

Chevron

PREMIUM

LUBRICANTS

Product

Salesfax

Digest

April 2025

A Chevron company brand

Product Salesfax Digest

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DEPOSIT SHIELD® *TECHNOLOGY*

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INTRODUCTION

The Product Salesfax Digest provides brief and concise information on the technical properties and typical uses of Chevron lubricants, fuels, and special products. Information printed in the Product Salesfax Digest is current at the time of publication. Product data may change at any time.

For health and safety information, consult the labels and Safety Data Sheets (SDSs) for each product.

In all instances, you should confirm that the Chevron product selected is consistent with the original equipment manufacturers' recommendation for the equipment operating conditions and customer maintenance practices. It is also essential that you follow all the original equipment manufacturers' instructions and recommendations regarding changing out or replacing one product with another. These recommendations often include completely draining, purging or flushing out the current product before replacement with new product to reduce the risk of compatibility problems. Except as set forth in Chevron's applicable standard product warranty or any specific agreement between you and Chevron, Chevron makes no representations or warranties of any kind and specifically disclaims any implied warranty of merchantability or fitness for particular purpose.

The properties shown for each product are typical test data. Typical test data are approximate values only. Minor variations in typical test values are to be expected in normal manufacturing.

To locate the Chevron Lubrication Marketer or agent nearest you, visit www.chevronlubricants.com, select an industry and click on "Marketer Locator" or call 1-800-822-5823.

LUBE TEK

Chevron's LUBE TEK technical assistance staff can provide customers with:

- Proper lubricant product recommendations
- Competitive product cross references
- Assistance with lubrication problems
- Interpretation of used oil analysis
- Lubrication change interval recommendations
- Change out recommendations when switching from one lubricant product to another
- Lubricating oil and grease compatibility information

Telephone: 1-800-LUBE-TEK (1-800-582-3835) E-mail: lubetek@chevron.com

North American Finished Lubricants

Contact Information - United States

You can contact Chevron Global Lubricants in the United States in several ways, depending on your question or requirement, please review the following options:

General Questions and Feedback

Chevron Information Center 800-533-6571

Bureaux de global lubricants

Chevron Corporation (Corporate Offices, Chevron Brand) 6101 Bollinger Canyon Rd. San Ramon, CA 94583 United States

Contact Information - Canada

Please phone 1-800-465-2772 for additional information about where to buy Chevron products in Canada.

Contact Information - Mexico

The Productos Chevron Mexico team, with headquarters in Mexico City:

- Markets Chevron lubricants, coolants and fuel additives through sales agents and distributors throughout Mexico.
- Provides customers with quality products and services through our highly motivated and professional team.
- Satisfies customer needs through workshops, transportation options, retail branch outlets, and industrial sector marketing activities.

Productos Chevron México S. de R.L. de C.V. Oriente 171 Núm. 401 Col. San Juan de Aragón Ampliación Delegación Gustavo A. Madero C.P. 07470 México D.F.

USA Customer Service #	800-526-3013
Mexico Customer Service #	55-5747-4900
Fax	55-5520-9358
Email	ordenesmexico@chevron.com

Environmental, Health, and Safety Data

Safety Data Sheets (SDSs)

SDSs have been prepared for all Chevron products to comply with the requirements of OSHA Hazard Communication 29 CFR 1910.1200 (2012) and many state and federal health and safety related laws and regulations.

SDSs are available from:

- https://cglapps.chevron.com/msdspds
- lubemsds@chevron.com
- your Chevron Lubrication Marketer
- If you are unable to contact your Chevron Lubrication Marketer, please contact:

Chevron Products Company Chevron Business Center 9401 Williamsburg Plaza, Suite 201 Louisville, KY 40222

If you send a written request, be sure to include your full return address, telephone number, fax number, and e-mail address, if applicable.

Emergency Telephone Numbers

Health (24 h)				
USA only	800-231-0623			
Outside USA	001-510-231-0623, international collect calls accepted			
Transportation (24 h)				
CHEMTREC - USA only	1-800-424-9300			
CHEMTREC - Outside USA	1-703-527-3887, international collect calls accepted			
Mexico - SETIQ	01 800 00 214 00 and 55 59 15 88 (D.F.) Javier Ramirez, Emmanuel Remigio, Enrique Perea and Guillermo Vega			





Chevron ISOCLEAN® Program Solution to Controlling Particle Contamination

Particle contamination in lubricants is known as the leading cause of lubricant-related failure in equipment. Lubricating oils are the lifeblood of equipment components and contaminated oils cost companies downtime, parts, repairs and replacements, field service expenses, and their competitive business edge. Fluid particle contamination directly impacts the potential useful life of the machine components and the company's capital investment.

Start Clean—Meet OE Fluid Cleanliness



Chevron ISOCLEAN[®] Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry-leading filtration and testing technology. They are the first step for contamination control and maximizing component life.

- · Certified to Equipment Manufacturers' Fluid ISO Cleanliness recommendations
- · Exceed Equipment Manufacturers' Performance Specifications
- · Certified and backed by Chevron
- · Certificate of Analysis on every delivery
- · Tested three times with three different methods prior to certification

Stay Clean—Maintain Fluid Cleanliness



The performance of equipment depends on the cleanliness and integrity of the fluid being used. Machines operating under normal temperature with fluid systems kept free of solids, moisture and gasses are likely to last significantly longer than equipment with contaminated systems. Chevron ISOCLEAN[®] Services are a proactive approach to maintaining your systems to peak performance and to maximize component service life.

Onsite Services Available:

- · Fluid Purification and Dehydration-removal of particles, water, and dissolved gases
- · Varnish Removal and Mitigation—using the latest chemical cleaning and resin technologies
- · High-velocity Flushing—ensure loosening and removal of particles
- Reservoir and Tank Cleaning—fully trained and certified technicians in confined space entry
- Condition Monitoring and System Audits—on-site sampling, sensor monitoring, and reporting



CLEAN. REDEFINED.





Chevron ISOCLEAN® Program Fast. Simple. Turn Key.

Our Four Step Program

Step 1 » Contact Chevron ISOCLEAN® Lubricant Marketer

Complete Site Assessment & Fluids Analysis

Step 2 » Set Fluid Cleanliness Requirements

Research OEM Cleanliness Specifications

Step 3 » Evaluate Onsite Contamination Control Options

- Air and Breather Controls
- Storage Tanks (Clean or Not Clean)
- · Point of Dispensing
- Last Chance Filtration

Step 4 » Begin Delivery of Chevron ISOCLEAN® Certified Lubricants







To learn more about the Chevron ISOCLEAN[®] Program visit www.chevronisoclean.com Or call 1-866-354-4476



CLEAN. REDEFINED.



HEAVY DUTY MOTOR OILS



DELO[®] 100 MOTOR OIL SAE 40

PRODUCT DESCRIPTION

 $\mathsf{Delo}^{\textcircled{B}}$ 100 Motor Oil is recommended for use in twoand four-stroke diesel engines in farm machinery, construction equipment, marine, and other off-highway applications where the SAE 40 grade is specified by the OEM.

CUSTOMER BENEFITS

Delo 100 Motor Oil is recommended for use in older two- and four-stroke diesel engines where the SAE 40 engine oil is specified by the OEM.

Delo 100 Motor Oil delivers value through:

- High temperature deposit control Protects against high temperature oxidation and oil thickening in older engines.
- Special extreme pressure antiwear properties — Protects critical valve train components.
- Protection against rust, corrosion, varnish, and sludge — Helps keep oil screens, filters, and rings clean and free for prolonged periods.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.^{*} Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Helps maximize your bottom line business results.

FEATURES

Delo 100 Motor Oil is a high performance crankcase oil for older diesel engines requiring an SAE 40 monograde engine oil.

It is manufactured using selected premium paraffinic base oils and detergent, dispersant, wear control, antioxidant, corrosion inhibitor, and foam suppressant additives.

APPLICATIONS

Delo 100 Motor Oil is recommended for use in two- and four-stroke diesel engines in farm machinery, construction equipment, marine, and other off-highway applications where SAE 40 grade is specified by the OEM. Delo 100 Motor Oil is recommended for use in two-stroke diesel engines requiring highly effective control of wear and deposits.

Delo 100 Motor Oil utilizes exceptional quality technology to provide excellent performance in older engines burning ultra low sulfur diesel fuels.

Delo 100 Motor Oil meets the requirements of:

API Service Categories

CF⁺, CF-2⁺

• **Detroit Diesel Corporation two-stroke** engine recommendations, including the 0.85% ash maximum limit for Series 149 engines.

* See Warranty Plus for details and restrictions.

+ Obsolete specification.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

9 July 2013 HDMO-10

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TYPICAL TEST DATA

SAE Grade	40		
Product Number	222404		
SDS Number	7329		
API Gravity	27.7		
Viscosity, Kinematic cSt at 40°C cSt at 100°C	145 15.0		
Viscosity Index	104		
Flash Point, °C(°F)	258(498)		
Pour Point, °C(°F)	-24(-11)		
Sulfated Ash, wt %	0.80		
Base Number, ASTM D2896	7.3		
Phosphorus, wt %	0.096		
Zinc, wt %	0.105		

Minor variations in product typical test data are to be expected in normal manufacturing.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



DELO[®] 400 SAE 10W, 20, 30, 40, 50

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 monograde oils are mixed-fleet motor oils recommended for older four-stroke gasoline and diesel engines.

CUSTOMER BENEFITS

Delo 400 monograde motor oils are recommended for use in four-stroke gasoline and diesel engines where the SAE 10W, 20, 30, 40 or 50 monogrades are specified by the OEM.

Delo 400 monograde heavy duty motor oils deliver value through:

- **Controlled oil costs** Minimal crownland deposits and outstanding oxidation stability lead to the ability to minimize oil consumption.
- Long engine life Excellent control of deposits and wear optimize the engine overhaul intervals.
- Exceptional engine cleanliness High detergency provides excellent deposit and sludge control in the piston ring belt area.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.* Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Help maximize your bottom line business results.

FEATURES

Delo 400 monograde heavy duty motor oils are premium quality engine oils.

* See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

20 November 2018 HDMO-51

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They are formulated utilizing advanced additive technology which helps provide outstanding engine protection for four-stroke diesel engines requiring a monograde engine oil.

Delo 400 SAE 10W, 20, 30, 40 and 50 are manufactured using carefully selected premium paraffinic base oils and an optimal blend of dispersant, detergent, oxidation inhibition, antiwear, corrosion inhibition, and defoaming additives.

FUNCTIONS

Delo 400 monograde motor oils are high performance crankcase oils for older diesel engines requiring 10W, 20, 30, 40 or 50 monograde engine oil.

They are manufactured using selected premium paraffinic base oils and detergent, dispersant, wear control, antioxidant, corrosion inhibitor, and foam suppressant additives.

APPLICATIONS

Delo 400 monograde oils are mixed-fleet motor oils recommended for older four-stroke gasoline and diesel engines that require a monograde engine oil.

Delo 400 oils are formulated for exceptional performance in older engines using both normal, high, and low sulfur diesel fuels.

Delo 400 monograde oils are not recommended for use in DDC two-stroke engines.

Delo[®] 400 is approved for:

- MAN Energy Solutions for MAN ES 28/33D engines burning distilate fuel (SAE 40)
- MAN M 3275-2 (SAE 30, 40)
- MB-Approval 228.2 (SAE 30, 40)
- MTU Category 2 (SAE 30, 40)

Delo 400 meets the requirements of:

- API Service Categories
 - CF[†]
 - SJ (SAE 30, 40)
- MAN 270 (SAE 30, 40)
 - + Obsolete specification.

SAE Grade	10W	20	30	40	50
Product Number	235109	235117	235118	235120	235119
SDS Number	28323	28323	6711	6711	6711
Density at 15°C, kg/L	0.8700	0.8747	0.8819	0.8863	0.8934
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	45 7.0	61 8.5	94 11.5	136 14.7	214 19.3
Viscosity, Cold Crank, °C/mPa.s	-25/5370	_	—	—	—
Viscosity Index	113	111	111	108	102
Flash Point, °C(°F)	226(439)	236(457)	236(457)	250(482)	264(507)
Pour Point, °C(°F)	-30(-22)	-30(-22)	-27(-17)	-24(-11)	-21(-6)
Sulfated Ash, mass %	0.95	0.95	1.5	1.5	0.95
Base Number, mgKOH/g, ASTM D2896	6.3	6.3	10.1	10.1	6.3
Phosphorus, mass %	0.069	0.069	0.11	0.11	0.069
Zinc, mass %	0.076	0.076	0.122	0.122	0.076

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



DELO[®] 400 NG SAE 15W-40

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 NG with ISOSYN[®] Technology is a premium CNG/LNG oil formulated to deliver outstanding protection and long drain performance in a wide variety of compressed natural gas (CNG), liquefied natural gas (LNG) and liquefied petroleum gas (LPG) engine applications. It has demonstrated excellent field performance in a variety of operations and has the capability to help customers minimize operating costs in CNG/LNG engines of municipal bus service, Linehaul and delivery truck service, waste truck operations and off road equipment.

CUSTOMER BENEFITS

Key benefits of Delo 400 NG SAE 15W-40 include:

- Alternative fuel performance: Delivers great performance for medium and heavy duty vehicles using CNG, LNG or LPG.
- Excellent engine cleanliness Excellent ratings for sludge control; and valve, or piston deposits in field trials and engine tests.
- Superb oil oxidation/nitration control Minimal main or connecting rod bearing corrosion
- Low wear performance: Offers excellent tappet and liner wear performance in alternative fuel engines.
- Extended oil drain performance: Delivers long drain performance protection despite higher stress of CNG combustion¹
- Warranty Plus protection warranty protection provided for CNG/LNG engines using Delo 400 NG²
- Access to Chevron's lubrication and industry knowledge — Helps maximize your bottom line business results.

FEATURES

Delo 400 NG is formulated with Chevron's ISOSYN Technology which incorporates premium



base oils, shear stable viscosity modifier and a low ash additive package specially formulated for long service in spark and pilot diesel injection ignited, CNG/LNG engines in stressful, high temperature conditions.

In heavy duty natural gas vehicles, Delo 400 NG:

- Promotes engine reliability and durability through exceptional wear protection
- Minimizes valve recession and deposits
- Helps minimize oil consumption

APPLICATIONS

Delo 400 NG SAE 15W-40 can be used in various applications as follows:

- LNG/CNG Linehaul truck service
- LNG/CNG Delivery truck service
- LNG/CNG Waste truck service
- LNG/CNG Cement truck service
- LNG/CNG Oil Field truck servicing
- CNG Municipal Bus Service
- Light Duty CNG pick-up trucks

2 See Warranty Plus for details and limitations.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

3 August 2016 HDMO-35

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¹ Chevron has successfully tested Delo 400 NG SAE 15W-40 in Cummins ISL G series CNG engines in severe delivery truck service and has achieved oil drain intervals of 33% longer than the Cummins recommended drain interval for this engine in this service. Chevron recommends always following OEM specified oil drain intervals.

The types of CNG/LNG engine models that $Delo^{(\!R\!)} 400$ NG will provide maximum performance protection include:

- Cummins B5.9G
- Cummins C8.3G
- Cummins ISL G (8.9L)
- Cummins ISX12 G
- Cummins ISX15 G
- Detroit Diesel Series 50G
- Detroit Diesel Series 60G
- Navistar LNG Maxxforce[®] DT 7.6L
- Navistar LNG Maxxforce 13L

Approvals

Delo 400 NG is recommended for engines in medium and heavy duty vehicles fueled by CNG, LNG or LPG.

Delo 400 NG meets **Cummins** Engineering Standard CES 20085.

It is approved for **Detroit Diesel** 93K216 mobile gas engine oil specification and is suitable for use under:

- MB 226.9
- Volvo CNG
- Mack CNG
- Renault RGD
- Isuzu CNG
- Hino CNG
- Hyundai CNG

TYPICAL TEST DATA

SAE Grade	15W-40		
Product Number	222221		
SDS Number	31888		
Density at 15°C, kg/L	0.876		
Viscosity, Kinematic cSt at 40°C cSt at 100°C	126 15.8		
Viscosity Index	132		
Viscosity, Cold Crank °C/Poise	-20/66		
Flash Point, °C(°F)	230(446)		
Pour Point, °C(°F)	-27(-17)		
Sulfated Ash, wt %	0.85		
Acid Number, ASTM D664	1.9		
Base Number, ASTM D2896	6.1		
Base Number, ASTM D4739	5.1		
Phosphorus, ppm	800		
Zinc, ppm	880		

Minor variations in product typical test data are to be expected in normal manufacturing.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



DELO[®] 400 SNG SAE 15W-40



PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 SNG SAE 15W-40 with ISOSYN[®] Technology is a premium CNG/LNG oil formulated to deliver outstanding protection and long drain performance in a wide variety of compressed natural gas (CNG), liquefied natural gas (LNG) and liquefied petroleum gas (LPG) fueled, spark-ignition mobile engine applications. It has demonstrated excellent field performance in natural gas engines, and has the capability to help customers minimize operating costs in CNG/LNG engines of municipal bus service, linehaul and delivery truck service, waste truck operations and off-road equipment.

CUSTOMER BENEFITS

Key benefits of Delo 400 SNG SAE 15W-40 include:

- Alternative Fuel Performance Delivers great performance for medium and heavy duty vehicles using CNG, LNG or LPG.
- Excellent Engine Cleanliness Excellent ratings for sludge control; and valve, or piston deposits in field trials and engine tests.
- Superb oil oxidation/nitration control for long oil service intervals.
- Low Wear Performance Offers excellent liner and piston ring protection in alternative fuel engines.
- Extended Oil Drain Performance Delivers long drain performance protection despite high stress of CNG combustion.

- Warranty Plus Protection warranty protection provided for CNG/LNG engines using Delo 400 ${\rm SNG.}^1$
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Delo 400 SNG is formulated with Chevron's ISOSYN Technology, which incorporates premium base oils, shear stable viscosity modifier and a low ash additive package specially formulated for long-service ignited, CNG/LNG engines in stressful, high temperature conditions.

In heavy duty natural gas vehicles, Delo 400 SNG:

- Promotes engine reliability and durability through exceptional wear protection
- · Minimizes valve recession and deposits
- Helps minimize oil consumption

APPLICATIONS

Delo 400 SNG SAE 15W-40 can be used in various applications as follows:

- LNG/CNG Linehaul truck service
- LNG/CNG Delivery truck service
- LNG/CNG Waste truck service
- LNG/CNG Cement truck service
- LNG/CNG Oil Field truck servicing
- CNG Municipal Bus Service
- Light Duty CNG pick-up trucks

1 See Warranty Plus for details and limitations.

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 May 2020 HDMO-36

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The types of CNG/LNG engine models that $Delo^{\ensuremath{\mathbb{R}}}$ 400 SNG is recommended for include:

- Cummins ISL G (8.9L)
- Cummins ISX12 G
- Cummins ISX12 N
- Cummins L9 N
- Detroit Diesel Series 50G
- Detroit Diesel Series 60G

APPROVALS

Delo 400 SNG is recommended for engines in medium and heavy duty vehicles fueled by CNG, LNG or LPG.

Delo 400 SNG is approved against **Cummins** Engineering Standard CES 20092 and meets all of the requirements of **Cummins** Engineering Standard CES 20085.

It is suitable for use under:

- Detroit Diesel 93K216
- Hino CNG
- Hyundai CNG
- Isuzu CNG
- Mack CNG
- Renault RGD
- Volvo CNG

TYPICAL TEST DATA

SAE Grade	15W-40
Product Number	235116
SDS Number	
U.S.	50030
Canada	50031
Mexico	50032
Colombia	50033
Density at 15°C, kg/L	0.87
Viscosity, Kinematic	
cSt at 40°C	115
cSt at 100°C	15.4
Viscosity Index	141
Viscosity, Cold Crank	
°C/Poise	-20/54
Flash Point, °C(°F)	238(460)
Pour Point, °C(°F)	-36(-33)
Sulfated Ash, wt %	0.89
Acid Number, ASTM D664,	
mgKOH/g	2.1
Base Number, ASTM D2896,	
mgKOH/g	7.0
Base Number, ASTM D4739,	
mgKOH/g	6.5
Phosphorus, ppm	770
Zinc, ppm	840

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 SNG ISOCLEAN[®] CERTIFIED LUBRICANT

SAE 15W-40



PRODUCT DESCRIPTION

"Delo. Let's go further.®"



Delo[®] 400 SNG SAE 15W-40

ISOCLEAN[®] Certified Lubricant with

ISOSYN[®] Technology is a premium CNG/LNG oil formulated to deliver outstanding protection and long drain performance in a wide variety of compressed natural gas (CNG), liquefied natural gas (LNG) and liquefied petroleum gas (LPG) fueled, spark-ignition mobile engine applications. It has demonstrated excellent field performance in natural gas engines, and has the capability to help customers minimize operating costs in CNG/LNG engines of municipal bus service, linehaul and delivery truck service, waste truck operations and off-road equipment.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Key benefits of Delo 400 SNG SAE 15W-40 include:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.

- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Alternative Fuel Performance Delivers great performance for medium and heavy duty vehicles using CNG, LNG or LPG.
- Excellent Engine Cleanliness Excellent ratings for sludge control; and valve, or piston deposits in field trials and engine tests.
- Superb oil oxidation/nitration control for long oil service intervals.
- Low Wear Performance Offers excellent liner and piston ring protection in alternative fuel engines.
- Extended Oil Drain Performance Delivers long drain performance protection despite high stress of CNG combustion.
- Warranty Plus Protection warranty protection provided for CNG/LNG engines using Delo 400 SNG.¹
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Delo 400 SNG ISOCLEAN Certified Lubricant is formulated with Chevron's ISOSYN Technology, which incorporates



premium base oils, shear stable viscosity modifier and a low ash additive package specially formulated for long-service ignited, CNG/LNG engines in stressful, high temperature conditions.

1 See Warranty Plus for details and limitations.

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

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1 August 2020 HDMO-36 ISOCLEAN

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- Promotes engine reliability and durability through exceptional wear protection
- Minimizes valve recession and deposits
- Helps minimize oil consumption

APPLICATIONS

Delo 400 SNG SAE 15W-40 ISOCLEAN Certified Lubricant can be used in various applications as follows:

- LNG/CNG Linehaul truck service
- LNG/CNG Delivery truck service
- LNG/CNG Waste truck service
- LNG/CNG Cement truck service
- LNG/CNG Oil Field truck servicing
- CNG Municipal Bus Service
- Light Duty CNG pick-up trucks

The types of CNG/LNG engine models that Delo 400 SNG ISOCLEAN Certified Lubricant is recommended for include:

- Cummins ISL G (8.9L)
- Cummins ISX12 G
- Cummins ISX12 N
- Cummins L9 N
- Detroit Diesel Series 50G
- Detroit Diesel Series 60G

APPROVALS

Delo 400 SNG ISOCLEAN Certified Lubricant is recommended for engines in medium and heavy duty vehicles fueled by CNG, LNG or LPG.

Delo 400 SNG ISOCLEAN Certified Lubricant is approved against **Cummins** Engineering Standard CES 20092 and meets all of the requirements of **Cummins** Engineering Standard CES 20085.

It is suitable for use under:

- Detroit Diesel 93K216
- Hino CNG
- Hyundai CNG
- Isuzu CNG

- Mack CNG
- Renault RGD
- Volvo CNG

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	15W-40
Product Number	235114
SDS Number	50000
U.S.	50030
Canada	50031
Mexico	50032
Colorribia	50033
Density at 15°C, kg/L	0.87
Viscosity, Kinematic	
cSt at 40°C	115
cSt at 100°C	15.4
Viscosity Index	141
Viscosity, Cold Crank	
°C/Poise	-20/54
Flash Point, °C(°F)	238(460)
Pour Point, °C(°F)	-36(-33)
Sulfated Ash, wt %	0.89
Acid Number, ASTM D664,	
mgKOH/g	2.1
Base Number, ASTM D2896,	
mgKOH/g	7.0
Base Number, ASTM D4739,	
mgKOH/g	6.5
Phosphorus, ppm	770
Zinc, ppm	840

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 SYNTHETIC SAE 0W-30

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 Synthetic SAE 0W-30 is a mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and fourstroke gasoline engines in which the API CG-4^{*}, CF-4^{*} and CF^{*} service categories and SAE 0W-30 viscosity grade is recommended.

CUSTOMER BENEFITS

Delo 400 Synthetic heavy duty engine oil delivers value through:

- Exceptional Cold Weather Starting Due to excellent low temperature pumpability.
- Optimized Oil Cost Low oil consumption as proven by excellent deposit control on piston crownlands. Outstanding oxidation stability contributes to long oil service life.
- **Optimal Operating Costs** Excellent soot dispersancy and wear control contributes to maximizing engine life to overhaul and helps defer the cost of investing in new equipment. Helps keep filters clean, contributing to maximum filter life.
- Outstanding Engine Life The combination of exceptional soot dispersancy and excellent low temperature pumpability helps lead to less wear at startup and during all around operating conditions.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.[†] Problem resolution and technical advice from Chevron's lubrication experts.

 Access to Chevron's Lubrication and Industry Knowledge — Help maximize your bottom line business results.

FEATURES

Delo 400 SP SAE 0W-30 is a mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CG-4*, CF-4* and CF* service categories and SAE 0W-30 viscosity grade is recommended.

It is manufactured using stable synthetic base stocks. This oil utilizes highly dispersed viscosity index improvers that promote stable viscosities and soot dispersancy between oil drains.

FUNCTIONS

Delo 400 Synthetic heavy duty engine oil has excellent shear stability and is designed to not shear down to a lower viscosity grade in most applications. Thus, engines are well protected during maximum drain intervals.

Delo 400 Synthetic heavy duty engine oil maintains excellent deposit control. It retards the formation of sludge, deposits, and varnish associated with low and high temperature operation, thus helping to keep engines clean.

This oil also provides outstanding wear, rust, and corrosion protection.

With its low viscosity, Delo 400 Synthetic heavy duty engine oil assures consistent cold weather engine starting. The outstanding low temperature pumpability also minimizes wear. This oil maintains excellent oil circulation once the engine has started and is running.

Product(s) manufactured in the USA.

A Chevron company product

30 January 2014 HDMO-40

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^{*} Obsolete specification

⁺ See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

 $\mathsf{Delo}^{\mathbb{R}}$ 400 Synthetic heavy duty engine oil minimizes oil thickening and has excellent oxidation and thermal stability. It minimizes oil consumption because of its low volatility.

APPLICATIONS

Delo 400 Synthetic is a mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CG-4, CF-4 and CF service categories and SAE 0W-30 viscosity grade is recommended.

Delo 400 Synthetic heavy duty engine oil meets the requirements of:

- API Service Categories
 - CG-4, CF-4, CF, SH[‡], SJ
 - Energy Conserving for API SH

It meets the requirements of:

• Allison C4

TYPICAL TEST DATA

SAE Grade	0W-30
Product Number	235195
SDS Number	17066
API Gravity	33.1
Viscosity, Kinematic cSt at -40°C cSt at 40°C cSt at 100°C	11,000 52.2 10.3
Viscosity, Cold Crank, °C/Poise	-35/47.5
Viscosity Index	190
Flash Point, °C(°F)	215(419)
Pour Point, °C(°F)	-51(-60)
Sulfated Ash, wt %	1.1
Base Number, ASTM D2896	10
Phosphorus, wt %	0.114
Zinc, wt %	0.130

Minor variations in product typical test data are to be expected in normal manufacturing.

⁺ Obsolete specification

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



DELO[®] 400 SP SAE 0W-30 (Synthetic)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 SP SAE 0W-30 (Synthetic) is a mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and fourstroke gasoline engines in which an SAE 0W-30 viscosity grade is recommended for cold weather startup and operation. It is formulated with the same technology found in Chevron's Delo 400 XSP SAE 5W-40 and Delo 400 XSP SAE 5W-30 products that are licensed against API CK-4.

CUSTOMER BENEFITS

Delo 400 SP heavy duty engine oil delivers value through:

- Exceptional Cold Weather Starting Due to excellent low temperature pumpability.
- Optimized Oil Cost Low oil consumption as proven by excellent deposit control on piston crownlands. Outstanding oxidation stability contributes to long oil service life.
- **Optimal Operating Costs** Excellent soot dispersancy and wear control contributes to maximizing engine life to overhaul and helps defer the cost of investing in new equipment. Helps keep filters clean, contributing to maximum filter life.
- Outstanding Engine Life The combination of exceptional soot dispersancy and excellent low temperature pumpability helps lead to less wear at startup and during all around operating conditions.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and

labor.^{*} Problem resolution and technical advice from Chevron's lubrication experts.

 Access to Chevron's Lubrication and Industry Knowledge — Help maximize your bottom line business results.

FEATURES

Delo 400 SP SAE 0W-30 is a mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which an SAE 0W-30 viscosity grade is recommended for cold weather start-up and operation. It is formulated with the same technology found in Chevron's Delo 400 XSP SAE 5W-40 and Delo 400 XSP SAE 5W-30 products that are licensed against API CK-4.

It is designed for subzero arctic-type temperatures and manufactured using stable synthetic base stocks. This oil utilizes highly dispersed viscosity index improvers that promote stable viscosities and soot dispersancy.

FUNCTIONS

Delo 400 SP SAE 0W-30 heavy duty engine oil has excellent shear stability and is designed to not shear down to a lower viscosity grade in most applications. Thus, engines are well protected during maximum drain intervals.

Delo 400 SP SAE 0W-30 heavy duty engine oil maintains excellent deposit control. It retards the formation of sludge, deposits, and varnish associated with low and high temperature operation, thus helping to keep engines clean.

* See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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This oil also provides outstanding wear, rust, and corrosion protection.

With its low viscosity, Delo[®] 400 SP SAE 0W-30 heavy duty engine oil assures consistent cold weather engine starting. The outstanding low temperature pumpability also minimizes wear. This oil maintains excellent oil circulation once the engine has started and is running.

Delo 400 SP SAE 0W-30 heavy duty engine oil minimizes oil thickening and has excellent oxidation and thermal stability. It minimizes oil consumption because of its low volatility.

APPLICATIONS

Delo 400 SP SAE 0W-30 is a mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which an SAE 0W-30 viscosity grade is recommended for cold weather start-up and operation. It is formulated with the same technology found in Chevron's Delo 400 XSP SAE 5W-40 and Delo 400 XSP SAE 5W-30 products that are licensed against API CK-4.

Delo 400 SP SAE 0W-30 heavy duty engine oil is recommended for diesel and gasoline engines that need API CK-4 / SN performance capability and ability to operate in subzero arctic environments.

TYPICAL TEST DATA

SAE Grade	0W-30
Product Number	235196
SDS Number	44986
Density at 15°C, Kg/L	0.840
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	56.4 10.2
Viscosity, Cold Crank, mPa.s at -35°C	4447
Viscosity, MRV, mPa.s at -40°C	13550
Viscosity, HTHS, mPa.s	3.1
Viscosity Index	171
Flash Point, °C(°F)	232(450)
Pour Point, °C(°F)	-54(-65)
Sulfur, mass %	0.3
Sulfated Ash, mass %	1.0
Base Number, ASTM D2896, mgKOH/g	10
Phosphorus, mass %	0.08
Zinc, mass %	0.08

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 SP ISOCLEAN[®] Certified Lubricant SAE 0W-30 (Synthetic)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"



Delo[®] 400 SP SAE 0W-30 (Synthetic) ISOCLEAN[®] Certified Lubricant is a

mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which an SAE 0W-30 viscosity grade is recommended for cold weather start-up and operation. It is formulated with the same technology found in Chevron's Delo 400 XSP SAE 5W-40 and Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricants that are licensed against API CK-4.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo 400 SP ISOCLEAN Certified Lubricant delivers value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.

- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Exceptional Cold Weather Starting Due to excellent low temperature pumpability.
- Optimized Oil Cost Low oil consumption as proven by excellent deposit control on piston crownlands. Outstanding oxidation stability contributes to long oil service life.
- **Optimal Operating Costs** Excellent soot dispersancy and wear control contributes to maximizing engine life to overhaul and helps defer the cost of investing in new equipment. Helps keep filters clean, contributing to maximum filter life.
- Outstanding Engine Life The combination of exceptional soot dispersancy and excellent low temperature pumpability helps lead to less wear at startup and during all around operating conditions.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.* Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Help maximize your bottom line business results.

* See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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FEATURES

Delo[®] 400 SP SAE 0W-30 ISOCLEAN[®] Certified Lubricant is a mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which an SAE 0W-30 viscosity grade is recommended for cold weather start-up and operation. It is formulated with the same technology found in Chevron's Delo 400 XSP SAE 5W-40 and Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricants that are licensed against API CK-4.

It is designed for subzero arctic-type temperatures and manufactured using stable synthetic base stocks. This oil utilizes highly dispersed viscosity index improvers that promote stable viscosities and soot dispersancy.

FUNCTIONS

Delo 400 SP SAE 0W-30 ISOCLEAN Certified Lubricant has excellent shear stability and is designed to not shear down to a lower viscosity grade in most applications. Thus, engines are well protected during maximum drain intervals.

Delo 400 SP SAE 0W-30 ISOCLEAN Certified Lubricant maintains excellent deposit control. It retards the formation of sludge, deposits, and varnish associated with low and high temperature operation, thus helping to keep engines clean.

This oil also provides outstanding wear, rust, and corrosion protection.

With its low viscosity, Delo 400 SP SAE 0W-30 ISOCLEAN Certified Lubricant assures consistent cold weather engine starting. The outstanding low temperature pumpability also minimizes wear. This oil maintains excellent oil circulation once the engine has started and is running.

Delo 400 SP SAE 0W-30 ISOCLEAN Certified Lubricant minimizes oil thickening and has excellent oxidation and thermal stability. It minimizes oil consumption because of its low volatility.

APPLICATIONS

Delo 400 SP SAE 0W-30 ISOCLEAN Certified Lubricant is a mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which an SAE 0W-30 viscosity grade is recommended for cold weather start-up and operation. It is formulated with the same technology found in Chevron's Delo 400 XSP SAE 5W- 40 and Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricants that are licensed against API CK-4.

Delo 400 SP SAE 0W-30 ISOCLEAN Certified Lubricant is recommended for diesel and gasoline engines that need API CK-4 / SN performance capability and ability to operate in subzero arctic environments.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	0W-30
Product Number	235197
SDS Number	44986
Density at 15°C, Kg/L	0.840
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	56.4 10.2
Viscosity, Cold Crank, mPa.s at -35°C	4447
Viscosity, MRV, mPa.s at -40°C	13550
Viscosity, HTHS, mPa.s	3.1
Viscosity Index	171
Flash Point, °C(°F)	232(450)
Pour Point, °C(°F)	-54(-65)
Sulfur, mass %	0.3
Sulfated Ash, mass %	1.0
Base Number, ASTM D2896, mgKOH/g	10
Phosphorus, mass %	0.08
Zinc, mass %	0.08

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XSP SAE 5W-30 (Full Synthetic)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 XSP SAE 5W-30 (Full Synthetic) with ISOSYN[®] Advanced Technology is a mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 5W-30 viscosity grade are recommended.

CUSTOMER BENEFITS

Delo 400 XSP SAE 5W-30 with ISOSYN Advanced Technology is an API CK-4 performance heavy duty engine oil specifically formulated for on highway applications including 2017 greenhouse gas-compliant (GHG 17) diesel engines with lower CO₂ emissions and improved fuel economy, in addition to EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is fully compatible with previous API Oil Service Categories. It delivers value through:

- Fuel Economy Improvement Up to 2% improvement vs. SAE 15W-40 oil¹ in class 8 diesel engine bench testing.
- **Promotes Consistent Cold Engine Starting** Low viscosity synthetic base stocks promote consistent cold engine starting for diesel engines operating in sub-zero temperature.
- Minimized Operating Costs Exceptional soot dispersancy and wear control help protect cylinders, pistons, rings, and valve train components

1 Actual results will vary depending upon vehicle type, load and other driving conditions.

contributing to maximum vehicle utilization and minimal downtime.

- **Exceptional Deposit Control** Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives allow for extended diesel engine component protection.
- Excellent Emission Control System Life Promotes long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus minimizing maintenance costs.
- Managed Inventory Costs Delo 400 XSP SAE 5W-30 is compatible with previous API Oil Service Categories. Suitable for use in gasoline engines and naturally aspirated or turbocharged electronically controlled/low emission diesel engines. One oil that meets the performance requirements of most North American and European engine manufacturers. One oil that allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that help save money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.² Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Helps maximize your bottom line business results.

2 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

FEATURES

Delo[®] 400 XSP SAE 5W-30 is formulated with ISOSYN[®] Advanced Technology, which is



the combination of Chevron's industry leading formulating expertise with unique, high performance additive chemistry to help extend the durability of your critical diesel engine parts.

Delo 400 XSP SAE 5W-30 with ISOSYN Advanced Technology meets the most stringent EGR soot control requirements.

Delo 400 XSP SAE 5W-30 with ISOSYN Advanced Technology has been specifically designed to meet the demands of EGR and EGR/SCR engines while at the same time providing the highest level of performance in older diesel engines.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 69% improved wear protection*
- Up to 64% improved piston deposit control*

*Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo 400 XSP SAE 5W-30 with ISOSYN Advanced Technology helps keep piston rings clean and free for optimum combustion pressure and minimal wear. Delo 400 XSP SAE 5W-30 with ISOSYN Advanced Technology minimizes valve and piston crown land deposits, thereby managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and helps to avoid filter plugging, abrasive wear, viscosity increases, and oil gelation. These problems could cause excessive engine wear and bearing failure, without prior warning.

Optimized additive chemistries combined with synthetic base stocks control oxidation, sludge, and undue thickening between oil drains. Delo 400 XSP SAE 5W-30 engine oil's antiwear technologies protect against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A defoaming additive helps prevent air entrainment.

APPLICATIONS

Delo 400 XSP SAE 5W-30 with ISOSYN Advanced Technology is a mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 5W-30 viscosity grade are recommended. It is formulated for engines operating under severe service.

Delo 400 XSP SAE 5W-30 with ISOSYN Advanced Technology is excellent for use in new, advanced engines developed to meet the latest emissions and reliability standards and in engines equipped with features like super-charging, turbo-charging, direct injection, higher power density, intercooling, full electronic management of fuel and emissions systems, exhaust selective catalytic reduction, exhaust gas recirculation, and exhaust particulate filters.

Vocational and light duty fleets are often a mix between diesel and gasoline engines. This product is recommended for API SN and API SN PLUS, and will meet the latest gasoline qualifications providing for one oil in a mixed vocational, short haul, or delivery fleet.

Delo 400 XSP SAE 5W-30 with ISOSYN Advanced Technology is formulated for exceptional performance with many fuels, including low sulfur and ultra low sulfur diesel fuels, gasoline, most gasoline fuel blends, and many biofuel formulations.

Delo[®] 400 XSP SAE 5W-30 with ISOSYN Advanced Technology is recommended for use in older engines in conditions when SAE 5W-30 viscosity grade is recommended, as well as in today's most modern low emission designs.

Delo 400 XSP SAE 5W-30 with ISOSYN[®] Advanced Technology is recommended for use in Caterpillar engines in off-highway or construction applications in conditions when SAE 5W-30 viscosity grade is recommended.

Delo 400 XSP SAE 5W-30 is approved for:

- API Service Categories CK-4, CJ-4, CI-4, CI-4 PLUS, CH-4, SN, SN PLUS
- Cummins CES 20086
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC IV-18 LA
- **DTFR** 15C100 (previously known as MB-Approval 228.31)
- **DTFR** 15C110 (previously known as MB-Approval 228.51)
- Mack EOS-4.5
- Volvo VDS-4.5

Delo 400 XSP SAE 5W-30 is recommended for:

- ACEA European Service Categories E7, E8, E11
- Caterpillar ECF-3
- **JASO** DH-2
- MTU Category 3.1

TYPICAL TEST DATA

SAE Grade	5W-30
Product Number	257001
SDS Number	
U.S.	45138
Canada	45139
Mexico	45140
Density at 15°C, kg/L	0.85
Viscosity, Kinematic	
mm²/s at 40°C	72.4
mm²/s at 100°C	12.1
Viscosity, Cold Crank, °C/mPa.s	-30/6100
Viscosity, MRV, °C/mPa.s	-35/35,000
Viscosity, HTHS, mPa.s	3.5
Viscosity Index	165
Flash Point, °C(°F)	224(435)
Pour Point, °C(°F)	-46(-51)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g,	
ASTM D2896	10
Phosphorus, mass %	0.08
Sulfur, mass %	0.3
Zinc, mass %	0.08

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XSP ISOCLEAN[®] CERTIFIED LUBRICANT SAE 5W-30 (Full Synthetic)



PRODUCT DESCRIPTION

"Delo. Let's go further. ®"

 $\mathsf{Delo}^{\textcircled{R}}$ 400 XSP SAE 5W-30 (Full Synthetic) ISOCLEAN R Certified

Lubricant with ISOSYN[®] Advanced Technology is a mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 5W-30 viscosity grade are recommended. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified Lubricants are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is an API CK-4 performance heavy duty engine oil specifically formulated for on highway applications including 2017 greenhouse gas-compliant (GHG 17) diesel engines with lower CO₂ emissions and improved fuel economy, in addition to EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is fully compatible with previous API Oil Service Categories. It delivers value through:

 Ready to use — Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.

- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Fuel Economy Improvement Up to 2% improvement vs. SAE 15W-40 oil¹ in class 8 diesel engine bench testing.
- **Promotes Consistent Cold Engine Starting** Low viscosity synthetic base stocks promote consistent cold engine starting for diesel engines operating in sub-zero temperature.
- Minimized Operating Costs Exceptional soot dispersancy and wear control help protect cylinders, pistons, rings, and valve train components contributing to maximum vehicle utilization and minimal downtime.
- Exceptional Deposit Control Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives allow for extended diesel engine component protection.
- Excellent Emission Control System Life Promotes long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus minimizing maintenance costs.

1 Actual results will vary depending upon vehicle type, load and other driving conditions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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- Managed Inventory Costs Delo[®] 400 XSP SAE 5W-30 (Full Synthetic) ISOCLEAN[®] Certified Lubricant is compatible with previous API Oil Service Categories. Suitable for use in gasoline engines and naturally aspirated or turbocharged electronically controlled/low emission diesel engines. One oil that meets the performance requirements of most North American and European engine manufacturers. One oil that allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that help save money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.² Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Helps maximize your bottom line business results.

ADVANCED

TECHNOLOG

FEATURES

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant is formulated with ISOSYN



Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology meets the most stringent EGR soot control requirements.

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology has been specifically designed to meet the demands of EGR and EGR/SCR engines while at the same time providing the highest level of performance in older diesel engines.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 69% improved wear protection*
- Up to 64% improved piston deposit control*
 - *Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

² See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

FUNCTIONS

Delo[®] 400 XSP SAE 5W-30 ISOCLEAN[®] Certified Lubricant with ISOSYN[®] Advanced Technology helps keep piston rings clean and free for optimum combustion pressure and minimal wear. Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology minimizes valve and piston crown land deposits, thereby managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and helps to avoid filter plugging, abrasive wear, viscosity increases, and oil gelation. These problems could cause excessive engine wear and bearing failure, without prior warning.

Optimized additive chemistries combined with synthetic base stocks control oxidation, sludge, and undue thickening between oil drains. Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant engine oil's antiwear technologies protect against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A defoaming additive helps prevent air entrainment.

APPLICATIONS

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is a mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and fourstroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 5W-30 viscosity grade are recommended. It is formulated for engines operating under severe service.

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is excellent for use in new, advanced engines developed to meet the latest emissions and reliability standards and in engines equipped with features like super-charging, turbocharging, direct injection, higher power density, intercooling, full electronic management of fuel and emissions systems, exhaust selective catalytic reduction, exhaust gas recirculation, and exhaust particulate filters.

Vocational and light duty fleets are often a mix between diesel and gasoline engines. This product is recommended for API SN and API SN PLUS, and will meet the latest gasoline qualifications providing for one oil in a mixed vocational, short haul, or delivery fleet.

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is formulated for exceptional performance with many fuels, including low

sulfur and ultra low sulfur diesel fuels, gasoline, most gasoline fuel blends, and many biofuel formulations.

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is recommended for use in older engines in conditions when SAE 5W-30 viscosity grade is recommended, as well as in today's most modern low emission designs.

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is recommended for use in Caterpillar engines in off-highway or construction applications in conditions when SAE 5W-30 viscosity grade is recommended.

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant is approved for:

- API Service Categories CK-4, CJ-4, CI-4, CI-4 PLUS, CH-4, SN, SN PLUS
- **Cummins** CES 20086
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC IV-18 LA
- **DTFR** 15C100 (previously known as MB Approval 228.31)
- **DTFR** 15C110 (previously known as MB-Approval 228.51)
- Mack EOS-4.5
- Volvo VDS-4.5

Delo 400 XSP SAE 5W-30 ISOCLEAN Certified Lubricant is recommended for:

- ACEA European Service Categories E7, E8, E11
- Caterpillar ECF-3
- **JASO** DH-2
- MTU Category 3.1

TYPICAL TEST DATA

SAE Grade	5W-30
Product Number	278098
SDS Number	
U.S.	45138
Canada	45139
Mexico	45140
Density at 15°C, kg/L	0.85
Viscosity, Kinematic	
mm²/s at 40°C	72.4
mm²/s at 100°C	12.1
Viscosity, Cold Crank, °C/mPa.s	-30/6100
Viscosity, MRV, °C/mPa.s	-35/35,000
Viscosity, HTHS, mPa.s	3.5
Viscosity Index	165
Flash Point, °C(°F)	224(435)
Pour Point, °C(°F)	-46(-51)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g,	
ASTM D2896	10
Phosphorus, mass %	0.08
Sulfur, mass %	0.3
Zinc, mass %	0.08

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XSP-FA SAE 5W-30 (Full Synthetic)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 XSP-FA SAE 5W-30 (Full Synthetic) with ISOSYN[®] Advanced Technology is a premium full synthetic fuel-economy and mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API FA-4, SN or SN PLUS service categories and SAE 5W-30 viscosity grade are recommended.

CUSTOMER BENEFITS

Delo 400 XSP-FA SAE 5W-30 with ISOSYN Advanced Technology is an API FA-4 performance heavy duty engine oil specifically formulated for on highway applications, including certain 2017 greenhouse gascompliant (GHG 17) diesel engines with lower CO_2 emissions and improved fuel economy, as well as certain EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems, calling for API FA-4.

Delo 400 XSP-FA SAE 5W-30 delivers value through:

- Fuel Economy Improvement Up to 2% improvement vs. SAE 15W-40 oil¹ in class 8 diesel engine bench testing.
- Minimized Operating Costs Exceptional oxidation control enables extended oil drain intervals, contributing to maximum vehicle utilization and minimal downtime.
- Promotes Consistent Cold Engine Starting Low viscosity synthetic base stocks promote

1 Actual results will vary depending upon vehicle type, load and other driving conditions.

consistent cold engine starting for diesel engines operating in sub-zero temperature.

- Exceptional Deposit Control Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives allow for extended diesel engine component protection.
- Excellent Emission Control System Life Promotes long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus minimizing maintenance costs.
- Managed Inventory Costs Delo 400 XSP-FA SAE 5W-30 is suitable for use in gasoline engines and naturally aspirated or turbocharged electronically controlled/low emission diesel engines, where API FA-4, SN or SN PLUS performance and SAE 5W-30 are required. It allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that help save money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.² Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Helps maximize your bottom line business results.

2 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 April 2023 HDMO-49

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FEATURES

Delo[®] 400 XSP-FA SAE 5W-30 (Full Synthetic) with ISOSYN[®] Advanced Technology is



formulated using advanced technology to provide outstanding protection and improved fuel economy for on-highway diesel engine applications that allow the use of an API FA-4 SAE 5W-30.

Delo 400 XSP-FA SAE 5W-30 is formulated with ISOSYN Advanced Technology, which is the combination of Chevron's industry-leading formulating expertise with unique, high performance additive chemistry to help extend the durability of critical engine parts.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 69% improved wear protection*
- Up to 64% improved piston deposit control*
 - *Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo 400 XSP-FA SAE 5W-30 with ISOSYN Advanced Technology helps keep piston rings clean and free for optimum combustion pressure and minimal wear. Delo 400 XSP-FA SAE 5W-30 with ISOSYN Advanced Technology minimizes valve and piston crown land deposits, thereby managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and helps to avoid filter plugging, abrasive wear, viscosity increases, and oil gelation. These problems could cause excessive engine wear and bearing failure, without prior warning.

Optimized additive chemistries combined with synthetic base stocks control oxidation, sludge, and undue thickening between oil drains, enabling extended service intervals. Delo 400 XSP-FA SAE 5W-30 engine oil's antiwear technologies protect against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A defoaming additive helps prevent air entrainment.

APPLICATIONS

Delo 400 XSP-FA SAE 5W-30 with ISOSYN Advanced Technology is a mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API FA-4, SN or SN PLUS service categories and SAE 5W-30 viscosity grade are recommended. It is formulated for engines operating under severe service, and broad climate conditions.

Delo 400 XSP-FA SAE 5W-30 with ISOSYN Advanced Technology is excellent for use in new, advanced engines developed to meet the latest emissions and reliability standards and in engines equipped with features like super-charging, turbo-charging, direct injection, higher power density, intercooling, full electronic management of fuel and emissions systems, exhaust selective catalytic reduction, exhaust gas recirculation, and exhaust particulate filters.

Delo 400 XSP-FA SAE 5W-30 with ISOSYN Advanced Technology is formulated for exceptional performance with many fuels, including low sulfur and ultra low sulfur diesel fuels, gasoline, most gasoline fuel blends, and many biofuel formulations.

Delo 400 XSP-FA SAE 5W-30 is approved for:

- API Service Categories FA-4, SN, SN PLUS
- Cummins CES 20087
- **DTFR** 15C130 (previously known as MB Approval 228.61)
- Detroit Fluids Specification (DFS) 93K223
- Mack EOS-5
- Volvo VDS-5

Delo 400 XSP-FA SAE 5W-30 is recommended for:

- Ford WSS-M2C214-B1
- **JASO** DH-2F

TYPICAL TEST DATA

SAE Grade	5W-30
Product Number	257008
SDS Number	
U.S.	49948
Canada	49949
Mexico	49950
Density at 15°C, kg/L	0.86
Viscosity, Kinematic	
mm²/s at 40°C	59
mm²/s at 100°C	9.9
Viscosity, Cold Crank, °C/mPa.s	-30/6030
Viscosity, MRV, mPa.s	-35/18,500
Viscosity, HTHS, mPa.s	3.1
Viscosity Index	156
Flash Point, °C(°F)	231(448)
Pour Point, °C(°F)	-45(-49)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g, ASTM D2896	10
Phosphorus, mass %	0.08
Sulfur, mass %	0.3
Zinc, mass %	0.08

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XSP-FA ISOCLEAN[®] CERTIFIED LUBRICANT SAE 5W-30 (Full Synthetic)



PRODUCT DESCRIPTION

"Delo. Let's go further. ®"

Delo[®] 400 XSP-FA SAE 5W-30 (Full Synthetic) ISOCLEAN[®] Certified

Lubricant with ISOSYN[®] Advanced Technology is a premium full synthetic fuel-economy and mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API FA-4, SN or SN PLUS service categories and SAE 5W-30 viscosity grade are recommended.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified Lubricants are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo 400 XSP-FA SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is an API FA-4 performance heavy duty engine oil specifically formulated for on highway applications, including certain 2017 greenhouse gas-compliant (GHG 17) diesel engines with lower CO_2 emissions and improved fuel economy, as well as certain EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems, calling for API FA-4.

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Fuel Economy Improvement Up to 2% improvement vs. SAE 15W-40 oil¹ in class 8 diesel engine bench testing.
- Minimized Operating Costs Exceptional oxidation control enables extended oil drain intervals, contributing to maximum vehicle utilization and minimal downtime.
- **Promotes Consistent Cold Engine Starting** Low viscosity synthetic base stocks promote consistent cold engine starting for diesel engines operating in sub-zero temperature.
- Exceptional Deposit Control Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives allow for extended diesel engine component protection.

Delo 400 XSP-FA SAE 5W-30 delivers value through:

1 Actual results will vary depending upon vehicle type, load and other driving conditions.

Product(s) manufactured in the USA.

A Chevron company product

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

- Excellent Emission Control System Life Promotes long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus minimizing maintenance costs.
- Managed Inventory Costs Delo[®] 400 XSP-FA SAE 5W-30 (Full Synthetic) ISOCLEAN[®] Certified Lubricant is suitable for use in gasoline engines and naturally aspirated or turbocharged electronically controlled/low emission diesel engines, where API FA-4, SN or SN PLUS performance and SAE 5W-30 are required. It allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that help save money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.² Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Helps maximize your bottom line business results.

FEATURES

Delo 400 XSP-FA SAE 5W-30 (Full Synthetic) with ISOSYN Advanced Technology is



formulated using advanced technology to provide outstanding protection and improved fuel economy for on-highway diesel engine applications that allow the use of an API FA-4 SAE 5W-30.

Delo 400 XSP-FA SAE 5W-30 is formulated with ISOSYN Advanced Technology, which is the combination of Chevron's industry-leading formulating expertise with unique, high performance additive chemistry to help extend the durability of critical engine parts.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 69% improved wear protection*
- Up to 64% improved piston deposit control*
 - *Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo[®] 400 XSP-FA SAE 5W-30 (Full Synthetic) ISOCLEAN[®] Certified Lubricant with ISOSYN[®] Advanced Technology helps keep piston rings clean and free for optimum combustion pressure and minimal wear. Delo 400 XSP-FA SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology minimizes valve and piston crown land deposits, thereby managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and helps to avoid filter plugging, abrasive wear, viscosity increases, and oil gelation. These problems could cause excessive engine wear and bearing failure, without prior warning.

Optimized additive chemistries combined with synthetic base stocks control oxidation, sludge, and undue thickening between oil drains, enabling extended service intervals. Delo 400 XSP-FA SAE 5W-30 ISOCLEAN Certified Lubricant engine oil's antiwear technologies protect against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A defoaming additive helps prevent air entrainment.

² See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

APPLICATIONS

Delo 400 XSP-FA SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is a mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API FA-4, SN or SN PLUS service categories and SAE 5W-30 viscosity grade are recommended. It is formulated for engines operating under severe service, and broad climate conditions.

Delo 400 XSP-FA SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is excellent for use in new, advanced engines developed to meet the latest emissions and reliability standards and in engines equipped with features like supercharging, turbo-charging, direct injection, higher power density, intercooling, full electronic management of fuel and emissions systems, exhaust selective catalytic reduction, exhaust gas recirculation, and exhaust particulate filters.

Delo 400 XSP-FA SAE 5W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is formulated for exceptional performance with many fuels, including low sulfur and ultra low sulfur diesel fuels, gasoline, most gasoline fuel blends, and many biofuel formulations.

Delo 400 XSP-FA SAE 5W-30 ISOCLEAN Certified Lubricants approved for:

- API Service Categories FA-4, SN, SN PLUS
- Cummins CES 20087
- **DTFR** 15C130 (previously known as MB Approval 228.61)
- Detroit Fluids Specification (DFS) 93K223
- Mack EOS-5
- Volvo VDS-5

Delo 400 XSP-FA SAE 5W-30 ISOCLEAN Certified Lubricants is recommended for:

- Ford WSS-M2C214-B1
- **JASO** DH-2F

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	5W-30
Product Number	259001
SDS Number U.S.	49948
Canada Mexico	49949 49950
Density at 15°C, kg/L	0.86
Viscosity, Kinematic mm²/s at 40°C mm²/s at 100°C	59 9.9
Viscosity, Cold Crank, °C/mPa.s	-30/6030
Viscosity, MRV, mPa.s	-35/18,500
Viscosity, HTHS, mPa.s	3.1
Viscosity Index	156
Flash Point, °C(°F)	231(448)
Pour Point, °C(°F)	-45(-49)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g, ASTM D2896	10
Phosphorus, mass %	0.08
Sulfur, mass %	0.3
Zinc, mass %	0.08

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XSP SAE 5W-40 (Full Synthetic)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 XSP SAE 5W-40 (Full Synthetic) with ISOSYN[®] Advanced Technology is a mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and fourstroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 5W-40 viscosity grade is recommended.

CUSTOMER BENEFITS

Delo 400 XSP SAE 5W-40 with ISOSYN Advanced Technology is an API CK-4 heavy duty engine oil specifically formulated for on-highway and off-highway applications including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO₂ emissions and improved fuel economy, in addition to EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is fully compatible with previous engine models and previous API Oil Service Categories. It delivers value through:

- Low Viscosity Synthetic Base Stock Promotes consistent cold engine starting for gasoline and diesel engines operating in sub-zero temperatures.
- Minimized Operating Costs Exceptional soot dispersancy and wear control protect the cylinders, pistons, rings, and valve train components against wear and corrosion, promoting optimum service life and minimal maintenance. Contributes to maximum vehicle utilization and minimal downtime.
- Excellent Emission Control System Life Promotes long Diesel Particulate Filter (DPF) life for

minimal downtime and cleaning, thus minimizing maintenance costs.

- **Managed Inventory Costs** Is compatible with previous API Oil Service Categories. Suitable for use in gasoline engines and naturally aspirated or turbocharged electronically controlled/low emission diesel engines. One oil that meets the engine performance requirements of most North American and European engine manufacturers. One oil that allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that help save money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Delo 400 XSP SAE 5W-40 is formulated with ISOSYN Advanced Technology, which is a combination of premium base oils



Advanced Technology, which is a combination of premium base oils and high performance additives with Chevron's formulating expertise that provides superb diesel engine parts protection - all at an outstanding value.

Delo 400 XSP SAE 5W-40 with ISOSYN Advanced Technology meets the most stringent EGR soot control requirements.

Delo 400 XSP SAE 5W-40 with ISOSYN Advanced Technology has been specifically designed to meet the

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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© 2017-2024 Chevron U.S.A. Inc. All rights reserved. Chevron, the Chevron Hallmark, Delo and Delo. Let's go further. are trademarks owned by Chevron Intellectual Property LLC. All other trademarks are property of their respective owners. demands of EGR and EGR/SCR engines while at the same time providing the highest level of performance in older diesel engines.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 69% improved wear protection*
- Up to 64% improved piston deposit control*

*Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo 400 XSP SAE 5W-40 with ISOSYN Advanced Technology helps keep piston rings clean and free for optimum combustion pressure and minimal wear. Delo 400 XSP SAE 5W-40 with ISOSYN Advanced Technology minimizes valve and piston crown land deposits, thereby managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and helps to avoid filter plugging, cylinder head sludge, abrasive wear, viscosity increases, and oil gelation. These problems could cause excessive engine wear and bearing failure, without prior warning.

Optimized additive chemistries combined with synthetic base stocks control oxidation, sludge, and undue thickening between oil drains. Delo 400 XSP SAE 5W-40's antiwear technologies protect against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A defoaming additive helps prevent air entrapment.

APPLICATIONS

Delo 400 XSP SAE 5W-40 with ISOSYN Advanced Technology is a mixed-fleet motor oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 5W-40 viscosity grade is recommended. It is formulated for engines operating under severe service and a wide range of climatic conditions.

Delo 400 XSP SAE 5W-40 with ISOSYN Advanced Technology is excellent for use in engines developed to meet 2010 emissions standards and in engines equipped with features like four-valve heads, supercharging, turbocharging, direct injection, shorter piston crowns, higher power density, intercooling, full electronic management of fuel and emissions systems, exhaust gas recirculation, and exhaust particulate filters.

This product is recommended for use in older engines, as well as in today's most modern low emission designs.

Delo 400 XSP SAE 5W-40 is approved for:

- API Service Categories CK-4, CJ-4, CI-4, CI-4 PLUS, CH-4, SN, SN PLUS
- Allison TES-439, approval # 439-34732018, heavy-duty automatic transmissions
- Cummins CES 20086
- DEUTZ DQC III-18 LA
- Detroit Fluids Specification (DFS) 93K222
- Mack EOS-4.5
- MAN M 3775
- MTU Category 2.1
- Volvo VDS-4.5

Delo 400 XSP SAE 5W-40 is recommended for:

- **ACEA** E11
- Caterpillar ECF-3
- **DTFR** 15C100 (previously known as MB Approval 228.31)
- **JASO** DH-2

TYPICAL TEST DATA

SAE Grade	5W-40
Product Number	257002
SDS Number	
U.S.	45599
Canada	455600
Mexico	455601
Density at 15°C, kg/L	0.852
Viscosity, Kinematic	
mm²/s at 40°C	96.0
mm²/s at 100°C	15.4
Viscosity, Cold Crank, °C/mPa.s	-30/5900
Viscosity Index	170
Viscosity, MRV, mPa.s at -35°C	29081
Viscosity, HTHS, mPa.s	4.2
Flash Point, °C(°F)	223(433)
Pour Point, °C(°F)	-46(-51)
Sulfated Ash, mass %	1.0
Base Number, ASTM D2896, mg KOH/g	10.1
Phosphorus, mass %	0.08
Zinc, mass %	0.08

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XSP ISOCLEAN[®] CERTIFIED LUBRICANT SAE 5W-40 (Full Synthetic)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 XSP SAE 5W-40 (Full Synthetic) ISOCLEAN[®] Certified

Lubricant with ISOSYN[®] Advanced Technology is a mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 5W-40 viscosity grade is recommended.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified Lubricants are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo 400 XSP SAE 5W-40 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is an API CK-4 heavy duty engine oil specifically formulated for onhighway and off-highway applications including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO₂ emissions and improved fuel economy, in addition to EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is fully compatible with previous engine models and previous API Oil Service Categories. It delivers value through:

 Ready to use — Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.

- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Low Viscosity Synthetic Base Stock Promotes consistent cold engine starting for gasoline and diesel engines operating in sub-zero temperatures.
- **Minimized Operating Costs** Exceptional soot dispersancy and wear control protect the cylinders, pistons, rings, and valve train components against wear and corrosion, promoting optimum service life and minimal maintenance. Contributes to maximum vehicle utilization and minimal downtime.
- Excellent Emission Control System Life Promotes long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus minimizing maintenance costs.
- Managed Inventory Costs Is compatible with previous API Oil Service Categories. Suitable for use in gasoline engines and naturally aspirated or turbocharged electronically controlled/low emission diesel engines. One oil that meets the engine performance requirements of most North American and European engine manufacturers. One oil that allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that help save money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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© 2019-2024 Chevron U.S.A. Inc. All rights reserved. Chevron, the Chevron Hallmark, Delo and Delo. Let's go further. are trademarks owned by Chevron Intellectual Property LLC. All other trademarks are property of their respective owners. damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.

 Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Delo[®] 400 XSP SAE 5W-40 ISOCLEAN[®] Certified Lubricant is formulated with ISOSYN



Advanced Technology, which is a combination of premium base oils and high performance additives with Chevron's formulating expertise that provides superb diesel engine parts protection - all at an outstanding value.

Delo 400 XSP SAE 5W-40 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology meets the most stringent EGR soot control requirements.

Delo 400 XSP SAE 5W-40 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology has been specifically designed to meet the demands of EGR and EGR/SCR engines while at the same time providing the highest level of performance in older diesel engines.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations. ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 69% improved wear protection*
- Up to 64% improved piston deposit control*
 - *Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo 400 XSP SAE 5W-40 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology helps keep piston rings clean and free for optimum combustion pressure and minimal wear. Delo 400 XSP SAE 5W-40 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology minimizes valve and piston crown land deposits, thereby managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and helps to avoid filter plugging, cylinder head sludge, abrasive wear, viscosity increases, and oil gelation. These problems could cause excessive engine wear and bearing failure, without prior warning.

Optimized additive chemistries combined with synthetic base stocks control oxidation, sludge, and undue thickening between oil drains. Delo 400 XSP SAE 5W-40 ISOCLEAN Certified Lubricant's antiwear technologies protect against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A defoaming additive helps prevent air entrapment.

APPLICATIONS

Delo 400 XSP SAE 5W-40 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is a mixed-fleet motor oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and fourstroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 5W-40 viscosity grade is recommended. It is formulated for engines operating under severe service and a wide range of climatic conditions.

Delo 400 XSP SAE 5W-40 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is excellent for use in engines developed to meet 2010 emissions standards and in engines equipped with features like four-valve heads, supercharging, turbocharging, direct

¹ See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

injection, shorter piston crowns, higher power density, intercooling, full electronic management of fuel and emissions systems, exhaust gas recirculation, and exhaust particulate filters.

It is formulated for exceptional performance with many fuels, including low sulfur and ultra low sulfur diesel fuels.

This product is recommended for use in older engines, as well as in today's most modern low emission designs.

Delo[®] 400 XSP SAE 5W-40 ISOCLEAN[®] Certified Lubricant is approved for:

- API Service Categories CK-4, CJ-4, CI-4, CI-4 PLUS, CH-4, SN, SN PLUS
- Allison TES-439, approval # 439-34732018, heavy-duty automatic transmissions
- Cummins CES 20086
- DEUTZ DQC III-18 LA
- Detroit Fluids Specification (DFS) 93K222
- Mack EOS-4.5
- MAN M 3775
- MTU Category 2.1
- Volvo VDS-4.5

Delo 400 XSP SAE 5W-40 ISOCLEAN Certified Lubricant is recommended for:

- **ACEA** E11
- Caterpillar ECF-3
- **DTFR** 15C100 (previously known as MB Approval 228.31)
- **JASO** DH-2

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	5W-40
Product Number	278088
SDS Number	
U.S.	45599
Canada	45600
Mexico	45601
Density at 15°C, kg/L	0.852
Viscosity, Kinematic	
mm²/s at 40°C	96.0
mm ² /s at 100°C	15.4
Viscosity, Cold Crank, °C/mPa.s	-30/5900
Viscosity Index	170
Viscosity, MRV, mPa.s at -35°C	29081
Viscosity, HTHS, mPa.s	4.2
Flash Point, °C(°F)	223(433)
Pour Point, °C(°F)	-46(-51)
Sulfated Ash, mass %	1.0
Base Number, ASTM D2896, mg KOH/g	10.1
Phosphorus, mass %	0.08
Zinc, mass %	0.08

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XSP SAE 15W-40 (Full Synthetic)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 XSP SAE 15W-40 (Full Synthetic) with ISOSYN[®] Advanced Technology[™] is a mixed-fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and fourstroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 15W-40 viscosity grade is recommended.

CUSTOMER BENEFITS

Delo 400 XSP SAE 15W-40 with ISOSYN Advanced Technology is an API CK-4 heavy duty engine oil specifically formulated for on-highway and off-highway applications including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO₂ emissions and improved fuel economy, in addition to EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is fully compatible with previous engine models and previous API Oil Service Categories. It delivers value through:

- Low Volatility Synthetic Base Stock Promotes low oil consumption. Specially formulated to minimize oil consumption.
- **SN/SN PLUS Approved** API SN/SN PLUS Approved for use in gasoline fueled vehicles.
- Minimized Operating Costs Exceptional soot dispersancy and wear control protect the cylinders, pistons, rings, and valve train components against wear and corrosion, promoting optimum service life and minimal maintenance. Contributes to maximum vehicle utilization and minimal downtime.

- Excellent Emission Control System Life Promotes long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus minimizing maintenance costs.
- **Managed Inventory Costs** Is compatible with previous API Oil Service Categories. Suitable for use in gasoline engines and naturally aspirated or turbocharged electronically controlled/low emission diesel engines. One oil that meets the engine performance requirements of most North American and European engine manufacturers. One oil that allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that minimize inventory costs, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Delo 400 XSP SAE 15W-40 is formulated with ISOSYN Advanced Technology, which is a combination of premium base oils and high performance additives with Chevron's formulating expertise that provides superb diesel engine parts protection - all at an outstanding value.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 January 2024 HDMO-52

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Delo 400 XSP SAE 15W-40 with ISOSYN Advanced Technology meets the most stringent EGR soot control requirements.

Delo 400 XSP SAE 15W-40 with ISOSYN Advanced Technology has been specifically designed to meet the demands of EGR and EGR/SCR engines while at the same time providing the highest level of performance in older diesel engines.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 69% improved wear protection*
- Up to 64% improved piston deposit control*

*Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo 400 XSP SAE 15W-40 with ISOSYN Advanced Technology helps keep piston rings clean and free for optimum combustion pressure and minimal wear. Delo 400 XSP SAE 15W-40 with ISOSYN Advanced Technology minimizes valve and piston crown land deposits, thereby managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and helps to avoid filter plugging, cylinder head sludge, abrasive wear, viscosity increases, and oil gelation. These problems could cause excessive engine wear and bearing failure, without prior warning.

Optimized additive chemistries combined with synthetic base stocks control oxidation, sludge, and

undue thickening between oil drains. Delo 400 XSP SAE 15W-40's antiwear technologies protect against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A defoaming additive helps prevent air entrapment.

APPLICATIONS

Delo 400 XSP SAE 15W-40 with ISOSYN Advanced Technology is a mixed-fleet motor oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 15W-40 viscosity grade is recommended. It is formulated for engines operating under severe service and a wide range of climatic conditions.

Delo 400 XSP SAE 15W-40 with ISOSYN Advanced Technology is excellent for use in engines developed to meet 2010 emissions standards and in engines equipped with features like four-valve heads, supercharging, turbocharging, direct injection, shorter piston crowns, higher power density, intercooling, full electronic management of fuel and emissions systems, exhaust gas recirculation, and exhaust particulate filters.

This product is recommended for use in older engines, as well as in today's most modern low emission designs.

Delo 400 XSP SAE 15W-40 is approved for:

- API Service Categories CK-4, CJ-4, CI-4, CI-4, CI-4 PLUS, CH-4, SN, SN PLUS
- **Cummins** CES 20086
- Detroit Fluids Specification (DFS) 93K222

Delo 400 XSP SAE 15W-40 is recommended for:

- ACEA European Service Category E11
- Caterpillar ECF-3
- Ford WSS-M2C171-F1
- MB Approval 228.31
- Mack EOS 4.5
- Volvo VDS-4.5

TYPICAL TEST DATA

SAE Grade	15W-40
Product Number	257015
SDS Number U.S.	54830
Canada Mexico	54831 54832
Density at 15°C, kg/L	0.862
Viscosity, Kinematic mm²/s at 40°C mm²/s at 100°C	104.5 14.8
Viscosity, Cold Crank, °C/mPa.s	-20/4600
Viscosity Index	135
Viscosity, MRV, mPa.s at -35°C	13000
Viscosity, HTHS, mPa.s	4.1
Flash Point, °C(°F)	236(457)
Pour Point, °C(°F)	-48(-54)
Sulfated Ash, mass %	1.0
Base Number, ASTM D2896, mg KOH/g	10
Phosphorus, mass %	0.11
Zinc, mass %	0.12

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XLE SAE 10W-30 (Synblend)

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 XLE SAE 10W-30 with ISOSYN[®] Advanced Technology is a premium synthetic blend, mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and fourstroke gasoline engines in which the API CK-4, API SN or API SN PLUS service category and SAE 10W-30 viscosity grade are recommended.

CUSTOMER BENEFITS

Delo 400 XLE SAE 10W-30 (Synblend) with ISOSYN Advanced Technology is an API CK-4 heavy duty engine oil specifically formulated for on-highway applications, including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO_2 emissions, and 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for SAE 10W-30 heavy duty engine oil.

Delo 400 XLE SAE 10W-30 with ISOSYN Advanced Technology is also recommended for off-highway applications when SAE 10W-30 viscosity grade is required. It is formulated for newer engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. These newer engines generally meet Tier IV (2014) emissions requirements.

It is fully compatible with previous engine models and previous API Oil Service Categories.

Delo 400 XLE SAE 10W-30 delivers value through:

• **Improved Fuel Efficiency** — Up to 1% improvement vs. SAE 15W-40 oils in Class 8 diesel engine bench testing.

- Better Low Temperature Pumpability Improved flow rate and pumpability versus SAE 15W-40 oils.
- Exceptional Deposit Control Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives allows for extended diesel engine component protection.
- Minimized Operating Costs Exceptional soot dispersancy and wear control. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum vehicle utilization and minimal downtime.
- Excellent Emission Control System Life Provides long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus managing your maintenance costs.
- Managed Inventory Costs Backwards compatible with previous API Oil Service Categories. Suitable for use in four-stroke gasoline and naturally aspirated turbocharged and modern electronically controlled/low emission diesel engines calling for an SAE 10W-30 heavy duty engine oil. Allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that may contribute to saving money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 May 2024 HDMO-53

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¹ See Warranty Plus for details and restrictions.

 Access to Chevron's Lubrication and Industry Knowledge — Helps to maximize your bottom line business results.

FEATURES

Delo[®] 400 XLE SAE 10W-30 with ISOSYN[®] Advanced Technology is formulated using advanced



additive technology to provide outstanding protection and improved fuel efficiency for on highway applications including 2010 compliant engines.

Delo 400 XLE SAE 10W-30 is formulated with ISOSYN Advanced Technology, which is a combination of Chevron's industry-leading formulating expertise with unique, high performance additive chemistry to help extend the durability of critical engine parts.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 68% improved wear protection*
- Up to 64% improved piston deposit control*

*Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo 400 XLE SAE 10W-30 with ISOSYN Advanced Technology helps to keep rings clean and free for maximum combustion pressure and to provide minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid filter plugging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, and oil gelling. These problems can result in excessive engine wear and bearing failure on startup, without prior indication to the operator.

Specially selected oxidation inhibitors control oxidation, sludge, and undue thickening. Its unique blend of extreme pressure antiwear additive protects against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrapment.

The combination of premium dispersant additives and ISOSYN Advanced Technology allows Delo 400 XLE SAE 10W-30 to effectively disperse soot and keep it in suspension. This minimizes the risk of valve train wear and filter plugging.

Applications

Delo 400 XLE SAE 10W-30 with ISOSYN Advanced Technology is a fuel economy and mixed fleet motor oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 10W-30 viscosity grade are recommended. It is formulated for engines operating under severe service and a wide range of climatic conditions.

Excellent performance in new advanced engines developed to meet the latest emissions and reliability standards and in engines equipped with features like four-valve heads, super-charging, turbo-charging, direct injection, higher power density, intercooling, full electronic management of fuel and emissions systems, exhaust selective catalytic reduction, exhaust gas recirculation, and exhaust particulate filters.

Delo 400 XLE SAE 10W-30 with ISOSYN Advanced Technology is formulated for exceptional performance with ultra low sulfur diesel (ULSD) and other low sulfur diesel fuels.

This product is recommended for use in:

- Today's most modern on highway low emission designs as well as some older engines.
- Today's most modern off highway engines where an SAE 10W-30 viscosity grade is recommended including those adapted for the most stringent emissions standards in construction, agriculture, marine, and mining applications.
- Excellent performance in Auxiliary Power Units (APUs) found on trailer refrigeration (refer) units or on truck tractors to help reduce main engine idle.

Delo[®] 400 XLE SAE 10W-30 is approved for:

- API Service Categories CK-4, CJ-4, CI-4, CI-4 PLUS, CH-4, SN, SN PLUS
- Cummins CES 20086
- **DTFR** 15C110 (previously known as MB Approval 228.51)
- **DTFR** 15C100 (previously known as MB Approval 228.31)
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC III-18 LA
- Mack EOS-4.5
- MAN M3775
- MTU Category 2.1
- Renault RLD-3
- Volvo VDS-4.5

Delo[®] 400 XLE SAE 10W-30 is recommended for:

- **ACEA** E11
- Caterpillar ECF-3
- **JASO** DH-2
- **MAN** M3575

TYPICAL TEST DATA

SAE Grade	10W-30
Product Number	257000
SDS Number	
U.S.	42039
Canada	42040
Mexico	42041
Density at 15°C, kg/L	0.868
Viscosity, Kinematic	
mm²/s at 40°C	81
mm²/s at 100°C	11.9
Viscosity, Cold Crank, °C/mPa.s	-25/6300
Viscosity, MRV, °C/mPa.s	-30/20,400
Viscosity Index	142
Flash Point, °C(°F)	234(453)
Pour Point, °C(°F)	-46(-51)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g,	
ASTM D2896	10
Phosphorus, mass %	0.080
Sulfur, mass %	0.3
Zinc, mass %	0.086

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XLE ISOCLEAN[®] CERTIFIED LUBRICANT SAE 10W-30 (Synblend)



PRODUCT DESCRIPTION

"Delo. Let's go further.[®]"



Delo[®] 400 XLE SAE 10W-30 ISOCLEAN[®] Certified Lubricant with

ISOSYN[®] Advanced Technology is a premium synthetic blend, mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4, API SN or API SN PLUS service category and SAE 10W-30 viscosity grade are recommended. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo 400 XLE SAE 10W-30 (Synblend) ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is an API CK-4 heavy duty engine oil specifically formulated for on-highway applications, including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO_2 emissions, and 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for SAE 10W-30 heavy duty engine oil.

Delo 400 XLE SAE 10W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is also recommended for off-highway applications when SAE 10W-30 viscosity grade is required. It is formulated for newer engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. These newer engines generally meet Tier IV (2014) emissions requirements.

It is fully compatible with previous engine models and previous API Oil Service Categories.

Delo 400 XLE SAE 10W-30 ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Improved Fuel Efficiency** Up to 1% improvement vs. SAE 15W-40 oils in Class 8 diesel engine bench testing.
- Better Low Temperature Pumpability Improved flow rate and pumpability versus SAE 15W-40 oils.
- Exceptional Deposit Control Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives allows for extended diesel engine component protection.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 May 2024 HDMO-53 ISOCLEAN

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- Minimized Operating Costs Exceptional soot dispersancy and wear control. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum vehicle utilization and minimal downtime.
- Excellent Emission Control System Life Provides long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus managing your maintenance costs.
- Managed Inventory Costs Backwards compatible with previous API Oil Service Categories. Suitable for use in four-stroke gasoline and naturally aspirated turbocharged and modern electronically controlled/low emission diesel engines calling for an SAE 10W-30 heavy duty engine oil. Allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that may contribute to saving money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Helps to maximize your bottom line business results.

FEATURES

 $\mathsf{Delo}^{\texttt{R}}$ 400 XLE SAE 10W-30 ISOCLEAN $^{\texttt{R}}$ Certified Lubricant with ISOSYN $^{\texttt{R}}$ Advanced



Technology is formulated using advanced additive technology to provide outstanding protection and improved fuel efficiency for on highway applications including 2010 compliant engines.

Delo 400 XLE SAE 10W-30 ISOCLEAN Certified Lubricant is formulated with ISOSYN Advanced Technology, which is a combination of Chevron's industry-leading formulating expertise with unique, high performance additive chemistry to help extend the durability of critical engine parts.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 68% improved wear protection*
- Up to 64% improved piston deposit control*
 - *Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo 400 XLE SAE 10W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology helps to keep rings clean and free for maximum combustion pressure and to provide minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid filter plugging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, and oil gelling. These problems can result in excessive engine wear and bearing failure on startup, without prior indication to the operator.

Specially selected oxidation inhibitors control oxidation, sludge, and undue thickening. Its unique blend of extreme pressure antiwear additive protects against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrapment.

¹ See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.
The combination of premium dispersant additives and ISOSYN Advanced Technology allows Delo 400 XLE SAE 10W-30 to effectively disperse soot and keep it in suspension. This minimizes the risk of valve train wear and filter plugging.

APPLICATIONS

Delo[®] 400 XLE SAE 10W-30 ISOCLEAN[®] Certified Lubricant with ISOSYN Advanced Technology is a fuel economy and mixed fleet motor oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4, API SN or API SN PLUS service categories and SAE 10W-30 viscosity grade are recommended. It is formulated for engines operating under severe service and a wide range of climatic conditions.

Excellent performance in new advanced engines developed to meet the latest emissions and reliability standards and in engines equipped with features like four-valve heads, super-charging, turbo-charging, direct injection, higher power density, intercooling, full electronic management of fuel and emissions systems, exhaust selective catalytic reduction, exhaust gas recirculation, and exhaust particulate filters.

Delo 400 XLE SAE 10W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is formulated for exceptional performance with ultra low sulfur diesel (ULSD) and other low sulfur diesel fuels.

This product is recommended for use in:

- Today's most modern on highway low emission designs as well as some older engines.
- Today's most modern off highway engines where an SAE 10W-30 viscosity grade is recommended including those adapted for the most stringent emissions standards in construction, agriculture, marine, and mining applications.
- Excellent performance in Auxiliary Power Units (APUs) found on trailer refrigeration (refer) units or on truck tractors to help reduce main engine idle.

Delo[®] 400 XLE SAE 10W-30 ISOCLEAN Certified Lubricant is approved for:

- API Service Categories CK-4, CJ-4, CI-4, CI-4 PLUS, CH-4, SN, SN PLUS
- **Cummins** CES 20086
- **DTFR** 15C110 (previously known as MB Approval 228.51)
- **DTFR** 15C100 (previously known as MB Approval 228.31)
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC III-18 LA
- Mack EOS-4.5
- MAN M3775
- MTU Category 2.1
- Renault RLD-3
- Volvo VDS-4.5

Delo 400 XLE SAE 10W-30 ISOCLEAN Certified Lubricant is recommended for:

- **ACEA** E11
- Caterpillar ECF-3
- **JASO** DH-2
- MAN M3575

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	10W-30
Product Number	257011
SDS Number	
U.S.	42039
Canada	42040
Mexico	42041
Density at 15°C, kg/L	0.868
Viscosity, Kinematic	
mm²/s at 40°C	81
mm²/s at 100°C	11.9
Viscosity, Cold Crank, °C/mPa.s	-25/6300
Viscosity, MRV, °C/mPa.s	-30/20,400
Viscosity Index	142
Flash Point, °C(°F)	234(453)
Pour Point, °C(°F)	-46(-51)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g,	
ASTM D2896	10
Phosphorus, mass %	0.080
Sulfur, mass %	0.3
Zinc, mass %	0.086

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XLE SB SAE 15W-40 (Synblend)

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 XLE SB SAE 15W-40 with ISOSYN[®] Advanced Technology is a premium synblend, heavy-duty engine oil optimized with a mixture of synthetic and conventional base stocks designed for extended drains (up to 1.5x OEM standard drain interval) and mixed fleets. It is recommended for naturally aspirated and turbocharged, four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4 or API SN service category and SAE 15W-40 viscosity grades are recommended. It is also approved by many of the major heavy-duty Original Equipment Manufacturers (OEM), meeting their latest engine oil specifications.

CUSTOMER BENEFITS

Delo 400 XLE SB SAE 15W-40 with ISOSYN Advanced Technology is an API CK-4 heavy duty engine oil specifically formulated for on highway applications, including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO₂ emissions, in addition to 2010 compliant low emission and off-highway Tier IV diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for SAE 15W-40 premium heavy duty motor oil.

Additionally, Delo 400 XLE SB SAE 15W-40 has excellent performance in Allison heavy-duty transmission units requiring Allison TES-439 approval and provides excellent shear stability and component protection.

It is fully compatible with previous engine models and previous API Oil Service Categories.

Delo 400 XLE SB SAE 15W-40 delivers value through:

- Extended Drain Performance* Formulated for extended oil drain protection for both on- and off-road diesel engines. Extended oil drain potential up to 1.5x, based on the average of U.S. Class 8 engine manufacturers' recommendations.
- **Exceptional Deposit Control** Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives provide excellent diesel engine component protection.
- Better Low Temperature Pumpability Improved flow rate and pumpability versus conventional SAE 15W-40 oils and similar pour point to conventional SAE 10W-30 products with better cold flow properties than conventional SAE 15W-40 products.
- Long Drain Performance Formulated for long oil drain protection for both on and off-road diesel engines.
- Minimized Operating Costs Exceptional soot dispersancy and wear control. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum equipment utilization and minimal downtime.
- Excellent Emission Control System Life Provides long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus managing your maintenance costs.
- Managed Inventory Costs Backwards compatible with previous API Oil Service Categories. Provides single solution for the oil and gas industry for both heavy duty stationary engine and Allison off

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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highway transmission performance. Suitable for use in four-stroke gasoline and naturally aspirated turbocharged and modern electronically controlled/ low emission diesel engines. Allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that may contribute to saving money, space and handling time.

- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

ISOSYN ADVANCED TECHNOLOGY

Delo[®] 400 XLE SB SAE 15W-40 with ISOSYN[®] Advanced Technology is formulated using advanced additive technology to provide outstanding protection



for on highway applications including new GHG 17 compliant engines.

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations. Delo 400 XLE SB SAE 15W-40 with ISOSYN Advanced Technology helps to keep rings clean and free for maximum combustion pressure and to provide minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid filter plugging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, oil gelling, and minimizes the risk of valve train wear. These problems can result in excessive engine wear and bearing failure on startup, without prior indication to the operator.

Specially selected oxidation inhibitors control oxidation, sludge, and undue thickening. Its high-quality blend of anti-wear additives protects against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrainment.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Improved engine durability with up to 44% improved liner wear*
- Potential for 1.5x extended oil life with up to 37% improved oxidation performance*
- Better reliability with up to 56% improved viscosity control*

*Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

APPLICATIONS

Delo 400 XLE SB SAE 15W-40 has a wide range of specifications and approvals. It is recommended for today's most modern on-highway low emission designs, as well as older, on-highway diesel engines. This versatile oil meets stringent emissions standards, making it an ideal choice for various industries, including oil and gas, construction, agriculture, marine, and mining.

¹ See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

Delo 400 XLE SB SAE 15W-40 is approved for:

- API Service Categories CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4, SN
- Allison TES-439
- **Cummins** CES 20086
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC III-18 LA
- **DTFR** 15C100 (previously known as MB 228.31)
- Mack EOS-4.5
- MAN M3775
- Renault RLD-3
- Volvo VDS-4.5

Delo 400 XLE SB SAE 15W-40 is recommended for:

- **ACEA** E11
- Caterpillar ECF-3
- Ford WSS-M2C171-F1
- **JASO** DH-2
- MTU Category 2.1

TYPICAL TEST DATA

SAE Grade	15W-40
Product Number	257004
SDS Number U.S. Canada Mexico Colombia	43380 43381 43382 46894
Density at 15°C, kg/L	0.87
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	110 14.9
Viscosity, Cold Crank, °C/mPa.s	-20/5200
Viscosity, MRV, °C/mPa.s	-25/17,500
Viscosity, HTHS, mPa.s	4.2
Viscosity Index	141
Flash Point, °C(°F)	230(446)
Pour Point, °C(°F)	-39(-38)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g, ASTM D2896	8.0
Phosphorus, mass %	0.11
Sulfur, mass %	0.38
Zinc, mass %	0.12

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 XLE SB ISOCLEAN[®] CERTIFIED LUBRICANT SAE 15W-40 (Synblend)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 XLE SB SAE 15W-40 ISOCLEAN[®] Certified Lubricant with

ISOSYN[®] Advanced Technology is a premium synblend, heavy-duty engine oil optimized with a mixture of synthetic and conventional base stocks designed for extended drains (up to 1.5x OEM standard drain interval) and mixed fleets. It is recommended for naturally aspirated and turbocharged, four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4 or API SN service category and SAE 15W-40 viscosity grades are recommended. It is also approved by many of the major heavy-duty Original Equipment Manufacturers (OEM), meeting their latest engine oil specifications.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo 400 XLE SB SAE 15W-40 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is an API CK-4 heavy duty engine oil specifically formulated for on highway applications, including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO₂ emissions, in addition to 2010 compliant low emission and off-highway Tier IV diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for SAE 15W-40 premium heavy duty motor oil.

Additionally, Delo 400 XLE SB SAE 15W-40 ISOCLEAN Certified Lubricant has excellent performance in Allison heavy-duty transmission units requiring Allison TES-439 approval and provides excellent shear stability and component protection.

It is fully compatible with previous engine models and previous API Oil Service Categories.

Delo 400 XLE SB SAE 15W-40 ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Extended Drain Performance* Formulated for extended oil drain protection for both on- and off-road diesel engines. Extended oil drain potential up to 1.5x, based on the average of U.S. Class 8 engine manufacturers' recommendations.
- **Exceptional Deposit Control** Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives provide excellent diesel engine component protection.

Product(s) manufactured in the USA and Colombia. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

20 October 2024 HDMO-55 ISOCLEAN

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- Better Low Temperature Pumpability -Improved flow rate and pumpability versus conventional SAE 15W-40 oils and similar pour point to conventional SAE 10W-30 products with better cold flow properties than conventional SAE 15W-40 products.
- Long Drain Performance Formulated for long oil drain protection for both on and off-road diesel engines.
- Minimized Operating Costs Exceptional soot dispersancy and wear control. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum equipment utilization and minimal downtime.
- Excellent Emission Control System Life -Provides long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus managing your maintenance costs.
- Managed Inventory Costs Backwards compatible with previous API Oil Service Categories. Provides single solution for the oil and gas industry for both heavy duty stationary engine and Allison off highway transmission performance. Suitable for use in four-stroke gasoline and naturally aspirated turbocharged and modern electronically controlled/ low emission diesel engines. Allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that may contribute to saving money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge – Helps maximize vour bottom line business results.

ISOSYN ADVANCED TECHNOLOGY

Delo[®] 400 XLE SB SAE 15W-40 **ISOCLEAN** Certified Lubricant with ISOSYN[®] Advanced Technology is formulated using advanced additive technology to provide outstanding protection for on highway



applications including new GHG 17 compliant engines. ISOSYN Advanced Technology is the combination of

Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

Delo 400 XLE SB SAE 15W-40 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology helps to keep rings clean and free for maximum combustion pressure and to provide minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid filter plugging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, oil gelling, and minimizes the risk of valve train wear. These problems can result in excessive engine wear and bearing failure on startup, without prior indication to the operator.

Specially selected oxidation inhibitors control oxidation, sludge, and undue thickening. Its high-guality blend of anti-wear additives protects against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrainment.

¹ See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Improved engine durability with up to 44% improved liner wear²
- Potential for 1.5x extended oil life with up to 37% improved oxidation performance²
- Better reliability with up to 56% improved viscosity control²

APPLICATIONS

Delo 400 XLE SB SAE 15W-40 ISOCLEAN Certified Lubricant has a wide range of specifications and approvals. It is recommended for today's most modern on-highway low emission designs, as well as older, onhighway diesel engines. This versatile oil meets stringent emissions standards, making it an ideal choice for various industries, including oil and gas, construction, agriculture, marine, and mining.

Delo 400 XLE SB SAE 15W-40 ISOCLEAN Certified Lubricant is approved for:

- API Service Categories CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4, SN
- Allison TES-439
- Cummins CES 20086
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC III-18 LA
- DTFR 15C100 (previously known as MB 228.31)
- Mack EOS-4.5
- **MAN** M3775
- Renault RLD-3
- Volvo VDS-4.5

Delo 400 XLE SB SAE 15W-40 ISOCLEAN Certified Lubricant is recommended for:

- **ACEA** E11
- Caterpillar ECF-3
- Ford WSS-M2C171-F1
- **JASO** DH-2
- MTU Category 2.1

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	15W-40
Product Number	278017
SDS Number	43380
Canada	43381
Mexico Colombia	43382 46894
Density at 15°C, kg/L	0.87
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	110 14.9
Viscosity, Cold Crank, °C/mPa.s	-20/5200
Viscosity, MRV, °C/mPa.s	-25/17,500
Viscosity, HTHS, mPa.s	4.2
Viscosity Index	141
Flash Point, °C(°F)	230(446)
Pour Point, °C(°F)	-39(-38)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g, ASTM D2896	8.0
Phosphorus, mass %	0.11
Sulfur, mass %	0.38
Zinc, mass %	0.12

Minor variations in product typical test data are to be expected in normal manufacturing.

² Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.



DELO[®] 400 ZFA SAE 10W-30 (Synblend)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 400 ZFA SAE 10W-30 with ISOSYN[®] Advanced Technology is a premium synthetic technology fuel economy and mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API FA-4, SN or SN PLUS service category and SAE 10W-30 viscosity grade are recommended.

CUSTOMER BENEFITS

Delo 400 ZFA SAE 10W-30 (Synthetic Technology) with ISOSYN Advanced Technology is an API FA-4 heavy duty engine oil specifically formulated for on highway applications, including certain 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO_2 emissions and improved fuel economy, in addition to certain EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for SAE 10W-30 heavy duty motor oil.

Delo 400 ZFA SAE 10W-30 with ISOSYN Advanced Technology is formulated to protect new generation GHG'17 model diesel engines.

Delo 400 ZFA SAE 10W-30 delivers value through:

- **Improved Fuel Economy** Up to 1.3% improvement vs. SAE 15W-40 oils in Class 8 vehicle diesel engine bench testing programs.
- Better Low Temperature Pumpability Excellent cold flow properties help with rapid oil circulation to minimize wear during cold temperature starting.

- Exceptional Deposit Control Superb oxidation resistance, thermal stability and detergency minimize piston and turbocharger deposits.
- Minimized Operating Costs Exceptional antiwear, deposit and soot control. Cylinders, pistons, rings and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum vehicle utilization and minimal downtime.
- Excellent Emission Control System Life Provides long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus managing maintenance costs.
- Managed Inventory Costs Suitable for use in four-stroke gasoline and naturally aspirated turbocharged and modern electronically controlled/ low emission diesel engines where API FA-4 or SN performance oils are required. Allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that may contribute to saving money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

A **Chevron** company product

30 May 2024 HDMO-75

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

FEATURES

Delo[®] 400 ZFA SAE 10W-30 with ISOSYN[®] Advanced Technology is formulated using advanced



additive technology to provide outstanding protection and improved fuel economy for on-highway diesel engine applications that allow the use of an API FA-4 SAE 10W-30.

Delo 400 ZFA SAE 10W-30 is formulated with ISOSYN Advanced Technology, which is the combination of Chevron's industry-leading formulating expertise with unique, high performance additive chemistry to help extend the durability of critical engine parts.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.

Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 68% improved wear protection*
- Up to 64% improved piston deposit control*

*Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo 400 ZFA SAE 10W-30 with ISOSYN Advanced Technology helps to keep rings clean and free for maximum combustion pressure and minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid filter plugging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, and oil gelling. These problems can result in excessive engine wear and bearing failure on startup, without prior indication to the operator.

Specially selected oxidation inhibitors control oxidation, sludge, and undue thickening. Its unique blend of extreme pressure anti-wear additives protect against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrainment.

The combination of premium dispersant additives and ISOSYN Advanced Technology allows Delo 400 ZFA SAE 10W-30 to effectively disperse soot and keep it in suspension. This minimizes the risk of valve train wear and filter plugging.

Applications

Delo 400 ZFA SAE 10W-30 with ISOSYN Advanced Technology is a fuel economy and mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and fourstroke gasoline engines in which the API FA-4, SN or SN PLUS service categories and SAE 10W-30 viscosity grade are recommended. It is formulated for engines operating under severe service and in a wide range of climatic conditions.

Delo 400 ZFA SAE 10W-30 with ISOSYN Advanced Technology is formulated for exceptional performance with ultra low sulfur diesel (ULSD) and other low sulfur diesel fuels.

Delo 400 ZFA SAE 10W-30 is approved for:

- API Service Categories FA-4, SN, SN PLUS
- Cummins CES 20087
- **DTFR** 15C130 (previously known as MB Approval 228.61)
- Detroit Fluids Specification (DFS) 93K223

Delo 400 ZFA SAE 10W-30 is recommended for:

• Ford F150 diesel engines where Ford WSS-M2C214-B1 or API FA-4 SAE 10W-30 is specified

It is also recommended for today's most modern onhighway low emission designs, as well as some previous generation model diesel engines (Detroit Diesel DD15/DD13 EPA 13 and EPA 10 model diesel

engines) that are authorized to use API FA-4 SAE 10W-30 engine oils.

TYPICAL TEST DATA

SAE Grade	10W-30
Product Number	257003
SDS Number	42683
Density at 15°C, kg/L	0.867
Viscosity, Kinematic mm²/s at 40°C mm²/s at 100°C	65 9.8
Viscosity, Cold Crank, °C/mPa.s	-25/5100
Viscosity, MRV, °C/mPa.s	-30/15,400
Viscosity Index	135
Flash Point, °C(°F)	232(450)
Pour Point, °C(°F)	-48(-54)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g, ASTM D2896	10
Phosphorus, mass %	0.076
Sulfur, mass %	0.28
Zinc, mass %	0.083

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 400 ZFA ISOCLEAN[®] CERTIFIED LUBRICANT SAE 10W-30 (Synblend)



PRODUCT DESCRIPTION

"Delo. Let's go further.®"



Delo[®] 400 ZFA SAE 10W-30 ISOCLEAN[®] Certified Lubricant with

ISOSYN[®] Advanced Technology is a premium synthetic technology fuel economy and mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API FA-4, SN or SN PLUS service category and SAE 10W-30 viscosity grade are recommended. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo 400 ZFA SAE 10W-30 (Synthetic Technology) ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is an API FA-4 heavy duty engine oil specifically formulated for on highway applications, including certain 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO_2 emissions and improved fuel economy, in addition to certain EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for SAE 10W-30 heavy duty motor oil.

Delo 400 ZFA SAE 10W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is formulated to protect new generation GHG'17 model diesel engines. Delo 400 ZFA SAE 10W-30 ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Improved Fuel Economy** Up to 1.3% improvement vs. SAE 15W-40 oils in Class 8 vehicle diesel engine bench testing programs.
- Better Low Temperature Pumpability Excellent cold flow properties help with rapid oil circulation to minimize wear during cold temperature starting.
- Exceptional Deposit Control Superb oxidation resistance, thermal stability and detergency minimize piston and turbocharger deposits.
- Minimized Operating Costs Exceptional antiwear, deposit and soot control. Cylinders, pistons, rings and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum vehicle utilization and minimal downtime.
- Excellent Emission Control System Life Provides long Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus managing maintenance costs.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

30 May 2024 HDMO-75 ISOCLEAN

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- Managed Inventory Costs Suitable for use in four-stroke gasoline and naturally aspirated turbocharged and modern electronically controlled/ low emission diesel engines where API FA-4, SN or SN PLUS service category and SAE 10W-30 viscosity grades are required. Allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that may contribute to saving money, space and handling time.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

 $\mathsf{Delo}^{\texttt{R}}$ 400 ZFA SAE 10W-30 ISOCLEAN $^{\texttt{R}}$ Certified Lubricant with ISOSYN $^{\texttt{R}}$ Advanced

Technology is formulated using advanced additive technology to provide outstanding protection and improved fuel economy for on-highway diesel engine applications that allow the use of an API FA-4 SAE 10W-30.

ADVANCED

Delo 400 ZFA SAE 10W-30 ISOCLEAN Certified Lubricant is formulated with ISOSYN Advanced Technology, which is the combination of Chevron's industry-leading formulating expertise with unique, high performance additive chemistry to help extend the durability of critical engine parts.

ISOSYN ADVANCED TECHNOLOGY

ISOSYN Advanced Technology is the combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts. Delo 400 products formulated with ISOSYN Advanced Technology can provide improved engine longevity, extended oil drain performance, and excellent diesel component parts protection, helping to extend vehicle life and minimize total cost of ownership when compared with previous generation Chevron HDMO formulations.

ISOSYN Advanced Technology benefits customers by helping to provide:

- Up to 35% improved oil oxidation control*
- Up to 68% improved wear protection*
- Up to 64% improved piston deposit control*
 - *Results will vary based on the Delo 400 product, operating conditions, and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

FUNCTIONS

Delo 400 ZFA SAE 10W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology helps to keep rings clean and free for maximum combustion pressure and minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid filter plugging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, and oil gelling. These problems can result in excessive engine wear and bearing failure on startup, without prior indication to the operator.

Specially selected oxidation inhibitors control oxidation, sludge, and undue thickening. Its unique blend of extreme pressure anti-wear additives protect against valve train wear and scuffing of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrainment.

The combination of premium dispersant additives and ISOSYN Advanced Technology allows Delo 400 ZFA SAE 10W-30 ISOCLEAN Certified Lubricant to effectively disperse soot and keep it in suspension. This minimizes the risk of valve train wear and filter plugging.

¹ See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

APPLICATIONS

Delo[®] 400 ZFA SAE 10W-30 ISOCLEAN[®] Certified Lubricant with ISOSYN[®] Advanced Technology is a fuel economy and mixed fleet engine oil recommended for naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API FA-4, SN or SN PLUS service categories and SAE 10W-30 viscosity grade are recommended. It is formulated for engines operating under severe service and in a wide range of climatic conditions.

Delo 400 ZFA SAE 10W-30 ISOCLEAN Certified Lubricant with ISOSYN Advanced Technology is formulated for exceptional performance with ultra low sulfur diesel (ULSD) and other low sulfur diesel fuels.

Delo 400 ZFA SAE 10W-30 ISOCLEAN Certified Lubricant is approved for:

- API Service Categories FA-4, SN, SN PLUS
- Cummins CES 20087
- **DTFR** 15C130 (previously known as MB Approval 228.61)
- Detroit Fluids Specification (DFS) 93K223

Delo 400 ZFA SAE 10W-30 ISOCLEAN Certified Lubricant is recommended for:

• Ford F150 diesel engines where Ford WSS-M2C214-B1 or API FA-4 SAE 10W-30 is specified

It is also recommended for today's most modern onhighway low emission designs, as well as some previous generation model diesel engines (Detroit Diesel DD15/DD13 EPA 13 and EPA 10 model diesel engines) that are authorized to use API FA-4 SAE 10W-30 engine oils.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	10W-30
Product Number	278086
SDS Number	
U.S.	42683
Canada	43553
Mexico	43554
Density at 15°C, kg/L	0.867
Viscosity, Kinematic	
mm²/s at 40°C	65
mm²/s at 100°C	9.8
Viscosity, Cold Crank, °C/mPa.s	-25/5100
Viscosity, MRV, °C/mPa.s	-30/15,400
Viscosity Index	135
Flash Point, °C(°F)	232(450)
Pour Point, °C(°F)	-48(-54)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g,	
ASTM D2896	10
Phosphorus, mass %	0.076
Sulfur, mass %	0.28
Zinc, mass %	0.083

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 600 ADF 10W-30 (Synblend)

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 600 ADF 10W-30 with Ultra Low Ash Technology is a premium, high-performance, synthetic blend, heavy-duty, long drain and mixed-fleet engine oil. It is recommended for Tier IV Final & 2017 greenhouse gascompliant, naturally aspirated and turbocharged fourstroke diesel engines, in which the API CK-4 service category and 10W-30 viscosity grade are recommended. It is also formulated for mobile compressed natural gas (CNG) engines.

Delo 600 ADF 10W-30 provides extended diesel particulate filter (DPF) service intervals between manual cleanings and reduced fuel economy loss associated with DPF regenerations and ash build-up.

CUSTOMER BENEFITS

Delo 600 ADF 10W-30 with *OMNIMAX*[™] is an API CK-4 performance, heavy-duty engine oil, specifically formulated for off- and on-highway applications, including Tier IV Final and 2017 greenhouse gascompliant (GHG 2017) engines with lower CO₂ emissions, as well as EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems, calling for API CK-4. It is also approved for use in mobile CNG engines that require oils meeting Cummins Engineering Standard (CES) 20092, making it an excellent solution for fleets seeking a single product to service their diesel and CNG-fueled applications.

OMNIMAX delivers maximum system protection to both the engine and the emissions system. This allencompassing protection helps drastically reduce the rate of DPF clogging to deliver extended DPF¹



service life and industry-redefining fuel economy retention.

Delo 600 ADF 10W-30 delivers value through:

- Extended Emission Control System Interval

 Provides more than two times diesel particulate filter (DPF) service interval for minimal downtime and cleaning, thus managing your maintenance costs.
- **Maintain Fuel Economy Longer** Less metallic additive ash build-up in DPF means less fuel consumed for regeneration and less DPF back pressure to help maintain fuel economy.
- **Exceptional Deposit Control** Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives provide excellent diesel engine component protection.
- Superb Long Drain Performance Formulated for exceptional long oil drain protection for both on and off-road diesel and CNG engines.
- Minimized Operating Costs Exceptional soot dispersancy and wear control. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum equipment utilization and minimal downtime.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

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Up to 2.5 times the extended DPF ash cleaning interval and up to 3% improved fuel economy retention based on Chevron field trials and engine tests.

labor.² Problem resolution and technical advice from Chevron's lubrication experts.

 Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Delo[®] 600 ADF 10W-30 is formulated with *OMNIMAX*[™], a Chevron Patented Technology. *OMNIMAX* delivers maximum system protection to both the engine and emissions system. This allencompassing protection helps drastically reduce DPF clogging, delivering industry redefining fuel economy retention and extended DPF service life.

Delo 600 ADF 10W-30 meets or exceeds current heavy-duty engine oil specifications to provide durability and wear protection of critical diesel engine parts.

FUNCTIONS

Delo 600 ADF 10W-30 with *OMNIMAX* meets or exceeds API CK-4 performance requirements with ultra-low levels of metallic additives reducing the amount of ash build-up in engine emission after treatment systems such as diesel particulate filters (DPF) thus reducing the frequency of regeneration and unit cleaning.

Delo 600 ADF 10W-30 helps to keep rings clean and free for maximum combustion pressure and to provide minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid oil filter clogging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, oil gelling, and minimizes the risk of valve train wear.

Specially selected oxidation inhibitors control oxidation, oil thickening and sludge. Its unique blend of anti-wear additives protects against valve train wear and adhesion of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrainment.

APPLICATIONS

Delo 600 ADF 10W-30 with *OMNIMAX* is an API CK-4, ultra-low ash heavy duty engine oil specifically formulated for on highway applications, including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO_2 emissions, in addition to 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for 10W-30 premium heavy duty motor oil.

Delo 600 ADF 10W-30 with ultra-low ash additive technology is also recommended for off highway Tier IV Final emission compliant engine applications where a 10W-30 viscosity grade is required. It is formulated for engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is also approved for use in mobile CNG engines that require oils meeting Cummins Engineering Standard (CES) 20092, making it an excellent solution for fleets seeking a single product to service their diesel and CNG-fueled applications.

It is fully compatible with previous engine models and previous API Oil Service Categories.

Delo 600 ADF 10W-30 is approved:

- for use in Cummins mobile compressed natural gas (CNG) engines
- for use in mixed diesel and CNG engine fleets

Delo 600 ADF 10W-30 is also approved for:

- API Service Categories CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4
- Cummins CES 20086, CES 20092
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC IV-18 LA
- **DTFR** 15C100 (previously known as MB Approval 228.31)
- Mack EOS-4.5
- MAN M3775
- Renault RLD-3
- Volvo VDS-4.5

² See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

Delo 600 ADF 10W-30 is recommended for:

- **ACEA** E8/E11
- Caterpillar ECF-3

TYPICAL TEST DATA

SAE Grade	10W-30
Product Number	257010
SDS Number U.S. Canada Mexico	50739 50740 50741
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	79.1 11.9
Viscosity, Cold Crank, °C/mPa.s	-25/6200
Viscosity, MRV, °C/mPa.s	-30/22,200
Viscosity, HTHS, mPa.s	3.6
Viscosity Index	145
Flash Point, °C(°F)	231(448)
Pour Point, °C(°F)	-33(-27)
Sulfated Ash, mass %	0.4
Base Number, mgKOH/g, ASTM D2896	7
Sulfur, mass %	0.2

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 600 ADF ISOCLEAN[®] CERTIFIED LUBRICANT 10W-30 (Synblend)

SOCLE

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 600 ADF 10W-30 ISOCLEAN[®]

Certified Lubricant with with Ultra Low Ash Technology is a premium, high-performance, synthetic blend, heavy-duty, long drain and mixed-fleet engine oil. It is recommended for Tier IV Final & 2017 greenhouse gas-compliant, naturally aspirated and turbocharged four-stroke diesel engines, in which the API CK-4 service category and 10W-30 viscosity grade are recommended. It is also formulated for mobile compressed natural gas (CNG) engines. Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant provides extended diesel particulate filter (DPF) service intervals between manual cleanings and reduced fuel economy loss associated with DPF regenerations and ash buildup.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant with *OMNIMAX*TM is an API CK-4 performance heavyduty engine oil, specifically formulated for off- and onhighway applications, including Tier IV Final and 2017 greenhouse gas-compliant (GHG 2017) engines with lower CO₂ emissions, as well as EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems, calling for API CK-4. It is also approved for use in mobile CNG engines that require oils meeting Cummins Engineering Standard (CES) 20092, making it an excellent solution for fleets seeking a single product to service their diesel and CNG-fueled applications.

OMNIMAX delivers maximum system protection to both the engine and the emissions system. This allencompassing protection helps drastically reduce the rate of DPF clogging to deliver extended DPF¹ service life and industry-redefining fuel economy retention.

Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Extended Emission Control System Interval

 Provides more than two times diesel particulate filter (DPF) service interval for minimal downtime and cleaning, thus managing your maintenance costs.
- Maintain Fuel Economy Longer Less metallic additive ash build-up in DPF means less fuel

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 May 2024 HDMO-80 ISOCLEAN

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¹ Up to 2.5 times the extended DPF ash cleaning interval and up to 3% improved fuel economy retention based on Chevron field trials and engine tests.

consumed for regeneration and less DPF back pressure to help maintain fuel economy.

- **Exceptional Deposit Control** Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives provide excellent diesel engine component protection.
- Superb Long Drain Performance Formulated for exceptional long oil drain protection for both on and off-road diesel and CNG engines.
- Minimized Operating Costs Exceptional soot dispersancy and wear control. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum equipment utilization and minimal downtime.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.² Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Delo[®] 600 ADF 10W-30 ISOCLEAN[®] Certified Lubricant is formulated with *OMNIMAX*TM, a Chevron Patented Technology. *OMNIMAX* delivers maximum system protection to both the engine and emissions system. This all-encompassing protection helps drastically reduce DPF clogging, delivering industry redefining fuel economy retention and extended DPF service life.

Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant meets or exceeds current heavy-duty engine oil specifications to provide durability and wear protection of critical diesel engine parts.

FUNCTIONS

Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant with *OMNIMAX* meets or exceeds API CK-4 performance requirements with ultra-low levels of metallic additives reducing the amount of ash build-up in engine emission after treatment systems such as diesel particulate filters (DPF) thus reducing the frequency of regeneration and unit cleaning.

Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant helps to keep rings clean and free for maximum combustion pressure and to provide minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid oil filter clogging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, oil gelling, and minimizes the risk of valve train wear.

Specially selected oxidation inhibitors control oxidation, oil thickening and sludge. Its unique blend of anti-wear additives protects against valve train wear and adhesion of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrainment.

² See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

APPLICATIONS

Delo[®] 600 ADF 10W-30 ISOCLEAN[®] Certified Lubricant with *OMNIMAX*TM is an API CK-4, ultra-low ash heavy duty engine oil specifically formulated for on highway applications, including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO₂ emissions, in addition to 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for 10W-30 premium heavy duty motor oil.

Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant with ultra-low ash additive technology is also recommended for off highway Tier IV Final emission compliant engine applications where a 10W-30 viscosity grade is required. It is formulated for engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is also approved for use in mobile CNG engines that require oils meeting Cummins Engineering Standard (CES) 20092, making it an excellent solution for fleets seeking a single product to service their diesel and CNG-fueled applications.

It is fully compatible with previous engine models and previous API Oil Service Categories.

Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant is approved:

- for use in Cummins mobile compressed natural gas (CNG) engines
- for use in mixed diesel and CNG engine fleets

Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant is also approved for:

- API Service Categories CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4
- Cummins CES 20086, CES 20092
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC IV-18 LA
- **DTFR** 15C100 (previously known as MB Approval 228.31)
- Mack EOS-4.5
- MAN M3775
- Renault RLD-3
- Volvo VDS-4.5

Delo 600 ADF 10W-30 ISOCLEAN Certified Lubricant is recommended for:

- **ACEA** E8/E11
- Caterpillar ECF-3

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	10W-30
Product Number	257013
<i>SDS Number U.S. Canada Mexico</i>	50739 50740 50741
Density at 15°C, kg/L	0.862
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	79.1 11.9
Viscosity, Cold Crank, °C/mPa.s	-25/6200
Viscosity, MRV, °C/mPa.s	-30/22,200
Viscosity, HTHS, mPa.s	3.6
Viscosity Index	145
Flash Point, °C(°F)	231(448)
Pour Point, °C(°F)	-33(-27)
Sulfated Ash, mass %	0.4
Base Number, mgKOH/g, ASTM D2896	7
Sulfur, mass %	0.2

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 600 ADF 15W-40 (Synblend)

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 600 ADF 15W-40 with Ultra Low Ash Technology is a premium, high-performance, synthetic blend, heavy-duty, long drain and mixed-fleet engine oil. It is recommended for Tier IV Final & 2017 greenhouse gascompliant, naturally aspirated and turbocharged fourstroke diesel engines, in which the API CK-4 service category and 15W-40 viscosity grade are recommended. It is also formulated for mobile compressed natural gas (CNG) engines.

Delo 600 ADF 15W-40 provides extended diesel particulate filter (DPF) service intervals between manual cleanings and reduced fuel economy loss associated with DPF regenerations and ash build-up.

CUSTOMER BENEFITS

Delo 600 ADF 15W-40 with *OMNIMAX*[™] is an API CK-4 performance heavy-duty engine oil, specifically formulated for off- and on-highway applications, including Tier IV Final and 2017 greenhouse gascompliant (GHG 2017) engines with lower CO₂ emissions, as well as EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems, calling for API CK-4. It is also approved for use in mobile CNG engines that require oils meeting Cummins Engineering Standard (CES) 20092, making it an excellent solution for fleets seeking a single product to service their diesel and CNG-fueled applications. OMNIMAX delivers maximum system protection to both the engine and the emissions system. This allencompassing protection helps drastically reduce the rate of DPF clogging to deliver extended DPF¹ service life and industry-redefining fuel economy retention.

Delo 600 ADF 15W-40 delivers value through:

- Extended Emission Control System Interval

 Provides more than two times diesel particulate filter (DPF) service interval for minimal downtime and cleaning, thus managing your maintenance costs.
- Maintain Fuel Economy Longer Less metallic additive ash build-up in DPF means less fuel consumed for regeneration and less DPF back pressure to help maintain fuel economy.
- **Exceptional Deposit Control** Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives provide excellent diesel engine component protection.
- Superb Long Drain Performance Formulated for exceptional long oil drain protection for both on and off-road diesel and CNG engines.
- **Minimized Operating Costs** Exceptional soot dispersancy and wear control. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum equipment utilization and minimal downtime.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

30 May 2024 HDMO-85

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¹ Up to 2.5 times the extended DPF ash cleaning interval and up to 3% improved fuel economy retention based on Chevron field trials and engine tests.

- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.² Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Delo[®] 600 ADF 15W-40 is formulated with *OMNIMAX*TM, a Chevron Patented Technology. *OMNIMAX* delivers maximum system protection to both the engine and emissions systems. This allencompassing protection helps drastically reduce DPF clogging, delivering industry redefining fuel economy retention and extended DPF service life.

Delo 600 ADF 15W-40 meets or exceeds current heavy-duty engine oil specifications to provide durability and wear protection of critical diesel engine parts.

FUNCTIONS

Delo 600 ADF 15W-40 with *OMNIMAX* meets or exceeds API CK-4 performance requirements with ultra-low levels of metallic additives reducing the amount of ash build-up in engine emission after treatment systems such as diesel particulate filters (DPF) thus reducing the frequency of regeneration and unit cleaning.

Delo 600 ADF 15W-40 helps to keep rings clean and free for maximum combustion pressure and to provide minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid oil filter clogging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, oil gelling, and minimizes the risk of valve train wear.

Specially selected oxidation inhibitors control oxidation, oil thickening and sludge. Its unique blend of anti-wear additives protects against valve train wear and adhesion of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrainment.

APPLICATIONS

Delo 600 ADF 15W-40 with *OMNIMAX* is an API CK-4, ultra-low ash heavy duty engine oil specifically formulated for on highway applications, including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO_2 emissions, in addition to 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for 15W-40 premium heavy duty motor oil.

Delo 600 ADF 15W-40 with ultra-low ash additive technology is also recommended for off highway Tier IV Final emission compliant engine applications where an 15W-40 viscosity grade is required. It is formulated for engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is also approved for use in mobile CNG engines that require oils meeting Cummins Engineering Standard (CES) 20092, making it an excellent solution for fleets seeking a single product to service their diesel and CNG-fueled applications.

It is fully compatible with previous engine models and previous API Oil Service Categories.

Delo 600 ADF 15W-40 is approved:

- for use in Cummins mobile compressed natural gas (CNG) engines
- for use in mixed diesel and CNG engine fleets

Delo 600 ADF 15W-40 is also approved for:

- API Service Categories CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4
- Cummins CES 20086, CES 20092
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC III-18 LA
- **DTFR** 15C100 (previously known as MB Approval 228.31)
- Mack EOS-4.5
- MAN M3775
- Renault RLD-3
- Volvo VDS-4.5

² See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

• **ZF TE-ML** 04C

Delo 600 ADF 15W-40 is recommended for:

- **ACEA** E11
- Caterpillar ECF-3

TYPICAL TEST DATA

SAE Grade	15W-40
Product Number	257009
SDS Number U.S. Canada Mexico	50742 50743 50744 0.868
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	111.5 14.9
Viscosity, Cold Crank, °C/mPa.s	-20/6400
Viscosity, MRV, °C/mPa.s	-25/19300
Viscosity, HTHS, mPa.s	4.4
Viscosity Index	136
Flash Point, °C(°F)	248(478)
Pour Point, °C(°F)	-30(-22)
Sulfated Ash, mass %	0.4
Base Number, mgKOH/g, ASTM D2896	7
Sulfur, mass %	0.2

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 600 ADF ISOCLEAN[®] CERTIFIED LUBRICANT 15W-40 (Synblend)

SOCI E

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 600 ADF 15W-40 ISOCLEAN[®] Certified Lubricant with Ultra Low Ash

Technology is a premium, high-performance, synthetic blend, heavy-duty, long drain and mixed-fleet engine oil. It is recommended for Tier IV Final & 2017 greenhouse gas-compliant, naturally aspirated and turbocharged four-stroke diesel engines, in which the API CK-4 service category and 15W-40 viscosity grade are recommended. It is also formulated for mobile compressed natural gas (CNG) engines. Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant provides extended diesel particulate filter (DPF) service intervals between manual cleanings and reduced fuel economy loss associated with DPF regenerations and ash buildup.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant with *OMNIMAX*TM is an API CK-4 performance heavyduty engine oil, specifically formulated for off- and onhighway applications, including Tier IV Final and 2017 greenhouse gas-compliant (GHG 2017) engines with lower CO₂ emissions, as well as EPA 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems, calling for API CK-4. It is also approved for use in mobile CNG engines that require oils meeting Cummins Engineering Standard (CES) 20092, making it an excellent solution for fleets seeking a single product to service their diesel and CNG-fueled applications.

OMNIMAX delivers maximum system protection to both the engine and the emissions system. This allencompassing protection helps drastically reduce the rate of DPF clogging to deliver extended DPF¹ service life and industry-redefining fuel economy retention.

Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Extended Emission Control System Interval

 Provides more than two times diesel particulate filter (DPF) service interval for minimal downtime and cleaning, thus managing your maintenance costs.
- Maintain Fuel Economy Longer Less metallic additive ash build-up in DPF means less fuel

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

30 May 2024 HDMO-85 ISOCLEAN

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¹ Up to 2.5 times the extended DPF ash cleaning interval and up to 3% improved fuel economy retention based on Chevron field trials and engine tests.

consumed for regeneration and less DPF back pressure to help maintain fuel economy.

- **Exceptional Deposit Control** Provides high performance piston deposit control and turbocharger protection due to its superb oxidation performance. Its high performing detergent and dispersant additives provide excellent diesel engine component protection.
- Superb Long Drain Performance Formulated for exceptional long oil drain protection for both on and off-road diesel and CNG engines.
- Minimized Operating Costs Exceptional soot dispersancy and wear control. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing optimum service life and minimal maintenance. Contributes to maximum equipment utilization and minimal downtime.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.² Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Delo[®] 600 ADF 15W-40 ISOCLEAN[®] Certified Lubricant is formulated with *OMNIMAX*, a Chevron Patented Technology. *OMNIMAX* delivers maximum system protection to both the engine and emissions systems. This all-encompassing protection helps drastically reduce DPF clogging, delivering industry redefining fuel economy retention and extended DPF service life.

Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant meets or exceeds current heavy-duty engine oil specifications to provide durability and wear protection of critical diesel engine parts.

FUNCTIONS

Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant with *OMNIMAX* meets or exceeds API CK-4 performance requirements with ultra-low levels of metallic additives reducing the amount of ash build-up in engine emission after treatment systems such as diesel particulate filters (DPF) thus reducing the frequency of regeneration and unit cleaning.

Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant helps to keep rings clean and free for maximum combustion pressure and to provide minimal wear. It minimizes valve and piston crown land deposits, thus managing oil consumption. Its high level of ashless dispersants keeps fuel soot in suspension and thus helps to avoid oil filter clogging, heavy cylinder head sludge, abrasive polishing wear, high viscosity increase, oil gelling, and minimizes the risk of valve train wear.

Specially selected oxidation inhibitors control oxidation, oil thickening and sludge. Its unique blend of anti-wear additives protects against valve train wear and adhesion of highly loaded parts operating under boundary lubrication. A specially selected viscosity index improver ensures easy flow at low temperatures and excellent film protection in hot engine areas. A defoaming additive protects against air entrainment.

APPLICATIONS

Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant with *OMNIMAX* is an API CK-4, ultra-low ash heavy duty engine oil specifically formulated for on highway applications, including 2017 greenhouse gas (GHG 17) compliant diesel engines with lower CO_2 emissions, in addition to 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for 15W-40 premium heavy duty motor oil.

Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant with ultra-low ash additive technology is also recommended for off highway Tier IV Final emission compliant engine applications where an 15W-40 viscosity grade is required. It is formulated for engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is also approved for use in mobile CNG engines that require oils meeting Cummins Engineering Standard (CES) 20092, making it an excellent solution for fleets seeking a single product to service their diesel and CNG-fueled applications.

It is fully compatible with previous engine models and previous API Oil Service Categories.

² See Warranty Plus for details and restrictions.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

Delo[®] 600 ADF 15W-40 ISOCLEAN[®] Certifed Lubricant is approved:

- for use in Cummins mobile compressed natural gas (CNG) engines
- for use in mixed diesel and CNG engine fleets

Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant is also approved for:

- API Service Categories CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4
- **Cummins** CES 20086, CES 20092
- Detroit Fluids Specification (DFS) 93K222
- DEUTZ DQC III-18 LA
- **DTFR** 15C100 (previously known as MB Approval 228.31)
- Mack EOS-4.5
- MAN M3775
- Renault RLD-3
- Volvo VDS-4.5
- **ZF TE-ML** 04C

Delo 600 ADF 15W-40 ISOCLEAN Certified Lubricant is recommended for:

- **ACEA** E11
- Caterpillar ECF-3

TYPICAL TEST DATA

SAE Grade	15W-40
Product Number	257014
SDS Number U.S. Canada Mexico	50742 50743 50744
Density at 15°C, kg/L	0.868
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	111.5 14.9
Viscosity, Cold Crank, °C/mPa.s	-20/6400
Viscosity, MRV, °C/mPa.s	-25/19300
Viscosity, HTHS, mPa.s	4.4
Viscosity Index	136
Flash Point, °C(°F)	248(478)
Pour Point, °C(°F)	-30(-22)
Sulfated Ash, mass %	0.4
Base Number, mgKOH/g, ASTM D2896	7
Sulfur, mass %	0.2

Minor variations in product typical test data are to be expected in normal manufacturing.



URSA[®] SUPER PLUS SAE 30, 40

PRODUCT DESCRIPTION

Ursa[®] Super Plus monograde motor oils are recommended for use in two and four-cycle gasoline and diesel engines where the appropriate API service category and SAE 30 or 40 viscosity grade is specified by the OEM.

CUSTOMER BENEFITS

Ursa Super Plus monograde heavy duty motor oils deliver value through:

- Managed oil costs Minimal piston crownland deposits and strong oxidation stability promote low oil consumption.
- Long engine life resulting from additives that protect highly loaded parts from scuffing and wear optimizing engine overhaul intervals.
- **Outstanding engine cleanliness** High detergency provides excellent deposit and sludge control in the piston ring belt area.
- Access to Chevron's lubrication and industry knowledge — Helps maximize your bottom line business results.

FEATURES

Ursa Super Plus monograde oils are quality, mixed fleet motor oils manufactured using selected high viscosity index base oils and additives that provide protection against sludge, varnish, ash deposits, wear, oxidation, foam, corrosion, and rust.

Ursa Super Plus monograde oils utilize technology to help provide excellent performance in older model engines.

FUNCTIONS

Ursa Super Plus monograde oils are strong performing crankcase oils for older diesel engines requiring SAE 30 or 40 monograde engine oil.

They are manufactured using selected paraffinic base oils in combination with detergent, dispersant, wear control, antioxidant, corrosion inhibitor and foam suppressant additives.

APPLICATIONS

Ursa Super Plus monograde oils are ideal for older diesel engines in mixed commercial fleets, farm machinery, construction equipment, marine and other off-highway applications specifying an SAE 30 or 40 monograde engine oil.

They may also be used in four-cycle gasoline engines where this product is recommended by the OEM.

Ursa Super Plus meets the requirements of:

- API Service Categories
 - CF^{*}, CF-2^{*}
- **Detroit Diesel Corporation** 2-cycle engine recommendations (71, 92) (SAE 40)

* Obsolete specification.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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10 April 2015 HDMO-90

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TYPICAL TEST DATA

SAE Grade	30	40
Product Number	271203	271204
SDS Number	23578	23578
API Gravity	29.4	28.7
Viscosity, Kinematic cSt at 40°C cSt at 100°C	96 11.5	141 14.7
Viscosity Index	107	104
Flash Point, °C(°F)	232(450)	254(489)
Pour Point, °C(°F)	-27(-17)	-24(-11)
Sulfated Ash, wt %	0.95	0.98
Base Number, ASTM D2896	6.3	6.3
Phosphorus, wt %	0.069	0.069
Zinc, wt %	0.072	0.072

Minor variations in product typical test data are to be expected in normal manufacturing.



URSA[®] SUPER PLUS EC SAE 10W-30

PRODUCT DESCRIPTION

Ursa[®] Super Plus EC SAE 10W-30 is a cost effective, heavy duty, synblend engine oil for naturally aspirated and turbocharged four-stroke diesel engines in which the API CK-4 service category and SAE 10W-30 viscosity grade are recommended.

CUSTOMER BENEFITS

Ursa Super Plus EC SAE 10W-30 is an API CK-4 heavy duty engine oil specifically formulated for 2017 greenhouse gas (GHG 17) compliant diesel engines designed to meet lower CO_2 emissions and improved fuel economy, in addition to 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems. It is fully compatible with previous engine models and previous API Oil Service Categories.

Ursa Super Plus EC SAE 10W-30 delivers value through:

- Good Engine Protection Delivers soot dispersancy and wear control. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing long engine service life and minimal maintenance. Contributes to optimal vehicle utilization and minimal downtime.
- Appropriate Emission Control System Life Helps protect Diesel Particulate Filters (DPF) for minimal downtime and cleaning, thus managing maintenance costs.
- Managed Inventory Costs Backward compatible with all previous API Oil Service Categories and engine models. Good for service in naturally aspirated, turbocharged and modern electronically controlled/low emission diesel engines.

- **Minimized Operating Costs** Provides up to 1.2% improved fuel economy performance versus SAE 15W-40 engine oil in Class 8 trucks.¹
- Access to Chevron's Lubrication and Industry Knowledge — Helps maximize your bottom line business results.

FEATURES

Ursa Super Plus EC SAE 10W-30 is a cost-effective heavy-duty engine oil formulated to provide appropriate protection in normal operating conditions. It is designed to be a robust formulation for multiple types of applications.

APPLICATIONS

Ursa Super Plus EC SAE 10W-30 is a heavy duty engine oil recommended for four-stroke diesel engines in which the API CK-4 service category and SAE 10W-30 viscosity grade are recommended. It is formulated for engines operating under severe service and a wide range of climatic conditions.

This product is recommended for use in on-highway diesel engines that require API CK-4 service category and allow the use of an SAE 10W-30 viscosity grade. It can also be used in cold weather environments to facilitate engine start up performance.

 Actual results will vary depending upon vehicle type, load, and other driving conditions. Chevron U.S.A. Inc. makes no representations or warranties, express or implied, regarding the accuracy of the estimate provided.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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Ursa Super Plus EC SAE 10W-30 is approved for:

- API Service Categories CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4
- **Cummins** CES 20086
- Detroit Fluids Specification (DFS) 93K222
- Ford WSS-M2C171-F1
- Mack EOS-4.5
- Renault RLD-3
- Volvo VDS-4.5

Ursa Super Plus EC SAE 10W-30 meets the requirements of:

- ACEA E11
- Caterpillar ECF-3

TYPICAL TEST DATA

SAE Grade	10W-30
Product Number	257006
SDS Number	(2202
U.S.	43293
Canada Movico	43294
Mexico	43295
Density at 15°C, kg/L	0.87
Viscosity, Kinematic	
mm ² /s at 40°C	79.4
mm ² /s at 100°C	11.8
Viscosity, Cold Crank,	
°C/mPa.s	-25/6200
Viscosity, MRV, °C/mPa.s	-30/21,000
Viscosity, HTHS, mPa.s at 150°C	3.5
Viscosity Index	142
Flash Point, °C(°F)	231(448)
Pour Point, °C(°F)	-44(-47)
Sulfated Ash, mass %	1.0
Base Number, mgKOH/g, ASTM D2896	9.6
	0.0
Suirur, mass %	0.3
Phosphorus, mass %	0.10
Zinc, mass %	0.11

Minor variations in product typical test data are to be expected in normal manufacturing.



URSA[®] SUPER PLUS EC SAE 15W-40

PRODUCT DESCRIPTION

Ursa[®] Super Plus EC SAE 15W-40 is a cost effective, heavy duty, synblend engine oil recommended for all naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CK-4 or API SN service categories and SAE 15W-40 viscosity grades are recommended.

CUSTOMER BENEFITS

Ursa Super Plus EC SAE 15W-40 is an API CK-4 heavy duty engine oil specifically formulated for 2017 greenhouse gas (GHG 17) compliant diesel engines designed to meet lower CO_2 emissions and improved fuel economy, in addition to 2010 compliant low emission diesel engines with Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF) and Exhaust Gas Recirculation (EGR) systems calling for SAE 15W-40 heavy duty engine oil. It is fully compatible with previous engine models and previous API Oil Service Categories.

Ursa Super Plus EC SAE 15W-40 delivers value through:

- Good Engine Protection Disperses soot and helps control wear. Cylinders, pistons, rings, and valve train components are well protected against wear and corrosion, providing good service life and minimal maintenance.
- Appropriate Emission Control System Life Provides appropriate Diesel Particulate Filter (DPF) life for minimal downtime and cleaning, thus managing maintenance costs.
- Managed Inventory Costs Backward compatible with all previous API Oil Service Categories and engine models. Good for service in gasoline engines and naturally aspirated, turbocharged and modern electronically controlled/ low emission diesel engines.

 Access to Chevron's Lubrication and Industry Knowledge - Helps maximize your bottom line business results.

FEATURES

Ursa Super Plus EC SAE 15W-40 is a cost-effective fleet heavy duty engine oil formulated to provide appropriate protection in normal operating conditions. It is designed to be a robust formulation for multiple types of applications.

APPLICATIONS

Ursa Super Plus EC SAE 15W-40 is a heavy duty engine oil recommended for four-stroke diesel and gasoline engines in which API CK-4 or API SN service category and SAE 15W-40 viscosity grades are recommended. It is formulated for engines operating under severe service and a wide range of climatic conditions.

Ursa Super Plus EC SAE 15W-40 is approved for:

- API Service Categories CK-4, CJ-4, CI-4 PLUS, CI-4, CH-4 and SN
- Cummins CES 20086
- Detroit Fluids Specification (DFS) 93K222
- Ford WSS-M2C171-F1
- Mack EOS-4.5
- Renault RLD-3
- Volvo VDS-4.5

Ursa Super Plus EC SAE 15W-40 meets the requirements of:

- **ACEA** E11
- Caterpillar ECF-3

Product(s) manufactured in the USA and Colombia. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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TYPICAL TEST DATA

SAE Grade	15W-40
Product Number	257005
<i>SDS Number U.S. Canada Mexico Colombia</i>	43290 43291 43292 46317
Density at 15°C, kg/L	0.876
Viscosity, Kinematic mm²/s at 40°C mm²/s at 100°C	113 15.0
Viscosity, Cold Crank, °C/mPa.s	6200
Viscosity, MRV, °C/mPa.s	15,600
Viscosity, HTHS, mPa.s at 150°C	4.3
Viscosity Index	138
Flash Point, °C(°F)	235(455)
Pour Point, °C(°F)	-36(-32.8)
Sulfated Ash, mass %	1.0
Base Number, ASTM D2896, mgKOH/g	8.0
Sulfur, mass %	0.37
Phosphorus, mass %	0.12
Zinc, mass %	0.13

Minor variations in product typical test data are to be expected in normal manufacturing.



PASSENGER CAR MOTOR OILS



HAVOLINE[®] PRO-DS[®] FULL SYNTHETIC MOTOR OIL SAE 0W-16, 0W-20, 0W-40, 5W-20, 5W-30, 5W-40, 10W-30

PRODUCT DESCRIPTION

Chevron Havoline[®] PRO-DS[®] Full Synthetic Motor Oil is a premium full synthetic oil designed with a proprietary cleaning booster to provide ultimate protection that prolongs the peak performance and efficiency of your engine, especially under harsh stop-and-go driving conditions, extreme temperatures and heavy loads. It provides outstanding protection for vehicles with direct-injection and turbochargers and those that require a full synthetic motor oil. It exceeds the latest and most demanding industry and automaker standards.

FEATURES/BENEFITS

Chevron Havoline PRO-DS Full Synthetic Motor Oils use the latest full synthetic base oils and special cleaning additives, including antioxidants and friction modifiers, to provide unmatched protection and performance. They provide outstanding protection against harmful engine deposits, are formulated with low friction components for maximum fuel economy, and provide:

- Engine life extension Provides unsurpassed protection against sludge, varnish and deposit buildup to keep modern engines running cleaner, stronger, and for longer.
- Excellent wear protection Delivers excellent anti-wear protection for bearings to help preserve engines and turbocharger durability. Up to 50% lower friction-induced wear than industry standards.
- **Protection for critical engine parts** Provides unsurpassed protection for critical engine parts against Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines.

- Excellent fuel economy retention Deliver excellent fuel economy retention to help save on fuel costs.
- Corrosion protection Excellent corrosive wear protection helps prevent corrosion of critical engine parts
- Enhanced thermal stability 76% more resistance to thermal breakdown, helping to resist oil breakdown and keep oil fresher for longer
- **Compatibility with hybrids** Havoline PRO-DS is also suitable for use in Hybrid vehicles. Engineered with hybrid vehicles in mind, Havoline PRO-DS is formulated to withstand extreme levels of water and fuel contamination and fortified with corrosion and rust preventing chemistries that help preserve vital engine surfaces more than 25% better than industry requirements. It also provides 20% stronger sludge protection than industry standards and provides powerful wear protection in cold, hot and start/stop conditions.
- Maximum engine power Help maximize the power of your engine while maintaining fuel efficiency and cleanliness.
- Oil flow to protect engine components Provide excellent protection against aeration to keep oil passages flowing smoothly to protect vital components
- Peace of mind Meets or exceeds the latest rigorous industry and automaker standards, including ILSAC GF-7 / API SQ and GM's dexos1[™] Gen 3 specification

Product(s) manufactured in the USA and Colombia. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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PERFORMANCE CLAIMS

- Protection up to 10,000 miles*
- Unsurpassed cleanliness Sludge control up to 25% better than GF-7 limits¹
- Wear protection Reduces friction-related wear of critical engine parts up to 50% better than industry GF-7 limits²
- Fights thermal breakdown Unsurpassed control in fighting temperature-related oil breakdown and oil thickening up to 76% better than GF-7 limits³, helping to keep oil fresher longer
- Fuel economy Formulated with low friction components for maximum fuel economy that meets or exceeds GF-7 requirements
- Corrosion protection Excellent corrosive wear protection helps prevent corrosion of critical engine parts, up to 64% better than GF-7 limits⁴.
- dexos certification Meets or exceeds GM's dexos1[™] Gen3 specification (SAE 0W-20 and 5W-30).
- Turbo approved Excellent turbocharger efficiency and protection helps extend the life of the turbocharger⁵
- Direct injection engine protection Unsurpassed prevention of harmful combustion events and helps provide protection for critical engine parts against Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines.
- Piston deposit reduction that exceeds GF-7 requirements

*Guaranteed protection for 10,000 miles, or one year, whichever comes first. If your vehicle is under warranty, maintain oil change intervals recommended in your owner's manual. Follow your vehicle's oil warning lights. Severe service conditions are excluded.

- 1. Based on Sequence VH sludge and varnish test using SAE 0W-20
- 2. Based on Sequence IVB valve train wear test using SAE 0W-30
- 3. Based on Sequence IIIH deposit test using SAE 0W-20
- Based on Sequence VIII corrosion test using SAE 5W-30
 Based on GMTC turbocharge test using SAE 5W-30

APPLICATIONS, APPROVALS AND SPECIFICATIONS

Havoline[®] PRO-DS[®] Full Synthetic Motor Oils are recommended for advanced, high power density and performance engines with turbochargers, and gasoline direct injection. Recommended for vehicles operating in extreme hot and cold or stop-and-go driving conditions. For use in most domestic and import conventional or hybrid passenger cars, SUVs, pickup trucks and vans, including new and older vehicles.

SAE Grade	0W-16	0W-20	0W-40
API SQ/Resource Conserving	Approved	Approved	Meets API SN
ACEA A3/B3 ^a , A3/B4			Meets
Chrysler MS-6395		Meets	
Fiat 9.55535-CR-1		Meets	
Ford WSS-M2C937-A			Meets
Ford WSS-M2C962-A1 ³		Meets	
GM dexos1 Generation 3		License # D335BACH089	
ILSAC GF-7A		Approved	
ILSAC GF-7B	Approved		
RN 0700/0710			Meets
VW 502 00			Meets
VW 505 00			Meets

Meets or exceeds the following industry and OEM standards:

Meets or exceeds the following industry and OEM standards:

SAE Grade	5W-20	5W-30	5W-40	10W-30
API CF ^a			Recommended	
API SQ/Resource Conserving	Approved	Approved	Approved	Approved
ACEA A3/B3 ^a , A3/B4			Meets	
Acura/Honda HTO-06		Meets		
BMW Longlife-01 (6th Edition)			Meets	
Chrysler MS-6395	Meets	Meets		Meets
FCA US LLC (formerly Chrysler Group LLC) MS-12991			Meets	
Fiat 9.55535-CR-1	Meets	Meets		Meets
Daimler-MB Approval 229.30			Approved	
Daimler-MB Approval 229.50			Approved	
Ford WSS-M2C960-A1 ¹	Meets			
Ford WSS-M2C961-A1 ²		Meets		
SAE Grade	5W-20	5W-30	5W-40	10W-30
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GM dexos1 Generation 3		License # D335AACH089		
GM 6094M	Meets	Meets		Meets
GM 4718M		Meets		Meets
ILSAC GF-7A	Approved	Approved		Approved
Porsche A40			Meets	
VW 501.01 ^a			Recommended	
VW 502 00			Approved	
VW 505 00			Approved	

a Obsolete specification.

1 Compatible with Ford WSS-M2C945-A1/B1

2 Compatible with Ford WSS-M2C946-A1/B1

3 Compatible with Ford WSS-M2C947-A1/B1

TYPICAL TEST DATA

SAE Grade	Test Method	0W-16	0W-20	0W-40
Product Number		223517	223508	223513
SDS/MSDS Number USA Canada Mexico Colombia		48323 48325 48326	47956 47957 47958 44191	59865 59867 59866
Density at 15°C, kg/L	ASTM D4052	0.8464	0.8443	0.844
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	37.3 7.1	42.0 8.0	74.9 13.3
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-35/5100	-35/4600	5900
Viscosity Index	ASTM D2270	161	167	182
Flash Point, °C(°F)	ASTM D92	230(446)	234(453)	232(450)
Phosphorus, mass%	ASTM D4951	0.077	0.077	0.096
Ash, sulphated, mass%	ASTM D874	0.9	0.9	1.2
Zinc, mass%	ASTM D4951	0.089	0.089	0.105

Minor variations in product typical test data are to be expected in normal manufacturing.

TYPICAL TEST DATA

SAE Grade	Test Method	5W-20	5W-30	5W-40	10W-30
Product Number		223509	223510	223726	223511
SDS/MSDS Number USA Canada Mexico Colombia		47959 47960 47961 44191	47962 47963 47964 44191	36693 36710 36711	47965 47966 47967 44191
Density at 15°C, kg/L	ASTM D4052	0.8464	0.8479	0.853	0.8576
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	45.0 8.2	62.0 10.8	83.6 13.4	63.8 10.0
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-30/3800	-30/4200	-30/5600	-25/4000
Viscosity Index	ASTM D2270	160	169	163	150
Flash Point, °C(°F)	ASTM D92	227(441)	238(460)	224(435)	252(486)
Phosphorus, mass%	ASTM D4951	0.077	0.077	0.096	0.077
Ash, sulphated, mass%	ASTM D874	0.9	0.9	1.2	0.9
Zinc, mass%	ASTM D4951	0.089	0.089	0.105	0.089

To find the right Chevron Havoline product for your vehicles, please consult www.Havoline.com to find the right motor oil using our Product Selector tool.



HAVOLINE[®] PRO-DS[®] FULL SYNTHETIC MOTOR OIL SAE Euro 0W-30, Euro 5W-40

PRODUCT DESCRIPTION

Chevron Havoline[®] PRO-DS[®] Full Synthetic Motor Oil is a premium full synthetic oil specially engineered for the highest level of protection demanded by highperformance engines like European luxury vehicles and sport utility vehicles (SUV's). These motor oils help provide outstanding performance and exceptional wear protection under harsh stop-and-go driving conditions, extreme temperatures and heavy loads.

Havoline PRO-DS Full Synthetic Motor Oil delivers advanced protection for high output, supercharged and turbocharged performance vehicles, and exceeds the latest and most demanding industry and automaker standards.

CUSTOMER BENEFITS

Chevron Havoline PRO-DS Full Synthetic Motor Oil uses full synthetic base oils and special cleaning additives, including antioxidants and friction modifiers, to provide unmatched protection against harmful engine deposits and premature wear in high performance or extended service engines, outstanding thermal and shear stability to control viscosity, and superior cold temperature performance. Its exceptional resistance to volatility helps promote low oil consumption, fast engine starting (especially in cold weather), and rapid lubrication of all moving parts.

Chevron Havoline PRO-DS Full Synthetic Motor Oils help deliver:

- Engine life extension Provide outstanding protection against sludge, varnish, deposit buildup and emissions to keep modern engines running cleaner, stronger, and for longer.
- Excellent wear protection Excellent anti-wear protection with advanced additives that provide a protective layer on metal surfaces for quick

lubrication during starting to help preserve engines and turbocharger durability.

- Maximum engine power Help maximize the power of your engine while maintaining fuel efficiency and cleanliness.
- Enhanced thermal stability Excellent thermal protection in both extreme hot and cold conditions to help maintain oils' original viscosity for longer, providing protection against oil breakdown, allowing for fast starts, and maintaining fuel economy.

FEATURES/PERFORMANCE CLAIMS

Havoline PRO-DS Full Synthetic Motor Oils exhibit outstanding thermal and shear stability to control viscosity and performance during extended oil drain intervals.

The exceptional resistance to volatility and lasting stability of synthetic base stocks promotes low oil consumption, fast engine starting (especially in cold weather), and extremely rapid lubrication of all moving parts. Advanced additives also help protect highperformance engines against harmful deposits and premature wear.

Below is a summary of the Havoline PRO-DS Full Synthetic Euro Motor Oil viscosities.

Euro 0W-30:

- High-performance full synthetic motor oil specially designed for modern European vehicles with advanced cleaning additives to help protect against sludge, varnish and deposit buildup, and to extend engine life in severe operating conditions.
- Premium base oils and advanced additives offer excellent viscosity control, helping to extend oil drain periods.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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- Low temperature control helps increase engine protection and rapid lubricant circulation during cold start-ups, even when biodiesel is used.
- Suitable for a range of gasoline and diesel passenger car and light duty diesel engines without diesel particulate filters (DPF) or three way catalysts (TWC).
- Meets the requirements of ACEA A3/B4 and a range of European OEM specifications including Daimler, Volvo, VW and Renault.

Euro 5W-40:

 Select full synthetic base oils and advanced additive technology help make Euro 5W-40 a premium engine oil.



- Lower levels of Sulfated Ash, Phosphorus and Sulfur (SAPS) help to fully protect emissions reduction systems while providing outstanding protection of the engine's mechanical components.
- An ideal choice for gasoline engines equipped with three-way catalytic converters and newer, light duty diesel engines equipped with Diesel Particulate Filters (DPF).
- Helps provide protection over a broad range of engines, ranging from SUVs, luxury and highperformance vehicles to mid-size sedans and hybrid vehicles.
- Specifically formulated to meet the most demanding needs of the latest model European cars and is recommended for many BMW, Mercedes-Benz, Porsche, and Volkswagen service applications.
- Meets the requirements of API SN and ACEA C3 and is also licensed under the dexos2[™] specification (License no. D225GDDC089).¹

¹ dexos2 is a registered trademark of General Motors LLC.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

APPLICATIONS, SPECIFICATIONS, MANUFACTURER APPROVALS

Havoline[®] PRO-DS[®] Full Synthetic Motor Oils are recommended for European four-stroke gasoline and light duty diesel engines in passenger cars, sport utility vehicles, and light trucks.

Specifications	Euro 0W-30	Euro 5W-40
API SN and all previous "S" service categories		Meets
API SJ	Meets	
ACEA A3/B3 [†] , A3/B4	Meets	
ACEA C3		Meets
BMW Longlife-04 (6th Edition)		Meets
GM dexos2™		License no. D225GDDC089
Daimler-MB Approval 226.50	Approved	
Daimler-MB Approval 229.30	Approved	
Daimler-MB Approval 229.31		Approved
Daimler-MB Approval 229.50	Approved	
Daimler-MB Approval 229.51		Approved
Porsche A40		Meets
RN 0700/0710	Approved	
Volvo 95200356	Approved	
VW 502 00		Meets
VW 505 00		Approved
VW 505 01		Approved

+ Obsolete specification

TYPICAL TEST DATA

SAE Grade	Euro 0W-30	Euro 5W-40
Product Number	223512	223504
SDS/MSDS Number		
<i>U.S.</i>	59877	36238
Canada	59879	36239
Mexico	59878	36240
Colombia		41482
API Gravity	36.2	33.7
Density @15°C, kg/L	0.844	0.856
Viscosity, Kinematic		
mm²/s at 40°C	70	83.1
mm²/s at 100°C	12.3	13.8
Viscosity, Cold Crank,		
mPa.s @ -30°C	5700	5800
Viscosity Index	177	171
Volatility, NOACK, 250°C, 1 h		
Evaporation Loss, %	10	9
Phosphorus, mass %	0.096	0.082
Zinc, mass %	0.105	0.093

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] PRO-RS[™] RENEWABLE FULL SYNTHETIC MOTOR OIL SAE 0W-16, 0W-20, 5W-20, 5W-30

PRODUCT DESCRIPTION

Havoline[®] PRO-RS[™] Renewable Full Synthetic Motor Oil is a top-tier, renewable full synthetic motor oil derived from feedstock that includes 25% sustainably sourced plant-based oils. This product has all the performance benefits of a premium full synthetic motor oil¹, including excellent cleaning power and wear protection, but also provides environmental benefits like outstanding fuel economy, emission control², lower carbon³ and is a USDA Certified Biobased Product.

Havoline PRO-RS is designed with a proprietary cleaning booster to provide ultimate protection, especially under harsh stop-and-go driving conditions, extreme temperatures, and heavy loads. Havoline PRO-RS exceeds the latest and most demanding industry and automaker standards - 100% full synthetic performance without compromise.

FEATURES/BENEFITS

Havoline PRO-RS Renewable Full Synthetic Motor Oils are better for your car, better for the environment, and deliver:

- Lower carbon intensity has up to 37% lower carbon intensity than corresponding Havoline[®] PRO-DS[®] viscosity grade⁴
- The purity of plants is made with 25% sustainably sourced plant-based oils
- Proprietary ECOSTRENGTH[™] Technology process - uses Chevron's proprietary next generation ECOSTRENGTH Technology, an innovative process to develop high-performance synthetic lubricants, utilizing renewable plant-based feedstocks with pure hydrocarbon molecules that may not have any of the impurities found in traditional base oils derived from crude petroleum
- **Peace of mind** Havoline PRO-RS is a USDA Certified Biobased Product and exceeds the latest rigorous industry and automaker standards, including ILSAC GF-6 / API SP and GM's dexos1[™] Gen 3 specification (SAE 0W-20 and 5W-30)
- Superior fuel economy retention helps maintain the oil's original fuel economy benefit at least 30% longer than typical full synthetic motor oils to help save on fuel costs⁵

1 Equivalent performance to other full synthetic motor oils.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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Based on unsurpassed Sequence IIIHB result on PRO-RS 0W-30.

³ Lower carbon intensity on a lifecycle basis compared to PRO-DS SAE 0W-20 viscosity grade; lifecycle analysis based only on cradle-to-gate analysis and doesn't include carbon intensity for end-of-life or any in-use aspects of the lifecycle analysis.

⁴ Lower carbon intensity on a lifecycle basis compared to PRO-DS SAE 0W-20 viscosity grade; lifecycle analysis based only on cradle-to-gate analysis and doesn't include carbon intensity for end-of-life or any in-use aspects of the lifecycle analysis.

⁵ Based on Modified Sequence VIF Fuel Economy Retention Test @ 340 hours using SAE 0W-16; compared against Havoline PRO-DS SAE 0W-16

- Excellent thermal protection helps maintain oils' original viscosity for longer, providing protection against oil breakdown and helping to keep engines running stronger, and for longer⁶
- **Enhanced engine performance** improved stability and lower volatility oil help reduce evaporative loss while in service, maintains oil performance for longer, and helps reduce oil consumption, which leads to less oil top off⁷
- Environmental benefits excellent fuel economy retention, outstanding emission control, lower carbon, and Havoline[®] PRO-RS[™] is a USDA Certified Biobased Product.

PERFORMANCE CLAIMS

- Engine performance Extreme stress tests show Havoline PRO-RS keeps engines running efficiently up to 1.3 times longer than corresponding full synthetic motor oil¹
- Lower Oil Volatility Up to 19% lower volatility than corresponding full synthetic motor oil²
- **Turbocharger protection** Excellent turbocharger efficiency and protection helps extended the life of the turbocharger³
- Sludge control and protection best performing sludge control in the Havoline PCMO portfolio⁴ meets the most rigorous next generation OEM requirements⁵ and provides protection to help keep engines running cleaner and longer.
- Direct injection engine protection Helps provide protection for critical engine parts against Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines
- Piston deposit reduction
 - 1. Based on Modified Sequence VIF Fuel Economy Retention Test using SAE 0W-16; compared against Havoline PRO-DS SAE 0W-16
 - Based on Noack Volatility performance test using SAE 5W-20; compared against Havoline PRO-DS SAE 5W-20
 - Based on GMTC turbocharge test using SAE 5W-30 (Turbo Coolant Temperature Increase after 1800 Cycles (%))
 - 4. Based on M271SL Sludge Test using SAE 5W-30; compared against Havoline PRO-DS SAE 5W-30
 - 5. Based on Sequence VH Sludge & Deposit Test using SAE 0W-20 and SAE 5W-30 viscosity grades

⁶ Based on PVIS % (Percent Viscosity Increase) in the GM Oxidation & Deposits Test (GMOD) comparing Havoline PRO-RS 0W-20 and Havoline PRO-RS 5W-30 against Havoline PRO-DS 0W-20 and Havoline PRO-DS 5W-30

⁷ As demonstrated in less oil consumption in GMOD test when Havoline PRO-RS 0W-20 and Havoline PRO-RS 5W-30 is compared to Havoline PRO-DS 0W-20 and Havoline PRO-DS 5W-30. As demonstrated in better Noack under ASTM D5800 test when compared to Havoline PRO-DS Full Synthetic SAE 5W-20

APPLICATIONS, APPROVALS AND SPECIFICATIONS

Havoline[®] PRO-RS[™] Renewable Full Synthetic Motor Oils provide outstanding protection, especially for hybrids, vehicles with direct-injection and turbochargers and those that require a full synthetic motor oil. Recommended for vehicles operating under harsh stop-and-go driving conditions, extreme temperatures, and heavy loads. For use in most domestic and import passenger cars, SUVs, pickup trucks and vans.

SAE Grade	0W-16	0W-20	5W-20	5W-30
API SP/SN Plus/Resource Conserving	х	х	Х	Х
ILSAC GF-6A		Х	Х	Х
ILSAC GF-6B	Х			
Acura/Honda HTO-06				Х
Chrysler MS-6395		Х	Х	Х
Fiat 9.55535-CR-1		Х	Х	Х
Ford WSS-M2C960-A1 ¹			Х	
Ford WSS-M2C961-A1 ²				Х
Ford WSS-M2C962-A1 ³		Х		
GM dexos1 Generation 3		License # D335BMDI089		License # D335ALDI089
GM 6094M			Х	Х
GM 4718M				Х
USDA BioPreferred ^{®4} Certification	Х	X	Х	Х

Meets or exceeds the following industry and OEM standards:

1 Compatible with Ford WSS-M2C945-A1/B1

2 Compatible with Ford WSS-M2C946-A1/B1

3 Compatible with Ford WSS-M2C947-A1/B1

4 BioPreferred is a trademark owned by the USDA

SAE Grade	Test Method	0W-16	0W-20	5W-20	5W-30
Product Number		223520	223521	223522	223523
SDS/MSDS Number		55582	55585	53889	55592
Density at 15°C, kg/L	ASTM D4052	0.8450	0.8434	0.8470	0.8473
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	37.6 7.3	43.2 8.2	44.9 8.2	61.1 10.8
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-35/4300	-35/5000	-30/3760	-35/3700
Viscosity Index	ASTM D2270	163	168	159	170
Flash Point, °C(°F)	ASTM D92	234(453)	226(439)	246(475)	230(446)
Phosphorus, mass%	ASTM D4951	0.077	0.077	0.077	0.077
Ash, sulphated, mass%	ASTM D874	0.9	0.9	0.9	0.9
Zinc, mass%	ASTM D4951	0.089	0.089	0.089	0.089

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.

To find the right Chevron Havoline product for your vehicles, please consult www.Havoline.com to find the right motor oil using our Product Selector tool.



HAVOLINE[®] HIGH MILEAGE SYNBLEND MOTOR OIL SAE 0W-20, 5W-20, 5W-30, 10W-30

PRODUCT DESCRIPTION

Havoline[®] High Mileage SynBlend Motor Oil is a synthetic blend motor oil specially designed for highmileage vehicles or vehicles of any age. It is specially formulated with seal conditioning agents to help fight the effects of aging and extra cleaning and anti-wear additives to help extend the life of engines, particularly in severe driving conditions.

FEATURES/BENEFITS

Chevron Havoline High Mileage SynBlend Motor Oil contains additives that can help maintain the condition of seals and gaskets to control oil consumption. It is especially suited for the unique needs of engines that have accumulated 75,000 miles or more and is designed to deliver:

- Special protection for high mileage vehicles -Protection for vehicles with more than 75,000 miles to help reduce leak and prevent oil consumption with special conditioners for seals and gaskets
- **Cleaner engines** Helps reduce sludge and deposit buildup to keep engines running longer
- Wear protection Delivers anti-wear protection for bearings to help preserve engines and turbocharger durability up to 25% lower friction induced wear than industry standards
- **Protection for critical engine parts** Helps provide excellent protection for critical engine parts against Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines
- Better fuel economy retention Preserves fuel economy better than conventional motor oils to help save on fuel costs
- **Corrosion protection** Corrosive wear protection helps prevent corrosion of critical engine parts

• Thermal stability - fights temperature related oil breakdown

PERFORMANCE CLAIMS

- Protection up to 5,000 miles*
- Cleanliness Fights sludge and deposit buildup beyond GF-7 limits¹
- **Fuel economy** Fuel economy retention that meets or exceeds GF-7 requirements²
- Wear protection Reduces friction-related wear of critical engine parts up to 25% better than industry GF-7 limits³
- Corrosion protection Corrosive wear protection helps prevent corrosion of critical engine parts beyond GF-7 limits⁴

*Guaranteed protection for 5,000 miles, or one year, whichever comes first. If your vehicle is under warranty, maintain oil change intervals recommended in your owner's manual. Follow your vehicle's oil warning lights. Severe service conditions are excluded.

- 1. Based on Sequence VH sludge and varnish test using SAE 0W-20
- 2. Based on Sequence VIE fuel economy test using SAE 10W-30
- 3. Based on Sequence IVB valvetrain wear test using SAE 0W-30
- 4. Based on Sequence VIII corrosion test using SAE 5W-30

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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Both high mileage and newer cars, SUV, and light truck engines, including high-revving and/or turbocharged engines where ILSAC GF-7 and/or API SQ or previous specification is specified (specification depends on specific oil grade). Also recommended for use in mobile and stationary equipment where an API SQ or previous "S" category oil, and the appropriate viscosity grade is stipulated.

Specifications	0W-20	5W-20	5W-30	10W-30
API SQ/Resource Conserving	Х	Х	Х	Х
ILSAC GF-7A	Х	Х	Х	Х
Chrysler MS-6395	Х	Х	Х	Х
Fiat 9.55535-CR-1	Х	Х	Х	Х
Ford WSS-M2C930-A		Х		
Ford WSS-M2C960-A1 ¹		Х		
Ford WSS-M2C961-A1 ²			Х	
Ford WSS-M2C962-A1 ³	Х			
GM 6094M		Х	Х	Х

Meets or exceeds the following industry and OEM standards:

1 Compatible with Ford WSS-M2C945-A1/B1

2 Compatible with Ford WSS-M2C946-A1/B1

3 Compatible with Ford WSS-M2C947-A1/B1

TYPICAL TEST DATA

SAE Grade	Test Method	0W-20	5W-20	5W-30	10W-30
Product Number		212045	224110	224111	224112
SDS Number		52146	52628	52649	52655
Density at 15°C, kg/l	ASTM D4052	0.8509	0.8613	0.8601	0.8687
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	43.3 8.2	48.8 8.4	57.7 9.8	65.7 10.1
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-35/5500	-30/5400	-30/5100	-25/5000
Viscosity Index	ASTM D2270	168	146	157	140
Flash Point, °C(°F)	ASTM D92	232(450)	232(450)	228(442)	238(460)
Sulfated Ash, mass %	ASTM D874	0.8	0.8	0.8	0.8
Phosphorus, mass %	ASTM D4951	0.066	0.066	0.066	0.066
Zinc, mass %	ASTM D4951	0.076	0.076	0.076	0.076

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] SYNBLEND DX MOTOR OIL SAE 0W-20, 5W-30

PRODUCT DESCRIPTION

Chevron Havoline[®] SynBlend DX Motor Oil is a synthetic blend motor oil with GM dexos1[™] Gen 3 certification that contains cleaning and anti-wear additives to provide protection for modern engines to run efficiently.

FEATURES/BENEFITS

Chevron Havoline SynBlend DX Motor Oil is designed to deliver:

- **Cleaner engines** Helps reduce sludge and deposit buildup to keep engines running longer
- Wear protection Delivers anti-wear protection to help preserve bearings, camshafts and other vital engine parts
- **Protection for critical engine parts** Helps provide superior protection for critical engine parts against Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines
- Better fuel economy retention Preserves fuel economy better than conventional motor oils to help save on fuel costs
- **Corrosion protection** Corrosive wear protection helps prevent corrosion of critical engine parts
- Thermal stability Fights temperature related oil breakdown
- Peace of mind Meets or exceeds the latest industry and automaker standards, including GM's dexos1[™] Gen 3 specification

PERFORMANCE CLAIMS

- Protection up to 5,000 miles*
- Cleanliness Fights sludge and deposit buildup beyond GF-7 limits¹
- Wear protection Reduces friction-related wear of critical engine parts up to 25% better than industry GF-7 limits²
- **Thermal protection** Fights temperature-related oil breakdown and oil thickening
- **Fuel economy** Fuel economy retention that meets or exceeds GF-7 requirements³
- Corrosion protection Corrosive wear protection helps prevent corrosion of critical engine parts beyond GF-7 limits⁴
- dexos certification Meets or exceeds GM's tough dexos1 Gen3 standards

*Guaranteed protection for 5,000 miles, or one year, whichever comes first. If your vehicle is under warranty, maintain oil change intervals recommended in your owner's manual. Follow your vehicle's oil warning lights. Severe service conditions are excluded.

- 1. Based on Sequence VH sludge and varnish test using SAE 0W-20
- 2. Based on Sequence IVB valvetrain wear test using SAE 0W-30
- 3. Based on GMVFE fuel economy test using SAE 0W-20
- 4. Based on Sequence VIII corrosion test using SAE 5W-30

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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All modern car, SUV, and light truck engines, including newer turbocharged engines where ILSAC GF-7 and/or API SQ or previous specification is specified. Also recommended for use in mobile and stationary equipment where an API SQ or previous "S" category oil, and the appropriate viscosity grade is stipulated.

Meets or exceeds the following industry and OEM standards:

SAE Grade	0W-20	5W-30
API SQ/Resource Conserving	Х	Х
ILSAC GF-7A	Х	Х
Chrysler MS-6395	Х	Х
Fiat 9.55535-CR-1	Х	Х
Ford WSS-M2C961-A1 ¹		Х
Ford WSS-M2C962-A1 ²	Х	
GM dexos1 Generation 3	License # D335BVGA089	License # D335AUGB089
GM 6094M		Х

1 Compatible with Ford WSS-M2C946-A1/B1

2 Compatible with Ford WSS-M2C947-A1/B1

TYPICAL TEST DATA

SAE Grade	Test Method	0W-20	5W-30
Product Number		212043	212044
SDS Number		52555	52558
Density at 15 ^o C, kg/l	ASTM D4052	0.8437	0.8585
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	42.2 8.7	63.5 10.6
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-35/5700	-30/6100
Viscosity Index	ASTM D2270	166	158
Flash Point, ^o C(^o F)	ASTM D92	236(457)	228(442)
Sulfated Ash, wt %	ASTM D874	0.9	0.9
Phosphorus, wt %	ASTM D4951	0.077	0.077
Zinc, wt %	ASTM D4951	0.089	0.089

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] SYNBLEND DX MOTOR OIL SAE 0W-20, 5W-30

PRODUCT DESCRIPTION

Chevron Havoline[®] SynBlend DX Motor Oil is a synthetic blend motor oil with GM dexos1[™] Gen 3 certification that contains cleaning and anti-wear additives to provide protection for modern engines to run efficiently.

FEATURES/BENEFITS

Chevron Havoline SynBlend DX Motor Oil is designed to deliver:

- **Cleaner engines** Helps reduce sludge and deposit buildup to keep engines running longer
- Wear protection Delivers anti-wear protection to help preserve bearings, camshafts and other vital engine parts
- **Protection for critical engine parts** Helps provide superior protection for critical engine parts against Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines
- Better fuel economy retention Preserves fuel economy better than conventional motor oils to help save on fuel costs
- **Corrosion protection** Corrosive wear protection helps prevent corrosion of critical key engine parts
- Thermal stability Fights temperature related oil breakdown
- Peace of mind Meets or exceeds the latest industry and automaker standards, including GM's dexos1[™] Gen 3 specification

PERFORMANCE CLAIMS

- Protection up to 5,000 miles*
- Cleanliness Fights sludge and deposit buildup beyond GF-7 limits¹
- Wear protection Reduces friction-related wear of critical engine parts up to 25% better than industry GF-7 limits²
- **Thermal protection** Fights temperature-related oil breakdown and oil thickening
- **Fuel economy** Fuel economy retention that meets or exceeds GF-7 requirements³
- Corrosion protection Corrosive wear protection helps prevent corrosion of critical engine parts beyond GF-7 limits⁴
- dexos certification Meets or exceeds GM's tough dexos1 Gen3 standards

*Guaranteed protection for 5,000 miles, or one year, whichever comes first. If your vehicle is under warranty, maintain oil change intervals recommended in your owner's manual. Follow your vehicle's oil warning lights. Severe service conditions are excluded.

- 1. Based on Sequence VH sludge and varnish test using SAE 0W-20
- 2. Based on Sequence IVB valvetrain wear test using SAE 0W-30
- 3. Based on GMVFE fuel economy test using SAE 0W-20
- 4. Based on Sequence VIII corrosion test using SAE 5W-30

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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All modern car, SUV, and light truck engines, including newer turbocharged engines where ILSAC GF-7 and/or API SQ or previous specification is specified. Also recommended for use in mobile and stationary equipment where an API SQ or previous "S" category oil, and the appropriate viscosity grade is stipulated.

Meets or exceeds the following industry and OEM standards:

SAE Grade	0W-20	5W-30
API SQ/Resource Conserving	Х	Х
ILSAC GF-7A	Х	Х
Chrysler MS-6395	Х	Х
Fiat 9.55535-CR-1	Х	Х
Ford WSS-M2C961-A1 ¹		Х
Ford WSS-M2C962-A1 ²	Х	
GM dexos1 Generation 3	License # D335BVGA089	License # D335AUGB089
GM 6094M		Х

1 Compatible with Ford WSS-M2C946-A1/B1

2 Compatible with Ford WSS-M2C947-A1/B1

TYPICAL TEST DATA

SAE Grade	Test Method	0W-20	5W-30
Product Number		212043	212044
SDS Number		52555	52558
Density at 15 ^o C, kg/l	ASTM D4052	0.8437	0.8585
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	42.2 8.7	63.5 10.6
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-35/5700	-30/6100
Viscosity Index	ASTM D2270	166	158
Flash Point, ^o C(^o F)	ASTM D92	236(457)	228(442)
Sulfated Ash, wt %	ASTM D874	0.9	0.9
Phosphorus, wt %	ASTM D4951	0.077	0.077
Zinc, wt %	ASTM D4951	0.089	0.089

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] SYNBLEND MOTOR OIL SAE 5W-20, 5W-30

PRODUCT DESCRIPTION

Chevron Havoline[®] SynBlend Motor Oil is a quality synthetic blend motor oil specially formulated with extra additives that provide additional wear protection compared to conventional motor oils.

FEATURES/BENEFITS

Chevron Havoline SynBlend Motor Oil is formulated with a combination of advanced synthetic and conventional base oils plus additives to deliver:

- **Cleaner engines** Helps reduce sludge and deposit buildup to keep engines running longer.
- Wear protection Deliver anti-wear protection to help preserve bearings, camshafts and other vital engine parts.
- **Protection for critical engine parts** Helps provide protection for critical engine parts against Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines.
- Protection and performance in cold temperatures - Provide better low temperature performance and oil flow during cold starts than conventional motor oils.

PERFORMANCE CLAIMS

- Cleanliness Fights sludge and deposit buildup beyond GF-7 limits¹
- Wear protection Reduces friction-related wear of critical engine parts up to 25% better than industry GF-7 limits²
- Thermal protection Resists thermal breakdown and maintains the oil's original viscosity longer, and fights oil thickening
- Three-way catalyst protection
- Cold temperature performance Better cold start and cold temperature protection than conventional motor oils
 - 1. Based on Sequence IIIH deposit test using SAE 5W-30 & Sequence VH sludge and varnish test using SAE 0W-20
 - 2. Based on Sequence IVB valvetrain wear test using SAE 0W-30

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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Recommended for passenger cars, light trucks, SUVs, powerboats, motorcycles and other mobile and stationary equipment using four-stroke gasoline engines that specify API SQ or previous specification as well as GF-7 or previous specification.

Meets or exceeds the following industry and OEM standards:

SAE Grade	5W-20	5W-30
API SQ/Resource Conserving	х	х
ILSAC GF-7A	Х	Х
Chrysler MS-6395	Х	Х
Fiat 9.55535-CR-1		Х
Ford WSS-M2C960-A1 ¹	Х	
Ford WSS-M2C961-A1 ²		Х
GM 6094M	Х	Х

1 Compatible with Ford WSS-M2C945-A1/B1

2 Compatible with Ford WSS-M2C946-A1/B1

SAE Grade	Test Method	5W-20	5W-30
Product Number		212048	212049
<i>SDS Number U.S. Canada Mexico Colombia El Salvador</i>		31086 31087 33132 33134 33133	31086 31087 33132 33134 33133
Density @15 ^o C, kg/l	ASTM D4052	0.8621	0.8612
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	48.1 8.2	62.3 10.4
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-30/5600	-30/6300
Viscosity Index	ASTM D2270	143	157
Flash Point, ^o C(^o F)	ASTM D92	237(459)	230(446)
Sulfated Ash, wt %	ASTM D874	0.7	0.7
Phosphorus, wt %	ASTM D4951	0.077	0.077
Zinc, wt %	ASTM D4951	0.089	0.089

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] MOTOR OIL SAE 10W-30, 10W-40, 20W-50

PRODUCT DESCRIPTION

Chevron Havoline[®] Motor Oil is a conventional motor oil designed for continuous wear protection and to protect against deposits, sludge and contamination in older engines.

FEATURES/BENEFITS

Chevron Havoline Motor Oil helps protect engines under both normal and harsh driving conditions and delivers:

- **Cleaner engines** Helps reduce sludge and deposit buildup to keep engines running longer
- Wear protection Deliver anti-wear protection to help preserve bearings, camshafts and other vital engine parts
- **Protection for critical engine parts** Helps provide protection for critical engine parts against Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines

PERFORMANCE CLAIMS

- Cleanliness Fights sludge and deposit buildup beyond GF-7 limits¹
- Wear protection Reduces friction-related wear of critical engine parts up to 25% better than industry GF-7 limits²
- Thermal protection Resists thermal breakdown and maintains the oil's original viscosity longer, and fights oil thickening
- Three-way catalyst protection
 - 1. Based on Sequence IIIH deposit test using SAE 5W-30 & Sequence VH sludge and varnish test using SAE 0W-20
 - 2. Based on Sequence IVB valvetrain wear test using SAE 0W-30

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

1 April 2025 PCMO-70

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Recommended for both new and high-mileage cars, as well as turbocharged and naturally aspirated engines. Vehicles that specify API SQ or previous specification as well as GF-7 or previous specification (depending on oil grade).

Meets or exceeds the following industry and OEM standards:

SAE Grade	10W-30	10W-40	20W-50
API SQ	Х	Х	Х
API SQ/Resource Conserving	х		
ILSAC GF-7A	Х		
Chrysler MS-6395	Х		
GM 6094M	Х		
Fiat 9.55535-CR-1	Х		

TYPICAL TEST DATA

SAE Grade	Test Method	10W-30	10W-40	20W-50
Product Number		224103	224104	224105
<i>SDS/MSDS Number USA Colombia El Salvador</i>		48735 48736 49574	48735 - -	48735 - 31407
Density at 15°C, kg/L	ASTM D4052	0.8726	0.8713	0.8794
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	69.0 10.3	95.7 14.0	166.8 18.6
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-25/6500	-25/6200	-15/8300
Viscosity Index	ASTM D2270	136	150	126
Flash Point, °C(°F)	ASTM D92	236(457)	238(460)	248(478)
Sulfated Ash, mass %	ASTM D874	0.8	0.8	0.8
Phosphorus, mass %	ASTM D4951	0.077	0.077	0.077
Zinc, mass %	ASTM D4951	0.087	0.087	0.087

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] 2-CYCLE ENGINE OIL TC-W3[®]

PRODUCT DESCRIPTION

Havoline[®] 2-Cycle Engine Oil TC-W3[®] is a general purpose oil for air and water cooled 2-cycle engines.¹

CUSTOMER BENEFITS

Havoline 2-Cycle Engine Oil TC-W3 delivers value through:

- **Exceptionally clean engines** with minimum combustion chamber deposits, negligible port clogging, clean ring grooves, and free rings.
- Excellent rust protection
- Long spark plug life
- Easy mixing and stable mixtures with gasolines even at low ambient temperatures.

FEATURES

Havoline 2-Cycle Engine Oil TC-W3 is a high quality two stroke engine lubricant that delivers excellent performance in water-cooled and air-cooled applications. It is formulated to provide excellent lubrication and deposit control in a wide range of applications.

Havoline 2-Cycle Engine Oil TC-W3 contains a special ashless detergent designed to help keep piston rings from sticking promoting smooth and efficient engine operation. Havoline 2-Cycle Engine Oil TC-W3 will help keep the engine clean of deposits and will also protect the pistons from scuffing and preignition problems.

To enhance storage and transportation safety, Havoline 2-Cycle Engine Oil TC-W3 contains a high flash solvent. This solvent also allows good mixing with gasoline at very low temperatures.

It is dyed teal blue for easy identification of fuel-oil mixtures in pre-mixed applications.

APPLICATIONS

Havoline 2-Cycle Engine Oil TC-W3 is recommended for use in two-stroke engines where TC-W3 or earlier general purpose



IC-W3 or earlier general purpose lubricants are recommended. These applications include outboard engines, motorcycles, lawn mowers, scooters, golf carts, chain saws, and other two-stroke powered equipment.

Havoline 2-Cycle Engine Oil TC-W3 is well suited for engines using oil injection systems with fuel/oil mixture ratios of up to 150:1.

Havoline 2-Cycle Engine Oil TC-W3 has excellent low temperature mixing characteristics that make it suitable for use in cold climate conditions.

Havoline 2-Cycle Engine Oil TC-W3:

- is licensed under the NMMA TC-W3 performance standard. Registration #RL-697232A.
- is recommended for API TC requirements for use in air-cooled two-stroke applications

The mixing chart below is a guide for correct fuel-blend ratios as recommended by engine manufacturers.

Ounces of oil to add:

Gallons of Gasoline	1	2	3	4	5	6
16:1 Ratio	8	16	24	32	40	48
24:1 Ratio	5	11	16	21	27	32
32:1 Ratio	4	8	12	16	20	24
50:1 Ratio	3	5	8	11	13	16
100:1 Ratio	2	3	4	6	7	8

1 TC-W3 is a registered trademark of The National Marine Manufacturers Association.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 December 2022 PCMO-100

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TYPICAL TEST DATA

Product Number	221896
<i>SDS/MSDS Number USA Colombia El Salvador</i>	8629 33698 33699
Density at 15°C, kg/L	0.87
Viscosity, Kinematic, cSt at 100°C	9.3
Viscosity, Brookfield, cP at -25°C	6120
Flash Point PM, °C(°F)	88(190)
Sulfated Ash, wt %	0
Base Number, ASTM D2896	4.7

Minor variations in product typical test data are to be expected in normal manufacturing.



SUPREME MOTOR OIL SAE 10W-30, 10W-40, 20W-50, 30, 40

PRODUCT DESCRIPTION

Supreme Motor Oil is a quality conventional motor oil that protects against harmful deposits, sludge and contamination in automotive engine applications.

FEATURES/BENEFITS

Supreme Motor Oil is specifically formulated with quality base oils and cutting-edge additives to:

- Help maximize the power of your engine while maintaining cleanliness.
- Deliver good protection against sludge and deposit formation under both normal and challenging driving conditions.
- Help prevent Low Speed Pre-Ignition (LSPI) in turbocharged direct-injection engines.
- Help maximize the life of catalytic converters / emissions control systems.
- Slow the aging process by reducing wear to keep engines running longer.

PERFORMANCE CLAIMS

- Keeps engines clean through sludge prevention and limits deposit formation better than industry standard
- Excellent three-way catalyst protection
- Reduces friction-related wear up to 25% better than GF-7 limit¹.
 - 1. Based on Sequence IVB valvetrain wear test using SAE 0W-30

APPLICATIONS, SPECIFICATIONS & APPROVALS

Suitable for both new and high-mileage cars, as well as turbocharged and naturally aspirated engines. Primarily for older engines that specify legacy API specifications (SN Plus, SN, SL, SJ, SG, SF). Also, for use in lawnmowers, forestry equipment, construction, snow blowers and other four-stroke engines that specify a single oil weight (SAE 30 and SAE 40).

Suitable for use in:

SAE Grade	10W-30	10W-40	20W-50	30	40
Compressed natural gas (CNG)/Liquified petroleum gas (LPG)	Х	Х	Х		

Product(s) manufactured in the USA and El Salvador.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 April 2025 PCMO-20

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SAE Grade	10W-30	10W-40	20W-50	30	40
API SQ	Х	Х	Х	Х	Х
API SQ/Resource Conserving	Х				
ILSAC GF-7A	Х				
Chrysler MS-6395	Х				
Fiat 9.55535-CR-1	Х				
GM 6094M	Х				

Meets or exceeds the following industry and OEM standards:

TYPICAL TEST DATA

SAE Grade	Test Method	10W-30	10W-40	20W-50	30	40
Product Number		224118	224119	224120	224114	224115
SDS Number U.S. El Salvador		17483 48759	6717 —	6717 48770	6717 —	6717 —
Density at 15°C, kg/l	ASTM D4052	0.8726	0.8713	0.8794	0.8785	0.8807
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	69.0 10.3	95.7 14.0	165.5 18.5	82.3 10.5	116.2 13.4
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-25/6500	-25/6200	-15/8300	N/A	N/A
Viscosity Index	ASTM D2270	136	150	126	112	112
Flash Point, °C(°F)	ASTM D92	236(457)	238(460)	248(478)	246(474)	272(521)
Sulfated Ash, wt %	ASTM D874	0.8	0.8	0.8	0.8	0.8
Phosphorus, wt %	ASTM D4951	0.067	0.067	0.067	0.067	0.067
Zinc, wt %	ASTM D4951	0.075	0.075	0.075	0.075	0.075

Minor variations in product typical test data are to be expected in normal manufacturing.



SUPREME MOTOR OIL ISOCLEAN[®] CERTIFIED LUBRICANT SAE 10W-30

PRODUCT DESCRIPTION

Supreme ISOCLEAN[®] Certified Lubricant SAE 10W-30 is a premium quality motor oil that protects against harmful deposits, sludge and



contamination in automotive engine applications. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

FEATURES/BENEFITS

Supreme ISOCLEAN Certified Lubricant SAE 10W-30 delivers value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.

Supreme ISOCLEAN Certified Lubricant SAE 10W-30 is specifically formulated with quality base oils and cutting-edge additives to:

- Help maximize the power of your engine while maintaining cleanliness.
- Deliver good protection against sludge and deposit formation under both normal and challenging driving conditions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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- Help prevent Low Speed Pre-Ignition (LSPI) in turbocharged direct-injection engines.
- Help maximize the life of catalytic converters / emissions control systems.
- Slow the aging process by reducing wear to keep engines running longer.

PERFORMANCE CLAIMS

- Keeps engines clean through sludge prevention and limits deposit formation better than industry standard
- Excellent three-way catalyst protection
- Reduces friction-related wear up to 25% better than $GF-7 \text{ limit}^1$.
 - 1. Based on Sequence IVB valvetrain wear test using SAE 0W-30

1 April 2025 PCMO-20 ISOCLEAN

Suitable for both new and high-mileage cars, turbocharged and naturally aspirated engines, and compressed natural gas (CNG)/liquified petroleum gas (LPG) engines. Primarily for older engines that specify legacy API specifications (SN Plus, SN, SL, SJ, SG, SF).

Meets or exceeds the following industry and OEM standards:

SAE Grade	10W-30
API SQ	Х
API SQ/Resource Conserving	Х
ILSAC GF-7A	Х
Chrysler MS-6395	Х
Fiat 9.55535-CR-1	Х
GM 6094M	Х

TYPICAL TEST DATA

SAE Grade	Test Method	10W-30
Product Number		274315
<i>SDS Number U.S. Canada Mexico</i>		17483 17483CAN 17483MEX
Density at 15°C, kg/l	ASTM D4052	0.8726
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	69.0 10.3
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-25/6500
Viscosity Index	ASTM D2270	136
Flash Point, °C(°F)	ASTM D92	236(457)
Sulfated Ash, wt %	ASTM D874	0.8
Phosphorus, wt %	ASTM D4951	0.067
Zinc, wt %	ASTM D4951	0.075

Minor variations in product typical test data are to be expected in normal manufacturing.



SUPREME SYNTHETIC MOTOR OIL SAE 0W-20, 5W-20, 5W-30

PRODUCT DESCRIPTION

Supreme Synthetic Motor Oil is a quality synthetic oil that provides enhanced protection in the areas of deposit control, sludge prevention, and wear protection, to keep older engines running clean and strong.

FEATURES/BENEFITS

Supreme Synthetic Motor Oil is formulated with advanced additives to protect the engine under both normal and harsh driving conditions and to:

- Flow better at low temperatures than conventional motor oils for extra protection during cold starts.
- Provide enhanced protection against sludge and deposit formation.
- Help prevent Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines to protect critical engine parts.
- Help maximize the life of catalytic converters / emissions control systems.
- Slow the aging process by reducing wear to keep engines running longer.

PERFORMANCE CLAIMS

- Keeps engines clean with sludge protection up to 8% better than GF-7 limit¹.
- Helps the oil retain its original viscosity longer. Resists thermal breakdown.
- Excellent three-way catalyst protection.
- Reduces friction-related wear up to 25% better than GF-7 limit².
- Prevents corrosive wear.
 - 1. Based on Sequence VH sludge and varnish test using SAE 0W-20
 - 2. Based on Sequence IVB valve train wear test using SAE 0W-30

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 April 2025 PCMO-30

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Suitable for both new and high-mileage cars, as well as turbocharged and naturally aspirated engines. Vehicles that specify API SQ or previous specification as well as GF-7 or previous specification.

Meets or exceeds the following industry and OEM standards:

SAE Grade	0W-20	5W-20	5W-30
API SQ/Resource Conserving	Х	Х	Х
ILSAC GF-7A	Х	Х	Х
Fiat 9.55535-CR-1	Х	Х	Х
Ford WSS-M2C960-A1 ¹		Х	
Ford WSS-M2C961-A1 ²			Х
Ford WSS-M2C961-A1 ³	Х		
GM 6094M			Х

1 Compatible with Ford WSS-M2C945-A1/B1

2 Compatible with Ford WSS-M2C946-A1/B1

3 Compatible with Ford WSS-M2C947-A1/B1

TYPICAL TEST DATA

SAE Grade	Test Method	0W-20	5W-20	5W-30
Product Number		220113	220114	220115
SDS Number U.S. Canada Mexico		64794 64794 64794	64796 64796 64796	64793 64793 64793
Density at 15°C, kg/l	ASTM D4052	0.8470	0.8512	0.8538
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	45.0 8.3	47.5 8.3	56.8 10.0
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	5700	4400	5000
Viscosity Index	ASTM D2270	163	151	165
Flash Point, °C(°F)	ASTM D92	226	233	238
Sulfated Ash, wt %	ASTM D874	0.9	0.9	0.9
Phosphorus, wt %	ASTM D4951	0.066	0.066	0.066
Zinc, wt %	ASTM D4951	0.076	0.076	0.076

Minor variations in product typical test data are to be expected in normal manufacturing.



SUPREME SYNBLEND MOTOR OIL SAE 5W-20, 5W-30

PRODUCT DESCRIPTION

Supreme SynBlend Motor Oil is a quality synthetic blend oil that provides enhanced protection in the areas of deposit control, sludge prevention, and wear protection, to keep older engines running clean and strong.

FEATURES/BENEFITS

Supreme SynBlend Motor Oil is formulated with advanced additives to protect the engine under both normal and harsh driving conditions and to:

- Flow better at low temperatures than conventional motor oils for extra protection during cold starts.
- Provide enhanced protection against sludge and deposit formation.
- Help prevent Low Speed Pre-Ignition (LSPI) in turbocharged direct injection engines to protect critical engine parts.
- Help maximize the life of catalytic converters / emissions control systems.
- Slow the aging process by reducing wear to keep engines running longer.

PERFORMANCE CLAIMS

- Keeps engines clean with sludge protection up to 8% better than GF-7 limit¹ (5W-30).
- Helps the oil retain its original viscosity longer. Resists thermal breakdown.
- Excellent three-way catalyst protection.
- Reduces friction-related wear up to 25% better than GF-7 limit² (5W-30).
- Prevents corrosive wear.
 - 1. Based on Sequence VH sludge and varnish test using SAE 0W-20
 - 2. Based on Sequence IVB valvetrain wear test using SAE 0W-30

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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Suitable for both new and high-mileage cars, turbocharged and naturally aspirated engines, as well as vehicles that specify API SQ or previous specification as well as GF-7 or previous specification.

Meets or exceeds the following industry and OEM standards:

SAE Grade	5W-20	5W-30
	API SQ/ Resource Conserving X	API SQ/ Resource Conserving X
	ILSAC GF-7A X	ILSAC GF-7A X
Chrysler MS-6395	Х	Х
Fiat 9.55535-CR-1	Х	Х
Ford WSS-M2C960-A1 ¹	Х	
Ford WSS-M2C961-A1 ²		Х
GM 6094M	Х	Х

1 Compatible with Ford WSS-M2C945-A1/B1

2 Compatible with Ford WSS-M2C946-A1/B1

TYPICAL TEST DATA

SAE Grade	Test Method	5W-20	5W-30
Product Number		212046	212047
<i>SDS Number U.S. Canada Mexico</i>		52278 52279 52280	52278 52279 52280
Density at 15°C, kg/l	ASTM D4052	0.8621	0.8618
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445 ASTM D445	48.4 8.2	62.3 10.2
Viscosity, Cold Crank (CCS) (cP), CCS @ °C	ASTM D5293	-30/5600	-30/5900
Viscosity Index	ASTM D2270	144	153
Flash Point, °C(°F)	ASTM D92	237(459)	230(446)
Sulfated Ash, wt %	ASTM D874	0.7	0.7
Phosphorus, wt %	ASTM D4951	0.066	0.066
Zinc, wt %	ASTM D4951	0.076	0.076

Minor variations in product typical test data are to be expected in normal manufacturing.



TRANSMISSION AND TORQUE FLUIDS



CHEVRON 1000 THF

PRODUCT DESCRIPTION

Chevron 1000 THF is a high quality, multifunctional tractor hydraulic fluid, specially formulated for use in transmissions, final drives, wet brakes, and hydraulic systems of tractors and other equipment employing a common fluid reservoir.

CUSTOMER BENEFITS

Chevron 1000 THF delivers value through:

- Low operating costs Chevron 1000 THF meets or exceeds fluid performance requirements of most OEM's, maintaining efficiency and reliability while minimizing overall operating costs.
- Long equipment life Special additives protect metal surfaces against scuffing and wear even under severe operating conditions leading to maximum equipment life.
- Low inventory cost One fluid does the job of a full range of tractor hydraulic systems. Can replace multiple products and free up shelf space.
- Minimizing weather and storage concerns Protects against rust and corrosion of highly finished precision parts when operating in humid conditions and during seasonal shutdown periods.
- Minimal downtime Good compatibility with seals, O-rings, and packing materials maintains their good condition and keeps leakage at a minimum.
- **Smooth operation** Formulated to suppress brake "chatter" and transmission "slip" for quiet and efficient action of brakes and transmission.
- Reliable operation Formulation helps keep metal parts clean and free of varnish and sludge deposits that could result in premature breakdown.
- Fast service time Orange color helps identify origin point of incidental leaks for easy detection and quick remedy.

FEATURES

Chevron 1000 THF is a high quality, multifunctional tractor hydraulic fluid, specially formulated for use in transmissions, final drives, wet brakes, and hydraulic systems of tractors and other equipment employing a common fluid reservoir.

It is formulated with highly refined base stocks, a viscosity index improver, oxidation and corrosion inhibitors, antiwear, friction modifiers, an antifoaming agent, and a pour point depressant.

Its distinctive orange color allows for easy product identification and leak detection.

Chevron 1000 THF meets the needs of modern tractors for a multi-functional lubricant. It is designed for many uses, such as lubrication of the transmission and final drive, and serves as a hydraulic fluid to operate power steering units, brakes, implements, and attachments.

Chevron 1000 THF is formulated to suppress brake "chatter" and excessive brake facing wear. It offers smooth operation of clutch packs and wet brakes, provides excellent shifting action, provides exceptional rust and corrosion protection for vital parts, and minimizes leakage because of good compatibility with seals, O-rings, and packing materials.

It helps prevent sludge and varnish formation, protects metal surfaces against scuffing and wear, and provides outstanding lubrication for spur, helical, and spiral bevel final drive gears.

Chevron 1000 THF is compatible with equipment manufacturer's proprietary fluids and other fluids of this type.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 November 2024 TTF-3

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APPLICATIONS

Chevron 1000 THF meets requirements by Hitachi for aftermarket use and is recommended for use in its Rigid Dump Trucks (model codes EH3500AC-3, EH4000AC-3 & EH5000AC-3).

It is also recommended for use:

- in ABB Dodge controlled start-up transmissions
- in non-hypoid API GL-4 applications
- in Hitachi mid-sized wheel loader axle applications, transfer case and hydraulics
- as a multifunctional fluid in many types of farm tractors and equipment
- in applications which call for the following OEM lubricant specifications:
 - AGCO Power Fluid 821XL
 - Case Corporation JIC-143, JIC-145, MS 1206, MS 1207, MS 1209, MS 1210 (TCH)
 - Case New Holland MAT 3505, MAT 3525, MAT 3540*
 - Caterpillar TO-2¹
 - Ford New Holland ESN-M2C134-D, FNHA 2 C 201.00
 - International Harvester B6
 - John Deere JDM J20C
 - Kubota UDT
 - Massey Ferguson M1135¹, M1141, M1143, M1145
 - Minneapolis-Moline Q-1722¹, Q-1766¹, Q-1766B¹
 - **Oliver** Q-1705¹
 - Renk Doromat 874A¹ and 874B¹
 - Volvo 97303 (WB 101)
 - White Farm Equipment Q-1826¹
 - **ZF** TE-ML 03E, TE-ML 05F, TE-ML 17E, TE-ML 21F

Chevron 1000 THF is also an excellent hydraulic fluid for many types of hydraulic systems requiring an antiwear hydraulic fluid in this viscosity range. It passes the High Pressure Vane Pump Test, ASTM D2882, with less than 15 mg steel weight loss. Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

Product Number		226606
SDS Number USA Colombia El Salvador		7648 33702 33703
API Gravity	ASTM D1298	30.5
Density @ 15°C, g/L	ASTM D4052	0.8656
Viscosity Index	ASTM D2270	145
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	58.4 9.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	271 57.5
Viscosity, Brookfield cP at -35°C	ASTM D2983	40,000
Flash Point, °C(°F)	ASTM D92	235(455)
Pour Point, °C(°F)	ASTM D97	-44(-47)
Color	Visual	Orange

Minor variations in product typical test data are to be expected in normal manufacturing.

*Suitable for use for tractors requiring Case New Holland MAT 3540, except for the following tractors built after 2012: Case IH Steiger, Quadtrac, Magnum, and New Holland T8 and T9 series.

Caution: Some of the specifications are no longer deemed active by the original equipment manufacturer. Significant harm to the transmission, hydraulic system, seals, final drive or axles is possible when using this product in applications in which it is not intended.



CHEVRON 1000 THF ISOCLEAN[®] Certified Lubricant

PRODUCT DESCRIPTION

Chevron 1000 THF ISOCLEAN[®] Certified Lubricant is a high quality, multifunctional tractor hydraulic fluid, specially formulated for use in



transmissions, final drives, wet brakes, and hydraulic systems of tractors and other equipment employing a common fluid reservoir. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Chevron 1000 THF ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Low operating costs Chevron 1000 THF meets or exceeds fluid performance requirements of most OEM's, maintaining efficiency and reliability while minimizing overall operating costs.
- Long equipment life Special additives protect metal surfaces against scuffing and wear even under severe operating conditions leading to maximum equipment life.

- Low inventory cost One fluid does the job of a full range of tractor hydraulic systems. Can replace multiple products and free up shelf space.
- **Minimizing weather and storage concerns** Protects against rust and corrosion of highly finished precision parts when operating in humid conditions and during seasonal shutdown periods.
- **Minimal downtime** Good compatibility with seals, O-rings, and packing materials maintains their good condition and keeps leakage at a minimum.
- **Smooth operation** Formulated to suppress brake "chatter" and transmission "slip" for quiet and efficient action of brakes and transmission.
- **Reliable operation** Formulation helps keep metal parts clean and free of varnish and sludge deposits that could result in premature breakdown.
- Fast service time Orange color helps identify origin point of incidental leaks for easy detection and quick remedy.

FEATURES

Chevron 1000 THF ISOCLEAN Certified Lubricant is a high quality, multifunctional tractor hydraulic fluid, specially formulated for use in transmissions, final drives, wet brakes, and hydraulic systems of tractors and other equipment employing a common fluid reservoir.

It is formulated with highly refined base stocks, a viscosity index improver, oxidation and corrosion inhibitors, antiwear, friction modifiers, an antifoaming agent, and a pour point depressant.

Its distinctive orange color allows for easy product identification and leak detection.

Chevron 1000 THF ISOCLEAN Certified Lubricant meets the needs of modern tractors for a multi-functional lubricant. It is designed for many uses, such as lubrication of the transmission and final drive, and

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 November 2024 TTF-3 ISOCLEAN

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serves as a hydraulic fluid to operate power steering units, brakes, implements, and attachments.

Chevron 1000 THF ISOCLEAN[®] Certified Lubricant is formulated to suppress brake "chatter" and excessive brake facing wear. It offers smooth operation of clutch packs and wet brakes, provides excellent shifting action, provides exceptional rust and corrosion protection for vital parts, and minimizes leakage because of good compatibility with seals, O-rings, and packing materials.

It helps prevent sludge and varnish formation, protects metal surfaces against scuffing and wear, and provides outstanding lubrication for spur, helical, and spiral bevel final drive gears.

Chevron 1000 THF ISOCLEAN Certified Lubricant is compatible with equipment manufacturer's proprietary fluids and other fluids of this type.

APPLICATIONS

Chevron 1000 THF ISOCLEAN Certified Lubricant meets requirements by Hitachi for aftermarket use and is recommended for use in its Rigid Dump Trucks (model codes EH3500AC-3, EH4000AC-3 & EH5000AC-3).

It is also recommended for use:

- in ABB Dodge controlled start-up transmissions
- in non-hypoid API GL-4 applications
- in Hitachi mid-sized wheel loader axle applications, transfer case and hydraulics
- as a multifunctional fluid in many types of farm tractors and equipment
- in applications which call for the following OEM lubricant specifications:
 - AGCO Power Fluid 821XL
 - Case Corporation JIC-143, JIC-145, MS 1206, MS 1207, MS 1209, MS 1210 (TCH)
 - Case New Holland MAT 3505, MAT 3525, MAT 3540*
 - **Caterpillar** TO-2¹
 - Ford New Holland ESN-M2C134-D, FNHA 2 C 201.00
 - International Harvester B6
 - John Deere JDM J20C

- Kubota UDT
- Massey Ferguson M1135¹, M1141, M1143, M1145
- Minneapolis-Moline Q-1722¹, Q-1766¹, Q-1766B¹
- **Oliver** Q-1705¹
- Renk Doromat 874A¹ and 874B¹
- Volvo 97303 (WB 101)
- White Farm Equipment Q-1826¹
- **ZF** TE-ML 03E, TE-ML 05F, TE-ML 17E, TE-ML 21F

Chevron 1000 THF ISOCLEAN Certified Lubricant is also an excellent hydraulic fluid for many types of hydraulic systems requiring an anti-wear hydraulic fluid in this viscosity range. It passes the High Pressure Vane Pump Test, ASTM D2882, with less than 15 mg steel weight loss.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

*Suitable for use for tractors requiring Case New Holland MAT 3540, except for the following tractors built after 2012: Case IH Steiger, Quadtrac, Magnum, and New Holland T8 and T9 series.

Caution: Some of the specifications are no longer deemed active by the original equipment manufacturer. Significant harm to the transmission, hydraulic system, seals, final drive or axles is possible when using this product in applications in which it is not intended.

TYPICAL TEST DATA

Product Number		278021
SDS Number USA Canada Mexico Colombia El Salvador		7648 7648CAN 7648MEX 33702 33703
API Gravity	ASTM D1298	30.5
Density @ 15°C, g/L	ASTM D4052	0.8656
Viscosity Index	ASTM D2270	145
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	58.4 9.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	271 57.5
Viscosity, Brookfield cP at -35°C	ASTM D2983	40,000
Flash Point, °C(°F)	ASTM D92	235(455)
Pour Point, °C(°F)	ASTM D97	-44(-47)
Color	Visual	Orange

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON ATF HD 389

PRODUCT DESCRIPTION

Chevron ATF HD 389 is designed for Allison onhighway, heavy-duty transmissions which require the TES-389 Schedule One ATF. It is also suitable for use in most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes which need a high-performance, multi-purpose, power transmission fluid.

CUSTOMER BENEFITS

Chevron ATF HD 389 delivers value through:

- **Protection** against the formation of lacquers, sludge, or other harmful deposits.
- **Exceptional stability** provided by high-quality base oil and oxidation inhibitors.
- Compatibility with seals Especially effective in protecting fluoroelastomer seals used in Allison heavy-duty transmissions.
- Fast circulation during cold weather and excellent lubricating body when hot.
- Easy identification Dyed red in color.

FEATURES

Chevron ATF HD 389 is formulated with Group II base stocks and additives that help provide oxidation and thermal stability, friction control, load-carrying ability, corrosion and wear protection. It helps protect against the formation of deposits, sludge, varnish, and foam.

Chevron ATF HD 389 provides outstanding durability.

Under the most severe operating conditions, Chevron ATF HD 389:

- maintains friction control for smooth shift action.
- protects against cracking of fluoroelastomer seals used in Allison transmissions.
- retains low temperature fluidity and high temperature stability for long operating periods.

- protects automatic transmission fluid coolers from corrosion.
- minimizes the chances of a transmission overhaul due to sludge, corrosion, and wear.

APPLICATIONS

Chevron ATF HD 389 is designed for Allison on-highway, heavy-duty transmissions which require the TES-389 Schedule One ATF. It is also suitable for use in most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes which need a high-performance, multi-purpose, power transmission fluid.

Chevron ATF 389 is suitable for use in Weber-Hydraulik cab tilt systems.

Chevron ATF HD 389 meets or exceeds the performance requirements of:

- Allison TES-389

Chevron ATF HD 389 is recommended for:

- Allison C-4 Fluid
- Ford MERCON^{®1}
- General Motors DEXRON^{®2}-III H

Allison transmissions manufactured in 2007 and beyond can use either a DEXRON-VI or TES-389 fluid. Allison models built in 2006 or earlier should use only a TES-389 fluid to ensure seal compatibility.

Chevron ATF HD 389 has the following qualifications:

	West	Central	East
Allison TES-	AA-	AA-	AA-
389	33902015	33832015	34052015

1 MERCON is a registered trademark of Ford Motor Company.

2 DEXRON is a registered trademark of General Motors LLC.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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1 June 2023 TTF-18

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Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in a breathing apparatus or medical equipment.

TYPICAL TEST DATA

SAE Grade	10W
Product Number	226534
SDS Number	20495
API Gravity	33.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	34.3 7.1
Viscosity, Brookfield cP at -40°C	17,000
Viscosity Index	176
Flash Point, °C(°F)	206(403)
Pour Point, °C(°F)	-48(-54)
Color	Red

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON ATF HD 389 ISOCLEAN[®] Certified Lubricant

PRODUCT DESCRIPTION

Chevron ATF HD 389 ISOCLEAN[®] Certified Lubricant is designed for Allison on-highway, heavy-duty transmissions which require the TES-



389 Schedule One ATF. It is also suitable for use in most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes which need a high-performance, multi-purpose, power transmission fluid. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Chevron ATF HD 389 ISOCLEAN Certified Lubricant delivers value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Protection** against the formation of lacquers, sludge, or other harmful deposits.
- **Exceptional stability** provided by high-quality base oil and oxidation inhibitors.
- **Compatibility with seals** Especially effective in protecting fluoroelastomer seals used in Allison heavy-duty transmissions.

- Fast circulation during cold weather and excellent lubricating body when hot.
- Easy identification Dyed red in color.

FEATURES

Chevron ATF HD 389 ISOCLEAN Certified Lubricant is formulated with Group II base stocks and additives that help provide oxidation and thermal stability, friction control, load-carrying ability, corrosion and wear protection. It helps protect against the formation of deposits, sludge, varnish, and foam.

Chevron ATF HD 389 ISOCLEAN Certified Lubricant provides outstanding durability.

Under the most severe operating conditions, Chevron ATF HD 389 ISOCLEAN Certified Lubricant:

- maintains friction control for smooth shift action.
- protects against cracking of fluoroelastomer seals used in Allison transmissions.
- retains low temperature fluidity and high temperature stability for long operating periods.
- protects automatic transmission fluid coolers from corrosion.
- minimizes the chances of a transmission overhaul due to sludge, corrosion, and wear.

APPLICATIONS

Chevron ATF HD 389 ISOCLEAN Certified Lubricant is designed for Allison on-highway, heavy-duty transmissions which require the TES-389 Schedule One ATF. It is also suitable for use in most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes which need a highperformance, multi-purpose, power transmission fluid.

Chevron ATF 389 ISOCLEAN Certified Lubricant is suitable for use in Weber-Hydraulik cab tilt systems.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 June 2023 TTF-18 ISOCLEAN

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Chevron ATF HD 389 ISOCLEAN® Certified Lubricant meets or exceeds the performance requirements of:

- Allison TES-389

Chevron ATF HD 389 ISOCLEAN Certified Lubricant is recommended for:

- Allison C-4 Fluid
- Ford MERCON®1
- General Motors DEXRON^{®2}-III H

Allison transmissions manufactured in 2007 and beyond can use either a DEXRON-VI or TES-389 fluid. Allison models built in 2006 or earlier should use only a TES-389 fluid to ensure seal compatibility.

Chevron ATF HD 389 ISOCLEAN Certified Lubricant has the following qualifications:

	West	Central	East
Allison TES-	AA-	AA-	AA-
389	33902015	33832015	34052015

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in a breathing apparatus or medical equipment.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	10W
Product Number	226539
SDS Number	20495
API Gravity	33.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	34.3 7.1
Viscosity, Brookfield cP at -40°C	17,000
Viscosity Index	176
Flash Point, °C(°F)	206(403)
Pour Point, °C(°F)	-48(-54)
Color	Red

Minor variations in product typical test data are to be expected in normal manufacturing.

2 DEXRON is a registered trademark of General Motors LLC.

¹ MERCON is a registered trademark of Ford Motor Company.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



CHEVRON AUTOMATIC TRANSMISSION FLUID MD-3

PRODUCT DESCRIPTION

Formulated for applications that call for the former DEXRON $^{\textcircled{R}}\mbox{-III}$ H, MERCON $^{\textcircled{R}}\mbox{, Caterpillar TO-2 and Allison C-4 fluids.}^1$

CUSTOMER BENEFITS

Chevron Automatic Transmission Fluid MD-3 delivers value through:

- **Protection** against the formation of lacquers, sludge, or other harmful deposits.
- **Exceptional stability** provided by excellent base oil and extra oxidation inhibitors.
- Quiet performance Especially effective in minimizing transmission "chatter." Helps ensure smooth, quiet action at all speeds.
- Fast circulation during cold weather and excellent lubricating body when hot.

FEATURES

Chevron Automatic Transmission Fluid MD-3 is a passenger car and light truck automatic transmission fluid for most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes requiring a high-performance, multi-purpose, power transmission fluid.

It is formulated with premium, severely hydroprocessed base stocks and additives that helps provide oxidation and thermal stability, friction control, load-carrying ability, corrosion and wear protection. It helps protect against the formation of deposits, sludge, varnish, and foam.

Chevron Automatic Transmission Fluid MD-3 helps provide outstanding durability.

• Is specially formulated to help prevent shudder.

Under severe operating conditions, this fluid:

• Retains low temperature fluidity and high temperature stability for long operating periods.

Maintains friction control for smooth shift action.

- Protects automatic transmission fluid coolers from corrosion.
- Helps minimize the chances of a transmission overhaul due to sludge, corrosion, and wear.

APPLICATIONS

Chevron Automatic Transmission Fluid MD-3 is designed for use in most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes requiring a high performance, multi-purpose, power transmission fluid. It is recommended for applications that call for the former DEXRON-III H, MERCON, Caterpillar TO-2 and Allison C-4 fluids.

Always check your owners manual to determine the proper automatic transmission fluid for your transmission.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

Product(s) manufactured in the USA and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2024 TTF-20

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DEXRON is a registered trademark of General Motors Corporation.
 MERCON is a registered trademark of Ford Motor Company.

TYPICAL TEST DATA

Product Number U.S. El Salvador	226502 219715
SDS Number	21
API Gravity	33.4
Viscosity, Kinematic cSt at 40°C cSt at 100°C	34.1 7.0
Viscosity Index	171
Flash Point, °C(°F)	212(414)
Pour Point, °C(°F)	-50(-58)
Color	Red

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®]SYN ATF 668

PRODUCT DESCRIPTON

"Delo. Let's go further.[®]"

Delo[®] Syn ATF 668 is a full synthetic transmission fluid specifically engineered for Allison heavy duty automatic truck and bus transmissions. It is officially approved and licensed by Allison for transmissions requiring TES 668TM and is backwards compatible with TES 295[®], TES 389[®] and TES 468^{®1}.

CUSTOMER BENEFITS

Delo Syn ATF 668 delivers value through:

- **Improved transmission performance** by providing greater than 13 times anti-shudder durability compared to TES 295 fluids that allows smoother shifts at low speeds and over a wider temperature range.
- Exceptional clutch operation across temperature variations and load sizes as the fluid ages in transmission under extreme working conditions.
- Longer Service Life and lower maintenance cost enabled by improved anti-wear protection, antioxidation and shear stability over TES 295 fluids. These advantages reduce noise, vibration, harshness, and maintains hardware reliability for extended drain intervals.
- **Optimal fluid performance** for fast circulation and efficient power transfer in the most demanding conditions and during cold weather start-ups.

FEATURES

Delo Syn ATF 668 is designed for severe duty and extended drain intervals. It is approved for on



highway and vocational Allison transmissions that call for an Allison TES 668 fluid and is backwards compatible for transmissions specifying an Allison TES 295, Allison TES 389 and TES 468 approved fluid. This product can be used in hybrid transmissions which specify an Allison TES 468 Fluid.

Delo Syn ATF 668 meets the needs, terms of warranty and policies of Allison Extended Transmission Coverages (ETC) with the following features:

- It provides the same oil change/drain intervals as TES 295 fluids.
- It has the same prognostic settings as TES 295 fluids.
- It is recommended for the same oil temperature operating range as TES 295 fluids, and
- It will not affect the transmission oil cooling, oil levels, calibrations, or any other aspects of the transmission installation.

It is manufactured from synthetic base oils and additive that help provide oxidation and thermal stability, friction control, load-carrying ability, corrosion, and wear protection. It helps prevent the accumulation of deposits and the formation of sludge, varnish, and foam. Delo Syn ATF 668 has excellent low temperature flow properties and enhanced protection against viscosity breakdown.

Product(s) manufactured in the USA.

A Chevron company product

1 September 2024 TTF-21

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¹ TES 295, TES 389, TES 468 and TES 668 are all registered trademarks of Allison Transmission, Inc.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

APPLICATIONS

Delo Syn ATF 668 is approved by Allison Transmission[®] (approval number 668-10042020), for use in the following applications:

- Specified for Allison 1000 Series[™], 2000 Series[™], 3000 Series[™], 4000 Series[™], H 40/50 EP[™] and eGen Flex[™] Series on-highway products
- Next-generation of Allison transmissions that specify TES 668 fluids

Recommended for use in equipment requiring a ZF TE ML 14B/C transmission fluid.

Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

TYPICAL TEST DATA

Product Number		223073
SDS Number		54598
Density @ 15°C, kg/L	ASTM D4052	0.8511
Viscosity, Kinematic mm²/s at 40°C mm²/s at 100°C	ASTM D445	33 6.8
Viscosity Index	ASTM D2270	174
Brookfield Viscosity, cP at -40°C	ASTM D2983	<12,000
Flash Point, °C(°F)	ASTM D92	238(460)
Pour Point, °C(°F)	ASTM D97	-54(-65)
Color	Visual	Red

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN ATF 668 ISOCLEAN[®] Certified Lubricant

PRODUCT DESCRIPTON

"Delo. Let's go further.[®]"



Delo[®] Syn ATF 668 ISOCLEAN[®] Certified Lubricant is a full synthetic

transmission fluid specifically engineered for Allison heavy duty automatic truck and bus transmissions. It is officially approved and licensed by Allison for transmissions requiring TES 668[™] and is backwards compatible with TES 295[®], TES 389[®] and TES 468^{®1}. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo Syn ATF 668 ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements. Improved transmission performance by providing greater than 13 times anti-shudder durability compared to TES 295 fluids that allows

smoother shifts at low speeds and over a wider temperature range.

- **Exceptional clutch operation** across temperature variations and load sizes as the fluid ages in transmission under extreme working conditions.
- Longer Service Life and lower maintenance cost enabled by improved anti-wear protection, antioxidation and shear stability over TES 295 fluids. These advantages reduce noise, vibration, harshness, and maintains hardware reliability for extended drain intervals.
- **Optimal fluid performance** for fast circulation and efficient power transfer in the most demanding conditions and during cold weather start-ups.

FEATURES

Delo Syn ATF 668 ISOCLEAN Certified Lubricant is designed for severe duty and extended



drain intervals. It is approved for on highway and vocational Allison transmissions that call for an Allison TES 668 fluid and is backwards compatible for transmissions specifying an Allison TES 295, Allison TES 389 and TES 468 approved fluid. This product can be used in hybrid transmissions which specify an Allison TES 468 Fluid.

Delo Syn ATF 668 ISOCLEAN Certified Lubricantbmeets the needs, terms of warranty and policies of Allison Extended Transmission Coverages (ETC) with the following features:

- It provides the same oil change/drain intervals as TES 295 fluids.
- It has the same prognostic settings as TES 295 fluids.
- It is recommended for the same oil temperature operating range as TES 295 fluids, and

Product(s) manufactured in the USA.

A Chevron company product

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¹ TES 295, TES 389, TES 468 and TES 668 are all registered trademarks of Allison Transmission, Inc.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

• It will not affect the transmission oil cooling, oil levels, calibrations, or any other aspects of the transmission installation.

It is manufactured from synthetic base oils and additive that help provide oxidation and thermal stability, friction control, load-carrying ability, corrosion, and wear protection. It helps prevent the accumulation of deposits and the formation of sludge, varnish, and foam. Delo Syn ATF 668 ISOCLEAN Certified Lubricant has excellent low temperature flow properties and enhanced protection against viscosity breakdown.

APPLICATIONS

Delo Syn ATF 668 ISOCLEAN Certified Lubricant is approved by Allison Transmission[®] (approval number 668-10042020), for use in the following applications:

- Specified for Allison 1000 Series[™], 2000 Series[™], 3000 Series[™], 4000 Series[™], H 40/50 EP[™] and eGen Flex[™] Series on-highway products
- Next-generation of Allison transmissions that specify TES 668 fluids

Recommended for use in equipment requiring a ZF TE ML 14B/C transmission fluid.

Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

Product Number		223074
SDS Number		54598
Density @ 15°C, kg/L	ASTM D4052	0.8511
Viscosity, Kinematic mm²/s at 40°C mm²/s at 100°C	ASTM D445	33 6.8
Viscosity Index	ASTM D2270	174
Brookfield Viscosity, cP at -40°C	ASTM D2983	<12,000
Flash Point, °C(°F)	ASTM D92	238(460)
Pour Point, °C(°F)	ASTM D97	-54(-65)
Color	Visual	Red

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®]SYN ATF HD

PRODUCT DESCRIPTON

"Delo. Let's go further.®"

 $\mathsf{Delo}^{\mathbb{R}}$ Syn ATF HD is specially engineered for heavy duty automatic truck and bus transmissions operating in extended service. It is officially approved by Voith and ZF for extended drain intervals.

CUSTOMER BENEFITS

Delo Syn ATF HD delivers value through:

- **Extended drains** of up to six times that of a conventional automatic transmission fluid.
- **Protection** against the formation of lacquers, sludge, or other harmful deposits.
- **Exceptional stability** provided by excellent base oil and extra oxidation inhibitors.
- Fast circulation during cold weather and excellent lubricating qualities when hot.
- **Optimized friction characteristics** for smooth shifting and efficient power transfer.

FEATURES

Delo Syn ATF HD is designed for severe duty and extended drain intervals. It is recommended for



any application that calls for the Allison TES-295^{®1} and Allison TES-389TM performance levels. It has been field tested in several urban transit fleets with excellent results for drain intervals ranging from 50,000 to 100,000 miles.

It is manufactured from synthetic base oils and additives that help provide oxidation and thermal stability, friction control, load-carrying ability, corrosion and wear protection. It helps prevent the accumulation of deposits and the formation of sludge, varnish, and foam.

1 TES-295 is a registered trademark and TES-389 is a trademark of Allison Transmission, Inc.

Delo Syn ATF HD has excellent low temperature flow properties and enhanced protection against viscosity breakdown.

Under the most severe operating conditions, this fluid:

- maintains friction control for smooth shift action.
- retains low temperature fluidity and high temperature stability for long operating periods.
- provides excellent antiwear protection.
- greatly extends the time to transmission overhauls due to sludge, corrosion, wear of clutches and bands, gears and bearings, leakage past seals, and loss of frictional properties compared to a conventional automatic transmission fluid.

APPLICATIONS

Delo[®] Syn ATF HD is specially engineered for heavy duty automatic truck and bus transmissions operating in extended service. It is officially approved by Voith and ZF for extended drain intervals. It is also approved for Volvo 97341 applications.

It is suitable for Allison TES-389 standard drain and Allison TES-295 extended drain service; however, it is not approved by Allison for these applications.

It is also an excellent choice for passenger cars and light trucks requiring General Motors DEXRON[®]-III,² as well as Ford MERCON[®] and MERCON[®] V,³ especially for those vehicles in moderate to severe service. Examples of severe service applications include police cars,

3 MERCON is a registered trademark of Ford Motor Company. Although Delo Syn ATF HD is suitable for use in transmissions that require MERCON and MERCON V fluids, this product is not officially licensed or approved by Ford for such applications and its use may void Ford's warranty. For applications that require a MERCON V licensed product, please use Chevron ATF MERCON V.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

Product(s) manufactured in the USA.

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² DEXRON is a registered trademark of General Motors LLC.

taxicabs, pickup & delivery trucks, recreational vehicles, and tow trucks.

Delo Syn ATF HD has the following qualifications:

- DTFR 13C170 (previously known as MB 236.9)
- MAN 339 V-2, 339 Z-2
- Voith H55.6336.XX
- Volvo Transmission Oil 97341:053 (AT101), 97342 (AT102)
- ZF TE-ML 03D, TE-ML 04D, TE-ML 14B, TE-ML 17C, TE-ML 20B, TE-ML 25B

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

TYPICAL TEST DATA

Product Number	223040
SDS Number	35581
API Gravity	35.2
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	35.3 7.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	179 51
Viscosity, Brookfield mPa.s at -40°C	11,400
Viscosity Index	183
Flash Point, °C(°F)	216(421)
Pour Point, °C(°F)	-49(-56)
Color	Red
FZG Gear Wear Test, Failure Load Stage	12

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN ATF HD ISOCLEAN[®] CERTIFIED LUBRICANT

PRODUCT DESCRIPTON

"Delo. Let's go further.[®]"



Delo[®] Syn ATF HD ISOCLEAN[®] Certified Lubricant is specially engineered for

heavy duty automatic truck and bus transmissions operating in extended service. It is officially approved by Voith and ZF for extended drain intervals. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo Syn ATF HD ISOCLEAN Certified Lubricant delivers value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Extended drains** of up to six times that of a conventional automatic transmission fluid.
- **Protection** against the formation of lacquers, sludge, or other harmful deposits.
- **Exceptional stability** provided by excellent base oil and extra oxidation inhibitors.
- Fast circulation during cold weather and excellent lubricating qualities when hot.

• **Optimized friction characteristics** for smooth shifting and efficient power transfer.

FEATURES

Delo Syn ATF HD ISOCLEAN Certified Lubricant is designed for severe duty and extended



drain intervals. It is recommended for any application that calls for the Allison TES-295^{®1} and Allison TES-389[™] performance levels. It has been field tested in several urban transit fleets with excellent results for drain intervals ranging from 50,000 to 100,000 miles.

It is manufactured from synthetic base oils and additives that help provide oxidation and thermal stability, friction control, load-carrying ability, corrosion and wear protection. It helps prevent the accumulation of deposits and the formation of sludge, varnish, and foam.

Delo Syn ATF HD ISOCLEAN Certified Lubricant has excellent low temperature flow properties and enhanced protection against viscosity breakdown.

Under the most severe operating conditions, this fluid:

- maintains friction control for smooth shift action.
- retains low temperature fluidity and high temperature stability for long operating periods.
- provides excellent antiwear protection.
- greatly extends the time to transmission overhauls due to sludge, corrosion, wear of clutches and bands, gears and bearings, leakage past seals, and loss of frictional properties compared to a conventional automatic transmission fluid.

1 TES-295 is a registered trademark and TES-389 is a trademark of Allison Transmission, Inc.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2024 TTF-22 ISOCLEAN

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APPLICATIONS

Delo[®] Syn ATF HD ISOCLEAN[®] Certified Lubricant is specially engineered for heavy duty automatic truck and bus transmissions operating in extended service. It is officially approved by Voith and ZF for extended drain intervals. It is also approved for Volvo 97341 applications.

It is suitable for Allison TES-389 standard drain and Allison TES-295 extended drain service; however, it is not approved by Allison for these applications.

It is also an excellent choice for passenger cars and light trucks requiring General Motors DEXRON[®]-III,² as well as Ford MERCON[®] and MERCON[®] V,³ especially for those vehicles in moderate to severe service. Examples of severe service applications include police cars, taxicabs, pickup & delivery trucks, recreational vehicles, and tow trucks.

Delo Syn ATF HD ISOCLEAN Certified Lubricant has the following qualifications:

- DTFR 13C170 (previously known as MB 236.9)
- MAN 339 V-2, 339 Z-2
- Voith H55.6336.XX
- Volvo Transmission Oil 97341:053 (AT101), 97342 (AT102)
- ZF TE-ML 03D, TE-ML 04D, TE-ML 14B, TE-ML 17C, TE-ML 20B, TE-ML 25B

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

2 DEXRON is a registered trademark of General Motors LLC.

3 MERCON is a registered trademark of Ford Motor Company. Although Delo Syn ATF HD ISOCLEAN Certified Lubricant is suitable for use in transmissions that require MERCON and MERCON V fluids, this product is not officially licensed or approved by Ford for such applications and its use may void Ford's warranty. For applications that require a MERCON V licensed product, please use Chevron ATF MERCON V.

TYPICAL TEST DATA

Product Number	223081
SDS Number	35581
API Gravity	35.2
Viscosity, Kinematic mm²/s at 40°C mm²/s at 100°C	35.3 7.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	179 51
Viscosity, Brookfield mPa.s at -40°C	11,400
Viscosity Index	183
Flash Point, °C(°F)	216(421)
Pour Point, °C(°F)	-49(-56)
Color	Red
FZG Gear Wear Test, Failure Load Stage	12

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN-AMT XDT SAE 75W-90

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] Syn-AMT XDT is a heavy duty truck synthetic automated manual transmission (AMT) fluid specially formulated for extended drain and severe service operations, and recommended for both factory and service fill of Daimler DT-12 Automated Manual Transmissions installed on most Freightliner or Western Star trucks that have DD15 or DD13 diesel engines.

CUSTOMER BENEFITS

Delo Syn-AMT XDT delivers value through:

- Extended drain capabilities Provides onhighway drain intervals of up to 300,000 miles¹ in on-highway Daimler DT-12 Heavy Duty automated manual transmissions (AMT).
- Extended transmission warranty coverage Delo Syn-AMT XDT SAE 75W-90 is approved for use in maintaining Daimler's 750,000 extended warranty coverage for DT-12 transmissions when used for either top-off or service fill.
- Extreme pressure protection Helps protect against transmission gear scuffing, pitting and adhesive wear, even at this lower viscosity level, allowing for excellent parts protection.
- Superb thermal and oxidation stability Formulated for high temperature performance and excellent oxidation resistance to protect against sludge, varnish, lacquer and harmful deposit buildup in critical transmission components.
- High viscosity index and low pour point Excellent low temperature performance allowing for rapid circulation of the fluid for easier start up and reduced stress on the transmission components.
 - 1 When extending oil drains, always follow OEM recommendations and utilize used oil analysis.

- Wide seal compatibility Compatible with a wide range of seal elastomers helping to prevent seal deterioration and fluid loss.
- **Excellent shear stability** Robust viscosity retention, which contributes to system protection throughout the fluid's service life.
- Fuel economy performance Provides up to 2% fuel economy savings, compared to higher viscosity full synthetic SAE 50 transmission lubricants to help minimize vehicle operating costs.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drivetrain that covers lubricant-related damage to your equipment, including parts and labor.² Includes problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Helps maximize the bottom line business results of trucking industry professionals.

FEATURES

Delo Syn-AMT XDT SAE 75W-90 is a premium, heavy duty transmission fluid engineered to



provide excellent fluid shear stability and superb frictional characteristics to promote smooth, easy shifting. The high performance additives allow for excellent resistance to rust and corrosion, and are compatible with various types of ferrous and yellow metals.

2 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

17 May 2018 TTF-24

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APPLICATIONS

Delo Syn-AMT XDT SAE 75W-90 is recommended for factory and service fill for Daimler DT-12 automated manual transmissions when operating under severe conditions and in extremely cold or hot environments.

Delo Syn-AMT XDT SAE 75W-90 meets or exceeds the performance requirements of **API Service Category GL-4**.

SAE Grade	75W-90
Product Number	223078
<i>SDS Number U.S. Canada Mexico</i>	41488 41489 42092
API Gravity	0.849
Viscosity, Kinematic cSt at 40°C cSt at 100°C	96.5 14.5
Viscosity Index	158
Flash Point, PM, °C(°F)	215(419)
Pour Point, °C(°F)	-51(-60)

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.

Delo Syn-AMT XDT SAE 75W-90 is approved for:

- Daimler MB-Approval 235.11
- MAN 341 Type MB

Delo Syn-AMT XDT SAE 75W-90 is recommended for:

• ZF TE-ML 08



DELO[®] SYN-TRANS HD SAE 50

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] Syn-Trans HD is a heavy duty truck manual transmission fluid recommended for service fill of heavy duty manual transmissions, such as those manufactured by **Eaton, Meritor**, and **Mack**.

CUSTOMER BENEFITS

Delo Syn-Trans HD delivers value through:

- Extended drain capabilities Proven field performance for on-highway drain intervals of 500,000 miles and greater.
- Excellent thermal and oxidation stability The synthetic hydrocarbon base oil used in this product provides outstanding stability.
- A high viscosity index and low pour point The performance of the synthetic hydrocarbon base stock provides extremely broad operating temperature ranges when compared with conventional mineral oil based lubricants.
- Protection against gear wear and copper corrosion — The unique additive package can protect gears without using the "active sulfur" agents commonly found in automotive axle oils. This results in little to no corrosion and long life for copper-containing parts, such as oil coolers, bushings, and thrust washers.

FEATURES

Delo Syn-Trans HD is a heavy duty truck manual transmission fluid.



It is manufactured from synthesized hydrocarbon base fluids which have excellent thermal and oxidation stability, a high natural viscosity index, and a low pour point.

Delo Syn-Trans HD's outstanding low temperature flow properties and natural high viscosity index provides exceptional all-climate, year-round performance in heavy duty truck transmissions. Its use permits easy shifting in extremely cold weather and minimal drag and gear wear during startup.

APPLICATIONS

Delo Syn-Trans HD is recommended for service fill of heavy duty manual transmissions, such as those manufactured by **Eaton**, **Meritor**, and **Mack**.

This product is not recommended for use as an engine crankcase oil.

Delo Syn-Trans HD

- meets the performance requirements of:
 - API Service Category MT-1
 - Meritor 0-81

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

7 May 2015 TTF-27

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TYPICAL TEST DATA

SAE Grade	50
Product Number	223039
<i>SDS Number U.S. Colombia</i>	35590 41477
API Gravity	32.5
Viscosity, Kinematic cSt at 40°C cSt at 100°C	141 18.3
Viscosity Index	144
Flash Point, °C(°F)	136(277)
Pour Point, °C(°F)	-42(-44)
FZG Scuff Test, Passing Load Stage	12
ASTM D1500 Color	1.5 (light pale)

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN-TRANS HD ISOCLEAN[®] Certified Lubricant SAE 50

PRODUCT DESCRIPTION

"Delo. Let's go further.®"



Delo[®] Syn-Trans HD ISOCLEAN[®]

Certified Lubricant is a heavy duty truck

manual transmission fluid recommended for service fill of heavy duty manual transmissions, such as those manufactured by **Eaton, Meritor**, and **Mack**. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo Syn-Trans HD ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Extended drain capabilities Proven field performance for on-highway drain intervals of 500,000 miles and greater.
- Excellent thermal and oxidation stability The synthetic hydrocarbon base oil used in this product provides outstanding stability.

- A high viscosity index and low pour point The performance of the synthetic hydrocarbon base stock provides extremely broad operating temperature ranges when compared with conventional mineral oil based lubricants.
- Protection against gear wear and copper corrosion — The unique additive package can protect gears without using the "active sulfur" agents commonly found in automotive axle oils. This results in little to no corrosion and long life for copper-containing parts, such as oil coolers, bushings, and thrust washers.

FEATURES

Delo Syn-Trans HD ISOCLEAN Certified Lubricant is a heavy duty truck manual transmission fluid.



It is manufactured from synthesized hydrocarbon base fluids which have excellent thermal and oxidation stability, a high natural viscosity index, and a low pour point.

Delo Syn-Trans HD ISOCLEAN Certified Lubricant's outstanding low temperature flow properties and natural high viscosity index provides exceptional allclimate, year-round performance in heavy duty truck transmissions. Its use permits easy shifting in extremely cold weather and minimal drag and gear wear during startup.

Product(s) manufactured in the USA and Colombia. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 July 2021 TTF-27 ISOCLEAN

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APPLICATIONS

Delo Syn-Trans HD ISOCLEAN Certified Lubricant is recommended for service fill of heavy duty manual transmissions, such as those manufactured by **Eaton**, **Meritor**, and **Mack**.

This product is not recommended for use as an engine crankcase oil.

Delo Syn-Trans HD ISOCLEAN Certified Lubricant

- meets the performance requirements of:
 - API Service Category MT-1
 - Meritor 0-81

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	50
Product Number	223091
<i>SDS Number U.S. Colombia</i>	35590 41477
API Gravity	32.5
Viscosity, Kinematic cSt at 40°C cSt at 100°C	141 18.3
Viscosity Index	144
Flash Point, °C(°F)	136(277)
Pour Point, °C(°F)	-42(-44)
FZG Scuff Test, Passing Load Stage	12
ASTM D1500 Color	1.5 (light pale)

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN-TRANS XV SAE 75W-80

PRODUCT DESCRIPTION

Delo[®] Syn-Trans XV SAE 75W-80 is a premium full synthetic, heavy duty, automated manual transmission fluid formulated specifically for Volvo iShift and Mack mDrive[®] transmissions.

CUSTOMER BENEFITS

"Delo. Let's go further.®"

Delo Syn-Trans XV SAE 75W-80 delivers exceptional value through:

- Extended drain capabilities Provides extended life service up to 500,000 miles in Volvo and Mack automated manual transmissions.
- Extreme pressure protection Protects against transmission gear scuffing, pitting and adhesive wear even at a lower viscosity level allowing for excellent parts protection.
- **Superb thermal and oxidation stability** Formulated for high temperature performance and excellent oxidation resistance to protect against sludge, varnish, lacquer and harmful deposit buildup in critical transmission components.
- High viscosity index and low pour point Excellent low temperature performance allowing for rapid circulation of the fluid for easier start up and reduced stress on the transmission components.
- Wide seal compatibility This product is compatible with a wide range of seal elastomers helping to prevent seal deterioration and fluid loss.
- Excellent shear stability Contributes to robust viscosity retention and system protection throughout fluid service life.
- Fuel economy performance Provides fuel economy savings compared to more viscous full synthetic SAE 50 and SAE 75W-90 transmission lubricants to help minimize vehicle operating costs.

- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drivetrain that covers lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Maximizes the bottom line business results of trucking industry professionals.

FEATURES

Delo Syn-Trans XV SAE 75W-80 is a premium heavy duty,



automated manual transmission fluid engineered to provide excellent fluid shear stability and superb frictional characteristics to promote smooth, easy shifting. The high performance additives allow for excellent resistance to rust and corrosion and are compatible with various types of ferrous and yellow metals.

APPLICATIONS

Delo Syn-Trans XV SAE 75W-80 is recommended for use in heavy duty on-road automated manual transmissions when operating under severe conditions and in extremely cold or hot environments. Delo Syn-Trans XV meets and exceeds the requirements of API Service Categories GL-4. In addition, it is approved against:

- MAN 341 Type E4
- Volvo 97305, 97307, 97318

These approvals allow the use of Delo Syn-Trans XV SAE 75W-80 at extended drain intervals and for use in top-off applications without loss of manufacturer's warranty for these specific transmissions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

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¹ See Warranty Plus for details and restrictions.

TYPICAL TEST DATA

SAE Grade	75W-80
Product Number	223080
SDS Number	35726
API Gravity	35.6
Viscosity, Kinematic cSt at 40°C cSt at 100°C	54.1 9.17
Viscosity, Brookfield cP at -26°C cP at -40°C	3,670 19,300
Viscosity Index	151
Flash Point, °C(°F)	244(471)
Pour Point, °C(°F)	-54(-65)

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN-TRANS XE SAE 75W-90 (Replaces Delo[®] Syn-Trans XE SAE 50)

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] Syn-Trans XE is a heavy duty truck synthetic automated manual transmission (AMT) fluid specially formulated for extended drain and severe service operations, and recommended for both factory and service fill of Eaton Ultra Shift Automated Manual Transmissions utilized by the main North American Truck Manufacturers when coupled with Cummins, PACCAR MX or Navistar diesel engines.

CUSTOMER BENEFITS

Delo Syn-Trans XE delivers value through:

- Extended drain capabilities Provides onhighway drain intervals of 500,000 miles in onhighway Eaton medium and heavy duty transmissions, including automated manual transmissions (AMT), and 500,000 miles for older model Eaton Heavy Duty Manual Transmissions.
- Extreme pressure protection Protects against transmission gear scuffing, pitting and adhesive wear, even at this lower viscosity level, allowing for excellent parts protection.
- Superb thermal and oxidation stability Formulated for high temperature performance and excellent oxidation resistance to protect against sludge, varnish, lacquer and harmful deposit buildup in critical transmission components.
- High viscosity index and low pour point Excellent low temperature performance allowing for rapid circulation of the fluid for easier start up and reduced stress on the transmission components.
- Wide seal compatibility Compatible with a wide range of seal elastomers helping to prevent seal deterioration and fluid loss.

- **Excellent shear stability** Robust viscosity retention, which contributes to system protection throughout the fluid's service life.
- Fuel economy performance Provides up to 2% fuel economy savings, compared to higher viscosity full synthetic SAE 50 transmission lubricants (PS 164, rev 7 type fluids), to help minimize vehicle operating costs.
- Warranty plus protection Bumper-to-bumper warranty protection from the engine to the drivetrain that covers lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Maximizes the bottom line business results of trucking industry professionals.

1. See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 March 2016 TTF-29

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FEATURES

Delo[®] Syn-Trans XE SAE 75W-90 is a premium, heavy duty transmission fluid engineered to



provide excellent fluid shear stability and superb frictional characteristics to promote smooth, easy shifting. The high performance additives allow for excellent resistance to rust and corrossion, and are compatible with various types of ferrous and yellow metals.

APPLICATIONS

Delo Syn-Trans XE SAE 75W-90 is recommended for factory and service fill for Eaton heavy duty on-road automated manual transmissions when operating under severe conditions and in extremely cold or hot environments. It has also been formulated for use in older generation Eaton manual transmissions that require PS-164, rev 7 performance to allow for consolidated use at truck workshops.

Delo Syn-Trans XE SAE 75W-90 should not be used in axles as it is designed for AMT transmissions and has friction modifiers, which do not work well in axle lubrication.

Delo Syn-Trans XE SAE 75W-90 meets or exceeds the performance requirements of:

• API Service Category MT-1

Delo Syn-Trans XE SAE 75W-90 is approved for:

• Eaton PS-386

Delo Syn-Trans XE SAE 75W-90 is recommended for use in:

- Eaton PS-164, rev 7
- Mack TO-A PLUS
- Meritor 0-81
- Navistar MPAPS B-6816
- Volvo 97305
- ZF Freedomline

TYPICAL TEST DATA

SAE Grade	75W-90
Product Number	223079
SDS Number	39693
API Gravity	34.9
Viscosity, Kinematic cSt at 40°C cSt at 100°C	95.1 14.8
Viscosity Index	163
Flash Point, °C(°F)	238(460)
Pour Point, °C(°F)	-42(-43)

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN-THF XC

PRODUCT DESCRIPTION

Delo[®] Syn-THF XC is a high performance synthetic wet brake transaxle fluid designed for applications where a Volvo WB102 fluid is required. Delo Syn-THF XC is formulated with a high performance synthetic base fluid, in combination with a specially optimized additive system.

CUSTOMER BENEFITS

Delo Syn-THF XC delivers value through:

- Low operational costs Excellent performance in a wide range of ambient and operating temperatures provides year round improved low temperature hydraulic and transmission responsiveness.
- Long oil life Outstanding ability of the base stock to withstand oxidation at high operating temperatures results in maximum service life of the oil.
- Long equipment life Special additives help to protect metal surfaces against scuffing and wear even under severe operating conditions.
- Low inventory cost Delo Syn-THF XC has the potential to replace many of the other hydraulic fluids in your inventory which can significantly free up space in your warehouse and minimize your carrying cost. Always confirm that the Chevron product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.
- **Minimalized weather and storage concerns** — Protects against rust and corrosion of highly finished precision parts when operating in humid conditions and during seasonal shutdown periods.
- **Minimal downtime** Good compatibility with seals, O-rings, and packing materials maintains their good condition and keeps leakage at a minimum.

- **Smooth operation** By protecting against brake "chatter" and transmission "slip" it maximizes the quiet and efficient action of brakes and transmission.
- **Reliable operation** Formulation helps keep metal parts clean and free of varnish and sludge deposits that could result in premature breakdown.

FEATURES

Delo Syn-THF XC is formulated with ISOSYN $^{\textcircled{R}}$ Advanced Technology, which is the



combination of Chevron's industry leading formulating expertise with unique, high performance additive chemistry to help extend the durability of your critical diesel engine parts.

Delo Syn-THF XC is specially designed for all weather operations and applications — both severe winter cold and extreme summer heat. This, combined with excellent oxidation stability, minimizes the need for seasonal oil changes.

Its distinctive orange color provides for easy product identification and leak detection.

FUNCTIONS

Delo Syn-THF XC is a combination lubricant for modern tractors and similar equipment. It performs many functions, such as lubrication of the transmission and final drive, and serves as a hydraulic fluid to operate power steering units, brakes, implements, and attachments.

Delo Syn-THF XC has a viscosity index much higher than conventional multifunctional transmission/ hydraulic fluids. This provides excellent flow at low temperatures and good oil film protection at high operating temperatures.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 November 2024 TTF-30

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Furthermore, Delo[®] Syn-THF XC:

- minimizes brake "chatter" and excessive brake facing wear
- assists with the smooth operation of clutch packs and wet brakes
- provides excellent shifting action
- provides rust and corrosion protection for vital parts
- minimizes leakage because of good compatibility with seals, O-rings, and packing materials
- minimizes sludge and varnish formation
- protects metal surfaces against scuffing and wear
- provides excellent gear lubrication compared to conventional cold weather, low viscosity tractor hydraulic fluids
- allows for ready leak detection because of its distinctive orange color.

Delo Syn-THF XC is compatible with many combination tractor, transmission, and hydraulic fluids.

APPLICATIONS

Delo Syn-THF XC is approved for **Volvo** 97304 (WB102) and can be used in applications requiring 97303 (WB101).

Delo Syn-THF XC is recommended for use:

- as a multifunctional and multi-seasonal fluid in many types of tractors and construction equipment.
- in applications which call for the following OEM lubricant specifications:
 - AGCO improved power fluid 821XL
 - Case International JIC-143, JIC-145, MS 1206, MS 1207, MS 1209, MS 1210 (TCH)
 - Case New Holland MAT 3525
 - Ford New Holland ESN-M2C134-D, FNHA-2-C-200, FNHA-2-C-201
 - International Harvester B6
 - John Deere JDM J20C, JDM J20D
 - Kubota UDT
 - Massey Ferguson M1127, M1129A, M1135, M1141, M1143, M1145
 - Minneapolis-Moline Q-1722, Q-1766, Q-1766B
 - Oliver Q-1705
 - White Farm Equipment Q-1826

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

	Test Method	
Product Number		226605
SDS Number		56881
API Gravity	ASTM D1298	33.4
Density at 15°C, kg/L	ASTM D4052	0.8571
Viscosity Index	ASTM D2770	167
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	38.5 7.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	180 50.8
Viscosity, Brookfield cP at -40°C	ASTM D2983	16,180
Flash Point, °C(°F)	ASTM D92	226(439)
Pour Point, °C(°F)	ASTM D97	-48(-54)
Color	Visual	Orange

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN-THF XC ISOCLEAN[®] CERTIFIED LUBRICANT

PRODUCT DESCRIPTION

Delo[®] Syn-THF XC ISOCLEAN[®] Certified Lubricant is a high performance synthetic wet brake transaxle fluid designed for applications



where a Volvo WB102 fluid is required. Delo Syn-THF XC ISOCLEAN Certified Lubricant is formulated with a high performance synthetic base fluid, in combination with a specially optimized additive system. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo Syn-THF XC ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Low operational costs Excellent performance in a wide range of ambient and operating temperatures provides year round improved low temperature hydraulic and transmission responsiveness.
- Long oil life Outstanding ability of the base stock to withstand oxidation at high operating

temperatures results in maximum service life of the oil.

- Long equipment life Special additives help to protect metal surfaces against scuffing and wear even under severe operating conditions.
- Low inventory cost Delo Syn-THF XC has the potential to replace many of the other hydraulic fluids in your inventory which can significantly free up space in your warehouse and minimize your carrying cost. Always confirm that the Chevron product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.
- Minimalized weather and storage concerns

 Protects against rust and corrosion of highly
 finished precision parts when operating in humid
 conditions and during seasonal shutdown periods.
- **Minimal downtime** Good compatibility with seals, O-rings, and packing materials maintains their good condition and keeps leakage at a minimum.
- **Smooth operation** By protecting against brake "chatter" and transmission "slip" it maximizes the quiet and efficient action of brakes and transmission.
- **Reliable operation** Formulation helps keep metal parts clean and free of varnish and sludge deposits that could result in premature breakdown.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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15 November 2024 TTF-30 ISOCLEAN

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FEATURES

Delo[®] Syn-THF XC ISOCLEAN[®] Certified Lubricant is formulated with ISOSYN[®] Advanced



Technology, which is the combination of Chevron's industry leading formulating expertise with unique, high performance additive chemistry to help extend the durability of your critical diesel engine parts.

Delo Syn-THF XC ISOCLEAN Certified Lubricant is specially designed for all weather operations and applications — both severe winter cold and extreme summer heat. This, combined with excellent oxidation stability, minimizes the need for seasonal oil changes.

Its distinctive orange color provides for easy product identification and leak detection.

FUNCTIONS

Delo Syn-THF XC ISOCLEAN Certified Lubricant is a combination lubricant for modern tractors and similar equipment. It performs many functions, such as lubrication of the transmission and final drive, and serves as a hydraulic fluid to operate power steering units, brakes, implements, and attachments.

Delo Syn-THF XC ISOCLEAN Certified Lubricant has a viscosity index much higher than conventional multifunctional transmission/hydraulic fluids. This provides excellent flow at low temperatures and good oil film protection at high operating temperatures.

Furthermore, Delo Syn-THF XC ISOCLEAN Certified Lubricant:

- minimizes brake "chatter" and excessive brake facing wear
- assists with the smooth operation of clutch packs and wet brakes
- provides excellent shifting action
- provides rust and corrosion protection for vital parts
- minimizes leakage because of good compatibility with seals, O-rings, and packing materials
- minimizes sludge and varnish formation
- protects metal surfaces against scuffing and wear
- provides excellent gear lubrication compared to conventional cold weather, low viscosity tractor hydraulic fluids
- allows for ready leak detection because of its distinctive orange color.

Delo Syn-THF XC ISOCLEAN Certified Lubricant is compatible with many combination tractor, transmission, and hydraulic fluids.

APPLICATIONS

Delo Syn-THF XC ISOCLEAN Certified Lubricant is approved for **Volvo** 97304 (WB102) and can be used in applications requiring 97303 (WB101).

Delo Syn-THF XC ISOCLEAN Certified Lubricant is recommended for use:

- as a multifunctional and multi-seasonal fluid in many types of tractors and construction equipment.
- in applications which call for the following OEM lubricant specifications:
 - AGCO improved power fluid 821XL
 - Case International JIC-143, JIC-145, MS 1206, MS 1207, MS 1209, MS 1210 (TCH)
 - Case New Holland MAT 3525
 - Ford New Holland ESN-M2C134-D, FNHA-2-C-200, FNHA-2-C-201
 - International Harvester B6
 - John Deere JDM J20C, JDM J20D
 - Kubota UDT
 - Massey Ferguson M1127, M1129A, M1135, M1141, M1143, M1145
 - Minneapolis-Moline Q-1722, Q-1766, Q-1766B
 - Oliver Q-1705
 - White Farm Equipment Q-1826

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

	Test Method	
Product Number		278107
SDS Number		56881
API Gravity	ASTM D1298	33.4
Density at 15°C, kg/L	ASTM D4052	0.8571
Viscosity Index	ASTM D2770	167
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	38.5 7.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	180 50.8
Viscosity, Brookfield cP at -40°C	ASTM D2983	16,180
Flash Point, °C(°F)	ASTM D92	226(439)
Pour Point, °C(°F)	ASTM D97	-48(-54)
Color	Visual	Orange

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] TORQFORCE[®] SAE 10W, 30, 50, 60

PRODUCT DESCRIPTION

Delo[®] TorqForce[®] products are high performance lubricants designed for use in transmissions, final drives, and hydraulic systems in Allison, Caterpillar, Dana Powershift, Komatsu, Vickers and ZF equipment.

CUSTOMER BENEFITS

Delo TorqForce products deliver value through:

- Long equipment life Special additives help protect metal surfaces against scuffing and wear even under severe operating conditions of high temperature and high load.
- Smooth operation Excellent frictional control helps prevent clutch slippage and offers quiet and efficient action of transmission and brakes while minimizing wear.
- Minimal downtime Good compatibility with seals, O-rings, and packing materials maintains their good condition and keeps leakage at a minimum.
- Improved filterability Delo TorqForce is formulated with special additive chemistry that allows for ultra-fine filtration which provides exceptional fluid cleanliness and equipment reliability performance.
- Long oil life Outstanding ability of the base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil.
- **Reliable operation** Formulated to keep metal parts clean and free of varnish and sludge deposits that could result in premature breakdown.
- **Minimizing weather and storage concerns** Protects against rust and corrosion of highly finished precision parts when operating in humid conditions and during seasonal shutdown periods.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive

train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.

FEATURES

Delo TorqForce products are high performance lubricants designed for use in transmissions, final



drives, and hydraulic systems requiring a fluid meeting Caterpillar TO-4 or Allison C-4 requirements. They are also recommended for transmission and hydraulic systems manufactured by Dana Powershift, Komatsu, Vickers and ZF.

They are manufactured using highly refined base oils, detergents, dispersants, oxidation and corrosion inhibitors, antiwear and extreme pressure agents, and a foam suppressant.

Delo TorqForce products are designed for both newly developed and older model drive train components.

They offer excellent friction retention, wear control, seal compatibility, oxidation stability, and viscosity stability.

The frictional characteristics of the fluid are retained over the life of the lubricant.

Delo TorqForce products are formulated to help protect against wear, even in severe service conditions and under high loads. They help protect precision parts against wear under high load conditions by controlling the formation of corrosion, varnish, and sludge.

Delo TorqForce products are compatible with new and traditional seal and clutch materials.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2023 TTF-31

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APPLICATIONS

Delo[®] TorqForce[®] products are recommended for use in Caterpillar, Komatsu, transmissions, final drives, and wet brakes, and in Allison, Dana Powershift, Vickers and ZF transmissions, torque converters, and hydraulic systems.

Under normal ambient temperatures, **hydraulic systems will use the SAE 10W** viscosity grade. SAE 10W and 30 are recommended for mobile hydraulic systems where operating requirements are severe.

Transmissions will use the SAE 30 viscosity grade. Delo TorqForce products are also recommended for heavy duty off highway automatic transmissions requiring an SAE 10W, 30, 50 or 60 fluid.

Final drives will use the SAE 50 viscosity grade at normal temperatures and SAE 60 at high ambient temperatures.

In order to meet Caterpillar specifications, Delo TorqForce products are not friction modified. Thus, they are not recommended for equipment made by other OEMs who require friction modified fluids in order to assure smooth and quiet brake operation. For example, many farm tractor OEMs require fluids such as Chevron 1000 THF in order to eliminate brake noise.

Delo TorqForce products are approved for:

- **ZF** TE-ML 03C (SAE 10W, 30)
- ZF TE-ML 07F (SAE 30)

Delo TorqForce products meet:

- requirements of Allison C-4 (SAE 10W, 30)
- service requirements of Caterpillar TO-4

Delo TorqForce products are recommended for:

- Dana Powershift (SAE 10W, 30, 50)
- Komatsu KES 07.868.1
- Vickers 35VQ25 (SAE 10W, 30)
- Volvo 97305 (SAE 50)

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

SAE Grade	10W	30	50	60
Product Number	293105	293106	293107	293108
SDS/MSDS Number				
USA	38351	38351	38351	38351
Colombia	38355	38355	38355	38355
El Salvador	39331	39331	39331	—
API Gravity	30.0	28.7	26.5	25.0
Viscosity, Kinematic				
cSt at 40°C	43.8	87.5	199	319
cSt at 100°C	6.8	10.9	18.5	25.0
Viscosity, Cold Crank, °C/Poise	-25/60	_	_	—
Viscosity Index	110	110	103	101
Flash Point, °C(°F)	238(460)	266(511)	266(511)	266(511)
Pour Point, °C(°F)	-33(-27)	-27(-17)	-27(-17)	-15(+5)

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®]TORQFORCE[®] ISOCLEAN[®] CERTIFIED LUBRICANT SAE 10W, 30, 50, 60

PRODUCT DESCRIPTION

Delo[®] TorqForce[®] ISOCLEAN[®] Certified Lubricants are high performance lubricants designed for use in transmissions, final drives, and



hydraulic systems in Allison, Caterpillar, Dana Powershift, Komatsu, Vickers and ZF equipment. Chevron ISOCLEAN Certified Lubricants, which have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo TorqForce ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Long equipment life Special additives help protect metal surfaces against scuffing and wear even under severe operating conditions of high temperature and high load.
- **Smooth operation** Excellent frictional control helps prevent clutch slippage and offers quiet and

efficient action of transmission and brakes while minimizing wear.

- **Minimal downtime** Good compatibility with seals, O-rings, and packing materials maintains their good condition and keeps leakage at a minimum.
- **Improved filterability** Delo TorqForce ISOCLEAN Certified Lubricant is formulated with special additive chemistry that allows for ultra-fine filtration which provides exceptional fluid cleanliness and equipment reliability performance. Delo TorqForce ISOCLEAN Certified Lubricants can achieve cleanliness levels down to 18/16/13 and potentially cleaner with appropriate Chevron approved ISOCLEAN Programs.
- Long oil life Outstanding ability of the base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil.
- **Reliable operation** Formulated to keep metal parts clean and free of varnish and sludge deposits that could result in premature breakdown.
- Minimizing weather and storage concerns Protects against rust and corrosion of highly finished precision parts when operating in humid conditions and during seasonal shutdown periods.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2023 TTF-31 ISOCLEAN

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FEATURES

Delo[®] TorqForce[®] ISOCLEAN[®] Certified Lubricants are high performance lubricants designed



for use in transmissions, final drives, and hydraulic systems requiring a fluid meeting Caterpillar TO-4 or Allison C-4 requirements. They are also recommended for transmission and hydraulic systems manufactured by Dana Powershift, Komatsu, Vickers and ZF.

They are manufactured using highly refined base oils, detergents, dispersants, oxidation and corrosion inhibitors, antiwear and extreme pressure agents, and a foam suppressant.

Delo TorqForce ISOCLEAN Certified Lubricants are designed for both newly developed and older model drive train components.

They offer excellent friction retention, wear control, seal compatibility, oxidation stability, and viscosity stability.

The frictional characteristics of the fluid are retained over the life of the lubricant.

Delo TorqForce ISOCLEAN Certified Lubricants are formulated to help protect against wear, even in severe service conditions and under high loads. They help protect precision parts against wear under high load conditions by controlling the formation of corrosion, varnish, and sludge.

Delo TorqForce ISOCLEAN Certified Lubricants are compatible with new and traditional seal and clutch materials.

APPLICATIONS

Delo TorqForce ISOCLEAN Certified Lubricants are recommended for use in Caterpillar, Komatsu, transmissions, final drives, and wet brakes, and in Allison, Dana Powershift, Vickers and ZF transmissions, torque converters, and hydraulic systems.

Under normal ambient temperatures, **hydraulic systems will use the SAE 10W** viscosity grade. SAE 10W and 30 are recommended for mobile hydraulic systems where operating requirements are severe.

Transmissions will use the SAE 30 viscosity grade. Delo TorqForce ISOCLEAN Certified Lubricants are also recommended for heavy duty off highway automatic transmissions requiring an SAE 10W, 30, 50 or 60 fluid. **Final drives will use the SAE 50** viscosity grade at normal temperatures.

In order to meet Caterpillar specifications, Delo TorqForce products are not friction modified. Thus, they are not recommended for equipment made by other OEMs who require friction modified fluids in order to assure smooth and quiet brake operation. For example, many farm tractor OEMs require fluids such as Chevron 1000 THF in order to eliminate brake noise.

Delo TorqForce ISOCLEAN Certified Lubricants are approved for:

- **ZF** TE-ML 03C (SAE 10W, 30)
- **ZF** TE-ML 07F (SAE 30)

Delo TorqForce ISOCLEAN Certified Lubricants meet:

- requirements of Allison C-4 (SAE 10W, 30)
- service requirements of Caterpillar TO-4

Delo TorqForce ISOCLEAN Certified Lubricants are recommended for:

- Dana Powershift (SAE 10W, 30, 50)
- Komatsu KES 07.868.1
- Vickers 35VQ25 (SAE 10W, 30)
- Volvo 97305 (SAE 50)

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	10W	30	50	60
Product Number	254602	254603	254601	254604
SDS/MSDS Number	20251	20251	20251	41220
USA Canada Mexico	38351 38352 38353	38351 38352 38353	38351 38352 38353	41329 41342 41341
API Gravity	30.0	28.7	26.5	25.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	43.8 6.8	87.5 10.9	199 18.5	319 25.0
Viscosity, Cold Crank, °C/Poise	-25/60	—	—	—
Viscosity Index	110	110	103	101
Flash Point, °C(°F)	238(460)	266(511)	266(511)	266(511)
Pour Point, °C(°F)	-33(-27)	-27(-17)	-27(-17)	-15(+5)

Minor variations in product typical test data are to be expected in normal manufacturing.


DELO[®]TORQFORCE[®]MP

PRODUCT DESCRIPTION

Delo[®] TorqForce[®] MP is a synblend lubricant designed for use in transmissions, wet brakes, and hydraulic systems requiring a fluid meeting Caterpillar TO-4 or TO-4M requirements. It can also be used in Komatsu equipment for hydraulic and transmission requirements in cold climate operations.

CUSTOMER BENEFITS

Delo TorqForce MP delivers value through:

- Low operational cost Excellent performance in a wide range of ambient and operating temperatures. Provides optimum low temperature transmission, wet-brake, and hydraulic responsiveness — helping to minimize seasonal oil changes and operational costs.
- Smooth operation Excellent frictional control helps prevent clutch slippage; formulated for quiet and efficient action of transmission and brakes while minimizing wear.
- **Improved filterability** Delo TorqForce MP is formulated with special additive chemistry that allows for ultra-fine filtration which provides exceptional fluid cleanliness and equipment reliability performance.
- Long oil life Outstanding ability of the base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil.
- Cold weather performance Very good cold weather pumpability for transmission and hydraulic components that operate in cold climates and need improved flow capability to keep key parts lubricated.
- Low inventory cost One fluid does the job of a full range of mobile hydraulic systems. Can replace multiple products and free up shelf space too!
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related

damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.

FEATURES

Delo TorqForce MP is a high performance lubricant designed for use in transmissions, final



drives, and hydraulic systems requiring a fluid meeting Caterpillar TO-4 or TO-4M, or Allison C-4 requirements. It is also recommended for transmission and hydraulic systems manufactured by Dana Powershift, Komatsu, Vickers and ZF.

Delo TorqForce MP is a synblend product, manufactured using a unique blend of base stocks and additive technology. As a result, this product provides both excellent low temperature pumpability and high temperature film thickness.

The fluid is designed for both newly developed and older model drive train components.

Delo TorqForce MP is compatible with new and traditional seal and clutch materials. The frictional characteristics of the fluid are retained over the life of the lubricant. Components are protected from wear, even in severe service and under high loads. It helps protect precision parts against wear under high load conditions by controlling the formation of corrosion, varnish, and sludge.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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25 September 2024 TTF-32

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APPLICATIONS

 $Delo^{\mathbb{R}}$ TorqForce^{\mathbb{R}} MP is recommended for:

- Allison, Caterpillar, Dana Powershift, Komatsu and Vickers transmissions, wet brakes, torque converters, and hydraulic systems requiring a fluid meeting Caterpillar TO-4/TO-4M or Komatsu requirements
- Lightly loaded final drives making inventory consolidation possible
- Heavy duty off highway automatic transmissions

Delo TorqForce MP is not recommended for use in combined farm tractor hydraulic and transmission systems where low brake chatter is a requirement.

Delo TorqForce MP meets:

• service requirements Caterpillar TO-4 and TO-4M

Delo TorqForce MP is recommended for:

- Dana Powershift
- Komatsu KES 07.868.1
- Vickers 35VQ25
- **ZF** TE-ML-03C

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

	ASTM Test Method	
Product Number		293110
SDS Number		38357
API Gravity	ASTM D1298	30.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	113 14.3
Viscosity Index	ASTM D2270	129
Flash Point, °C(°F)	ASTM D92	270(518)
Pour Point, °C(°F)	ASTM D97	-36(-33)
Mini-Rotary Viscometer cP at -20°C cP at -30°C	ASTM D4684	7000 43,000

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®]TORQFORCE[®]MP ISOCLEAN[®] CERTIFIED LUBRICANT

PRODUCT DESCRIPTION

Delo[®] TorqForce[®] MP ISOCLEAN[®] Certified Lubricant is a synblend lubricant designed for use in transmissions, wet brakes, and



hydraulic systems requiring a fluid meeting Caterpillar TO-4 or TO-4M requirements. It can also be used in Komatsu equipment for hydraulic and transmission requirements in cold climate operations. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo TorqForce MP ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Low operational cost Excellent performance in a wide range of ambient and operating temperatures. Provides optimum low temperature transmission, wet-brake, and hydraulic responsiveness — helping to minimize seasonal oil changes and operational costs.

- Smooth operation Excellent frictional control helps prevent clutch slippage; formulated for quiet and efficient action of transmission and brakes while minimizing wear.
- **Improved filterability** Delo TorqForce MP ISOCLEAN Certified Lubricant is formulated with special additive chemistry that allows for ultra-fine filtration which provides exceptional fluid cleanliness and equipment reliability performance. Delo TorqForce MP ISOCLEAN Certified Lubricant can achieve cleanliness levels down to 18/16/13 and potentially cleaner with appropriate Chevron approved ISOCLEAN Programs.
- Long oil life Outstanding ability of the base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil.
- Cold weather performance Very good cold weather pumpability for transmission and hydraulic components that operate in cold climates and need improved flow capability to keep key parts lubricated.
- Low inventory cost One fluid does the job of a full range of mobile hydraulic systems. Can replace multiple products and free up shelf space too!
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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FEATURES

Delo[®] TorqForce[®] MP ISOCLEAN[®] Certified Lubricant is a high performance lubricant



designed for use in transmissions, final drives, and hydraulic systems requiring a fluid meeting Caterpillar TO-4 or TO-4M, or Allison C-4 requirements. It is also recommended for transmission and hydraulic systems manufactured by Dana Powershift, Komatsu, Vickers and ZF.

Delo TorqForce MP ISOCLEAN Certified Lubricant is a synblend product, manufactured using a unique blend of base stocks and additive technology. As a result, this product provides both excellent low temperature pumpability and high temperature film thickness.

The fluid is designed for both newly developed and older model drive train components.

Delo TorqForce MP ISOCLEAN Certified Lubricant is compatible with new and traditional seal and clutch materials. The frictional characteristics of the fluid are retained over the life of the lubricant. Components are protected from wear, even in severe service and under high loads. It helps protect precision parts against wear under high load conditions by controlling the formation of corrosion, varnish, and sludge.

APPLICATIONS

Delo TorqForce MP ISOCLEAN Certified Lubricant is recommended for:

- Allison, Caterpillar, Dana Powershift, Komatsu and Vickers transmissions, wet brakes, torque converters, and hydraulic systems requiring a fluid meeting Caterpillar TO-4/TO-4M or Komatsu requirements
- Lightly loaded final drives making inventory consolidation possible
- · Heavy duty off highway automatic transmissions

Delo TorqForce MP ISOCLEAN Certified Lubricant is not recommended for use in combined farm tractor hydraulic and transmission systems where low brake chatter is a requirement.

Delo TorqForce MP ISOCLEAN Certified Lubricant meets:

• service requirements Caterpillar TO-4 and TO-4M

Delo TorqForce MP ISOCLEAN Certified Lubricant is recommended for:

- Dana Powershift
- Komatsu KES 07.868.1
- Vickers 35VQ25
- **ZF** TE-ML-03C

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN[®] Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

	ASTM Test Method	
Product Number		254605
<i>SDS/MSDS Number USA Canada Mexico</i>		38357 38358 38359
API Gravity	ASTM D1298	30.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	113 14.3
Viscosity Index	ASTM D2270	129
Flash Point, °C(°F)	ASTM D92	270(518)
Pour Point, °C(°F)	ASTM D97	-36(-33)
Mini-Rotary Viscometer cP at -20°C cP at -30°C	ASTM D4684	7000 43,000

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®]TORQFORCE[®]SYN SAE 5W-30 (formerly 5W-20)

PRODUCT DESCRIPTION

 $\mathsf{Delo}^{\mathbb{R}}$ TorqForce $^{\mathbb{R}}$ Syn SAE 5W-30 is a high performance fully synthetic lubricant designed for use in transmissions and hydraulic systems.

CUSTOMER BENEFITS

Delo TorqForce Syn SAE 5W-30 delivers value through:

- Long equipment life Special additives protect metal surfaces against scuffing and wear even under operating conditions of high temperature and high load.
- Smooth operation Excellent frictional control helps prevent clutch slippage and assures quiet and efficient action of transmission and brakes while minimizing wear.
- Extreme temperature performance Excellent cold weather pumpability in sub-zero/ arctic operating conditions. Very good high operating temperature performance for severe service applications.
- **Improved filterability** Delo TorqForce Syn SAE 5W-30 is formulated with special additive chemistry that allows for ultra-fine filtration which provides exceptional fluid cleanliness and equipment reliability performance.
- Minimal downtime Good compatibility with seals, O-rings, and packing materials maintains their good condition and keeps leakage at a minimum.
- Long oil life Outstanding ability of the synthetic base stock to withstand oxidation at high operating temperatures resulting in long service life for the oil.
- **Reliable operation** Formulation helps keep metal parts clean and free of varnish and sludge deposits that could result in premature breakdown.

- **Minimizing weather and storage concerns** Protects against rust and corrosion of highly finished precision parts when operating in humid conditions and during seasonal shutdown periods.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.

FEATURES

Delo TorqForce Syn SAE 5W-30 is a high performance lubricant designed for use in transmissions



and hydraulic systems operating in arctic conditions and requiring a fluid meeting Caterpillar TO-4. It is also recommended for transmission and hydraulic systems manufactured by Dana Powershift, Komatsu, Vickers and ZF.

Delo TorqForce Syn SAE 5W-30 is formulated with synthetic base oils and additives to provide excellent friction retention, wear control, seal compatibility, oxidation stability, and viscosity stability. The frictional characteristics of the fluid are retained over the life of the lubricant.

Components are protected from wear, even under high load conditions by controlling the formation of corrosion, varnish, and sludge.

Delo TorqForce Syn SAE 5W-30 is designed for both newly developed and older model drive train components. It provides high performance throughout the seasons, maintaining optimal stability in a wide range of ambient temperatures.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

A Chevron company product

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

APPLICATIONS

Delo TorqForce Syn SAE 5W-30 is recommended for use in **Allison, Caterpillar, Dana Powershift, Komatsu, Vickers** and **ZF** transmissions, wet brakes, and hydraulic systems operating in arctic conditions.

It is not recommended for use in combined farm tractor hydraulic and transmission systems where low brake chatter is a requirement.

Delo TorqForce Syn SAE 5W-30 meets:

• service requirements of Caterpillar TO-4

Delo TorqForce Syn SAE 5W-30 is recommended for:

- Allison C-4
- Dana Powershift
- Komatsu KES 07.868.1
- Vickers 35VQ25
- **ZF** TE-ML-03C

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

SAE Grade	Test Method	5W-30
Product Number		278100
SDS Number		54573
Density at 15°C, kg/L	ASTM D4052	0.8657
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	53.8 10.5
Viscosity Index	ASTM D2270	189
Viscosity, Brookfield, cP at -35°C	ASTM D2983	15,400
Viscosity, Cold Crank, cP at -30°C	ASTM D5293	5,500
Viscosity, Pumping, cP at -35°C	ASTM D4684	11,500
Flash Point, °C(°F)	ASTM D92	232(451)
Pour Point, °C(°F)	ASTM D97	-48(-54)

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®]TORQFORCE[®]SYN ISOCLEAN[®]CERTIFIED LUBRICANT SAE 5W-30 (formerly 5W-20)

SOCI E

PRODUCT DESCRIPTION

Delo[®] TorqForce[®] Syn SAE 5W-30 ISOCLEAN[®] Certified Lubricant is a high performance fully synthetic lubricant designed for use in transmissions and

hydraulic systems. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo TorqForce Syn SAE 5W-30 ISOCLEAN Certified Lubricant delivers value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Long equipment life Special additives protect metal surfaces against scuffing and wear even under operating conditions of high temperature and high load.
- Smooth operation Excellent frictional control helps prevent clutch slippage and assures quiet and efficient action of transmission and brakes while minimizing wear.

- Extreme temperature performance Excellent cold weather pumpability in sub-zero/ arctic operating conditions. Very good high operating temperature performance for severe service applications.
- **Improved filterability** Delo TorqForce Syn SAE 5W-30 ISOCLEAN Certified Lubricant is formulated with special additive chemistry that allows for ultrafine filtration which provides exceptional fluid cleanliness and equipment reliability performance. Delo TorqForce Syn SAE 5W-30 ISOCLEAN Certified Lubricant can achieve cleanliness levels down to 18/ 16/13 and potentially cleaner with appropriate Chevron approved ISOCLEAN Programs.
- Minimal downtime Good compatibility with seals, O-rings, and packing materials maintains their good condition and keeps leakage at a minimum.
- Long oil life Outstanding ability of the synthetic base stock to withstand oxidation at high operating temperatures resulting in long service life for the oil.
- **Reliable operation** Formulation helps keep metal parts clean and free of varnish and sludge deposits that could result in premature breakdown.
- **Minimizing weather and storage concerns** Protects against rust and corrosion of highly finished precision parts when operating in humid conditions and during seasonal shutdown periods.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 June 2021 TTF-33 ISOCLEAN

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FEATURES

Delo[®] TorqForce[®] Syn SAE 5W-30 ISOCLEAN[®] Certified Lubricant is a high performance



lubricant designed for use in transmissions and hydraulic systems operating in arctic conditions and requiring a fluid meeting Caterpillar TO-4. It is also recommended for transmission and hydraulic systems manufactured by Dana Powershift, Komatsu, Vickers and ZF.

Delo TorqForce Syn SAE 5W-30 ISOCLEAN Certified Lubricant is formulated with synthetic base oils and additives to provide excellent friction retention, wear control, seal compatibility, oxidation stability, and viscosity stability. The frictional characteristics of the fluid are retained over the life of the lubricant.

Components are protected from wear, even under high load conditions by controlling the formation of corrosion, varnish, and sludge.

Delo TorqForce Syn SAE 5W-30 ISOCLEAN Certified Lubricant is designed for both newly developed and older model drive train components. It provides high performance throughout the seasons, maintaining optimal stability in a wide range of ambient temperatures.

APPLICATIONS

Delo TorqForce Syn SAE 5W-30 ISOCLEAN Certified Lubricant is recommended for use in **Allison**, **Caterpillar, Dana Powershift, Komatsu, Vickers** and **ZF** transmissions, wet brakes, and hydraulic systems operating in arctic conditions.

It is not recommended for use in combined farm tractor hydraulic and transmission systems where low brake chatter is a requirement.

Delo TorqForce Syn SAE 5W-30 ISOCLEAN Certified Lubricant meets:

• service requirements of Caterpillar TO-4

Delo TorqForce Syn SAE 5W-30 ISOCLEAN Certified Lubricant is recommended for:

- Allison C-4
- Dana Powershift
- Komatsu KES 07.868.1
- Vickers 35VQ25
- **ZF** TE-ML-03C

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	Test Method	5W-30
Product Number		278101
SDS Number		54573
Density at 15°C, kg/L	ASTM D4052	0.8657
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	53.8 10.5
Viscosity Index	ASTM D2270	189
Viscosity, Brookfield, cP at -35°C	ASTM D2983	15,400
Viscosity, Cold Crank, cP at -30°C	ASTM D5293	5,500
Viscosity, Pumping, cP at -35°C	ASTM D4684	11,500
Flash Point, °C(°F)	ASTM D92	232(451)
Pour Point, °C(°F)	ASTM D97	-48(-54)

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] ATF+4[®] AUTOMATIC TRANSMISSION FLUID

PRODUCT DESCRIPTION

Formulated for all FCA Automatic Transmissions.

CUSTOMER BENEFITS

Havoline[®] ATF+4[®] Automatic Transmission Fluid delivers value through:

- Warranty coverage as an officially approved FCA US fluid
- Correct viscosity and frictional characteristics to help ensure smooth operation in FCA transmissions
- **Optimal drain intervals** of at least 100,000 miles under normal operating conditions
- Long-lasting viscosity modifiers for maximum fluid life.

FEATURES

Havoline ATF+4 Automatic Transmission Fluid is formulated with high purity synthetic base stocks. It is designed to maintain its viscosity through excellent oxidation stability and use of long lasting viscosity modifiers.

It has excellent low temperature fluidity and viscosity breakdown performance over previous generation FCA ATF fluids.

Havoline ATF+4 Automatic Transmission Fluid is specially formulated to give outstanding protection in critical areas of FCA transmission operation.

Havoline ATF+4 Automatic Transmission Fluid:

- lubricates and helps prevent wear in gears, clutches, and bearings.
- transfers engine power effectively
- · removes heat efficiently
- operates well over a wide temperature range

- resists thermal and oxidative breakdown
- promotes sufficient viscosity at high temperatures with minimal sheardown
- gives proper friction performance for FCA vehicles (smooth shift feel, no shudder)
- protects seals, gaskets, and other nonferrous components
- helps prevent sludge and varnish formation
- resists foaming

APPLICATIONS

Havoline ATF+4 Automatic Transmission Fluid is designed for use in FCA US automatic transmissions and automatic transaxles where a Mopar ATF PLUS[®], ATF+2[®], ATF+3[®] or ATF+4[®] fluid is specified.¹ The FCA US includes FCA, Dodge, Plymouth, Jeep and Eagle vehicles.

It is not recommended for use in transmissions specifying either ${\sf DEXRON}^{\textcircled{R}}$ or ${\sf MERCON}^{\textcircled{R}}$ type fluids.²

Havoline ATF+4 Automatic Transmission Fluid has been registered with FCA US LLC, license number 40630035.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

2 DEXRON is a registered trademark of General Motors Corporation. MERCON is a registered trademark of Ford Motor Company.

Product(s) manufactured in Canada.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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7 November 2022 TTF-70

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¹ Mopar ATF PLUS, ATF+2, ATF+3 and ATF+4 are registered trademarks of FCA US LLC (formerly known as Chrysler Group LLC).

Product Number	222270
SDS Number	16360
API Gravity	35.4
Viscosity, Kinematic cSt at 40°C cSt at 100°C	33.24 7.51
Viscosity, Brookfield cP at -40°C	8,380
Viscosity Index	204
Flash Point, °C(°F)	198(388)
Pour Point, °C(°F)	-51(-60)
Color	Red

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] AUTOMATIC TRANSMISSION FLUID MD-3

PRODUCT DESCRIPTION

Formulated for applications that call for the former ${\sf DEXRON}^{\circledast}\text{-}{\rm III}$ H, ${\sf MERCON}^{\circledast}\text{-}{\rm Caterpillar}$ TO-2 and Allison C-4 fluids.^1

CUSTOMER BENEFITS

 ${\rm Havoline}^{\ensuremath{\mathbb{R}}}$ Automatic Transmission Fluid MD-3 delivers value through:

- **Protection** against the formation of lacquers, sludge, or other harmful deposits.
- **Exceptional stability** provided by premium base oils and extra oxidation inhibitors.
- **Quiet performance** Especially effective in minimizing transmission "chatter." Helps ensure smooth, quiet action at all speeds.
- Fast circulation during cold weather and excellent film strength when hot.

FEATURES

Havoline Automatic Transmission Fluid MD-3 is a passenger car and light truck automatic transmission fluid for most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes requiring a high-performance, multi-purpose, power transmission fluid.

It is formulated with premium hydroprocessed base stocks and additives that help provide oxidation and thermal stability, friction control, load-carrying ability, corrosion and wear protection. It helps protect against the formation of deposits, sludge, varnish, and foam.

Havoline Automatic Transmission Fluid MD-3 helps provide outstanding durability.

 DEXRON is a registered trademark of General Motors Corporation.
MERCON is a registered trademark of Ford Motor Company. Under severe operating conditions, this fluid:

- Maintains friction control for smooth shift action.
- Is specially formulated to help prevent shudder.
- Retains low temperature fluidity and high temperature stability for long operating periods.
- Protects automatic transmission fluid coolers from corrosion.
- Helps minimize the chances of a transmission overhaul due to sludge, corrosion, and wear.

APPLICATIONS

Havoline Automatic Transmission Fluid MD-3 is designed for use in most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes requiring a high performance, multi-purpose, power transmission fluid. It is recommended for applications that call for the former DEXRON-III H, MERCON, Caterpillar TO-2 and Allison C-4 fluids.

Always check your owner's manual to determine the proper automatic transmission fluid for your vehicle.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatuses or medical equipment.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2024 TTF-90

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Product Number	221854
<i>SDS/MSDS Number USA Colombia El Salvador</i>	8654 33101 33701
API Gravity	34.1
Viscosity, Kinematic cSt at 40°C cSt at 100°C	34.1 7.0
Viscosity Index	171
Flash Point, °C(°F)	185(365)
Pour Point, °C(°F)	-50(-58)
Color	Red

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] AUTOMATIC TRANSMISSION FLUID MD-3 ISOCLEAN[®] CERTIFIED LUBRICANT

PRODUCT DESCRIPTION

Formulated for applications that call for the former DEXRON[®]-III H, MERCON[®], Caterpillar TO-2 and Allison C-4 fluids.¹



Chevron ISOCLEAN[®] Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Havoline[®] Automatic Transmission Fluid MD-3 ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Protection** against the formation of lacquers, sludge, or other harmful deposits.
- **Exceptional stability** provided by premium base oils and extra oxidation inhibitors.
 - DEXRON is a registered trademark of General Motors Corporation.
 MERCON is a registered trademark of Ford Motor Company.

- Quiet performance Especially effective in minimizing transmission "chatter." Helps ensure smooth, quiet action at all speeds.
- Fast circulation during cold weather and excellent film strength when hot.

FEATURES

Havoline Automatic Transmission Fluid MD-3 ISOCLEAN Certified Lubricant is a passenger car and light truck automatic transmission fluid for most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes requiring a highperformance, multi-purpose, power transmission fluid.

It is formulated with premium hydroprocessed base stocks and additives that help provide oxidation and thermal stability, friction control, load-carrying ability, corrosion and wear protection. It helps protect against the formation of deposits, sludge, varnish, and foam.

Havoline Automatic Transmission Fluid MD-3 ISOCLEAN Certified Lubricant helps provide outstanding durability.

Under severe operating conditions, this fluid:

- Maintains friction control for smooth shift action.
- Is specially formulated to help prevent shudder.
- Retains low temperature fluidity and high temperature stability for long operating periods.
- Protects automatic transmission fluid coolers from corrosion.
- Helps minimize the chances of a transmission overhaul due to sludge, corrosion, and wear.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 October 2024 TTF-90 ISOCLEAN

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APPLICATIONS

Havoline[®] Automatic Transmission Fluid MD-3 ISOCLEAN[®] Certified Lubricant is designed for use in most pre-2006 automatic transmissions built by General Motors, Ford Motor Company and other makes requiring a high performance, multi-purpose, power transmission fluid. It is recommended for applications that call for the former DEXRON-III H, MERCON, Caterpillar TO-2 and Allison C-4 fluids.

Always check your owner's manual to determine the proper automatic transmission fluid for your vehicle.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatuses or medical equipment.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

Product Number	223082
SDS/MSDS Number USA Canada Mexico Colombia El Salvador	8654 33097 38663 33101 33701
API Gravity	34.1
Viscosity, Kinematic cSt at 40°C cSt at 100°C	34.1 7.0
Viscosity Index	171
Flash Point, °C(°F)	185(365)
Pour Point, °C(°F)	-50(-58)
Color	Red

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



9 March 2015 TTF-100

HAVOLINE[®] AUTOMATIC TRANSMISSION FLUID TYPE F

PRODUCT DESCRIPTION

Havoline[®] Automatic Transmission Fluid Type F is a high performance lubricating fluid for pre-1977 (and some 1977 to 1981) automatic transmissions built by Ford Motor Company and other makes requiring a high friction Type F fluid.

CUSTOMER BENEFITS

Havoline Automatic Transmission Fluid Type F delivers value through:

- **Protection** against the formation of lacquers and other harmful deposits.
- **Exceptional stability** provided by premium base oils and extra oxidation inhibitors.
- **Quiet performance** Especially effective in helping to ensure proper action in Ford, Lincoln, and Mercury transmissions at all speeds.
- Fast circulation during cold weather and excellent film strength when hot.

FEATURES

Havoline Automatic Transmission Fluid Type F is manufactured using selected highly refined base oils and additives that promote oxidation and thermal stability, friction control, cleanliness, load-carrying ability, corrosion and wear protection, and help prevent the formation of foam.

It is red in color for identification and leakage control.

Havoline Automatic Transmission Fluid Type F protects against deposits, corrosion and wear, promotes proper shifting action, resists oxidation and viscosity increase, and helps ensure long transmission life.

APPLICATIONS

Havoline Automatic Transmission Fluid Type F is recommended for automatic transmissions in Ford, Mercury, and Lincoln passenger cars and light trucks manufactured by Ford Motor Company and certain other makes prior to 1977, and some makes from 1977 to 1981 (consult the vehicle owners manual).

This fluid is not to be used in Ford transmissions that require a fluid meeting Ford specification M2C138-CJ. Havoline[®] or Chevron Automatic Transmission Fluid MD-3 is the recommended fluid in this case.

Havoline Automatic Transmission Fluid Type F meets the requirements of former **Ford** specification M2C33-F.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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Product Number	221855
SDS Number	8653
API Gravity	32.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	37.2 7.3
Viscosity, Saybolt SUS at 100°F SUS at 210°F	189 50.6
Viscosity, Brookfield cP at -18°C	1400
Viscosity Index	165
Flash Point, °C(°F)	214(417)
Pour Point, °C(°F)	-45(-49)
Color	Red

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] GLOBAL MULTI-VEHICLE ATF (FOR REGIONS OUTSIDE CALIFORNIA)

PRODUCT DESCRIPTION

Havoline[®] Global Multi-Vehicle ATF (Automatic Transmission Fluid) is a premium, synthetic blend multi-purpose transmission fluid, for use in modern automatic transmissions of most domestic and import passenger cars, SUVs, light duty trucks, and vans.

CUSTOMER BENEFITS

- **Broad coverage** suitable for use in a wide range of vehicle makes and models, including many high-viscosity applications.
- **Save money** covers 99% of automatic transmissions without the need for supplemental additives or top treats.
- Lower maintenance costs provides excellent proven protection of transmissions* and keeps them clean for extended drain intervals, even under the harshest driving conditions.
- **Improve fuel economy** low viscosity formulation reduces transmission drag and friction of internal components that improve efficiency and maximizes vehicle fuel economy.
- Maximize transmission life premium formula blended with high purity synthetic base oils resists against foaming and protects transmission against wear, corrosion, and sludge and lacquer formation.

FEATURES

Havoline Global Multi-Vehicle ATF is formulated with a synthetic blend of hydro-processed base stocks, carefully crafted additives, and long-lasting viscosity modifiers. It has been tested for use in the latest generation of low-viscosity ATF applications, and is also backward compatible with most high-viscosity applications.

- Oxidation stability and wear protection -Helps transmissions stay cleaner and last longer with superior protection of transmission components from wear over a wide range of temperatures.
- Friction control and performance Maintains smooth and consistent shifting with no shudder as the fluid ages in the transmission, even under extreme driving conditions. Also meets the friction performance requirements of JASO M315, DEXRON[®]-VI and MERCON[®] V standards.
- Enhanced protection Retains exceptional low temperature flow properties and excellent protection against viscosity breakdown at high temperatures, even under the most demanding operating conditions. To minimize transmission breakdowns and reduce vehicle noise and vibration, it also provides good foam resistance and protects against the formation of sludge, varnish, and other harmful deposits in the transmission.

APPLICATIONS

Havoline Global Multi-Vehicle ATF is recommended for use in applications of Hyundai, Isuzu, Kia, Mitsubishi, Nissan/Infiniti, Subaru, Toyota/Lexus and Suzuki that require automatic transmission fluids and Hybrid Vehicles where Toyota Type WS fluid or any fluid listed in the table below is specified. It meets the requirements of all General Motors and other vehicles specifying DEXRON®-VI or older DEXRON specs.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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15 June 2022 TTF-115 Non-CA

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ОЕМ	Fluid Spec
AISIN-Warner Transmissions	JWS 3309 ATF AW-1
Allison	C4
BMW	ETL-8072B LA 2634 LT 71141 7045-E P/N 83 22 0 397 114 P/N 83 22 2 220 438/440 P/N 83 22 7 542 290 P/N 83 22 0 026 922 P/N 83 22 0 403 248/249 P/N 83 22 9 407 765 P/N 83 22 9 407 807 P/N 999 917 547 00 (A2) P/N 000 043 205 09 P/N 83 22 2 152 426
Chrysler/FCA ^a	Mopar ASRC P/N 68043742AA1 P/N 68218925AA
Ford	MERCON [®] V ^b MERCON [®] LV MERCON [®] SP Motorcraft FNR5 ATF Motorcraft P/N XT-5-QM Motorcraft P/N XT-6-QSP Motorcraft P/N XT-8-QAW Motorcraft P/N XT-9-QMM5 Motorcraft P/N XT-10-QLV Motorcraft Premium WSS-M2C924-A
General Motors	DEXRON [®] HP ^c DEXRON [®] -VI DEXRON [®] -III DEXRON [®] -II Saturn T-IV Saturn P/N 22717466 ATF Z1
Honda	ATF Type 3.0 ATF DW-1 ATF-Z1

This product is recommended for use in the following applications:

OEM	Fluid Spec
Hyundai/Kia	SP-II SP-III SP-IV SP-IV-RR SP4-M1 ATF RED-1K WS NWS-9638 SPH-IV
Isuzu	Genuine ATF ATF-II ATF-III
Jaguar - Land Rover	02JDE 26444 LR023288 ETL-7045E LT 71141 Esso JWS3309US JLM 20238 JLM 20292 WSS-M2C922-A1 K17
Mazda	ATF M-III ATF M-V Type T-IV JWS3317 M3
Mercedes Benz	MB 236.41 MB 236.5 MB 236.6 MB 236.7 MB 236.8 MB 236.9 MB 236.10 MB 236.10 MB 236.11 MB 236.12 MB 236.14 ATF 3403-M115 NAG-1
Mitsubishi	J2 J3 Diamond SP-II Diamond SP-III
Nissan/Infiniti	Matic-W Matic-J Matic-S Matic-D Matic-K
Peugeot/Citroen	Z 000169756

ОЕМ	Fluid Spec	
Porsche	P/N 000 043 204 63 P/N 000 043 304 00	
Renault	Matic-D2	
Subaru/Saab	ATF 5AT ATF HP	
Suzuki	ATF 3317 Matic-D Matic-J Matic-S	
Toyota/Lexus	Type D-II Type T Type T-II Type T-III Type T-IV (JWS 3309) Type WS (JWS 3324)	
Volkswagen	G 060 540 A2 G 055 540 A2 G 055 025 (-A2) G 052 533 G 052 162 (-A1, -A2) G 052 990 A2 TL 52533 (G 052 533) TL 52162 (G 052 162 A1 and A2) ZF 5HP (18FL, 30)	
Volvo	97340 97341 P/N 1161621 P/N 1161540 P/N 1161640 P/N 1161521 P/N 31 256 774	
ZF	LifeguardFluid 5 LifeguardFluid 6 LifeguardFluid 8 P/N S671 090 312 TE-ML 11A / B	

- a. For Chrysler ATF+3[®] and ATF+4[®] applications, use Havoline[®] ATF+4[®] Automatic Transmission Fluid. ATF+3 and ATF+4 are registered trademarks of FCA US LLC (formerly known as Chrysler Group LLC).
- b. MERCON is a registered trademark of Ford Motor Company.
- c. DEXRON is a registered trademark of General Motors Corporation.

For additional information on this product, please consult the Havoline ATF guide, Havoline Recommendation Guide or a Chevron sales representative.

- Chevron does not recommend Havoline Global Multi-Vehicle ATF for use in vehicles with continuously variable transmissions (CVTs) or dual clutch transmissions (DCTs) unless indicated above, nor in Ford transmissions where Ford Type F fluids are recommended. Always check your owner's manual to determine the proper automatic transmission fluid for your vehicle. The use of this product in transmissions where recommended by Chevron will not void the vehicle's warranty. All Havoline products, including Havoline Global Multi-Vehicle ATF, are backed by Chevron's Limited Product Warranty.
- To support Havoline Global Multi-Vehicle ATF performance, Chevron has conducted extensive laboratory evaluations and field tests.

	Test Method	
Product Number		226537
<i>SDS Number U.S. Canada Mexico</i>		40639 40640 40641
API Gravity	ASTM D1298	33.0
Density at 15°C, kg/L	ASTM D4052	0.860
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	31.0 6.2
Viscosity, Brookfield cP at -40°C	ASTM D2983	13,000
Viscosity Index	ASTM D2270	155
Flash Point, °C(°F)	ASTM D92	216(421)
Pour Point, °C(°F)	ASTM D97	-54(-65)
Color	Visual	Red

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] GLOBAL MULTI-VEHICLE ATF (FOR USE IN CALIFORNIA)

PRODUCT DESCRIPTION

Havoline[®] Global Multi-Vehicle ATF (Automatic Transmission Fluid) is a premium, synthetic blend multi-purpose transmission fluid, for use in modern automatic transmissions of most domestic and import passenger cars, SUVs, light duty trucks, and vans.

CUSTOMER BENEFITS

- **Broad coverage** suitable for use in a wide range of vehicle makes and models, including many high-viscosity applications.
- **Save money** covers 99% of automatic transmissions without the need for supplemental additives or top treats.
- Lower maintenance costs provides excellent proven protection of transmissions* and keeps them clean for extended drain intervals, even under the harshest driving conditions.
- **Improve fuel economy** low viscosity formulation reduces transmission drag and friction of internal components that improve efficiency and maximizes vehicle fuel economy.
- Maximize transmission life premium formula blended with high purity synthetic base oils resists against foaming and protects transmission against wear, corrosion, and sludge and lacquer formation.

FEATURES

Havoline Global Multi-Vehicle ATF is formulated with a synthetic blend of hydro-processed base stocks, carefully crafted additives, and long-lasting viscosity modifiers. It has been tested for use in the latest generation of low-viscosity ATF applications, and is also backward compatible with most high-viscosity applications.

- Oxidation stability and wear protection -Helps transmissions stay cleaner and last longer with superior protection of transmission components from wear over a wide range of temperatures.
- Friction control and performance Maintains smooth and consistent shifting with no shudder as the fluid ages in the transmission, even under extreme driving conditions. Also meets the friction performance requirements of JASO M315, DEXRON[®]-VI and MERCON[®] V standards.
- Enhanced protection Retains exceptional low temperature flow properties and excellent protection against viscosity breakdown at high temperatures, even under the most demanding operating conditions. To minimize transmission breakdowns and reduce vehicle noise and vibration, it also provides good foam resistance and protects against the formation of sludge, varnish, and other harmful deposits in the transmission.

APPLICATIONS

Havoline Global Multi-Vehicle ATF is recommended for use in applications of Hyundai, Isuzu, Kia, Mitsubishi, Nissan/Infiniti, Subaru, Toyota/Lexus and Suzuki that require automatic transmission fluids and Hybrid Vehicles where Toyota Type WS fluid or any fluid listed in the table below is specified. It meets the requirements of all General Motors and other vehicles specifying DEXRON[®]-VI, DEXRON[®]-III, DEXRON[®]-II, DEXRON[®]-II-D, or DEXRON[®].

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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15 June 2022 TTF-115 for CA

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ОЕМ	Fluid Spec
AISIN-Warner Transmissions	JWS 3309 ATF AW-1
Allison	C4
BMW	ETL-8072B LA 2634 LT 71141 7045-E P/N 83 22 0 397 114 P/N 83 22 2 220 438/440 P/N 83 22 7 542 290 P/N 83 22 0 026 922 P/N 83 22 0 403 248/249 P/N 83 22 9 407 765 P/N 83 22 9 407 765 P/N 83 22 9 407 807 P/N 999 917 547 00 (A2) P/N 000 043 205 09 P/N 83 22 2 152 426
Chrysler/FCA ^a	Mopar ASRC P/N 68043742AA1 P/N 68218925AA
General Motors	DEXRON [®] HP ^b DEXRON [®] -VI DEXRON [®] -III DEXRON [®] -II Saturn T-IV Saturn P/N 22717466 ATF Z1
Honda	ATF Type 3.0 ATF DW-1 ATF-Z1
Hyundai/Kia	SP-II SP-III SP-IV SP-IV-RR SP4-M1 ATF RED-1K WS NWS-9638 SPH-IV
Isuzu	Genuine ATF ATF-II ATF-III

This product is recommended for use in the following applications:

OEM	Fluid Spec
Jaguar - Land Rover	02JDE 26444 LR023288 ETL-7045E LT 71141 Esso JWS3309US JLM 20238 JLM 20292 WSS-M2C922-A1 K17
Mazda	ATF M-III ATF M-V Type T-IV JWS3317 M3
Mercedes Benz	MB 236.41 MB 236.5 MB 236.6 MB 236.7 MB 236.8 MB 236.9 MB 236.10 MB 236.10 MB 236.11 MB 236.12 MB 236.14 ATF 3403-M115 NAG-1
Mitsubishi	J2 J3 Diamond SP-II Diamond SP-III
Nissan/Infiniti	Matic-W Matic-J Matic-S Matic-D Matic-K
Peugeot/Citroen	Z 000169756
Porsche	P/N 000 043 204 63 P/N 000 043 304 00
Renault	Matic-D2
Subaru/Saab	ATF 5AT ATF HP
Suzuki	ATF 3317 Matic-D Matic-J Matic-S

OEM	Fluid Spec
Toyota/Lexus	Type D-II Type T Type T-II Type T-III Type T-IV (JWS 3309) Type WS (JWS 3324)
Volkswagen	G 060 540 A2 G 055 540 A2 G 055 025 (-A2) G 052 533 G 052 162 (-A1, -A2) G 052 990 A2 TL 52533 (G 052 533) TL 52162 (G 052 162 A1 and A2) ZF 5HP (18FL, 30)
Volvo	97340 97341 P/N 1161621 P/N 1161540 P/N 1161640 P/N 1161521 P/N 31 256 774
ZF	LifeguardFluid 5 LifeguardFluid 6 LifeguardFluid 8 P/N S671 090 312 TE-ML 11A / B

a. For Chrysler ATF+3[®] and ATF+4[®] applications, use Havoline[®] ATF+4[®] Automatic Transmission Fluid. ATF+3 and ATF+4 are registered trademarks of FCA US LLC (formerly known as Chrysler Group LLC).

b. DEXRON is a registered trademark of General Motors Corporation.

For additional information on this product, please consult the Havoline ATF guide, Havoline Recommendation Guide or a Chevron sales representative. Chevron does not recommend Havoline Global Multi-Vehicle ATF for use in vehicles with continuously variable transmissions (CVTs) or dual clutch transmissions (DCTs) unless indicated above, nor in Ford transmissions where Ford Type F fluids are recommended. Always check your owner's manual to determine the proper automatic transmission fluid for your vehicle. The use of this product in transmissions where recommended by Chevron will not void the vehicle's warranty. All Havoline products, including Havoline Global Multi-Vehicle ATF, are backed by Chevron's Limited Product Warranty.

- California law prohibits all manufacturers of multivehicle ATFs from recommending products in certain applications where the viscometrics do not match those of the official OEM specification. Havoline Global Multi-Vehicle ATF is outside of the viscosity requirements of Ford applications requiring Ford MERCON[®], MERCON[®] V, MERCON[®] LV, Mercon[®] SP and MERCON[®] ULV. Where applications allow use of an alternate fluid of a higher viscosity (example: Nissan Matic-J when Nissan Matic-S is not available) to one of the above fluid specifications, Havoline Global Multi-Vehicle ATF is an excellent recommendation.
- To support Havoline Global Multi-Vehicle ATF performance, Chevron has conducted extensive laboratory evaluations and field tests which may not meet all laboratory test requirements of certain OEM specifications.

	Test Method	
Product Number		226537
<i>SDS Number U.S. Canada Mexico</i>		40639 40640 40641
API Gravity	ASTM D1298	33.0
Density at 15°C, kg/L	ASTM D4052	0.860
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	31.0 6.2
Viscosity, Brookfield cP at -40°C	ASTM D2983	13,000
Viscosity Index	ASTM D2270	155
Flash Point, °C(°F)	ASTM D92	216(421)
Pour Point, °C(°F)	ASTM D97	-54(-65)
Color	Visual	Red

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] FULL SYNTHETIC MULTI-VEHICLE ATF

PRODUCT DESCRIPTION

Havoline[®] Full Synthetic Multi-Vehicle Automatic Transmission Fluid (ATF) is a premium, full synthetic transmission fluid with a low viscosity formulation, superior friction control, and dependable protection for use in 6+ speed automatic transmissions of both domestic and import vehicles (model Years 2006 and newer, refer to owner's manual). It is approved by Ford and General Motors for use in transmissions and transaxles requiring their latest ATF specifications -DEXRON[®]-VI^{*} and MERCON[®]-LV.[†] It also exceeds the requirements of JASO 1A-LV, the performance standards created by Japanese automobile manufacturers and recognized by Japanese and Korean carmakers for certifying the ATF for use in their vehicles.

CUSTOMER BENEFITS

Havoline Full Synthetic Multi-Vehicle ATF delivers value through:

- **Peace of mind** officially approved fluid for General Motors DEXRON-VI and Ford MERCON-LV applications so it offers warranty coverage for vehicles that specify these specifications.
- Broad coverage backward compatible with all applications that require General Motor DEXRON-III, DEXRON-II and DEXRON specs. Recommended for many Toyota, Honda, Hyundai vehicles and other import vehicles.[‡]
- **Maximize transmission life** advanced formula made with high purity synthetic base oils resists foaming and protects transmission against wear, corrosion, and sludge formation.
- Lower maintenance costs superior high temperature and anti-oxidation properties help

* DEXRON is a registered trademark of General Motors Corporation.

 MERCON is a registered trademark of Ford Motor Company. protect the transmission and keep it clean during extended drain intervals.

- **Improve fuel economy** low viscosity formula reduces transmission drag and improves efficiency to help maximize fuel economy.
- Save money with proven technology this product has been proven to work with modern vehicles through extensive tests, so there's no need for supplemental additives or top treats.

FEATURES

Havoline Full Synthetic Multi-Vehicle ATF is formulated with high purity synthetic base oils and long-lasting viscosity modifiers to meet the demanding requirements of modern vehicles.

- Friction control and performance maintains friction control and excellent friction performance for smooth and consistent shifting without any shudder as the fluid ages in the transmission, even under extreme driving conditions. It also exceeds the friction performance requirements of JASO, DEXRON-VI and MERCON-LV standards.
- Oxidation stability and wear protection Helps keep transmission cleaner and lasting longer by providing excellent oxidation stability and superior protection of transmission components from wear and degradation (to reduce noise and vibration) over a wide range of temperatures.
- Shear stability with exceptional lubrication Retains fluid viscosity and physical properties, and provides efficient power transfer from engine to wheels at high temperatures and under the most demanding operating conditions.

Product(s) manufactured in the USA.

A Chevron company product

15 October 2022 TTF-130

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Chevron does not recommend Havoline Full Synthetic Multi-Vehicle ATF for use in vehicles with continuously variable transmissions (CVTs) or dual clutch transmissions (DCTs) unless indicated above. Havoline Full Synthetic Multi-Vehicle ATF is not recommended for transmissions where Ford Type F, MERCON, MERCON V, MERCON SP, MERCON ULV is specified.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

APPLICATIONS

Licensed/approved for use in:

- All Ford vehicles requiring MERCON[®]-LV fluid (MERCON-LV license number MLV190802)
- All General Motors and other vehicles specifying DEXRON[®]-VI, DEXRON[®]-III, DEXRON[®]-II or DEXRON[®] fluid (DEXRON-VI license number J-62318)

Recommended by Chevron for use in:

- JASO 1A-LV (M315) specification for shifting performance, shear stability and exceptional anti-shudder durability desired by Asian automakers for their high and low viscosity applications
- Voith H55.6335.xx (G607)
- Vehicles built with ZF and Aisin Warner transmissions, where LifeguardFluid 5, LifeguardFluid 8, LifeguardFluid 9, AW-1 or AW-2 fluids are specified
- **Hybrid Vehicles** where Toyota Type WS fluid or any fluid listed in the table below is specified
- Most modern transmissions manufactured by European, Asian and North American OEMs, where the below standards are specified:

OEM	Fluid Spec
BMW	ETL-8072B P/N 83 22 0 397 114 P/N 83 22 2 152 426
Chrysler/FCA	Mopar ASRC P/N 68043742AA3 P/N 68218925AA
General Motors	Saturn P/N 22717466
Honda	ATF Type 3.0 ATF DW-1, ATF-Z1
Hyundai/Kia	SP-IV SP-IV-RR SP4-M1 WS (NWS-9638) SPH-IV
Jaguar - Land Rover	JLM 20238 JLM 20292 WSS-M2C922-A1

OEM	Fluid Spec
Mercedes Benz	MB 236.41 MB 236.8
Nissan/Infiniti	Matic W
Porsche	P/N 000 043 204 63 P/N 000 043 304 00
Suzuki	Matic-D
Toyota/Lexus	Type T-II Type T-III Type-IV ATF WS (JWS 3324 / NWS 9638)
Volkswagen	G 060 540 A2 G 055 540 A2
Volvo	P/N 1161521 P/N 31 256 774
ZF	TE-ML 09

All Havoline products, including Havoline Full Synthetic Multi-Vehicle ATF, are backed by Chevron's Limited Product Warranty. Always check your owner's manual to determine the proper automatic transmission fluid for your vehicle. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

For additional information on this product, please consult the Havoline ATF guide, Havoline Recommendation Guide or a Chevron sales representative.

	Test Method	
Product Number		226536
SDS Number		39548
Density at 15°C, kg/L	ASTM D4052	0.8477
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	29.0 5.8
Viscosity, Brookfield cP at -40°C	ASTM D2983	10,300
Viscosity Index	ASTM D2770	148
Flash Point, °C(°F)	ASTM D92	217(423)
Pour Point, °C(°F)	ASTM D97	-54(-65)
Color		Red

Minor variations in product typical test data are to be expected in normal manufacturing.



$Havoline^{\mathbb{R}}$ Full Synthetic CVT Fluid

PRODUCT DESCRIPTION

Havoline[®] Full Synthetic CVT Fluid is designed for modern continuously variable transmissions (CVTs), which rely on high steel-on-steel friction between either a belt or chain and pulleys to transfer power.

Havoline Full Synthetic CVT Fluid contains anti-wear and anti-shudder additives, as well as long-life friction modifiers to effectively maintain the steel-on-steel friction to help prevent slipping, as well as premature wear and hot spots at the interface. It is formulated with premium, full synthetic base stocks and shearstable viscosity modifiers that provide greater performance benefits at extreme operating temperatures compared to part synthetic and conventional mineral-based fluids.

CUSTOMER BENEFITS

Havoline Full Synthetic CVT Fluid delivers value through:

- Excellent steel-on-steel frictional engagement and torque transfer
- Excellent wet clutch performance, shifting and anti-shudder durability
- Superior high temperature protection to effectively resist oxidation
- Extended drain intervals due to improved oxidation resistance
- Excellent low-temperature fluidity for optimal performance in cold conditions
- Maximizes equipment life, by helping to protect against: wear, corrosion, and deposit formation

APPLICATIONS

Havoline Full Synthetic CVT Fluid is recommended for service fill use in the following passenger car, push-belt and chain-driven continuously variable transmission applications:

- BMW/MINI P/N 83 220 136 376, P/N 83 220 429 154, EZL 799, EZL 799A
- Daihatsu AMMIX CVTF, CVTF-DC, CVTF-DFE
- Dodge/Jeep NS-2, CVTF+4
- Ford CVT23, CFT30, WSS-M2C933-A, Motorcraft XT-7-QCFT, MERCON[®] C*
- General Motors CVTF I-Green2, DEX-CVT
- Honda/Acura HMMF (without starting clutch), HCF-2
- Hyundai/Kia SP-CVT 1, SP-III (CVT only)
- Mazda CVTF 3320
- Mercedes Benz 236.20
- **Mitsubishi** CVTF-J1, CVTF-J4, SP-III (CVT only)
- Nissan NS-1, NS-2, NS-2V, NS-3, Nissan D-Matic (N-CVT only)
- Shell Green 1V
- **Subaru** Lineartronic CVTF (P/N K0425Y0710), Lineartronic CVTF II (P/N K0425Y0711) CV-30, High Torque CVTF (SOA748V0200), e-CVTF
- Suzuki TC, NS-2, CVTF 3320, CVT Green 1, CVT Green 2, CVT Green 3
- Toyota TC, FE
- Volkswagen/Audi TL 52180, G 052 180 A2, G 052 516 A2

* MERCON is a registered trademark of Ford Motor Company.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 July 2019 TTF-140

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Always check your owner's manual for the proper transmission fluid recommendations.

Havoline Full Synthetic CVT Fluid is not recommended for use in Ford and Toyota hybrid eCVT units or in any non-CVT transmissions.

Use of Havoline Full Synthetic CVT Fluid in transmissions where recommended by Chevron will not void the vehicle's warranty. All Havoline products are backed by Chevron's Limited Product Warranty.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

Product Number	226538
<i>SDS Number U.S. Canada Mexico</i>	47818 48504 48505
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	39.1 7.2
Viscosity, Brookfield cP at -40°C	12,300
Viscosity Index	179
Flash Point, °C(°F)	205(401)
Pour Point, °C(°F)	-51(-60)
Color	Amber

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON TRACTOR FLUID

PRODUCT DESCRIPTION

Chevron Tractor Fluid is a universal tractor hydraulic fluid for use in transmissions, final drives, wet brakes, and the hydraulic systems of tractors and other equipment employing a common fluid reservoir.

CUSTOMER BENEFITS

Chevron Tractor Fluid offers:

- Oxidation protection Provides oxidation stability to control the generation of sludge and other deposits, minimizing viscosity increase.
- Wear protection Meets the requirements of John Deere J20C performance and quality standards to reduce wear and improve product life.
- **Responsive hydraulic performance** Maintains lubricant viscosity control over a wide operating-temperature range.
- **Compatibility with elastomers** Compatible with seals, gaskets, and packing materials, helping to keep those components in good condition.

FEATURES

Chevron Tractor Fluid is a universal tractor hydraulic fluid that lubricates and protects hydraulic systems, transmissions, final drives, wet brakes, and power take-off (PTO) equipment that use a common fluid reservoir.

All product is tested against production specifications for quality and consistency.

The fluid provides good oxidation stability and sludge control.

Chevron Tractor Fluid also offers good wear protection for prolonged equipment life.

It is fully compatible with equipment manufacturers' proprietary fluids and other fluids of this type.

APPLICATIONS

Chevron Tractor Fluid is recommended for use as a universal tractor hydraulic fluid in common fluid reservoir systems, lubricating and protecting hydraulic equipment, transmissions, final drives, wet brakes, and PTO equipment in agricultural, construction, and forestry applications.

It meets all John Deere J20C performance specifications and can be used in most applications where universal tractor hydraulic fluids are specified. These include but are not limited to equipment manufactured by John Deere, Case, New Holland, Massey-Ferguson, Ford, and Agco-Allis.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

28 September 2020 TTF-55

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Product Number	221880
<i>SDS/MSDS Number USA Colombia El Salvador</i>	34428 35224 35223
API Gravity	30.5
Density kg/L at 15°C lb/gal at 60°F	0.8839 7.29
Viscosity, Kinematic cSt at 40°C cSt at 100°C	60.0 9.5
Viscosity, Brookfield cP at -35°C	48,000
Viscosity Index	140
Flash Point, °C(°F)	235(455)
Pour Point, °C(°F)	-43(-45)
Color	Amber

Minor variations in product typical test data are to be expected in normal manufacturing.



URSA[®] HYDRAULIC OIL 10W

PRODUCT DESCRIPTION

Ursa[®] Hydraulic Oil 10W is a heavy duty on- and offhighway hydraulic oil that is recommended for SAE 10W applications and for equipment with Caterpillar TO-2 requirements.

CUSTOMER BENEFITS

Ursa Hydraulic Oil 10W delivers value through:

- Meets many major pump manufacturer's requirements For antiwear-type hydraulic fluids in heavy duty on- and off-highway mobile hydraulic systems. Excellent Eaton-Vickers 35VQ25A performance.
- Foam inhibition Contains special foam suppressant to minimize both foaming and aeration problems.
- Excellent antiwear properties Formulated with anti-wear performance additives.
- Excellent thermal stability In the presence of copper and steel.
- **Excellent filterability** Thermal and hydrolytic stability helps prevent formation of deposits which may interfere with filtration in equipment with close tolerances.

FEATURES

Ursa Hydraulic Oil 10W is a premium hydraulic oil specifically designed to give maximum hydraulic pump protection in on- and off-highway heavy duty hydraulic applications where an SAE 10W engine oil is specified.

Ursa Hydraulic Oil 10W provides excellent antiwear protection, oxidation and corrosion inhibition, as well as foam and aeration suppression.

The antiwear additives in Ursa Hydraulic Oil 10W create a protective film on the metal surfaces. This protective film minimizes metal-to-metal contact, which is most severe in vane- and piston-type pumps. Ursa Hydraulic Oil 10W is fully compatible with engine oils that may typically be used in hydraulic applications.

APPLICATIONS

Ursa Hydraulic Oil 10W is recommended for:

- Heavy duty on- and off-highway mobile hydraulic systems where an SAE 10W engine oil is specified.
- Caterpillar hydraulic systems where a **Caterpillar TO-2** fluid is required.
- Caterpillar hydraulic systems where a minimum of 0.09 percent (900 ppm) of zinc additive is specified.
- Pump applications requiring an **Eaton-Vickers 35VQ25A** hydraulic oil.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 July 2016 TTF-60

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Product Number	273270
<i>SDS/MSDS Number USA Colombia El Salvador</i>	23575 33075 33074
API Gravity	31.2
Viscosity, Kinematic cSt at 40°C cSt at 100°C	40 6.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	184.7 48
Viscosity Index	114
Flash Point, °C(°F)	234(452)
Pour Point, °C(°F)	-33(-27)
Zinc, wt %	0.094

Minor variations in product typical test data are to be expected in normal manufacturing.



URSA[®] HYDRAULIC OIL 10W ISOCLEAN[®] CERTIFIED LUBRICANT

PRODUCT DESCRIPTION

 $\begin{array}{l} \text{Ursa}^{\textcircled{R}} \text{ Hydraulic Oil 10W ISOCLEAN}^{\textcircled{R}} \\ \text{Certified Lubricant is a heavy duty on-} \\ \text{and off-highway hydraulic oil that is} \\ \text{recommended for SAE 10W applications} \end{array}$



and for equipment with Caterpillar TO-2 requirements. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Ursa Hydraulic Oil 10W ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Meets many major pump manufacturer's requirements For antiwear-type hydraulic fluids in heavy duty on- and off-highway mobile hydraulic systems. Excellent Eaton-Vickers 35VQ25A performance.
- Foam inhibition Contains special foam suppressant to minimize both foaming and aeration problems.
- Excellent antiwear properties Formulated with anti-wear performance additives.

- Excellent thermal stability In the presence of copper and steel.
- **Excellent filterability** Thermal and hydrolytic stability helps prevent formation of deposits which may interfere with filtration in equipment with close tolerances.

FEATURES

Ursa Hydraulic Oil 10W ISOCLEAN Certified Lubricant is a premium hydraulic oil specifically designed to give maximum hydraulic pump protection in on- and offhighway heavy duty hydraulic applications where an SAE 10W engine oil is specified.

Ursa Hydraulic Oil 10W ISOCLEAN Certified Lubricant provides excellent antiwear protection, oxidation and corrosion inhibition, as well as foam and aeration suppression.

The antiwear additives in Ursa Hydraulic Oil 10W ISOCLEAN Certified Lubricant create a protective film on the metal surfaces. This protective film minimizes metal-to-metal contact, which is most severe in vaneand piston-type pumps.

Ursa Hydraulic Oil 10W ISOCLEAN Certified Lubricant is fully compatible with engine oils that may typically be used in hydraulic applications.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 July 2016 TTF-60 ISOCLEAN

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APPLICATIONS

Ursa[®] Hydraulic Oil 10W ISOCLEAN[®] Certified Lubricant is recommended for:

- Heavy duty on- and off-highway mobile hydraulic systems where an SAE 10W engine oil is specified.
- Caterpillar hydraulic systems where a **Caterpillar TO-2** fluid is required.
- Caterpillar hydraulic systems where a minimum of 0.09 percent (900 ppm) of zinc additive is specified.
- Pump applications requiring an **Eaton-Vickers 35VQ25A** hydraulic oil.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

Product Number	278061
SDS Number	23575
API Gravity	31.2
Viscosity, Kinematic cSt at 40°C cSt at 100°C	40 6.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	184.7 48
Viscosity Index	114
Flash Point, °C(°F)	234(452)
Pour Point, °C(°F)	-33(-27)
Zinc, wt %	0.094

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



NATURAL GAS ENGINE OILS



CHEVRON COMPRESSOR OIL 260

PRODUCT DESCRIPTION

Chevron Compressor Oil 260 is used to lubricate compressors in hydrocarbon service.

CUSTOMER BENEFITS

Chevron Compressor Oil 260 delivers value through:

- Oxidation resistance Contains an oxidation inhibitor that helps to resist varnish formation in the system.
- Good deposit control
- Good oil-water separability

FEATURES

Chevron Compressor Oil 260 is a high viscosity index lubricant for use in natural gas compressors.

It is formulated from a carefully selected blend of base oils and additives that help provide protection against rust, corrosion, and wear.

APPLICATIONS

Chevron Compressor Oil 260 is used to lubricate the cylinders of reciprocating gas compressors.

Chevron Compressor Oil 260 is recommended for use in:

- Natural gas compressors.
- Dry natural gas compressors, or natural gas compressors containing carbon dioxide or hydrogen sulfide.

Do not use in breathing air apparatus or medical equipment.

TYPICAL TEST DATA

Product Number	231809
SDS Number	7312
API Gravity	27.6
Viscosity, Kinematic cSt at 40°C cSt at 100°C	260 20.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	1380 106
Viscosity Index	95
Flash Point, °C(°F)	275(527)
Pour Point, °C(°F)	-16(+3)
Color	4.5
Calcium, wt %	0.078

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

6 January 2014 GEO-3

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HDAX[®] 3100 Ashless Gas Engine Oil sae 15W-40, 40

PRODUCT DESCRIPTION

HDAX[®] 3100 Ashless Gas Engine Oils are high performance, bright stock free, ashless, dispersant-type natural gas engine oils.

CUSTOMER BENEFITS

HDAX 3100 Ashless Gas Engine Oils deliver value through:

- · Low ring and cylinder liner wear
- Minimal ash deposits Minimizes deposits on valves, piston heads, combustion chambers, spark plugs, and port surfaces, thereby minimizing the risk of pre-ignition and detonation.
- Clean engines The ashless dispersant inhibits sludge formation and piston deposits in naturally aspirated or turbocharged two-stroke engines.
- Long oil life Oxidation inhibitors minimize oil degradation and provide long oil life.
- Ease in starting SAE 15W-40 provides good startup and lubricant pumpability in cold weather.

FEATURES

HDAX 3100 Ashless Gas Engine Oils are manufactured using selected paraffinic base oils and an additive package containing a dispersant, wear inhibitor, and oxidation inhibitor.

They are formulated for use in high speed, high output, turbocharged two-stroke and selected four-stroke gas engines operating at full capacity.

Minimal ash content in HDAX 3100 Ashless Gas Engine Oils help protect combustion chamber and spark plug from deposit formation that can result in pre-ignition, detonation, and loss of engine power. HDAX 3100 Ashless Gas Engine Oils

- provide long overhaul intervals and filter life in ashless oil applications
- help prevent valve burning or guttering by maintaining clean valve faces
- maximize the lubricant service life by controlling viscosity increase with an effective ashless oxidation inhibitor
- offer excellent wear protection
- protect against engine corrosion

APPLICATIONS

HDAX 3100 Ashless Gas Engine Oils are recommended for two-stroke high output, turbocharged and naturally aspirated gas engines requiring an ashless oil. They are also suitable for selected naturally aspirated fourstroke engines where minimal ash deposits are desired.

HDAX 3100 Ashless Gas Engine Oil SAE 40 is our preferred lubricant for engines manufactured by

- Ajax (SAE 40 or SAE 15W-40)
- Clark-Dresser
- Cooper Bessemer (two-stroke)
- Worthington (two-stroke)

HDAX 3100 Ashless Gas Engine Oil SAE 40 is suitable for engines manufactured by

- Caterpillar G3500 NA series
- Waukesha VR and Intermediate/Clinton series (four-stroke)
- Fairbanks-Morse/MEP (two-stroke)

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 February 2018 GEO-10

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TYPICAL TEST DATA

SAE Grade	15W-40	40
Product Number	235458	235456
SDS Number	32271	32271
Density at 15°C, kg/L	0.8806	0.8762
Viscosity, Kinematic cSt at 40°C cSt at 100°C	134 15.6	121 13.0
Viscosity Index	122	100
Flash Point, °C(°F)	236(457)	258(496)
Pour Point, °C(°F)	-25(-13)	-16(3)
Sulfated Ash, wt %	<0.1	<0.1
Acid Number, ASTM D664	1.0	1.0
Base Number, ASTM D2896	0.8	0.8
Phosphorus, ppm	700	700
Zinc, ppm	380	380

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 3200 LOW ASH GAS ENGINE OIL SAE 30, 40

PRODUCT DESCRIPTION

HDAX[®] 3200 Low Ash Gas Engine Oils are high performance, low ash, dispersant/detergent type engine oils designed to be used primarily in four-stroke stationary engines fueled by natural or synthetic gas.

CUSTOMER BENEFITS

HDAX 3200 Low Ash Gas Engine Oils deliver value through:

- Low wear Provide excellent protection against piston, ring, and liner scuffing, scoring, and wear.
- Minimal valve recession The level and type of ash producing additives in the oils controls valve recession with low levels of combustion chamber deposits to minimize the potential for pre-ignition and spark plug fouling.
- Minimum oil viscosity increase Oxidation inhibited and nitration resistant to help ensure minimum viscosity increase and low wear rates.
- Clean pistons Excellent piston cleanliness to help prevent ring sticking and maintain clean, varnish-free piston skirts.
- Clean crankcases and top decks Minimize the formation of sludge in the crankcase and in the valve rocker cover/top deck area.
- Catalyst compatibility Formulated to be compatible with exhaust emissions reduction systems.

FEATURES

HDAX 3200 Low Ash Gas Engine Oils are formulated with high quality base stocks and an additive package containing ashless dispersant, oxidation inhibitors, metallic detergents, and a metallic antiwear agent. HDAX 3200 Low Ash Gas Engine Oils provide excellent oxidation and nitration resistance, which minimize the buildup of insolubles. HDAX 3200 Low Ash Gas Engine Oils give excellent protection against ring/liner scuffing and wear. They also minimize valve recession in fourstroke engines, provide excellent piston/ring belt deposit control and effectively protect against the formation and buildup of engine sludge.

APPLICATIONS

HDAX 3200 Low Ash Gas Engine Oils are recommended for four-stroke and selected two-stroke stationary engines fueled by natural or synthetic gas.

Recommended for four-stroke gas-fueled engines manufactured by:

- Caterpillar
- Delaval Enterprise
- Dresser-Rand Categories I, II, and III (SAE 30)
- Superior
- Waukesha
- Worthington

HDAX 3200 Low Ash Gas Engine Oils are formulated to meet catalyst compatibility requirements and are especially suited for installations requiring low phosphorus oil to prevent exhaust catalyst poisoning.

HDAX 3200 Low Ash Gas Engine Oils are suitable for use with fuels containing low levels of sulfur. In sour gas applications, an oil such as HDAX 5300 Medium Gas Engine Oil SAE 40 with higher base reserve may be required.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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TYPICAL TEST DATA

SAE Grade	30	40
Product Number	232310	232311
SDS Number	32277	32277
Density at 15°C, kg/L	0.8773	0.8794
Viscosity, Kinematic cSt at 40°C cSt at 100°C	97.3 11.4	124 13.5
Viscosity Index	104	108
Flash Point, °C(°F)	222(432)	230(446)
Pour Point, °C(°F)	-27(-17)	-27(-17)
Sulfated Ash, wt %	0.45	0.45
Acid Number, ASTM D664	1.0	1.0
Base Number, ASTM D2896	4.0	4.0
Phosphorus, ppm	280	280
Zinc, ppm	320	320

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 5100 ASHLESS GAS ENGINE OIL SAE 15W-40, 30, 40

PRODUCT DESCRIPTION

 ${\rm HDAX}^{\textcircled{R}}$ 5100 Ashless Gas Engine Oils are advanced performance, premium quality, ashless, natural gas engine oils.

CUSTOMER BENEFITS

HDAX 5100 Ashless Gas Engine Oils deliver value through:

- Excellent low temperature performance HDAX 5100 Ashless Gas Engine Oil SAE 15W-40 is less viscous than SAE 30 and 40 oils at low temperatures, so it provides easy startup and improved cold temperature lubrication as compared to straight grades.
- Promotes low maintenance cost and long engine life
- **Minimizes ash deposits** Protects against spark plug fouling from lubricating oil ash deposits. Minimizes ash deposits on valves, piston heads, combustion chamber surfaces, spark plugs, and port surfaces, minimizing the risk of pre-ignition and detonation.
- Low ring and cylinder liner wear
- **Exceptional engine cleanliness** Minimizes engine deposits at both high and low operating temperatures through the use of an ashless dispersant.
- Minimum viscosity increase in severe service

 Ashless oxidation inhibitor minimizes viscosity
 increase allowing for long oil drain intervals.
- Proven performance in older four-stroke naturally aspirated and turbocharged engines.

FEATURES

HDAX 5100 Ashless Gas Engine Oils are formulated with Group II base stocks and a carefully balanced ashless package of dispersant, antioxidant, extreme pressure, and corrosion inhibitor additives.

HDAX 5100 Ashless Gas Engine Oils are formulated without bright stock for all two-stroke and selected four-stroke high speed, high output, turbocharged natural gas engines operating at full capacity.

HDAX 5100 Ashless Gas Engine Oils help provide exceptionally clean engine parts, even under severe operating conditions and extended overhaul intervals. They help protect against the formation of crankcase sludge and help to maintain clean exhaust ports in two-stroke engines.

APPLICATIONS

HDAX 5100 Ashless Gas Engine Oils are recommended for all two-stroke and selected four-stroke stationary engines that require an ashless-type engine oil and which use natural gas.

They are the recommended lubricant for two-stroke gas engines with high compression ratios and turbochargers, and two-stroke engines known to be sensitive to combustion chamber and port deposits.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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HDAX[®] 5100 Ashless Gas Engine Oils are recommended for gas fueled engines manufactured by:

- Ajax
- Caterpillar (except 3400, 3500, 3600)
- Clark-Dresser
- Cooper Bessemer (two-stroke)
- Dresser-Rand (Ingersoll-Rand) Categories
 I and II
- Fairbanks-Morse/MEP
- Waukesha VR and Intermediate/Clinton
- Worthington (two-stroke)

TYPICAL TEST DATA

SAE 15W-40 oils may not be appropriate for large medium speed gas engines. Consult Chevron at lubetek@chevron.com before using HDAX 5100 Ashless Gas Engine Oil SAE 15W-40 in these applications.

SAE Grade	15W-40	30	40
Product Number	232308	232373	232307
SDS Number	26850	26850	7050
Density at 15°C, kg/L	0.8746	0.8773	0.8790
Viscosity, Kinematic cSt at 40°C cSt at 100°C	128.6 15.72	95.6 11.6	120 13.7
Viscosity Index	128	109	111
Flash Point, °C(°F)	230(446)	252(486)	260(500)
Pour Point, °C(°F)	-34(-29)	-32(-26)	-26(-15)
Sulfated Ash, wt %	nil	nil	nil
Acid Number, ASTM D664	0.9	0.8	0.8
Base Number, ASTM D2896	2.8	2.8	2.8
Phosphorus, ppm	670	670	670
Zinc, ppm	<10	<10	<10

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 5200 Low Ash Gas Engine Oil sae 15W-40, 30, 40

PRODUCT DESCRIPTION

HDAX[®] 5200 Low Ash Gas Engine Oils are advanced performance, premium quality, bright stock free, low ash, dispersant/detergent type engine oils.

CUSTOMER BENEFITS

HDAX 5200 Low Ash Gas Engine Oils deliver value through:

- Low maintenance cost and long engine life
- Low wear Provide excellent protection against piston, ring, and liner scuffing, scoring, and wear.
- Valve protection The level and type of ash producing additives in the oils provide minimum valve recession with low levels of combustion chamber deposits to minimize the potential for preignition and spark plug fouling.
- Clean pistons Provides piston cleanliness to help prevent ring sticking and maintain clean, varnish-free piston skirts.
- Clean crankcases and top decks Minimizes the formation of crankcase and valve cover/top deck sludge.
- Catalyst compatibility Formulated to be compatible with exhaust emissions reduction systems.
- Excellent low temperature performance HDAX 5200 Low Ash Gas Engine Oil SAE 15W-40 provides maximum oil flow to engine components for better lubrication during cold startup, compared to straight grades.

FEATURES

HDAX 5200 Low Ash Gas Engine Oils are formulated with premium base oil technology and an additive package containing ashless dispersant, oxidation inhibitors, metallic detergents and a metallic antiwear agent.

HDAX 5200 Low Ash Gas Engine Oils provide outstanding oxidation and nitration resistance, which minimize the buildup of insolubles and help provide long oil and filter life. HDAX 5200 Low Ash Gas Engine Oils give excellent protection against ring and liner scuffing and wear. They also minimize valve recession in four-stroke engines and provide excellent piston and ring belt deposit control and effectively protect against the formation and buildup of engine sludge.

HDAX 5200 Low Ash Gas Engine Oil SAE 15W-40 helps provide easy engine startup, maximum oil flow in low temperatures, and can reduce oil consumption compared to straight grades.

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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property of their respective owners.

APPLICATIONS

HDAX[®] 5200 Low Ash Gas Engine Oils are recommended for four-stroke and selected two-stroke stationary engines fueled by natural gas.

HDAX 5200 Low Ash Gas Engine Oil SAE 40 is approved for:

- Caterpillar Energy Solutions GmbH for CG132, CG170 & CG260 gas engines
- **INNIO Jenbacher** gas engines, as listed in the table below:

Engine Type	Class A	Class B	Class C	Class S	Catalyst
Type 2/3	x			х	х
Type 4A	x			х	х
Type 4BD	x	x	x	х	х
Type 4CE	x	x	x	х	х
Type 6CE	x				х
Type 6FJ	x	x	x	х	х

Where INNIO Jenbacher divides fuel quality into these classes:

- Class A: Clean natural gas that complies with TA 1000-0300.
- Class B: Biogas and Sewage gas.
- Class C: Landfill gas.
- Class S: Special gases requiring special approval like Syngas.
- Catalyst: With an oxidation catalytic converter
- MAN Diesel & Turbo engines in operation on natural gas (CNG/LNG) - now MAN Energy Solutions
- MAN Energy Solutions for use in MAN ES fourstroke medium speed engines on natural gas (CNG/LNG) - formerly MAN Diesel & Turbo
- **MWM** gas engines
- Wärtsilä gas engines and dual fuel engines with natural gas as main fuel
- All **Waukesha** gas engines burning pipeline quality gas, including 220 GL and Cogeneration

HDAX 5200 Low Ash Gas Engine Oils are recommended for four-stroke gas-fueled engines manufactured by:

- Caterpillar
- Delaval Enterprise
- **Dresser-Rand** (Categories I, II, and III)
- MWM (DEUTZ)
- Superior
- Worthington

HDAX 5200 Low Ash Gas Engine Oils are formulated to meet catalyst compatibility requirements and are especially suited for installations requiring low phosphorus oil to prevent exhaust catalyst poisoning.

HDAX 5200 Low Ash Gas Engine Oils are suitable for use with fuels containing low levels of sulfur. In sour gas applications, a lubricant with higher base reserve such as HDAX 5300 Medium Ash Gas Engine Oil SAE 40 may be required.

HDAX 5200 Low Ash Gas Engine Oil SAE 15W-40 is particularly suited for four-stroke and selected twostroke gas engines requiring good low temperature startability.

TYPICAL TEST DATA

SAE Grade	15W-40	30	40
Product Number	232331	232327	232328
SDS/MSDS Number USA Colombia	7046 —	7046 —	7046 33435
Density at 15°C, kg/L	0.8752	0.8773	0.8790
Viscosity, Kinematic cSt at 40°C cSt at 100°C	126 15.6	97.3 11.4	124 13.5
Viscosity Index	130	104	104
Viscosity, Cold Crank, °C/Poise	-20/61	—	—
Flash Point, °C(°F)	204(399)	215(419)	230(446)
Pour Point, °C(°F)	-30(-22)	-30(-22)	-30(-22)
Sulfated Ash, wt %	0.5	0.5	0.5
Acid Number, ASTM D664	1.0	1.0	1.0
Base Number, ASTM D2896	4.2	4.2	4.2
Phosphorus, ppm	270	270	270
Zinc, ppm	320	320	320

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 5200 Low Ash Gas Engine Oil ISOCLEAN[®] Certified Lubricant

SAE 15W-40, 30, 40

PRODUCT DESCRIPTION

HDAX[®] 5200 Low Ash Gas Engine ISOCLEAN[®] Certified Lubricants are advanced performance, premium quality, bright stock free, low ash,



dispersant/detergent type engine oils. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

HDAX 5200 Low Ash Gas Engine ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Low maintenance cost and long engine life
- Low wear Provide excellent protection against piston, ring, and liner scuffing, scoring, and wear.
- Valve protection The level and type of ash producing additives in the oils provide minimum valve recession with low levels of combustion chamber deposits to minimize the potential for preignition and spark plug fouling.

- Clean pistons Provides piston cleanliness to help prevent ring sticking and maintain clean, varnish-free piston skirts.
- Clean crankcases and top decks Minimizes the formation of crankcase and valve cover/top deck sludge.
- **Catalyst compatibility** Formulated to be compatible with exhaust emissions reduction systems.

FEATURES

HDAX 5200 Low Ash Gas Engine ISOCLEAN Certified Lubricants are formulated with premium base oil technology and an additive package containing ashless dispersant, oxidation inhibitors, metallic detergents and a metallic antiwear agent.

HDAX 5200 Low Ash Gas Engine ISOCLEAN Certified Lubricants provide outstanding oxidation and nitration resistance, which minimize the buildup of insolubles and help provide long oil and filter life. HDAX 5200 Low Ash Gas Engine ISOCLEAN Certified Lubricants give excellent protection against ring and liner scuffing and wear. They also minimize valve recession in four-stroke engines and provide excellent piston and ring belt deposit control and effectively protect against the formation and buildup of engine sludge.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

HDAX[®] 5200 Low Ash Gas Engine ISOCLEAN[®] Certified Lubricants are recommended for four-stroke and selected two-stroke stationary engines fueled by natural gas.

HDAX 5200 Low Ash Gas Engine ISOCLEAN Certified Lubricants are approved for:

- Caterpillar Energy Solutions GmbH for CG132, CG170 & CG260 gas engines
- **INNIO Jenbacher** gas engines, as listed in the table below:

Engine Type	Class A	Class B	Class C	Class S	Catalyst
Type 2/3	x			х	х
Type 4A	x			х	х
Type 4BD	x	x	x	х	х
Type 4CE	x	x	x	х	х
Type 6CE	x				х
Type 6FJ	х	х	х	х	х

Where INNIO Jenbacher divides fuel quality into these classes:

- Class A: Clean natural gas that complies with TA 1000-0300.
- Class B: Biogas and Sewage gas.
- Class C: Landfill gas.
- Class S: Special gases requiring special approval like Syngas.
- Catalyst: With an oxidation catalytic converter
- MAN Diesel & Turbo engines in operation on natural gas (CNG/LNG) - now MAN Energy Solutions
- **MAN Energy Solutions** for use in MAN ES fourstroke medium speed engines on natural gas (CNG/LNG) - formerly MAN Diesel & Turbo
- All **MWM** gas engines
- Wärtsilä gas engines and dual fuel engines with natural gas as main fuel
- All **Waukesha** gas engines burning pipeline quality gas, including 220 GL and Cogeneration

HDAX 5200 Low Ash Gas Engine ISOCLEAN Certified Lubricants are recommended for four-stroke gas-fueled engines manufactured by:

- Caterpillar
- Delaval Enterprise
- Dresser-Rand (Categories I, II, and III)
- **MWM** (DEUTZ)
- Superior
- Worthington

HDAX 5200 Low Ash Gas Engine ISOCLEAN Certified Lubricants are formulated to meet catalyst compatibility requirements and are especially suited for installations requiring low phosphorus oil to prevent exhaust catalyst poisoning.

HDAX 5200 Low Ash Gas Engine ISOCLEAN Certified Lubricants are suitable for use with fuels containing low levels of sulfur. In sour gas applications, a lubricant with higher base reserve such as HDAX 5300 Medium Ash Gas Engine Oil SAE 40 may be required.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	15W-40	30	40
Product Number	274317	274318	274319
SDS/MSDS Number Canada Mexico	7046 7046CAN 7046MEX	7046 7046CAN 7046MEX	7046 7046CAN 7046MEX
Density at 15°C, kg/L	0.8752	0.8773	0.8790
Viscosity, Kinematic cSt at 40°C cSt at 100°C	126 15.6	97.3 11.4	124 13.5
Viscosity Index	130	104	104
Viscosity, Cold Crank, °C/Poise	-20/61	_	_
Flash Point, °C(°F)	204(399)	215(419)	230(446)
Pour Point, °C(°F)	-30(-22)	-30(-22)	-30(-22)
Sulfated Ash, wt %	0.5	0.5	0.5
Acid Number, ASTM D664	1.0	1.0	1.0
Base Number, ASTM D2896	4.2	4.2	4.2
Phosphorus, ppm	270	270	270
Zinc, ppm	320	320	320

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 5200 EF SAE 40

PRODUCT DESCRIPTION

HDAX[®] 5200 EF is a premium quality, dispersant/ detergent engine oil designed with emulsion-breaking technology to reduce disruptions in gas transmission and process operations while providing outstanding engine and compressor cylinder lubrication.

CUSTOMER BENEFITS

HDAX 5200 EF delivers value through:

- Emulsion breaking technology Technology targets the emulsions caused by production chemicals, water, and various forms of hydro-carbons that disrupt gas transmission and processing operations.
- **Increased efficiency** HDAX 5200 EF breaks emulsions increasing effectiveness of gas processing equipment, including, but not limited to, slug catchers, coalescing filters, amine units, knock-out pots, dehydration units, and condensers.
- **Improved profitability** Reduce contamination of valuable natural gas liquids.
- Lower maintenance Reduced emulsion carryover to downstream systems means less cleaning of slug catchers, coalescing filters, amine units, knock-out pots, dehydration units, and condensers.
- Low wear Very good to excellent oil life performance, as well as excellent protection against piston, ring, and liner scuffing, scoring, and wear.
- Valve protection Helps provide minimum valve recession with low levels of combustion chamber deposits to minimize the potential for pre-ignition and spark plug fouling.

APPLICATIONS

HDAX 5200 EF is recommended for four-stroke stationary engines fueled by natural gas and the compressor cylinders powered by these engines that are compressing 'wet gas.' HDAX 5200 EF is recommended to break emulsions, to reduce disruptions in dehydration units, coalescing filters, knock-out pots, slug catchers, and condensers.

TYPICAL TEST DATA

SAE Grade	40
Product Number	274320
SDS Number	38730
Density at 15°C, Kg/L	0.88
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	112 12.9
Viscosity Index	109
Flash Point, °C(°F)	236(457)
Pour Point, °C(°F)	-33(-27)
Sulfated Ash, mass %	0.5
Base Number, ASTM D2896, mgKOH/g	3.8
Acid Number, mgKOH/g	0.6
Phosphorous, ppm	260
Zinc, ppm	300

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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HDAX[®] 5200 EF ISOCLEAN[®] Certified Lubricant SAE 40

PRODUCT DESCRIPTION

HDAX[®] 5200 EF ISOCLEAN[®] Certified Lubricant is a premium quality, dispersant/detergent engine oil designed with emulsion-breaking



technology to reduce disruptions in gas transmission and process operations while providing outstanding engine and compressor cylinder lubrication.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

HDAX 5200 EF ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Emulsion breaking technology Technology targets the emulsions caused by production chemicals, water, and various forms of hydrocarbons that disrupt gas transmission and processing operations.

- **Increased efficiency** HDAX 5200 EF breaks emulsions increasing effectiveness of gas processing equipment, including, but not limited to, slug catchers, coalescing filters, amine units, knock-out pots, dehydration units, and condensers.
- **Improved profitability** Reduce contamination of valuable natural gas liquids.
- Lower maintenance Reduced emulsion carryover to downstream systems means less cleaning of slug catchers, coalescing filters, amine units, knock-out pots, dehydration units, and condensers.
- Low wear Very good to excellent oil life performance, as well as excellent protection against piston, ring, and liner scuffing, scoring, and wear.
- Valve protection Helps provide minimum valve recession with low levels of combustion chamber deposits to minimize the potential for pre-ignition and spark plug fouling.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

HDAX 5200 EF ISOCLEAN[®] Certified Lubricant is recommended for four-stroke stationary engines fueled by natural gas and the compressor cylinders powered by these engines that are compressing 'wet gas.' HDAX 5200 EF is recommended to break emulsions, to reduce disruptions in dehydration units, coalescing filters, knock-out pots, slug catchers, and condensers.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

SAE Grade	40
Product Number	274322
SDS Number	
U.S.	48090
Canada	48100
Mexico	48101
Density at 15°C, Kg/L	0.88
Viscosity, Kinematic	
mm ² /s at 40°C	112
mm ² /s at 100°C	12.9
Viscosity Index	109
Flash Point, °C(°F)	236(457)
Pour Point, °C(°F)	-33(-27)
Sulfated Ash, mass %	0.5
Base Number, ASTM D2896,	
mgKOH/g	3.8
Acid Number, mgKOH/g	0.6
Phosphorous, ppm	260
Zinc, ppm	300

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 5300 MEDIUM ASH GAS ENGINE OIL SAE 40

PRODUCT DESCRIPTION

HDAX[®] 5300 Medium Ash Gas Engine Oil is an advanced performance, premium quality, medium ash, dispersant/detergent type gas engine oil formulated especially for four-stroke engines where medium ash oils are preferred.

CUSTOMER BENEFITS

HDAX 5300 Medium Ash Gas Engine Oil delivers value through:

- Excellent corrosion control Specially formulated to protect engines burning high sulfur containing fuels, even under intermittent operating conditions where high levels of acidic condensate form.
- Valve recession control Provides maximum valve recession control over low ash formulations in those engines where medium ash oils are preferred.
- Minimum viscosity increase Excellent oxidation and nitration resistance to ensure minimum viscosity increase.
- Clean crankcases and top decks Minimizes the formation of sludge in the crankcase and in the rocker cover/top-deck area.
- Low wear Provides excellent protection against corrosive wear, adhesive wear, and piston ring and liner scuffing and scoring.

FEATURES

HDAX 5300 Medium Ash Gas Engine Oil is formulated with premium group II base oil technology and an additive package containing ashless dispersant, oxidation inhibitors, metallic detergents, and a metallic antiwear additive. HDAX 5300 Medium Ash Gas Engine Oil provides a high level of base reserve to control corrosion when high sulfur fuels are used.

APPLICATIONS

HDAX 5300 Medium Ash Gas Engine Oil is recommended for:

- four-stroke engines fueled by sour gas.
- engines where increased ash levels are preferred for maximum valve recession control and head life.

TYPICAL TEST DATA

SAE Grade	40
Product Number	232309
SDS Number	17017
Density at 15°C, kg/L	0.8811
Viscosity, Kinematic cSt at 40°C cSt at 100°C	125.4 13.5
Viscosity Index	103
Flash Point, °C(°F)	270(518)
Pour Point, °C(°F)	-33(-27)
Sulfated Ash, wt %	0.70
Acid Number, ASTM D664	1.0
Base Number, ASTM D2896	6.2
Phosphorus, ppm	270
Zinc, ppm	310

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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HDAX[®] 6500 LFG GAS ENGINE OIL SAE 40

PRODUCT DESCRIPTION

HDAX[®] 6500 LFG Gas Engine Oil is a premium quality high performance low ash dispersant/detergent type SAE 40 gas engine oil, specifically formulated for landfill gas, biogas, digester gas and sour gas applications.

CUSTOMER BENEFITS

HDAX 6500 LFG Gas Engine Oil delivers value through:

- Maximizes oil service life Combination of high performance premium base fluids and a robust inhibitor package offers extended service protection with oxidation and nitration resistance and good base retention.
- Minimizes operating costs Low oil consumption from excellent piston deposit control with extended drain capability keeps equipment in service longer generating revenue.
- Long Engine Life Formulated to protect from corrosive wear in engines burning harsh landfill and sour gas fuels. Protects against valve train wear and scuffing of highly loaded parts operating under boundary lubrication conditions. Level and type of ash producing additives controls valve recession and potential for pre-ignition.
- Minimizes maintenance costs Exceptional oxidation resistance and dispersancy minimizes sludge formation, protects against filter plugging, abrasive polishing wear and oil thickening. Special formulation gives excellent corrosion control in engines burning high chlorofluorocarbon (CFC) and / or high sulfur containing fuels where high level of acidic condensate form. This exceptional corrosion control ensures maximum liner life even in intermittent operation.
- Advanced catalyst protection Low phosphorus technology formulation promotes reliable catalyst performance and protection.

FEATURES

HDAX 6500 LFG Gas Engine Oil is a premium quality high performance low ash dispersant/detergent type SAE 40 gas engine oil, specifically formulated for landfill gas, biogas, digester gas and sour gas applications. Combination of high performance premium base fluids and a robust inhibitor package provides exceptional protection and extended service protection for engines burning aggressive sour gases.

HDAX 6500 LFG Gas Engine Oil provides excellent corrosion resistance in landfill gas, biogas, digester gas and sour gas applications, even when intermittent operation results in the formation of significant levels of acidic condensate. At 0.55 m% sulfated ash, HDAX 6500 LFG Gas Engine Oil gives this performance without the higher levels of combustion chamber deposits compared to some other products used in these applications.

It also provides excellent valve recession control for four stroke engines where low ash oil is preferred.

HDAX 6500 LFG Gas Engine Oil provides excellent deposit control on pistons minimizing ring sticking; providing scuffing protection to the cylinder liners, minimizing oil consumption and lacquering. Excellent engine cleanliness promotes long component life.

APPLICATIONS

HDAX 6500 LFG is recommended for:

- Four-stroke engines fueled by landfill gas containing elevated levels of chlorofluorocarbons (CFCs)
- Sour gas applications where corrosive wear is a special concern
- · Engines where low ash oils are preferred

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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- Caterpillar Energy Solutions GmbH for Model CG 132, CG 170 and CG 260 engines
- Cummins QSV gas engines burning landfill gas
- **GE Jenbacher** gas engine types 2, 3, 4 versions A & B, type 4 version D, and type 6 versions C & E in fuel classes B (biogas) and C (landfill gas)
- MAN Truck and Bus M3271-4 for special gas
- **MWM** Gas Engines
- **TEDOM** rule 61-0-0281.1 for landfill, biogas and sewage gas fuels

HDAX 6500 LFG meets the requirements of these engines burning landfill gas:

• MTU MTL 5074

HDAX 6500 LFG is suitable for use in the following engines burning landfill gas or biogas fuels:

- Caterpillar
- Waukesha

The total base number or TBN retention, excellent deposit control and minimum viscosity increase performance of HDAX 6500 LFG Gas Engine Oil make this premium oil especially suited for extended drain service in four stroke gas engines.

TYPICAL TEST DATA

SAE Grade	40
Product Number	262326
SDS Number	34537
Viscosity Grade	SAE 40
Density at 15°C, kg/L	0.875
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	130 14.7
Viscosity Index	114
Flash Point, °C(°F)	268(514)
Pour Point, °C(°F)	-27(-17)
Sulfated Ash, m %	0.55
Acid Number, ASTM D664, mg KOH/g	1.2
Base Number, ASTM D2896, mg KOH/g	4.5

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 9200 Low Ash Gas Engine Oil sae 40

PRODUCT DESCRIPTION

HDAX[®] 9200 Low Ash Gas Engine Oil is a premium performance, low ash, dispersant/detergent type gas engine oil. It offers robust component protection even under heavy loads, and is designed for use in natural gas applications.

CUSTOMER BENEFITS

HDAX 9200 Low Ash provides the following benefits:

- Long oil life Formulated with a combination of premium base oils and high performance additives for extended oil drains^{*}. Excellent oxidation and nitration resistance, with a strong alkaline reserve that has the ability to protect against the effects of acidic attack and oxidation, significantly prolonging the service life of the oil.
- **Clean pistons** Offers combustion chamber and piston deposit control, liner protection, sludge and wear control, and corrosion protection.
- **Minimized valve recession** The unique ashproducing additives in the oil allow minimal valve recession with low levels of combustion chamber deposits, to minimize the potential for pre-ignition and spark plug fouling.
- Low fluid volatility Helps minimize oil consumption.
- Low wear Provides exceptional protection against piston, ring, and linear scuffing, scoring and wear.

FEATURES

HDAX 9200 Low Ash Gas Engine Oil is our top of the line gas engine oil that has proven field experience in gas engines in gas-gathering operations,



offering extremely low sulfur, nitrogen, and aromatics, in combination with ashless dispersant and oxidation inhibitors, with a metallic detergent and anti-wear additive system. It offers reliable corrosion resistance and our most advanced deposit control formulation to control deposits and help prevent ring sticking in today's modern engines, including those with steel piston crowns rated at a high brake mean effective pressure (BMEP).

HDAX 9200 Low Ash Gas Engine Oil oxidation and nitration resistance is designed to minimize viscosity increases in service, while promoting long oil life.

APPLICATIONS

HDAX 9200 Low Ash Gas Engine Oil is suited to new generation high output, turbocharged, low emission 4-cycle engines requiring low ash lubricants, and is recommended for use in natural gas applications. It is formulated to meet catalyst compatibility requirements with low phosphorus levels.

HDAX 9200 Low Ash Gas Engine Oil is suitable for use with fuels containing low levels of sulfur and chlorofluoro-carbons (CFC). In sour gas/high CFC applications, lubricants with a higher base reserve, such as HDAX 6500 LFG SAE 40, may be required.

Product(s) manufactured in the USA and Colombia.

A Chevron company product

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^{*} Results will vary based on operating conditions and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

HDAX 9200 Low Ash Gas Engine Oil is approved for:

- Caterpillar Energy Solutions GmbH for CG132, CG170 & CG260 series engines
- **INNIO Jenbacher** gas engines, as listed in the table below:

Engine Type	Class A	Class B	Class C	Class S	Catalyst
Type 2/3	x			x	x
Type 4A	x			x	x
Type 4BD	x			x	х
Type 4CE	x			x	x
Type 6CE	x			x	x
Type 6FJ	x			x	x

Where **INNIO Jenbacher** divides fuel quality into these classes:

- Class A: Clean natural gas that complies with TA 1000-0300.
- Class B: Biogas and Sewage gas.
- Class C: Landfill gas.
- Class S: Special gases requiring special approval like Syngas.
- Catalyst: With an oxidation catalytic converter
- Engine oil approved for use in **Aggreko** engines, where (the Group II) HDAX 9200 Low Ash Gas Engine Oil products are approved for the 420 B and 420 C range for 50 Hz operation to a MAX drain interval of 2,000 hours
- MTU preliminary approval MTL 5074 for Series 4000 gas engines*
- **MWM** TCG series burning natural gas
- **RMB/Energie** burning natural gas
- **TEDOM** rule 61-0-0281.1 for natural gas and propane-butane
- Waukesha VGF, VGP & 220GL Series Engines, Natural Gas, including Cogeneration

*This preliminary approval may be used to carry out a field test which, on successful conclusion, will result in an approval for use in MTU gas engines and listing in their fluids and lubricants specification. Recommended for four-stroke gas-fueled engines manufactured by:

- Caterpillar Oil and Gas G3300, G3400, G3500 and G3600 series
- Cummins QSV and QSK series
- Dresser-Rand Guascor (Category I and II Engines)
- MAN Diesel & Turbo natural gas and dual fuel cogeneration
- Superior 4-stroke (Engines now supplied by GE)
- Wärtsilä 25SG, 28SG, 34SG, 50SG, 175SG, 220SG, 20DF, 32DF, 34DF & 50DF series, with natural gas as the main fuel

TYPICAL TEST DATA

SAE Grade	40
Product Number	255275
SDS Number	
U.S.	43629
Canada	43630
Mexico	43631
Colombia	54160
Density at 15°C, kg/L	0.881
Viscosity, Kinematic	
mm ² /s at 40°C	125
mm ² /s at 100°C	13.5
Viscosity Index	103
Flash Point, °C(°F)	278(532)
Pour Point, °C(°F)	-33(-27)
Sulfated Ash, mass % ASTM D874	0.50
Base Number, mg KOH/g	
ASTM D2896	4.2
Phosphorus, ppm	270
Zinc, ppm	320

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 9500 GAS ENGINE OIL SAE 40

PRODUCT DESCRIPTION

HDAX[®] 9500 Gas Engine Oil is a premium quality, high performance, low ash dispersant/detergent type SAE 40 gas engine oil, specifically formulated for landfill gas, biogas, digester gas and sour gas applications.

CUSTOMER BENEFITS

HDAX 9500 Gas Engine Oil delivers value through:

- Maximizes oil service life Combination of high performance premium base fluids and a robust inhibitor package offers extended service protection with oxidation and nitration resistance and good base retention.
- Minimizes operating costs Low oil consumption from excellent piston deposit control with extended drain capability keeps equipment in service longer, generating revenue.
- Long Engine Life Formulated to protect from corrosive wear in engines burning harsh landfill and sour gas fuels. Protects against valve train wear and scuffing of highly loaded parts operating under boundary lubrication conditions. Level and type of ash producing additives controls valve recession and potential for pre-ignition.
- Minimizes maintenance costs Exceptional oxidation resistance and dispersancy minimizes sludge formation, protects against filter plugging, abrasive polishing wear and oil thickening. Special formulation gives excellent corrosion control in engines burning high chlorofluorocarbon (CFC) and / or high sulfur containing fuels where high level of acidic condensate form. This exceptional corrosion control ensures maximum liner life even in intermittent operation.
- Advanced catalyst protection Low phosphorus technology formulation promotes reliable catalyst performance and protection.

FEATURES

HDAX 9500 Gas Engine Oil is a premium quality, high performance, low ash dispersant/detergent type SAE 40 gas engine oil, specifically formulated for landfill gas, biogas, digester gas and sour gas applications. The combination of high performance premium base fluids and a robust inhibitor package provides exceptional protection and extended service protection for engines burning aggressive sour gases.

HDAX 9500 Gas Engine Oil provides excellent corrosion resistance in landfill gas, biogas, digester gas and sour gas applications, even when intermittent operation results in the formation of significant levels of acidic condensate. At 0.6 m% sulfated ash, HDAX 9500 Gas Engine Oil gives this performance without the higher levels of combustion chamber deposits compared to some other products used in these applications.

It also provides excellent valve recession control for four stroke engines where low ash oil is preferred.

HDAX 9500 Gas Engine Oil provides excellent deposit control on pistons minimizing ring sticking; providing scuffing protection to the cylinder liners, minimizing oil consumption and lacquering. Excellent engine cleanliness promotes long component life.

APPLICATIONS

HDAX 9500 is recommended for:

- Sour gas applications where corrosive wear is a special concern
- Engines where low ash oils are preferred

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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HDAX[®] 9500 is approved for:

- Jenbacher TA 1000-1109, Fuel Class B (biogas, sewage gas) and Class C (landfill gas) for the following engine types and versions:
 - Type 2 and 3
 - Type 4 Version A
 - Type 4 Versions B and D
 - $-\,$ Type 6 Versions C and E
- MAN Truck and Bus M3271-5 for special gas. MAN Approval Number TUC 1849/21
- **TEDOM** meeting requirement 61-0-0281.1 for fuel types: G (natural gas), P (propane-butane), L (landfill), B (biogas), and S (sewage gas).

HDAX 9500 is suitable for use in the following engines burning landfill gas or biogas fuels:

- Caterpillar
- Waukesha

The total base number, or TBN retention, excellent deposit control and minimum viscosity increase the performance of HDAX 9500 Gas Engine Oil, making this premium oil especially suited for extended drain service in four stroke gas engines.

TYPICAL TEST DATA

SAE Grade	40
Product Number	262426
SDS Number	57222
Viscosity Grade	SAE 40
Density at 15°C, kg/L	0.8725
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	116 13.4
Viscosity Index	113
Flash Point, °C(°F)	270(518)
Pour Point, °C(°F)	-33(-27)
Sulfated Ash, m %	0.6
Acid Number, ASTM D664, mg KOH/g	1.1
Base Number, ASTM D2896, mg KOH/g	5.4

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 9700 SAE 40

PRODUCT DESCRIPTION

HDAX[®] 9700 is a premium performance, uniquelydesigned engine oil recommended for dual fuel, medium-speed, four stroke cycle trunk piston engines burning natural gas with approximately 3 percent diesel pilot fuel ignition and up to 100 percent low sulfur diesel fuel (<500 ppm sulfur).

CUSTOMER BENEFITS

HDAX 9700 provides the following benefits:

- **Smooth engine operation** Fit for purpose formulation minimizes risk of rough engine operations that may result from misfiring or detonation when operating in dual fuel mode and using an elevated ash engine oil, as is typical of medium speed diesel engine oils.
- Long oil life A combination of premium base oils and high performance additives offer excellent oxidation and nitration resistance over extended oil life.*
- Clean pistons Very low combustion chamber and piston deposits help protect liners from scoring and extend engine top-end maintenance cycles.
- **Minimized valve recession** The unique ashcontaining additives in the oil allow minimal valve recession with low levels of combustion chamber deposits, to minimize the potential for pre-ignition and spark plug fouling.
- Low fluid volatility Helps minimize oil consumption.

 Used oil analysis is recommended for establishing and maintaining oil service intervals.

FEATURES

HDAX 9700 is a premium dual fuel gas engine oil with proven field service experience in dual fuel engines operating with diesel pilot ignition



natural gas mode and up to 100 percent diesel mode for extended operational periods. It offers reliable deposit control, corrosion resistance and wear protection. Its hybrid technology is designed to control ash accumulation in combustion chambers to minimize risk of preignition and the rough engine operation that may be associated with engine misfire and detonation.

APPLICATIONS

HDAX 9700 is recommended for dual fuel, natural gas / ultra low sulfur diesel medium-speed trunk piston engines in coastal marine, inland marine, railroad and power generation applications. These high output engines may be turbocharged and equipped with exhaust catalysts systems.

HDAX 9700 has field service experience in:

• Wärtsilä dual fuel engines in coastal marine operations

HDAX 9700 is approved for:

• Hyundai Himsen

HDAX 9700 is also approved by MAN for use in MAN ES four-stroke medium speed engines. This lubricant is suitable for dual fuel engines in distillate fuel operation, gas operation, and engines with alternating natural gas and distillate fuel operation, as long as the distillate fuel does not exceed a maximum sulphur content of 1000ppm.

HDAX 9700 is approved by the Anglo Belgian Corporation for use in 6DZ and 8DZ in-line engines, and fuel S < 0.1%; 12 DZ and 16DZ V-shape engines with DPF and fuel S < 0.1%. HDAX 9700 is also suitable for use in applications requiring API CF.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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TYPICAL TEST DATA

SAE Grade	40
Product Number	232313
<i>SDS Number U.S. Canada Mexico</i>	50347 50347 50346
Density at 15°C, kg/L	0.8721
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	117 13.4
Viscosity Index	110
Flash Point, °C(°F)	268(514)
Pour Point, °C(°F)	-36(-33)
Sulfated Ash, mass % ASTM D874	0.7
Base Number, mg KOH/g ASTM D2896	5.8
Phosphorus, ppm	280
Zinc, ppm	330

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] 9700 ISOCLEAN[®] Certified Lubricant sae 40

PRODUCT DESCRIPTION

HDAX[®] 9700 ISOCLEAN[®] Certified Lubricant is a premium performance uniquely designed engine oil recommended for dual fuel, medium-



speed, four stroke cycle trunk piston engines burning natural gas with approximately 3 percent diesel pilot fuel ignition and up to 100 percent low sulfur diesel fuel (<500 ppm sulfur). Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

HDAX 9700 ISOCLEAN Certified Lubricant provides the following benefits:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Smooth engine operation Fit for purpose formulation minimizes risk of rough engine operations that may result from misfiring or detonation when operating in dual fuel mode and using an elevated ash engine oil, as is typical of medium speed diesel engine oils.

- Long oil life A combination of premium base oils and high performance additives offer excellent oxidation and nitration resistance over extended oil life.*
- Clean pistons Very low combustion chamber and piston deposits help protect liners from scoring and extend engine top-end maintenance cycles.
- **Minimized valve recession** The unique ashcontaining additives in the oil allow minimal valve recession with low levels of combustion chamber deposits, to minimize the potential for pre-ignition and spark plug fouling.
- Low fluid volatility Helps minimize oil consumption.

FEATURES

HDAX 9700 ISOCLEAN Certified Lubricant is a premium dual fuel gas engine oil with proven field service experience in dual fuel engines



operating with diesel pilot ignition natural gas mode and up to 100 percent diesel mode for extended operational periods. It offers reliable deposit control, corrosion resistance and wear protection. Its hybrid technology is designed to control ash accumulation in combustion chambers to minimize risk of preignition and the rough engine operation that may be associated with engine misfire and detonation.

 Used oil analysis is recommended for establishing and maintaining oil service intervals.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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APPLICATIONS

HDAX[®] 9700 ISOCLEAN[®] Certified Lubricant is recommended for dual fuel, natural gas / ultra low sulfur diesel medium-speed trunk piston engines in coastal marine, inland marine, railroad and power generation applications. These high output engines may be turbocharged and equipped with exhaust catalysts systems.

HDAX 9700 ISOCLEAN Certified Lubricant has field service experience in:

• Wärtsilä dual fuel engines in coastal marine operations

HDAX 9700 ISOCLEAN Certified Lubricant is approved for:

• Hyundai Himsen

HDAX 9700 ISOCLEAN Certified Lubricant is approved by MAN for use in MAN ES four-stroke medium speed engines. This lubricant is suitable for dual fuel engines in distillate fuel operation, gas operation, and engines with alternating natural gas and distillate fuel operation, as long as the distillate fuel does not exceed a maximum sulphur content of 1000ppm.

HDAX 9700 is approved by the Anglo Belgian Corporation for use in 6DZ and 8DZ in-line engines, and fuel S < 0.1%; 12 DZ and 16DZ V-shape engines with DPF and fuel S < 0.1%. HDAX 9700 is also suitable for use in applications requiring API CF.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	40
Product Number	232314
SDS Number U.S. Canada	50346 50347
Density at 15°C, kg/L	0.8721
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	117 13.4
Viscosity Index	110
Flash Point, °C(°F)	268(514)
Pour Point, °C(°F)	-36(-33)
Sulfated Ash, mass % ASTM D874	0.7
Base Number, mg KOH/g ASTM D2896	5.8
Phosphorus, ppm	280
Zinc, ppm	330

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] NG SCREW COMPRESSOR OIL 68, 150

PRODUCT DESCRIPTION

HDAX[®] NG Screw Compressor Oils are formulated for use in natural gas screw compressors running on dry natural gas, or natural gas containing water or sour gases.

CUSTOMER BENEFITS

HDAX NG Screw Compressor Oils deliver value through:

- **Cost effectiveness** Provide excellent performance at a significantly lower cost than polyglycol synthetics.
- Wide range of operating temperatures Ability to start compressors in colder environments, and ability to provide ample oil film thickness at operating temperatures.
- **Corrosion protection** Contain rust and corrosion inhibitors to help protect equipment against water and corrosive effects of sour gases.

FEATURES

HDAX NG Screw Compressor Oils are formulated to

- meet the lubrication demands of screw compressors in natural gas service.
- protect lubricated parts against the corrosive effects of water and sour gas.

HDAX NG Screw Compressor Oils are formulated with premium Group II base oil technology and ashless additives. The base stocks and selected additives extend the low temperature operating range of the compressor, allowing cold starts and ability to quickly reach operating pressure. Other additives protect against wear, rust, deposits, foaming, and help protect compressor parts from the corrosive effects of sour gas. High viscosity indices and extremely low pour points allow HDAX NG Screw Compressor Oils to remain fluid at low startup temperatures, helping to protect moving parts when lubrication is most needed.

These ashless oils also stay sufficiently viscous at high operating temperatures to protect bearings during operation.

HDAX NG Screw Compressor Oils have excellent thermal and oxidative stability, minimizing the deposits and sludge which can form due to lubricant degradation in the high temperature environment of the compressor.

APPLICATIONS

HDAX NG Screw Compressor Oils should not be used in ammonia or air compressors services.

Polyglycol synthetics are frequently recommended for natural gas screw compressors because they are believed to be less susceptible to dilution by natural gas; however, their cost is quite high. HDAX NG Screw Compressor Oils are formulated to provide effective lubrication of natural gas screw compressors, but with a hydroprocessed mineral oil lubricant.

HDAX NG Screw Compressor Oils are recommended for use in screw compressors of all major natural gas compressor manufacturers, including Frick, Howden, FES, Mycom, and Ariel.

HDAX NG Screw Compressor Oil 68 is recommended

- when ambient startup temperatures are very low
- where dilution is minimal
- for higher speed operations

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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HDAX[®] NG Screw Compressor Oil 150 is

recommended

- when startup temperatures are moderate to high
- where dilution by liquid hydrocarbons is significant

TYPICAL TEST DATA

ISO Grade	68	150
Product Number	255204	255205
SDS Number	6852	6852
API Gravity	30.5	29.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	65 10.4	143 18.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	330 62	736 96
Viscosity Index	150	150
Flash Point, °C(°F)	236(457)	256(493)
Pour Point, °C(°F)	-44(-47)	-32(-26)
Rust Preventive Test Procedure B, Synthetic Sea Water	Pass	Pass
Four-Ball Wear Scar Diameter, mm	0.5	0.5
Copper Strip Test 3 h at 121°C	1a	1a

Minor variations in product typical test data are to be expected in normal manufacturing.



HDAX[®] NG SCREW COMPRESSOR OIL ISOCLEAN[®] Certified Lubricant

68, 150

PRODUCT DESCRIPTION

HDAX[®] NG Screw Compressor ISOCLEAN[®] Certified Lubricants are formulated for use in natural gas screw compressors running on dry natural



gas, or natural gas containing water or sour gases. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

HDAX NG Screw Compressor ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Cost effectiveness** Provide excellent performance at a significantly lower cost than polyglycol synthetics.
- Wide range of operating temperatures Ability to start compressors in colder environments, and ability to provide ample oil film thickness at operating temperatures.

 Corrosion protection — Contain rust and corrosion inhibitors to help protect equipment against water and corrosive effects of sour gases.

FEATURES

HDAX NG Screw Compressor ISOCLEAN Certified Lubricants are formulated to

- meet the lubrication demands of screw compressors in natural gas service.
- protect lubricated parts against the corrosive effects of water and sour gas.

HDAX NG Screw Compressor ISOCLEAN Certified Lubricants are formulated with premium Group II base oil technology and ashless additives. The base stocks and selected additives extend the low temperature operating range of the compressor, allowing cold starts and ability to quickly reach operating pressure. Other additives protect against wear, rust, deposits, foaming, and help protect compressor parts from the corrosive effects of sour gas.

High viscosity indices and extremely low pour points allow HDAX NG Screw Compressor ISOCLEAN Certified Lubricants to remain fluid at low startup temperatures, helping to protect moving parts when lubrication is most needed.

These ashless oils also stay sufficiently viscous at high operating temperatures to protect bearings during operation.

HDAX NG Screw Compressor ISOCLEAN Certified Lubricants have excellent thermal and oxidative stability, minimizing the deposits and sludge which can form due to lubricant degradation in the high temperature environment of the compressor.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

HDAX[®] NG Screw Compressor ISOCLEAN[®] Certified Lubricants should not be used in ammonia or air compressors services.

Polyglycol synthetics are frequently recommended for natural gas screw compressors because they are believed to be less susceptible to dilution by natural gas; however, their cost is quite high. HDAX NG Screw Compressor ISOCLEAN Certified Lubricants are formulated to provide effective lubrication of natural gas screw compressors, but with a hydroprocessed mineral oil lubricant.

HDAX NG Screw Compressor ISOCLEAN Certified Lubricants are recommended for use in screw compressors of all major natural gas compressor manufacturers, including Frick, Howden, FES, Mycom, and Ariel.

HDAX NG Screw Compressor ISOCLEAN Certified Lubricant 68 is recommended

- when ambient startup temperatures are very low
- where dilution is minimal
- for higher speed operations

HDAX NG Screw Compressor ISOCLEAN Certified Lubricant 150 is recommended

- when startup temperatures are moderate to high
- where dilution by liquid hydrocarbons is significant

ISO Grade	68	150
Product Number	255206	255209
SDS Number	6852	6852
API Gravity	30.5	29.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	65 10.4	143 18.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	330 62	736 96
Viscosity Index	150	150
Flash Point, °C(°F)	236(457)	256(493)
Pour Point, °C(°F)	-44(-47)	-32(-26)
Rust Preventive Test Procedure B, Synthetic Sea Water	Pass	Pass
Four-Ball Wear Scar Diameter, mm	0.5	0.5
Copper Strip Test 3 h at 121°C	1a	1a

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



MARINE LUBRICANTS



DELO[®] 710 LS SAE 20W-40, 40

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 710 LS products are industry leading, premium diesel engine oils for use in GE and EMD Tier 4 engines in marine, railroad and power generation applications. Delo 710 LS SAE 20W-40 and SAE 40 have approvals for LMOA Generation 7 Designate for use in GE engines, as well as having Progress Rail approval for use in EMD engines.

CUSTOMER BENEFITS

Delo 710 LS products deliver value and long engine life through:

- Excellent Wear Control
- · Helps maximize engine cleanliness
- Exhaust system and turbocharger deposit control
- Excellent Oxidation stability, soot dispersancy and base retention for long oil life with newly designed low consumption power assemblies
- SAE 20W-40 helps provide a 15% to 25%¹ oil consumption reduction vs. monograde engine oils
- Formulated specifically for engines using Low Sulfur and Ultra Low Sulfur diesel fuels

FEATURES

Delo 710 LS products are approved for use in GE and EMD for Tier 4 compliant engines and



is backwardly compatible with all previous engines.

Delo 710 LS products are specifically formulated for use with Low Sulfur Diesel (LSD) and Ultra Low Sulfur Diesel (ULSD) fuels and new low emission engines.

Delo 710 LS products use premium quality base oils that are exceptionally pure, with extremely low levels

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of sulfur, nitrogen and aromatics to enhance oxidation resistance.

Delo 710 LS employs complex detergents, advanced dispersants and superior oxidation and wear inhibitors to effectively address the deleterious effects of lower oil consumption and engine modifications in new and re-manufactured Tier 4, Tier 3, Tier 2+, Tier 1+ and Tier 0+ locomotives. In addition, the 20W-40 viscosity grade can reduce oil consumption 15-25%¹ vs monograde engine oils. All of these features make Delo 710 LS an excellent lubricant for engines using LSD and ULSD fuels with or without exhaust after-treatment equipment.

APPLICATIONS

Delo 710 LS is recommended for diesel engines using LSD or ULSD fuels where Zn-free oils are required in the following applications:

- Railroad
- Marine
- Offshore Drilling and Production
- Stationary Power Generation

Delo 710 LS benefits:

- Designed for low and ultra low sulfur fuels
- Formulated for GE and EMD engines used in a wide range of railroad, inland marine and stationary engines
- Uses an optimized ash content and additive formulation with advanced dispersant technology
- Helps minimize exhaust system and turbo-charger deposits
- Zinc free, Phosphorus free, Non-chlorinated
- Compatible with earlier generation GE approved engine oils
 - 1 Oil Consumption reduction will vary depending on engine duty cycle.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2022 RRL-28

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- Miscible with competitive railroad type oils and additive systems when engine manufacturers recommended practices are followed
- Delo 710 LS products are approved for LMOA Generation 7 (which supersedes the performance requirements of LMOA Generation 6) for use in GE engines, and are also approved by Progress Rail for use in EMD engines, including Tier 4 emission and older generation locomotive engines.

SAE Grade	20W-40	40
Product Number	235084	235085
SDS Number	39777	42504
Density at 15°C, kg/L	0.875	0.877
Viscosity, Kinematic mm2/s at 40°C mm2/s at 100°C	135.8 15.5	140.5 14.8
Viscosity Index	116	102
Flash Point, °C(°F)	230(446)	265(509)
Pour Point, °C(°F)	-31(-24)	-31(-24)
Sulfated Ash, wt %	1.15	1.15
Base Number, ASTM D2896	10.5	10.5
Zinc, ppm	10 max	10 max

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 1000 MARINE SAE 30, 40

PRODUCT DESCRIPTION

 $\mathsf{Delo}^{\mathbb{R}}$ 1000 Marine is a high-performance, mediumalkaline, diesel engine oil for medium- and high-speed trunk piston diesel engines.

CUSTOMER BENEFITS

Delo 1000 Marine delivers value through:

- Wear protection Protects against corrosive combustion products and minimizes wear on all moving engine components. Provides excellent protection for cams, camshaft and bearings.
- Detergent/Dispersant Properties Keeps crankcases and oil control rings clean. Reduces deposit formation particularly in the ring belt area and reduces lube oil filter blockage. Effectively handles insolubles.
- **Oxidation stability** Oxidation inhibitors protect the oil against high thermal stresses, protect engine parts from corrosion and reduce undercrown deposits, while promoting extended lubricant life.
- Rust protection Prevents corrosion of engine parts when the engine is not in operation. Provides excellent rust protection as required in stern tube application.
- **Balanced additive components** Provides minimal maintenance and down time, long engine life, and economical operating costs.

FEATURES

Delo 1000 Marine is blended from high-quality base oils and selected additives that protect the oil from oxidation and provide excellent detergency and dispersancy.

Delo 1000 Marine has extremely good viscosity control, and its excellent alkalinity retention properties prevent corrosive wear over long periods of time.

Delo 1000 Marine also has good water separation and anti-foam properties.

APPLICATIONS

Delo 1000 Marine 30 and 40 are recommended for all types of trunk piston engines, including the latest highoutput, medium-speed engines using high sulphur gas oil or marine diesel oil with a maximum sulphur level of 1.5%.

Delo 1000 Marine is approved by the major builders of trunk piston engines.

The FZG (A/8.3/90) failure load stage 12 permits its use in engine reduction gears and other applications where EP properties are required.

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

24 March 2015 ML-40

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SAE Grade	30	40
Product Number	235096	235094
SDS/MSDS Number USA Colombia	12811 —	12811 32512
Density at 15°C, kg/L	0.89	0.89
Viscosity, Kinematic cSt at 40°C cSt at 100°C	102.5 11.6	135 14.2
Viscosity Index	100	100
Flash Point, °C(°F)	240(464)	240(464)
Pour Point, °C(°F)	-18(-4)	-18(-4)
Sulfated Ash, wt %	1.67	1.67
Base Number, ASTM D2896	12	12
FZG test (A/8.3/90), failure load test	12	12

Minor variations in product typical test data are to be expected in normal manufacturing.



TARO[®] 20 DP SAE 30(X), 40(X)

PRODUCT DESCRIPTION

Taro[®] 20 DP are high performance, high alkalinity diesel engine oils for medium and high speed trunk piston diesel engines burning residual fuels with a maximum sulphur content up to 2%. Taro 20 DP can also be used in combination with gas oil or marine diesel oil (MDO).

CUSTOMER BENEFITS

Taro 20 DP deliver value through:

- Wear protection High BN levels control cylinder liner wear effectively and protects bearings from corrosion. High performance antiwear additives provide excellent protection against adhesive wear for cams, camshaft and bearings.
- Excellent foaming and water tolerance Provide a high degree of water tolerance and antifoam protection.
- **Detergent/Deposit Properties** Keep crankcases and control oil rings clean. Prevents deposit formation throughout the engine. Reduces lube oil filter blockage. Effectively handles insolubles.
- Oxidation stability Oxidation inhibitors protect the oil against high thermal stresses, protect engine parts from corrosion and reduce undercrown deposits, while promoting extended lubricant life.
- **Rust protection** Prevent corrosion of engine parts when the engine is not in operation.
- **Balanced additive components** Provide minimal maintenance and down-time, long engine life, and economical operating costs.

FEATURES

Taro 20 DP are blended from high quality base oils and additives that provide an extra margin of protection against ring sticking, piston deposits and wear under severe operating conditions.

Taro 20 DP have very good viscosity control when used in severe high temperature service and its excellent alkalinity retention characteristics prevent corrosive wear over long periods of operation.

The unique detergent and dispersant additive system promotes outstanding piston cleanliness as well as superb heavy fuel related contaminants handling characteristics. This helps reduce both "hot" (piston lands and grooves, piston undercrown, purifier heaters) and "cold" (crankcase, cambox, rocker area, fuel pumps, purifier bowl) deposits. The oil provides a high degree of water tolerance, good water separability and base retention properties.

APPLICATIONS

Taro 20 DP are recommended for trunk piston diesel engines burning MDO or low sulfur heavy fuels with a sulfur content up to 2%.

Taro 20 DP meet the requirements of most major marine diesel engine manufacturers.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

17 March 2015 ML-82

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SAE Grade	30(X)	40(X)
Product Number	293001	293002
SDS/MSDS Number	26775	26775
API Gravity	25.7	25.7
Density at 15°C, kg/L	0.91	0.91
Viscosity, Kinematic cSt at 40°C cSt at 100°C	95 11.0	135 14.0
Viscosity Index	100	100
Flash Point, °C(°F)	240(464)	240(464)
Pour Point, °C(°F)	-12(0)	-12(0)
Sulfated ash, mass %	2.5	2.5
Base Number, ASTM D2896	20	20

Minor variations in product typical test data are to be expected in normal manufacturing.



TARO[®] 20 DP **ISOCLEAN[®]** CERTIFIED LUBRICANT SAE 30(X), 40(X)

PRODUCT DESCRIPTION

Taro[®] 20 DP ISOCLEAN[®] Certified Lubricants are high performance, high alkalinity diesel engine oils for medium and high speed trunk piston diesel



engines burning residual fuels with a maximum sulphur content up to 2%. Taro 20 DP ISOCLEAN Certified Lubricants can also be used in combination with gas oil or marine diesel oil (MDO). Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Taro 20 DP ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- Flexibility ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Wear protection High BN levels control cylinder liner wear effectively and protects bearings from corrosion. High performance antiwear additives provide excellent protection against adhesive wear for cams, camshaft and bearings.

- Excellent foaming and water tolerance Provide a high degree of water tolerance and antifoam protection.
- **Detergent/Deposit Properties** Keep crankcases and control oil rings clean. Prevents deposit formation throughout the engine. Reduces lube oil filter blockage. Effectively handles insolubles.
- Oxidation stability Oxidation inhibitors protect the oil against high thermal stresses, protect engine parts from corrosion and reduce undercrown deposits, while promoting extended lubricant life.
- **Rust protection** Prevent corrosion of engine parts when the engine is not in operation.
- Balanced additive components Provide minimal maintenance and down-time, long engine life, and economical operating costs.

FEATURES

Taro 20 DP ISOCLEAN Certified Lubricants are blended from high quality base oils and additives that provide an extra margin of protection against ring sticking, piston deposits and wear under severe operating conditions.

Taro 20 DP ISOCLEAN Certified Lubricants have very good viscosity control when used in severe high temperature service and its excellent alkalinity retention characteristics prevent corrosive wear over long periods of operation.

The unique detergent and dispersant additive system promotes outstanding piston cleanliness as well as superb heavy fuel related contaminants handling characteristics. This helps reduce both "hot" (piston lands and grooves, piston undercrown, purifier heaters) and "cold" (crankcase, cambox, rocker area, fuel pumps, purifier bowl) deposits. The oil provides a

Product(s) manufactured in the USA.

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1 January 2021 ML-82 ISOCLEAN

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high degree of water tolerance, good water separability and base retention properties.

APPLICATIONS

Taro 20 DP ISOCLEAN[®] Certified Lubricants are recommended for trunk piston diesel engines burning MDO or low sulfur heavy fuels with a sulfur content up to 2%.

Taro 20 DP ISOCLEAN Certified Lubricants meet the requirements of most major marine diesel engine manufacturers.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

SAE Grade	30(X)	40(X)
Product Number	293142	293143
SDS/MSDS Number	26775	26775
API Gravity	25.7	25.7
Density at 15°C, kg/L	0.91	0.91
Viscosity, Kinematic cSt at 40°C cSt at 100°C	95 11.0	135 14.0
Viscosity Index	100	100
Flash Point, °C(°F)	240(464)	240(464)
Pour Point, °C(°F)	-12(0)	-12(0)
Sulfated ash, mass %	2.5	2.5
Base Number, ASTM D2896	20	20

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



TARO[®] 30 DP SAE 30(X), 40(X)

PRODUCT DESCRIPTION

Taro[®] 30 DP are high performance, high alkalinity diesel engine oils for medium and high speed trunk piston diesel engines burning residual fuels with a maximum sulfur content up to 4%.

CUSTOMER BENEFITS

Taro 30 DP deliver value through:

- Wear protection High BN levels control cylinder liner wear effectively and protects bearings from corrosion. High performance antiwear additives provide excellent protection against adhesive wear for cams, camshaft and bearings.
- Excellent foaming and water tolerance Provides a high degree of water tolerance and antifoam protection.
- Detergent/Dispersant Properties Keeps crankcases and oil control rings clean. Prevents deposit formation throughout the engine. Reduces lube oil filter blockage. Effectively handles insolubles.
- **Oxidation stability** Oxidation inhibitors protect the oil against high thermal stresses, protect engine parts from corrosion and reduce undercrown deposits, while promoting extended lubricant life.
- **Rust protection** Prevents corrosion of engine parts when the engine is not in operation.
- Balanced additive components Provides minimal maintenance and downtime, long engine life and economical operating costs.

FEATURES

Taro 30 DP are blended from high quality base oils and additives that provide an extra margin of protection against ring sticking, piston deposits, and wear under severe operating conditions.

Taro 30 DP have very good viscosity control when used in severe high temperature service and its excellent alkalinity retention characteristics prevent corrosive wear over long periods of operation.

The unique detergent and dispersant additive system promotes outstanding piston cleanliness as well as superb heavy fuel related contaminants handling characteristics. This helps reduce both "hot" (piston lands and grooves, piston undercrown, purifier preheaters) and "cold" (crankcase, cambox, rocker area, fuel pumps, purifier bowl) deposits.

APPLICATIONS

Taro 30 DP are recommended for trunk piston diesel engines burning residual fuels with a maximum sulfur level of 4%.

Taro 30 DP meet the requirements of most major marine diesel engine manufacturers.

Product(s) manufactured in the USA.

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SAE Grade	30(X)	40(X)
Product Number	293003	293004
SDS/MSDS Number	26775	26775
API Gravity	25.7	25.7
Density at 15°C, kg/L	0.91	0.91
Viscosity, Kinematic cSt at 40°C cSt at 100°C	95 11.0	135 14.0
Viscosity Index	100	100
Flash Point, °C(°F)	240(464)	240(464)
Pour Point, °C(°F)	-12(0)	-12(0)
Sulfated ash, mass %	3.7	3.7
Base Number, ASTM D2896	30	30

Minor variations in product typical test data are to be expected in normal manufacturing.



TARO[®] 40 XL SAE 40(X)

PRODUCT DESCRIPTION

Taro[®] 40 XL is a high performance, very high alkalinity diesel engine oil for medium speed trunk piston diesel engines burning residual fuels with a maximum sulfur level of 4.5%.

CUSTOMER BENEFITS

Taro 40 XL delivers value through:

- Wear protection High BN levels control cylinder liner wear effectively and protects bearings from corrosion. High performance antiwear additives provide excellent protection against adhesive wear for cams, camshaft and bearings.
- Excellent foaming and water tolerance Helps provide a high degree of water tolerance and antifoam protection.
- Detergent/Dispersant Properties Keeps crankcases and oil control rings clean. Prevents deposit formation throughout the engine. Reduces lube oil filter blockage. Effectively handles insolubles.
- **Oxidation stability** Oxidation inhibitors protect the oil against high thermal stresses, protect engine parts from corrosion and reduce undercrown deposits, while promoting extended lubricant life.
- **Rust protection** Prevents corrosion of engine parts when the engine is not in operation.
- **Balanced additive components** Provides minimal maintenance and down-time, long engine life and economical operating costs.

FEATURES

Taro 40 XL is blended from high quality base oils and additives that provide an extra margin of protection against ring sticking, piston deposits, and wear under severe operating conditions.

Taro 40 XL has very good viscosity control when used in severe high temperature service and its excellent alkalinity retention characteristics help prevent corrosive wear over long periods of operation.

The unique detergent and dispersant additive system promotes outstanding piston cleanliness as well as superb heavy fuel related contaminants handling characteristics. This helps reduce both "hot" (piston lands and grooves, piston undercrown, purifier preheaters) and "cold" (crankcase, cambox, rocker area, fuel pumps, purifier bowl) deposits.

Taro 40 XL has good water separation and base retention properties.

APPLICATIONS

Taro 40 XL is recommended for trunk piston diesel engines burning residual fuels with a maximum sulfur level of 4.5%.

Taro 40 XL SAE 40(X) meets the requirements of most major marine diesel engine manufacturers.

Product(s) manufactured in the USA.

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SAE Grade	40(X)
Product Number	293005
SDS/MSDS Number	26684
API Gravity	25.7
Density at 15°C, kg/L	0.91
Viscosity, Kinematic cSt at 40°C cSt at 100°C	135 14.0
Viscosity Index	100
Flash Point, °C(°F)	240(464)
Pour Point, °C(°F)	-12(0)
FZG Scuffing Test (A/8.3/90), failure load stage, ASTM D5182	12
Sulfated ash, mass %	4.9
Base Number, ASTM D2896	40

Minor variations in product typical test data are to be expected in normal manufacturing.



TARO[®] 50 XL SAE 40(X)

PRODUCT DESCRIPTION

Taro[®] 50 XL is a high performance very high alkalinity diesel engine oil for medium speed trunk piston diesel engines burning residual fuels with a maximum sulfur level of 4.5%.

CUSTOMER BENEFITS

Taro 50 XL delivers value through:

- Wear protection High BN levels control cylinder liner wear effectively and protects bearings from corrosion. High performance antiwear additives provide excellent protection against adhesive wear for cams, camshaft and bearings.
- Excellent foaming and water tolerance Helps provide a high degree of water tolerance and antifoam protection.
- **Detergent/Dispersant Properties** Keeps crankcases and oil control rings clean. Prevents deposit formation throughout the engine. Reduces lube oil filter blockage. Effectively handles insolubles.
- **Oxidation stability** Oxidation inhibitors protect the oil against high thermal stresses, protect engine parts from corrosion and reduce undercrown deposits, while promoting extended lubricant life.
- **Rust protection** Prevents corrosion of engine parts when the engine is not in operation.
- **Balanced additive components** Provides minimal maintenance and down time, long engine life, and economical operating costs.

FEATURES

Taro 50 XL is blended from high quality base oils and additives that provide an extra margin of protection against ring sticking, piston deposits and wear under severe operating conditions.

Taro 50 XL has very good viscosity control when used in severe high temperature service and its excellent alkalinity retention characteristics help prevent corrosive wear over long periods of operation.

The unique detergent and dispersant additive system promotes outstanding piston cleanliness as well as superb heavy fuel related contaminants handling characteristics. This helps reduce both "hot" (piston lands and grooves, piston undercrown, purifier preheaters) and "cold" (crankcase, cambox, rocker area, fuel pumps, purifier bowl) deposits.

Taro 50 XL has good water separation and base retention properties.

APPLICATIONS

Taro 50 XL is recommended for trunk piston diesel engines burning residual fuels with a maximum sulfur level of 4.5% and with low oil consumption.

Taro 50 XL meets the requirements of most major marine diesel engine manufacturers.

Product(s) manufactured in the USA.

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SAE Grade	40(X)
Product Number	293006
SDS/MSDS Number	26730
API Gravity	24.6
Density at 15°C, kg/L	0.91
Viscosity, Kinematic cSt at 40°C cSt at 100°C	135 14.0
Viscosity Index	100
Flash Point, °C(°F)	240(464)
Pour Point, °C(°F)	-12(0)
FZG Scuffing Test (A/8.3/90), failure load stage, ASTM D5182	12
Sulfated ash, mass %	5.9
Base Number, ASTM D2896	50

Minor variations in product typical test data are to be expected in normal manufacturing.



TARO[®] Ultra 40, 70, 100, 140 SAE 50

PRODUCT DESCRIPTION

Taro[®] Ultra products are cylinder lubricants designed for lubricating the latest generation two-stroke marine engines running on low sulphur fuels under all loads and operating conditions. It is blended with highlyrefined base oils and carefully selected additives to provide excellent ring and liner wear protection and piston cleanliness in slow-speed crosshead diesel engines.

CUSTOMER BENEFITS

Taro Ultra products deliver value through:

- Engine protection Protects against excessive cylinder liner and piston ring wear, thus allowing prolonged service intervals.
- Engine cleanliness Helps prevent ring sticking and minimizes deposit formation on the pistons and throughout the combustion chamber exhaust areas.
- **Storage stability** Stable at ambient temperatures and during long-term storage.
- Compatibility Miscible and compatible with diesel cylinder lubricants generally known to the international marine trade.

FEATURES

Taro Ultra is specifically designed to cope with the demands and required flexibility for IMO 2020. Taro Ultra has been fully field tested using a wide variety of fuels expected to be available post IMO 2020 implementation and are approved by major OEMs.

APPLICATIONS

Taro Ultra is approved for:

- MAN Energy Solutions
- Winterthur Gas & Diesel

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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20 July 2024 ML-97

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Taro Ultra	SAE	BN	Recommended Application, "Description"
40	50	40	Recommended for lubricating large low-speed marine diesel engines continuously using low sulfur fuel under all loads and operating conditions. Running low sulfur fuels allows the use of lower BN engine oil.
70	50	70	For large, low-speed marine diesel engines running on low sulfur fuels operating under corrosive conditions or for older, mildly corrosive engines equipped with exhaust abatement technologies using heavy fuel oil.
100	50	100	Formulated to protect against cold corrosion in 2-stroke marine engines using exhaust abatement technologies running on heavy fuel oil operating under all loads and conditions.
140	50	140	Ultra-high base number cylinder lubricant formulated for use in latest generation 2-stroke marine engines operating under highly corrosive environments with a tendency to develop cold corrosion inside the cylinder. Able to provide the same level of alkalinity and corrosion protection as Taro Ultra 100 at lower feed rates, helping to reduce operation costs. Provides excellent ring and liner wear protection and piston cleanliness in slow-speed cross-head diesel engines.

APPROVALS AND SPECIFICATIONS

Taro Ultra products should be used in accordance with OEM guidelines and recommendations. They meet or exceed the following OEM specifications and industry standards:

Base Number	40	70	100	140
MAN ES (Gp I)	Х	Х	Х	Х
MAN ES (Gp II)	Х	Х	Х	Х
WinGD (Gp I)	Х	Х	Х	Х
WinGD (Gp II)	Х	Х	Х	
J-Eng (Gp I)	Х	Х	Х	
J-Eng (Gp II)	Х	Х	Х	

Base Number	40	70	100	140
Product Number	233911	233908	219036	219037
SDS/MSDS Number	51164	49537	49535	51161
SAE Viscosity Grade	50	50	50	50
Density at 15°C, kg/L	0.92	0.93	0.95	0.98
Viscosity, Kinematic mm ² /s at 100°C	19	19	19	19
Viscosity Index	95	95	95	95
Flash Point, °C(°F)	220°C min	220°C min	220°C min	220°C min
Pour Point, °C(°F)	-15°C	-15°C	-15°C	-15°C
Base Number, mg KOH/g (ASTM D2896)	40	70	100	140

Minor variations in product typical test data are to be expected in normal manufacturing.



TARO[®] ULTRA ADVANCED 40

PRODUCT DESCRIPTION

Taro[®] Ultra Advanced 40 is the latest addition to Chevron Marine Lubricants' range of cylinder oils meeting the highest performance standards. Taro Ultra Advanced 40 is designed to provide improved marine engine protection over previous generations of low Base Number (BN) formulations. It is blended with highly refined base oils and carefully-selected additives to help provide strong ring and linear wear protection, and piston cleanliness in large bore, low speed crosshead engines.

CUSTOMER BENEFITS

Taro Ultra Advanced 40 delivers value through:

- **Engine protection** Designed to keep pistons clean at moderate BN and oil ash level, eliminating the need to alternate with cylinder oils of higher and lower BN to help maintain cleanliness.
- Engine exhaust cleanliness Operation with a lower sulfated ash lubricant can help reduce accumulation of oil ash in scavenge space, on exhaust valves, turbocharger and other components in the exhaust system such as economizer and critical exhuast gas after treatment systems as SCR, EGR, DPF.
- **Storage stability** Stable at ambient temperatures and during long-term storage.
- **Compatibility** Miscible and compatible with diesel cylinder lubricants generally known to the international marine trade.

FEATURES

Taro Ultra Advanced 40 is formulated to offer enhanced piston and piston ring pack cleanliness and linear wear protection as a result of high dispersant and detergent effectiveness, at moderate BN levels. It also protects the latest engine designs operating on fuels with sulfur content of 0.5% and lower from wear and corrosion.

APPLICATIONS

Taro Ultra Advanced 40 is recommended for cylinder lubrication of the latest generation large, low-speed marine diesel engines equipped with exhuast abatement technologies operating with a range of low and up to zero sulphur fuels, including VLSFO, ULSFO, LNG and methanol. Taro Ultra Advanced 40 should be used in accordance with OEM guidelines and recommendations.

Taro Ultra Advanced 40 is approved for:

• MAN Energy Solutions (Category II cylinder oils)

TYPICAL TEST DATA

Base Number	40
Product Number	219040
SDS/MSDS Number	57986
Density at 15°C, kg/L	0.92
Viscosity, Kinematic mm ² /s at 100°C	19
Viscosity Index	95
Flash Point, °C(°F)	220°C min
Pour Point, °C(°F)	-15°C
Base Number, mg KOH/g (ASTM D2896)	40

Minor variations in product typical test data are to be expected in normal manufacturing.

10 February 2023

MI -98

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VERITAS[®] 800 MARINE OIL SAE 30

PRODUCT DESCRIPTION

Veritas[®] 800 Marine Oil is a premium crankcase lubricant for slow-speed crosshead diesel engines.

CUSTOMER BENEFITS

Veritas 800 Marine Oil delivers value through:

- Wear protection The lubricating oil alkalinity reserve helps protect bearings and bright metals in the engine lubrication systems against corrosive wear from acids formed by combustion.
- **Detergency** Helps clean crankcases, piston interiors and lubricating oil lines.
- **Corrosion protection** Helps protect engine parts against rusting.
- **Rust protection** Helps prevent corrosion of engine parts when the engine is not in operation.
- Resistance to foaming A foam inhibitor helps prevent the formation of foam and ensures smooth operation of lube oil pumps with a continuous feed of oil to all lubricated parts.
- **Easy purification** The oil can be cleaned with the normal shipboard purifiers. Water washing of Veritas 800 Marine is neither necessary nor recommended.

FEATURES

Veritas 800 Marine Oil is manufactured from highly refined lubricating oil stocks and has very good anticorrosion and anti-foam properties. The oil has a moderate level of alkalinity to neutralize acidic combustion products that can enter the crankcase. Special additives give the oil detergent properties which helps clean crankcases. The combination of detergency and the excellent oxidation stability promotes clean piston interiors where oil is used for cooling.

APPLICATIONS

Veritas 800 Marine Oil SAE 30 is recommended for the crankcase lubrication of large, slow speed marine diesel engines. Due to ingress of high viscosity cylinder drip oil into the SAE 30 system oil, the viscosity often shows an increase. Veritas 800 Marine Oil meets the **Wärtsilä, MAN B&W**, and **Mitsubishi** crosshead engine system oil requirements.

Veritas 800 Marine Oil is suitable for use in Winterthur Gas and Diesel WinGD X, X-DF, RT-Flex, RT-Flex DF, Wärtsilä RTA, X and RTA-Flex engines, as well as in Sulzer 2-Stroke engines.

TYPICAL TEST DATA

SAE Grade	30
Product Number	250035
SDS Number	23296
Density at 15°C, kg/L	0.89
Viscosity, Kinematic cSt at 40°C cSt at 100°C	111 11.9
Viscosity Index	95
FZG test (A/8.3/90), failure load stage	11
Flash Point, °C(°F)	240(464)
Pour Point, °C(°F)	-18(0)
Rust test, synthetic seawater	Pass
Base Number, ASTM D2896	5.6

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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25 October 2024 ML-110

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RAILROAD LUBRICANTS



DELO[®] 710 LS SAE 20W-40, 40

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] 710 LS products are industry leading, premium diesel engine oils for use in GE and EMD Tier 4 engines in marine, railroad and power generation applications. Delo 710 LS SAE 20W-40 and SAE 40 have approvals for LMOA Generation 7 for use in GE engines, as well as having Progress Rail approval for use in EMD engines.

CUSTOMER BENEFITS

Delo 710 LS products deliver value and long engine life through:

- Excellent Wear Control
- · Helps maximize engine cleanliness
- Exhaust system and turbocharger deposit control
- Excellent Oxidation stability, soot dispersancy and base retention for long oil life with newly designed low consumption power assemblies
- SAE 20W-40 helps provide a 15% to 25%¹ oil consumption reduction vs. monograde engine oils
- Formulated specifically for engines using Low Sulfur and Ultra Low Sulfur diesel fuels

FEATURES

Delo 710 LS products are approved for use in GE and EMD for Tier 4 compliant engines and



is backwardly compatible with all previous engines.

Delo 710 LS products are specifically formulated for use with Low Sulfur Diesel (LSD) and Ultra Low Sulfur Diesel (ULSD) fuels and new low emission engines.

Delo 710 LS products use premium quality base oils that are exceptionally pure, with extremely low levels

of sulfur, nitrogen and aromatics to enhance oxidation resistance.

Delo 710 LS employs complex detergents, advanced dispersants and superior oxidation and wear inhibitors to effectively address the deleterious effects of lower oil consumption and engine modifications in new and re-manufactured Tier 4, Tier 3, Tier 2+, Tier 1+ and Tier 0+ locomotives. In addition, the 20W-40 viscosity grade can reduce oil consumption 15-25%¹ vs monograde engine oils. All of these features make Delo 710 LS an excellent lubricant for engines using LSD and ULSD fuels with or without exhaust after-treatment equipment.

APPLICATIONS

Delo 710 LS is recommended for diesel engines using LSD or ULSD fuels where Zn-free oils are required in the following applications:

- Railroad
- Marine
- Offshore Drilling and Production
- Stationary Power Generation

Delo 710 LS benefits:

- Designed for low and ultra low sulfur fuels
- Formulated for GE and EMD engines used in a wide range of railroad, inland marine and stationary engines
- Uses an optimized ash content and additive formulation with advanced dispersant technology
- Helps minimize exhaust system and turbo-charger deposits
- Zinc free, Phosphorus free, Non-chlorinated
- Compatible with earlier generation GE approved engine oils
 - 1 Oil Consumption reduction will vary depending on engine duty cycle.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2022 RRL-28

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- Miscible with competitive railroad type oils and additive systems when engine manufacturers recommended practices are followed
- Delo 710 LS products are approved for LMOA Generation 7 (which supersedes the performance requirements of LMOA Generation 6) for use in GE engines, and are also approved by Progress Rail for use in EMD engines, including Tier 4 emission and older generation locomotive engines.

SAE Grade	20W-40	40
Product Number	235084	235085
SDS Number	39777	42504
Density at 15°C, kg/L	0.875	0.877
Viscosity, Kinematic mm2/s at 40°C mm2/s at 100°C	135.8 15.5	140.5 14.8
Viscosity Index	116	102
Flash Point, °C(°F)	230(446)	265(509)
Pour Point, °C(°F)	-31(-24)	-31(-24)
Sulfated Ash, wt %	1.15	1.15
Base Number, ASTM D2896	10.5	10.5
Zinc, ppm	10 max	10 max

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] 710 HB RT SAE 20W-40

PRODUCT DESCRIPTION

Delo[®] 710 HB RT is an industry leading, premium diesel engine oil for use in GE and EMD Tier 4 engines in marine, railroad and power generation applications. Delo 710 HB RT SAE 20W-40 has approvals for LMOA Generation 7 for use in GE engines, as well as having Progress Rail approval for use in EMD engines.

CUSTOMER BENEFITS

Delo 710 HB RT delivers value and long engine life through:

- Excellent Wear Control
- Helps maximize engine cleanliness
- Exhaust system and turbocharger deposit control
- Excellent Oxidation stability, soot dispersancy and base retention for long oil life with newly designed low consumption power assemblies
- SAE 20W-40 helps provide a 15% to 25%¹ oil consumption reduction vs. monograde engine oils
- Formulated specifically for engines using Low Sulfur and Ultra Low Sulfur diesel fuels

FEATURES

Delo 710 HB RT is approved for use in GE and EMD for Tier 4 compliant engines and is backwardly compatible with all r



backwardly compatible with all previous engines.

Delo 710 HB RT is specifically formulated for use with Low Sulfur Diesel (LSD) and Ultra Low Sulfur Diesel (ULSD) fuels and new low emission engines.

Delo 710 HB RT uses premium quality base oils that are exceptionally pure, with extremely low levels of sulfur, nitrogen and aromatics to enhance oxidation resistance. Delo 710 HB RT employs complex detergents, advanced dispersants and superior oxidation and wear inhibitors to effectively address the deleterious effects of lower oil consumption and engine modifications in new and re-manufactured Tier 4, Tier 3, Tier 2+, Tier 1+ and Tier 0+ locomotives. In addition, the 20W-40 viscosity grade can reduce oil consumption 15-25%¹ vs monograde engine oils. All of these features make Delo 710 HB RT an excellent lubricant for engines using LSD and ULSD fuels with or without exhaust after-treatment equipment.

APPLICATIONS

Delo 710 HB RT is recommended for diesel engines using LSD or ULSD fuels where Zn-free oils are required in railroad applications.

Delo 710 HB RT benefits:

- Designed for low and ultra low sulfur fuels
- Formulated for GE and EMD engines used in a wide range of railroad, inland marine and stationary engines
- Uses an optimized ash content and additive formulation with advanced dispersant technology
- Helps minimize exhaust system and turbo-charger deposits
- · Zinc free, Phosphorus free, Non-chlorinated
- Compatible with earlier generation GE approved engine oils
- Miscible with competitive railroad type oils and additive systems when engine manufacturers recommended practices are followed

1 Oil Consumption reduction will vary depending on engine duty cycle.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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15 October 2024 RRL-30

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• Delo 710 HB RT is approved for LMOA Generation 7 (which supersedes the performance requirements of LMOA Generation 6) for use in GE engines, and are also approved by Progress Rail for use in EMD engines, including Tier 4 emission and older generation locomotive engines.

TYPICAL TEST DATA

SAE Grade	20W-40
Product Number	235086
SDS Number	65081
Density at 15°C, kg/L	0.879
Viscosity, Kinematic mm2/s at 100°C	15.4
Pour Point, °C(°F)	-23(-9)
Sulfated Ash, wt %	1.82
Base Number, ASTM D2896	17
Zinc, ppm	10 max

Minor variations in product typical test data are to be expected in normal manufacturing.



REGAL[®] HD 57 (formerly Journaltex[®])

PRODUCT DESCRIPTION

Regal[®] HD 57 (formerly Journaltex[®] HD 57) is designed for use in lubricating locomotive traction motor suspension bearings and plain railcar journal bearings.

CUSTOMER BENEFITS

Regal HD 57 delivers value through:

- **Excellent lubricity characteristics** imparted by the additive package helps minimize friction to help prevent premature bearing failure.
- Good rust protection Effective inhibitor package helps prevent rusting of surfaces exposed to water.
- Water separability Regal HD 57 separates readily from water.
- Good shear stability
- Excellent air release by foam inhibitor helps hasten the release of foam and entrained air.

FEATURES

Regal HD 57 is manufactured from high viscosity index, low pour point base oils for use on suspension bearings. It contains an additive package that helps resist rust and corrosion and helps protect journal bearings during the critical break-in period by minimizing friction in heavily loaded bearings.

APPLICATIONS

Regal HD 57 is designed to lubricate locomotive traction motor suspension bearings and plain railcar journal bearings. It is also recommended for lubricating tractor motor suspension bearings, truck center plates, plain journal bearing waste saturation and pad lubrication or free oiling.

TYPICAL TEST DATA

Product Number	273113
SDS/MSDS Number USA Colombia	23546 31104
API Gravity	31.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	60.9 8.7
Viscosity, Saybolt SUS at 100°F SUS at 210°F	320 56
Viscosity Index	117
Flash Point, °C(°F)	237(459)
Pour Point, °C(°F)	-39(-38)

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA and Colombia. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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CHEVRON TMGL PREMIUM

PRODUCT DESCRIPTION

Chevron TMGL Premium is a black, adhesive, semi-fluid grease specifically designed for lubrication of traction motor gear cases of diesel-electric locomotives.

CUSTOMER BENEFITS

Chevron TMGL Premium delivers value through:

- **Minimized downtime** High film strength and EP additive package protects heavily loaded gears from wear and scuffing. Good low temperature fluidity offers effective lubrication under cold startup conditions.
- Long service life Excellent oxidation resistance minimizes thickening in high temperature service while high base oil viscosity and adhesiveness minimize the tendency to leak from the gear case.
- Enhanced equipment protection Effective corrosion inhibitors protect gear components from rusting in wet conditions.

FEATURES

Chevron TMGL Premium is a black, adhesive, semi-fluid grease specifically designed for lubrication of traction motor gear cases of diesel-electric locomotives.

Chevron TMGL Premium contains a lithium thickener, very high viscosity base fluid and a special EP additive system.

APPLICATIONS

Chevron TMGL Premium is recommended for:

- Traction motor gear cases (incorporating appropriate seal designs) where semi-fluid grease-type lubricants are specified.
- Older non-sealed traction motor designs that normally use heavy residual-type gear lubricants, where the higher leakage rate that may result is acceptable.
- Slow to medium speed industrial gear applications where an EP semi-fluid grease is specified.

TYPICAL TEST DATA

Product Number	277117
SDS Number	23642
Color	Dark Brown
Texture	Semi-Fluid Tacky
Base Fluid Viscosity, cSt 100°C	425
Brookfield Apparent Viscosity 200°F, cp, No. 3 spindle at 4 rpm	7,500
Thickener Type	Lithium Soap
Thickener Content, %	1.5
Timken OK Load, lbs	40

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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PAPER AND FOREST PRODUCTS



CLARITY[®] SAW GUIDE OIL 46, 100, 150

PRODUCT DESCRIPTION

 $\mbox{Clarity}^{\mbox{$\mathbb 8$}}$ Saw Guide Oils are designed to lubricate saw blades and guides in saw equipment.

CUSTOMER BENEFITS

Clarity Saw Guide Oils deliver value through:

- **Clean cutting** Helps reduce excessive drag that slows cutting.
- Exceptional performance in low water and low oil consumption saw systems.
- Excellent low temperature properties Low pour point and proprietary formulation help keep guide holes, lines and filters free from build-up associated with low temperatures.
- Excellent rust and corrosion protection
- **Excellent lubrication** due to oily film on saw blade.
- **Operator comfort** Low odor.
- Sufficient tackiness and water mixing Allows the oil to cling to saw and guide components.
- Environmental sensitivity Clarity Saw Guide Oil passes stringent EL/LL50 Acute Aquatic Toxicity testing (OECD 201, 202, 203). Tested with fingerling rainbow trout, daphnia, freshwater algae, and Mysid shrimp using a water accommodated fraction up to 5000 mg/liter (fifty times the minimum pass rate of the LL50 test.) The test results were obtained during the development of the product line and are considered representative of any/all commercial samples. Ashless formulation facilitates conventional recycling.
- Low toxicity Inherently biodegradable and has very low acute aquatic toxicity to both fish and invertebrates based on tests of water

accommodated fractions.¹ Ashless formulation facilitates conventional recycling programs.

FEATURES

Clarity Saw Guide Oils are designed to promote long saw guide and saw blade life in thin kerf saw equipment, when operating in severe service and reduced cooling water modes.



Clarity Saw Guide Oils are formulated with premium base oil technology and specially selected ashless additives to reduce friction between saw and guide components in thin kerf saw equipment.

The oil's lubricity performance helps minimize rust and corrosion problems, while reducing friction to allow much cooler operation.

Clarity Saw Guide Oils have been formulated with effective rust inhibitors to help prevent rust formation.

Oiliness and EP properties help provide excellent film strength for boundary lubrication and extreme pressure conditions.

Clarity Saw Guide Oils help to allow the correct mixing of oil and water and have tackiness properties to enable the lubricants to cling to saw and guide components.

1. Based on testing of similarly formulated product.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 March 2018 PFP-40

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APPLICATIONS

Clarity Saw Guide Oils are specifically formulated to lubricate modern thin kerf sawing systems. Clarity Saw Guide Oils' performance properties have been field proven to meet the severe requirements of this application. Clarity Saw Guide Oils are especially recommended for use in many saw systems, including those manufactured by: CAE (Newnes, McGehee), Optimil, Salem, TMT, Ukiah, and USNR (Kockums CanCar, Schurman).

TYPICAL TEST DATA

ISO Grade	46	100	150
Product Number	255199	255201	266188
SDS Number	6716	6716	6716
API Gravity	32.0	30.7	29.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	43.7 7.0	95.0 11.3	143 14.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	224 50	494 65	749 78
Viscosity Index	118	110	100
Flash Point, °C(°F)	242(468)	262(504)	274(525)
Pour Point, °C(°F)	-33(-27)	-33(-27)	-30(-22)
Rust Prevention, ASTM D665 Procedure B, 24 h	Pass	Pass	Pass

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON PAPER MACHINE OIL PREMIUM 150, 220, 320

PRODUCT DESCRIPTION

Chevron Paper Machine Oil Premium oils are paper machine circulating oils designed to give excellent performance in centralized lubrication systems of paper machines.

CUSTOMER BENEFITS

Chevron Paper Machine Oil Premium oils deliver value through:

- Minimized unscheduled downtime High oxidation stability provides excellent resistance to deposit formation. The detergent/dispersant additive system enables quick removal of deposits from hot bearing surfaces, and the suspension of small particles, rendering them harmless.
- **Compatibility with ultra-fine filters** The specially balanced additive package and highly refined base stocks provide the outstanding filterability essential for ultra-fine 6 to 12 micron filters, even in the presence of water.
- Excellent Water Separability Helps permit rapid separation of water in circulating oil system reservoirs - minimizing the chance of premature filter plugging and maximizing bearing life.
- Long equipment life The special antiwear additive system provides excellent protection against wear of heavily loaded bearings and surfaces. Effective corrosion inhibitors resist rust and copper corrosion.
- Less frequent circulating system changes High oxidation stability helps ensure long lubricant service life, particularly in newer design machines with smaller oil reservoirs.

FEATURES

Chevron Paper Machine Oil Premium oils are circulating oils designed for use in the centralized lubrication systems of paper machines, including wet-end systems, dryer bearings, and calender stacks.

They are formulated with a specially balanced additive package containing a barium-free detergent/ dispersant, oxidation, antiwear, rust and copper corrosion inhibitors.

They have excellent demulsibility properties and provide outstanding filterability critical for use with ultra-fine filters of modern paper machines.

APPLICATIONS

Chevron Paper Machine Oil Premium oils are recommended for use in:

- Circulating oil systems of paper machines, particularly those equipped with ultra-fine 6 to 12 micron filters, superheated steam, or those susceptible to water contamination.
- Suction box pumps, vacuum and white water pumps, agitators, reduction gears, and gear head motors.
- Pulp grinders and pulp refiner oil circulation systems.
- Gear drive units and pumps in industrial applications.
- Plain and antifriction bearings at elevated temperatures.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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ISO Grade	150	220	320
Product Number	253035	253036	253037
SDS Number	13560	13560	13560
API Gravity	29.5	28.4	27.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	143 13.7	209 17.7	304 22.7
Viscosity, Saybolt SUS at 100°F SUS at 210°F	753 75	1107 91	1621 113
Viscosity Index	91	92	92
Flash Point, °C(°F)	246(475)	249(480)	248(473)
Pour Point, °C(°F)	-15(+5)	-15(+5)	-12(+10)
Rust Prevention, ASTM D665B	Pass	Pass	Pass
Oxidation Stability Minutes to 25 psi pressure drop, ASTM D2272	150	150	150

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON RED CHAIN BAR OIL 68, 100, 150, 220

PRODUCT DESCRIPTION

Chevron Red Chain Bar Oils are designed for use in chain saws.

CUSTOMER BENEFITS

Chevron Red Chain Bar Oils deliver value through:

- **Minimal wear** Helps minimize wear for the chain, bar, and sprocket.
- **Tackiness** The level of tackiness helps keep the oil on the chain and helps prevent sling-off when the chain is traveling at high speeds resulting in minimal waste and consumption.
- **Field experience** Used extensively in the field with proven experience.

FEATURES

Chevron Red Chain Bar Oils are very tacky lubricants made from special high viscosity base oils having the desired flow and pumpability properties to help assure adequate lubrication over a wide range of ambient temperatures.

Chevron Red Chain Bar Oils are manufactured to meet the needs of the forest products industry under adverse operating conditions.

To a logger, chainsaw lubrication is one of the most demanding requirements for efficient chainsaw performance and operation. Chevron Red Chain Bar Oils were designed to meet this demand with economy in mind.

There are four grades of Chevron Red Chain Bar Oils to meet any ambient temperature requirements.

ISO 68 is recommended for winter conditions when temperatures are consistently below 0°C (32°F).

ISO 100 is the ideal grade for cool weather conditions of $0-15^{\circ}C$ (32-60°F) to help assure a proper flow from either hand operated or automatic chain oilers.

ISO 150 is a good choice for all-season use in mild climates and provides excellent wear protection under hot weather operating conditions. It may also be used, where OEM recommended, for chain drives, on lumber carriers, lawnmowers, and farm equipment.

ISO 220 is often preferred by forest industry professionals during the summer season due to its outstanding lubricating and film retention properties. The higher viscosity of the ISO 220 grade, in combination with wear protection additives, helps provide the extra level of protection needed in high performance professional saws.

APPLICATIONS

Chevron Red Chain Bar Oils are recommended for use in chain saws using either hand-operated or automatic chain oilers to lubricate the chain, bar, and sprocket.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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ISO Grade	68	100	150	220
Product Number	225156	225108	225109	225157
SDS Number	6804	6804	6804	6804
API Gravity	27.7	27.9	25.5	24.9
Viscosity, Kinematic cSt at 40°C	65	95	143	209
Viscosity, Saybolt SUS at 100°F	335	495	750	1105
Flash Point, °C(°F)	200(392)	218(424)	218(424)	218(424)
Pour Point, °C(°F)	-30(-22)	-27(-17)	-24(-11)	-21(-6)

Minor variations in product typical test data are to be expected in normal manufacturing.



METALWORKING FLUIDS



BRIGHT-CUT[®] METALWORKING FLUID NHG, NM, AM, AH

PRODUCT DESCRIPTION

Bright-Cut[®] Metalworking Fluids are chlorine-free cutting oils for use in machining operations.

CUSTOMER BENEFITS

Bright-Cut Metalworking Fluids deliver value through:

- Excellent antiweld performance, optimal tool life and exceptional surface finish without chlorine and with minimal amounts of sulfur and fat.
- **Clear, light color** allows operator to see the machined part during the cutting operation.
- **Minimal odor** Does not have the strong sulfur smell characteristic of conventional cutting oils, resulting in a more pleasant work environment.
- **Chlorine-free** Minimizes the cost of disposal at the end of the fluid life.
- Outstanding thermal and oxidation stability

 For maximum fluid life, due to Group II base stocks found in NM, AM and AH grades.
- Minimal misting and smoking promoting a safe work environment The thermal stability and low volatility of the Group II base stock and the use of an effective mist suppressant minimizes worker exposure to cutting oil mist and vapor.
- Multipurpose performance The nonstaining cutting oils are formulated to serve as the cutting oil, hydraulic fluid and machine lubricant to help eliminate the problem of machine lubricants contaminating the cutting oil.

FEATURES

The unique synthetic antiweld components of Bright-Cut replace the chlorine and minimize the amount of sulfur and fat typically needed for difficult cutting operations. They are light in color, for maximum visibility during machining, and minimal in odor.

Bright-Cut Metalworking Fluids formulated with Group II base stocks provide maximum oil life and promote a safe work environment by increasing the fluid's flash point, and minimizing exposure to aromatics and product vapor, smoking, and misting.

Bright-Cut Metalworking Fluids:

- provide excellent cooling and lubrication in a wide range of machining operations
- help prevent welding of chip and tool
- flush chips away from the work area
- protect the finished work surfaces, tools and machines against rusting and staining
- minimizes oil mist in high speed machine tools

The nonstaining oil, Bright-Cut NM Metalworking Fluid, can be used as a dual or tri-purpose oil in associated splash, hydraulic or spindle lubrication systems of metalworking machines.

Bright-Cut AM and AH Metalworking Fluids contain active sulfur and will stain copper and brass.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

27 April 2015 MWF-10

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APPLICATIONS

Do not use Bright-Cut[®] Metalworking Fluids in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

The **severity** of the machining operation and the **machinability** of the metal are the criteria for selecting the proper cutting oil.

Bright-Cut NHG Metalworking Fluid

- Service Classification: Honing/Grinding, Nonstaining
- A low viscosity cutting oil that is designed for use in light duty machining or honing and grinding operations on ferrous and nonferrous metals, particularly aluminum, magnesium and their alloys. It can also be mixed with other Bright-Cut Metalworking Fluids to adjust their compounding to meet the demands of a specific machining operation.
- Not for sale or use in the South Coast Air Quality Management District or the Ventura County Air Pollution Control District of California

Bright-Cut NM Metalworking Fluid

- Service Classification: Medium Duty, Nonstaining
- The workhorse tri-purpose cutting oil, suitable for automatic screw machine operations on freemachining to intermediate steels, and intermediate to difficult nonferrous metals.

Bright-Cut AM Metalworking Fluid

- Service Classification: Medium Duty, Active
- A versatile, general purpose cutting oil for use with carbon steels and alloy steels. It provides the cooling needed for light-to-moderately severe machining operations and gives excellent tool life and finishes in operations such as tapping, threading, drilling, gear shaving and turning.

Bright-Cut AH Metalworking Fluid

- Service Classification: Heavy Duty, Active
- Provides excellent performance for a wide range of applications. It is suitable for machining tough alloy steels and stainless steels. It is well adapted for broaching, threading, tapping and other difficult operations requiring a heavy duty oil for tool life and finish. This oil may be blended with Bright-Cut NHG Metalworking Fluid for less severe applications.

	NHG	NM	АМ	AH
Product Number	233935	233945	233944	233946
SDS Number	7720	7721	7721	7721
API Gravity	39.4	31.0	31.5	30.5
Viscosity, Kinematic cSt at 40°C cSt at 100°C	4.68 —	38.9 6.5	37.1 6.36	41.0 6.7
Viscosity, Saybolt SUS at 100°F SUS at 210°F	41	200 48	190 48	210 49
Flash Point, °C(°F)	129(264)	210(410)	218(424)	194(381)
Pour Point, °C(°F)	-6(+21)	-12(+10)	-4(+25)	0(+32)
Color	L 0.5	L 1.0	L 1.5	L 1.5
Total Sulfur, wt %	0.1	0.5	1.1	1.7
Active Sulfur, wt %	—	-	0.5	1.6
Phosphorus, wt %	0.027	-	-	-
Zinc, wt %	0.030	-	-	-
Chlorine, wt %	—	-	-	-
Fatty Oil, vol %	1.8	-	-	-
Synthetic EP, wt %	—	5	5	4.5
Antimist	Yesa	Yes	Yes	Yes
Volatile Organic Content (VOC), g/L ASTM E1868-10	383	< 10	< 10	< 10

a Antimist is less effective in low viscosity oils.

Minor variations in product typical test data are to be expected in normal manufacturing.


CHEVRON SOLUBLE OIL B

PRODUCT DESCRIPTION

Chevron Soluble Oil B is used broadly in machine shops as a multifunctional cutting fluid. It is primarily formulated to cool and lubricate the contact point of the tool and the work piece.

CUSTOMER BENEFITS

Chevron Soluble Oil B delivers value through:

- **Minimal separation** Excellent emulsion even with hard water
- Good rust protection for steel work and machined parts even when water/oil emulsion ratios are 80:1
- Cooling maximized by metal wetting. In addition, promotes good chip settling.
- **Minimal foaming** Possibility of sump overflow minimized
- **Good stability in storage** Minimal tendency to turn rancid
- Good ability to control bacterial growth and rancid odors

FEATURES

Chevron Soluble Oil B:

- helps prevent rusting or corrosion of the machined metals
- helps control the growth of bacteria which is a constant problem in soluble oil circulating systems due to outside contamination
- minimizes surface foam
- speeds the release of entrained air which could cause pump cavitation

This is an extremely versatile fluid designed to meet many of the situations encountered in the metalworking industry.

Chevron Soluble Oil B is an emulsifying oil that readily mixes with water, forming a homogeneous and

exceptionally stable emulsion. It is used in the machining of both ferrous and nonferrous metals, particularly when cutting with carbon or high speed steel or tungsten carbide tools. It contains an effective biocide that combats bacterial growth, rancidity, and odor in machine sumps.

APPLICATIONS

Chevron Soluble Oil B is recommended for metals (except magnesium) where maximum cooling is desired — particularly when cutting with carbon, high speed steel, or tungsten carbide tools.

Chevron Soluble Oil B is used extensively in milling, drilling, gear cutting, turning, planing, shaping, sawing, and grinding operations.

Chevron Soluble Oil B is typically diluted in water/oil ratios ranging from 10:1 to 50:1. See the Chevron Soluble Oil Mixing Recommendations chart for the proper water/oil ratio for each application.

Always add oil to water to avoid forming sticky invert emulsions that do not emulsify properly in water.

Chevron Soluble Oil B provides excellent in-process corrosion protection. Use of this product as a metal protective fluid for short-term rust protection is not recommended.

Do not recommend Chevron Soluble Oil B emulsions for operations involving magnesium. Hot magnesium is a fire hazard when it contacts water.

Emulsions of soluble metalworking fluids and water may become contaminated with harmful microorganisms such as bacteria and fungus, which can cause illness and infection. This can occur even in emulsions with fluids that initially contain some biocide because the biocide can be depleted during service. A metalworking fluid maintenance program should be followed in order to control this hazard. Such a program may require the use of biocides.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 March 2022 MWF-40

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	В
Product Number	233703
SDS Number	7090
API Gravity	21.6
Viscosity, Kinematic cSt at 40°C cSt at 100°C	38.0 5.2
Viscosity, Saybolt SUS at 100°F SUS at 210°F	198 43.7
Flash Point, °C(°F)	160(320)
Pour Point, °C(°F)	-30(-22)
Total Sulfur, wt %	0.30
Active Sulfur, wt %	None
Volatile Organic Content (VOC), g/L ASTM E-1868-10	44

Minor variations in product typical test data are to be expected in normal manufacturing.

MIXING RECOMMENDATIONS

First figure indicates parts of water. Second figure indicates parts of Chevron Soluble Oil B.

Material	Turning, Shaping, Planing, Drilling	Milling	Pipe and Plain Threading	Automatic Screw Machines	Grinding	Thread Grinding	Deep Drilling	Gear Shaving or Cutting
Plain, medium, and high carbon steels	20:1	20:1	\rightarrow	20:1	50:1	20:1	\rightarrow	20:1
Alloy steels	15:1	15:1	\rightarrow	15:1	50:1	15:1	\rightarrow	15:1
Ingot iron, wrought iron, low carbon steels	15:1	15:1	\rightarrow	15:1	50:1	15:1	\rightarrow	15:1
Stainless steels, tool and die steels	10:1	10:1	\rightarrow	10:1	50:1	10:1	\rightarrow	10:1
Aluminum and aluminum alloys	25:1	25:1	30:1	30:1	50:1	30:1	20:1	30:1
Copper and brass	25:1	25:1	30:1	30:1	\rightarrow	\rightarrow	20:1	30:1
Zinc and zinc alloys	25:1	30:1	30:1	30:1	\rightarrow	\rightarrow	20:1	\rightarrow
Bronze and high strength copper alloys	10:1	10:1	10:1	10:1	50:1	10:1	\rightarrow	10:1
Magnesium and magnesium alloys	FIRE HAZARD							
Titanium and titanium alloys	10:1	10:1	\rightarrow	\rightarrow	\rightarrow	\rightarrow	\rightarrow	\rightarrow
Nickel and nickel alloys	10:1	10:1	\rightarrow	10:1	50:1	10:1	\rightarrow	10:1
Cast iron	Dry	Dry	Dry	\rightarrow	Dry	Dry	Dry	Dry

 \rightarrow Seldom used.

Emulsions of soluble metalworking fluids and water may become contaminated with harmful microorganisms such as bacteria and fungus, which can cause illness and infection. This can occur even in emulsions with fluids that initially contain some biocide because the biocide can be depleted during service. A metalworking fluid maintenance program should be followed in order to control this hazard. Such a program may require the use of biocides.

Dilution Ratio	10:1	15:1	20:1	25:1	30:1	50:1
Refractometer Reading	11.0	7.5	5.2	5.2	3.2	1.7

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



GEAR LUBRICANTS



CLARITY[®] SYNTHETIC EA GEAR OIL 100, 150

PRODUCT DESCRIPTION

Clarity[®] Synthetic EA Gear Oils are readily biodegradable high performance gear oils that meet EPA Vessel General Permit (VGP) requirements for environmentally acceptable lubricants. They are designed to give maximum protection in industrial gear applications on vessels and in environmentally sensitive areas.

CUSTOMER BENEFITS

Clarity Synthetic EA Gear Oils deliver value through:

- Environmentally acceptable Meets the requirements of the EPA Vessel General Permit (VGP) for biodegradation, low toxicity and low bioaccumulation.
- **Premium performance** Ashless formulation provides excellent protection against wear of industrial gears, provides rust and corrosion protection, water separability, foam inhibition, EP protection and shear stability.
- Long oil life Outstanding ability of the synthetic base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil relative to vegetable-based readily biodegradable products.
- Excellent low temperature pumpability Specifically developed with high viscosity index to ensure good fluidity for low operating temperatures.

FEATURES

These lubricants are readily biodegradable, non-bioaccumulative, and minimally toxic. In the event of a spill, the product biodegrades by more



than 60% within 28 days, minimizing the impact to the environment.

Clarity Synthetic EA Gear Oils are designed to give maximum protection in industrial gear equipment used in applications requiring a high performance gear oil and have environmental concerns such as off-shore marine or Oil and Gas, construction in or near water, mining and power utility operations as well as other high-performance industrial applications.

Clarity Synthetic EA Gear Oils are formulated with synthetic base stock and an ashless, zinc-free additive system that provide exceptional oxidation stability, water separability, foam suppression, and protection against wear, rust and corrosion.

Clarity Synthetic EA Gear Oils are high VI synthetic products which allow for operation over a wide temperature range.

Clarity Synthetic EA Gear Oils are designed to the performance requirements of conventional antiwear/ extreme pressure gear oils, while providing an additional benefit in case of leaks or incidental discharge to the environment.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

21 April 2014 GL-5

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APPLICATIONS

Clarity[®] Synthetic EA Gear Oils¹ are designed to give maximum protection in industrial gear equipment used on vessels and in environmentally sensitive areas.

Clarity Synthetic EA Gear Oils meet the requirements of:

- Aegir
- **AGMA** EP 9005-E02
- Berg
- Blom+Voss
- Chesterton
- Cincinnati Milacron P-76 (ISO 100), P-77 (ISO 150)
- **David Brown** S1.53.101
- **DIN** 51517, Part 3
- IHC Merwede
- James Walker
- Kamewa
- Kemel
- Ortlinghaus
- Schottel
- U.S. Steel 224
- Wärtsilä
 - 1 Chevron Clarity EA Gear Oils are rebrands of Terresolve Technologies, Ltd. products as follows:

Chevron	Terresolve Technologies
Clarity [®] Synthetic EA Gear Oil 100	ENVIROLOGIC [®] 210
Clarity [®] Synthetic EA Gear Oil 150	ENVIROLOGIC [®] 215

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Clarity Synthetic EA Gear Oils are miscible with common mineral based gear oils, however, following good practice, in-service oils should be completely drained to avoid any risk of additive incompatibility and ensure that the full performance benefits are achieved.

Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

ISO Grade	100	150
Product Number	223061	223060
SDS Number	35642	35642
API Gravity	36.8	36.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	100.0 18.0	150.0 23.0
Viscosity Index	199	183
Flash Point, °C(°F)	185(365)	185(365)
Pour Point, °C(°F)	-39(-38)	-39(-38)
Copper Corrosion, ASTM D130, 3 hrs. at 100°C	1b	1b
Rust Test, ASTM D665B Synthetic Sea water	Pass	Pass
Water Separability, ASTM D1401 at 82°C	<u><</u> 3 ml emulsion at 30 minutes	<u><</u> 3 ml emulsion at 30 minutes
FZG, DIN 51354, Fail Load Stage	>12	>12
Timken OK Load, ASTM D2782, lb	>60	>60
Elastomer Compatibility, ASTM D471 Buna-N (100°C, 168 hrs) Viton (150°C, 168 hrs)	Pass Pass	Pass Pass
Biodegradability, ASTM D7373, %	>60	>60
Aquatic Toxicity Fathead minnow, OECD 203, mg/L Daphnia magna, OECD 202, mg/L Algae, OECD 201, mg/L	>1000 >130 >120	>1000 >130 >120
Bioaccumulation	Negative	Negative

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] GEAR ESI[®] SAE 80W-90, 85W-140

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] Gear ESI[®] are premium grade automotive gear lubricants designed for gears operating under severe temperature and load conditions, and whose SAE 80W-90 viscosity grade offers extended-drain performance comparable to leading synthetics.

CUSTOMER BENEFITS

Delo Gear ESI deliver value through:

- **Minimal wear** Delo Gear ESI are formulated to promote long life for gears, bearings, and seals.
- Seal compatibility Seal materials are not adversely affected by Delo Gear ESI at temperatures as high as 163°C (325°F).
- Low operating temperatures Unique additive chemistry minimizes friction resulting in cool operating temperatures.
- Long lubricant life The outstanding thermal and oxidation stability characteristics of Delo Gear ESI allow for optimal drain intervals which may result in lubricant savings.
- **Fuel savings** The remarkable low friction properties of this product contribute to minimal energy consumption.
- Compatibility Compatible with conventional sulfur-phosphorus and synthesized hydrocarbon based lubricants.

FEATURES

Delo Gear ESI are premium grade automotive gear lubricants.



They are formulated with ISOSYN[®] Technology and compounded with a unique extreme pressure additive utilizing an inorganic borate compound. They also contain a patented, synergistic combination of additives that protect against wear, seizure, oxidation, corrosion, rust, and foam.

Delo Gear ESI are ideally suited for gear sets exposed to extremely high temperatures and loads.

Tests have proven that Delo Gear ESI provide a wear protection film 3 to 5 times thicker than the conventional sulfur-phosphorus antiwear film. The inorganic borate film is composed of compounds that do not react with metal. The film forms promptly to provide exceptional gear protection and maximum thermal stability. By minimizing friction, cool operating temperatures have been observed.

APPLICATIONS

These lubricants are excellent automotive gear lubricants, particularly those operating under severe temperature and load conditions. They provide excellent wear control even in the presence of small amounts of water. Their exceptional thermal and oxidation stability, and antiwear performance promote long gear life and optimal drain intervals.

Delo Gear ESI **SAE 80W-90** was field tested in more than 100 on-highway, Class 8 trucks with drain intervals of 500,000 to 750,000 miles. The product showed excellent field results in axles manufactured by **Dana**, **Meritor**, and **Mack**. It is approved for the extended drain specifications of both **Meritor** and **Mack**.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

21 November 2022 GL-11

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Delo[®] Gear ESI[®]:

- meets the performance requirements of **API Service Categories** GL-4, GL-5, and MT-1
- is qualified for **SAE J2360** (formerly known as MIL-PRF-2105E)
- is approved for Meritor O-95 and O-76* extended drain, up to 500,000 mile initial and service fill**
- SAE 80W-90 is approved for Mack GO-J PLUS up to 500,000 mile initial and service fill**

TYPICAL TEST DATA

SAE Grade	80W-90	85W-140
Product Number	224503	224504
SDS Number	6698	6698
Density at 15°C, kg/L	0.8882	0.9013
Viscosity, Kinematic cSt at 40°C cSt at 100°C	140 14.2	341 25.0
Viscosity, Brookfield cP at -12°C cP at -26°C	 120,000	80,000 —
Viscosity Index	99	95
Flash Point, °C(°F)	210(410)	210(410)
Pour Point, °C(°F)	-33(-27)	-15(+5)
Timken OK Load, Ib	75	75

Minor variations in product typical test data are to be expected in normal manufacturing.

*Meritor O-95 supersedes O-76 and is backwards compatible.

**Refer to manufacturer's recommendations for extended drain lubricants.



DELO[®] GEAR ESI[®] ISOCLEAN[®] CERTIFIED LUBRICANT SAE 80W-90, 85W-140

PRODUCT DESCRIPTION

"Delo. Let's go further.®"



 $\mathsf{Delo}^{\texttt{R}}$ Gear $\mathsf{ESI}^{\texttt{R}}$ ISOCLEAN $^{\texttt{R}}$ Certified

Lubricants are premium grade automotive gear lubricants designed for gears operating under severe temperature and load conditions, and whose SAE 80W-90 viscosity grade offers extended-drain performance comparable to leading synthetics.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo Gear ESI ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Minimal wear** Delo Gear ESI are formulated to promote long life for gears, bearings, and seals.

- Seal compatibility Seal materials are not adversely affected by Delo Gear ESI at temperatures as high as 163°C (325°F).
- Low operating temperatures Unique additive chemistry minimizes friction resulting in cool operating temperatures.
- Long lubricant life The outstanding thermal and oxidation stability characteristics of Delo Gear ESI allow for optimal drain intervals which may result in lubricant savings.
- **Fuel savings** The remarkable low friction properties of this product contribute to minimal energy consumption.
- Compatibility Compatible with conventional sulfur-phosphorus and synthesized hydrocarbon based lubricants.

FEATURES

Delo Gear ESI ISOCLEAN Certified Lubricants are premium grade automotive gear lubricants.



They are formulated with ISOSYN[®] Technology and compounded with a unique extreme pressure additive utilizing an inorganic borate compound. They also contain a patented, synergistic combination of additives that protect against wear, seizure, oxidation, corrosion, rust, and foam.

Delo Gear ESI ISOCLEAN Certified Lubricants are ideally suited for gear sets exposed to extremely high temperatures and loads.

Tests have proven that Delo Gear ESI ISOCLEAN Certified Lubricants provide a wear protection film 3 to 5 times thicker than the conventional sulfurphosphorus antiwear film. The inorganic borate film is

Product(s) manufactured in Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

21 November 2022 GL-11 ISOCLEAN

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APPLICATIONS

These lubricants are excellent automotive gear lubricants, particularly those operating under severe temperature and load conditions. They provide excellent wear control even in the presence of small amounts of water. Their exceptional thermal and oxidation stability, and antiwear performance promote long gear life and optimal drain intervals.

Delo[®] Gear ESI[®] ISOCLEAN[®] Certified Lubricant **SAE 80W-90** was field tested in more than 100 onhighway, Class 8 trucks with drain intervals of 500,000 to 750,000 miles. The product showed excellent field results in axles manufactured by **Dana**, **Meritor**, and **Mack**. It is approved for the extended drain specifications of both **Meritor** and **Mack**.

Delo Gear ESI ISOCLEAN Certified Lubricants:

- meet the performance requirements of API Service Categories GL-4, GL-5, and MT-1
- are qualified for SAE J2360 (formerly known as MIL-PRF-2105E)
- are approved for **Meritor** O-95 and O-76* extended drain, up to 500,000 mile initial and service fill**
- SAE 80W-90 is approved for Mack GO-J PLUS up to 500,000 mile initial and service fill**

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

SAE Grade	80W-90	85W-140
Product Number	224605	224606
SDS Number U.S. Canada Mexico	6698 6698CAN 6698MEX	6698 6698CAN 6698MEX
Density at 15°C, kg/L	0.8882	0.9013
Viscosity, Kinematic cSt at 40°C cSt at 100°C	140 14.2	341 25.0
Viscosity, Brookfield cP at -12°C cP at -26°C	 120,000	80,000 —
Viscosity Index	99	95
Flash Point, °C(°F)	210(410)	210(410)
Pour Point, °C(°F)	-33(-27)	-15(+5)
Timken OK Load, Ib	75	75

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.

**Meritor O-95 supersedes O-76 and is backwards compatible.

**Refer to manufacturer's recommendations for extended drain lubricants.



DELO[®] SYN-GEAR HD **SAE 75W-90**

PRODUCT DESCRIPTION

"Delo. Let's go further. ""

Delo[®] Syn-Gear HD gear lubricant is a heavy duty, extreme pressure, multigrade automotive gear lubricant and is an alternative for equipment not under warranty or with an expired warranty. Chevron recommends Delo Syn-Gear XDM for Dana and Meritor axles still under warranty.

CUSTOMER BENEFITS

Delo Syn-Gear HD delivers value through:

- Extended drain capabilities Field proven in fleet testing for 500,000-mile drain intervals.
- Excellent thermal and oxidation stability Synthetic hydrocarbon base oils provide outstanding stability.
- High viscosity index and low pour point Synthetic hydrocarbon base oils provide extremely broad operating temperature ranges when compared with conventional mineral oil based lubricants.
- Excellent seal compatibility Compatible with many widely used seal elastomers.
- Refill and top off compatibility Compatible with conventional mineral oil-based and other synthetic automotive gear lubricants.

FEATURES

Delo Syn-Gear HD imparts maximum lubrication during



startup at subzero temperatures, while its improved viscosity-temperature characteristics provide dependable lubrication at high temperatures. Low frictional losses in the lubricant film and minimal churning losses due to lower bulk oil viscosity lead to reduced operating temperatures when compared to conventional gear lubricants.

APPLICATIONS

Delo Syn-Gear HD is recommended as a rear axle and differential lubricant in over-the-road and off-road vehicles when operating under severe conditions and in extremely cold or hot environments. This product has been successfully field tested for long drain intervals in class 8 on-highway trucks using axles made by the following OEMs: Meritor, DAF, Daimler, Dana, MAN and Scania.

Delo Syn-Gear HD is approved for:

- MAN Nutzfahrzeuge 342 Type M2
- Meritor 0-95 and 0-76¹ Extended Drain
- SAE J2360 (formerly MIL-PRF-2105E)
- Scania STO 1:0
- Volvo 97312

Delo Syn-Gear HD meets or exceeds the requirements of:

- API Service Categories GL-4, GL-5 and MT-1
- Dana SHAES 256 REV A, now obsolete
- Mack GO-J

1. Meritor O-95 supersedes O-76 and is backwards compatible

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

25 November 2022 GI -17

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SAE Grade	Test Method	75W-90
Product Number		223034
SDS Number		35588
Density at 60°F, lb/gal	ASTM D4052	7.22
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	108 15.1
Viscosity, Brookfield cP at -40°C	ASTM 2983 (mod)	137,500
Viscosity Index	ASTM D2270	146
Flash Point, °C(°F)	ASTM D93	192(378)
Pour Point, °C(°F)	ASTM D97	-45(-49)

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN-GEAR HD ISOCLEAN[®] CERTIFIED LUBRICANT SAE 75W-90

PRODUCT DESCRIPTION

"Delo. Let's go further.®"



Delo[®] Syn-Gear HD ISOCLEAN[®]

Certified Lubricant is a heavy duty,

extreme pressure, multigrade automotive gear lubricant and is an alternative for equipment not under warranty or with an expired warranty. Chevron recommends Delo Syn-Gear XDM ISOCLEAN Certified Lubricant for Dana and Meritor axles still under warranty.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo Syn-Gear HD ISOCLEAN Certified Lubricant delivers value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Extended drain capabilities Field proven in fleet testing for 500,000-mile drain intervals.

- Excellent thermal and oxidation stability Synthetic hydrocarbon base oils provide outstanding stability.
- High viscosity index and low pour point Synthetic hydrocarbon base oils provide extremely broad operating temperature ranges when compared with conventional mineral oil based lubricants.
- Excellent seal compatibility Compatible with many widely used seal elastomers.
- Refill and top off compatibility Compatible with conventional mineral oil-based and other synthetic automotive gear lubricants.

FEATURES

Delo Syn-Gear HD ISOCLEAN Certified Lubricant imparts maximum lubrication during



startup at subzero temperatures, while its improved viscosity-temperature characteristics provide dependable lubrication at high temperatures. Low frictional losses in the lubricant film and minimal churning losses due to lower bulk oil viscosity lead to reduced operating temperatures when compared to conventional gear lubricants.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original ex-

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

25 November 2022 GL-17 ISOCLEAN

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APPLICATIONS

Delo[®] Syn-Gear HD ISOCLEAN[®] Certified Lubricant is recommended as a rear axle and differential lubricant in over-the-road and off-road vehicles when operating under severe conditions and in extremely cold or hot environments. This product has been successfully field tested for long drain intervals in class 8 on-highway trucks using axles made by the following OEMs:

Meritor, DAF, Daimler, Dana, MAN and Scania.

Delo Syn-Gear HD ISOCLEAN Certified Lubricant is approved for:

- MAN Nutzfahrzeuge 342 Type M2
- Meritor O-95 and O-76¹ Extended Drain
- SAE J2360 (formerly MIL-PRF-2105E)
- Scania STO 1:0
- Volvo 97312

Delo Syn-Gear HD meets or exceeds the requirements of:

- API Service Categories GL-4, GL-5 and MT-1
- Dana SHAES 256 REV A, now obsolete
- Mack GO-J

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	Test Method	75W-90
Product Number		223027
SDS Number U.S. Canada Mexico		35588 37170 37171
Density at 60°F, lb/gal	ASTM D4052	7.22
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	108 15.1
Viscosity, Brookfield cP at -40°C	ASTM 2983 (mod)	137,500
Viscosity Index	ASTM D2270	146
Flash Point, °C(°F)	ASTM D93	192(378)
Pour Point, °C(°F)	ASTM D97	-45(-49)

Minor variations in product typical test data are to be expected in normal manufacturing.

^{1.} Meritor O-95 supersedes O-76 and is backwards compatible

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



DELO[®] SYN-GEAR XDM SAE 75W-90, 80W-140

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] Syn-Gear XDM are premium heavy duty, extreme pressure, multigrade automotive gear lubricants. Delo Syn-Gear XDM SAE 75W-90 is recommended for Dana and Meritor axles with 500,000-mile service intervals and supports Dana's 750,000-mile axle warranty coverage for line haul service. Delo Syn-Gear HD SAE 75W-90 is an alternative for equipment not under warranty or with expired warranty.

CUSTOMER BENEFITS

Delo Syn-Gear XDM deliver exceptional value through:

- Extended drain capabilities Meets the requirements of major axle manufacturers for extended drains.
- Excellent thermal and oxidation stability Synthetic hydrocarbon base oils provide outstanding stability.
- High viscosity index and low pour point Synthetic hydrocarbon base oils provide extremely broad operating temperature ranges when compared with conventional mineral oil based lubricants.
- Excellent seal compatibility Compatible with many widely used seal elastomers.
- **Refill and top off compatibility** Compatible with conventional mineral oil based and other synthetic automotive gear lubricants.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drivetrain that covers lubricant-related damage to your equipment, including parts and labor.¹ Problem

1 See Warranty Plus for details and restrictions.

resolution and technical advice from Chevron's lubrication experts.

• Access to Chevron's lubrication and industry knowledge — Maximizes the bottom line business results of trucking industry professionals.

FEATURES

The exceptionally low Brookfield viscosity and pour point of Delo Syn-Gear XDM imparts excellent



lubrication during startup at subzero temperatures, while the outstanding viscosity temperature characteristics (viscosity index) provides excellent lubrication at high temperatures. Low frictional losses in the lubricant film and minimal churning losses due to lower bulk oil viscosity lead to reduced operating temperatures when compared to conventional gear lubricants.

APPLICATIONS

Delo Syn-Gear XDM is recommended as rear axle and differential lubricants in over-the-road and off-road vehicles when operating under severe conditions and in extremely cold or hot environments.

Delo Syn-Gear XDM is approved for:

- Dana SHAES 256 REV C (SAE 75W-90 only)
- Mack GO-J (SAE 75W-90)
- Meritor 0-95 and 0-76² Extended Drain
- SAE J2360 (formerly MIL-PRF-2105E)
- Scania STO 1:0 (SAE 75W-90 only)
- **STEMCO** PPS+ and PPS wheel end systems (SAE 75W-90 only)

2 Meritor O-95 supersedes O-76 and is backwards compatible

Product(s) manufactured in the USA.

A **Chevron** company product

25 November 2022 GL-19

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

Delo Syn-Gear XDM meets or exceeds the requirements of:

- API Service Categories GL-4, GL-5, and MT-1
- Dana SHAES 256 REV A, now obsolete
- Mack GO-J (SAE 80W-140)

TYPICAL TEST DATA

SAE Grade	Test Method	75W-90	80W-140
Product Number		223030	223031
SDS Number		35582	35586
Density at 60°F, lb/gal	ASTM D4052	7.21	7.31
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	108 15.1	245 26.5
Viscosity, Brookfield cP at -26°C cP at -40°C	ASTM 2983 (mod)		50,000 —
Viscosity Index	ASTM D2270	146	140
Flash Point, PM, °C(°F)	ASTM D93	140(284)	136(277)
Pour Point, °C(°F)	ASTM D97	-48(-54)	-42(-44)

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN-GEAR XDM ISOCLEAN[®] CERTIFIED LUBRICANT SAE 75W-90, 80W-140

PRODUCT DESCRIPTION

"Delo. Let's go further.®"



Delo[®] Syn-Gear XDM ISOCLEAN[®]

Certified Lubricants are premium heavy duty, extreme pressure, multigrade automotive gear lubricants. Delo Syn-Gear XDM SAE 75W-90 is recommended for Dana and Meritor axles with 500,000-mile service intervals and supports Dana's 750,000-mile axle warranty coverage for line haul service. Delo Syn-Gear HD SAE 75W-90 is an alternative for equipment not under warranty or with expired warranty.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo Syn-Gear XDM ISOCLEAN Certified Lubricants deliver exceptional value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.

- Extended drain capabilities Meets the requirements of major axle manufacturers for extended drains.
- Excellent thermal and oxidation stability Synthetic hydrocarbon base oils provide outstanding stability.
- High viscosity index and low pour point Synthetic hydrocarbon base oils provide extremely broad operating temperature ranges when compared with conventional mineral oil based lubricants.
- Excellent seal compatibility Compatible with many widely used seal elastomers.
- **Refill and top off compatibility** Compatible with conventional mineral oil-based and other synthetic automotive gear lubricants.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drivetrain that covers lubricant-related damage to your equipment, including parts and labor.¹ Problem resolution and technical advice from Chevron's lubrication experts.
- Access to Chevron's lubrication and industry knowledge — Maximizes the bottom line business results of trucking industry professionals.

FEATURES

The exceptionally low Brookfield viscosity and pour point of Delo Syn-Gear XDM ISOCLEAN



Certified Lubricants impart excellent lubrication during startup at subzero temperatures, while the outstanding viscosity temperature characteristics (viscosity index) provides excellent lubrication at high temperatures. Low frictional losses in the lubricant film and minimal

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

25 November 2022 GL-19 ISOCLEAN

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APPLICATIONS

Delo Syn-Gear XDM ISOCLEAN Certified Lubricants are recommended as rear axle and differential lubricants in over-the-road and off-road vehicles when operating under severe conditions and in extremely cold or hot environments.

Delo Syn-Gear XDM ISOCLEAN Certified Lubricants are approved for:

- Dana SHAES 256 REV C (SAE 75W-90 only)
- Mack GO-J (SAE 75W-90)
- Meritor 0-95 and 0-76² Extended Drain
- SAE J2360 (formerly MIL-PRF-2105E)
- Scania STO 1:0 (SAE 75W-90 only)
- **STEMCO** PPS+ and PPS wheel end systems (SAE 75W-90 only)

SAE Grade **Test Method** 75W-90 80W-140 Product Number 223029 223028 SDS Number U.S. 35582 35586 Canada 36013 37043 Mexico 36014 35586 Density at 60°F, lb/gal ASTM D4052 7.21 7.31 Viscosity, Kinematic ASTM D445 cSt at 40°C 108 245 cSt at 100°C 15.1 26.5 Viscosity, Brookfield ASTM 2983 (mod) cP at -26°C 50,000 cP at -40°C 106,000 Viscosity Index **ASTM D2270** 146 140 Flash Point, PM, °C(°F) ASTM D93 140(284) 136(277) Pour Point, °C(°F) ASTM D97 -48(-54)-42(-44)

TYPICAL TEST DATA

Delo Syn-Gear XDM ISOCLEAN Certified Lubricants meet or exceed the requirements of:

- API Service Categories GL-4, GL-5, and MT-1
- Dana SHAES 256 REV A, now obsolete
- Mack GO-J (SAE 80W-140)

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

2 Meritor O-95 supersedes O-76 and is backwards compatible

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] SYN-GEAR XDA SAE 75W-85

PRODUCT DESCRIPTION

"Delo. Let's go further.®"

Delo[®] Syn-Gear XDA is a premium heavy duty, extreme pressure, multigrade automotive gear lubricant formulated for new generation Daimler axles found on newer model Freightliner and Western Star Trucks.

CUSTOMER BENEFITS

Delo Syn-Gear XDA delivers exceptional value through:

- Extended drain capabilities Provides extended life service up to 300,000 miles (500,000 km) for Daimler axles that require Daimler MB235.31 and Detroit DFS 93K219.03.¹
- Excellent thermal and oxidation stability Synthetic hydrocarbon base oils provide outstanding stability.
- High viscosity index and low pour point Synthetic hydrocarbon base stocks provide extremely broad operating temperature ranges when compared with conventional mineral oil based lubricants.
- Excellent seal compatibility Compatible with many widely used seal elastomers.
- Refill and top off compatibility Delo Syn-Gear XDA is compatible with conventional mineral oil based and other synthetic automotive gear lubricants.
- Warranty Plus Protection Bumper-to-bumper warranty protection from the engine to the drivetrain that covers lubricant-related damage to your equipment, including parts and labor.² Problem
 - 1 Results will vary based on operating conditions and engine types. Always follow OEM recommendations and utilize used oil analysis testing when extending oil drain intervals.
 - 2 See Warranty Plus for details and restrictions.

resolution and technical advice from Chevron's lubrication experts.

• Access to Chevron's lubrication and industry knowledge — Maximizes the bottom line business results of trucking industry professionals.

FEATURES

Delo Syn-Gear XDA is a premium heavy duty, extreme pressure, multigrade automotive gear



lubricant. It is manufactured from synthesized hydrocarbon base fluids which have excellent thermal and oxidation stability, a high viscosity index, and a low pour point.

The low pour point of Delo Syn-Gear XDA imparts excellent lubrication during startup at subzero temperatures, while the outstanding viscosity temperature characteristics provide excellent lubrication at high temperatures.

APPLICATIONS

Delo Syn-Gear XDA is recommended as rear axle and differential lubricant in over-the-road applications when operating under severe conditions and in extremely cold or hot environments. Delo Syn-Gear XDA meets and exceeds the requirements of API Service Category GL-5. It is approved for **Detroit DFS** 93K219.03.

In addition, it meets the performance requirements for:

- SAE J2360 (formerly MIL-PRF-2105E)
- Daimler MB 235.31

Delo Syn-Gear XDA SAE 75W-85 is recommended for **Daimler** and **Detroit** drive axles in line haul onhighway service. For Freightliner and Western Star trucks that have Daimler axles installed.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

10 February 2023 GL-20

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SAE Grade	75W-85
Product Number	223090
SDS Number	43600
Density at 60°F, lb/gal	7.23
Viscosity, Kinematic cSt at 40°C cSt at 100°C	69.0 11.9
Viscosity, Brookfield cP at -26°C cP at -40°C	7,200 65,000
Viscosity Index	167
Flash Point, COC, °C(°F)	195
Pour Point, °C(°F)	-48

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®]TORQFORCE[®]FD SAE 60

PRODUCT DESCRIPTION

Delo[®] TorqForce[®] FD SAE 60 is a premium heavy-duty gear lubricant specifically designed for use in final drives and axles of modern Caterpillar off-road equipment operating in severe service, where fluids meeting the Cat FD-1 specification are recommended.

CUSTOMER BENEFITS

Delo TorqForce FD SAE 60 delivers value through:

- Maximizes equipment life in severe service

 Advanced additive system minimizes wear in heavily loaded gears and bearings by forming a strong protective layer on metal surfaces under extreme service conditions.
- Prolongs oil life Extremely high thermal and oxidation stability protects against viscosity increase and deposit formation. Drain interval of 4,000 hours is recommended (compare to typical 2,000 hour drain interval for Cat TO-4 fluids).
- **Minimizes unscheduled maintenance** Effective rust and corrosion inhibitors protect final drive components. Good viscosity characteristics at low temperatures ensure rapid oil circulation on start-up, preventing premature component wear.
- Excellent foam protection Works to avoid fluid loss due to foaming.
- Long equipment life Fluid film with special additives helps protect metal surfaces against pitting, scuffing and wear, even under severe operating conditions of high temperature and high load.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹

 Access to Chevron's lubrication and industry knowledge — Maximizes the bottom line business results of trucking industry professionals.

FEATURES

Delo TorqForce FD SAE 60 is designed *specifically* for heavy-duty final drives and axles in severe service. It exhibits significantly improved performance versus TO-4 fluids in the area of gear protection, resistance to macropitting, improved corrosion protection and foam stability.

For customers who have final drive applications where the fluid also lubricates oil-immersed brakes or clutches from a common sump system, please use Delo TorqForce SAE 50 (Caterpillar TO-4). Additionally, Chevron's Delo TorqForce FD SAE 60 should not be used in powershift transmissions since it doesn't contain key friction modifiers required for high friction materials found in these systems.

APPLICATIONS

- Final drives, axles, differentials and front wheels of Caterpillar equipment where Cat FD-1 performance fluid is specified. It is not suitable where a common sump is used for lubricating final drive gears, and immersed brakes or clutches.
- Caterpillar Mining and Aggregate Haul Trucks
- Caterpillar Wheel and Track Mining Loaders & Dozers
- Caterpillar Wheel Scrapers
- Caterpillar Wheel and Track Fellers
- Caterpillar Wheel and Track Skidders
- Caterpillar Knuckleboom Loaders

Delo TorqForce FD SAE 60 meets or exceeds the **Caterpillar** FD-1 specification.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 September 2019 GL-22

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SAE Grade	60
Product Number	293111
SDS Number	41030
Density at 15 °C, kg/L	.90
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	335 25
Viscosity Index	97
Flash Point, °C(°F)	288(550)
Pour Point, °C(°F)	-25(-13)
Phosphorus, mass %	0.031
Calcium, mass %	0.028

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] TORQFORCE[®] FD ISOCLEAN[®] CERTIFIED LUBRICANT SAE 60

PRODUCT DESCRIPTION

Delo[®] TorqForce[®] FD SAE 60 ISOCLEAN[®] Certified Lubricant is a premium heavy-duty gear lubricant specifically designed for use in final



drives and axles of modern Caterpillar off-road equipment operating in severe service, where fluids meeting the Cat FD-1 specification are recommended. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo TorqForce FD SAE 60 ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Maximizes equipment life in severe service

 Advanced additive system minimizes wear in heavily loaded gears and bearings by forming a strong protective layer on metal surfaces under extreme service conditions.

- Prolongs oil life Extremely high thermal and oxidation stability protects against viscosity increase and deposit formation. Drain interval of 4,000 hours is recommended (compare to typical 2,000 hour drain interval for Cat TO-4 fluids).
- **Minimizes unscheduled maintenance** Effective rust and corrosion inhibitors protect final drive components. Good viscosity characteristics at low temperatures ensure rapid oil circulation on start-up, preventing premature component wear.
- Excellent foam protection Works to avoid fluid loss due to foaming.
- Long equipment life Fluid film with special additives helps protect metal surfaces against pitting, scuffing and wear, even under severe operating conditions of high temperature and high load.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹
- Access to Chevron's lubrication and industry knowledge — Maximizes the bottom line business results of trucking industry professionals.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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FEATURES

Delo[®] TorqForce[®] FD SAE 60 ISOCLEAN[®] Certified Lubricant is designed *specifically* for heavy-duty final drives and axles in severe service. It exhibits significantly improved performance versus TO-4 fluids in the area of gear protection, resistance to macropitting, improved corrosion protection and foam stability.

For customers who have final drive applications where the fluid also lubricates oil-immersed brakes or clutches from a common sump system, please use Delo TorqForce SAE 50 (Caterpillar TO-4). Additionally, Chevron's Delo TorqForce FD SAE 60 ISOCLEAN Certified Lubricant should not be used in powershift transmissions since it doesn't contain key friction modifiers required for high friction materials found in these systems.

APPLICATIONS

- Final drives, axles, differentials and front wheels of Caterpillar equipment where Cat FD-1 performance fluid is specified. It is not suitable where a common sump is used for lubricating final drive gears, and immersed brakes or clutches.
- Caterpillar Mining and Aggregate Haul Trucks
- Caterpillar Wheel and Track Mining Loaders & Dozers
- Caterpillar Wheel Scrapers
- Caterpillar Wheel and Track Fellers
- Caterpillar Wheel and Track Skidders
- Caterpillar Knuckleboom Loaders

Delo TorqForce FD SAE 60 meets or exceeds the specification:

• CATERPILLAR FD-1

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

SAE Grade	60
Product Number	293112
SDS Number	41030
Density at 15 °C, kg/L	.90
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	335 25
Viscosity Index	97
Flash Point, °C(°F)	288(550)
Pour Point, °C(°F)	-25(-13)
Phosphorus, mass %	0.031
Calcium, mass %	0.028

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] TORQFORCE[®] SYN FD-1

PRODUCT DESCRIPTION

Delo[®] TorqForce[®] Syn FD-1 is a premium, fully synthetic, multigrade, heavy-duty gear lubricant specifically designed for use in final drives and axles of modern Caterpillar off-road equipment operating in severe service, where fluids meeting the CAT FD-1 specification are recommended. The CAT FD-1 spec is designed to address extreme pressure (EP) or heavy load-carrying capability needed for final drive gear sets and bearings.

CUSTOMER BENEFITS

Delo TorqForce Syn FD-1 delivers value through:

- Maximizes equipment life in severe service

 Advanced additive system minimizes wear in heavily loaded gears and bearings by forming a strong protective layer on metal surfaces under extreme service conditions.
- Prolongs oil life Extremely high thermal and oxidation stability protects against viscosity increase and deposit formation. Drain interval of 6,000 hours is recommended (4,000 hour drain for Delo TorqForce FD SAE 60).
- Extreme temperature performance Excellent cold weather pumpability in sub-zero/ arctic operating conditions. Very good high operating temperature performance for severe service applications.
- **Minimizes unscheduled maintenance** Effective rust and corrosion inhibitors protect final drive components. Good viscosity characteristics at low temperatures ensure rapid oil circulation on start-up, preventing premature component wear.
- Excellent foam protection Works to avoid fluid loss due to foaming.
- Better Low Temperature Performance -Excellent cold flow properties help with rapid oil circulation to minimize wear during cold temperature starting.

- Long equipment life Fluid film with special additives helps protect metal surfaces against pitting, scuffing and wear, even under severe operating conditions of high temperature and high load.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹

FEATURES

Delo TorqForce Syn FD-1 is designed *specifically* for heavy-duty final drives and axles in severe service. It exhibits significantly improved performance versus TO-4 fluids in the area of gear protection, resistance to macropitting, improved corrosion protection and foam stability.

For customers who have final drive applications where the fluid also lubricates oil-immersed brakes or clutches from a common sump system, please use Delo TorqForce SAE 50 (Caterpillar TO-4). Additionally, Chevron's Delo TorqForce Syn FD-1 should not be used in powershift transmissions since it doesn't contain key friction modifiers required for high friction materials found in these systems.

APPLICATIONS

Delo TorqForce Syn FD-1 is formulated for use in CAT off-highway trucks and D11R carry dozer front wheels, differentials and final drive where gear and bearing loads and temperatures are high. It is not suitable where a common sump is used for lubricating final drive gears, and immersed brakes or clutches.

Delo TorqForce Syn FD-1 meets or exceeds the **Caterpillar** FD-1 specification.

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 August 2022 GL-23

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	Test Method	Multigrade
Product Number		278102
SDS Number		54934
Density at 15 °C, kg/L	ASTM D4052	0.8447
API Gravity	ASTM D4052	33.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	274 31
Viscosity Index	ADTM D2270	152
Viscosity, HTHS cP, 150°C	ASTM D4683	8.77
Viscosity, Brookfield cP, -10°C(14°F)	ASTM D2983	8,520
Viscosity, Brookfield cP, -20°C(-4°F)	ASTM D2983	24,000
Viscosity, Brookfield cP, -30°C(-22°F)	ASTM D2983	92,200
Viscosity, MRV cP, -30°C(-22°F)	ASTM D4684	82,752
Flash Point, COC, °C(°F)	ASTM D92	254(489)
Pour Point, °C(°F)	ASTM D97	-48(-54)
Copper Corrosion 3 hours, 100°C (212°F)	ASTM D130	1a
Foam Test, Sequence I Tendency/Stability, mL	ASTM D892	0/0
Foam Test, Sequence II Tendency/Stability, mL	ASTM D892	10/0
Foam Test, Sequence III Tendency/Stability, mL	ASTM D892	0/0
Phosphorus, mass %		0.031
Calcium, mass %		0.028

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] TORQFORCE[®] SYN FD-1 ISOCLEAN[®] CERTIFIED LUBRICANT

PRODUCT DESCRIPTION

Delo[®] TorqForce[®] Syn FD-1 ISOCLEAN[®] Certified Lubricant is a premium, fully synthetic, multigrade, heavy-duty gear lubricant specifically



designed for use in final drives and axles of modern Caterpillar off-road equipment operating in severe service, where fluids meeting the CAT FD-1 specification are recommended. The CAT FD-1 spec is designed to address extreme pressure (EP) or heavy load-carrying capability needed for final drive gear sets and bearings.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo TorqForce Syn FD-1 ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.

- Maximizes equipment life in severe service

 Advanced additive system minimizes wear in heavily loaded gears and bearings by forming a strong protective layer on metal surfaces under extreme service conditions.
- Prolongs oil life Extremely high thermal and oxidation stability protects against viscosity increase and deposit formation. Drain interval of 6,000 hours is recommended (4,000 hour drain for Delo TorgForce FD SAE 60).
- Extreme temperature performance Excellent cold weather pumpability in sub-zero/ arctic operating conditions. Very good high operating temperature performance for severe service applications.
- **Minimizes unscheduled maintenance** Effective rust and corrosion inhibitors protect final drive components. Good viscosity characteristics at low temperatures ensure rapid oil circulation on start-up, preventing premature component wear.
- Excellent foam protection Works to avoid fluid loss due to foaming.
- Better Low Temperature Performance -Excellent cold flow properties help with rapid oil circulation to minimize wear during cold temperature starting.
- Long equipment life Fluid film with special additives helps protect metal surfaces against pitting, scuffing and wear, even under severe operating conditions of high temperature and high load.
- Warranty Plus protection Bumper-to-bumper warranty protection from the engine to the drive train. Payment for Chevron lubricant-related damage to your equipment, including parts and labor.¹

1 See Warranty Plus for details and restrictions.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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FEATURES

Delo[®] TorqForce[®] Syn FD-1 ISOCLEAN[®] Certified Lubricant is designed *specifically* for heavy-duty final drives and axles in severe service. It exhibits significantly improved performance versus TO-4 fluids in the area of gear protection, resistance to macropitting, improved corrosion protection and foam stability.

For customers who have final drive applications where the fluid also lubricates oil-immersed brakes or clutches from a common sump system, please use Delo TorqForce SAE 50 (Caterpillar TO-4). Additionally, Chevron's Delo TorqForce Syn FD-1 ISOCLEAN Certified Lubricant should not be used in powershift transmissions since it doesn't contain key friction modifiers required for high friction materials found in these systems.

APPLICATIONS

Delo TorqForce Syn FD-1 ISOCLEAN Certified Lubricant is formulated for use in CAT off-highway trucks and D11R carry dozer front wheels, differentials and final drive where gear and bearing loads and temperatures are high. It is not suitable where a common sump is used for lubricating final drive gears, and immersed brakes or clutches.

Delo TorqForce Syn FD-1 ISOCLEAN Certified Lubricant meets or exceeds the **Caterpillar** FD-1 specification.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

	Test Method	Multigrade
Product Number		278103
SDS Number		54934
Density at 15 °C, kg/L	ASTM D4052	0.8447
API Gravity	ASTM D4052	33.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	274 31
Viscosity Index	ADTM D2270	152
Viscosity, HTHS cP, 150°C	ASTM D4683	8.77
Viscosity, Brookfield cP, -10°C(14°F)	ASTM D2983	8,520
Viscosity, Brookfield cP, -20°C(-4°F)	ASTM D2983	24,000
Viscosity, Brookfield cP, -30°C(-22°F)	ASTM D2983	92,200
Viscosity, MRV cP, -30°C(-22°F)	ASTM D4684	82,752
Flash Point, COC, °C(°F)	ASTM D92	254(489)
Pour Point, °C(°F)	ASTM D97	-48(-54)
Copper Corrosion 3 hours, 100°C (212°F)	ASTM D130	1a
Foam Test, Sequence I Tendency/Stability, mL	ASTM D892	0/0
Foam Test, Sequence II Tendency/Stability, mL	ASTM D892	10/0
Foam Test, Sequence III Tendency/Stability, mL	ASTM D892	0/0
Phosphorus, mass %		0.031
Calcium, mass %		0.028

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON GEAR OIL GL-1 SAE 90, 140

PRODUCT DESCRIPTION

Chevron Gear Oils GL-1 are rust and oxidation inhibited gear oils that are recommended for many automotive and industrial equipment where the equipment suppliers recommend the use of a straight mineral oil in SAE viscosity grades 90 (ISO 220) or 140 (ISO 460).

CUSTOMER BENEFITS

Chevron Gear Oils GL-1 deliver value through:

- **Good lubricant film** Provided through use of select high viscosity index base stocks.
- Excellent rust protection Offers long equipment life by protecting gears from rust.
- **Good antifoam protection** Provides maximum gear and bearing life by maintaining full lubricant film with minimal entrained air or surface foam.
- **High viscosity index** Avoids thinning out excessively at high temperatures.
- **Good oxidation stability** Provide long service life even in the presence of copper or bronze.

FEATURES

Chevron Gear Oils GL-1 are rust and oxidation inhibited gear oils.

They are manufactured from high viscosity index paraffinic base stocks. They contain a metal deactivator to help stop such metals as copper from acting as catalysts to promote oil oxidation. They also contain rust, corrosion, and foam inhibitors, plus a pour point depressant to offer fluidity at low temperatures.

Chevron Gear Oils GL-1 help provide long life for gears and bearings in gear cases where the OEM recommends the use of a straight mineral oil. High viscosity indexes and low pour points help deliver good film strength and gear wear protection at both high and low temperatures.

APPLICATIONS

Chevron Gear Oils GL-1 are recommended for many types of automotive and industrial equipment where the equipment suppliers recommend the use of a straight mineral oil in SAE viscosity grades 90 (ISO 220) or 140 (ISO 460).

Chevron Gear Oils GL-1 are also suitable for lubrication of many types of equipment where copper or bronze is present and susceptible to attack by oils containing sulfur-phosphorus compounds.

Chevron Gear Oils GL-1 meet the requirements of **API Service Category** GL-1.

TYPICAL TEST DATA

SAE Grade	90	140
Product Number	223036	223037
SDS Number	35585	35585
Density at 15°C, kg/L	0.8968	0.8956
Viscosity, Kinematic cSt at 40°C cSt at 100°C	204 18.0	404 28.0
Viscosity Index	96	95
Flash Point, °C(°F)	294(561)	310(590)
Pour Point, °C(°F)	-12(+10)	-12(+10)

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

7 May 2015 GL-25

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HAVOLINE[®] GEAR OIL SAE 80W-90, 85W-140

PRODUCT DESCRIPTION

Havoline[®] Gear Oils are high performance oils recommended for use in most spiral bevel and hypoid differentials, power dividers, and oil-lubricated steering axle wheel bearings.

CUSTOMER BENEFITS

Havoline Gear Oils deliver value through:

- Long gear life Extreme pressure properties protect hypoid and other types of gears from scuffing and wear.
- Wide range of weather protection Multiple viscosity capability offers proper gear lubrication at both low and high operating temperatures.
- **Rust and corrosion protection** Effective inhibitor package protects against rusting or corrosion of gear and bearing surfaces.
- Low foam Excessive foaming minimized by use of foam inhibitor.
- Long lubricant life Outstanding thermal and oxidation stability allow high temperature operation with long lubricant life.
- Seal Protection Formulated to protect against oil seal deterioration.

FEATURES

Havoline Gear Oils are made from paraffinic base stocks and contain a carefully balanced additive package to help provide maximum gear protection and long lubricant life.

The sulfur-phosphorus extreme pressure additives used in Havoline Gear Oils provide outstanding thermal and oxidation stability.

In addition, these lubricants are fortified with rust and corrosion inhibitors, a foam inhibitor, and a pour point depressant.

The sulfur-phosphorus extreme pressure additives in Havoline Gear Oils minimize the spalling and wear of gears by creating a microthin sacrificial film on the surface of the gear teeth which is actually softer than the gears themselves. Frictional heat and pressures between tooth surfaces cause the sulfur-phosphorus to react with the surface of the gear teeth at the point of contact, thus creating the sacrificial film.

The highly refined base stocks and various inhibitors in the additive package help assure a well-balanced lubricant and long gear and bearing life.

APPLICATIONS

Havoline Gear Oils are recommended for use in many spiral bevel and hypoid differentials, power dividers, and oil-lubricated steering axle wheel bearings.

Their multiviscosity characteristics allow their use in equipment operating over a broad ambient temperature range. This means good cold flow properties and gear protection.

Havoline Gear Oils are approved for:

• Mack GO-J

Havoline Gear Oils meet the requirements of:

- API Service Categories MT-1, GL-4, and GL-5
- SAE J 2360 (formerly known as MIL-PRF-2105E)

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

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11 February 2013 GL-33

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SAE Grade	80W-90	85W-140
Product Number	222271	222272
SDS Number	8600	8600
Density at 15.6°C(60°F), kg/L(lb/gal)	0.896(7.46)	0.908(7.56)
Viscosity, Kinematic cSt at 40°C cSt at 100°C	145 14.2	341 25.0
Viscosity, Brookfield cP at -12°C cP at -26°C		123,000
Viscosity Index	95	95
Flash Point, °C(°F)	218(421)	226(439)
Pour Point, °C(°F)	-33(-27)	-15(+5)

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] FULL SYNTHETIC LS (LIMITED SLIP) GEAR LUBRICANT

SAE 75W-90, 75W-140

PRODUCT DESCRIPTION

Havoline[®] Full Synthetic LS (Limited Slip) Gear Lubricant is a premium, full synthetic gear lubricant designed for superior performance and dependable wear protection for use in most passenger cars and light-duty trucks. It is designed to perform in extreme operating conditions and over a range of temperatures, is SAE J2360 approved and can be used with open and limited slip differentials requiring SAE J2360, API GL-5 or MT-1 specifications.

CUSTOMER BENEFITS

Havoline Full Synthetic LS (Limited Slip) Gear Lubricant delivers value through:

- **Enjoy peace of mind** offers warranty coverage for vehicles that require SAE J2360 approval.
- **Maintain broad coverage** a single gear lubricant for use in both conventional and limited slip differentials eliminates the need and complexity to carry multiple products.
- **Maximize gear life** helps protect gears (like hypoids) under extreme pressure from scuffing and wear.
- Low maintenance costs superior high temperature and oxidation stability properties help protect differentials, prevent excessive tire wear, maximize gear oil life, and extend drain intervals.
- Helps improve fuel economy low viscosity formulation reduces churn losses and helps improve efficiency to maximize fuel economy.
- **Proven performance** rigorous field trials have proven product performance in real-world environments, including reduction in NVH (noise, vibration and harshness), improved on - and offroad traction and low wear of axle shaft.

 Save money - this single, multi-purpose product meets the requirements of limited slip differentials, so there is no need for limited slip boosters¹ or top treats that could potentially void equipment warranty.

FEATURES

Havoline Full Synthetic LS (Limited Slip) Gear Lubricant is formulated with high purity synthetic base oils and thermally stable friction modifiers that can be used for complete replacement or top-off in limited slip differentials.

- Shear stability and wear protection retains fluid viscosity by maintaining a micro-thin sacrificial film on the surface of the gear teeth to help minimize the spalling and wear of gears, even under the most demanding operating conditions.
- Limited slip performance eliminates chattering and helps improve traction, low temperature fluidity and ease of startup in limited slip differentials.
- Thermal and oxidation stability Resists against degradation, minimizes oxidative sludge and varnish formation, and provides superior protection over a range of temperatures for maximum gear, bearing and seal life.
- Equipment cleanliness rust and corrosion inhibitors help protect hardware from rust and corrosion and reduce the wear of components.
- **Lubrication** foam inhibitors help maintain lubricant film strength for maximum lubrication performance.

1. Use of limited slip booster can void OEM warranty and cause loss of antiwear and extreme pressure performance.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

25 June 2022 GL-34

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APPLICATIONS

Havoline[®] Full Synthetic LS (Limited Slip) Gear Lubricant is licensed for use in applications that require SAE J2360 approval (SAE 75W-90 approval number: PRI GL 1179; SAE 75W-140 approval number: PRI GL 1180).

This product meets or exceeds the performance requirements of:

- API Service GL-5
- API Category MT-1
- Chrysler MS-9763
- Mack GO-J
- Meritor 076-E, 076-N, 0-76-Q, 0-76-R, 0-80, and 0-94²

Havoline Full Synthetic LS (Limited Slip) Gear Lubricant is recommended for service-fill and top-off of:

- Open and limited slip differentials
- Differentials calling for SAE 75W-90 and 75W-140 viscosity grades
- Axles in passenger cars, medium and heavy-duty trucks, and buses, where gear lubricants are recommended
- Non-synchronized manual transmissions
- Off-highway applications requiring API GL-4 fluids that provide adequate anti-chatter performance (friction modification).
 - 2. Supersedes Meritor O-76 specifications

SAE Grade	Test Method	75W-90	75W-140
Product Number		250603	250604
SDS Number		55441	55450
Density at 15°C, kg/L	ASTM D4052	0.8885	0.8885
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445	90 15.4	186 27.9
Viscosity, Brookfield mPa.s at -26°C	ASTM D2983	32,900	103,300
Viscosity Index	ASTM D2270	182	188
Flash Point, °C(°F)	ASTM D92	200(392)	201(394)
Pour Point, °C(°F)	ASTM D97	-54(-65)	-45(-49)

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] POWER STEERING FLUID

PRODUCT DESCRIPTION

Fluid for automotive power steering systems in automobiles and light trucks.

CUSTOMER BENEFITS

Havoline[®] Power Steering Fluid delivers value through:

- Protection against pump wear
- Protection against deterioration of seals and hoses
- Protection against corrosion, rust, and oxidation

FEATURES

Havoline Power Steering Fluid is a general purpose power steering fluid.

Havoline Power Steering Fluid is blended with high quality base stocks and a balanced additive system containing friction modifiers, anti-wear agents, and inhibitors against oxidation, foam, and rust.

APPLICATIONS

Havoline Power Steering Fluid is recommended for automotive power steering systems in automobiles and light trucks.

It is designed for use in applications which call for the following OEM specifications:

- FCA US LLC (formerly known as Chrysler Group LLC) MS-5931
- Ford ESW-M2C128-C
- **GM** 9985010
- Volkswagen TL-VW-570-26

Havoline Power Steering Fluid is also suitable for Subaru, Mercedes-Benz, Mazda, and Volvo systems. It is not recommended for use in Honda vehicles. It can be used in power steering applications where DEXRON[®], DEXRON[®]-II, DEXRON[®]-II D, DEXRON[®]-III or MERCON[®] is required.¹ Check owner's manual for correct fluid type recommended.

TYPICAL TEST DATA

Product Number	221806
SDS Number	10825
API Gravity	35
Viscosity, Kinematic cSt at 40°C cSt at 100°C	41.0 7.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	191 52.0
Viscosity, Brookfield cP at -40°C	20,000
Viscosity Index	155
Flash Point, °C(°F)	210(410)
Pour Point, °C(°F)	-51(-60)
Color	Red

Minor variations in product typical test data are to be expected in normal manufacturing.

 DEXRON is a registered trademark of General Motors Corporation.
 MERCON is a registered trademark of Ford Motor Company.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 September 2022 GL-35

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are property of their respective owners.


MEROPA[®] 68, 100, 150, 220, 320, 460, 680, 1000, 1500

PRODUCT DESCRIPTION

Meropa[®] gear lubricants are premium quality extreme pressure gear oils with excellent load carrying capacity, water demulsibility, oxidation stability, and corrosion protection.

CUSTOMER BENEFITS

Meropa gear lubricants deliver value through:

- Gear set efficiencies High thermal stability EP system helps maintain clean gear and bearing surfaces, minimizing deposits which interfere with effective lubrication. High oxidation stability limits in-service viscosity increases, which can lead to energy losses.
- Long equipment life Effective EP system forms a protective film in areas of metal-to-metal contact, minimizing wear rates and maintaining efficient transfer of power. Good water separation and effective rust inhibitors protect surfaces against rust and corrosion. High thermal stability additive system minimizes the formation of acidic compounds which can be corrosive to bearing materials. The effective corrosion inhibitor provides additional protection for metal components.

 Long oil life — Effective oxidation inhibitors and copper passivator minimize oil oxidation, limiting viscosity increase and promoting long drain intervals.

FEATURES

Meropa gear lubricants are high performance, multipurpose gear lubricants designed for many types of industrial gear lubrication services where loads and shock loadings are high.



APPLICATIONS

Meropa gear lubricants are recommended for:

- Industrial enclosed gearing where an AGMA extreme pressure lubricant is specified
- Bath, splash, circulating, or spray mist lubrication as applicable to the proper viscosity grade
- General industrial plant lubrication where the performance properties of an AGMA extreme pressure lubricant is required
- Rexnord gear drives requiring a mineral-based extreme pressure lubricant

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 September 2023 GL-37

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CLAIMS AND APPLICATIONS

ISO Grade	68	100	150	220	320	460	680	1000	1500
AIST (formerly U.S. Steel) 224	М	М	М	М	М	м	М		
ANSI/AGMA 9005-F16-AS	М	м	М	М	М	м	М	м	М
David Brown S1.53.101 (5E)	М	м	М	М	М	м	М	м	
DIN 51517/3 CLP	М	М	М	М	М	М	М	М	М
Fives Cincinnati	M P-63	M P-76	M P-77	M P-74	M P-59	M P-35	M P-34	M P-78	
Grob Lubricant Chart	Α	Α	Α	Α	Α	Α	Α		
ISO 12925-1 CKC	М	М	М	М	М	М	М	М	
ISO 12925-1 CKD	М	М	М	М	М	М	М		
Joy Mining Machinery				M TO- MEP	M TO- HEP	M TO-HD			
Pekrun Werknorm N8053	Α	Α	Α	Α	Α	A	Α	Α	
Rexnord ^a Falk gear drive models: V, A, F, J, Planetgear Obsolete Falk gear drive models:Class D, G, Y, Link Belt Model "R"	A	A	A	A	A	A	A		
Rexnord ^a Falk EP	Α	Α	Α	Α	Α	Α	Α		
SMS Group SN 180-2		Α	Α	Α	Α	Α	Α		
Sumitomo Drive Technologies Paramax 9000	А	А	А	Α	А				
Waldrich Siegen Lubricants for Machine Tools	Α	Α	Α	Α	Α		Α		
ZF		A TE-ML 04H	A TE-ML 04H	A TE-ML 04F					

a Consult with Rexnord/Falk Gear for applications: worm gear drives, high-speed drives, open gearing or any custom gear drive.

A: Approved for

M: Meets or exceeds requirements

Meropa gear lubricants have a typical sulfur-phosphorus odor characteristic of industrial gear oils. A ventilated environment is recommended during use.

TYPICAL TEST DATA

ISO Grade	Test Method	68	100	150	220	320
Product Number		277209	277219	277210	277211	277212
SDS Number		23551	23551	23551	23551	23551
AGMA Grade		2 EP	3 EP	4 EP	5 EP	6 EP
API Gravity	ASTM D287	31.0	30.6	29.7	28.4	27.3
Density at 15°C, kg/L	ASTM D4052	0.8703	0.8725	0.8773	0.8845	0.8906
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	68 8.8	100 11.6	150 15.1	220 19.5	320 25.0
Viscosity Index	ASTM D2270	100	103	100	100	100
Flash Point, °C(°F)	ASTM D92	236(457)	250(482)	264(507)	278(532)	278(532)
Pour Point, °C(°F)	ASTM D97	-32(-26)	-29(-20)	-26(-15)	-23(-9)	-22(-8)
Foam Test, Seq. II Tendency, mL Stability, mL	ASTM D892	50 max 0				
Water Separation Minutes to 3 mL emulsion	ASTM D1401	25	20	20	20	25
Copper Corrosion 3 h @ 100°C	ASTM D130	1B	1B	1B	1B	1B
Rust Test	ASTM D665A ASTM D665B	Pass Pass	Pass Pass	Pass Pass	Pass Pass	Pass Pass
Timken OK Load, Ib	ASTM D2783	70	70	75	75	75
4 Ball Weld Weld Point, kg Load Wear Index	ASTM D2783	250 45.9	250 >45	250 >45	250 52.9	250 >45
FE-8 Bearing Test Roller weight loss, mg	DIN51819-3	3.7	3.7**	3.7**	2.1	2.1#
FZG Scuff Test, A/8.3/90°C, Fail Stage	ASTM D5182	>14	>14	>14	>14	>14
FZG Pass Stage	ASTM D5182	12	12	12	12	12

**Read-across data: In this test, lower ISO grades are typically more severe than higher ISO grades; therefore, data is readacross from ISO 68

#Read-across data: In this test, lower ISO grades are typically more severe than higher ISO grades; therefore, data is readacross from ISO 220

Minor variations in product typical test data are to be expected in normal manufacturing.

ISO Grade	Test Method	460	680	1000	1500
Product Number		277213	277214	277215	277216
SDS Number		23551	23551	23551	23551
AGMA Grade		7 EP	8 EP	8A EP	9 EP
API Gravity	ASTM D287	26.3	26.0	25.9	25.7
Density at 15°C, kg/L	ASTM D4052	0.8962	0.8979	0.8985	0.8996
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	460 31.3	680 41.6	1000 55.5	1500 76.2
Viscosity Index	ASTM D2270	98	101	106	113
Flash Point, °C(°F)	ASTM D92	279(534)	279(534)	273(523)	272(522)
Pour Point, °C(°F)	ASTM D97	-21(-6)	-21(-6)	-22(-8)	-19(-2)
Foam Test, Seq. II Tendency, mL Stability, mL	ASTM D892	50 max 0	50 max 0	50 max 0	50 max 0
Water Separation Minutes to 3 mL emulsion	ASTM D1401	30	40	20	40
Copper Corrosion 3 h @ 100°C	ASTM D130	1B	1B	1B	1B
Rust Test	ASTM D665A ASTM D665B	Pass Pass	Pass Pass	Pass Pass	Pass Pass
Timken OK Load, lb	ASTM D2783	80	80	80	80
4 Ball Weld Weld Point, kg Load Wear Index	ASTM D2783	250 >45	250 51.4	250* 51.4*	250* 51.4*
FE-8 Bearing Test Roller weight loss, mg	DIN51819-3	2.1#	2.1#	2.1#	2.1#
FZG Scuff Test, A/8.3/90°C, Fail Stage	ASTM D5182	>14	>14	>14	>14
FZG Pass Stage	ASTM D5182	12	>12	>12	>12

*Read-across data: In this test, lower ISO grades are typically more severe than higher ISO grades; therefore, data is readacross from ISO 680

#Read-across data: In this test, lower ISO grades are typically more severe than higher ISO grades; therefore, data is readacross from ISO 220

Minor variations in product typical test data are to be expected in normal manufacturing.



Meropa[®] **ISOCLEAN[®]** Certified Lubricant 68, 100, 150, 220, 320, 460, 680, 1000

PRODUCT DESCRIPTION

Meropa[®] ISOCLEAN[®] Certified Lubricants are premium quality extreme pressure gear oils with excellent load carrying capacity, water



demulsibility, oxidation stability, and corrosion protection. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Meropa ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- Flexibility ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron **ISOCLEAN Certified Lubricant includes an ISOCLEAN** Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Gear set efficiencies High thermal stability EP system helps maintain clean gear and bearing surfaces, minimizing deposits which interfere with effective lubrication. High oxidation stability limits in-service viscosity increases, which can lead to energy losses.

- Long equipment life Effective EP system forms a protective film in areas of metal-to-metal contact, minimizing wear rates and maintaining efficient transfer of power. Good water separation and effective rust inhibitors protect surfaces against rust and corrosion. High thermal stability additive system minimizes the formation of acidic compounds which can be corrosive to bearing materials. The effective corrosion inhibitor provides additional protection for metal components.
- Long oil life Effective oxidation inhibitors and copper passivator minimize oil oxidation, limiting viscosity increase and promoting long drain intervals.

FEATURES

Meropa ISOCLEAN Certified Lubricants are high performance, multipurpose gear lubricants designed for many types of industrial gear lubrication



services where loads and shock loadings are high.

APPLICATIONS

Meropa ISOCLEAN Certified Lubricants are recommended for:

- Industrial enclosed gearing where an AGMA extreme pressure lubricant is specified
- Bath, splash, circulating, or spray mist lubrication as applicable to the proper viscosity grade
- General industrial plant lubrication where the performance properties of an AGMA extreme pressure lubricant is required
- · Rexnord gear drives requiring a mineral-based extreme pressure lubricant

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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15 September 2023 GL-37 ISOCLEAN

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CLAIMS AND APPLICATIONS

ISO Grade	68	100	150	220	320	460	680	1000	1500
AIST (formerly U.S. Steel) 224	М	М	М	М	М	м	М		
ANSI/AGMA 9005-F16-AS	М	м	М	М	М	м	М	м	М
David Brown S1.53.101 (5E)	М	м	М	М	М	м	М	м	
DIN 51517/3 CLP	М	М	М	М	М	М	М	М	М
Fives Cincinnati	M P-63	M P-76	M P-77	M P-74	M P-59	M P-35	M P-34	M P-78	
Grob Lubricant Chart	Α	Α	Α	Α	Α	Α	Α		
ISO 12925-1 CKC	М	М	М	М	М	М	М	М	
ISO 12925-1 CKD	М	М	М	М	М	М	М		
Joy Mining Machinery				M TO- MEP	M TO- HEP	M TO-HD			
Pekrun Werknorm N8053	Α	Α	Α	Α	Α	A	Α	Α	
Rexnord ^a Falk gear drive models: V, A, F, J, Planetgear Obsolete Falk gear drive models:Class D, G, Y, Link Belt Model "R"	A	A	A	A	A	A	A		
Rexnord ^a Falk EP	Α	Α	Α	Α	Α	Α	Α		
SMS Group SN 180-2		Α	Α	Α	Α	Α	Α		
Sumitomo Drive Technologies Paramax 9000	А	А	А	Α	А				
Waldrich Siegen Lubricants for Machine Tools	Α	Α	Α	Α	Α		Α		
ZF		A TE-ML 04H	A TE-ML 04H	A TE-ML 04F					

a Consult with Rexnord/Falk Gear for applications: worm gear drives, high-speed drives, open gearing or any custom gear drive.

A: Approved for

M: Meets or exceeds requirements

Meropa ISOCLEAN Certified Lubricants have a typical sulfur-phosphorus odor characteristic of industrial gear oils. A ventilated environment is recommended during use.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

ISO Grade	Test Method	68	100	150	220	320
Product Number		278039	278047	278040	278041	278042
SDS Number		23551	23551	23551	23551	23551
AGMA Grade		2 EP	3 EP	4 EP	5 EP	6 EP
API Gravity	ASTM D287	31.0	30.6	29.7	28.4	27.3
Density at 15°C, kg/L	ASTM D4052	0.8703	0.8725	0.8773	0.8845	0.8906
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	68 8.8	100 11.6	150 15.1	220 19.5	320 25.0
Viscosity Index	ASTM D2270	100	103	100	100	100
Flash Point, °C(°F)	ASTM D92	236(457)	250(482)	264(507)	278(532)	278(532)
Pour Point, °C(°F)	ASTM D97	-32(-26)	-29(-20)	-26(-15)	-23(-9)	-22(-8)
Foam Test, Seq. II Tendency, mL Stability, mL	ASTM D892	50 max 0				
Water Separation Minutes to 3 mL emulsion	ASTM D1401	25	20	20	20	25
Copper Corrosion 3 h @ 100°C	ASTM D130	1B	1B	1B	1B	1B
Rust Test	ASTM D665A ASTM D665B	Pass Pass	Pass Pass	Pass Pass	Pass Pass	Pass Pass
Timken OK Load, Ib	ASTM D2783	70	70	75	75	75
4 Ball Weld Weld Point, kg Load Wear Index	ASTM D2783	250 45.9	250 >45	250 >45	250 52.9	250 >45
FE-8 Bearing Test Roller weight loss, mg	DIN51819-3	3.7	3.7**	3.7**	2.1	2.1#
FZG Scuff Test, A/8.3/90°C, Fail Stage	ASTM D5182	>14	>14	>14	>14	>14
FZG Pass Stage	ASTM D5182	12	12	12	12	12

Minor variations in product typical test data are to be expected in normal manufacturing.

**Read-across data: In this test, lower ISO grades are typically more severe than higher ISO grades; therefore, data is readacross from ISO 68

#Read-across data: In this test, lower ISO grades are typically more severe than higher ISO grades; therefore, data is readacross from ISO 220

TYPICAL TEST DATA

ISO Grade	Test Method	460	680	1000
Product Number		278043	278044	278045
SDS Number		23551	23551	23551
AGMA Grade		7 EP	8 EP	8A EP
API Gravity	ASTM D287	26.3	26.0	25.9
Density at 15°C, kg/L	ASTM D4052	0.8962	0.8979	0.8985
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	460 31.3	680 41.6	1000 55.5
Viscosity Index	ASTM D2270	98	101	106
Flash Point, °C(°F)	ASTM D92	279(534)	279(534)	273(523)
Pour Point, °C(°F)	ASTM D97	-21(-6)	-21(-6)	-22(-8)
Foam Test, Seq. II Tendency, mL Stability, mL	ASTM D892	50 max 0	50 max 0	50 max 0
Water Separation Minutes to 3 mL emulsion	ASTM D1401	30	40	20
Copper Corrosion 3 h @ 100°C	ASTM D130	1B	1B	1B
Rust Test	ASTM D665A ASTM D665B	Pass Pass	Pass Pass	Pass Pass
Timken OK Load, lb	ASTM D2783	80	80	80
4 Ball Weld Weld Point, kg Load Wear Index	ASTM D2783	250 >45	250 51.4	250* 51.4*
FE-8 Bearing Test Roller weight loss, mg	DIN51819-3	2.1#	2.1#	2.1#
FZG Scuff Test, A/8.3/90°C, Fail Stage	ASTM D5182	>14	>14	>14
FZG Pass Stage	ASTM D5182	12	>12	>12

#Read-across data: In this test, lower ISO grades are typically more severe than higher ISO grades; therefore, data is readacross from ISO 220.

Minor variations in product typical test data are to be expected in normal manufacturing.



MEROPA[®] XL 68, 150, 220, 320, 460, 680

PRODUCT DESCRIPTION

Meropa[®] XL gear oils are premium, high-performance, semi-synthetic gear oils, offering long lubricant life, corrosion protection, excellent wear protection with high load carrying capacity and robust micropitting wear protection. They are designed for use in industrial and marine gear systems, where extreme load and shock load protection is required.

CUSTOMER BENEFITS

Meropa XL gear oils deliver value through:

- **Provides thermal and oxidative stability** The thermal and oxidative stability of Meropa XL minimizes deposit formation and can extend bearing and gear life. Excellent resistance to oil degradation at high temperatures, resulting in extended oil life and long drain intervals.
- Rust and corrosion protection Meropa XL offers rust and corrosion protection over long service periods.
- Extended gear and bearing life Particularly effective in enclosed gear drives operating under extreme load, speed, and temperature conditions.
- Less wear Ensures optimum wear protection with reduced maintenance and increased system uptime.
- **Provides micropitting resistance** Delivers excellent micropitting and wear protection with reduced maintenance and increased system uptime. Approved by Flender Gear Units for helical, bevel and planetary gear units. Micropitting performance is a key component in the Flender approval.
- **Keeps components clean** Advanced additive technology helps prevent varnish and sludge and keeps components clean. Clean components can contribute to long lubricant and equipment life.

• Water separation — Excellent demulsibility and corrosion protection for trouble-free operation in applications where water contamination is unavoidable.

FEATURES

Meropa XL gear oils are designed to help ensure optimal performance in today's smaller, lighter and more energy efficient industrial gear systems. The advanced formulation is balanced to provide extreme pressure



protection, while provide extreme pressure protection, while providing protection against yellow metal corrosion. The robust chemistry is compatible with multiple types of sealant and paint coatings, and helps to minimize the possibility of leaking seals and paint blistering on the inside of the gearbox. Competitive products with over-aggressive chemistries will attack the paint coatings and cause filter plugging.

APPLICATIONS

Meropa XL gear oils are recommended for:

- Industrial enclosed gearing where an AGMA EP lubricant is specified
- Industrial enclosed gearing where DIN 51517 (CLP) lubricant is specified
- Bath, splash, circulating, or spray mist lubrication as applicable to the proper viscosity grade
- Marine gearboxes requiring an extreme pressure lubricant
- Rexnord gear drives requiring an extreme pressure or conventional micropitting resistant lubricant

Also recommended for a variety of gears, including:

- Spur, bevel, helical, worm and industrial hypoid gear cases on mobile contractor type equipment
- Underground mining equipment

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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- Cement mills, ball mills
- Rolling mills
- Crushers
- Shakers

- Hoists
- Conveyors
- Machine tools
- Marine equipment

CLAIMS AND SPECIFICATIONS

ISO Grade	68	150	220	320	460	680
AIST (formerly U.S. Steel) 224	М	М	М	М	М	М
ANSI/AGMA 9005-F16-AS	М	М	М	М	М	М
DIN 51517/3 CLP	М	М	М	М	М	М
David Brown S1.53.101(5E)	М	М	М	М	М	М
Fives Cincinnati	M P-63	M P-77	M P-74	M P-59	M P-35	M P-34
Flender Rev. 16 Helical-Bevel-Planetary Gear Units		Α	A	Α	Α	Α
Grob Lubricant Chart		Α	Α	Α	Α	
ISO 12925-1 CKC	М	М	М	М	М	М
ISO 12925-1 CKD	М	М	М	М	М	М
Joy Mining Machinery			M TO-MEP	M TO-HEP	M TO-HD	
Pekrun Werknorm N8053		Α	Α	Α	Α	
Reintjes BV1597/3, BV1597/4 BV1917/3, BV1917/4 BV2060/3, BV2060/4		М				
Rexnord ^a Falk gear drive models: V, A, F, J, Planetgear Obsolete Falk gear drive models: Class D, G, Y, Link Belt Model "R"	A	A	A	A	A	A
Rexnord ^a Falk EP + MP Resistance	Α	Α	Α	Α	Α	Α
SMS Group SN 180-2		Α	Α	Α	Α	Α
Sumitomo Drive Technologies Paramax 9000		Α	Α	Α		
Waldrich Siegen Lubricants for Machine Tools	Α	Α	Α	Α		Α
ZF TE-ML 04H		Α				

a Consult with Rexnord/Falk Gear for applications: worm gear drives, high-speed drives, open gearing or any custom gear drive.

A: Approved for M: Meets or exceeds requirements

ISO Grade	Test Method	68	150	220
Product Number		277414	277410	277411
SDS Number		46389	37390	37390
AGMA Grade		2 EP	4 EP	5 EP
API Gravity	ASTM D287	31.6	33.7	31.6
Density at 15°C, kg/L	ASTM D4052	0.8670	0.8560	0.8670
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	68 9.3	150 16.4	220 21.9
Viscosity Index	ASTM D2270	112	115	120
Flash Point, °C(°F)	ASTM D92	224(435)	250(482)	248(478)
Pour Point, °C(°F)	ASTM D97	-15(5)	-36(-33)	-30(-22)
Foam Test Seq. I Tendency, mL Stability, mL	ASTM D892	0 0	0 0	0 0
Water Separation Minutes to 3 mL emulsion	ASTM D1401	5	10	5
Copper Corrosion, 3 hr at 100°C	ASTM D130	1B	1B	1B
Rust Test	ASTM D665B	Pass	Pass	Pass
Steel Pin Corrosion (24 hrs 60° C)	ISO 7120B	Pass	Pass	Pass
FAG FE-8 Bearing Test, Roller Weight Loss, (mg)	DIN 51819-3	3	1.0	1.0
FZG Pass Stage	ASTM D5182	> 12	> 12	> 12
FZG Micropitting, Fail Stage	FVA 54	_	10/High	10/High

Minor variations in product typical test data are to be expected in normal manufacturing.

Meropa XL gear oils have the typical sulfur-phosphorus odor characteristic of industrial gear oils. A ventilated environment is recommended during use.

ISO Grade	Test Method	320	460	680
Product Number		277412	277413	277416
SDS Number		37390	37390	37390
AGMA Grade		6 EP	7 EP	8 EP
API Gravity	ASTM D287	29.6	29.2	29.2
Density at 15°C, kg/L	ASTM D4052	0.8780	0.8800	0.8802
Viscosity, Kinematic cSt at 40°C cSt at 100°C Viscosity Index	ASTM D445 ASTM	320 29.2 124	460 38.4 127	680 50.2 127
,	D2270			
Flash Point, °C(°F)	ASTM D92	248(478)	247(477)	238(460)
Pour Point, °C(°F)	ASTM D97	-30(-22)	-27(-17)	-33(-27)
Foam Test Seq. I Tendency, mL Stability, mL	ASTM D892	0 0	0 0	0 0
Water Separation Minutes to 3 mL emulsion	ASTM D1401	5	10	20
Copper Corrosion, 3 hr at 100°C	ASTM D130	1B	1B	1B
Rust Test	ASTM D665B	Pass	Pass	Pass
Steel Pin Corrosion (24 hrs 60° C)	ISO 7120B	Pass	Pass	Pass
FAG FE-8 Bearing Test, Roller Weight Loss, (mg)	DIN5181 9-3	1.0	1.0	1.0
FZG Pass Stage	ASTM D5182	> 12	> 12	> 12
FZG Micropitting, Fail Stage	FVA 54	10/High	10/High	10/High



MEROPA[®] XL ISOCLEAN[®] Certified Lubricant 68, 150, 220, 320, 460, 680

PRODUCT DESCRIPTION

Meropa[®] XL ISOCLEAN[®] Certified Lubricants are premium, highperformance, semi-synthetic gear oils, offering long lubricant life, corrosion



protection, excellent wear protection with high load carrying capacity and robust micropitting wear protection. They are designed for use in industrial and marine gear systems, where extreme load and shock load protection is required. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Meropa XL ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Provides thermal and oxidative stability The thermal and oxidative stability of Meropa XL minimizes deposit formation and can extend bearing and gear life. Excellent resistance to oil degradation

at high temperatures, resulting in extended oil life and long drain intervals.

- **Rust and corrosion protection** Meropa XL offers rust and corrosion protection over long service periods.
- Extended gear and bearing life Particularly effective in enclosed gear drives operating under extreme load, speed, and temperature conditions.
- Less wear Ensures optimum wear protection with reduced maintenance and increased system uptime.
- **Provides micropitting resistance** Delivers excellent micropitting and wear protection with reduced maintenance and increased system uptime. Approved by Siemens MD and Rev. 15 (FLENDER) for helical, bevel and planetary gear units. Micropitting performance is a key component in the Siemens MD approval.
- Keeps components clean Advanced additive technology helps prevent varnish and sludge and keeps components clean. Clean components can contribute to long lubricant and equipment life.
- Water separation Excellent demulsibility and corrosion protection for trouble-free operation in applications where water contamination is unavoidable.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 March 2025 GL-43 ISOCLEAN

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FEATURES

Meropa[®] XL ISOCLEAN[®] Certified Lubricants are designed to help ensure trouble-free performance in today's smaller, lighter and more energy efficient industrial gear systems. The advanced formulation is balanced to



advanced formulation is balanced to provide extreme pressure protection, while providing protection against yellow metal corrosion. The robust chemistry is compatible with multiple types of sealant and paint coatings, and helps to minimize the possibility of leaking seals and paint blistering on the inside of the gearbox. Competitive products with overaggressive chemistries will attack the paint coatings and cause filter plugging.

APPLICATIONS

Meropa XL ISOCLEAN Certified Lubricants are recommended for:

- industrial enclosed gearing where an AGMA EP lubricant is specified
- industrial enclosed gearing where DIN 51517 (CLP) lubricant is specified
- bath, splash, circulating, or spray mist lubrication as applicable to the proper viscosity grade
- marine gearboxes requiring an extreme pressure lubricant
- Rexnord gear drives requiring an extreme pressure or conventional micropitting resistant lubricant

Also recommended for a variety of gears, including:

- Spur, bevel, helical, worm and industrial hypoid gear cases on mobile contractor type equipment
- Underground mining equipment
- Cement mills, ball mills
- Rolling mills
- Crushers
- Shakers
- Hoists
- Conveyors
- Machine tools
- Marine equipment

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

CLAIMS AND SPECIFICATIONS

ISO Grade	68	150	220	320	460	680
AIST (formerly U.S. Steel) 224	М	М	М	М	М	М
ANSI/AGMA 9005-F16-AS	М	М	М	М	М	М
DIN 51517/3 CLP	М	М	М	М	М	М
David Brown S1.53.101(5E)	М	М	М	М	М	М
Fives Cincinnati	М Р-63	M P-77	M P-74	M P-59	M P-35	M P-34
Flender Gear Units Helical-Bevel-Planetary Gear Units		A	A	A	A	Α
Grob Lubricant Chart		Α	A	Α	Α	
ISO 12925-1 CKC	М	М	М	М	М	М
ISO 12925-1 CKD	М	М	М	М	М	М
Joy Mining Machinery			M TO-MEP	M TO-HEP	M TO-HD	
Pekrun Werknorm N8053		А	А	Α	A	
Reintjes BV1597/3, BV1597/4 BV1917/3, BV1917/4 BV2060/3, BV2060/4		М				
Rexnord ^a Falk gear drive models: V, A, F, J, Planetgear Obsolete Falk gear drive models: Class D, G, Y, Link Belt Model "R"	Α	A	A	A	A	A
Rexnord ^a Falk EP + MP Resistance	Α	A	A	Α	Α	Α
SMS Group SN 180-2		Α	Α	Α	Α	Α
Sumitomo Drive Technologies Paramax 9000		A	A	A		
Waldrich Siegen Lubricants for Machine Tools	Α	А	А	Α		A
ZF TE-ML 04H		A				

a Consult with Rexnord/Falk Gear for applications: worm gear drives, high-speed drives, open gearing or any custom gear drive.

$\boldsymbol{\mathsf{A}}\text{:}$ Approved for

M: Meets or exceeds requirements

ISO Grade	Test Method	68	150	220	320
Product Number		274325	274306	274307	274308
<i>SDS Number U.S. Canada Mexico</i>		46389 46390 46391	37390 37391 37392	37390 37391 37392	37390 37391 37392
AGMA Grade		2 EP	4 EP	5 EP	6 EP
API Gravity	ASTM D287	31.7	33.6	31.6	29.5
Density at 15°C, kg/L	ASTM D4052	0.8670	0.8560	0.8670	0.8780
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	68 9.3	150 16.4	220 21.9	320 29.2
Viscosity Index	ASTM D2270	110	115	120	124
Flash Point, °C(°F)	ASTM D92	224(435)	250(482)	248(478)	248(478)
Pour Point, °C(°F)	ASTM D97	-15(5)	-36(-33)	-30(-22)	-30(-22)
Foam Test Seq. I Tendency, mL Stability, mL	ASTM D892	0	0	0 0	0 0
Water Separation Minutes to 3 mL emulsion	ASTM D1401	5	10	5	5
Copper Corrosion, 3 hr at 100°C	ASTM D130	1B	1B	1B	1B
Rust Test	ASTM D665B	Pass	Pass	Pass	Pass
Steel Pin Corrosion (24 hrs 60° C)	ISO 7120B	Pass	Pass	Pass	Pass
FAG FE-8 Bearing Test, Roller Weight Loss, (mg)	DIN 51819-3	3	1.0	1.0	1.0
FZG Pass Stage	ASTM D5182	> 12	> 12	> 12	> 12
FZG Micropitting, Fail Stage	FVA 54	_	10/High	10/High	10/High

Minor variations in product typical test data are to be expected in normal manufacturing.

Meropa XL gear oils have the typical sulfur-phosphorus odor characteristic of industrial gear oils. A ventilated environment is recommended during use.

ISO Grade	Test Method	460	680
Product Number		274309	274326
<i>SDS Number U.S. Canada Mexico</i>		37390 37391 37392	37390 37391 37392
AGMA Grade		7 EP	8 EP
API Gravity	ASTM D287	29.3	28.9
Density at 15°C, kg/L	ASTM D4052	0.8800	0.8802
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	460 38.2	680 50.0
Viscosity Index	ASTM D2270	127	127
Flash Point, °C(°F)	ASTM D92	247(477)	238(460)
Pour Point, °C(°F)	ASTM D97	-27(-17)	-33(-27)
Foam Test Seq. I Tendency, mL Stability, mL	ASTM D892	0 0	0 0
Water Separation Minutes to 3 mL emulsion	ASTM D1401	10	20
Copper Corrosion, 3 hr at 100°C	ASTM D130	1B	1B
Rust Test	ASTM D665B	Pass	Pass
Steel Pin Corrosion (24 hrs 60 ^o C)	ISO 7120B	Pass	Pass
FAG FE-8 Bearing Test, Roller Weight Loss, (mg)	DIN 51819-3	1.0	1.0
FZG Pass Stage	ASTM D5182	> 12	> 12
FZG Micropitting, Fail Stage	FVA 54	10/High	10/High



MEROPA ELITESYN[™] WL 320, 680

PRODUCT DESCRIPTION

Meropa EliteSyn[™] WL is a premium, high-performance synthetic gear oil designed for use in GE electric wheel motors and other industrial gear boxes. It offers high efficiency, reduced operating temperatures, long lubricant life, and excellent micropitting wear protection. It is also designed to protect against extreme load and shock load protection.

CUSTOMER BENEFITS

Meropa EliteSyn WL delivers value through:

- **Energy efficiency** advanced additive technology, resulting in less power consumption. Provides the opportunity for energy, equipment and productivity efficiencies.
- Reduced operating temperatures synthetic base oils provide a lower coefficient of friction and can lower gearbox operating temperatures versus a mineral oil product.
- Long lubricant life very high oxidation resistance promotes long drain intervals.
- Wide temperature range extremely cold weather and high temperature protection that allows equipment operating temperature ranges from -40°C to 140°C, a far wider range than conventional gear oils.
- Provides micropitting resistance Delivers high level of micropitting and wear protection with reduced maintenance and increased system uptime.

FEATURES

Meropa EliteSyn WL gear oil is formulated to be our ultimate offering that meets or exceeds many industry performance standards. It delivers high efficiency improvements in modern gearboxes that are smaller, lighter and more energy efficient.



The Meropa EliteSyn WL additive system is compatible with paint coatings and multiple types of seals to minimize the possibility of leaking seals and paint blistering on the inside of the gearbox. Competitor products with overaggressive chemistries can attack the paint coatings and cause filter plugging and lubricant loss.

APPLICATIONS

Meropa EliteSyn WL is recommended for:

- Industrial enclosed gearing where an AGMA EP lubricant is specified
- Bath, splash, circulating, or spray mist lubrication as applicable to the proper viscosity grade
- Mining haul truck electric wheel motors

Meropa EliteSyn WL gear oil meets the performance requirements of:

- ANSI/AGMA 9005-F16-AS
- AIST (formerly US Steel) 224
- DIN 51517/3 CLP
- ISO 12925-1 CKC
- ISO 12925-1 CKD
- Siemens MD Rev. 15 (applied)
- Fives (Cincinnati Machine)
- GE D50E35
- David Brown S1.53.101 (5E)

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 April 2023 GL-44

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ISO Grade	Test Method	320	680
Product Number		278104	278018
SDS Number U.S. Canada Mexico		56834 56834 56834	48630 48631 48632
AGMA Grade		6 EP	8 EP
Density at 15°C, Kg/L	ASTM D4052	0.8614	0.8647
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	320 34.6	680 64.6
Viscosity Index	ASTM D2270	152	166
Flash Point, °C(°F)	ASTM D92	245 (473)	237 (459)
Pour Point, °C(°F)	ASTM D97	-45 (-49)	-40 (-40)
Rust Test	ASTM D665A ASTM D665B	Pass Pass	Pass Pass
Copper Corrosion 3h at 100°C	ASTM D130	1a	1b
Water separation, minutes to 3 mL emulsion @82°C	ASTM D1401	15	30
Four-Ball EP, Weld Load, kg Load Wear Index	ASTM D2783	250 54	250 54
FZG Scuffing, Fail Load Stage	A/8.3/90	> 14	> 14
FAG FE-8 Roller Bearing Test, Roller Weight Loss (mg)	DIN 51819-3	4	4
FZG Micropitting, fail load stage	FVA 54	10/High	10/High

Minor variations in product typical test data are to be expected in normal manufacturing.

Consult with your Chevron Lubricant Representative for your business application.



MEROPA ELITESYN[™] XM 150, 220, 320, 460, 680

PRODUCT DESCRIPTION

Meropa EliteSynTM XM oils are premium, highperformance synthetic gear oils, offering maximum efficiency, reduced operating temperatures, long lubricant life and robust micropitting wear protection. They are designed for use in industrial and marine gear systems, where extreme load and shock load protection is required.

CUSTOMER BENEFITS

Meropa EliteSyn XM lubricants deliver value through:

- **Maximum efficiency** advanced additive technology, resulting in less power consumption that provides the opportunity for increased energy, equipment and productivity efficiencies.
- Helps reduce operating temperatures synthetic base oils provide a lower coefficient of friction and can lower gearbox operating temperatures versus a mineral oil product.
- Long lubricant life very high oxidation resistance promotes long drain intervals.
- Wide temperature range low cold weather and high temperature protection that allows equipment operating temperature range from -30°C to 140°C, a far wider range than conventional gear oils.
- Provides micropitting resistance Delivers maximum micropitting and wear protection with reduced maintenance and increased system uptime.

FEATURES

Meropa EliteSyn XM gear oils are formulated to be our ultimate offering that meets or exceeds industry performance standards. They enable the equipment manufacturers desire for efficiency improvements in



designing gearboxes that are smaller, lighter and more energy efficient.

The additives in Meropa EliteSyn XM are compatible with paint coatings and with multiple types of seals to minimize the possibility of leaking seals and paint blistering on the inside of the gearbox. Competitor products with overaggressive chemistries may attack paint coatings and cause filter plugging.

APPLICATIONS

Meropa EliteSyn XM gear oils can be applied in:

- Industrial enclosed gearing where an AGMA EP lubricant is specified
- Bath, splash, circulating, or spray mist lubrication as applicable to the proper viscosity grade
- Marine gearboxes requiring an extreme pressure lubricant
- Rexnord gear drives requiring a synthetic extreme pressure or synthetic micropitting resistant lubricant

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2024 GL-45

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CLAIMS AND SPECIFICATIONS

ISO Grade	150	220	320	460	680
AIST (formerly U.S. Steel) 224	М	М	М	М	М
ANSI/AGMA 9005-F16-AS	М	М	М	М	М
DIN 51517/3 CLP	М	М	М	М	М
David Brown S1.53.101(5E)	М	М	М	М	М
Fives Cincinnati	M P-77	M P-74	M P-59	М Р-35	M P-34
Flender Rev. 16.1 Helical-Bevel-Planetary Gear Units	Α	Α	Α	A	A
GE D50E35			М	М	М
Hansen Gear Units Series HP1, HP2, HPP, P4 and M4ACC	Α	Α	Α	Α	Α
Hitachi AC Final Drive Gear	М	М	М	М	М
ISO 12925-1 CKC	М	М	М	М	М
ISO 12925-1 CKD	М	М	М	М	М
Joy Mining Machinery		M TO-SMEP	M TO-SHEP		
Pekrun Werknorm N8053	Α	A	Α	Α	Α
Rexnord ^a Falk gear drive models: Class V, A, F, J, Planetgear Obsolete Falk gear drive models: Class D, G, Y, Link Belt Model "R"	Α	A	Α	A	A
Rexnord ^a Falk EP + MP reistance	Α	Α	Α	Α	Α
SEW-Eurodrive Rev. 07 004 05 13 Helical-Bevel-Planetary Gear Units: X.e M1N, ML2, MCSeries Planetary Gear Units: P2e, P2, XP, P-X.e, PPK Series	A	A	A	A	A
Sumitomo Drive Technologies Paramax 9000	Α	Α	Α		
ZF		A TE-ML 27F	A TE-ML 27H	A TE-ML 27J	

a Consult with Rexnord/Falk Gear for applications: worm gear drives, high-speed drives, open gearing or any custom gear drive.

A: Approved for

M: Meets or exceeds requirements

ISO Grade	Test Method	150	220	320	460	680
Product Number		279009	279008	273229	275006	275007
<i>SDS Number U.S. Canada Mexico</i>		50215 50216 50217	50215 50216 50217	50215 50216 50217	50215 50216 50217	50215 50216 50217
AGMA Grade		4 EP	5 EP	6 EP	7 EP	8 EP
API Gravity	ASTM D287	30.1	28.6	27.2	26.1	24.9
Density at 15°C, kg/L	ASTM D4052	0.8754	0.8836	0.8912	0.8975	0.9041
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	150 20.6	220 27.5	320 36.2	460 47.2	680 62.3
Viscosity Index	ASTM D2270	160	160	160	160	160
Flash Point, °C(°F)	ASTM D92	237(459)	239(462)	242(468)	243(469)	244(471)
Pour Point, °C(°F)	ASTM D5950	-36(-33)	-36(-33)	-36(-33)	-36(-33)	-30(-22)
Foam Test, Seq. II Tendency, mL Stability, mL	ASTM D892	50 max 0	50 max 0	50 max 0	50 max 0	50 max 0
Water Separation, Minutes to 0 mL emulsion	ASTM D1401	15	15	20	5	5
Copper Corrosion 3h @ 100°C	ASTM D130	1b	1b	1b	1b	1b
Rust Test	ASTM D665A ASTM D665B	Pass Pass	Pass Pass	Pass Pass	Pass Pass	Pass Pass
Timken OK Load, Ib	ASTM D2782	>100	>100	>100	>100	>100
Four-Ball Weld, Weld Point, kg Load Wear Index	ASTM D2783	250 58	250 ^a 58 ^a	250 ^a 58 ^a	250 ^a 58 ^a	250 ^a 58 ^a
FZG Scuffing (A/8.3/90) Fail Stage	ASTM D5182	> 14	> 14	> 14	> 14 ^a	> 14 ^a
FZG Micropitting, Fail Stage	FVA 54	10/High	10/High	10/High	10/High	10/High
FAG FE-8 Bearing Test, Roller Weight Loss, mg	DIN 51819-3	Pass	Pass	Pass	Pass	Pass

a Read-Across data: For this testing, the lower ISO grades result(s) are typically more severe than higher ISO grades; therefore, data is read across from the lower grades.

Minor variations in product typical test data are to be expected in normal manufacturing.



MEROPA ELITESYN[™] XM ISOCLEAN[®] CERTIFIED LUBRICANT 150, 220, 320, 460, 680

PRODUCT DESCRIPTION

Meropa EliteSynTM XM ISOCLEAN[®] Certified Lubricants are premium, highperformance synthetic gear oils, offering maximum efficiency, reduced



operating temperatures, long lubricant life and robust micropitting wear protection. They are designed for use in industrial and marine gear systems, where extreme load and shock load protection is required. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Meropa EliteSyn XM ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Maximum efficiency** advanced additive technology, resulting in less power consumption that provides the opportunity for increased energy, equipment and productivity efficiencies.

- **Reduced operating temperatures** synthetic base oils provide a lower coefficient of friction and can lower gearbox operating temperatures versus a mineral oil product.
- Long lubricant life very high oxidation resistance promotes long drain intervals.
- Wide temperature range low cold weather and high temperature protection that allows equipment operating temperature range from -30°C to 140°C, a far wider range than conventional gear oils.
- Provides micropitting resistance Delivers maximum micropitting and wear protection with reduced maintenance and increased system uptime.

FEATURES

Meropa EliteSyn XM ISOCLEAN Certified Lubricants are formulated to be our ultimate offering that meets or exceeds industry performance standards. They enable the equipment manufacturers desire for efficiency



improvements in designing gearboxes that are smaller, lighter and more energy efficient.

The additives in Meropa EliteSyn XM ISOCLEAN Certified Lubricants are compatible with paint coatings and with multiple types of seals to minimize the possibility of leaking seals and paint blistering on the inside of the gearbox. Competitor products with overaggressive chemistries may attack paint coatings and cause filter plugging.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2024 GL-45 ISOCLEAN

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APPLICATIONS

Meropa EliteSynTM XM ISOCLEAN[®] Certified Lubricants can be applied in:

- Industrial enclosed gearing where an AGMA EP lubricant is specified
- Bath, splash, circulating, or spray mist lubrication as applicable to the proper viscosity grade
- Marine gearboxes requiring an extreme pressure lubricant
- Rexnord gear drives requiring a synthetic extreme pressure or synthetic micropitting resistant lubricant

CLAIMS AND SPECIFICATIONS

ISO Grade	150	220	320	460	680
AIST (formerly U.S. Steel) 224	М	М	М	М	М
ANSI/AGMA 9005-F16-AS	М	М	М	М	М
DIN 51517/3 CLP	М	М	М	М	М
David Brown S1.53.101(5E)	М	М	М	М	М
Fives Cincinnati	M P-77	M P-74	M P-59	M P-35	M P-34
Flender Rev. 16.1 Helical-Bevel-Planetary Gear Units	Α	Α	A	Α	A
GE D50E35			М	М	М
Hansen Gear Units Series HP1, HP2, HPP, P4 and M4ACC	Α	A	Α	Α	Α
Hitachi AC Final Drive Gear	М	М	М	М	М
ISO 12925-1 CKC	М	М	М	М	М
ISO 12925-1 CKD	М	М	М	М	М
Joy Mining Machinery		M TO-SMEP	M TO-SHEP		
Pekrun Werknorm N8053	Α	Α	Α	Α	Α
Rexnord ^a Falk gear drive models: Class V, A, F, J, Planetgear Obsolete Falk gear drive models: Class D, G, Y, Link Belt Model "R"	Α	Α	A	A	A
Rexnord ^a Falk EP + MP reistance	Α	Α	Α	Α	A
SEW-Eurodrive Rev. 07 004 05 13 Helical-Bevel-Planetary Gear Units: X.e M1N, ML2, MCSeries Planetary Gear Units: P2e, P2, XP, P-X.e, PPK Series	A	A	A	A	A
Sumitomo Drive Technologies Paramax 9000	Α	Α	Α		
ZF		A TE-ML 27F	A TE-ML 27H	A TE-ML 27J	

a Consult with Rexnord/Falk Gear for applications: worm gear drives, high-speed drives, open gearing or any custom gear drive.

$\boldsymbol{\mathsf{A}}\text{:}$ Approved for

M: Meets or exceeds requirements

ISO Grade	Test Method	150	220	320	460	680
Product Number		279010	279011	279012	279013	279014
SDS Number U.S. Canada Mexico		50215 50216 50217	50215 50216 50217	50215 50216 50217	50215 50216 50217	50215 50216 50217
AGMA Grade		4 EP	5 EP	6 EP	7 EP	8 EP
API Gravity	ASTM D287	30.1	28.6	27.2	26.1	24.9
Density at 15°C, kg/L	ASTM D4052	0.8754	0.8836	0.8912	0.8975	0.9041
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	150 20.6	220 27.5	320 36.2	460 47.2	680 62.3
Viscosity Index	ASTM D2270	160	160	160	160	160
Flash Point, °C(°F)	ASTM D92	237(459)	239(462)	242(468)	243(469)	244(471)
Pour Point, °C(°F)	ASTM D5950	-36(-33)	-36(-33)	-36(-33)	-36(-33)	-30(-22)
Foam Test, Seq. II Tendency, mL Stability, mL	ASTM D892	50 max 0	50 max 0	50 max 0	50 max 0	50 max 0
Water Separation, Minutes to 0 mL emulsion	ASTM D1401	15	15	20	5	5
Copper Corrosion 3h @ 100°C	ASTM D130	1b	1b	1b	1b	1b
Rust Test	ASTM D665A ASTM D665B	Pass Pass	Pass Pass	Pass Pass	Pass Pass	Pass Pass
Timken OK Load, lb	ASTM D2782	>100	>100	>100	>100	>100
Four-Ball Weld, Weld Point, kg Load Wear Index	ASTM D2783	250 58	250 ^a 58 ^a	250 ^a 58 ^a	250 ^a 58 ^a	250 ^a 58 ^a
FZG Scuffing (A/8.3/90) Fail Stage	ASTM D5182	> 14	> 14	> 14	> 14 ^a	> 14 ^a
FZG Micropitting, Fail Stage	FVA 54	10/High	10/High	10/High	10/High	10/High
FAG FE-8 Bearing Test, Roller Weight Loss, mg	DIN 51819-3	Pass	Pass	Pass	Pass	Pass

a Read-Across data: For this testing, the lower ISO grades result(s) are typically more severe than higher ISO grades; therefore, data is read across from the lower grades.

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®]GEAR EP-5 SAE 80W-90, 85W-140

PRODUCT DESCRIPTION

 $\mathsf{Delo}^{\texttt{®}}$ Gear EP-5 gear lubricants are recommended for use in spiral bevel and hypoid differentials, power dividers, and oil-lubricated steering axle wheel bearings.

CUSTOMER BENEFITS

Delo Gear EP-5 delivers value through:

- Long gear life Extreme pressure properties protect hypoid and other types of gears from scuffing and wear.
- **Rust and corrosion protection** Effective inhibitor package protects against rusting or corrosion of gear and bearing surfaces.
- **Excellent foam inhibition** Foaming minimized by use of foam inhibitor.
- Long lubricant life Outstanding thermal and oxidation stability allow high temperature operation with long lubricant life.
- Seal Protection Formulated to protect against oil seal deterioration.

FEATURES

Delo Gear EP-5 are multipurpose lubricants.

They are made from paraffinic base stocks and contain a carefully balanced additive package to provide gear protection and long lubricant life.

The sulfur-phosphorus extreme pressure additive technology used in Delo Gear EP-5 provides exceptional thermal and oxidation stability. In addition, this lubricant is fortified with rust and corrosion inhibitors, a foam inhibitor, and a pour point depressant. The sulfur-phosphorus extreme pressure additives in Delo Gear EP-5 minimize the spalling and wear of gears by creating a microthin sacrificial film on the surface of the gear teeth which is actually softer than the gears themselves. Frictional heat and pressures between gear teeth cause the sulfur-phosphorus to react with the surfaces of the gear teeth at the point of contact, thus creating the sacrificial film.

The highly refined base stocks and various inhibitors in the additive package help assure a well-balanced lubricant and long gear and bearing life.

APPLICATIONS

Delo Gear EP-5 lubricants are recommended for use in spiral bevel and hypoid differentials, power dividers, and oil-lubricated steering axle wheel bearings.

Their multiviscosity characteristics allow their use in equipment operating over a broad ambient temperature range. This means good cold flow properties and gear protection.

Delo Gear EP-5 lubricants are approved for **SAE J2360** (formerly known as MIL-PRF-2105E). It meets the requirements of:

- API Service Categories MT-1 and GL-5
- Mack GO-J
- Meritor 076-D (SAE 80W-90)
- Meritor 076-A (SAE 85W-140)
- Volvo 97321 (obsolete specification)
- **ZF** TE-ML 05A, 12M, 16B, 17B, 19B, 21A (SAE 80W-90)
- ZF TE-ML 05A (SAE 85W-140)

Product(s) manufactured in the USA.

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

12 December 2022 GL-46

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SAE Grade	Test Method	80W-90	85W-140
Product Number		223022	223021
<i>SDS Number U.S. Canada Mexico</i>		44036 44042 44043	44036 44042 44043
Density at 15.6°C, kg/L Density at 60°F, lb/gal	ASTM D4052	0.8856 (7.39)	0.8991 (7.50)
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	145 14.2	341 25.0
Viscosity, Brookfield cP at -12°C cP at -26°C	ASTM D2983	73,000	80,000 —
Viscosity Index	ASTM D2270	95	95
Flash Point, °C(°F)	ASTM D92	218(421)	226(439)
Pour Point, °C(°F)	ASTM D97	-33(-27)	-15(+5)

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] GEAR EP-5 ISOCLEAN[®] CERTIFIED LUBRICANT SAE 80W-90, 85W-140

PRODUCT DESCRIPTION

Delo[®] Gear EP-5 ISOCLEAN[®] Certified Lubricants are recommended for use in spiral bevel and hypoid differentials, power dividers, and oil-lubricated



steering axle wheel bearings. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Delo Gear EP-5 ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Long gear life Extreme pressure properties protect hypoid and other types of gears from scuffing and wear.
- Rust and corrosion protection Effective inhibitor package protects against rusting or corrosion of gear and bearing surfaces.
- Excellent foam inhibition Foaming minimized by use of foam inhibitor.

- Long lubricant life Outstanding thermal and oxidation stability allow high temperature operation with long lubricant life.
- Seal Protection Formulated to protect against oil seal deterioration.

FEATURES

Delo Gear EP-5 ISOCLEAN Certified Lubricants are multipurpose lubricants.

They are made from paraffinic base stocks and contain a carefully balanced additive package to provide gear protection and long lubricant life.

The sulfur-phosphorus extreme pressure additive technology used in Delo Gear EP-5 ISOCLEAN Certified Lubricants provide exceptional thermal and oxidation stability. In addition, this lubricant is fortified with rust and corrosion inhibitors, a foam inhibitor, and a pour point depressant.

The sulfur-phosphorus extreme pressure additives in Delo Gear EP-5 ISOCLEAN Certified Lubricants minimize the spalling and wear of gears by creating a micro-thin sacrificial film on the surface of the gear teeth which is actually softer than the gears themselves. Frictional heat and pressures between gear teeth cause the sulfur-phosphorus to react with the surfaces of the gear teeth at the point of contact, thus creating the sacrificial film.

The highly refined base stocks and various inhibitors in the additive package help assure a well-balanced lubricant and long gear and bearing life.

Product(s) manufactured in the USA and Colombia. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

12 December 2022 GL-46 ISOCLEAN

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APPLICATIONS

Delo Gear EP-5 ISOCLEAN Certified Lubricants are recommended for use in spiral bevel and hypoid differentials, power dividers, and oil-lubricated steering axle wheel bearings.

Their multiviscosity characteristics allow their use in equipment operating over a broad ambient temperature range. This means good cold flow properties and gear protection.

Delo Gear EP-5 ISOCLEAN Certified Lubricants are approved for **SAE J2360** (formerly known as MIL-PRF-2105E). It meets the requirements of:

- API Service Categories MT-1 and GL-5
- Mack GO-J
- Meritor 076-D (SAE 80W-90)
- Meritor 076-A (SAE 85W-140)
- Volvo 97321 (obsolete specification)
- ZF TE-ML 05A, 12M, 16B, 17B, 19B, 21A (SAE 80W-90)
- **ZF** TE-ML 05A (SAE 85W-140)

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

SAE Grade	Test Method	80W-90	85W-140
Product Number		223026	223025
SDS Number U.S. Canada Mexico		44036 44042 44043	44036 44042 44043
Colombia		47698	47698
Density at 15.6°C, kg/L Density at 60°F, lb/gal	ASTM D4052	0.8856 (7.39)	0.8991 (7.50)
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	145 14.2	341 25.0
Viscosity, Brookfield cP at -12°C cP at -26°C	ASTM D2983		80,000 —
Viscosity Index	ASTM D2270	95	95
Flash Point, °C(°F)	ASTM D92	218(421)	226(439)
Pour Point, °C(°F)	ASTM D97	-33(-27)	-15(+5)

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



DELO[®] GEAR EXTREME EP-5 SAE 75W-90

PRODUCT DESCRIPTION

 $\mathsf{Delo}^{\textcircled{R}}$ Gear Extreme EP-5 gear lubricant is a heavy duty automotive gear lubricant designed to meet the severe demands of cold weather operations.

CUSTOMER BENEFITS

Delo Gear Extreme EP-5 delivers value through:

- **Maximizing fuel economy** by minimizing friction and lubricant drag.
- **Minimizing wear** through use of high performance antiwear additives.
- **Maximizing lubrication** in cold operating conditions due to good flow properties.
- Gear and bearing protection due to effective rust and foam inhibitors.

FEATURES

Delo Gear Extreme EP-5 is a heavy duty automotive gear lubricant designed to meet the severe demands of cold weather operations.

It is formulated with highly refined base stocks and compounded with extreme pressure, antiwear, corrosion inhibition, rust preventive, and foam suppressant additives, as well as a shear stable viscosity index improver. This additive package is a modern sulfur-phosphorus system with maximum thermal stability, gear spalling protection, and antiwear performance.

Delo Gear Extreme EP-5 is designed to provide excellent wear protection for automotive gear sets operating in extremely cold conditions, where fluidity of the lubricant is critical to protect gears and bearings. Low viscosity hastens the release of entrained air in the lubricant at low temperatures, and can help promote better oil film on moving parts.

APPLICATIONS

Delo Gear Extreme EP-5 is recommended for automotive rear axle and manual transmission gears operating in severe arctic climates, or where the manufacturer recommends a viscosity range lighter than conventional SAE 80W-90 or SAE 85W-140 gear lubricants.

Delo Gear Extreme EP-5 is engineered to meet the requirements of **API Service Categories** GL-4, GL-5 and MT-1.

It is engineered to pass the performance requirements of **SAE J2360** (formerly known as MIL PRF-2105E).

TYPICAL TEST DATA

SAE Grade	75W-90
Product Number	250601, 222025a
<i>SDS/MSDS Number U.S. Canada Mexico</i>	46997 46998 46996
Density at 15°C, kg/L	0.885
Viscosity, Kinematic cSt at 40°C cSt at 100°C	94 16.8
Viscosity, Brookfield cP at -40°C	120,000
Viscosity Index	195
Channel Point, °C(°F)	-50(-58)
Pour Point, °C(°F)	-45(-49)

a Product code for Multigear Extreme EP-5

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 April 2018 GL-50

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DELO[®]GEAR LS SAE 80W-90

PRODUCT DESCRIPTION

Delo[®] Gear LS gear lubricant is a high quality gear lubricant designed to provide protection in extreme operating conditions for applications requiring API GL-5 or MT-1 performance levels.

CUSTOMER BENEFITS

Delo Gear LS gear lubricant delivers value through:

- Controlled inventory costs One gear lubricant for both conventional and limited slip differentials. Simplified inventory can help save money, space, and handling time.
- Optimal gear life Extreme pressure properties protect hypoid and other types of gears from scuffing and wear.
- Long lubricant life Outstanding thermal and oxidation stability allow high temperature operation with long lubricant life.

FEATURES

Delo Gear LS gear lubricant is a high quality gear lubricant.

It is formulated with a thermally stable friction modifier and can be used for complete replacement or top-off in limited slip differentials.

Delo Gear LS gear lubricant contains a high performance sulfur-phosphorous extreme pressure additive, thermally stable base stocks, and friction modifiers for limited slip performance. In addition, this lubricant is fortified with rust and corrosion inhibitors, a foam inhibitor, and a pour point depressant. The extreme pressure additives in Delo Gear LS gear lubricant minimize the spalling and wear of gears by creating a micro-thin sacrificial film on the surface of the gear teeth which is actually softer than the gears themselves. Frictional heat and pressures between tooth surfaces cause the sulfur-phosphorous to react with the surface of the gear teeth at the point of contact, thus creating the sacrificial film.

The limited slip additive was carefully selected to provide the desired frictional properties in limited slip differentials with no degradation of performance in conventional applications.

Delo Gear LS gear lubricant has outstanding thermal and oxidative stability. It minimizes oxidative sludge and varnish formation for maximum gear, bearing and seal life. In particular, the high thermal stability of the friction modifier results in stable friction levels and longer life for anti-stick-slip performance.

APPLICATIONS

Delo Gear LS gear lubricant is recommended for service fill and top-off of all limited slip differentials. It is recommended for differentials where manufacturers' specify API GL-5 gear lubricants plus supplemental limited slip additive.

Delo Gear LS gear lubricant provides excellent performance in conventional automotive gear oil applications requiring API GL-5 or MT-1 performance levels, including:

- Differentials calling for this viscosity grade
- Axles in buses and heavy duty trucks where gear lubricants are recommended
- Four-wheel drive transfer cases
- Applications where a "multipurpose" gear lubricant or an API Service Classification GL-5 is required

Product(s) manufactured in the USA and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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1 April 2018 GL-52

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Delo[®] Gear LS gear lubricant can also be used in offhighway wheel loader axles equipped with wet brakes. It is recommended for small and medium size loaders made by **Hitachi** and **Kawasaki**. This fluid can be a good choice for applications requiring friction modification (anti-chatter) with a level of gear protection much higher than that provided by typical API GL-4 tractor fluids.

Delo Gear LS gear lubricant meets or exceeds the performance requirements of **API Service Categories** MT-1 and GL-5.

Note: Delo Gear LS gear lubricant is designed for full refill of all limited slip differentials. However, there may be instances when axle chatter occurs. If so, it is acceptable to add at least 3% by volume of aftermarket limited slip top treat additive (4 ounces of top treat per gallon of lubricant).

TYPICAL TEST DATA

SAE Grade	80W-90
Product Number	250602, 250600 ^a
<i>SDS/MSDS Number U.S. Canada Mexico El Salvador</i>	46958 46959 46960 46962
Density at 15°C, kg/L	0.889
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	135 14.3
Viscosity, Brookfield mPa.s at -26°C	70,300
Viscosity Index	104
Flash Point, °C(°F)	221(430)
Pour Point, °C(°F)	-34(-29)

a. Product code for Multigear LS SAE 80W-90

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON OPEN GEAR GREASE

PRODUCT DESCRIPTION

Chevron Open Gear Grease is an open gear grease formulated with high viscosity mineral oils in a nonsoap-based thickener typically used in chain and open gear lubricant applications.

CUSTOMER BENEFITS

Chevron Open Gear Grease delivers value through:

- Low environmental impact Does not contain a diluent.
- Long equipment life High film strength provides excellent antiwear protection to gear teeth under high, shock load conditions.
- Minimizes operating cost Long lasting lubrication film minimizes frequency of repeated application and, therefore, overall volume of lubricant used.
- **Reliability** The high dropping point, the molybdenum disulfide/graphite fillers, and the tackiness additive offer excellent protection against gear failure at elevated temperatures during severe operation.
- Flexibility to use in wet conditions Resists rust, supporting long gear life, and assures good film strength even in a wet environment.

FEATURES

Chevron Open Gear Grease is formulated with high viscosity mineral oils in a nonsoap-based thickener. This grease appears brownish-black and is extremely tacky.

Chevron Open Gear Grease contains special functional fillers (molybdenum disulfide and graphite), which impart a long-lasting film on working surfaces.

It also contains tackiness additives, wetting agents and rust inhibitors to protect metal surfaces.

APPLICATIONS

Chevron Open Gear Grease is recommended:

- for many open gears in industrial, mining, construction, and marine equipment
- for chain and sprocket lubrication
- as a tenacious fifth wheel lubricant

Chevron Open Gear Grease can be applied in a variety of methods, including:

- from a cartridge in a caulking gun
- through a mechanical lubricator over a wide range of operating temperatures

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

10 February 2018 GL-55

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Product Number	230002
SDS Number	6809
Contains Diluent	No
Penetration, at 25°C(77°F) Unworked	360
Four-Ball EP Weld, ASTM D2596, kg Wear, ASTM D2266, mm	315 0.60
Rust Test, ASTM D1743, rating	Pass
Timken OK Load, Ib	40
Thickener Type	Inorganic Clay
Base Oil Viscosity, Kinematic (without thickener or filler) cSt at 40°C cSt at 100°C	6532 152
Flash Point, °C(°F)	>204(400)
Resultant Film	Tacky
Texture	Smooth
Color	Brown-Black

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON OPEN GEAR LUBRICANT 250 NC

PRODUCT DESCRIPTION

Chevron Open Gear Lubricant is formulated to minimize wear and provide shock load protection during typical operations.

CUSTOMER BENEFITS

Chevron Open Gear Lubricant delivers value through:

- Low environmental impact The carrier solvent contained in Chevron Open Gear Lubricant is a non-ozone depleting diluent. Chevron Open Gear Lubricants also pass the EPA's Toxicity Characteristic Leaching Procedure (TCLP) test.
- Long equipment life High film strength provides excellent anti-wear protection to gear teeth under high, shock load conditions.
- Ease of application Easily applied with brushes, swabs or through automatic lubrication systems.

FEATURES

Chevron Open Gear Lubricant is a black, viscous lubricant formulated with an asphaltic base and diluted with a non-chlorinated solvent for easy application by hand or through automatic lubrication systems.

It provides a high film strength coating on gear teeth to minimize wear.

Chevron Open Gear Lubricant is designed to provide tacky, tenacious lubricant films on open gears operating under severe shock load conditions.

Chevron Open Gear Lubricant contains a nonchlorinated diluent that eases the application of these lubricants onto the gears. The diluent then evaporates, leaving a tacky lubricant film on the gear teeth. It can also be used to lubricate chains, sprockets, wire rope, and cables. When used as a cable coating, the diluent allows the lubricant to penetrate into the core, thus carrying the lubricant into the individual strands and minimizes wear as the cable is run through sheaves or onto a winch drum.

APPLICATIONS

Chevron Open Gear Lubricant is recommended for many types of open gears, wire ropes, and cables.

It can be applied by brush, by swab or by automatic lubrication systems.

It provides lubrication for mining equipment, including:

- girth and pinion gears on rod and ball mills;
- rack and pinion gears on shovel dipsticks;
- swing and pinion gears on top of the lower frame of shovels and draglines, which are sometimes served with an automatic lubrication system.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 December 2022 GL-65

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	250 NC
Product Number	255141
SDS Number	7088
Contains Diluent ^a	Yes
Thickener Type	Asphaltic
Timken OK Load, ASTM D2782, lb	40
Four-Ball Weld Point, ASTM D2783, kg Wear Scar Diameter, ASTM D2266, mm	315 0.60
Rust Test, ASTM D665, 24 h, Distilled Water	Pass
Viscosity, Kinematic cSt at 40°C (with diluent) cSt at 100°C (without diluent)	4125 800
Viscosity, Saybolt SUS at 100°F (with diluent) SUS at 210°F (without diluent)	19,110 3730
Low Temperature Pumpability Lincoln Ventmeter at 400 psi, °C(°F)	0(32)
Flash Point, °C(°F)	83(181)
Pour Point, °C(°F)	4(40)
Resultant Film ^b	Tacky
Texture	Smooth
Color	Black

a Diluent is nonchlorinated and combustible. It is also volatile, therefore it is important to keep containers tightly sealed to avoid loss.

b At normal ambient temperature 21°C to 38°C (70°F to 100°F).

Minor variations in product typical test data are to be expected in normal manufacturing.



TALCOR[™] OGP-4 #000

PRODUCT DESCRIPTION

Talcor[™] OGP-4 is an advanced Open Gear Lubricant formulated with solvent free blend of hydro-treated mineral oils and stable synthetic thickeners, new micro ground lubricating solids and plastic-coupling chemical agents for the lubrication of industrial open or enveloped gears.

CUSTOMER BENEFITS

Talcor OGP-4 delivers value through:

- **Safer operation** as products do not contain solvents.
- Suitable performance under a wide range of operational temperatures - due the excellent pumpability that allows its usage at low temperatures (above 0°C/32°F).
- Long equipment life its inert formulation does not react with copper alloy or other components of the pumping system.
- Low product consumption combination of plastic agents and stabilizers provides an efficient adhesiveness that reduces product consumption.
- Low wear product promotes the formation of a high resistance film to compression and shear.

APPLICATIONS

Talcor OGP-4 is recommended for open gears, racks & pinions, dipper sticks, circle rollers and rails and other mechanisms that are found in the mining, steel, cement, sugar and other heavy industries. It is also recommended for gears and pinions that operate at elevated temperatures up to 85°C (185°F).

Talcor OGP-4 is not recommended for use in high-speed journals or roller bearings.

Product(s) manufactured in Thailand.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 September 2023 GL-70

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NLGI Grade	Test Method	#000
Product Number		255144
SDS/MSDS Number		58470
Safe Operating Temp, °C(°F)		85 (185)
Penetration, at 25°C (77°F) Unworked	ASTM D217	460
Four Ball Weld Point, kg	ASTM D2596	620
FZG Test, Stage Passed	DIN 51354	12
Timken OK Load (1b)	ASTM D2509	55
Copper Corrosion 3h at 100°C	ASTM D4048	1a
Bearing Rust Protection	ASTM D1743	Pass
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	1800 88
Pour Point °C (°F)	ASTM D97	-9(16)
Lincoln Ventmeter, psig at 30s, at 75°F 30°F 0°F	K95400	9 11 1359
Texture		Soft, Smooth Grease
Color		Black

Minor variations in product typical test data are to be expected in normal manufacturing.



TALCOR[™] OGP-6 #000

PRODUCT DESCRIPTION

Talcor[™] OGP-6 is an adhesive, Open Gear Lubricant free of bitumen, graphite, molybdenum disulphide and other heavy metals. Its highly refined base oils and stable synthetic thickeners, compounded together with high performance enhancing additives, provide a transparent lubricant film on the gear flanks.

CUSTOMER BENEFITS

Talcor OGP-6 delivers value through:

- **Ease of maintenance** Excellent adhesion on the gear flanks and easy drainage from gear guards. Transparent lubricant film makes it easier to inspect gear flanks.
- Ease of application Can be dispensed without heating, through conventional spray lubricating systems.
- Excellent wear protection Surpasses the scope of the FZG Test, thus providing excellent lubrication under boundary load conditions.
- **Stable chemistry** Shear stable synthetic thickeners ensure good mechanical stability whilst in service without packing in the gear teeth roots.

APPLICATIONS

Talcor OGP-6 is designed specifically to be used on exceptionally heavily-loaded open gears where a solids-free lubricant is desired.

Product(s) manufactured in Thailand.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 September 2023 GL-71

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- Continued

TYPICAL TEST DATA

NLGI Grade	Test Method	#000
Product Number		255145
SDS/MSDS Number		58480
Penetration, at 25°C (77°F) Unworked	ASTM D217	456
Four Ball Weld Point, kg	ASTM D2596	800
FZG Test, Stage Passed	DIN 51354	12
Timken OK Load (1b)	ASTM D2509	40
Copper Corrosion 3h at 100°C	ASTM D4048	1a
Bearing Rust Protection	ASTM D1743	Pass
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	4700 186
Pour Point, °C(°F)	ASTM D97	-11(12)
Lincoln Ventmeter, psig at 30s, at 75°F 30°F 0°F	K95400	1 4 1308
Texture		Soft, Smooth Grease
Color		Yellow

Minor variations in product typical test data are to be expected in normal manufacturing.



GREASES



GREASE GUIDELINES

OPERATING TEMPERATURE RANGES

	Operating Tem	perature, °C(°F)
	Minimum ^a	Maximum ^b
Black Pearl [®] Grease EP		
1, 2	-40(-40)	177(350)
Multifak CG	-29(-20)	162(325)
Clarity [®] Synthetic EA Grease	-40(-40)	100(212)
Black Pearl [®] HM	-50(-58)	150(302)
Starplex [®] EP		
00, 0	-40(-40)	132(270)
1, 2	-40(-40)	177(350)
Delo [®] Grease ESI [®] EP 2	-32(-25)	177(350)
Starplex [®] HD 1, 2	-26(-15)	177(350)
Starplex [®] HD M3 1, 2	-26(-15)	177(350)
Starplex [®] HD M5 1, 2	-26(-15)	177(350)
Starplex [®] Syn EP M5 1	-40(-40)	235(450)
Delo [®] Syn-Grease SFE EP	-45(-50)	190(375)
Multifak [®] EP		
NLGI 000	-35(-31)	70(158)
NLGI 00	-35(-31)	77(170)
NLGI 0	-30(-22)	99(210)
NLGI 1	-20(-4)	125(257)
NLGI 2	-15(5)	127(260)
Sil-X [®] Grease NLGI 1	-9(+15)	204(400)
Black Pearl [®] SRI 2	-30(-22)	177(350)
Starplex [®] Premium 1	-18(0)	163(325)
Texclad [®] 2	-18(0)	79(175)
Starplex [®] Syn XD 1.5	-40(-40)	235(450)
Starplex [®] Syn HD 1.5	-51(-60)	232(450)
Ultra-Duty HD		
0	-26(-15)	132(270)
1	-26(-15)	138(280)
2	-26(-15)	143(290)
Ultra-Duty XD 00	-29(-20)	121(250)

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

April 2025

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Always refer to the OEM's equipment guidelines for determining the best relubrication intervals.

THICKENER TYPE

	Aluminum complex	Calcium	Lithium	Lithium complex	Polyurea	Silica	GC-LB	LB
Black Pearl [®] Grease EP					•		•	
Multifak [®] CG			٠					
Clarity [®] Synthetic EA Grease		٠						
Starplex [®] EP				•			٠	
Starplex [®] HD 1, 2				•				
Starplex [®] HD M3/5 1, 2				٠				
Starplex [®] Syn EP M5 1				•				
Delo [®] Grease ESI [®] EP				•				٠
Delo [®] Syn-Grease SFE EP					•			
Multifak [®] EP			•					•
Sil-X [®] Grease						٠		
Black Pearl [®] SRI 2					•			
Starplex [®] Premium				٠				
Texclad [®]		٠						
Starplex [®] Syn XD				•				
Starplex [®] Syn HD				•				
Ultra-Duty HD 0, 1, 2			•					
Ultra-Duty XD 00			•					

COMPATIBILITY

The statement that two greases are compatible means only that mixtures of the two do not soften excessively or lose heat resistance to an unacceptable degree.

The statement that two greases are compatible does not imply equivalence of the two greases in overall lubrication performance.

Therefore, the statement that two greases are compatible offers no information about the performance of mixtures with regard to load carrying ability, rust prevention, wear prevention or any other measurable aspect of grease performance.

Reported test results are <u>not</u> based on ASTM D6185 but are instead based on a Chevron proprietary test method. Compatibility testing done on fresh products does not necessarily predict compatibility results for combinations of fresh and used products.

When changing lubricants, it is essential that all equipment manufacturer procedures be followed, including drain and flush requirements.

For further information, contact LUBE TEK at 1-800-LUBE-TEK (1-800-582-3835) or lubetek@chevron.com.

RESOURCES

Chevron Lubricants Technical Bulletin LTB_42_02_12 "Grease Compatibility and Grease Lubrication Practices"



BLACK PEARL[®] EP 1, 2 (formerly Black Pearl[®] Grease EP NLGI 1, 2)

PRODUCT DESCRIPTION

Black Pearl[®] EP are multipurpose, polyurea, extreme pressure, water-resistant greases.

CUSTOMER BENEFITS

Black Pearl EP delivers value through:

- Excellent pumpability Easy pumping in typical centralized lubrication systems and at low temperatures.
- **High load capacity** High film strength provide good overall EP performance, shock load protection and low wear protection.
- **Corrosion protection** Passes the ASTM D1743 Bearing Rust Test.
- Water resistance Product provides exceptional water wash out results.
- Excellent adhesion These greases stay in place and continue lubricating under most operating conditions.
- Long lubricant life in storage and in use.

FEATURES

Black Pearl EP are multipurpose, polyurea, extreme pressure, water-resistant greases.

Black Pearl EP greases are formulated with highly refined base stock, a polyurea thickener, and rust and oxidation inhibitors. They are black in color and smooth and buttery in texture.

FUNCTIONS

Black Pearl EP provides outstanding film strength and adhesive properties. As a result, these products are particularly effective in providing excellent wear protection in heavily loaded and shock load conditions.

Black Pearl EP greases are formulated to stay in place, stick to bearing surfaces and, thus, provide excellent lubrication under a wide range of operating conditions. They perform particularly well in roller bearings. These products provide exceptional water wash out results. The rust inhibitors effectively protect bearing surfaces against corrosion. Pumpability is excellent over a wide range of temperatures as indicated by the Lincoln ventmeter test and the relatively low pressure drop in piping. Oxidation inhibitors promote long life in storage and in use. In addition, they also perform well at high temperatures.

APPLICATIONS

Black Pearl EP greases are recommended for general lubrication service in many types of automotive and industrial applications.

Typical industrial applications are:

- Presses
- Antifriction bearings
- Low and high speed journal bearings
- Roller and needle bearings
- Shaker or classifier screen bearings
- Conveyors and run out rolls
- Electric motor bearings (only when roller bearings are in use)
- Exhaust fan bearings
- Crusher bearings
- Pump bearings

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

10 March 2023 GR-10

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Typical automotive applications are:

- Chassis points including ball joints and universal joints
- Wheel bearings
- Water pumps
- Fifth wheels
- Steering system bearings
- King pins

Black Pearl[®] EP 1 and 2 work well in both plain and antifriction-type bearings, particularly those subjected to shock loading.



Black Pearl EP greases are registered by **NSF** and are

acceptable as a lubricant where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

NLGI Grade	Test Method	1	2
Product Number		254592	254591
SDS Number		7237	7237
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-40(-40) 177(350)	-40(-40) 177(350)
Penetration, at 25°C(77°F) Unworked Worked (60 strokes) Worked (100,000 strokes)	ASTM D217	320 325 360	255 280 335
Dropping Point, °C(°F)	ASTM D2265	270(518)	270(518)
Timken OK Load, lb	ASTM D2509	70	70
Four-Ball Weld Point, kg	ASTM D2596	500	500
Four-Ball Wear Scar, mm	ASTM D2266	0.42	0.42
Lincoln Ventmeter, psig at 30 s at 75°F 30°F 0°F -22°F	K95400	215 235 280 625	300 350 800 †
Copper Corrosion, rating	ASTM D4048	1a	1a
Bearing Rust Protection	ASTM D1743	Pass	Pass
Water Washout, 79°C, %	ASTM D1264	<1	<1
Thickener, % Type		11.5 Polyurea	13.5 Polyurea
ISO Viscosity Grade, Base Oil Equivalent		220	220
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	220 14.4	220 14.4
Viscosity Index	ASTM D2270	97	97
Flash Point, °C(°F)	ASTM D92	260(500)	260(500)
Pour Point, °C(°F)	ASTM D97	-9(16)	-9(16)
Texture		Smooth, Buttery	Smooth, Buttery
Color		Black	Black

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

[†] Too stiff at this temperature to pump through device.

Minor variations in product typical test data are to be expected in normal manufacturing.



10 March 2023

GR-15

BLACK PEARL[®] HM 1 (formerly Delo[®] Extreme Grease EP)

PRODUCT DESCRIPTION

Black Pearl[®] HM (formerly Delo[®] Extreme Grease EP) is recommended for use as a general purpose automotive and industrial grease where extreme low temperature performance is required.

CUSTOMER BENEFITS

Black Pearl HM delivers value through:

- Low temperature performance Designed to lubricate in arctic climates.
- **Good rust protection** Passes ASTM D1743-73 rust test.
- Good pumpability Low viscosity oil component of grease enables easy application in winter climates. It has good pumpability at low temperatures, down to -30°C (-22°F).
- **Good load carrying capacity** As indicated by the Timken OK load of 45 lb.

FEATURES

Black Pearl HM is manufactured using a polyurea thickener, special low viscosity base oil, and rust and oxidation inhibitors.

It is specially formulated for use in automotive and industrial applications where extreme low temperatures are encountered.

Black Pearl HM has outstanding low temperature lubrication qualities and provides metal parts with excellent rust and corrosion protection as well as protection from wear.

APPLICATIONS

Black Pearl HM is recommended for use as a general purpose automotive and industrial grease where extreme low temperature performance is required.

It is also recommended for use in environments with a wide ambient temperature range.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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NLGI Grade	Test Method	1
Product Number		259127
<i>SDS/MSDS Number U.S. Canada Mexico</i>		44533 44534 44535
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-50(-58) 150(302)
Penetration, at 25°C(77°F) Unworked Worked	ASTM D217	310 325
Dropping Point, °C(°F)	ASTM D2265	245(473)
Timken OK Load, Ib	ASTM D2509	45
Lincoln Ventmeter, psig at 30 s, at 75°F 30°F 0°F -22°F	K95400	0 0 100 420
Thickener, % Type		16 Polyurea
ISO Viscosity Grade, Base Oil Equivalent		22
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	22.0 4.3
Viscosity Index	ASTM D2770	101
Flash Point, °C(°F)	ASTM D92	176(349)
Pour Point, °C(°F)	ASTM D97	-27(-17)
Texture		Smooth, Buttery
Color		Black

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minor variations in product typical test data are to be expected in normal manufacturing.



BLACK PEARL[®] SRI 2 (formerly: Chevron SRI Grease 2)

PRODUCT DESCRIPTION

Black Pearl[®] SRI 2 is a high temperature ball and roller bearing grease.

CUSTOMER BENEFITS

Black Pearl SRI 2 delivers value through:

- Wide application range Suitable for high rpm operation, operating temperatures ranging from -30°C to 177°C (-22°F to 350°F).
- Excellent oxidation stability Provides exceptional bearing life at operating temperatures in the range of 93°C to 177°C (199°F to 350°F).
- Excellent rust protection Provides rust protection as defined by ASTM D5969 with 10% Synthetic Sea Water.

FEATURES

Black Pearl SRI 2 is a high temperature ball and roller bearing grease.

It is formulated with highly refined base stocks, a modern ashless, organic polyurea thickener coupled with high performance rust and oxidation inhibitors (the latter to provide outstanding rust protection in severe applications that many electric motor applications are exposed to in field operations). Its texture is smooth and buttery and its color is dark green.

As noted, Black Pearl SRI 2 passes the Static Bearing Rust Test, ASTM D5969, with 10% synthetic sea water. These properties help to provide longer bearing life under high speed and high temperature operation. This is nearly 10 times the life possible when using conventional lithium greases. Under normal operating temperatures and conditions, Black Pearl SRI 2 can be used as a "Life Pack" lubricant in sealed bearings. Note that in today's more modern, high output (horsepower), high load electric motors, there are times where these units employ ball bearings and roller element bearings on the same motor. On units where horsepower and load are considered high on the roller element bearing, EP greases should be employed.

APPLICATIONS

Black Pearl SRI 2 is recommended:

- for use in a wide range of automotive and industrial applications
- for use in antifriction bearings operating at high speeds (10,000 rpm and greater)
- where the operating temperatures are on the order of 150°C (302°F) and higher
- where there is a likelihood that water or salt water will get into the bearings

Black Pearl SRI 2 will perform in bearings at temperatures as low as $-30^{\circ}C$ ($-22^{\circ}F$).

Black Pearl SRI 2 is registered by **NSF** and is acceptable as a lubricant where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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NLGI Grade	Test Method	2
Product Number		254521
SDS Number		35940
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-30(-22) 177(350)
Penetration, at 25°C(77°F) Unworked Worked	ASTM D217	255 280
Dropping Point, °C(°F)	ASTM D2265	243(470)
High Temperature Life, hours at 177°C (350°F)	ASTM D3336	750+
Lincoln Ventmeter, psig at 30 s, at 75°F 30°F 0°F	K95400	225 425 750
Thickener, % Type		8.0 Polyurea
ISO Viscosity Grade, Base Oil Equivalent		100
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	100 11.0
Viscosity Index	ASTM D2270	94
Flash Point, °C(°F)	ASTM D92	260(500)
Pour Point, °C(°F)	ASTM D97	-15(5)
Texture		Smooth, Buttery
Color		Dark Green

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.
 b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minor variations in product typical test data are to be expected in normal manufacturing.



25 September 2023

GR-25

MULTIFAK[®] CG (formerly Chevron Coupling Grease)

PRODUCT DESCRIPTION

Multifak[®] CG is specifically designed for the lubrication of high-speed grease lubricated flexible couplings where high centrifugal forces are present.

CUSTOMER BENEFITS

Multifak CG delivers value through:

- Exceptional film strength Formulated with a high viscosity base oil and polymer for exceptional film strength
- **Minimal oil separation** in high-speed couplings under high centrifugal forces
- Excellent adhesion Stringy and tacky
- **Minimal leakage** because of a tackiness polymer additive
- Extreme pressure, rust, and oxidation protection
- Long relubrication intervals Helps avoid costly maintenance and downtime
- Excellent low temperature pumpability down to 0°C (32°F)

FEATURES

Multifak CG is a brown, stringy and tacky grease manufactured using a high viscosity base oil, a lithium soap thickener, rust and oxidation inhibitors, and extreme pressure and polymer tackiness additives.

It is designed for high-speed grease lubricated flexible couplings and is specially formulated to provide specific resistance to centrifugal separation in high-speed gear or grid couplings.

Multifak CG has high load-carrying capacity and therefore provides good protection of lubricated parts against wear.

APPLICATIONS

Multifak CG is specifically designed for the lubrication of high-speed grease lubricated flexible couplings where high centrifugal forces are present.

It is recommended for use in high- speed grid, gear, or chain couplings in a variety of industrial applications.

Multifak CG meets the coupling requirements of AGMA CG-1, CG-2 and CG-3 type couplings.

Multifak CG exhibits little to no oil separation in the ASTM D4425 high-speed centrifuge test.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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	Test Method	
Product Number		230003
SDS Number		6819
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-29(-20) 162(325)
Penetration, at 25°C(77°F) Unworked Worked	ASTM D217	252 330
Dropping Point, °C(°F)	ASTM D2265	215(419)
Timken OK Load, Ib	ASTM D2509	40
Thickener Type		Lithium
Four Ball Weld, kg	ASTM D2596	315
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	700 41
Centrifugal Oil Separation, 24 h, vol%	ASTM D4425	<3
Texture		Smooth, Tacky
Color		Dark Brown

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minor variations in product typical test data are to be expected in normal manufacturing.



MULTIFAK[®] EP 000, 00, 0, 1, 2

PRODUCT DESCRIPTION

Multifak $^{\ensuremath{\mathbb{R}}}$ EP greases are multipurpose extreme pressure greases suitable for use in many industrial grease applications.

CUSTOMER BENEFITS

Multifak EP greases deliver value through:

- **Good water resistance** Resistance to washout of bearings.
- Good corrosion protection Inhibited to protect bearing surfaces.
- **Good oxidation stability** Helps to support long life in storage and in use.
- **Simplified lubrication** One grease designed to satisfy many different industrial grease requirements.
- Low oil separation tendency Recommended for use in typical centralized lubrication systems.

FEATURES

Multifak EP greases are multipurpose extreme pressure greases suitable for use in many industrial grease applications.

Multifak EP greases are manufactured using selected highly refined medium viscosity index base oils, a lithium 12 hydroxystearate thickener, an extreme pressure additive, and rust and oxidation inhibitors.

Multifak EP greases have high load-carrying capacity and, therefore, provide good protection of lubricated parts against wear. They provide good lubrication in the presence of water, protect bearing surfaces against corrosion, and have excellent resistance to oxidation, which supports long life in storage and in use.

Multifak EP greases are work stable. They resist separation or throw out from antifriction bearings.

They have low oil bleeding tendency under pressure and are pumpable at low temperatures.

APPLICATIONS

Multifak EP greases are suitable for use in typical centralized lubrication systems.

Multifak EP greases can satisfy a wide range of industrial and commercial grease applications.

Typical applications include:

- General Machinery plain, antifriction, roller, and needle bearings
- Construction equipment
- Conveyors and run-out rolls
- Crusher, shaker, or classifier screen bearings
- Chassis lubrication
- Non-disc brake wheel bearings

Multifak EP greases are recommended for both plain and antifriction bearings and particularly for bearings subjected to shock loading. **NLGI grades 1** and **2** comply with Timken's recommendation for this service.



Multifak EP 000 is a semifluid grease formulated to meet the lubrication requirements of machinery having enclosed gear cases where housings and seals have lost their ability to retain conventional gear oils.

Product(s) manufactured in the USA and Colombia. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 November 2023 GR-30

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CLAIMS AND APPLICATIONS

NLGI Grade	000	00	0	1	2
Grob Lubricant Chart	Α	Α			Α
NLGI LB				Α	Α
NSF H2 ^a			Α	Α	Α
Pekrun Werknorm N8053		Α			Α
SMS Group SN 180-1		Α	Α		Α
Volvo 97718					Α
Waldrich Siegen Lubricants for Machine Tools					Α

a NLGI grades 0, 1 and 2 are registered by NSF and are acceptable as a lubricant where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

A: Approved for

M: Meets or exceeds requirements

NLGI Grade	Test Method	000	00	0	1	2
Product Number		274508	274509	274501	274502	274503
SDS/MSDS Number USA Colombia		38345 —	23689 —	23562 —	23562 —	23562 34392
Operating Temperature, °C(°F) Minimum ^a		-35(-31) 70(158)	-35(-31) 77(170)	-30(-22) 99(210)	-20(-4) 125(257)	-15(5) 127(260)
Penetration, at 25°C (77°F) Unworked Worked	ASTM D217	445 460	415 415	390 370	305 325	275 280
Dropping Point, °C(°F)	ASTM D2265	160(320)	160(320)	171(340)	186(367)	188(370)
Timken OK Load, lb	ASTM D2509	40	40	40	40	40
Four Ball Weld Point, kg	ASTM D2596	250	250	250	250	250
Copper Corrosion	ASTM D4048	1b	1b	1b	1b	1b
Bearing Rust	ASTM D1743	Pass	Pass	Pass	Pass	Pass
Thickener Type		Lithium	Lithium	Lithium	Lithium	Lithium
ISO Viscosity Grade, Base Oil Equivalent		320	220	220	220	220
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	320 24	220 19	220 19	220 19	220 19
Base Oil Viscosity Index	ASTM D2270	95	97	97	97	97
Flash Point, °C(°F)	ASTM D92	224(435)	204(400)	204(400)	249(480)	249(480)
Pour Point, °C(°F)	ASTM D97	-27(-17)	-24(-11)	-12(-10)	-12(-10)	-12(-10)
Texture		Buttery	Buttery	Buttery	Buttery	Buttery
Color		Red	Amber	Amber	Amber	Amber

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minor variations in product typical test data are to be expected in normal manufacturing.



STARPLEX[®] EP M3 STARPLEX[®] EP 00, 0, 1, 2 (formerly Delo[®] Grease EP & Delo[®] Starplex EP)

PRODUCT DESCRIPTION

Starplex[®] EP is a comprehensive line of greases that are available with or without molybdenum disulfide. These greases are technically advanced, extreme pressure greases for a wide variety of on-road applications.

CUSTOMER BENEFITS

Starplex EP greases deliver value through:

- Extreme pressure high load carrying capacity - Protection against shock loading, thus promoting long bearing life
- Excellent corrosion and wear protection -Even in wet conditions
- Excellent water resistance Good resistance to wash out of bearings
- Excellent high temperature stability Offers lasting bearing protection
- **Outstanding low temperature pumpability** -Easy handling in the container and greasedispensing equipment

FEATURES

Starplex EP greases are extreme pressure greases for a wide variety of on-highway and light duty off-road applications.



They are formulated with highly refined base stocks, a lithium complex thickener, rust and oxidation inhibitors, and extreme pressure additives.

They are engineered to minimize friction and wear with a thick, velvety coating for excellent load carrying protection.

Starplex EP greases are specially formulated for extreme pressure wheel bearing and chassis applications including the steering drag links, king pins, transmission cross shaft spring pins, shackle pins, brake cam shafts, and fifth wheel faceplates and pivots operating under high and low temperature conditions.

The high viscosity index base oil makes these products perfect for the centralized lubrication systems found on today's mobile equipment in wide temperature ranges.

Starplex EP M3 features 3% moly, which is sought after by many OEMs in off-road applications. They feature better corrosion resistance, wear control, and shock loading than our basic Starplex EP products.

APPLICATIONS

Starplex EP greases are designed for extreme duty in a wide variety of on-highway and light duty off-road vehicle and equipment applications. Suitable for applications calling for Volvo 97720 (NLGI Grade 2).

On-highway heavy duty trucks — These lubricants are perfect for a wide variety of Class 8 trucks in most chassis and wheel bearing applications ranging from automatic centralized greasing systems to wheel bearings operating near the high temperatures of disc brakes. This product is for most applications, from owner/operators to fleets (especially those considering extended service intervals).

Light Duty Off-Road vehicles — Whether the application is in logging, agriculture or utilities, these greases will perform. Use them in tractors, cherry

Product(s) manufactured in the USA and Colombia. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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Medium- and light-duty trucks and buses — As with their heavy-duty counterparts, the Class 7 and Class 6 vehicles and buses require an extreme duty grease. Starplex EP greases will provide that performance.

Automobiles — Starplex EP greases are exceptional lubricants for high temperature wheel bearings and other high performance automotive applications.

Heavy Duty On/Off Highway Road Construction and Maintenance Vehicles - These

products are well suited for greasing on/off road heavy duty. Starplex EP greases are an excellent choice for king pins, bushing and bucket pins, 5th wheels and other severe duty applications found on these types of vehicles. They are also ideally suited for on highway heavy duty applications as well as a variety of mix use equipment. Starplex EP greases meet the requirements of the Mack MG-C grease specification. They also meet Caterpillar recommendations for greases containing 3% molybdenum disulfide.

Starplex EP greases are NLGI GC-LB certified (NLGI 1 and 2).



NLGI Grade	Test Method	Starplex EP 1 M3	Starplex EP 2 M3
Product Number		254649	254650
SDS/MSDS Number USA		58648	58309
Operating Temp, °C(°F) Minimum Maximum		-40(-40) 177(350)	-40(-40) 177(350)
Penetration, at 25°C(77°F) Worked (60 Strokes)	ASTM D217	325	280
Dropping Point, °C(°F)	ASTM D2265	245(471)	255(491)
Four Ball Weld Point, kg Load Wear Index, kg	ASTM D2596	400 72	400 72
Four Ball Wear Scar, mm	ASTM 2266	0.43	0.43
Timken OK Load, lb	ASTM D 2509	50	50
Water Spray-off, wt %	ASTM D4049	30	20
Lincoln Ventmeter, psig at 30 s, at 75°F 30°F 0°F	K95400	200 450 1250	250 700 1400
Copper Corrosion	ASTM D4048	1a	1a
Bearing Rust, 5% Synthetic Sea Water	ASTM D1743	Pass	Pass
Thickener Type		Lithium Complex	Lithium Complex
Molybdenum Disulfide Content, %		3	3
ISO Viscosity Grade Base Oil Equivalent		220	220
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	220 19.0	220 19.0
Base Oil Viscosity Index	ASTM D2270	97	97
Flash Point, °C(°F)	ASTM D92	274(525)	274(525)
Pour Point, °C(°F)	ASTM D97	-12(10)	-12(10)
Texture		Tacky	Tacky
Color		Grey/Black	Grey/Black

NLGI Grade	Test Method	Starplex EP 00	Starplex EP 0	Starplex EP 1	Starplex EP 2
Product Number		235212	235211	259119	259118
<i>SDS/MSDS Number USA Canada Mexico Colombia</i>		6818 6818CAN 6818MEX -	6818 6818CAN 6818MEX -	44614 44615 44616 -	44614 44615 44616 33449
Operating Temp, °C(°F) Minimum ^a Maximum ^b		-40(-40) 132(270)	-40(-40) 132(270)	-40(-40) 177(350)	-40(-40) 177(350)
Penetration, at 25°C(77°F) Worked (60 Strokes)	ASTM D217	415	370	325	280
Dropping Point, °C(°F)	ASTM D2265	n/a	235(455)	245(471)	255(491)
Four Ball Weld Point, kg Load Wear Index, kg	ASTM D2596	315 50	315 50	315 50	315 50
Four Ball Wear Scar, mm	ASTM 2266	0.45	0.45	0.45	0.45
Timken OK Load, lb	ASTM D 2509	50	50	50	50
Water Washout, wt %	ASTM D1264	n/a	15	10	5
Lincoln Ventmeter, psig at 30 s, at 75°F 30°F 0°F	К95400	50 50 100	100 150 450	200 450 1250	250 700 1400
Copper Corrosion	ASTM D4048	1b	1b	1b	1b
Bearing Rust, 5% Synthetic Sea Water	ASTM D1743	Pass	Pass	Pass	Pass
Thickener Type		Lithium Complex	Lithium Complex	Lithium Complex	Lithium Complex
ISO Viscosity Grade Base Oil Equivalent		220	220	220	220
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	220 19.0	220 19.0	220 19.0	220 19.0
Base Oil Viscosity Index	ASTM D2270	97	97	97	97
Flash Point, °C(°F)	ASTM D92	274(525)	274(525)	274(525)	274(525)
Pour Point, °C(°F)	ASTM D97	-	-	-12(10)	-12(10)
Texture		Tacky	Tacky	Tacky	Tacky
Color		Red	Red	Red	Red

$Starplex^{\texttt{R}} \, \texttt{EP} - \texttt{Continued}$

- a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.
- b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.



STARPLEX[®] SYN EP 1 M5 STARPLEX[®] HD M5 STARPLEX[®] HD M3 STARPLEX[®] HD

1, 2

(formerly: Delo[®] Syn-Grease SXD 220 Moly 5% EP 1 Delo[®] Grease ESI HD Moly 5% Delo[®] Grease ESI HD Moly 3% Delo[®] Grease ESI HD EP)

PRODUCT DESCRIPTION

Starplex[®] HD is a comprehensive line of greases that are available with or without molybdenum disulfide. These greases are designed for plain and anti-friction bearing applications operating under high stress/high load conditions, coupled with high ambient temperatures typically found in heavy duty off-road applications.

CUSTOMER BENEFITS

Starplex Syn EP 1 M5, Starplex HD M5, Starplex HD M3, and Starplex HD greases deliver value for the offroad construction and mining industries by offering:

- Corrosion and wear protection
- Water resistance in both submerged and direct pressure spray situations
- Shock load protection
- **Performance across a wide temperature range** from extremely hot to extremely cold conditions, this unique heavy duty EP product line delivers when needed most

FEATURES

Starplex HD greases are multipurpose, high performance products specially formulated for



plotates specially formalited for plain and anti-friction bearing applications operating under high stress/high load conditions, coupled with high ambient temperatures typically found in heavy duty off-road applications. Developed as a true contractors product, this line of grease was specifically designed to lubricate and protect equipment that is subjected to demanding conditions.

STARPLEX SYN EP 1 M5

Our product to use in the most demanding applications. This product features synthetic base oil in a lithium complex thickener system. Provides excellent corrosion protection, water resistance, and shock loading capability. This product also provides excellent performance throughout a wide temperature range. It is especially effective in very cold climates or where temperature ranges vary dramatically in a short period of time. It contains 5% moly, which is desired by many OEMs for off-road applications.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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STARPLEX[®] HD M5 And M3

This tier of products features 5% or 3% moly sought after by many OEMs in off-road applications. These products are formulated using highly refined base oils in a lithium complex thickener system. They also feature better corrosion resistance, wear control, and shock loading than our basic Starplex HD products. They provide very good protection over a wide temperature range.

STARPLEX HD

Our basic product which works in many applications and provides good protection from wear, shock loading, and fairly effective operating temperature range. This product features high viscosity index conventional oil in a lithium complex thickener system. The product also provides excellent corrosion protection. This product does not contain moly.

Starplex HD greases are manufactured using select, highly refined base oils using a lithium complex thickener system that includes excellent rust and oxidation inhibitors coupled with extreme pressure and tackiness additives. The non-moly version is red in color and stringy in texture. Additionally, this comprehensive line includes 5% and 3% moly versions to meet the demands of OEM manufacturers who require molybdenum disulfide in the grease to meet required warranty specifications. These molycontaining products are grey/black in color and stringy in texture.

The lithium complex thickener in Starplex HD greases elevates the dropping point to approximately 265°C (510°F) making them excellent for use in applications where sustained high operating temperatures are common. Additionally, since they are all comprised of the same base formulation, they are compatible with one another.

APPLICATIONS

These greases are recommended for applications operating over wide temperature ranges.

Starplex HD greases are not intended for use in highspeed bearing applications such as those found in electric motors due to the greases' high viscosity base stocks formulation. When in doubt, please consult your Chevron representative or OEM maintenance manual for application parameters when considering a switch to these greases.

Starplex HD greases are ideal for a wide variety of Off-Road Construction applications across several industries:

- **Off-Road Construction** These greases display outstanding water washout and spray-off resistance properties in wet, off-road environments and offer excellent shock load extreme pressure (EP) protection. Unique additive technology of these products makes them tenacious at adhering to metal surfaces found in this industry while protecting these vital components from rust and corrosion. Applications for the product include most types of heavy-duty earth moving machinery, including tractors (dozers), excavators, backhoes, shovels, high lifts, articulated loaders, haul trucks, tri-axle dumps and more. They are excellent for heavily loaded machine implement pins and bushings, and other applications operating in severe, high shockload environments where metal to metal contact wear often occurs. Since Starplex HD greases are offered in 5% and 3% moly containing versions, they are also able to meet wide off-road OEM application ranges using one common product line, thus reducing field inventory. Because they are lithium complex thickened, the non-moly version is also excellent for mixed fleet applications where disc brake lubrication is required, such as pick-up trucks.
- Surface and Underground Mining and Quarry

 Applications appropriate for these greases include those found above plus pins and bushings on buckets, loaders, shovels and continuous miners, shaker screens, crushers, and conveyors.

• **Agriculture** — Will serve as an excellent multipurpose heavy duty lubricant for both general and industrial farm and agricultural use, from medium to heavy duty front steer and articulated tractors and loaders to larger new rubber tracked units. These products will work well in many applications including three point hitches, high lift pins and bushings and other heavy duty farm related industrial machinery.

 Heavy Duty On/Off Highway Road Construction and Maintenance Vehicles -These products are well suited for greasing on/off road heavy duty tri-axle dump trucks and cement mixers that also find their way off road as much as on. Starplex[®] HD greases are an excellent choice for king pins, bushing and bucket pins, 5th wheels and other severe duty applications found on these types of vehicles. They are also ideally suited for on highway heavy duty applications as well as airport fixed ground operation snow and ice removal equipment, such as plows, blowers and salt spreaders when the preferred method of lubrication is by manual application. These products were formulated using a new rust inhibitor package tested with 0.5% mixtures of magnesium chloride and calcium chloride road de-icers and were proven to reduce rust and corrosion when these corrosive materials were present. In colder climates, where moly is required, the Starplex Syn EP M5 1 grade would be the preferred product of choice.

Starplex HD greases meet the requirements of the Mack MG-C grease specification. They also meet Caterpillar recommendations for greases containing 5% and 3% molybdenum disulfide.

Note 1: Starplex HD greases are designed using high viscosity base oils. These oils offer excellent protection in severe duty, high shock load conditions where typical ambient temperatures are above freezing. For extreme cold weather climate conditions, Chevron recommends using Starplex Syn EP 1 M5 for equipment that requires the product to be used in centralized automatic grease dispensing systems.

Because each application varies, you should consult your equipment OEM or Chevron Lubrication Specialist before switching over to these products. **Note 2**: In cases where centralized automatic dispensing systems or long manual grease runs are the preferred method of lubrication and normal operating temperatures are consistently well below 20°F, Starplex HD would offer better pumpability. They would also be the preferred choice for onboard vehicle lubrication systems operating in severe cold weather service. Starplex Syn EP 1 M5 and Starplex HD are fully compatible. Please consult your local Chevron Lubrication Specialist for more information.

	Test Method	Starplex Syn EP 1 M5	Starplex HD 1 M5	Starplex HD 2 M5	Starplex HD 1 M3	Starplex HD 2 M3
Product Number		259115	259121	259120	259123	259122
SDS/MSDS Number USA Colombia El Salvador		44839 — —	44831 44834 —	44831 44834 —	44825 44830 44826	44825 44830 44826
Molybdenum Disulfide content %		5	5	5	3	3
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-40(-40) 235(450)	-26(-15) 177(350)	-26(-15) 177(350)	-26(-15) 177(350)	-26(-15) 177(350)
Penetration, at 25°C (77°F) Worked (60 strokes)	ASTM D217	325	325	280	325	280
Dropping Point, °C(°F)	ASTM D2265	265(509)	266(509)	267(509)	268(509)	269(509)
Four Ball Weld Point, kg Load Wear Index, kg	ASTM D2596	800+ 135	500 75	500 75	500 75	500 75
Four Ball Wear Scar, mm	ASTM D2266	0.48	0.43	0.43	0.43	0.43
Timken OK Load, lb	ASTM D2509	40	70	70	70	70
Bearing Water Washout, wt % Loss at 175°F	ASTM D1264	1.5	5	4	5	4
Water Spray-off, % at 100°F	ASTM D4049	N/A	25	15	25	15
EMCOR Dynamic Bearing Rust, 10% Synthetic Sea Water	ASTM D6138	0,1	0,0	0,0	0,0	0,0
Lincoln Ventmeter, psig at 30 s, at 75°F 30°F 0°F -22°F	K95400	260 400 775 1675	250 600 1720 †	450 1550 1725 †	250 600 1720 †	510 1700 1800 †
Flow Pressure, psi 68°F(20°C) 32°F(0°C) -4°F(-20°C) -22°F(-30°C)	DIN 51805	0.9 1.2 2.2 3.1	0.5 2 10 38	1 4 20 max pressure	0.5 2 10 38	2 4 19 max pressure
Copper Corrosion	ASTM D4048	1b	2b	2b	2b	2b

	Test Method	Starplex Syn EP 1 M5	Starplex HD 1 M5	Starplex HD 2 M5	Starplex HD 1 M3	Starplex HD 2 M3
Thickener, % Type		13.0 Lithium Complex	7.0 Lithium Complex	13.0 Lithium Complex	7.0 Lithium Complex	13.0 Lithium Complex
ISO Viscosity Grade Base Oil Equivalent		220	460	460	460	460
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	220 25	460 31	460 31	460 31	460 31
Viscosity Index	ASTM D2770	143	97	97	97	97
Oil Separation, wt %	ASTM D1742	1.6	2	2	2	2
Flash Point, °C(°F)	ASTM D92	232(450)	274(525)	274(525)	274(525)	274(525)
Texture		Stringy	Stringy	Stringy	Stringy	Stringy
Color		Gray/ Black	Gray/ Black	Gray/ Black	Gray/ Black	Gray/ Black

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

⁺ Too stiff at this temperature to pump through device.

Minor variations in product typical test data are to be expected in normal manufacturing.

	Test Method	Starplex HD 1	Starplex HD 2
Product Number		259125	259124
<i>SDS/MSDS Number USA Colombia El Salvador</i>		44815 44818 —	44815 44818 —
Molybdenum Disulfide content %		_	_
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-26(-15) 177(350)	-26(-15) 177(350)
Penetration, at 25°C (77°F) Worked (60 strokes)	ASTM D217	325	280
Dropping Point, °C(°F)	ASTM D2265	270(509)	271(509)
Four Ball Weld Point, kg Load Wear Index, kg	ASTM D2596	500 75	500 75
Four Ball Wear Scar, mm		0.43	0.43
Timken OK Load, Ib		75	80
Bearing Water Washout, wt % Loss at 175°F	ASTM D1264	5	4
Water Spray-off, % at 100°F	ASTM D4049	25	15
EMCOR Dynamic Bearing Rust, 10% Synthetic Sea Water, ASTM D6138	ASTM D6138	0,0	0,0
Lincoln Ventmeter, psig at 30 s, at 75°F 30°F 0°F -22°F	K95400	250 600 1720 †	625 1600 1800 †
Flow Pressure, psi 68°F(20°C) 32°F(0°C) -4°F(-20°C) -22°F(-30°C)	DIN 51805	0.5 2 10 38	2 5 22 max pressure
Copper Corrosion	ASTM D4048	1b	1b

	Test Method	Starplex HD 1	Starplex HD 2
Thickener, % Type		7.0 Lithium Complex	13.0 Lithium Complex
ISO Viscosity Grade Base Oil Equivalent		460	460
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	460 31	460 31
Viscosity Index	ASTM D2270	97	97
Oil Separation, wt %	ASTM D1742	2	2
Flash Point, °C(°F)	ASTM D92	274(525)	274(525)
Texture		Stringy	Stringy
Color		Red	Red

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

⁺ Too stiff at this temperature to pump through device.



STARPLEX[®] SYN XD 1.5 (formerly Ulti-Plex[®] HV Synthetic Grease EP)

PRODUCT DESCRIPTION

Starplex[®] Syn XD is a high performance grease specially formulated for extreme pressure bearing applications operating under high and low temperature conditions and for those difficult applications requiring extended lubrication intervals.

CUSTOMER BENEFITS

Starplex Syn XD delivers value through:

- **High temperature stability** up to 232°C (450°F). High temperature stability indicates the highest temperature at which the grease could be used with frequent (daily) re-lubrication.
- Low temperature lubrication down to -40°C (-40°F). Low temperature lubrication is the lowest temperature at which a grease already in place could be expected to provide lubrication but may not maintain pumpability.
- Excellent corrosion and wear protection.
- Excellent water resistance.
- Optimal relubrication intervals.

FEATURES

Starplex Syn XD is a high performance grease specially formulated for extreme pressure bearing applications operating under high and low



temperature conditions and for those difficult applications requiring extended lubrication intervals.

It is manufactured using highly refined high viscosity synthetic base oil, a lithium complex thickener, rust and oxidation inhibitors, and extreme pressure and tackiness additives. It is light tan in color and smooth and buttery in texture.

Starplex Syn XD provides an alternative for high temperature applications. The uniform molecular structure of the synthetic base oil minimizes friction between moving parts and boosts lubrication performance over a wide temperature range.

The high viscosity index of the synthetic base oil allows bearings lubricated with Starplex Syn XD to operate at temperatures as low as $-40^{\circ}C$ ($-40^{\circ}F$).

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

Starplex[®] Syn XD is recommended for use in applications with operating temperatures up to 232°C (450°F) with a dropping point of approximately 280°C (536°F).

Starplex Syn XD is ideal for a wide variety of applications across several industries, including:

- Paper and Forest Products Starplex Syn XD is designed for heavily loaded, low speed bearings which may be found in sludge presses and washers.
- Mining/Mineral Processing Starplex Syn XD is particularly recommended for:
 - mining operations that involve extreme pressure applications requiring low temperature pumpability. Applications include: pins and bushings on buckets and loaders, shaker screens, crushers, and conveyors
 - low temperature mining applications
 - automatic lubricating systems in onboard shovels, trucks, and other mobile equipment kiln and cooling bed bearings
- Off-Road Construction Starplex Syn XD is ideally suited for lubrication systems that involve pumping grease through long supply lines at low temperatures. Starplex Syn XD is formulated to minimize water washout in off-road environments.
- Marine The rust and corrosion inhibition . properties of Starplex Syn XD make it ideal for use in marine equipment exposed to severe corrosion environments. Examples include deck equipment, offshore drilling equipment, grease lubricated shaft bearings, cranes, and windlass winches.
| NLGI Grade | Test Method | 1.5 |
|--|-------------|-------------------------|
| Product Number | | 250500 |
| SDS Number | | 8268 |
| Operating Temperature, °C(°F)
Minimum ^a
Maximum ^b | | -40(-40)
232(450) |
| Penetration, at 25°C(77°F)
Unworked
Worked | ASTM D217 | 295
315 |
| Dropping Point, °C(°F) | ASTM D2265 | 280(536) |
| Timken OK Load, Ib | ASTM D2509 | 50 |
| Four Ball
Weld Point, kg
Load Wear Index, kg | ASTM D2596 | 500
95 |
| Four Ball
Wear Scar, mm | ASTM D2266 | 0.5 |
| Bearing Water Washout, wt % loss at 175°F | ASTM D1264 | 7 |
| Lincoln Ventmeter, psig at 30 s, at
24°C (75°F)
-1°C (30°F)
-18°C (0°F) | K95400 | 300
550
960 |
| Copper Corrosion | ASTM D4048 | 1b |
| Thickener, %
Type | | 13.0
Lithium Complex |
| Viscosity, Kinematic (Base Fluid)
cSt at 40°C
cSt at 100°C | ASTM D445 | 1200
100 |
| Viscosity Index (Base Fluid) | ASTM D2270 | 173 |
| Flash Point, °C(°F) (Base Fluid) | ASTM D92 | 302(576) |
| Texture | | Smooth, Buttery |
| Color | | Light Tan |

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minor variations in product typical test data are to be expected in normal manufacturing.



STARPLEX[®] SYN HD 1.5 (formerly Ulti-Plex[®] Synthetic Grease EP)

PRODUCT DESCRIPTION

Starplex[®] Syn HD is a high performance grease specially formulated for extreme pressure bearing applications operating under high and low temperatures.

CUSTOMER BENEFITS

Starplex Syn HD delivers value through:

- High temperature stability
- Low temperature pumpability
- Low temperature lubrication
- Excellent corrosion protection
- Excellent water washout performance
- Long relubrication intervals

FEATURES

Starplex Syn HD is a high performance grease specially formulated for extreme pressure bearing applications operating under high and low temperature conditions and for those difficult applications requiring extended lubrication intervals.

It is manufactured using selected highly refined high viscosity synthetic base oils, a lithium complex thickener, rust and oxidation inhibitors, and extreme pressure and tackiness additives. It is light tan in color and smooth and buttery in texture.

Starplex Syn HD provides an alternative for high temperature applications. The uniform molecular structure of the synthetic base oils reduces friction between moving parts and boosts lubrication performance over a wide temperature range.

The high viscosity index of the synthetic base oils allow for exceptional pumpability at subzero (-18°C/0°F) temperatures, allowing bearings lubricated with

Starplex Syn HD to operate at temperatures as low as -51°C (-60°F).

APPLICATIONS

Starplex Syn HD is recommended for use in applications with temperatures up to 232°C (450°F), with a dropping point of approximately 280°C (536°F).



Starplex Syn HD is ideal for a wide variety of applications across several industries, including:

- **Paper and Forest Products** Starplex Syn HD is recommended for applications such as: sludge press bearings, lime kilns, pumps, woodyard heavy equipment, Doctor oscillator bearings, felt roll bearings, pulp refiner bearings, rope sheaves, and exhaust fan bearings. Starplex Syn HD is particularly well-suited for high temperature applications, such as felt roll bearings and lime kilns operating at temperatures in excess of 204°C (400°F) when combined with frequent re-lubrication.
- Mining Starplex Syn HD is recommended for
 - mining operations that involve high pressure applications requiring low temperature pumpability. Applications include: pins and bushings on buckets and loaders, shaker screens, crushers, and conveyors
 - low temperature mining applications
 - automatic lubricating systems in onboard shovels, trucks, and other mobile equipment
- Off-Road Construction Starplex Syn HD is well suited for lubrication systems that involve pumping grease through long supply lines at low temperatures. It also displays exceptional water washout resistance properties in wet, off-road environments.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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• **Marine** — The rust and corrosion inhibition properties of Starplex Syn HD make it ideal for use in marine equipment exposed to corrosion environments. Examples include deck equipment, offshore drilling equipment, grease lubricated shaft bearings, cranes, and windlass winches.

Starplex[®] Syn HD is registered by **NSF** and is acceptable as a lubricant where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

NLGI Grade	Test Method	1.5
Product Number		250188
SDS Number		5343
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-51(-60) 232(450)
Penetration, at 25°C (77°F) Unworked Worked	ASTM D217	295 315
Dropping Point, °C(°F)	ASTM D2265	280(536)
Timken OK Load, Ib	ASTM D2509	50
Four-Ball Weld Point, kg Load Wear Index, kg	ASTM D2596	500 79
Bearing Water Washout, wt % loss at 175°F	ASTM D1264	5
Lincoln Ventmeter, psig at 30 s, at 24°C (75°F) -1°C (30°F) -18°C (0°F) -30°C (-22°F)	K95400	38 → 517 725
Copper Corrosion	ASTM D4048	1B
Thickener, % Type		13.0 Lithium Complex
ISO Viscosity Grade, Base Oil Equivalent		460
Viscosity, Kinematic (Base Fluid) cSt at 40°C cSt at 100°C	ASTM D445	460 43.0
Viscosity Index (Base Fluid)	ASTM D2270	145
Flash Point, °C(°F) (Base Fluid)	ASTM D92	288(550)
Texture		Smooth, Buttery
Color		Light Tan

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases can't be pumped at these minimum temps.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

 \rightarrow Not tested at this temperature.

Minor variations in product typical test data are to be expected in normal manufacturing.



STARPLEX[®] PREMIUM 1

PRODUCT DESCRIPTION

Starplex[®] Premium 1 is a lithium complex grease, formulated with a high viscosity base oil and special selected additives, including polymers, to impart extreme pressure characteristics as well as corrosion, wear oxidation and water wash out protection.

CUSTOMER BENEFITS

Starplex Premium 1 delivers value through:

- High temperature stability up to 325°F.
- Excellent corrosion and wear protection.
- Excellent water resistance.
- Optimal lubrication intervals

FEATURES

Starplex Premium 1 is a lithium complex grease, formulated with a high viscosity base oil and special additives, including polymers to impart extreme pressure characteristics as well as corrosion, wear oxidation and water wash out protection.

Starplex Premium 1 provides an alternative for high temperature applications. The high viscosity base oils contained in this product serve to minimize friction between moving parts and maintain lubrication performance over a wide temperature range.

APPLICATIONS

Starplex Preumim 1 is recommended for use in applications with temperatures up to 325°F (163°C). It is ideally suited for lubrication where water washout is an issue.



Starplex Premium 1 is ideal for a wide variety of applications across several industries, including:

- **Paper and Forest Products** This lubricant is recommended for applications such as: sludge press bearings, lime kilns, pumps, woodyard heavy equipment, doctor oscillator bearings, felt roll bearings, pulp refiner bearings, rope sheaves, and exhaust fan bearings.
- General Manufacturing and light duty Off-Road
 - General Machinery plain, anti friction, roller, and needle bearings
 - Conveyors and run-out rolls
 - Chassis lubrication

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

13 April 2015 GR-48

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NLGI Grade	1
Product Number	277113
SDS Number	23640
Operating Temperature, °C(°F) Minimum ^a Maximum ^b	-18(0) 163(325)
Penetration, at 25°C(77°F) Worked	325
Dropping Point, °C(°F)	232(450)
Timken OK Load, lb	50
Thickener, % Type	10 Lithium Complex
Viscosity, Kinematic [*] cSt at 40°C cSt at 100°C	475 30
Viscosity, Saybolt [*] SUS at 100°F SUS at 210°F	2537 147
Viscosity Index [*]	90
Flash Point, °C(°F)*	300(572)
Texture	Tacky
Color	Dark Brown

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

- b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.
- * Determined on mineral oil extracted by vacuum filtration.

Minor variations in product typical test data are to be expected in normal manufacturing.



RYKON[®] **EP, HD, HD M5** 1, 2

PRODUCT DESCRIPTION

Rykon[®] EP and HD are Chevron's line of overbased calcium sulfonate complex greases that are available with or without molybdenum disulfide. Rykon delivers superior water resistance performance to protect your equipment from failures and your operation from downtime. These greases are designed for plain and anti-friction bearing applications operating under high stress/high load conditions, coupled with high ambient temperatures typically found in heavy duty off-road applications.

CUSTOMER BENEFITS

Rykon greases deliver value for the off-road construction and mining industries by offering:

- Extreme pressure high-load carrying capacity - Protection against shock loading, thus promoting long bearing life
- Excellent corrosion and wear protection -Especially in wet conditions
- Excellent water resistance Good resistance to wash-out of bearings in submerged or direct spray situations
- Excellent high temperature stability Offers lasting bearing protection
- **Outstanding low temperature pumpability** -Easy handling in the container and grease dispensing equipment

FEATURES

Rykon greases utilize an overbased calcium sulfonate complex thickener system that produces multipurpose, high-performance products that protect against corrosion, wear, have high dropping points and good thermal stability. They are specially formulated for plain and anti-friction bearing applications operating under high stress/high load and wet conditions typically found in heavy duty off-road applications. This line of grease was specifically designed to lubricate and protect equipment that is subjected to demanding conditions.

RYKON[®] EP

Rykon EP is our multipurpose product which works in many applications and provides good protection from wear, shock loading, and corrosion.

RYKON[®] HD

Rykon HD is used in demanding applications in wet environments. This product features all the benefits of Rykon EP, but the heavier viscosity can provide better protection for higher loads and slower speeds.

RYKON[®] HD M5

Rykon HD M5 features a boost of 5% moly product to meet the demands of OEMs of off-road applications. They feature great shock loading and provide anti-weld protection.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

15 September 2024 GR-50

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APPLICATIONS

Rykon greases are designed for extreme duty in a wide variety of on-highway and light duty off-road vehicle and equipment applications.

• Off-Road Construction - These greases display outstanding water washout and spray-off resistance properties in wet, off-road environments and offer excellent shock load extreme pressure (EP) protection. Unique additive technology of these products makes them tenacious at adhering to metal surfaces found in this industry while protecting these vital components from rust and corrosion.

Applications for the product include most types of heavy-duty earth moving machinery, including tractors (dozers), excavators, backhoes, shovels, high lifts, articulated loaders, haul trucks, tri-axle dumps and more. They are excellent for heavily loaded machine implement pins and bushings, and other applications operating in severe, high shockload environments where metal to metal contact wear often occurs. Since Rykon greases are offered in 5% moly containing versions, they are also able to meet wide off-road OEM application ranges using one common product line, thus reducing field inventory.

- Surface and Underground Mining and Quarry - Applications appropriate for these greases include those found above plus pins and bushings on buckets, loaders, shovels and continuous miners, shaker screens, crushers, and conveyors.
- **Agriculture** Will serve as an excellent multipurpose heavy duty lubricant for both general and industrial farm and agricultural use, from medium to heavy duty front steer and articulated tractors and loaders to larger new rubber tracked units. These products will work well in many applications including three point hitches, high lift pins and bushings and other heavy duty farm related industrial machinery.
- Heavy Duty On/Off Highway Road Construction and Maintenance Vehicles -These products are well suited for greasing on/off road heavy duty tri-axle dump trucks and cement mixers that also find their way off road as much as on. Rykon HD greases are an excellent choice for king pins, bushing and bucket pins, 5th wheels and other severe duty applications found on these types

of vehicles. They also meet Caterpillar recommendations for greases containing 5% molybdenum disulfide.

- **Paper and Forest Products** Rykon HD is recommended for applications such as: pumps, woodyard heavy equipment, rope sheaves, exhaust fan bearings, and any general lubrication points needing a high water wash-out grease.
- Light Duty Off-Road Vehicles Whether the application is in logging, agriculture or utilities, these greases will perform. Use them in tractors, cherry pickers or any of a number of light duty offroad vehicles.
- **Manufacturing and Steel** Rykon greases are formulated to withstand the demanding conditions of manufacturing and steel industries. Their highload capacity, excellent water resistance, and ability to tolerate a wide range of temperatures ensure they maintain their physical and performance properties under extreme conditions.

Rykon greases are NLGI GC-LB certified.



	Test Method	Rykon EP 1	Rykon EP 2	Rykon HD 1
Product Number		255656	255652	255657
SDS/MSDS Number USA		58137	58137	58137
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-30(-22) 177(350)	-20 (-4) 177(350)	-30(-22) 177(350)
Thickener Type		Calcium Sulfonate Complex	Calcium Sulfonate Complex	Calcium Sulfonate Complex
ISO Viscosity Grade Base Oil Equivalent		220	220	460
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	220 19	220 19	460 31
Base Oil Viscosity Index	ASTM D2770	97	97	97
Penetration, at 25°C (77°F) Worked (60 strokes)	ASTM D217	315	280	316
Dropping Point, °C (°F)	ASTM D2265	304(579)	316(600)	304(579)
Four Ball Weld Point, kg Load Wear Index, kg	ASTM D2596	800 142	800 142	800 105
Four Ball Wear Scar, mm	ASTM 2266	0.35	0.50	0.37
Timken OK Load, lb	ASTM D2509	60	60	65
Copper Corrosion, 3h at 100°C	ASTM D4048	1b	1b	1b
Bearing Rust Protection	ASTM D1743	Pass	Pass	Pass
Salt Fog Test, hrs	ASTM B117	>1000	>1000	>1000
Water Washout, wt% loss at 80°C (176°F)	ASTM D1264	1.1	2.5	2.3
Flow Pressure at -20°C, mbar	DIN 51 805	517	917	779
Oil Separation, wt%	ASTM D1742	0.0	0.1	0.0
Texture		Tacky	Tacky	Tacky
Color		Tan	Tan	Tan

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minor variations in product typical test data are to be expected in normal manufacturing.

	Test Method	Rykon HD 2	Rykon HD 1 M5	Rykon HD 2 M5
Product Number		255653	255658	255654
SDS/MSDS Number USA		58137	58137	58137
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-20 (-4) 177(350)	-30(-22) 177(350)	-20 (-4) 177(350)
Thickener Type		Calcium Sulfonate Complex	Calcium Sulfonate Complex	Calcium Sulfonate Complex
ISO Viscosity Grade Base Oil Equivalent		460	460	460
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	460 31	460 31	460 31
Base Oil Viscosity Index	ASTM D2770	97	97	97
Penetration, at 25°C (77°F) Worked (60 strokes)	ASTM D217	280	324	280
Dropping Point, °C (°F)	ASTM D2265	306 (583)	303(577)	308 (586)
Four Ball Weld Point, kg Load Wear Index, kg	ASTM D2596	800 105	800 111	800 111
Four Ball Wear Scar, mm	ASTM 2266	0.43	0.32	0.43
Timken OK Load, lb	ASTM D2509	65	75	75
Copper Corrosion, 3h at 100°C	ASTM D4048	1b	1b	1b
Bearing Rust Protection	ASTM D1743	Pass	Pass	Pass
Salt Fog Test, hrs	ASTM B117	>1000	>1000	>1000
Water Washout, wt% loss at 80°C (176°F)	ASTM D1264	1.5	1.3	2.5
Flow Pressure at -20°C, mbar	DIN 51 805	1063	779	1103
Oil Separation, wt%	ASTM D1742	0.0	0.0	0.0
Molybdenum Disulfide Content, %		-	5	5
Texture		Tacky	Tacky	Tacky
Color		Tan	Grey/Black	Grey/Black

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.



DELO[®] GREASE ESI[®] EP 2

PRODUCT DESCRIPTION

Delo[®] Grease ESI[®] EP 2 is a technically advanced, extended service interval wheel bearing, chassis and kingpin grease for a wide variety of on-road and offroad applications.

CUSTOMER BENEFITS

Delo Grease ESI EP 2 delivers value through:

- Extended Service Protection to 30,000+ miles/48,000+ km (or equivalent hours)¹
- Extreme pressure high load carrying capacity
- Excellent corrosion and wear protection
- Excellent water resistance
- Excellent high temperature stability
- Superb low temperature pumpability²

FEATURES

Delo Grease ESI EP 2 is a technically advanced, extended service premium grease for a wide variety of on-highway and light duty off-road applications.



It is formulated with highly refined base stocks, a lithium complex thickener, rust and oxidation inhibitors, and extreme pressure and tackiness additives. Delo Grease ESI EP 2 is red in color with a tacky texture, and is an NLGI 2 consistency grade.

It is engineered to minimize friction and wear with a thick, velvety coating for excellent load carrying protection.

Delo Grease ESI EP 2 is specially formulated for extreme pressure in extended service wheel bearing and chassis applications including the steering drag links, kingpins, fifth-wheels, transmission cross shaft spring pins, shackle pins, brake cam shafts, and fifth wheel faceplates and pivots operating under high and low temperature conditions.

This product is formulated to perform in unusually demanding conditions of high and low temperatures including good pumpability in a variety of lubrication systems. Delo Grease ESI EP 2 uses a lithium complex thickener system and has a dropping point of approximately 266°C (510°F). Delo Grease ESI EP 2 has excellent high temperature stability up to 177°C (350°F).³ Delo Grease ESI EP 2 can also be recommended for applications operating down to -32°C (-25°F).4

1 Notes: Service intervals of 30,000+ miles/ 48,000+ km (or equivalent hours) are recommended for customers who maintain equipment in accordance with OEM requirements for their specific geographic area and specific service of the vehicle.

2 As compared to Mid-High Viscosity Base Oil Heavy Duty EP 2 Greases.

Product(s) manufactured in the USA and Colombia.

3 Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

1 May 2022 GR-51

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Delo[®] Grease ESI[®] EP 2 has the proper base oil viscosity to meet NLGI LB requirements for low temperature operation. Delo Grease ESI EP 2 exceeds the requirements of NLGI GC for EP protection and wheel bearing life.



Delo Grease ESI EP 2 is approved for:

- MB-Approval 265.1
- Volvo 97720
- GROB Lubricant Chart

APPLICATIONS

Delo Grease ESI EP 2 is designed for extreme duty in a wide variety of on-highway and light duty off-road vehicle and equipment applications.

On-highway heavy duty trucks — This lubricant is perfect for a wide variety of Class 6 - 8 trucks in most chassis and wheel bearing applications ranging from automatic centralized greasing systems (see Notes A and B) to wheel bearings operating near the high temperatures of disc brakes. This product is for most applications, from owner/operators to fleets (especially those considering extended service intervals of 30,000+ miles/48,000+ km or equivalent hours).⁵

Light Duty Off-Road vehicles — Whether the application is in logging, agriculture or utilities, this grease will perform. Use it in tractors, cherry pickers or any of a number of light duty off-road vehicles.

Automobiles — Delo Grease ESI EP 2 is an exceptional lubricant for high temperature wheel bearings and other high performance automotive applications.

Note A: Delo Grease ESI EP 2 is designed using high viscosity base oils. These oils offer excellent protection in severe duty, high shock load conditions where typical ambient temperatures are above -32°C (-25°F). Before using in applications involving onboard automatic grease dispensing systems in severe cold climate conditions, you should first consult with your equipment OEM specialist or Chevron Lubrication Specialist.

Note B: Not recommended for unheated shops where centralized automatic dispensing systems or long manual grease runs are the preferred method of lubrication and normal operating temperatures are consistently below -7°C (20°F).

⁵ Notes: Service intervals of 30,000+ miles/ 48,000+ km (or equivalent hours) are recommended for customers who maintain equipment in accordance with OEM requirements for their specific geographic area and specific service of the vehicle.

NLGI Grade	Test Method	2
Product Number		259126
SDS/MSDS Number U.S. Colombia		44800 44810
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-32(-25) 177(350)
Penetration, at 25°C(77°F) Worked (60 strokes)	ASTM D217	285
Dropping Point, °C(°F)	ASTM D2265	266(511)
Four Ball Weld Weld Point, kg Load Wear Index, kg	ASTM D2596	400 72
Four Ball Wear Wear Scar, mm	ASTM D2566	0,45
Timken OK Load, Ib	ASTM D2509	80
Bearing Water Washout, wt % Loss at 79°C (175°F)	ASTM D1264	4
Water Spray-Off, % at 38°C (100°F)	ASTM D4049	15
EMCOR Dynamic Bearing Rust, 10% Synthetic Sea Water	ASTM D6138	0
Lincoln Ventmeter, psig at 30 s, at 75°F 32°F 0°F -22°F	K95400	325 570 1601 †
Copper Corrosion, rating	ASTM D4048	1B
Thickener, % Type		11 Lithium Complex
ISO Viscosity Grade, Base Oil Equivalent		220/320
Viscosity, Kinematic* cSt at 40°C cSt at 100°C	ASTM D445	261 21.5
Viscosity Index*	ASTM D2770	98
Flash Point, °C(°F)*	ASTM D92	274(525)
Texture		Tacky
Color		Red

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

- b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.
- ⁺ Too stiff at this temperature to pump through device.
- * Determined on mineral oil extracted by vacuum filtration. Minor variations in data are to be expected in normal manufacturing.



DELO[®] SYN-GREASE[™] SFE EP 0 (formerly Delo Synthetic Grease SF)

PRODUCT DESCRIPTION

 $\mathsf{Delo}^{\mathbb{R}}$ Syn-GreaseTM SFE EP is a high performance semi-fluid grease specifically engineered for trailer wheel-ends operating in a wide range of conditions.

CUSTOMER BENEFITS

Delo Syn-Grease SFE EP delivers value through:

- High temperature stability up to 190°C (375°F)
- Low temperature lubrication down to -45°C (-50°F)
- Excellent antiwear/low friction performance
- Extreme pressure load carrying capacity
- Rust protection
- Extended lubrication intervals
- Energy efficiency improvement

FEATURES

Delo Syn-Grease SFE EP is a high performance grease specifically engineered for trailer wheel-ends operating in a wide range of conditions.

Delo Syn-Grease SFE EP is manufactured using polyalphaolefin (PAO) synthetic base oil, a polyurea thickener, rust and oxidation inhibitors, extreme pressure additives, and a special combination of friction reducing agents. It is gold in color with a smooth, semifluid texture.

Delo Syn-Grease SFE EP is formulated to perform in demanding conditions of high and low temperatures. The polyurea thickener in Delo Synthetic Grease SFE elevates the dropping point to 230°C (446°F). This high dropping point equates to excellent high temperature stability up to 190°C (375°F). In addition, the high viscosity index (VI) of the PAO synthetic base

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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oil allows for excellent flow properties at low temperatures - allowing Delo Syn-Grease SFE EP to operate at temperatures as low as -45°C (-50°F).

APPLICATIONS

Trailer lubrication — Delo Syn-Grease SFE EP is recommended for use in trailer axles. It flows smoothly and evenly at temperatures as low as $-45^{\circ}C$ ($-50^{\circ}F$) and continues to lubricate efficiently at temperatures up to 190°C (375°F). It provides many advantages in trailer axle lubrication, compared to mineral oil-based grease, such as

- Excellent low temperature properties (i.e. lower starting torque).
- Oxidation resistance at high temperatures.
- Excellent antiwear/low friction performance throughout the operating temperature range.

NLGI Grade	Method	0/00
Product Number		259117
SDS Number U.S. Canada Mexico		44740 44741 44742
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-45(-50) 190(375)
Penetration, at 25°C(77°F) Unworked Worked	ASTM D217	365 390
Dropping Point, °C(°F)	ASTM D2265	230(446)
Timken OK Load, lb	ASTM D2509	45
Thickener, % Type		9 Polyurea
Viscosity, Kinematic (Base Fluid) cSt at 40°C cSt at 100°C	ASTM D445	130 17.6
Viscosity, Saybolt (Base Fluid) SUS at 100°F SUS at 210°F	ASTM D445	603 88
Viscosity Index (Base Oil)	ASTM D2270	150
Bearing Rust Protection	ASTM D1743	Pass
Four-Ball Wear, 165°F, 1200 rpm, 40 kg Extreme Pressure	ASTM D2266 ASTM D2596	0.34
Load Wear Index, kg Last Nonseizure Load, kg Weld Point, kg		50 126 200
Low Temperature Torque, -40°F, Nm Starting Running	ASTM D4693	1.4 0.9
U.S. Steel Pumpability, -40°F, Grams per minute at 50 psi 100 psi 150 psi	U.S. Steel	0.4 7.7 13.3
Texture		Smooth, Semifluid
Color		Gold

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minor variations in product typical test data are to be expected in normal manufacturing.



MARFAK[®] BIO ELITESYN HD 2 (formerly clarity[®] synthetic ea grease)

PRODUCT DESCRIPTION

Chevron's Marfak[®] Bio EliteSyn HD Grease is an anhydrous calcium-thickened lubricating grease based on biodegradable esters. It is compliant to 2013 VGP legislation and the Swedish Standard 155470. The grease contains antioxidants, corrosion inhibitors, and extreme pressure and anti-wear additives. The thickener, together with the biodegradable esters, makes the product suitable for lubrication of heavily loaded applications. The lubricating grease has excellent adhesion and water resistance.

CUSTOMER BENEFITS

Marfak Bio EliteSyn HD Grease delivers value through:

- Environmentally acceptable Meets the requirements of the EPA Vessel General Permit (VGP) for biodegradation, low toxicity and low bioaccumulation.
- Water resistance Provides satisfactory lubrication in the presence of water and is not washed out of bearings.
- **Corrosion protection** Rust-inhibited to protect steel and nonferrous-bearing surfaces against corrosion.
- **Multipurpose** Satisfies all grease requirements of the majority of marine equipment.
- Pumpability Can be used over a wide temperature range in centralized lubrication systems.

APPLICATIONS

Marfak Bio EliteSyn HD is a versatile, high performance, environmentally acceptable lubricant (EAL) developed for a wide variety of applications where environmental sensitivity and biodegradability may benefit operations or may be a requirement due to legislative demands.

While primarily designed for marine applications, Marfak Bio EliteSyn HD can also be applied to a diverse range of other applications including the forestry, agriculture, and construction industries where the combination of exposed applications and operating conditions may result in an increased risk of lubricants coming into contact with the surrounding environment.

For marine applications, Marfak Bio EliteSyn HD can be recommended for a range of plain and rolling element bearings or slide-ways in a variety of on-deck equipment including:

- Boom pins, and crane pulleys
- Anchor winches
- Wire ropes
- Deck equipment bearings
- Cargo door hinges
- Thruster and rudder bearings

Open gear or rack and pinion systems where conditions of operation do not require dedicated products containing solid lubricant technology.

Examples of applications in other areas where Marfak Bio EliteSyn HD may also be used include the general lubrication points on steering or chassis components of forestry, agricultural and construction vehicles as well as saw chains within the forestry segment, where a biodegradable grease is required.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 October 2023 GR-55

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It is also important to note that Marfak Bio EliteSyn HD offers excellent low temperature mobility and is therefore suitable for use in most modern centralized lubrication systems.

This product is especially suited for applications where risk of contamination in soil or water may occur.

TYPICAL TEST DATA

NLGI Grade	Test Method	2
Product Number		238009
SDS Number		39898
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-40(-40) 100(212)
Penetration at 25°C (77°F), Worked (60 strokes)	ASTM D217	265-295
Dropping Point, °C (°F)	ASTM D2265	> 140 (284)
Four Ball Weld Point, kg	ASTM D2596	315
Water Spray-off, wt%	ASTM D4049	< 50
Water Washout at 38°C (100°F), wt%	ASTM D1264	<10
Flow Pressure at -40°C (-40°F), mbar	DIN 51 805	<1400
Biodegradability, %	OECD 301 B	65
Base Oil Viscosity, Kinematic* cSt at 40°C cSt at 100°C	ASTM D445	500.0 53.0
Thickener Type		Anhydrous Calcium
Base Fluid		Synthetic Ester
Texture		Smooth/Tacky
Color		Yellow

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with

frequent (daily) relubrication.

* Determined on mineral oil extracted by vacuum filtration.

Minor variations in product typical test data are to be expected in normal manufacturing.



23 January 2013 GR-100

SIL-X[®] GREASE

PRODUCT DESCRIPTION

Sil-X[®] Grease is a silica-thickened grease recommended for industrial applications subjected to very high temperatures requiring a lubricant which will not melt.

CUSTOMER BENEFITS

Sil-X Grease delivers value through:

- High temperature stability "No melt" silica thickener will not melt at high temperatures, but will remain in place on bearing surfaces and continue to help provide excellent lubricity.
- Good leak prevention Grease makeup helps prevent leakage from bearings.
- Good visibility Distinctive red color permits ready determination that the lubricant is still in place.

FEATURES

Sil-X Grease is a silica-thickened grease.

It is manufactured using high viscosity, high viscosity index base oils and contains effective rust and oxidation inhibitors.

It is transparent red in color, and has a smooth consistency with distinct stringiness.

Sil-X Grease provides excellent lubrication in industrial applications where high temperatures are encountered. The dropping point of Sil-X Grease exceeds 260°C (500°F).

Its high viscosity oil and high viscosity additive characteristics enable this lubricant to seal bearings and resist leakage and washout. Under high temperature operating conditions, the "no-melt" silica thickener keeps the lubricant in place long after conventional multipurpose greases would have melted and run out of bearings.

Sil-X Grease is excellent in terms of pumpability.

APPLICATIONS

Sil-X Grease is recommended for industrial applications subjected to very high temperatures requiring a lubricant which will not melt.

Typical applications are plain or journal bearings, antifriction bearings, gear cases in kiln cars, conveyors in ceramic and paint baking ovens, furnace doors, shafts extending through furnaces, etc.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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NLGI Grade	1
Product Number	255779
SDS Number	6704
Operating Temperature, °C(°F) Minimum ^a Maximum ^b	-9(+15) 204(400)
Penetration, at 25°C(7°F) Unworked Worked	328 325
Dropping Point, °C(°F)	>260°C(500°F) Contains "no-melt" silica thickener
Lincoln Ventmeter, psig at 30 s, at 75°F 30°F 0°F -22°F	175 200 † →
Thickener, % Type	6.0 Silica
ISO Viscosity Grade, Base Oil Equivalent	460
Viscosity, Kinematic* cSt at 40°C cSt at 100°C	467 30.5
Viscosity, Saybolt* SUS at 100°F SUS at 210°F	2506 150
Viscosity Index*	94
Flash Point, °C(°F)*	304(580)
Pour Point, °C(°F)*	-12(+10)
Texture	Smooth
Color	Red

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

⁺ Too stiff at this temperature to pump through device.

 \rightarrow Not tested at this temperature.

* Determined on mineral oil extracted by vacuum filtration.

Minor variations in product typical test data are to be expected in normal manufacturing.



TEXCLAD[®] 2

PRODUCT DESCRIPTION

Texclad $^{(\!R\!)}$ 2 is a calcium-based grease that resists washout and provides good film strength and load carrying capabilities.

CUSTOMER BENEFITS

Texclad 2 delivers value through:

- Water tolerance Resists washout, even when subject to gross water contamination.
- **Excellent adhesiveness** Provides good film strength in both wet and dry environments.

FEATURES

Texclad 2 is a calcium-based grease, which contains special friction modifiers such as molybdenum disulfide and graphite. These modifiers help create a longlasting film on working surfaces. Texclad 2 has good load carrying capability and is very resistant to water washout.

APPLICATIONS

Texclad 2 is recommended:

- for ball mill gears, traveling water screens, and fork lifts.
- for chain and sprocket lubrication and as a tenacious fifth wheel lubricant.

TYPICAL TEST DATA

Product Number	277116
SDS Number	24159
Operating Temperature, °C(°F) Minimum ^a Maximum ^b	-18(0) 79(175)
Penetration, at 25°C(77°F) Worked	280
Dropping Point, °C(°F)	99(210)
Thickener, % Type	9.0 Calcium
Viscosity, Kinematic [*] cSt at 40°C cSt at 100°C	1000 36.8
Texture	Tacky
Color	Black

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

- b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.
- * Determined on mineral oil extracted by vacuum filtration.

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

27 April 2015 GR-120

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ULTRA-DUTY HD 0, 1, 2 (formerly Chevron Ultra-Duty Grease EP NLGI 0, 1, 2)

PRODUCT DESCRIPTION

Ultra-Duty HD greases are versatile, high pressure greases with good adhesive properties designed for a wide variety of automotive and industrial applications.

CUSTOMER BENEFITS

Ultra-Duty HD greases deliver value through:

- Shock load protection
- Load-carrying protection
- Corrosion and rust protection
- Water resistant
- Maximum service lubrication

FEATURES

Ultra-Duty HD greases are versatile, high pressure greases with good adhesive properties designed for a wide variety of automotive and industrial applications.

They are manufactured using selected highly refined, high viscosity base oils, a lithium-12 hydroxystearate thickener, rust and oxidation inhibitors, and extreme pressure and tackiness additives. They are red in color and stringy in texture.

Ultra-Duty HD greases provide thicker shock-absorbing oil film protection and greater water resistance than conventional multipurpose greases due to their high viscosity components.

The high viscosity components and tackiness additive give Ultra-Duty HD greases an excellent adhesive quality which provides a tenacious lubricating film in working parts. The lubricants stay in place under abrasive operating conditions to resist water washout and shock load wear. The tackiness characteristics of Ultra-Duty HD greases make these products somewhat harder to pump than the historical soft, buttery greases. For this reason, we recommend the use of a heavy follower plate with airdriven grease pumps.

Ultra-Duty HD greases lubricate well at low temperatures. The ASTM D1478 low temperature torque test shows that they retain their lubricating capacity, as defined by military specification MIL-G-81322, down to about -26°C (-15°F).

APPLICATIONS

Ultra-Duty HD greases are recommended for use in automotive and industrial equipment operating under most conditions except where very high operating temperatures are encountered. Typical applications are: mining equipment, construction equipment, material handling equipment, marine deck equipment, marine deck cranes, oil field equipment, offshore drilling equipment, paper machines, dredging equipment, logging equipment, rock quarry equipment, etc., operating in water, mud, or dusty conditions.

Ultra-Duty HD greases will help provide the needed shock load and rust protection and, best of all, they stay put which means less frequent regreasing. They are not Chevron's primary recommendation for high temperature wheel bearings. Starplex[®] Greases EP or Black Pearl[®] Greases EP are preferred for wheel bearing applications.

In industrial service, Ultra-Duty HD greases are recommended for use in most types of plain and antifriction bearings from 1-1/2 inch OD to over 16 inch OD, operating at speeds from 50 to 3000 rpm, as well as slides, gears, ways, etc.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

10 March 2023 GR-150

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NLGI Grade	Test Method	0	1	2
Product Number		238013	238012	238011
SDS Number		6790	6790	6790
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-26(-15) 132(270)	-26(-15) 138(280)	-26(-15) 143(290)
Penetration, at 25°C (77°F) Worked (60 Strokes)	ASTM D217	360	325	280
Dropping Point, °C(°F)	ASTM D2265	171(342)	171(342)	190(374)
Four Ball Weld Point, kg	ASTM D2596	315	315	315
Four Ball Wear Scar, mm	ASTM D2266	0.45	0.45	0.45
Timken OK Load, lb	ASTM D2509	55	70	70
Water Washout, wt %	ASTM D1264	15	10	7
Water Spray-off, wt %	ASTM D4049	n/a	40	25
Lincoln Ventmeter, psig at 30 s, at 24°C (75°F) -1°C (30°F) -18°C (0°F)	K95400	100 200 1700	100 400 1750	280 600 2500
Thickener, % Type		5.6 Lithium	7.2 Lithium	8.6 Lithium
ISO Viscosity Grade, Base Oil Equivalent		460	460	460
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	460 31.0	460 31.0	460 31.0
Viscosity Index	ASTM D2770	97	97	97
Flash Point, °C(°F)	ASTM D92	274(525)	274(525)	274(525)
Oil Separation, mass %	ASTM D1742	5	4	2
Texture		Stringy	Stringy	Stringy
Color		Red	Red	Red

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minor variations in product typical test data are to be expected in normal manufacturing.



ULTRA-DUTY XD 00 (formerly Chevron Ultra-Duty HD 00)

PRODUCT DESCRIPTION

Ultra-Duty XD is a lithium based semi-fluid grease recommended for gear drives that specify an NLGI 00 grease.

CUSTOMER BENEFITS

Ultra-Duty XD delivers value through:

- **Semi-fluid grease properties** provide a thick film of lubricant to critical parts.
- Low temperature lubrication.
- Excellent rust and corrosion protection
- **Tacky consistency** minimizes the risk of water washout.

FEATURES

Ultra-Duty XD is a lithium based semi-fluid grease specially formulated with a high viscosity base oil, and an additive package that contains inhibitors and tackifiers.

APPLICATIONS

Ultra-Duty XD is recommended for gear drives that specify an NLGI 00, semi-fluid, grease. These include large mowing machines pulled behind tractors and gearboxes in large mixers.

Ultra-Duty XD is unsuitable for applications requiring an extreme pressure grease.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

10 March 2023 GR-151

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NLGI Grade	Test Method	00
Product Number		277118
SDS Number		23693
Operating Temperature, °C(°F) Minimum ^a Maximum ^b		-29(-20) 121(250)
Penetration, at 25°C(77°F) Worked (60 Strokes)	ASTM D217	415
Dropping Point, °C(°F)	ASTM D2265	166(331)
Bearing Rust Protection	ASTM D1743	Pass
Thickener, % Type		1.9 Lithium
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	680 40.0
Viscosity Index	ASTM D2270	97
Texture		Tacky
Color		Brown

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.

b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.

Minor variations in product typical test data are to be expected in normal manufacturing.



INDUSTRIAL OILS



ARIES[®] 32, 46, 100, 150, 220, 320

PRODUCT DESCRIPTION

 $\operatorname{Aries}^{\textcircled{R}}$ lubricants are designed for use in percussion air tools.

CUSTOMER BENEFITS

Aries lubricants deliver value through:

- Long equipment life Extreme pressure performance withstands heavy shock loads typical of rock drill service, protecting the equipment against rapid wear.
- **Reliability in wet conditions** Provides a tenacious film that clings to lubricated parts. Resists being washed away by trace water in the compressed air.
- **Protection in wet environments** Antirust performance protects critical parts from the corrosive action of wet environments.
- Low inventory cost A multipurpose lubricant that can be used for general purpose lubrication of gears, air tools, in hand oiling and for chain drives minimizing the number of lubricants in inventory.

FEATURES

Aries lubricants are designed to give maximum protection to percussion rock drills.

They are formulated from highly refined, high viscosity index, paraffinic base stocks and additives, which provide performance characteristics expected of an exceptional rock drill oil.

Aries lubricants are formulated to meet the critical lubrication demands of percussion rock drills. Their exceptional extreme pressure performance provides protection for the rock drill piston, rifle bar and nut against the heavy shock loads typical of rock drill service. The adhesiveness and emulsification tendency of these oils provide a tenacious lubricant film on the rock drill's moving parts which will not be washed off by incidental water that is common in the compressed air which drives the piston in this application.

These oils also provide excellent rust and corrosion protection, which is important in light of the corrosive environments in which many rock drills are used.

Aries lubricants contain no chlorinated additives and are completely ashless, minimizing environmental and disposal considerations.

Additionally, since rock drills are frequently used in mining environments where ventilation is limited, the low odor and toxicity of these lubricants are added benefits.

APPLICATIONS

Aries lubricants have proven excellent in many airoperated tools, such as jackhammers, drifters, etc.

The additive package provides many performance characteristics, which lend themselves well to the lubrication of enclosed gears, and all types of industrial plain and anti-friction bearings as applicable to the proper viscosity grade.

Their tacky quality makes them suitable for oncethrough applications; e.g. lubrication of chain drives.

Aries 46, 100, 150, 220 and 320 meet the specifications of **Ingersoll-Rand** Rock Drill Oil Specification for light, medium and heavy rock drill oils.

Product(s) manufactured in the USA and Colombia. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 May 2019 IO-10

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	32	46	100	150	220	320
Product Number	273254	273265	273266	273272	273268	273267
SDS/MSDS Number USA Colombia	26143 —	23516 —	23516 33458	23516 —	23516 —	23516 —
API Gravity	25.2	32.2	31.5	29.8	28.8	26.7
Viscosity, Kinematic cSt at 40°C cSt at 100°C	32 5.3	46 6.7	100 11.3	150 15.0	220 19.2	320 24.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	162 43	236 48	524 66	790 81	1163 98	1696 118
Viscosity Index	95	98	98	99	98	97
Flash Point, °C(°F)	140(284)	210(410)	230(446)	260(500)	260(500)	260(500)
Pour Point, °C(°F)	-42(-44)	-33(-27)	-30(-22)	-30(-22)	-24(-11)	-18(0)
Timken OK Load, lb	-	60	65	65	70	75
Falex EP Fail Load, lb	-	3200	3200	3200	3200	3200
Steam Emulsion Number	>1200	>1200	>1200	>1200	>1200	>1200

Minor variations in product typical test data are to be expected in normal manufacturing.



CAPELLA[®] P 68

PRODUCT DESCRIPTION

Capella[®] P 68 provides effective wear protection for reciprocating, vane, and screw compressors in ammonia refrigeration systems, and systems using refrigerant R-22 and R-502.

CUSTOMER BENEFITS

Capella P 68 delivers value through:

- Minimum oil carryover Low volatility and good ammonia immiscibility which helps prevent oil reaching the evaporator, promoting refrigeration efficiency and minimizing maintenance. The low pour point and high viscosity index ensures that oil which does reach the evaporator will drain more rapidly than a naphthenic oil.
- Minimal make-up oil required Minimal makeup oil is required because this product resists "carryover" to the refrigeration system's low temperature side.
- **Minimum sludging and formation of harmful deposits** in the high temperature environment of the compressor which promotes long equipment and lubricant life while minimizing maintenance.
- **Stable viscosity** Group II base stock properties allow the oil to maintain a stable viscosity, staying in grade longer than a naphthenic refrigeration oil.
- Effective protection for critical parts of the compressor provided by high viscosity index, low foaming tendency, and inherent antiwear properties. The oil maximizes equipment life and life to overhaul by providing effective lubrication to all moving parts.
- Long drain intervals Resistance to thermal degradation can allow customers to extend drain intervals.

FEATURES

Capella P 68, formulated with Group II - base stocks, is designed to specifically address the requirements of ammonia refrigeration systems. Capella P 68 provides advantages over naphthenic refrigeration oils in the critical performance areas of lubrication, thermal stability, and reduction of oil carryover.

APPLICATIONS

Although designed for use in ammonia refrigeration systems, Capella P 68 is also recommended for use in systems using refrigerant R-22 and R-502 - provided the evaporator temperature is above -32°C (-25°F). It is not recommended for systems using refrigerant R-12 or R-134a.

Capella P 68 is compatible with the seal elastomers commonly used in refrigeration compressors (e.g., Buna-N, chloroprene). Some Naphthenic refrigeration oils can compromise the integrity of certain seal elastomers. It is good maintenance practice to install new seal elastomers when replacing a naphthenic refrigeration oil. This is especially important when chloroprene (neoprene) seals are present.

Capella P 68 is registered by **NSF** and is acceptable as a lubricant where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

Capella P 68 is recommended for use in **Vilter** and **Sabroe** refrigeration compressors.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 February 2022 IO-11

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ISO Grade	68	
Product Number	273227	
SDS Number	23525	
API Gravity	29.5	
Viscosity, Kinematic cSt at 40°C cSt at 100°C Viscosity, Saybolt	64.6 8.8	
SUS at 100°F SUS at 210°F	300 55	
Viscosity Index	109	
Flash Point, °C(°F)	244(471)	
Pour Point, °C(°F)	-39(-38)	
Dielectric Strength, kV	35	

Minor variations in product typical test data are to be expected in normal manufacturing.



CAPELLA[®] WF 32, 68

PRODUCT DESCRIPTION

Capella $^{(\!R\!)}$ WF oils are designed for use as refrigeration compressor oils.

CUSTOMER BENEFITS

Capella WF oils deliver value through:

- **Wax-free** Suitable for ultra-low temperature service.
- **Water-free** Low moisture content helps prevent icing in refrigeration expansion valves and helps prevent system corrosion.
- Low carbon residue Helps minimize the tendency to form carbon deposits on the hot spots of the compressor unit.
- Excellent compatibility in both Freon and ammonia systems Suitable for use in many types of refrigeration systems.
- **Premium quality** Helps prevent lubricantcaused equipment failures.
- Thermal stability For long service life.

FEATURES

Capella WF oils help provide maximum wear protection to refrigeration compressor or system in which they are used.

Capella WF oils are manufactured using specially refined naphthenic mineral oils. Carefully selected base stocks assure the exceedingly low pour points necessary for refrigeration compressor lubricants.

They are highly refined and specially treated to help resist the sludging action of refrigerants in the presence of high temperature and metal catalysts.

APPLICATIONS

Capella WF oils are suitable for use in refrigeration systems. They are particularly suitable for modern, compact, high pressure refrigeration systems using Freon. Since they are wax-free, they are suitable for use in very cold ambient temperatures as a bearing lubricant or for hand oiling.

Capella WF oils are unsuitable for refrigerant systems using HFC refrigerants, such as R-134a.

The viscosity grade for the application should be based on the equipment manufacturer's recommendation.

Capella WF oils satisfy the requirements of hermetically sealed air conditioning compressors or the many types of smaller units.

Capella WF oils are registered by **NSF** and are acceptable as a lubricant where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

16 April 2015 IO-12

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property of their respective owners.

ISO Grade	32	68	
Product Number	273273	273271	
SDS/MSDS Number USA Colombia	23529 33461	23529 33461	
API Gravity	23.9	23.0	
Viscosity, Kinematic cSt at 40°C cSt at 100°C	29.5 4.37	64.0 6.48	
Viscosity, Saybolt SUS at 100°F SUS at 210°F	154 41	338 48	
Viscosity Index	7	12	
Flash Point, °C(°F)	168(334)	179(354)	
Pour Point, °C(°F)	-40(-40)	-38(-36)	
Dielectric Strength, kV ^a (ASTM D877 ^b)	> 30	> 30	
Sealed Tube Stability % R-22, 14 days	0.30	0.60	

- a Dielectric strength value applies only to "point of manufacture" of packaged products produced at a Chevron manufacturing facility. (Does not apply to bulk packaging). The oil will quickly lose its high dielectric strength value when exposed to contamination and to very small amounts of moisture and water.
- b Industry standard test method for measuring kV values is not precise and test results can differ significantly.

Minor variations in product typical test data are to be expected in normal manufacturing.



CETUS[®] DE 32, 68, 100, 150

PRODUCT DESCRIPTION

Cetus[®] DE oils are used for portable and stationary rotary screw, rotary vane, and reciprocating compressors.

CUSTOMER BENEFITS

Cetus DE oils deliver value through:

- Long life Cetus DE oils have a low sludgeforming tendency and a high solvency for deposits that help to keep compressor parts clean. Their ability to minimize oil consumption, carry over, varnish, sludge, and deposits; as well as maximize deposit-free valve life helps minimize compressor maintenance and energy costs.
- **Ignition safety** Cetus DE oils provide a greater margin of safety than conventional petroleum products because their flash points, fire points, and auto ignition temperatures are much higher. They are not, however, true fire resistant fluids.

FEATURES

Cetus DE oils are synthetic diester-based, oxidation resistant, compressor oils.

APPLICATIONS

Cetus DE oils are used for portable and stationary rotary screw, rotary vane, and reciprocating compressors. While specific manufacturer recommendations vary, the ISO 32 and ISO 68 grades are most commonly used for rotary compressors, while higher viscosity grades are preferred for reciprocating units. These oils can be used in compressors with the following gases: process air, benzene, butadiene, carbon dioxide (dry), carbon monoxide, ethylene, furnace (crack) gas, helium, hydrocarbon gases, hydrogen, inert



gases, methane, natural gas, nitrogen, propane, sulfur hexafluoride, and synthesis gas.

Cetus DE oils can be used in contact with the following seals, paints, and plastics:

- Viton
- High nitrile Buna N
- Teflon
- Epoxy paint
- · Oil-resistant alkyd
- Nylon
- Delrin
- Celcon

These oils should not be used with:

- Neoprene
- SBR rubber
- Low nitrile Buna N
- Acrylic paint
- Lacquer
- Polystyrene
- PVC
- ABS

Cetus DE 100 is approved by:

- Matsubara Iron Works Co. Ltd, for use as a reciprocating air compressor lubricant.
- Tanabe Pneumatic Machinery Co. Ltd, for use in type H series reciprocating compressors.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

8 January 2016 IO-15

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Do not use in breathing air apparatus or medical equipment.

ISO Grade	32	68	100	150
Product Number	293020	293021	293022	293023
SDS Number	27070	27070	27070	27070
API Gravity	23.1	16.7	15.9	17.5
Viscosity, Kinematic cSt at 40°C cSt at 100°C	31.0 5.5	67.5 7.6	96 10.1	152 14.1
Viscosity, Saybolt SUS at 100°F SUS at 210°F	148 44.7	340 51.1	518 61.7	806 72.1
Viscosity Index	120	65	92	89
Flash Point, °C(°F)	266(511)	250(482)	252(486)	249(480)
Pour Point, °C(°F)	-56(-69)	-33(-27)	-39(-38)	-34(-29)

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.

CETUS[®] HIPERSYN[®] OIL 32, 46, 68, 100, 150, 220, 320, 460

PRODUCT DESCRIPTION

Cetus[®] HiPerSYN[®] Oils are synthetic compressor oils. Cetus HiPerSYN Oils are recommended for air compressors; especially portable and stationary rotary, vane, and screw compressors.

CUSTOMER BENEFITS

Cetus HiPerSYN Oils deliver value through:

- Long lubricant life in high temperature operations Outstanding thermal and oxidation stability.
- Long machinery life and maximum compressor efficiency — Oxidative stability and low carbon-forming tendencies minimize sludge and deposit formation.
- Long drain intervals Long lubricant life means less frequent oil changes.
- Minimal maintenance and downtime Trouble-free operation and extended service intervals can lead to reduced operating costs.
- Minimum oil consumption Low volatility means less oil goes downstream, and less oil is needed for makeup.
- Proven performance in rotary screw air compressors manufactured by major OEMs including Sullair and Quincy as well as Diamond Power soot blowers.

FEATURES

Cetus HiPerSYN Oils are formulated with premium base oil technology and a high level of purity and refinement, and has been further enhanced by

their unique additive systems that provide outstanding thermal and oxidation stability, high viscosity index, high flash point, low pour point, anti-wear protection, and excellent hydrolytic stability.

Cetus HiPerSYN Oils also protect against the formation of oxidation byproducts and acidic materials which will eventually cause deposits and varnish, rust, oxidation, and foaming.

They provide demulsibility performance and help minimize entrained air, which could otherwise result in reduced lubricant film thickness and potentially lead to pump cavitation.

Cetus HiPerSYN Oils pass the acute aquatic toxicity criteria adopted by the U.S. Environmental Protection Agency (EPA). Cetus HiPerSYN Oils are registered by **NSF** and are acceptable as a lubricant where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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1 May 2017 IO-16

APPLICATIONS

Cetus[®] HiPerSYN[®] Oils are formulated to provide outstanding lubricating qualities for air compressors, especially portable and stationary rotary, vane, and screw compressors.

Do not use in breathing air apparatus or medical equipment.

Cetus HiPerSYN Oils are generally designed for applications with wider operating temperature ranges as compared to non-synthetic oils. The higher viscosity grade products are especially effective in high temperature applications, such as industrial bearings and gears that require an R&O-type synthetic gear oil as well as sootblowers, where outstanding thermal and oxidative stability are required. Cetus HiPerSYN Oil ISO 320 is recommended for use in oil lubricated vibrating mechanisms in Deister vibrating machines.

Cetus HiPerSYN Oils are approved by Volvo Construction Equipment Company for use in:

- all models of Volvo Asphalt Compactors as a drum eccentric oil and carrier oil (3,000 hour extended drain interval) - Service Bulletin 160 COA 115 Version 2, dated 2017-02-16
- all models of Volvo Soil Compactors as a drum eccentric oil and carrier oil (3,000 hour extended drain interval) - Service Bulletin 160 COS 116 Version 3, dated 2017-02-16

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.
ISO Grade	ASTM	32	46	68	100
Product Number		259136	259137	259138	259139
<i>SDS Number U.S. Mexico Colombia</i>		8562 8562MEX 32554	8562 8562MEX 32554	8562 8562MEX 32554	8563 8562MEX 32554
API Gravity	D287	36.2	35.5	35.1	34.5
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445	30.4 5.7	43.7 7.3	68.6 10.4	105 14.1
Viscosity, Saybolt SUS at 100°F SUS at 210°F	D445	160 45.6	225 50.6	352 61.2	539 75.9
Viscosity Index	D2270	130	130	136	140
Flash Point, °C(°F)	D92	230(446)	244(471)	260(500)	260(500)
Pour Point, °C(°F)	D97	-40(-40)	-36(-33)	-38(-36)	-35(-31)
Color, ASTM	D1500	L 0.5	L 0.5	L 0.5	L 0.5
Copper Corrosion 3 h at 121°C	D130	1B	1B	1B	1B
Foam Tendency/Stability, mL/mL Sequence I	D892	10/0	10/0	10/0	10/0
Oxidation Stability Hours to 2.0 mg KOH/g acid number ^a Minutes to 25 psi pressure drop	D943 D2272	18,000 1800	18,000 1800	18,000 1800	12,000+ 2800

a Modified ASTM D943, allowed to run beyond 10,000 h.

Minor variations in product typical test data are to be expected in normal manufacturing.

ISO Grade	ASTM	150	220	320	460
Product Number		259140	259141	259142	259143
SDS Number		8563	8563	8563	8563
API Gravity	D287	33.9	34.3	32.6	32.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445	158 19.5	231 27.0	336 33.7	483 43.3
Viscosity, Saybolt SUS at 100°F SUS at 210°F	D445	815 98.7	1183 132	1751 164	2520 210
Viscosity Index	D2270	142	152	142	142
Flash Point, °C(°F)	D92	260(500)	260(500)	260(500)	260(500)
Pour Point, °C(°F)	D97	-35(-31)	-34(-29)	-34(-29)	-30(-22)
Color, ASTM	D1500	L 0.5	L 0.5	L 0.5	L 0.5
Copper Corrosion 3 h at 121°C	D130	1B	1B	1B	1B
Foam Tendency/Stability, mL/mL Sequence I	D892	10/0	10/0	10/0	10/0
Oxidation Stability Hours to 2.0 mg KOH/g acid number ^a Minutes to 25 psi pressure drop	D943 D2272	12,000+ 2800	12,000+ 2800	12,000+ 2800	12,000+ 2800

a Modified ASTM D943, allowed to run beyond 10,000 h.

Minor variations in product typical test data are to be expected in normal manufacturing.



CETUS[®] HIPERSYN[®] OIL ISOCLEAN[®] CERTIFIED LUBRICANT 32, 46, 68, 100, 150, 220, 320, 460

PRODUCT DESCRIPTION

Cetus[®] HiPerSYN[®] ISOCLEAN[®] Certified Lubricants are synthetic compressor oils. They are recommended for air compressors;



especially portable and stationary rotary, vane, and screw compressors. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Cetus HiPerSYN ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Long lubricant life in high temperature operations — Outstanding thermal and oxidation stability.
- Long machinery life and maximum compressor efficiency — Oxidative stability and low carbon-forming tendencies minimize sludge and deposit formation.

- Long drain intervals Long lubricant life means less frequent oil changes.
- Minimal maintenance and downtime Trouble-free operation and extended service intervals can lead to reduced operating costs.
- Minimum oil consumption Low volatility means less oil goes downstream, and less oil is needed for makeup.
- Proven performance in rotary screw air compressors manufactured by major OEMs including Sullair and Quincy as well as Diamond Power soot blowers.

FEATURES

Cetus HiPerSYN ISOCLEAN Certified Lubricants are formulated with premium base oil technology and a high level of purity and refinement,



and has been further enhanced by their unique additive systems that provide outstanding thermal and oxidation stability, high viscosity index, high flash point, low pour point, anti-wear protection, and excellent hydrolytic stability.

Cetus HiPerSYN ISOCLEAN Certified Lubricants also protect against the formation of oxidation byproducts and acidic materials which will eventually cause deposits and varnish, rust, oxidation, and foaming.

They have very good demulsibility characteristics allowing quick release of moisture and help minimize entrained air, which could otherwise result in reduced lubricant film thickness and potentially lead to pump cavitation.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 January 2019 IO-16 ISOCLEAN

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APPLICATIONS

Cetus HiPerSYN ISOCLEAN Certified Lubricants are formulated to provide outstanding lubricating qualities for air compressors, especially portable and stationary rotary, vane, and screw compressors.

Do not use in breathing air apparatus or medical equipment.

Cetus HiPerSYN ISOCLEAN Certified Lubricants are generally designed for applications with wider operating temperature ranges as compared to nonsynthetic oils. The higher viscosity grade products are especially effective in high temperature applications, such as industrial bearings and gears that require an R&O-type synthetic gear oil as well as sootblowers, where outstanding thermal and oxidative stability are required.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

ISO Grade	ASTM	32	46	68	100
Product Number		278025	278026	278027	278028
<i>SDS Number U.S. Canada Mexico Colombia</i>		8562 8562CAN 8562MEX 32554	8562 8562CAN 8562MEX 32554	8562 8562CAN 8562MEX 32554	8563 8563CAN 8563MEX 32554
API Gravity	D287	36.2	35.5	35.1	34.5
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445	30.4 5.7	43.7 7.3	68.6 10.4	105 14.1
Viscosity, Saybolt SUS at 100°F SUS at 210°F	D445	160 45.6	225 50.6	352 61.2	539 75.9
Viscosity Index	D2270	130	130	136	140
Flash Point, °C(°F)	D92	230(446)	244(471)	260(500)	260(500)
Pour Point, °C(°F)	D97	-40(-40)	-36(-33)	-38(-36)	-35(-31)
Color, ASTM	D1500	L 0.5	L 0.5	L 0.5	L 0.5
Copper Corrosion 3 h at 121°C	D130	1B	1B	1B	1B
Foam Tendency/Stability, mL/mL Sequence I	D892	10/0	10/0	10/0	10/0
Oxidation Stability Hours to 2.0 mg KOH/g acid number ^a Minutes to 25 psi pressure drop	D943 D2272	18,000 1800	18,000 1800	18,000 1800	12,000+ 2800

a Modified ASTM D943, allowed to run beyond 10,000 h.

Minor variations in product typical test data are to be expected in normal manufacturing.

ISO Grade	ASTM	150	220	320	460
Product Number		278029	278030	278031	278032
<i>SDS Number U.S. Canada Mexico Colombia</i>		8563 8563CAN 8563MEX 32554	8563 8563CAN 8563MEX 32554	8563 8563CAN 8563MEX 32554	8563 8563CAN 8563MEX 32554
API Gravity	D287	33.9	34.3	32.6	32.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445	158 19.5	231 27.0	336 33.7	483 43.3
Viscosity, Saybolt SUS at 100°F SUS at 210°F	D445	815 98.7	1183 132	1751 164	2520 210
Viscosity Index	D2270	142	152	142	142
Flash Point, °C(°F)	D92	260(500)	260(500)	260(500)	260(500)
Pour Point, °C(°F)	D97	-35(-31)	-34(-29)	-34(-29)	-30(-22)
Color, ASTM	D1500	L 0.5	L 0.5	L 0.5	L 0.5
Copper Corrosion 3 h at 121°C	D130	1B	1B	1B	1B
Foam Tendency/Stability, mL/mL Sequence I	D892	10/0	10/0	10/0	10/0
Oxidation Stability Hours to 2.0 mg KOH/g acid number ^a Minutes to 25 psi pressure drop	D943 D2272	12,000+ 2800	12,000+ 2800	12,000+ 2800	12,000+ 2800

a Modified ASTM D943, allowed to run beyond 10,000 h.



8 July 2019 IO-17

CETUS ELITESYN[™]NG 68, 100, 150

PRODUCT DESCRIPTION

Cetus EliteSynTM NG is a PAG (polyalkylene glycol) based natural gas compressor oil formulated for use in rotary screw and reciprocating compressors to resist hydrocarbon dilution in natural gas service with heavier hydrocarbon gases, high H2S and/or CO2 content. This product provides improved protection against wear, corrosion, and varnish formation when compared to mineral-oil based lubricants in similar service.

CUSTOMER BENEFITS

Cetus EliteSyn NG oils deliver value through:

- Minimized dilution Up to 60% less dilution than hydrocarbon oils which helps limit dilution levels to 20% wt, or less, in typical screw compressor applications
- **Corrosion resistance** Excellent corrosion and rust resistance for sour gas (H2S) compression
- Anti-wear protection Resists surface "washing" by condensed hydrocarbons in reciprocating compressors
- **Minimized clogging** Water-soluble base stock prevents downstream filter clogging and complications when compared to compounded or mineral oil-based fluids

FEATURES

For higher molecular weight hydrocarbon gas, refinery waste gas and vapor recovery applications, properly formulated water-soluble ethylene oxide polyalkylene glycols, or PAG lubricants, are recommended as they are more resistant to hydrocarbon dilution. When compared to mineral oils or other synthetic hydrocarbons (PAO), Cetus EliteSyn NG exhibits up to 50% less dilution by normal hydrocarbons. It is also inversely soluble with water which allows the rejection of water at temperatures above approximately 70°C (158°F).

Select additives have been included to protect compressor systems from corrosion in sour or acid gas applications with higher levels of carbon dioxide and hydrogen sulfide.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

Cetus EliteSynTM NG fluids are recommended for portable and stationary rotary screw, rotary vane, and reciprocating compressors. OEM recommendations for proper ISO viscosity grade should be referenced and followed for given operating conditions.

Cetus EliteSyn NG can be used in compressors with the following gases:

- Process air
- Benzene
- Butadiene
- Carbon dioxide (dry)
- Carbon monoxide

- Ethylene
- Furnace (crack) gas
- Helium
- Hydrocarbon gases
- Hydrogen
- Inert gases
- Methane
- Natural gas
- Nitrogen
- Propane
- Sulfur hexafluoride
- Synthetic gases

ISO Grade	68	100	150
Product Number	233905	233906	233907
SDS Number	7579	7579	7579
Denisty at 20°C	1.03	1.04	1.05
Viscosity, Kinematic cSt at 40°C cSt at 100°C	68 14.2	100 20.2	150 28.8
Viscosity Index	220	227	230
Flash Point, °C(°F)	204(400)	240(464)	240(464)
Pour Point, °C(°F)	-51(-60)	-48(-55)	-48(-55)
Fire Point, °C(°F)	285(545)	282(540)	290(554)
Total Acid Number	0.6	0.6	0.6
Copper Corrosion -24h at 100C	1B	1B	1B
4 Ball Wear, 1800rpm, 75C, 40kg, 1hr	0.4	0.35	0.35

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



CETUS[®] PAO 32, 46, 68, 100, 150

PRODUCT DESCRIPTION

Cetus[®] PAO oils are synthetic air compressor lubricants formulated with high quality PAO base fluids and a high performance additive package.

CUSTOMER BENEFITS

Cetus PAO oils deliver value through:

- Exceptional thermal and oxidation stability - Long lubricant life in high temperature operations.
- Long machinery life and maximum **compressor efficiency** – Low carbon-forming tendency minimizes deposits.
- Long drain intervals Long lubricant life means less frequent oil changes.
- Minimal maintenance and downtime Helps promote long service intervals which can minimize operating costs.
- · Low volatility and excellent air release tendency - Helps to reduce oil carryover downstream and less makeup oil is needed.

FEATURES

Cetus PAO oils are synthetic air compressor lubricants formulated with the highest quality polyalphaolefin (PAO) base fluids.

They provide excellent thermal and oxidation stability, high viscosity index, high flash point, low pour point, and excellent hydrolytic stability.

Cetus PAO oils protect against rust, oxidation, and foaming, and have ashless antiwear properties.

Cetus PAO oils are designed to meet the requirements of modern higher output, more efficient air compressors. These units are more compact and operate at higher speeds than older compressors, resulting in higher temperatures. As temperatures increase, deposit formation on valves and air separators can also increase.



The high thermal and oxidation stability extends crankcase drain intervals compared with those obtained with mineral oils. Compressor operators can realize minimal equipment downtime and used oil disposal costs.

Valve cleanliness is maintained by the excellent thermal and oxidation stability and low carbon-forming tendencies of this product. Clean valves help minimize recompression, maximize compressor efficiencies and minimize maintenance shutdown costs.

Compressor users can realize savings in maintenance and lubrication costs through longer drain intervals offered by Cetus PAO compared to mineral oil based products.

In addition, they will find compatibility with most elastomeric seal materials that are used with mineral oil-based compressor lubricants.

APPLICATIONS

Cetus PAO oils are formulated to provide excellent lubricating gualities for many air compressors, especially portable and stationary rotary and screw compressors as well as single-stage, two-stage, and multistage reciprocating compressors.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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While specific manufacturer recommendations vary, the **ISO 32, 46** and **68** grades are most commonly used for rotary air compressors, while higher viscosity grades are preferred for reciprocating air compressors.

Since reciprocating compressors require both a crankcase lubricant and a cylinder lubricant, Cetus[®] PAO oils are formulated to meet this dual requirement.

Cetus PAO 68 has especially been developed for the lubrication of turbochargers in marine diesel engines, where two separate lubricating oil systems are in place.

Cetus PAO meet the requirements of:

• DIN 51506 VDL standard

Cetus PAO 68 is approved for:

 ABB VTR.4 turbochargers. Fulfills the requirements as low friction lubricant for a 5000 hour drain interval. Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

ISO Grade	32	46	68	100	150
Product Number	293024	293025	293026	293027	293028
SDS Number	28999	28999	29718	29718	29751
API Gravity	30.6	36.6	36.0	35.4	34.6
Viscosity, Kinematic cSt at 40°C cSt at 100°C	32.0 6.1	46.0 8.1	68.0 10.4	100 14.0	150 19.0
Viscosity, Saybolt SUS at 100°F SUS at 210°F	150 45.6	214 51.4	316 60.6	464 74.0	695 93.8
Viscosity Index	134	136	141	142	145
Flash Point, °C(°F)	250(482)	250(482)	240(464)	260(500)	266(510)
Pour Point, °C(°F)	-45(-49)	-46(-51)	-47(-53)	-48(-54)	-49(-56)

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



CETUS[®] PAO ISOCLEAN[®] CERTIFIED LUBRICANT 32, 46, 68, 100, 150

SOCLE/

PRODUCT DESCRIPTION

Cetus[®] PAO ISOCLEAN[®] Certified Lubricants are synthetic air compressor lubricants formulated with high quality PAO base fluids and a high performance

additive package. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Cetus PAO ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Exceptional thermal and oxidation stability — Long lubricant life in high temperature operations.
- Long machinery life and maximum compressor efficiency — Low carbon-forming tendency minimizes deposits.
- Long drain intervals Long lubricant life means less frequent oil changes.

- Minimal maintenance and downtime Helps promote long service intervals which can minimize operating costs.
- Low volatility and excellent air release tendency — Helps to reduce oil carryover downstream and less makeup oil is needed.

FEATURES

Cetus PAO ISOCLEAN Certified Lubricants are synthetic air compressor lubricants formulated with the highest quality polyalphaolefin (PAO) base fluids.

They provide excellent thermal and oxidation stability, high viscosity index, high flash point, low pour point, and excellent hydrolytic stability.

Cetus PAO ISOCLEAN Certified Lubricants protect against rust, oxidation, and foaming, and have ashless antiwear properties.

Cetus[®] PAO ISOCLEAN[®] Certified Lubricants are designed to meet the requirements of modern higher output, more efficient air compressors. These units are more compact and operate at higher speeds than older compressors, resulting in higher tempe



operate at higher speeds than older compressors, resulting in higher temperatures. As temperatures increase, deposit formation on valves and air separators can also increase.

The high thermal and oxidation stability extends crankcase drain intervals compared with those obtained with mineral oils. Compressor operators can realize minimal equipment downtime and used oil disposal costs.

Valve cleanliness is maintained by the excellent thermal and oxidation stability and low carbon-forming tendencies of this product. Clean valves help minimize

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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1 May 2019 IO-18 ISOCLEAN

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recompression, maximize compressor efficiencies and minimize maintenance shutdown costs.

Compressor users can realize savings in maintenance and lubrication costs through longer drain intervals offered by Cetus PAO compared to mineral oil based products.

In addition, they will find compatibility with most elastomeric seal materials that are used with mineral oil-based compressor lubricants.

APPLICATIONS

Cetus[®] PAO ISOCLEAN[®] Certified Lubricants are formulated to provide excellent lubricating qualities for many air compressors, especially portable and stationary rotary and screw compressors as well as singlestage, two-stage, and multistage reciprocating compressors.

While specific manufacturer recommendations vary, the **ISO 32, 46** and **68** grades are most commonly used for rotary air compressors, while higher viscosity grades are preferred for reciprocating air compressors. Since reciprocating compressors require both a crankcase lubricant and a cylinder lubricant, Cetus PAO oils are formulated to meet this dual requirement.

Cetus PAO ISOCLEAN Certified Lubricant 68 has especially been developed for the lubrication of turbochargers in marine diesel engines, where two separate lubricating oil systems are in place.

Cetus PAO ISOCLEAN Certified Lubricants meet the requirements of:

• DIN 51506 VDL standard

Cetus PAO ISOCLEAN Certified Lubricant 68 is approved for:

 ABB VTR.4 turbochargers. Fulfills the requirements as low friction lubricant for a 5000 hour drain interval.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed. Do not use in breathing air apparatus or medical equipment.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

ISO Grade	32	46	68	100	150
Product Number	293137	293138	293139	293140	293141
<i>SDS Number U.S. Canada Mexico</i>	28999 29783 39926	28999 29783 39926	28999 29783 39926	28999 29783 39926	28999 29783 39926
API Gravity	30.6	36.6	36.0	35.4	34.6
Viscosity, Kinematic cSt at 40°C cSt at 100°C	32.0 6.1	46.0 8.1	68.0 10.4	100 14.0	150 19.0
Viscosity, Saybolt SUS at 100°F SUS at 210°F	150 45.6	214 51.4	316 60.6	464 74.0	695 93.8
Viscosity Index	134	136	141	142	145
Flash Point, °C(°F)	250(482)	250(482)	240(464)	260(500)	266(510)
Pour Point, °C(°F)	-45(-49)	-46(-51)	-47(-53)	-48(-54)	-49(-56)

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



CETUS[®] PAO HC

PRODUCT DESCRIPTION

Cetus[®] PAO HC is a synthetic compressor lubricant formulated with high quality PAO base fluids.

CUSTOMER BENEFITS

Cetus PAO HC delivers value through:

- **Exceptional thermal stability** The polyalphaolefin base fluid helps assure long lubricant life in high temperature operations.
- **High Purity** Cetus PAO HC has a low carbon forming tendency and contains no polymer additives that result in the formation of deposits and sticky residues on discharge valves, piping and aftercooler tubing.
- Low coefficient of friction Compared to conventional compressor lubricants, Cetus PAO HC provides better lubrication of moving parts with reduction of operating temperatures.
- Formulation for inert y hydrocarbon gas compression — Cetus PAO HC does not contain the additives used for air compression, which can lead to catalyst poisoning.

FEATURES

Cetus PAO HC is a synthetic compressor lubricant. It is formulated to meet the demands of reciprocating compressors for gases other than air.

It is formulated with the highest quality polyalphaolefin (PAO) base fluids. PAO has inherent properties, such as excellent thermal and oxidative stability, high viscosity index, high flash and fire points, natural friction reducing ability, and excellent low temperature fluidity, which make Cetus PAO HC especially well suited for the lubrication of compressor cylinders.

The ashless nature of Cetus PAO HC makes it nonpoisonous to catalysts.

The purity and thermal stability of this lubricant will substantially minimize the formation of sludge,

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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deposits and sticky residues on compressor discharge valves, piping and aftercooler tubing.

APPLICATIONS

Cetus PAO HC is designed to meet the needs of cylinder lubrication in reciprocating compressors for inert gases (e.g. nitrogen, hydrogen, carbon dioxide, etc.) or for hydrocarbon gases (e.g. ethylene, propylene, propane, butane, etc).

The synthetic properties of Cetus PAO HC minimize the problems associated with dilution by liquid hydrocarbons and by gas absorption at high pressures.

Cetus PAO HC meets **U.S. Food and Drug Administration (FDA)** requirements, 21 CFR 178.3570, and is suitable for lubrication of ethylene and propylene compressors involved in the manufacture of polymeric food packaging.

Cetus PAO HC is registered by **NSF** and is acceptable as a lubricant where incidental food contact may occur (H1) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

> 25 February 2016 IO-19

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ISO Grade	220
Product Number	293029
SDS Number	31296
AGMA Grade	5
API Gravity	36.7
Viscosity, Kinematic cSt at 40°C cSt at 100°C	230 28.3
Viscosity, Saybolt SUS at 100°F SUS at 210°F	1066 134.8
Viscosity Index	160
Flash Point, °C(°F)	232(450)
PAO 6 HVI/mPAO 150 Pour Point, °C(°F) (measured)	-49(-56)

Minor variations in product typical test data are to be expected in normal manufacturing.



CLARITY[®] MACHINE OIL 150, 220, 320, 460

PRODUCT DESCRIPTION

Clarity[®] Machine Oils are circulating oils for use in industrial equipment such as gear boxes, calender stack bearings and crown control rolls.

CUSTOMER BENEFITS

Clarity Machine Oils deliver value through:

- **High temperature stability** Contains an effective oxidation inhibitor to protect the oil at elevated ambient operating temperatures.
- Long lubricant life A well-balanced additive package and high quality base oils help minimize breakdown and maximize oil life. Gives excellent performance in the FAG FE-8 Bearing Test.
- **Excellent wear protection** Helps provide high FZG, Timken, and AGMA EP performance.
- Excellent water separability The lubricant separates readily from water.
- Effective foam inhibition Helps minimize amount of entrained air in the oil, minimizing the possibility of pump cavitation and also helps prevent surface foam.
- **Pall wet filterability** Clarity Machine Oil consistently provides excellent wet aged filtration with low micron filters.
- Environmental sensitivity Ashless formulation facilitates reclaiming and recycling efforts. Nontoxic to aquatic species as determined by LC-50 testing.

FEATURES

Clarity Machine Oils **150**, **220**, and **320** are formulated with high quality base oils.



Their ashless extreme pressure additive packages include rust, oxidation, and foam inhibitors.

Their outstanding oxidation stability minimizes deposit formation.

They have gear oil EP characteristics to minimize wear, and yet do not contain corrosive active sulfur additives.

Their ashless formulation facilitates reclaiming and recycling of circulating oils.

They have excellent water separating ability (demulsibility), and exceptional wet filterability with fine porosity oil filters, as demonstrated by the Pall Filterability Test.

FUNCTIONS

Clarity[®] Machine Oils are formulated to meet the critical demands of circulating systems in industrial equipment. These systems expose the lubricant to a broad range of operating temperatures which hasten oxidation. Clarity Machine Oils have good tolerance to contamination with water, oxidation byproducts and other particles. Clarity Machine Oils are able to have a long lubricant life in spite of these contaminants and still do an outstanding job of keeping the circulating oil system clean and lubricating the many plain and anti-friction bearings associated with this complex high speed equipment.

APPLICATIONS

Clarity Machine Oils are recommended for use in circulating systems of industrial equipment as well as gear boxes, including wet-end systems, dryer bearings, and calender stacks in paper machine systems.

Clarity Machine Oils have been used successfully in the lubrication of many types of paper machine equipment including Valmet, Beloit, and Voith Sulzer paper machine equipment.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 July 2016 IO-20

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In addition, Clarity Machine Oils provide excellent filtration performance in the Pall Filterability Test using low micron filters.

Clarity Machine Oils 150, 220, 320 and 460 may be used as AGMA EP Oils 4, 5, 6 and 7, respectively, for back-side gears and enclosed gear drives. Clarity Machine Oils **220** and **320** may also be used in plain and anti-friction bearings.

TYPICAL TEST DATA

ISO Grade	150	220	320	460
Product Number	294008	294009	294010	294011
SDS Number	6680	6680	6680	6680
AGMA Grade	4 EP	5 EP	6 EP	7 EP
API Gravity	29.3	27.7	26.1	26.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	143 14.6	209 18.4	304 23.5	437 29.0
Viscosity, Saybolt SUS at 100°F SUS at 210°F	749 78.1	1104 94.2	1616 117	2343 143
Viscosity Index	101	97	98	95
Flash Point, °C(°F)	246(475)	249(480)	248(473)	278(532)
Pour Point, °C(°F)	-15(+5)	-15(+5)	-12(+10)	-18(0)
Timken OK Load, lb	60	60	60	60
FZG Failure Load Stage, DIN 51354	>12	>12	>12	>12
Oxidation Stability, Hours to 2.0 mg KOH/g acid number, ASTM D943 Minutes to 25 psi pressure drop, ASTM D2272	4500 367	4000 375	3000 345	1835 345
Pall Filterability Wet Aged, mL to 25 psi	>17,000	>17,000	>17,000	_

Minor variations in product typical test data are to be expected in normal manufacturing.



CLARITY[®] MACHINE OIL ISOCLEAN[®] Certified Lubricant 150, 220, 320, 460

SOCLE

PRODUCT DESCRIPTION

Clarity[®] Machine Oils ISOCLEAN[®] Certified Lubricants are circulating oils for use in industrial equipment such as gear boxes, calender stack bearings

and crown control rolls. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Clarity Machine Oils ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **High temperature stability** Contains an effective oxidation inhibitor to protect the oil at elevated ambient operating temperatures.
- Long lubricant life A well-balanced additive package and high quality base oils help minimize breakdown and maximize oil life. Gives excellent performance in the FAG FE-8 Bearing Test.
- **Excellent wear protection** Helps provide high FZG, Timken, and AGMA EP performance.

- Excellent water separability The lubricant separates readily from water.
- Effective foam inhibition Helps minimize amount of entrained air in the oil, minimizing the possibility of pump cavitation and also helps prevent surface foam.
- **Pall wet filterability** Clarity Machine Oil consistently provides excellent wet aged filtration with low micron filters.
- Environmental sensitivity Ashless formulation facilitates reclaiming and recycling efforts. Nontoxic to aquatic species as determined by LC-50 testing.

FEATURES

Clarity Machine Oils ISOCLEAN Certified Lubricants are formulated with high quality base oils.



Their ashless extreme pressure

additive packages include rust, oxidation, and foam inhibitors.

Their outstanding oxidation stability minimizes deposit formation.

They have gear oil EP characteristics to minimize wear, and yet do not contain corrosive active sulfur additives.

Their ashless formulation facilitates reclaiming and recycling of circulating oils.

They have excellent water separating ability (demulsibility), and exceptional wet filterability with fine porosity oil filters, as demonstrated by the Pall Filterability Test.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 April 2019 IO-20 ISOCLEAN

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FUNCTIONS

Clarity[®] Machine Oils ISOCLEAN Certified Lubricants are formulated to meet the critical demands of circulating systems in industrial equipment. These systems expose the lubricant to a broad range of operating temperatures which hasten oxidation. Clarity Machine Oils ISOCLEAN Certified Lubricants have good tolerance to contamination with water, oxidation byproducts and other particles. Clarity Machine Oils ISOCLEAN Certified Lubricants are able to have a long lubricant life in spite of these contaminants and still do an outstanding job of keeping the circulating oil system clean and lubricating the many plain and anti-friction bearings associated with this complex high speed equipment.

APPLICATIONS

Clarity Machine Oils ISOCLEAN Certified Lubricants are recommended for use in circulating systems of industrial equipment as well as gear boxes, including wet-end systems, dryer bearings, and calender stacks in paper machine systems.

Clarity Machine Oils ISOCLEAN Certified Lubricants have been used successfully in the lubrication of many types of paper machine equipment including Valmet, Beloit, and Voith Sulzer paper machine equipment.

In addition, Clarity Machine Oils ISOCLEAN Certified Lubricants provide excellent filtration performance in the Pall Filterability Test using low micron filters.

Clarity Machine Oils ISOCLEAN Certified Lubricants may be used as AGMA EP Oils 4, 5, 6 and 7, respectively, for back-side gears and enclosed gear drives.

Clarity Machine Oils ISOCLEAN Certified Lubricants **220** and **320** may also be used in plain and anti-friction bearings.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubrication Marketer to set specific ISO Cleanliness targets for your business application.

ISO Grade	150	220	320	460
Product Number	278084	294043	278083	274311
SDS Number U.S. Canada Mexico	6680 6680CAN 6680MEX	6680 6680CAN 6680MEX	6680 6680CAN 6680MEX	6680 6680CAN 6680MEX
AGMA Grade	4 EP	5 EP	6 EP	7 EP
API Gravity	29.3	27.7	26.1	26.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	143 14.6	209 18.4	304 23.5	437 29.0
Viscosity, Saybolt SUS at 100°F SUS at 210°F	749 78.1	1104 94.2	1616 117	2343 143
Viscosity Index	101	97	98	95
Flash Point, °C(°F)	246(475)	249(480)	248(473)	278(532)
Pour Point, °C(°F)	-15(+5)	-15(+5)	-12(+10)	-18(0)
Timken OK Load, Ib	60	60	60	60
FZG Failure Load Stage, DIN 51354	>12	>12	>12	>12
Oxidation Stability, Hours to 2.0 mg KOH/g acid number, ASTM D943 Minutes to 25 psi pressure drop, ASTM D2272	4500 367	4000 375	3000 345	1835 345
Pall Filterability Wet Aged, mL to 25 psi	>17,000	>17,000	>17,000	_

Minor variations in product typical test data are to be expected in normal manufacturing.



CLARITY[®] SYNTHETIC MACHINE OIL 150, 220, 320, 460

PRODUCT DESCRIPTION

Clarity[®] Synthetic Machine Oils are designed for use as EP gear oils and as paper machine oils.

CUSTOMER BENEFITS

Clarity Synthetic Machine Oils deliver value through:

- High temperature stability Exceptional performance in the ASTM D943 Turbine Oil Stability Test. The test ran for >11,000 hours (>1 year) vs. 4000 hours for the mineral oil formulas.
- Long lubricant life The PAO base oils with their high viscosity index, combined with a well-balanced additive package, minimize oil breakdown and maximize oil life.
- Excellent wear protection Helps provide high FZG, Timken, and AGMA EP performance.
- Excellent water separability The lubricants readily separate from water.
- Effective foam inhibition Helps minimize amount of entrained air in the oils, minimizing the possibility of pump cavitation and also helps prevent surface foam.
- Pall wet filterability Clarity Synthetic Machine Oils provide excellent wet filtration with low porosity filters, as determined by the Pall Filterability Test.
- Environmental sensitivity Ashless formulation facilitates reclaiming and recycling circulating oils.

FEATURES

Clarity Synthetic Machine Oils combine our proprietary ashless formulation with the superior performance properties of polyalphaolefin (PAO) synthetic base oils. This combination provides greatly enhanced thermal and oxidation stability.

In addition, the high viscosity index of the PAO base oils offers greater lubricant film thickness than mineral oil-based products at high operating temperatures. Clarity Synthetic Machine Oils also offer excellent EP properties, allowing them to be used as EP gear lubricants.



Clarity Synthetic Machine Oils have excellent demulsibility (water separating ability) and wet filterability, as defined by the Pall Filterability Test.

Clarity Synthetic Machine Oils can be combined with mineral oil products for recycling purposes.

They provide long lubricant life due to exceptional oxidation stability, resulting in minimal lubricant usage and disposal.

FUNCTIONS

These products are formulated to meet critical demands of industrial equipment exposed to temperatures where mineral oil-based fluids are shortlived.

The extraordinary thermal and oxidative stability of PAOs are boosted by the outstanding antioxidant package in the Clarity Synthetic Machine Oil formulas.

The oils also contain highly effective antirust and nontraditional EP additives.

Clarity Synthetic Machine Oils 150, 220, 320, and 460 may be used as AGMA 4 EP, 5 EP, 6 EP, and 7 EP oils, respectively.

Clarity Synthetic Machine Oils provide excellent filtration performance in the Pall Filterability Test using low micron filters. This test defines oils having good filterability as giving 2000 mL filtration. After >10,000 mL, Clarity Synthetic Machine Oils were still filterable.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

27 May 2016 IO-21

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APPLICATIONS

 $\mbox{Clarity}^{\mbox{$\mathbb{8}$}}$ Synthetic Machine Oils may be used in the following applications:

- Extreme temperature bearing and circulating oil systems
- Gear boxes
- Dryer section accessories
- Moisture profiler
- Calender rolls
- Crown control rolls
- Oil heated rolls
- High temperature air compressors
- High pressure hydraulic pumps

TYPICAL TEST DATA

Clarity Synthetic Machine Oils are registered by **NSF** and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

ISO Grade	150	220	320	460
Product Number	266174	266172	266175	266183
SDS Number	6872	6872	6872	6872
AGMA Grade	4 EP	5 EP	6 EP	7 EP
API Gravity	36.9	36.4	35.9	35.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	143 19.8	209 26.3	304 35.2	437 46.1
Viscosity, Saybolt SUS at 100°F SUS at 210°F	734 100	1077 129	1572 170	2270 222
Viscosity Index	159	160	162	163
Flash Point, °C(°F)	258(496)	236(457)	258(496)	270(518)
Pour Point, °C(°F)	-48(-54)	-45(-49)	-42(-44)	-36(-33)
Timken OK Load, Ib	65	65	65	65
FZG Failure Load Stage, DIN 51354	>12	>12	>12	>12
Oxidation Stability Hours to 2.0 mg KOH/g acid number, ASTM D943 Minutes to 25 psi pressure drop, ASTM D2272	>8000 375	>10,000 375	>10,000 375	>10,000 375
Pall Filterability Wet Aged, mL to 25 psi	>10,000	>10,000	>10,000	>10,000

Minor variations in product typical test data are to be expected in normal manufacturing.



CLARITY[®] SYNTHETIC MACHINE OIL **ISOCLEAN[®]** Certified Lubricant 150, 220, 320, 460

PRODUCT DESCRIPTION

Clarity[®] Synthetic Machine ISOCLEAN[®] Certified Lubricants are designed for use as EP gear oils and as paper machine oils. Chevron ISOCLEAN



Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Clarity Synthetic Machine ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- Flexibility ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements -Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- High temperature stability Exceptional performance in the ASTM D943 Turbine Oil Stability Test. The test ran for >11,000 hours (>1 year) vs. 4000 hours for the mineral oil formulas.
- Long lubricant life The PAO base oils with their high viscosity index, combined with a well-balanced additive package, minimize oil breakdown and maximize oil life.
- Excellent wear protection Helps provide high FZG, Timken, and AGMA EP performance.

- Excellent water separability The lubricants readily separate from water.
- Effective foam inhibition Helps minimize amount of entrained air in the oils, minimizing the possibility of pump cavitation and also helps prevent surface foam.
- Pall wet filterability Clarity Synthetic Machine Oils provide excellent wet filtration with low porosity filters, as determined by the Pall Filterability Test.
- Environmental sensitivity Ashless formulation facilitates reclaiming and recycling circulating oils.

FEATURES

Clarity Synthetic Machine ISOCLEAN Certified Lubricants combine our proprietary ashless formulation with the superior performance properties of polvalphaolefin (PAO) synthetic base oils. This combination provides greatly enhanced thermal and oxidation stability.

In addition, the high viscosity index of the PAO base oils offers greater lubricant film thickness than mineral oil-based products at high operating temperatures. Clarity Synthetic Machine Oils also offer excellent EP properties, allowing them to be used as EP gear lubricants.



Clarity Synthetic Machine ISOCLEAN Certified

Lubricants have excellent demulsibility (water separating ability) and wet filterability, as defined by the Pall Filterability Test.

Clarity Synthetic Machine ISOCLEAN Certified Lubricants can be combined with mineral oil products for recycling purposes.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 April 2020 **IO-21 ISOCLEAN**

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They provide long lubricant life due to exceptional oxidation stability, resulting in minimal lubricant usage and disposal.

FUNCTIONS

These products are formulated to meet critical demands of industrial equipment exposed to temperatures where mineral oil-based fluids are short-lived.

The extraordinary thermal and oxidative stability of PAOs are boosted by the outstanding antioxidant package in the Clarity $^{\mbox{\scriptsize R}}$ Synthetic Machine Oil formulas.

The oils also contain highly effective antirust and nontraditional EP additives.

Clarity Synthetic Machine ISOCLEAN[®] Certified Lubricants 150, 220, 320, and 460 may be used as AGMA 4 EP, 5 EP, 6 EP, and 7 EP oils, respectively.

Clarity Synthetic Machine Oils provide excellent filtration performance in the Pall Filterability Test using low micron filters. This test defines oils having good filterability as giving 2000 mL filtration. After >10,000 mL, Clarity Synthetic Machine Oils were still filterable.

APPLICATIONS

Clarity Synthetic Machine ISOCLEAN Certified Lubricants may be used in the following applications:

- Extreme temperature bearing and circulating oil systems
- Gear boxes
- Dryer section accessories
- Moisture profiler
- Calender rolls
- Crown control rolls
- Oil heated rolls
- High temperature air compressors
- High pressure hydraulic pumps

Clarity Synthetic Machine Oils are registered by **NSF** and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification. Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

ISO Grade	150	220	320	460
Product Number	266241	266240	266242	266243
SDS Number	6872	6872	6872	6872
Canada Mexico Colombia	6872CAN 6872MEX 32539	6872CAN 6872MEX 32539	6872CAN 6872MEX 32539	6872CAN 6872MEX 32539
AGMA Grade	4 EP	5 EP	6 EP	7 EP
API Gravity	36.9	36.4	35.9	35.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	143 19.8	209 26.3	304 35.2	437 46.1
Viscosity, Saybolt SUS at 100°F SUS at 210°F	734 100	1077 129	1572 170	2270 222
Viscosity Index	159	160	162	163
Flash Point, °C(°F)	258(496)	236(457)	258(496)	270(518)
Pour Point, °C(°F)	-48(-54)	-45(-49)	-42(-44)	-36(-33)
Timken OK Load, Ib	65	65	65	65
FZG Failure Load Stage, DIN 51354	>12	>12	>12	>12
Oxidation Stability Hours to 2.0 mg KOH/g acid number, ASTM D943 Minutes to 25 psi pressure drop, ASTM D2272	>8000 375	>10,000 375	>10,000 375	>10,000 375
Pall Filterability Wet Aged, mL to 25 psi	>10,000	>10,000	>10,000	>10,000

Minor variations in product typical test data are to be expected in normal manufacturing.



CLARITY[®] AW 32, 46, 68

PRODUCT DESCRIPTION

Clarity[®] AW oils are high-performance ashless antiwear hydraulic fluids designed to meet the stringent demands of modern OEM designs, where increased performance is required. They give maximum protection in both mobile and stationary hydraulic equipment applications.

CUSTOMER BENEFITS

Clarity AW oils deliver value through:

- **Premium performance** Ashless formulation meets or exceeds major vane, piston and gear pump manufacturer's requirements providing excellent protection of hydraulic systems against wear, rust and corrosion along with exceptional hydrolytic stability, water separability, and filterability for smooth equipment operation.
- **Outstanding oxidation and thermal stability** - Longer service life than conventional zinc-based antiwear hydraulic oils. High thermal stability results in lower system sludge and varnish formation.
- Excellent air release and foam control -Ensures low air content in hydraulic fluid for improved equipment responsiveness.
- Low toxicity Zinc-free formula is inherently biodegradable¹ and has very low acute aquatic toxicity to both fish and invertebrates based on tests of water accommodated fractions. Ashless formulation facilitates conventional recycling programs.

FEATURES

Clarity AW oils are formulated with premium base oil technology and an ashless, zinc- free additive system that provides exceptional oxidation stability, water separability, foam suppression,



and protection against wear, rust and corrosion. They are designed to meet or exceed the performance requirements of conventional antiwear hydraulic oils, especially in severe, high-output applications such as axial piston pumps. The antiwear performance of these oils makes them especially suited for high performance industrial applications where pressures may exceed 5000 psi.

The zinc-free formula makes it well suited for applications involving yellow metals found in hydraulic systems.

Clarity AW oils are long-life lubricants (are not vegetable oil based), with dramatically longer TOST (ASTM D943 oxidation stability test) lives than conventional zinc-based hydraulic fluids. A longer TOST life equates to longer service life, which can improve the customer's bottom line. This level of oxidation stability is especially applicable in high efficiency (high speed, high temperature, high output) applications where severe stress is placed on the hydraulic fluid.

Many hydraulic systems are required to operate in environmentally sensitive areas where leaks or spills of hydraulic fluid may result in contamination of the soil or nearby waterways. Conventional antiwear hydraulic oils are formulated with metal-containing performance additives which can persist in the environment in the event of leaks. Vegetable-based hydraulic oils generally meet the environmental requirements, but can fall short of the performance requirements.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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Inherently biodegradable by OECD 301D testing and guidelines in EPA 800-R-11-002, November 2011 evaluations for a similar product. Product is not considered readily biodegradable. Clarity Bio EliteSyn AW should be used if a readily biodegradable EAL fluid is required.

APPLICATIONS

Clarity AW oils are designed to meet the stringent demands of modern OEM designs, where increased performance of the hydraulic oil is required. They have demonstrated excellent performance in hydraulic systems using vane-, piston-, and gear-type pumps in mobile and stationary equipment. They are designed to provide protection in high performance hydraulic applications where pressures may exceed 5000 psi. These oils are recommended for use in plastic injection molding where OEMs require a fluid meeting DIN 51524 or equivalent industry performance standards. They are also suitable for use in lightly loaded reciprocating compressors.

Clarity EliteSyn AW oils are compatible with seal materials commonly found in most hydraulic systems, including nitrile and flouro elastomers (NBR and FKM).

CLAIMS AND SPECIFICATIONS

	32	46	68
Parker Hannifin (Dennison) HF-0, HF-1, HF-2	Α	Α	A
Eaton (Vickers) E-FDGN-TB002-E	Α	Α	Α
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)	M P-68	M P-70	M P-69
Hitachi/John Deere Construction JCMAS HK VG 32, 46	М	М	-
Krauss-Maffei Kunststofftechnik	-	М	-
NSF H2 ^b	Α	Α	Α
US Steel (AIST) 126, 127	М	М	М
ASTM D6158 HM	М	М	М
DIN 51524-2 HLP	М	М	М
ISO 11158 L-HM	М	М	М
SAE MS1004-HM	М	М	М

a Obsolete specification

b Clarity AW (ISO 32, 46, 68) are registered by NSF and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

A: Approved for or listed

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

ISO Grade	Test Method	32	46	68
Product Number		230344	230345	230346
<i>SDS Number U.S. Canada Mexico</i>		65294 65295 65296	65297 65298 65299	65300 65301 65302
API Gravity	ASTM D287	33.8	32.1	31.7
Density at 15°C, kg/l	ASTM D4057	0.856	0.865	0.867
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445	32.1 5.6	46.8 7.0	68.7 9.1
Viscosity Index	ASTM D2770	115	107	108
Flash Point, °C(°F)	ASTM D92	227	238	248
Pour Point, °C(°F)	ASTM D97	-40	-38	-35
Copper Corrosion 3hr at 100°C	ASTM D130	1a	1a	1a
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	30 0	10 0	10 0
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass
Water Separability, minutes to <3mL at 54°C	ASTM D1401	15	15	15
Oxidation Stability, TOST Hours to 2.0 mg KOH/g acid number	ASTM D943	>10,000	>10,000	>10,000
FZG Gear Test, Fail Load Stage	DIN 51354	12	12	12
Acute Aquatic Toxicity (LC-50)	OECD 203	Pass	Pass	Pass

The results expressed above were obtained during the development of this product and are considered representative of (any/all) commercial samples.



CLARITY[®] AW ISOCLEAN[®] CERTIFIED LUBRICANT 32, 46, 68

PRODUCT DESCRIPTION

Clarity[®] AW ISOCLEAN[®] Certified Lubricants are high-performance ashless anti-wear hydraulic fluids designed to meet the stringent



demands of modern OEM designs, where increased performance is required. They give maximum protection in both mobile and stationary hydraulic equipment applications.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Clarity AW ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Premium performance** Ashless formulation meets or exceeds major vane, piston and gear pump manufacturer's requirements providing excellent protection of hydraulic systems against wear, rust and corrosion along with exceptional hydrolytic

stability, water separability, and filterability for smooth equipment operation.

- Outstanding oxidation and thermal stability

 Longer service life than conventional zinc-based antiwear hydraulic oils. High thermal stability results in lower system sludge and varnish formation.
- Excellent air release and foam control -Ensures low air content in hydraulic fluid for improved equipment responsiveness.
- Low toxicity Zinc-free formula is inherently biodegradable¹ and has very low acute aquatic toxicity to both fish and invertebrates based on tests of water accommodated fractions. Ashless formulation facilitates conventional recycling programs.

FEATURES

Clarity AW ISOCLEAN Certified

Lubricants are formulated with premium base oil technology and an ashless, zincfree additive system that provides exceptional oxidation stability, water



separability, foam suppression, and protection against wear, rust and corrosion. They are designed to meet or exceed the performance requirements of conventional antiwear hydraulic oils, especially in severe, highoutput applications such as axial piston pumps. The antiwear performance of these oils makes them especially suited for high performance industrial applications where pressures may exceed 5000 psi.

 Inherently biodegradable by OECD 301D testing and guidelines in EPA 800-R-11-002, November 2011 evaluations for a similar product. Product is not considered readily biodegradable. Clarity Bio EliteSyn AW ISOCLEAN Certified Lubricant should be used if a readily biodegradable EAL fluid is required.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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The zinc-free formula makes it well suited for applications involving yellow metals found in hydraulic systems.

Clarity AW ISOCLEAN Certified Lubricants are long-life lubricants (are not vegetable oil based), with dramatically longer TOST (ASTM D943 oxidation stability test) lives than conventional zinc-based hydraulic fluids. A longer TOST life equates to longer service life, which can improve the customer's bottom line. This level of oxidation stability is especially applicable in high efficiency (high speed, high temperature, high output) applications where severe stress is placed on the hydraulic fluid.

Many hydraulic systems are required to operate in environmentally sensitive areas where leaks or spills of hydraulic fluid may result in contamination of the soil or nearby waterways. Conventional antiwear hydraulic oils are formulated with metal-containing performance additives which can persist in the environment in the event of leaks. Vegetable-based hydraulic oils generally meet the environmental requirements, but can fall short of the performance requirements.

APPLICATIONS

Clarity AW ISOCLEAN Certified Lubricants are designed to meet the stringent demands of modern OEM designs, where increased performance of the hydraulic oil is required. They have demonstrated excellent performance in hydraulic systems using vane-, piston-, and gear-type pumps in mobile and stationary equipment. They are designed to provide protection in high performance hydraulic applications where pressures may exceed 5000 psi. These oils are recommended for use in plastic injection molding where OEMs require a fluid meeting DIN 51524 or equivalent industry performance standards. They are also suitable for use in lightly loaded reciprocating compressors.

Clarity AW ISOCLEAN Certified Lubricants are compatible with seal materials commonly found in most hydraulic systems, including nitrile and flouro elastomers (NBR and FKM).

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

CLAIMS AND SPECIFICATIONS

	32	46	68
Parker Hannifin (Dennison) HF-0, HF-1, HF-2	Α	Α	Α
Eaton (Vickers) E-FDGN-TB002-E	Α	Α	Α
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)	M P-68	M P-70	M P-69
Hitachi/John Deere Construction JCMAS HK VG 32, 46	М	М	-
Krauss-Maffei Kunststofftechnik	-	М	-
NSF H2 ^b	Α	Α	Α
US Steel (AIST) 126, 127	М	М	М
ASTM D6158 HM	М	М	М
DIN 51524-2 HLP	М	М	М
ISO 11158 L-HM	М	М	М
SAE MS1004-HM	М	М	М

a Obsolete specification

b Clarity AW (ISO 32, 46, 68) are registered by NSF and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

A: Approved for or listed

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

ISO Grade	Test Method	32	46	68
Product Number		278108	278109	278110
<i>SDS Number U.S. Canada Mexico</i>		65294 65295 65296	65297 65298 65299	65300 65301 65302
API Gravity	ASTM D287	33.8	32.1	31.7
Density at 15°C, kg/l	ASTM D4057	0.856	0.865	0.867
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445	32.1 5.6	46.8 7.0	68.7 9.1
Viscosity Index	ASTM D2770	115	107	108
Flash Point, °C(°F)	ASTM D92	227	238	248
Pour Point, °C(°F)	ASTM D97	-40	-38	-35
Copper Corrosion 3hr at 100°C	ASTM D130	1a	1a	1a
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	30 0	10 0	10 0
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass
Water Separability, minutes to <3mL at 54°C	ASTM D1401	15	15	15
Oxidation Stability, TOST Hours to 2.0 mg KOH/g acid number	ASTM D943	>10,000	>10,000	>10,000
FZG Gear Test, Fail Load Stage	DIN 51354	12	12	12
Acute Aquatic Toxicity (LC-50)	OECD 203	Pass	Pass	Pass

The results expressed above were obtained during the development of this product and are considered representative of (any/all) commercial samples.



CLARITY[®] ELITESYNTM AW 32, 46, 68

PRODUCT DESCRIPTION

Clarity[®] EliteSyn[™] AW oils are premium highperformance ashless anti-wear hydraulic fluids designed to meet the stringent demands of modern OEM designs, where increased performance is required. They give maximum protection and improve productivity and efficiency in both mobile and stationary hydraulic equipment applications. These are high viscosity index fluids that provide a wide operating temperature range.

CUSTOMER BENEFITS

Clarity EliteSyn AW oils deliver value through:

- Hydraulic system efficiency High performance formula improves hydraulic response time, increases operating temperature range and can improve production, as well as the potential for lowering energy cost.
- **Premium performance** Ashless formulation meets or exceeds major vane, piston and gear pump manufacturer's requirements providing excellent protection of hydraulic systems against wear, rust and corrosion along with exceptional hydrolytic stability, water separability, and filterability for smooth equipment operation.
- Exceptional oxidation and thermal stability -Outstanding ability of the synthetic base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil with minimum varnish and sludge formation.
- Excellent air release and foam control -Ensures low air content in hydraulic fluid for improved equipment responsiveness.
- Wide operating temperature range -Minimum change in viscosity over wide operating temperatures due to high viscosity index. Multiviscosity performance minimizes the need to change viscosity grades for seasonal changes.

- Excellent low temperature pumpability -Specifically developed to ensure good low temperature fluidity for low temperature operations as low as -40°C (-40°F) for ISO 32 grade, and -30°C (-22°F) for ISO 46 and 68 grades.
- Low toxicity Zinc-free formula is inherently biodegradable¹ and has very low acute aquatic toxicity to both fish and invertebrates based on tests of water accommodated fractions. Ashless formulation facilitates conventional recycling programs.

FEATURES

Clarity EliteSyn AW oils are designed to give maximum protection to both mobile and stationary hydraulic pumps in highperformance industrial applications as well as in environmentally sensitive areas.



Clarity EliteSyn AW oils are formulated with synthetic base stock and an ashless, zinc-free additive system that provide exceptional oxidation stability, water separability, foam suppression, and protection against wear, rust and corrosion.

Clarity EliteSyn AW oils are formulated with high viscosity index to improve hydraulic response time and increase operating temperature range while resisting shear viscosity loss.

1 Inherently biodegradable by OECD 301D testing and guidelines in EPA 800-R-11-002, November 2011 evaluations for a similar product. Product is not considered readily biodegradable. Clarity Bio EliteSyn AW should be used if a readily biodegradable EAL fluid is required.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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20 February 2025 IO-27

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In side-by-side excavator efficiency testing², Clarity EliteSyn AW ISO 46 improved productivity up to 6.2% and fuel efficiency up to 4.5%, when compared to a monograde hydraulic oil (a lower VI product with VI <105). Clarity EliteSyn AW ISO 32 provided a 5% increase in efficiency in plastic injection machines when compared to a monograde hydraulic oil.

Clarity EliteSyn AW oils are designed to meet or exceed the performance requirements of conventional antiwear hydraulic oils, especially in severe, highoutput applications such as axial piston pumps.

Clarity EliteSyn AW oils are long-life lubricants, with a dramatically longer oxidation stability life (ASTM D943, Turbine Oil Stability Test) than conventional hydraulic fluids. A longer oxidation stability life equates to longer service life, which can improve the customer's bottom line. This level of oxidation stability is especially applicable in high efficiency (high speed, high temperature, high output) applications where severe stress is placed on the hydraulic fluid. They have a viscosity index much higher than typical conventional antiwear hydraulic oils, provide excellent low temperature pumpability and better wear protection at high operating temperatures (refer to Typical Test Data table).

Conventional antiwear hydraulic oils formulated with metal-containing performance additives may persist in the environment in the event of leaks.

APPLICATIONS

Clarity EliteSyn AW oils are designed to meet the stringent demands of modern OEM designs, where increased performance of the hydraulic oil is required. They have demonstrated excellent performance in hydraulic systems using vane-, piston-, and gear-type pumps in mobile and stationary equipment. They are designed to provide protection in high performance hydraulic applications where pressures may exceed 5000 psi. These oils are recommended for use in plastic injection molding where OEMs require a fluid meeting DIN 51524 or equivalent industry performance standards. They are also suitable for use in lightly loaded reciprocating compressors.

Clarity EliteSyn AW oils are compatible with seal materials commonly found in most hydraulic systems, including nitrile and flouro elastomers (NBR and FKM).

For low temperature startups, care must be taken to ensure that the hydraulic oil flows freely into the pump and no cavitation occurs. Otherwise, subjecting a pump to cavitation will cause damage to critical components. Careful attention to the oil's viscosity at low temperature is the key to ensuring adequate flow and preventing cavitation.

Please consult with the original equipment manufacturers (OEMs) of your equipment to determine the maximum viscosity allowed during startup under no load conditions.

The recommended maximum viscosity under load conditions for hydraulic oil as specified by most pump OEMs is 860 cSt. For cold starts under no-load conditions, the startup viscosity can be much higher than 860 cSt. No-load running conditions should be applied until the equipment has warmed up to the maximum startup viscosity under load as recommended by the OEM, and full load operation can then be applied when the oil viscosity falls below this recommended viscosity under load.

Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult with your equipment manufacturer if equipment is operating outside normal operation conditions.

² Clarity EliteSyn AW ISO 32 obtained greater results in both productivity and fuel efficiency compared to an ISO 46.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

CLAIMS AND SPECIFICATIONS

	32	46	68
Parker Hannifin (Dennison) HF-0, HF-1, HF-2	Α	Α	Α
Eaton (Vickers) E-FDGN-TB002-E	Α	Α	Α
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)	M P-68	M P-70	M P-69
Hitachi/John Deere Construction JCMAS HK VG 32, 46	М	М	-
Krauss-Maffei Kunststofftechnik	-	М	-
NSF H2 ^b	Α	Α	Α
US Steel (AIST) 126, 127	М	М	М
ASTM D6158 HM, HV	М	М	М
DIN 51524-2 HLP, 51524-3 HVLP	М	М	М
ISO 11158 L-HM, L-HV	М	М	М
SAE MS1004-HM	М	М	М

a Obsolete specification

b Clarity EliteSyn AW (ISO 32, 46, 68) are registered by NSF and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

A: Approved for or listed

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

ISO Grade	Test Method	32	46	68
Product Number		230350	230351	230352
<i>SDS Number U.S. Canada Mexico</i>		56604 64839 64838	56642 64841 64842	56621 64843 64844
API Gravity	ASTM D287	35.9	35.5	35.5
Density at 15°C, kg/l	ASTM D4057	0.8455	0.8475	0.8472
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445	33.0 7.1	46.3 9.15	68.0 11.5
Viscosity Index	ASTM D2770	191	184	164
Flash Point, °C(°F)	ASTM D92	216	234	246
Pour Point, °C(°F)	ASTM D97	-52	-47	-44
Brookfield Viscosity cP at -20°C cP at -30°C cP at -40°C	ASTM 2983	985 2790 10320	1760 5320 22300	3560 13940 -
Copper Corrosion 3hr at 100°C	ASTM D130	1a	1a	1a
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	10 0	10 0	10 0
Tapered Roller Bearing, % Viscosity Loss, 40°C	CEC L-45-A-99	6%	9%	3%
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass
Water Separability, minutes to <3mL at 54°C	ASTM D1401	5	25	20
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	>10,000	>10,000	>10,000
FZG (A/8.3/90), Fail Load Stage	DIN 51354	12	>12	>12
Acute Aquatic Toxicity (LC-50)	OECD 203	Pass	Pass	Pass

The results expressed above were obtained during the development of this product and are considered representative of (any/all) commercial samples.



CLARITY[®] ELITESYN[™] AW ISOCLEAN[®] CERTIFIED LUBRICANT 32, 46, 68

PRODUCT DESCRIPTION

Clarity[®] EliteSyn[™] AW ISOCLEAN[®] Certified Lubricants are premium highperformance ashless anti-wear



hydraulic fluids designed to meet the stringent demands of modern OEM designs, where increased performance is required. They give maximum protection and improve productivity and efficiency in both mobile and stationary hydraulic equipment applications. These are high viscosity index fluids that provide a wide operating temperature range.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Clarity EliteSyn AW ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.

- Hydraulic system efficiency High performance formula improves hydraulic response time, increases operating temperature range and can improve production, as well as the potential for lowering energy cost.
- **Premium performance** Ashless formulation meets or exceeds major vane, piston and gear pump manufacturer's requirements providing excellent protection of hydraulic systems against wear, rust and corrosion along with exceptional hydrolytic stability, water separability, and filterability for smooth equipment operation.
- Exceptional oxidation and thermal stability -Outstanding ability of the synthetic base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil with minimum varnish and sludge formation.
- Excellent air release and foam control -Ensures low air content in hydraulic fluid for improved equipment responsiveness.
- Wide operating temperature range -Minimum change in viscosity over wide operating temperatures due to high viscosity index. Multiviscosity performance minimizes the need to change viscosity grades for seasonal changes.
- Excellent low temperature pumpability -Specifically developed to ensure good low temperature fluidity for low temperature operations as low as -40°C (-40°F) for ISO 32 grade, and -30°C (-22°F) for ISO 46 and 68 grades.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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• Low toxicity - Zinc-free formula is inherently biodegradable¹ and has very low acute aquatic toxicity to both fish and invertebrates based on tests of water accommodated fractions. Ashless formulation facilitates conventional recycling programs.

FEATURES

Clarity EliteSyn AW ISOCLEAN Certified Lubricants are designed to give maximum protection to both mobile and [stationary hydraulic pumps in highperformance industrial applications as well as in environmentally sensitive areas.



Clarity EliteSyn AW ISOCLEAN Certified Lubricants are formulated with synthetic base stock and an ashless, zinc-free additive system that provide exceptional oxidation stability, water separability, foam suppression, and protection against wear, rust and corrosion.

Clarity EliteSyn AW ISOCLEAN Certified Lubricants are formulated with high viscosity index to improve hydraulic response time and increase operating temperature range while resisting shear viscosity loss.

In side-by-side excavator efficiency testing², Clarity EliteSyn AW ISO 46 improved productivity up to 6.2% and fuel efficiency up to 4.5%, when compared to a monograde hydraulic oil (a lower VI product with VI <105). Clarity EliteSyn AW ISO 32 provided a 5% increase in efficiency in plastic injection machines when compared to a monograde hydraulic oil.

Clarity EliteSyn AW ISOCLEAN Certified Lubricants are designed to meet or exceed the performance requirements of conventional antiwear hydraulic oils, especially in severe, high-output applications such as axial piston pumps.

Clarity EliteSyn AW ISOCLEAN Certified Lubricants are long-life lubricants, with a dramatically longer oxidation stability life (ASTM D943, Turbine Oil Stability Test) than conventional hydraulic fluids. A longer oxidation stability life equates to longer service life, which can improve the customer's bottom line. This level of oxidation stability is especially applicable in high efficiency (high speed, high temperature, high output) applications where severe stress is placed on the hydraulic fluid. They have a viscosity index much higher than typical conventional antiwear hydraulic oils, provide excellent low temperature pumpability and better wear protection at high operating temperatures (refer to Typical Test Data table).

Conventional antiwear hydraulic oils formulated with metal-containing performance additives may persist in the environment in the event of leaks.

APPLICATIONS

Clarity EliteSyn AW ISOCLEAN Certified Lubricants are designed to meet the stringent demands of modern OEM designs, where increased performance of the hydraulic oil is required. They have demonstrated excellent performance in hydraulic systems using vane-, piston-, and gear-type pumps in mobile and stationary equipment. They are designed to provide protection in high performance hydraulic applications where pressures may exceed 5000 psi. These oils are recommended for use in plastic injection molding where OEMs require a fluid meeting DIN 51524 or equivalent industry performance standards. They are also suitable for use in lightly loaded reciprocating compressors.

Clarity EliteSyn AW ISOCLEAN Certified Lubricants are compatible with seal materials commonly found in most hydraulic systems, including nitrile and flouro elastomers (NBR and FKM).

For low temperature startups, care must be taken to ensure that the hydraulic oil flows freely into the pump and no cavitation occurs. Otherwise, subjecting a pump to cavitation will cause damage to critical components. Careful attention to the oil's viscosity at low temperature is the key to ensuring adequate flow and preventing cavitation.

Please consult with the original equipment manufacturers (OEMs) of your equipment to determine the maximum viscosity allowed during startup under no load conditions.

The recommended maximum viscosity under load conditions for hydraulic oil as specified by most pump OEMs is 860 cSt. For cold starts under no-load conditions, the startup viscosity can be much higher than 860 cSt. No-load running conditions should be applied until the equipment has warmed up to the maximum startup viscosity under load as

Inherently biodegradable by OECD 301D testing and guidelines in EPA 800-R-11-002, November 2011 evaluations for a similar product. Product is not considered readily biodegradable. Clarity Bio EliteSyn AW should be used if a readily biodegradable EAL fluid is required.

² Clarity EliteSyn AW ISO 32 obtained greater results in both productivity and fuel efficiency compared to an ISO 46.

with your equipment manufacturer if equipment is

operating outside normal operation conditions.

recommended by the OEM, and full load operation can then be applied when the oil viscosity falls below this recommended viscosity under load.

Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult

CLAIMS AND SPECIFICATIONS

	32	46	68
Parker Hannifin (Dennison) HF-0, HF-1, HF-2	Α	Α	Α
Eaton (Vickers) E-FDGN-TB002-E	Α	Α	Α
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)	M P-68	M P-70	M P-69
Hitachi/John Deere Construction JCMAS HK VG 32, 46	М	М	-
Krauss-Maffei Kunststofftechnik	-	М	-
NSF H2 ^b	Α	Α	Α
US Steel (AIST) 126, 127	М	М	М
ASTM D6158 HM, HV	М	М	М
DIN 51524-2 HLP, 51524-3 HVLP	М	М	М
ISO 11158 L-HM, L-HV	М	М	М
SAE MS1004-HM	М	М	М

a Obsolete specification

b Clarity EliteSyn AW (ISO 32, 46, 68) are registered by NSF and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

A: Approved for or listed

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

Please consult with the original equipment manufacturer (OEM) if equipment is operating outside normal operation conditions. Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed. Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

ISO Grade	Test Method	32	46	68
Product Number		278111	278112	278113
SDS Number U.S.		56604	56604	56604
API Gravity	ASTM D287	35.9	35.5	35.5
Density at 15°C, kg/l	ASTM D4057	0.8455	0.8475	0.8472
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445	33.0 7.1	46.3 9.15	68.0 11.5
Viscosity Index	ASTM D2770	191	184	164
Flash Point, °C(°F)	ASTM D92	216	234	246
Pour Point, °C(°F)	ASTM D97	-52	-47	-44
Brookfield Viscosity cP at -20°C cP at -30°C cP at -40°C	ASTM 2983	985 2790 10320	1760 5320 22300	3560 13940 -
Copper Corrosion 3hr at 100°C	ASTM D130	1a	1a	1a
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	10 0	10 0	10 0
Tapered Roller Bearing, % Viscosity Loss, 40°C	CEC L-45-A-99	6%	9%	3%
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass
Water Separability, minutes to <3mL at 54°C	ASTM D1401	5	25	20
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	>10,000	>10,000	>10,000
FZG (A/8.3/90), Fail Load Stage	DIN 51354	12	>12	>12
Acute Aquatic Toxicity (LC-50)	OECD 203	Pass	Pass	Pass

The results expressed above were obtained during the development of this product and are considered representative of (any/all) commercial samples.



CLARITY[®] BIO ELITESYNTM AW 32, 46, 68

PRODUCT DESCRIPTION

Clarity[®] Bio EliteSyn[™] AW oils are synthetic renewable, readily biodegradable, high performance hydraulic fluids. They are formulated with ashless technology to provide



maximum protection in mobile and stationary hydraulic equipment in industrial and marine applications, including environmental sensitive areas.

Clarity Bio EliteSyn AW oils meet the requirements of the EPA Vessel General Permit (VGP) for biodegradation, low toxicity, and low bioaccumulation, and are EU Ecolabel approved.

CUSTOMER BENEFITS

Clarity Bio EliteSyn AW delivers value through:

- Environmentally acceptable Meets the requirements of the EPA Vessel General Permit (VGP) for biodegradation, low toxicity and low bioaccumulation to fish and inverterbrates.
- **Zinc-free** Suitable for applications involving yellow metals found in axial piston pumps.
- Excellent performance Ashless formulation provides excellent protection against wear of hydraulic pumps, provides rust and corrosion protection, hydrolytic stability, water separability, foam inhibition, air release, filterability and seal compatibility.
- Outstanding oil life Outstanding ability of the synthetic base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil relative to vegetable-based, readily biodegradable products.
- Excellent low temperature pumpability Specifically developed to ensure good low temperature fluidity for low temperature operations.

FEATURES

Clarity Bio EliteSyn AW oils are USDA Certified Biobased¹ and made



with more than 85% renewable synthetic base stock. These high-performance synthetic lubricants utilize sustainably sourced renewable plant-based feedstocks to produce hydrocarbon molecules that do not have any of the impurities found in traditional base oils derived from crude petroleum.

They are readily biodegradable, non-bioaccumulative, and minimally toxic. In the event of a spill, the product biodegrades by more than 60% within 28 days, minimizing the impact to the environment.

These oils are designed to the performance requirements of conventional antiwear hydraulic oils, while providing an additional benefit in case of leaks or incidental discharge to the environment and are approved for use by leading marine stern tube manufacturers.

They give maximum protection in hydraulic equipment used in vessels and in both mobile and stationary hydraulic pumps in high-performance industrial applications.

Clarity Bio EliteSyn AW oils are formulated with synthetic base stock and an ashless, zinc-free additive system that provides exceptional oxidation stability, water separability, foam suppression, and protection against wear, rust and corrosion.

1 The USDA Certified Biobased Product label is a certification mark of the U.S.Department of Agriculture.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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The high VI synthetic base stock allows for operation over a wide temperature range and provides excellent low temperature pumpability.

Clarity[®] Bio EliteSyn[™] AW hydraulic oils are designed for excellent performance in applications involving:

ISO Grade	32	46	68
mobile and stationary hydraulic vane-, piston-, and gear-type pumps	х	х	х
high performance industrial applications where pressures may exceed 5000 psi	х	х	х
Servo-valves using multi-metal components	Х	Х	Х
Stern tube applications			Х

CLAIMS AND SPECIFICATIONS

	32	46	68
Parker Hannifin (Dennison) HF-1, HF-6	Α	Α	Α
Danfoss/Eaton E-FDGN-TB002-E	Α	Α	A
EU Ecolabel BE/027/006	Α	Α	A
Swedish Standard SS 155434	Α	Α	A
Kobelco Eagle (KEMEL)	-	-	A
AEGIR Marine	-	-	A
USDA BioPreferred [®] Program ^a	Α	Α	A
ASTM D8324-21 2013 VGP Compliant (water interfacing)	М	М	М
Fives Cincinnati ^b (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)	M P-68	M P-70	M P-69
JCMAS HK VG 32, 46	М	М	-
ASTM D6158 HV	М	М	М
DIN 51524/3 HVLP	М	М	М
ISO 11158 L-HV	М	М	М
ISO 15380 Class HEPR	М	М	М

a BioPreffered is a trademark of the U.S. Department of Agriculture. Visit https://www.biopreferred.gov.

b Obsolete specification

A: Approved for or listed

M: Meets or exceeds requirements

Clarity Bio EliteSyn AW oils are compatible with nitrile (NBR) and fluoro (FKM) rubber seal materials used in most hydraulic and stern tube systems. Clarity Bio EliteSyn AW hydraulic oils are miscible with common mineral based hydraulic oils, however, they are not compatible with zinc/calcium containing fluids.

Follow good practices, OEM recommended lubricant change-out procedures, including drain and flush requirements, to avoid risk of additive incompatibility and ensure that the full performance benefits are achieved. Compatibility testing should be conducted if Clarity Bio EliteSyn AW is used to top up an existing system.

Please consult with the original equipment manufacturer (OEM) if equipment is operating outside normal operation conditions. Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

ISO Grade	Test Method	32	46	68
Product Number		223010	223011	223012
<i>SDS Number U.S. Canada Mexico Colombia</i>		57770 58449 58450 58451	57762 58452 58453 58454	57757 58467 58469 58468
API Gravity		40.6	39.7	39.7
Density at 15°C, kg/l	ASTM D4052	0.8223	0.8263	0.8262
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445	31.8 6.5	46 8.2	68 11.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	161 47.9	212 53.7	340 67.1
Viscosity Index	ASTM D2770	164	165	175
Flash Point, °C(°F)	ASTM D92	235(455)	252(486)	237(459)
Pour Point, °C(°F)	ASTM D97	-46(-51)	-35(-31)	-41(-42)
Brookfield Viscosity cP at -20°C cP at -30°C	ASTM 2983	1020 2410	1430 4730	2330 7250
Air release at 50°C, minutes	ASTM D3427	2.95	2.18	6.38
Copper Corrosion 3hr at 100°C	ASTM D130	1b	1a	1a
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	>10,000	>10,000	>10,000
FZG (A/8.3/90), Fail Load Stage	DIN 5182	12	>12	>12
Biodegradability, % in 28 days	OECD 301B	>60	>60	>60
Ecotoxicity Algae, 72 h, EC-50, mg/L Daphnia magna, 48 h, EC-50, mg/L Fathead minnow, 96 h, LC-50, mg/L	OECD 201 OECD 202 OECD 203	>100 >100 >100	>100 >100 >100	>100 >100 >100

Minor variations in product typical test data are to be expected in normal manufacturing.



CLARITY[®] BIO ELITESYN[™] AW ISOCLEAN[®] CERTIFIED LUBRICANT 32, 46, 68

PRODUCT DESCRIPTION

Clarity[®] Bio EliteSyn[™] AW ISOCLEAN[®] Certified Lubricants are synthetic renewable, readily biodegradable, high performance hydraulic fluids. They are formulated with ashless technology to provide maximum protection in mobile and stationary hydraulic equipment in industrial and marine applications, including environmental sensitive areas. Clarity Bio

EliteSyn AW ISOCLEAN Certified Lubricants meet the requirements of the EPA Vessel General Permit (VGP) for biodegradation, low toxicity, and low bioaccumulation, and are EU Ecolabel approved.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Clarity Bio EliteSyn AW ISOCLEAN Certified Lubricants deliver value through:



- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.

• **Environmentally acceptable** — Meets the requirements of the EPA Vessel General Permit (VGP) for biodegradation, low toxicity and low bioaccumulation.

- **Zinc-free** Suited for applications involving yellow metals found in axial piston pumps.
- **Excellent performance** Ashless formulation provides excellent protection against wear of hydraulic pumps, provides rust and corrosion protection, hydrolytic stability, water separability, foam inhibition, and filterability.
- Outstanding oil life Outstanding ability of the synthetic base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil relative to vegetable-based, readily biodegradable products.
- Excellent low temperature pumpability Specifically developed to ensure good low temperature fluidity for low temperature operations.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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FEATURES

Clarity Bio EliteSyn AW ISOCLEAN Certified Lubricants are USDA Certified



Biobased¹ and made with more than 85% renewable synthetic base stock. These high-performance synthetic lubricants utilize sustainably sourced renewable plant-based feedstocks to produce pure hydrocarbon molecules that may not have any of the impurities found in traditional base oils derived from crude petroleum.

They are readily biodegradable, non-bioaccumulative, and minimally toxic. In the event of a spill, the product biodegrades by more than 60% within 28 days, minimizing the impact to the environment.

These oils are designed to the performance requirements of conventional antiwear hydraulic oils, while providing an additional benefit in case of leaks or incidental discharge to the environment and are approved for use by leading marine stern tube manufacturers.

1 The USDA Certified Biobased Product label is a certification mark of the U.S.Department of Agriculture.

They give maximum protection in hydraulic equipment used in vessels and in both mobile and stationary hydraulic pumps in high-performance industrial applications.

Clarity[®] Bio EliteSyn AW ISOCLEAN Certified Lubricants are formulated with synthetic base stock and an ashless, zinc-free additive system that provides exceptional oxidation stability, water separability, foam suppression, and protection against wear, rust and corrosion.

The high VI synthetic base stock allows for operation over a wide temperature range and provides excellent low temperature pumpability.

Clarity Bio ElitSyn AW ISOCLEAN Certified Lubricants are compatible with nitrile (NBR) and fluoro (FKM) rubber seal materials used in most hydraulic and stern tube systems.

APPLICATIONS

Clarity Bio EliteSyn AW ISOCLEAN Certified Lubricants are designed for applications involving:

ISO Grade	32	46	68
mobile and stationary hydraulic vane-, piston-, and gear-type pumps	х	Х	х
high performance industrial applications where pressures may exceed 5000 psi	х	х	х
Servo-valves using multi-metal components	Х	Х	Х
Stern tube applications			Х

CLAIMS AND SPECIFICATIONS

	32	46	68
Parker Hannifin (Dennison) HF-1, HF-6	Α	Α	Α
Danfoss/Eaton E-FDGN-TB002-E	Α	Α	Α
EU Ecolabel BE/027/006	Α	Α	Α
Swedish Standard SS 155434	Α	Α	Α
Eaton (Vickers) E-FDGN-TB002-E	Α	Α	Α
Kobelco Eagle (KEMEL) Stern Tube	-	-	Α
AEGIR Marine Static Compatibility Test	-	-	Α
USDA BioPreferred [®] Program ^a	Α	Α	Α
ASTM D8324-21 2013 VGP Compliant (water interfacing)	М	М	М
Fives Cincinnati ^b (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)	M P-68	M P-70	M P-69
JCMAS HK VG 32, 46	М	М	-
ASTM D6158 HV	М	М	М
DIN 51524-3 HVLP	М	М	М
ISO 11158 L-HV	М	М	М
ISO 15380 HEPR	М	М	М

a BioPreffered is a trademark of the U.S. Department of Agriculture. For more information visit https:// www.biopreferred.gov.

b Obsolete specification

A: Approved for or listed

M: Meets or exceeds requirements

Clarity Bio EliteSyn AW ISOCLEAN Certified Lubricants are compatible with nitrile (NBR) and fluoro (FKM) rubber seal materials used in most hydraulic and stern tube systems. They are miscible with common mineral based hydraulic oils, however, they are not compatible with zinc/calcium containing fluids.

Follow good practices, OEM recommended lubricant change-out procedures, including drain and flush requirements, to avoid risk of additive incompatibility and ensure that the full performance benefits are achieved. Compatibility testing should be conducted if Clarity Bio EliteSyn AW is used to top up an existing system.

Please consult with the original equipment manufacturer (OEM) if equipment is operating outside normal operation conditions. Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed. Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

ISO Grade	Test Method	32	46	68
Product Number		223910	223911	223912
SDS Number U.S. Canada Mexico Colombia		57770 58449 58450 58451	57762 58452 58453 58454	57757 58467 58469 58468
API Gravity		40.6	39.7	39.7
Density at 15°C, kg/l	ASTM D4052	0.8223	0.8263	0.8262
Viscosity, Kinematic mm ² /s at 40°C mm ² /s at 100°C	ASTM D445	31.8 6.5	43.7 8.2	67.1 11.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	161 47.9	212 53.7	340 67.1
Viscosity Index	ASTM D2770	164	165	175
Flash Point, °C(°F)	ASTM D92	235(455)	252(486)	237(459)
Pour Point, °C(°F)	ASTM D97	-46(-51)	-35(-31)	-41(-42)
Brookfield Viscosity cP at -20°C cP at -30°C	ASTM 2983	1020 2410	1430 4730	2330 7250
Air release at 50°C, minutes	ASTM D3427	2.95	2.18	6.38
Copper Corrosion 3hr at 100°C	ASTM D130	1b	1a	1a
Rust Test, Synthetic Sea Water	ASTM D665B	Pass	Pass	Pass
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	>10,000	>10,000	>10,000
FZG, Fail Load Stage	DIN 51354	12	>12	>12
Biodegradability, % in 28 days	OECD 301B	>60	>60	>60
Ecotoxicity Algae, 72 h, EC-50, mg/L Daphnia magna, 48 h, EC-50, mg/L Fathead minnow, 96 h, LC-50, mg/L	OECD 201 OECD 202 OECD 203	>100 >100 >100	>100 >100 >100	>100 >100 >100

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON VARTECH[®] INDUSTRIAL SYSTEM CLEANER

PRODUCT DESCRIPTION

Chevron Vartech[®] Industrial System Cleaner (ISC) is a deposit cleaning product added directly to circulating oil or hydraulic systems during operation in order to clean a system of varnish and sludge deposits before a scheduled oil change. It helps prepare the system for optimum performance prior to a new, fresh oil change.

CUSTOMER BENEFITS

Chevron Vartech ISC[®] delivers value through:

- **Reduces equipment failure** removes deposits that can accelerate component wear.
- **Restores system performance** removes deposits from servos and small passages that can restrict operation response.
- **Restores system efficiency** removes surface varnish that inhibits heat transfer and can reduce full load operations.
- Less filter changes improves breakdown of deposits that can plug filters during cleaning.
- **Minimal flushing required** excellent compatibility facilitates reduced flushing requirements.
- Maintains equipment protection Highly compatible formula does not interfere with EP/AW protection.

FEATURES

VARTECH ISC stabilizes varnish and sludge surface deposits in the oil to enable their efficient removal through a scheduled oil change, restoring system operational efficiency.

The advanced cleaning chemistry effectively dissolves and disperses varnish surface deposits to minimize filter loading during cleaning compared to leading competitor cleaners. The solvent-free formula has reduced volatility and excellent compatibility with most elastomer seals.

VARTECH ISC is compatible with most mineral and synthetic hydrocarbon circulating and hydraulic fluids*. The enhanced formula helps retain oxidation control and will not compromise other critical performance attributes. This allows for extended cleaning duration and reduces the requirements for system flushing before fresh oil fill.

APPLICATIONS

VARTECH ISC is designed to effectively remove varnish and sludge from lubricating systems in steam and combustion turbines, centrifugal and rotary screw compressors, and stationary hydraulic systems. It is recommended for use in ISO 22 to 100 viscosity grade fluids. Vartech ISC is approved by Siemens Energy for use in steam and gas turbines, compressors, and generators to remove varnish and deposits.

VARTECH ISC is recommended to be added directly to the in-service fluid at concentrations between 5% to 10% of the total oil volume in the system. Ten percent (10%) concentration is needed for cleaning severe varnish deposits. Five percent (5%) is suitable for maintenance cleaning.

For most effective cleaning results, Vartech ISC treatment should be added to the in-service fluid and circulated in normal system operation for a period of 7 to 30 days**. Operating temperatures in the range of 120 to 250°F (50 to 120°C) are ideal for best cleaning performance. Lower temperatures may reduce cleaning effectiveness and need longer cleaning times.

*May not be compatible with some non-mineral based synthetic fluids.

**Extended times beyond times listed above are possible.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

10 January 2025 IO-30

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INSTRUCTIONS FOR USE

Chevron Vartech ISC is added directly to the in-service lubricating oil. If the current oil is severely deteriorated, it is recommended the degraded oil be drained, and the cleaner added to a new fill of recommended oil.

- 1. Determine the amount of cleaner required and the proper duration: 10% for severe varnish cleaning or 5% for maintenance service.
- Install a fresh set of filters to maximize varnish and deposit collection. Ensure additional filters are available for the system as filter changes may be required due to release of varnish and deposits.
- Ensure system does not exceed maximum fill levels when adding the system cleaner; if needed, drain adequate volume of oil to maintain proper operating volume.
- 4. Add Chevron Vartech ISC to the system, up to the chosen concentration, ideally while oil is circulating.
- Operate the equipment as normal for the chosen duration. Ensure operating temperatures are maintained within the recommended range. Monitor filters for increased differential pressure; replace as necessary.
- 6. Drain the oil/cleaner mixture from the system while the oil is still warm (safe handling temperatures) and recently circulated. When possible, drain as many locations in the system where oil may get trapped (i.e. filter housings, coolers, piping, de-gassing tanks, etc.).
- When possible, manually clean any accessible settled deposits and oil from the reservoir after draining.
- 8. System rinse* is recommended when any of the following exist:
 - Complete drain is not possible (more than 10% residual remaining)
 - Extremely degraded in-service oil
 - Severe deposits in the system
- 9. Replace filters.
- 10. Refill the system with a Chevron lubricant meeting equipment manufacturers' requirements.

*Flush oil used should be compatible with the final fill oil. Contact your Chevron representative with any additional questions or concerns.

TYPICAL TEST DATA

ISO Grade	Test Method	
Product Number		223000
SDS Number U.S.		51900
API Gravity	ASTM D4052	29.2
Density at 15°C, kg/L	ASTM D4052	0.8803
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	53 7.7
Viscosity Index	ASTM D2270	110
Flash Point, COC, °C(°F)	ASTM D92	146(295)
Fire Point, COC, °C(°F)	ASTM D92	264(507)
Pour Point, COC, °C(°F)	ASTM D5950	-17(-1)

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON CYLINDER OIL W 220, 460, 680

PRODUCT DESCRIPTION

Chevron Cylinder Oils W are recommended for lubrication of compressor cylinders and sliding worm gear surfaces in worm drive gear cases.

CUSTOMER BENEFITS

Chevron Cylinder Oils W deliver value through:

- Excellent metal wettability and high film strength for any moisture condition.
- Versatility Three viscosity grades available to cover the range of steam pressures and temperatures found in industry.
- Minimized inventory Can be used as worm gear lubricants. Meets AGMA compounded lubricant specifications.

FEATURES

Chevron Cylinder Oils W are designed to meet the needs of emulsifying cylinder oils.

Chevron Cylinder Oils W help provide excellent metal wettability. The combination of oil emulsibility and metal wetting characteristics result in minimum oil consumption rates and maximum oil lubricity in the presence of wet steam or water.

The metal wetting helps ensure an effective lubricant film on the cylinder walls and pistons of steam pump, and also provides the oiliness properties which are extremely important in lubricating the sliding worm gear surfaces in worm drive gear cases.

APPLICATIONS

Compressor manufacturers often recommend cylinder oils for compressor cylinder lubrication. The oiliness of Chevron Cylinder Oils W promotes a metal wetting characteristic that resists the washing action of water and maintains a tenacious oil film on the surface of the compressor cylinder. The low viscosity of Chevron Cylinder Oil W 220 makes it suitable for this application in colder climates.

Chevron Cylinder Oil W 460 is recommended for moderate service applications where steam pressures will not exceed 150 psi and temperatures vary between 171°C to 204°C (340°F to 400°F).

Chevron Cylinder Oil W 680 is a higher viscosity lubricant recommended for steam pressures up to 300 psi and temperatures from 218°C to 302°C (425°F to 575°F).

Chevron Cylinder Oils W are ideal choices for worm gears.

Chevron Cylinder Oils W are recommended for use in underground brine pumps at geothermal power generation facilities.

Chevron Cylinder Oils W 220, 460, and 680 meet the requirements of ANSI/AGMA 9005-E02 for AGMA Lubricant Numbers 5, 7 Compounded, and 8 Compounded, respectively.

Chevron Cylinder Oils W 460 and 680 are registered by **NSF** and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

17 August 2015 IO-50

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ISO Grade	220	460	680
Product Number	230339	230330	230329
SDS Number	7673	7673	7673
AGMA Grade	5 (Compounded)	7 Comp (Compounded)	8 Comp (Compounded)
API Gravity	26.8	26.1	24.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	209 18.5	437 30.4	646 39.3
Viscosity, Saybolt SUS at 100°F SUS at 210°F	1103 95	2335 149	3476 191
Viscosity Index	98	99	99
Flash Point, °C(°F)	288(550)	308(586)	316(601)
Pour Point, °C(°F)	-12(10)	-9(16)	-8(18)

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON FORM OIL

PRODUCT DESCRIPTION

Chevron Form Oil has been designed to be used as a concrete form wetting and release oil.

CUSTOMER BENEFITS

Chevron Form Oil delivers value through:

- Excellent low temperature performance Low pour point permits oil to remain fluid at subzero temperatures.
- Ready separation of forms from concrete.
- Minimum leakage Contains an oiliness additive to help minimize leakage and maximize film strength.

FEATURES

Chevron Form Oil is a high quality, lightly compounded lubricant which will do an excellent job as a concrete form oil where customers desire a quick clean break from the forms.

Chevron Form Oil is a light colored oil manufactured using specially refined base oils. These base oils possess excellent natural low pour points, good "metal wetting" characteristics, and good natural film strength.

Chevron Form Oil contains an oiliness additive that maximizes film strength under boundary lubrication.

APPLICATIONS

Chevron Form Oil is an excellent concrete form wetting agent. It can be used on forms where a release agent is recommended. Chevron Form Oil is especially recommended for use in the manufacture of precast concrete structures, concrete pipe, and precast concrete curbs and beams.

Chevron Form Oil, with the oiliness additive, does an excellent job in aluminum polishing.

Chevron Form Oil is recommended for use as a rust preventive on sheet and plate steel, wire, and cold drawn bar stock in warehouse storage.

TYPICAL TEST DATA

ISO Grade	22
Product Number	242011
SDS Number	4734
API Gravity	26.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	23.1 4.1
Viscosity, Saybolt SUS at 100°F SUS at 210°F	121 40.1
Viscosity Index	56
Flash Point, °C(°F)	185(365)
Pour Point, °C(°F)	-40(-40)
Wetting Agent, %	4.5

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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CHEVRON GLASS MACHINE OIL MV

PRODUCT DESCRIPTION

Chevron Glass Machine Oil MV is a machine oil designed for use in the glass manufacturing process.

CUSTOMER BENEFITS

Chevron Glass Machine Oil MV delivers value through:

- Ability to maintain film thickness High viscosity index indicates an oil that maintains film thickness at high temperatures.
- **Sludge protection** Detergents and dispersants help minimize deposits on metal surfaces.
- **Rust protection** Contains a rust inhibitor to help protect metal surfaces.
- Long lubricant life Resists thermal oxidation and viscosity increase, helping to provide long lubricant life.
- Foam inhibition

FEATURES

Chevron Glass Machine Oil MV is a machine oil designed for use in the glass manufacturing process.

It is manufactured from highly refined mineral base oils and contains an additive package with antiwear, dispersant and detergent properties.

It has a high viscosity index to help ensure good film strength between metal surfaces under moderate loads and temperatures. This film strength is further enhanced by the antiwear additive protection.

The foam and aeration suppressant allows the quick release of entrained air, also maximizing film strength.

APPLICATIONS

Chevron Glass Machine Oil MV is recommended as a machine oil and constant cushion oil for I.S. glass machines. It is also designed for use in linkage and lightly loaded gearboxes, central lubrication systems, mechanical gob distributors, blowhead and funnel cams.

TYPICAL TEST DATA

Product Number	229106
SDS Number	12769
API Gravity	29.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	111 14.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	572 77.5
Viscosity Index	134
Flash Point, °C(°F)	234(453)
Pour Point, °C(°F)	-38(-36)
Foaming Tendency, Sequence II, 0 min, mL	15

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

6 January 2014 IO-82

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GST[®] OIL 32, 46, 68, 100

PRODUCT DESCRIPTION

GST[®] Oils are formulated with premium base oil technology designed to meet the critical demands of:

- non-geared gas, steam, and hydroelectric turbine bearing lubrication
- reduction gear lubrication in marine operations

They are an excellent recommendation for many other industrial applications including air compression where R&O type oils are recommended.

CUSTOMER BENEFITS

GST Oils deliver value through:

- **Exceptional oxidation stability** for long service life at elevated temperatures. Formulated with premium base oil technology and an ashless, zinc-free formulation.
- Rust and corrosion protection
- **High viscosity index** helps ensure minimum viscosity change when variations in temperature occur.
- **Minimum foam** helps prevent sump overflow or erratic governor operation.
- **Fast air release** minimizes possibility of pump cavitation in systems with high circulation rates and small reservoirs.
- Exceptional thermal stability minimizes deposit formation.
- **Rapid water separation** keeps water in oil to a minimum.
- Hydraulic fluid service GST Oils 32, 46 and 68 are excellent hydraulic fluids in low pressure systems up to 1000 psi.
- Air compressor lubricant when OEM recommends R&O type oil.

FEATURES

GST Oils are formulated with premium base oil technology and an ashless, zinc-free formulation that provides exceptional oxidation stability, water



separability, and protection against rust and corrosion.

Higher temperatures in advanced gas and steam turbines require circulating system oil with exceptional high temperature stability. GST Oils have outstanding **thermal and oxidation stability**.

Nonvolatile **oxidation inhibition** minimizes the evaporative loss of the inhibitors, a common problem with turbine oils where bearing temperatures are high and system capacities are limited. With retained oxidation resistance for long periods under high temperature conditions, GST Oils will promote long oil service life and help minimize turbine down time.

Corrosion inhibition protects costly turbine shafts and gears from corrosion and rusting.

GST Oils have excellent demulsibility characteristics which allow these oils to maintain a high film strength coating on critical wear points of bearings and gear reducers and assure fast removal of water contamination.

Foam inhibition helps prevent sump overflow and erratic governor operation.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 March 2022 IO-85

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APPLICATIONS

GST[®] Oils are formulated to meet the critical demands of non-geared gas, steam, and hydroelectric turbine bearing lubrication, and reduction gear lubrication in marine operations. They are an excellent recommendation for many other industrial applications including air compression where R&O type oils are recommended.

GST Oil 32, 46, 68, 100 are registered by **NSF** and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

PERFORMANCE CLAIMS

	32	46	68	100
Ansaldo Energia AD000020487	Α	Α		
Ansaldo Energia TGO2-0171-E0000		Α		
General Electric (Alstom) HTGD 90117	Α	Α	М	
MAN Energy Solutions 10000494596	Α	Α	Α	
Siemens TLV 9013 04, TLV 9013 05	Α	Α		
Siemens Westinghouse PD-55125Z3	Α			
Alstom NBA P50001A	М	М		
Alstom NBA P50003A	М			
GE Oil & Gas ITN52220.02, ITN 52220.03	М	М		
General Electric GEK 28143a, b	М	М		
General Electric GEK 107395A, 120498, 27070, 32568e-k, 46506d, e	М			
MAG Cincinnati Cincinnati Machine P-38	М			
MAG Cincinnati Cincinnati Machine P-55		М		
MAG Cincinnati Cincinnati Machine P-54			М	
Siemens MAT 812101	М			
Siemens MAT 812102		М		
Solar Turbine ES 9-224 Class II	М	М		
ASTM D4304 Type I	М	М	М	М
ASTM D4304 Type III	М	М		
ANSI/AGMA 9005-F16	М	М		
British Standard 489	М	М	М	М
DIN 51515-1 TD	М	М	М	М
DIN 51515-2 TG	М	М		
ISO 8068 AR, B, L-TSA, L-TGA, TGB, TGSB	М	М	М	
JIS K-2213 Type 2	М	М		

 $\boldsymbol{\mathsf{A}}\text{:}$ Approved for

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

ISO Grade	32	46	68	100
Product Number	253026	253027	253028	253029
SDS Number	6710	6710	6710	6710
AGMA Grade	—	1	2	3
API Gravity	32.7	32.0	31.7	31.4
Viscosity, Kinematic cSt at 40°C cSt at 100°C	32.0 5.4	43.7 6.6	68.0 8.8	100.0 11.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	165 44.4	225 48.2	352 55.9	520 65.4
Viscosity Index	102	101	102	100
Flash Point, °C(°F)	222(432)	224(435)	245(473)	262(504)
Pour Point, °C(°F)	-36(-33)	-36(-33)	-33(-27)	-30(-22)
Oxidation Stability ASTM D943 ^a ASTM D2272 ^b	>10,000 1700	>10,000 1400	>10,000 1400	>10,000 1400

a Hours to 2.0 mg KOH/g acid number modified D943.

b Minutes to 25 psi pressure drop.

Minor variations in product typical test data are to be expected in normal manufacturing.



GST[®]OIL ISOCLEAN[®] Certified Lubricant

32, 46, 68, 100

PRODUCT DESCRIPTION

GST[®] ISOCLEAN[®] Certified Lubricants are formulated with premium base oil technology designed to meet the critical demands of:



- non-geared gas, steam, and hydroelectric turbine bearing lubrication
- reduction gear lubrication in marine operations

They are an excellent recommendation for many other industrial applications including air compression where R&O type oils are recommended. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

GST Oil ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- Flexibility ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Exceptional oxidation stability for long service life at elevated temperatures. Formulated with

premium base oil technology and an ashless, zincfree formulation.

- Rust and corrosion protection
- · High viscosity index helps ensure minimum viscosity change when variations in temperature occur
- Minimum foam helps prevent sump overflow or erratic governor operation.
- Fast air release minimizes possibility of pump cavitation in systems with high circulation rates and small reservoirs.
- Exceptional thermal stability minimizes deposit formation.
- Rapid water separation keeps water in oil to a minimum.
- Hydraulic fluid service GST Oils 32, 46 and 68 are excellent hydraulic fluids in low pressure systems up to 1000 psi.
- Air compressor lubricant when OEM recommends R&O type oil.

FEATURES

GST ISOCLEAN Certified Lubricants are formulated with premium base oil technology and an ashless, zinc-free formulation that provides exceptional oxidation stability, water separability, and protection



against rust and corrosion. Higher temperatures in advanced gas and steam turbines require circulating system oil with exceptional

high temperature stability. GST ISOCLEAN Certified Lubricants have outstanding thermal and oxidation stability.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 March 2022 **IO-85 ISOCI FAN**

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Nonvolatile **oxidation inhibition** minimizes the evaporative loss of the inhibitors, a common problem with turbine oils where bearing temperatures are high and system capacities are limited. With retained oxidation resistance for long periods under high temperature conditions, GST[®] ISOCLEAN[®] Certified Lubricants will promote long oil service life and help minimize turbine down time.

Corrosion inhibition protects costly turbine shafts and gears from corrosion and rusting.

GST ISOCLEAN Certified Lubricants have excellent demulsibility characteristics which allow these oils to maintain a high film strength coating on critical wear points of bearings and gear reducers and assure fast removal of water contamination.

Foam inhibition helps prevent sump overflow and erratic governor operation.

APPLICATIONS

GST ISOCLEAN Certified Lubricants are formulated to meet the critical demands of non-geared gas, steam, and hydroelectric turbine bearing lubrication, and reduction gear lubrication in marine operations. They are an excellent recommendation for many other industrial applications including air compression where R&O type oils are recommended.

GST Oil 32, 46, 68, 100 are registered by **NSF** and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

PERFORMANCE CLAIMS

	32	46	68	100
Ansaldo Energia AD000020487	Α	Α		
Ansaldo Energia TGO2-0171-E0000		Α		
General Electric (Alstom) HTGD 90117	Α	Α	М	
MAN Energy Solutions 10000494596	Α	Α	Α	
Siemens TLV 9013 04, TLV 9013 05	Α	Α		
Siemens Westinghouse PD-55125Z3	Α			
Alstom NBA P50001A	М	М		
Alstom NBA P50003A	М			
GE Oil & Gas ITN52220.02, ITN 52220.03	М	М		
General Electric GEK 28143a, b	М	М		
General Electric GEK 107395A, 120498, 27070, 32568e-k, 46506d, e	М			
MAG Cincinnati Cincinnati Machine P-38	М			
MAG Cincinnati Cincinnati Machine P-55		М		
MAG Cincinnati Cincinnati Machine P-54			М	
Siemens MAT 812101	М			
Siemens MAT 812102		М		
Solar Turbine ES 9-224 Class II	М	М		
ASTM D4304 Type I	М	М	М	М
ASTM D4304 Type III	М	М		
ANSI/AGMA 9005-F16	М	М		
British Standard 489	М	М	М	М
DIN 51515-1 TD	М	М	М	М
DIN 51515-2 TG	М	М		
ISO 8068 AR, B, L-TSA, L-TGA, TGB, TGSB	М	М	М	
JIS K-2213 Type 2	М	М		

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN[®] Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

ISO Grade	32	46	68	100
Product Number	254606	254607	254608	278069
SDS Number	6710	6710	6710	6710
AGMA Grade	_	1	2	3
API Gravity	32.7	32.0	31.7	31.4
Viscosity, Kinematic cSt at 40°C cSt at 100°C	32.0 5.4	43.7 6.6	68.0 8.8	100.0 11.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	165 44.4	225 48.2	352 55.9	520 65.4
Viscosity Index	102	101	102	100
Flash Point, °C(°F)	222(432)	224(435)	245(473)	262(504)
Pour Point, °C(°F)	-36(-33)	-36(-33)	-33(-27)	-30(-22)
Oxidation Stability ASTM D943 ^a ASTM D2272 ^b	>10,000 1700	>10,000 1400	>10,000 1400	>10,000 1400

a Hours to 2.0 mg KOH/g acid number modified D943.

b Minutes to 25 psi pressure drop.

Minor variations in product typical test data are to be expected in normal manufacturing.



GST ADVANTAGE[™] RO 32, 46

PRODUCT DESCRIPTION

GST Advantage[™] RO products are formulated with VARTECH[™] Technology, which is advanced chemistry combined with premium base oils that inhibits varnish formation to help maintain peak performance, reliability and productivity.

CUSTOMER BENEFITS

GST Advantage RO products deliver value through:

- Low Varnish Potential ensures varnish formation is minimized to extend oil life and protect equipment.
- Exceptional Oxidation and Thermal Stability for long service life at severe temperatures with minimal deposit formation.
- Outstanding Rust and Corrosion Protection
- Minimum Foaming helps prevent sump overflow or erratic governor operation.
- Fast Air Release minimizes possibility of pump cavitation in systems with high circulation rates and lesser residence time.
- Rapid Water Separation facilitates water removal.
- Hydraulic Fluid Service for systems requiring an ISO viscosity grade 32 or 46, and pressures not exceeding 1000 psi.
- Air Compressor Lubricant for systems requiring an ISO viscosity grade 32 or 46 R&O oil.

FEATURES

GST Advantage RO products are formulated with VARTECH Technology to resist and disrupt the formation of varnish while maintaining outstanding thermal and oxidative stability. They are suitable for use in non-geared gas and steam turbines where elevated temperatures are experienced and require circulation systems with exceptional high temperature stability.

GST Advantage RO combines highly refined group II base stocks and a unique ashless, zinc-free formulation minimizing the formation of deposits in reservoirs, high temperature bearings, and, other hot areas of the turbine that can lead to trips and failures.

APPLICATIONS

GST[®] Advantage RO products are formulated to meet the critical demands of non-geared gas, steam and hydroelectric turbine bearing lubrication and R&O service in marine reduction gears. They are additionally suitable for industrial severe service requiring an R&O, ISO viscosity grade 32 or 46 circulating oil with extended service capability.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 November 2021 IO-88

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PERFORMANCE CLAIMS

	32	46
Ansaldo Energia TGO2-0171-E0000		Α
Ansaldo Energia AD000020487	A	Α
Doosan Skoda TP0010P	Α	Α
MAN Energy Solutions 10000494596	A	Α
Siemens TLV 9013 04, TLV 9013 05	A	Α
Alstom NBA P50001A	М	М
Alstom NBA P50003A	М	
General Electric (Alstom) HTGD 90117	М	М
GE Oil & Gas ITN52220.02, ITN 52220.03	М	М
General Electric GEK 28143a, b	М	М
General Electric GEK 107395A, 120498, 27070, 32568e-k, 46506d, e	М	
MAG Cincinnati Cincinnati Machine P-38	М	
MAG Cincinnati Cincinnati Machine P-55		М
Siemens MAT 812101	М	
Siemens MAT 812102		М
Siemens Westinghouse PD-55125Z3	М	
Solar Turbine ES 9-224 Class II	М	М
ASTM D4304 Type I, III	М	М
ANSI/AGMA 9005-F16	М	М
British Standard 489	М	М
DIN 51515-1 TD, 51515-2 TG	М	М
ISO 8068 AR, B, L-TSA, L-TGA	М	М
JIS K-2213 Type 2	М	М

A: Approved for

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

ISO Grade	32	46
Product Number	253093	253094
SDS Number U.S. Canada Mexico	47986 47987 47988	47986 47987 47988
API Gravity	32.5	33.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	34.2 5.7	42.4 6.6
Viscosity, Saybolt SUS at 100°F SUS at 210°F	162.3 44.4	218.2 48.1
Viscosity Index	105	103
Flash Point, °C(°F)	224(435)	236(456)
Pour Point, °C(°F)	-14(7)	-13(9)
Oxidation Stability ASTM D943 ^a ASTM D2272 ^b IP 280 (TOP), m %	10,000 1,500 0.08	10,000 1,600 0.08
Air Release D3427 at 50°C, minutes	1.4	2.1

a Hours to 2.0 mg KOH/g acid number D943.

b Minutes to 25 psi pressure drop.

Minor variations in product typical test data are to be expected in normal manufacturing.



GST ADVANTAGE[™] **RO ISOCLEAN[®] CERTIFIED LUBRICANT** 32, 46

PRODUCT DESCRIPTION

GST Advantage[™] RO ISOCLEAN[®] Certified Lubricants are formulated with VARTECH[™] Technology, which is advanced chemistry combined with



premium base oils that inhibits varnish formation to help maintain peak performance, reliability and productivity.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

GST Advantage RO ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Low Varnish Potential ensures varnish formation is minimized to extend oil life and protect equipment.
- Exceptional Oxidation and Thermal Stability for long service life at severe temperatures with minimal deposit formation.

- Outstanding Rust and Corrosion Protection
- **Minimum Foaming** helps prevent sump overflow or erratic governor operation.
- **Fast Air Release** minimizes possibility of pump cavitation in systems with high circulation rates and lesser residence time.
- Rapid Water Separation facilitates water removal.
- **Hydraulic Fluid Service** for systems requiring an ISO viscosity grade 32 or 46, and pressures not exceeding 1000 psi.
- Air Compressor Lubricant for systems requiring an ISO viscosity grade 32 or 46 R&O oil.

FEATURES

GST Advantage RO ISOCLEAN Certified Lubricants are formulated with VARTECH Technology to resist and disrupt the formation of varnish



while maintaining outstanding thermal and oxidative stability. They are suitable for use in non-geared gas and steam turbines where elevated temperatures are experienced and require circulation systems with exceptional high temperature stability.

GST Advantage RO ISOCLEAN Certified Lubricants combine highly refined group II base stocks and a unique ashless, zinc-free formulation minimizing the formation of deposits in reservoirs, high temperature bearings, and, other hot areas of the turbine that can lead to trips and failures.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 November 2021 IO-88 ISOCLEAN

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APPLICATIONS

GST Advantage[™] RO products are formulated to meet the critical demands of non-geared gas, steam and hydroelectric turbine bearing lubrication and R&O

PERFORMANCE CLAIMS

service in marine reduction gears. They are additionally suitable for industrial severe service requiring an R&O, ISO viscosity grade 32 or 46 circulating oil with extended service capability.

	32	46
Ansaldo Energia TGO2-0171-E0000		A
Ansaldo Energia AD000020487	A	A
Doosan Skoda TP0010P	A	A
MAN Energy Solutions 10000494596	A	A
Siemens TLV 9013 04, TLV 9013 05	A	A
Alstom NBA P50001A	М	М
Alstom NBA P50003A	М	
General Electric (Alstom) HTGD 90117	М	М
GE Oil & Gas ITN52220.02, ITN 52220.03	М	М
General Electric GEK 28143a, b	М	М
General Electric GEK 107395A, 120498, 27070, 32568e-k, 46506d, e	М	
MAG Cincinnati Cincinnati Machine P-38	М	
MAG Cincinnati Cincinnati Machine P-55		М
Siemens MAT 812101	М	
Siemens MAT 812102		М
Siemens Westinghouse PD-55125Z3	М	
Solar Turbine ES 9-224 Class II	М	М
ASTM D4304 Type I, III	М	М
ANSI/AGMA 9005-F16	М	М
British Standard 489	М	М
DIN 51515-1 TD, 51515-2 TG	М	М
ISO 8068 AR, B, L-TSA, L-TGA	М	М
JIS K-2213 Type 2	М	М

A: Approved for

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

ISO Grade	32	46
Product Number	254617	278089
SDS Number U.S. Canada Mexico	47986 47987 47988	47986 47987 47988
API Gravity	32.5	33.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	34.2 5.7	42.4 6.6
Viscosity, Saybolt SUS at 100°F SUS at 210°F	162.3 44.4	218.2 48.1
Viscosity Index	105	103
Flash Point, °C(°F)	224(435)	236(456)
Pour Point, °C(°F)	-14(7)	-13(9)
Oxidation Stability ASTM D943 ^a ASTM D2272 ^b IP 280 (TOP), m %	10,000 1,500 0.08	10,000 1,600 0.08
Air Release D3427 at 50°C, minutes	1.4	2.1

a Hours to 2.0 mg KOH/g acid number D943.

b Minutes to 25 psi pressure drop.

Minor variations in product typical test data are to be expected in normal manufacturing.



GST ADVANTAGE[™] **EP** 32, 46

PRODUCT DESCRIPTION

GST Advantage[™] EP oils are formulated with VARTECH[™] Technology, which is advanced chemistry combined with premium base oils that inhibits varnish formation to help maintain peak performance, reliability and productivity. GST Advantage EP oils are highly recommended for use in gas and steam turbines with and without loaded gearboxes. GST Advantage EP oils are designed to meet the critical lubrication demands of:

- · combined cycle turbines
- · large heavy duty industrial gas turbines
- gas and steam turbines

They are an excellent recommendation for many other industrial applications including air compression and where R&O and EP type oils are recommended.

CUSTOMER BENEFITS

GST Advantage EP oils deliver value through:

- Outstanding oxidation stability for long service at elevated temperatures. Formulated with premium base oil technology and an ashless, zinc-free formulation.
- Minimal sludge and varnish formation
- Rapid water separation keeps water in oil to a minimum
- Rust and corrosion protection
- **High viscosity index** assures minimum viscosity change with temperature variations
- **Resistance to foam formation** helps prevent reservoir overflow
- Quick air release minimizes the possibility of pump cavitation in systems with high circulation rates and small reservoirs

FEATURES

GST Advantage EP oils are formulated with VARTECH Technology to resist and disrupt the formation of varnish. It uses premium base oil technology



combined with an ashless, zinc-free formulation that provides exceptional oxidation stability, water separability, anti-wear and protection against rust and corrosion.

Higher temperatures in advanced gas and steam turbines require a circulating system oil with exceptional high temperature **thermal stability**, **oxidation resistance** and low sludging potential. GST Advantage EP oils have **outstanding thermal and oxidation stability and excellent sludge control**.

Corrosion inhibition protects turbine shafts, gears and lubrication system parts from corrosion and rusting.

GST Advantage EP oils have excellent **water separability** characteristics which allow these oils to maintain a high film strength coating on critical wear points of bearings and gear reducers and to help ensure rapid removal of water contamination.

Foam inhibition helps to prevent sump overflow.

APPLICATIONS

GST Advantage EP oils are highly recommended for use in gas and steam turbines with and without loaded gearboxes. GST Advantage EP oils are designed to meet the critical lubrication demands of combined cycle turbines, large heavy duty industrial gas turbines, and gas and steam turbines with loaded gears. They are an excellent recommendation for many other industrial applications including air compression where R&O type oils are recommended.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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12 May 2021 IO-89

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CLAIMS AND SPECIFICATIONS

ISO Grade	32	46
Ansaldo Energia TGO2-0171-E000	Α	Α
Doosan Skoda TP0010P	Α	Α
MAN Energy Solutions 10000494596	Α	Α
Siemens TLV 9013 04 and TLV 9013 05	Α	Α
Alstom NBA P50001A	М	М
Alstom NBA P50003A	М	
General Electric (Alstom) HTGD 90117	М	М
GE Oil & Gas ITN52220.02, ITN52220.03	М	М
General Electric GEK 28143a,b	М	М
General Electric GEK 101941A, 107395A, 120498, 27070, 32568e-k, 46506d,e	М	
MAG Cincinnati Cincinnati Machine P-38	М	
MAG Cincinnati Cincinnati Machine P-54		М
Siemens MAT 812101, 812106, 812108	М	
Siemens MAT 812102, 812107, 812109		М
Siemens Westinghouse PD-55125Z3	М	
Solar Turbine ES 9-224 Class II	М	М
ANSI/AGMA 9005-F16	М	М
ASTM D4304 Type I, II, III and D6158-HL	М	М
British Standard 489	М	М
DIN 51515-1 TD, 51515-2 TG	М	М
ISO 8068 AR, B, L-TSA, L-TGA, L-TSE, L-TGE	М	М
JIS K-2213 Type 2	М	М

 $\boldsymbol{\mathsf{A}}\text{:}$ Approved for

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

ISO Grade	32	46
Product Number	250054	250055
SDS Number	54051	54051
AGMA Grade	—	1
API Gravity	33.0	31.8
Viscosity, Kinematic cSt at 40°C cSt at 100°C	34.2 5.8	42.4 6.6
Viscosity, Saybolt SUS at 100°F SUS at 210°F	176 45.7	218 48.2
Viscosity Index	112	105
Flash Point, °C(°F)	226(439)	234(453)
Pour Point, °C(°F)	-36(-33)	-34(-29)
Oxidation Stability ASTM D943 ^a ASTM D2272 ^b	> 10,000 2,200	> 10,000 2,100
FZG, Fail stage, DIN 51354	10	10

a Hours to 2.0 mg KOH/g acid number D943.

b Minutes to 25 psi pressure drop.

Minor variations in product typical test data are to be expected in normal manufacturing.



GST[®] ADVANTAGE EP ISOCLEAN[®] Certified Lubricant

32, 46

PRODUCT DESCRIPTION

GST Advantage[™] EP ISOCLEAN[®] Certified Lubricants are formulated with VARTECH[™] Technology, which is advanced chemistry combined with



premium base oils that inhibits varnish formation to help maintain peak performance, reliability and productivity. GST Advantage EP ISOCLEAN Certified Lubricants are highly recommended for use in gas and steam turbines with and without loaded gearboxes. GST Advantage EP ISOCLEAN Certified Lubricants are designed to meet the critical lubrication demands of:

- combined cycle turbines
- · large heavy duty industrial gas turbines
- gas and steam turbines

They are an excellent recommendation for many other industrial applications including air compression and where R&O and EP type oils are recommended.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

GST Advantage EP ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.

- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Outstanding oxidation stability** for long service at elevated temperatures. Formulated with premium base oil technology and an ashless, zinc-free formulation.
- Minimal sludge and varnish formation
- Rapid water separation keeps water in oil to a minimum
- Rust and corrosion protection
- **High viscosity index** assures minimum viscosity change with temperature variations
- Resistance to foam formation helps prevent reservoir overflow
- Quick air release minimizes the possibility of pump cavitation in systems with high circulation rates and small reservoirs

FEATURES

GST Advantage EP ISOCLEAN Certified Lubricants are formulated with VARTECH Technology to resist and discuss the formation of variable. It



disrupt the formation of varnish. It uses premium base oil technology combined with an ashless, zinc-free formulation that provides exceptional oxidation stability, water separability, anti-wear and protection against rust and corrosion.

Higher temperatures in advanced gas and steam turbines require a circulating system oil with exceptional high temperature **thermal stability**, **oxidation resistance** and low sludging potential.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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GST Advantage EP ISOCLEAN Certified Lubricants have outstanding thermal and oxidation stability and excellent sludge control.

Corrosion inhibition protects turbine shafts, gears and lubrication system parts from corrosion and rusting.

GST[®] Advantage EP ISOCLEAN[®] Certified Lubricants have excellent **water separability** characteristics which allow these oils to maintain a high film strength coating on critical wear points of bearings and gear reducers and to help ensure rapid removal of water contamination.

Foam inhibition helps to prevent sump overflow.

APPLICATIONS

GST Advantage EP ISOCLEAN Certified Lubricants are highly recommended for use in gas and steam turbines with and without loaded gearboxes. GST Advantage EP ISOCLEAN Certified Lubricants are designed to meet the critical lubrication demands of combined cycle turbines, large heavy duty industrial gas turbines, and gas and steam turbines with loaded gears. They are an excellent recommendation for many other industrial applications including air compression where R&O type oils are recommended.

CLAIMS AND SPECIFICATIONS

ISO Grade	32	46
Ansaldo Energia TGO2-0171-E000	A	Α
Doosan Skoda TP0010P	Α	Α
MAN Energy Solutions 10000494596	Α	Α
Siemens TLV 9013 04 and TLV 9013 05	Α	Α
Alstom NBA P50001A	М	М
Alstom NBA P50003A	М	
General Electric (Alstom) HTGD 90117	М	М
GE Oil & Gas ITN52220.02, ITN52220.03	М	М
General Electric GEK 28143a,b	М	М
General Electric GEK 101941A, 107395A, 120498, 27070, 32568e-k, 46506d,e	М	
MAG Cincinnati Cincinnati Machine P-38	М	
MAG Cincinnati Cincinnati Machine P-54		М
Siemens MAT 812101, 812106, 812108	М	
Siemens MAT 812102, 812107, 812109		М
Siemens Westinghouse PD-55125Z3	М	
Solar Turbine ES 9-224 Class II	М	М
ANSI/AGMA 9005-F16	М	М
ASTM D4304 Type I, II, III and D6158-HL	М	М
British Standard 489	М	М
DIN 51515-1 TD, 51515-2 TG	М	М
ISO 8068 AR, B, L-TSA, L-TGA, L-TSE, L-TGE	М	М
JIS K-2213 Type 2	М	М

 $\boldsymbol{\mathsf{A}}\text{:}$ Approved for

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks, and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.
ISO Grade	32	46	
Product Number	293054	293055	
SDS Number	54051	54051	
AGMA Grade	-	1	
API Gravity	33.0	31.8	
Viscosity, Kinematic cSt at 40°C cSt at 100°C	34.2 5.8	42.4 6.6	
Viscosity, Saybolt SUS at 100°F SUS at 210°F	176 45.7	218 48.2	
Viscosity Index	112	105	
Flash Point, °C(°F)	226(439)	234(453)	
Pour Point, °C(°F)	-36(-33)	-34(-29)	
Oxidation Stability ASTM D943 ^a ASTM D2272 ^b	> 10,000 2,200	> 10,000 2,100	
FZG, Fail stage, DIN 51354	10	10	

a Hours to 2.0 mg KOH/g acid number D943.

b Minutes to 25 psi pressure drop.

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON GST[®] 2190 EP

PRODUCT DESCRIPTION

Chevron GST[®] 2190 EP is formulated for use in circulating oil systems for marine gear turbine sets.

CUSTOMER BENEFITS

Chevron GST 2190 EP delivers value through:

- Long lubricant life because of selected base stocks and additives.
- Extreme pressure characteristics help provide high film strength to protect gears and bearings engaged in heavy-duty service.
- MIL-PRF-17331L and MIL-PRF-17331K(SH) approved — Meets stringent military specifications for Navy vessels and submarines.
- **High viscosity index** Minimal viscosity change in broad operating temperature range enhances lubricant film strength.

FEATURES

Chevron GST 2190 EP was developed primarily as a circulating system oil for marine gear turbine sets.

Chevron GST 2190 EP provides mild extreme pressure protection as well as resistance to rust, oxidation, corrosion, and foaming.

Chevron GST 2190 EP has outstanding thermal and oxidation stability which allows it to withstand the high temperatures found in turbine bearing and gear lubrication.

The foam inhibition helps prevent the buildup of foam in the sump tank with possible vent pipe overflow.

Its excellent stability, high viscosity index, and rust and corrosion inhibition help assure high film strength lubrication for gears and bearings, as well as rust and corrosion protection. Together, these qualities promote both long lubricant and equipment life.

It does not contain any silicone additives.

APPLICATIONS

Chevron GST 2190 EP is recommended for use in marine turbine reduction gears, where heavy tooth loading and shock loads are encountered.

The extreme pressure properties enable Chevron GST 2190 EP to meet the requirements of MIL-PRF-17331L and MIL-PRF-17331K(SH).

Do not filter through Fuller's Earth-type filtration systems since this would deplete the additive package.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

Product Number	253089
SDS Number	48587
API Gravity	32.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	79.8 10.3
Viscosity, Saybolt SUS at 100°F SUS at 210°F	370 60.2
Viscosity Index	111
Flash Point, °C(°F)	246(475)
Pour Point, °C(°F)	-12(+10)
Color, ASTM D1500	0.5
Conradson Carbon Residue, mass %	0.1
Sulfated Ash, wt %	< 0.001
Corrosion, Copper Strip, 3 h at 100°C	1
Acid Number, ASTM D974, mg KOH/g	0.16

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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CHEVRON GST[®] 2190 EP ISOCLEAN[®] CERTIFIED LUBRICANT

PRODUCT DESCRIPTION

Chevron GST[®] 2190 EP ISOCLEAN® Certified Lubricant is formulated for use in circulating oil systems for marine gear turbine sets. Chevron ISOCLEAN



Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Chevron GST 2190 EP ISOCLEAN Certified Lubricant delivers value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Long lubricant life because of selected base stocks and additives.
- Extreme pressure characteristics help provide high film strength to protect gears and bearings engaged in heavy-duty service.
- Meets the physical, chemical and performance requirements of MIL-PRF-17331L and MIL-PRF-17331K(SH) — Meets stringent military specifications. Not a QPL listed material.

• **High viscosity index** — Minimal viscosity change in broad operating temperature range enhances lubricant film strength.

FEATURES

Chevron GST 2190 EP ISOCLEAN Certified Lubricant was developed primarily as a circulating system oil for marine gear turbine sets.

Chevron GST 2190 EP ISOCLEAN Certified Lubricant provides mild extreme pressure protection as well as resistance to rust, oxidation, corrosion, and foaming.

Chevron GST 2190 EP ISOCLEAN Certified Lubricant has outstanding thermal and oxidation stability which allows it to withstand the high temperatures found in turbine bearing and gear lubrication.

The foam inhibition helps prevent the buildup of foam in the sump tank with possible vent pipe overflow.

Its excellent stability, high viscosity index, and rust and corrosion inhibition help assure high film strength lubrication for gears and bearings, as well as rust and corrosion protection. Together, these qualities promote both long lubricant and equipment life.

It does not contain any silicone additives.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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10 September 2020 IO-90 ISOCLEAN

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APPLICATIONS

Chevron GST[®] 2190 EP ISOCLEAN[®] Certified Lubricant is recommended for use in marine turbine reduction gears, where heavy tooth loading and shock loads are encountered.

The extreme pressure properties enable Chevron GST 2190 EP SOCLEAN[®] Certified Lubricant to meet the requirements of MIL-PRF-17331L and MIL-PRF-17331K(SH). Not a QPL listed material.

Do not filter through Fuller's Earth-type filtration systems since this would deplete the additive package.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

Product Number	253088
SDS Number	48587
API Gravity	32.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	79.8 10.3
Viscosity, Saybolt SUS at 100°F SUS at 210°F	370 60.2
Viscosity Index	111
Flash Point, °C(°F)	246(475)
Pour Point, °C(°F)	-12(+10)
Color, ASTM D1500	0.5
Conradson Carbon Residue, mass %	0.1
Sulfated Ash, wt %	< 0.001
Corrosion, Copper Strip, 3 h at 100°C	1
Acid Number, ASTM D974, mg KOH/g	0.16

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON HEAT TRANSFER OIL Grades 22, 46

PRODUCT DESCRIPTION

Chevron Heat Transfer Oils are mineral oil-type transfer oils for use in heat transfer systems with forced circulation.

CUSTOMER BENEFITS

Chevron Heat Transfer Oils deliver value through:

- Excellent thermal efficiency and stability Helps ensure long oil life through outstanding thermal and oxidation stability which helps prevent sludging or deposit formation inside piping.
- Good rust and corrosion protection Help prevent rusting or corrosive problems in circulating oil system.
- Excellent performance at temperature extremes — Outstanding thermal stability helps assure minimal thermal cracking at high temperatures or in repeated cycling from low to high temperatures.
- Ease of pumping and circulation Excellent stability helps assure minimal oxidation and helps prevent sludging or deposit formation inside piping.
- **Minimized makeup oil** Low vapor pressure combined with low volatility and high flash point means minimum evaporative loss.

FEATURES

Chevron Heat Transfer Oils are mineral-type transfer oils for use in secondary or indirect heating systems.

They are formulated with premium base oil technology.

Chevron Heat Transfer Oils are noncorrosive, low odor level, excellent seal compatibility fluids that can absorb heat quickly and transport it to the material or fluid requiring heat. Their excellent thermal and oxidation stability promotes long service life and clean heat exchanger systems.

There are many uses of heat in processing materials. There are also many ways of transferring heat to the material or fluid that needs to be heated. Chevron Heat Transfer Oils are excellent for this purpose and offer many advantages. They can be used at low pressures. In most applications, the equipment required to apply the oils is relatively inexpensive. The application equipment can also be portable and, therefore, used where it is needed.

APPLICATIONS

Chevron Heat Transfer Oils are recommended for use in heat transfer systems where fuel oil, gas, or electricity is used to heat a fluid, which then transfers the heat to the point of application.

In closed, forced circulation systems equipped with expansion tanks, Chevron Heat Transfer Oil **Grade 22** can be used with bulk oil temperatures up to 316°C (600°F) and skin temperatures up to 343°C (650°F) where good thermal stability and pumpability are required. Chevron Heat Transfer Oil Grade 22 is also ideal where high heat transfer rates combine with high flow rates, and for systems where repeated heating and cooling cycles are required.

In closed or open systems with forced circulation, Chevron Heat Transfer Oil **Grade 46** can be used where bulk oil temperatures do not exceed 288°C (550°F) and skin temperatures may be as high as 316°C (600°F). The oil surface in contact with air in open systems should not exceed 107°C (225°F).

Copper and copper alloys should not be used in heat transfer systems with a hydrocarbon fluid unless air (oxygen) is excluded from contact with the fluid by hermetic sealing and/or an inert gas "blanket."

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

20 November 2015 IO-100

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Grade	22	46
Product Number	231706	231709
SDS/MSDS Number USA Colombia El Salvador	4610 32552 32551	37644 33472 33473
API Gravity	33.8	32.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	23.1 4.47	41.1 6.32
Viscosity, Saybolt SUS at 100°F SUS at 210°F	120 41.3	212 47.4
Viscosity Index	104	101
Flash Point, °C(°F)	210(410)	240(464)
Fire Point, °C(°F)	229(444)	271(520)
Autoignition Point, °C(°F), ASTM E659	345(653)	359(678)
Pour Point, °C(°F)	-13(+9)	-15(+5)
Ramsbottom Carbon Residue, wt %	0.04	0.05

Minor variations in product typical test data are to be expected in normal manufacturing.

THERMAL PROPERTIES

Chevron Heat Transfer Oil Grade 22

Temperature, °C(°F)	0(32)	40(104)	50(122)	100(212)	150(302)	200(392)	250(482)	300(572)	350(662)
Viscosity, Kinematic, cSt	197.75	23.10	16.03	4.47	2.09	1.25	*	*	*
Gravity Specific kg/L	0.8680 0.8649	0.8401 0.8396	0.8330 0.8331	0.8003 0.8000	0.7658 0.7655	0.7290 0.7294	0.6916 0.6914	0.6550 0.6512	0.6083 0.6083
Specific heat BTU/lb-°F, Calories/gm/°C	0.443	0.490	0.502	0.556	0.608	0.655	0.698	0.738	0.774
Thermal conductivity BTU/hr-ft-°F	0.0758	0.0725	0.0717	0.0676	0.0635	0.0594	0.0553	0.0512	0.0471
Vapor Pressure, mm-Hg	Nil	0.000003	0.0001	0.0011	0.065	0.75	8	19	50
Coefficient of Thermal Expansion, °C	0.00072	0.00077	0.00078	0.00084	0.00092	0.00102	0.00113	0.00127	0.00146
Volume Change from 60°F, %	-1.13	+1.86	+2.65	+6.89	+11.71	+17.24	+23.68	*	*

11-90

Chevron Heat Transfer Oil Grade 46

Temperature, °C(°F)	0(32)	40(104)	50(122)	100(212)	150(302)	200(392)	250(482)	300(572)	350(662)
Viscosity, Kinematic, cSt	489.96	41.10	27.02	6.32	2.70	1.54	*	*	*
Gravity Specific kg/L	0.8745 0.8742	0.8473 0.8491	0.8425 0.8428	0.8105 0.8101	0.7763 0.7760	0.7416 0.7404	0.7032 0.7030	0.6680 0.6635	0.6215 0.6215
Specific heat BTU/Ib- F, Calories/gm/°C	0.440	0.488	0.499	0.554	0.606	0.653	0.697	0.737	0.773
Thermal conductivity BTU/hr-ft- °F	0.0758	0.0725	0.0717	0.0676	0.0635	0.0594	0.0553	0.0512	0.0471
Vapor Pressure, mm-Hg	Nil	0.0000004	0.00003	0.0002	0.017	0.35	5	16	40
Coefficient of Thermal Expansion, °C	0.00071	0.00075	0.00076	0.00082	0.00090	0.00099	0.00109	0.00123	0.00140
Volume Change from 60°F, %	-1.18	+1.82	+2.59	+6.73	+11.41	+16.77	+22.98	*	*

* Estimated values. Values for shaded areas are not shown, as values would represent extrapolation beyond reasonable accuracy.



CHEVRON HEAT TRANSFER OIL ISOCLEAN[®] Certified Lubricant

Grades 22, 46

PRODUCT DESCRIPTION

Chevron Heat Transfer ISOCLEAN[®] Certified Lubricants are mineral oil-type transfer oils for use in heat transfer systems with forced circulation.



Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Chevron Heat Transfer ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Excellent thermal efficiency and stability Helps ensure long oil life through outstanding thermal and oxidation stability which helps prevent sludging or deposit formation inside piping.
- Good rust and corrosion protection Help prevent rusting or corrosive problems in circulating oil system.
- Excellent performance at temperature extremes — Outstanding thermal stability helps

assure minimal thermal cracking at high temperatures or in repeated cycling from low to high temperatures.

- Ease of pumping and circulation Excellent stability helps assure minimal oxidation and helps prevent sludging or deposit formation inside piping.
- **Minimized makeup oil** Low vapor pressure combined with low volatility and high flash point means minimum evaporative loss.

FEATURES

Chevron Heat Transfer ISOCLEAN Certified Lubricants are mineral-type transfer oils for use in secondary or indirect heating systems.

They are formulated with premium base oil technology.

Chevron Heat Transfer ISOCLEAN Certified Lubricants are noncorrosive, low odor level, excellent seal compatibility fluids that can absorb heat quickly and transport it to the material or fluid requiring heat.

Their excellent thermal and oxidation stability promotes long service life and clean heat exchanger systems.

There are many uses of heat in processing materials. There are also many ways of transferring heat to the material or fluid that needs to be heated. Chevron Heat Transfer ISOCLEAN Certified Lubricants are excellent for this purpose and offer many advantages. They can be used at low pressures. In most applications, the equipment required to apply the oils is relatively inexpensive. The application equipment can also be portable and, therefore, used where it is needed.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2021 IO-100 ISOCLEAN

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APPLICATIONS

Chevron Heat Transfer ISOCLEAN[®] Certified Lubricants are recommended for use in heat transfer systems where fuel oil, gas, or electricity is used to heat a fluid, which then transfers the heat to the point of application.

In closed, forced circulation systems equipped with expansion tanks, Chevron Heat Transfer ISOCLEAN Certified Lubricant **Grade 22** can be used with bulk oil temperatures up to 316°C (600°F) and skin temperatures up to 343°C (650°F) where good thermal stability and pumpability are required. Chevron Heat Transfer Oil Grade 22 is also ideal where high heat transfer rates combine with high flow rates, and for systems where repeated heating and cooling cycles are required.

In closed or open systems with forced circulation, Chevron Heat Transfer ISOCLEAN Certified Lubricant **Grade 46** can be used where bulk oil temperatures do not exceed 288°C (550°F) and skin temperatures may be as high as 316°C (600°F). The oil surface in contact with air in open systems should not exceed 107°C (225°F).

Copper and copper alloys should not be used in heat transfer systems with a hydrocarbon fluid unless air (oxygen) is excluded from contact with the fluid by hermetic sealing and/or an inert gas "blanket."

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

Grade	22	46
Product Number	231707	231710
<i>SDS/MSDS Number USA Colombia El Salvador</i>	4610 32552 32551	37644 33472 33473
API Gravity	33.8	32.0
Viscosity, Kinematic cSt at 40°C cSt at 100°C	23.1 4.47	41.1 6.32
Viscosity, Saybolt SUS at 100°F SUS at 210°F	120 41.3	212 47.4
Viscosity Index	104	101
Flash Point, °C(°F)	210(410)	240(464)
Fire Point, °C(°F)	229(444)	271(520)
Autoignition Point, °C(°F), ASTM E659	345(653)	359(678)
Pour Point, °C(°F)	-13(+9)	-15(+5)
Ramsbottom Carbon Residue, wt %	0.04	0.05

Minor variations in product typical test data are to be expected in normal manufacturing.

THERMAL PROPERTIES

Chevron Heat Transfer Oil Grade 22

Temperature, °C(°F)	0(32)	40(104)	50(122)	100(212)
Viscosity, Kinematic, cSt	197.75	23.10	16.03	4.47
Gravity Specific kg/L	0.8680 0.8649	0.8401 0.8396	0.8330 0.8331	0.8003 0.8000
Specific heat BTU/lb-°F, Calories/gm/°C	0.443	0.490	0.502	0.556
Thermal conductivity BTU/hr-ft-°F	0.0758	0.0725	0.0717	0.0676
Vapor Pressure, mm-Hg	Nil	0.000003	0.0001	0.0011
Coefficient of Thermal Expansion, °C	0.00072	0.00077	0.00078	0.00084
Volume Change from 60°F, %	-1.13	+1.86	+2.65	+6.89

Temperature, °C(°F)	150(302)	200(392)	250(482)	300(572)	350(662)
Viscosity, Kinematic, cSt	2.09	1.25	*	*	*
Gravity Specific kg/L	0.7658 0.7655	0.7290 0.7294	0.6916 0.6914	0.6550 0.6512	0.6083 0.6083
Specific heat BTU/Ib-°F, Calories/gm/°C	0.608	0.655	0.698	0.738	0.774
Thermal conductivity BTU/hr-ft-°F	0.0635	0.0594	0.0553	0.0512	0.0471
Vapor Pressure, mm-Hg	0.065	0.75	8	19	50
Coefficient of Thermal Expansion, °C	0.00092	0.00102	0.00113	0.00127	0.00146
Volume Change from 60°F, %	+11.71	+17.24	+23.68	*	*

Temperature, °C(°F)	0(32)	40(104)	50(122)	100(212)
Viscosity, Kinematic, cSt	489.96	41.10	27.02	6.32
Gravity Specific kg/L	0.8745 0.8742	0.8473 0.8491	0.8425 0.8428	0.8105 0.8101
Specific heat BTU/Ib- F, Calories/gm/°C	0.440	0.488	0.499	0.554
Thermal conductivity BTU/hr-ft- °F	0.0758	0.0725	0.0717	0.0676
Vapor Pressure, mm-Hg	Nil	0.0000004	0.00003	0.0002
Coefficient of Thermal Expansion, °C	0.00071	0.00075	0.00076	0.00082
Volume Change from 60°F, %	-1.18	+1.82	+2.59	+6.73

Chevron Heat Transfer Oil Grade 46

Chevron Heat Transfer Oil Grade 46

Temperature, °C(°F)	150(302)	200(392)	250(482)	300(572)	350(662)
Viscosity, Kinematic, cSt	2.70	1.54	*	*	*
Gravity Specific kg/L	0.7763 0.7760	0.7416 0.7404	0.7032 0.7030	0.6680 0.6635	0.6215 0.6215
Specific heat BTU/Ib- F, Calories/gm/°C	0.606	0.653	0.697	0.737	0.773
Thermal conductivity BTU/hr-ft- °F	0.0635	0.0594	0.0553	0.0512	0.0471
Vapor Pressure, mm-Hg	0.017	0.35	5	16	40
Coefficient of Thermal Expansion, °C	0.00090	0.00099	0.00109	0.00123	0.00140
Volume Change from 60°F, %	+11.41	+16.77	+22.98	*	*

*Estimated values. Values for shaded areas are not shown, as values would represent extrapolation beyond reasonable accuracy.



CHEVRON HYDRAULIC OIL 5606A

PRODUCT DESCRIPTION

Chevron Hydraulic Oil 5606A is manufactured to be used broadly as a hydraulic medium in automotive and industrial equipment operating in unusually cold conditions such as the Alaska North Slope where conventional hydraulic oils are not suitable.

CUSTOMER BENEFITS

Chevron Hydraulic Oil 5606A delivers value through:

- Minimum viscosity change over a wide range of operating temperatures.
- Low pour point permits operation at low temperatures.
- Shear stability for long fluid life.

FEATURES

Chevron Hydraulic Oil 5606A is manufactured from specially selected, highly refined, low viscosity and low pour point petroleum base stocks. It contains a shear resistant viscosity index improver, which provides an extremely high viscosity index. It also contains an antiwear agent and an oxidation inhibitor. It contains a red colored dye to hasten identification.

The low viscosity of the base stock used in this fluid and combined with a shear stable viscosity index improver provides the extremely high viscosity index (300+) which is critical for a lubricant or hydraulic fluid operating over the broad temperature range of -54°C to 60°C (-65°F to 140°F).

Since this is a conventional petroleum base stock, and not a synthetic, the low pour point is critical to minimize filter plugging.

In addition, the antiwear additive and foam inhibitor help prevent pump cavitation and promote long pump and servo valve life.

APPLICATIONS

Chevron Hydraulic Oil 5606A is manufactured to be used broadly as a hydraulic medium in automotive and industrial equipment operating in unusually cold conditions.

Chevron Hydraulic Oil 5606A can be used in hydraulic systems employing synthetic rubber packing and seals. It is not to be used in systems designed for castor oil-alcohol base fluids.

Chevron Hydraulic Oil 5606A is not recommended for any aviation applications. This product is designed for land use only.

Chevron Hydraulic Oil 5606A may not be suitable for extremely high shearing pumps or equipment. Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult with your equipment manufacturer if equipment is operating outside normal operating conditions.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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23 October 2014 IO-107

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Product Number	247707
SDS Number	818
API Gravity	29.7
Viscosity, Kinematic cSt at -40°C cSt at 40°C cSt at 100°C	510 15.0 5.5
Viscosity, Saybolt SUS at 100°F SUS at 210°F	80 45
Viscosity Index	300+
Flash Point, °C(°F)	82(180)
Pour Point, °C(°F)	-63(-81)

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON HYDRAULIC OIL AW 32, 46, 68

PRODUCT DESCRIPTION

Chevron Hydraulic Oils AW are designed to give excellent hydraulic pump protection.

CUSTOMER BENEFITS

Chevron Hydraulic Oils AW deliver value through:

- **Good oxidation stability** Provide good service life in high pressure service.
- Rust and corrosion protection Give excellent protection against corrosion of both copper and steel, and passes the ASTM D665A distilled water rust test and ASTM D665B synthetic sea water rust test.
- Minimum viscosity change over a wide temperature range.
- Good foam inhibition Contain special foam suppressant, minimizing both foaming and aeration problems.
- Excellent antiwear properties
- Meets major pump manufacturer's requirements ISO 32, 46 and 68 meet the requirements of leading hydraulic pump manufacturers for antiwear-type hydraulic fluids in both vane- and piston-type pumps.
- **Good stability in the presence of water** by ASTM D2619 Hydrolytic Stability test and the Denison hybrid T6H20C Wet Pump test.
- **Good thermal stability** in the presence of copper and steel by the MAG Cincinnati Machine Thermal Stability, Procedure A, test.
- Fast water separation Minimize rust problems by fast release of water.

FEATURES

Chevron Hydraulic Oils AW are formulated with refined paraffinic base oils. They provide excellent antiwear protection, oxidation and corrosion inhibition, as well as foam and aeration suppression. All grades have excellent demulsibility characteristics.

Hydraulic systems, due to the nature of their operation, experience accelerated wear unless they are protected by clean, high quality antiwear hydraulic oils. Surging pressures in pumps and valves can increase metal-to-metal contact unless antiwear protection is present. The antiwear additives in Chevron Hydraulic Oils AW create a protective film on the metal surfaces. This protective film minimizes metal-to-metal contact, which is most severe in vane- and gear-type pumps. As hydraulic pressures increase over 1000 psi, the need for antiwear protection increases proportionally.

APPLICATIONS

Chevron Hydraulic Oils AW are versatile lubricants available in ISO viscosity grades 32, 46 and 68.

ISO 32, **46** and **68** grades are most commonly used for hydraulics with vane-, piston-, or gear-type pumps, especially where pressures exceed 1000 psi. They can also be used to lubricate lightly loaded reciprocating compressors.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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CLAIMS AND APPLICATIONS

ISO Grade	32	46	68
Bosch Rexroth Racine Model S	М	М	М
Eaton (Vickers) 35VQ25A (Pump Test) I-286-S (Stationary) M-2950-S (Mobile)	М	М	М
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)	M P-68	M P-70	M P-69
NSF H2 ^b	Α	Α	Α
Parker Hannifin (Denison) HF-0, HF-1, HF-2	М	М	М
ASTM D6158 HM	М	М	М
DIN 51524-2 HLP	М	М	М
ISO 11158 L-HM	М	М	М

a. Obsolete specification.

b. Chevron Hydraulic AW ISO grades 32, 46, 68 are registered by NSF and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

A: Approved for

M: Meets or exceeds requirements

ISO Grade	Test Method	32	46	68
Product Number		255675	255674	255673
<i>SDS Number U.S. Colombia El Salvador</i>		7457 32564 32563	7457 32564 32563	7457 32564 32563
API Gravity	ASTM D287	32.6	31.8	31.6
Density at 15°C, kg/L	ASTM D4057	0.8655	0.8735	0.8811
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	30.4 5.2	43.7 6.5	64.6 8.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	157 44	225 48	334 55
Viscosity Index	ASTM D2270	98	98	99
Flash Point, °C(°F)	ASTM D92	220(428)	226(439)	235(455)
Pour Point, °C(°F)	ASTM D97	-25(-13)	-23(-9)	-22(-8)
Copper Corrosion 3h at 100°C	ASTM D130	1b	1b	1b
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	20 0	20 0	20 0
Rust Test, Procedure A&B	ASTM D665	PASS	PASS	PASS
Water Separability, minutes to <3mL at 54°C	ASTM D1401	15	15	15
Oxidation Stability, TOST Hours to 2.0mg KOH/g TAN	ASTM D943	>5000	>5000	>5000

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON HYDRAULIC OIL AW ISOCLEAN[®] CERTIFIED LUBRICANT

32, 46, 68

PRODUCT DESCRIPTION

Chevron Hydraulic Oils AW ISOCLEAN[®] Certified Lubricants are designed to give excellent hydraulic pump



protection. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Chevron Hydraulic Oils AW ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **Good oxidation stability** Provide good service life in high pressure service.
- Rust and corrosion protection Give excellent protection against corrosion of both copper and steel, and passes the ASTM D665A distilled water rust test and ASTM D665B synthetic sea water rust test.
- Minimum viscosity change over a wide temperature range.

- Good foam inhibition Contain special foam suppressant, minimizing both foaming and aeration problems.
- Excellent antiwear properties
- Meets major pump manufacturer's requirements ISO 32, 46 and 68 meet the requirements of leading hydraulic pump manufacturers for antiwear-type hydraulic fluids in both vane- and piston-type pumps.
- **Good stability in the presence of water** by ASTM D2619 Hydrolytic Stability test and the Denison hybrid T6H20C Wet Pump test.
- **Good thermal stability** in the presence of copper and steel by the MAG Cincinnati Machine Thermal Stability, Procedure A, test.
- **Fast water separation** Minimize rust problems by fast release of water.

FEATURES

Chevron Hydraulic Oils AW are formulated with refined paraffinic base oils. They provide excellent antiwear protection, oxidation and corrosion inhibition, as well as foam and aeration suppression. All grades have excellent demulsibility characteristics.

Hydraulic systems, due to the nature of their operation, experience accelerated wear unless they are protected by clean, high quality antiwear hydraulic oils. Surging pressures in pumps and valves can increase metal-to-metal contact unless antiwear protection is present. The antiwear additives in Chevron Hydraulic Oils AW create a protective film on the metal surfaces. This protective film minimizes metal-to-metal contact, which is most severe in vane- and gear-type pumps. As hydraulic pressures increase over 1000 psi, the need for antiwear protection increases proportionally.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

Chevron Hydraulic Oils AW ISOCLEAN[®] Certified Lubricants are versatile lubricants available in ISO viscosity grades 32, 46 and 68.

ISO 32, **46** and **68** grades are most commonly used for hydraulics with vane-, piston-, or gear-type pumps,

CLAIMS AND APPLICATIONS

ISO Grade	32	46	68
Bosch Rexroth Racine Model S	М	М	М
Eaton (Vickers) 35VQ25A (Pump Test) I-286-S (Stationary) M-2950-S (Mobile)	Μ	Μ	М
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)	M P-68	M P-70	M P-69
NSF H2 ^b	Α	Α	Α
Parker Hannifin (Denison) HF-0, HF-1, HF-2	М	М	М
ASTM D6158 HM	М	М	М
DIN 51524-2 HLP	М	М	М
ISO 11158 L-HM	М	М	М

a. Obsolete specification.

b. Chevron Hydraulic AW ISO grades 32, 46, 68 are registered by NSF and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

A: Approved for

M: Meets or exceeds requirements

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

ISO Grade	Test Method	32	46	68
Product Number		293130	293131	293132
<i>SDS Number U.S. Colombia El Salvador</i>		7457 32564 32563	7457 32564 32563	7457 32564 32563
API Gravity	ASTM D287	32.6	31.8	31.6
Density at 15°C, kg/L	ASTM D4057	0.8655	0.8735	0.8811
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	30.4 5.2	43.7 6.5	64.6 8.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	157 44	225 48	334 55
Viscosity Index	ASTM D2270	98	98	99
Flash Point, °C(°F)	ASTM D92	220(428)	226(439)	235(455)
Pour Point, °C(°F)	ASTM D97	-25(-13)	-23(-9)	-22(-8)
Copper Corrosion 3h at 100°C	ASTM D130	1b	1b	1b
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	20 0	20 0	20 0
Rust Test, Procedure A&B	ASTM D665	PASS	PASS	PASS
Water Separability, minutes to <3mL at 54°C	ASTM D1401	15	15	15
Oxidation Stability, TOST Hours to 2.0mg KOH/g TAN	ASTM D943	>5000	>5000	>5000

Minor variations in product typical test data are to be expected in normal manufacturing.



RANDO[®] **HD** 10, 22, 32, 46, 68, 100, 150, 220, 320

PRODUCT DESCRIPTION

Rando[®] HD oils are formulated with premium base oil technology and designed to give robust protection to hydraulic pumps in mobile and stationary systems.

CUSTOMER BENEFITS

Rando HD oils deliver value through:

- Long equipment life Special antiwear additive package minimizes wear by protecting surfaces when load causes breakdown of the lubricant film.
- **Minimized downtime** Effective rust and oxidation inhibitor system helps prevent the production of abrasive particles from rust formation, and deposits, varnishes and sludges from oil breakdown, which can damage equipment surfaces and seals, and block filters prematurely.
- Smooth operation Good hydrolytic stability and water separation characteristics promote excellent filterability in the presence of water contamination. Good anti-foam and air release help ensure smooth operation and system efficiency.
- **Optimal oil service life** High oxidation stability resists oil thickening and deposit formation in service, minimizing the possibility of an unscheduled change of hydraulic fluid.

FEATURES

Rando HD **ISO 32**, **46**, and **68** are formulated with Group II base stocks.

Rando HD **ISO 100**, **150**, **220**, and **320** are designed for lubricant applications requiring an AGMA R&O gear oil lubricant in the applicable viscosity grade.

Rando HD oils provide excellent:

- antiwear protection
- oxidation and corrosion inhibition
- foam and aeration suppression

Under moderate loads and temperatures, the high viscosity index of Rando HD oils help ensure good film strength between metal surfaces and is further enhanced by antiwear additive protection.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 May 2024 IO-170

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APPLICATIONS

ISO Grade	10	22	32	46	68
spindle lubricants where zinc-free oils are not a requirement	Х	Х			
high performance industrial applications where pressures may exceed 5000 psi			x	х	x
lightly loaded reciprocating compressors			Х	Х	Х
ISO Grade	100	150	220	320]
by draulic aquipment reduction	V	V	V	V	7

hydraulic equipment reduction gears where EP is not required	Х	Х	Х	Х
plain and antifriction bearings	Х	Х	Х	Х
circulating oil systems	Х	Х	Х	Х
applications where AGMA rust and oxidation inhibited oils are required	х	х	х	х

CLAIMS AND SPECIFICATIONS

ISO Grade	10	22	32	46	68	100	150	220	320
Arburg Injection Molding				Α					
Bosch Rexroth RDE 90245			Α	Α	Α				
Eaton (Vickers) E-FDGN-TB002-E			А	Α	Α				
Eaton (Vickers) 35VQ25A (Pump Test) I-286-S (Stationary) M-2950-S (Mobile)			М	М	М				
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)			М p-68	М p-70	М p-69				
General Motors LS2 LH			М	М	М				
GROB Lubricants Chart	A	Α	Α	Α	Α				
Husky Injection Molding				Α					
Joy HO-S					М				
NSF H2 ^b			Α	Α	Α	Α	A	Α	Α
Parker Hannifin (Denison) HF-0, HF-1, HF-2			А	Α	Α				
Rexnord Falk Class A, F, J, Planetgear, Class D, G, Y, Link Belt Model R					A	A			
ZF TE-ML 04K			Α	Α					
ANSI/AGMA 9005-E02, 9005-F16 R&O			М	м	м	М	м	м	м
ASTM D6158 HM	М	М	М	М	М	М	М		
DIN 51524-2 HLP		М	М	М	М	М			
ISO 11158 L-HM	М	М	М	М	М	М	М		
JCMAS HK VG 32, 46			М	М					
SAE MS1004-HM		М	М	М	М	М			
US Steel (AIST) 126, 127	1		М	М	М		1	1	

a Obsolete specification

b Rando HD ISO grades 32, 46, 68, 100, 150, 220, 320 are registered by NSF and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

A: Approved for

M: Meets or exceeds requirements

ISO Grade	Test Method	10	22	32	46	68
Product Number		273252	273276	273277	273278	273279
<i>SDS/MSDS Number USA Colombia El Salvador</i>		23706 32579 —	23548 32605 —	23556 33476 33477	23556 33476 33477	23556 33476 33477
API Gravity	ASTM D287	28.7	35.4	33.3	31.9	31.5
Density at 15°C, kg/L	ASTM D4057	0.8866	0.8463	0.8585	0.8655	0.868
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	10.3 2.5	23.1 4.4	32 5.5	45.7 6.9	67.2 8.8
Viscosity, Saybolt SUS at 100°F SUS at 212°F	ASTM D2161	63 35	120 41	157 44	225 48	334 54
Viscosity Index	ASTM D2770	48	98	110	107	105
Flash Point, °C(°F)	ASTM D92	154(309)	177(351)	220(428)	226(439)	235(455)
Pour Point, °C(°F)	ASTM D97	-60(-76)	-38(-36)	-38(-36)	-36(-33)	-35(-31)
Copper Corrosion 3h at 100°C	ASTM D130	1b	1b	1b	1b	1b
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	20 0	20 0	10 0	10 0	10 0
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass	Pass	Pass
Water Separability, minutes to <3mL at 54°C	ASTM D1401	5	10	15	15	20
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	_	_	>6000	>6000	>6000
FZG Gear Test Fail Load Stage	DIN 51354	_	_	12	12	12

Minor variations in product typical test data are to be expected in normal manufacturing.

ISO Grade	Test Method	100	150	220	320
Product Number		273228	273280	273281	277316
<i>SDS/MSDS Number USA Colombia El Salvador</i>		23550 33474 33475	23550 33474 33475	23550 33474 —	23550 33474 —
API Gravity	ASTM D287	31	29.9	28.7	27.8
Density at 15°C, kg/L	ASTM D4057	0.8696	0.8754	0.8768	0.8874
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	98.9 11.5	147.9 14.6	209 18.2	301.8 23.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	495 64	751 76	1105 93	1617 117
Viscosity Index	ASTM D2770	106	103	96	97
Flash Point, °C(°F)	ASTM D92	250(482)	260(500)	271(520)	277(531)
Pour Point, °C(°F)	ASTM D97	-15(+5)	-12(+10)	-12(+10)	-12(+10)
Copper Corrosion 3h at 100°C	ASTM D130	1b	1b	1b	1b
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	10 0	10 0	10 0	10 0
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass	Pass
Water Separability, minutes to <3mL at 82°C	ASTM D1401	20	22	<30	<30
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	>2000	>1200	>1000	>1000
FZG Gear Test Fail Load Stage	DIN 51354	12	12	12	12

Minor variations in product typical test data are to be expected in normal manufacturing.



RANDO[®] HD ISOCLEAN[®] Certified Lubricant 10, 22, 32, 46, 68, 100, 150, 220, 320

PRODUCT DESCRIPTION

Rando[®] HD ISOCLEAN[®] Certified Lubricants are formulated with premium base oil technology and designed to give robust protection to



hydraulic pumps in mobile and stationary systems. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Rando HD ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Long equipment life Special antiwear additive package minimizes wear by protecting surfaces when load causes breakdown of the lubricant film.
- **Minimized downtime** Effective rust and oxidation inhibitor system helps prevent the production of abrasive particles from rust formation, and deposits, varnishes and sludges from oil

breakdown, which can damage equipment surfaces and seals, and block filters prematurely.

- Smooth operation Good hydrolytic stability and water separation characteristics promote excellent filterability in the presence of water contamination. Good anti-foam and air release help ensure smooth operation and system efficiency.
- **Optimal oil service life** High oxidation stability resists oil thickening and deposit formation in service, minimizing the possibility of an unscheduled change of hydraulic fluid.

FEATURES

Rando HD ISOCLEAN Certified Lubricants **ISO 32**, **46**, and **68** are formulated with Group II base stocks.

Rando HD ISOCLEAN Certified Lubricants **ISO 100**, **150**, **220**, and **320** are designed for lubricant applications requiring an AGMA R&O gear oil lubricant in the applicable viscosity grade.

Rando HD ISOCLEAN Certified Lubricants provide excellent:

- antiwear protection
- oxidation and corrosion inhibition
- · foam and aeration suppression

Under moderate loads and temperatures, the high viscosity index of Rando HD ISOCLEAN Certified Lubricants help ensure good film strength between metal surfaces and is further enhanced by antiwear additive protection.

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

ISO Grade	10	22	32	46	68
spindle lubricants where zinc-free oils are not a requirement	Х	Х			
high performance industrial applications where pressures may exceed 5000 psi			х	х	х
lightly loaded reciprocating compressors			Х	Х	Х
	•	•			

ISO Grade	100	150	220	320
hydraulic equipment reduction gears where EP is not required	Х	Х	Х	Х
plain and antifriction bearings	Х	Х	Х	Х
circulating oil systems	Х	Х	Х	Х
applications where AGMA rust and oxidation inhibited oils are required	Х	Х	Х	Х

CLAIMS AND SPECIFICATIONS

ISO Grade	10	22	32	46	68	100	150	220	320
Arburg Injection Molding				Α					
Bosch Rexroth RDE 90245			Α	Α	Α				
Eaton (Vickers) E-FDGN-TB002-E			Α	Α	Α				
Eaton (Vickers) 35VQ25A (Pump Test) I-286-S (Stationary) M-2950-S (Mobile)			м	м	М				
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)			М p-68	М p-70	М p-69				
General Motors LS2 LH			М	М	М				
GROB Lubricants Chart	Α	Α	Α	Α	Α				
Husky Injection Molding				Α					
Joy HO-S					М				
NSF H2 ^b			Α	Α	Α	Α	Α	Α	Α
Parker Hannifin (Denison) HF-0, HF-1, HF-2			Α	Α	Α				
Rexnord Falk Class A, F, J, Planetgear, Class D, G, Y, Link Belt Model R					A	A			
ZF TE-ML 04K			Α	Α					
ANSI/AGMA 9005-E02, 9005-F16 R&O			м	м	м	м	м	м	м
ASTM D6158 HM	М	М	М	М	М	М	М		
DIN 51524-2 HLP		М	М	М	М	М			
ISO 11158 L-HM	М	М	М	М	М	М	М	1	
JCMAS HK VG 32, 46			М	М					
SAE MS1004-HM		М	М	М	М	М			
US Steel (AIST) 126, 127			М	М	М				

a Obsolete specification

b Rando HD ISO grades 32, 46, 68, 100, 150, 220, 320 are registered by NSF and are acceptable as lubricants where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

A: Approved for

M: Meets or exceeds requirements

ISO Grade	Test Method	10	22	32	46	68
Product Number		274302	254616	254612	254613	254614
<i>SDS/MSDS Number USA Canada Mexico Colombia El Salvador</i>		23706 24836 24837 32579 —	23548 23549 24835 32605 —	23556 23557 23558 33476 33477	23556 23557 23558 33476 33477	23556 23557 23558 33476 33477
API Gravity	ASTM D287	28.7	35.4	33.3	31.9	31.5
Density at 15°C, kg/L	ASTM D4057	0.8866	0.8463	0.8585	0.8655	0.868
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	10.3 2.5	23.1 4.4	32 5.5	45.7 6.9	67.2 8.8
Viscosity, Saybolt SUS at 100°F SUS at 212°F	ASTM D2161	63 35	120 41	157 44	225 48	334 54
Viscosity Index	ASTM D2770	48	98	110	107	105
Flash Point, °C(°F)	ASTM D92	154(309)	177(351)	220(428)	226(439)	235(455)
Pour Point, °C(°F)	ASTM D97	-60(-76)	-38(-36)	-38(-36)	-36(-33)	-35(-31)
Copper Corrosion 3h at 100°C	ASTM D130	1b	1b	1b	1b	1b
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	20 0	20 0	10 0	10 0	10 0
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass	Pass	Pass
Water Separability, minutes to <3mL at 54°C	ASTM D1401	5	10	15	15	20
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	_	_	>6000	>6000	>6000
FZG Gear Test Fail Load Stage	DIN 51354	_	_	12	12	12

Minor variations in product typical test data are to be expected in normal manufacturing.

ISO Grade	Test Method	100	150	220	320
Product Number		254615	274303	274304	274305
<i>SDS/MSDS Number USA Canada Mexico Colombia El Salvador</i>		43810 43811 25219MEX 33474 33475	23550 23554 23555 33474 —	23550 23554 23555 33474 —	23550 23554 23555 <i>33474</i> —
API Gravity	ASTM D287	31	29.9	28.7	27.8
Density at 15°C, kg/L	ASTM D4057	0.8696	0.8754	0.8768	0.8874
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	98.9 11.5	147.9 14.6	209 18.2	301.8 23.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	ASTM D2161	495 64	751 76	1105 93	1617 117
Viscosity Index	ASTM D2770	106	103	96	97
Flash Point, °C(°F)	ASTM D92	250(482)	260(500)	271(520)	277(531)
Pour Point, °C(°F)	ASTM D97	-15(+5)	-12(+10)	-12(+10)	-12(+10)
Copper Corrosion 3h at 100°C	ASTM D130	1b	1b	1b	1b
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	10 0	10 0	10 0	10 0
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass	Pass
Water Separability, minutes to <3mL at 82°C	ASTM D1401	20	22	<30	<30
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	>2000	>1200	>1000	>1000
FZG Gear Test Fail Load Stage	DIN 51354	12	12	12	12

Minor variations in product typical test data are to be expected in normal manufacturing.



RANDO[®] HD PREMIUM OIL MV

PRODUCT DESCRIPTION

Rando[®] HD Premium Oil MV is a versatile multiviscosity lubricant designed to give robust protection to hydraulic pumps.

CUSTOMER BENEFITS

Rando HD Premium Oil MV delivers value through:

- High oxidation stability Long service life in high pressure service.
- Excellent protection against rust and corrosion — Gives excellent protection against corrosion of both copper and steel. Passes the ASTM D665A distilled water rust test and ASTM D665B salt water rust test.
- **High viscosity index** Minimum change in viscosity over wide operating temperatures.
- Foam inhibition Contains special foam suppressant.
- Seal conditioning For long seal life and leak resistance.
- Excellent antiwear properties Provides excellent wear protection.
- **Good stability** in the presence of water in the ASTM D2619 Hydrolytic Stability Test.
- Fast water separation and excellent demulsibility — Protects against rust problems by fast release of water.
- **Good filterability** Excellent thermal and hydrolytic stability help prevent formation of deposits which may interfere with filtration in equipment having close tolerances.

FEATURES

The multiviscosity feature of Rando HD Premium Oil MV promotes even and continuous power transmission over a wide temperature range with a minimum of shudder.



Hydraulic systems, due to the nature of their operation, experience accelerated wear unless they are protected by clean, high quality antiwear hydraulic oils.

Surging pressures in pumps and valves can increase metal-to-metal contact unless antiwear protection is present. The antiwear additives in Rando HD Premium Oil MV plate out on the metal surfaces and minimize the metal-to-metal contact that is most severe in vane-, piston-, and gear-type pumps.

As hydraulic pressures increase over 1000 psi, the need for antiwear protection increases proportionally.

In laboratory efficiency testing, Rando[®] HD Premium Oil MV provided up to 4% improvement in overall hydraulic pump efficiency when compared to a typical monograde hydraulic oil like Hydraulic Oil AW (a lower VI product with VI<105).

APPLICATIONS

Rando HD Premium Oil MV is recommended for hydraulic or circulating oil systems, including marine on-deck machinery, hydraulic actuated loading bins, or hydraulic equipment that require a wider operating temperature as compared to a single viscosity grade oil. Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult with your equipment manufacturer if equipment is operating outside normal operating conditions.

Rando HD Premium Oil MV meets the requirements of:

- ASTM D6158, D6158 HV
- Bosch Rexroth former specification RE 90220-01

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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- DIN 51524-3, HVLP
- ISO 6743-4 HV
- Fives Cincinnati (formerly MAG Cincinnati, Cin Machine, Cin Milacron) P-68
- Vickers M-2950S, I-286

In a clean, dry environment, Rando HD Premium Oil MV typically meets a typical dielectric strength of 35 kV^1 (ASTM D877²).

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

Product Number	277314
SDS Number	
U.S.	23695
Mexico	24839
Colombia	32615
ISO Grade	32
API Gravity	31.6
Viscosity, Kinematic cSt at 40°C cSt at 100°C	32.5 6.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	164.9 48.8
Viscosity Index	180
Flash Point, °C(°F)	190(374)
Pour Point, °C(°F)	-50(-58)
Brookfield Viscosity, ASTM D2983, cP at -20°C	1040
Brookfield Viscosity, ASTM D2983, cP at -30°C	3310
Brookfield Viscosity, ASTM D2983, cP at -40°C	14800

Minor variations in product typical test data are to be expected in normal manufacturing.

2 Industry standard test method for measuring kV values is not precise and test results can differ significantly.

Dielectric strength value applies only to "point of manufacture" of packaged products produced at a Chevron manufacturing facility. (Does not apply to bulk packaging). The oil will quickly lose its high dielectric strength value when exposed to contamination and to very small amounts of moisture and water.



RANDO[®] HD PREMIUM OIL MV **ISOCLEAN[®] CERTIFIED LUBRICANT**

PRODUCT DESCRIPTION

Rando[®] HD Premium Oil MV ISOCLEAN[®] Certified Lubricant is a versatile multiviscosity lubricant designed to give robust protection to



hydraulic pumps. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Rando HD Premium Oil MV ISOCLEAN Certified Lubricant delivers value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- Flexibility ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements -Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- High oxidation stability Long service life in high pressure service.
- Excellent protection against rust and **corrosion** — Gives excellent protection against corrosion of both copper and steel. Passes the ASTM D665A distilled water rust test and ASTM D665B salt water rust test.
- **High viscosity index** Minimum change in viscosity over wide operating temperatures.
- Foam inhibition Contains special foam suppressant.

- Seal conditioning For long seal life and leak resistance.
- Excellent antiwear properties Provides excellent wear protection.
- Good stability in the presence of water in the . ASTM D2619 Hydrolytic Stability Test.
- Fast water separation and excellent **demulsibility** – Protects against rust problems by fast release of water.
- Good filterability Excellent thermal and hydrolytic stability help prevent formation of deposits which may interfere with filtration in equipment having close tolerances.

FEATURES

The multiviscosity feature of Rando HD Premium Oil MV ISOCLEAN Certified Lubricant promotes even and continuous power transmission over a



wide temperature range with a minimum of shudder.

Hydraulic systems, due to the nature of their operation, experience accelerated wear unless they are protected by clean, high quality antiwear hydraulic oils.

Surging pressures in pumps and valves can increase metal-to-metal contact unless antiwear protection is present. The antiwear additives in Rando HD Premium Oil MV ISOCLEAN Certified Lubricant plate out on the metal surfaces and minimize the metal-to-metal contact that is most severe in vane-, piston-, and geartype pumps.

As hydraulic pressures increase over 1000 psi, the need for antiwear protection increases proportionally.

In laboratory efficiency testing, Rando HD Premium Oil MV ISOCLEAN Certified Lubricant provided up to 4% improvement in overall hydraulic pump efficiency when compared to a typical monograde hydraulic oil like Hydraulic Oil AW (a lower VI product with VI<105).

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

Rando[®] HD Premium Oil MV ISOCLEAN[®] Certified Lubricant is recommended for hydraulic or circulating oil systems, including marine on-deck machinery, hydraulic actuated loading bins, or hydraulic equipment that require a wider operating temperature as compared to a single viscosity grade oil. Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult with your equipment manufacturer if equipment is operating outside normal operating conditions.

Rando HD Premium Oil MV ISOCLEAN Certified Lubricant meets the requirements of:

- ASTM D6158, D6158 HV
- Bosch Rexroth former specification RE 90220-01
- DIN 51524-3, HVLP
- **ISO** 6743-4 HV
- Fives Cincinnati (formerly MAG Cincinnati, Cin Machine, Cin Milacron) P-68
- Vickers M-2950S, I-286

In a clean, dry environment, Rando HD Premium Oil MV ISOCLEAN Certified Lubricant typically meets a typical dielectric strength of 35 kV^1 (ASTM D877²).

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN[®] Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

Product Number	278066
SDS Number U.S. Mexico Colombia	23695 24839 32615
ISO Grade	32
API Gravity	31.6
Viscosity, Kinematic cSt at 40°C cSt at 100°C	32.5 6.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	164.9 48.8
Viscosity Index	180
Flash Point, °C(°F)	190(374)
Pour Point, °C(°F)	-50(-58)
Brookfield Viscosity, ASTM D2983, cP at -20°C	1040
Brookfield Viscosity, ASTM D2983, cP at -30°C	3310
Brookfield Viscosity, ASTM D2983, cP at -40°C	14800

Minor variations in product typical test data are to be expected in normal manufacturing.

2 Industry standard test method for measuring kV values is not precise and test results can differ significantly.

Dielectric strength value applies only to "point of manufacture" of packaged products produced at a Chevron manufacturing facility. (Does not apply to bulk packaging). The oil will quickly lose its high dielectric strength value when exposed to contamination and to very small amounts of moisture and water.



RANDO[®] HDZ 15, 22, 32, 46, 68, 100

PRODUCT DESCRIPTION

Rando[®] HDZ oils are formulated with premium base oil technology and designed to give robust protection to hydraulic pumps in mobile and stationary systems. These are high viscosity index hydraulic oils that provide a wide operating temperature range.

CUSTOMER BENEFITS

Rando HDZ oils deliver value through:

- **High oxidation stability** Long service life in high pressure service.
- Protection against rust and corrosion Gives excellent protection against corrosion of both copper and steel. Passes the ASTM D665A distilled water rust test and ASTM D665B salt water rust test.
- High viscosity index Minimum change in viscosity over a wide range of operating temperatures.
- Foam inhibition Contains special foam suppressant.
- Excellent antiwear properties Provides excellent wear protection.
- **Good stability** in the presence of water in the ASTM D2619 Hydrolytic Stability Test and in the presence of copper and steel in the MAG Cincinnati Machine Thermal Stability Test.
- **Fast water separation** Protects against rust problems by fast release of water.
- Good filterability Excellent thermal and hydrolytic stability helps prevent formation of deposits which may interfere with filtration in equipment having close tolerances.

FEATURES

Rando HDZ oils incorporate antiwear additives, oxidation and corrosion inhibitors, foam and aeration suppressants, and a shear stable viscosity index improver.



1 January 2024 IO-174

Hydraulic systems, due to the nature of their operation, experience accelerated wear unless they are protected by clean, high quality antiwear hydraulic oils. Surging pressures in pumps and valves can increase metal-to-metal contact unless antiwear protection is present. The antiwear additives in Rando HDZ oils plate out on the metal surfaces. This plating minimizes metal-to-metal contact, which is most severe in vane-, piston-, and gear-type pumps. As hydraulic pressures increase over 1000 psi, the need for antiwear protection increases proportionally.

In field performance demonstrations, Rando HDZ oils provided up to 3.4% improvement in overall hydraulic pump efficiency when compared to a typical conventional hydraulic oil (a lower VI product with VI<105).

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

ISO Grade	15	22	32	46	68	100
high performance industrial applications where pressures may exceed 5000 psi			Х	х	х	
lightly loaded reciprocating compressors			Х	Х	Х	
hydraulic equipment reduction gears where EP is not required						Х
plain and antifriction bearings						Х
circulating oil systems						Х
applications where AGMA rust and oxidation inhibited oils are required						х
CLAIMS AND SPECIFICATIONS

ISO Grade	15	22	32	46	68	100
Arburg Injection Molding				Α		
Bosch Rexroth RDE 90245			Α	Α	Α	
Bosch Rexroth RA & RE 90220 ^a , 90221 ^a			М	М	М	
Eaton (Vickers) 35VQ25A (Pump Test) I-286-S (Stationary) M-2950-S (Mobile)			М	Μ	М	
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)			М p-68	М p-70	М p-69	
Frank Mohn, (Framo) hydraulic cargo pumping				Α		
MAN Truck & Bus OEM Engine Specifications	Α					
Parker Hannifin (Denison) HF-0, HF-1, HF-2			А	А	А	
ZF TE-ML 04R			Α	Α		
ANSI/AGMA 9005-E02, 9005-F16 R&O			М	М	М	М
ASTM D6158 HM, HV	М	М	М	М	М	М
DIN 51524-2 HLP, 51524-3 HVLP	М	М	М	М	М	М
ISO 11158 L-HM, L-HV	М	М	М	М	М	М
JCMAS HK VG 32, 46			М	М		
SAE MS1004-HM, HV		М	М	М	М	М
US Steel (AIST) 126,127			М	М	М	

a Obsolete specification

A: Approved for

M: Meets or exceeds requirements

Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult with your equipment manufacturer if equipment is operating outside normal operating conditions.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

ISO Grade	Test Method	15	22	32	46	68	100
Product Number		273282	273264	273260	273261	273262	273263
SDS Number U.S. Mexico Colombia		23543 23545	23537 23539 51622	23537 23539 51622	23537 23539 51622	23537 23539 51622	23537 23539 51622
API Gravity	ASTM D287	27.4	32.9	34	32.2	30.8	30.4
Density at 15°C, kg/L	ASTM D4057	0.8897	0.8544	0.843	0.8638	0.8706	0.8728
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	15.8 3.9	22.6 5.1	33.2 6.6	47.1 8.3	69.6 11.2	97.8 14.0
Viscosity, Saybolt SUS at 100°F SUS at 212°F	ASTM D2161	81.4 39.1	108 43.0	150 46.9	214 53.1	316 62.8	464 74.8
Viscosity Index	ASTM D2770	148	152	159	155	154	146
Flash Point, °C(°F)	ASTM D92	150(302)	188(370)	220(428)	226(439)	212(414)	232(450)
Pour Point, °C(°F)	ASTM D97	-62(-80)	-54(-65)	-50(-58)	-46(-51)	-43(-45)	-40(-40)
Brookfield Viscosity cP at -20°C cP at -30°C cP at -40°C	ASTM D2983	500 1660 6920	750 2340 9120	1290 4900 25100	2330 9120 -	4450 19300 -	8040 - -
Copper Corrosion 3h at 100°C	ASTM D130	1b	1b	1b	1b	1b	1b
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	50 0	40 0	10 0	0 0	0 0	0 0
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass	Pass	Pass	Pass
Water Separability, minutes to <3mL at 54°C	ASTM D1401	10	10	10	15	15	_
Water Separability, minutes to <3mL at 82°C	ASTM D1401	_	_	_	_	_	10
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	_	_	>6000	>6000	>6000	>3000

ISO Grade	Test Method	15	22	32	46	68	100
FZG Gear Test Fail Load Stage	DIN 51354	_	_	12	12	12	12
Dielectric Strength, kV ^a	ASTM D877 ^b	35	35	35	35	35	35

a Dielectric strength value applies only to "point of manufacture" of packaged products produced at a Chevron manufacturing facility. (Does not apply to bulk packaging). The oil will quickly lose its high dielectric strength value when exposed to contamination and to very small amounts of moisture and water.

b Industry standard test method for measuring kV values is not precise and test results can differ significantly.

Minor variations in product typical test data are to be expected in normal manufacturing. In a clean, dry environment, Rando HDZ 15, 22, 32, 46, 68 and 100 typically meet a dielectric strength of 35 kVa (ASTM D877b).



RANDO[®] HDZ ISOCLEAN[®] Certified Lubricant 15, 22, 32, 46, 68, 100

PRODUCT DESCRIPTION

Rando[®] HDZ ISOCLEAN[®] Certified Lubricants are formulated with premium base oil technology and designed to give robust protection to



hydraulic pumps in mobile and stationary systems. These are high viscosity index hydraulic oils that provide a wide operating temperature range. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Rando HDZ ISOCLEAN Certified Lubricants deliver value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- **Peace of mind** Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- **High oxidation stability** Long service life in high pressure service.
- Protection against rust and corrosion Gives excellent protection against corrosion of both copper and steel. Passes the ASTM D665A distilled water rust test and ASTM D665B salt water rust test.

- High viscosity index Minimum change in viscosity over a wide range of operating temperatures.
- Foam inhibition Contains special foam suppressant.
- Excellent antiwear properties Provides excellent wear protection.
- **Good stability** in the presence of water in the ASTM D2619 Hydrolytic Stability Test and in the presence of copper and steel in the MAG Cincinnati Machine Thermal Stability Test.
- Fast water separation Protects against rust problems by fast release of water.
- Good filterability Excellent thermal and hydrolytic stability helps prevent formation of deposits which may interfere with filtration in equipment having close tolerances.

FEATURES

Rando HDZ ISOCLEAN Certified Lubricants incorporate antiwear additives, oxidation and corrosion inhibitors, foam and aeration



suppressants, and a shear stable viscosity index improver.

Hydraulic systems, due to the nature of their operation, experience accelerated wear unless they are protected by clean, high quality antiwear hydraulic oils. Surging pressures in pumps and valves can increase metal-to-metal contact unless antiwear protection is present. The antiwear additives in Rando HDZ ISOCLEAN Certified Lubricants plate out on the metal surfaces. This plating minimizes metal-to-metal contact, which is most severe in vane-, piston-, and gear-type pumps. As hydraulic pressures increase over

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 January 2024 IO-174 ISOCLEAN

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In field performance demonstrations, Rando HDZ ISOCLEAN Certified Lubricants provided up to 3.4% improvement in overall hydraulic pump efficiency when compared to a typical conventional hydraulic oil (a lower VI product with VI<105).

APPLICATIONS

ISO Grade	15	22	32	46	68	100
high performance industrial applications where pressures may exceed 5000 psi			х	х	Х	
lightly loaded reciprocating compressors			Х	Х	Х	
hydraulic equipment reduction gears where EP is not required						Х
plain and antifriction bearings						Х
circulating oil systems						Х
applications where AGMA rust and oxidation inhibited oils are required						Х

CLAIMS AND SPECIFICATIONS

ISO Grade	15	22	32	46	68	100
Arburg Injection Molding				Α		
Bosch Rexroth RDE 90245			Α	Α	Α	
Bosch Rexroth RA & RE 90220 ^a , 90221 ^a			М	М	М	
Eaton (Vickers) 35VQ25A (Pump Test) I-286-S (Stationary) M-2950-S (Mobile)			М	Μ	Μ	
Fives Cincinnati ^a (formerly MAG Cincinnati, Cincinnati Machine, Cincinnati Milacron)			М p-68	М p-70	М p-69	
Frank Mohn, (Framo) hydraulic cargo pumping				Α		
MAN Truck & Bus OEM Engine Specifications	Α					
Parker Hannifin (Denison) HF-0, HF-1, HF-2			Α	А	А	
ZF TE-ML 04R			Α	Α		
ANSI/AGMA 9005-E02, 9005-F16 R&O			М	М	М	М
ASTM D6158 HM, HV	М	М	М	М	М	М
DIN 51524-2 HLP, 51524-3 HVLP	М	М	М	М	М	М
ISO 11158 L-HM, L-HV	М	М	М	М	М	М
JCMAS HK VG 32, 46			М	М		
SAE MS1004-HM, HV		М	М	М	М	М
US Steel (AIST) 126,127			М	М	М	

a Obsolete specification

A: Approved for

M: Meets or exceeds requirements

Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult with your equipment manufacturer if equipment is operating outside normal operating conditions. Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

ISO Grade	Test Method	15	22	32	46	68	100
Product Number		278064	278065	254609	254610	254611	274323
SDS Number U.S. Canada Mexico Colombia		23543 23544 23545	42265 42266 42267 51622	23537 23538 23529 51622	23537 23538 23529 51622	23537 23538 23529 51622	23537 23538 23539 51622
API Gravity	ASTM D287	27.4	32.9	34	32.2	30.8	30.4
Density at 15°C, kg/L	ASTM D4057	0.8897	0.8544	0.843	0.8638	0.8706	0.8728
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	15.8 3.9	22.6 5.1	33.2 6.6	47.1 8.3	69.6 11.2	97.8 14.0
Viscosity, Saybolt SUS at 100°F SUS at 212°F	ASTM D2161	81.4 39.1	108 43.0	150 46.9	214 53.1	316 62.8	464 74.8
Viscosity Index	ASTM D2770	148	152	159	155	154	146
Flash Point, °C(°F)	ASTM D92	150(302)	188(370)	220(428)	226(439)	212(414)	232(450)
Pour Point, °C(°F)	ASTM D97	-62(-80)	-54(-65)	-50(-58)	-46(-51)	-43(-45)	-40(-40)
Brookfield Viscosity cP at -20°C cP at -30°C cP at -40°C	ASTM D2983	500 1660 6920	750 2340 9120	1290 4900 25100	2330 9120 -	4450 19300 -	8040 - -
Copper Corrosion 3h at 100°C	ASTM D130	1b	1b	1b	1b	1b	1b
Foam Test, Seq. I Tendency, mL Stability, mL	ASTM D892	50 0	40 0	10 0	0 0	0 0	0 0
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass	Pass	Pass	Pass
Water Separability, minutes to <3mL at 54°C	ASTM D1401	10	10	10	15	15	_
Water Separability, minutes to <3mL at 82°C	ASTM D1401	_	_	_	_	_	10
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN	ASTM D943	_	_	>6000	>6000	>6000	>3000

ISO Grade	Test Method	15	22	32	46	68	100
FZG Gear Test Fail Load Stage	DIN 51354	_	_	12	12	12	12
Dielectric Strength, kV ^a	ASTM D877 ^b	35	35	35	35	35	35

a Dielectric strength value applies only to "point of manufacture" of packaged products produced at a Chevron manufacturing facility. (Does not apply to bulk packaging). The oil will quickly lose its high dielectric strength value when exposed to contamination and to very small amounts of moisture and water.

b Industry standard test method for measuring kV values is not precise and test results can differ significantly.

Minor variations in product typical test data are to be expected in normal manufacturing. In a clean, dry environment, Rando HDZ 15, 22, 32, 46, 68 and 100 typically meet a dielectric strength of 35 kVa (ASTM D877b).



Rando[®] WM

PRODUCT DESCRIPTION

Rando[®] WM 32 is a high performance multigrade hydraulic fluid designed for use in wind turbine systems and a wide range of other applications. Rando WM 32 offers high level protection and performance under severe operating conditions.

Rando WM 32 provides good low temperature fluidity with a high viscosity index (VI) and therefore offers a wide operating temperature window. This product complies with Swedish Standard SS 15 54.34.

CUSTOMER BENEFITS

Rando WM 32 delivers value through:

- Reliable low temperature fluidity Helps promote good pumpability and critical component wear protection during cold system start-up
- Robust anti-wear and corrosion inhibitor systems — Helps contribute to greater system uptime performance and reduced maintenance costs
- Thermal stability performance Helps to protect against oil degradation, deposit formation and helps promote extended fluid service life
- Dependable filtration characteristics in the presence of water contamination Helps reduce maintenance downtime
- **High shear stability** Helps to assist reliable protection and trouble-free performance for the life of the fluid, under high temperature, high pressure conditions

FEATURES

Rando WM 32 offers:



- Wide temperature performance and extended service life
- Low temperature system start-up wear protection
- System wear and corrosion protection
- Reliable filtration performance in the presence of water
- Trouble-free performance under high temperature, high pressure conditions

APPLICATIONS

Rando WM 32 is recommended for use in wind turbines and in many types of high pressure hydraulic systems operating across a wide ambient and operating temperature range.

Rando WM 32 is suitable for systems with gear, vane, radial and axial piston pumps.

Rando WM 32 is approved for:

• Vestas Wind Systems 0000-2843

Rando WM 32 meets the requirements of:

- ASTM D6158
- DIN 51524-3, HVLP
- ISO 6743-4 HV, 11158
- Swedish Standard SS 15 54 34, SMR 1996-2
- Vickers M-2950S, I-286

Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult with your equipment manufacturer if equipment is operating outside normal operating conditions.

Product(s) manufactured in Belgium.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

TYPICAL TEST DATA

	32
Product Number	273284
SDS Number	26304
API Gravity	27.4
Density, ASTM D1298, kg/L @ 15°C	0.89
Viscosity, Kinematic cSt at 40°C cSt at 100°C	32.5 6.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	164.9 48.8
Viscosity Index	180
Flash Point, °C(°F)	150(302)
Pour Point, °C(°F)	-48(-54)
Kinematic Viscosity, ASTM D445, mm ² /s @ -30°C after 72 hours	3000
FZG, DIN 51354, Fail load stage	10

Minor variations in product typical test data are to be expected in normal manufacturing.



RANDO[®] WM ISOCLEAN[®] Certified Lubricant 32

PRODUCT DESCRIPTION

Rando[®] WM 32 ISOCLEAN[®] Certified Lubricant is a high performance multigrade hydraulic fluid designed for



use in wind turbine systems and a wide range of other applications. Rando WM 32 offers high level protection and performance under severe operating conditions.

Rando WM 32 ISOCLEAN Certified Lubricant provides good low temperature fluidity with a high viscosity index (VI) and therefore offers a wide operating temperature window. This product complies with Swedish Standard SS 15 54.34.

Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Rando WM 32 ISOCLEAN Certified Lubricant delivers value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.

- Reliable low temperature fluidity Helps promote good pumpability and critical component wear protection during cold system start-up
- Robust anti-wear and corrosion inhibitor systems — Helps contribute to greater system uptime performance and reduced maintenance costs
- Thermal stability performance Helps to protect against oil degradation, deposit formation and helps promote extended fluid service life
- Dependable filtration characteristics in the presence of water contamination Helps reduce maintenance downtime
- **High shear stability** Helps to assist reliable protection and trouble-free performance for the life of the fluid, under high temperature, high pressure conditions

FEATURES

Rando WM 32 ISOCLEAN Certified Lubricant offers:



- Wide temperature performance and extended service life
- Low temperature system start-up wear protection
- System wear and corrosion protection
- Reliable filtration performance in the presence of water
- Trouble-free performance under high temperature, high pressure conditions

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 April 2019 IO-178 ISOCLEAN

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APPLICATIONS

Rando[®] WM 32 ISOCLEAN[®] Certified Lubricant is recommended for use in wind turbines and in many types of high pressure hydraulic systems operating across a wide ambient and operating temperature range.

Rando WM 32 ISOCLEAN Certified Lubricant is suitable for systems with gear, vane, radial and axial piston pumps.

Rando WM 32 ISOCLEAN Certified Lubricant is approved for:

• Vestas Wind Systems 0000-2843

Rando WM 32 ISOCLEAN Certified Lubricant meets the requirements of:

- ASTM D6158
- DIN 51524-3, HVLP
- ISO 6743-4 HV, 11158
- Swedish Standard SS 15 54 34, SMR 1996-2
- Vickers M-2950S, I-286

Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult with your equipment manufacturer if equipment is operating outside normal operating conditions.

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

TYPICAL TEST DATA

	32
Product Number	274316
SDS Number U.S. Canada Mexico API Gravity	26304 26304CAN 26304MEX 27.4
Density, ASTM D1298, kg/L @ 15°C	0.89
Viscosity, Kinematic cSt at 40°C cSt at 100°C	32.5 6.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	164.9 48.8
Viscosity Index	180
Flash Point, °C(°F)	150(302)
Pour Point, °C(°F)	-48(-54)
Kinematic Viscosity, ASTM D445, mm ² /s @ -30°C after 72 hours	3000
FZG, DIN 51354, Fail load stage	10

Minor variations in product typical test data are to be expected in normal manufacturing.



REGAL[®] HH 13, 68 (formerly Canopus[®])

PRODUCT DESCRIPTION

 ${\sf Regal}^{\circledast}$ HH oils (formerly ${\sf Canopus}^{\circledast}$ oils) are designed for use as industrial circulating oils.

CUSTOMER BENEFITS

Regal HH oils deliver value through:

- **High resistance to forming emulsions** due to excellent water separating characteristics.
- Long lubricant life provided by natural oxidation stability.
- **Good lubricant compatibility** Compatible with other mineral-based and polyalphaolefin lubricants.

FEATURES

Regal HH oils are high quality, high viscosity index, and highly refined uncompounded straight mineral oils with excellent water separating characteristics.

Regal HH oils possess good natural thermal and oxidation stability. Their high viscosity index makes them suitable for use over a wide temperature range. In circulating oil systems not requiring antiwear, compressor, or lightly loaded gear cases not requiring antiwear, they will maintain a high film strength and protect metal parts. Lubricant-related deposits will be kept to a minimum due to the excellent stability of these oils. System contaminants such as dirt and moisture can be easily removed from these oils by proper filtration.

Regal HH **68** is registered by **NSF** and is acceptable as a lubricant where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

APPLICATIONS

Regal HH oils are recommended for use in many circulating oil systems where antiwear is not required, as cylinder lubricants in double-acting reciprocating compressors, and for the lubrication of both cylinders and running gears of single-acting compressors.

Because of their compatibility, Regal HH oils are good for flushing lubricant systems as well.

Regal HH oils can be used for hand oiling. Their high viscosity index makes them suitable for use over a wide temperature range.

Do not use Regal HH in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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	13	68
Product Number	273109	273112
SDS Number	23519	23522
API Gravity	34.0	31.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	12.6 3.0	64.6 8.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	72 36.5	335 54.5
Viscosity Index	90	99
Flash Point, °C(°F)	179(354)	242(468)
Fire Point, °C(°F)	204(399)	276(529)
Pour Point, °C(°F)	-40(-40)	-15(+5)

Minor variations in product typical test data are to be expected in normal manufacturing.



REGAL[®] R&O 22, 32, 46, 68, 100, 115, 150, 220, 320, 460, 680

PRODUCT DESCRIPTION

 $\mbox{Regal}^{\mbox{$\mathbb R$}}$ R&O oils are turbine oils designed to give outstanding performance in steam and hydroelectric turbines.

CUSTOMER BENEFITS

Regal R&O oils deliver value through:

- Long lubricant life provided by excellent thermal and oxidation stability. Formulated with an ashless, zinc-free formulation.
- **Excellent demulsibility** helps ensure good lubricant film strength and minimal wear through quick water separation.
- **Excellent air release** in turbine oil reservoir systems by the foam inhibitor hastening the release of foam and entrained air.
- **Rust protection** of metal surfaces due to the use of an effective rust and corrosion inhibitor.
- Environmental benefits All grades are ashless. This facilitates reclaiming and recycling of the used oils.

FEATURES

Regal R&O oils provide rust protection, oxidation inhibition, and foam suppression.

They pass the Fresh Water Corrosion Test (ASTM D665, Procedure A), and the severe Synthetic Sea Water Rust Test (ASTM D665, Procedure B).

The thermal and oxidation stability of these lubricants, due to their high level of refinement, has been further enhanced by their unique ashless, zinc-free formulation. The high thermal and oxidation stability help protect against oxidation deposit formation or the generation of acidic material. Regal R&O oils have very good demulsibility characteristics allowing quick release of moisture.

Regal R&O oils minimize entrained air which otherwise could result in low lubricant film strength between moving parts and pump cavitation.

APPLICATIONS

Regal R&O oils ISO 32 through ISO 150 are recommended for use in most electric motor bearings, air compressors, gears, hydroelectric turbines, steam turbines, marine turbines, and non-heavy duty hydraulic systems where OEM recommends R&O type oils (for heavy duty hydraulic systems, customers should consider Rando HD oils).

These products can also be used as a general purpose machine oil for shop use when R&O type oil is needed or is recommended. The multifunctional characteristics of Regal R&O type oils may allow them to replace other special application lubricants, which can result in reduced inventory and operating cost.

Regal R&O 32

- meets:
 - Alstom HTGD 90117
 - ASTM D4304 Type I, British Standard 489, and DIN 51515 standard organization requirements for new lubricants used in gas and steam turbines and auxiliary equipment
 - General Electric GEK 28143b, GEK 46506D
 - MAG Cincinnati, Cincinnati Machine P-38
 - Siemens TLV 901304

Product(s) manufactured in the USA, Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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Regal R&O 46

- meets:
 - Alstom HTGD 90117
 - ASTM D4304 Type I, British Standard 489, and DIN 51515 standard organization requirements for new lubricants used in gas and steam turbines and auxiliary equipment
 - General Electric GEK 28143b
 - MAG Cincinnati, Cincinnati Machine P-55
 - Siemens TLV 901304

Regal R&O 68

- meets:
 - ASTM D4304 Type I, British Standard 489, and DIN 51515 standard organization requirements for new lubricants used in gas and steam turbines and auxiliary equipment
 - MAG Cincinnati, Cincinnati Machine P-54
- suitable for use in General Electric, Alstom, and Westinghouse hydroelectric turbines, land and marine steam turbines, and associated reduction gears when OEM recommends R&O type oil

Regal R&O 100

- meets:
 - ASTM D4304 Type I, British Standard 489, and DIN 51515 standard organization requirements for new lubricants used in gas and steam turbines and auxiliary equipment
- suitable for use in General Electric, Alstom, and Westinghouse hydroelectric turbines, land and marine steam turbines, and associated reduction gears when OEM recommends R&O type oil

Regal R&O 115, 150, 220, 320, 460 & 680 meet:

- ANSI/AGMA 9005-F16-RO requirements
- DIN 51517/2 CL requirements
- MORGOIL Advanced specifications

Do not use Regal R&O in large and high temperature gas turbines. $\mathsf{GST}^{\textcircled{R}}$ Oils are recommended for these gas turbines.

Do not use Regal R&O 32, 46, or 68 in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

Note that finished lubricants may affect the adherence of applied protective coatings (such as paint). If this product is used where coating applications are performed, the coating manufacturer should be consulted regarding adequate surface preparation.

	ASTM	115 ^a	22	32	46	68
Product Number USA Colombia El Salvador		277317 	277312 — —	273209 273209	273210 273210	273211 273211 273211
<i>SDS/MSDS Number USA Canada Mexico Colombia El Salvador</i>		48146 48160 48159 — —	23566 23567 23568 — —	23566 23567 23568 — 32648	23566 23567 23568 — 32648	23566 23567 23568 32649 32648
API Gravity ^b	D287	30.5(27.6)	34.2(32.1)	32.9(31.3)	31.7(30.2)	31.2(29.1)
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445	115 12.2	23.1 4.4	30.4 5.2	43.7 6.5	64.6 8.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	D445	602 68.5	120 41.2	157 43.7	226 48.0	335 54.5
Viscosity Index	D2270	96	102	100	98	99
Flash Point, °C(°F)	D92	278(532)	220(428)	222(432)	224(435)	245(473)
Pour Point, °C(°F)	D97	-15(+5)	-15(+5)	-30(-22)	-27(-17)	-24(-11)
Rust Test, Procedure B, 24 h	D665	Pass	Pass	Pass	Pass	Pass
Copper Corrosion, 3h at 100°C, max	D130	1a	_	_	_	—
Oxidation Stability ^b Hours to 2.0 mg KOH/g acid number Minutes to 25 psi	D943	 (>2000) 	>6000 (>3000) >1000	>6000 (>3000) >900	>6000 (>3000) >900	>5500 (>2500) >900
pressure drop	D2272	(>400)	(>600)	(>600)	(>500)	(>400)
FZG, Pass Stage ^c , DIN 51354		_	_	10	10	10

a Available in the Midwest and East.

b Typical values for products from the Bayonne, Charleston, Cicero, Louisville, and Port Arthur plants are in parentheses.

c FZG, Pass Stage, DIN 51354 is not applicable to products manufactured in Colombia and El Salvador.

Minor variations in product typical test data are to be expected in normal manufacturing.

	ASTM	100	150	220	320	460	680
Product Number USA Colombia El Salvador		273212 273212 273212	273204 273213 —	273205 273215 273215	273206 — —	273207 — —	273208 — —
SDS/MSDS Number USA Canada Mexico Colombia El Salvador		23566 23567 23568 32649 32648	48146 48160 48159 32649 —	48146 48160 48159 32649 32648	48146 48160 48159 — —	48146 48160 48159 — —	48146 48160 48159 — —
API Gravity ^a	D287	30.7(28.1)	29.8(27.1)	28.5(26.1)	27.5(25.4)	26.4	26.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445	95.0 10.8	143 14.2	220 19.0	304 23.2	460 31.3	646 39.6
Viscosity, Saybolt SUS at 100°F SUS at 210°F	D445	495 63.1	750 76.4	1163 96.8	1618 116	2463 152	3474 193
Viscosity Index	D2270	97	96	97	95	97	99
Flash Point, °C(°F)	D92	262(504)	284(543)	294(561)	298(568)	310(590)	312(594)
Pour Point, °C(°F)	D97	-15(+5)	-21(+5)	-18(+10)	-12(+10)	-12(+10)	-12(+10)
Rust Test, Procedure B, 24 h	D665	Pass	Pass	Pass	Pass	Pass	Pass
Copper Corrosion, 3h at 100°C, max			1a	1a	1a	1a	1a
Oxidation Stability ^a Hours to 2.0 mg KOH/g acid number	D943	>5500 (>2000)	>3500 (>1500)	>2200 (>1200)	>1800 (>1100)	>900 (>900)	>900
Minutes to 25 psi pressure drop	D2272	>900 (>400)	>450	>425	>400	>275	>275
FZG, Pass Stage ^b , DIN 51354		10	_	_	_	_	_

a Typical values for products from the Bayonne, Charleston, Cicero, Louisville, and Port Arthur plants are in parentheses.

b FZG, Pass Stage, DIN 51354 is not applicable to products manufactured in Colombia and El Salvador.

Minor variations in product typical test data are to be expected in normal manufacturing.



REGAL[®] R&O **ISOCLEAN[®]** CERTIFIED LUBRICANT 22, 32, 46, 68, 100, 115, 150, 220, 320, 460, 680

PRODUCT DESCRIPTION

Regal[®] R&O ISOCLEAN[®] Certified Lubricants are turbine oils designed to give outstanding performance in steam and hydroelectric turbines. Chevron



ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Regal R&O ISOCLEAN Certified Lubricants deliver value through:

- Ready to use Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- Flexibility ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- OE fluid cleanliness requirements -Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Long lubricant life provided by excellent thermal and oxidation stability. Formulated with an ashless, zinc-free formulation.
- Excellent demulsibility helps ensure good lubricant film strength and minimal wear through quick water separation.
- Excellent air release in turbine oil reservoir systems by the foam inhibitor hastening the release of foam and entrained air.

- Rust protection of metal surfaces due to the use of an effective rust and corrosion inhibitor.
- Environmental benefits All grades are ashless. This facilitates reclaiming and recycling of the used oils.

FEATURES

Regal R&O ISOCLEAN Certified Lubricants provide rust protection, oxidation inhibition, and foam suppression.

They pass the Fresh Water Corrosion Test (ASTM D665, Procedure A), and the severe Synthetic Sea Water Rust Test (ASTM D665, Procedure B).

The thermal and oxidation stability of these lubricants, due to their high level of refinement, has been further enhanced by their unique ashless, zinc-free formulation. The high thermal and oxidation stability help protect against oxidation deposit formation or the generation of acidic material.

Regal R&O ISOCLEAN Certified Lubricants have very good demulsibility characteristics allowing quick release of moisture.

Regal R&O ISOCLEAN Certified Lubricants minimize entrained air which otherwise could result in low lubricant film strength between moving parts and pump cavitation.

1 December 2020

IO-185 ISOCLEAN

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

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APPLICATIONS

Regal[®] R&O ISOCLEAN[®] Certified Lubricants ISO 32 through ISO 150 are recommended for use in most electric motor bearings, air compressors, gears, hydroelectric turbines, steam turbines, marine turbines, and non-heavy duty hydraulic systems where OEM recommends R&O type oils (for heavy duty hydraulic systems, customers should consider Rando HD ISOCLEAN Certified Lubricants).

These products can also be used as a general purpose machine oil for shop use when R&O type oil is needed or is recommended. The multifunctional characteristics of Regal R&O type oils may allow them to replace other special application lubricants, which can result in reduced inventory and operating cost.

Regal R&O ISOCLEAN Certified Lubricant 32

- meets:
 - Alstom HTGD 90117
 - ASTM D4304 Type I, British Standard 489, and DIN 51515 standard organization requirements for new lubricants used in gas and steam turbines and auxiliary equipment
 - General Electric GEK 28143b, GEK 46506D
 - MAG Cincinnati, Cincinnati Machine P-38
 - Siemens TLV 901304

Regal R&O ISOCLEAN Certified Lubricant 46

- meets:
 - **Alstom** HTGD 90117
 - ASTM D4304 Type I, British Standard 489, and DIN 51515 standard organization requirements for new lubricants used in gas and steam turbines and auxiliary equipment
 - General Electric GEK 28143b
 - MAG Cincinnati, Cincinnati Machine P-55
 - Siemens TLV 901304

Regal R&O ISOCLEAN Certified Lubricant 68

- meets:
 - ASTM D4304 Type I, British Standard 489, and DIN 51515 standard organization requirements for new lubricants used in gas and steam turbines and auxiliary equipment
 - MAG Cincinnati, Cincinnati Machine P-54
- suitable for use in General Electric, Alstom, and Westinghouse hydroelectric turbines, land and

marine steam turbines, and associated reduction gears when OEM recommends R&O type oil

Regal R&O ISOCLEAN Certified Lubricant 100

- meets:
 - ASTM D4304 Type I, British Standard 489, and DIN 51515 standard organization requirements for new lubricants used in gas and steam turbines and auxiliary equipment
- suitable for use in General Electric, Alstom, and Westinghouse hydroelectric turbines, land and marine steam turbines, and associated reduction gears when OEM recommends R&O type oil

Regal R&O ISOCLEAN Certified Lubricants 115, 150, 220, 320, 460 & 680 meet:

- ANSI/AGMA 9005-F16-RO requirements
- DIN 51517/2 CL requirements
- MORGOIL Advanced specifications

Do not use Regal R&O in large and high temperature gas turbines. ${\sf GST}^{\textcircled{R}}$ Oils are recommended for these gas turbines.

Do not use Regal R&O ISOCLEAN Certified Lubricants 32, 46, or 68 in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not use in breathing air apparatus or medical equipment.

Note that finished lubricants may affect the adherence of applied protective coatings (such as paint). If this product is used where coating applications are performed, the coating manufacturer should be consulted regarding adequate surface preparation.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

	ASTM	115 ^a	22	32	46	68
Product Number		278051	278048	278034	278049	278035
<i>SDS/MSDS Number USA Canada Mexico</i>		23566 23567 23568	23566 23567 23568	23566 23567 23568	23566 23567 23568	23566 23567 23568
API Gravity ^b	D287	30.5(27.6)	34.2(32.1)	32.9(31.3)	31.7(30.2)	31.2(29.1)
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445	115 12.2	23.1 4.4	30.4 5.2	43.7 6.5	64.6 8.4
Viscosity, Saybolt SUS at 100°F SUS at 210°F	D445	602 68.5	120 41.2	157 43.7	226 48.0	335 54.5
Viscosity Index	D2270	96	102	100	98	99
Flash Point, °C(°F)	D92	278(532)	220(428)	222(432)	224(435)	245(473)
Pour Point, °C(°F)	D97	-15(+5)	-15(+5)	-30(-22)	-27(-17)	-24(-11)
Rust Test, Procedure B, 24 h	D665	Pass	Pass	Pass	Pass	Pass
Oxidation Stability ^b Hours to 2.0 mg KOH/g acid number Minutes to 25 psi	D943	_ (>2000) _	>6000 (>3000) >1000	>6000 (>3000) >900	>6000 (>3000) >900	>5500 (>2500) >900
pressure drop	D2272	(>400)	(>600)	(>600)	(>500)	(>400)
FZG, Pass Stage ^c , DIN 51354		_	_	10	10	10

a Available in the Midwest and East.

b Typical values for products from the "East of the Rockies" plants (Bayonne, Charleston, Cicero, Louisville, and Port Arthur) are in parentheses.

c FZG, Pass Stage, DIN 51354 is not applicable to products manufactured in Colombia and El Salvador.

Minor variations in product typical test data are to be expected in normal manufacturing.

	ASTM	100	150	220	320	460	680
Product Number		278050	278036	278052	278037	278053	278038
<i>SDS/MSDS Number USA Canada Mexico</i>		23566 23567 23568	23566 23567 23568	23566 23567 23568	48146 48160 48159	48146 48160 48159	48146 48160 48159
API Gravity ^a	D287	30.7(28.1)	29.8(27.1)	28.5(26.1)	27.5(25.4)	26.4	26.3
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445	95.0 10.8	143 14.2	220 19.0	304 23.2	460 31.3	646 39.6
Viscosity, Saybolt SUS at 100°F SUS at 210°F	D445	495 63.1	750 76.4	1163 96.8	1618 116	2463 152	3474 193
Viscosity Index	D2270	97	96	97	95	97	99
Flash Point, °C(°F)	D92	262(504)	284(543)	294(561)	298(568)	310(590)	312(594)
Pour Point, °C(°F)	D97	-15(+5)	-21(+5)	-18(+10)	-12(+10)	-12(+10)	-12(+10)
Rust Test, Procedure B, 24 h	D665	Pass	Pass	Pass	Pass	Pass	Pass
Oxidation Stability ^a Hours to 2.0 mg KOH/g acid number	D943	>5500 (>2000)	>3500 (>1500)	>2200 (>1200)	>1800 (>1100)	>900 (>900)	>900
Minutes to 25 psi pressure drop	D2272	>900 (>400)	>450	>425	>400	>275	>275
FZG, Pass Stage ^b , DIN 51354		10	_	_	_	_	_

a Typical values for products from the "East of the Rockies" plants (Bayonne, Charleston, Cicero, Louisville, and Port Arthur) are in parentheses.

b FZG, Pass Stage, DIN 51354 is not applicable to products manufactured in Colombia and El Salvador.

Minor variations in product typical test data are to be expected in normal manufacturing.



REGAL[®]SGT 22

PRODUCT DESCRIPTION

Regal[®] SGT 22 is designed for use in modified aviationtype gas turbines in non-aviation stationary applications such as in industrial power generation and in marine service.

CUSTOMER BENEFITS

Regal SGT 22 delivers value through:

- Long service life Excellent oxidation and thermal stability of the synthetic polyolester base fluid and special additive system helps resist oil breakdown under severe, high temperature, high load conditions. The low volatility of the synthetic ester helps minimize evaporative losses.
- **Minimal maintenance and downtime** Minimal coking tendency of the synthetic ester base fluid and additive system helps minimize deposit formation on bearings and other areas exposed to the heat of the hot gases. High load carrying capacity helps ensure excellent protection against wear. The oil is compatible with normal engine and accessory metallic construction materials and elastomeric sealing compounds.
- Excellent all-temperature performance Excellent viscosity-temperature characteristics of the synthetic ester help promote outstanding low temperature fluidity to facilitate starting at low temperatures, while helping to ensure that an effective lubricant film is always available under the most severe, high temperature conditions to protect critical components against wear.

FEATURES

Regal SGT 22 is a premium performance, synthetic polyol ester-based turbine lubricant for use in modified aviation-type gas turbines in stationary and marine service. A special additive system imparts excellent high temperature thermal and oxidation stability.

APPLICATIONS

Regal SGT 22 has well over 2.5 million fired hours with excellent performance. It is designed for



modified aviation-type gas turbines exposed to the most severe operating environment in non-aviation applications such as industrial power generation and marine propulsion.

Regal SGT 22 is approved for:

- U.S. Military Specification MIL-PRF-23699G, Class STD
- General Electric LM Series Aeroderivitive Turbines
- Siemens (Allison) 501K
- Siemens (Rolls Royce) Avon, Olympus, Tyne and Spey models
- Siemens (Rolls Royce) RB 211 Gas Turbines

Regal SGT 22 meets the requirements of:

• Turbomeca Makila TL

Regal SGT 22 is compatible with other lubricants approved under MIL-PRF-23699G. Regal SGT 22 is compatible with metals, paints, coatings and elastomers such as Viton, Teflon, fluorosilicone and Buna N (NBR).

Regal SGT 22 is not to be used in aircraft service. Regal SGT 22 is not recommended for gas turbines that require MIL-PRF-23699G, Class C/I (Corrosion Inhibiting) or HTS (High Thermal Stability).

Product(s) manufactured in USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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30 May 2024 IO-187

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Product Number	278016
SDS Number	37008
Viscosity, Kinematic cSt at -40°C cSt at 40°C cSt at 100°C	9,800 25.6 5.12
Operating Temperature °C(°F) Minimum Maximum	-40(-40) 204(400)
Flash Point, °C(°F)	270(518)
Pour Point, °C(°F)	-60(-76)
Acid number, mg KOH/g	0.16

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON SHINGLE OIL

PRODUCT DESCRIPTION

Chevron Shingle Oil is designed for use on shake roofs, log homes, wood siding, and fences.

CUSTOMER BENEFITS

Chevron Shingle Oil delivers value through:

- **Improved appearance** Helps maintain the structural strength and stability of the wood by reducing cupping, cracking, and splitting caused by cyclical exposure to sun and rain.
- Prolonged useful life Helps prolong wood's useful life by reducing the effects of weathering.
- Ability to retard aging Helps absorb into the wood and improves the appearance of shake roofs, log homes, wood siding, and fencing.

FEATURES

Chevron Shingle Oil is a straw colored, low viscosity oil designed for use as a shingle or shake dressing for shake roofs, wooden fencing, wood siding, and log homes.

Chevron Shingle Oil penetrates the wood surface to enhance or replace natural oils and resins leached out by cyclical exposure to sun and rain.

Although Chevron Shingle Oil retards the aging process, it will not renew wood that is already weather damaged.

APPLICATIONS

Loose dirt and debris should be removed before the oil is applied. The roof should be hosed with water 24 hours prior to application to lessen the possibility of over application. Alternatively, a licensed contractor can power wash the roof thereby removing weatherdamaged wood, allowing oil to absorb into new wood.

Chevron Shingle Oil may be applied by brushing or spraying. The typical application rate is 150-300 square feet per gallon. Application rate depends on the type of wood and the rate at which the oil saturates the wood.

Do not overapply — Over application may lead to shingle or shake "cupping" and the presence of oil in rainwater runoff.

Do not add color pigments — as they will lump and settle out.

Do not walk on treated surfaces — Chevron Shingle Oil is a petroleum oil and is slippery.

Do not use on flat surfaces, such as decks.

Properly licensed contractors may add certain chemicals, such as antifungal agents and other substances, to Chevron Shingle Oil. Be sure to find out what safety or health restrictions may apply to these additives.

To prevent possible damage to foliage:

- Avoid spraying in windy conditions
- Avoid spraying directly on plants

TYPICAL TEST DATA

Product Number	213304
SDS Number	4223
API Gravity	23.4
Viscosity, Kinematic cSt at 40°C cSt at 100°C	21.7 3.5
Volatile Organic Compound, g/L	130
Flash Point, COC, °C(°F)	183(361)
Pour Point, °C(°F)	-38(-36)
Color, ASTM	0.5

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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TEGRA[®] SYNTHETIC BARRIER FLUID 5 cSt, 17 cSt

PRODUCT DESCRIPTION

Tegra[®] Synthetic Barrier Fluid is used as a barrier fluid in dual mechanical seals found in pumps handling hydrocarbon liquids.

CUSTOMER BENEFITS

Tegra Synthetic Barrier Fluid delivers value through:

- Exceptional thermal and oxidation stability — Long fluid life in high temperature operation.
- Low coefficient of friction helps minimize the operating face temperature of the seal to prevent blistering of the carbon seal face.
- Excellent wear protection helps minimize surface wear that can lead to early seal failure.
- Protection in extreme conditions The barrier fluid's inhibition against rust and corrosion, foaming and oil oxidation provides excellent protection in extreme conditions.

FEATURES

Tegra Synthetic Barrier Fluid is formulated to perform as a barrier fluid in dual mechanical seals.

Manufactured from the highest quality polyalphaolefin base fluids, it helps provide protection against wear, oxidation, rust and corrosion, and foaming.

It has a low viscosity and excellent friction reducing ability. The fluid provides excellent low temperature fluidity and high temperature stability for performance over a wide temperature range.

Its light viscosity, high viscosity index, and friction reducing ability helps minimize high face wear and high operating face temperatures that can lead to blistering of carbon seal faces.

Tegra Synthetic Barrier Fluid's excellent oxidation stability, rust protection and foam inhibition helps

provide protection to the seal under extreme conditions or in corrosive environments.

APPLICATIONS

Tegra Synthetic Barrier Fluid is designed to meet the needs of a barrier fluid for dual mechanical seals per API Standard 682, *Shaft Sealing Systems for Centrifugal and Rotary Pumps*. Dual mechanical seals are used to control emissions of volatile air pollutants from industrial equipment. Leading seal manufacturers recommend the use of low viscosity synthetic fluids for extended seal life of API Standard 682 dual mechanical seals.

Tegra Synthetic Barrier Fluid is compatible with a wide range of:

- process liquids and does not contain impurities that could lead to catalyst poisoning should it enter the process stream.
- seal elastomers, including Buna N, nitrile, Neoprene, polyacrylate, fluorosilicone, Hypalon, and fluorocarbon.

Tegra Synthetic Barrier Fluid 17 cSt has a low Volatile Organic Compound (VOC) level (<10 g/liter by ASTM E1868), so that the barrier fluid itself will not be the source of volatile air pollutants in higher temperature applications.

Tegra Synthetic Barrier Fluid 5 cSt is suitable for use in low temperature applications.

Use of Tegra Synthetic Barrier Fluid will help provide very stable seal performance over a wide temperature range.

Tegra Synthetic Barrier Fluid helps maximize the life of the dual mechanical seal by minimizing the operating face temperature and surface wear.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

22 November 2022 IO-235

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	5 cSt	17 cSt
Product Number	210441	210448
SDS Number U.S. Canada Mexico Colombia	6952 30480 6952MEX 32735	6952 30480 6952MEX 32735
API Gravity	40.8	40.9
Viscosity, Kinematic cSt at 40°C cSt at 100°C	5.1 1.6	17.1 3.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	43.7 31.5	91.5 39.5
Viscosity Index	-	127
Flash Point, °C(°F)	164(327)	228(442)
Pour Point, °C(°F)	<-60 (<-76)	<-60 (<-76)

Minor variations in product typical test data are to be expected in normal manufacturing.



TEGRA[®] SYNTHETIC BARRIER FLUID ISOCLEAN[®] CERTIFIED LUBRICANT 17 cSt

PRODUCT DESCRIPTION

Tegra[®] Synthetic Barrier Fluid ISOCLEAN[®] Certified Lubricant is used as a barrier fluid in dual mechanical seals found in pumps handling



hydrocarbon liquids. Chevron ISOCLEAN Certified Lubricants have been certified to meet specified ISO Cleanliness standards at point of delivery using industry leading filtration and testing technology. ISOCLEAN Certified products are the first step for contamination control and maximizing component life.

CUSTOMER BENEFITS

Tegra Synthetic Barrier Fluid ISOCLEAN Certified Lubricant delivers value through:

- **Ready to use** Enables users to meet stringent original equipment manufacturers' cleanliness standards for fill lubricants.
- **Flexibility** ISO Cleanliness targets can be customized to fit your business application needs.
- Peace of mind Each delivery of Chevron ISOCLEAN Certified Lubricant includes an ISOCLEAN Certificate of Analysis.
- **OE fluid cleanliness requirements** Customized to meet specific equipment manufacturers' fluid cleanliness requirements.
- Exceptional thermal and oxidation stability - Long fluid life in high temperature operation.
- Low coefficient of friction helps minimize the operating face temperature of the seal to prevent blistering of the carbon seal face.
- Excellent wear protection helps minimize surface wear that can lead to early seal failure.
- Protection in extreme conditions The barrier fluid's inhibition against rust and corrosion, foaming

and oil oxidation provides excellent protection in extreme conditions.

FEATURES

Tegra Synthetic Barrier Fluid ISOCLEAN Certified Lubricant is formulated to perform as a barrier fluid in dual mechanical seals.

Manufactured from the highest quality polyalphaolefin base fluids, it helps provide protection against wear, oxidation, rust and corrosion, and foaming.

It has a low viscosity and excellent friction reducing ability. The fluid provides excellent low temperature fluidity and high temperature stability for performance over a wide temperature range.

Its light viscosity, high viscosity index, and friction reducing ability helps minimize high face wear and high operating face temperatures that can lead to blistering of carbon seal faces.

Tegra Synthetic Barrier Fluid ISOCLEAN Certified Lubricant's excellent oxidation stability, rust protection and foam inhibition helps provide protection to the seal under extreme conditions or in corrosive environments.

APPLICATIONS

Tegra Synthetic Barrier Fluid ISOCLEAN Certified Lubricant is designed to meet the needs of a barrier fluid for dual mechanical seals per API Standard 682, *Shaft Sealing Systems for Centrifugal and Rotary Pumps*. Dual mechanical seals are used to control emissions of volatile air pollutants from industrial equipment. Leading seal manufacturers recommend the use of low viscosity synthetic fluids for extended seal life of API Standard 682 dual mechanical seals.

Tegra Synthetic Barrier Fluid ISOCLEAN Certified Lubricant is compatible with a wide range of:

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

1 September 2023 IO-235 ISOCLEAN

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- process liquids and does not contain impurities that could lead to catalyst poisoning should it enter the process stream.
- seal elastomers, including Buna N, nitrile, Neoprene, polyacrylate, fluorosilicone, Hypalon, and fluorocarbon.

Tegra Synthetic Barrier Fluid 17 cSt ISOCLEAN Certified Lubricant has a low Volatile Organic Compound (VOC) level (<10 g/liter by ASTM E1868), so that the barrier fluid itself will not be the source of volatile air pollutants in higher temperature applications. Use of Tegra Synthetic Barrier Fluid ISOCLEAN Certified Lubricant will help provide very stable seal performance over a wide temperature range.

Tegra Synthetic Barrier Fluid ISOCLEAN Certified Lubricant helps maximize the life of the dual mechanical seal by minimizing the operating face temperature and surface wear.

Consult with your Chevron Lubricant Representative or Chevron ISOCLEAN Certified Lubricants Marketer to set specific ISO Cleanliness targets for your business application.

	17 cSt
Product Number	278096
<i>SDS Number U.S. Canada Mexico Colombia</i>	6952 30480 6952MEX 32735
API Gravity	40.9
Viscosity, Kinematic cSt at 40°C cSt at 100°C	17.1 3.9
Viscosity, Saybolt SUS at 100°F SUS at 210°F	91.5 39.5
Viscosity Index	127
Flash Point, °C(°F)	228(442)
Pour Point, °C(°F)	<-60 (<-76)

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON WAY LUBRICANT 32, 68, 220

PRODUCT DESCRIPTION

Chevron Way Lubricants are designed for use in the lubrication of slides and ways of machine tools.

CUSTOMER BENEFITS

Chevron Way Lubricants deliver value through:

- Excellent separation from metalworking coolants — The SKC (SKC Gleittechnik) coolant separation test showed excellent separation from a wide variety of commercial coolants.
- Excellent adhesion Stringiness agent minimizes leakage and helps control lubrication costs.
- Smooth tool motion Low coefficient of static friction minimizes the chances of "stick-slip" or jerky movement of machine tool sliding parts which have cast iron or plastic moving on cast iron.

FEATURES

Chevron Way Lubricants are high quality lubricants designed to help meet the critical lubrication demands for the slides and ways of machine tools.

Chevron Way Lubricants are formulated with high quality base stocks and an additive system that help provide extreme pressure and antiwear protection, foam suppression, thermal stability, and demulsification.

These lubricants help provide an unusual adhesive or tacky quality. Chevron Way Lubricants help minimize leakage and adhere to metal surfaces providing a tenacious lubricant film. Due to their adhesiveness, these oils form a tenacious film which helps resist being wiped away by the slowly moving parallel surfaces of the way or being washed away by cutting fluids. Chevron Way Lubricants are friction modified to meet the exacting lubrication demands for the slides and ways of machine tools. Their inherent low coefficient of static friction minimizes the chances of "stick-slip" or jerky motion of sliding parts on machine tools, which maximizes the operating efficiency of the tools and promotes smooth overall operation.

Chevron Way Lubricants are formulated to help provide excellent way oil separation from the metalworking coolant in the reservoir, minimizing the adverse affect of tramp oil on the coolant stability. Results may vary depending on the chemistry of the metalworking coolant used.

Their antiwear and extreme pressure properties help protect the sliding surfaces.

These oils help protect cast iron and bronze surfaces from rust and corrosion, and are resistant to oxidation to promote long lubricant life.

APPLICATIONS

Chevron Way Lubricants have proven excellence in the lubrication of ways in many types of machine tools, e.g. lathes, planers, shapers, drilling and tapping machines, etc., including those operating at high loads.

These oils perform well in the lubrication of lightly loaded enclosed gears and industrial plain and antifriction bearings. Additionally, their tacky quality makes these oils suitable for once-through applications, e.g. lubrication of chain drives.

Chevron Way lubricants meet the requirements of:

• MAG Cincinnati, Cincinnati Machine under their P-53 (ISO 32), P-47 (ISO 68), and P-50 (ISO 220) specifications for way lubricants.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

16 July 2015 IO-278

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ISO Grade	32	68	220
Product Number	277315	273110	273111
SDS Number	23581	23581	23581
AGMA Grade	0	2	5
API Gravity	32.9	31.0	28.5
Viscosity, Kinematic cSt at 40°C cSt at 100°C	33.6 5.8	64.6 8.6	209 18.8
Viscosity, Saybolt SUS at 100°F SUS at 210°F	173 45.7	334 55.2	1102 95.9
Viscosity Index	115	104	100
Flash Point, °C(°F)	220(428)	250(482)	264(507)
Pour Point, °C(°F)	-18(0)	-18(0)	-15(+5)

Minor variations in product typical test data are to be expected in normal manufacturing.



WAY OIL VISTAC[®] 68, 220

PRODUCT DESCRIPTION

Way Oils $\mathsf{Vistac}^{\texttt{R}}$ are designed for use in the lubrication of slides and ways of machine tools.

CUSTOMER BENEFITS

Way Oils Vistac deliver value through:

- Excellent adhesion Stringiness agent helps minimize leakage and helps control lubrication costs.
- **Oxidation stability** Resists deterioration from oxidation and promotes long service life.
- Smooth tool motion Low coefficient of static friction helps minimize stick-slip or jerky movement of sliding parts on machine tools.

FEATURES

Way Oils Vistac help provide extreme pressure and antiwear protection and have stringiness and oiliness characteristics. As indicated by part of the name, Vistac, these lubricants have an unusual adhesive or tacky quality.

Way Oils Vistac minimize leakage and adhere to metal surfaces providing a tenacious lubricant film.

Way Oils Vistac are formulated to meet the critical lubrication demands for the slides and ways of machine tools.

Their inherent low coefficient of static friction minimizes stick-slip or jerky motion of sliding parts on machine tools which maximize operating efficiency of the tools and promotes smooth overall operation.

Due to their adhesiveness, these oils form a tenacious film which resists being wiped away by the slowly moving parallel surfaces of the way or being washed away by cutting fluids.

Their antiwear and extreme pressure properties help protect the sliding surfaces.

These oils also help protect cast iron and bronze surfaces from rust and corrosion, and are resistant to oxidation to promote long lubricant life.

APPLICATIONS

Way Oils Vistac have proven excellence in the lubrication of ways in many types of machine tools, e.g., lathes, planers, shapers, drilling and tapping machines, etc., including those operating at high loads.

These oils can also be used to lubricate bearings found in slides and ways of machine tools.

Their tacky quality makes these oils suitable for oncethrough applications, e.g., lubrication of chain drives.

If contamination with soluble oils is a problem, Way Lubricants are recommended.

Way Oils Vistac meet the requirements of:

 MAG Cincinnati, Cincinnati Machine P-47 (ISO 68), P-50 (ISO 220) specifications for way lubricants

Way Oils Vistac are registered by **NSF** and are acceptable as a lubricant where there is no possibility of food contact (H2) in and around food processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements of appropriate use, ingredient review and labeling verification.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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15 July 2015 IO-280

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ISO Grade	68	220
Product Number	232511	232512
SDS Number	7459	7459
API Gravity	25.4	25.7
Viscosity, Kinematic cSt at 40°C cSt at 100°C	64.6 7.3	209 15.0
Viscosity, Saybolt SUS at 100°F SUS at 210°F	338 50.8	1121 79.9
Viscosity Index	61	60
Flash Point, °C(°F)	200(392)	234(453)
Pour Point, °C(°F)	-24(-11)	-15(+5)

Minor variations in product typical test data are to be expected in normal manufacturing.



FUEL ADDITIVES



TECHRON[®] CONCENTRATE PLUS Complete Fuel System Cleaner

PRODUCT DESCRIPTION

Techron[®] Concentrate Plus is a **Complete Fuel System Cleaner** that works in one tankful. It is formulated for gasoline powered passenger cars and light trucks, including carbureted, two-stroke, port fuel injected and direct injected engines.

CUSTOMER BENEFITS

Techron Concentrate Plus, Complete Fuel System Cleaner, is recommended by many major automakers, the world over. It is an *unsurpassed*, complete fuel system cleaner, that can help:

- Clean deposits from fuel injectors, carburetors, intake valves, and combustion chambers
- Cleans, restores, and protects the entire fuel system, including sulfur-contaminated fuel gauge sensors

One tankful of fuel treated with Techron Concentrate Plus, Complete Fuel System Cleaner, can help:

- Maximize fuel economy¹
- Restore lost power and performance
- Restore and protect operation of the fuel gauge sensor
- Minimize harmful exhaust emissions
- Relieve cold start problems
- Minimize deposit-related knock and ping
- Restore lost acceleration
- Remove deposits from two-stroke engines²

FEATURES

Techron Concentrate Plus, Complete Fuel System Cleaner, with its exclusive formula, is **unsurpassed** in cleaning the entire fuel system (fuel injectors, intake valves and combustion chambers) in one tankful. Its use can maximize fuel economy¹ and restore lost power, performance and acceleration.

Techron Concentrate Plus, Complete Fuel System Cleaner, is formulated with a proprietary deposit control additive which can clean sulfur corrosion, a possible cause of fuel gauge malfunction. Regular use can help prevent harmful sulfur components in gasoline from attacking sensitive electronic fuel sending units on some vehicles.

Techron Concentrate Plus, Complete Fuel System Cleaner, works in one tankful and is unbeatable at helping your engine achieve maximum performance and operate with the lowest possible harmful emissions. Also, by cleaning combustion chamber deposits, it can relieve cold start problems and minimize deposit-related knock and ping.

Techron Concentrate Plus, Complete Fuel System Cleaner, is fully compatible and protective in all commercially available ethanol blends (E10, E85, etc).

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

14 April 2015 FA-41

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¹ Restores lost fuel economy by removing harmful fuel injector and intake valve deposits.

² Treat fuel at 1 ounce per gallon (30 ml per 3.78 L).

APPLICATIONS

Techron[®] Concentrate Plus, Complete Fuel System Cleaner, is designed for gasoline carbureted or fuel injected spark ignition engines. To keep the entire fuel system clean, use Techron Concentrate Plus, Complete Fuel System Cleaner, every 3,000 miles (4,800 km) or at scheduled oil change intervals, not to exceed twice per oil change.

Recommended for use in:

- Spark ignition engines with gasoline, ethanol and gasoline/ethanol blends
- Direct injected gasoline engines (DISI)
- Gasoline hybrid vehicles

Suitable for use in:

- Gasoline two-stroke air-cooled engines (motorcycle or chainsaw)
- Gasoline two-stroke water-cooled engines (motorcycle or marine)
- Gasoline four-stroke lawnmower, motorcycle and marine engines

Will not harm catalytic converters and oxygen sensors.

Not recommended for diesel engines.

PRODUCT AND SDS NUMBERS

Product Number	266701
SDS Number	36726


TECHRON[®] D CONCENTRATE Diesel Fuel System Cleaner

PRODUCT DESCRIPTION

Techron[®] D Concentrate Diesel Fuel System Cleaner is an ultra-high performance, one-tank cleanup, diesel fuel system cleaner designed for use in diesel pickup truck and passenger car engines. Using state of the art detergent technology, this powerful, patented formulation offers superior deposit cleanup, control and engine protection. Its advanced chemistry promotes the efficient removal of harmful conventional nozzle deposits, as well as internal diesel injector deposits (IDID). It is effective in older engines and the latest generation common-rail diesel engines, and offers highly effective performance when used with conventional, renewable and biodiesel blend¹ diesel fuels.

CUSTOMER BENEFITS

Techron D Concentrate Diesel Fuel System Cleaner helps:

- Maximize and improve fuel economy up to 5.6% by restoring dirty fuel injectors to like-new condition in just one treatment
- Removal of the natural buildup of carbon deposits throughout the entire fuel system
- Clean internal diesel injector deposits (IDID), indirect injection (IDI) and high speed direct injection (HSDI) nozzle-coking deposits
- Restore lost engine power
- Improve engine responsiveness, drivability and engine noise reduction
- Boost cetane up to 5 points, improving combustion for reduced smog-producing emissions and improved cold starting
- Prevent fuel injector sticking and failure

FEATURES

Techron D Concentrate Diesel Fuel System Cleaner is uniquely designed to be a one-tank cleanup solution that will clean diesel injectors and keep them performing like new. It can be used with all types of diesel fuel, including ultra-low sulfur diesel, bio diesel, renewable diesel and bio diesel blends¹.

APPLICATIONS

One 20-oz. bottle of Techron D Concentrate Diesel Fuel System Cleaner treats up to 45 gallons of diesel fuel. Use every 3,000 miles or once per season. Not recommended for gasoline engines.

Techron D Concentrate Diesel Fuel System Cleaner:

- Will not harm after treatment devices such as Diesel Particulate Filters (DPFs)
- Complies with the federal low-sulfur content requirements for use in diesel motor vehicles
- Is effective in conventional, renwable, and biodiesel blend diesel¹ fuels
- Works with all types of diesel engines

Product(s) manufactured in the USA.

A Chevron company product

1 July 2024 FA-42

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¹ Compatible with biodiesel blends up to B20

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

TYPICAL TEST DATA

Product Number	266373
SDS Number USA Canada Mexico	42369 42377 42376
Viscosity, Kinematic mm ² /s at 40°C	3.0
Density at 15°C	0.854
Flash Point, PM, °C	69 (62)
Appearance	Clear, bright liquid



TECHRON[®] HIGH MILEAGE Fuel System Cleaner

PRODUCT DESCRIPTION

Techron[®] High Mileage Fuel System Cleaner is specially formulated to clean and protect classic cars and all vehicles with over 75,000 miles.

It is formulated for gasoline powered - modern and classic - passenger cars, light trucks, and SUVs, including carbureted, two stroke, and port fuel injected engines. It also stabilizes fuel for up to 24 months.

CUSTOMER BENEFITS

With regular use, Techron High Mileage Fuel System Cleaner helps:

- **Restore power and performance** Restores lost power and performance by removing gum, varnish, and other fuel system deposits.
- Maximize fuel economy Keeps engines clean, and protects from deposits that rob engine efficiency and reduce fuel economy.
- **Stabilize fuel** Stabilizes fuel for 24 months. Perfect for classic cars and vehicles with infrequent use.

FEATURES

Vehicles with higher mileage accumulation can suffer from the effects of age - including carbon build-up over time and corrosion in the fuel system - that can impact performance and increase maintenance costs. Techron High Mileage Fuel System Cleaner helps keep your engine humming, no matter how many roads your vehicle has traveled.

Techron High Mileage Fuel System Cleaner is fully compatible and protective in all commercially available ethanol blends (E10, E85, etc).

APPLICATIONS

Techron High Mileage Fuel System Cleaner is formulated for gasoline powered - modern and classic passenger cars, light trucks, and SUVs, including carbureted, two stroke, and port fuel injected engines. To keep the entire fuel system clean, use Techron High Mileage every 1,000 miles or as needed for your high mileage vehicle.¹ One 12oz bottle treats up to 21 gallons of gasoline.

Recommended for use in:

- Spark ignition engines with gasoline, ethanol and gasoline/ethanol blends
- Gasoline hybrid vehicles

Will not harm catalytic converters and oxygen sensors.

Not recommended for diesel engines.

Not for aviation.

PRODUCT AND SDS NUMBERS

Product Number	266711
SDS Number	48764

1 Do not exceed twelve 12oz. treatments between oil changes.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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1 January 2024 FA-45

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TECHRON[®] FUEL INJECTOR CLEANER

PRODUCT DESCRIPTION

Techron[®] Fuel Injector Cleaner is an aftermarket fuel additive designed to clean gasoline fuel injectors in one tankful.

CUSTOMER BENEFITS

Techron Fuel Injector Cleaner **cleans harmful deposits** from clogged fuel injectors and dirty carburetors in one tankful to **help maximize fuel economy**.

FEATURES

Engines that are sensitive or in severe service can have performance problems caused by fuel injector deposits. Techron Fuel Injector Cleaner with its exclusive Chevron Techron technology can remove deposits from clogged fuel injectors in one tankful. Fuel injector deposits at the injector tip can impact fuel flow, upsetting the air/fuel mixture. The symptoms of these deposits can be:

- Hesitation or stumble during acceleration
- Loss of power
- Increased emissions of hydrocarbons and carbon monoxide

Techron Fuel Injector Cleaner can clean up these deposits in one tankful to help restore lost fuel economy.

APPLICATIONS

Techron Fuel Injector Cleaner is designed for all carbureted, fuel injected spark ignition, and gasoline direct injection engines.

Safe to use every 1,000 miles or as needed to keep fuel injectors clean.

Suitable for use in two-stroke engines.

Will not harm catalytic converters and oxygen sensors.

Not recommended for diesel engines.

PRODUCT AND SDS NUMBERS

Product Number	266703
SDS Number	36730

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

1 September 2022 FA-50

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ANTIFREEZE/COOLANTS



DELO[®] ELC ANTIFREEZE/COOLANT

PRODUCT DESCRIPTION

Delo[®] ELC Antifreeze/Coolant products are single phase, ethylene glycol based NOAT (Nitrited Organic Additive Technology) products available in various dilutions that are based on patented aliphatic carboxylate corrosion inhibitor technology specifically formulated for heavy duty cooling system applications that require nitrite.

CUSTOMER BENEFITS

Delo ELC Antifreeze/Coolant products deliver value through:

- Managing Costs Helps eliminate the cost of using SCAs (supplemental coolant additives), regular testing and the manpower required to perform these tasks effectively eliminating those costs when compared to conventional or fully formulated coolants.
- Long Service Life Service life of 1,000,000 miles / 1,600,000 km on-road use / 15,000 hours off-highway use, or 8 years, of diesel engine coolant system protection when properly maintained.
- **Optimal Cooling System Operation** The silicate free formula improves heat transfer when compared to silicate containing formulations. Silicates deposits can reduce heat transfer and increase downtime due to over-heating.
- **Maximum Hardware Life** Maximum water pump life due to minimal water pump seal wear resulting from the silicate free formulation.
- Excellent Protection Effective, long term corrosion protection, even at elevated temperatures, of commonly found cooling system metals. Effective at protecting aluminum in high temperature applications.
- Variable Applications Recommended for use in on-road, off-road and stationary engine applications that call for an extended life, silicate and phosphate free formulation that contains nitrite and molybdate. Can be used in engines using

variable fuel types and variable emission control protocols. Check with your OEM for specific product application requirements.

- **Compatibility** Compatible with other coolant formulations and supplemental coolant additives. Chevron recommends that this product not be diluted by more than 25% with other coolant formulations. Dilution by more than 25% will reduce extended life performance.
- **Biodegradability** Biodegradable in its unused form.
- **Stability** Storage stable for a minimum of 8 years as purchased.

FEATURES

Delo ELC Antifreeze/Coolant products are heavy duty engine coolants that use a patented organic corrosion inhibitor technology called aliphatic carboxylates. Delo ELC is free of nitrates, borates, silicates, phosphates and amines. These products contain nitrites and molybdates for additional cylinder liner protection.

Delo ELC Antifreeze/Coolant products are recommended for use in a wide variety of cooling system applications including on-road, off-road and stationary engine applications. These products are also recommended in mixed fleet applications where heavy duty and light duty trucks are present. Please check your OEM's coolant recommendations.

Delo ELC Antifreeze/Coolant products do not require the addition of supplemental coolant additives to obtain their service life of 1,000,000 miles / 1,600,000 km / 15,000 hours, or 8 years, when properly maintained. Routine visual inspections, coolant top-off and annual laboratory testing are recommended to ensure maximum service life.

Delo ELC Antifreeze/Coolant products have been fully tested under the CAT EC-1 specification and have been found to meet all the chemical and performance requirements of this specification.

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

3 May 2024 COOL-40

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APPLICATIONS

Recommended applications for $\mathsf{Delo}^{(\!\!R\!)}\mathsf{ELC}$ Antifreeze/Coolant products:

- Heavy duty engines regardless of fuel type or environmental controls being used where the OEM recommends a silicate free, extended life coolant that contains nitrites¹
- Mixed fleets where both light duty and heavy duty trucks are present
- Stationary engine applications regardless of fuel type being used
- Marine cooling systems where freeze protection is needed and a nitrite containing coolant is recommended

Delo ELC Antifreeze/Coolants are approved for:

- **Cummins** CES 14439
- Deutz DQC CB-14

Delo ELC Antifreeze/Coolants meet the specifications of:

- ASTM D6210
- ASTM D3306
- Caterpillar EC-1
- Detroit Series 60 and DD15 engines per SVC BRO 0002
- Navistar B1 Type 3
- TMC RP 329, 302A, 351 (color)

Delo ELC Antifreeze/Coolants are recommended by Chevron for use in:

- **Caterpillar** Stationary Natural Gas Engines
- Cummins applications specifying CES 14603
- Cummins Westport ISX 12G and ISL G CNG engines
- Freightliner and Western Star Truck Diesel Engines
- GE Jenbacher Stationary Natural Gas Engines
- Hino Truck Diesel Engines
- Isuzu Truck Diesel Engines
- Kenworth and Peterbilt Truck Diesel Engines
- Kobelco Construction Equipment Diesel Engines
- Komatsu Construction Equipment Diesel Engines

- MTU 4000 Diesel Engines
- Navistar Truck Diesel Engines
- Scania and MAN Truck Diesel Engines
- Volvo and Mack Truck Diesel Engines
- Wärtsilä Stationary Diesel Engines
- Waukesha Stationary Natural Gas Engines
- White-Superior Stationary Natural Gas Engines

Note: It is recommended that this product not be diluted with other coolant formulations by more than 25% in order to maintain performance claims.

Delo ELC Antifreeze/Coolant products are backed by Chevron's Limited Product Warranty. Always check your original equipment manufacturer to determine the proper fluid for your equipment, its operating conditions, and maintenance practices.

PRODUCT DILUTION AND BOIL OVER RECOMMENDATIONS FOR DELO ELC ANTIFREEZE/COOLANT - CONCENTRATE

Boiling Protection, °F/°C	
(using a 15 lb pressure cap)	
50% 1:1 (1 part antifreeze/1 part water)	265/129
Freezing Protection, °F/°C	
40% 2:3 (2 parts antifreeze/3 parts water)	-12/-24
50% 1:1 (1 part antifreeze/1 part water)	-34/-37
60% 3:2 (3 parts antifreeze/2 parts water)	-62/-52

Notes

- Product concentrates should be agitated before use or dilution.
- Delo ELC Antifreeze/Coolant Premixed 50/50 should be used as purchased. No dilution is recommended.
- For maximum protection against freezing in extremely cold areas, a 60 percent solution of Delo ELC Antifreeze/Coolant - Concentrate (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent are not recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

¹ Some OEMs recommend the use of nitrite free coolants. Check with your OEM.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

PRODUCT REFERENCE

Note: Bitterant is a flavor aversive that may help reduce the accidental ingestion of this product. These products contain bitterant.

Product Number 227808 SDS Number USA 10652 MSDS Number Colombia 33059 Delo[®] ELC Antifreeze/Coolant - Concentrate

Product Number 227811 SDS Number USA 10673 MSDS Number Colombia 33053 Delo ELC Antifreeze/Coolant - Premixed 50/50

Product Number 275111 SDS Number USA 23721 Delo ELC Antifreeze/Coolant - Premixed 60/40

TYPICAL TEST DATA Delo ELC Antifreeze/Coolant - Concentrate

Appearance	Red
Specific gravity 15/15°C	1.130
Freezing point, °C ^a ASTM D1177	-37
pH ^b , ASTM D 1287	8.3
Reserve alkalinity ^c , ASTM D1121	6.0
Silicate, % ^d	None

a 50 vol % aqueous solution.

b 1:2 dilution with water.

c As received.

d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

Delo ELC Antifreeze/Coolant ASTM D1384 Glassware Corrosion Test

Delo ELC Antifreeze/Coolant ASTM D1384 Glassware Corrosion Test		
	ASTM Limit	Weight loss, mg
		per coupon ^a
Copper	10 max	2
Solder	30 max	0
Brass	10 max	-1
Steel	10 max	-1
Iron	10 max	-1
Aluminum	30 max	3

a Negative indicates net gain.

PH AND RA COMPARISON OF DELO ELC ANTIFREEZE/COOLANT VERSUS TRADI-TIONAL COOLANTS IS SHOWN BELOW:

	Delo ELC Antifreeze/ Coolant	Traditional Antifreeze/ Coolant
Typical pH	8.3	10.5
Typical RA ^a (mL)	6.0	12.0

a RA is defined as the amount in milliliters (mL), of 0.1 normal hydrochloric acid required to reduce the pH of 10 ml of antifreeze to 5.5.

Minor variations in product typical test data are to be expected in normal manufacturing.

HANDLING PRACTICES

The primary limiting factor in the shelf life of a coolant is silicate instability. Since silicate will eventually polymerize to silicate gel, silicate containing coolants have a shelf life of about 18 months. Delo ELC Antifreeze/Coolant is silicate-free and therefore can be stored for at least 8 years, provided the integrity of the container is maintained. Product should be agitated before use.



DELO[®] ELC ADVANCED ANTIFREEZE/COOLANT

PRODUCT DESCRIPTION

Delo[®] ELC Advanced Antifreeze/Coolant products have a patented formulation for protection, and compatibility with flux brazing residue present from the manufacturing process of today's aluminum heat exchangers. Delo ELC Advanced products are the next generation, ethylene glycol based NOAT (Nitrited Organic Additive Technology) products to provide excellent extended life coolant system protection in diesel, natural gas and CNG engines for both on- and off-road applications. It is available in Premixed 50/50 and concentrate.

CUSTOMER BENEFITS

Delo ELC Advanced Antifreeze/Coolant products deliver value through:

- Excellent Aluminum Protection Compatibility with CAB¹ brazed material and fast passivator properties. Effective at protecting aluminum in high temperature applications and eliminating nitrite depletion to provide optimal cooling system performance.
- **Better pH Stability** Unique inhibitor system neutralizes the drivers of pH shift in coolants.
- Improved Elastomer Compatibility Improved mix of inhibitors package
- Excellent Hardware Life Improved liner pitting performance than previous generation ELC coolants. Delo ELC Advanced shows significant improvement in surpassing the ASTM D 7583 John Deere coolant cavitation test.
- Managing Costs Helps eliminate the cost of using SCAs (supplemental coolant additives), regular testing and the manpower required to perform these tasks, effectively eliminating those costs when compared to conventional or fully formulated coolants.

- Long Service Life Service life of 1,500,000 miles / 2,400,000 km on-road use / 20,000 hours off-highway use, or 8 years.
- **Optimal Cooling System Operation** No gel or deposit formation. Silicates and other SCA deposits can reduce heat transfer and increase downtime due to over-heating.
- Variable Applications Recommended for use in on-road, off-road and stationary engine applications that call for an extended life, silicate and phosphate free formulation that contains nitrite and molybdate. Can be used in engines using variable fuel types and variable emission control protocols. Check with your OEM for specific product application requirements.
- **Compatibility** Compatible with other coolant formulations and supplemental coolant additives. Chevron recommends that this product not be diluted by more than 25% with other coolant formulations. Dilution by more than 25% will reduce extended life performance and other benefits.
- Environmentally Friendly Biodegradable in its unused form. Phosphate, borate, silicate, 2EHA and amine free.
- Stability Storage stable for 8 years.

FEATURES

Delo ELC Advanced contains a special formulation designed to improve compatibility with the industry changes to more CAB brazed aluminum components, more heat exchangers, and higher operating temperatures.

Delo ELC Advanced Antifreeze/Coolant products are heavy duty engine coolants that use an organic corrosion inhibitor technology called carboxylates. Delo ELC Advanced is free of borate, silicate, phosphate, amine and 2EHA. These products contain nitrites and molybdates for additional cylinder liner protection.

Product(s) manufactured in the USA and El Salvador.

A Chevron company product

15 July 2024 COOL-42

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¹ Controlled Atmosphere Brazing.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

Delo[®] ELC Advanced Antifreeze/Coolant products are recommended for use in a wide variety of cooling system applications, including on-road, off-road and stationary engine applications. These products are also recommended in mixed fleet applications where heavy duty and light duty trucks are present. Please check your OEM's coolant recommendations.

Delo ELC Advanced Antifreeze/Coolant products do not require the addition of supplemental coolant additives to obtain their service life of 1,500,000 miles / 2,400,000 km / 20,000 hours, or 8 years, when properly maintained. Routine inspections, coolant topoff and annual laboratory testing are recommended to ensure maximum service life.

Delo ELC Advanced Antifreeze/Coolant products were designed to exceed the CAT EC-1 performance requirements.

APPLICATIONS

Recommended applications for $\mathsf{Delo}^{\textcircled{R}}\mathsf{ELC}$ Advanced Antifreeze/Coolant products:

- Heavy duty engines regardless of fuel type or environmental controls being used where the OEM recommends a silicate free, extended life coolant that contains nitrites²
- Mixed fleets where both light duty and heavy duty trucks are present
- Stationary engine applications regardless of fuel type being used
- Marine cooling systems where freeze protection is needed and a nitrite containing coolant is recommended

Delo ELC Advanced Antifreeze/Coolants are approved for:

• Cummins CES 14439

Delo ELC Advanced Antifreeze/Coolant meets or exceeds the specifications of:

- ASTM D6210
- ASTM D3306
- Caterpillar EC-1
- Deutz DQC CB-14
- TMC RP 364, 351 (color)
- Phosphate-free requirement of European OEMs
- Silicate-free requirement of Japanese OEMs

Delo ELC Advanced Antifreeze/Coolants are recommended by Chevron for use in (always check OEM recommendations):

- Caterpillar Stationary Natural Gas Engines
- **Cummins** applications specifying CES 14603
- Cummins Westport ISX 12G and ISL G CNG engines
- **Detroit**[™] DD15, DD13, Series 60, MBE 4000, MBE 900 Engines
- Freightliner and Western Star Truck Diesel Engines
- **GE Jenbacher** Stationary Natural Gas Engines
- Hino Truck Diesel Engines
- Isuzu Truck Diesel Engines
- Kenworth and Peterbilt Truck Diesel Engines
- **Kobelco** Construction Equipment Diesel Engines
- **Komatsu** Construction Equipment Diesel Engines
- Mack MP8, MP7 Engines
- MTU 4000 Diesel Engines
- Navistar CEMS B1 Type 3
- PACCAR MX, MX13 Engines
- Scania and MAN Truck Diesel Engines
- Volvo and Mack Truck Diesel Engines
- Wärtsilä Stationary Diesel Engines
- Waukesha Stationary Natural Gas Engines
- White-Superior Stationary Natural Gas Engines

Note: It is recommended that Delo ELC Advanced Antifreeze/Coolant not be diluted with other coolant formulations by more than 25% in order to maintain performance claims.

² Some OEMs recommend the use of nitrite free coolants. Check with your OEM.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

Delo ELC Advanced Antifreeze/Coolant products are backed by Chevron's Limited Product Warranty. Always check with your original equipment manufacturer to determine the proper fluid for your equipment, its operating conditions, and maintenance practices.

PRODUCT DILUTION FOR BOIL OVER AND FREEZE POINT PROTECTION RECOMMENDATIONS FOR DELO[®] ELC ADVANCED ANTIFREEZE/COOLANT -CONCENTRATE

Boiling Protection, °F/°C	
(using a 15 lb pressure cap)	
50% 1:1 (1 part antifreeze/1 part water)	265/129
Freezing Protection, °F/°C	
40% 2:3 (2 parts antifreeze/3 parts water)	-12/-24
50% 1:1 (1 part antifreeze/1 part water)	-34/-37
60% 3:2 (3 parts antifreeze/2 parts water)	-62/-52

Notes

- Product concentrates should be agitated before use or dilution.
- Delo ELC Antifreeze/Coolant Premixed 50/50 should be used as purchased. No dilution is recommended.
- For maximum protection against freezing in extremely cold areas, a 60 percent solution of Delo ELC Advanced Antifreeze/Coolant - Concentrate (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent are not recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

PRODUCT REFERENCE

Note: Bitterant is a flavor aversive that may help reduce the accidental ingestion of this product. These products contain bitterant.

Delo ELC Advanced Antifreeze/Coolant - Concentrate Product Number 227818 SDS Number USA 49252 SDS Number Canada 49254 SDS Number Mexico 49253 SDS Number El Salvador 49256

Delo ELC Advanced Antifreeze/Coolant - Premixed 50/50 Product Number 227819 SDS Number USA 49262 SDS Number Canada 49263 SDS Number Mexico 49264 SDS Number El Salvador 49266

TYPICAL TEST DATA

Delo ELC Advanced Antifreeze/Coolant -Concentrate

Appearance	Red
Specific gravity 15/15°C	1.126
Freezing point, °C ^a ASTM D1177	-37
pH ^b , ASTM D 1287	8.4
Reserve alkalinity ^c , ASTM D1121	3.6
Silicate, % ^d	None

a 50 vol % aqueous solution.

b 1:2 dilution with water.

c As received.

d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

Delo ELC Advanced Antifreeze/Coolant ASTM D1384 Glassware Corrosion Test

Delo ELC Advanced Antifreeze/Coolant ASTM D1384 Glassware Corrosion Test		
	ASTM Limit	Weight loss, mg
		per coupon
Copper	10 max	2
Solder	30 max	2
Brass	10 max	1
Steel	10 max	1
Iron	10 max	0
Aluminum	30 max	6

Delo ELC Advanced Extended Life Prediluted 50/50 Antifreeze/Coolant ASTM D4340 Aluminum Hot Surface Corrosion Test

Delo ELC Advanced Extended Life Prediluted 50/50 Antifreeze/Coolant ASTM D4340 Aluminum Hot Surface Corrosion Test		
	ASTM Limit	Weight loss, mg

Delo ELC Advanced Extended Life Prediluted 50/50 Antifreeze/Coolant ASTM D2570 Simulated Service Corrosion Test

1.0

0.4

Aluminum

Delo ELC Advanced Extended Life Prediluted 50/50 Antifreeze/Coolant ASTM D2570 Simulated Service Corrosion Test		
	ASTM Limit	Weight loss, mg
		per coupon ^a
Copper	20 max	8
Solder	60 max	3
Brass	20 max	8
Steel	20 max	0
Iron	20 max	-1
Aluminum	60 max	3

a Negative indicates net gain.

t HANDLING PRACTICES t The primary limiting factor in the shelf life of a coolant

is silicate instability. Since silicate will eventually polymerize to silicate gel, silicate containing coolants have a shelf life of about 18 months. Delo ELC Advanced Antifreeze/Coolant has a shelf life of 8 years, provided the integrity of the container is maintained. Product should be agitated before use.



DELO[®] ELC PG ANTIFREEZE/COOLANT

PRODUCT DESCRIPTION

Delo[®] ELC PG Antifreeze/Coolants are single phase, propylene glycol type products based on Chevron's patented aliphatic carboxylate inhibitor system with nitrite and molybdate added and are available as a concentrate or a 50/50 pre-dilute.

CUSTOMER BENEFITS

Delo ELC PG Antifreeze/Coolants deliver value through:

- **Improved economics** Eliminates the cost of using SCAs (supplemental coolant additives), regular testing and the manpower required to perform these tasks effectively eliminating those costs when compared to conventional of fully formulated coolants.
- Long Service Life 750,000 miles/1,200,000 km on-road use (8 years or 12,000 hours off-highway use).
- Improved cooling system operation The silicate free formula improves heat transfer compared to silicate containing formulations. Silicate deposits can reduce heat transfer and increase downtime due to over-heating.
- **Improved Hardware Life** Improved water pump life due to reduced water pump seal wear resulting from silicate free formulation.
- Excellent Protection Effective, long term corrosion protection, even at elevated temperatures, of commonly found cooling system metals. Effective at protecting aluminum in high temperature applications.

- Variable Applications Recommended for use in on-road, off-road and stationary engine applications that recommend a PG based extended life, silicate and phosphate free coolant containing nitrites. Can be used in engines using variable fuel types and variable emission control protocols.¹ Check with your OEM for specific product application requirements.
- **Compatibility** Compatible with other coolant formulations and supplemental coolant additives. Mixing of ethylene glycol and propylene glycol based coolant/antifreeze products is not recommended. Chevron recommends that this product not be diluted by more than 25% with other coolant formulations. Dilution by more than 25% will reduce extended life properties.
- **Biodegradability** Readily biodegradable in its unused form.
- Less Toxic Uses a propylene glycol base that is less acutely toxic than ethylene glycol.
- **Stability** Storage stable for a minimum of 8 years as purchased.

FEATURES

Delo ELC PG Antifreeze/Coolants are heavy duty engine coolants that contains a patented organic corrosion inhibitor technology called aliphatic carboxylates. Delo ELC PG Antifreeze/Coolant is free of nitrates, borates, silicates, phosphates and amines. These products contain nitrites and molybdates for additional cylinder liner protection.

Delo ELC PG Antifreeze/Coolants are recommended for use in a wide variety of cooling system applications including on-road, off-road and stationary engine applications.

1 Some OEMs recommend the use of nitrite free coolants. Some OEMs also do not recommend the use of PG based coolants. Check with your OEM for specific recommendations.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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3 May 2024 COOL-43

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Delo ELC PG Antifreeze/Coolants do not require the addition of supplemental coolant additives to obtain a service life of 750,000 miles/1,200,000 km/8 years/ 12,000 hours with correct top-up practices.

Delo ELC PG Antifreeze/Coolants meet the CAT EC-1 specification.

APPLICATIONS

Recommended applications for Delo ELC PG Antifreeze/ Coolants:

- Heavy duty engines regardless of fuel type or environmental controls being used where the OEM recommends an extended life, PG based, silicate and phosphate free coolant that contains nitrites²
- Mixed fleets where both light duty and heavy duty trucks are present
- Stationary engine applications regardless of fuel type being used
- Marine cooling systems where freeze protection is needed and a nitrite containing coolant is recommended
- Environments where freeze protection and a low acute toxicity base fluid is needed
- Meets or Exceeds: CAT EC-1, ASTM D6210

PRODUCT DILUTION AND BOIL OVER RECOMMENDATIONS FOR DELO ELC PG ANTIFREEZE/COOLANT - CONCENTRATE

Boiling Protection, °C/°F	
(using a 15 lb pressure cap)	
50% 1:1 (1 part antifreeze/1 part water)	126.7/260
Freezing Protection, °C/°F	
40% 2:3 (2 parts antifreeze/3 parts water)	-21.6/-7
50% 1:1 (1 part antifreeze/1 part water)	-32.7/-27
60% 3:2 (3 parts antifreeze/2 parts water)	-56.7/-70

Notes

- Product concentrates should be agitated before use or dilution.
- Prediluted 50/50 products should be used as purchased.
- For maximum protection against freezing in extremely cold areas, a 60 percent solution of Delo ELC PG Antifreeze/Coolant - Concentrate (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent are not recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

PRODUCT REFERENCE

Product Number 275110 SDS Number 23711 Delo ELC PG Antifreeze/Coolant - Concentrate

Product Number 275109 SDS Number 23715 Delo ELC PG Antifreeze/Coolant - Premixed 50/50

² Some OEMs recommend the use of nitrite free coolants. Some OEMs also do not recommend the use of PG based coolants. Check with your OEM for specific recommendations.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

TYPICAL TEST DATA

Delo[®] ELC PG Antifreeze/Coolant - Concentrate

	ASTM 3306 requirements	Method used	
Propylene glycol	Base		91.5% w/w glycol
Other glycols	5% w/w max.		0.5% max.
Inhibitor content			5% w/w
Water content	5% w/w max	ASTM D1123	4% w/w max
Ash content	5% w/w max	ASTM D1119	1.4% w/w
Nitrite content			1100
Color			Pink
Specific gravity, 15°C	1.030 to 1.065	ASTM D1122	
Specific gravity, 20°C		ASTM D1122	1.042
Equilibrium boiling point	> 152°C	ASTM D1120	165°C
Reserve alkalinity	report	ASTM D1121	6.3
Refractive index			1.431

Minor variations in product typical test data are to be expected in normal manufacturing.

Delo ELC PG Antifreeze/Coolant - Premixed 50/50

	ASTM 3306 requirements	Method used	
рН	7.5 to 11.0	ASTM D1287	8.5
Foaming properties at 25°C break time		ASTM D1881	50 ml 5 sec.
Foaming properties at 88°C break time	150 ml max.	ASTM D1881	50 ml 5 sec. typ.
Freezing protection			-33°C

Minor variations in product typical test data are to be expected in normal manufacturing.

HANDLING PRACTICES

The primary limiting factor in the shelf life of a coolant is silicate instability. Since silicate will eventually polymerize to silicate gel, silicate containing coolants have a shelf life of about 18 months. Delo ELC PG Antifreeze/Coolants are silicate-free and therefore can be stored for at least 8 years, provided the integrity of the container is maintained. Products should be agitated before use.



DELO[®]ELI CORROSION INHIBITOR

PRODUCT DESCRIPTION

Delo[®] ELI Corrosion Inhibitor is a water-based inhibitor, super concentrate, using a patented synergistic combination of aliphatic carboxylates that also contains nitrite and molybdate as secondary inhibitors.

CUSTOMER BENEFITS

Delo ELI Corrosion Inhibitor delivers value through:

- Long Service Life 600,000 miles, 1,000,000 km, 12,000 hours, 6 years in on-road and off-road engine applications and 32,000 hours or 8 years in stationary engines with yearly testing required.
- Corrosion Protection Extended life corrosion protection in aqueous solutions for engine metals, including aluminum, iron, steel, brass, copper and solder alloys.
- **Compatibility** Compatible with glycol-based engine coolants and other water based corrosion inhibitors. Dilution of this product by more than 25% with other inhibitor technologies will reduce inhibitor protection performance. Excellent elastomer compatibility.
- Wide Application Recommended for use in internal combustion engines regardless of fuel type where freeze point is not needed and the OEM recommends a nitrite containing, silicate free water based extended life coolant.¹ Delo ELI Corrosion Inhibitor has been successfully used in marine, onroad, off-road and stationary application engines. This product also can be used as an extended life heat transfer fluid in circulating systems.
- Excellent Protection Protects cooling system engine metals including aluminum against erosion, corrosion and cavitation. Silicate free formula shows improved water-pump life over silicate containing coolants.

- **Improved economics** Low depletion rates helps eliminate need for additional supplemental coolant additives. Delo ELI Corrosion Inhibitor is a super concentrate and should be diluted to 5.5%-10% with good quality water before use.
- **Heat Transfer** Non deposit forming formula helps maintain heat transfer efficiencies.
- Environmentally friendly At the recommended use rate (5.5 10wt% in water), Delo ELI Corrosion Inhibitor has low aquatic toxicity and no long-term effects on the environment. The extended life of the in-use product minimizes the need for frequent disposal, further contributing to the protection of the environment. Undiluted Delo ELI Corrosion Inhibitor concentrate could potentially be harmful to the environment if spilled or improperly disposed, so care should be taken to prevent such releases.
- **Stability** Shelf life of 1 year. Service life of 6 years minimum.

FEATURES

Delo ELI Corrosion Inhibitor is a water based, extended life corrosion inhibitor based on aliphatic carboxylates that is recommended for use in a wide variety of cooling systems in industrial, on-road, off-road and stationary applications.

Delo ELI Corrosion Inhibitor is recommended where complete cooling system protection is needed but where freeze protection is not required.

APPLICATIONS

Delo ELI Corrosion Inhibitor is recommended for use in industrial and commercial cooling systems where the OEM recommends a silicate free, nitrite containing water based corrosion inhibitor system.

Delo ELI Corrosion Inhibitor is recommended for use in **Caterpillar** and other engine OEM applications where a nitrite containing, silicate free extended life coolant is specified.

1 Check for specific OEM recommendations.

Product(s) manufactured in the USA.

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

Toxicological & environmental aspects

At the recommended use rate (5.5 - 10wt% in water), Delo[®] ELI Corrosion Inhibitor has low aquatic toxicity and no long-term effects on the environment. The extended life of the in-use product minimizes the need for frequent disposal, further contributing to the protection of the environment. Undiluted Delo ELI Corrosion Inhibitor concentrate could potentially be harmful to the environment if spilled or improperly disposed, so care should be taken to prevent such releases.

PRODUCT REFERENCE

Product Number 236541 SDS Number 38254 Delo ELI Corrosion Inhibitor - Concentrate

TYPICAL TEST DATA Delo ELI Corrosion Inhibitor

Technical Characteristics	Method	Delo ELI
Inhibitor content		50% w/w
Water content	ASTM D1123	50% w/w
Amine, phosphate, borate, silicate		None
Color		Red
Specific gravity, 20°C	ASTM D1122	1.08 typ.
pН	ASTM D1287	8.3 typ.
Storage stability		1 year
	Method	5% dilution
pН	ASTM D1287	8.3 typ.
Foaming properties at 25°C	ASTM D1881	55 ml typ.
break Time		3 sec typ.
Effect on non-metals	GME 60 255	no effect
Hard water stability	VW PV 1426	no precipitate

Minor variations in product typical test data are to be expected in normal manufacturing.

Delo ELI Corrosion Inhibitor ASTM D1384 Glassware Corrosion Test

	ASTM D3306 (max)	5% Delo ELI Weight loss, mg per coupon ^a
Copper	10 max	1.6
Solder	30 max	-0.3
Brass	10 max	1.7
Steel	10 max	0.2
Cast Iron	10 max	1.5
Aluminum	30 max	4.6

a Weight loss AFTER chemical cleaning. All weight losses are in mg/coupon. Weight gain is indicated by a "-" sign.

HANDLING PRACTICES

Delo ELI Corrosion Inhibitor is a water based product and will freeze. This product is not combustible. It is recommended that this product be stored indoors to prevent freezing. If freezing occurs product should be defrosted and agitated before use.



DELO[®] XLC ANTIFREEZE/COOLANT

PRODUCT DESCRIPTION

Delo[®] XLC Antifreeze/Coolant is a non-nitrited extended life OAT (Organic Additive Technology) formulation for heavy or light duty vehicles and other equipment. Delo XLC is formulated with an aliphatic carboxylate corrosion inhibitor system available as a concentrate and a premix 50/50.

CUSTOMER BENEFITS

Delo XLC Antifreeze/Coolant products deliver value through:

- Long Service Life Service life of 1,000,000 miles / 1,600,000 km / 15,000 hours or 8 years.
- Excellent Protection Excellent protection against pitting, corrosion and erosion even on hard to protect metals like aluminum.
- Minimized Maintenance and Related Costs Recommend Delo Coolant Maintenance Kit for routine coolant testing to help detect and eliminate cooling system issues.
- **Heat Transfer** Excellent heat transfer compared to silicate containing coolants.
- Hardware Life Maximum water pump life due to no silicate formula.
- Various Applications Excellent protection for mixed fleets where the OEM specifies a nitrite free coolant. Can be used in heavy duty engines using reduced emission protocols including or combining EGR, DPF, SCR and after-cooler technologies. This product is recommended for mixed fleet applications.¹
- Wide Temperature Applications Protection against winter freeze-up and summer boil-over.
- **Biodegradability** Biodegradable in its unused form.

- **Compatibility** Compatible with conventional antifreeze. Dilution with conventional antifreeze will reduce extended life benefits. Chevron recommends that this product not be diluted by more than 25% with other coolant formulations.
- **Stability** Can be stored for 8 years in sealed containers without any effect on the product quality or performance.

FEATURES

Delo XLC Antifreeze/Coolant is a heavy-duty, ethylene glycol based engine coolant which incorporates patented organic corrosion inhibitor technology called aliphatic carboxylates. The Delo XLC formula is free of nitrite, nitrate, borate, phosphate, silicate, and amines, and provides maximum protection of the six basic metal alloys found in most heat transfer systems. Delo XLC products do not contain phosphates or silicates which are known to contribute to hard water scale issues. Delo XLC promotes maximum water pump seal life by eliminating inorganic corrosion inhibitors. Delo XLC has a recommended service life of 1,000,000 miles / 1,600,000 km / 15,000 hours or 8 years. This product will not require the addition of supplementary coolant additives (SCA's) to achieve its recommended service life. Routine visual inspections, coolant top-off and annual laboratory testing are recommended to ensure maximum service life.

Note: These products are not to be used to protect the inside of potable water systems against freezing.

Product(s) manufactured in the USA.

A Chevron company product

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¹ Some OEM's require the use of nitrite in heavy duty engine applications.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

APPLICATIONS

Recommended applications for Delo XLC Antifreeze/ Coolant:

- Heavy duty engines regardless of fuel type or environmental controls being used where the OEM recommends a nitrite free, silicate free coolant.
- Mixed fleets where automobiles, light duty trucks and heavy duty trucks are being serviced and the OEM recommends a nitrite free, silicate free product.¹
- Recreational vehicles where a nitrite free, silicate free product is recommended.
- On-road, Off-road and Marine cooling system applications.

Delo[®] XLC Antifreeze/Coolants are approved for:

- Cummins CES 14439
- Cummins CES 14636
- Daimler Truck Fluid Release 29C110 (previously known as MB 325.3) (Concentrate)
- Daimler Truck Fluid Release 29D110 (previously known as MB 326.3) (Premixed 50/50)
- Detroit Diesel DFS93K217ELC
- Deutz DQC CB-14
- Komatsu KES 07.892
- MAN 324 Type SNF

Delo XLC Antifreeze/Coolants meet the specifications of:

- ASTM D3306
- ASTM D6210
- DAF 74002
- MTU MTL 5048
- TMC RP 364

Delo XLC Antifreeze/Coolants are recommended by Chevron for use in:

- Cummins applications specifying CES 14603
- GE Jenbacher Stationary Natural Gas Engines
- Hino Truck Diesel Engines
- Isuzu Truck Diesel Engines
- Kobelco Construction Equipment Diesel Engines
- MTU 2000/4000 Diesel Engines
- Navistar[™] MAXXFORCE Engines
- Scania Truck Diesel Engines

- Volvo Construction Equipment (VCE) Diesel Engines
- Volvo and Mack Truck Diesel Engines
- Wärtsilä Stationary Diesel Engines
- **Vestas** Wind Turbine Power Electronics External Coolant System
- European HD OEMs that require both Phosphate-free and Nitrite-free formulations
- Japanese HD OEMs that require Silicate-free formulations

It is recommended that this product not be diluted with other coolant formulations by more than 25% in order to maintain performance claims.

Delo XLC Antifreeze/Coolant products are backed by Chevron's Limited Product Warranty. Always check your original equipment manufacturer to determine the proper fluid for your equipment, its operating conditions, and maintenance practices.

PRODUCT DILUTION AND BOIL OVER PROTECTION RECOMMENDATIONS FOR DELO XLC ANTIFREEZE/COOLANT -CONCENTRATE

Boiling Protection, °F/°C	
(using a 15 lb pressure cap)	
50% 1:1 (1 part antifreeze/1 part water)	265/129
Freezing Protection, °F/°C	
40% 2:3 (2 parts antifreeze/3 parts water)	-12/-24
50% 1:1 (1 part antifreeze/1 part water)	-34/-37
60% 3:2 (3 parts antifreeze/2 parts water)	-62/-52

Notes

- Product concentrates should be agitated before use or dilution.
- Delo XLC Antifreeze/Coolant Premixed 50/50 should be used as purchased. No dilution is recommended.
- For maximum protection against freezing in extremely cold areas, a 60 percent solution of Delo XLC Antifreeze/Coolant - Concentrate (3 parts antifreeze/2 parts water) can be used.
 Concentrations greater than 67 percent are not recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

PRODUCT REFERENCE

Note: Bitterant is a flavor aversive that may help reduce the accidental ingestion of this product. These products contain bitterant.

Product Number 227076 SDS Number 38086 Delo XLC Antifreeze/Coolant - Concentrate

Product Number 227077 SDS Number 38123 Delo XLC Antifreeze/Coolant - Premixed 50/50

Delo[®] XLC Antifreeze/Coolant ASTM D1384 Glassware Corrosion Tests

Delo XLC Antifreeze/Coolant ASTM D1384 Glassware Corrosion Test 33% Glycol Solution		
	ASTM Limit	Weight loss, mg
		per coupon ^a
Copper	10 max	0
Solder	15 max	2
Brass	10 max	0
Steel	10 max	0
Iron	10 max	-1
Aluminum	20 max	2

a Negative indicates net gain.

Delo XLC Antifreeze/Coolant ASTM D1384 Glassware Corrosion Test 70% Glycol Solution

	ASTM Limit	Weight loss, mg per coupon ^a
Copper	10 max	3
Solder	15 max	1
Brass	10 max	3
Steel	10 max	1
Iron	10 max	1
Aluminum	20 max	-2

a Negative indicates net gain.

Delo XLC Antifreeze/Coolant ASTM D4340 Hot Surface Aluminum Test

Delo XLC Antifreeze/Coolant ASTM D4340 Hot Surface Aluminum Test		
	ASTM Limit	Weight loss, mg
		per coupon
Aluminum	1 max	.1

Delo XLC Antifreeze/Coolant ASTM D2809 Water Pump Cavitation Test

Delo XLC Antifreeze/Coolant ASTM D2809 Water Pump Cavitation Test		
	ASTM Limit	Performance Rating
	8 min	10

Delo XLC Antifreeze/Coolant ASTM D7583 JD Cavitation Test

Delo XLC Antifreeze/Coolant ASTM D7583 JD Cavitation Test		
	ASTM Limit	Number of Pits
	200 max	131

Delo XLC Antifreeze/Coolant Cummins Cavitation Test

Delo XLC Antifreeze/Coolant Cummins Proprietary Test		
	Requirement	Performance
	Pass	Pass

TYPICAL TEST DATA

DELO[®] XLC ANTIFREEZE/COOLANT - CONCENTRATE

Appearance	Pink
Specific gravity 15/15°C	1.130
Freezing point, °C ^a , ASTM D1177	-37
pH ^b , ASTM D1287	8.5
Reserve alkalinity ^c , ASTM D1121	6.0
Silicate, % ^d	None

a 50 vol % aqueous solution.

b 1:2 dilution with water.

c As received.

d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

The primary limiting factor in the shelf life of a coolant is silicate instability. Since silicate will eventually

HANDLING PRACTICES

is silicate instability. Since silicate will eventually polymerize to silicate gel, silicate containing coolants have a shelf life of about 18 months. Delo XLC Antifreeze/Coolant is silicate-free and can be stored for 8 years, provided the container remains sealed. Product should be agitated before use.



DELO[®]XLI CORROSION INHIBITOR

PRODUCT DESCRIPTION

 $\mathsf{Delo}^{\mathbb{R}}$ XLI Corrosion Inhibitor - Concentrate is a water based, low toxicity, environmentally friendly, nitrite free carboxylate inhibitor.

CUSTOMER BENEFITS

- Corrosion Protection Corrosion protection for engine metals, including aluminum, iron, copper and solder alloys.
- Wide Service Application Recommended as a coolant for all types of cooling systems not requiring nitrite and where freeze protection is not required.
- Long service life The corrosion inhibitors in Delo XLI Corrosion Inhibitor - Concentrate contain a synergistic combination of mono and di-carboxylates that provide superior protection for a minimum of 600,000 miles, 960,000 km, 12,000 hours, 6 years in on-road and off-road engine applications and 32,000 hours or 6 years in stationary engines. This product does not require regular inhibitor additions if proper maintenance practices are used.
- **Compatibility** Delo XLI Corrosion Inhibitor -Concentrate is a super concentrate and should be diluted to 5.5%-10% with good quality water before use. Compatible with glycol-based engine coolants but further dilution of the Delo XLI inhibitors by more than 25% with other corrosion inhibitor technologies will reduce the effectiveness of this product.
- **Heat Transfer** Silicate and phosphate free formulation does not contribute to deposit build up, as can be seen with phosphate and silicate containing coolants, which can help maintain heat transfer efficiency.
- Improved economics No regular inhibitor additions and longer service life means lower overall maintenance costs.

- Excellent toxicological and environmental aspects — based on low toxicity inhibitors this product is readily biodegradable. The extended service life characteristic of this product contributes to the protection of the environment due to less frequent fluid disposal.
- **Easy Testing** inhibitor concentration testing can be easily done using a brix refractometer.

FEATURES

Delo XLI Corrosion Inhibitor - Concentrate provides long life corrosion protection by using optimized and patented aliphatic carboxylate organic inhibitors that provide long lasting protection for cooling system metals and components including hard to protect aluminum.

Delo XLI helps maintain excellent heat transfer since it does not contain silicates and phosphates which can over time create deposits on heat transfer surfaces.

Delo XLI exhibits low depletion rates and does not require the addition of supplemental coolant additives with correct maintenance practices. Dilution of Delo XLI by more than 25% will reduce inhibitor performance.

Delo XLI protects against erosion, corrosion and cavitation of cooling system components.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 April 2015 COOL-49

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APPLICATIONS

Recommended for the following OEM use as a cooling water inhibitor:

- Detroit Diesel
- Deutz (TR0199-99-2091)
- GEC Alsthom Ruston
- Liebherr MD 1-36-130 (DCA)
- MaK
- MAN 248
- MAN Diesel (2-stroke and 4-stroke engines)
- **MB** 312.0
- **MTU** MTL 5049
- MWM
- Newman-Haas Racing
- Scania TI 2-98 0813 TB
- Sulzer Diesel ZBS0503.doc
- Ulstein Bergen
- Wärtsilä 32-9011
- Yanmar

 $\mathsf{Delo}^{\mathbb{R}}$ XLI is also recommended for use in any OEM equipment recommending a nitrite free, water based carboxylate based corrosion inhibitor.

Toxicological & environmental aspects

Delo XLI Corrosion Inhibitor - Concentrate is based on low toxicity inhibitors and is readily biodegradable. The extended service life characteristic of this product contributes to the protection of the environment due to less frequent fluid disposal. The toxicological and environmental properties of Delo XLI Corrosion Inhibitor - Concentrate was evaluated by an independent laboratory. The results are listed below:

- LD₅₀ >2000 mg/kg (oral toxicity according to OECD guideline No 401)
- LC₅₀ >1000 mg/l (fish toxicity according to OECD guideline No 203)
- Biodegradability: 92% (18 days) (test according to OECD guideline No 301E)

PRODUCT REFERENCE

Product Number 236540 SDS Number 38102 Delo XLI Corrosion Inhibitor - Concentrate

TYPICAL TEST DATA

$\ensuremath{\mathsf{Delo}}^{\ensuremath{\mathbb{R}}}$ XLI Corrosion Inhibitor - Concentrate

Technical Characteristics	Method	Delo XLI Corrosion Inhibitor - Concentrate
Inhibitor content		50% w/w
Water content	ASTM D1123	50% w/w
Nitrite, amine, phosphate, borate, silicate		Nil
Color		Green Flourescent
Specific gravity, 20°C	ASTM D1122	1.08 typ.
рН	ASTM D1287	8.3 typ.
Storage stability		12 months if stored in non-opaque containers, 36 months if stored in opaque containers.
	Method	5% dilution
рН	ASTM D1287	8.1 typ.
Effect on non-metals	GME 60 255	no effect
Hard water stability	VW PV 1426	no precipitate

Minor variations in product typical test data are to be expected in normal manufacturing.

Corrosion Protection

Table 1: Modified ASTM D1384 GlasswareCorrosion Tests - 300 ppm chloride

	ASTM D1384 (max)	5% Delo [®] XLI- Weight loss in mg/coupon ^a
Copper	10 max	0.6
Solder	30 max	4.5
Brass	10 max	0.6
Steel	10 max	0.0
Cast Iron	10 max	0.7
Aluminum	30 max	9.8
AlMn	/	4.8

a Weight loss AFTER chemical cleaning. All weight losses are in mg/coupon. Weight gain is indicated by a "-" sign.

Table 2: Modified MTU High TemperatureCorrosion Test (2000 W)

	Weight loss in mg/coupon ^a	
test duration 116 hrs	5% Delo XLI in D9 water hot coupon	5% Delo XLI in FVV-water hot coupon
Cast Iron	-1.3	-9.0
Aluminum SAE 329	9.3	-16.4
Aluminum AIMg Si1	1.8	40.7

a Weight loss AFTER chemical cleaning. All weight losses are in mg/coupon. Weight gain is indicated by a "-" sign.

HANDLING PRACTICES

Delo XLI - Concentrate has a shelf life of 12 months if stored in non-opaque containers, 36 months if stored in opaque containers and a service life of at least 6 years with correct maintenance practices. This product is water based and will freeze. It is recommended that this product should be stored where it will not freeze. This product is not combustible.



HAVOLINE[®] CONVENTIONAL ANTIFREEZE/ COOLANT

PRODUCT DESCRIPTION

Havoline[®] Conventional Antifreeze/Coolants are low silicate, ethylene glycol based multi-purpose coolants, available as concentrates or 50/50 pre-dilute products, designed for use in automotive engines where silicates are needed and with SCA addition in heavy-duty diesel engines.

CUSTOMER BENEFITS

Havoline Conventional Antifreeze/Coolants deliver value through:

- Wide Service Application These silicate containing products can be used in a wide variety of automotive vehicles where a low silicate product is required¹. It can also be used in heavy duty engines when SCA's are added. These products are also suitable for use in industrial internal combustion engines where an antifreeze/coolant is required to provide protection against freezing, boil over, and corrosion.
- Service Life 2 years or 50,000 miles (80,500 km) in automotive service or up to 250,000 miles (400,000 km) in heavy duty service when supplemental coolant additives are used and correct top up practices are followed.
- Protection Provides excellent protection to automotive cooling system components including aluminum.
- Wide temperature application Protects against winter freeze up and minimizes the chances of summer boil over.
- Antifoam properties Excellent antifoam package minimizes foaming potential.
 - 1 Some OEMs require the use of silicate free coolants. Always follow your OEM's recommendation.

• **Compatibility** — Compatible with heavy duty coolant additive filters and liquids. Compatible with most major brands of coolants. Note: This product is not an extended life coolant.

FEATURES

Havoline Conventional Antifreeze/Coolants are single phase, ethylene glycol based products blended with a premium quality additive package. They are low silicate coolants designed for use in both heavy-duty diesel and automotive engines, particularly those containing aluminum alloys. When used in Heavy Duty Diesel application, an initial dose of supplemental coolant additive is required. In addition, routine SCA application will also be required. Please follow engine OEM recommendations regarding coolant maintenance. These products provide antifoam properties, and rust and corrosion protection for aluminum, brass, copper, solder, steel and cast iron. They mix readily with any clean tap water and are compatible with cooling system filters and supplemental additives. Havoline Conventional Antifreeze/Coolant products are free of nitrites and amines.

Havoline Conventional Antifreeze/Coolants have a service life of 2 years/50,000 miles (80,500 km) in automotive applications and 200,000 to 250,000 miles (320,000 to 400,000 km) in heavy duty application when SCA's are added.

Note: These products are not to be used to protect the inside of potable water systems against freezing.

APPLICATIONS

Recommended applications for Havoline Conventional Antifreeze/Coolant products:

• Automobiles requiring a non-extended life, silicate containing coolant meeting ASTM D3306.

Product(s) manufactured in the USA.

A Chevron company product

1 April 2015 COOL-240

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

- Heavy duty cooling systems requiring a nonextended life, low silicate coolant that is compatible with supplemental coolant additives.
- Industrial cooling systems, recreational equipment and compressors where a low silicate, non-extended life formulation is recommended.

PRODUCT APPROVALS²

Havoline[®] Conventional Antifreeze/Coolants meet:

- ASTM D3306 for automotive service
- ASTM D4985 for heavy duty diesel service
- TMC of ATA RP-302A

Suitable for use in:²

- AAMVA
- General Motors prior to 1994
- FCAs (formerly known as Chrysler) prior to 1999
- Fords prior to 2001
- Most heavy duty cooling systems including John Deere, JI Case, Cummins, Freightliner, Mack and Kenworth/Peterbilt (Note: Use of supplemental additives may be required.)

PRODUCT DILUTION AND BOIL OVER PROTECTION RECOMMENDATIONS FOR HAVOLINE CONVENTIONAL ANTIFREEZE/COOLANT - CONCENTRATE

Boiling Protection, °F/°C (15 lb pressure cap) 50% (1 part antifreeze/1 part water)	265/129
Freezing Protection, °F/°C 40% (2 parts antifreeze/3 parts water) 50% (1 part antifreeze/1 part water) 60% (3 parts antifreeze/2 parts water)	-12/-24 -34/-37 -62/-52

Notes

- Product concentrates should be agitated before use or dilution.
- Havoline Conventional Antifreeze/Coolant -Premixed 50/50 should be used as purchased. No dilution is recommended.

2 Always be sure to check with engine OEM's coolant recommendations.

- For maximum protection against freezing in extremely cold areas, a 60 percent solution (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent are not recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

PRODUCT REFERENCE

Note: Bitterant is a flavor aversive that may help reduce the accidental ingestion of this product. These products contain bitterant.

Product Number 226110 SDS Number 10719 Havoline Conventional Antifreeze/Coolant -Concentrate

Product Number 226821 SDS Number 10723 Havoline Conventional Antifreeze/Coolant - Premixed 50/50

TYPICAL TEST DATA

HAVOLINE CONVENTIONAL ANTIFREEZE/COOLANT -CONCENTRATE

Appearance	Fluorescent green
Specific gravity 60/60°C	1.130
Freezing point, °C ^a , ASTM D1177	-37
pH ^b , ASTM D1287	10.5
Reserve alkalinity ^c , ASTM D1121	12.0
Silicate, % ^d	0.09

a 50 vol % aqueous solution.

b 1:2 dilution with water.

c As received.

d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

Havoline[®] Conventional Antifreeze/Coolant -Concentrate ASTM D1384 Glassware Corrosion Test

	ASTM Limit	Weight loss, mg per coupon ^a
Copper	10 max	3
Solder	30 max	-1
Brass	10 max	3
Steel	10 max	-1
Iron	10 max	1
Aluminum	30 max	4

a Negative indicates net gain.

HANDLING PRACTICES

In order to prevent the formation of silicate gel in storage containers Havoline Conventional Antifreeze/ Coolant products should not be stored longer than eighteen months, and should not be treated with supplemental coolant additives until it is ready to be used.



HAVOLINE[®] UNIVERSAL ANTIFREEZE/COOLANT

PRODUCT DESCRIPTION

Havoline[®] Universal products are single phase, ethylene glycol antifreeze/coolants based on patented aliphatic carboxylate corrosion inhibitor systems and are available as a concentrate and a 50/50 pre-dilute.

CUSTOMER BENEFITS

Havoline Universal Antifreeze/Coolants deliver value through:

- Wide service application Recommended use in Domestic, Asian and European automotive and light duty truck applications including newer hybrid vehicles.¹
- Long Service Life 150,000 miles/240,000 km/5 years of cooling system protection.
- Beneficial formulation Organic additive formulation that is free of silicate, nitrite, borate, phosphate, nitrate and amines and which promotes long service life.
- **Compatibility** Compatible with other extended life coolant formulations. Note: It is recommended that this product not be diluted by more than 25% with other coolant formulations.
- **Performance** Exceptional protection at high operating temperatures. Minimizes the occurrence of hard water scale.
- Wide temperature application Protects against winter freeze up and minimizes chances of summer boil over.
- Managed Inventory Costs Can be used in mixed fleet applications where both cars and light duty trucks are present from various manufacturers.¹
- Stability Storage stability for at least 8 years.

FEATURES

Havoline Universal Antifreeze/Coolants are designed for all makes and all models of automobile and light duty trucks regardless of fuel type built by American, European, or Asian OEMs.¹ This product is dyed yellow, which allows it to be used as top-up in any automobile or light duty truck application without changing the existing coolant color. Havoline Universal is recommended for use in general service applications where cooling system warranty maintenance is not required. Mixing of Havoline Universal with other products will reduce its extended life properties.

Note: These products are not to be used to protect the inside of potable water systems against freezing.

APPLICATIONS

Recommended Applications for Havoline Universal Antifreeze/Coolants:

- All makes and all models of automotive and light duty trucks regardless of fuel type¹
- Meets or exceeds: ASTM D3306
- It is recommended that this product not be diluted with other coolant formulations by more than 25% in order to maintain performance claims.

Product(s) manufactured in the USA.

A Chevron company product

1 April 2015 COOL-260

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¹ Some OEMs require the use of silicate containing coolants. Follow your OEM's recommendation.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

PRODUCT DILUTION AND BOIL OVER PROTECTION RECOMMENDATIONS FOR HAVOLINE[®] UNIVERSAL ANTIFREEZE/ COOLANT - CONCENTRATE

Boiling Protection, °F/°C	
(using a 15 lb pressure cap)	265/129
Freeding Drotestice 05/00	205/125
Preezing Protection, °F/°C	-12/-24
50% 1:1 (1 part antifreeze/1 part water)	-34/-37
60% 3:2 (3 parts antifreeze/2 parts water)	-62/-52

Notes

- Product concentrates should be agitated before use or dilution.
- Prediluted 50/50 products should be used as purchased.
- For optimum year round protection against freezing, boiling and corrosion, a 50 percent Havoline Universal (1 part antifreeze/1 part water) is recommended.
- For maximum protection against freezing in extremely cold areas, a 60 percent solution of Havoline Universal Antifreeze/Coolant - Concentrate (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent are not recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

PRODUCT REFERENCE

Note: Bitterant is a flavor aversive that may help reduce the accidental ingestion of this product. These products contain bitterant.

Product Number 227062 SDS Number 14875 Havoline Universal Antifreeze/Coolant - Concentrate

Product Number 227063 SDS Number 14879 Havoline Universal Antifreeze/Coolant - Premixed 50/50

TYPICAL TEST DATA HAVOLINE UNIVERSAL ANTIFREEZE/COOLANT -CONCENTRATE

Appearance	Light Yellow
Specific gravity 15/15°C	1.130
Freezing point, °C ^a , ASTM D1177	-37
pH ^b , ASTM D1287	8.3
Reserve alkalinity ^c , ASTM D1121	6.0
Silicate, % ^d	None

a 50 vol % aqueous solution.

b 1:2 dilution with water.

c As received.

d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

HANDLING PRACTICES

The primary limiting factor in the shelf life of a coolant is silicate instability. Since silicate will eventually polymerize to silicate gel, silicate containing coolants have a shelf life of about 18 months. Havoline Universal Antifreeze/Coolants are silicate-free and therefore can be stored for at least 8 years, provided the integrity of the container is maintained. Product should be agitated before use.



HAVOLINE[®] XTENDED LIFE ANTIFREEZE/COOLANT

PRODUCT DESCRIPTION

Havoline[®] Xtended Life Antifreeze/Coolant is a single phase, ethylene glycol antifreeze/coolants based on an aliphatic corrosion inhibitor system available as a concentrate and a premix 50/50.

CUSTOMER BENEFITS

Havoline Xtended Life Antifreeze/Coolant delivers value through:

- **OEM Approval** Meets the requirements of Ford WSS-M97B44-D, GM 6277, MB 325.3 and Volkswagen TL 774F specifications.
- Wide service application Recommended for use in Domestic, Asian and European automotive and passenger car diesel applications including newer hybrid vehicles.
- **Heat Transfer** Improved heat transfer when compared to silicate containing antifreeze/coolant products.
- Long Service Life 150,000 miles/240,000 km/5 years of cooling system protection.
- Beneficial formulation Organic additive formulation that is free of silicate, nitrite, borate, phosphate, nitrate and amines and which allows longer service life.
- Protection Outstanding high temperature protection of cooling systems metals including aluminum.
- Water Pump Performance Compatible with water pump seal materials and minimizes formation of abrasive solids which can help extend water pump life.
- **Performance** Superior protection at high operating temperatures. Reduces the occurrence of hard water scale.
- Wide temperature application Protects against winter freeze up and minimizes chances of summer boil over.

- Reduced Inventory Can be used in mixed fleet applications where both gasoline and passenger car diesel vehicles are present from various manufacturers.
- **Stability** Can be stored for approximately 8 years in sealed containers without any effect on the product quality or performance.

FEATURES

Havoline Xtended Life Antifreeze/Coolant is based on a patented aliphatic organic additive formulation that provides a service life of 150,000 miles/240,000 km/5 years and is approved under GM 6277 meeting the GM DEX-COOL[®] requirements.¹

The main corrosion inhibitors in Havoline Xtended Life Antifreeze/Coolant have been shown to remain above 95% of their original concentration with proper top off after 150,000 miles/240,000 km in automobiles. This allows much longer intervals between coolant changeouts.

Havoline Xtended Life Antifreeze/Coolant has been formulated without inhibitors such as silicates that have been shown to be abrasive to water pump seals. In comparison taxi field tests versus conventional coolants, Havoline Xtended Life Antifreeze/Coolant reduced the need to replace water pumps during the 100,000 mile/160,900 km test. In addition to fleet tests, this product has also been tested by a major manufacturer of water pump seals and has been found to be more compatible with the seals than other coolants previously tested.

Note: These products are not to be used to protect the inside of potable water systems against freezing.

APPLICATIONS

 $\mathsf{Havoline}^{\texttt{R}}$ Xtended Life Antifreeze/Coolant meets the specifications of:

Product(s) manufactured in the USA and Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

23 May 2016 COOL-270

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¹ DEX-COOL is a registered trademark of General Motors Corporation.

- ASTM D3306
- Ford WSS-M97B44-D
- **GM** 6277
- **MB** 325.3
- **VW** TL 774F

Havoline Xtended Life Antifreeze/Coolant is recommended for use in:

- General Motors vehicles post 1995
- Chrysler vehicles post 2001
- Ford Vehicles post 2003
- European gasoline and diesel automobiles
- Japanese gasoline automobiles, SUVs and Pickup trucks
- Korean gasoline automobiles and SUVs

It is recommended that this product not be diluted with other coolant formulations by more than 25% in order to maintain performance claims.

PRODUCT DILUTION AND BOIL OVER PROTECTION RECOMMENDATIONS FOR HAVOLINE XTENDED LIFE ANTIFREEZE/ COOLANT - CONCENTRATE

Boiling Protection, °F/°C	
(using a 15 lb pressure cap)	
50% 1:1 (1 part antifreeze/1 part water)	265/129
Freezing Protection, °F/°C	
40% 2:3 (2 parts antifreeze/3 parts water)	-12/-24
50% 1:1 (1 part antifreeze/1 part water)	-34/-37
60% 3:2 (3 parts antifreeze/2 parts water)	-62/-52

Notes

- Product concentrates should be mixed before use or dilution.
- Havoline Xtended Life Antifreeze/Coolant Premixed 50/50 should be used as purchased. No dilution is recommended.
- For maximum protection against freezing in extremely cold areas, a 60 percent solution (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent are not recommended.
- Always dispose of used coolant in accordance with all local, state, and federal guidelines.

PRODUCT REFERENCE

Note: Bitterant is a flavor aversive that may help reduce the accidental ingestion of this product. These products contain bitterant.

Product Number 236542 SDS Number USA 38248 MSDS Number Colombia 38264 Havoline Xtended Life Antifreeze/Coolant - Concentrate

Product Number 236543 SDS Number USA 38257 MSDS Number Colombia 38260 Havoline Xtended Life Antifreeze/Coolant - Premixed 50/50

TYPICAL TEST DATA

Havoline Xtended Life Antifreeze/Coolant

Appearance/Color	Orange
Specific gravity 15/15°C	1.130
Freezing point, °C ^a , ASTM D1177	-37
pH ^b , ASTM D1287	8.5
Reserve alkalinity ^c , ASTM D1121	6.0
Silicate, % ^d	None

a 50 vol % aqueous solution.

b 1:2 dilution with water.

c As received.

d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

Havoline[®] Xtended Life Antifreeze/Coolant ASTM D1384 Glassware Corrosion Test

	ASTM Limit	Weight loss, mg per coupon ^a
Copper	10 max	2
Solder	30 max	-2
Brass	10 max	2
Steel	10 max	-1
Iron	10 max	-3
Aluminum	30 max	4

a Negative indicates net gain.

HANDLING PRACTICES

The primary limiting factor in the shelf life of a coolant is silicate instability. Since silicate will eventually polymerize to silicate gel, traditional coolants have a shelf life of about 18 months. Havoline Xtended Life Antifreeze/Coolant is silicate-free and can be stored for at least 8 years, provided the container remains sealed.



HDAX[®] ELC ANTIFREEZE/COOLANT - PREMIXED 40/60

PRODUCT DESCRIPTION

HDAX[®] ELC Antifreeze/Coolant - Premixed 40/60 is formulated with Chevron's patented carboxylate corrosion inhibitor technology for use in heavy duty stationary natural gas engines that require improved heat transfer performance and long-life cooling system protection in a wide range of operating conditions.

CUSTOMER BENEFITS

HDAX ELC Antifreeze/Coolant - Premixed 40/60 delivers value through:

- Superb cooling system operation The silicate free formula provides improved heat transfer when compared to traditional stationary gas engine coolants that typically contain silicates. When compared to traditional 50/50 stationary gas engine coolants there is even better heat transfer performance:
 - Lab tests have measured a 7% improvement in thermal conductivity with this formula.
 - As a 40/60 blend, there is a 10% increase in thermal conductivity at operating temperature.
 - These combined benefits can provide up to 17% better heat transfer performance.

This improved heat transfer supports fewer high temperature engine derating events or shutdowns.

- **Phosphate Free Formulation** Elimination of phosphates helps reduce the occurrence of hard water and phosphate scale on heat transfer surfaces such as liners, hoses and radiators versus high phosphate-containing heat transfer fluids (typically containing 3000 ppm or greater of Phosphate).
- Long Service Life Up to 32,000 hours of stationary engine coolant life when following OEM coolant maintenance recommendations and maintaining a correct 40/60 dilution ratio. For 32,000 hour life operations, always ensure the system is topped-off with HDAX ELC Antifreeze/

Coolant - Premixed 40/60 and take coolant samples every 6 months to check for coolant dilution. Should dilution occur, add HDAX ELC Antifreeze/Coolant -Premixed 40/60 to maintain appropriate coolant system protection.

- Excellent Protection Effective, long term corrosion protection, even at elevated temperatures, of commonly found cooling system metals. Effective at protecting aluminum in high temperature applications and protecting against liner cavitation and pitting. Maximizes water pump seal life due to its silicate-free, phosphate-free formulation.
- Low Maintenance Fluid Recommended for use in all stationary gas engine applications. Excellent for operations where stationary engines are in remote locations, or are periodically moved from job site to job site and coolant maintenance is sporadic. Check with your OEM for specific product application and maintenance requirements and always monitor through periodic coolant analysis.
- Ready to Use Formulation No need to add water - product is ready to use. HDAX ELC Antifreeze/Coolant - Premixed 40/60 will provide freeze protection down to -12°F.
- **Compatibility** Compatible with other coolant formulations and supplemental coolant additives. Chevron recommends that this product not be diluted by more than 20% with other coolant formulations. Dilution by more than 20% will reduce extended life performance.
- **Biodegradability** Biodegradable in its unused form.
- **Stability** Storage stability for a minimum of 8 years as purchased.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

3 May 2024 COOL-56

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PERFORMANCE

HDAX[®] Extended Life Technology is being utilized today with stationary gas engine operators who report excellent long-life performance, superb cavitation protection, and low maintenance costs. It is used in various engine models including Caterpillar and Waukesha stationary gas engines in severe operating conditions.

Note: This product is not to be used to protect the inside of potable water systems against freezing.

APPLICATIONS

Meets or Exceeds:

• ASTM D6210 and D3306

Suitable for use in these stationary gas engines:

- Ajax
- Caterpillar
- Cooper-Bessemer
- MWM
- Wärtsilä
- Waukesha
- White Superior

PRODUCT REFERENCE

Note: Bitterant is a flavor aversive that may help reduce the accidental ingestion of this product. This product contains bitterant.

Product Number 227075 SDS Number 32023 HDAX ELC Antifreeze/Coolant - Premixed 40/60

TYPICAL TEST DATA HDAX ELC ANTIFREEZE/COOLANT - PREMIXED 40/60

Appearance	Red
Specific gravity 15/15°C	1.06
Freezing point, °F/°C ^a , ASTM D1177	-12/-24
Boiling Protection, °F/°C (using a 15 lb pressure cap)	262/128
pH ^a , ASTM D1287	8.3
Reserve alkalinity ^a , ASTM D1121	6.0

a 60 vol % aqueous solution.

Minor variations in product typical test data are to be expected in normal manufacturing.

Notes:

- HDAX ELC Antifreeze/Coolant Premixed 40/60 should be used as manufactured. No dilution is recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

HDAX ELC Antifreeze/Coolant - Premixed 40/60

ASTM D1384 Glassware Corrosion Test

Data generated on a 33% dilution as per the method.

ASTM D1384 Glassware Corrosion Test		
		Weight loss, mg
	ASTM Limit	per coupon ^a
Copper	10 max	0
Solder	30 max	3
Brass	10 max	0
Steel	10 max	0
Iron	10 max	-1
Aluminum	30 max	-3

a Negative indicates net gain.

HANDLING PRACTICES

HDAX ELC Antifreeze/Coolant - Premixed 40/60 has a storage shelf life of up to 8 years.



HDAX[®] PF ANTIFREEZE/COOLANT - PREMIXED 50/50

PRODUCT DESCRIPTION

HDAX[®] PF Antifreeze/Coolant - Premixed 50/50 is a single-phase, ethylene glycol based, low silicate coolant/antifreeze designed for use in natural gas engines and in heavy duty on-highway and off-highway diesel engines.

CUSTOMER BENEFITS

HDAX PF Antifreeze/Coolant - Premixed 50/50 delivers value through:

- **Ready to Use Formulation** Diluted with high quality deionized water this product provides freeze protection down to -34°F (-37°C).
- Fully Formulated Inhibitor Package Precharged with a quality inhibitor package this product does not require an initial dose of supplemental coolant additives (SCA). Maintenance doses of SCA's are required. The recommendation of the Original Engine Manufacturers (OEMs) should be followed when adding chemical additives (supplemental coolant additives).
- Phosphate Free Formulation Elimination of phosphates helps reduce the occurrence of hard water scale.
- **Compatibility** Compatible with commercially available supplemental coolant additives in liquid or filter form and with other low silicate, fully formulated, phosphate free coolants. Also compatible with commercially available test strips.
- Effective corrosion inhibitor package Provides protection for wet sleeve cylinder liners and cooling system metals including aluminum, brass, cast iron, steel, solder, and copper. The antifoam package also reduces the occurrence of foam in the cooling system.

- Wide temperature application Protects against winter freeze up and minimizes chances of summer boil over.
- Excellent Service Life Stationary engines service life is 5,000 hours/2.5 years. Note: Due to differences in how equipment runs and is used, it is recommended that regular inhibitor testing be performed.

FEATURES

HDAX PF Antifreeze/Coolant - Premixed 50/50 uses a low silicate technology and contains a complete supplemental coolant additive package that provides maximum protection for basic metal alloys found in most heat transfer systems. HDAX PF Antifreeze/ Coolant - Premixed 50/50 does not require an initial addition of supplemental coolant additives (SCAs), but does require maintenance additions of SCAs to maintain the correct additive balance. This product is phosphate free in order to reduce hard water scale development and contains nitrite for additional liner protection. This product is available in two colors, light purple (fuchsia) or green.

HDAX PF Antifreeze/Coolant - Premixed 50/50 is specifically blended for use in stationary engines using various fuel sources.

Note: This product is not to be used to protect the inside of potable water systems against freezing.

APPLICATIONS

Meets or Exceeds:

- ASTM D6210 and D3306
- TMC RP 329

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 April 2015 COOL-57

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Suitable for use in:

- White Superior
- Ajax
- Mack Truck
- International Truck
- PACCAR
- Caterpillar
- J.I. Case
- John Deere
- Cooper-Bessemer
- Waukesha

PRODUCT DILUTION AND BOIL OVER PROTECTION RECOMMENDATIONS FOR HDAX[®] PF ANTIFREEZE/COOLANT -PREMIXED 50/50

Boiling Protection, °F(°C) (15 lb pressure cap)	Freezing Protection, °F(°C)
265(129)	-34(-37)

Notes:

- HDAX PF Antifreeze/Coolant Premixed 50/50 should be used as manufactured. No dilution is recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

PRODUCT REFERENCE

Note: Bitterant is a flavor aversive that may help reduce the accidental ingestion of this product. These products contain bitterant.

Product Number 227072 SDS Number 38251 HDAX PF Antifreeze/Coolant - Premixed 50/50

Product Number 275112 SDS Number 37455 HDAX PF Green Antifreeze/Coolant - Premixed 50/50

TYPICAL TEST DATA

HDAX PF ANTIFREEZE/COOLANT - PREMIXED 50/50

Appearance	Light Purple or Green
Specific gravity 15/15°C	1.074
Freezing point, °F/°C ^a , ASTM D1177	-34/-37
pH ^a , ASTM D1287	10.5
Reserve alkalinity ^a , ASTM D1121	6.0
Silicate, % ^b	0.0125

a 50 vol % aqueous solution.

b As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

HDAX PF Antifreeze/Coolant - Premixed 50/50 ASTM D1384 Glassware Corrosion Test

ASTM D1384 Glassware Corrosion Test		
	ASTM Limit	Weight loss, mg
		per coupon ^a
Copper	10 max	0
Solder	30 max	3
Brass	10 max	0
Steel	10 max	0
Iron	10 max	-1
Aluminum	30 max	-3

a Negative indicates net gain.

HANDLING PRACTICES

HDAX PF Antifreeze/Coolant - Premixed 50/50 has a storage shelf life of 18 months. Product should be agitated before use.



CHEVRON HEAVY DUTY PF ANTIFREEZE/COOLANT

PRODUCT DESCRIPTION

Chevron Heavy Duty PF Antifreeze/Coolant is a singlephase, ethylene glycol based fully formulated, heavyduty diesel engine coolant/antifreeze that is available as a concentrate and a 50/50 pre-dilute.

CUSTOMER BENEFITS

Chevron Heavy Duty PF Antifreeze/Coolant delivers value through:

- Wide Service Application Suitable for gasoline, diesel, and natural gas powered automotive and industrial engines.
- **Beneficial Formulation** Formulated with nitrite and molybdate to protect against wet cylinder liner pitting. Outstanding corrosion protection for aluminum, brass, cast iron, steel, solder, and copper phosphate-free formula helps reduce hard water scale formation.
- **Ease of Maintenance** No initial requirement for a pre-charge dose of SCA and reduced SCA use during life of coolant with continued use of this product for top-up.
- **Compatibility** Formulation is compatible with other fully formulated coolants that are phosphate free, low silicate and that contain molybdate and nitrite for cylinder liner protection. Compatible with commercially available supplemental coolant additives in both filter and liquid form.
- Long Service Life Recommended service life of 200,000 miles to 250,000 miles (320,000 km to 400,000 km) with correct top-up and SCA additions.
- Wide Temperature applications Protects against winter freeze up and minimizes the chance of summer boil over.

 Multiple colors — Due to a variety of colors available for fully formulated coolant/antifreeze products in the marketplace we make these products available in a purple or green color.

FEATURES

Chevron Heavy Duty PF Antifreeze/Coolant products are recommended for use in on-road, off-road and stationary applications where a fully formulated, nonextended life coolant is recommended by the OEM.

Chevron Heavy Duty PF Antifreeze/Coolant products contain an effective inhibitor package that protects cooling system metals and components against erosion, corrosion and cavitation.

Chevron Heavy Duty PF Antifreeze/Coolant products are phosphate free which helps reduce the occurrence of hard water scale formation.

Note: This product is not to be used to protect the inside of potable water systems against freezing.

APPLICATIONS

Recommended applications for Chevron Heavy Duty PF Antifreeze/Coolant: $^{\rm 1}$

- On-road, Off-road and Stationary engines regardless of fuel type.
- Mixed fleet operations calling for a coolant antifreeze that meets ASTM D3306, TMC RP 329 or ASTM D6210

Chevron Heavy Duty PF Antifreeze/Coolant products meet or exceed the requirements of:

- ASTM D3306 and ASTM D6210
- **TMC** RP 329 and RP-302

 Follow your OEM's recommendations. Some OEM's recommend the use of extended life silicate free coolants.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 April 2015 COOL-55

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Chevron Heavy Duty PF Antifreeze/Coolant is recommended for use in most heavy duty and light duty engine applications including:

- Caterpillar
- Cummins
- Detroit Diesel
- Ford (requiring ESE-M97B44-A)
- Freightliner
- General Motors
- International
- J.I. Case JIC501
- John Deere
- Mack Truck
- **PACCAR** (Peterbilt and Kenworth)
- Volvo

PRODUCT DILUTION AND BOIL OVER PROTECTION RECOMMEDATIONS FOR CHEVRON HEAVY DUTY PF ANTIFREEZE/COOLANT - CONCENTRATE

Boiling Protection, °F/°C (15 lb pressure cap) 50% 1:1 (1 part antifreeze/1 part water)	265/129
Freezing Protection, °F/°C 40% 2:3 (2 parts antifreeze/3 parts water) 50% 1:1 (1 part antifreeze/1 part water) 60% 3:2 (3 parts antifreeze/2 parts water)	-12/-24 -34/-37 -62/-52

Notes:

- Product concentrates should be mixed before use or dilution.
- 50/50 Pre-diluted products should be used as purchased.
- For maximum protection against freezing in extremely cold areas, a 60 percent solution (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67percent are not recommended.
- Always dispose of used coolant/antifreeze in accordance with all local, state and federal regulations.

PRODUCT REFERENCE

Note: Bitterant is a flavor aversive that may help reduce the accidental ingestion of this product. These products contain bitterant.

Product Number 227043 SDS Number 12144 Chevron Heavy Duty PF Antifreeze/Coolant -Concentrate

Product Number 275114 SDS Number 23730 Chevron Heavy Duty PF Green Antifreeze/Coolant -Concentrate

Product Number 227045 SDS Number 12146 Chevron Heavy Duty PF Antifreeze/Coolant - Premixed 50/50

Product Number 275113 SDS Number 23726 Chevron Heavy Duty PF Green Antifreeze/Coolant -Premixed 50/50

TYPICAL TEST DATA

CHEVRON HEAVY DUTY PF ANTIFREEZE/COOLANT -CONCENTRATE

Appearance	Purple or Green
Specific gravity 15/15°C	1.12
Freezing point, °F/°C ^a , ASTM D1177	-34/-37
pH ^b , ASTM D1287	10.5
Reserve alkalinity ^c , ASTM D1121	8.5
Silicate, % ^d	0.025

a 50 vol % aqueous solution.

b 1:2 dilution with water.

c As received.

d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

Chevron Heavy Duty PF Antifreeze/Coolant ASTM D1384 Glassware Corrosion Test

	ASTM Limit	Weight loss, mg per coupon ^a
Copper	10 max	0
Solder	30 max	3
Brass	10 max	0
Steel	10 max	0
Iron	10 max	-1
Aluminum	30 max	-3

a Negative indicates net gain.

HANDLING PRACTICES

Product shelf life is 18 months. Product service life is 200,000 miles to 250,000 miles, 320,000 km to 400,000 km, 5000 hours or 2 $\frac{1}{2}$ years. Product should be agitated before use if it has been standing for an extended period.



CHEVRON HTF E-100

PRODUCT DESCRIPTION

Chevron HTF E-100 is an exceptional quality single phase, silicate free ethylene glycol concentrate used in heat transfer applications or as an industrial coolant/ antifreeze product.

CUSTOMER BENEFITS

Chevron HTF E-100 delivers value through:

- **Performance** The inhibitor system is designed to protect brass, copper, solder, steel, cast iron, aluminum, and other metals commonly found in industrial cooling and heating systems.
- Foam Inhibition A foam inhibitor is included to minimize foaming tendencies during service.
- Wide Service Applications Can be used in irrigation, power generating systems, oil field operations, line heaters and portable air compressors applications where cavitation protection is not needed. In addition, this product is recommended for use in snow melting systems, loading ramps, walkways, highways, airfield runways, and as a coolant in ice skating rinks and air conditioning systems. This product is not recommended for heavy duty internal combustion engines unless supplemental coolant additives are added. Not recommended for automotive applications.
- **Biodegradable** Readily biodegradable in its pure unused form.

FEATURES

- Chevron HTF E-100 is a multi-purpose heat transfer fluid blended with a quality additive package that is recommended for use in various applications where cavitation protection is not required.
- Chevron HTF E-100 provides antifoam properties, and rust and corrosion protection for brass, copper, solder, steel and cast iron.

- Chevron HTF E-100 mixes readily with clean tap water and is compatible with cooling system additive filters and liquid supplemental additives.
- Chevron HTF E-100 is borax free, silicate free, nitrite free and amine free.

Note: This product is not to be used to protect the inside of potable water systems against freezing.

APPLICATIONS

Chevron HTF E-100 is recommended for use in heat transfer and cooling systems where a silicate free, nitrite free ethylene glycol based coolant is recommended by the equipment manufacturer (OEM).

PRODUCT DILUTION AND BOIL OVER PROTECTION RECOMMENDATIONS FOR CHEVRON HTF E-100

Boiling Protection, °F/°C (15 lb pressure cap) 50% (1 part antifreeze/1 part water)	265/129
Freezing Protection, °F/°C 40% (2 parts antifreeze/3 parts water) 50% (1 part antifreeze/1 part water) 60% (3 parts antifreeze/2 parts water)	-12/-24 -34/-37 -62/-52

Chevron HTF E-100 coolant will require addition of coolant additives over the life of the fluid. Please follow the OEM's recommendations for coolant inhibitor level maintenance and treatment requirements.

Notes

• For optimum year round protection against freezing, boiling and corrosion, a 50 percent Chevron HTF E-100 solution (1 part antifreeze/1 part water) is recommended. For maximum protection against freezing in extremely cold areas a 60 percent solution (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent are not recommended.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

16 July 2015 COOL-60

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- Original Equipment Manufacturer (OEM) recommendations should be followed when adding supplemental coolant additives, or when changing out cooling systems.
- Always dispose of used coolant in accordance with local, state and federal guidelines.
- Product concentrates should be agitated before use or dilution.

PRODUCT REFERENCE

Product Number 228407 SDS Number 29607 Chevron HTF E-100

TYPICAL TEST DATA

Chevron HTF E-100

Appearance	Pink
Specific gravity 60/60°F	1.130
Freezing point, °F(°C) ^a , ASTM D1177	-34(-37)
pH ^b , ASTM D1287	10.5
Reserve alkalinity ^c , ASTM D1121	12.0
Silicate, % ^d	None

a 50 vol % aqueous solution.

b 1:2 dilution with water.

c As received.

d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

Chevron HTF E-100 ASTM D1384 Glassware Corrosion Test

	ASTM Limit	Weight loss, mg per coupon
Copper	10 max	3
Solder	30 max	2
Brass	10 max	4
Steel	10 max	0
Iron	10 max	1
Aluminum	30 max	6

HANDLING PRACTICES

Because this product is silicate free, Chevron HTF E-100 coolant can be stored at least 5 years without silicate drop-out or deposit concerns. Product should be agitated before use or dilution.



CHEVRON HTF P-150

PRODUCT DESCRIPTION

Chevron HTF P-150 is a superior quality single phase, silicate free, propylene glycol concentrate used in heat transfer applications or as an industrial coolant/ antifreeze product.

CUSTOMER BENEFITS

Chevron HTF P-150 delivers value through:

- **Performance** The inhibitor system is designed to protect brass, copper, solder, steel, cast iron, aluminum, and other metals commonly found in industrial cooling and heating systems.
- Foam Inhibition A foam inhibitor is included to minimize foaming tendencies during service.
- Wide Service Applications Can be used in irrigation, power generating systems, oil field operations, line heaters and portable air compressor applications where cavitation protection is not needed. In addition this product is recommended for use in snow melting systems, loading ramps, walkways, highways, airfield runways, and as a coolant in ice skating rinks and air conditioning systems. This product is not recommended for heavy duty internal combustion engines unless supplemental coolant additives are added. Not recommended for automotive applications.
- Low Toxicity This product is made with a propylene glycol base fluid which has very low acute toxicity in its unused form. Mixing this fluid with ethylene glycol fluids will increase toxicity and is not recommended.
- Lower Freeze point Propylene glycol based fluids provide improved freeze protection than ethylene glycol based fluids.
- **Biodegradable** Readily biodegradable in its pure unused form.

FEATURES

- Chevron HTF P-150 is a multi-purpose heat transfer fluid blended with a quality additive package that is recommended for use in various applications where cavitation protection is not required.
- Chevron HTF P-150 provides antifoam properties, and rust and corrosion protection for brass, copper, solder, steel and cast iron.
- Chevron HTF P-150 mixes readily with clean tap water and is compatible with cooling system additive filters and liquid supplemental additives.
- Chevron HTF P-150 is borax free, silicate free, nitrite free and amine free.

Note: This product may not to be used to protect the inside of potable water systems against freezing.

APPLICATIONS

Chevron HTF P-150 is recommended for use in heat transfer and cooling systems where a silicate free, nitrite free, propylene glycol based coolant is recommended by the equipment manufacturer (OEM).

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

16 July 2015 COOL-58

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PRODUCT DILUTION AND BOIL OVER PROTECTION RECOMMENDATIONS FOR CHEVRON HTF P-150

Boiling Protection, °C/°F (15 lb pressure cap) 50% (1 part antifreeze/1 part water)	129.4/265
Freezing Protection, °C/°F 40% (2 parts antifreeze/3 parts water) 50% (1 part antifreeze/1 part water) 60% (3 parts antifreeze/2 parts water)	-24.7/-12 -37.2/-34 -52.2/-62

Chevron HTF P-150 coolant, depending on how it is used, may require addition of coolant additives over the life of the fluid. These additives may increase toxicity of fluid. Please follow the OEM's recommendations for coolant inhibitor level maintenance and treatment requirements. Note additive manufactures warnings concerning toxicity.

Notes

- Product should be agitated before use or dilution.
- For optimum year round protection against freezing, boiling, and corrosion, a 50 percent Chevron HTF P-150 solution (1 part antifreeze/1 part water) is recommended.
- For maximum protection against freezing in extremely cold areas, a 60 percent solution (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent are not recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

PRODUCT REFERENCE

Product Number 275115 SDS Number 23731 Chevron HTF P-150

TYPICAL TEST DATA CHEVRON HTF P-150

Appearance	Pink
Specific gravity 60/60°F	1.130
Freezing point,°C(°F) ^a , ASTM D1177	-34
pH ^b , ASTM D1287	10.5
Reserve alkalinity ^c , ASTM D1121	12.0
Silicate, % ^d	None

a 50 vol % aqueous solution.

b 1:2 dilution with water.

c As received.

d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.

HANDLING PRACTICES

Because this product is silicate free, Chevron HTF P-150 coolant is storage stable for at least 5 years if container integrity is maintained. Product should be agitated before use or dilution.



CHEVRON HTF P-200

PRODUCT DESCRIPTION

Chevron HTF P-200 is a single phase, silicate free, propylene glycol (USP) based heat transfer fluid concentrate.

CUSTOMER BENEFITS

Chevron HTF P-200 delivers value through:

- Meeting the requirements of the U.S. Department of Agriculture (USDA) for use in the immersion or spray freezing equipment of packaged poultry or wrapped meat under the Federal Meat and Poultry Products Inspection Program.
- Silicate free formulation that reduces deposits on heat transfer surfaces.
- Providing corrosion protection to heat transfer metals including solder, steel, cast iron, aluminum, and other metals commonly found in industrial cooling and heating systems.
- Inclusion of a foam inhibitor to minimize foaming in use.
- Readily biodegradable in its pure unused form.

FEATURES

Chevron HTF P-200 is a multi-purpose heat transfer fluid formulated with USP propylene glycol.

The Chevron HTF P-200 formulation is free of nitrites, amines and silicates. Extensive laboratory simulated service and actual service tests have proven the effectiveness of this coolant in helping to prevent corrosion.

Chevron HTF P-200 is storage stable for at least 5 years and mixes easily with clean water.

Chevron HTF P-200 is colorless and contains no dyes.

Chevron HTF P-200 is a concentrate and must be mixed with water before use. A 50/50 dilution of Chevron HTF P-200 and water is recommended for maximum corrosion protection.

Product(s) manufactured in the USA. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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APPLICATIONS

- Chevron HTF P-200 is an inhibited propylene glycol (USP) based concentrate product meeting the requirements of the U.S. Department of Agriculture (USDA) for use in the immersion or spray freezing equipment of packaged poultry or wrapped meat under the Federal Meat and Poultry Products Inspection Program.
- Recommended for use in industrial cooling and heating systems that require an NSF approved product.

In non-USDA applications, Chevron HTF P-200 may be used in applications where incidental contact with food is possible. This product is not intended for use as a food component or additive.

• NSF registered HT1

1 September 2021 COOL-70

PRODUCT DILUTION AND BOIL OVER PROTECTION RECOMMENDATIONS FOR CHEVRON HTF P-200

Boiling Protection, °C/°F (15 lb pressure cap) 50% (1 part antifreeze/1 part water)	126.7/260
Freezing Protection, °C/°F 30% (3 parts antifreeze/7 parts water) 40% (2 parts antifreeze/3 parts water) 50% (1 parts antifreeze/1 part water) 60% (3 parts antifreeze/2 parts water)	-13.9/+7 -21.6/-7 -32.7/-27 -56.7/-70

Notes

- For optimum year round protection against freezing, boiling and corrosion, a 50 percent Chevron HTF P-200 solution (1 part antifreeze/1 part water) is recommended.
- For maximum protection against freezing in extremely cold areas, a 60 percent solution (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent are not recommended.
- Always dispose of used coolant in accordance with local, state and federal guidelines.

PRODUCT REFERENCE

Product Number 227047 SDS Number 12147 Chevron HTF P-200

TYPICAL TEST DATA

Appearance	Clear
Specific gravity 60/60°C	1.056
Freezing point, °C(°F) ^a , ASTM D1177	-33(-27)
pH ^b , ASTM D1287	10.0
Reserve alkalinity ^c , ASTM D1121	12.0
Silicate, % ^d	None

a 50 vol % aqueous solution.

- b 1:2 dilution with water.
- c As received.
- d As anhydrous alkali metasilicate.

Minor variations in product typical test data are to be expected in normal manufacturing.



CHEVRON SILICATE ADDITIVE

PRODUCT DESCRIPTION

Chevron Silicate Additive has been recommended by Cummins and Chevron for use in selected Cummins engines that have been factory filled with Delo[®] ELC Antifreeze/Coolant in North America. This silicate containing additive is not recommended for use in any engine manufactured by other engine makers such as Volvo, Mack, Detroit Diesel or Caterpillar.

APPLICATIONS

Chevron Silicate Additive is a silicate containing additive to be used only for treatment of Cummins QSK engines that have been factory filled with Delo ELC Antifreeze/Coolant.

The purpose of this additive is to potentially improve the seal life of the coolant passage seals in Cummins QSK engines. This product is not recommended for use in any engine not built by Cummins.

Chevron Silicate Additive is available in 8 oz containers and should be used based on cooling system capacity. Please check your owner's manual for the cooling system capacity of the vehicle being treated.

How to apply Chevron Silicate Additive:

Step 1: Allow engine to cool and open coolant overflow tank.

Step 2: Add the recommended dose of Chevron Silicate Additive to the coolant overflow tank based on the table below.

Treat rates for using Chevron Silicate Additive

in Cummins QSK engines			
Cooling System Capacity		Chevron Silicate Additive needed	
Gallons Liters		8 oz bottle	
0-6 gallons	0–23 liters	1/2 bottle	
6-8 gallons	24–34 liters	3/4 bottle	
9-11 gallons	35–45 liters	1 bottle	
12-16 gallons	46-61 liters	1 1/4 bottles	
25 gallons	95 liters	2 1/2 bottles	
50 gallons	190 liters	5 bottles	
100 gallons	379 liters	10 bottles	

PRODUCT REFERENCE

Product Number 227029 SDS Number 37412 Chevron Silicate Additive

TYPICAL TEST DATA

Appearance	Clear
Freeze point (as sold)	-34°F(-37°C)

15 July 2015 COOL-90

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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LIGHT PRODUCTS



CHEVRON AVIATION GASOLINES 100 and 100 Low Lead

FEATURES

Chevron Aviation Gasolines (Avgas) 100 and 100 Low Lead are manufactured to meet the requirements of ASTM D910, *Standard Specification for Aviation Gasolines*. They also may qualify for U.S. military uses, since the ASTM specification is now the basis for acceptance for such uses.

Chevron Avgas 100 is available only in Hawaii.

APPLICATIONS

Chevron Avgas 100 and 100 Low Lead are intended for use in light, personal aircraft, single- and twin-engined executive aircraft, crop dusters, two- and four-engined transports, and certain military light aircraft which require aviation gasoline.

Piston engine aircraft are generally certified for operation on a specific grade of aviation gasoline. The use of a higher grade may be acceptable when the specified grade is not available. However, for engines designed for Grade 80, continued use of Grade 100, with its higher lead content, may result in malfunctioning such as spark plug fouling. Engine manufacturer's recommendations should be followed.

Grade 100 Low Lead is approved by most engine manufacturers for use as an alternate fuel in aircraft engines originally designed for operation on Grade 80 when it is unavailable. Engine manufacturer's recommendations must be strictly adhered to. Check with the airframe or engine manufacturer for details.

PRODUCT AND SDS/MSDS NUMBERS

	Avgas 100	Avgas 100 Low Lead
Product Number	200205	200239
SDS/MSDS Number	2647	2647

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28 March 2012 LPA-10

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CHEVRON JET FUELS A, A-1, A-50

FEATURES

Chevron Jet Fuels A, A-1, and A-50 are kerosene-type aviation turbine fuels. They are manufactured to meet the requirements of ASTM D1655, Standard Specification for Aviation Turbine Fuels or Ministry of Defence: Defence Standard 91-91 Turbine Fuel, Aviation Kerosine Type, Jet A-1.

The freezing point specifications for these grades are as follows:

- Chevron Jet Fuel A has a maximum freezing point of -40°C (-40°F).
- Chevron Jet Fuel A-1 has a maximum freezing point of -47°C (-53°F).
- **Chevron Jet Fuel A-50** is offered only in Alaska where a lower freezing point is needed. It has a maximum freezing point of -46°C (-50°F).

PRODUCT AND SDS/MSDS NUMBERS

APPLICATIONS

Chevron Jet Fuels are recommended for use in all turbo-jet and turbo-prop powered aircraft used in commercial airline and general aviation service for the grade required by the manufacturer.

They may sometimes also be used in certain military aircraft when their use is approved for the application.

Chevron Jet Fuels are recommended in all stationary aircraft turbine conversions for standby power or cogeneration, for the grade required by the manufacturer, and all military nonaircraft uses where one of these fuels is specified.

	D1655 A	D1655 A-1	D1655 A-50	DS 91-91 A-1
Product Number	216103	216101	216100	235611
SDS/MSDS Number	0513	0513	0513	0513

27 March 2012 LPA-20

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CHEVRON REGULAR UNLEADED GASOLINE

CUSTOMER BENEFITS

Chevron Regular Unleaded Gasoline delivers value through:

- Area blending Provides top performance for seasonal and location changes.
- **Economical performance** for engines with nonpremium antiknock requirements.
- Extra value Chevron Regular Unleaded Gasoline, with the deposit control additive Techron[®], provides intake and fuel-injection system deposit control which helps keep exhaust emissions low and helps maximize engine performance.

FEATURES

Chevron Regular Unleaded Gasoline is a clear, lightyellow colored, regular-grade, unleaded gasoline.

It is composed of carefully blended components to satisfy the octane needs of most cars. Chevron Regular Unleaded Gasoline contains the Techron deposit control additive.

Chevron Regular Unleaded Gasoline meets all state and federal specifications for an unleaded gasoline.

FUNCTIONS

Chevron Regular Unleaded Gasoline meets the requirements of ASTM D4814, *Standard Specification for Automotive Spark-Ignition Engine Fuel*. It provides good antiknock performance without the addition of organometallic antiknock additives. It may contain up to 10 volume percent ethanol depending on geographic location and time of year. The (R+M)/2 octane rating is 87 minimum (may be slightly lower in some high elevation markets).

It provides the proper volatility for each geographical area, and time of year, to provide good cold starting and warmup characteristics, vapor-lock protection, and fuel economy.

It meets or exceeds industry specifications for oxidation stability and gum formation in storage.

Chevron Regular Unleaded Gasoline contains Chevron's proprietary deposit control additive, Techron, which provides unsurpassed intake system deposit control performance. The Techron additive is Chevron's proprietary gasoline additive that helps keep an engine's entire intake system clean, plus avoids contributing to excessive combustion chamber deposits like some other oil companies' additives. Chevron's gasolines with the Techron additive give unsurpassed performance in avoiding deposit-related problems.

Fuel injector and intake valve deposits can cause hesitation and stumbling, loss of power on acceleration, higher emissions and loss of mileage.

Use of Chevron gasolines with the Techron additive over the years will help cars avoid deposit-related performance deterioration, and will help cars avoid deposit-related increase in emissions.

23 April 2012 LPG-1

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APPLICATIONS

Chevron Regular Unleaded Gasoline is designed for use in most spark-ignition engines where the manufacturer specifies the use of an unleaded gasoline. Unleaded gasoline must be used in vehicles equipped with catalytic converters because lead poisons the catalyst and destroys its ability to reduce exhaust pollutants. It is also recommended for leaded fuel vehicles where the engine octane requirement and operating conditions permit the use of an unleaded gasoline.

Chevron Regular Unleaded Gasoline is satisfactory for use in most two-stroke cycle gasoline-powered engines where gasoline-oil mix is used, such as outboard motors, chain saws, scooters, etc., unless the manufacturer specifies leaded gasoline only.

CAUTION — **FOR MOTOR FUEL USE ONLY**. Do not use as a Pressure Appliance Fuel. This is especially critical in appliances that employ a "generator" system.

WARNING

PORTABLE CONTAINER FIRE HAZARD

Improper filling of portable gasoline containers creates danger of fire.

To fill a container:

- Place approved container on the ground away from vehicle or trailer. DO NOT fill any container that is inside a vehicle or on a truck/trailer bed.
- Keep nozzle in contact with the container while filling.
- Do not use a nozzle lock-open device.

It is unlawful and dangerous to dispense gasoline into unapproved or improperly labeled containers.



CHEVRON PLUS UNLEADED GASOLINE

CUSTOMER BENEFITS

Chevron Plus Unleaded Gasoline delivers value through:

- Area blending provides top performance for seasonal and location changes
- Economical performance for engines with nonpremium antiknock requirements
- **Extra value**. Chevron Plus Unleaded Gasoline, with deposit control additive Techron[®], provides intake and fuel-injection system deposit control which helps keep exhaust emissions low and helps maximize engine performance.

FEATURES

Chevron Plus Unleaded Gasoline is a clear, light-yellow colored, mid-grade, unleaded gasoline.

It provides enhanced antiknock performance with a minimum 89 (R+M)/2 octane rating (CAN BE slightly lower in SOME high elevation markets). Chevron Plus Unleaded Gasoline contains the Techron deposit control additive.

Chevron Plus Unleaded Gasoline meets all state and federal specifications for an unleaded gasoline.

FUNCTIONS

Chevron Plus Unleaded Gasoline meets the requirements of ASTM D4814, *Standard Specification for Automotive Spark-Ignition Engine Fuel*. It provides enhanced antiknock performance without the addition of organometallic or other antiknock additives. It may contain up to 10 volume percent ethanol depending on geographic location and time of year. The (R+M)/2 octane rating is 89 minimum (may be slightly lower in some high elevation markets).

It provides the proper volatility for each geographical area, and time of year, for good cold starting and warmup characteristics, vapor-lock protection, and fuel economy.

It meets or exceeds industry specifications for oxidation stability and gum formation in storage.

Chevron Plus Unleaded Gasoline contains Chevron's proprietary deposit control additive, Techron, which provides unsurpassed intake system deposit control performance. The Techron additive is Chevron's proprietary gasoline additive that helps keep an engine's entire intake system clean, plus avoids contributing to excessive combustion chamber deposits like some other oil companies' additives. Chevron's gasolines with the Techron additive give unsurpassed performance in avoiding deposit-related problems.

Fuel injector and intake valve deposits can cause hesitation and stumbling, loss of power on acceleration, higher emissions and loss of mileage.

Use of Chevron gasolines with the Techron additive over the years will help cars avoid deposit-related performance deterioration, and will help cars avoid deposit-related increase in emissions.

A **Chevron** company product

23 April 2012 LPG-2

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APPLICATIONS

Chevron Plus Unleaded Gasoline provides a higher octane than regular unleaded for those drivers who need a moderately higher octane fuel than regular unleaded, and is designed for use in spark-ignition engines where the manufacturer specifies the use of an unleaded fuel. Unleaded gasoline must be used in vehicles equipped with catalytic converters because lead poisons the catalyst and destroys its ability to reduce exhaust pollutants.

It also is recommended for leaded fuel vehicles where the engine octane requirement and operating conditions permit the use of an unleaded gasoline.

Chevron Plus Unleaded Gasoline is satisfactory for use in two-stroke cycle gasoline-powered engines where gasoline-oil mix is used, such as outboard motors, chain saws, scooters, etc., unless the manufacturer specifies leaded gasoline only.

CAUTION — **FOR MOTOR FUEL USE ONLY.** Do not use as a Pressure Appliance Fuel. This is especially critical in appliances that employ a "generator" system.

WARNING

PORTABLE CONTAINER FIRE HAZARD

Improper filling of portable gasoline containers creates danger of fire.

To fill a container:

- Place approved container on the ground away from vehicle or trailer. DO NOT fill any container that is inside a vehicle or on a truck/trailer bed.
- Keep nozzle in contact with the container while filling.
- Do not use a nozzle lock-open device.

It is unlawful and dangerous to dispense gasoline into unapproved or improperly labeled containers.



CHEVRON SUPREME UNLEADED GASOLINE

CUSTOMER BENEFITS

Chevron Supreme Unleaded Gasoline delivers value through:

- "Knock-free" performance for most properly adjusted high octane requirement engines or improved performance for most engines equipped with knock limiters that are activating using lower octane gasoline.
- Area blending provides top performance for seasonal and location changes.
- **Extra value** Chevron Supreme Unleaded Gasoline, with deposit control additive Techron[®], provides intake and fuel injection system deposit control which helps keep exhaust emissions low and helps maximize engine performance.

FEATURES

Chevron Supreme Unleaded Gasoline is a clear, lightyellow colored, premium-grade, unleaded gasoline.

It is composed of selected premium blending components to yield a premium-grade antiknock level for those engines not satisfied by Chevron Regular Unleaded Gasoline or Chevron Plus Unleaded Gasoline. It contains Chevron's Techron deposit control additive for cleanup of deposits left by lower quality gasolines.

Chevron Supreme Unleaded Gasoline meets all state and federal specifications for an unleaded gasoline.

FUNCTIONS

Chevron Supreme Unleaded Gasoline meets the requirements of ASTM D4814, *Standard Specification for Automotive Spark-Ignition Engine Fuel*. It provides high antiknock performance without the addition of organometallic or other antiknock additives. It may contain up to 10 volume percent ethanol depending on geographic location and time of year. The (R+M)/2 octane rating ranges from 93 minimum in eastern markets to 91 minimum in some western markets (may be slightly lower in some high elevation markets).

It provides the proper volatility for each geographical area, and time of year, for good cold starting and warmup characteristics, vapor-lock protection, and fuel economy.

It meets or exceeds industry specifications for oxidation stability and gum formation in storage.

Chevron Supreme Unleaded Gasoline contains the deposit control additive Techron for cleanup of deposits left by lower quality gasolines. The Chevron Techron additive is Chevron's proprietary gasoline additive that helps keep an engine's entire intake system clean, plus avoids contributing to excessive combustion chamber deposits like some other oil companies' additives. Chevron's gasolines with the Techron additive give unsurpassed performance in avoiding deposit-related problems.

Fuel injector and intake valve deposits can cause hesitation and stumbling, loss of power on acceleration, higher emissions and loss of mileage.

Use of Chevron gasolines with the Techron additive over the years will help cars avoid deposit-related performance deterioration, and will help cars avoid deposit-related increase in emissions.

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23 April 2012 LPG-3

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APPLICATIONS

Chevron Supreme Unleaded Gasoline is designed for use in all spark-ignition engines where the manufacturer specifies the use of an unleaded fuel and where higher antiknock quality is needed than is available in other grades of unleaded gasolines. Unleaded gasoline must be used in vehicles equipped with catalytic converters because lead poisons the catalyst and destroys its ability to reduce exhaust pollutants.

It is also recommended for leaded fuel vehicles where the engine octane requirements and operating conditions permit the use of an unleaded gasoline.

Chevron Supreme Unleaded Gasoline is satisfactory for use in two-stroke cycle gasoline-powered engines where gasoline oil-mix is used, such as outboard motors, chain saws, scooters, etc., unless the manufacturer specifies leaded gasoline only.

CAUTION — **FOR MOTOR FUEL USE ONLY.** Do not use as a Pressure Appliance Fuel. This is especially critical in appliances that employ a "generator" system.

WARNING

PORTABLE CONTAINER FIRE HAZARD

Improper filling of portable gasoline containers creates danger of fire.

To fill a container:

- Place approved container on the ground away from vehicle or trailer. DO NOT fill any container that is inside a vehicle or on a truck/trailer bed.
- Keep nozzle in contact with the container while filling.
- Do not use a nozzle lock-open device.

It is unlawful and dangerous to dispense gasoline into unapproved or improperly labeled containers.



CHEVRON LS HEATING FUEL 2

CUSTOMER BENEFITS

Chevron LS Heating Fuel 2 delivers value through:

- High BTU/gallon content which minimizes cost.
- **Clean fuel** which means long burner life between services.
- Long storage life that permits buying large volumes to minimize transit costs

FEATURES

Chevron LS Heating Fuel 2 is a medium-bodied distillate fuel manufactured from selected crudes. It meets the requirements of ASTM D396, *Standard Specification for Fuel Oils*, for a No. 2 heating fuel with a sulfur content of 0.05 mass % maximum (500 ppm) - a "low sulfur" fuel.

Chevron LS Heating Fuel 2 has good storage life, high heat content, and is seasonally blended to avoid cold flow problems. Rigorous attention is also paid to fuel cleanliness.

FUNCTIONS

Chevron LS Heating Fuel 2 provides a clean-burning energy source, and allows proper atomization in pressure or gun burners for complete combustion.

APPLICATIONS

Chevron LS Heating Fuel 2 is applicable for domestic or commercial warm-air furnaces, water heaters, restaurant and galley ranges, commercial hot-air driers, and orchard heaters requiring a No. 2 heating fuel.

PRODUCT AND SDS NUMBERS

Product Number	271006
SDS Number	6894

A Chevron company product

23 April 2012 LPM-40

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CHEVRON ULS DIESEL 2

CUSTOMER BENEFITS

Chevron ULS Diesel 2 delivers value through:

- Reliable cold starting
- Quiet combustion
- Excellent available power and economy
- Long fuel filter life
- Reliable cold flow properties
- Long storage life

In addition, there are special benefits of the low sulfur content:

- **Longer engine life** due to reduced levels of combustion acids which lead to corrosive wear of piston rings and cylinder walls. Piston ring area and piston skirt deposits are also minimized.
- Extended oil life Reduced combustion acids decrease the rate of oil additive depletion.
- Lower particulate (PM) emissions are achieved compared to previous low sulfur (500 ppm) diesel formulations.

FEATURES

Chevron ULS Diesel 2 is a high quality low sulfur diesel fuel (15 ppm). It meets the requirements of ASTM D975, *Standard Specification for Diesel Fuel Oils*. This product complies with the U.S. Environmental Protection Agency and with Calfornia Air Resources Board regulations. It is appropriate for use in all diesel vehicles and engines including on-road and off-road vehicles, locomotives and marine applications.

Chevron ULS Diesel 2 meets the fuel requirements of major engine manufacturers, is area blended for cold weather use, and has high heat content.

FUNCTIONS

The high cetane number of Chevron ULS Diesel 2 provides quiet combustion and quick starting at low temperatures. The high heat content permits engines to achieve rated power output and optimum fuel economy. Area blending assures a minimum risk of wax plugging of fuel filters and an absence of cold pumping problems. Chevron ULS Diesel 2 has excellent storage and thermal stability.

APPLICATIONS

Chevron ULS Diesel 2 meets the requirements of all major manufacturers of high speed diesel engines.

PRODUCT AND SDS NUMBERS

Product Number	270005
SDS Number	6894

23 April 2012 LPM-30

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BASE OILS



CHEVRON NEUTRAL OIL 60R, 100R, 150R, 220R, 600R

PRODUCT DESCRIPTION

Chevron Neutral Oils are all-hydroprocessed, Group II/ II+ paraffinic base oils that can be used in blending in a variety of lubricant and process oils.

CUSTOMER BENEFITS

Chevron Neutral Oils deliver value through:

- High viscosity index
- Good volatility
- Exceptional oxidation stability
- Compatibility with a wide array of additives for formulating flexibility

FEATURES

Chevron Neutral Oils are all-hydroprocessed, highly refined API Group II/II+ paraffinic base stocks. Their extremely low sulfur, nitrogen, and aromatic content give them excellent thermal and oxidation stability. These base oils provide excellent cold flow performance because the ISODEWAXING[®] catalyst and technology convert almost all of the wax in the feed into very stable, branched isoparaffins.

Chevron Neutral Oils offer the following characteristics relative to typical Group I (solvent refined) base stocks:

- Lower volatility and cold cranking simulator (CCS) viscosity to meet modern engine oil specifications
- Better oxidation and thermal stability
- Lower aromatics, sulfur and nitrogen
- Improved response to pour point depressants
- Improved soot dispersancy in heavy duty motor oil formulations

Chevron Neutral Oils 150R, 220R, and 600R are API Group II base stocks with a typical viscosity index of 99-103.

Chevron Neutral Oil 100R is a 5 cSt Group II "plus" base stock with a typical viscosity index of 116-119. It was designed to meet the strict volatility requirements of modern engine oils while maintaining API Group II status to simplify qualification programs and to provide interchangeability of Chevron base stocks with other approved stocks. Chevron 100R enables blenders to minimize the amount of more expensive Group III oils needed for the most stringent 10W-XX, 5W-XX and 0W-XX motor oil requirements. Chevron 100R was upgraded to match the specifications of Chevron 110RLV, which has been sunset.

Chevron Neutral Oil 60R is a light viscosity oil that is typically used in light industrial oil applications, electrical insulating oils, as well as other specialty lubricants and process oils.

Chevron Neutral Oils are non-toxic and meet **U.S. Food and Drug Administration (FDA)** requirement 21 CFR 178.3620(c) for components of nonfood articles.

APPLICATIONS

When combined with properly selected additives, Chevron Neutral Oils are ideal for blending a wide variety of finished products, including:

- Passenger car motor oils
- Heavy duty motor oils
- Industrial engine oils
- Tractor hydraulic fluids
- Transmission fluids
- Gear oils
- Greases
- Hydraulic oils
- Ammonia refrigeration oils
- Paper machine oils
- Turbine oils

Always confirm that the Chevron product selected whether combined with other base oils/additives or used alone will meet the required usage specifications or original equipment manufacturers recommendation for the equipment operating conditions and customer's maintenance practices.

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22 July 2019 BO-10

© 2004-2019 Chevron U.S.A. Inc. All rights reserved. Chevron, the Chevron Hallmark and ISODEWAXING are trademarks owned by Chevron Intellectual Property LLC. All other trademarks are property of their respective owners. • Process oils

• Heat transfer fluids

• Lubricant additives

TYPICAL TEST DATA

		60R	100R
Product Number		240664	240667
SDS Number		30963	49837
API Base Stock Category	(API 1509 E.1.3)	Group II	Group II+
API Gravity	ASTM D1298	32.9	36.0
Specific Gravity at 60/60°F	ASTM D1298	0.861	0.845
Density, lb/gal	ASTM D1298	7.167	7.034
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	10.5 2.6	21.21 4.40
Viscosity, Saybolt SUS at 100°F	ASTM D2161	64	113
Viscosity Index	ASTM D2270	70	117
Cold-Cranking Simulator cP at -30°C cP at -25°C cP at -20°C cP at -10°C	ASTM D5293	 	2450 1230 — —
Pour Point, °C	ASTM D97	-33	-15
Evaporation Loss, NOACK, wt %	CEC-L-40-A-93	_	16
Flash Point, COC, °C	ASTM D92	165	206
Color	ASTM D1500	L 0.5	L 0.5
Sulfur, ppm	Chevron	<6	<6
Water, ppm	ASTM D1744	50	<50
Saturates, HPLC, wt %	Chevron	>99	>99
Aromatics, HPLC, wt %	Chevron	<1	<1

Minor variations in product typical test data are to be expected in normal manufacturing.

Always confirm that the Chevron product selected whether combined with other base oils/additives or used alone will meet the required usage specifications or original equipment manufacturers recommendation for the equipment operating conditions and customer's maintenance practices.

TYPICAL TEST DATA

		150R	220R	600R
Product Number		581595	246748	246747
SDS Number		11858	6986	6986
API Base Stock Category	(API 1509 E.1.3)	Group II	Group II	Group II
API Gravity	ASTM D1298	34.0	32.1	31.0
Specific Gravity at 60/60°F	ASTM D1298	0.855	0.865	0.871
Density, lb/gal	ASTM D1298	7.119	7.202	7.251
Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	29.4 5.24	41.0 6.3	106 12.0
Viscosity, Saybolt SUS at 100°F	ASTM D2161	150	212	530
Viscosity Index	ASTM D2270	112	102	102
Cold-Cranking Simulator cP at -30°C cP at -25°C cP at -20°C cP at -10°C	ASTM D5293	5070 2660 1400 —	 5600 3200 	 4800
Pour Point, °C	ASTM D97	-15	-15	-15
Evaporation Loss, NOACK, wt %	CEC-L-40-A-93	14	11	2
Flash Point, COC, °C	ASTM D92	220	230	265
Color	ASTM D1500	L 0.5	L 0.5	L 0.5
Sulfur, ppm	Chevron	<6	<6	<6
Water, ppm	ASTM D1744	<50	<50	<50
Saturates, HPLC, wt %	Chevron	>99	>99	>99
Aromatics, HPLC, wt %	Chevron	<1	<1	<1

Minor variations in product typical test data are to be expected in normal manufacturing.

Always confirm that the Chevron product selected whether combined with other base oils/additives or used alone will meet the required usage specifications or original equipment manufacturers recommendation for the equipment operating conditions and customer's maintenance practices.

Latin America-Only Products

The products on the following pages are manufactured either in Colombia or El Salvador (or both) and are only available for purchase in those countries. Each Product Data Sheet lists which country the product is manufactured in at the bottom of the page.



For questions on ordering these products, please contact a Chevron Latin America Supply Chain representative.



MOTORCYCLE OILS (LATIN AMERICA ONLY)



HAVOLINE[®] MOTORCYCLE OIL 2T

PRODUCT DESCRIPTION

Havoline[®] Motorcycle Oil 2T is a mineral oil engineered with high quality Group II base oils, recommended for air-cooled two-stroke gasoline motorcycle engine lubrication.

CUSTOMER BENEFITS

Havoline Motorcycle Oil 2T provides:

- **Excellent immiscibility** Providing easy mixing with gasoline, at any temperature.
- Antiwear protection Based on its specific additives.
- Longer spark plug life Its low ash additives reduce the formation of deposits.
- Engine cleanliness Reducing the formation of deposits.
- Better handling Since it is manufactured with less toxic, low aromatic content solvent, low odor and higher flash point.

APPLICATIONS

Havoline Motorcycle Oil 2T is recommended for use in motorcycle, scooter and similar air-cooled two-stroke engines, where a lubricant that meets JASO FB, API TC and ISO EGB specification is required.

Havoline Motorcycle Oil 2T is also recommended for use in motorcycles, lawn mowers, scooters and other two-stroke gasoline powered equipment where a product of this type is required.

Havoline Motorcycle Oil 2T can be used in all types of two-stroke gasoline driven equipment that requires prior API TB, API TA and JASO FA specifications.

The mixing ratio with gasoline is defined by the equipment manufacturer and should be verified in the owner's manual.

Havoline Motorcycle Oil 2T should not be used in motors driven by alcohol.

Product(s) manufactured in Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 August 2021 PCMO-3400

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Havoline Motorcycle Oil 2T meets:

- API Service Category
 - API TC
- Asian Specifications
 - JASO FB
- European Specifications
 - ISO EGB

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Material Safety Data Sheet or contact your sales representative.

TYPICAL TEST DATA

	ASTM Method	Havoline [®] Motorcycle OiI 2T
Product Number	—	743338
MSDS Number Colombia El Salvador	_	33708 33709
Color	—	Green
Density @ 15°C	D4052	0.875
Viscosity, Kinematic cSt @ 40°C cSt @ 100°C	D445 D445	63.11 8.660
Viscosity Index	D2270	110
Flash Point, PM, °C	D93	114
Pour Point, °C	D97	-30

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] MOTORCYCLE OILS 4T SAE 10W-30, 10W-40, 20W-50

PRODUCT DESCRIPTION

Premium performance, shear-stable, multigrade, multifunctional fluids formulated with Group II base oils and Multitec[™] Superior Technology Formulation, specifically designed for use in four stroke gasoline motorcycle engines, clutches and gearboxes.

CUSTOMER BENEFITS

Havoline[®] Motorcycle Oils 4T with Multitec Superior Technology Formulation deliver value through:

- Excellent engine cleanliness High performance formulas provide excellent overall engine and transmission cleanliness in all service conditions. High oxidation stability maintains engine performance throughout the full oil drain intervals in modern motorcycle designs.
- Anti-wear protection for long engine life Anti-wear additive system reduces wear of highly stressed engine and gearbox components under severe operating conditions, providing long engine and gear box life.
- Easy starting and riding, even at high temperatures — Special additive mix minimizes oil thinning, particularly in the gearbox, offering high stress protection at both start-up and during high temperature operation.
- **Power and Performance** Highly effective cleaning system ensures excellent control of engine deposits for optimum power release and acceleration. Frictional and stability characteristics enable and maintain smooth clutch operation.

FEATURES

Havoline Motorcycle Oils 4T with Multitec Superior Technology Formulation are Premium quality motorcycle engine oils.



SAE 10W-30 Provides complete

protection for motorcycle engines, clutches and gearboxes. Havoline Motorcycle Oil 4T SAE 10W-30 promotes increased fuel economy relative to heavier viscosity grades. It provides exceptional thermal stability, optimal power transfer and efficient shifting. Recommended for motorcycle engines including Honda and Kymco models that require the listed specifications.

SAE 10W-40 Provides complete protection for motorcycle engines, clutches and gearboxes. SAE 10W-40 provides exceptional thermal stability, optimal power transfer and efficient shifting. Recommended for motorcycle engines including Yamaha, Suzuki, Kawasaki and Kymco models that require the listed specifications.

SAE 20W-50 Provides complete protection for motorcycle engines, clutches and gearboxes. SAE 20W-50 provides excellent shear stability, optimal power transfer and efficient shifting. Recommended for motorcycle engines including Honda, Suzuki, Yamaha and Bajaj models that require the listed specifications.

Product(s) manufactured in Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

15 November 2024 PCMO-3600

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APPLICATIONS

Havoline[®] Motorcycle Oils 4T with Multitec[™] Superior Technology Formulation are recommended for use in four-stroke gasoline motorcycle engines, when a lubricant that meets JASO MA/MA2 and API SL classification is required by the manufacturer.

They are especially recommended for motorcycles that use only one oil for clutch, transmission and engine lubrication. They are suitable for four-stroke air and liquid cooled engines of scooters, ATVs and portable power equipment.

They can also be used in other types of portable power equipment engines and in other special applications such as chain lubrication, when an SAE 10W-30 or 20W-50 viscosity and API SL classification oil is required.

The JASO MA2 category defines the highest friction motorcycle oils suitable for use in the most critical oilimmersed clutch installations. Oils which meet JASO MA2 also meet in full JASO MA, so may be used wherever JASO MA is specified. These products are not recommended for equipment with automatic transmissions that require JASO MB specification.

Havoline Motorcycle Oils 4T with Multitec Superior Technology meet:

- API Service Category
 - SL
- Clutch Plate Performance Specification
 - JASO T 903:2023 MA2/MA

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Safety Data Sheet or contact your sales representative.

SAE Grade	ASTM Method	10W-30	10W-40	20W-50
Product Number	—	743330	743331	743341
MSDS Number Colombia El Salvador	-	33166 33165	33166 33165	33166 33165
Density at 15°C	D4052	0.865	0.864	0.865
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445 D445	70.4 10.6	95 13.8	183.2 19.5
Low Temperature Viscosiy (CCS), cP	D5923	5,800 at -25°C	5,500 at -25°C	8,400 at -15°C
Viscosity Index	D2270	140	150	121
Flash Point, COC, °C	D92	240	240	266
Pour Point, °C	D97	-39	-39	-33

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] MOTORCYCLE OIL 4T API SF SAE 20W-50

PRODUCT DESCRIPTION

Havoline[®] Motorcycle Oil 4T API SF SAE 20W-50 is a multigrade oil, formulated with mineral bases, for the lubrication of four-stroke gasoline motorcycle engines.

CUSTOMER BENEFITS

Havoline Motorcycle Oil 4T API SF SAE 20W-50 offers:

- **Good engine starting** Due to its multiviscosity characteristics and its additives.
- Engine cleanliness Causing low deposit formation.
- Antiwear protection Based on its additives that extend engine and gear box life.
- **Protection at high temperatures** Therefore the oil maintains an adequate lubricant film.

APPLICATIONS

Havoline Motorcycle Oil 4T API SF SAE 20W-50 is recommended for use in four-stroke motorcycle engines, when an oil that meets API SF classification is required.

It provides smooth gear changes and suitable clutch operation.

It is suitable for use in motorcycles from different manufacturers such as: Dafra, Honda and Suzuki.

It can also be used in other types of gasoline, ethanol and CNG (compressed natural gas) powered engines, and also in special applications such as chain lubrication, when an SAE 20W-50 viscosity and API SF classification oil is required.

Havoline Motorcycle Oil 4T API SF SAE 20W-50 meets:

- API Service Category
 - SF

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Material Safety Data Sheet or contact your sales representative.

TYPICAL TEST DATA

SAE Grade	ASTM Method	20W-50
Product Number	_	743340
MSDS Number Colombia El Salvador	_	33155 33154
Density at 20°C	D4052	0.879
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445 D445	165.0 18.08
Low Temperature Viscosiy (CCS), -15°C, cP	D5923	8,000
Viscosity Index	D2270	121
Flash Point, COC, °C	D92	254
Pour Point, °C	D97	-27

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

8 July 2013 PCMO-3500

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HAVOLINE[®] MOTORCYCLE OIL 4T SAE 25W-50 JASO MA2

PRODUCT DESCRIPTION

Havoline[®] Motorcycle Oil 4T SAE 25W-50 JASO MA2 is a multi-grade oil specially formulated to meet the needs of four-stroke tricycle engines with severe operating conditions such as high temperature operation, in city traffic, with significant stop-and-go driving.

CUSTOMER BENEFITS

Havoline Motorcycle Oil 4T SAE 25W-50 JASO MA2 offers:

- Engine protection under severe operating conditions - Extreme pressure additives, anti foam formation, detergent, dispersancy and anti-wear protection, protect the engine under severe conditions including high temperature operation and stop-and-go driving.
- High oxidation stability Resists oxidative breakdown that leads to the formation of sludge and varnish
- Extended gear box and engine life Advanced additive formulation reduces engine and gear wear
- MA2 Performance Ensures reliable and predictable wet clutch operation.

APPLICATIONS

Havoline Motorcycle Oil 4T SAE 25W-50 JASO MA2 is recommended for use in in all four-stroke tricycle and motorcycle engines where an oil that meets JASO MA2, JASO MA, API SL, or previous "S", classification is required.

It provides smooth gear changes and clutch operation.

It can also be used in special applications, such as chain lubrication, when an SAE 25W-50 viscosity and API SL classification oil is required.

Havoline Motorcycle Oil 4T SAE 25W-50 JASO MA2 meets:

- Approved for JASO Performance Grade — MA2
- Meets API Service Category
 - SL, and all Previous "S" performance categories

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Material Safety Data Sheet or contact your sales representative.

TYPICAL TEST DATA

SAE Grade	ASTM Method	25W-50
Product Number	_	743367
MSDS Number Colombia El Salvador	_	50652 50653
Density at 20°C	D4052	0.877
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445 D445	176.0 19.18
Low Temperature Viscosiy (CCS), -10°C, cP	D5923	5,600
Viscosity Index	D2270	123
Flash Point, COC, °C	D92	210
Pour Point, °C	D97	-29

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in Colombia and El Salvador.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 October 2019 PCMO-3550

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HAVOLINE[®] FULL SYNTHETIC MOTORCYCLE 4T OIL **SAE 10W-50**

PRODUCT DESCRIPTION

Premium performance, shear-stable, multifunctional fluids formulated with Group III base oils, specifically designed for use in four stroke gasoline motorcycle engines, clutches and gearboxes.

CUSTOMER BENEFITS

Havoline[®] Full Synthetic Motorcycle 4T oils with Multitec[™] Superior Technology Formulation deliver value through:

- Reliable and trusted protection Excellent thermal stability helps prevent oil from breaking down, increasing protection against engine heat damage. High shear stability keeps the engine further protected under all kinds of riding conditions.
- Engine cleanliness Excellent detergency and Havoline's unique deposit control properties help keep the engine clean and in peak condition.
- Anti-wear protection for long engine life -Anti-wear additive system reduces wear of highly stressed engine and gearbox components under severe operating conditions, providing long engine and gear box life.
- Enhanced acceleration and seamless shifting Improved clutch grip and seamless shifting throughout all RPMs. High static friction prevents clutch slippage, ensuring maximum power transfer for acceleration, especially in high load conditions.
- Power and Performance High quality, fully synthetic Group III base oils are selected to ensure oil retains its intended properties between each service interval.

FEATURES

Havoline Full Synthetic Motorcycle 4T oils with Multitec Superior Technology Formulation are premium quality, full synthetic motorcycle engine oils.



They provide complete protection for motorcycle engines, clutches and gearboxes. They provide exceptional thermal stability, optimal power transfer and efficient shifting.

APPLICATIONS

Havoline Full Synthetic Motorcycle 4T oils with Multitec Superior Technology Formulation are recommended for use when a lubricant that meets JASO MA/MA2 and API SN engine oil is specified. They are recommended for modern air- and liquid-cooled, four-stroke motorcycle engines, motorcycles equipped with back torque limiters and exhaust catalytic converters and motorcycles with combined engine and transmission units, or separate gearboxes.

SAE 10W-50 is suitable for v-twin and big bore engines. Thicker oil also ensures an added layer of protection against engine wear.

Havoline Full Synthetic Motorcycle 4T oils with Multitec Superior Technology Formulation meet:

- API Service Category
 - SN
- Clutch Plate Performance Specification
 - JASO T 903:2016 MA/MA2

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Safety Data Sheet or contact your sales representative.

Product(s) manufactured in Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

1 July 2022 PCMO-3650

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TYPICAL TEST DATA

SAE Grade	ASTM Method	10W-50
Product Number	—	743366
MSDS Number Colombia El Salvador	-	45490 45489
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445 D445	116.5 17.5
Sulfated Ash, mass %	D874	1.1
Phosphorus, mass %	D4951	0.096
Low Temperature Viscosity (CCS), cP	D5923	5200 @ -25°C
Viscosity Index	D2270	150
Flash Point, COC, °C	D92	230
Pour Point, °C	D97	-39

Minor variations in product typical test data are to be expected in normal manufacturing.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



HAVOLINE[®] SYNTHETIC TECHNOLOGY MOTORCYCLE OIL 4T SAE 10W-40

PRODUCT DESCRIPTION

Premium oil formulated with a blend of synthetic and Premium Group II base oils and Multitec[™] Superior Technology Formulation, specifically designed for use in four stroke gasoline motorcycle engines, clutches and gearboxes.

CUSTOMER BENEFITS

Havoline[®] Synthetic Technology Motorcycle Oil 4T SAE 10W-40 with Multitec Superior Technology Formulation delivers value through:

- Excellent engine cleanliness High performance formulas provide excellent overall engine and transmission cleanliness in all service conditions. Excellent thermal oxidation stability maintains engine performance throughout the full oil drain intervals in modern motorcycle designs.
- Anti-wear protection for long engine life Anti-wear additive system reduces wear of highly stressed engine and gearbox components under severe operating conditions, providing long engine and gear box life.
- Easy starting and smooth operation at high temperatures — Its special additive mix and high quality base oils maintain a resistant and adequate lubricant film, particularly in the gearbox, offering high stress protection at both start-up and during high temperature operation.
- **Power and Performance** Highly effective cleaning system ensures excellent control of engine deposits for optimum power release and acceleration. Frictional and stability characteristics enable and maintain smooth clutch operation.

FEATURES

Havoline Synthetic Technology Motorcycle Oil 4T SAE 10W-40 with Multitec is a premium quality 4T motorcycle engine oil.



SAE 10W-40 Provides complete

protection for motorcycle engines, clutches and gearboxes. It provides high thermal stability, excellent start and efficient shifting. Recommended for four stroke motorcycle engines including Yamaha, Suzuki, Kawasaki, Honda and Kymco models that require this viscosity grade and specifications.

APPLICATIONS

Havoline Synthetic Technology Motorcycle Oil 4T SAE 10W-40 with Multitec is recommended for use in fourstroke gasoline motorcycle engines, when a lubricant that meets JASO MA/MA2 and API SL classification is required by the manufacturer.

It is especially recommended for motorcycles that use only one oil for clutch, transmission and engine lubrication. It is suitable for four-stroke air and liquid cooled engines of scooters, ATVs and portable power equipment.

It can also be used in other types of portable power equipment engines and in other special applications such as chain lubrication, when an SAE 10W-40 viscosity and API SL classification oil is required.

The JASO MA2 category defines the highest friction motorcycle oil suitable for use in the most critical oilimmersed clutch installations. Oils which meet JASO MA2 also meet in full JASO MA, so may be used wherever JASO MA is specified.

Product(s) manufactured in Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

13 July 2021 PCMO-3660

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Havoline[®] Synthetic Blend Motorcycle Oil 4T SAE 10W-40 with MultitecTM meets:

• API Service Category

— SL

- Clutch Plate Performance Specification
 - JASO T 903:2011 MA2/MA

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Safety Data Sheet or contact your sales representative.

TYPICAL TEST DATA

SAE Grade	ASTM Method	10W-40
Product Number	—	743332
MSDS Number Colombia El Salvador	_	38728 38729
Density at 20°C	D4052	0.868
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445 D445	99.8 14.4
Low Temperature Viscosiy (CCS), cP	D5923	6,400 at -25°C
Viscosity Index	D2270	148
Flash Point, COC, °C	D92	230
Pour Point, °C	D97	-35

Minor variations in product typical test data are to be expected in normal manufacturing.



HAVOLINE[®] MOTORCYCLE SHOCK OIL

PRODUCT DESCRIPTION

Havoline[®] Motorcycle Shock Oil is formulated with a premium base oil technology and is designed to provide robust protection for hydraulic pumps in mobile and stationary systems.

CUSTOMER BENEFITS

Havoline Motorcycle Shock Oil provides value through:

- Long equipment life An anti-wear additive package minimizes wear by protecting surfaces when the load causes a failure in the lubricating film.
- **Minimized down-time** Its effective rust and corrosion inhibitor system helps prevent the production of abrasive particles resulting from the formation of rust and deposits, varnishes, and sludge due to failure of the oil, which can damage the surfaces and seals of the equipment and clog filters prematurely.
- **Smooth operation** Its good hydrolytic stability and water-separation characteristics favor excellent filterability in the presence of water contamination. Its anti-foam and air-release properties ensure smooth operation and efficiency of the system.
- **Optimum oil service life** Its high oxidation stability resists the thickening of the oil in the formation of deposits during service, minimizing the likelihood of an unscheduled change of hydraulic fluid.

CHARACTERISTICS

Havoline Motorcycle Shock Oil is formulated with Group II base stocks.

Havoline Motorcycle Shock Oil is designed for lubricant applications that require an AGMA R&O gear lubricating oil in the applicable viscosity grade.

Havoline Motorcycle Shock Oil provides excellent:

- Anti-wear protection
- Corrosion and oxidation inhibition

• Foam and aeration suppression

Under moderate loads and temperatures, the high viscosity index of Havoline Motorcycle Shock Oil helps to ensure good film strength between the metal surfaces and is enhanced by the anti-wear additive protection.

APPLICATIONS

Havoline Motorcycle Shock Oil can be used as an axle lubricant where zinc-free oils are not a requirement.

Havoline Motorcycle Shock Oil is recommended for:

- Vane- or piston-type pumps, or gears, especially those in which the pressures exceed 1000 psi
- Lightly loaded reciprocating compressors

Havoline Motorcycle Shock Oil is recommended for applications in which AGMA oils that are inhibited against rust and oxidation are required for:

- Reducing gears in hydraulic equipment in which EP [extreme pressure] is not required
- Ordinary and anti-friction bearings
- Circulating oil systems

Havoline Motorcycle Shock Oil is approved for:

- Eaton-Vickers 35VQ25A, M-2950-S (mobile) and I-286-S (stationary) pump
- Parker Hannifin (Denison) HFO, HF1, HF2, T6H2OC

Havoline Motorcycle Shock Oil meets the requirements of:

- AFNOR NF E 48-603 HM
- **ANSI/AGMA** 9005-EO2, Industrial Gear Lubrication, for gear lubrication such as gear oils with inhibited rust and oxidation
- **ASTM** D6158 HM
- **Bosch Rexroth** previous specification RE 90220-01

Product(s) manufactured in Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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1 February 2019 PCMO-3900

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- **DIN** 51524-2
- General Motors LS2 Specification, LH for antiwear hydraulic fluids
- ISO 11158 L-HM
- Fives Cincinnati (formerly MAG Cincinnati, Cin Machine, Cin Milacron) P-68
- US Steel 126, 127

Havoline Motorcycle Shock Oil is registered by the NSF and is acceptable as a lubricants in which there is no possibility of contact with foods (H2) in and around food-processing areas. The NSF Nonfood Compounds Registration Program is a continuation of the USDA's product listing and approval program, which is based on satisfaction of the requirements for appropriate use, a review of ingredients, and verification of labeling.

Do not use this product in high-pressure systems near flames, sparks, or hot surfaces. Use only in wellventilated areas. Keep the container closed.

Do not use in air-breathing devices or medical equipment.

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Material Safety Data Sheet or contact your sales representative.

743384
45886
33.1
32.0 6.3
150 46.9
153
220(428)
-50(-58)
1290
4900
25,100
>5000

TYPICAL TEST DATA

Minor variations in product typical test data are to be expected in normal manufacturing.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



MULTITEC

Superior Technology Formulation

> 1 July 2021 PCMO-3950

HAVOLINE[®] SCOOTER OIL SAE 10W-40, 20W-50

PRODUCT DESCRIPTION

Havoline[®] Scooter Oils are premium performance, shear-stable, multigrade, four-stroke scooter engine oils, suitable for use where SAE 10W-40 and 20W-50 lubricants are required, including high specific output engines operating in severe service.

CUSTOMER BENEFITS

Havoline Scooter Oils offer:

- **Smoother ride** Highly effective friction modifier reduces engine friction to ensure minimum power loss, which in turn can mean reduced fuel consumption or improved power release and acceleration.
- Longer drain interval High performance formula provides excellent engine cleanliness in all service conditions. It also maintains performance throughout the full oil drain intervals as recommended by OEMs in modern scooter designs.
- **Engine durability** Anti-wear additive system reduces wear of highly stressed engine components under severe operating conditions.
- **Good all-temperature protection** Highly shear stable viscosity index improver additive minimizes shear-thinning and resists breakdown under high stresses which occur at high rotational speeds. Provides protection at both start-up and during high temperature operation.

APPLICATIONS

- Latest generation, four-stroke scooter engines
- Air and liquid-cooled four-stroke scooter engines
- Suitable for high-performance scooters
- Scooters fitted with exhaust catalytic converters

Havoline Scooter Oils are recommended for use only in those scooters in which the engine is independently lubricated. This includes the majority of modern types, which are fitted with belt-type continuously variable automatic transmissions.

Havoline Scooter Oil SAE 10W-40 and SAE 20W-50 meet the requirements:

- API Service Category
 - API SL and all previous "S" categories
- JASO
 - MB (2011)

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Safety Data Sheet or contact your sales representative.

Product(s) manufactured in Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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TYPICAL TEST DATA

SAE Grade	ASTM Method	10W-40	20W-50
Product Number	_	743059	743058
MSDS Number Colombia	—	54091	54091
Density at 20°C	D4052	0.871	0.879
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445 D445	98.6 14.30	174 19.00
Apparent Viscosity (CCS), cP	D5293	6400	8000
Viscosity Index	D2270	150	130
Flash Point, COC, °C	D92	230	250
Pour Point, °C	D97	-36	-33

Minor variations in product typical test data are to be expected in normal manufacturing.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



HAVOLINE[®] SYNTHETIC BLEND 4 CYCLE OUT-**BOARD ENGINE OIL SAE 10W-30**

PRODUCT DESCRIPTION

Havoline[®] Synthetic Blend 4 Cycle Outboard Engine Oil SAE 10W-30 is a premium oil formulated with a blend of synthetic and premium Group II base oils, specifically designed for use in four stroke outboard gasoline engines.

CUSTOMER BENEFITS

The high-performance formula for Havoline Synthetic Blend 4 Cycle Outboard Engine Oil SAE 10W-30 provides:

- Excellent overall engine protection and cleanliness
- Outstanding thermal oxidation stability
- Wear reduction of highly stressed engine components under severe operating conditions
- Excellent control of engine deposits for optimum power and acceleration

It is specially formulated to inhibit the formation of rust and corrosion.

APPLICATIONS

Havoline Synthetic Blend 4 Cycle Outboard Engine Oil SAE 10W-30 is designed for use in modern marine outboard engines employing catalyst emission control equipment and for applications requiring a NMMA FC-W or NMMA FC-W Catalyst Compatible engine oil.

Havoline Synthetic Blend 4 Cycle Outboard Engine Oil SAE 10W-30 meets:

API Service Category

– SI

It is licensed under NMMA FC-W Catalyst Compatible performance standard. Registration # FC-433009X.

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Safety Data Sheet or contact your sales representative.

TYPICAL TEST DATA

SAE Grade	ASTM Method	10W-30
Product Number	—	788522
MSDS Number Colombia El Salvador	_	50015 50014
Density at 15°C	D4052	0.87
Viscosity, Kinematic cSt at 100°C	D445	12.44
Sulfated Ash	D874	0.97
Base number	D2896	8.67
Flash Point, COC, °C	D92	238
Pour Point, °C	D97	-30

Minor variations in product typical test data are to be expected in normal manufacturing.

> 15 November 2019 PCMO-4000

Product(s) manufactured in Colombia and El Salvador. Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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TRANSMISSION AND TORQUE FLUIDS (LATIN AMERICA ONLY)



1 August 2017 TTF-145

HAVOLINE[®] MOTORCYCLE TRANSMISSION FLUID SAE 75W-90

PRODUCT DESCRIPTION

Havoline[®] Motorcycle Transmission Fluid SAE 75W-90 is formulated with mineral bases and extreme pressure additives for lubricating motorcycle manual transmissions that operate with dedicated oil sump.

CUSTOMER BENEFITS

Havoline Motorcycle Transmission Fluid SAE 75W-90 provides:

- Mechanical parts durability Because of its special and balanced extreme pressure additives, it prevents part wear even under severe conditions.
- Excellent protection against rust and corrosion — Due to its special inhibitor additives that protect surfaces.
- Long oil life Its excellent oxidation resistance prevents sludge and deposit formation.

APPLICATIONS

Havoline Motorcycle Transmission Fluid SAE 75W-90 is recommended for various models of motorcycle manual transmissions that specify a product with API GL-4 classification.

It meets the requirements of most motorcycle manufacturers that call for a product that meets the quality level listed below:

• API Service Category GL-4

HANDLING AND SAFETY

For information on the safe handling of this product, consult the Material Safety Data Sheet or contact your sales representative.

TYPICAL TEST DATA

SAE Grade	ASTM Method	75W-90
Product Number	-	743383
MSDS Number U.S. Colombia	—	45887 45887
Density at 15.6°C, g/cm ³	D4052	0.872
Viscosity, Kinematic cSt at 40°C cSt at 100°C	D445 D445	87.50 14.55
Low Temperature Viscos- ity (Brookfield) cP at -40°C	D5293	120,000
Viscosity Index	D2270	173
Flash Point, °C	D92	204
Pour Point, °C	D97	-24

Minor variations in product typical test data are to be expected in normal manufacturing.

Product(s) manufactured in Colombia.

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



GEAR LUBRICANTS (LATIN AMERICA ONLY)



HAVOLINE[®] MOTORCYCLE CHAIN LUBE

PRODUCT DESCRIPTION

Havoline[®] Motorcycle Chain Lube has been designed to give maximum protection to motorcycle chains.

CUSTOMER BENEFITS

 $\mathsf{Havoline}^{\texttt{R}}$ Motorcycle Chain Lube delivers value through:

- Long equipment life Extreme pressure performance withstands heavy shock loads, protecting the equipment against rapid wear.
- Reliability in wet conditions Provides a tenacious film that clings to lubricated parts. Resists being washed away by water during use.
- **Protection in wet environments** Anti-rust performance protects chains from the corrosive action of wet environments.

FEATURES

Havoline Motorcycle Chain Lube has been designed to give maximum protection to motorcycle chains.

It is formulated from highly refined, high viscosity index, paraffinic base stocks and additives, which provide performance characteristics expected of an exceptional chain oil.

Havoline Motorcycle Chain Lube is formulated to meet the critical lubrication demands of motorcycle chains. Its exceptional anti-wear performance provides protection for the chain in any motorcycle driving condition. The adhesiveness and emulsification tendency of this oil provide a tenacious lubricant film on the chain's moving parts, which will not be washed off by water that is common in this application.

This oil also provides excellent rust and corrosion protection, which is important in light of the corrosive environments in which motorcycles are used.

Havoline Motorcycle Chain Lube contains no chlorinated additives and is completely ashless, minimizing environmental considerations.

Product(s) manufactured in Colombia.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A Chevron company product

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1 August 2017 GL-36

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APPLICATIONS

Havoline Motorcycle Chain Lube's tacky quality makes it the ideal choice for lubricating motorcycle chains as it will not be easily removed in high speeds or wet conditions.

TYPICAL TEST DATA

Product Number	743382
SDS/MSDS Number USA Colombia	45883 45883
API Gravity	31.5
Viscosity, Kinematic cSt at 40°C cSt at 100°C	95 10.9
Viscosity Index	98
Flash Point, °C(°F)	230(446)
Pour Point, °C(°F)	-30(-22)

Minor variations in product typical test data are to be expected in normal manufacturing.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.



FUEL ADDITIVES (LATIN AMERICA ONLY)



TECHRON[®] CONCENTRATE PLUS Complete Fuel System Cleaner - Motorcycles and Scooters

PRODUCT DESCRIPTION

Techron[®] Concentrate Plus for Motorcycles and Scooters is a **Complete Fuel System Cleaner** that works in one tankful. It is formulated for gasoline powered motorcycles and scooters, including carbureted, two-stroke, port fuel injected and direct injected engines.

CUSTOMER BENEFITS

Techron Concentrate Plus is recommended by many major OEMs the world over. With repeat use over time, it can help motorcycles and scooters that have soot build-up in the engine by:

- Restoring power by aiding in the removal of harmful deposits
- Improving engine responsiveness
- Reducing cold start problems
- Reducing engine noise
- Restoring lost fuel economy

FEATURES

Techron Concentrate Plus is a fuel system treatment that helps to restore lost power and performance caused by deposit build-up in motorcycle engine parts, such as carburetors and injectors. It is suitable for use in all 4-stroke motorcycle engines.

Techron Concentrate Plus is formulated with improved deposit control fuel-additive chemistry. This can help to slow down the amount of carbon soot built up in intake valves, fuel injectors and combustion chambers.

APPLICATIONS

Techron Concentrate Plus is suitable for use in all 4-stroke motorcycle engines.

Add one 75ml bottle of Techron Concentrate Plus to an empty tank every time gasoline fuel top-up is done.

Repeat the application every 3,000 km (1,850 miles) for best results over time.

For a larger tank, more than 6L(1.6 gallons), a second bottle treatment may be required to get full benefits.

Will not harm catalytic converters and oxygen sensors.

Not recommended for diesel engines.

PRODUCT AND SDS NUMBERS

Product Number	266706
SDS Number	41895

1 November 2019

FA-40

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

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Emergency Information

SAFETY DATA SHEETS (SDS)

Safety Data Sheets have been prepared for all Chevron products to comply with the requirements of OSHA Hazard Communication 29 CFR 1910.1200 and many state and federal health and safety related laws and regulations.

Safety Data Sheets are available from:

- https://cglapps.chevron.com/msdspds
- lubemsds@chevron.com
- your Chevron Lubrication Marketer

If you are unable to contact your Chevron supplier, please contact:

Chevron Chevron Business Center 9401 Williamsburg Plaza, Suite 201 Louisville, KY 40222

If you send a written request, be sure to include your full return address, telephone number, fax number, and e-mail address, if applicable.

EMERGENCY TELEPHONE NUMBERS

Health (24 hr)

	USA only	800-231-0623
	Outside USA 0623, international collect calls acce	001-510-231- pted
Tr	ansportation (24 hr)	
	CHEMTREC - USA only 9300	1 800 424
	CHEMTREC - Outside USA 3887, international collect calls acce	1 703 527 pted
	Mexico - SETIQ 00 and 55 59 15 88 (D.F.)	01 800 00 214
	Emmanuel Remigio, Enrique Perea a Vega	Javier Ramirez, nd Guillermo

API Engine Oil Service Category Chart

GASOLINE ENGINES			
Category	Status	Service	
SP	Current	Introduced in May 2020, designed to provide timing chain wear protection, improved high temperature deposit protection for pistons and turbochargers, more stringent sludge and varnish control, and protection against low-speed pre-ignition (LSPI). API SP with Resource Conserving matches ILSAC GF-6A by combining API SP performance with improved fuel economy, emission control system protection, and protection of engines operating on ethanol-containing fuels up to E85.	
SN	Current	Introduced in October 2010 for 2011 and older vehicles, designed to provide improved high temperature deposit protection for pistons, more stringent sludge control, and seal compatibility. API Service Category SN engine oils that also carry the designation SN Plus are formulated to provide API SN performance and addi- tional protection against low-speed pre-ignition for turbocharged direct injection gasoline-powered vehicles. Oils that meet the requirements for API SN with SN Plus or API SN with SN Plus and Resource Conserving at the limit shown in Annex G, Table G-5, and are properly licensed, may display "SN Plus" or "Resource Conserving SN Plus" in the lower portion of the API Service Symbol in conjunction with API SN in the upper portion. Oils that satisfy SN Plus can also effectively lubri- cate engines calling for API SN, with SN Plus and Resource Conserving, or ILSAC GF-5. API SN with SN Plus and API SN with SN Plus and Resource Conserving are also backward compatible to API Service Categories before API SN.	
SM	Current	For 2010 and older automotive engines.	
SL	Current	For 2004 and older automotive engines.	
SJ	Current	For 2001 and older automotive engines.	
SH	Obsolete	For 1996 and older engines.	
SG	Obsolete	For 1993 and older engines.	
SF	Obsolete	For 1988 and older engines.	
SE	Obsolete	CAUTION : Not suitable for use in gasoline-powered automotive engines built after 1979.	
SD	Obsolete	CAUTION : Not suitable for use in gasoline-powered automotive engines built after 1971. Use in more modern engines may cause unsatisfactory performance or equipment harm.	
SC	Obsolete	CAUTION : Not suitable for use in gasoline-powered automotive engines built after 1967. Use in more modern engines may cause unsatisfactory performance or equipment harm.	
SB	Obsolete	CAUTION : Not suitable for use in gasoline-powered automotive engines built after 1951. Use in more modern engines may cause unsatisfactory performance or equipment harm.	
SA	Obsolete	CAUTION : Contains no additives. Not suitable for use in gasoline-powered automotive engines built after 1930. Use in more modern engines may cause unsatisfactory performance or equipment harm.	

DIESEL ENGINES		
Category	Status	Service
CK-4	Current	API Service Category CK-4 describes oils for use in high-speed four-stroke cycle diesel engines designed to meet 2017 model year on-highway and Tier 4 non-road exhaust emission standards as well as for previous model year diesel engines. API CK-4 oils are designed to provide enhanced protection against oil oxidation, viscosity loss due to shear, and oil aeration as well as protection against catalyst poisoning, particulate filter blocking, engine wear, piston deposits, degradation of low- and high-temperature properties, and soot-related viscosity increase.Engine oils that meet the API Service Category CK-4 designation have been tested in accordance with the ACC Code of Practice and may use the API Base Oil Interchangeability Guidelines and the API Guidelines for SAE Viscosity-Grade Read Across. API CK-4 oils exceed the performance criteria of API CJ-4, CI-4 with CI-4 PLUS, CI-4, and CH-4 and can effectively lubricate engines calling for those API Service Categories. When using CK-4 oil with higher than 15 ppm sulfur fuel, consult the engine manufacturer for service interval recommendations.
FA-4	Current	API Service Category FA-4 describes certain XW-30 oils specifically formulated for use in select high-speed four-stroke cycle diesel engines designed to meet 2017 model year on-highway greenhouse gas (GHG) emission standards. API FA-4 oils are designed to provide enhanced protection against oil oxidation, viscosity loss due to shear, and oil aeration as well as protection against catalyst poisoning, particulate filter blocking, engine wear, piston deposits, degradation of low- and high temperature properties, and soot-related viscosity increase. Engine oils that meet the API Service Category FA-4 designation have been tested in accordance with the ACC Code of Practice and may use the API Base Oil Interchangeability Guidelines and the API Guidelines for SAE Viscosity-Grade Read Across. API FA-4 oils are not interchangeable or backward compatible with API CK-4, CJ-4, CI-4 with CI-4 PLUS, CI-4, and CH-4 oils. Refer to engine manufacturer recommendations to determine if API FA-4 oils are suitable for use.
C]-4	Current	Introduced in 2006. For high-speed, four-stroke engines designed to meet 2007 model year on-highway exhaust emission standards. CJ-4 oils are compounded for use in all applications with diesel fuels ranging in sulfur content up to 500 ppm (0.05% by weight). However, use of these oils with greater than 15 ppm (0.0015% by weight) sulfur fuel may impact exhaust aftertreatment system durability and/or oil drain interval. CJ-4 oils are effective at sustaining emission control system durability where particulate filters and other advanced aftertreatment systems are used. Optimum protection is provided for control of catalyst poisoning, particulate filter blocking, engine wear, piston deposits, low- and high-temperature stability, soot handling properties, oxidative thickening, foaming, and viscosity loss due to shear. API CJ-4 oils exceed the performance criteria of API CI-4 with CI-4 PLUS, CI-4, CH-4, CG-4, and CF-4 and can effectively lubricate engines calling for those API Service Categories. When using CJ-4 oil with higher than 15 ppm sulfur fuel, consult the engine manufacturer for service interval.
CI-4	Current	Introduced in 2002. For high -speed, four-stroke engines designed to meet 2004 exhaust emission standards implemented in 2002. CI-4 oils are formulated to sustain engine durability where exhaust gas recirculation (EGR) is used and are intended for use with diesel fuels ranging in sulfur content up to 0.5% weight. Can be used in place of CD, CE, CF-4, CG-4 and CH-4 oils. Some CI-4 oils may also qualify for the CI-4 PLUS designation.

		DIESEL ENGINES
Category	Status	Service
CH-4	Current	Introduced in 1998. For high-speed, four-stroke engines designed to meet 1998 exhaust emission standards. CH-4 oils are specifically compounded for use with diesel fuels ranging in sulfur content up to 0.5% weight. Can be used in place of CD, CE, CF-4, and CG-4 oils.
CG-4	Obsolete	Introduced in 1995. For severe duty, high-speed, four-stroke engines using fuel with less than 0.5% weight sulfur. CG-4 oils are required for engines meeting 1994 emission standards. Can be used in place of CD, CE, and CF-4 oils.
CF-4	Obsolete	Introduced in 1990. For high-speed, four-stroke, naturally aspirated and turbo- charged engines. Can be used in place of CD and CE oils.
CF-2	Obsolete	Introduced in 1994. For severe duty, two-stroke-cycle engines. Can be used in place of CD-II oils.
CF	Obsolete	Introduced in 1994. For off-road, indirect-injected and other diesel engines includ- ing those using fuel with over 0.5% weight sulfur. Can be used in place of CD oils.
CE	Obsolete	Introduced in 1985. For high-speed, four-stroke, naturally aspirated and turbo- charged engines. Can be used in place of CC and CD oils.
CD-II	Obsolete	Introduced in 1985. For two-stroke-cycle engines.
CD	Obsolete	Introduced in 1955. For certain naturally aspirated and turbocharged engines.
CC	Obsolete	CAUTION : Not suitable for use in diesel-powered engines built after 1990.
СВ	Obsolete	CAUTION : Not suitable for use in diesel-powered engines built after 1961.
CA	Obsolete	CAUTION : Not suitable for use in diesel-powered engines built after 1959.

Extracted from API 1509 17th Edition, 2012- Annex E - API Base Oil Interchangeability Guidelines For Passenger Car Motor Oils and Diesel Engine Oils. Reproduced courtesy of the American Petroleum Institute.

API Lubricant Service Designations for Automotive Manual Transmissions, Manual Transaxles, and Axles

API GL-1

Lubricants intended for manual transmissions operating under such mild conditions that straight petroleum or refined petroleum oil may be used satisfactorily. Oxidation and rust inhibitors, defoamers, and pour depressants may be added to improve the characteristics of these lubricants. Friction modifiers and extreme pressure additives shall not be used.

API GL-4

Lubricants intended for axles with spiral bevel gears operating under moderate to severe conditions of speed and load or axles with hypoid gears operating under moderate speeds and loads.

Although this service designation is still used commercially to describe lubricants, some test equipment used for performance verification is no longer available.

API GL-5

Lubricants intended for gears, particularly hypoid gears, in axles operating under various combinations of high-speed/shock load and low-speed/high-torque conditions. Lubricants qualified under SAE J 2360 (formerly known as U.S. Military Specification MIL-PRF-2105E) satisfy the requirements of the API GL-5 service designation, although the API designation does not require military approval.

API MT-1

Lubricants intended for nonsynchronized manual transmissions used in buses and heavy-duty trucks. Lubricants meeting the requirements of API MT-1 service provide protection against the combination of thermal degradation, component wear, and oil-seal deterioration, which is not provided by lubricants in current use meeting only the requirements of API GL-1, 4, or 5.

Extracted from API 1509 17th Edition, 2012- Annex E - API Base Oil Interchangeability Guidelines For Passenger Car Motor Oils and Diesel Engine Oils. Reproduced courtesy of the American Petroleum Institute.

API Base Oil Definitions

Group	Sulfur, Wt %		Saturates	V.I.
Ι	>0.03	and/or	<90	80-119
II	≤0.03	and	<u>></u> 90	80-119
III	≤0.03	and	<u>></u> 90	<u>></u> 120
IV		All Polyalphac	olefins (PAOs)	
V	All Stocks Not I	ncluded in Groups I-IV (N	Naphthenic Oils and Non-I	PAO Synthetics)

Group I — These base oils are commonly called solvent refined base oils because nearly all of them are manufactured using solvent extraction and solvent dewaxing.

Group II — These base oils are hydroprocessed which give them significantly lower levels of impurities than Group I base oils.

Group III — These base oils are also hydroprocessed but have significantly higher VI than Group II base oils.

They are now generally regarded as "synthetic" in the USA.

Group IV — Polyalphaolefin (PAO) base oils are manufactured from olefins, a specific type of chemical feedstock. They predate Group III base oils and are sometimes referred to as traditional synthetics.

Group V — This category is a catch-all for all other base oils not included in categories I-IV. It includes low VI base oils like naphthenic base oils (also called pale oils) and high VI non-PAO synthetics like esters.

Extracted from API 1509 17th Edition, 2012- Annex E - API Base Oil Interchangeability Guidelines For Passenger Car Motor Oils and Diesel Engine Oils. Reproduced courtesy of the American Petroleum Institute.

Approximate Equivalents Kinematic Viscosity to Saybolt Universal Viscosity at 100°F Industrial Fluid Lubricants



To obtain approximate conversions, use the following conversion factors. Refer to ASTM D2161 for exact values: Saybolt, SUS = Kinematic, cSt x 4.6 Kinematic, cSt = Saybolt, SUS / 4.6.

ISO Viscosity Grade	Midpoint Viscosity, cSt at 40.0°C	Kinematic Vis cSt at	scosity Limits, 40.0°C	Approximate Equivalent SUS Units
		Min	Max	
2	2.2	1.98	2.42	32
3	3.2	2.88	3.52	36
5	4.6	4.14	5.06	40
7	6.8	6.12	7.48	50
10	10	9.00	11.0	60
15	15	13.5	16.5	75
22	22	19.8	24.2	105
32	32	28.8	35.2	150
46	46	41.4	50.6	215
68	68	61.2	74.8	315
100	100	90.0	110	465
150	150	135	165	700
220	220	198	242	1000
320	320	288	352	1500
460	460	414	506	2150
680	680	612	748	3150
1000	1000	900	1100	4650
1500	1500	1350	1650	7000
2200	2200	1980	2420	10300
3200	3200	2880	3520	15000

ASTM/ISO Viscosity System for Industrial Fluid Lubricants

Reprinted, with permission, from ASTM D2422 Standard Classification of Industrial Fluid Lubricants by Viscosity System, copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standards may be obtained from ASTM, www.astm.org.

Viscosity Ranges for ANSI/AGMA 9005-E02^a Lubricants

ISO Viscosity Grade	Viscosit cSt (or mm ²	y Range ²/s) at 40°C	Former AGMA Grade
	min	max	Equivalents
ISO VG 32	28.8	35.2	0
ISO VG 46	41.4	50.6	1
ISO VG 68	61.2	74.8	2
ISO VG 100	90	110	3
ISO VG 150	135	165	4
ISO VG 220	198	242	5
ISO VG 320	288	352	6
ISO VG 460	414	506	7
ISO VG 680	612	748	8
ISO VG 1000	900	1100	8A
ISO VG 1500	1350	1650	9
ISO VG 2200	1980 ^c	2420 ^c	10
ISO VG 3200	2880 ^d	3520 ^d	11

a Revision of ANSI/AGMA 9005-D94.

b With the change from AGMA viscosity grade equivalent to ISO viscosity grade classifications, the designations EP, R and COMP will no longer be used as part of the viscosity grade nomenclature.

c Viscosity limits have changed when compared with previous AGMA specifications (2880 to 3520 cSt at 40°C).

d Viscosity limits have changed when compared with previous AGMA specifications (4140 to 5060 cSt at 40°C).

AGMA 9005-E02 Lubri	cant Classifications & Minimum Performance Requirements
RO (Formerly R&O)	Inhibited Oils
EP	Antiscuff/Antiwear Oils
CP (Formerly COMP)	Compounded Oils ^a

a Compounded gear oils are blended of petroleum base oils with 3% to 10% of natural or synthetic fatty oils. These lubricants are frequently used in wormgear drives.

Extracted from ANSI/AGMA 9005-E02, *Industrial Gear Lubrication*, with the permission of the publisher, the American Gear Manufacturers Association, 1001 North Fairfax Street, Suite 500, Alexandria, Virginia 22314.

UNDERSTANDING ISO CLEANLINESS CODES

The International Organization for Standardization (ISO) developed a cleanliness code to measure contamination levels per milliliter of fluid at three sizes: 4 microns, 6 microns and 14 microns. Each number represents a contaminant level code for the correlating particle size including all particles of the specified size and larger. It is written as XX/YY/ZZ where:

- * XX = total number of particles \geq 4 μm
- YY = total number of particles \geq 6 μ m
- ZZ = total number of particles \geq 14 μ m

In this example, the particles measured at the given micron levels are assigned a code based on where the value falls in the table. For this example, the ISO code would be 20/17/13.

Particles/ml ISO Code 20 $\geq 4 \mu$ 9,721 1.254 ≥6 µ 17 ≥10 µ 326 ≥14 µ 73 13 ≥21 µ 12 ≥38 µ 5 ≥70 µ 0 ≥100 µ 0

	More than (p/ml)	Up to and including (p/ml)	ISO Code
	80,000	160,000	24
	40,000	80,000	23
	20,000	40,000	22
	10,000	20,000	21
-	5,000	10,000	20
	2,500	5,000	19
	1,300	2,500	18
-	640	1,300	17
	320	640	16
	160	320	15
	80	160	14
	40	80	13
	20	40	12
	10	20	11
	5	10	10
	2.5	5	9
	1.3	2.5	8

Some programs or equipment guides may report under the old two-number system. In this case, simply drop the first number: */17/13.

READING POTENTIAL LIFE EXTENSION CHARTS

The following charts can be used to calculate the the potential useful life extension that can be achieved by moving from the current ISO cleanliness to a recommended ISO cleanliness level.

- · Find the current ISO cleanliness rating on the Y axis
- Move horizontally to the new target ISO cleanliness rating on the X axis
- · The corresponding box is the estimated life extension factor

Appendix - continued

For example, in the chart below, locate the current oil system ISO cleanliness code on the Y axis, 20/18/15. Move horizontally to the new target cleanliness level, 17/15/12. This gives a life extension factor for rolling element bearings a 1.7.

Maintaining the target cleanliness level of 17/15/12 means we can estimate the system components to last 1.7 times longer than at the current 20/18/15 ISO cleanliness level.

		New Cleanl	iness Level									
		22/20/17	21/19/16	20/18/15	19/17/14	18/16/13	17/15/12	16/14/11	15/13/10	14/12/9	13/11/8	12/10
	28/26/23	3	3.5	4	5	6	7.5	9	>10	>10	>10	>10
	27/25/22	2.5	3	3.5	4	5	6	7	9	>10	>10	>10
	26/24/21	2	2.5	3	4	5	6	7	8	10	>10	>10
	25/23/20	1.5	2	2.5	3	3.5	4	5	6	8	9	>10
	24/22/19	1.3	1.6	2	2.5	3	3.5	4	5	6	7	>10
	23/21/18	1.2	1.5	1.7	2	2.5	3	3.5	4	5	7	10
SS	22/20/17		1.2	1.5	1.7	2	2.5	3	4	5	7	9
line	21/19/16			1.2	1.5	1.7	2	2.5	3	4	6	8
lear	20/18/15				1.2	1.5	1.7	2	2.5	3	4.5	6
e C	19/17/14					1.2	1.5	1.7	2	2.5	3	5
chin	18/16/13						1.2	1.5	1.7	2	3.5	4
Ma	17/15/12							1.2	1.5	1.7	2	2.5
rent	16/14/11								1.3	1.6	1.8	2
Cur	15/13/10									1.2	1.5	1.8

ROLLING ELEMENT BEARINGS

Source: Noria Corporation, Fundamentals of Machinery Lubrication, Noria Skills Training

JOURNEY BEARINGS AND TURBO MACHINERY

		New Cleanl	iness Level									
		22/20/17	21/19/16	20/18/15	19/17/14	18/16/13	17/15/12	16/14/11	15/13/10	14/12/9	13/11/8	12/10
	28/26/23	4	4.5	6	6.5	7.5	8.5	10	>10	>10	>10	>10
	27/25/22	3	3.5	4.5	5	6.5	8	9	10	>10	>10	>10
	26/24/21	2.5	3	4	5	6.5	7.5	8.5	9.5	>10	>10	>10
	25/23/20	1.7	2.3	3	3.7	5	6	7	8	9.5	>10	>10
	24/22/19	1.4	1.8	2.3	3	3.5	4.5	5.5	7	8	10	>10
	23/21/18	1.2	1.5	1.8	2.2	3	3.5	4.5	5	7	9	10
SS	22/20/17		1.2	1.5	1.8	2.3	3	3.5	5	5	8	10
nine	21/19/16			1.2	1.5	1.8	2.2	3	3.5	5	7	9
lear	20/18/15				1.2	1.5	1.8	2.3	3	3.5	5.5	8
e C	19/17/14					1.2	1.5	1.8	2.3	3	4	6
chir	18/16/13						1.2	1.5	1.8	2.3	3.7	4.5
Za	17/15/12							1.2	1.5	1.8	2.3	3
rent	16/14/11								1.3	1.6	1.9	2.3
Cur	15/13/10									1.2	1.6	2

Source: Noria Corporation, Fundamentals of Machinery Lubrication, Noria Skills Training

GEAR BOXES AND OTHER SYSTEMS

		New Clean	liness Leve	I								
		22/20/17	21/19/16	20/18/15	19/17/14	18/16/13	17/15/12	16/14/11	15/13/10	14/12/9	13/11/8	12/10
	28/26/23	2.5	3	3.5	4	5	6.5	7	9	10	>10	>10
	27/25/22	2	2.5	3	3.5	4	5	6	7.5	9	>10	>10
	26/24/21	1.5	2	2.5	3	4	5	6	7	8	10	>10
	25/23/20	1.3	1.5	2	2.5	3	3.5	4	5	6.5	8.5	10
	24/22/19	1.1	1.3	1.7	2	2.5	3	3.5	4	5	5.5	8.5
	23/21/18	1.1	1.3	1.4	1.6	2	2.5	3	3.5	4	5.5	8
SSS	22/20/17		1.05	1.3	1.4	1.7	2	2.5	3	4	5.5	7
Jine	21/19/16			1.1	1.3	1.5	1.7	2	2.5	3.5	4.5	6
lear	20/18/15*				1.1	1.3	1.5	1.7	2	2.5	3.7	5
e O	19/17/14					1.1	1.3	1.5	1.7	2	2.5	3.5
Ichir	18/16/13						1.1	1.3	1.5	1.8	3	3.5
Š	17/15/12							1.1	1.4	1.5	1.8	2.2
rent	16/14/11								1.2	1.4	1.5	1.8
Cur	15/13/10									1.1	1.3	1.6

Source: Noria Corporation, Fundamentals of Machinery Lubrication, Noria Skills Training

HYDRAULIC SYSTEMS AND DIESEL ENGINES

		New Clean	liness Leve	1								
		22/20/17	21/19/16	20/18/15	19/17/14	18/16/13	17/15/12	16/14/11	15/13/10	14/12/9	13/11/8	12/10
	28/26/23	5	7	9	>10	>10	>10	>10	>10	>10	>10	>10
	27/25/22	4	5	7	9	>10	>10	>10	>10	>10	>10	>10
	26/24/21	3	4	6	7	9	>10	>10	>10	>10	>10	>10
	25/23/20	2	3	4	5	7	9	>10	>10	>10	>10	>10
	24/22/19	1.6	2	3	4	5	7	8	>10	>10	>10	>10
	23/21/18	1.3	1.5	2	3	4	5	7	9	>10	>10	>10
SSS	22/20/17		1.3	1.6	2	3	4	5	7	9	>10	>10
Jline	21/19/16			1.3	1.6	2	3	4	5	7	9	>10
lear	20/18/15				1.3	1.6	2	3	4	5	7	>10
D er	19/17/14					1.3	1.6	2	3	4	6	8
chir	18/16/13						1.3	1.6	2	3	4	6
Ma	17/15/12							1.3	1.6	2	3	4
rent	16/14/11								1.3	1.6	2	3
Cur	15/13/10									1.4	1.8	2.5

Source: Noria Corporation, Fundamentals of Machinery Lubrication, Noria Skills Training

	10,0	000	5,0	00	2,5	00	1,0	00	50	0	25	00	10	0	IJ	0
	Rolling Element	Journal	Rolling Element	Journal	Rolling Element	Journal	Rolling Element	Journal	Rolling Element	Journal	Rolling Element	Journal	Rolling Element	Journal	Rolling Element	Journa
50,00	0 2.3	1.6	3.3	1.9	4.6	2.3	7.8	2.9	11.2	3.5	16.2	4.3	26.2	5.5	37.8	6.7
) 25,000	0 1.6	1.3	2.3	1.6	3.3	1.9	5.4	2.4	7.8	2.9	11.2	3.5	18.2	4.6	26.2	5.5
10,00(C		1.4	1.2	2	1.5	3.3	1.9	4.8	2.3	6.9	2.8	11.2	3.5	16.2	4.3
5,00	C				1.4	1.2	2.3	1.6	3.3	1.9	4.8	2.3	7.8	2.9	11.2	3.5
с, 50(2,50)	C						1.6	1.3	2.3	1.6	3.3	1.9	5.4	2.4	7.8	2.9
1,00(•								1.4	1.2	2	1.5	3.3	1.9	4.8	2.3
50(C										1.4	1.2	2.3	1.6	3.3	1.9
25(0												1.5	1.3	2.3	1.6
7u Q	0														1.4	1.2
Source: Nor	ia Corporatic	on, Fundar	nentals of I	Machinery	Lubrication	, Noria Sk	tills Trainin	D								

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EXAMPLE:

- A circulating oil system contains oil with 1,000 ppm or 0.1 percent moisture content. Locate the box for 1,000 ppm in the current moisture level.
 - Move horizontally to the new target moisture level, 250 ppm or 0.025 percent.
- The life extension factor for the new, target moisture level would be a factor of 2.0 for rolling element bearings and a life extension factor of 1.5 for journal bearings.

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MOISTURE CONTENT

NLGI Grease Consistency Numbers

The National Lubricating Grease Institute has established a grease consistency category based on ASTM D217 Worked Penetration characteristics. Worked Penetration is defined as the distance that an ASTM cone under a specified load, at 25° C (77° F), penetrates in 5 seconds the smooth surface of a grease sample that has been subjected to 60 strokes in a grease worker. The greater the number defined in terms of the cone penetration, the softer the grease and the lower the NLGI number. Since the penetration scale is not continuous with the NLGI scale, i.e., there are lapses of 15 tenths of a millimeter between NLGI numbers, it is possible to design greases to fall between NLGI numbers. When this is done, unofficial half NLGI numbers are sometimes used.

NLGI Consistency Number	ASTM D217-10 Worked (60 Strokes) Penetration at 25°C(77°F), tenths of a millimeter
000	445 to 475
00	400 to 430
0	355 to 385
1	310 to 340
2	265 to 295
3	220 to 250
4	175 to 205
5	130 to 160
6	85 to 115

The results of two laboratories are considered different if they vary by more than 20 units.

Reprinted, with permission, from ASTM D217 Standard Test Methods for Cone Penetration of Lubricating Grease, copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standards may be obtained from ASTM, www.astm.org.

SAE Viscosity Grades for Engine Oils SAE J300 January 2015

Note: $1 \text{ mPa} \cdot s = 1 \text{ cP}; 1 \text{ mm}^2/s = 1 \text{ cSt}$

SAE	Low Temperature (°C) Cranking	Low Temperature (°C) Pumping	Low Shear Rate Kinematic Viscosity ^c , mm ² /s at 100°C		High Shear Rate Viscosity ^d mPars
Grade	Viscosity ^a , mPa∙s	Viscosity ^b , mPa∙s			at 150°C
	Мах	Max with No Yield Stress	Min	Max	Min
0W	6200 at -35	60,000 at -40	3.8	-	-
5W	6600 at -30	60,000 at -35	3.8	—	_
10W	7000 at -25	60,000 at -30	4.1	—	—
15W	7000 at -20	60,000 at -25	5.6	—	—
20W	9500 at -15	60,000 at -20	5.6	—	—
25W	13000 at -10	60,000 at -15	9.3	—	—
8	—	—	4.0	< 6.1	1.7
12	—	—	5.0	< 7.1	2.0
16	—	—	6.1	< 8.2	2.3
20	—	—	6.9	< 9.3	2.6
30	—	—	9.3	< 12.5	2.9
40	_	-	12.5	< 16.3	3.5 (0W-40, 5W-40 and 10W-40 grades)
40	_	_	12.5	< 16.3	3.7 (15W-40, 20W-40, 25W-40 and 40 grades)
50	-	—	16.3	< 21.9	3.7
60	-	—	21.9	< 26.1	3.7

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- a ASTM D5293: Cranking viscosity The non-critical specification protocol in ASTM D3244 shall be applied with a P value of 0.95.
- b ASTM D4684. Note that the presence of any yield stress detectable by this method constitutes a failure regardless of viscosity.
- c ASTM D445.
- d ASTM D4683, CEC L-36-A-90 (ASTM D4741), or ASTM D5481.
- All values, with the exception of the low-temperature cranking viscosity, are critical specifications as defined by ASTM D3244.

Kinematic viscosity ranges for SAE 8 to 20 viscosity grades partially overlap. In labeling a single-grade or multigrade oil meeting the kinematic viscosity requirements of more than one grade, only the highest viscosity grade satisfied by the HTHS viscosity shall be referred to on the label.
Automotive Gear Lubricant Viscosity Classification SAE J306 revised June 2005

SAE Viscosity Grade	Maximum Temperature for Viscosity of 150,000 cP, [°] C ^a , ^b	Kinematic Viscosity at 100°C, cSt ^c	
		Minimum ^d	Maximum
70W	-55 ^e	4.1	_
75W	-40	4.1	—
80W	-26	7.0	_
85W	-12	11.0	_
80	-	7.0	<11.0
85	-	11.0	<13.5
90	-	13.5	<18.5
110	-	18.5	<24.0
140	-	24.0	<32.5
190	-	32.5	<41.0
250	—	41.0	—

Note: 1 cP = 1 mPa"s; 1 cSt = 1 mm²/s

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- a Using ASTM D2983.
- b Additional low temperature viscosity requirements may be appropriate for fluids intended for use in light duty synchronized manual transmissions. See SAE J306 text.
- c Using ASTM D445.
- d Limit must also be met after testing in CEC L-45-A-99, Method C (20 hours).
- e The precision of ASTM Method D2983 has not been established for determinations made at temperatures below -40°C. This fact should be taken into consideration in any producer-consumer relationship.

This classification is based on the lubricant viscosity measured at both high and low temperatures. The high-temperature kinematic viscosity values are determined according to ASTM D445, with the results reported in centistokes (cSt). The low-temperature viscosity values are determined according to ASTM D2983 and these results are reported in centipoise (cP).

High temperature viscosity is related to the hydrodynamic lubrication characteristics of the fluid. Some gear lubricants may contain high molecular weight polymers, known as viscosity modifiers or viscosity index improvers, which function to increase the viscosity of the fluids. During use, these polymers may shear to a lower molecular weight, thereby resulting in a fluid with a lower viscosity than that of the new fluid. In order to ensure that the designated high temperature viscosity grade is retained during use, lubricants must meet the 100°C viscosity limits listed in Table 1 not only when new, but also following evaluation in CEC L-45-A-99, Viscosity Shear Stability of Transmission Lubricants, Method C (20 hours).

Low temperature viscosity requirements are related to the ability of the fluid to flow and provide adequate lubrication to critical parts under low ambient temperatures conditions. The 150,000 cP viscosity value used for the definition of low-temperature properties is based on a series of tests in a specific rear axle design. These tests have shown that pinion bearing failure has occurred at viscosities higher than 150,000 cP and the Brookfield method was shown to give adequate precision at this viscosity level. However, it should be pointed out that other axle designs may tolerate higher viscosities and fail at lower viscosities.



GLOSSARY

This Glossary is offered as a concise source of basic information about petroleum products—their properties, the processes by which they are made, the test methods used to assess product characteristics and assure consistent quality, and the types of equipment and materials that rely on petroleum products for their operation or manufacture.

An italicized word or phrase within a definition indicates that the term is defined separately under its own heading.

A

absolute viscosity — the ratio of shear stress to shear rate. It is a fluid's internal resistance to flow. The common unit of absolute viscosity is the poise (see *viscosity*). Absolute viscosity divided by the fluid's density equals kinematic viscosity.

absorption — the taking up, assimilation, or incorporation of one material into another.

acid — a chemical substance that can react with metals to form salts and with bases or alkalies to form salts plus water. Acids contain hydrogen and they form hydrogen ions (H+) in water. They are considered strong or weak depending on the hydrogen ion concentration in the solution.

acid number — see neutralization number.

additive — a chemical added in small quantities to a petroleum product to impart or improve certain properties.

AGMA — American Gear Manufacturers Association, which as one of its activities establishes and promotes standards for gears and lubricants.

alkaline — the property of a substance, product, or mixture that gives it the chemical character of a base or alkali, as contrasted to an acid.

aniline point — lowest temperature at which a specified quantity of aniline (a benzene derivative) is soluble in a specified quantity of a petroleum product, as determined by test method ASTM D611 or D1012; hence, an empirical measure of the solvent power of a hydrocarbon.

antioxidant – see *oxidation inhibitor*.

antiwear agent — an additive that minimizes wear caused by metal-to-metal contact during conditions of mild boundary lubrication (e.g., stops and starts, oscillating motion). The additive reacts chemically with, and forms a film on metal surfaces under normal operating conditions.

API (American Petroleum Institute) –

trade association of petroleum producers, refiners, marketers, and transporters, organized for the advancement of the petroleum industry by conducting research, gathering and disseminating information, and maintaining cooperation between government and the industry on all matters of mutual interest.

API Service Categories — gasoline and diesel engine oil quality levels established jointly by API, SAE, and ASTM, and sometimes called SAE or API/SAE categories.

API gravity — see *specific gravity*.

aromatic — unsaturated hydrocarbon identified by one or more benzene rings or by chemical behavior similar to benzene.

ash content — noncombustible residue of a lubricating oil or fuel, determined in accordance with ASTM D582 and D874 (sulfated ash).

ashless dispersant — cleanliness additive for crankcase oils. It is widely used in lubricants for aviation piston engines. Unlike conventional crankcase-oil detergents, ashless dispersants do not contain metallic compounds. See *dispersant*.

ASTM (American Society for Testing and

Materials) — an organization devoted to "the promotion of knowledge of the materials of engineering, and the standardization of specifications and methods of testing." A preponderance of the data used to describe, identify, or specify petroleum products is determined in accordance with ASTM test methods.

autoignition temperature — minimum temperature at which a combustible fluid will burst into flame without an extraneous ignition source.

B

base — one of a broad class of compounds that react with acids to form salts plus water.

base number — see *neutralization number*.

base oils — base stocks and base stock blends used as an inert ingredient or diluent in the manufacture of automotive and industrial lubricants, and some industrial, agricultural, and consumer chemicals.

base stock — a primary refined petroleum fraction, usually a lube oil, into which additives and other oils are blended to produce finished products.

bright stock — high viscosity oils, highly refined and dewaxed to make clear products of good color, produced from residual stocks, or bottoms; used for blending with lower viscosity oils.

Brookfield viscosity — apparent viscosity of an oil, as determined under test method ASTM D2983.

bulk modulus — measure of a fluid's resistance to compressibility; the reciprocal of compressibility.

С

carbon residue — percent of coked material remaining after a sample of lubricating oil has been exposed to high temperatures under ASTM D189 (Conradson) or D524 (Ramsbottom). Results of these tests are reported as a percentage of the weight of the original sample.

catalyst — substance that contributes to a chemical reaction without, itself, undergoing any change.

centipoises — see viscosity.

centistokes — see viscosity.

centralized lubrication — system under which grease or oil is dispensed automatically from a reservoir directly to the lubricated parts of one or more machines. Flow is maintained by a pump or battery of pumps operating on a common rail, and the amount of lubricant supplied to each point can be regulated by metering devices at each point.

channel point — a measure of the lowest temperature at which a gear lubricant may be used safely.

Cleveland Open Cup (COC) — test (ASTM D92) for determining the flash point and fire point of all petroleum products except fuel oil and products with flash points below 70°C (175°F).

cloud point — temperature at which a cloud or haze of wax crystals appears at the bottom of a sample of lubricating oil in a test jar, when cooled under conditions prescribed by test method ASTM D2500.

Cold Cranking Simulator (CCS) — a high shear viscometer used to measure viscosity of crankcase oils at low temperature (0°F).

compatibility — the ability of petroleum products to form a homogeneous mixture that neither separates nor is altered by chemical interaction.

compounded oil — special blend of petroleum oil with small amounts of fatty or synthetic fatty oils added to them to impart special properties.

compressor — any of a wide variety of mechanisms designed to compress air or other gas to produce useful work.

corrosion — chemical attack on a metal or other solid by contaminants in a lubricant or coolant.

corrosion inhibitor — additive for protecting metal surfaces against chemical attack by water or other contaminants.

cutting fluid — fluid, usually of petroleum origin, for cooling and lubricating the tool and work in machining and grinding.



demulsibility — ability of an oil to separate from water, as determined by ASTM D1401 or D2711.

detergent — an additive in crankcase oils generally combined with (and confused with) dispersant additives. A detergent chemically neutralizes acidic contaminants in the oil before they become insoluble and fall out of the oil, forming sludge.

detergent-dispersant — engine oil additive that is a combination of a detergent and a dispersant; important in preventing the formation of sludge and other engine deposits.

dielectric strength (breakdown volt-

age) — minimum voltage required to produce an electric arc through an oil sample, as measured by test method ASTM D877; hence, an indication of the insulating (arc preventive) properties of a transformer oil. A low dielectric strength may indicate contamination, especially by water.

dispersant — engine oil additive that helps prevent sludge, varnish, and other engine deposits by breaking up insoluble contaminant particles already formed. Particles are kept finely divided so that they can remain "dispersed" or colloidally suspended in the oil.

dropping point — the temperature at which a grease passes from a semisolid to a liquid state under specified test conditions ASTM D556. It is an indication of whether a grease will flow from a bearing at operating temperature.



emulsibility — the ability of an oil to emulsify with water. The oil becomes suspended in the water in minute particles in a more or less stable form.

emulsion — intimate mixture of oil and water, generally of a milky or cloudy appearance.

engine deposits — hard or persistent accumulations of sludge, varnish, and carbonaceous residues due to blow-by of unburned and partially burned (partially oxidized) fuel, or from partial breakdown of the crankcase lubricant.

EP additive — lubricant additive that prevents sliding metal surfaces from seizing under conditions of extreme pressure (EP). At the high local temperatures associated with metal-to-metal contact, an EP additive combines chemically with the metal to form a surface film that prevents the welding of opposing asperities, and the consequent scoring that is destructive to sliding surfaces under high loads.



film strength — property of a lubricant which acts to prevent scuffing or scoring of bearing surfaces.

fire point — the minimum sample temperature at which vapor is produced at a sufficient rate to sustain combustion. Specifically, it is the lowest sample temperature at which the ignited vapor persists in burning for at least 5 seconds.

flash point — minimum temperature of a petroleum product or other combustible fluid at which vapor is produced at a rate sufficient to yield a combustible mixture. Specifically, it is the lowest sample temperature at which the air vapor mixture will "flash" in the presence of an ignition source (small flame).

floc point — temperature at which waxy materials in a lubricating oil separate from a mixture of oil and FREON R-12 refrigerant, giving a cloudy appearance to the mixture.

fluid friction — A liquid's internal resistance to flow. See *friction*.

foaming — occurrence of a frothy mixture of air and a petroleum product (e.g., lubricant, fuel oil) that can reduce the effectiveness of the product, and cause sluggish hydraulic operation, air binding of oil pumps, and over-flow of tanks or sumps.

foam inhibitor — an additive which causes foam to dissipate more rapidly. It promotes the combination of small bubbles into large bubbles which burst more easily.

freezing point — a specific temperature that can be defined in two ways, depending on the ASTM test used.

friction — resistance to the motion of one surface relative to another. The a mount of friction is dependent on the smoothness of the contacting surfaces, as well as the force with which they are pressed together.



grease — mixture of a fluid lubricant (usually a petroleum oil) and a thickener (usually a soap) dispersed in the oil. Because greases do not flow readily, they are used where extended lubrication is required and where oil would not be retained.



heat of combustion — measure of the available energy content of a fuel, under controlled conditions specified by test method ASTM D240 or D2382.

hydrocarbon — chemical compound of hydrogen and carbon; also called an organic compound. Hydrogen and carbon atoms can be combined in virtually countless ways to make a diversity of products.

hydrolytic stability — ability of additives and certain synthetic lubricants to resist chemical decomposition (hydrolysis) in the presence of water.

Ι

ILSAC (International Lubricant Standardization & Approval Committee) —

composed of Japanese and U.S. automobile manufacturers, it initiates and promotes the development of passenger vehicle engine oil performance specifications.

inhibitor — additive that improves the performance of a petroleum product through the control of undesirable chemical reactions. See *corrosion inhibitor, oxidation inhibitor, rust inhibitor*.

inorganic compound — chemical compound, usually mineral, that does not include hydrocarbons and their derivatives.

insolubles — test for contaminants in used lubricating oils, under conditions prescribed by test method ASTM D893.

ISO — International Standards Organization.

ISO Cleanliness Code 4406:1999 -

developed by the International Standards Organization to measure contamination levels per milliliter of fluid at three sizes: 4 microns, 6 microns and 14 microns. Each number represents a contaminant level code for the correlating particle size including all particles of the specified size and larger. It is written as XX/YY/ZZ. See *micron*.

ISO viscosity classification system -

international system, approved by the International Standards Organization (ISO), for classifying industrial lubricants according to viscosity. Each ISO viscosity grade number designation corresponds to the mid-point of a viscosity range expressed in centistokes (cSt) at 40°C.

ISOSYN — ISOSYN[®] Technology is how Chevron formulates its top tier $Delo^{®}$ products. It's the combination of our premium base oils, high performance additives, with Chevron's formulation expertise that provides superb diesel engine parts protection. All at an outstanding value.

ISOSYN Advanced Technology – The

combination of Chevron's outstanding formulating expertise, unique high performance additive chemistry and premium base oils that helps extend the durability of critical diesel engine parts.



kinematic viscosity — absolute viscosity of a fluid divided by its density at the same temperature of measurement. It is the measure of a fluid's resistance to flow under gravity, as determined by test method ASTM D445.

load wear index — measure of the relative ability of a lubricant to prevent wear under applied loads; it is calculated from data obtained from the Four Ball EP Method.

lubrication — Control of friction and wear by the introduction of a friction-reducing film between moving surfaces in contact. The lubricant used may be a fluid, solid, or plastic substance.

lubricity — Ability of an oil or grease to lubricate; also called film strength. Lubricity can be enhanced by additive treatment.



melting point — the temperature at which a solid substance melts or becomes liquid. Grease melting point is determined by placing a small amount of the grease on the bulb of a thermometer and heating in hot air until the grease begins to run off. Also see *dropping point*.

micron — a unit of length equal to one millionth of a meter.

mineral oil — Any petroleum oil, as contrasted to animal or vegetable oils. Also, a highly refined petroleum distillate, or white oil, used medicinally as a laxative.

miscible — capable of being mixed in any concentration without separation of phases.

moly, molysulfide — see *molybdenum disulfide*.

molybdenum disulfide — a black, lustrous powder (MoS2) that serves as a dry-film lubricant in certain high temperature and high vacuum applications.

multigrade oil — engine oil that meets the requirements of more than one SAE (Society of Automotive Engineers) viscosity grade classification (see *SAE viscosity grades*), and may therefore be suitable for use over a wider temperature range than a single grade oil.

Ν

naphthene — hydrocarbon characterized by saturated carbon atoms in a ring structure, and having the general formula CnH2n; also called cycloparaffin or cycloalkane. See *pale oil*.

naphthenic — see *naphthene*.

neutralization number — also called neut number, an indication of the acidity or alkalinity of an oil; the number is the weight in milligrams of the amount of acid (hydrochloric acid [HCI]) or base (potassium hydroxide [KOH]) required to neutralize one gram of the oil, in accordance with test method ASTM D664 (potentiometric method) or ASTM D974 (colorimetric method).

neutral oils — paraffinic base oils of low or medium viscosity obtained in petroleum distillation and prepared by various methods. They derive their name from the fact that they have not been treated with either an acid or an alkali.

Newtonian fluid — fluid, such as a straight mineral oil, whose viscosity does not change with rate of flow.

NLGI (National Lubricating Grease Insti-

tute) — trade association whose main interest is grease and grease technology.

NLGI consistency grades — simplified system established by the National Lubricating Grease Institute (NLGI) for rating the consistency of grease.

NMMA — National Marine Manufacturers Association.



octane number — expression of the antiknock properties of a gasoline, relative to that of a standard reference fuel. There are two distinct types of octane number measured in the laboratory: Research Octane Number (RON) and Motor Octane Number (MON), determined in accordance with ASTM D2699 and D2700, respectively.

oil — a greasy unctuous liquid of vegetable, animal, mineral, or synthetic origin.

oxidation — a form of chemical deterioration to which petroleum products, like most other organic materials, are subject. The resistance of many petroleum products to oxidation, however, is very high. Oxidation usually involves the addition of oxygen atoms, and the result is nearly always one of degradation.

oxidation inhibitor — substance added in small quantities to a petroleum product to increase its oxidation resistance, thereby lengthening its service or storage life; also called an antioxidant.

oxidation stability — resistance of a petroleum product to oxidation; hence a measure of its potential service or storage life. There are a number of ASTM tests to determine the oxidation stability of a lubricant or fuel, all of which are intended to simulate service conditions on an accelerated basis.



pale oil — straight naphthenic mineral oil, straw or pale yellow in color, used as a once-through lubricant and in the formulation of process oils. Naphthenic lubricating oils have low pour points owing to their very low wax content, and good solvency properties.

paraffin — hydrocarbon identified by saturated straight (normal) or branched (iso) carbon chains. Paraffins are relatively nonreactive and have excellent oxidation stability. In contrast to naphthenic (see *naphthene*) oils, paraffinic lube oils have relatively high wax content and pour point, and generally have a high viscosity index.

paraffinic — see paraffin.

particle count — a report of the number and size (in microns) in a volume of fluid. See *micron*.

penetration (grease) — measure of the consistency of a grease, utilizing a penetrometer. Penetration is reported as the tenths of a millimeter (penetration number) that a standard cone, acting under the influence of gravity, will penetrate the grease sample under test conditions prescribed by test method ASTM D217. Standard test temperature is 25°C (77°F). The higher the penetration number, the softer the grease.

poise — CGS unit of absolute viscosity; shear stress (in dynes per square centimeter) required to move one layer of fluid along another over a total layer thickness of one centimeter at a shear rate of one centimeter per second. Dimensions are dyne-sec/cm². The centipoise (cP) is 1/100 of a poise and is the unit of absolute viscosity most commonly used.

pour point — is a widely used low temperature flow indicator and is 5°F above the temperature to which a normally liquid petroleum product maintains fluidity.

pour point depressant — additive used to lower the pour point of a petroleum product.

ppm – parts per million.

process oil — oil that serves as a temporary or permanent component of a manufactured product.



R&O — rust and oxidation-inhibited term applied to highly refined industrial lubricating oils formulated for long service in circulating systems, compressors, hydraulic systems, bearing housing, gear cases, etc. The finest R&O oils are often referred to as turbine oils. **rheology** — study of the deformation and flow of matter in terms of stress, strain, temperature, and time. The rheological properties of a grease are commonly measured by penetration and apparent viscosity.

rust inhibitor — a lubricant additive for protecting ferrous (iron and steel) components from rusting caused by water contamination or other harmful materials from oil degradation.



SAE (Society of Automotive Engi-

neers) — organization responsible for the establishment of many U.S. automotive and aviation standards, including the viscosity classifications of engine oils and gear oils.

SAE viscosity grades — engine oil classification system as outlined in the Society of Automotive Engineers (SAE) standard J300, based on the measured viscosity of the oil at either -18°C (0°F), using test method ASTM D2602, or at 100°C (212°F), using ASTM D445. If the viscosity is measured at -18°C, the grade number of the oil includes the suffix "W" (e.g., SAE 20W), denoting suitability for winter use.

shear — deformation which occurs when parallel planes of a body are displaced relative to each other in a direction parallel to themselves.

shear rate — rate at which adjacent layers of a fluid move with respect to each other, usually expressed as reciprocal seconds.

shear stability — ability of a fluid to maintain a stable shear rate over a period of time.

shear stress — frictional force overcome in sliding one "layer" of fluid along another, as in any fluid flow. The shear stress of a petroleum oil or other Newtonian fluid at a given temperature varies directly with shear rate (velocity). The ratio between shear stress and shear rate is constant; this ratio is termed viscosity. **sludge** — in gasoline engines, a soft, black, mayonnaise-like emulsion of water, other combustion by-products, and oil formed during low-temperature engine operation.

soap — the salt of an acid derived from animal or vegetable matter. Metallic soaps are used in the manufacture of grease.

specific gravity — for petroleum products, the ratio of the mass of a given volume of product and the mass of an equal volume of water, at the same temperature. The standard reference temperature is 15.6°C (60°F). Specific gravity is determined by test method ASTM D1298. The higher the specific gravity, the heavier the product.

STLE (Society of Tribology and

Lubrication Engineers) — an organization intended to advance the knowledge and application of lubrication and related sciences.

straight mineral oil — petroleum oil containing no additives.

sulfated ash — the ash content of fresh, compounded lubricating oil as determined by ASTM D874. Indicates level of metallic additives in the oil.

synthetic lubricant — a lubricating fluid made with synthetic base stock featuring higher lubrication performance than a conventional lubricant. A synthetic base stock is composed of chemically altered molecules. A synthetic base stock could be a severely hydroprocessed Group III oil, or it could be a chemically synthesized oil like a polyalphaolefin.

tackiness agent — additive used to increase the adhesive properties of a lubricant, improve retention, and prevent dripping and splattering. **texture** — that property of a lubricating grease which is observed when a small portion of it is compressed and the pressure slowly released.

thermal stability — ability to resist chemical degradation at high temperatures.

total acid number (TAN) — see *neutralization number*.

total base number (TBN) — see *neutralization number*.

tribology — science of the interactions between surfaces moving relative to each other. Such interactions usually involve the interplay of two primary factors: the load, or force, perpendicular to the surfaces, and the frictional force that impedes movement.

V

viscosity — measurement of a fluid's resistance to flow. The common metric unit of absolute viscosity is the poise, which is defined as the force in dynes required to move a surface one square centimeter in area past a parallel surface at a speed of one centimeter per second, with the surfaces separated by a fluid film one centimeter thick.

viscosity index — empirical, unitless number indicating the effect of temperature change on the kinematic viscosity of an oil. Liquids change viscosity with temperature, becoming less viscous when heated; the higher the viscosity index of an oil, the lower its tendency to change viscosity with temperature.

viscosity index improver — lubricant additive, usually a high molecular weight polymer, that reduces the tendency of an oil to change viscosity with temperature. Multigrade oils, which provide effective lubrication over a broad temperature range, usually contain viscosity index improvers.

Volatile Organic Compounds (VOC) -

any organic compound that evaporates or vaporizes under operating conditions. There are many government regulations regarding the release of VOCs.

volatility — expression of evaporation tendency. The more volatile a petroleum liquid, the lower its boiling point and the greater its flammability.

W

wear — the attrition or rubbing away of the surface of a material as a result of mechanical action.

Ζ

ZDDP (zinc dialkyl dithiophosphate or

zinc diaryl dithiophosphate) — widely used as an antiwear agent in motor oils to protect heavily loaded parts, particularly the valve train mechanisms (such as the camshaft and cam followers) from excessive wear. It is also used as an antiwear agent in hydraulic fluids and certain other products.