How much ash is too much and how much is not enough?

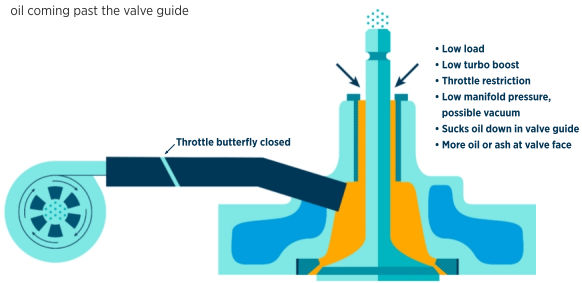
Additional considerations of low load on engines

VS

Additional considerations of high load on engines

Ashless oil

- Low intake manifold pressure/vacuum may pull additional oil past valve guides and piston rings resulting in
  - Increased combustion chamber deposits
  - Increased oil consumption
- Small naturally aspirated (non-turbocharged) engines may use valve guide seals to reduce oil coming past the valve guide
- Some small engines running at reduced load can benefit from ashless oil use although this is against the recommendation of some OEMs.



Low ash oil

- When operated at high loads the intake manifold pressure is positive pushing oil up the guide.
- Intake and combustion pressures are also higher helping to push piston rings against the liner for a tighter seal.
- Higher combustion pressures push the valves harder against the seat which can accelerate wear if the ash cushion is absent.
- Engine temperature is also often higher which helps flash off moisture from the oil sump.
- Elevated temperatures may increase oil degradation for faster oxidation, nitration and liner lacquering.
- Low ash oils work better in these conditions with better base number retention, detergency to prevent deposits and valve cushioning.