



# TECHNICAL DATA

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## 9000 SUPREME 9000 SAE 5W-40 FULL SYNTHETIC ENGINE OIL

Supreme 9000 SAE 5W-40 is a full synthetic premium quality heavy-duty engine oil specially formulated to extend engine life, while providing for extended drain capability and improved fuel economy benefits. Supreme 9000 SAE 5W-40 exceeds the current requirements for API CJ-4 and is particularly suitable for use in emission compliant engines that utilize heavy EGR and exhaust after-treatment devices such as diesel particulate filters (DPFs) with or without diesel oxidation catalysts (DOCs). Supreme 9000 SAE 5W-40 can also be used in low- emission certified diesel engines that are equipped with EGR, older non-EGR containing diesel engines, off-highway diesel engines that are powered by either high, low or ultra- low sulfur diesel fuels, high performance gasoline engines and mixed fleet applications.

Supreme 9000 SAE 5W-40 is blended from a unique combination of select synthetic base fluids to provide the following advantages:

- Superior cold cranking and oil pumpability at low temperatures.
- Exceptional oxidative and thermal stability especially at high engine operating temperatures.
- Exceptional low volatility characteristics to control oil consumption.
- A high viscosity index.
- Improved fuel economy benefits.
- Extended oil drain capability and intervals.

Today's low emission diesel engines generate higher amounts of soot and operate at higher operating temperatures than older diesel engines. In addition current tighter engine designs reduce oil consumption, resulting in less fresh oil make-up to replenish additives. The top piston rings are located higher bringing the oil film closer to the combustion chamber, thus exposing the engine oil to severe thermal stresses. All of these factors in addition to the use of heavy EGR and exhaust after-treatment devices such as diesel particulate filters (DPFs) with or without diesel oxidation catalysts (DOCs) require the need for the engine oil to contain an advanced additive system that will enhance the engine oil's ability to protect against soot overloading, high temperature deposit formation, while providing TBN retention and extended drain capabilities.

Blended into Supreme 9000's synthetic base stocks is a balanced proprietary heavy-duty diesel additive technology and a highly shear stable viscosity index improver which provide the following performance benefits:

- Excellent wear and deposit control protection.
- Superior thermal and oxidative stability.
- Superior soot busting capabilities to prevent soot build-up and agglomeration.
- Exceptional thermal stability, for outstanding performance at high engine operating temperatures.
- Excellent TBN retention and reserve for effective acid neutralization throughout the oil drain interval.
- Excellent protection against acidic corrosion of vital components.
- Excellent soot dispersancy for protection against soot overloading, increases in viscosity due to soot thickening and soot abrasive wear.
- Enhanced detergency to provide high temperature piston cleanliness, protection against bore polishing and scuffing and increased engine cleanliness.
- Excellent protection against low temperature sludge build-up and high temperature deposits.
- Reduced high temperature carbon build-up – both in single and two-piece pistons.
- Exceptional ring and liner wear protection that results in improved oil consumption control.
- Excellent shear stability for stay-in-grade performance throughout the entire oil drain interval.
- Excellent cold weather start-ability and pumpability for better cold temperature starts.

- Excellent anti-foaming properties to protect against aeration and foaming.
- Superior low volatility characteristics to control oil consumption.
- Longer filter life especially at high soot levels for better engine protection.
- Excellent high temperature/high shear performance to provide excellent oil film thickness and engine protection at high operating temperatures and shear rates.
- Exceptional valve-train wear protection especially during high soot conditions.
- Excellent resistance to corrosion and corrosive and abrasive wear
- Excellent gasket and seal life.
- Prolonged after-treatment (dpf and doc) life.
- Improved fuel economy and longer drain intervals for lower overall maintenance costs.
- Increased engine life, improved engine durability and reliability for reduced maintenance costs due to downtime.

Supreme 9000 SAE 5W-40 also contains two proven frictional modifiers, Micron Moly®, a liquid soluble type of Moly and Schaeffer Mfg's own proprietary additive Penetro® . Once plated, these frictional modifiers form a long lasting, slippery, tenacious lubricant film, which prevents metal-to-metal contact and damaging frictional wear which results in:

- Increased Fuel Economy.
- A Low Coefficient of Friction.
- Significantly Less Bearing, Ring, Piston, Cylinder and Valve-Train Wear.
- Increased Engine Efficiency, Durability and Life.
- Less Downtime and Reduced Maintenance

Supreme 9000 SAE 5W-40 meets and exceeds the following manufacturers' specifications and requirements: Military Specifications MIL-PRF-2104H and A-A-52306A; API Service Classifications CJ-4/CI-4/SN; CI-4 Plus; Global Specification DHD-1; JASO DH-1 and DH-2; Mack EO-O Premium Plus-07; Caterpillar; Caterpillar CAT ECF-1-a, CAT ECF-2, CAT ECF-3; Cummins CES 20081; Detroit Diesel 7SE 270; Detroit Diesel Power Guard Oil Specification 93K218; MTU Category Type 2 and 2.1; Navistar; ACEA E7-16 and E9-16; Deutz; Mercedes-Benz MB 228.3 and MB 228.31; Volvo VDS-4; MAN 271; MAN 3275-1; MAN 3575; MTU Category Type 2 and 2.1; Renault RLD-2 and RLD-3; Scania LA, LD-F and LDF-2; Iveco; and DAF

## TYPICAL PROPERTIES

SAE Grade	<b>5W-40</b>
Viscosity 40°C cSt (ASTM D445)	85.50-89.00
Viscosity 100°C cSt (ASTM D445)	13.50 –15.00
CCS Viscosity @ -30°C cP (ASTM D5293)	5,700
High Temperature High Shear Viscosity 302°F/150°C Cp (ASTM D4683)	4.05
Mini-rotary Viscosity-TP.1 @ -35°C cP (ASTM D4684)	20,900
Viscosity Index (ASTM D2270)	164
Flash Point °F/°C (ASTM D92)	437°/225°
Stable Pour Point °F/°C (FTM 7916 Method 203)	<-41°/-42°
Sulfated Ash Content % Wt. (ASTM D874)	0.98
Total Base Number (ASTM D2896)	9
NOACK Volatility (ASTM D5800) % Evaporation Loss @ 250°C	11%
Shear Stability % Viscosity Loss 90 Passes (ASTM D7109)	10%
Foam Test (ASTM D892 Option A)	
Sequence I	0/0
Sequence II	0/0
Sequence III	0/0
High Temperature Foam Test (ASTM D6082 Option A)	0/0
Sequence IIIG % Viscosity@ 40°C EOT	130%