



# TECHNICAL DATA

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## 500 ECO5000™ SAE 15W-40 API CJ-4/CI-4/CI-4 PLUS/SM

Eco5000™ SAE 15W-40 is a premium quality, parasynthetic, heavy-duty diesel engine oil that is formulated with highly re-refined Group II base oils. Eco5000™ SAE 15W-40 is formulated to provide improved soot handling capabilities, oxidation resistance and extended wear protection. Eco5000™ SAE 15W-40 is recommended for use in all types of diesel engines operating on both less than 500 ppm and ultra-low sulfur diesel fuel. Eco5000™ SAE 15W-40 exceeds the current requirements for API CJ-4 and is particularly suitable for use in low emission compliant engines that utilize heavy EGR and exhaust after-treatment devices such as diesel particulate filters (DPFs), diesel oxidation catalysts (DOCs) and selective catalytic reduction (SCR). Eco5000™ SAE 15W-40 can also be used in low- emission certified diesel engines that are equipped with EGR, older, non-EGR containing diesel engines, all types of off-highway diesel engines, especially Tier 3, Tier 4 Interim and Tier 4 Final off-highway engines, high performance gasoline engines and mixed fleet applications.

ECO5000™ SAE 15W-40 is blended from a unique combination of the finest quality, severely hydrotreated polyalphaolefin (PAO) synthetic base fluids, virgin and re-refined severely hydrotreated and hydrocracked Group II Plus available. This unique combination provides Eco5000™ SAE 15W-40 with the following advantages:

1. **Fullfills Federal directives and mandates for governmental agencies to use recycled/recovered materials including Executive Order 13423; Section 6002 of RCRA and CFR48Subpart 23.4**
2. **A low carbon footprint, since re-refined base oils produce less greenhouse and toxic emissions, consume less energy and reduce the demand for crude oil**
3. **Superior cold weather startability via lower engine cold-cranking and oil pumpability temperatures which allow for better cold temperature starts.**
4. **Superior thermal and oxidative stability.**
5. **Excellent low volatility characteristics that provide exceptional oil consumption control and prevent deposit formation on critical engine parts.**
6. **High viscosity index**

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7. **Low sulfur content.** This ensures that exhaust after-treatment devices are protected against catalyst poisoning and accumulation of particulate material, which can lead to reduced engine performance, due to increased backpressure and ultimately the failure of the exhaust after-treatment device.
8. **Extended oil drain intervals.** Based on OEM and used oil analysis recommendations.

Blended into the Eco5000™'s base stock combination is a balanced, proprietary, heavy-duty diesel additive technology and a highly shear stable viscosity index improver. This combination provides Eco5000™ 15W40 with the following performance benefits:

1. **Excellent wear and deposit control protection**
2. **Superior soot busting capabilities to prevent soot build-up and agglomeration**
3. **Exceptional thermal stability, for outstanding performance at high engine operating temperatures**
4. **Excellent TBN retention and reserve for effective acid neutralization throughout the entire oil drain interval**
5. **Excellent protection against acidic corrosion of vital engine components**
6. **Excellent soot dispersancy for protection against soot overloading, increases in viscosity due to soot thickening and soot abrasive wear**
7. **Enhanced detergency to provide high temperature piston cleanliness and protection against bore polishing and scuffing**
8. **Increased engine cleanliness**
9. **Excellent protection against low temperature sludge build-up and high temperature deposits**
10. **Reduced high temperature carbon build-up – both in single and two-piece pistons**
11. **Exceptional ring and liner wear protection which provides improved oil consumption control**
12. **Excellent shear stability for 'stay-in-grade' performance throughout the entire oil drain interval**
13. **Excellent anti-foaming properties protect against aeration and foaming**
14. **Superior low volatility characteristics to control oil consumption.**
15. **Longer filter life, especially at high soot levels for better engine protection**
16. **Excellent high temperature/high shear performance provides excellent oil film thickness and engine protection at high operating temperatures and shear rates**

- 17. Exceptional valve-train wear protection, especially during high soot conditions**
- 18. Superb resistance to corrosive and abrasive wear**
- 19. Excellent gasket and seal life**
- 20. Prolonged after-treatment (DPF and DOC) life**
- 21. Improved fuel economy**
- 22. Longer drain intervals for lower overall maintenance costs**
- 23. Improved engine durability and reliability which leads to increased engine life, especially for older model engines, and reduced maintenance costs due to reduced downtime.**

Further blended into these synthetic blend base fluids, the highly advanced proprietary, low ash, performance additive package and shear stable viscosity index improver are two proven frictional modifiers, Micron Moly®, a liquid soluble type of Moly and Schaeffer Mfg.'s own proprietary additive Penetro®. These two proven frictional modifiers, once plated, form a long lasting, slippery, tenacious lubricant film, which prevents metal-to-metal contact and further prevents damaging, frictional wear. This prevention of metal-to-metal contact and reduction in wear results in:

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

Eco5000™ 15W40 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/SM; CI-4 Plus; Global Specification DHD-1; JASO DH-1 and DH-2; Mack EO-O Premium Plus-07; Caterpillar; Caterpillar ECF-1-a, ECF-2 ECF-3; Cummins CES 20081; Detroit Diesel 7SE 270; Detroit Diesel Power Guard Oil Specification 93K218; Detroit Diesel Series 2000/4000 Category 1; MTU Category Type II; Navistar; ACEA E7-12 and E9-12; Deutz; Mercedes-Benz MB228.3, MB 228.31, MB 228.5, MB 229.1, and MB229.5; Volvo VDS-4; MAN 271; MAN 3275; MTU Oil Category Type 2; Renault RLD-3; Scania LD-F and LDF-2; Inveco; and DAF.

**TYPICAL PROPERTIES**

SAE Grade	15W-40
Specific Gravity @ 60°F/15°C	0.87 – 0.88
Viscosity @ 40°C cSt (ASTM D-445)	95 – 110
Viscosity @ 100°C cSt (ASTM D-445)	14.00-15.50
CCS Viscosity @ -20°C cP (ASTM D-5293)	6,000
Mini-rotary Viscosity TP-1 @ -25°C cP (ASTM D-4684)	20,000
High Temperature High Shear Viscosity 302°F/150°C cP	4.0
Viscosity Index (ASTM D-2270)	150
Flash Point °F/°C (ASTM D-92)	440°/221°
Fire Point °F/°C (ASTM D-92)	490°/254°
Pour Point °F/°C (ASTM D-97/D-5950)	-38°/<-39°
Sulfated Ash Content % Wt. (ASTM D-874)	0.951
Total Base Number (ASTM D-2896)	10
NOACK Volatility (ASTM D-5800)	
% Evaporation Loss @ 250°C	10.15%
Shear Stability % Viscosity Loss – 90 Passes (ASTM D-7109)	9.9%
Foam Test (ASTM D-892 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 III G	
% Viscosity Increase @ 40°C EOT	75%