



## **LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL**

### **Premium Motor Oil For Heavy-Duty Diesel and Gasoline Engines**

#### **PRODUCT DESCRIPTION**

PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL is a truly exceptional motor oil that exceeds the stringent performance requirements of the API CI-4, CI-4 PLUS classification, Caterpillar ECF-1, Cummins CES 20078, Cummins CES 20077, Cummins CES 20076, Mack EO-N PREMIUM PLUS 03, Mercedes 228.3, Volvo VDS-3 and Global DHD-1. PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL provides excellent quality in both on-and off-highway applications and in both diesel and gasoline engines, including diesel engines incorporating Exhaust Gas Recirculation (EGR).

PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> SAE 15W-40 HEAVY DUTY MULTIGRADE ENGINE OIL is formulated so that it resists shear down, viscosity loss and thickening from heavy soot loading and oxidation, even under extreme circumstances, such as extended oil drains of up to twice the normal interval. PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL has been tested and proven effective in all kinds of engines, including Caterpillar, Cummins, Detroit Diesel, Mack, Mercedes, International, Volvo, as well as others, running for many hours and miles, under the harshest conditions imaginable. It is formulated to be tough enough, strong enough and durable enough to handle the way you manage your fleet.

PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> SAE 15W-40's unique additive system has been combined with Pennzoil's PureBase<sup>®</sup> base oil. PureBase<sup>®</sup> was developed through an innovative refining process in which crude oil is distilled and molecularly restructured. PureBase<sup>®</sup> base oil enables the Long-Life<sup>®</sup> additive system to disperse and suspend soot at greater levels, extending drain intervals in certain conditions and applications. This is a critical requirement in EGR engines.

October 2002 and more current diesel engines must emit significantly fewer oxides of nitrogen (NO<sub>x</sub>) emissions out of the exhaust. As a result, much more soot is generated and deposited in the crankcase. Soot inside the engine, if uncontrolled, can cause considerable damage. Soot particles that are deposited in the engine over time can agglomerate, making larger particles. This can cause oil to thicken, restricting oil flow, reducing fuel economy and shortening engine life by inflicting damage to the moving parts of the engine. PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL has outstanding soot control, which helps protect your engine against brutal wear and helps extend engine life.

PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL is available in single viscosity grades SAE 10W, 30, 40, and 50, and as multi-grades SAE 15W-40 and SAE 10W-30. PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL SAE 30 and 40 exceed the requirements for API performance categories CF-4, CF-2, CF/SJ. PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL SAE 50 meets the requirements of API CF-2, CF/SJ. PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL SAE 15W-40 and SAE 10W-30 exceed the requirements of API CI-4 PLUS (SAE 15W40), CI-4, CH-4, CG-4, CF-4, CF/SL performance categories. PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL SAE 10W meets the requirements of API CF Service Classification and meets Vickers 35VQ25.

PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL SAE 15W-40 and SAE 10W-30 will maintain their viscosity under conditions of high temperature and high stress, helping protect moving parts from friction, wear and engine destroying metal-to-metal contact. PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> HEAVY DUTY ENGINE OIL SAE 15W-40 and SAE 10W-30 have outstanding resistance to "shearing out" of viscosity grade, so they can continue to provide the oil film and wear protection necessary, even under extended drain interval conditions.

## **APPLICATION**

PENNZOIL® LONG-LIFE® HEAVY DUTY ENGINE OIL is truly a universal oil. It is recommended for use in over-the-road diesel trucks, heavy-duty construction equipment, mining equipment, oil field engines, farm vehicles and passenger cars. Because it is also recommended for gasoline engines, PENNZOIL® LONG-LIFE® HEAVY DUTY ENGINE OIL provides mixed-fleet operators the convenience of a single line of motor oils for all vehicles.

PENNZOIL® LONG-LIFE® HEAVY DUTY ENGINE OIL can be used with complete confidence for extended oil drain intervals when combined with used oil monitoring maintenance practices. Always change oil as specified by the engine manufacturer to maintain your warranty.

PENNZOIL® LONG-LIFE® HEAVY DUTY ENGINE OIL meets or exceeds the performance requirements of the following diesel engine manufacturers: Caterpillar, Cummins, Detroit Diesel, International, Mack Trucks, Mercedes, Volvo, as well as others. PENNZOIL® LONG-LIFE® HEAVY DUTY ENGINE OIL also meets or exceeds the performance requirements of the following gasoline engine manufacturers: Daimler-Chrysler, Ford, and General Motors. PENNZOIL® LONG-LIFE® HEAVY DUTY MULTIGRADE ENGINE OIL is recommended wherever engine manufacturers specify the use of an engine oil meeting API Service Classification CI-4 PLUS, CI-4, CH-4, CG-4, CF-4, CF and SL, or any combination of these. Always refer to the vehicle owner's manual for the correct viscosity choice.

PENNZOIL® LONG-LIFE® HEAVY DUTY ENGINE OIL meets the performance requirements of military Commercial Item Descriptions (C.I.D.) A-A-52039A and A-A-52306. PENNZOIL® LONG-LIFE® HEAVY DUTY ENGINE OIL also meets the transmission fluid requirements of Caterpillar TO-2 and Allison C-4 specifications.

## **BENEFITS**

- Helps extend engine life
- Provides a shield against all forms of wear
- Helps maintain fuel economy
- Helps reduce oil consumption
- Outstanding soot control
- Consistent oil pressure for thorough engine lubrication
- Advanced PureBase® base oil technology
- Backed by Pennzoil's limited warranty
- Recommended for both diesel and gasoline engines - single line of motor oils for mixed fleets
- Recommended for engines incorporating Exhaust Gas Recirculation (EGR)
- Recommended for turbocharged diesel engines
- Minimizes piston and combustion chamber deposits
- Fights sludge and varnish
- Effectively neutralizes acids to help keep corrosive wear to a minimum
- Contains anti-wear and anti-scuff agents
- SAE 10W-30 and 15W-40 exceed Caterpillar TO-2 and Allison C-4 transmission fluid specifications
- SAE 10W and SAE 30 are suitable for use in applications specifying the use of Allison C-4 performance fluids
- SAE 10W-30 and 15W-40 meet the requirements of Caterpillar ECF-1 specification
- SAE 15W-40 is approved by Mack as an EO-N PREMIUM PLUS 03, EO-N & EO-M PLUS quality engine oil
- SAE 10W-30 is approved by Mack as an EO-N & EO-M PLUS quality engine oil
- SAE 15W-40 is Volvo VDS-3 & VDS-2 approved
- Cummins CES 20078, CES 20077, CES 20076, CES 20072 & CES 20071 performance, SAE 15W-40
- DaimlerBenz Sheet 228.3 performance; SAE 15W-40
- ACEA E3 and E5; SAE 15W-40
- Detroit Diesel 93K214; SAE 15W-40
- Global DHD-1 performance and JASO DH-1 performance: SAE 15W-40

**TYPICAL PHYSICAL AND CHEMICAL PROPERTIES  
PENNZOIL® LONG-LIFE® HEAVY DUTY ENGINE OIL**

TEST	METHOD	TYPICAL RESULTS		
SAE Viscosity Grade	SAE J300	15W-40	10W-30	10W
API Service Category	SAE J183	CI-4 PLUS, CI-4, CH-4, CG-4, CF-4, CF/SL	CI-4, CH-4, CG-4, CF-4,CF/SL	CF
Gravity				
Specific @ 60°F(15.6°C)	ASTM D-287	0.881	0.875	0.877
°API		29.1	30.2	29.7
Pounds per Gallon		7.35	7.28	7.33
Flash Point, °C(°F) Min.	ASTM D-92	205(400)	205(400)	205(400)
Pour Point, °C(°F).	ASTM D-97	-33 (-27)	-39 (-38)	-30(-22)
Color	ASTM D-1500	4.0	4.0	4.5
Viscosity				
@ 40°C, cSt	ASTM D-445	118	78	38
@ 100°C, cSt	ASTM D-445	15.8	11.7	6.5
Viscosity Index	ASTM D-2270	136	144	120
High Temperature/High Shear Vis., cP	ASTM D-4683	4.3	3.5	2.4
Low Temperature Viscosity				
Vis (cP) at Temperature (°C)	ASTM D-2602	6,400 @-20	6,500@-25	7,000 max @-25
Low-Temperature Pumping, cP. (°C)	ASTM D-4684	23,000 @-25	25,000@-30	60,000max @-30
Sulfated Ash Content, % wt.	ASTM D-874	1.3	1.3	<1.0
Shear Stability, % Vis Loss	DIN Method	<4.0	< 4.0	--
Total Base Number	ASTM D-2896	11	11	6 min
Material Number				
Bulk		3710	1437	3720
55 Gallon Drum		3716	158775	3726
5 Gallon Pail		3714	158777	3724
2.5 Gallon Ea., Case of 2		3715		
1 Gallon Ea., Case of 4		56796		

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TEST	METHOD	TYPICAL RESULTS		
SAE Viscosity Grade	SAE J300	30	40	50
API Service Category	SAE J183	CF-4, CF-2, CF/ SJ	CF-4, CF-2, CF/ SJ	CF-2, CF/ SJ
Gravity				
Specific @ 60°F(15.6°C)	ASTM D-287	0.880	0.882	0.880
API		29.3	28.9	29.0
Pounds per Gallon		7.33	7.34	7.35
Flash Point, °C(°F) Min.	ASTM D-92	205(400)	205(400)	205(400)
Pour Point, °C(°F).	ASTM D-97	-30 (-22)	-24 (-11)	-20 (-4)
Color	ASTM D-1500	4.5	5.0	6.0
Viscosity				
@ 40°C, cSt	ASTM D-445	97	146	229
@ 100°C, cSt	ASTM D-445	10.9	14.4	19.0
Viscosity Index	ASTM D-2270	107	103	102
High Temperature/High Shear Vis., cP	ASTM D-4683	3.8	4.6	5.7
Low Temperature Viscosity				
Vis (cP) at Temperature (°C), Max.	ASTM D-2602	--	--	--
Low-Temperature Pumping, cP (°C),Max	ASTM D-4684	--	--	--
Sulfated Ash Content, % wt.	ASTM D-874	<1.0	<1.0	<1.0
Shear Stability, % Vis Loss	DIN Method	--	--	--
Total Base Number	ASTM D-2896	7	7	7
Material Number				
Bulk		3740	3750	
55 Gallon Drum.		3746	3756	3766
5 Gallon Pail		3744	3754	3764
2.5 Gallon Ea., Case of 2		3745	3755	
1 Gallon Ea., Case of 4		3747	3757	
1 Quart Ea., Case of 12		3743	3753	