



## LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS

### Long Service Life, Tough Protection For Heavy-Duty Truck Axles

#### PRODUCT DESCRIPTION

The trucking industry is a vastly different business than it was a generation ago. Customers demand just-in-time deliveries to keep their factories running and their stores stocked. Margins are thinner. Trucks are bigger, heavier, and driven at higher speeds than they were a few years ago. Streamlined designs and fairings allow for less airflow and higher operating temperatures. Conditions are tough in the trucking industry – and it's a business that never stops. You can't afford to be on the side of the road waiting for your truck axle to be repaired because your gear oil couldn't stand up to the test. That's why we formulated PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS – axle lubricants tough enough for your truck.

Just as the trucking industry has changed, gear lubricants have changed. LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS are formulated with PureBase<sup>®</sup> - our highly refined base oils – and unique, state-of-the-art performance additives to meet today's challenges of heavier trucks, higher speeds, higher temperatures and extended drain intervals. These lubricants have earned Dana Corporation's SHAES-256 approval (formerly known as Eaton PS-163) for extended warranty drive axles operating on 500,000 mile initial drains and 250,000 mile extended service fill drain intervals. As such, they will be found on the list of E500<sup>™</sup> "Approved Lubricants for Extended Warranties", providing protection under the Roadranger<sup>®</sup>\* 750,000 mile extended warranty program (500,000 mile factory/250,000 mile service fill drain intervals). LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS have also received approval under the new ArvinMeritor (formerly Rockwell) O76-Q "Extended Drain Hypoid Lubricants" specification, allowing their use at 500,000 mile drain intervals in ArvinMeritor truck axles equipped with pump and filtration systems. In years past, approvals for extended drain intervals were reserved only for synthetic fluids. PENNZOIL<sup>®</sup> LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS have also received Mack Trucks, Inc. GO-J and MIL-PRF-2105E approvals.

To earn the Dana SHAES-256 and ArvinMeritor O76-Q approvals, LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS were subjected to over 50 million miles of actual field testing in truck axles of fleets hauling goods under a wide variety of temperatures and conditions. The oil from the axles in the 100-vehicle test fleet was analyzed regularly, and axles were torn-down and inspected by Dana and ArvinMeritor personnel to ensure adequate protection for axles under their extended warranty programs. LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS also underwent rigorous and extensive laboratory testing.

The additive technology in PENNZOIL<sup>®</sup> LONG-LIFE<sup>™</sup> EXTENDED WARRANTY GEAR OILS provides outstanding protection of gears, bearings and differentials in heavy-duty axles from damage due to wear and shock loading. It is especially good at resisting spalling. The frictional properties of LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS provide for excellent power divider operation for optimum wheel performance—a feature that is especially important in heavy-duty off-road axle operation. And the additives in LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS are highly stable, will not separate, and maintain their effectiveness in the presence of heat, as well as when exposed to water from rain, snow or truck washes.

LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS are specially engineered to deliver outstanding cold weather performance—with low temperature mobility equivalent to their synthetic counterparts. This feature helps guard against wear during cold temperature start-ups.

LONG-LIFE<sup>®</sup> EXTENDED WARRANTY GEAR OILS effectively inhibit oxidation and resist the effects of heat. They meet API MT-1 requirements and provide the latest in "Clean Gear" performance. These attributes help reduce the loss of lubricant due to seal degradation, as these gear oils are less likely to form harmful, abrasive deposits.

\* Roadranger<sup>®</sup> is a registered trademark of the Eaton Corporation

## APPLICATION

PENNZOIL® LONG-LIFE® EXTENDED WARRANTY GEAR OILS are formulated for use in universal duty hypoid or spiral bevel-gear truck differentials of over-the-road truck fleets, as well as in off-road vehicle axles. These lubricants exceed all performance requirements of Dana SHAES-256 (formerly Eaton PS-163), ArvinMeritor O76-Q, Mack GO-J, API GL-5, MT-1 and MIL-PRF-2105E specifications. LONG-LIFE® EXTENDED WARRANTY GEAR OILS can be used in Dana® Spicer® drive axles for extended drain intervals of 500,000 mile factory fill and 250,000 mile service fill , in ArvinMeritor axles equipped with pumps and filter for extended drain intervals of 500,000 miles, and in Mack axles operating on standard drain intervals.

LONG-LIFE® EXTENDED WARRANTY GEAR OILS are available in SAE grades 75W-90 and 80W-140 and can be used wherever an API GL-5 SAE grade 75W-90, 80W-140, 75W, 80W, 90 or 140 gear lube is recommended.

LONG-LIFE® EXTENDED WARRANTY GEAR OILS are completely compatible with both synthetic and mineral-based axle lubricants at any ratio, under a wide variety of operating conditions. The additive will not separate or fall out when used to top-off synthetic fluids, as is often seen with competitive mineral-based fluids. This allows for easy top-off and refill of truck axles with no need for flushing between lubricants.

LONG-LIFE® EXTENDED WARRANTY GEAR OILS will also find application in Mack heavy-duty truck or bus manual transmissions. Both grades of LONG-LIFE® EXTENDED WARRANTY GEAR OILS can be used in Mack truck manual transmissions, if changed at 200,000-mile intervals. It is worth noting that Eaton and ZFMeritor do not allow the use of API GL-5, MT-1 gear oils in their heavy duty transmissions.

It should also be noted that most axle oils are not compatible with transmission fluids. Mixing of the two lubricants should be avoided as it may result in incompatibility and additive separation.

## BENEFITS

- Meets Dana SHAES-256 (formerly Eaton PS-163) specification, for use at 500,000 mile factory fill and 250,000 mile service fill drain intervals
- Meets ArvinMeritor (formerly Rockwell) O76-Q specification, for use at 500,000 mile drain intervals
- Mack Trucks, Inc. GO-J approved
- U.S. Military specification MIL-PRF-2105E approved
- Meets API GL-5 & MT-1 specifications
- Outstanding protection against wear
- Low temperature performance equivalent to synthetics
- Compatible with synthetic and mineral-based gear lubes—facilitates top-off and refill of axles
- Resists deposit formation to protect seals from premature degradation and subsequent lubricant loss
- Inhibits oil oxidation for clean operation and long lubricant life
- No additive fallout in the event of water contamination
- Provides outstanding anti-foam protection
- Combats rust and corrosion

**TYPICAL PHYSICAL AND CHEMICAL PROPERTIES  
PENNZOIL® LONG-LIFE® EXTENDED WARRANTY GEAR OILS**

<b>TEST</b>	<b>METHOD</b>	<b>75W-90</b>	<b>80W-140</b>
SAE Grade		75W-90	80W-140
API Service		GL-5 & MT-1	GL-5 & MT-1
Dana Corporation		SHAES-256	SHAES-256
ArvinMeritor		O76-Q	O76-Q
Mack Trucks, Inc.		GO-J	GO-J
U.S. Military / LRI		MIL-PRF-2105E	MIL-PRF-2105E
Gravity, °API	ASTM D-287	30.6	28.8
Specific Gravity	ASTM D-1298	0.8729	0.8827
Density	ASTM D-1298	0.8721	0.8819
Lbs/gal		7.27	7.34
Viscosity	ASTM D-445		
@ 40°C, cSt		114.8	247.6
@ 100°C, cSt		16.84	27.40
@ 100°F, SUS		587.4	1285
@ 210°F, SUS		87.11	134.5
Viscosity Index		160	145
Brookfield Viscosity			
Typical cP	ASTM D-2983	110,000 @ -40°C (-40°F)	60,000 @ -26°C (-15°F)
Pour Point, °C(°F)	ASTM D-97	-48(-54)	-39(-38)
Flash Point, °C(°F)	ASTM D-92	158(316)	188(370)
Color, ASTM	ASTM D-1500	1.5	1.5
Material Numbers			
Bulk		62742	62741
35 Pound Plastic Pail		62734	62736
120 Pound Drum		62738	62737
400 Pound Drum		62739	62740