

LUBRICANT REVIEW INSTITUTE (LRI) OVERVIEW

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HISTORY OF SAE J2360/MIL-L-2105

- From 1943, the US Army had qualified lubricants to its specifications, partly based on recommendations from an advisory body that it sponsored.
- During the World War II (WWII) era, there were several documented examples when gear oil used in military vehicles caused the axles to become inoperable.
- At that time, Army's Ordnance Lubrication Program governed two varieties of gear oil.
- Failure analyses indicated that the causes of these oil-related performance problems often included one or more of the following:
 - The oil exhibited an unexpected higher or lower viscosity.
 - An inadequate volume of oil, causing oil starvation.
 - Gearing had heavy wear, scoring or missing teeth.
 - Internal components had corrosion.
 - The corrosion was often accompanied by visibly-wet oil.



HISTORY OF SAE J2360 MIL-L-2105 (CONTINUED)

- In a post-war effort to address those performance concerns, the US military met with the SAE around 1952 and formally requested a new military gear oil specification be created.
- These efforts, completed in 1960, included research and development of test procedures to replicate the performance of hypoid gear lubricants utilizing the temperatures, point-source loadings, and sliding velocity conditions of automotive hypoid gears.
- These test sequences initiated the use of the following test designations:
 - L-33: Resistance of gear lubricants to moisture corrosion;
 - L-37: Dynamic evaluation of a gear lubricant's ability to perform under conditions of low speed and high torque;
 - L-42: Dynamic evaluation of gear lubricant's ability to perform under conditions of high speed and shock loading;
 - L-60: Measurement of gear lubricant thermal and oxidative stability.

HISTORY OF SAE J2360 MIL-L-2105 (CONTINUED)

- Then in 1977, the US Army contracted the Society of Automotive Engineers (SAE) to review and make recommendations on candidate products based on military performance specifications.
- SAE created the Lubricant Review Institute (LRI), which established a Gear Lubricant Review Committee.
- This allows the US Army to retain responsibility for approving and qualifying products to its specifications.
- Performance Review Institute (PRI) has been involved in the Lubricant Review Institute since 1998, when SAE International transferred the administrative function to PRI and a Qualified Product List was developed.
 - MIL-L-2105 was then converted into SAE J2360
 - <https://www.p-r-i.org/qpl/lubricant-review-institute>.

KEY TESTING CRITERIA

- List of key SAE J2360 tests for gear oils include:
- Chemical and Physical Testing
 - L-33-1 (ASTM D7038): Evaluation of Moisture Corrosion Resistance
 - L-37-1 (ASTM D8165): Evaluation of Load-Carrying (Low-Speed & High Torque)
 - L-42 (ASTM D7452): Evaluation of the Load Carrying (High Speed & Shock Loading)
 - L-60-1 (ASTM D5704): Evaluation of Thermal and Oxidative Stability
 - Seals (ASTM D5662): Gear Oil Compatibility with Typical Oil Seal Elastomers
 - Light-Duty and Heavy-Duty Field Trials

KEY TESTING CRITERIA

Additional Military Requirements

- Extended L-60-1 (ASTM D5704): Evaluation of the Thermal and Oxidative Stability
- FED-STD-791F; Method 7504.0: Efficiency of Axle Gear Lubricants
- FED-STD-791F; Method 7506.0 Gear Lubricant Compatibility for Stryker Vehicle Limited Slip Differential Clutches