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Standard Specification for Performance of Manual Transmission Gear Lubricants¹

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1. Scope

1.1 This specification lists the test methods and acceptance criteria for determining the acceptability of lubricants used in nonsynchronized heavy duty manual transmissions.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 ASTM Standards:²

D130 Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test

D892 Test Method for Foaming Characteristics of Lubricating Oils

D5182 Test Method for Evaluating the Scuffing Load Capacity of Oils (FZG Visual Method)

D5579 Test Method for Evaluating the Thermal Stability of Manual Transmission Lubricants in a Cyclic Durability Test

D5662 Test Method for Determining Automotive Gear Oil Compatibility with Typical Oil Seal Elastomers

D5704 Test Method for Evaluation of the Thermal and Oxidative Stability of Lubricating Oils Used for Manual Transmissions and Final Drive Axles

2.2 Federal Standards:³

Federal Standard No. 791C, Method 3430.2 Compatibility Characteristics of Universal Gear Lubricants

Federal Standard No. 791C, Method 3440.1 Storage Solubility Characteristics of Universal Gear Lubricants

2.3 SAE Publications:⁴

SAE J2360 Lubricating Oil, Gear Multipurpose (Metric) Military Use

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *nonsynchronized transmission, n*—a transmission having no means for synchronizing the speeds of engaging elements. Typical heavy-duty manual transmissions have no such means for gear engagement by the shift lever, but may have such means for pneumatic engagement of auxiliary range gears.

3.1.2 *oil seal compatibility, n*—in lubricants for lubricating manual transmissions and final drive axles, prevention of chemical or thermal degradation of seal elastomers typically observed as hardening, cracking, or excessive swelling in a manner which would result in oil leakage.

3.1.3 *thermal oxidation, n*—in lubricants used for lubricating manual transmissions and final drive axles, deterioration of the lubricant under high-temperature conditions which is observed as viscosity increase of the lubricant, insolubles formation in the lubricant, deposit formation on the parts, or a combination thereof.

4. Performance Classification

4.1 *API Category MT-1*—The designation API Category MT-1 identifies the category of lubricants intended for use in nonsynchronized manual transmissions, apart from API Service Category GL-4. See **Appendix X1** for background information on this category.

5. Performance Requirements

5.1 API Category MT-1 performance requirements for candidate gear lubricants are provided in **Table 1**.

6. Number of Tests and Retests

6.1 *Test Method D5704*—In determining whether an oil meets the required limits the following rules shall apply:

6.1.1 No more than three operationally valid tests are to be conducted for compliance testing.

¹ This specification is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.B0.03 on Automotive Gear Lubricants & Fluids.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

⁴ Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, <http://www.sae.org>.