SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

SAE J2363

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Submitted for recognition as an American National Standard

Lubricating Oil for Wheeled Military Vehicles with Heavy-Duty Diesel Engines

1. Scope

1.1 General—This SAE Standard describes lubricating oils meeting the API performance categories CF, CF-2, and CG-4, and the SAE J300. These oils are suitable for the lubrication of wheeled vehicles with compression-ignition (diesel) engines. This document is equivalent to the military's Commercial Item Description A-A-52306 when all requirements are met.

1.2 Intended Use—The lubricating oils described by this document are only intended for use in the engines of Tactical Wheeled vehicles equipped with compression-ignition engine systems. It is not a replacement for SAE J2359 (Lubricating Oil, Internal Combustion Engine, Military Combat/Tactical Service), nor is it intended for use in transmissions or hydraulic systems.

2. References

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein. Unless otherwise specified, the latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J300—Engine Oil Viscosity Classification
SAE J2359—Lubricating Oil, Internal Combustion Engine, Military Combat/Tactical Service

2.1.2 API PUBLICATION—Available from American Petroleum Institute, Marketing Department Program Manager, ESCS Program, 1220 L Street NW, Washington, DC 2005.

API 1509—The API Engine Oil Licensing and Certification System

2.1.3 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 92—Test Method for Flash and Fire Points by Cleveland Open Cup
ASTM D 97—Test Methods for Pour Point of Petroleum Oils
ASTM D 287—Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)
ASTM D 445—Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)
ASTM D 524—Test Method for Ramsbottom Carbon Residue of Petroleum Products

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ASTM D 664—Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration
ASTM D 874—Test Method for Sulfated Ash from Lubricating Oils and Additives
ASTM D 1091—Test Methods for Phosphorus in Lubricating Oils and Additives
ASTM D 2270—Method for Calculating Viscosity Index from Kinematic Viscosity at 40 and 100 °C
ASTM D 2622—Test Method for Sulfur in Petroleum Products (X-Ray Spectrographic Method)
ASTM D 2896—Test Method for Total Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration
ASTM D 3228—Test Method for Total Nitrogen in Lubricating Oils and Fuel Oils by Modified Kjeldahl Method
ASTM D 4047—Test Method for Phosphorus in Lubricating Oils and Additives by Quinoline Phosphomolybdate Method
ASTM D 4628—Test Method for Analysis of Barium, Calcium, Magnesium, and Zinc in Unused Lubricating Oils by Atomic Absorption Spectrometry
ASTM D 4629—Test Method for Organically Bound Trace Nitrogen in Liquid Petroleum Hydrocarbons by Oxidative Combustion and Chemiluminescence Detection
ASTM D 4739—Test Method for Base Number Determination by Potentiometric Titration
ASTM D 4927—Test Methods for Elemental Analysis of Lubricant and Additive Components—Barium, Calcium, Phosphorus, Sulfur, and Zinc by Wavelength-Dispersive X-Ray Fluorescence Spectroscopy
ASTM D 4951—Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry
ASTM D 5185—Test Method for Determination of Additive Elements, Wear Metals, and Contaminants in Used Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry

2.1.4 GOVERNMENT PUBLICATIONS—Available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

FED-STD-313—Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities
FED-STD-791—Lubricants, Liquid Fuels and Related Products; Methods of Testing

2.1.5 U.S. DEPARTMENT OF LABOR (DOL) (OSHA)—Available from the OSHA Publication Office, Room S-4203, 200 Constitution Avenue, NW, Washington, DC 20210.

OSHA 29 CFR 1910.1200—Hazard Communication; Interpretation Regarding Lubricating Oils

3. Classification

3.1 Viscosity Grades—The lubricating oils shall be of the grades in Table 1:

TABLE 1—VISCOSITY GRADES

Viscosity Grade	Performance Level
SAE 15W-40	CF, CF-2, CG-4
SAE 30	CF, CF-2
SAE 40	CF, CF-2

4. Salient Characteristics

4.1 Materials—The engine lubricating oils shall be derived from petroleum fractions, synthetically-produced fractions, or a combination of the two types of products. They may be virgin or re-refined stocks or a combination thereof. The stocks shall be compounded with such functional additives (detergents, dispersants, oxidation inhibitor, corrosion inhibitors, etc.) as necessary to meet the specified requirements (see Sections 5 and 6).

4.2 Performance—The engine lubricants shall meet the SAE J300, the American Petroleum Institute (API) performance level identified herein and described in API Publication 1509. The lubricating oils shall carry the API donut symbol and shall meet all the requirements and characteristics for the performance level herein specified (see 3.1).

4.2.1 STORAGE AND COMPATIBILITY—The oils shall show no evidence of separation or color change when they are tested in accordance with FED-STD-791 (FTMS) Method 3470 and using designated reference oils as required by the test. Reference oils can be obtained from SAE. A test report for each formulation offered must be provided at the time of solicitation.

4.3 Physical and Chemical Requirements—The lubricating oils shall meet all the physical and chemical properties required for all the previously specified performance levels (see 3.1), SAE J300, and those in Table 2. Typical values are to be provided for each salient physical and chemical property listed in Table 2 for each formulation offered at the time of solicitation and for those properties required to meet the performance level herein specified (see 3.1), and SAE J300. Section 4.3.1 is required only for military contracts unless otherwise requested.

TABLE 2—LUBRICATING OIL PROPERTIES

Property	SAE 15W-40	SAE 30	SAE 40	ASTM Test Procedure or Federal Test Method Standard (FTMS)
Viscosity Kinematic, cSt @ 40 °C	X	X	X	D 445
Viscosity Index	X	X	X	D 2270
Pour Point, °C max.	–25	–18	–15	D 97
Stable Pour Point, °C max.	–25	—	—	FTMS 203
Flash Point, °C min.	215	220	225	D 92
Gravity, °API	X	X	X	D 287
Carbon Residue, Mass %	X	X	X	D 524
Sulfated Ash, Mass %	X	X	X	D 874
Total Acid Number	X	X	X	D 664
Base Number	X	X	X	D 2896, D 4739(1)
Phosphorus, Mass %	X	X	X	D 1091(1), D 4047, D 5185, D 4927, D 4951
Sulfur, Mass %	X	X	X	D 2622, D 4927, D 4951(1), D 5185
Nitrogen, Mass %	X	X	X	D 3228(1), D 4629
Metallic Components, Mass %	X	X	X	D 4628, D 4927, D 4951(1), D 5185

X = Report Typical Value.

1. Denotes preferred method.

4.3.1 FORMULATION DATA—The contractor shall provide the name, type, percent, and manufacturer of all base stocks and additive packages for each formulation to be supplied under contract or order, or used in performance testing. Each formulation must be identified by a formula number or oil code, and if more than one code is used for a formulation, then all codes associated with that formulation must be indicated. In addition, the contractor must identify which formulation was used to run each performance test. This information shall be provided to the contracting officer at the time of solicitation.

4.3.1.1 Base Stocks—The contractor shall identify all base stocks used in each formulation offered or used in performance testing by base stock name, manufacturer, and type of base stock according to Appendix E of API 1509. The data listed in Table E-1 (Appendix E - API 1509) shall be included for all base stocks.

4.3.1.2 *Additives*—The contractor shall identify all additive systems used in each formulation offered or used in performance testing by additive package name, manufacturer, and type of additive system (i.e., Detergent Inhibitor (DI), Viscosity Improver Type (OCP, SIP, PMA, etc.), Pour Point Depressant, etc.). If there are read-across between different formulations, then an explanation on how the additive systems relate to one another must be provided.

5. Regulatory Requirements

5.1 **Hazard Communication Standard—**The stocks used shall not be considered carcinogenic or potentially carcinogenic as defined under the Hazard Communication Standard OSHA 29 CFR 1910.1200.

5.2 **Toxicity—**The engine lubricating oil shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate departmental medical service who will act as an advisor to the contracting agency. The contractor shall have the toxicological formulations and associated information available for review by the contracting activity to evaluate the safety of the material for proposed use.

5.3 **Recovered Material—**The offeror/contractor is encouraged to use recovered materials in accordance with Public Law 94-580 to the maximum extent possible. When re-refined base stocks are sought, the minimum content to be used in the formulation shall be indicated in the contract or solicitation.

6. Quality Assurance Provisions

6.1 **Contractor Certification—**The contractor shall certify and maintain substantiating evidence, that the product offered meets the salient characteristics of this document, and that the product conforms to the producer's own drawings, specifications, standards, quality assurance practices, and the information provided in 6.4.

6.2 **Market Acceptability (MA)—**The contractor shall provide products which have a proven market record based on the number of items sold, length of time the product has been on the market, and reliability and performance of the products as required under the contract or solicitation.

6.3 **Inspection and Test—**The inspection and testing of products to be supplied under the document shall use the following tolerances. These will be used to determine acceptability of the physical and chemical properties of SAE grade products supplied under contract unless otherwise specified. The typical properties of the offered product(s) (see 4.3) will be used to assign tolerances according to Table 3. In no case will tolerances assigned, based on the typical properties provided, be outside the established limits indicated, including the SAE J300 viscosity requirements. The inspection and testing of products to be supplied under the document shall be specified in the contract or order.

6.4 **Pre-Review Process—**Awards will be made only for products which have been pre-reviewed by the Lubricant Review Institute Engine Oil Review Committee. The attention of the contractors is called to the requirement and manufacturers are urged to arrange to have their products pre-reviewed in order that they may be eligible to be awarded contracts or orders for the products covered by this document. Copies of the Lubricants Review Institute Engine Oil procedures are available from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096-0001, Attention: Secretary of the Lubricant Review Institute.

TABLE 3—LUBRICANT TOLERANCES

Property	Tolerance Range(1)
Kinematic Viscosity @ 100 °C	X ± 1.00 cSt, but must fall within the herein specified limits.
Kinematic Viscosity @ 40 °C	X ± 10 cSt.
Apparent Viscosity, cP; @ –15 °C and @ –20 °C	SAE 15W-40 must meet requirement according to SAE J300
High Temperature/High Shear	SAE 15W-40 must meet requirement according to SAE J300
Pumpability @ –25 °C	SAE 15W-40 must meet requirement according to SAE J300
Viscosity Index	SAE grades 30 and 40 shall be ≥80.
Pour Point	Must meet requirement indicated in the physical and chemical requirements.
Flash Point	Meet requirement indicated in the physical and chemical requirements.
Gravity, °API	X ± 1.0 °API
Total Base Number	X ± 1 TBN number
Sulfur	0.90 x (typical value); minimum and 1.20 x (typical value), maximum
Nitrogen	0.90 x (typical value); minimum
Other Elements: Zinc, Phosphorus, Calcium, Magnesium, Barium, Sodium, Copper, Boron, and Molybdenum.	0.90 x (typical value); minimum, and 1.20 x (typical value); maximum

1. Tolerances will be calculated from the accepted typical physical and chemical properties provided at the time of the solicitation for each formulation identified.

7. Packaging

7.1 Preservation, Packaging, Packing, Labeling, and Marking—Preservation, packaging, labeling, and marking shall be as specified in the contract or order. The container will be as specified in the contract or order.

8. Notes

8.1 Ordering Data—The procuring agency should specify the preferred options permitted herein and include the following information in procurement documents:

a. Title, number, and date of this document.
b. SAE grade of oil required.
c. Quantity of oil required.
d. Type and unit of issue required.
e. The certification requirement as indicated in 5.1 must be included in the solicitation/contract.
f. When this document is used for procurement, the inspection and test clause must appear in the solicitation.
g. Market Acceptability requirements must appear in the solicitation.

8.2 National Stock Numbers (NSN)—The following NSN's are for use by the Government and do not constitute a requirement on the contractor, unless required by the contract or order. The lubricating oils provided under this document can be ordered using the NSN's in Table 4:

TABLE 4—NATIONAL STOCK NUMBERS

National Stock Numbers	SAE Viscosity Grade	Unit Issue
9150-01-352-2962	15W-40	5 gal plastic container
9150-01-351-9018		55 gal drum
9150-01-351-9016	30	Box 12 1-qt. plastic bottles
9150-01-352-8090		5 gal plastic container
9150-01-351-9015		55 gal drum
9150-01-352-8091	40	55 gal drum

PREPARED BY THE SAE MILITARY/INDUSTRY LUBRICANT COMMITTEE