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MIL-STD-3004-2A
16 November 2020
MIL-STD-3004-2
11 September 2018

# DEPARTMENT OF DEFENSE STANDARD PRACTICE

## QUALITY ASSURANCE AND SHELF-LIFE EXTENSION TESTING FOR PACKAGED FUELS, LUBRICANTS AND RELATED PRODUCTS

## Part 2 of 2

AMSC N/A

FSC 91GP

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# FOREWORD

1. This Standard is approved for use by all Departments and Agencies of the Department of Defense (DoD).

2. The information in this Standard was extracted from MIL-STD-3004D w/Change 1, dated 28 Mar 2016, to facilitate the transfer of Quality Assurance (QA) policy responsibilities for Packaged Petroleum Products from Defense Logistics Agency (DLA) Energy to DLA Aviation. DLA Aviation also has responsibility for chemicals (packaged and bulk).

3. Certain provisions of this Standard are subject to international standardization agreements. When an amendment, revision, or cancellation of this Standard is proposed which would affect or violate the international agreement concerned, the preparing activity will take appropriate reconciliation action through international standardization channels, including departmental standardization offices, if required.

4. The tables in this Standard are numerous; therefore, they are located after the end of Section 6 but preceding the Appendices.

5. Unless specifically stated, all references to government documents and non-government publications shall refer to the most recent version or revision of that document or publication.

6. References to the Quality Assurance Representative (QAR) include Military Service personnel designated to perform these functions.

7. Regarding changes from previous issue, margin notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

8. Comments, suggestions, or questions on this document should be addressed to DLA Aviation - VEB, ATTN: VEB, 8000 Jefferson Davis Hwy. Richmond, VA 23397-5616, or email: stdznmgt@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at https://assist.dla.mil.



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## SUMMARY OF CHANGE

Changes are at the request of various organizations and services. The DoD Shelf-Life Laboratory reviewed and concurs with all changes. Hereafter, the DoD Shelf-Life Laboratory will be referred to as SLL.

1. Revised cover page and 1.1 to reflect that the standards usage is to define testing required for shelf-life extension. Includes wording on types of testing not covered by this standard.

2. Added the following materials to the specification. This involved adding the specification to the cited section and table.

a. MIL-PRF-46176, 2.2.1 – was in table IV but not 2.2.1.
b. MIL-PRF-32538, 2.2.1, table IV
c. SAE J1704, 2.2.3, table VI
d. A-A-59313, 2.2.1, table IX
e. MIL-PRF-907, 2.2.1, table IX
f. MIL-PRF-83483, 2.2.1, table IX
g. MIL-DTL-32353, 2.2.1, table IV
h. DoD-L-24651, 2.2.1, table IV
i. A-A-50433, 2.2.1, table V

3. Made changes to the following materials. This involved changes to the cited table. Specific changes are not noted in this summary.

a. Tables IV through X, multiple materials – added “none” to “military symbol” and “NATO code” if previously blank, revised previous N/A to “none” if applicable, corrected existing codes as required.
b. Tables IV through X – if a minimum retest frequency was not listed, set at 12 months. This allowed deletion of table II “REMARKS” column.
    i. DoD-G-24650
    ii. A-A-59313
    iii. MIL-PRF-907
    iv. MIL-PRF-83483
c. Tables IV through X, multiple materials – when additional tests specified in table end notes, clarified which materials note applies to.
d. MIL-PRF-85734, table IV
e. MIL-PRF-2104, table IV – also removed OE/HDO-5/40 as this is not in the specification.
f. MIL-PRF-7808, table IV
g. MIL-PRF-9000, Table IV
h. MIL-PRF-21260, Table IV
i. MIL-PRF-46167, table IV – note on cancellation /supersession removed, document has been re-instated as “Active”.
j. SAE J1899, table IV
k. SAE J1966, table IV
l. DoD-G-24650, table V



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m. MIL-G-25537, table V
n. MIL-PRF-10924, table V
o. MIL-DTL-23549, table V
p. MIL-PRF-24139, table V
q. MIL-PRF-32014, table V
r. A-A-59354, table VI
s. MIL-PRF-6083. table VI
t. MIL-PRF-46170, table VI
u. MIL-PRF-17672, table VI – also military symbols and NATO codes had been reversed
v. SAE J1703, table VI
w. MIL-DTL-25681, table VII
x. MIL-PRF-81329, table VII

4. Deleted the following materials due to cited reason.

a. A-A-58092, 2.2.1, table IX – not extendable
b. A-A-59132, 2.2.1, table IX – not deteriorative
c. MIL-L-19701, 2.2.1, table V – cancelled 22 October 2019
d. MIL-L-23398, 2.2.1, table VII – not extendable
e. MIL-PRF-46010, 2.2.1, table VII – not extendable
f. MIL-PRF-46147, 2.2.1, table VII – not extendable
g. MIL-W-12062, 2.2.1, table VIII – no NSNs, no service procurement
h. SAE AS87132, 2.2.3, table VII – not extendable
i. MIL-W-20553, 2.2.1, table VIII – cancelled 13 September 2019

5. Other changes

a. 1.2 – corrected from “bulk” product to “packaged” product. Added clarification on shelf life purpose of the standard
b. 2.2.1 – updated “Air and Space Interoperability Council (ASIC)” to “Air Force Interoperability Council (AFIC)”.
c. 2.2.1 and various tables – updated or corrected several specification numbers.
d. 2.2.2, US Government Forms – deleted DD Form 250 as it was only cited in section 3.40 which has been deleted.
e. 2.3 and various tables – removed extra spaces in multiple document designations.
f. 3.15 – deleted at recommendation of SLL as not relevant to type B-2 testing.
g. 3.16 – deleted at recommendation of SLL as not relevant to type B-2 testing.
h. 3.17.1 – Added for clarification of 3.30. Numbering per MIL-STD-962D w/Change 2, 5.18.6 to avoid renumbering of the rest of the document.
i. 3.20.1, 3.28, 3.40.1, 3.56.1, 3.60.1, 3.62, 3.64, 3.66, 3.67.1, 3.69.1, 3.69.2 – Added or revised definitions as requested.
j. 3.34 – added text that type of test is not addressed in the standard.
k. 3.36 – deleted at recommendation of SLL as not relevant to type B-2 testing.
l. 3.38 – deleted at recommendation of SLL as not relevant to type B-2 testing.
m. 3.40 – deleted at recommendation of SLL as not relevant to type B-2 testing.
n. 3.44 – revised to reflect that 55 USG or more is bulk.



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o. 3.46 – deleted at recommendation of SLL as not relevant to type B-2 testing.
p. 3.47 – revised section to better define PQDR system
q. 3.56 – added text that Quality Surveillance includes shelf-life extension
r. 3.61 – deleted at recommendation of SLL as not relevant to specification.
s. 3.71 – added test cross-referencing Quality Surveillance.
t. 3.78 – added text that this type of test is not addressed in the standard
u. 3.79 – added text that this type of test is not addressed in the standard.
v. 3.80 – added text that this type of testing is for shelf-life extension.
w. 3.81 – added text that this type of test is not addressed in the standard.
x. 3.82 – added text that this type of test is not addressed in the standard.
y. 3.86 – deleted at recommendation of SLL as not relevant to type B-2 testing.
z. 4.3 – revised as requested
aa. 4.8 – revised wording for clarity.
bb. 5.3 – added text on when receiving test are not required. Taken from table II notes.
cc. 5.11.j – revised wording to also require quantity remaining information.
dd. 5.12 – revised for clarity.
ee. 5.12.1 – deleted as contamination test is no longer included in the document.
ff. 5.12.7 – Revised similar to 4.3.
gg. 5.13.1 and 5.16.2.1 – updated POC information as needed.
hh. 5.14.11 – added Expiration date to container marking requirements
ii. 5.15.1 – revised wording for clarity.
jj. 5.15.3.d and e – revised as requested.
kk. 5.16.1 – subsection b. and c. deleted at recommendation of SLL as not relevant to packaged product. Subsection a. combined into main section.
ll. 5.16.2 – subsections b. and d. deleted at the recommendation of the SLL as Intra-Governmental Receipt Limits only relate to bulk product, not packaged product. Subsequent section relettered.
mm. 5.16.2.e (2) – deleted word tank (now “storage”, not “storage tank”).
nn. 5.16.2.e (9) – deleted last sentence of subsection at SLL recommendation as contamination testing is not addressed by this standard.
oo. 5.16.2.1 – corrected paragraph numbering. There were 2 paragraphs with number 5.16.2. Per the index, the second paragraph (Service and DLA responsibilities) should be 5.16.2.1.
pp. 5.16.3.2 – revised to reflect current procedures.
qq. 5.16.3.3 and 5.16.3.4 – deleted at SLL recommendation as reclamation is not covered by this standard.
rr. 5.16.4 and all subsections – deleted at SLL recommendation as reclamation is not covered by this standard
ss. Table I, Gasoline Aviation – revised note to clarify test frequency.
tt. Table II, “When Sampled” column – deleted “contamination” from part (b) and all of part (c) as not being covered by this standard.
uu. Table II, “Remarks” column – deleted column and added 12 month test frequency in relevant tables. Only applied to 4 materials.
vv. Table II, original note 1 – deleted, added information to 5.3 “Product receipt”.
ww. Table II, original note 2 (new note 1) – revised to cite table IV to X below, deleted wording of MIL-STD-3004-2.



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xx. Table II, new note 2 – added note that unidentifiable or potentially contaminated products should be discarded.
yy. Table III – deleted as type B-1 and C testing are not covered by this standard.
zz. Table V, Characteristics – changed Oxidation stability time on 1 sheet from 50 hr to 100 hr to match other sheets (no material on changed sheet calls for OS).
aaa. Table VII, MIL-PRF-81329 – revised test frequency note to clarify test and discard date as specified by SLL.
bbb. Table VII, deleted original note 5 (Discard 6 months from the date of manufacture) as it was not cited in the table. Updated previous note 6 to note 5.
ccc. Table X, updated multiple note citations, notes have not been changed.
ddd. Tables IV-X – added cross-references to notes to denote material and or test being referenced. Also moved notes from end of each page to end of table.
eee. Multiple tables – moved note on "list of approved labs" to Appendix A.
fff. A.2 – Deleted table A-I and replaced with note to see website.
ggg. B.2.3, Fuel System Icing Inhibitor – Deleted on request. Renumbered subsequent sections.
hhh. B.2.4, Lubricity – Deleted on request. Renumber subsequent sections.
iii. C.1.1 – deleted the following as they were not in or are no longer referenced in the standard:

| | | |
|---|---|---|
| i. | ACS | American Chemical Society |
| ii. | CoA | Certificate of Analysis |
| iii. | EA | Executive Agency |
| iv. | IGRL | Inter-Governmental Receipt Limits |
| v. | PAS | Pre-Award Survey |
| vi. | RC | Recertification Certificate |
| vii. | RR | Receiving Report |
| viii. | SDS | Safety Data Sheet |
| ix. | WAWF | Wide Area Work Flow |

6. Updated web-links as required by changing http:// to https://. This includes removing comment in Foreword item 8 that "quicksearch.dla.mil" is not on a secure website and changing to https://assist.dla.mil as https://quicksearch.dla.mil does not provide actual contact information.



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# 1. SCOPE

1.1 Scope. This Standard provides DoD Policy, general instructions, and minimum procedures to be used by the Military Services and the DLA in performing quality assurance, quality surveillance and shelf-life extension functions of U. S. Government-owned packaged fuels, lubricants, and related products worldwide at all locations except product procurement facilities that are covered by requirements contained in the contract. Requirements for procurement needs may be derived from this document as necessary. The information contained herein is appropriate to quality assurance where applicable. This Standard does not cover type A conformance testing, type B-1 transport testing, type B-3 contamination testing or type C identification testing. Copies of this Standard can be obtained through regular channels from ASSIST Online website: https://assist.dla.mil/ or https://quicksearch.dla.mil/.

1.2 Applicability. Quality assurance (QA) is a planned and systematic pattern of all actions necessary to provide confidence that adequate technical requirements are established; products and services conform to established technical requirements; and satisfactory performance is achieved. "For the Government, Contract QA is a method to determine if a supplier of product and/or services fulfilled its contract obligations pertaining to products and/or services provided. It includes all actions required to ensure the Government is receiving the proper products and/or services. By common usage, Petroleum QA responsibility is fulfilled when the product and/or service is accepted by the Government and the product no longer belongs to the contractor or when the service is complete." Quality Surveillance (QS), as used herein and as a subset of QA, is the aggregate of measures (blending, stock rotation, sampling, etc.) used to determine and maintain both the quality of product receipts and the Government-owned packaged petroleum POL products to the degree necessary to ensure that such products are suitable for its intended use and in a condition suitable for shelf-life extension. A vigilant QS program, implemented by properly trained personnel, is necessary to protect the original product quality and the interests of the Government. Policy and procedures discussed for QS on receiving Government-owned fuel POL applies to Military Service acceptance requirements for fuels purchased by DLA Aviation.

# 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information, or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this standard, whether or not they are listed.

2.2 Government Documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.



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INTERNATIONAL STANDARDIZATION AGREEMENTS (STANAG)

| | |
|---|---|
| STANAG 1110 | Allowable Deterioration Limits for NATO Armed Forces Fuels, Lubricants and Associated Products |
| STANAG 3149 | Minimum Quality Surveillance for Fuels |
| STANAG 4714 | Minimum Quality Surveillance for Lubricants and Associated Products |
| STANAG 7036 | Methods of Detection and Treatment of Fuels Contaminated by Microorganisms |

(Copies of these documents are available online at https://quicksearch.dla.mil.)

AIR FORCE INTEROPERABILITY COUNCIL (AFIC)

| | |
|---|---|
| AIR STD 4021 | Allowable Deterioration Limits for Stored Fuels, Lubricants, and Associated Products |

(Copies of this document are available online at https://quicksearch.dla.mil.)

FEDERAL SPECIFICATIONS

| | |
|---|---|
| C-T-91 | Tallow, Inedible |
| O-M-232 | Methanol, (Methyl Alcohol) |
| O-E-751 | Ether, Petroleum, Technical Guide |
| SS-G-659 | Graphite, Dry, (Lubricating) |
| TT-I-735 | Isopropyl Alcohol |
| VV-C-846 | Cutting Fluids: Emulsifiable Oils |
| VV-D-1078 | Damping Fluid, Silicone Base, (Dimethyl Polysiloxane) |
| VV-G-671 | Grease, Graphite |
| VV-L-825 | Lubricating Oil, Refrigerant Compressor, Uninhibited |
| VV-P-236 | Petrolatum, Technical |

(Copies of these documents are available online at https://quicksearch.dla.mil.)

COMMERCIAL ITEM DESCRIPTIONS (CID)

| | |
|---|---|
| A-A-50493 | Oil, Penetrating, (for Loosening Frozen Metallic Parts) |
| A-A-50433 | Grease, Sea Water Wash Resistant |
| A-A-52624 | Antifreeze, Multi Engine Type |
| A-A-59004 | Anti-Galling Compound, Thread Lubricating, Seizing Resistant, and Calcium Hydroxide Containing |
| A-A-59113 | Lubricating Oil, Machine Tool Slideways |
| A-A-59137 | Lubricating Oil, Breech Block, (for Naval Ordnance) |
| A-A-59173 | Grease, Silicone |
| A-A-59197 | Fatty Oil, (for Metal-Working Lubricants) |
| A-A-59255 | Wax, Paraffin, Technical |
| A-A-59290 | Hydraulic Fluid, Arresting Gear |
| A-A-59313 | Thread, Compound; Antiseize, Zinc Dust-Petrolatum |
| A-A-59354 | Hydraulic Fluids, Petroleum Base, for Machine Tools |
| A-A-59921 | Cleaning Compounds, Aircraft Surface |

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DEPARTMENT OF DEFENSE SPECIFICATIONS

| | |
|---|---|
| DoD-G-24508 | Grease, High Performance, Multipurpose, (Metric) |
| DoD-G-24650 | Grease, Food Grade, Food Processing Equipment, (Metric) |
| DoD-G-85733 | Grease, High Temperature, Catapult System |
| DoD-L-24651 | Lubricating Oil, Food Grade, Food Processing Equipment (Metric) |
| DoD-L-81846 | Lubricating Oil, Instrument, Ball Bearing, High Flash Point |
| DoD-PRF-24574 | Lubricating Fluid for Low and High Pressure Oxidizing Gas Mixtures |
| DoD-PRF-85734 | Lubricating Oil, Helicopter Transmission System, Synthetic Base |
| MIL-A-53009 | Additive, Antifreeze Extender, Liquid Cooling Systems |
| MIL-C-6529 | Corrosion Preventive, Aircraft Engine |
| MIL-C-11796 | Corrosion Preventive Compound, Petrolatum, Hot Application |
| MIL-DTL-4339 | Corrosion Preventive, Soluble Oil for Water Injection Systems, (NATO Code Number C-630) |
| MIL-DTL-5020 | Liquid, Compass, Aircraft |
| MIL-DTL-17111 | Fluid, Power Transmission |
| MIL-DTL-23549 | Grease, General Purpose |
| MIL-DTL-25681 | Lubricant, Molybdenum Disulfide, Silicone |
| MIL-DTL-32353 | Hydraulic & Lubricating Oil, Synthetic Hydrocarbon Base |
| MIL-DTL-46014 | Lubricating Oil, Spindle |
| MIL-DTL-83767 | Lubricating Oil, Vacuum Pump, Mechanical |
| MIL-DTL-83800 | Propanediol, 1, 2- |
| MIL-DTL-85470 | Inhibitor, Icing, Fuel System, High Flash, (NATO Code S-1745) |
| MIL-DTL-87177 | Lubricants, Water Displacing, Synthetic |
| MIL-G-21164 | Grease, Molybdenum Disulfide, for Low and High Temperatures, (NATO Code Number G-353) |
| MIL-G-25013 | Grease, Aircraft, Ball and Roller Bearing, (NATO Code Number G-372, Metric) |
| MIL-G-25537 | Grease, Aircraft, Helicopter Oscillating Bearing, (NATO Code Number G- 66, Metric) |
| MIL-G-81827 | Grease, Aircraft, High Load Capacity, Wide Temperature Range |
| MIL-G-81937 | Grease, Instrument, Ultra-Clean, Metric |
| MIL-H-19457 | Hydraulic Fluid, Fire-Resistant, Non-Neurotoxic |
| MIL-H-22072 | Hydraulic Fluid, Catapult, (NATO Code Number H-579) |
| MIL-H-81019 | Hydraulic Fluid, Petroleum Base, Ultra-Low Temperature, Metric |
| MIL-L-15719 | Lubricating Grease, (High-Temperature, Electric Motor, Ball and Roller Bearings) |
| MIL-L-24131 | Lubricant, Colloidal Graphite in Isopropanol |
| MIL-L-24478 | Lubricant, Molybdenum Disulfide in Isopropanol |
| MIL-L-46150 | Lubricant, Weapons, Semi-Fluid, (High Load-Carrying Capacity) |
| MIL-PRF-680 | Degreasing Solvent |
| MIL-PRF-907 | Antiseize Thread Compound, High Temperature |
| MIL-PRF-2104 | Lubricating Oil, Internal Combustion Engine Combat/Tactical Service |
| MIL-PRF-3150 | Lubrication Oil, Preservative, Medium |



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| | |
|---|---|
| MIL-PRF-3572 | Lubricant, Colloidal Graphite in Oil |
| MIL-PRF-5606 | Hydraulic Fluid, Petroleum Base, Aircraft, Missile, and Ordnance |
| MIL-PRF-6081 | Lubricating Oil, Jet Engine |
| MIL-PRF-6083 | Hydraulic Fluid, Petroleum Base, for Preservation and Operation |
| MIL-PRF-6085 | Lubricating Oil, Instrument, Aircraft, Low Volatility |
| MIL-PRF-6086 | Lubricating Oil, Gear, Petroleum Base, (NATO O-153, O-155) |
| MIL-PRF-7024 | Calibrating Fluids, Aircraft, Aircraft Fuel System Components |
| MIL-PRF-7808 | Lubricating Oil, Aircraft Turbine Engine, Synthetic Base |
| MIL-PRF-7870 | Lubricating Oil: General Purpose, Low Temperature, (NATO O-142) |
| MIL-PRF-8188 | Corrosion-Preventive, Aircraft Turbine Engine, Synthetic Base |
| MIL-PRF-9000 | Lubrication Oil, Shipboard Internal Combustion Engine, High-Output Diesel |
| MIL-PRF-10924 | Grease, Automotive and Artillery |
| MIL-PRF-12070 | Fog, Oil |
| MIL-PRF-14107 | Lubricating Oil, Weapons, Low Temperature |
| MIL-PRF-16173 | Corrosion Preventive Compound, Solvent Cutback, Cold-Application |
| MIL-PRF-17331 | Lubricating Oil, Steam Turbine and Gear, Moderate Service |
| MIL-PRF-17672 | Hydraulic Fluid, Petroleum, Inhibited |
| MIL-PRF-18458 | Grease, Wire Rope - Exposed Gear |
| MIL-PRF-21260 | Lubricating Oil, Internal Combustion Engine, Preservative Break-in |
| MIL-PRF-23699 | Lubricating Oil, Aircraft Turbine Engine, Synthetic Base: NATO Code Numbers: O-152, O-154, O-156, and O-167 |
| MIL-PRF-23827 | Grease, Aircraft and Instrument, Gear and Actuator Screw |
| MIL-PRF-24139 | Grease, Multipurpose, Water Resistant |
| MIL-PRF-25017 | Inhibitor, Corrosion/Lubricity Improver, Fuel Soluble, (NATO S-1747) |
| MIL-PRF-25567 | Leak Detection Compound, Oxygen Systems |
| MIL-PRF-26087 | Lubricating Oil, Reciprocating Compressor, Ground Support |
| MIL-PRF-27617 | Grease, Aircraft and Instrument, Fuel and Oxidizer Resistant |
| MIL-PRF-32014 | Grease, Aircraft and Instrument |
| MIL-PRF-32033 | Lubricating Oil, General Purpose, Preservative, (Water-Displacing, Low Temperature) |
| MIL-PRF-32538 | Lubricating Oil, Helicopter Transmission System, Synthetic Base, NATO Code Number O-165 |
| MIL-PRF-38299 | Fluid, Purging, for Preserving Fuel Tanks of Jet Aircraft |
| MIL-PRF-46000 | Lubricant, Semi-Fluid, (Automatic Weapons) |
| MIL-PRF-46002 | Preservative Oil, Contact and Volatile Corrosion-Inhibited |
| MIL-PRF-46167 | Lubricating Oil, Internal combustion Engine, Artic |
| MIL-PRF-46170 | Hydraulic Fluid, Rust Inhibited, Fire Resistant, Synthetic Hydrocarbon Base, (NATO Code No. H-544) |
| MIL-PRF-46176 | Brake Fluid, Silicone, Automotive, All-Weather, Operational and Preservative |
| MIL-PRF-52308 | Filter-Coalescer Element, Fluid Pressure |
| MIL-PRF-53074 | Lubricating Oil, Steam-Cylinder, Mineral |
| MIL-PRF-63460 | Lubricant, Cleaner and Preservative for Weapons and Weapons Systems |



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| | |
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| MIL-PRF-81322 | Grease, Aircraft, General Purpose, Wide Temperature Range, (NATO Code G-395) |
| MIL-PRF-81329 | Lubricant, Solid Film, Extreme Environment, (NATO Code Number S- 1737) |
| MIL-PRF-83261 | Grease, Aircraft, Extreme Pressure, Anti-Wear |
| MIL-PRF-83282 | Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, (NATO Code Number H-537, Metric) |
| MIL-PRF-83363 | Grease, Transmission, Helicopter, (NATO G-396) |
| MIL-PRF-83483 | Antiseize Thread Compound, Molybdenum Disulfide-Petrolatum |
| MIL-PRF-85336 | Lubricant, All-Weather, (Automatic Weapons) |
| MIL-PRF-85570 | Cleaning Compounds, Aircraft, Exterior |
| MIL-PRF-85704 | Cleaning Compound, Turbine Engine Gas Path |
| MIL-PRF-87252 | Coolant Fluid, Hydrolytically Stable, Dielectric |
| MIL-PRF-87257 | Hydraulic Fluid, Fire Resistant; Low Temperature, Synthetic Hydrocarbon Base, Aircraft and Missile |
| MIL-PRF-87937 | Cleaning Compound, Aerospace Equipment |
| MIL-S-17980 | Sea Marker Packet, Inflatable Survival Equipment |
| MIL-S-53021 | Stabilizer, Additive, Diesel Fuel |
| MIL-T-17128 | Transducer Fluid, Sonar |
| MIL-W-13945 | Wax, Hydrocarbon, (for Ordnance Use) |

(Copies of these documents are available online at https://quicksearch.dla.mil.)

DEPARTMENT OF DEFENSE STANDARDS

| | |
|---|---|
| MIL-STD-290 | Packaging and Marking of Petroleum and Related Products |
| MIL-STD-3004-1 | Quality Assurance/Surveillance for Bulk Fuels, Lubricants and Related Products |

(Copies of these documents are available online at https://quicksearch.dla.mil.)

2.2.2 Other Government documents, drawings and publications. The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

US GOVERNMENT FORMS

DD FORM 1222 Request for and Results of Tests

(Copies of these documents are available online at https://www.dla.mil/.)

US GOVERNMENT STANDARD FORM

SF 368 Product Quality Deficiency Report

(Copies of this document are available online at https://www.gsa.gov/.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.



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AMERICAN GEAR MANUFACTURERS ASSOCIATION (AGMA)

ANSI/AGMA 9005 Industrial Gear Lubrication
(Copies of this document are available from https://www.agma.org.)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes
ANSI/NCSL Z540.3 Requirements for the Calibration of Measuring and Test Equipment
(Copies of these documents are available from https://www.ansi.org.)

AMERICAN PETROLEUM INSTITUTE (API)

API MPMS Manual of Petroleum Measurement Standards
(Copies of this document are available from https://www.api.org.)

ASTM INTERNATIONAL

| | |
|---|---|
| ASTM D892 | Standard Test Method for Foaming Characteristics of Lubrication Oils |
| ASTM D1298 | Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method |
| ASTM D3487 | Standard Specification for Mineral Insulating Oil used in Electrical Apparatus |
| ASTM D4057 | Standard Practice for Manual Sampling of Petroleum and Petroleum Products |
| ASTM D5001 | Standard Test Method for Measurement of Lubricity of Aviation Turbine Fuels by the Ball-on-Cylinder Lubricity Evaluator, (BOCLE) |
| ASTM D5006 | Standard Test Method for Measurement of Fuel System Icing Inhibitors (Ether Type) in Aviation Fuels |
| ASTM D6078 | Standard Test Method for Evaluating Lubricity of Diesel Fuels by the Scuffing Load Ball-on-Cylinder Lubricity Evaluator, (SLBOCLE) |
| ASTM D6079 | Standard Test Method for Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig, (HFRR) |
| ASTM MANUAL 1 | Significance of Tests for Petroleum Products |

(Copies of these documents are available from https://www.astm.org.)

ENERGY INSTITUTE (EI)

| | |
|---|---|
| EI-1570 | Handbook on Electronic Sensors for the Detection of Particulate Matter and/or Free Water During Aircraft Refueling |
| EI-1581 | Specifications and Qualifications Procedures for Aviation Jet Fuel Filter/Separators |



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| | |
|---|---|
| EI-1598 | Design, Functional Requirements and Laboratory Protocols for Electronic Sensors to Monitor Free Water and/or Particulate Matter in Aviation Fuel |

(Copies of these documents are available from https://www.energyinst.org.)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

| | |
|---|---|
| ISO 3170 | Petroleum Liquids - Manual Sampling |
| ISO 4406 | Hydraulic Fluid Power-Fluids - Method for Coding the Level of Contamination by Solid Particles |
| ISO 9001 | Quality Management Systems Requirements |
| ISO 10012 | Measurement Management Systems-Requirements for Measurement Processes and Measuring Equipment |
| ISO/IEC 17025 | General Requirements for the Competence of Testing and Calibration Laboratories |

(Copies of these documents are available from https://www.iso.org/iso/catalogue_ics.)

SAE INTERNATIONAL

| | |
|---|---|
| SAE AMS1424 | Deicing/Anti-Icing Fluid, Aircraft SAE Type I |
| SAE AMS1428 | Fluid, Aircraft Deicing/Anti-icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV |
| SAE AMS1435 | Fluid, Generic, Deicing/Anti-Icing Runways and Taxiways |
| SAE AMS2518 | Thread Compound, Anti-Seize, Graphite-Petrolatum |
| SAE AMS-G-4343 | Grease, Pneumatic System |
| SAE AMS-G-6032 | Grease, Plug Valve, Gasoline and Oil Resistant, (NATO Code Number G-363, Metric) |
| SAE AMS-M-7866 | Molybdenum Disulfide, Technical, Lubrication Grade |
| SAE AS1241 | Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft |
| SAE AS8660 | Silicone Compound, (NATO Code Number S-736) |
| | |
| SAE J1703 | Motor Vehicle Brake Fluid |
| SAE J1704 | Motor Vehicle Brake Fluid Based Upon Glycols, Glycol Ethers and the Corresponding Borates |
| SAE J1899 | Lubricating Oil, Aircraft Piston Engine, (Ashless Dispersant) |
| SAE J1966 | Lubricating Oils, Aircraft Piston Engine, (Non-Dispersant Mineral Oil) |
| SAE J2360 | Automotive Gear Lubricants for Commercial and Military Use |

(Copies of these documents are available from https://www.sae.org.)

2.4 Order of Precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.



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## 3. DEFINITIONS

3.1 Acceptance. The act of an authorized Government representative by which the Government assumes for itself, or as agent of another, ownership of existing and identified supplies tendered, or approves specific services rendered, as partial or complete performance of the contract on the part of the contractor.

3.2 Acquisition Management Systems Control (AMSC) number. A control number assigned by the cognizant data management approval authority listed in SD-1, which indicates that a data item description (DID) or a defense specification or standard that cites DIDs has been cleared for use by the DoD.

3.3 Acquisition Streamlining and Standardization Information System (ASSIST). The ASSIST Online database is the official source for all Defense Standardization Program documents and contains the most current information on these documents prepared by DoD. It can be accessed at https://assist.dla.mil/ or https://quicksearch.dla.mil. The ASSIST database lists defense and federal specifications and standards, defense handbooks, and commercial item descriptions (CIDs). Quality Product Lists (QPLs), adopted non-government standards (NGS) and other related standardization documents used by the DoD may be accessed at https://qpldocs.dla.mil/.

3.4 Additives. A material added to another, usually in small amounts, to impart or enhance desirable properties or to suppress undesirable properties.

3.5 Appearance. Color, clarity, or evidence of stratification and contaminants that may be observed by visual examination of sample.

3.6 Barrel (BBL). A volume of liquid petroleum product equal to 42 U. S. gallons (USG) (159 Liters (L)).

3.7 Batch. A specific quantity of product that is processed or utilized as a single unit and tested to meet test criteria and specifications.

3.8 Batch number. A unique number that is assigned by refinery, manufacturing/blending plant or intermediate terminal that provides traceability to specified quantity of product.

3.9 Biobased materials. A material made from substances derived from living (or once living) organisms.

3.10 Bleeding. The separation of liquid lubricant from lubricating grease for any cause.

3.11 Blending. The procedures by which predetermined quantities of two or more similar products are homogeneously mixed to upgrade one of the products or to produce an intermediate grade or quality.



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3.12 Bulk petroleum products. Liquid petroleum product transported by various means and stored in tanks or containers having an individual fill capacity greater than 205 liters (about 55 gallons). (Exception: A 500 USG (1890 L) collapsible drum is considered a packaged item). Detailed procedures for Quality Surveillance Assurance for Bulk Petroleum Products are found in MIL-STD-3004-1.

3.13 Burner fuel. Any petroleum liquid suitable for the generation of heat by combination in a furnace or firebox as a vapor or a spray, or a combination of both.

3.14 Calibration. The determination of the values of the significant parameters by comparison with values indicated by a set of reference standards.

3.15 Certificate of Analysis (CoA). DELETED

3.16 Certificate of Conformance. DELETED

3.17 Clean (clear) and bright. The absence of visible solids, a cloud, a haze, an emulsion, or free water in the product (some specifications define this as Appearance, Workmanship, or as Workmanship, Finish and Appearance). Bright is the sparkle of clean, dry product in transmitted light.

3.17.1 Cloud point. The temperature at which wax precipitates from an undiluted oil. Not to be confused with Floc point.

3.18 Commingling. The mixing of two or more products of different ownership, type, or grade.

3.19 Contaminant. A foreign substance in a product.

3.20 Contaminated product. A product into which one or more grades of another product has been accidentally mixed, or a product containing foreign matter such as dust, rust, water, or emulsions to the extent it changes the characteristics of the product.

3.20.1 Control plan (CP). Written descriptions of the systems for controlling part and process quality by addressing the key characteristics and engineering requirements.

3.21 Dehydration. The removal of water.

3.22 Density. The density of a material is defined as its mass per unit volume. Density is typically reported at $15^{o}$C in kg/L or kg/$m^3$. In some cases (for instance in the U.S. oil and gas industry), density is also defined as its weight per unit volume: although, this quantity is more properly called specific weight or relative density.

3.23 Deteriorated product. A product in which one or more characteristics have changed to a level of quality outside the limits of the applicable specification.



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3.24 Dissolved water. Water in a solution which cannot be removed by mechanical means (e.g. filter/separator). The concentration of dissolved water varies with product temperature, the relative humidity of air contacting the product surface, and the chemical composition of the product.

3.25 Downgrading. The procedures by which an off-specification or contaminated product (due to deterioration or contamination) is approved for use as a lower grade of the same or similar product or as a completely different product.

3.26 Entrained water. Water carried by a product which does not settle out readily. Entrained water can be removed by mechanical means (e.g. filter/separator).

3.27 Environmentally preferable. Products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production manufacturing, packaging, distribution, reuse, operation, maintenance or disposal of the product or service.

3.28 Equivalent tests. Test methods that provide analogous results and fully correlate with standard methods, but have not yet been formally accepted. These test methods have been found to provide test results essentially identical to those produced by referenced standard testing methods.

3.29 Federal Supply Class (FSC) codes. FSC codes are used to group products into logical families for management purposes. The four-digit fields are used to group standardization documents and their products into logical families.

3.30 Floc point. The temperature at which waxy materials in a lubricating oil separates from a mixture of oil and Freon (registered trademark of E. I. du Pont de Nemours & Company) R-12 refrigerant, giving a cloudy appearance to the mixture; also called Freon Floc Point. Generally used to evaluate the tendency of refrigeration oils to plug expansion valves or capillaries in refrigerant systems. Not to be confused with Cloud Point, the temperature at which wax precipitates from an undiluted oil.

3.31 Free water. Water in a petroleum product other than dissolved water. Free water may be in the form of droplets or haze suspended in the product and/or a water layer at the bottom of the container.

3.32 Gum. Description of resin-like, fuel insoluble deposits (contaminants) formed during the oxidative and thermal deterioration of petroleum fuels.

3.33 Homogeneity. A quality or state of being homogeneous or having a uniform composition. A product is considered homogeneous when its base components are mixed uniformly throughout (no stratification). A truly homogenous product is assumed when the API Gravity differs by no more than ± 0.3 degrees. This limit is established from the reproducibility in ASTM D 1298.



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3.34 Identification tests. Selected tests applied to a sample to quickly determine the type or grade of the product represented or to determine if a quality has been altered by time or handling. See Type C test. This testing is not addressed in this standard.

3.35 Inspect. To examine critically especially to detect flaws, errors, etc.

3.36 Intra-Governmental receipt limits. DELETED.

3.37 Light-Ends. The lower-boiling fractions of a fuel or oil.

3.38 Long-term storage. DELETED.

3.39 Lubricity. The ability of a fluid to reduce the friction between two surfaces in motion.

3.40 Material inspection and receiving report (DD Form 250). DELETED.

3.40.1 Material Quality Control Storage Standards (MQCSS). The authority for shelf-life extension when visual inspection only is required, found on the same webpage as the Quality Status List (QSL).

3.41 Micron. One micron (μm, micrometer) is 1/1000 of one millimeter or $10^{-6}$ meter.

3.42 Mineral oil. Lubricating oils produced from petroleum sources with or without additives.

3.43 Off-Specification product. A product which fails to meet one or more of the physical, chemical, or performance requirements of the specification.

3.44 Packaged products. Petroleum products (generally a lubricant, oil, grease, or a specialty item) normally packaged by a manufacturer and procured, stored, transported, and issued in containers having a fill capacity of less than 55 USG. (Exception: A 500 USG (1890 L) collapsible drum is considered a packaged item.)

3.45 Particle counting. A method for determining the level of dispersed particles, specifically dirt particles and water droplets in the range from 4um (c) to 30um (c). A cumulative channel count is collected and provided for each defined channel. Results are reported ISO Codes In Accordance With (IAW), ISO 4406.

3.46 Pre-Award Survey (PAS). DELETED.

3.47 Product Quality Deficiency Report (PQDR). The purpose of the PQDR program is to remove defective or nonconforming items from the DoD supply chain, provide remediation to the unit for defective items, determine root cause of the defective item, and collect failure and nonconformance data for trend analysis. The PQDR process provides timely quality feedback to activities responsible for design, development, production, supply management, maintenance, contract administration, and other functions so that action can be initiated to address the deficiency. See Joint Publication DLAR 4155.24 and the Army Regulation AR 702-7-1 for PQDR processing.


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3.48 Qualified Product List (QPL). A list of products or families of products that have successfully completed the formal qualification process (including all specified periodic tests) that examines, tests and verifies that a specific product design meets all applicable specification requirements. The link to the QPL webpage is through Assist Online.

3.49 Qualified Product Database (QPD). This database consists of the officially approved electronic QPLs. Only those electronic QPLs published in the QPD are the official source for qualified products. The link to the QPD webpage is through Assist Online.

3.50 Quality. The composite of materiel attributes including performance, features and characteristics of a product, or service to satisfy a given requirement.

3.51 Quality Assurance (QA). A system of activities, the purpose of which is to provide to the producer and user of a product, measurement or service the assurance that it meets the defined standards of quality with a stated level of confidence and includes quality planning and quality control. A planned and systematic pattern of all actions necessary to ensure that adequate technical requirements are established; that products, quantity accountability, and services conform to these established technical requirements; and that satisfactory performance is achieved. It includes: Quality planning during specification development and review; Quality support to contracting and acquisition teams; Quality oversight of product and service providers to assure compliance to contracts and agreements; Quality Control (QC) operations for products and services incoming or in the Government supply chain; and, Quantity measurement and control activities. Contract QA is a method the Government uses to determine if products and/or services a supplier provided fulfilled its contractual obligations and includes all actions required to ensure compliance to contractual or agreement terms and conditions. Generically the term QA refers to all processes and procedures encompassing Quality planning/development, QA, QS, and QC.

3.52 Quality Assurance Representative (QAR). An organizational title assigned to the individual responsible for Government contract QA functions. QARs have cognizance over the procurement of product and/or services at contractor facilities (e.g. refineries, terminals, packaging plants, laboratories, and into plane sites). The Military Services may use other organizational titles for their personnel performing QA and QS functions.

3.53 Quality Control Plan (QCP). The written procedures developed by a contractor, encompassing contractor programs, processes and inspections, which assures the quality of services, quality and quantity of products, and conformance to other related contract requirements.

3.54 Quality notification. Quality notifications are product and services report customer/depot complaints on product purchased.

3.55 Quality Status List (QSL). A continually updated database that contains shelf-life test requirements and potential extension information, used exclusively by DoD activities to determine if Type II extendable shelf-life products and material have passed or failed suitable-for-use tests.


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3.56 Quality Surveillance (QS). A subset of QA encompassing the program of inspections, sampling, testing, quantity measurement and control, and documentation established to monitor the quality/quantity of product being received, stored and issue within the Government supply chain. This includes shelf-life extension testing.

3.56.1 Random sampling. As commonly used in in acceptance sampling theory, the process of selecting sample units so all units under consideration have the same probability of being selected.

3.57 Recertification Test (RT). A limited test analysis used to verify product quality.

3.58 Reclamation. Procedure to restore or change the quality of an off-specification or contaminated product so it will meet the specification of the original product or a lower grade product. The reclamation process, when properly applied, will result in down-grading, blending, purification, or dehydration.

3.59 Refinery Certificate of Quality (RCQ). The RCQ is produced at the point of manufacture and is the definitive original document describing the quality of a production batch of fuel.

3.60 Relative density (Specific Gravity). The ratio of the mass of a volume of a liquid at a specific temperature to the mass of an equal volume of pure water at the same or different temperature. Both reference temperatures will be explicitly stated. Common reference temperatures include 60/60°F, 20/20°C.

3.60.1 Reliability. The probability of a product performing its intended function under stated conditions without failure for a given period of time.

3.61 Release Certificate (RC). DELETED

3.62 Repeatability. The variation in measurements obtained when one measurement device is used several times by the same person to measure the same characteristic on the same product.

3.63 Representative sample. A portion extracted from a total volume that contains the constituents in the same proportions as are present in the total volume.

3.64 Reproducibility. The variation in measurements made by different people using the same measuring device to measure the same characteristic on the same product.

3.65 Requiring installation. A military installation, organization, or facility authorized to requisition and receive material from designated distribution and storage points.

3.66 Sample. In acceptance sampling, one or more units of product (or a quantity of material) drawn from a lot for purposes of inspection to reach a decision regarding acceptance of the lot.


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3.67 Sample tag. DD Form 2927, Petroleum and Lubricants Sample Identification Tag or DD Form 1222, Request for and Results of Tests form used for identification of petroleum and lubricant samples.

3.67.1 Sampling at random. See random sampling.

3.68 Settling time. The time a product needs to remain undisturbed or un-agitated in a storage tank to reduce the static charge of the fuel and/or to allow water and sediment to be eliminated/reduced from the product.

3.69 Service Control Point (SCP). Military service agency that provides technical guidance on the use of commodities (bulk or packaged), equipment and infrastructure. The three SCPs are the Army Petroleum Center (APC), the Naval Supply Systems Command (NAVSUP) Energy, and the Air Force Petroleum Office (AFPET).

3.69.1 Shelf life. The total period of time beginning with the manufactured date, cured date (elastomeric and rubber products only), assembled date, packed date (subsistence only), or packaging date (SAE AS5502 items only) and terminated by the date which an item must be used (expiration date) or subjected to inspection or test (inspect/test date), restoration, or disposal action.

3.69.2 Shelf-Life code. A one-position code assigned to an NSN to identify the number of months of original shelf-life and whether the original shelf-life is non-extendible (Type I) or extendible (Type II). Shelf-life items are identified with the shelf-life code in Segment H of the Federal Logistics Information System Total Item Record.
CODE “0” (ZERO) -- NSN is not a shelf-life item.
CODE “ALPHA” Character (except Code X) -- TYPE I (non-extendible) item.
CODE “NUMERIC” Character (plus Code X) -- TYPE II (extendible) item.

3.70 Shelf Life, Type I. A definite non-extendable period of shelf life.

3.71 Shelf Life, Type II. An assigned shelf-life period that may be extended after successful completion of inspection, testing, or restorative action. See Quality Surveillance.

3.72 Specification. A document prepared to support acquisition that describes essential technical requirements for material and the criteria for determining whether those requirements are met. Specifications can be classified as Federal, Military, Commercial, or Voluntary Standard. Specifications can be categorized as functional, design, or a performance specification. Petroleum specifications are usually a combination of functional and performance categories.

3.73 Specification limits. Boundaries or parameters that define acceptable performance for a characteristic expressed as a target maximum or minimum limit, or both an upper and lower limit (range).

3.74 Specific gravity. See relative density.

3.75 Super-Clean fluid. A fluid having a specified particulate contamination limit so low that the product is packaged in hermetically sealed containers under clean room conditions.


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3.76 Synthetic petroleum product. Materiel not refined from petroleum sources; usually produced by chemical synthesis.

3.77 Testing. Analytical techniques using instruments, equipment, and other methods to predict fuel and lubricant test values using compositional data typically determined by chemistry methods.

3.78 Type A tests. Complete quality conformance specification acceptance tests. Type A tests are addressed in the individual product specification documents and are not covered in this standard.

3.79 Type B-1 tests. Partial analysis checking for the principal characteristics most likely to be affected in the course of moving the product. Type B-1 tests are not addressed in this standard.

3.80 Type B-2 tests. Partial analysis to verify stability of characteristics susceptible to deterioration due to age, environmental or storage conditions. Type B-2 tests are used in this standard to determine whether product is still in condition to allow shelf-life extension.

3.81 Type B-3 tests. Partial analysis for contamination; in particular, for controlling the re-injection of pipeline interface products. Type B-3 tests are not addressed in this standard.

3.82 Type C tests. Quick, simple, partial analysis to verify product quality and to ensure that no change has taken place. Type C tests can be referred to as identification tests. Type C tests are not addressed in this standard.

3.83 Thief. A sampling apparatus designed so a liquid sample can be obtained from any specified point in the container.

3.84 Tolerance. Allowed variations within a specified standard.

3.85 Vapor Pressure (VP). The pressure exerted by the vapor of a liquid when in equilibrium with the liquid.

3.86 Verification tests. DELETED.



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# 4. GENERAL REQUIREMENTS

4.1 Personnel competency. Personnel responsible for handling product shall be thoroughly trained and fully qualified to perform assigned responsibilities. They shall be aware of the hazards in handling fuels and lubricants, as well as the applicable safety and operating procedures.

4.2 Equivalent tests. The use of alternate test methods to measure physical properties of a petroleum product is allowed, provided that: the test results are presented in the format required in the specification, and the test device has a demonstrated reliability and repeatability equal or better than called for by the specified method.

4.3 Calibrating test equipment. All laboratories shall ensure calibration of testing and measuring equipment is up to date and is to the accuracy necessary to ensure the equipment is within allowable tolerance limits. ISO 10012 or service defined requirements shall be used. See ANSI/NCSL Z540.3 and ISO/IEC 17025 as applicable.

4.4 Specifications. Each Joint Petroleum Office (JPO) and petroleum product laboratory shall maintain an up-to-date file of Government fuel and lubricant specifications (both Military and non-Government specifications and standards). It is not practical to include complete specification limits in this Standard, as specifications are subject to change with variations in product availability and technical developments. Limits cited in this Standard are for internal government use, not for procurement.

4.5 Government-Owned property. Contractors are obligated to adequately protect Government-owned property located on their premises for use on, or in connection with, a contract. The periodic inventory and reporting of such property is a contractual requirement. The amount of Government-owned petroleum products in pipelines will be reported as a separate item in stock reports.

4.6 Safety precautions. Throughout this Standard, there are general safety precautions and instructions that apply to petroleum handling and laboratory operations to ensure personal safety/health and the protection of Government property. Occupational Safety and Health Administration (OSHA), Department of Labor and standard commercial safety practices shall be observed.

4.7 Compliance with regulations and laws. Many petroleum products are considered hazardous materials and are regulated as such. Users of this Standard must be aware of regulations and laws governing the products that they are handling. In the event of a conflict between this Standard and a law or regulation, the law or regulation takes precedence.

4.8 Toxic chemicals, hazardous substances, and ozone-depleting chemicals. The use of toxic chemicals, hazardous substances, or ozone-depleting chemicals shall be avoided, if feasible. The desired performance requirements should be specified rather than the specific chemical or substance. If a toxic chemical, hazardous substance, or ozone-depleting chemical is required it shall be specified. The Environmental Protection Agency (EPA) maintains an online list of toxic chemicals and hazardous substances at http://www.epa.gov/emergencies/tools.htm#lol and should be consulted.



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4.9 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

4.10 Test Method. Government laboratories shall maintain an up-to-date file of all test methods performed in the laboratory.

## 5. DETAILED REQUIREMENTS

5.1 Receipt of turbine fuel approved packaged additives. Packaged additives should be inspected upon arrival for correct identification, content, packaging and damage. Containers should be in good condition upon arrival, and the vendor should supply proper paper work. Packaged additives should be stored under cover, preferably in warehouses or open sheds. In the situation where storage must be outside, containers must be off the ground on pallets or dunnage and covered with tarpaulins for protection from the elements. Additives that are in drums should be stored on their sides with proper bracing and blocking if necessary. Bungs should be in horizontal position so leaks may be detected. Drums should never be stored in a vertical position outdoors as water will collect on the drum heads, and could seep through bungs. The proper packaging, storage, and stock rotation (in which the oldest material is issued first) will help to minimize losses due to deterioration.

5.2 Packaged products. This section covers receipt and storage of packaged petroleum products for direct delivery and stock locations, see MIL-STD-290, Packaging and Marking of Petroleum and Related Products. For sampling and testing requirements and the significance of testing detailed requirements, see ASTM D4057 Standard Practice for Manual Sampling of Petroleum and Petroleum Products.

5.3 Product receipt. Products are delivered under DLA-Aviation contract either by direct delivery from the contractor's facility to the customer, or from a depot storage facility. Receiving tests are not required on packaged products provided the containers are intact and markings adequately identify the product.

5.4 Sampling. All samples shall be taken in accordance with standard procedures described in API MPMS, Chapter 8, Section 1/ASTM D4057, ISO 3170, or as prescribed by product specifications or contract requirements and ANSI/ASQ Z1.4.

5.5 Precautions. The precautions required to ensure a representative sample are many and depend on type of product being sampled, the type of container from which it is drawn and the sampling procedures employed. Each procedure is suitable for sampling a specific product under definite storage, transportation and container conditions. Warning: "All safety instructions shall be strictly observed".

5.6 Personnel to conduct sampling. Because improperly taken samples can completely invalidate a test, only trained and experienced personnel shall be assigned to sample the products. This cannot be overstressed; No amount of laboratory work will give reliable data on a product if the sample is not a true representation of that product.



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5.7 Responsibility. This Standard shall in no way alter any assigned responsibility of the various activities outside the continental United States for submitting special samples to a designated laboratory or as directed by the cognizant headquarters.

5.8 Types of samples. A sample is a portion of a packaged petroleum product taken which represents that entire batch or delivery. The various types of samples are as follows:

a. Tube or thief sample is one obtained with a sampling tube or special thief either as a core or spot sample from a specified point in the container.

b. Batch or lot sample is one obtained from a collection of units of package products.

5.9 Sampling apparatus, containers, and procedures.

a. Approved type samplers shall be used as specified by ASTM/API procedures. All sampling apparatus and containers shall be thoroughly clean and dry, and special care shall be taken so no lint or fibrous material remains in or on them.

b. Apparatus and containers shall be flushed three times with 10 to 20 % of the volume of the sample container of the product being sampled to ensure the sample is not contaminated with the previous material unless otherwise specified in the test procedures. For each flush, the container shall be closed and shaken for 10 seconds and product replaced for the next flush. All cans shall be thoroughly flushed to ensure complete removal of soldering flux. Sampling apparatus shall be cleaned immediately after use and stored so it shall remain clean until next use.

c. Containers such as drums shall be sampled with a thief. In sampling drums and cans, care shall be taken to remove all foreign matter from the area near the enclosure before the plug is removed.

d. Close all sample containers tightly, immediately after taking the sample. Do not use sealing wax, paraffin, rubber gaskets, pressure sensitive tapes, or similar material to seal containers. Light sample containers shall be adequately crated to withstand shipment. To prevent leakage caused by thermal expansion of the product, do not fill any sample container above 80 % volume capacity.

e. The one-gallon sample can, National Stock Number (NSN) 8110-01-371-8315, is suitable for fuel products and the one gallon sample can, NSN 8110-00-178-8292, is suitable for grease products.

5.10 Size of samples.

a. Except for liquid units of issue greater than 1-gallon and semi-solids greater than 6.5-pound can or container, all samples shall be submitted in the original unopened container. When instructed to take a sample, the sample size shall be as follows:



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b. Liquid

| Unit of Issue | Sample Size |
|---|---|
| 1. Less than 1 quart | 1 gallon (USG) |
| 2. 1-quart can | Four 1 quart cans |
| 3. 1-gallon can | 1-gallon can |
| 4. Any unit of issue larger than 1 gallon | 1 gallon |

c. Semi-solid

| Unit of Issue | Sample Size |
|---|---|
| 1. Less than 1 pound | 4 pounds |
| 2. 1-pound can | Four 1-pound cans |
| 3. 5 pound can or container | One 5-pound can or container |
| 4. 6.5-pound can or container | One 6.5-pound can or container |
| 5. Any unit of issue larger than 6.5 pounds | 5 pounds |

d. For container sizes not listed in the tables above, contact the appropriate focal point for instructions.

5.11 Identification of samples. Identify each sample container immediately after sampling by securely attaching a completed DD Form 1222, Request for and Results of Tests.

Information on the form shall include the following:

a. To, requesting activity

b. From, Prime contractor and address

c. Manufacturing plant name and address

d. End item, National Stock Number

e. Sample number

f. Lot number with revision (if applicable)

g. Reason for submittal

h. Date submitted

i. Material to be tested



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j. Quantity represented / quantity remaining in inventory after sampling

k. Specification & amendment and/or drawing number, revision for sample & date

l. Purchased from or source

m. Shipment method

n. Date sampled and submitted by

o. Remarks and/or special instructions and/or waivers

p. Send report of test to

q. Date sample received, results reported, and lab report number

r. Test performed, results, sample result

s. Qualification number (if available), and requirements

t. Date, name and title of person conducting test, and signature

u. Date of manufacture

v. Contract number

5.12 Testing. The quality surveillance segment (testing) presented in this section is the minimum essential for sound management of Government-owned properties. At a minimum, the test frequencies and minimum test parameters assures product quality throughout the logistic system and ultimately to the customer.

5.12.1 Contamination tests. DELETED

5.12.2 Test methods. All laboratory tests shall be conducted in accordance with the method prescribed in the specification covering the product, except any special or modified method outlined in this Standard which shall be used in lieu of the specification method when products are evaluated within the scope of this Standard.

5.12.3 Specification receipt limits. Specification receipt limits are absolute. Multiple tests may be performed and if these tests do not differ from each other by more than the amount specified for the reproducibility of the method, the results may be averaged to determine compliance with the specification limits.

5.12.4 Testing frequency. For current testing frequency requirements refer to Defense Logistics Information Service (DLIS) and/or Total Item Record (TIR).

5.12.5 Minimum testing. Table II outlines the minimum sampling and testing requirements considered necessary for determining the quality of petroleum and related products. It covers the conditions under which a sample is taken, the type of sample and the types of tests required to determine whether the quality is within acceptable limits.



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5.12.6 Alternate test methods. The use of alternate test methods to measure physical properties is allowed, provided that: test results are presented in the format required in the specification; the test device has a demonstrated reliability and repeatability equal to or better than that called for by the ASTM and the device has been approved for use by the military services. The types of alternate tests are listed below:

a. Equivalent tests are test methods that provide analogous results and fully correlate with standard ASTM methods but have not yet been formally accepted by ASTM. These test methods have been found to provide test results that will be essentially identical to those results produced by ASTM testing methodologies.

b. Predictive testing involves the use of instrumental and other types of analytical techniques to predict lubricant test values using compositional data that typically is determined by standard or wet chemistry methods.

5.12.7 Calibrating test equipment. All laboratories shall calibrate testing and measuring equipment to the accuracy necessary to ensure the equipment is within allowable tolerance limits. ISO 10012 or service defined requirements shall be used. See ANSI/NCSL Z540.3 and ISO/IEC 17025 as applicable

5.13 Disposition procedures. Prior to submission of samples for testing or prior to reclassification of condition codes, the storage activity/customer/laboratory shall consult the DoD QSL published by DLA Aviation to determine the status of the particular batch/lot number under a specific contract.

a. If the extension data is listed in the QSL, then the stock shall be updated accordingly.

b. If the QSL indicates condition code “H”, then the stock shall be disposed of through DLA Disposition Services, formerly Defense Reauthorization Marketing Office (DRMO), in accordance with local procedures.

c. If the item is not listed in the QSL, then the appropriate focal point shall be contacted.

5.13.1 Service and DLA responsibilities. The following are the responsible technical organizations within the Services and DLA for packaged petroleum products:

| | |
|---|---|
| Army | U.S. Army Petroleum Center<br>8725 John J Kingman Rd.<br>Ft. Belvoir, VA 22060<br>DSN: (392) 427-0659<br>FAX DSN: (392) 427-0669<br>Commercial: (571) 767-0659 |



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| | |
|---|---|
| Navy | NAVSUP Energy<br>ATTN: Code PS<br>8725 John J. Kingman Rd., Suite 3719<br>Ft. Belvoir, VA 22060-6224<br>DSN: (392) 427-7341<br>FAX DSN: (392) 427-7389<br>Commercial: (571) 767-7341 |
| Air Force | Air Force Petroleum Office<br>ATTN: AFPET/PTPS<br>2430 C Street, Building 70, Area B<br>Wright Patterson AFB, OH 45433-7632<br>DSN: (312) 785-8050<br>FAX DSN (312) 785-8051<br>Commercial: (937) 255-8050 |
| DLA<br>FSC 9150 / FSG 68 | DLA-Aviation<br>ATTN: DLA-FAJA<br>8000 Jefferson Davis Highway<br>Richmond, VA 23297-5000<br>DSN: (312) 695-2425<br>FAX DSN: (312) 695-3971<br>Commercial: (804) 279-2425 |
| FSC 9110 or 9160 | DLA-Troop Support<br>700 Robbins Avenue<br>Philadelphia, PA 19111-5096<br>DSN: (312) 442-5515<br>FAX DSN: (312) 442-5520<br>Commercial: (215) 697-5515 |

5.14 Packaging and storage of packaged petroleum products. The care and preservation of packaged oils and lubricants in a ready-for-issue condition, from supplier to user, is an important responsibility of the military services. Strict adherence to storage temperatures for all products is required. The appropriate military activity shall prescribe the procedures and establish the requirements in each phase of the storage program. The organization owning these products has an inherent obligation to ensure that such storage conditions are enforced. These shall be predicated on the type of item, type of storage, anticipated length of storage, probable end use and other factors.

5.14.1 Documentation. Care of packaged products in storage is a program of such magnitude that detailed procedures cannot be included in this Standard. Reference shall be made to appropriate departmental publications. Pertinent highlights are cited in the following paragraphs.


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5.14.2 Container inspection. Containers shall be inspected before being placed in storage and periodically thereafter. These inspections shall be made more frequently if required by local conditions. If containers are received in an unsuitable condition and repackaging is necessary, the product shall be fully inspected by a Government agent at the repackaging facility. Under no circumstances shall product be accepted without Government inspection if it has been repackaged by the railroad or trucking company.

5.14.3 Container suitability. Before filling, all containers shall be inspected to ensure they are clean, free of loose rust, paint flakes and contaminants and are suitable for receiving the product. Meticulous cleanliness of the container and filling equipment shall be ensured since many products require a high degree of cleanliness and have been micronically filtered. Super-clean fluids are MIL-PRF-7808, DOD-PRF-85734, and MIL-PRF-23699. Containers shall be appropriately marked prior to filling and shall be closed immediately after filling.

5.14.4 Drum storage. Except in an emergency, containers shall not be stored in direct contact with the ground. Drums shall be stored on their sides on dunnage with proper blocking and bracing. Bungs shall be in a horizontal position so leaks may be detected and/or eliminated. Drums shall never be stored vertically outdoors as water shall collect on drum heads, seep through bungs and contaminate the product.

5.14.5 Separate storage. For identification purposes, different products and grades shall be stored separately. Stocks of similar dates of filling shall be stored together whenever possible. Oldest stocks shall be used first.

5.14.6 Stock rotation. Where feasible, packaged products opened for spot checking or storage control testing shall be used as soon as possible. When this cannot be done, the containers shall be reclosed tightly, marked as having been previously opened and be included in the next issue if possible. To minimize deterioration of a product due to age, excessive corrosion of containers, and/or deterioration of packing and markings, (excluding other quality considerations), the oldest package petroleum products shall be issued first. Fill dates on the containers and the condition of the package are the governing factors.

5.14.7 Galvanized containers. Internally galvanized containers shall not to be used.

5.14.8 Small container storage. Containers smaller than the 55-gallon drum shall be stored under cover, preferably in warehouses or open sheds. In emergency situations, containers shall be stored outside, off the ground on pallets or dunnage and covered with tarpaulins for protection from the elements.

5.14.9 Contamination. Many things can happen in the filling, handling, storage and dispensing of packaged petroleum products. Some of the more detrimental things include contamination, deterioration of quality, inadvertent use of incorrect products, damage to equipment, loss of identity and loss of product. Improper storage conditions can lead to contamination, deterioration of identification markings and excessive corrosion of metal containers. Refilling of previously used containers without first cleaning and remarking can lead to contamination on issue. The use of an incorrect grade product in unmarked containers can result in incorrect applications with resultant loss of life and equipment. Improper loading, blocking, or bracing of packaged products in transportation equipment will usually result in container damage and often the loss of product.


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a. Water is a common source of contamination which can render packaged products unsuitable for use. Rough handling or improper application of plugs and gaskets will permit breathing and result in condensation of water vapor inside the package. Reasonable protection against atmospheric conditions will reduce water contamination.

b. Packaged petroleum products shall be properly protected from initial filling until ultimate consumption. Leaving containers open or unprotected at the final point of application of the product often results in contamination. Extreme care shall be taken at dispensing points to protect product quality. Instructions concerning disposition of product remaining after partial use of container contents shall be followed.

5.14.10 Minimum container markings. It is essential that containers for petroleum products are so marked that:

a. The products may be properly identified.

b. The origin and age of the product may be determined at any time.

c. Any hazard associated with the use or handling of the product is clearly indicated as flammable, toxic, or corrosive.

d. Identifying manufacturer information (e.g., specification, lot number, etc.) shall not be covered by locally produced identification labels

5.14.11 Field-filled container markings. The following minimum markings are required for all containers of petroleum products filled under field conditions:

a. National stock number

b. Nomenclature

c. Specification with revision and amendment number (if applicable)

d. Qualification Number (if applicable)

e. Contractor and contract number

f. Product batch, lot number or emulsion number

g. NATO code (if applicable)

h. Military symbol (if applicable)

i. Date of filling

j. Expiration date

k. Weight or volume of contents

l. Filling activity/ telephone number

m. Safety and use markings (when applicable)



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5.14.12 Marking of boxes and cartons. Minimum markings shall also be shown on boxes and cartons.

5.14.13 Marking of contractor supplied product. Packaged oils and lubricants supplied by contractors shall be marked in accordance with MIL-STD-290, or in accordance with provisions of the contract.

5.14.14 Marking of used drums. DELETED.

5.15 Deterioration of products.

5.15.1 Lubricating oils and gear oils. Most of these oils are procured as packaged products; however some are also procured and shipped in bulk. Those composed entirely of mineral oils, including those with additives such as viscosity index improvers, pour point depressants, or detergents, are very stable. If the package remains unbroken and airtight, the oil will remain on-specification for a long period of time. Storage guides and factors contributing to deterioration and contamination of packaged oils are listed below.

a. Most existing specifications for oils do not establish a quantitative limit for water content since none should theoretically be present. At the time of packaging, water content is at a negligible level. However, it is possible for a container to breathe air through the closures over a period of time, thus introducing atmospheric moisture into its contents. Very small amounts of water can usually be detected by cloudy or hazy appearance.

b. Engine lubricants and gear oils are required to pass ASTM D892, Foaming Characteristics of Lubricating Oils, which limits the amount of aerated foam in terms of foam tendency and foam stability. This tendency towards foaming is undesirable since it reduces lubricant flow to bearings/gears and decreases the thickness of the fluid film under hydrodynamic lubrication environments. To eliminate this, trace amounts of antifoam additives are added during production which shall be uniformly dispersed to be effective for controlling foam. Under storage conditions these dispersed antifoam additives may coalesce or stratify, which decreases their effectiveness significantly by allowing high foaming values under ASTM D892. In actual use environments, the high mechanical shear induced by gear/bearing activity re-disperses the antifoaming agent so satisfactory foaming control is attained. To ensure against premature failing of samples because of the coalescence tendency, ASTM D892 includes a pre-agitation requirement prior to sample analysis that involves mixing in a Waring-type blender.

5.15.2 Hydraulic fluids. Some hydraulic fluid specifications such as MIL-PRF-5606, MIL-PRF-6083, MIL-PRF-17672, MIL-PRF-46170, MIL-PRF-83282 and MIL-PRF-87257 contain particle contamination limits which are so low the products are required to be packaged under clean room conditions. Very slight amounts of dirt, rust, and metal particles will cause them to fail the specification limit for contamination. Five gallon and fifty-five gallon containers are opened by removing bungs. Quart and gallon containers are usually packaged in hermetically sealed containers, which should be opened by means of a piercing type device. To minimize external contamination, it is recommended that these containers are opened at the top of the vertical side rather than on the top. The act of opening any container may allow more


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contaminants into the fluid than the specification allows. In opening the container for use or evaluation it is extremely important that the can be opened and handled in a clean environment. The area of the container to be opened shall be flushed with filtered solvent (petroleum ether, mineral spirits or isopropyl alcohol). The device used for opening the container shall be thoroughly rinsed with filtered solvent. After the container is opened, a small amount of the material is poured from the container and disposed of prior to pouring the sample for analysis. Once a container is opened, the unused portion shall be discarded. Military hydraulic fluids, particularly those using ester synthetic hydrocarbon base stocks, can absorb water. The amount of water absorbed shall be controlled in order to prevent corrosion and other hydraulic system problems.

5.15.3 Greases. Deterioration of grease is usually indicated by bleeding or a change in texture, but neither constitutes assurance the grease is beyond specification limits. Tests such as penetration, dropping point and oil separation are necessary to make the determination.

a. Penetration is a method of measuring the consistency of grease. Consistency provides a means for classification of greases in accordance with the National Lubricating Grease Institute (NLGI) classification system. Most grease specifications contain a storage stability requirement which specifies that after a certain period of time under prescribed environmental conditions, the grease shall comply with all specification requirements except an expanded penetration. If the penetration is within the storage stability limits, the grease is satisfactory for use.

b. Dropping point indicates the temperature at which grease passes from a semisolid to a liquid state under the conditions of the test. It is not necessarily indicative of service performance. A change in dropping point is an indication the consistency of the grease has changed.

c. Oil separating from grease, commonly known as bleeding, is characteristic of most grease. The amount of bleeding varies with the composition of the grease, the size of the container and storage conditions. A film of free oil does not preclude satisfactory use of grease. However, where an excessive amount of free oil (pourable) is present, the grease shall not be used unless laboratory analysis confirms its continued conformance to specification requirements.

d. Incompatibility between the seal elastomer and the grease may result in the failure of seals to retain lubricating grease and exclude contamination. The deterioration of elastomer seals results in failure of lubricity and/or contaminant entry and causes a shortened bearing life.

e. Grease is formulated with various types of base oils, additives to control viscosity and other performance requirements, and thickeners. Some of these greases freeze at extreme cold weather conditions that may result in failure of bearings and equipment. Most military greases will operate down to minus 54° C (minus 65° F), which reflects one of the military's global operability requirements. This property is often determined using the bearing torque test or other rheological tests.

5.15.4 Insulating oils. Special precautions shall be taken to maintain insulating oils in first class condition. Insulating oil is required to have a high dielectric strength. It shall be moisture free and contain no foreign matter. If it is necessary to store insulating oils outdoors, the containers shall be protected from the weather. Containers shall not be opened or unsealed before


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the oil is actually required for use. If necessary to open for test, the utmost precaution shall be taken against the entrance of moisture or other foreign matter.

5.16 Non-Conforming product.

5.16.1 Identification of a non-conforming product. A product being accepted is deemed to be non-conforming when an authorized Government Representative either at origin on an Free on Board (FOB) Origin contract basis or at destination on an FOB Destination contract basis determines by inspection and/or tests not to conform to the procurement contract specifications.

5.16.2 Disposition request procedures. It is DLA Aviation policy to issue only those supplies and services that fully conform, in all respects, to the procurement specification requirement.

a. Based on these details, DLA Aviation will provide a decision concerning the product's use, rehabilitation, or disposition.

b. In the case of out of duty hour emergency requests, DLA Aviation shall provide disposition instructions and if possible notify the applicable Service technical office prior to shipment. If it is not possible to contact the Service technical office prior to shipment, then the contact shall be made as soon as practical.

c. Report of Customer/Depot Complaint and request for disposition instructions shall be sent through channels to DLA Aviation. The use of Standard Form 368 is recommended. The report shall contain, at a minimum, the following details:

(1) Specification and Grade of non-conforming product.

(2) Quantity of non-conforming product by storage/conveyance.

(3) Location where non-conforming product is held.

(4) Date of Receipt.

(5) Name of manufacturer, contract number, batch number, qualification number, date of manufacture, as applicable.

(6) Type of container or storage.

(7) Accountable military department.

(8) Need for replacement product.

(9) Detailed laboratory test results and if known, degree of contamination and contaminating materials. Test results reported shall include all known characteristics and whether results are within specification.



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5.16.2.1 Service and DLA responsibilities. The following are the responsible technical organizations of the Services and DLA for petroleum and related products.

| | | |
|---|---|---|
| a. Army | Mailing Address: | U.S. Army Petroleum Center<br>Room 0522 Mail Stop 6241<br>8725 John J. Kingman Rd.<br>Ft. Belvoir, VA 22060-6241 |
| | Message Address: | USAPC Ft Belvoir VA//AMXPC//<br>Telephone: Commercial: (751) 767-0659<br>DSN: (392) 427-0659 |
| b. Navy | Mailing Address: | Director NAVSUP Energy ATTN: Code PS<br>8725 John J. Kingman Rd., Suite 3719<br>Ft. Belvoir, VA 22060-6224 |
| | Message Address: | NAVSUP Energy BELVOIR VA<br>Telephone: Commercial: (751) 767-7334/7341<br>DSN: (392) 427-7334/7341 |
| c. Air Force | Mailing Address: | Air Force Petroleum Office<br>ATTN: AFPET/PTPS<br>2430 C Street, Building 70, Area B<br>Wright Patterson AFB, OH 45433-7632 |
| | Message Address: | Telephone: Commercial: (937) 255-8050<br>DSN (312) 785-8050<br>Email: afpet.ptps@us.af.mil |
| d. DLA Energy | Mailing Address: | DLA Energy DQA, Room 2843<br>8725 John J. Kingman Rd<br>Ft. Belvoir, VA 22060-6221 |
| | Message Address: | DLA Energy<br>FT BELVOIR VA//DLA Energy QA,<br>Telephone: Commercial: (703) 767-8736/8395<br>DSN: (392) 427-8736/8795 |
| e. DLA Aviation | Mailing Address: | DLA Aviation<br>Joint Commodities Division (FAJ)<br>8000 Jefferson Davis Highway<br>Richmond, VA 23297-5809 |
| | Message Address: | DLA Aviation<br>VA//DLA AVIATION-FAJ//<br>Telephone: Commercial: (804) 279-3995<br>DSN: (312) 695-3995 |

5.16.3 Communication copies. DLA Aviation shall be furnished copies of all communication regarding disposition of Government-owned off-specification product in overseas areas.

5.16.3.1 Chain of custody requirement for all samples shipped to a laboratory. In order to ensure sample integrity a record of the chain of custody must be maintained by the sample owner until sample disposal. Chain of custody documentation must be used for all samples forwarded



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where there is a contractual issue in question. Each change of custody shall be documented at the time and place of transfer including signature of the custodian. Chain of custody documentation shall be forwarded to DLA Aviation for inclusion into the Customer Depot Complaint (CDC) file. DLA Aviation determines product disposition, sample disposal and notifies sample owner(s) accordingly. Documentation and samples representing legal/potential legal disputes shall be maintained until release by DLA Aviation G.

5.16.3.2 Laboratory reports. DoD laboratories are authorized to provide dispositions for non-conforming products. Third party Chemical/POL Shelf-Life Extension laboratory test results are reviewed, accepted and entered into the SLES by the DLA Aviation FA/FM Chemist/Product Specialist. Disposition instructions to include Shelf Life Extension re-labeling are provide by DLA Aviation.

5.16.3.3 Reclamation. DELETED

5.16.3.4 Determining factors. DELETED

5.16.4 Reclamation techniques. DELETED

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The purpose of this Standard is to establish common requirements for maintaining quality during the receiving, storing and issuing of government-owned bulk and packaged petroleum products and coal. This Standard is military unique because it covers internal government procedures for the handling and storage of government-owned fuels under conditions not found in the commercial world such as long term storage and special testing requirements.

6.2 International standardization agreement implementation. This standard implements STANAG 1110 Allowable Deterioration Limits for NATO Armed Forces Fuels, Lubricants and Associated Products, STANAG 3149 Minimum Quality Surveillance for Fuels, STANAG 4714 Minimum Quality Surveillance for Lubricants and Associated Products, STANAG 7036 Methods of Detection and Treatment of Fuels Contaminated by Microorganisms, and AIR STD 4021 Allowable Deterioration Limits for Stored Fuels, Lubricants, and Associated Products. When changes to, revision, or cancellation of this standard are proposed, the preparing activity must coordinate the action with the U.S. National Point of Contact for the international standardization agreement, as identified in the ASSIST database at https://assist.dla.mil.

6.3 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.


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TABLE I. Minimum frequency for testing long-term storage of packaged petroleum products. [1]

| PRODUCT DESCRIPTION | MINIMUM TESTING FREQUENCY (MONTHS) |
|---|---|
| Gasoline, Aviation [1] | See note 2 |
| Gasoline, Automotive [1] | 12 |
| Turbine Fuel, Aviation [1] | 12 |
| Diesel Fuel [1] | 12 |
| Kerosene [1] | 12 |
| Fuels, Burner [1] | 12 |
| Fog Oils [1] | 12 |
| Other Petroleum Products, such as oils and greases | See note 3 |

NOTES:
1. For Bulk Petroleum Product long-term storage testing frequencies, see MIL-STD-3004-1.
2. For current minimum testing frequency requirements refer to Defense Logistics Information Service (DLIS) and/or the Total Item Record (TIR). See website, http://www.dla.mil/HQ/InformationOperations/LogisticsInformationServices.aspx. Test every 6 months if no other frequency is specified.
3. For products listed in TABLES IV – X, see minimum retest frequency for that product.

TABLE II. Minimum sampling and testing requirements for packaged petroleum products.

| SERIES | LOCATION OF STOCKS | TYPE STORAGE | WHEN SAMPLED | TYPE SAMPLE | TESTING REQUIRED |
|---|---|---|---|---|---|
| 1 | Packaged petroleum stocks wherever stored | Packaged | (a) Periodically as required by Table I. (b) When deterioration is suspected. . | Representative sample IAW API MPMS Chapter 8 | Type B-2 [1,2] |

NOTES:
1. B-2 tests requirements are listed in the applicable product table IV to X given below.
2. Unidentifiable or potential contaminated packaged petroleum products should be discarded.

TABLE III. Tests required for lubrication oils. DELETED



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TABLE IV. Type B-2 tests for lubricating oils. [5]

| CHARACTERISTICS | SPECIFICATION | | | | | |
|---|---|---|---|---|---|---|
| | A-A-59113 | A-A-59137 | ANSI/AGMA 9005 | DoD-L-81846 | DoD-PRF-24574 | DoD-PRF-85734 |
| Appearance / workmanship | | | | X | | |
| Color | | | | X | | |
| Viscosity @ 100 °C | | X [1] | X | X [1] | X | X |
| Viscosity @ 54 °C | | | | | | |
| Viscosity @ 40 °C | X | | X | X [1] | X | X |
| Viscosity @ -40 °C | | | | | | X |
| Viscosity @ -54 °C | | | | X | | |
| Relative density | | | | | | |
| Flash point | X | | X | X | X | X |
| Pour point | X | X | | X | X | X |
| Neutralization number (acid/base) | | | | | | X |
| Copper strip corrosion | X | | | | X | |
| Corrosion & oxidation stability | | | | X | | X |
| Evaporation loss | | | | X | | X |
| Precipitation number | | | | | | |
| Ash | | | | | | |
| Emulsion | | | | | | |
| Foam test | | | | | X | X |
| Water content | | | | | | |
| Particulate content / trace sediment | | | | X | | X |
| Trace metals | | | | | | X |
| Carbon residue | | | | | | |
| Hydrolytic stability | | | | | X | |
| Minimum retest frequency | 36 | 24 | 24 | 24 | 36 | 36 |
| Visual check frequency | | | | | | 12 |
| Military symbol(s) | None | None | None | None | None | None |
| NATO Code Numbers | None | None | None | None | None | O-160 |



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TABLE IV. Type B-2 tests for lubricating oils [5] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | | |
|---|---|---|---|---|---|---|
| | MIL-DTL-46014 | MIL-PRF-2104 | MIL-PRF-3150 | MIL-PRF-6081 | MIL-PRF-6085 | MIL-PRF-6086 |
| Appearance / workmanship | | | X | X | X | X |
| Color | | | | X | X | |
| Viscosity @ 100 °C | X | X | | | | |
| Viscosity @ 54 °C | | | | | X | |
| Viscosity @ 40 °C | X [1] | | X | X [1] | | X [1] |
| Viscosity @ -40 °C | | X (SCPL only) | | X | | |
| Viscosity @ -54 °C | | | | X | X | |
| Relative density | | | | | | |
| Flash point | X | X | | X | X | X |
| Pour point | | X | X | X | X | X |
| Neutralization number (acid/base) | | | | X | X | X |
| Copper strip corrosion | | | X | X | | X |
| Corrosion & oxidation stability | X | | | X | X | |
| Evaporation loss | | | X | | | |
| Precipitation number | | | | | X | |
| Ash | | | | | | |
| Emulsion | | | | | | |
| Foam test | | X | | | | X |
| Water content | | | | | | |
| Particulate content / trace | X | | | X | | |
| Trace metals | | | | | | |
| Carbon residue | | | | | | |
| Hydrolytic stability | | | | | | |
| Minimum retest frequency | 36 | 36 | 24 | 36 | 24 | 36 |
| Visual check frequency | | 12 | 12 | 12 | 12 | 12 |
| Military symbol(s) | None | OE/HDO-10, OE/HDO-30, OE/HDO-40, OE/HDO-15/40 SCPL | PL-M | None | OAI | OGL, OGR |
| NATO Code Numbers | None | O-237, O-238, None, O-1236, None | O-192 | O-133 | O-147 | O-153, O-155 |



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TABLE IV. Type B-2 tests for lubricating oils [5] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | | |
|---|---|---|---|---|---|---|
| | MIL-PRF-7808 | MIL-PRF-7870 | MIL-PRF-9000 | MIL-PRF-14107 | MIL-PRF-17331 | MIL-PRF-21260 |
| Appearance / workmanship | X | X | X | X | | |
| Color | | X | | | | |
| Viscosity @ 100 °C | X | | X | | X | X |
| Viscosity @ 54 °C | | | | | | |
| Viscosity @ 40 °C | X | X [1] | | X | X | |
| Viscosity @ -40 °C | | X | | | | |
| Viscosity @ -54 °C | X [1,4] | | | X | | |
| Relative density | | | | | | |
| Flash point | X | X | X | X | X | X |
| Pour point | | X | X | X | X | X |
| Neutralization number (acid/base) | X | X | X | X | X | |
| Copper strip corrosion | | | | | X | |
| Corrosion & oxidation stability | X | X | | X [1] | X [1] | |
| Evaporation loss | | X | | X | | |
| Precipitation number | | X | | X | | |
| Ash | | | | | | |
| Emulsion | | | | | X | |
| Foam test | X | | X | | X [2] | X |
| Water content | | | | | X | |
| Particulate content / trace | X | | | | X | |
| Trace metals | X | | | | | |
| Carbon residue | | | | | | |
| Hydrolytic stability | | | | | | |
| Minimum retest frequency | 36 | 36 | 24 | 24 | 24 | 24 |
| Visual check frequency | 12 | 12 | | | | 12 |
| Military symbol(s) | None | None | 9250 | LAW | 2190-TEP | PE-10, PE-30, PE-40, PE-15/40 |
| NATO Code Numbers | O-148, O-163 | O-142 | O-278 | O-157 | O-250 | C-640, C-642, None, None |



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TABLE IV. Type B-2 tests for lubricating oils [5] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | | |
|---|---|---|---|---|---|---|
| | MIL-PRF-23699 | MIL-PRF-26087 | MIL-PRF-32033 | MIL-PRF-46167 | MIL-PRF-53074 | MIL-DTL-83767 |
| Appearance / workmanship | | X | | | | X |
| Color | | X | X | | | |
| Viscosity @ 100 °C | X | X [1] | | X | X | |
| Viscosity @ 54 °C | | | | | | |
| Viscosity @ 40 °C | X | X [1] | X | | | X |
| Viscosity @ -40 °C | X | | X | X | | |
| Viscosity @ -54 °C | | | X | | | |
| Relative density | | | | | | |
| Flash point | X | X | X | X | X | X |
| Pour point | X | X | X | X | X | X |
| Neutralization number (acid/base) | X | X | | | X | X |
| Copper strip corrosion | | X | X | | X | X |
| Corrosion & oxidation stability | X | | | | | |
| Evaporation loss | X | | X | | | |
| Precipitation number | | X | X | | | |
| Ash | | | | | X | |
| Emulsion | | | | | | |
| Foam test | X | X | | X | | X |
| Water content | | | | | | |
| Particulate content / trace | X | | | | | |
| Trace metals | X | | | | | |
| Carbon residue | | X | | | | X |
| Hydrolytic stability | | | | | | |
| Minimum retest frequency | 36 | 36 | 24 | 24 | 36 | 24 |
| Visual check frequency | 12 | | 12 | 12 | | |
| Military symbol(s) | None | None | PL-S, PL-SE | OEA-30 | 5190, 5230 | None |
| NATO Code Numbers | O-152, O-154, O-156, O-167 | None | 0-190, none | None | None | None |



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TABLE IV. Type B-2 tests for lubricating oils [5] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | | | |
|---|---|---|---|---|---|---|---|
| | SAE J1899 | SAE J1966 | SAE J2360 | VV-L-825 [3] | MIL-PRF-32538 | MIL-DTL-32353 | DoD-L-24651 |
| Appearance / workmanship | X | X | | | | | |
| Color | | | | | | | |
| Viscosity @ 100 °C | X | X | X | X | X | X | X |
| Viscosity @ 54 °C | | | | | | | |
| Viscosity @ 40 °C | | | | X | X | X | X |
| Viscosity @ -40 °C | | | | | X | | |
| Viscosity @ -54 °C | | | | | | | |
| Relative density | | | | | | | |
| Flash point | X | X | X | X | X | X | X |
| Pour point | X | X | | X | X | X | X |
| Neutralization number (acid/base) | X | X | | X | X | X | |
| Copper strip corrosion | X | X | X | X | | X | |
| Corrosion & oxidation stability | | | | | X | X | |
| Evaporation loss | | | | | X | | |
| Precipitation number | | | | | | | |
| Ash | X | X | | X | | | |
| Emulsion | | | | | | X | |
| Foam test | X | | X | | X | X | |
| Water content | | | | | | X | |
| Particulate content / trace | X | X | | | X | | |
| Trace metals | X | | | | X | | |
| Carbon residue | | | | X | | | |
| Hydrolytic stability | | | | | | | |
| Minimum retest frequency | 36 | 36 | 24 | 3 | 36 | 24 | 24 |
| Visual check frequency | 12 | 12 | 12 | | 12 | | |
| Military symbol(s) | Type II Type III | 1065, 1080, 1100, 1120 | GO-75/90, GO- 80/90, GO-85/140 | RCO-2, RCO-3, RCO-4 | None | None | None |
| NATO Code Numbers | O-128, O-123 | O-113, None, O-117, None | O-186, O-226, O-228 | O-282, None, O-290 | O-165 | None | None |

NOTES:

1. For multiple material and tests, if capability exists.
2. For MIL-PRF-17331 Foam test, option A may be used for Government owned 2190 TEP if the conditions are met as required by ASTM D892.
3. For VV-L-825, also Floc Point and Dielectric Strength.
4. For MIL-PRF-7808, run low temperature viscosity at -51°C per specification.
5. For a commodity not listed in TABLES IV-X, see guidance on packaged product shelf life extension at https://www.shelflife.dla.mil/. Program POCs for the Military Services and Agency Administrators are listed on the home page.

Only an approved laboratory under the DoD Shelf Life Program can authorize the customer to extend the shelf life of any item.



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TABLE V. Type B-2 tests for greases, semi-fluids, lubricants, and other grease-like materials. [8]

| CHARACTERISTICS | SPECIFICATION | | | | |
|---|---|---|---|---|---|
| | DoD-G-85733 | DoD-G-24508 | DoD-G-24650 | MIL-G-21164 | MIL-G-25013 |
| Appearance /workmanship | X | X | X | | X |
| Odor | | X | | | |
| Penetration (un-worked) | | | | X | |
| Penetration (worked) | X | X | X | X | X |
| Worked stability | | X | | X | X |
| Dropping point / melting | X | X | X | X | X |
| Oil separation | | X | | X | X |
| Evaporation loss / bleed | X | X | | X | X |
| Copper strip corrosion | | X | | X | X |
| Oxidation stability (100hrs) | | | | | |
| Rust preventive properties | | X | | X | X |
| Water resistance | | X | | X | X |
| Fuel resistance | | | | | |
| Free-acidity / free alkali | | | | | |
| Molybdenum disulfide | | | | X | |
| Boiling water immersion | | | | | |
| Water stability | | | | | |
| Water content | | | | | |
| Dirt (particles) | | X | | | X |
| Load carrying capacity | X | X [5] | | X [5] | |
| Minimum retest frequency (months) | 24 | 24 | 12 | 24 | 24 |
| Visual check frequency (months) | | | | | |
| Military symbol(s) | None | None | None | GMD | None |
| NATO Code numbers | None | None | None | G-353 | G-372 |



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TABLE V. Type B-2 tests for greases, semi-fluids, lubricants, and other grease-like materials [8] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | |
|---|---|---|---|---|
| | MIL-G-25537 | MIL-G-81827 | MIL-G-81937 | MIL-L-15719 |
| Appearance / workmanship | X | X | X | X |
| Odor | X | | X | |
| Penetration (un-worked) | X | X | X | |
| Penetration (worked) | X | X | X | X |
| Worked stability | X | X | X | X |
| Dropping point / melting | X | X | X | X |
| Oil separation | X | X | X | |
| Evaporation loss / bleed | X | X | X | X |
| Copper strip corrosion | X | X | X | X |
| Oxidation stability (100 hrs.) | | | X | |
| Rust preventive properties | X | X | X | |
| Water resistance | | X | X | X |
| Fuel resistance | | | | |
| Free-acidity / free alkali | | | | |
| Molybdenum disulfide content | | X | | |
| Boiling water immersion | | X | | |
| Water stability / emulsification | | | | |
| Water content | | | | |
| Dirt (particles) | X | | X | X |
| Load carrying capacity | | X [5] | | |
| Minimum retest frequency | 24 | 24 | 24 | 24 |
| Visual check frequency (months) | | | | |
| Military symbol(s) | None | None | None | HTG |
| NATO Code Numbers | G-366 | None | None | None |



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TABLE V. Type B-2 tests for greases, semi-fluids, lubricants, and other grease-like materials [8] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | | |
|---|---|---|---|---|---|---|
| | MIL-PRF-46000 | MIL-L-46150 | MIL-PRF-10924 | MIL-PRF-18458 [1] | MIL-DTL-23549 | MIL-PRF-23827 |
| Appearance / workmanship | X | X | | X | X | X |
| Odor | X | | X | | | X |
| Penetration (un-worked) | | | | | | X |
| Penetration (worked) | X | | X | X | X | X |
| Worked stability | | | X | | | X |
| Dropping point / melting | | | X | | X | X |
| Oil separation | | | X | X | X | X |
| Evaporation loss / bleed | X | X | | | X | X |
| Copper strip corrosion | X | X | X | | X | X |
| Oxidation stability (100 hrs.) | X [4] | | | | | |
| Rust preventive properties | X | X | | | | X |
| Water resistance | | | | | | X |
| Fuel resistance | | | | | | |
| Acid number | X | | | | | |
| Molybdenum disulfide content | | | | | | |
| Boiling water immersion | | | | | X | |
| Water stability / emulsification | | | | | | |
| Water content | | | | | | |
| Dirt (particles) | | | | | | X |
| Load carrying capacity | X [5] | X [5] | X [5] | X [5] | X [5] | X [5] |
| Minimum retest frequency (months) | 24 | 24 | 24 | 24 | 24 | 24 |
| Visual check frequency (months) | | | 12 | | | |
| Military symbol(s) | LSA | None | GAA | None | None | None |
| NATO Code Numbers | O-158 | None | G-403 | None | None | G-354 (Type I) |



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TABLE V. Type B-2 tests for greases, semi-fluids, lubricants, and other grease-like materials [8] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | | |
|---|---|---|---|---|---|---|
| | MIL-PRF-24139 | MIL-PRF-27617 | MIL-PRF-81322 | MIL-PRF-83261 | MIL-PRF-83363 | MIL-PRF-85336 |
| Appearance / workmanship | X | X | X | X | X | |
| Odor | X | | X | | | |
| Penetration (un-worked) | | X | | | X | |
| Penetration (worked) | X | X | X | X | X | |
| Worked stability | X | | X | X | X | |
| Dropping point / melting | X | | X | | | |
| Oil separation | | X | X | X | X | |
| Evaporation loss / bleed | | X | X | X | X | X |
| Copper strip corrosion | X | X | X | | | X |
| Oxidation stability (100 hrs.) | X | X | | | | X |
| Rust preventive properties | | | X | | | X |
| Water resistance | X | X | X | X | | |
| Fuel resistance | | X | | | | |
| Free-acidity / free alkali | | | | | | |
| Molybdenum disulfide content | | | | | | |
| Boiling water immersion | | | | | | |
| Water stability / emulsification | | | | | | X |
| Water content | | | | | | |
| Dirt (particles) | X | | X | | | |
| Load carrying capacity | X [5] | | X [5] | X [5] | X [5] | X [5] |
| Minimum retest frequency | 24 | 24 | 24 | 24 | 24 | 24 |
| Visual check frequency (months) | | | | | | |
| Military symbol(s) | None | None | None | None | None | None |
| NATO Code Numbers | None | G-397 (Type I), G-398 (Type II), G-399 (Type III), G-1350 (Type IV) | G-395 | None | G-396 | None |



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TABLE V. Type B-2 tests for greases, semi-fluids, lubricants, and other grease-like materials [8] - Continued.

| CHARACTERISTICS | SPECIFICATION | |
|---|---|---|
| | MIL-PRF-32014 | A-A-59173 |
| Appearance / workmanship | X | X |
| Odor | X | |
| Penetration (un-worked) | | |
| Penetration (worked) | X | X |
| Worked stability | X | |
| Dropping point / melting | X | X |
| Oil separation | X | |
| Evaporation loss / bleed | | X |
| Copper strip corrosion | X | |
| Oxidation stability (100 hrs.) | | X |
| Rust preventive properties | X[7] | |
| Water resistance | X | |
| Fuel resistance | | |
| Free-acidity / free alkali | | |
| Molybdenum disulfide content | | |
| Boiling water immersion | | |
| Water stability / emulsification | | |
| Water content | | |
| Dirt (particles) | X | X |
| Load carrying capacity | | |
| Extreme Pressure, Four-Ball Method | X | |
| Wear Preventive, Four-Ball Method (75°C) | X | |
| Minimum retest frequency (months) | 24 | 24 |
| Visual check frequency (months) | | |
| Military symbol(s) | None | None |
| NATO Code numbers | None | None |



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TABLE V. Type B-2 tests for greases, semi-fluids, lubricants, and other grease-like materials [8] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | |
|---|---|---|---|---|---|
| | SAE AMS-G-4343 | SAE AMS-G-6032 | VV-G-671 [2] | VV-P-236 [3] | A-A-50433 |
| Appearance / workmanship | X | X | X | X | |
| Odor | X | | | | |
| Penetration (un-worked) | | X | | X | |
| Penetration (worked) | X | | X | | X |
| Worked stability | | | | | |
| Dropping point / melting | X | X | X | X | X |
| Oil separation | X | | | | |
| Evaporation loss / bleed | X | | | X | |
| Copper strip corrosion | X | X | X | X | X |
| Oxidation stability (100 hrs.) | | | | | X |
| Rust preventive properties | X | | | | |
| Water resistance | | X | | | X |
| Fuel resistance | | X | | | |
| Free-acidity / free alkali | | | | | X |
| Molybdenum disulfide content | | | | | |
| Boiling water immersion | | | | | |
| Water stability / emulsification | | | | | |
| Water content | | | X | | X |
| Dirt (particles) | | | | X | |
| Load carrying capacity | | | X [5] | | |
| Minimum retest frequency (months) | 24 | 24 | 24 | 24 | 24 |
| Visual check frequency (months) | | 6 [6] | 12 | | |
| Military symbol(s) | None | None | None | None | None |
| NATO Code Numbers | G-392 | G-363 | G-412 | S-743 | None |

NOTES:

1. For MIL-PRF-18458, also volatile matter.
2. For VV-G-671, also ash content.
3. For VV-P-236, also precipitation number, neutralization number (acid/base), viscosity, flash point, and abrasive material.
4. For MIL-PRF-46000, per time cited in specification.
5. For multiple items, if "Load carrying capacity" testing capability exists.
6. For SAE AMS-G-6032, also hardening.
7. For MIL-PRF-32014, alternative test from that specified is ASTM D5969 using 5% synthetic water.
8. For a commodity not listed in TABLES IV-X, see guidance on packaged product shelf life extension at https://www.shelflife.dla.mil/. Program POCs for the Military Services and Agency Administrators are listed on the home page.

Only an approved laboratory under the DoD Shelf Life Program can authorize the customer to extend the shelf life of any item.



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TABLE VI. Type B-2 tests for hydraulic, brake, shock absorber fluid. [5]

| CHARACTERISTICS | SPECIFICATION | | | | | |
|---|---|---|---|---|---|---|
| | A-A-59290 | A-A-59354 | MIL-DTL-17111 | MIL-H-19457 [1] | MIL-H-22072 | MIL-H-81019 |
| Appearance / workmanship | | | X | | X | X |
| Color | | X | X | | X | |
| Composition | | | | | | |
| Viscosity @ 100 °C | | | X | X | | |
| Viscosity @ 54 °C | | | | | X | |
| Viscosity @ 40 °C | X [2] | X | X | X | X [2] | X |
| Viscosity @ 25°C | | | | | | |
| Viscosity @ -40 °C | | | X [2] | | | |
| Viscosity @ -54 °C | | | | | | X |
| Low temperature stability | | | | | | |
| Relative density | X | | | X | X | |
| Flash point | | X | | | | X |
| Pour point | | X | X | X | | |
| Neutralization Number (acid/base) | | X | X | X | | X |
| Copper strip corrosion | | | | | | X |
| Corrosion & oxidation | | | | | | X |
| pH | X | | | | X | |
| Evaporation loss | | | X | X | X | |
| Water content | | | X | X | X | X |
| Foam test | | X | | X | X | X |
| Particulate content / trace | | | | | | X |
| Ash | X | | | | | |
| Precipitation number | | | X | X | | |
| Rust prevention | | | | | | |
| Emulsion | | | | X | | |
| Lubricity (steel-on-steel) | | | X [4] | X [4] | | |
| Gel time | | | | | | |
| Minimum retest frequency | 24 | 24 | 24 | 24 | 24 | 24 |
| Visual check frequency | | | | | | |
| Military symbol(s) | None | None | None | None | None | None |
| NATO Code | None | None | H-575 | H-580 | H-579 | None |



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TABLE VI. Type B-2 tests for hydraulic, brake, shock absorber fluid [5] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | | |
|---|---|---|---|---|---|---|
| | MIL-PRF-5606 | MIL-PRF-6083 | MIL-PRF-46170 | MIL-PRF-17672 | MIL-PRF-46176 | MIL-PRF-83282 |
| Appearance / workmanship | X | X | X | X | X | |
| Color | X | X | | | | X |
| Composition | | | | | | |
| Viscosity @ 100 °C | X | X | X | | X | X |
| Viscosity @ 54 °C | | | | | | |
| Viscosity @ 40 °C | X | X | X | X | | X |
| Viscosity @ 25°C | | | | | | |
| Viscosity @ -40 °C | X | X | X | | | X |
| Viscosity @ -54 °C | X | X | | | X [2] | |
| Low temperature stability | | | | | | |
| Relative density | | | | | | |
| Flash point | X | X | X | X | X | X |
| Pour point | X | X | X | X | | X |
| Neutralization Number (acid/base) | X | X | X | X | | X |
| Copper strip corrosion | X | X | | X | | |
| Corrosion & oxidation | | | | | | |
| Corrosiveness (bimetallic) | | | X | | | |
| pH | | | | | | |
| Evaporation loss | X | X | X | | | |
| Water content | X | X | X | X | | X |
| Foam test | X | X | X | X | | X |
| Particulate content / trace | X | X | X | X | | X |
| Ash | | | | | | |
| Precipitation number | | | | | | |
| Rust prevention | | | | | | |
| Emulsion | | | | X | | |
| Lubricity (steel-on-steel) | X [4] | X [4] | X [4] | | | X [4] |
| Gel time | | | | | | |
| Minimum retest frequency | 24 | 24 | 24 | 24 | 24 | 24 |
| Visual check frequency | 12 | | | | | 12 |
| Military symbol(s) | OHA | OHT | FRH | 2075-T-H<br>2110-T- H<br>2135-T-H | BFS | None |
| NATO Code Numbers | H-515 | C-635 | H-544 | None<br>H-573<br>None | H-547 | H-537 |



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TABLE VI. Type B-2 tests for hydraulic, brake, shock absorber fluid [5] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | |
|---|---|---|---|---|---|
| | MIL-PRF-87257 | SAE J1703 | SAE J1704 | SAE AS1241 [3] | VV-D-1078 |
| Appearance / workmanship | X | | | X | X |
| Color | X | | | | |
| Composition | | | | | |
| Viscosity @ 100 °C | X | X | X | X | |
| Viscosity @ 54 °C | | | | | |
| Viscosity @ 40 °C | X | | | X | |
| Viscosity @ 25°C | | | | | X |
| Viscosity @ -40 °C | X | X | X | | |
| Viscosity @ -54 °C | X | | | X | |
| Low temperature stability | X | | | | |
| Density @ 25 ºC | | | | X | |
| Relative density | | | | | X |
| Flash point | X | | | X | X |
| Pour point | X | | | X | X |
| Neutralization Number (acid/base) | X | | | X | X |
| Copper strip corrosion | | | | | |
| Corrosion & oxidation | | | | | |
| pH | | X | X | | |
| Evaporation loss | | | | | |
| Water content | X | | | X | |
| Foam test | X | | | X | |
| Particulate content / trace | X | | | X | |
| Ash | | | | | |
| Precipitation number | | | | | |
| Rust prevention | | | | | |
| Emulsion | | | | | |
| Lubricity (steel-on-steel) | | | | | |
| Gel time | | | | | |
| Minimum retest frequency (months) | 24 | 24 | 24 | 24 | 24 |
| Visual check frequency (months) | | 12 | 12 | | 12 |
| Military symbol(s) | None | None | None | None | None |
| NATO Code Numbers | H-538 | None | None | H-522 (Type IV, class 1) | S-1714, S-1716, S-1718, S-1720, S-1724, S-1726, S-1728, S-1732 |

NOTES:

1. For MIL-H-19457, also hydrolytic stability
2. For multiple items, viscosity per temperature in specification.
3. For SAE AS1241, also fire point characteristic.
4. For multiple items, if “Lubricity (steel-on-steel)” test capability exists.
5. For a commodity not listed in TABLES IV-X, see guidance on packaged product shelf life extension at https://www.shelflife.dla.mil/. Program POCs for the Military Services and Agency Administrators are listed on the home page.

Only an approved laboratory under the DoD Shelf Life Program can authorize the customer to extend the shelf life of any item.



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TABLE VII. Type B-2 tests for lubricants, (including solid film). [5]

| CHARACTERISTICS | SPECIFICATION | | | | |
|---|---|---|---|---|---|
| | A-A-59004 | MIL-DTL-25681 | MIL-L-24131 | MIL-L-24478 | MIL-DTL-87177 [1] |
| Appearance / workmanship | X | | | | X |
| Color | | | | | |
| Odor | | | | X | |
| Viscosity @ 100 °C | | X | | | |
| Viscosity @ 40 °C | | X | | | |
| Viscosity @ 0 °C | | | | | |
| Viscosity @ -40 °C | | | | | |
| Boiling point | | | | | |
| Flash point | | X | | | X |
| Pour point | | | | | |
| Density / relative density | | | | | |
| Oil content | X | | | | |
| Particle size | | | X | | |
| Solids content | | | X | X | |
| Ash | | | X | | |
| Adhesion | | | | | |
| Thermal stability | | | | | |
| Endurance life | | | | | |
| Load carrying capacity | | | | | X [3] |
| Minimum retest frequency | 12 | 24 | 12 | 12 | 24 |
| Visual check frequency | | | | 12 | |
| Military symbol(s) | None | None | None | None | None |
| NATO Code Numbers | None | S-1735 | None | None | None |



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TABLE VII. Type B-2 tests for lubricants, (including solid film) [5] – Continued.

| CHARACTERISTICS | SPECIFICATION | | |
|---|---|---|---|
| | MIL-PRF-3572 | MIL-PRF-63460 | MIL-PRF-81329 |
| Appearance / workmanship | X | X | X |
| Color | | | |
| Odor | | | |
| Viscosity @ 100 °C | X [2] | | |
| Viscosity @ 40 °C | | X | |
| Viscosity @ 0 °C | X [2] | | |
| Viscosity @ -40 °C | | X | |
| Boiling point | | | |
| Flash point | X | X | |
| Pour point | X | X | |
| Density / relative density | | | |
| Oil content | | | |
| Particle size | X | | |
| Solids content | X | | |
| Ash | X | | |
| Adhesion | | | X |
| Thermal stability | | | X |
| Endurance life | | | X |
| Load carrying capacity | | X [3] | |
| Minimum retest frequency (months) | 24 | 36 | See note 4 |
| Visual check frequency (months) | | | 6 |
| Military symbol(s) | None | CLP | None |
| NATO Code Numbers | None | S-758 | S-1737 |

NOTES:
1. For MIL-L-87177, also dielectric strength.
2. For MIL-PRF-3572, viscosity per temperature in specification.
3. For multiple items, if “Loading carrying capacity” test capability exists.
4. For MIL-PRF-81329, test at 6 months from date of manufacture and discard 12 months from date of manufacture.
5. For a commodity not listed in TABLES IV-X, see guidance on packaged product shelf life extension https://www.shelflife.dla.mil/. Program POCs for the Military Services and Agency Administrators are listed on the home page.

Only an approved laboratory under the DoD Shelf Life Program can authorize the customer to extend the shelf life of any item.



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TABLE VIII. Type B-2 tests for waxes. [1]

| CHARACTERISTICS | SPECIFICATION | | | |
|---|---|---|---|---|
| | A-A-59255 | C-T-91 | MIL-W-13945 | |
| Appearance / workmanship | X | X | X | |
| Odor | | X | X | |
| Color | X | | | |
| Melting point / solidification | X | X | X | |
| Softening point | | | | |
| Penetration | | | X | |
| Viscosity @ 100 °C | | | X | |
| Oil content | X | | X | |
| Flash point | | | X | |
| Relative density | | | | |
| Ash | | X | | |
| Water content | | X | | |
| Neutralization Number (acid/base) | | | X | |
| Saponification number | | X | X | |
| Volatile matter | | | | |
| Minimum retest frequency | 36 | 48 | 36 | |
| Visual check frequency | | | | |
| Military symbol(s) | None | None | None | |
| NATO Code Numbers | None | None | None | |

NOTE:

1. For a commodity not listed in TABLES IV-X, see guidance on packaged product shelf life extension at https://www.shelflife.dla.mil/. Program POCs for the Military Services and Agency Administrators are listed on the home page.

Only an approved laboratory under the DoD Shelf Life Program can authorize the customer to extend the shelf life of any item.



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.).[13]

| CHARACTERISTICS | SPECIFICATION | | | |
|---|---|---|---|---|
| | A-A-59197 | A-A-50493 | A-A-52624 | ASTM D3487 |
| Appearance / workmanship | X | X | | |
| Viscosity @ 100 °C | | | | |
| Viscosity @ 54 °C | | | | |
| Viscosity @ 40 °C | X [1] | X | | X |
| Viscosity @ 20 °C | | | | |
| Viscosity @ -40 °C | | | | |
| Viscosity @ -54 °C | | | | |
| Relative density | | | X | X |
| Distillation | | | | |
| Flash point | X | X | | X |
| Fire point | | | | |
| Pour point | X | | | X |
| Freezing point | | | X | |
| Penetration (un-worked) | | | | |
| Penetration (worked) | | | | |
| Melting point | | | | |
| Protection | | | | |
| Corrosion | | X | | |
| Neutralization Number (acid/base) | X | | | X |
| Acidity | | | | |
| Lead corrosion | | | | |
| pH | | | X | |
| Stability | | | | |
| Evaporation / bleed | | | | |
| Residue on evaporation | | | | |
| Ash | | | X | |
| Precipitation number | | | | |
| Foaming | | | | |
| Emulsification properties | | | | |
| Contamination / sediment | | | | |
| Water content | | X | | X |
| Dielectric strength | | | | X |
| Film appearance | | | | |
| Drying Rate | | | | |
| Particle size (fineness) | | | | |
| Surface and interface tension | | X | | |
| Non-volatile matter | | | | |
| Color | | | X | |
| Minimum retest frequency (months) | 36 | 36 | 36 | 24 |
| Visual check frequency (months) | | | | |
| Military symbol(s) | None | None | None | None |
| NATO Code Numbers | None | None | S-750 | None |



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.) [13] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | |
|---|---|---|---|---|---|
| | MIL-DTL-4339 | MIL-C-6529 | MIL-C-11796 | MIL-DTL-5020 | |
| Appearance / workmanship | X | X | X | X | |
| Viscosity @ 100 °C | | | | | |
| Viscosity @ 54 °C | | | | | |
| Viscosity @ 40 °C | | | | X [1] | |
| Viscosity @ 20 °C | | | | | |
| Viscosity @ -40 °C | | | | | |
| Viscosity @ -54 °C | | | | | |
| Relative density | | | | | |
| Distillation | | | | X | |
| Flash point | | | | X | |
| Fire point | | | | | |
| Pour point | | | | | |
| Freezing point | | | | | |
| Penetration (un-worked) | | | X | | |
| Penetration (worked) | | | | | |
| Melting point | | | X | | |
| Protection | | X | | | |
| Corrosion | X | | X | X | |
| Neutralization Number (acid/base) | | | | | |
| Acidity | | | | | |
| Lead corrosion | | | | | |
| pH | X | | | | |
| Stability | | X | X | | |
| Evaporation / bleed | | | | | |
| Residue on evaporation | | | | | |
| Ash | | | | | |
| Precipitation number | | X | | | |
| Foaming | | | | | |
| Emulsification properties | X | | | | |
| Contamination / sediment | | | | | |
| Water content | | | | | |
| Dielectric strength | | | | | |
| Film appearance | | | | | |
| Drying Rate | | | | | |
| Particle size (fineness) | | | | | |
| Surface and interface tension | | | | | |
| Minimum retest frequency (months) | 48 | 36 | 36 | 48 | |
| Visual check frequency (months) | | | | 12 | |
| Military symbol(s) | None | None | None | FDC | |
| NATO Code Numbers | C-630 | C-608, C-609, C-610 | C-633 | S-712 | |



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.) [13] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | |
|---|---|---|---|---|---|
| | MIL-PRF-8188 | MIL-PRF-12070 | MIL-PRF-16173 | MIL-PRF-46002 | MIL-PRF-87252 |
| Appearance / workmanship | X | X | X | X | X |
| Viscosity @ 100 °C | X | X | | X | X |
| Viscosity @ 54 °C | | | | | |
| Viscosity @ 40 °C | | | | X | X |
| Viscosity @ 20 °C | | | | | |
| Viscosity @ -40 °C | | | | | X |
| Viscosity @ -54 °C | | | | | X |
| Relative density | | | | | |
| Distillation | | | | | |
| Flash point | X | X | | X | X |
| Fire point | | | | | X |
| Pour point | | | | X | |
| Freezing point | | | | | |
| Penetration (un-worked) | | | | | |
| Penetration (worked) | | | | | |
| Melting point | | | | | |
| Protection | X [2] | | | | |
| Corrosion | | | X | X | X |
| Neutralization Number (acid/base) | | | | | X |
| Acidity | | | | | |
| Lead corrosion | X | | | | |
| pH | | | | | |
| Stability | | | X | | |
| Evaporation / bleed | | | | X | |
| Residue on evaporation | | | | | |
| Ash | | | X | | |
| Precipitation number | | | | X | |
| Foaming | X | | | | |
| Emulsification properties | | | | | |
| Contamination / sediment | | | | | X |
| Water content | | | | | X |
| Dielectric strength | | | | | X |
| Film appearance | | | X | | |
| Drying Rate | | | X | | |
| Particle size (fineness) | | | | | |
| Surface and interface tension | | | | | |
| Minimum retest frequency (months) | 36 | 36 | 36 | 24 | 24 |
| Visual check frequency | | | | | |
| Military symbol(s) | None | SGF-2 | None | None | None |
| NATO Code Numbers | C-638 | None | C-620, C-632 | None | S-1748 |



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.) [13] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | |
|---|---|---|---|---|---|
| | MIL-T-17128 | SAE AMS1424 | SAE AMS1428 | SAE AMS2518 | SAE AMS-M-7866 |
| Appearance / workmanship | X | X | X | X | X |
| Viscosity @ 100 °C | X | | | | |
| Viscosity @ 54 °C | | | | | |
| Viscosity @ 40 °C | X | | | | |
| Viscosity @ 20 °C | | | X | | |
| Viscosity @ -40 °C | | | | | |
| Viscosity @ -54 °C | | | | | |
| Relative density | X | X | X | | |
| Distillation | | | | | |
| Flash point | | | | | |
| Fire point | | | | | |
| Pour point | X | | | | |
| Freezing point | | X | X | | |
| Penetration (un-worked) | | | | X | |
| Penetration (worked) | | | | | |
| Refractive index | | X | X | | |
| Moisture (loss of | | | | | X |
| Corrosion | | | | | X |
| Neutralization Number (acid/base) | X | | | | |
| Acidity | | | | | |
| Lead corrosion | | | | | |
| pH | | X | X | | |
| Stability | | | | | |
| Evaporation / bleed | | | | X | |
| Residue on evaporation | | | | | |
| Ash | | | | | |
| Precipitation number | | | | | |
| Foaming | | | | | |
| Emulsification properties | | | | | |
| Contamination / sediment | | | | | |
| Water content | | | | | |
| Dielectric strength | | | | | |
| Film appearance | | | | | |
| Drying Rate | | | | | |
| Particle size (fineness) | | | | | X |
| Surface and interface tension | | | | | |
| Minimum retest frequency (months) | 36 | Note [12] | Note [12] | 36 | 36 |
| Visual check frequency (months) | | | | 12 | |
| Military symbol(s) | None | None | None | None | None |
| NATO Code Numbers | None | S-1717 | S-1719<br>S-1723 | S-720 | S-740 |



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.) [13] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | |
|---|---|---|---|---|---|
| | MIL-A-53009 | A-A-59921 | MIL-PRF-85570 [4] | MIL-PRF-85704 [5] | MIL-PRF-87937 [6] |
| Appearance / workmanship | | | X | X | X |
| Viscosity @ 100 °C | | | | | |
| Viscosity @ 54 °C | | | | | |
| Viscosity @ 40 °C | | | | | |
| Viscosity @ 20 °C | | | | | |
| Viscosity @ -40 °C | | | | | |
| Viscosity @ -54 °C | | | | | |
| Relative density | X | | | | |
| Distillation | | | | | |
| Flash point | | X | X | X | X |
| Fire point | | | | | |
| Pour point | | | | | |
| Freezing point | | | | | |
| Penetration (un-worked) | | | | | |
| Penetration (worked) | | | | | |
| Refractive index | | | | | |
| Moisture (loss of weight) | | | | | |
| Corrosion | | X | X | X | X |
| Neutralization Number (acid/base) | | | | | |
| Acidity | | | | | |
| Lead corrosion | | | | | |
| pH | X | X | X | X | X |
| Stability | | | | | |
| Evaporation / bleed | | | | | |
| Residue on evaporation | | X | | | X |
| Ash | | | | | |
| Precipitation number | | | | | |
| Foaming | | | | | |
| Emulsification properties | | X | | X | X |
| Contamination / sediment | | X | | | |
| Water content | | | | | |
| Dielectric strength | | | | | |
| Film appearance | | | | | |
| Drying Rate | | | | | |
| Particle size (fineness) | | | | | |
| Surface and interface tension | | | | | |
| Minimum retest frequency (months) | 24 | 36 | 24 | 24 | 36 |
| Visual check frequency (months) | | | | | |
| Military symbol(s) | None | None | None | None | None |
| NATO Code Numbers | None | None | None | None | None |



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.) [13] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | |
|---|---|---|---|---|
| | MIL-S-17980 [7] | O-E-751 [8] | SAE AMS1435 | MIL-DTL-83800 |
| Appearance / workmanship | X | X | X | X |
| Viscosity @ 100 °C | | | | |
| Viscosity @ 54 °C | | | | |
| Viscosity @ 40 °C | | | | |
| Viscosity @ 20 °C | | | | |
| Viscosity @ -40 °C | | | | |
| Viscosity @ -54 °C | | | | |
| Relative density | | X | X | X |
| Distillation | | X | | |
| Flash point | | | | X |
| Fire point | | | | |
| Pour point | | | | |
| Freezing point | | | | |
| Penetration (un-worked) | | | | |
| Penetration (worked) | | | | |
| Refractive index | | | | |
| Moisture (loss of weight) | | | | |
| Corrosion | | | X | |
| Neutralization Number (acid/base) | | | | |
| Acidity | | X | | X |
| Lead corrosion | | | | |
| pH | | | X | |
| Stability | | | | |
| Evaporation / bleed | | | | |
| Residue on evaporation | | X | | |
| Ash | | | | |
| Precipitation number | | | | |
| Foaming | | | | |
| Emulsification properties | | | | |
| Contamination / sediment | | | | |
| Water content | | | | X |
| Dielectric strength | | | | |
| Film appearance | | | | |
| Drying Rate | | | | |
| Particle size (fineness) | | | | |
| Surface and interface tension | | | | |
| Minimum retest frequency (months) | 24 | 36 | 48 | 18 |
| Visual check frequency (months) | | | | |
| Military symbol(s) | None | None | None | None |
| NATO Code Numbers | None | None | None | None |



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.) [13] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | |
|---|---|---|---|---|
| | MIL-PRF-25567 [9] | MIL-PRF-38299 [10] | MIL-PRF-680 | MIL-PRF-7024 [11] |
| Appearance / workmanship | | | X | |
| Viscosity @ 100 °C | | | | |
| Viscosity @ 54 °C | | | | |
| Viscosity @ 40 °C | | X | | |
| Viscosity @ 20 °C | | | | |
| Viscosity @ -40 °C | | | | |
| Viscosity @ -54 °C | | | | |
| Relative density | | | X | X |
| Distillation | | X | X | |
| Flash point | | X | X | |
| Fire point | | | | |
| Pour point | | | | |
| Freezing point | | X | | |
| Penetration (un-worked) | | | | |
| Penetration (worked) | | | | |
| Refractive index | | | | |
| Moisture (loss of weight) | | | | |
| Corrosion | | X | X | X |
| Neutralization Number (acid/base) | | | | |
| Acidity | | X | | |
| Lead corrosion | | | | |
| pH | X | | | |
| Stability | | | | |
| Evaporation / bleed | | | | |
| Residue on evaporation | X | | | |
| Ash | | | | |
| Precipitation number | | | | |
| Foaming | X | | | |
| Emulsification properties | | | | |
| Contamination / sediment | | X | | |
| Water content | | | | |
| Dielectric strength | | | | |
| Film appearance | | | | |
| Drying Rate | | | | |
| Particle size (fineness) | | | | |
| Surface and interface tension | | | | |
| Minimum retest frequency (months) | 36 | 24 | 24 | 36 |
| Visual check frequency (months) | | | | |
| Military symbol(s) | None | None | None | None |
| NATO Code Numbers | None | None | S-752<br>S-753<br>S-760 | None |



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.) [13] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | | |
|---|---|---|---|---|---|
| | SAE AS8660 | O-M-232 | SS-G-659 | TT-I-735 | VV-C-846 |
| Appearance / workmanship | X | X | X | X | X |
| Viscosity @ 100 °C | | | | | |
| Viscosity @ 54 °C | | | | | |
| Viscosity @ 40 °C | | | | | |
| Viscosity @ 20 °C | | | | | |
| Viscosity @ -40 °C | | | | | |
| Viscosity @ -54 °C | | | | | |
| Relative density | | X | | X | |
| Odor | | | | | X |
| Flash point | | | | | X |
| Fire point | | | | | |
| Pour point | | | | | X |
| Freezing point | | | | | |
| Penetration (un-worked) | | | | | |
| Penetration (worked) | X | | | | |
| Melting point | | | | | |
| Insolubility | X | | | | |
| Corrosion | X | | | | |
| Neutralization Number (acid/base) | | | | | |
| Acidity | | X | | X | |
| Lead corrosion | | | | | |
| pH | | | X | | |
| Stability | | | | | |
| Evaporation / bleed | X | | | | |
| Residue on evaporation | | X | | | |
| Ash | | | | | |
| Precipitation number | | | | | |
| Foaming | | | | | |
| Emulsification properties | | | | | X |
| Contamination / sediment | | | | | |
| Water content | | | | | X |
| Dielectric strength | X [3] | | | | |
| Film appearance | | | | | |
| Drying Rate | | | | | |
| Particle size (fineness) | | | X | | |
| Surface and interface tension | | | | | |
| Minimum retest frequency (months) | 36 | 24 | 48 | 48 | 36 |
| Visual check frequency (months) | 12 | 12 | 12 | 12 | 12 |
| Military Symbol(s) | None | None | None | None | OS |
| NATO Code Numbers | S-736 | S-747 | S-732 | S-737 | O-214 |



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.) [13] – Continued.

| CHARACTERISTICS | SPECIFICATION | | | |
|---|---|---|---|---|
| | A-A-59313 | MIL-PRF-83483 | MIL-PRF-907 | |
| Appearance / workmanship | X | X | X | |
| Viscosity @ 100 °C | | | | |
| Viscosity @ 54 °C | | | | |
| Viscosity @ 40 °C | | | | |
| Viscosity @ 20 °C | | | | |
| Viscosity @ -40 °C | | | | |
| Viscosity @ -54 °C | | | | |
| Relative density | | | | |
| Odor | | | | |
| Flash point | | | | |
| Fire point | | | | |
| Pour point | | | | |
| Freezing point | | | | |
| Penetration (un-worked) | | | | |
| Penetration (worked) | X | X | X | |
| Melting point | | | | |
| Dropping point | | | X | |
| Insolubility | | | | |
| Corrosion | | | | |
| Neutralization Number (acid/base) | | | | |
| Acidity | | | | |
| Lead corrosion | | | | |
| pH | | | | |
| Stability | X | X | | |
| Evaporation / bleed | | | | |
| Residue on evaporation | | | | |
| Ash | | | | |
| Precipitation number | | | | |
| Foaming | | | | |
| Emulsification properties | | | | |
| Contamination / sediment | | | | |
| Water content | | | | |
| Dielectric strength | | | | |
| Film appearance | | | | |
| Drying Rate | | | | |
| Particle size (fineness) | | | | |
| Surface and interface tension | | | | |
| Minimum retest frequency (months) | 12 | 12 | 12 | |
| Visual check frequency (months) | | | | |
| Military Symbol(s) | None | None | None | |
| NATO Code Numbers | None | None | None | |



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TABLE IX. Type B-2 tests for misc. products (specialty, cutting, anti-seizing, etc.) [6] – Continued.

Note:

1. For A-A 59197 and MIL-DTL-5020, Viscosity per temperature in specification.
2. For MIL-PRF-8188, Protection per temperature in specification.
3. For SAE AS8660, if "Dielectric strength" test capability exists.
4. For MIL-PRF-85570, also "Polyamide insulated wire effect, Type IV" minimum retest frequency: 18 months.
5. For MIL-PRF-85704, also Viscosity @ 27 °C.
6. For MIL-PRF-87937, also insoluble matter, polyamide insulated wire effect.
7. For MIL-S-17980, also volatile loss, sodium fluorescein content, and insoluble matter.
8. For O-E-751, also odor.
9. For MIL-PRF-25567, also non-flammability.
10. For MIL-PRF-38299, also total sulfur, mercaptan sulfur, gum content and conductivity.
11. For MIL-PRF-7024, also viscosity @ 0 °C and existent gum
12. For SAE-AMS-1424 and SAE-AMS-1428 Packaged products, have an initial 24 month shelf life from the date of manufacture and should be updated every 12 months.
13. For a commodity not listed in TABLES IV-X, see guidance on packaged product shelf life extension at https://www.shelflife.dla.mil/ . Program POCs for the Military Services and Agency Administrators are listed on the home page.

Only an approved laboratory under the DoD Shelf Life Program can authorize the customer to extend the shelf life of any item.



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TABLE X. Packaged additive shelf life and testing frequency [8]

| CHARACTERISTICS [1] | SPECIFICATION | |
|---|---|---|
| | MIL-DTL-85470 [5] FSII | MIL-PRF-25017 [6] CI/LI |
| Workmanship | X | X |
| Ash Content | | X |
| Pour Point | | X |
| Density @ 15 $^{O}$C | | X [7] |
| Viscosity @ 40 $^{O}$C | | X [7] |
| Flash Point | | X [7] |
| Total Acid Number | X | X [7] |
| pH @ 25 $^{O}$C (25% solution in water) | X | |
| Relative Density 20/20$^{O}$C | X | |
| Water | X | |
| NSN | 6850-01-089-5514 | 6850-00-292-9780 |
| Shelf Life [2, 3] | 18 Months | 24 Months |
| Test Frequency [4] | 9 Months | 15 Months |
| Military Symbol(s) | None | None |
| NATO Code Numbers | S-1745 | S-1747 |

NOTES:

1. Characteristics are from the product specifications. Refer to associated additive specification to determine appropriate ASTM test methods.
2. Static Dissipater Additive (SDA) and thermal stability improver (+100) additives are contracted and controlled through DLA Aviation, Richmond, VA (for address see 5.13.1) and do not have a defined shelf-life criteria. Any shelf life and/or testing requirements concerns for these items should be forwarded through them. It is noted that the manufacturer states that the self-life for SDA is 5 years, and for +100 is 12 months.
3. Shelf Life, for packaged items, applies to those items which are unopened and stored IAW Section 5 of this MIL Standard.
4. Once opened, packaged additives will be tested every 9 or 15 months until depleted or test results do not meet specifications.
5. Follow instructions and ASTM test methods and table properties contained within MIL-DTL-85470 to fulfill verification testing for a Fuel System Icing Inhibitor (FSII).
6. Perform conformance test identified in Table 1 of MIL-PRF-25017 when conducting shelf life testing of Corrosion Inhibitor/ Lubricity Improver (CI/LI).
7. Use the additive-specific values listed in QPL-25017, under Performance Specification, MIL-PRF-25017, to compare against the test results for each of these characteristics.
8. For a commodity not listed in TABLES IV-X, see guidance on packaged product shelf life extension at https://www.shelflife.dla.mil/ . Program POCs for the Military Services and Agency Administrators are listed on the home page.

Only an approved laboratory under the DoD Shelf Life Program can authorize the customer to extend the shelf life of any item.



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TABLE XI. Minimum standards of filtration and water separation for petroleum products.

| PRODUCT | INTO TANK CARS AND TRUCKS [5] | INTO DISPENSING UNITS [4] | INTO CONTAINERS (PACKAGE) | INTO AIRCRAFT [4] | INTO USING UNIT |
|---|---|---|---|---|---|
| Aviation Gasoline Bulk [1] | 150 microns [2] (max) No Visible Water | Filter-Separator 10 ppm by volume water, max. | Filter-Separator 10 ppm by volume water, max. | Filter or Filter-Separator [1] 10 ppm by volume Water, max. 150 microns [2] (max), No Visible Water | |
| Aviation Gasoline, Packaged [3] | | Filter-Separator [1] 10 ppm by volume Water, max. | | Filter or Filter-Separator [1] 10 ppm by volume Water, max. | |
| Aviation Turbine Fuels, Bulk [1] | 150 microns [2] (max) | Filter-Separator [1] 10 ppm by volume Water, max. | Filter-Separator [1] 10 ppm by volume water, max. | Filter-Separator [1] 10 ppm by volume Water, max. | |
| Aviation Turbine Fuels, Packaged [3] | | Filter-Separator [1] 10 ppm by volume Water, max. | | Filter-Separator [1] 10 ppm by volume Water, max. | |
| Aircraft Piston Engine Lube Oil, - Bulk | 240 microns [2] (max) No Visible Water | 240 microns [2] (max) No Visible Water | 240 microns [2] (max) No Visible Water | 240 microns [2] (max) No Visible Water | |
| Aircraft Piston Engine Lube Oil, Packaged | | 240 microns [2] (max) No Visible Water | 240 microns [2] (max) No Visible Water | 240 microns [2] (max) No Visible Water | |
| Aircraft jet Engine Lube Oils, - Packaged | | 25 microns, absolute (max) No Visible Water | 25 microns, absolute (max.) No Visible Water | 10 microns (max) (No Filtration necessary for Hermetically sealed containers) | |
| Aircraft Hydraulic Fluids - Packaged | | | (Filtered at time of manufacture), 5 microns, absolute (max) | 5 microns, absolute (max) (No filtration necessary for hermetically sealed containers) | |
| Diesel Fuel/ MOGAS (applicable for Army only) | | | Filter-Separator [1] 10 ppm by volume Water | | Filter-Separator 10 ppm by volume Water |

NOTES:
1. Filter-separator in accordance with Energy Institute (EI) 1581 or MIL-PRF-52308, electronic sensors that provide both a water and solid defense in accordance with EI 1598 and EI 1570, or other approved filter-separator equipment or combinations thereof.
2. 150 microns equal 100 mesh; 240 microns equal 60 mesh.
3. All visible water to be stripped or drained from fuel prior to issue.
4. All dispensing units or equipment that issue Aviation Gasoline or Aviation Turbine Fuel directly to aircraft must have a filter separator or electronic sensor installed at point of issue meeting requirements of Note 1.
5. 150 micron equal 100 mesh; 240 micron equal 60 mesh for Lubricating Oils for Tank Cars, Trucks and Intermodal Containers.



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# APPENDIX A

## MILITARY SERVICE PETROLEUM LABORATORIES AND TESTING CAPABILITIES

### A.1 SCOPE

A.1.1 Scope. This appendix is not a mandatory part of this Standard. The information contained herein is intended for guidance only. Unless otherwise directed, all samples should be forwarded to the laboratory designated in the appropriate service regulations. It is recommended to contact the laboratories listed below prior to submission of samples to ensure capabilities exist to perform/accomplish sample testing requirements.

### A.2 LIST OF LABORATORIES.

A.2.1 Laboratories. For a list of approved laboratories, see the table of QSL Test Labs for chemical commodities at https://www.shelflife.dla.mil/site/sles/TestLabs.aspx , Common Access Card (CAC) enabled.



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# APPENDIX B

# SIGNIFICANCE OF TESTS

## B.1 SCOPE

B.1.1 Scope. This appendix discusses the significance and purpose of some of the tests used in the quality assurance of fuels and lubricants. This appendix is not a mandatory part of this Standard. The information contained herein is intended for guidance only.

## B.2 GENERAL

B.2.1 General. Each of the various tests of fuels and lubricants indicated in the product specification has certain significance in relation to the quality of the product tested. Certain ones can give a quick, easy and positive identification of the product and at the same time, aid in detecting the presence of contaminants. Although descriptions of the testing equipment and test methods are not to be included in this publication, it is considered worthwhile to include a brief statement on the significance and purpose of certain tests. These statements may assist by providing a better understanding and appreciation of the scope and importance of the QA Program. For a more detailed coverage of this subject, see ASTM Manual 1, Significance of Tests of Petroleum Products.

B.2.2 Foam stability. This paragraph addresses Government-owned lubricating oil. All lubricating oils will foam to some extent when agitated. The foam that is formed in additive oils is often very stable and instead of breaking quickly tends to build in the oil system with subsequent oil loss through the breather outlets and other openings in the engine crankcase. Consequently, additive type motor oils are frequently treated with antifoam agents to eliminate potential foaming difficulties. The foam test requires agitating the oil sufficiently so a large quantity of foam is formed, then noting the time required for this foam to collapse. Some lubricants containing antifoam additive may fail initial foam tests. If they meet the foam requirements after agitation as described in Option A of ASTM D892, Foaming Characteristics of Lubricating Oils, they are satisfactory for use.

B.2.3 Viscosity. Viscosity is the measure of a liquid's resistance to flow. The significance of viscosity depends on the intended use of the product. From the point of view of application and performance, proper viscosity is highly important since specified minimum and maximum rates of flow are required for all fuels and lubricating oils. In fuel, viscosity determination serves as an index of how it will flow to the burners, the extent to which it will be atomized and the temperature at which the fuel must be maintained in order for heavy residual fuel to be properly atomized.

B.2.4 Lubricating oils. Care should be exercised to avoid contaminating lubricating oils with water, as it will hasten the decomposition of many oils, wash out additives, emulsify, and lead to engine malfunctioning. In used lubricating oils, water sediment may indicate poor maintenance or malfunctioning of screens, or its formation may have been caused by condensation

.



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# APPENDIX C

# ACRONYMS AND INITIALISMS

## C.1 SCOPE

C.1.1 Scope. This appendix lists most of the common acronyms and initialisms used in this document. This appendix is not a mandatory part of this standard and the information contained herein is intended for guidance only.

| | |
|---|---|
| AFPET | Air Force Petroleum Office |
| AGMA | American Gear Manufacturers Association |
| AMSC | Acquisition Management Systems Control |
| APC | Army Petroleum Center |
| API | American Petroleum Institute |
| ASSIST | Acquisition Streamlining and Standardization Information System |
| BBL | Barrel |
| BOCLE | Ball On Cylinder Lubricity Evaluator |
| CAC | Common Access Card |
| CID | Commercial Item Descriptions |
| CI/LI | Corrosion Inhibitor /Lubricity Improver |
| DLA | Defense Logistics Agency |
| DLIS | Defense Logistics Information Service |
| DoD | Department of Defense |
| EI | Energy Institute |
| FSC | Federal Supply Class |
| FSII | Fuel System Icing Inhibitor |
| HFRR | High Frequency Reciprocating Rig |
| IAW | In Accordance With |
| ISO | International Organization for Standardization |
| JPO | Joint Petroleum Office |
| MPMS | Manual of Petroleum Measurement Standards |
| NATO | North Atlantic Treaty Organization |
| NAVSUP | Naval Supply Systems Command (Energy) |
| NGS | Non-Government Standards |
| NLGI | National Lubricating Grease Institute |
| NSN | National Stock Number |
| OSHA | Occupational Safety and Health Administration |
| POL | Petroleum, Oils and Lubricants |
| ppm | Parts Per Million |
| PQDR | Product Quality Deficiency Report |
| QA | Quality Assurance |
| QAR | Quality Assurance Representative |
| QC | Quality Control |
| QCP | Quality Control Plan |
| QPD | Qualified Products Database |



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APPENDIX C

| | |
|---|---|
| QPL | Qualified Products List |
| QS | Quality Surveillance |
| QSL | Quality Surveillance List |
| RCQ | Refinery Certificate of Quality |
| RT | Recertification Test |
| SCP | Service Control Point |
| SDA | Static Dissipater Additive |
| SLBOCLE | Scuffing Load Ball-On-Cylinder Lubricity Evaluator |
| STANAG | Standardization Agreement |
| TIR | Total Item Record |
| USG | U.S. Gallons |
| VP | Vapor Pressure |



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## CONCLUDING MATERIAL

Custodians:
Army – AT
Navy – SA
Air Force – 68
DLA – GS

Review activities:
Navy – AS, SH, OS
Air Force – 20
DLA – PS

Preparing activity:
DLA – GS3
(Project 91GP-2019-002)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil/.



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