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MILITARY SPECIFICATION

LUBRICATING OIL, SPINDLE

1. SCOPE

1.1 Scope. This specification covers spindle oil for machine tool operation.

1.2 Classification. The spindle oils shall be of the following types·

Type I - Extra low viscosity

Type II - Low viscosity

Type III - Medium viscosity

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

STANDARDS

FEDERAL
Fed. Test Method Std. No. 791 - Lubricants, Liquid Fuels and Related Products; Methods of Testing

MILITARY
MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-290 - Packaging, Packing and Marking of Petroleum and Related Products

(Copies of specifications, standards, drawings and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS PUBLICATIONS:

ASTM Standards on Petroleum Products and Lubricants (Parts 17 and 18)

FSC 9150

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(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.

3. REQUIREMENTS

3.1 Material. The spindle oils shall consist of refined petroleum hydrocarbons, with or without additives.

3.2 Physical and chemical requirements. The spindle oils shall conform to the requirements for the respective types as specified in table I and in 3.3, 3.3.1, 3.3.2, 3.3.3, and 3.4.

Table I. Viscosity and flash point requirements

Properties	Values		
	Type I	Type II	Type III
Viscosity at 100°F.(37.78°C.)			
Kinematic, cs:	2.7 max.	9.0-12.0	20.0-23.0
(Saybolt, SUS):[1/]	(35.1 max.)	(55.5-66.0)	(97.8-110.7)
Viscosity at 210°F.(98.89°C.)			
Kinematic, cs:	--	2.0-3.0	3.0-5.0
(Saybolt, SUS):[1/]	--	(32.9-36.3)	(36.3-42.7)
Flash point, °F., minimum	175	280	300

[1/] For information only (see footnote 1, table II).

3.3 Oxidation stability. After being subjected to the oxidation stability test specified in 4.6, oils shall meet the requirements of 3.3.1, 3.3.2, and 3.3.3.

3.3.1 Acid number. The acid number of the spindle oil after the oxidation stability test shall not have increased by more than 0.10 (see 4.6).

3.3.2 Precipitation number. The precipitation number of the spindle oil after the oxidation stability test shall be not greater than 0.05 (see 4.6).

3.3.3 Corrosion. After the oxidation stability test, there shall be no visual evidence of etching or pitting on the metal squares. The degree of staining on the copper square shall not be more than that shown for classification 1b of the Copper Strip Corrosion Standard of ASTM D130. On the steel square, a dark brown, grey, or black stain shall be cause for rejection.

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3.4 Contamination. The spindle oil shall contain not more than 1.0 mg of solid material per liter of oil (see 4.6).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Lot.

4.2.1 Bulk lot. An indefinite quantity of a homogeneous mixture of material offered for acceptance in a single isolated container; or manufactured in a single plant run (not to exceed 24 hours), through the same processing equipment, with no change in ingredient material.

4.2.2 Packaged lot. An indefinite number of drums or other unit containers of identical size and type, offered for acceptance, and filled with a homogeneous mixture of material from one isolated container; or filled with a homogeneous mixture of material manufactured in a single plant run (not to exceed 24 hours) through the same processing equipment with no change in ingredient material.

4.3 Sampling.

4.3.1 Sampling for examination of the preparation for delivery. A random sample of containers shall be selected from each lot in accordance with MIL-STD-105 at inspection level II and acceptable quality level (AQL) = 2.5 percent defective, and shall be examined in accordance with 4.4.1.

4.3.2 Sampling for tests. Sampling of a lot for test purposes shall be done in accordance with ASTM method D270.

4.4 Inspection. Inspection procedures shall be in accordance with method 9601 of Fed. Test Method Std. No. 791.

4.4.1 Examination of the preparation for delivery. Samples selected in accordance with 4.3.1 shall be examined for compliance with MIL-STD-290 with regard to fill, closure, sealing, leakage, packaging, packing, and marking requirements. Any container having one or more defects or under the required fill shall be rejected. If the number of defective or underfilled containers exceeds the acceptance number for the appropriate sampling plan of MIL-STD-105, the lot represented by the sample shall be rejected.

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4.5 Classification of tests. All tests are classified as quality conformance tests.

4.6 Test methods. Tests shall be performed in accordance with the applicable methods listed in table II

Table II. Test methods

Test	Test method No., Fed. Std. 791	Test method No., ASTM
Viscosity (kinematic)		D445 1/
Viscosity, conversion of kinematic to Saybolt		D2161
Flash point (open cup)		D92
Oxidation stability	5308	
Acid number		D974
Precipitation number		D91
Corrosion		D130
Contamination	3006	

1/ Kinematic viscosity values shall be determined by ASTM method D445 and may be converted to Saybolt Universal Seconds by ASTM method D2161 if desired.

5. PREPARATION FOR DELIVERY

5.1 Packaging, packing, and marking. Unless otherwise specified in the contract or order, packaging, packing, and marking shall be in accordance with MIL-STD-290.

6. NOTES

6.1 Intended use. Spindle oils covered by this specification are intended for use as lubricants for high-speed spindles on machine tools. The type of oil selected should be based on the recommendation of the manufacturer of the machine tool. These oils may be used satisfactorily in other applications requiring extra low, low, or medium viscosity, oxidation-resistant oils

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6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number and date of this specification.

(b) Type of spindle oil required (see 1.2).

(c) Level of packaging and packing required (see 5.1).

(d) Type and size of container required (see 5.1).

6.3 Storage conditions. The spindle oils may be stored at temperatures ranging from -70° to +120°F. (-57° to +49°C.).

Custodian:
Army - MR

Review activities:
Army - AV, WC, MU

Preparing activity:
Army - MR

Project No. 9150-A036

Review/user information is current as of the date of this document. For future coordination of changes to this document, draft circulation should be based on the information in the current Federal Supply Classification Listing of DOD Standardization Documents.

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SPECIFICATION ANALYSIS SHEET

Form Approved Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.

SPECIFICATION

MIL-L-46014(MR), Lubricating Oil, Spindle

ORGANIZATION		CITY AND STATE
CONTRACT NO	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT $

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?
   A. GIVE PARAGRAPH NUMBER AND WORDING

   B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

   ☐ YES ☐ NO IF YES IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity)*	DATE

DD FORM 1 APR 63 1426 REPLACES NAVSHIPS FORM 4863 WHICH IS OBSOLETE

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