MIL-S-21558A (OS)
28 September 1973
SUPERSEDING
MIL-S-21558 (WEP)
29 August 1958

MILITARY SPECIFICATION

SEALS, PLAIN OR PLAIN ENCASED, OIL

This specification has been approved by the Naval Ordnance Systems Command, Department of the Navy.

1. SCOPE

1.1 Scope. This specification covers oil, plain or plain encased, seals for rotating or oscillating shafts used in Naval ordnance equipment.

1.2 Classification. Oil seals shall be of the following types, grades, and classes, as specified (see 6.2):

Types - The cross-sectional shape and construction shall be as specified by the procuring activity (see 6.2)

Grade A - Low torque seals

Class 1 - For operation at temperatures between -65° and 150° Fahrenheit (F)

Class 2 - For operation at temperatures between -20° and 200° F

Grade B - Medium torque seals

Class 1 - For operation at temperatures between -65° and 150° F

Class 2 - For operation at temperatures between -20° and 200° F.

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.

SPECIFICATIONS

Federal

PPP-B-601	Box, Wood, Cleated-Plywood
PPP-B-636	Box, Fiberboard
PPP-B-1055	Barrier Material, Waterproofed, Flexible

Military

MIL-P-116	Preservation, Methods of
MIL-B-121	Barrier Material, Greaseproofed, Flexible (Waterproofed)
MIL-A-140	Adhesive, Water-Resistant, Waterproof Barrier-Material
MIL-L-3150	Lubricating Oil, Preservative, Medium
MIL-H-5606	Hydraulic Fluid, Petroleum Base, Aircraft and Ordnance
MIL-F-17111	Fluid, Power Transmission

STANDARDS

Federal

FED-STD-151	Metals, Test Methods

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-1186	Cushioning, Anchoring, Bracing, Blocking, and Waterproofing, With Appropriate Test Methods

DRAWINGS

Department of the Navy

BUORD Sketch No. 94307	Grease and Oil Seal Test Machine (List of Drawings for)

(Copies of specifications, standards, drawings, and publications required by contractors 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 document forms 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 National Standards Institute, Inc.

ANSI B46.1	Surface Texture

(Copies of the above publication may be obtained from the American National Standards Institute, Inc., Dept. 1270, 1430 Broadway, New York, N. Y. 10018.)

3. REQUIREMENTS

*3.1 First article. Prior to commencing production, oil seals to be furnished under this specification shall be submitted to the activity designated in the contract or purchase order for first article inspection to determine conformance to the requirements of this specification. The first article submitted by a contractor shall be fully representative of the oil seals to be supplied from production facilities and tooling.

3.2 Component parts. Oil seals shall consist of the following component parts.

3.2.1 Sealing element. The sealing element shall be of a flexible, tough, homogeneous, nonabrasive, oil resistant material capable of withstanding the tests specified herein. It shall be a concentric ring which will remain firm and resilient during its service life. The sealing element shall be capable of establishing and maintaining a sealing contact

with minimum frictional drag for operating shaft speeds up to 2,000 feet per minute (fpm) rubbing velocity at the sealing lip of the sealing element. Such shaft speed of 2,000 fpm rubbing velocity shall be within the shaft rotation limit of 3,600 revolutions per minute (rpm). Sealing elements which unravel, fray, or become spongy during tests are not acceptable. The sealing element shall be capable of maintaining a minimum of leakage (see 3.6) against pressure equivalent to 6 inches head of hydraulic fluid measured from the centerline of the shaft. This feature will be checked during the torque tests of 4.7.2.1 and the endurance test of 4.7.2.2.

3.2.2 Pressure element. The use of an external pressure element is optional with the manufacturer. If used, the pressure element shall exert pressure evenly around the sealing lip of the sealing element, insure contact between the sealing lip and the mating surface, and automatically take up any wear of the sealing lip under the conditions of speed and eccentricity specified (see 3.2.1 and 3.3). The pressure element shall be anchored or secured to the oil seal in a manner which will assure its remaining in position during installation and operation. The pressure element shall be of a corrosion resistant material. Plated pressure elements are not acceptable.

3.2.3 Encasing components. Unless otherwise specified in the contract or order (see 6.2), oil seals shall be furnished with either a metallic case, a nonmetallic case with internal metal stiffener, or a nonmetallic case at the option of the contractor (see figures 1, 2, and 3). The encasing component shall be constructed to retain and anchor the sealing element and act as a sealing member under all conditions of service for which it is intended without misalignment or objectionable distortion.

3.2.3.1 Metallic case. Unless otherwise specified in the contract or order (see 6.2), metallic cases shall be made of either plated, plain steel or corrosion-resisting steel at the option of the contractor. Cadmium plated cases are not acceptable.

3.2.3.2 Nonmetallic case with internal metal stiffener. Nonmetallic cases with internal metal stiffeners shall be made of synthetic compound chemically bonded to an internal metal stiffener. The case and the sealing element shall be made of the same material.

3.2.3.3 Nonmetallic case. Nonmetallic cases shall be made of synthetic compound or of a fiber and compound composition chemically bonded to the sealing element.

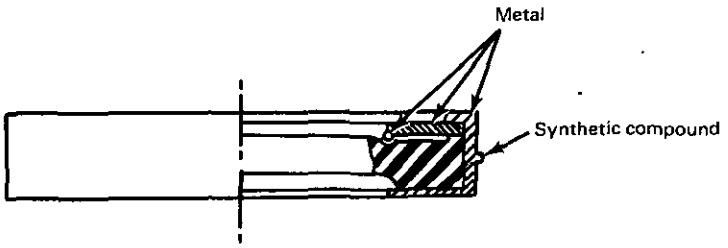

FIGURE 1. OIL SEAL, METAL ENCASED CONSTRUCTION

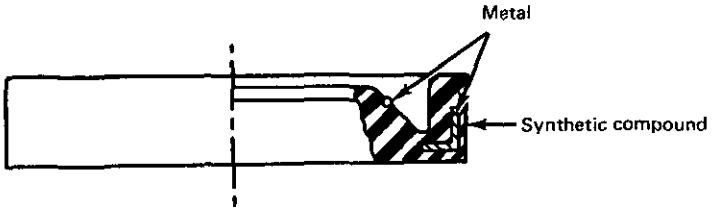

FIGURE 2. OIL SEAL, SEMIMETALLIC SHELL CONSTRUCTION

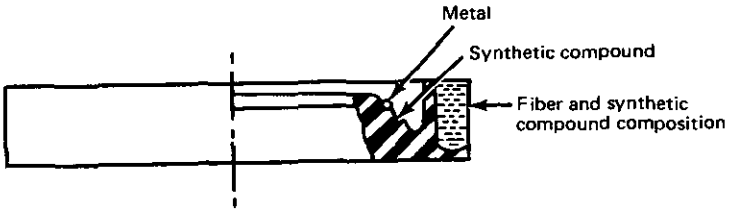

FIGURE 3. OIL SEAL, NONMETALLIC SHELL CONSTRUCTION

*3.3 General operational requirements. Oil seals shall be self-contained units in which the sealing element and other parts required by the design are suitable for concentric and snug assembly in housing bores, the diametral tolerances of which are as follows:

±0.001 inch for bores up to and including 3.000 inches
±0.0015 inch for bores of 3.001 to and including 6.000 inches
±0.002 inch for bores of 6.001 inches and larger.

Oil seals shall operate without deterioration while in contact with petroleum base fluids, such as those conforming to MIL-F-17111 or MIL-H-5606 and shall be capable of satisfactory operation with shafts having a surface roughness of 8 to 16 microinches RHR (see ANSI B46.1 for method

of interpretation), a minimum hardness of 30 Rockwell on the C scale, and eccentricities (total indicator runout) (TIR) not exceeding the following limits:

0.003 inch for shaft diameters up to and including 1.0 inch
0.005 inch for shaft diameters over 1.0 inch to and including 2.0 inches
0.008 inch for shaft diameters over 2.0 inches.

3.4 Shape and dimensions. The detail shape, in cross-section, of oil seals shall be in accordance with the cuts or drawings furnished with the contract or order. Dimensions and tolerances shall be as specified in the contract or order (see 6.2).

3.5 Torque. Oil seals submitted for test shall develop friction torque no greater than the torque values specified in table I when tested in the grease and oil seal test machine (BUORD Sketch No. 94307). Values given are for one seal, which is assumed to be one-half of the torque measured for two seals of equal size after correction has been made for the bearing torque of the test machine.

Table I

OIL SEAL TORQUE VALUES[1]

Grade and class	Torque values at 70° to 74° F (max.)	Torque values at -65° F (max.)	Torque values at -20° F (max.)
Grade A			
Class 1	$0.30\pi D^2$	$0.60\pi D^2$	-
Class 2	$0.30\pi D^2$	-	$0.45\pi D^2$
Grade B			
Class 1	$0.45\pi D^2$	$0.75\pi D^2$	-
Class 2	$0.45\pi D^2$	-	$0.65\pi D^2$

[1] Values are in pound-inch; D is the shaft diameter in inches.

*3.6 Leakage. The maximum rate of leakage of hydraulic fluid (MIL-F-17111 or MIL-H-5606) past the sealing lip of any oil seal, at any temperature within its operating range (see 1.2) shall not exceed 0.1 cubic centimeter per circumferential inch of shaft per hour. When assembled in a standard bore, any leakage other than past the sealing lip shall be cause for rejection. Measurements of leakage shall be made

in accordance with 4.7.2.3 during the torque tests of 4.7.2.1 and endurance test of 4.7.2.2, including stand by as well as running time.

*3.7 Volumetric change. The oil seal sealing element, when immersed in fluid conforming to MIL-F-17111, shall not show an increase in volume exceeding 10.0 percent or a volume decrease exceeding 1.0 percent. Upon exposure to oil, the sealing element shall not break down, soften, or roughen.

3.8 Reaction with metals. The sealing element and the shell or case of the oil seal shall not cause corrosion or pitting of the metal part with which it is in contact. Slight discoloration of the metal shall not be cause for rejecting the oil seal.

3.9 Adherence to metals. The sealing element and the shell or case of the oil seal shall not adhere or stick to the metal part with which it is in contact. The material shall be considered as adhering or sticking to the metal if particles or pieces of the sealing element, shell, or case remain adhered or stuck to the metallic surface either through operation of the metallic part in the oil seal or upon removal of the oil seal from the assembly.

3.10 Endurance. Oil seals shall be capable of withstanding the endurance test of 4.7.2.2 without exceeding the leakage requirement of 3.6. After test, the seals shall be serviceable with no evidence of cracking, flaking, excessive wear, or other malfunctioning. Normal wear shall not be considered as malfunctioning; however, it shall not include disintegration. At the conclusion of the test, the seals shall comply with the 70° to 74° F torque requirements of table I.

3.11 Salt spray. The exposed metal parts of the oil seal (case and pressure element) shall show no more than slight discoloration following the salt spray test of 4.7.1.3, and the sealing element shall not be injuriously affected by contact with the salt spray.

3.12 Workmanship. Sealing surfaces of oil seals shall be smooth and free from blemishes, irregularities, and other defects. Workmanship shall follow standards of high grade commercial practice and shall be first class in every respect.

4. QUALITY ASSURANCE PROVISIONS AND TEST REQUIREMENTS

*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 this specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

*4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

(1) First article inspection (4.3)
(2) Quality conformance inspection (4.4).

*4.3 First article inspection. First article inspection shall consist of examinations and tests for all the requirements of this specification. Failure of any oil seal in the sample to meet any requirement shall be cause for rejection of the first article sample.

*4.4 Quality conformance inspection. Unless otherwise specified in the contract or purchase order, quality conformance inspection for acceptance of individual lots shall consist of the examinations of 4.6.

4.5 Sampling.

4.5.1 Lot. For the purpose of sampling, a lot shall consist of all the oil seals of the same type, grade, class, and size offered for inspection at one time.

*4.5.2 Sampling for first article inspection. Sample oil seals of the same types, grades, and classes being submitted for first article inspection shall be of the sizes and in the quantities specified below:

Shaft diameter (inches)	Housing diameter (inches)	No. of seals in samples
3-1/2	4-1/2	12
2-5/8	3-5/8	12
7/8	1-1/2	12

The manufacturer shall supply the testing activity with a certified statement of prior tests showing that the samples being submitted conform to all requirements of this specification. Samples shall be forwarded to the test laboratory designated in the contract or purchase order. All packing containers shall be plainly marked as follows:

(a) Title, number, and date of this specification
(b) Sample for first article inspection
(c) Applicable drawing number and piece number
(d) Types, grades, classes, and sizes
(e) Manufacturer's designation or brand name
(f) Name of manufacturer and plant address.

*4.5.3 Sampling for quality conformance inspection. Unless otherwise specified in the contract or purchase order, sampling for quality conformance inspection shall be in accordance with the provisions of MIL-STD-105.

4.5.4 Sampling for inspection of filled containers. A random sample of filled containers shall be selected in accordance with the provisions of MIL-STD-105.

4.6 Examinations.

4.6.1 Visual and dimensional. Oil seals shall be visually examined for completeness of manufacture, freedom from defects, proper identification, and workmanship. Dimensional and other nondestructive inspections shall be made in accordance with the acceptance inspection instructions provided by the procuring activity.

4.6.2 Packaging, packing, and marking. Each sample filled container shall be examined to determine conformance to the requirements of section 5. Each sample container shall be examined for defects of construction, proper closure, and unsatisfactory marking. Any container in the sample having one or more defects or under required fill shall be rejected and disposition of the lot shall be in accordance with MIL-STD-105.

4.7 Tests.

4.7.1 Physical properties tests.

*4.7.1.1 Volumetric change. The oil seal sealing element shall be tested for volumetric change to determine compliance with the requirements

of 3.7. The test specimen may consist of the entire sealing element of the 2.625-inch shaft diameter size of oil seal or sections taken from this element. The water displacement method of measuring the change of volume of the sealing element shall be used. The sealing element specimen shall first be accurately weighed in air to the nearest milligram. This first weight shall be called W_1. The specimen shall then be weighed to the nearest milligram in distilled water at 25° Celsius (C) by suspending it in the water with a fine wire. The weight of the wire must be deducted from the total weight. This second weight shall be called W_2. When weighing in water, care must be taken that the specimen is free from adhering bubbles, and, if necessary, it may be first wetted by dipping into 95 percent alcohol or a 2 percent solution of aerosol OT in water and rinsed with distilled water. After this second weighing, the specimen must be blotted dry with filter paper. The specimen shall then be completely immersed in fluid conforming to MIL-F-17111 and allowed to remain in the fluid for a period of 70 hours ± 1 hour at a temperature of 150° F ± 2° for grade A or B, class 1 specimens, or 200° F ± 2° for grade A or B, class 2 specimens. At the end of this fluid immersion period, the specimen shall be removed and cleaned by rapidly rinsing it with petroleum ether (boiling point 30° to 60° C). The specimen shall then be weighed in air to the nearest milligram. The third weight shall be called W_3. The specimen shall then be weighed in water as described above. This fourth weight shall be called W_4. Percent volume change of the specimen is equal to

$$\frac{(W_3 - W_4) - (W_1 - W_2)}{(W_1 - W_2)} \times 100.$$

A positive answer represents an increase in volume of the sealing element.

*4.7.1.2 Corrosion and adhesion tests. The oil seal sealing element shall be tested for the corrosion of and adhesion to mild steel and phosphor bronze to determine compliance with the requirements of 3.8 and 3.9. Specimens for this test shall be obtained by cutting sections from the sealing element of oil seals. These tests shall be conducted in a compression device consisting of a base plate provided with two stud bolts on which polished plates of phosphor bronze and mild steel are placed. The plates shall measure 3 by 1 by 1/8 inches and shall be polished to a surface roughness of 8 to 16 microinches RHR (see ANSI B46.1 for method of interpretation). Two compression springs, which together are capable of imposing a load of 25 pounds per square inch (psi), are placed over the studs and secured by a nut on top of each stud. The nuts also serve to adjust the spring loads so as to obtain the specified load on the sealing element specimen. The total surface area of the sealing element specimen shall be 1 square inch. One or more strips of the sealing

element may be used to make up this area. Before running the test, the test strips of phosphor bronze and mild steel shall be cleaned with a suitable hydrocarbon. A stack of sealing element test specimens and metallic test strips assembled so that the specimens contact each specified metal is placed in the device and the stud nuts are adjusted so that the springs impose a load of 25 psi on the specimen. The device assembly shall then be placed in an electric oven at a temperature of 150° F for grade A or B, class 1 specimens, or 200° F for grade A or B, class 2 specimens, ±2°, for a period of 168 continuous hours. A second set of sealing element specimens and metallic plates shall be prepared in the same manner as above, except that the stack shall not be subject to any external load and shall be immersed for 48 hours in hydraulic fluid conforming to MIL-F-17111 at a temperature of 150° F for grade A or B, class 1 specimens, or 200° F for grade A or B, class 2 specimens, so that all surfaces become wet with fluid while held together by the weight of the overlying pieces only. At the end of the 48-hour soaking period, without disturbing the stack or removing excess fluid, the pressure springs and stud nuts are assembled on the device and the stud nuts adjusted so that the springs impose a load of 25 psi on the sealing element specimen. The device assembly shall then be placed in air in an electric oven at a temperature of 150° F ± 2° for class 1 specimens, or 200° F ± 2° for class 2 specimens, for a period of 120 hours (5 days). At the end of these test periods, the test assemblies shall be removed from the oven and disassembled. The sealing element specimen contact surface of the metallic test plates shall be carefully examined for corrosion and pitting. A slight discoloration of the metal shall not be considered as corrosion. The sealing element specimens shall be considered as adhering or sticking to the metal if particles or pieces of the sealing element, shell, or case remain adhered or stuck to the metallic surface either through operation of the metallic part in the oil seal or upon removal of the oil seal from the assembly.

4.7.1.3 Salt spray test. Oil seals shall be subjected to the salt spray test described in FED-STD-151, method 811, to determine conformance to 3.11. The test period shall be 100 hours.

4.7.2 Performance tests. Performance tests shall be conducted on a grease and oil seal test machine (BUORD Sketch No. 94307), or its equivalent. This machine consists of a dynamometer type housing with a 10-inch torque arm contacting the platform of a springless dial scale with a direct reading capacity of 0 to 25 pounds in increments of 0.01 pound. The test housing on the test machine is cradle mounted on a shaft, the shaft being mounted in fixed bearings and directly coupled with a 1,750 rpm, 1 horsepower, alternating current motor, which is started across the line. One oil seal is used in each end of the test housing to simulate a typical ordnance installation. Power transmission fluid

conforming to MIL-F-17111 is used within the test housing during the test runs, except that the fluid for the low temperature torque tests shall be hydraulic fluid conforming to MIL-H-5606. During the test runs, the fluid level shall be maintained at 6 inches above the centerline of the shaft. The various sizes of oil seals are accommodated on the grease and oil seal test machine by the use of shaft bushings and oil seal housing adapters. In using the grease and oil seal test machine for measurement of torque, corrections must be made for the friction of the ball bearings which support the housing. The value of the correction may be obtained by running the machine without seals but with suitable bushings fitted into the housing in the same way as a seal and having a large enough bore diameter to provide an annular clearance of 0.005 inch at the shaft. This would partly block the escape of hydraulic fluid from the housing and permit the maintenance of the required 6-inch head of fluid. The test housing shall then be filled with test fluid to the required 6-inch head level and a quick torque test taken ignoring the escaping fluid. The value obtained shall be deducted from the subsequent torque measurements made with the oil seals.

4.7.2.1 Torque.

4.7.2.1.1 Normal temperature torque tests (70° to 74° F). The grease and oil seal test machine of 4.7.2 shall be completely assembled with two identical seals, one in each end of the test housing which shall be filled with power transmission fluid conforming to MIL-F-17111. The electric motor shall be started and the following data recorded:

(a) Oil and ambient temperature at start of test run

(b) Torque measured after 10 seconds of running

(c) Torque each minute for 5 consecutive minutes and then each 5 minutes for 30 consecutive minutes

(d) Temperature of oil each time the torque is measured

(e) At the end of the run the motor shall be stopped. After 10 minutes it shall be restarted and a record taken of the torque after 10 seconds, 1 minute, and 5 minutes of operation.

The torque per seal obtained by subtracting the bearing friction torque from the torque measurement made at the 1-minute period and then dividing by 2, shall not exceed the 70° to 74° F torque values specified in table I.

4.7.2.1.2 Low-temperature torque tests (-20° to -65° F). A suitable cold temperature test box shall be constructed around the test housing and shaft of the grease and oil seal test machine of 4.7.2. The box shall be so constructed that it will be capable of holding sufficient quantities of dry ice to obtain test housing temperatures of -20° to -65° F. Provisions shall be made for determining the temperature of the test housing at all times. Two identical oil seals shall be assembled into test machine, one in each end of the test housing which shall be filled with hydraulic fluid conforming to MIL-H-5606. Dry Ice shall then be placed in the cold temperature test box and the oil and ambient temperatures taken and recorded. These temperature readings shall be taken at 15-minute intervals for a period of time that is required to bring the temperature of the fluid and test housing assembly down to -65° F for grades A or B, class 1 seals, or -20° F for grades A or B, class 2 seals. Upon reaching the required temperature, the grease and oil seal test machine shall be started, operated, and torque values computed as outlined in 4.7.2.1.1. At the conclusion of the test, the torque values obtained shall not exceed the values specified in table I.

4.7.2.1.3 Torque test after oil aging. Oil seals shall be subjected to a torque test after aging in oil. The torque tests specified in 4.7.2.1.1 and 4.7.2.1.2 shall be repeated using oil seals that shall be aged for 70 hours immersed in hydraulic fluid complying with MIL-F-17111. The fluid temperature shall be maintained at 150° F ± 2° for grades A or B, class 1 oil seals, or 200° F ± 2° for grades A or B, class 2 oil seals. The torque requirements of table I shall apply to these tests.

4.7.2.2 Endurance test. Oil seals shall be subjected to an endurance test to determine compliance with the requirements of 3.10. Two identical oil seals shall be installed in the test housing of the grease and oil seal test machine of 4.7.2. The test machine shall then be started, operated, and the torque values computed for the first 35 minutes as outlined in 4.7.2.1.1 and thereafter, once each 30 minutes of the entire test cycle outlined below. After starting the run, the fluid temperature within the test housing shall be raised to 150° F for grade A or B, class 1 seals, or 200° F for grade A or B, class 2 seals within approximately 1 hour. This temperature shall be maintained within ±5° F during the entire run by means of heating or cooling. A complete test run consists of a continuous test cycle of 8 hours running and 16 hours standby for a total running time of 80 hours and minimum total standby time of 160 hours with no standby period of less than 16 hours per day. Following the above test cycle and final standby period of at least 16 hours, the test machine shall be restarted and the seals subjected to a torque test with the hydraulic test fluid at a temperature of 70° to 74° F. The torque values obtained shall not exceed the values specified in table I. The above endurance test shall be run on each grade and class of oil seals for shaft size of 2.625 inches.

4.7.2.3 Leakage. Leakage shall be collected in tared vessels during the torque and endurance tests, weighed, and computed to cubic centimeters by dividing by the specific gravity of the fluid (at the fluid temperature when weighed), and to cubic centimeters per hour by dividing by the total hours of the test. Leakage shall not exceed the rate specified in 3.6.

5. PREPARATION FOR DELIVERY

5.1 General. Oil seals shall be cleaned, preserved, packaged, and packed in accordance with one of the following levels as specified in the contract or order (see 6.2).

5.1.1 Level A.

5.1.1.1 Cleaning. Each oil seal shall be cleaned in accordance with method C-1 of MIL-P-116. After cleaning, the oil seals shall be dried. Drying shall be accomplished by compressed dry-air, by complete draining, or by a combination of both compressed dry-air and draining. During the drying operation, metal surfaces on the oil seals shall not be exposed to fingerprint contamination. At this time, the handling of oil seals shall be performed with the aid of gloves, wire baskets, or trays.

5.1.1.2 Preservation. Immediately after cleaning and drying, oil seals shall be immersed in a bath of preservative oil conforming to MIL-L-3150.

5.1.1.3 Packaging.

5.1.1.3.1 Oil seals 5 inches or smaller in diameter shall be packaged in accordance with method IC-1, one seal to a unit package, of MIL-P-116. Unit packages, in groups of 10 oil seals of the same type, grade, class, and size but not to exceed 30, shall be packaged in boxes conforming to PPP-B-636 or PPP-B-601.

5.1.1.3.2 Oil seals larger than 5 inches in diameter shall be wrapped in grade A barrier material conforming to MIL-B-121 prior to being packaged in accordance with method IC-2, one seal to a unit package, of MIL-P-116. Unit packages, in groups of 10 oil seals of the same type, grade, class, and size shall be packaged in boxes conforming to PPP-B-636.

5.1.2 Level C. Oil seals shall be cleaned, preserved, and packaged in accordance with manufacturer's commercial practice.

5.2 Packing.

*5.2.1 Level A. Oil seals shall be packed in accordance with MIL-STD-1186 or PPP-B-601 (overseas type). Each shipping container shall be lined with a sealed waterproof case liner made from barrier material conforming to type L2(b) of PPP-B-1055. The seams and closures shall be sealed with water-resistant adhesive conforming to MIL-A-140, and shall have a water-resistance equal to or better than that of the body material.

5.2.2 Level B. Oil seals shall be packed in cleated plywood or fiber boxes conforming to PPP-B-601 and PPP-B-636, respectively.

5.2.3 Level C. Oil seals shall be packed in accordance with the latest edition of the Consolidated Freight Classification Rules, Motor Freight Classification Rules, Postal Regulations, or Code of Federal Regulations, whichever may be applicable. When fiberboard is used for container construction, the Mullen test shall be no less than 200 pounds. The gross weight of wood boxes shall not exceed 200 pounds.

5.3 Marking. In addition to any special marking required by the contract or order (see 6.2), marking of interior packages and shipping containers shall be in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. Oil seals covered by this specification are intended for use in power transmissions and hydraulic mechanisms for sealing hydraulic fluid.

6.2 Ordering data. Procurement documents should specify the following:

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

(b) Type, grade, and class required (see 1.2)

(c) Activity to perform first article inspection (see 3.1)

(d) Encasing components if different from 3.2.3

(e) Metallic case material if different from 3.2.3.1

(f) Dimensions and tolerances of oil seals (see 3.4)

(g) Quality conformance inspection if different from 4.4

(h) Sampling for quality conformance inspection if different from 4.5.3

(i) Levels of cleaning, preserving, packaging, and packing required (see 5.1)

(j) Special marking of interior packages and shipping containers when required (see 5.3).

*6.3 The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Navy - OS

Preparing activity:
Navy - OS
(Project No. 5330-N038)

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SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 22-R255

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. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.

SPECIFICATION

MIL-S-21558A (OS), Seals, Oil, Plain or Plain Encased

ORGANIZATION

CITY AND STATE

CONTRACT NUMBER

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 - Optional)*

DATE

DD FORM 1 JAN 66 1426 REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.