MIL-S-45005C(AT)
16 February 1988
SUPERSEDING
MIL-S-45005B(AT)
31 July 1980

MILITARY SPECIFICATION

SEAL, PLAIN, AND SEAL, PLAIN, ENCASED: FLUID, RADIAL, SINGLE AND MULTIPLE LIP SEALING MEMBER, SPRING-LOADED

This specification is approved for use within the US Army Tank-Automotive Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers radial, spring-loaded, single- and multiple-lip fluid seals. The seals incorporate either a leather, or synthetic elastomer, sealing member. The seals covered by this specification are those general application seals considered commercially as "oil seals" (see 6.1).

1.2 Classification. Seals shall be of the following classes, as specified (see 6.2):

Class 1	- Polymer-impregnated or coated chrome retanned leather sealing member, normal operating temperature service [-65 to 170 degrees Fahrenheit (°F)].
Class 2	- Oil resistant synthetic elastomer sealing member, normal operating temperature service (-65 to 200°F).
Class 3	- Oil resistant synthetic elastomer sealing member, extreme operating temperature service (-65 to 300°F).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-Automotive Command, ATTN: AMSTA-GDS, Warren, MI 48397-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

AMSC N/A FSC 5330

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS
FEDERAL

A-A-883	- Tape, Pressure Sensitive Adhesive, Masking.
O-L-164	- Leather Dressing, Mildew Preventive.
QQ-P-35	- Passivation Treatments for Corrosion-Resisting Steel.
QQ-P-416	- Plating, Cadmium (Electrodeposited).
PPP-T-60	- Tape, Packaging, Waterproof.
PPP-T-76	- Tape, Packaging, Paper (for Carton Sealing).
PPP-B-566	- Box Folding, Paperboard.
PPP-B-636	- Box, Shipping, Fiberboard.
PPP-B-676	- Boxes, Setup.

MILITARY

MIL-P-116	- Preservation-Packaging, Methods of.
MIL-B-117	- Bag, Sleeve and Tubing - Interior Packaging.
MIL-B-121	- Barrier Material, Greaseproofed, Waterproofed, Flexible.
MIL-P-130	- Paper, Wrapping, Laminated and Creped.
MIL-L-2104	- Lubricating Oil, Internal-Combustion Engine, Heavy-Duty.
MIL-S-12158	- Sealing Compound, Non-Curing Polybutene.
MIL-L-21260	- Lubricating Oil, Internal-Combustion Engine, Preservative and Break-In.
MIL-L-46167	- Lubricating Oil, Internal-Combustion Engine, Arctic.
MIL-C-81562	- Coatings, Cadmium, Tin-Cadmium and Zinc (Mechanically Deposited).

STANDARDS
MILITARY

MIL-STD-105	- Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129	- Marking for Shipment and Storage.
MIL-STD-130	- Identification Marking of US Military Property.
MIL-STD-45662	- Calibration Systems Requirements.
MS51000	- Seal, Plain Encased: Single Sealing Member, Spring-Loaded.
MS51906	- Seal, Plain Encased: Dual Seal, Spring-Loaded.
MS51907	- Seal, Plain Encased: Dual Sealing Members, Opposed, Spring-Loaded.
MS51908	- Seal, Plain Encased: Spring-Loaded, Flanged Type.
MS51909	- Seal, Plain Encased: Single Sealing Member, Spring-Loaded, Shouldered Case.
MS51910	- Seal, Plain Encased: Single Seal Member, External Type, Spring-Loaded.
MS51911	- Seal, Plain Encased: Dual Seal, Internal Seal Spring-Loaded.
MS51912	- Seal, Plain Encased: Dual Sealing Members, Opposed, One Seal Spring-Loaded.
MS51913	- Seal, Plain Encased: Dual Seal, External Spring-Loaded.
MS51914	- Seal, Plain Encased: Dual Seals, One Seal Spring-Loaded, Shouldered Case.
MS51915	- Seal, Plain Encased: One Felt, Plus One Leather or Synthetic Elastomer Sealing Member, Spring-Loaded.
MS51916	- Seal, Plain Encased: One Felt, and One Leather or Synthetic Elastomer Sealing Members, Spring-Loaded, Shouldered Case.

(Copies of specifications and standards required by the contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE J110	- Seals - Testing of Radial Lip, Recommended Practice.

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B117	- Salt Spray (Fog) Testing, Method of.
ASTM B633	- Electrodeposited Coatings of Zinc on Iron and Steel.
ASTM D3951	- Commercial Packaging, Practice for.

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

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. Seals furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable Qualified Products List (QPL) at the time set for opening of bids (see 4.4 and 6.3).

3.2 Materials. Materials shall be as specified herein and in referenced specifications and standards (see 4.8.1).

3.2.1 Recycled, virgin and reclaimed materials. There are no requirements for the exclusive use of virgin materials. The use of recycled or reclaimed (recovered) materials is acceptable provided that all other requirements of this specification are met (see 6.4.1).

3.3 Design and construction. The sealing member shall be leather or synthetic elastomer, spring-loaded and molded or mechanically clamped to a rigid or semi-rigid case single or multiple lip. Seals shall be constructed to the class and dimensions specified on the applicable drawing, or MS51000, or MS51906 through MS51916 (see 4.8.1, 4.8.2 and 6.2).

3.4 Performance.

3.4.1 Leakage. The maximum leakage of the lubricant from the seals shall be not more than 0.5 grams per hour for any 24-hour period of testing. There shall be no leakage during any shut-down period under static or non-rotating conditions (see 4.8.3.1).

3.4.2 Elevated temperature. Seals, when operated at elevated temperatures of 170 ± 3°F for class 1, 200 ± 3°F for class 2 and 300 ± 3°F for class 3, shall evidence no leakage greater than that as specified in 3.4.1 (see 4.8.3.2).

3.4.3 Low temperature. Seals shall evidence no cracks on the sealing lip after operation at a temperature of minus 65 ± 2°F (see 4.8.3.3).

3.4.4 Corrosion. The seal case or spring shall evidence no corrosion or damage affecting use and shall meet the requirements specified in 3.4.1 after exposure to a salt spray (fog) in accordance with ASTM B117 for 96 continuous hours (see 4.8.3.4).

3.5 Finish. When specified (see 6.2), the metallic cases of the seal shall be zinc coated in accordance with ASTM B633, class 5, type II or MIL-C-81562, class 3, type II or cadmium plated in accordance with MIL-C-81562, class 3, type II or QQ-P-416, class 3, type II. Corrosion resistant steel cases shall be passivated in accordance with QQ-P-35. When specified (see 6.2), leather sealing members shall be mold-proofed in accordance with to O-L-164. Springs shall not be coated. When corrosion resistance is required, a spring of corrosion resistant steel shall be specified (see 6.2). Corrosion tests shall be performed only when plating of cases, or a spring of corrosion resistant steel is specified. The outer metal press fit casing surface shall have a finish of 125 microinches, root-mean square (rms) maximum (see 4.8.1, 4.8.2 and 6.2).

3.6 Marking. Seals shall be marked in accordance with MIL-STD-130 (see 4.8.2).

3.7 Workmanship. Workmanship shall be such as to produce seals free of crack and mold marks in sealing members, and the outer metal press fit casing surface shall be free of burrs. Nonmetalic cases shall have an even surface, devoid of roughness, that shall permit a press fit into the housing cavity and shall be free of cracks, mold-flash or dirt. Workmanship shall be of a quality to assure that seals are free of defects that compromise, limit or reduce capability in the performance of their intended use (see 4.8.2).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order (see 6.2), the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor 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 or witness any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Inspection equipment. Unless otherwise specified in the contract (see 6.2), the contractor is responsible for the provision and maintenance of all inspection equipment necessary to assure that supplies and services conform to contract requirements. Inspection equipment must be capable of repetitive measurements to an accuracy of 10 percent of the measurement tolerance. Calibration of inspection equipment shall be in accordance with MIL-STD-45662.

4.2 Classification of inspection:

a. Qualification inspection (see 4.4).
b. Quality conformance inspections (see 4.5).
   1. Examination (see 4.5.2).
   2. Tests (see 4.5.3).
c. Control tests (see 4.6).

4.3 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be conducted under the following conditions:

a. Air temperature 73 $\pm$ 18°F
b. Barometric pressure 28.5 + 2.0 - 3.0 inches mercury (Hg)
c. Relative humidity 50 $\pm$ 30 percent

4.3.1 Test apparatus. The test apparatus shall conform to SAE J110, except that the surface finish of the rotating member shall be plunge-ground free of all visible lead marks, and shall be 10 to 16 microinches, rms. The shaft shall have a runout as specified in table I.

TABLE I. Test shaft diameter, rpm and runout at room and elevated temperatures. 1/

Shaft diameter (inches)	Class 1 (rpm)	Class 2 Class 3 (rpm)	Runout ± 0.0005 (inch)
thru 1.699	3400 ± 150	3500 ± 150	0.002
1.700 - 2.029	3000 ± 100	3400 ± 150	0.003
2.030 - 2.699	2500 ± 75	3300 ± 100	0.003
2.700 - 3.399	2000 ± 75	2600 ± 75	0.004
3.400 - 4.399	1500 ± 50	1900 ± 75	0.004
4.400 - 5.599	1200 ± 50	1500 ± 50	0.004
5.600 - 6.599	1000 ± 50	1300 ± 50	0.006
6.600 - 7.700	800 ± 50	1100 ± 50	0.007

1/ For larger shaft sizes, select a shaft speed in rpm to equal a rubbing velocity of 1500 feet per minute (fpm) for class 1, and 2000 fpm for class 2 or 3 seals.

4.3.2 Test lubricant. Test lubricant shall conform to MIL-L-2104, grade 10, except that during low temperature testing the lubricant shall conform to MIL-L-46167. The housing of the test apparatus shall be filled with the lubricant when testing class 2 or 3 seals and filled to mid-shaft when testing class 1 seals. The housing shall be vented to atmospheric pressure during all test and shutdown periods.

4.3.3 Seal installation. The sealing lip of the test seals, and the rotating shaft, shall be filled with a film of the test fluid before installation in the test machine. The outside diameter surface of the seal shall be coated with sealing compound conforming to type I of MIL-S-12158, when the seal is metal encased. When nonmetallic seals are tested, sealing compound shall not be used.

4.4 Qualification inspection. A qualification sample consisting of four seals, of the specified class, shall be subjected to qualification testing. Samples shall be representative of seals proposed to be furnished under contract. Qualification testing shall be conducted by the contractor under Government surveillance, or by an authorized testing facility at a site approved by the Government. Inspection shall consist of examination and testing as specified in table II. Tests shall be conducted in the following sequence: 4.8.3.1, 4.8.3.2, 4.8.3.3, 4.8.3.4 and 4.8.3.1.

TABLE II. Classification of inspections.

Title	Requirement	Inspection	Qualification	Quality conformance		
				Examination	Acceptance	Control
Materials and construction	3.2 and 3.3	4.8.1	X			
Defects (see table III)	3.3, 3.5, 3.6 and 3.7	4.8.2	X	X		
Leakage	3.4.1	4.8.3.1	X		X	
Elevated temperature	3.4.2	4.8.3.2	X			X
Low temperature	3.4.3	4.8.3.3	X			X
Corrosion	3.4.4	4.8.3.4	X			

4.4.1 Failure. Failure of a qualification sample to pass any of the inspections specified herein may be cause for the Government to refuse to conduct additional inspections until the faults revealed by the inspection have been corrected.

4.5 Quality conformance inspection.

4.5.1 Sampling.

4.5.1.1 Lot formation. An inspection lot shall consist of all the seals of one class and part number, from an identifiable production period, from one manufacturer, submitted at one time for acceptance.

4.5.1.2 Sampling for examination. Samples for quality conformance shall be selected in accordance with general inspection level II of MIL-STD-105.

4.5.1.3 Sampling for tests. Samples for acceptance tests shall be selected in accordance with level S-3 of MIL-STD-105.

4.5.2 Examination.

4.5.2.1 Acceptable quality level. Each sample selected in accordance with 4.5.1.2 shall be examined to determine conformance to the following acceptable quality levels (AQL).

Classification	AQL
Major	1.0
Minor	2.5

4.5.2.2 Classification of defects. For examination purposes, defects shall be classified as listed in table III. Any seals in the sample containing one or more defects shall be rejected, and if the number of defective seals in any one sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

TABLE III. Classification of defects.

Category	Defect	Method of examination
Critical	None	
Major	AQL 1.0% Defective	
101	Design and construction, nonconformance of (see 3.3).	Visual and functional
102	Dimensions, out of tolerance (see 3.3).	Visual and SIE 1/
103	Finish, improper (see 3.5).	Visual and SIE
104	Faulty workmanship affecting performance (see 3.7).	Visual and functional
Minor	AQL 2.5% Defective	
201	Marking improper (see 3.6).	Visual
202	Faulty workmanship affecting appearance (see 3.7).	Visual

1/ SIE = Standard Inspection Equipment.

4.5.3 Test. Samples selected in accordance with 4.5.1.3 shall be subjected to the quality conformance test specified in table II and shall conform to an AQL of 1.0 on the basis of percent defective.

4.6 Control tests. When specified (see 6.2), control tests shall be performed by the contractor on samples selected from each production lot as specified in 4.5.1.3. Samples selected shall be examined for defects in 4.5.2.2, then 50% of the samples shall be subjected to the performance test specified in 4.8.3.2, except for a period of 24 hours instead of the two 96 hour periods. After a 2-hour shutdown period, the specimen shall be examined for conformance to 3.4.1. The remaining 50% of the samples shall be subjected to the performance test specified in 4.8.3.3. Upon completion of this test, the samples shall be examined for conformance to the requirements of 3.4.3.

4.7 Failure. Failure of any test sample to pass any of the control tests shall be cause for the Government to refuse acceptance of the production quantity represented, until action taken by the contractor to correct defects and prevent recurrence has been approved by the Government.

4.8 Methods of inspection.

4.8.1 Materials and construction. Conformance to 3.2, 3.3 and 3.5 shall be determined by inspection of contractor records providing proof or certification that design, construction, processing, and materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.8.2 Defects. Conformance to 3.3, 3.5, 3.6 and 3.7 shall be determined by examination for the defects listed in table III. Examination shall be visual, functional, or by measurement with standard inspection equipment.

4.8.3 Performance. Unless otherwise specified herein, performance testing shall be conducted using the test apparatus specified in 4.3.1 and the test lubricant specified in 4.3.2. Seal installation shall be in accordance with 4.3.3.

4.8.3.1 Leakage. To determine conformance to 3.4.1, a seal test shall be run at room temperature for a period of 5 minutes. Leakage shall not exceed the rate specified in 3.4.1. A shutdown period of not less than 2 hours shall follow the 5-minute test. There shall be no leakage during the shut down period.

4.8.3.2 Elevated temperature. To determine conformance to 3.4.2, seals shall be subjected to an elevated temperature test for a total of 192 hours; 96 hours the first week, followed by a 64-hour shutdown period, then run again for another 96-hours. The test lubricant shall be maintained at the specified temperature for the seal class during the test periods, and shall be allowed to cool to room temperature during the shut down period. When testing class 3 seals, the test lubricant shall be replaced with fresh test lubricant before start of the second 96-hour test. The specified test temperature shall be reached within a 2-hour period after start of the test. Leakage shall be not more than that specified in 3.4.1. After testing for any 24-hour period, there shall be no leakage during the shutdown period.

4.8.3.3 Low temperature. To determine conformance to 3.4.3, the housing shall be filled with a test fluid conforming to MIL-L-46167 (see 4.3.2). The test apparatus shall then be placed in a cold chamber at the temperature specified for a period of 16 hours. Upon completion of the 16 hours of exposure, while still in the cold chamber, the shaft shall be rotated 10 revolutions by hand in 15 seconds. The test apparatus shall then be removed from the cold chamber and brought back to room temperature. Remove the seals and examine the sealing lip for evidence of cracks.

4.8.3.4 Corrosion. To determine conformance to 3.4.4, when plating of cases or a corrosion resistant steel spring is specified (see 3.5), seals shall be tested in accordance with ASTM B117. The samples shall be exposed to a 5% salt spray solution for a period of 96 continuous hours. There shall be no evidence of corrosion on the seal case and spring. Subsequently, the seal shall pass the test specified in 4.8.3.1

4.9 Inspection of packaging (for activities other than Army). All materials and processes involved in packaging shall be examined to determine conformance to section 5.

5. PACKAGING

5.1 For Army use.

5.1.1 Preservation, packaging, packing, and marking. Preservation, packaging, packing, and marking for the desired level shall be in accordance with the applicable packaging requirements specified by the contracting authority (see 6.2).

5.2 Other activities.

5.2.1 Preservation and packaging. Preservation and packaging shall be level A or commercial, as specified (see 6.2).

5.2.1.1 Level A.

5.2.1.1.1 Cleaning. Seals shall be cleaned in accordance with process C-1 of MIL-P-116.

5.2.1.1.2 Drying. Seals shall be dried in accordance with MIL-P-116.

5.2.1.1.3 Preservation application. Non-metallic case and seals shall not be preserved. Metallic encased seals shall be completely dipped in preservation oil conforming to grade 30 of MIL-L-21260 and completely drained until dripping ceases.

5.2.1.1.4 Unit packaging. Non-metallic encased seals shall be wrapped with paper conforming to MIL-P-130. Metallic encased seals shall be wrapped with barrier material conforming to type II, class 2, grade A of MIL-B-121 and secured with tape conforming to A-A-883. All wrapped seals shall be individually packaged into a heat sealed bag conforming to type II, class E of MIL-B-117.

5.2.1.1.5 Intermediate packaging. A quantity of seals, packaged as specified in 5.2.1.1.4, shall be placed in intermediate containers conforming to PPP-B-566 or PPP-B-676. Intermediate containers shall be uniform in size, contain equal quantities and shall be of minimum tare and cube.

5.2.1.2 Commercial. Seals shall be preserved and packaged in accordance with ASTM D3951, and in a manner which will afford adequate protection against corrosion and physical damage during shipment from the supply source to the first receiving activity.

5.2.2 Packing. Packing shall be level A, B or commercial, as specified (see 6.2).

5.2.2.1 Level A. Packages shall be packed in fiberboard boxes conforming to PPP-B-636, class weather-resistant, style optional, special requirements. In lieu of the closure and waterproofing requirements in the appendix of PPP-B-636, closure and waterproofing shall be accomplished by sealing all seams and manufacturer's joints with tape conforming to PPP-T-60 or class 1 of PPP-T-76. Bonding shall be applied in accordance with the appendix of PPP-B-636, using non-metals or tape banding only. The gross weight shall not exceed the weight limitation of PPP-B-636.

5.2.2.2 Level B. Packages shall be packed in fiberboard boxes conforming to PPP-B-636, class domestic, style optional, special requirements. Closure shall be in accordance with the appendix thereto. The gross weight shall not exceed the weight limitation of PPP-B-636.

5.2.2.3 Commercial. Seals, packaged as specified in 5.2.1.2, shall be packed in accordance with ASTM D3951, and in a manner to insure adequate protection against damage during shipment and handling. Containers shall conform to the rules and regulations applicable to the mode of transportation.

5.2.3 Marking. In addition to any special marking (see 6.2) required by the contract order, unit packages, intermediate packages and exterior shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The seals covered by this specification are intended to be press mounted as rotary shaft seals to retain oil or other fluids.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Class of seal required (see 1.2).
c. MS or applicable drawing number, title, and date (see 3.3).
d. Type of finish for metal encased seals, and if springs of corrosion resisting steel are required (see 3.5).
e. Whether mold-proofing is required (see 3.5).
f. If responsibility for inspection shall be other than as specified (see 4.1).
g. If responsibility for inspection equipment shall be other than as specified (see 4.1.2).
h. If inspection conditions shall be other than as specified (see 4.3).
i. Whether control tests are to be performed (see 4.6).
j. For Army use, specify the applicable level and packaging requirement (see 5.1.1).
k. For activities other than the Army, specify commercial packaging or applicable level of preservation, packaging and packing (see 5.2.1 and 5.2.2).
l. For activities other than the Army, specify whether special marking is required (see 5.2.3).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List (QPL No.) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the QPL is the Commanding General, US Army Tank-Automotive Command, ATTN: AMSTA-GDS, Warren, MI 48397-5000 and information pertaining to qualification of products may be obtained from that activity (see 3.1 and 4.4).

6.3.1 Retention of qualification. Certification shall be requested every two years from each manufacturer listed on the QPL, to retain listing on the QPL. This certification shall be forwarded to the qualifying activity and shall be signed by a responsible official of management, attesting that the listed product still meets the requirements of the current issue of the specification, is available from the listed plant, and can be produced under the same conditions as originally qualified; that is, same process, materials, construction, design, and manufacturer's part number or designation. Failure to provide certification will be cause for removal from the QPL (see 6.3).

6.3.2 Extension of qualification. Seals of one class and a specific shaft diameter shall be recognized as establishing qualification to a group of shaft diameter of the same class by that same manufactures, as specified in table IV.

TABLE IV. Establishing qualification of all shaft diameters.

Qualifying shaft diameter (inch)	Qualified shaft diameter (inch)
2.0 4.0	0.25 through 2.99 3.0 through 7.0

6.4 Definitions.

6.4.1 Recovered materials. "Recovered materials" means materials that have been collected or recovered from solid waste (see 6.4.2).

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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