

INCH- POUND

MIL-G-22050D(SH)
7 May 1993
SUPERSEDING
MIL-G-22050C(SHIPS)
25 January 1973
(See 6.6)

MILITARY SPECIFICATION

GASKET AND PACKING MATERIAL, RUBBER, FOR USE WITH POLAR FLUIDS, STEAM, AND AIR AT MODERATELY HIGH TEMPERATURES

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers rubber gaskets, packing, seals, strips, molded forms, and sheet material for use in hot air, hot water, steam, and various polar fluids such as aryl phosphate ester hydraulic fluids and aqueous monoethanolamine (MEA), at moderately high temperatures (see 6.1)

1.2 Classification. The rubber gasket and packing material shall be of the following grades, as specified (see 6.2).

- Grade 1 - Nominal 65 durometer hardness.
- Grade 2 - Nominal 80 durometer hardness.
- Grade 3 - Nominal 90 durometer hardness.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, ATTN: SEA 05Q42, Naval Sea Systems Command, 2531 Jefferson Davis Hwy, Arlington, VA 22242-5160 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5330, 9320

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

MIL-G-22050D(SHIPS)

2.1.1 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 listed in the issue of the Department of Defense Index of Specifications (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

PPP-F-320 - Fiberboard; Corrugated and Solid Sheet Stock
(Container Grade), and Cut Shapes.

MILITARY

MIL-P-4861 - Packing, Preformed, Rubber, Packaging of.
MIL-L-19140 - Lumber and Plywood, Fire Retardant Treated.
MIL-H-19457 - Hydraulic Fluid, Fire Resistant.
MIL-M-23573 - Monoethanolamine Chelating Agent Solution.

STANDARDS

FEDERAL

FED-STD-601 - Rubber: Sampling and Testing.

MILITARY

MIL-STD-190 - Identification Marking of Rubber Products.
MIL-STD-289 - Visual Inspection Guide for Rubber Sheet Material.
MIL-STD-407 - Visual Inspection Guide for Rubber Molded Items.
MIL-STD-413 - Visual Inspection Guide for Rubber O-Rings.
MIL-STD-2073-1 - DOD Material Procedures for Development and
Application of Packaging Requirements.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following documents form a part of this document 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 the documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 512 - Chloride Ion in Industrial Water and Industrial
Waste Water, Tests for.

D 3951 - Standard Practice for Commercial Packaging. (DOD adopted)

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

MIL-G-22050D(SHIPS)

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)
AP.P No. 568 - Aerospace Recommended Practices, Uniform
Dash Numbering System for O-Rings.

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

(Non-Government standards and other publications are normally available from the organizations that prepare or 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 document and the references cited herein (except for related associated detail specifications, or specification sheets), the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Material. The material shall be made from an ethylene-propylene elastomeric compound which will meet the applicable requirements specified herein. Suggested formulations are given in 6.4 for both grade 1 and grade 2 material. The material shall contain no low melting point metals such as mercury, lead or antimony used in either the formulation or preservation and packaging materials.

3.2 Form. The material shall be furnished in the form of sheets, strips, gaskets, packings, seals, or molded items of the sizes specified (see 6.2).

3.2.1 O-rings. Unless otherwise specified (see 6.2), o-ring sizes shall be in accordance with the dimensions and tolerances specified in AP.P-568.

3.3 Physical requirements of the rubber. The rubber compounds used in the gaskets and packing material shall conform to the applicable requirements in table I when tested as specified in 4.4.

MIL-G-22050D(SHIPS)

TABLE I. Physical requirements of rubber compounds.

	Grade 1	Grade 2	Grade 3	Test method
<u>Initial properties:</u>				
Tensile strength, psi, minimum (min)	2400	2400	2200	4.4.2
Ultimate elongation, percent, min.	250	150	95	4.4.2
Hardness, Shore A durometer, points, 15 sec.	65 ± 5	80 ± 5	90 ± 5	4.4.3
Leachable chlorides (parts per million) maximum (max)	200	200	200	4.4.9
<u>Properties after oven aging 166 hours at 280°F:</u>				
				4.4.4
Tensile strength, percent of initial, min.	70	70	70	4.4.4.1
Ultimate elongation, percent of initial, min.	70	70	70	4.4.4.1
Hardness, change in Shore A durometer, points max.	15	15	15	4.4.4.2
Compression set, percent, max.	60	60	60	4.4.4.3
<u>Properties after immersion in MIL-M-19457 hydraulic fluid¹/ for 166 hours at 212°F:</u>				
				4.4.5
Tensile strength, percent of initial, min.	80	80	--	4.4.5.1
Ultimate elongation, percent of initial, min.	80	80	--	4.4.5.1
Hardness, change in Shore A durometer, points max.	10	10	--	4.4.5.2
Volume change, percent (no shrink- age allowed)	0 to 10	0 to 10	--	4.4.5.3
<u>Properties after immersion in distilled water for 166 hours at 330°F:</u>				
				4.4.6
Tensile strength, percent of initial, min.	80	80	80	4.4.6.1
Ultimate elongation, percent of initial, min.	80	80	80	4.4.6.1
Volume change, percent (no shrinkage allowed)	0 to 10	0 to 10	0 to 10	4.4.6.2
<u>Properties after immersion in 25 percent aqueous solution of MEA for 166 hours at 330°F:</u>				
				4.4.7
Tensile strength, percent of initial, min.	80	80	--	4.4.7.1

MIL-G-22050D(SHIPS)

TABLE I. Physical requirements of rubber compounds. - Continued

	Grade 1	Grade 2	Grade 3	Test methods
Ultimate elongation, percent of initial, min.	80	80	--	4.4.7.1
Volume change, percent (no shrinkage allowed)	0 to 10	0 to 10	--	4.4.7.2
<u>Properties after 166 hours in steam at 330°F:</u>				4.4.8.1
Tensile strength, percent of initial, min.	80	80	80	4.4.8.1.1
Ultimate elongation, percent of initial, min.	80	80	80	4.4.8.1.1
Volume change, percent, max.	5	5	5	4.4.8.1.2
<u>Properties after 70 hours in steam at 390°F:</u>				4.4.8.2
Tensile strength, percent of initial, min.	--	--	90	4.4.8.2.1
Ultimate elongation, percent of initial, min.	--	--	85	4.4.8.2.1
Hardness, change in Shore A durometer, points max.	--	--	3	4.4.8.2.2
Volume change, percent (no shrinkage allowed)	--	--	0 to 8	4.4.8.2.3
Compression set, percent, max.	--	--	60	4.4.8.2.4
<u>Properties after 166 hours in steam at 550°F:</u>				4.4.8.3
Tensile strength, percent of initial, min.	--	--	75	4.4.8.3.1
Ultimate elongation, percent of initial, min.	--	--	15	4.4.8.3.1
Hardness, change in Shore A durometer, points max.	--	--	10	4.4.8.3.2
Volume change, percent (no shrinkage allowed)	--	--	0 to 5	4.4.8.3.3
Compression set, percent, max.	--	--	90	4.4.8.3.4

1/ Cellulube 220 or equal.

3.4 Identification. Material acquired under this specification shall be identified with white markings in accordance with MIL-STD-190. A permanent marking material that will have no deleterious effect on the rubber shall be used or in the case of individual one-item packaging, the marking may be put on the package.

MIL-G-22050D(SHIPS)

3.5 Workmanship. The material shall be examined for defects as specified in 4.3.1.

4. QUALITY ASSURANCE PROVISIONS

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

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractors overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Quality conformance inspection. Quality conformance inspection shall consist of the examinations and tests specified in 4.3.

4.2.2 Lot. For the purpose of quality conformance inspection and testing, a lot is defined as all the material produced in one facility, using the same materials, of the same grade and style, using the same production processes, not exceeding 1000 pounds, and being offered for delivery at one time.

4.2.3 Sampling for quality conformance inspection. As a minimum, the contractor shall randomly select a sample quantity from each lot of completed material in accordance with table II and inspect them in accordance with 4.5. If one or more defects are found in any sample, the entire lot shall be rejected. The contractor has the option of screening 100 percent of the rejected lot for the defective characteristic(s) or providing a new lot which shall be inspected in accordance with the sampling plan contained herein. The contractor shall maintain for a period of three years after contract completion records of inspections, tests, and any resulting rejections.

MIL-G-22050D(SHIPS)

TABLE II. Sample size for quality conformance inspections and tests.

Lot size number of gaskets, molded items, packings, or unit areas of sheets or strips	Sample size number of gaskets, molded items, packings, or unit areas of sheets or strips
2 to 50	5
51 to 90	7
91 to 150	11
151 to 280	13
281 to 500	16
501 to 1200	19
1201 to 3200	23
3201 and over	29

4.2.4 Sampling for tests. Representative samples shall be taken at random from each lot that passes the examination of 4.3.1, in sufficient quantity to conduct the quality conformance tests specified in 4.3.2. If the items are of such size or shape that test specimens cannot be prepared from them, substitute samples shall be provided in the form of a piece or pieces of rubber having dimensions appropriate to the tests required. The substitute samples shall be certified by the contractor to be of identical material and equivalent cure to that used in the lot of finished material offered for delivery.

4.3 Examinations and tests.

4.3.1 Visual and dimensional examination. Each of the samples taken in accordance with 4.2.2 shall be subjected to surface examinations for identification, workmanship, dimensions, and tolerances. MIL-STD-289, MIL-STD-407, or MIL-STD-413, as applicable, shall be used to determine and evaluate visual defects. The dimensions shall be determined in accordance with the applicable method specified in FED-STD-601.

4.3.2 Quality conformance tests. Quality conformance tests shall be conducted on samples selected in accordance with 4.2.4. Quality conformance tests shall consist of the examination and tests specified in 4.4 (see 6.3).

4.3.3 Action in case of nonconformance. If any of the samples in the quality conformance tests is found not to be in conformance with the requirements of the specification, the lot which it represents shall be rejected.

4.4 Test methods.

4.4.1 Testing conditions. Unless otherwise specified herein, the testing shall be conducted at a temperature of $80^{\circ} \pm 9^{\circ}\text{F}$.

MIL-G-22050D(SHIPS)

4.4.2 Tensile properties. The tensile strength and ultimate elongation shall be determined by methods 4111 and 4121, respectively, of FED-STD-601. Die III specimens that are 0.080 ± 0.010 inches thick shall be used for determinations of tensile properties.

4.4.3 Hardness. Hardness shall be determined with a Shore A durometer on specimens that are 0.500 ± 0.010 inch thick and at least 1.129 inch diameter, in accordance with method 3021 of FED-STD-601. The hardness readings shall be taken 15 seconds after firm contact is made between the rubber and the presser foot of the durometer.

4.4.4 Oven aging. Method 7221 of FED-STD-601 shall be used for oven aging the test specimens as specified for the individual tests, with the following exception: The aging period shall be 166 ± 1 hours at $280^\circ \pm 2^\circ\text{F}$. After the aging period, the tensile and hardness specimens shall be set aside for 16 to 96 hours at $80^\circ \pm 9^\circ\text{F}$ before determining the required property.

4.4.4.1 Tensile properties after oven aging. The tensile properties after oven aging shall be determined by the procedure specified in 4.4.2.

4.4.4.2 Hardness after oven aging. The hardness after oven aging shall be determined by the procedure specified in 4.4.3.

4.4.4.3 Compression set after oven aging. Compression set shall be determined in accordance with method 3311 of FED-STD-601 except that three 0.500 ± 0.010 inch thick specimens shall be tested and the specimens shall be held at a 25 percent deflection during oven aging.

4.4.5 Immersion in hydraulic fluid. Test specimens for the individual tests shall be immersed in hydraulic fluid conforming to MIL-H-19457 for 166 \pm 1 hours at $212^\circ \pm 2^\circ\text{F}$.

4.4.5.1 Tensile properties after immersion in hydraulic fluid. Tensile properties after immersion in hydraulic fluid shall be determined in accordance with method 6111 of FED-STD-601 and as specified in 4.4.2. Tensile strength shall be based on the swollen cross-sectional area.

4.4.5.2 Hardness after immersion in hydraulic fluid. Hardness shall be determined after immersion in hydraulic fluid. Before testing as specified in 4.4.3, the specimens shall be removed from the hot fluid and cooled in the test fluid at $80^\circ \pm 9^\circ\text{F}$ for 30 minutes and then removed from the fluid and wiped dry.

4.4.5.3 Volume change after immersion in hydraulic fluid. Volume change after immersion in hydraulic fluid shall be determined in accordance with method 6211 of FED-STD-601. The specimens shall consist of three strips 1 inch by 2 inches by 0.080 ± 0.010 inch.

MIL-G-22050D(SHIPS)

4.4.6 Immersion in hot distilled water. Test specimens for the individual tests shall be immersed in distilled water in a covered glass jar. The jar shall be put in a container capable of withstanding an internal pressure of 300 pounds per square inch (lb/in²). The container shall be sealed and placed in a steam autoclave and heated for 166 ± 1 hours at $330^\circ \pm 2^\circ\text{F}$.

4.4.6.1 Tensile properties after immersion in hot distilled water. After immersion in hot distilled water as specified in 4.4.6, the tensile properties shall be determined in accordance with method 6111 of FED-STD-601 and as specified in 4.4.2. Tensile strength shall be based on the swollen cross-sectional area.

4.4.6.2 Volume change after immersion in hot distilled water. Volume change after immersion in hot distilled water shall be determined as specified in 4.4.5.3.

4.4.7 Immersion in 25 percent aqueous solution of MEA. Test specimens for the individual tests shall be immersed in a 25 percent by volume aqueous solution of MEA in a covered glass jar. The jar shall be put in a container capable of withstanding an internal pressure of 300 lb/in². The container shall be sealed and placed in a steam autoclave and heated for 166 ± 1 hours at $330^\circ \pm 2^\circ\text{F}$. The MEA shall conform to MIL-M-23573.

4.4.7.1 Tensile properties after immersion in MEA solution. After immersion as specified in 4.4.7, the tensile properties shall be determined as specified in 4.4.5.1.

4.4.7.2 Volume change after immersion in MEA solution. After immersion as specified in 4.4.7, the volume change shall be determined as specified in 4.4.5.3.

4.4.8 Aging in steam.

4.4.8.1 Aging in steam at 330°F. Test specimens for the individual tests shall be exposed to steam in an autoclave for 166 ± 1 hours at $330^\circ \pm 2^\circ\text{F}$. After the aging period, the tensile specimens shall be set aside at $80^\circ \pm 9^\circ\text{F}$ for 16 to 96 hours before determining the required property.

4.4.8.1.1 Tensile properties after aging in steam at 330°F. After aging in steam as specified in 4.4.8.1, the tensile properties shall be determined as specified in 4.4.2.

4.4.8.1.2 Volume change after aging in steam at 330°F. After aging in steam as specified in 4.4.8.1, the volume change shall be determined as specified in 4.4.5.3.

4.4.8.2 Aging in steam at 390°F. Test specimens for the individual tests shall be exposed to steam in an autoclave for 70 ± 1 hours at $390 \pm 2^\circ\text{F}$. After the aging period, the tensile specimens shall be set aside at $80 \pm 9^\circ\text{F}$ for 16 to 96 hours before determining the required property.

MIL-G-2205QD(SHIPS)

4.4.8.2.1 Tensile properties after aging in steam at 390°F. After aging in steam as specified in 4.4.8.2, the tensile properties shall be determined as specified in 4.4.2.

4.4.8.2.2 Hardness after aging in steam at 390°F. After aging in steam as specified in 4.4.8.2, the hardness shall be determined as specified in 4.4.3.

4.4.8.2.3 Volume change after aging in steam at 390°F. After aging in steam as specified in 4.4.8.2, the volume change shall be determined as specified in 4.4.5.3.

4.4.8.2.4 Compression set after aging in steam at 390°F. After aging in steam as specified in 4.4.8.2, the compression set shall be determined in accordance with method 3311 of FED-STD-601 except that three 0.500 \pm 0.010 inch thick specimens shall be tested and the specimens shall be held at a 25 percent deflection during steam aging.

4.4.8.3 Aging in steam at 550°F. Test specimens for the individual tests shall be exposed to steam in an autoclave for 166 \pm 1 hours at 550 \pm 2°F. After the aging period, the tensile specimens shall be set aside at 80 \pm 9°F for 16 to 96 hours before determining the required property.

4.4.8.3.1 Tensile properties after aging in steam at 550°F. After aging in steam as specified in 4.4.8.3, the tensile properties shall be determined as specified in 4.4.2.

4.4.8.3.2 Hardness after aging in steam at 550°F. After aging in steam as specified in 4.4.8.3, the volume change shall be determined as specified in 4.4.3.

4.4.8.3.3 Volume change after aging in steam at 550°F. After aging in steam as specified in 4.4.8.3, the volume change shall be determined as specified in 4.4.5.3.

4.4.8.3.4 Compression set after aging in steam at 550°F. After aging in steam as specified in 4.4.8.3, the compression set shall be determined in accordance with method 3311 of FED-STD-601 except that three 0.500 \pm 0.010 inch thick specimens shall be tested and the specimens shall be held at a 25 percent deflection during steam aging.

4.4.9 Water leachable chlorides. The following test method shall be used:

- (a) Two test specimens, each of approximately but not less than 14 grams, shall be taken. Each test specimen shall be taken from a different sample. Test specimens for rubber bonded paper shall be taken from the samples of the first and the last roll of the lot. Test specimen of packing material shall be representative of the sample cross section.

MIL-G-22050D(SHIPS)

- (b) The test specimens shall be unravelled and cut into pieces no larger than 1/4 by 1/2 inch.
- (c) Each test specimen shall be weighted,, transferred to an Erlenmeyer flask equipped with a reflux condenser, covered with 200 to 300 milliliters (ml) of distilled or demineralized water and simmered in the range of 220° to 212°F for a minimum of 6 hours. The leach water shall then be separated by filtration and the filter rinsed. A blank determination shall be run using similarly cleaned equipment and distilled or demineralized water from the same source.
- (d) The extracted chloride ion shall be determined by the mercuric nitrate titration method, ASTM D512, referee method A or equal, and shall be corrected by the results of the blank determination.
- (e) The results of each test shall be calculated as net parts per million of extractable chloride ion by weight of the test specimen.

4.5 Inspection of packaging. Sample packs, and the inspection of the packaging (preservation, packing and marking) for shipment, stowage, and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition.)

5.1 General.5.1.1 Navy fire retardant requirements.

- a. Lumber and plywood. When specified (see 6.2), all lumber and plywood including laminated veneer materials used in shipping container and pallet construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated materials conforming to MIL-L-19140 as follows:

Level A and B - Type II - weather resistant
Category 1 - general use

Level C - Type I - nonweather resistant
Category 1 - general use

- b. Fiberboard. Fiberboard used in the construction of interior (unit and intermediate) and exterior fiberboard boxes including interior packaging forms shall conform to the class-domestic/fire retardant or class-weather resistant/fire retardant materials equipment as specified (see 6.2), of PPP-F-320 and amendments thereto.

MIL-G-22050D(SHIPS)

5.1.2 Asbestos. Talc, talcum or powder used in the packaging process, dusting for example, shall be asbestos free.

5.2 Preservation. Preservation shall be level A, C or Commercial as specified (see 6.2).

5.2.1 Level A. Material in the form specified shall be unit protected as follows:

5.2.1.1 Sheets, strips, and packing. Sheets, strips, and packings of like description shall be dusted with soapstone powder or talcum, interleaved over the complete area with kraft paper and rolled. Rolls shall be secured with water resistant pressure-sensitive adhesive tape. Rolls shall be individually wrapped with a flexible waterproof barrier material and all seams, joints and closures sealed with adhesive tape as specified herein or other suitable material(s).

5.2.1.2 Gaskets and molded items. Gaskets and molded items in quantity specified (see 6.2), shall be unit protected together without folding. Gaskets and molded items shall be dusted with soapstone powder or talcum, interleaved with kraft paper, and unit packed in a water resistant folding, setup, or metal edged paperboard, or a class-weather resistant/fire retardant fiberboard (see 5.1.1b.) box meeting the unit and intermediate container requirements of MIL-STD-2073-1. The container selection shall be at the option of the contractor.

5.2.2 Level C. Material shall be preserved as specified under level A except that the interior (unit and intermediate) boxes shall be as follows:

- a. Paperboard boxes shall be of the domestic or non-weather resistant type, class, or variety as applicable and,
- b. Fiberboard containers shall be of the class-domestic/fire retardant material (see 5.1.1.b). The box closure shall be in accordance with method I using pressure-sensitive tape.

5.2.3 Commercial. Commercial packaging (cleaning, preservation, and unit package) shall be in accordance with ASTM D 3951.

5.3 Packing. Packing shall be level A, B, C or Commercial as specified (see 6.2).

5.3.1 General requirements for levels A, B and C. Containers selected (see 5.3.2), shall be of minimum weight and cube consistent with the protection required, of uniform size, and contain identical quantities of identical material.

5.3.2 Levels A, B and C containers. Material preserved as specified (see 5.2), shall be packed in exterior shipping containers for the level of packing specified (see 5.3), in accordance with MIL-STD-2073-1, and herein. Unless otherwise specified (see 6.2), container selection shall be at the contractor's option.

MIL-G-22050D(SHIPS)

5.3.2.1 Caseliners, closure and gross weight.

5.3.2.1.2 Caseliners. Unless otherwise specified (see 6.2), level A shipping containers containing packing preserved level C or commercial shall be provided with waterproof caseliners in accordance with MIL-STD-2073-1.

5.3.2.1.3 Closure. Container closure, reinforcing, or banding shall be in accordance with the applicable container specification or appendix thereto except that weather-resistant fiberboard boxes shall be closed in accordance with method V and reinforced with non-metallic or tape banding and domestic or domestic/fire retardant fiberboard boxes shall be closed in accordance with method I using pressure sensitive tape.

5.3.2.1.4 Weight. Wood, plywood, and cleated type containers exceeding 200 pounds gross weight shall be modified by the addition of skids in accordance with MIL-STD-2073-1 and the applicable container specification or appendix thereto.

5.3.3 Commercial. Packing, preserved as specified (see 5.2) shall be packed for shipment in accordance with ASTM D 3951 and herein.

5.3.3.1 Container modification. Shipping containers exceeding 200 pounds gross weight shall have a minimum of two, 3-inch by 4-inch nominal wood skids laid flat, or a skid or sill type base which will support the material and facilitate handling by mechanical handling equipment during shipment, stowage and storage.

5.4 Marking, levels A, B, C and commercial. In addition to any special marking required (see 6.2), interior packs and shipping containers shall be marked for shipment, stowage, and storage in accordance with MIL-STD-2073-1.

5.5 O-rings. O-rings shall be packaged for the level specified (see 6.2) and marked in accordance with the requirements of MIL-P-4861.

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 material furnished under this specification is intended for use in air at temperatures up to 230°F, and for use in water, steam, and certain polar fluids at temperatures up to 280°F. This material is especially intended for use in CO₂ scrubbers, in high discharge systems, and in flexible joints. The suitability of this material for use in fluids other than those designated in this specification must be determined beforehand in appropriate immersion tests.

6.1.1 Grade 1 material is intended for use in all applications in 1.1. up to and including 230°F.

MIL-G-22050D(SHIPS)

6.1.2 Grades 2 and 3 material are intended for use in all applications listed in 1.1 up to and including 280°F.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number, and date of this specification.
- (b) Grade of material required (see 1.2).
- (c) Issue of DODISS to be cited in the solicitation and if required, the specific issue of individual documents referenced (see 2.1.1, 2.1.2 and 2.2).
- (d) Form and dimensions required (see 3.3).
- (e) When fire retardant lumber and plywood is not required (see 5.1.1.a).
- (f) Class of fire retardant fiberboard required (see 5.1.1.b).
- (g) Level of preservation and level of packing required (see 5.2, 5.3 and 5.5).
- (h) Container selection if other than contractor's option (see 5.2.1.2 and 5.3.2).
- (i) When caseliners are not required (see 5.3.2.1.1).
- (j) Special marking required (see 5.4).

6.3 Limited testing option. Quality conformance testing can be reduced provided the following criteria are met. If the product has been previously tested and the test results verified in writing by the Defense Contract Administration Specialist (DCAS) in that area, the following tests from 4.4 can be omitted: 4.4.6, 4.4.7, 4.4.8 and 4.4.9.

6.4 Suggested formulation. Vulcanizates prepared from the formulations shown below have been found to meet the requirements of this specification:

<u>Compounding ingredients^{1/}</u>	<u>Grade 1 parts by weight</u>	<u>Grade 2 parts by weight</u>
Nordel 1040	100	100
United SPF	50	80
Protox 166	5	5
Calcium stearate	1	1
Age Rite Resin D	2	2
Sulfur	0.3	0.3
DiCup 40-C	10	10

Cure: 30 minutes at 320°F. (160°C).

^{1/} These were the specific ingredients used when developing these formulations. Many of these ingredients are available under other brand names. It is not the intention of this listing to limit the choice of the commercial source of an ingredient or to infer that one brand is better than another.

MIL-G-22050D(SHIPS)

6.4.1 The above formulations are offered only as suggestions. the Government does not guarantee that materials made from these formulations will conform to the requirements of this specification. Use of these formulations does not relieve the supplier from having his product tested for conformity with the specification.

6.5 Subject term (key word) listing.

Aqueous monoethanolamine
Aryl phosphate ester
Ethylene-propylene elastomeric
Molded
Sheets
Strips
Seals

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

Preparing activity:
Navy - SH
(Project 5330-N152)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of 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.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER

MIL-G-22050(SH)

2. DOCUMENT DATE (YYMMDD)

07/05/93

3. DOCUMENT TITLE GASKET AND PACKING MATERIAL, RUBBER, FOR USE WITH POLAR FLUIDS, STEAM, AND AIR, AT MODERATELY HIGH TEMPERATURES.

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

d. TELEPHONE (Include Area Code)

(1) Commercial
(2) AUTOVON
(if applicable)

7. DATE SUBMITTED
(YYMMDD)

8. PREPARING ACTIVITY TECHNICAL POINT OF CONTRACT (TPOC):

a. NAME RICHARD DEMPSEY (05M3) (P) (U) (C) :

b. TELEPHONE (Include Area Code)

(1) Commercial (2) AUTOVON

PLEASE ADDRESS ALL CORRESPONDENCE TO:

(703) 602-0147

8-332-0147

c. ADDRESS (Include Zip Code) COMMANDER, SEA 05Q42
NAVAL SEA SYSTEMS COMMAND
2531 JEFFERSON DAVIS HWY
ARLINGTON, VA 22242-5160

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
Defense Quality and Standardization Office
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466
Telephone (703) 756-2340 AUTOVON 289-2340