INCH-POUND
MIL-PRF-17927D
27 September 2004
SUPERSEDING
MIL-G-17927C
24 December 1986

PERFORMANCE SPECIFICATION

GASKETS, FLAME RESISTANT HINGED CLOSURE

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers gaskets for use on hinged closures where flame resistance and fume containment are required.

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

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

Comments, suggestions, or questions on this document should be addressed to Commander, Naval Sea Systems Command, ATTN: SEA 05Q, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160 or emailed to commandstandards@navsea.navy.mil, with the subject line "Document Comment". Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at www.dodssp.daps.mil

AMSC N/A FSC 5330

BUREAU OF MEDICINE AND SURGERY (BUMED)

BUMED INST 6270.8 - Procedures for Obtaining Health Hazard Assessments Pertaining to Operational Use of a Hazardous Material.

(Copies of this document are available online at https://bumed.med.navy.mil or from Bureau of Medicine and Surgery, Department of the Navy, 2300 E Street, NW, Washington, DC 20372-5300.)

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

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQC Z1.4 - Sampling Procedures and Tables for Inspection by Attributes. (DoD adopted)

(Copies of this document are available from www.asq.org or American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

ASTM INTERNATIONAL

D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension. (DoD adopted)
D 1349 - Standard Practice for Rubber-Standard Temperatures for Testing. (DoD adopted)
D 2000 - Standard Classification System for Rubber Products in Automotive Applications. (DoD adopted)
D 2240 - Standard Test Method for Rubber Property - Durometer Hardness. (DoD adopted)

(Copies of these documents are available from www.astm.org or ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA, 19428-2959.)

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

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subject to first article inspection in accordance with 4.2.

3.2 Materials. The gaskets shall consist of a rubber core covered with a protective outer layer(s). The outer layer(s) shall adhere to the core and shall be coated with rubber. Asbestos material shall not be used. Gaskets shall not be lubricated with graphite or other materials.

3.2.1 Rubber core. The rubber core material shall be in accordance with ASTM D 2000 M5FE 310 A19B37EA14G11 (see Table I).

TABLE I. Physical properties of rubber.

Properties	Values
Initial Properties	
Hardness, durometer points, ±5	30
Tensile strength, (min), pounds per square inch (PSI)	1450
Ultimate elongation (min), %	500
Compression set, max, %, 22h at 350 ºF	35
Oil immersion, No. 3 oil, 22h at 350 ºF, max volume change, %	+80
Heat Resistance	
Change in hardness max, points	±10
Change in tensile strength max, %	-50
Change in elongation max, %	-50
Water Resistance	
Change in hardness, points	±5
Change in volume, %	±5
Tear Resistance	
1015 to 1500 PSI load, min, pound force per inch (lbf/in)	143

3.2.2 Outer layer(s). The outer layer(s) shall protect the core.

3.3 Adhesion. The outer layer(s) shall adhere to the core such that stripping the outer layer(s) from the core causes cohesive failure.

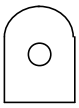
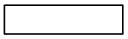
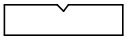
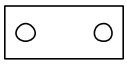
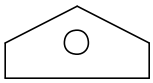
3.4 Sealing durometer. The sealing durometer of the finished gasket shall be as specified in Table II.

3.5 Tensile strength. The gasket shall have a minimum tensile strength of 300 pounds per inch.

3.6 Flame and heat resistance. The finished gasket shall show no melting or loss of material when subjected to the heat test of 4.4.6. When subjected to the flame test of 4.4.6, the gasket shall burn for not more than 60 seconds. The outer covering shall hold its shape and texture when the gasket is subjected to the flame and heat tests .

3.7 Dimensions, tolerances and size. The dimensions for the finished gasket shall be as shown in Table II. The finished gasket shall be within a tolerance of plus 1/16 inch, minus 0 inch. No minus tolerance shall be permitted.

TABLE II. Dimensions and construction (finished gasket).

Number designation	Shape	Nominal size (inches) gasket cross-section	Sealing durometer
1		3/4 x 3/4	45 ± 5
2		1/2 x 1-1/4	55 ± 5
3		1/4 x 1-1/4	55 ± 5
4		3/4 x 1-1/4 15/16 x 1-1/4	55 ± 5
5		1x1	45 ± 5
6		3/4 x 1-1/4	45 ± 5

3.8 Length of reels. Gasket material shall be provided in 25- or 50-foot reels.

3.9 Toxicity. The gaskets shall have no adverse effect on the health of personnel when used for its intended purpose. The gaskets shall be assessed by the Navy Environmental Health Center (NAVENVIRHLTHCEN) using the administrative Health Hazard Assessment (HHA). A flowchart for this process can be found as enclosure (1) of BUMEDINST 6270.8. The HHA is a review of the gaskets based on information submitted by the manufacturer, to assess health hazards associated with the handling, application, use and removal of the product. The gaskets shall not cause any environmental problems during waste disposal (see 4.4.7 and 6.5).

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

3.11 Workmanship. The workmanship of the finished gasket shall be such as to meet all requirements of this specification. The gasket shall be smooth and free from cracks or other obstructions.

4. VERIFICATION

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

a. First article inspection (see 4.2).

b. Conformance inspection (see 4.3).

4.2 First article inspection. First article inspection shall consist of the examinations and the tests specified in Table III.

4.3 Conformance inspection. The conformance inspection shall consist of the examinations and tests as specified in Table IV.

Table III. First article inspection.

Examinations, Measurements and Test	Requirements	Test
Performed on Core		
Hardness	3.2.1	4.4.2
Tensile strength and elongation	3.2.1	4.4.2
Comparison set	3.2.1	4.4.2
Oil immersion (volume change)	3.2.1	4.4.2
Heat resistance	3.2.1	4.4.2
Water resistance	3.2.1	4.4.2
Tear resistance	3.2.1	4.4.2
Performed on Finished Gasket		
Adhesion	3.3	4.4.3
Sealing durometer	3.4	4.4.4
Tensile strength	3.5	4.4.5
Flame and heat resistance	3.6	4.4.6
Dimensions, tolerances and size	3.7	-
Toxicity	3.9	4.4.7

Table IV. Conformance inspection.

Examinations, Measurements and Test	Requirements	Test
Performed on Finished Gasket		
Adhesion	3.3	4.4.3
Sealing durometer	3.4	4.4.4
Tensile strength	3.5	4.4.5
Flame and heat resistance	3.6	4.4.6
Dimensions	3.7	

4.3.1 Sampling.

4.3.1.1 Lot. For the purposes of sampling, examination, and tests, a lot shall consist of all gaskets of the same size, produced in one plant under essentially the same conditions, not exceeding 2500 feet and offered for delivery at one time.

4.3.1.2 Sampling for examination. As specified in 4.3.3, a random sample of reels shall be selected from each lot of gasket material for examination. Examination shall be in accordance with inspection level II of ASQC Z1.4.

4.3.1.3 Sampling for tests. Samples of gasket material shall be selected from each lot for the test as specified in 4.3.2 at special inspection level S4 in accordance with ASQC Z1.4. Samples of core rubber shall be furnished with each lot in the form of two sample pieces 6 by 6 inches by 0.080 + 0.010 inch thick and one sample piece approximately 4 by 3 inches by 0.500 + 0.010 inch thick, or cut from extruded core and supplied as slabs. The substitute samples shall be of the same material and equivalent core as that used in the lot of finished material offered for delivery.

4.3.2 Conformance tests. The samples selected for testing as specified in 4.3.1 shall be subjected to the tests as specified in Table IV. If any of the samples tested fail to meet any of the requirements specified herein, it shall be cause for rejection of the entire lot.

4.3.3 Examination. Each of the samples taken as specified in 4.3.1.2 shall be examined visually for workmanship, appearance, dimensions and tolerance. Any reel in the sample containing one or more visual or dimensional defects shall not be offered for delivery. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.4 Test procedures.

4.4.1 Testing conditions. Unless otherwise specified, the testing conditions shall be in accordance with the temperature and humidity of conditioning room requirements in accordance with ASTM D 1349.

4.4.2 Core. The rubber core material shall be tested for the requirements of Table III in accordance with ASTM D 2000.

4.4.3 Adhesion test. The outer layer(s) shall be stripped from the rubber core (and from each other) without the use of solvents.

4.4.4 Sealing durometer. The sealing durometer shall be determined in accordance with ASTM D 2240. The reading shall be taken on the finished gasket at the point where the knife or striker bar is to contact the gasket in actual application.

4.4.5 Tensile strength. The tensile strength shall be determined in accordance with ASTM D 412.

4.4.6 Flame and heat resistance. A specimen of the finished gasket shall be held for 15 seconds with one face across the flame of a Tirrill-type burner. The lower side of the gasket shall be held even with the tip of the blue cone of the flame. The temperature of the flame, measured with a pyrometer, shall be approximately 1600°F at the tip of the blue cone. If a pyrometer is not available for measuring the temperature, the tip of the blue cone of the flame shall be not less than 1 inch or more than 1-1/2 inches high. The specimen, when cut open at the exposed section, shall be examined for conformance to 3.6. In addition, a specimen of the gasket shall be held over a 1600°F flame, as specified herein for not more than 60 seconds (or until the silicone core ignites or bursts into flame). The gasket, when removed from the burner flame, shall be examined for conformance to 3.6.

4.4.7 Toxicity. To determine conformance with the requirements of 3.9, the gaskets shall be evaluated using the HHA process. Sufficient data to permit a HHA of the product shall be provided by the manufacturer/distributor to the NAVENVIRHLTHCEN. To obtain current technical information requirements specified by the NAVENVIRHLTHCEN, see 6.5.

5. PACKAGING

Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging

requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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 gasket material covered by this specification is intended to be used in scuttles, doors, and hatches located in the path of missile blast areas and also in fume-tight doors located in fire zone bulkheads. The gaskets covered by this document are military unique because they are used in missile blast areas, which the commercial public does not have access to obtain or use. In addition, the gaskets must be able to retain fumes and withstand extreme temperature changes from room temperature to temperatures of 1600°F for a minimum of 15 seconds.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of the specification.
b. When first article inspection is required (see 3.1).
c. Size or dimensions required (see 3.4.7 and 3.8).
d. Testing conditions as required (see 4.4.1).
e. Packaging requirements (see 5.1).
f. Is NEHC toxicity evaluation required? (see 6.5).
g. Is a Material Safety Data Sheet required? (see 6.4).

6.3 Fabrication. There are many material combinations that potentially could meet the requirements of this document. One possible material combination is as follows (see 6.3.1). Suggested shapes are listed in Table IV. However, if a gasket is fabricated from these components, there is no assurance that it will meet all the requirements of this document.

6.3.1 Yarns.

6.3.1.1 Wire-reinforced yarns. Wire-reinforced yarns may consist of three ends of textured continuous filament glass yarn and two ends of type 304 corrosion resistant steel (CRES) wire yarn. The wire and glass should be plied in a manner that will secure the glass and wire and prevent skin-back.

6.3.1.2 Wire insertion. The wire should be made of type 304 CRES in accordance with ASTM A 478. The total cross section of the two wires should be 0.009 ± 0.001 inch in diameter. Any combination of wire diameters is permitted.

6.3.1.3 Plain yarns. Plain yarns should consist of three ends of textured continuous filament glass yarn and two ends of synthetic yarn plied together. The synthetic yarn should not represent more than 3 percent by weight of the plied yarn. The fibrous glass fiber diameter should not be greater than 0.00025 inch.

6.3.2 Glass or wire-reinforced glass braids. The glass metallic braids may be constructed from two yarns as specified in 6.3.1.1 and 6.3.1.2. The yarn should be uniformly braided over the core. The braid should be so constructed that there may be a minimum of 14 two-ply yarns per inch in either direction measured at right angles to the direction of the two-ply yarn. The inner and outer braid should be bonded together with silicone rubber, except when resiliency is affected (see 6.3.4.1). The outer braid may be covered with silicone rubber to prevent wicking, to keep down wear, and to permit future top-dressing.

6.4 Material safety data sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. In order to obtain the MSDS, FAR clause 52.223-3 must be in the contract.

6.5 Toxicity evaluation. The NAVENVIRHLTHCEN requires sufficient information to permit a HHA of the product. Any questions concerning toxicity and requests for HHA should be addressed to the Commanding Officer, Navy Environmental Health Center, ATTN: Hazardous Materials Department, Industrial Hygiene Directorate, 620 John Paul Jones Circle, Suite 1100, Portsmouth, VA 20378-2103. Upon receipt of the HHA, a copy should be provided to Commander, Naval Sea Systems Command, ATTN: SEA 05M3, 1333 Isaac Hull Ave., SE, Stop 5133, Washington Navy Yard, DC 20376-5160.

6.6 Subject term (key word) listing.

Doors, fume tight
Gaskets
Rubber core
Silicone core
Tear resistance
Yarn

6.7 Shelf life. This specification covers items where shelf life is a consideration. Specific shelf-life requirements should be specified in the contract or purchase order. The shelf-life codes are contained in the Federal Logistics Information System Total Item Record. Additive information for shelf-life management may be obtained from *DoD 4140.27-M, Shelf-life Management Manual*, or the designated shelf-life Points of Contact (POC). The POC should be contacted in the following order: (1) the Inventory Control Points (ICPs), and (2) the DoD Service and Agency administrators for the DoD Shelf-Life Program. Appropriate POCs for the DoD Shelf-Life Program can be contacted through the DoD Shelf-Life Management website: http://www.shelflife.hq.dla.mil/.

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

Custodians:
Army - MR
Navy - SH

Preparing activity:
Navy - SH
(Project 5330-1281)

Review activities:
DLA - IS

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