

INCH-POUND

MIL-G-24716A(SH)

5 April 1993

SUPERSEDING

MIL-G-24716(SH)

10 May 1989

MILITARY SPECIFICATION

GASKETS, METALLIC-FLEXIBLE GRAPHITE, SPIRAL WOUND

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 spiral wound metallic-flexible graphite gaskets for use in both pipe line joints and other applications where pressure and temperature conditions do not exceed 2500 pounds per square inch (psi) and 1050 degrees Fahrenheit (*F).

1.2 Classification.

1.2.1 Part or identifying number (PIN). The PIN for the gaskets covered by this specification shall consist of a general prefix followed by a specific design designator.

The prefix shall consist of the letter "M", the basic number of this specification and an indication of the gasket type ("TYI" for type I and "TY2" for type II).

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

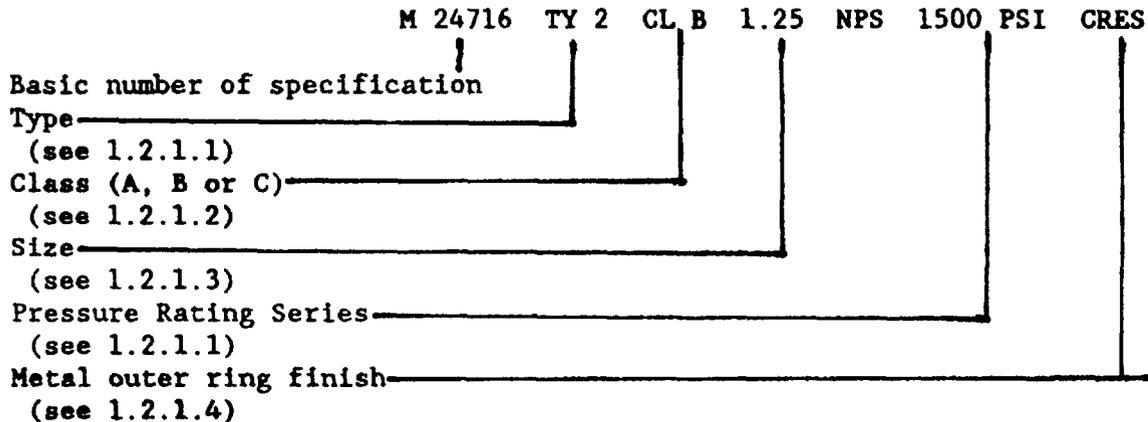
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For type I gaskets the design designator shall consist of a CAGE number, a drawing number and an item number. Where a Government issued drawing exists which specifies the gasket (class, dimensions and compression characteristics) the Government CAGE, drawing and item numbers, separated by dashes, "-", shall be used. Where no adequate Government drawing exists, the manufacturer's CAGE number and drawing and item numbers (or manufacturer's part number) may be used.

For type II gaskets the design designator shall consist of the Class, Size, Pressure Rating Series and Metal Outer Ring Finish as shown in the following example:

Type II Spiral Wound Gasket

1.2.1.1 Gasket Type and Series. Gaskets shall be of the following type and pressure rating series as specified (see 6.2).

Type I - Gaskets for applications other than pipeline flange joints (TYI) such as valve bonnets, pumps and other equipment applications. (This specification does not apply to gaskets for boiler manholes and handholes which are seated by internal pressure.)

Type II - Gaskets for ANSI B16.5 pipeline flange joints with metal outer rings (TY2) Series 150, 300, 400, 600, 900, 1500, and 2500 (PSI) gasket characteristics are defined in tables I through V

1.2.1.2 Gasket Class. Gaskets shall be of the following classes (see 3.2 and 6.2):

Class A - Corrosion-resistant steel (for temperatures up to 1050°F max.)
(CLA)

Class B - Nickel-chromium iron alloy (for temperatures up to 900°F max.)
(CLB)

Class C - Nickel-copper alloy (for temperatures up to 700°F where contact with sea water is possible) (CLC)

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1.2.1.3 Gasket Size. For type II gaskets, the size shall be identified by the associated pipe NPS. The corresponding NPS and actual dimensions of the gaskets can be obtained from tables I through V. Type I gasket dimensions are specified by the contracting activity.

1.2.1.4 Metal outer ring finish. For type II gaskets, the metal outer ring material and finish options (see 3.2.2) shall be identified as follows:

<u>Code</u>	<u>Metal outer ring material/finish</u>
CRPL	Carbon steel ring/chromium plated
CRES	Corrosion resistant material, as specified, ring/ uncoated
UNC	Carbon steel ring/uncoated
REF	No metal outer ring
Blank	Carbon steel ring/vendor coating option

NOTE: "CRES" metal outer rings may be provided in lieu of "CRPL" metal outer rings at the manufacturer's option. "CRES" metal outer rings may be substituted for "CRPL" metal outer rings in service.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards 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 and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

- QQ-N-281 - Nickel-Copper-Alloy Bar, Plate, Rod, Sheet, Strip, Wire, Forgings and Structural and Special Shaped Sections
- QQ-C-320 - Chromium Plating (Electrodeposited).
- PPP-F-320 - Fiberboard, Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes.

MILITARY

- MIL-L-19140 - Lumber and Plywood, Fire Retardant Treated.
- MIL-P-24503 - Packing Material, Graphitic, Corrugated Ribbon or Textured Tape and Preformed Ring.

STANDARD

MILITARY

- MIL-STD-2073-1 - DOD Material Procedures for Development and Application of Packaging Requirements.

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(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 are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)
B16.5 - Pipe Flanges and Flanged Fittings.

(Application for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- A 167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip. (DOD adopted)
- B 127 - Standard Specification for Nickel-Copper Alloy (UNS N04400) Plate, Sheet, and Strip. (DOD adopted)
- B 168 - Standard Specification for Nickel-Chromium-Iron Alloys (UNS N06600 and N06690) Plate, Sheet, and Strip. (DOD adopted)
- 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, PA 19103.)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
Boiler and Pressure Vessel Code
Section VIII - Pressure Vessels.

(Application for copies should be addressed to the American Society of Mechanical Engineers, 345 E. 47th Street, New York, NY 10017.)

(Nongovernment 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, specification sheets or MS standards), 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

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3.1 Design Spiral wound gaskets furnished under this specification shall be either type I or type II designs and shall be suitable for the service conditions specified.

3.1.1 Type I gaskets. Type I gaskets shall be either restricted or unrestricted compression designs and shall be compatible with the specific flange design. Type I gaskets shall have an uncompressed thickness of either 0.125 ± 0.005 inch or 0.175 ± 0.005 inch as specified by the contracting activity (see 6.2). (The gasket thickness measurement applies to the metallic strip portion of the gasket and does not include the filler material which may protrude slightly.) Unless otherwise specified, type I gaskets shall not be supplied with outside or inside metal rings.

3.1.1.1 Restricted compression flange design. Gaskets shall be capable of being compressed to the specified thickness as determined by the joint dimensions by a compressive load range as specified by the equipment manufacturer. Since type I gaskets are special gaskets for specific components such as valve bonnet joint, and so forth, the contracting activity shall obtain the compression load information from the component drawing or the equipment manufacturer. In those cases where this information cannot be obtained the following design criteria may be utilized if desired for acquisition of the gaskets. Gaskets shall be designed in accordance with minimum design seating stress as defined in the ASME Boiler and Pressure Vessel Code, Section VIII utilizing the formula $W_{m2} = 3.14 b G y$.

3.1.1.2 Unrestricted compression flange design. Unless otherwise specified by the original equipment manufacturer, gaskets shall be capable of being compressed to 0.130 ± 0.005 inch for gaskets having an original thickness of 0.175 or to 0.100 ± 0.005 inch for gaskets having an original thickness of 0.125 inch at a compression load specified by the equipment manufacturer. If compression load information specified in 3.1.1.1 is not available, the contracting activity may specify the gasket be designed in accordance with the minimum seating stress defined in the ASME Boiler and Pressure Vessel Code, Section VIII.

3.1.1.3 Exemption from compression test. If approved by the contracting activity, gaskets requiring a total compressive force in excess of 557,000 pounds may be exempted from the compression test requirement, since the compression load is in excess of the capacity of commonly available testing machines. If enough is known about such a gasket, an alternate compression test may be performed by specifying a required thickness range when compressed to 550,000 pounds (see 6.2).

3.1.2 Type II. Type II gaskets shall be compatible with the ANSI B16.5 pipeline flange specified. Type II gaskets shall consist of a refill snapped in a solid metal outer ring (see 3.1.2.2) with a sliding fit. The design shall be such that the gasket can be compressed without damage to 0.117 inch thickness. The gaskets shall conform to tables I through V.

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TABLE I. Type II gasket characteristics for series 150 psi ANSI flanges.

Nps	Pipe o.d.	Gasket refills (see figure 1)		Number of plies Metal ²		Metal outer ring o.d. ³	Test ⁴ load
		I.d.	O.d. ¹	Inside periphery ±1/2 turn	Outside ¹ periphery ±1/2 turn		
Inches	Inches	Inches ⁵	Inches ⁵			Inches	Pounds
1/4	0.540	1/2	27/32	-	-	1-3/4	12,600
1/2	0.840	3/4	1-7/32	6	3	1-7/8	12,600
3/4	1.050	1	1-17/32	6	3	2-1/4	12,600
1	1.315	1-1/4	1-27/32	3	3	2-5/8	12,600
1-1/4	1.660	1-23/32	2-11/32	3	3	3	15,100
1-1/2	1.900	2-1/8	2-23/32	3	3	3-3/8	15,100
2	2.375	2-3/4	3-11/32	3	3	4-1/8	24,200
2-1/2	2.875	3-1/8	3-27/32	3	3	4-7/8	24,200
3	3.500	4	4-23/32	3	3	5-3/8	24,200
3-1/2	4.000	4-1/2	5-7/32	3	3	6-3/8	48,500
4	4.500	5	5-27/32	3	3	6-7/8	48,500
5	5.563	6-1/8	6-31/32	3	3	7-3/4	72,500
6	6.625	7-3/16	8-7/32	3	3	8-3/4	72,500
8	8.625	9-3/16	10-11/32	3	3	11	72,500
10	10.750	11-5/16	12-15/32	3	3	13-3/8	151,001
12	12.750	13-3/8	14-23/32	3	3	16-1/8	151,000
14 o.d.	14.000	14-5/8	15-31/32	3	3	17-3/4	198,000
16 o.d.	16.000	16-5/8	18-7/32	3	3	20-1/4	264,000

- 1/ Neither outside diameter (o.d.) dimension nor outside periphery plies includes additional unwelded plies (see 3.3.1.1(a)).
- 2/ There shall be no flexible graphite plies between the metal plies on the inside and on the outside periphery.
- 3/ Tolerance plus or minus 1/32 inch for sizes up to 8 inches iron pipe size (ips) and plus or minus 1/16 inch for sizes over 8 inches nps.
- 4/ Corresponds to bolting loads of 30,000 psi ± 10 percent unit stress, except for gasket sizes 1 inch and smaller, which are based upon unit bolt stress of 25,000 psi at thread root area. When under this compressive test load, the gasket thickness shall be 0.130 ± 0.005 inch.
- 5/ Tolerance plus or minus 1/64 inch on the inside diameter (i.d.) and plus 1/16, minus 1/32 inch on the o.d.

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TABLE II. Type II gasket characteristics for series 300, 400 and 600 ANSI Flanges

Nps	Pipe Inches	Gasket refills (see figure 1)		Number of plies Metal ³		Total min 4	Metal outer ring ³ o.d., inches		Test load, Series 300	Test load, Series 400	Test load, Series 600
		I.d. Inch ¹	O.d. Inches 1, 2	Inside periphery ±1/2 turn	Outside periphery ±1/2 turn		Series 300	Series 400			
1/4	0.540	1/2	27/32	4	3	--		1-3/4	12,600	12,600	12,600
1/2	0.840	3/4	1-7/32	6	3	--		2-1/8	12,600	12,600	12,600
3/4	1.050	1	1-17/32	6	3	--	Use Series 600	2-5/8	20,200	20,200	20,200
1	1.315	1-1/4	1-27/32	6	3	--	Series 600	2-7/8	20,200	20,200	20,200
1-1/4	1.660	1-11/16	2-11/32	6	3	--		3-1/4	24,200	24,200	24,200
1-1/2	1.900	2	2-23/32	6	3	--		3-3/4	36,200	36,200	36,200
2	2.375	2-9/16	3-11/32	6	3	--		4-3/8	48,400	48,400	48,400
2-1/2	2.875	2-15/16	3-27/32	6	3	--		5-1/8	72,500	72,500	72,500
3	3.500	3-3/4	4-23/32	6	3	--		5-7/8	72,500	72,500	72,500
3-1/2	4.000	4-1/8	5-7/32	6	3	--	6-1/2	6-3/8	72,500	101,000	101,000
4	4.500	4-3/4	5-27/32	6	3	--	7-1/8	7	72,500	101,000	101,000
4-1/2	5.000	5-5/16	6-15/32	6	3	--	7-3/4	7-5/8	72,500	101,000	132,000
5	5.563	5-13/16	6-31/32	6	3	--	8-1/2	8-3/8	108,700	150,800	198,000
6	6.625	6-7/8	8-7/32	6	3	--	9-7/8	9-3/4	10-1/2	150,800	198,000
8	8.625	8-7/8	10-11/32	6	3	--	12-1/8	12	12-5/8	198,300	262,000
10	10.750	10-13/16	12-15/32	6	3	--	14-1/4	14-1/8	15-3/4	264,400	349,400
12	12.750	12-7/8	14-23/32	6	3	--	16-5/8	16-1/2	18	349,400	446,000
14 od	14.000	14-1/4	15-31/32	6	3	32	19-1/8	19	19-3/8	436,800	557,000
16 od	16.000	16-1/4	18-7/32	6	3	35	21-1/4	21-1/8	22-1/4	557,000	-----
18 od	18.000	18-1/2	20-23/32	6	3	35	23-1/2	23-3/8	24-1/8	-----	-----

1/ Tolerance plus or minus 1/64 inch on the i.d. and plus 1/16, minus 1/32 inch on the o.d.

2/ Neither o.d. dimension nor outside periphery plies includes additional unwelded plies (see 3.3.1.1(a)).

3/ There shall be no flexible graphite plies between the metal plies on the inside and on the outside periphery.

4/ The 32 plies minimum for 14 inch size applies to 600 series only and the 35 plies minimum for 16 inch size applies to 400 and 600 series only.

5/ Tolerance plus or minus 1/32 inch for sizes up to 8 inch nps and plus or minus 1/16 inch for sizes over 8 inches nps.

6/ Corresponds to bolting load of 30,000 psi plus or minus 10 percent unit stress, except for gasket sizes 1 inch and smaller, which are based upon unit bolt stress of 25,000 psi at the thread root area. When under this compressive test load, the gasket thickness shall be 0.130 ± 0.005 inch.

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TABLE III Type II Gasket characteristics for series 900 psi ANSI flanges.

Nps	Pipe o.d.	Gasket refill (see figure 1)		Number of plies		Metal outer ³ ring o.d.	Test load ⁴ Pounds
		I.d.	O.d. 1	Inside periphery +1/2 turn	Outside periphery +1/2 turn		
Inches	Inches	Inches ²	Inches ³	Inches ⁵		Inches	
1/4	0.540	-----	-----	-----	--	-----	-----
1/2	0.840						
3/4	1.050						
1	1.315						
1-1/4	1.660						
1-1/2	1.900						
2	2.375						
2-1/2	2.875						
3	3.500	3-3/4	4-23/32	6	3	6-5/8	101,000
4	4.500	4-3/4	5-27/32	6	3	8-1/8	175,000
5	5.563	5-13/16	6-31/32	6	3	9-3/4	223,000
6	6.625	6-7/8	8-7/32	6	3	11-3/8	262,000
8	8.625	8-7/8	10-11/32	6	3	14-1/8	416,000
10	10.725	10-13/16	12-15/32	6	3	17-1/8	554,000
12	12.750	12-7/8	14-23/32	6	3	19-5/8	-----

1/ Neither o.d. dimension nor outside periphery plies includes additional unwelded plies (see 3.3.1.1(a)).

2/ There shall be no flexible graphite plies between the metal plies on the inside and on the outside periphery

3/ Tolerance plus or minus 1/32 inch for sizes up to 8 inch nps and plus or minus 1/16 inch for sizes over 8 inches nps.

4/ Corresponds to bolting load of 30,000 psi plus or minus 10 percent unit stress, except for gasket sizes 1 inch and smaller, which are based upon unit bolt stress of 25,000 psi at the thread root area. When under this compressive test load, the gasket thickness shall be 0.130 ± 0.005 inch.

5/ Tolerance plus or minus 1/64 inch on the i.d. and plus 1/16, minus 1/32 inch on the o.d.

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TABLE IV. Type II Gasket characteristics for series 1500 psi ANSI flanges

Nps	Pipe o d.	Gasket refills (see figure 1)		Number of plies Metal ²		Metal outer ³ ring o.d. inch	Test load ⁴ pounds
		I.d	O.d	Inside periphery $\pm 1/2$ turn	Outside periphery $\pm 1/2$ turn		
Inches	Inches	Inches ⁵	Inches ⁵				
1/4	0.540	-----	-----	---	---	---	---
1/2	0.840	3/4	1-7/32	6	3	2-1/2	30,200
3/4	1.050	1	1-17/32	6	3	2-3/4	30,200
1	1.315	1-1/4	1-27/32	6	3	3-1/8	41,900
1-1/4	1.660	1-11/16	2-11/32	6	3	3-1/2	50,300
1-1/2	1.900	2	2-23/32	6	3	3-7/8	66,100
2	2.375	2-9/16	3-11/32	6	3	5-5/8	101,000
2-1/2	2.875	2-15/16	3-27/32	6	3	6-1/2	132,000
3	3.500	3-3/4	4-23/32	6	3	6-7/8	175,000
4	4.500	4-3/4	5-27/32	6	3	8-1/4	223,000
5	5.563	5-13/16	6-31/32	6	3	10	337,000
6	6.625	6-7/8	8-7/32	6	3	11-1/8	416,000
8	8.625	8-7/8	10-11/32	6	3	13-7/8	-----
10	10.725	10-13/16	12-15/32	6	3	17-1/8	-----
12	12.750	12-7/8	14-23/32	6	3	20-1/2	-----

1/ Neither o d dimension nor outside periphery plies includes additional unwelded plies (see 3.1.1(a)).

2/ There shall be no flexible graphite plies between the metal plies on the inside and on the outside periphery

3/ Tolerance plus or minus 1/32 inch for sizes up to 8 inch nps and plus or minus 1/16 inch for sizes over 8 inch nps.

4/ Corresponds to bolting load of 30,000 psi plus or minus 10 percent unit stress, except for gasket sizes 1 inch and smaller, which are based upon unit bolt stress of 25,000 psi at the thread root area. When under this compressive test load, the gasket thickness shall be 0.130 ± 0.005 inch.

5/ Tolerance plus or minus 1/64 inch on the i.d. and plus 1/16, minus 1/32 inch on the o d.

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TABLE V Type II Gasket characteristics for series 2500 psi ANSI flanges.

Nps	Pipe o.d.	Gasket refill (see figure 1)		Number of plies		Metal outer ³ ring o.d.	Test load ⁴
		I.d.	O.d. ¹	Inside periphery ±1/2 turn	Outside periphery ±1/2 turn		
Inches	Inches	Inches ⁵	Inches ⁵	Metal ²		Inches	
1/2	0.840	3/4	1-7/32	6	3	2-3/4	30,200
3/4	1.050	1	1-17/32	6	3	3	30,200
1	1.315	1-1/4	1-27/32	6	3	3-3/8	41,900
1-1/4	1.660	1-9/16	2-11/32	6	3	4-1/8	55,100
1-1/2	1.900	1-7/8	2-23/32	6	3	4-5/8	72,800
2	2.375	2-5/16	3-11/32	6	3	5-3/4	110,000
2-1/2	2.875	2-3/4	3-27/32	6	3	6-5/8	146,000
3	3.500	3-5/8	4-23/32	6	3	7-3/4	188,000
4	4.500	4-5/8	5-27/32	6	3	9-1/4	281,000
5	5.563	5-5/8	6-31/32	6	3	11	396,000
6	6.625	6-3/4	8-7/32	6	3	12-1/2	-----
8	8.625	8-1/2	10-11/32	6	3	15-1/4	-----
10	10.750	10-5/8	12-15/32	6	3	18-3/4	-----
12	12.750	12-3/4	14-23/32	6	3	21-5/8	-----

1/ Neither o.d. dimension nor outside periphery plies includes additional unwelded plies (see 3.3.1.1(a))

2/ There shall be no flexible graphite plies between metal plies on the inside and on the outside periphery

3/ Tolerance plus or minus 1/32 inch for sizes up to 8 inch nps and plus or minus 1/16 inch over 8 inch nps

4/ Corresponds to bolting load on 25,000 psi unit stress. When under this compressive test load, the gasket

thickness shall be 0.130 ± 0.005 inch.

5/ Tolerance plus or minus 1/64 inch on the i.d. and plus 1/16, minus 1/32 inch on the o.d.

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3.1.2.1 Refills for all series of type II gaskets. Refills shall be of the inside and outside dimensions specified in tables I through V. Type II gasket refills shall have an initial uncompressed thickness of 0.175 ± 0.005 inch. (The initial gasket thickness measurement applies to the metallic strip portion of the gasket and does not include the filler material which may protrude slightly.)

3.1.2.2 Metal outer ring. The metal outer ring shall have a thickness of $0.125 + 0.006/-0.008$ inch. The ring shall have a V-shaped groove or other satisfactory retaining feature machined on the inside periphery to fit the outside periphery of the refill.

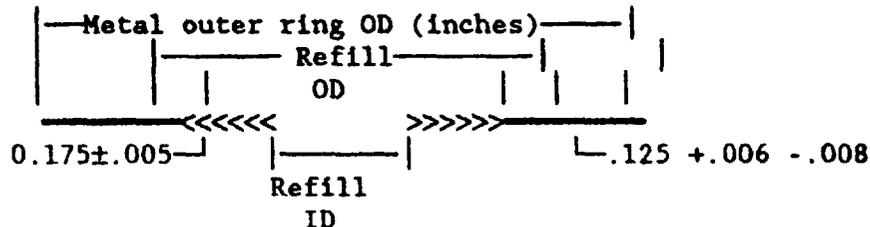


FIGURE 1. Gasket.

3.2 Materials.

3.2.1 Metal strip. The metal strip used in the gaskets shall be of the following materials:

- (a) Class A gaskets which are intended for temperatures up to 1050°F shall be corrosion-resisting steel type 347 in accordance with ASTM A 167.
- (b) Class B gaskets which are intended for temperatures up to 900°F maximum shall be nickel-chromium-iron alloy, cold rolled and annealed in accordance with ASTM B 168.
- (c) Class C gaskets which are intended for temperatures up to 700°F maximum where contact with sea water may occur shall be nickel-copper alloy, cold rolled and annealed, in accordance with QQ-N-281 or ASTM B 127.

3.2.2 Metal outer ring Unless otherwise specified (see 6.2), the metal outer ring shall be of carbon steel. At the option of the manufacturer, a protective tightly adherent coating may be applied to the metal outer ring. The resulting dimensions shall conform to 3.1.2.2 and tables I through V. When specified (see 6.2), the carbon steel outer ring shall be chromium plated in accordance with QQ-C-320. (The manufacturer may, at his option, provide corrosion resisting steel metal outer rings in lieu of chromium plated carbon steel metal outer rings.) The use of coatings composed of metallic materials having melting points lower than the maximum allowable gasket service temperature (see 1.2.1) is prohibited. The use of cadmium plating is prohibited. Nonmetallic coatings shall be tightly adherent (no flakes or blisters) at ambient temperature and present no hazard (ignition or fumes) at the specified operating temperature. Specific nonmetallic coating systems shall be approved by NAVSEA.

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3.2.3 Filler material. Gasket filler material shall be graphitic type I, class 2 corrugated ribbon or textured tape material meeting the requirements of MIL-P-24503.

3.2.3.1 Filler material thickness. Filler material thickness (see figure 1) between metal windings shall be as specified by the manufacturer to obtain the compression load characteristics specified in 3.1.1 and tables I through V.

3.2.3.2 Filler material surface finish. Filler material surface finish may be texturized or lightly corrugated as in accordance with MIL-P-24503, or plain.

3.2.4 Special application. For special applications other materials may be used only upon specific approval of the activity concerned.

3.2.5 Mercury contamination. During the manufacturing process, tests or examinations the supplies ordered shall not have come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing only a single boundary of containment.

3.3 Construction.

3.3.1 Assembly. Gasket shall be composed of a single strip of dovetail shaped metal spirally wound, starting on the inside and working outward ply-by-ply to the desired size. Between some of the plies shall be a cushion of flexible graphite ribbon or tape (for type II gaskets see tables I through V) either in a continuous single strip or in two strips depending upon the design

3.3.1.1 Spot welds. The number and spacing of spot welds on the gasket i.d. and o.d. shall conform to the following:

- (a) Terminal spot welds. The end of the terminal plies shall be spot welded to the adjacent plies with a minimum of two terminal spot welds. The first terminal spot weld shall be not greater than 1/4 inch from the end of the terminal ply. The second terminal spot weld shall be not greater than 3/4 inch from the first terminal spot weld measured along the perimeter. For type II gaskets, the terminal ply of the o.d. is that ply which is spot welded to the adjacent ply to obtain the dimensions in tables I through V; a maximum of four additional unwelded plies of the same continuous metal strip may be wound over the spot welded ply to facilitate fitting the gasket to the outer metal ring.
- (b) Additional spot welds on the terminal plies. Additional spot welds shall be located on the gasket i.d. such that the total number of spot welds on the terminal ply (including the terminal spot welds described in (a)) shall be not less than 3 and spaced at 3 inches maximum spacing along the perimeter between the adjacent spot welds in either direction.

3.3.2 Metal Metal strip shall be not less than 0.007 and not greater than 0.009 inch in thickness

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3.3.3 Plies. A ply shall consist of one 360 degree turn of metal strip. Plies shall be counted adjacent to a terminal weld. A flexible graphite ply shall consist of one 360 degree turn of flexible graphite strip(s) depending upon the design.

3.3.4 Compression tests Gaskets shall be capable of passing the compression load tests of 4.4.1.

3.3.5 Workmanship. Surfaces and edges of gaskets and metal outer rings shall be free of burrs, loosely adhering metal and corrosion.

3.4 Marking.

3.4.1 Type I gaskets. Each type I gasket should be individually identified with a sturdy paper tag. The tag shall contain the following information as specified by the contracting activity:

- (a) Equipment manufacturer's name.
- (b) Type of equipment and model number.
- (c) Equipment part number of gasket.
- (d) Part or identifying number - PIN (see 1.2.1).
- (e) Material of construction (or class).
- (f) Gasket manufacturer's name.
- (g) Customer's order number.
- (h) Any other information required to clearly identify the end use of the gasket.

NOTE: (Items (a), (b) and (c) are not required if (d) is provided.)

3.4.2 Type II gaskets Each type II gasket shall be permanently marked (e g., steel stamped, laser etched) on the outer metal ring to show the manufacturer's name, pipe size, pressure series, material of construction and "ANSI - MIL" to indicate that the gasket is for ANSI flanges and also meets the requirements of this specification (example: "2-3/4/600 Ni-Cr-Fe ANSI - MIL"). Where the same gasket is used in several pressure rating series (for example, the smaller gaskets of tables II, III and IV), the marking shall include all applicable pressure rating series. Both sides of the outer metal ring may be used where necessary on smaller sizes to furnish the above information

3.4.3 Refills. When refills are purchased separate from the rings, each refill shall be identified by enclosing each refill in a paper or plastic bag, or by means approved by the contracting activity, having the manufacturer's name, pipe size, pressure series, material and ANSI - MIL printed thereon. If a paper or plastic bag is used, it shall be sealed to ensure that the refill is retained in the bag. Identification markings need not be printed on plastic bags provided the marking is placed in the bag and is visible without requiring the bag to be opened.

3.5 Cleanliness requirements. Surface of gaskets and related parts shall be commercially clean, for example, free of dirt, oils, grease, chips, and any foreign matter.

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3.6 Production equipment inspection. An inspection shall be performed prior to starting a product run of MIL-type gaskets to ensure that equipment and process lines have been purged of material from the previous production run. The inspection shall be performed on all equipment used in manufacturing operations where the material is not segregated and positively identified.

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 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 any of the inspections set forth in this 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 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 ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the 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 Sampling for quality conformance. As a minimum, the contractor shall randomly select and examine or test the sample quantities specified herein to establish conformance to the requirements of this specification. If one or more defects are found in any sample, the entire lot shall be rejected. The contractor has the option of screening the rejected lot 100 percent for the defective characteristic(s) or providing a new lot which shall be inspected in accordance with the sampling plan contained herein.

4.2.1 Lot. All gaskets of the same type and size produced in one facility, using the same materials and production processes, and offered for delivery at one time shall be considered a lot for purposes of sampling, inspection and testing.

4.2.2 Sampling for visual, dimensional, workmanship and marking examination and alloy identity testing. Sample gaskets shall be selected at random from each lot in accordance with table VI for the examinations and tests specified in 4.3 and 4.4.2.

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TABLE VI. Sampling for visual, dimensional, workmanship and marking examination and alloy identity 1/ testing.

Lot size (number of gaskets)	Sample size (number to be examined/tested)
1 to 10	All
11 to 25	10
26 to 150	15
151 to 280	19
281 to 500	21
501 to 1200	27
1201 to 3200	35
3201 and over	38

1/ Sampling for alloy identity testing is only allowable if testing of each gasket in the lot is not required (see 4.2.2 and 6.2).

4.2.3 Sampling for compression tests. Sample gaskets shall be selected from each lot in accordance with table VII for the test specified in 4.4.1. If any gasket fails the compression test, the entire lot shall be rejected.

TABLE VII. Sampling for compression test.

Lot size (number of gaskets)	Sample size (number to be tested)
1 to 25	1
26 to 180	2
181 to 500	3
501 to 800	5
801 to 1,300	7
1,301 to 3,200	10
3,201 to 8,000	15
8,001 to 22,000	25
22,001 and over	35

4.3 Visual, dimensional, workmanship and marking examination. Each of the sample gaskets selected in accordance with 4.2.2 shall be examined and measured to verify conformance with all of the requirements of this specification which do not include the compression tests. Examination shall be conducted as specified in table VIII. The number of plies shall be counted using a magnifying glass to ensure accuracy of the count.

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TABLE VIII. Classification of defects.

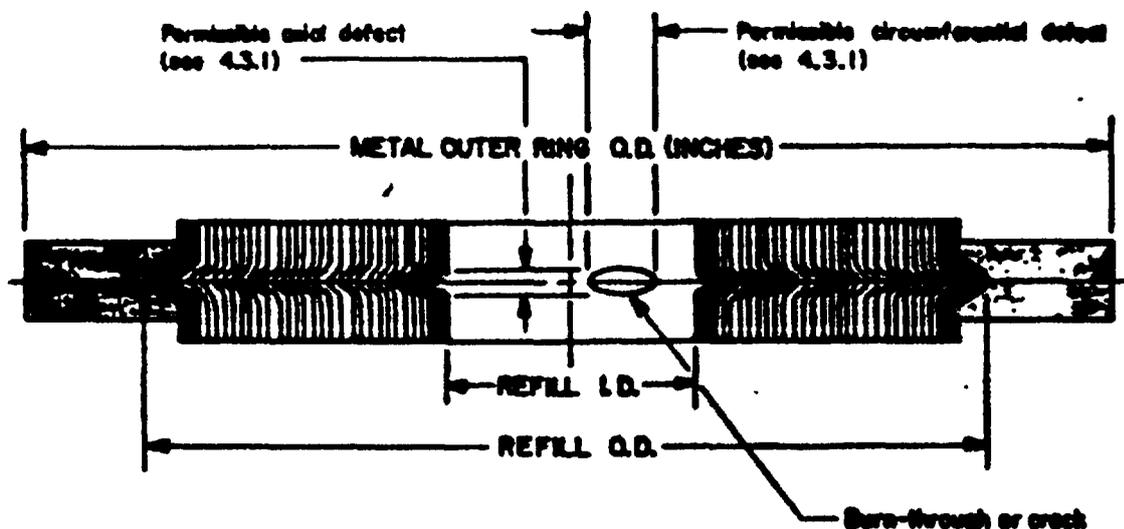
Categories	Defects
Critical 1	Alloy not as specified.
Major 101	Type of gasket not as specified.
102	Number of metal plies less than specified minimum.
103	Spot welds (on inside and outside diameters) missing, not the required number, incorrectly speced, or spot welds defective.
104	Uncompressed thickness of finished gasket not within specified tolerances.
105	Gasket refill not a sliding fit in the metal ring, or metal ring not provided with a satisfactory means of retaining the refill.
106	Inside or outside diameter of refill not within the specified tolerances.
107	Failures of gasket to conform to the dimensions specified for valve bonnets, pumps and other applications (type I only).
108	Identification markings (tag for type I) missing, illegible, incorrect or not as specified.
109	Surfaces or edges of gaskets or metal rings having burrs or loosely adhering metal.
110	Surfaces of gaskets or related parts exhibiting dirt, oils, grease, chips or any foreign matter.
111	Thickness of metal outer ring is outside specified tolerances.

4.3.1 Visual examination of spot welds. Spot welds shall be visually examined at a magnification of 5 to 10X. Defective spot welds, referenced in table VIII category 103, shall be defined as welds showing burn-through or cracks exceeding the following dimensions (see figure 2)

<u>Gasket thickness</u>	<u>Axial direction</u>	<u>Circumferential direction</u>
0.125 inch	0.034 inch	0.102 inch
0.175 inch	0.045 inch	0.134 inch

Acceptance criteria for defective spot welds shall be as specified in table IX.

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FIGURE 2. Gasket spot weld examination.TABLE IX. Examination of spot welds.1/

Number of spot welds in gasket I.D.	Acceptance number (defective)	Rejection number (defective)
3 to 4	0	1
5 to 7	1	2
8 to 11	2	3
12 to 15	3	4
16 and over	4	5

1/ Any gasket, regardless of number of spot welds, containing 2 defective welds adjacent to each other shall be considered a reject.

4.3.2 Filler material. Filler material inspection shall consist of certification supported by verifying data that the material specified in 3.2.3 used in fabricating the gasket is in conformance with the referenced specification or requirements prior to such fabrication.

4.4 Quality conformance tests.

4.4.1 Compression load test. The test shall consist of subjecting the gasket to compression in a hydraulic compression machine of suitable capacity and measuring the thickness of the gaskets while under the test loads specified in 3.1.1.1 and 3.1.1.2 for type I gaskets and tables I through V, as applicable for type II gaskets.

4.4.1.1 Equipment. Gaskets shall be tested between steel test plates, the surfaces of which shall have a smooth finish machined with a circular lay (concentric or phonographic) having a roughness not exceeding 500 microinches roughness average (RA) produced by machining not less than 40 cuts of uniform depth per inch of face

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width. Where a finer finish is required and so specified (see 6.2), plates with a roughness range of 63 to 125 microinches RA shall be used. Test plates shall be centrally located under the ball and socket head of the test machine. The ball and socket head shall be used to equally distribute the load applied to the gasket. By means of inverted T-straps, the upper construction plates shall be suspended and held in place when inserting a gasket. Four dial indicators graduated in 1/1000 inch divisions, located 90 degrees apart and mounted on the upper compression plate are employed for measuring the thickness of the gasket. (Electronic pick-up and recording of gasket thickness is acceptable in lieu of dial indicators.)

4.4.1.2 Loading. During the test the increment of load shall be applied until a load corresponding to the test load in accordance with 3.1.1.1 and 3.1.1.2 for type I gaskets and tables I through V, as applicable, for type II gaskets is obtained for the gasket under test. The maximum rate of loading allowed shall be 2,000 pounds per second. When specified (see 6.2), a plot showing load (ordinate) versus deflection (abscissa) shall be prepared and made available for each test made. Type II gaskets being tested shall include metal outer rings 0.117 - 0.125 inch thick. To ensure reliability of gasket compression characteristics for type II gaskets, the final compression test load shall be read prior to the test plates making contact with the gasket compression stop ring (metal outer ring).

4.4.1.3 Test procedure. Steel test plates shall be placed in contact with each other and under an applied load of 3,000 pounds, the dial indicators shall be set so that a zero reading is obtained with the maximum travel of the indicator plunger. Plates shall then be separated, a gasket centrally located between plates and the upper plate brought into contact with the gasket but no load applied. Dial indicators shall then be read, and the average of the four readings shall closely check the original micrometer thickness of the gasket. The load shall then be applied and the rate of loading depends on the size of gasket and the maximum load to be applied. The specified load shall be maintained only for a sufficient time, 5 to 10 seconds, to obtain the dial indicator readings. By means of reading the dial indicator scales counter-clockwise instead of clockwise the actual thickness of the gasket shall be directly obtained. The average of the four dial indicator readings shall be considered to be the thickness of the gasket. After completion of the test, the load shall be released but the upper compression plate shall be left in contact with the gasket for approximately 10 seconds and the dial indicator readings shall be taken to determine the recovery of the gaskets. The test plates shall then be separated, the gasket removed from the test machine, measured for thickness by micrometers, examined for excessive buckling on the inner periphery and condition of welds. The final micrometer thickness and the released average dial indicator thickness of the gasket shall be approximately the same providing the dial indicators are in proper adjustment. (Periodically, between test runs, the zero setting of the dial indicators shall be checked with the test plates in contact with one another.) No excessive buckling on the inner edge of the gasket shall be allowed (see 4.4.1.4(a)). Gaskets undergoing the compression test shall recover at least 0.010 inch for gaskets having a nominal thickness of 0.175 inch and 0.005 inch for gaskets having a nominal thickness of 0.125 inch. It shall be the responsibility of the gasket manufacturer to adjust dial indicator readings to compensate for any deflection of test plates under load

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4.4.1.4 Test failures. Test failures are defined as follows.

- (a) Gasket buckled excessively on inner periphery to the extent that metal plies separated or the dovetail formed metal strip imploded.
- (b) Welding failed.
- (c) Gasket thickness recovered less than specified in 4.4.1.3 after release of compression test load.
- (d) Compressed gasket thickness not in specified range at specified load.

4.4.2 Alloy identity. Prior to packaging, each of the sample gaskets selected in accordance with 4.2.2 or, when specified (see 6.2), each of the gaskets in the lot, shall be examined for alloy identity by a spot tester manufactured by Systems Scientific Laboratory, Ridgewood, New Jersey 07451, or Spot Testers Inc., Springfield, New Jersey 07081, or other equal tester, which has been demonstrated to the satisfaction of the Government inspection personnel. Test plates (for calibration purposes) of the alloys to be tested shall be provided for each tester. If any sample fails the alloy identity examination, the entire lot shall be rejected.

4.4.3 Refill sliding fit. Unless otherwise specified (see 6.2), each of the gaskets in the lot shall be tested to determine that the refill has a sliding fit in the metal outer ring.

4.5 Test reports. Unless otherwise specified (see 6.2, 6.6 and figure 3), a test report shall be furnished with each lot of material offered for acceptance. The test report shall include the results of the visual, dimensional, workmanship, marking, and refill sliding fit examinations; visual examination of spot welds; compression load tests; and the alloy identity test. Unless otherwise specified herein, qualitative results of nondestructive tests shall be recorded in the test report.

4.6 Inspection of packaging. Sample packages and the inspection of 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 acquisitions. For the extent of applicability of the preparation for delivery or packaging requirements of referenced documents listed in section 2, see 6 2)

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:

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

Level C - Type I - nonweather resistant.
Category I - 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 material requirements as specified (see 6.2) of PPP-F-320.
- (c) Cushioning and wrapping materials. The use of excelsior, newspaper, shredded paper (all types), and similar hydroscopic or nonneutral materials and all types of loose fill materials for packaging applications such as cushioning, fill, stuffing, and dunnage is prohibited. Materials selected shall have properties (characteristics) for resistance to fire (see 6.7). Cushioning or wrapping materials, as applicable, shall be provided to prevent item and package damage and to prevent free movement of the container contents.

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

5.2.1 Level A. Gaskets and refills, in quantity specified (see 6.2), shall be placed in a water resistant folding, set-up, or metal edged paperboard or a class-weather resistant/fire retardant fiberboard (see 5.1.1 (b)) box meeting the unit and intermediate container requirements of MIL-STD-2073-1. The container selection shall be at the option of the contractor

5.2.1.1 Bundling. When specified (see 6.2), gaskets shall be bundled, tied and wrapped in fire-retardant material (see 5.1.1 (c) and 6.7) The wrapper shall be secured with pressure sensitive tape The quantity per bundle and required ties shall be as follows

- (a) Type I gaskets (without outer metal rings)

<u>Size</u>	<u>Quantity and tying</u>
Up to and including 6 inches	25 pieces
Over 6 inches to 12 inches, inclusive	10 pieces, tied in 2 equidistant places
Over 12 inches to 15 inches, inclusive	10 pieces, tied in 3 equidistant places
Over 15 inches	5 pieces, tied in 4 equidistant places

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(b) Type II gaskets (with outer metal rings)

<u>Size</u>	<u>Quantity and tying</u>
Up to and including 5 inches	25 pieces
Over 5 inches to 8 inches, inclusive	25 pieces, tied in 2 equidistant places
Over 8 inches to 11 inches, inclusive	25 pieces, tied in 4 equidistant places
Over 11 inches, to 16 inches, inclusive	10 pieces, tied in 4 equidistant places
Over 16 inches	5 pieces, tied in 4 equidistant places.

5.2.1.2 Bulk. When specified (see 6.2), gaskets of like size and description shall be bulk packed directly into shipping containers for the level specified.

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

- (a) The paperboard containers shall be of the domestic or nonweather resistant type, class or variety as applicable and,
- (b) The fiberboard box 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 adhesive tape.

5.2.3 Commercial. Commercial packaging (cleaning, preservation, cushioning, and unit pack) 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 gaskets and filler 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.

5.3.2.1 Caseliners, closure and gross weight.

5.3.2.1.1 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.

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

5.3.2.1.3 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. Material 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.

6. NOTES

6.1 Intended use. Spiral wound metallic-flexible graphite gaskets are intended for use in pipe line joints, valve bonnets, pumps, and other equipment applications where pressure and temperature conditions do not exceed 2500 pounds per square inch or 1050°F

6.2 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number and date of this specification.
- (b) Part or identifying number (PIN) (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 and 2.2)
- (d) For type I gaskets specify the type and model of equipment on which used, the equipment manufacturer, equipment manufacturer's part number, gasket dimensions (and material of construction), compression test load initial uncompressed thickness, compressed thickness at total load, service, type of closure, number and size of bolts, federal stock number, if available, and if inside or outside rings are required, (see 3.1.1).
- (e) Alternate compression test, required thickness range (see 3.1.1.3)
- (f) For type II gaskets specify gasket size and whether complete gaskets (see 3.1.2) or refills (see 3.1.2.1) are required.
- (g) Temperatures, and other service conditions (see 3.2.1)
- (h) When an alternate metal outer ring material or a protective coating

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- of the metal outer ring is required (see 3.2 2).
- (i) Inspection records (see 6.5).
 - (j) When finer surface finish is required for steel test plates (see 4 4 1.1)
 - (k) When load deflection curves are required (see 4 4.1 2)
 - (l) When each of the gaskets in a lot shall be examined for alloy identity (see 4.4.2).
 - (m) When test of each of the gaskets in a lot for refill sliding fit is not required (see 4.4.3).
 - (n) When certification of quality conformance is not required (see 4.5).
 - (o) When fire retardant treated lumber and plywood is required (see 5.1.1(a)).
 - (p) Class of fire retardant fiberboard required (see 5.1.1(b)).
 - (q) Level of preservation and level of packing required (see 5.2 and 5.3).
 - (r) Quantity per package (see 5.2.1).
 - (s) When bundling or bulk is required (see 5 2.1 1 and 5.2.1.2).
 - (t) Container selection and options if other than the contractor's (see 5.2.1 and 5.3.2).
 - (u) When caseliners are not required (see 5.3.2.1.1).
 - (v) Special marking required (see 5.4).

6.3 Consideration of data requirements The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/ provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

<u>Reference Paragraph</u>	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
4 1.1	DI-RELI-80939	Test and Inspection Report	-----

The above DID's were those cleared as of the date of this specification. The current issue of DoD 5010 12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 Sub-contracted material and parts. The preparation for delivery or packaging requirements of referenced documents listed in section 2 do not apply when gaskets are procured by the supplier for incorporation into the equipment and the gaskets lose their separate identity when the equipment is shipped.

6.5 Records Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order (see 6 2 and 6.3).

6 6 Test reports (See 4 5, 6 2 and figure 3).

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6.7 Cushioning and wrapping materials (see 5.1.1(c)). Materials having properties for resistance to fire and acceptable for use within interior packs and shipping containers for Navy acquisitions are

<u>Material</u>	<u>Specification</u>
Cushioning Material, Plastic, Open Cell	A-A-440
Paper, Kraft, Treated (Fire Resistant)	A-A-1894
Paper, Kraft, Wrapping	UU-P-268, Type II, Grade C or D
Fiberboard	PPP-F-320, see 5.1.1(b)
Plastic Film, Flexible, Cellular	PPP-C-795, Class 3-Fire Retardant
Polystyrene Expanded, Resilient	PPP-C-850, Grade SE
Plastic, Open Cell, Cushioning	PPP-C-1842, Type I, Style B
Bound Fiber	PPP-C-1120, Class A, Grade I, Type Optional
Barrier Materials	MIL-B-131, Type II
Rubber, Latex Foam	MIL-R-5001, Grade A
Rubber, Cellular	MIL-R-6130, Grade A
Fibrous Glass	MIL-C-17435
Polystyrene Foam	MIL-P-19644, Type II
Rubber, Cellular, Synthetic	MIL-R-20092, Class 5
Polyurethane Foam	MIL-P-26514
Cushioning Material, Resilient Type, General	MIL-C-26861
Polyurethane Foam, Flexible Open Cell	MIL-F-81334
Foam-In-Place Packaging Materials: General Specification For	MIL-F-83671
Foam, Combustion, Retardant, for Cushioning Supply Items Aboard Navy Ships	MIL-F-87090(SA)

6.8 Subject term (key word) listing.

Corrosion-resistant steel
Corrugated ribbon
Pipe line joints
Pumps
Textured tape
Valve bonnets

6.9 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-N120)

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Manufacturer or distributor _____	Customer's name _____	
Address _____	Customer's order No. _____	
Date _____	PIN _____	
Type _____ Class _____	Lot No. _____	
<u>Dimensions</u>	<u>Refills</u>	<u>Outer ring</u>
I.d. inches _____	_____	_____
O.d. inches _____	_____	_____
Thickness, inches _____	_____	_____
<u>Metal strip</u>		<u>Flexible Graphite</u>
Document number		Document number
ASTM - _____		MIL-P-24503
MIL- _____		
Federal _____		<u>Refill sliding</u>
<u>Visual, dimensional, workmanship and marking examination</u>		<u>fit test</u>
Number examined _____	_____	_____
Number defective _____	_____	_____
Classification of defects _____	_____	_____
(see table VIII)		
<u>Visual examination of spot welds</u>		
Number examined _____	_____	
Number defective _____	_____	
Classification of defects _____	_____	
(see table VIII)		
<u>Compression load test</u>		
Test load, pounds _____	_____	
Compressed thickness, inches _____	_____	
Number tested _____	_____	
Number failed _____	_____	
Nature of failure _____	_____	
(see 4.4.1.4)		
<u>Alloy identity test</u>		
Number tested _____	_____	
Number accepted _____	_____	

We hereby certify that the metal strip and flexible graphite filler material used in the spiral wound metallic-flexible graphite gaskets is in accordance with the specifications listed above. (Submittal of actual test data for the metal strip is not required.) We further certify that the gaskets have been tested in accordance with MIL-G-24716 as modified by the applicable amendments. We certify, also, that the gaskets have not come in contact with mercury or any of its compounds.

Authorized Company Representative

- 1/ Items not applicable to the lot of material involved shall be marked N/A.
2/ This form is applicable to the quality conformance tests required for each lot and a copy shall be forwarded with each shipment.

FIGURE 3. Certification of quality conformance. 1/ 2/

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.

1. RECOMMEND A CHANGE:	1 DOCUMENT NUMBER MIL-G-24716A(SH)	2 DOCUMENT DATE (YYMMDD) 93-04-05
3. DOCUMENT TITLE GASKETS, METTALIC-FLEXIBLE GRAPHITE, SPIRAL WOUND		
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		
a. NAME TECHNICAL POINT OF CONTACT TPOC: MR. JIM REID (05Y239)	b. TELEPHONE (Include Area Code) (1) Commercial (703) 602-0367	(2) AUTOVON 8-332-0367
PLEASE ADDRESS ALL CORRESPONDENCE TO: 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