

MIL-F-3922B  
20 September 1963  
~~SUPERSEDING~~  
MIL-F-3922A  
7 September 1960

# MILITARY SPECIFICATION

## FLANGES, WAVEGUIDE, GENERAL PURPOSE,

### GENERAL SPECIFICATION FOR

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

#### 1. SCOPE

1.1 Scope. - This specification covers the general requirements for general purpose waveguide flanges which are used to couple mechanically and electrically two sections of waveguides or waveguide parts (see 6.2).

#### 1.2 Classification. -

1.2.1 Type designation. - The type designation of waveguide flanges is derived from the AN nomenclature system specified in Standard MIL-STD-196, and shall be as specified (see 3.1 and 6.1).

#### 2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

#### SPECIFICATIONS

##### FEDERAL

- FF-N-836 - Nuts, Hexagon and Square.
- FF-S-85 - Screws, Cap, Slotted and Hexagon Head.
- FF-S-86 - Screws, Cap, Socket Head.
- FF-W-84 - Washers, Lock (Spring).
- PPP-B-566 - Boxes, Folding, Paperboard.
- PPP-B-576 - Box, Wood, Cleated, Veneer, Paper Overlaid.
- PPP-B-585 - Boxes, Wood, Wirebound.
- PPP-B-591 - Boxes, Fiberboard, Wood-Cleated.
- PPP-B-601 - Boxes, Wood, Cleated-Plywood.
- PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
- PPP-B-636 - Box, Fiberboard.
- PPP-B-665 - Boxes; Paperboard, Metal Stayed (Including Stay Material).
- PPP-B-676 - Boxes, Set-Up, Paperboard.
- PPP-T-76 - Tape, Pressure-Sensitive Adhesive Paper, Water Resistant (for Carton Sealing).
- PPP-T-97 - Tape; Pressure-Sensitive Adhesive, Filament Reinforced.

##### MILITARY

- MIL-P-116 - Preservation, Methods of.
- MIL-O-4861 - "O" Rings, Rubber, Preformed, Packing, Packaging of.
- MIL-L-10547 - Liners, Case, Waterproof.

#### STANDARDS

##### MILITARY

- MIL-STD-10 - Surface Roughness Waviness and Lay.
- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-130 - Identification Marking of U. S. Military Property.
- MIL-STD-196 - Joint Electronics Type Designation System.

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(See Supplement-1B for applicable detail specifications and MS military standards.)

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

**2.2 Other publications.**- The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

**SOCIETY OF AUTOMOTIVE ENGINEERS, INC.**  
AMS3304 - Silicone Rubber, General Purpose.

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 485 Lexington Ave., New York 17, N. Y.)

**NATIONAL BUREAU OF STANDARDS**  
Handbook H28 - Screw-Thread Standards for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.)

**OFFICIAL CLASSIFICATION COMMITTEE**  
Uniform Freight Classification Rules.

(Application for copies should be addressed to the Official Classification Committee, One Park Avenue at 33rd Street, New York 16, N. Y.)

**AMERICAN SOCIETY FOR TESTING AND MATERIALS**  
B21-62 - Naval Brass Rod, Bar, and Shapes.  
B26-62T - Aluminum-Base Alloy Sand Castings.  
B80-62 - Magnesium-Base Alloy Sand Castings.  
B85-60 - Aluminum-Base Alloy Die Castings.  
B91-60 - Magnesium-Base Alloy Forgings.  
B94-58 - Magnesium-Base Alloy Die Castings.  
B107-61 - Magnesium-Base Alloy Bars, Rods, and Shapes.  
B108-62T - Aluminum-Base Alloy Permanent Mold Castings.  
B124-55 - Copper and Copper-Alloy Forging Rod, Bar, and Shapes.  
B140-58 - Leaded Red Brass (Hardware Bronze) Rod, Bar, and Shapes.  
B143-61 - Tin Bronze and Leaded Tin Bronze Sand Castings.  
B211-62 - Aluminum-Alloy Bars, Rods, and Wire.  
B221-62 - Aluminum-Alloy Extruded Bars, Rods, and Shapes.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia 3, Pa.)

### 3. REQUIREMENTS

**3.1 Detail specifications or MS military standards.**- The individual part requirements shall be as specified herein and in accordance with the applicable detail specifications or MS military standards (see 6.1).

**3.2 Material.**- The material for each part shall be as specified herein (see 3.1).

**3.2.1 Copper-base alloys.**-

**3.2.1.1 Bar stock.**- When fabricated from bar stock, flanges shall be of leaded red brass or naval brass.

**3.2.1.1.1 Leaded red brass.**- Composition of material for leaded red brass shall conform to the requirements for alloy B, half-hard, of Publication B140-58.

**3.2.1.1.2 Naval brass.**- Naval brass shall be of the composition for alloy A or C, half-hard, of Publication B21-62.

**3.2.1.2 Casting** - When fabricated by casting, flanges shall be of tin bronze conforming to the composition for alloy 1A or 1J of Publication B143-61.

**3.2.1.3 Forging** - When fabricated by forging, flanges shall be of leaded brass conforming to composition for alloy 2 of Publication B124-55, or naval brass conforming to composition for alloy A, half-hard, of Publication B21-62.

### **3.2.2 Aluminum-base alloys.**

**3.2.2.1 Bar stock and forging** - When fabricated from bar stock or by forging, flanges shall be of an aluminum alloy conforming to alloy 6061 of Publication B221-62 or B211-62; bar stock shall be temper T6.

**3.2.2.2 Sand casting** - When fabricated by sand casting, flanges shall be of an aluminum alloy conforming to alloy C4A, condition T4; alloy CS43A, condition F; alloy SG70A, condition T6; or alloy ZG61A, condition T5, of Publication B26-62T.

**3.2.2.3 Die casting** - When fabricated by die casting, flanges shall be of an aluminum alloy conforming to the composition for alloy G8A or SG100A of Publication B85-60.

**3.2.2.4 Permanent mold casting** - When fabricated by permanent mold casting, flanges shall be of an aluminum alloy conforming to alloy ZC60A, condition T5; alloy SG70A, condition T6; or alloy SC51A, condition T6, of Publication B108-62T.

### **3.2.3 Magnesium-base alloys.**

**CAUTION: MAGNESIUM IS INHERENTLY SUSCEPTIBLE TO CORROSION. PRECAUTIONS MUST BE TAKEN TO MINIMIZE THE POSSIBILITY OF CORROSION WHEN ASSEMBLING MAGNESIUM WAVEGUIDES TO THE APPLICABLE FLANGES.**

**3.2.3.1 Bar stock** - When fabricated from bar stock, flanges shall be of a magnesium alloy conforming to the composition for alloy AZ31B, condition F, of Publication B107-61.

**3.2.3.2 Sand casting** - When fabricated by sand casting, flanges shall be of a magnesium alloy conforming to alloy AZ91C, condition F, of Publication B80-62.

**3.2.3.3 Die casting** - When fabricated by die casting, flanges shall be of a magnesium alloy conforming to the composition for alloy AZ91A of Publication B94-58.

**3.2.3.4 Forging** - When fabricated by forging, flanges shall be of a magnesium alloy conforming to the composition for alloy AZ31B of Publication B91-60.

**3.2.4 Silicone rubber** - When gaskets are required for use with individual types of flanges (see 3.1), the material shall be silicone rubber conforming to Publication AMS3304.

**3.3 Design and construction** - Waveguide flanges shall be of the design, construction, and physical dimensions specified (see 3.1).

**3.3.1 Condition** - When specified (see 6.1), flanges shall be annealed before finish machining.

**3.3.2 Threaded parts** - All threaded parts shall be in accordance with Handbook H28.

**3.3.3 Cap screws** - All cap screws shall conform to Specification FF-S-85 or FF-S-86, whichever is applicable.

**3.3.4 Hexagon nuts** - Hexagon nuts shall conform to Specification FF-N-836.

**3.3.5 Lock washers** - Lock washers shall conform to Specification FF-W-84.

**3.4 Surface roughness** - When surface roughness is determined as specified in 4.6.2, all finished mating surfaces shall be 63 root mean square microinches.

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**3.5 Marking.-** Waveguide flanges shall be marked in accordance with Standard MIL-STD-130, with the type designation and the manufacturer's code symbol. The numbers shall be marked in depressed or raised characters in proportion to the size of the flange and at least 1/16 of an inch high, in the place specified (see 3.1). No periods shall be used either between the numbers or at the end of the code.

**3.6 Workmanship.-** Waveguide flanges shall be processed in such a manner as to be uniform in quality and all surfaces shall be free from burrs, die marks, chatter marks, scratches, dirt, grease, scale, splinters, and other defects that will affect life, serviceability, or appearance.

#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1 Responsibility for inspection.-

**4.1.1 Supplier.-** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 assure supplies and services conform to prescribed requirements.

**4.1.1.1 Test equipment and inspection facilities.-** Test equipment and inspection facilities shall be of sufficient accuracy, quality, and quantity to permit performance of the required inspection. The supplier shall establish calibration of inspection equipment to the satisfaction of the Government.

**4.2 Classification of inspection.-** The examination and testing of waveguide flanges shall be classified as follows:

- (a) Materials inspection (see 4.3).
- (b) Quality conformance inspection (see 4.5).
  - (1) Inspection of product for delivery (see 4.5.1).
  - (2) Inspection of preparation for delivery (see 4.5.2).

**4.3 Materials inspection.-** Materials inspection shall consist of verification that the materials listed in table I, used in fabricating the waveguide flanges, are in accordance with the applicable referenced specifications or requirements prior to such fabrication.

Table I - Materials inspection.

Material	Requirement paragraph	Applicable specification
Copper-base alloys:	3.2.1	...
Bar stock:	3.2.1.1	...
Leaded red brass . . . . .	3.2.1.1.1	B140-58
Naval brass . . . . .	3.2.1.1.2	B21-62
Casting (tin bronze) . . . . .	3.2.1.2	B143-61
Forging:		
Leaded brass . . . . .	3.2.1.3	B124-55
Naval brass . . . . .	3.2.1.3	B21-62
Aluminum-base alloys:	3.2.2	...
Bar stock and forging . . . . .	3.2.2.1	B221-62 or B211-62
Sand casting . . . . .	3.2.2.2	B26-62T
Die casting . . . . .	3.2.2.3	B85-60
Permanent mold casting . . . . .	3.2.2.4	B108-62T
Magnesium-base alloys:	3.2.3	...
Bar stock . . . . .	3.2.3.1	B107-61
Sand casting . . . . .	3.2.3.2	B80-62
Die casting . . . . .	3.2.3.3	B94-58
Forging . . . . .	3.2.3.4	B91-60
Silicone rubber . . . . .	3.2.4	AMS3304

**4.4 Inspection conditions.-** Unless otherwise specified herein, all inspection shall be made at room ambient temperature, relative humidity, and pressure.

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**4.5 Quality conformance inspection.-**

**4.5.1 Inspection of product for delivery.-** Inspection of product for delivery shall consist of group A.

**4.5.1.1 Inspection lot.-** An inspection lot, as far as practicable, shall consist of all the waveguide flanges of the same type designation, produced under essentially the same conditions, and offered for inspection at one time.

**4.5.1.2 Rejected lots.-** If an inspection lot is rejected, the supplier may withdraw the lot, rework it to correct the defects, or screen out the defective units, as applicable, and reinspect. Such lots shall be separate from new lots and shall be clearly identified as reinspected lots. Rejected lots shall be inspected using tightened inspection.

**4.5.1.3 Group A inspection.-** Group A inspection shall consist of the examinations and test specified in table II, and shall be made on the same set of sample units, in the order shown.

Table II - Group A inspection.

Examination or test	Requirement paragraph	Method paragraph	AQL (percent defective)	
			Major	Minor
Visual and mechanical examination:		4.6.1		
Design and construction . . . . .	3.1 and 3.3 to 3.3.5 incl	...	1.0	4.0
Marking . . . . .	3.5	...		
Workmanship . . . . .	3.6	...		
Surface roughness . . . . .	3.4	4.6.2	1.0	0

**4.5.1.3.1 Sampling plan.-** Statistical sampling and inspection shall be in accordance with Standard MIL-STD-105 for ordinary inspection. The acceptable quality levels (AQL) shall be as specified in table II. Major and minor defects shall be as defined in Standard MIL-STD-105.

**4.5.2 Inspection of preparation for delivery.-** Sample items and packs shall be selected and inspected in accordance with Specification MIL-P-116 to verify conformance with requirements in section 5 of this specification.

**4.6 Methods of examination and test.-**

**4.6.1 Visual and mechanical examination.-** Waveguide flanges and associated components shall be examined to verify that the design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements (see 3.1, 3.3 to 3.3.5 incl, 3.5, and 3.6).

**4.6.2 Surface roughness.-** Surface roughness shall be determined in accordance with Standard MIL-STD-10 (see 3.4).

**5. PREPARATION FOR DELIVERY****5.1 Preservation and packaging.-**

**5.1.1 Level A.-** Unless otherwise specified (see 6.1), flanges shall be individually protected and unit-packaged in accordance with method 1A of Specification MIL-P-116, without the use of contact preservatives. Unless otherwise specified (see 6.1), when method 1A-8 is used for items weighing more than 1 pound, the package shall be placed in unit containers conforming to Specification PPP-B-566, PPP-B-665, or PPP-B-676. Mounting hardware and gaskets procured with flanges shall be included within each unit package.

**5.1.1.1** When mounting hardware is purchased separately, it shall be individually protected and unit-packaged in accordance with method 1A of Specification MIL-P-116, without the use of contact preservatives.

**5.1.1.2** When gaskets or "O" rings are purchased separately, they shall be packaged in accordance with Specification MIL-O-4861.

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5.1.7 Level C.- Flanges shall be afforded preservation and packaging in accordance with the supplier's normal commercial practice.

5.2 Packing.-

5.2.1 Level A.- Flanges packaged as specified (see 6.1) shall be packed in overseas-type wirebound wood, wood-created fiberboard, wood-created plywood, nailed wood, fiber (class 2), or wood-created paper-overlaid boxes conforming to Specification PPP-B-585, PPP-B-591, PPP-B-601, PPP-B-621, PPP-B-636, or PPP-B-576, respectively. Shipping containers shall have case liners conforming to Specification MIL-1-10547; the case liners shall be closed and sealed in accordance with the appendix thereto. Case liners for boxes conforming to Specification PPP-B-636 will not be required provided the center and edge seams and manufacturers' joints are sealed with tape, at least 1-1/2 inches wide, conforming to Specification PPP-T-76. Box closures and strapping shall be as specified in the applicable box specification or appendix thereto. Fiber boxes conforming to Specification PPP-B-636 may be banded with tape conforming to type IV of Specification PPP-T-97 and appendix thereto in lieu of steel straps. The gross weight of wood boxes shall not exceed 200 pounds; fiberboard boxes shall not exceed the weight limitations of the applicable box specification.

5.2.2 Level B.- Flanges packaged as specified (see 6.1) shall be packed in domestic-type wirebound wood, wood-created fiberboard, wood-created plywood, nailed wood, fiber (class 1 or 2, as specified (see 6.1)), or wood-created paper-overlaid boxes conforming to Specification PPP-B-585, PPP-B-591, PPP-B-601, PPP-B-621, PPP-B-636, or PPP-B-576, respectively. Box closures shall be as specified in the applicable box specification or appendix thereto. The gross weight of wood boxes shall not exceed 200 pounds; fiberboard boxes shall not exceed the weight limitations of the applicable box specification.

5.2.3 Level C.- Flanges packaged as specified (see 6.1) shall be packed in containers of the type, size, and kind commonly used for the purpose, in a manner that will insure acceptance by common carrier and safe delivery at destination. Shipping containers shall comply with the Uniform Freight Classification Rules or regulations of other carriers as applicable to the mode of transportation.

5.2.4 Exterior containers.- Insofar as possible and practical, exterior containers shall be uniform shape and size, shall be of minimum cube and tare consistent with the protection required, and shall contain identical quantities of identical items.

5.3 Marking.- In addition to any special marking required by the contract or order, unit packages, intermediate packages, and exterior shipping containers shall be marked in accordance with Standard MIL-STD-129 (see 6.1).

## 6. NOTES

6.1 Ordering data.- Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Title, number, and date of the applicable detail specification or MS military standard, and the complete type designation (see 1.2.1 and 3.1).
- (c) That the supplier shall not substitute for a specified material or fabricated part unless he obtains approval from the Government. Evidence to substantiate his claim that such a substitute is suitable shall be submitted with his request. Similar notification and substantiating evidence shall be submitted at any later time if substitution becomes necessary or desirable. At the discretion of the Government, test samples may be required to prove the suitability of the proposed substitute.
- (d) Whether flanges are to be annealed before finish machining (see 3.3.1).
- (e) Levels of preservation and packaging and packing, and applicable marking (see sect 5).
- (f) Method of preservation and packaging of Specification MIL-P-116, if other than method 1A (see 5.1.1).
- (g) Class of fiber (see 5.2.2).

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6.2 Engineering Information.- Illustrations and additional information for these waveguide parts are available in MIL-HDLA-216, "R.F. Transmission Lines and Fittings," copies of which are available upon request from Naval Supply Depot, 5801 Tabor Ave., Philadelphia 20, Pennsylvania. Such additional information is not to be considered a contractual requirement.

**Custodians:**

Army - EL  
Navy - Ships  
Air Force - ASD

**Preparing activity:**

Navy - Ships  
(Project 5985-0371)

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