

MIL-F-39000A
 21 October 1977
 SUPERSEDING
 MIL-F-39000
 12 November 1963

MILITARY SPECIFICATION
 FLANGES, WAVEGUIDE, RIDGE,
 GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers the general requirements for ridge-waveguide flanges that are used to couple mechanically and electrically two sections of ridge-waveguides or ridge-waveguide units (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. 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	- Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat.
FF-S-85	- Screw, Cap, Slotted and Hexagon Head.
FF-S-86	- Screw, Cap, Socket-Head.
FF-W-84	- Washers, Lock (Spring).
QQ-S-781	- Strapping, Steel, Flat and Seals.
ZZ-R-765	- Rubber, Silicone.
PPP-B-566	- Boxes, Folding, Paperboard.
PPP-B-585	- Boxes, Wood, Wirebound.
PPP-B-601	- Boxes, Wood, Cleated-plywood.
PPP-B-621	- Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636	- Boxes, Shipping, Fiberboard.
PPP-B-676	- Boxes, Setup.
PPP-T-60	- Tape: Packaging, Waterproof.
PPP-T-76	- Tape, Packaging, Paper, (for Carton Sealing).

MILITARY

MIL-P-116	- Preservation-Packaging, Methods of.
MIL-F-39000/1	- Flanges, Waveguide, Single Ridge, Socket Mount (Bandwidth Ratio 2.4:1).
MIL-F-39000/2	- Flanges, Waveguide, Single Ridge, Socket Mount (Bandwidth Ratio 3.6:1).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Naval Electronic Systems Command, Department of the Navy, ATTN: ELEX 5043, Washington, DC 20360, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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- MIL-F-39000/3 - Flanges, Waveguide, Double Ridge, Socket Mount (Bandwidth Ratio 2.4:1)..
- MIL-F-39000/4 - Flanges, Waveguide, Double Ridge, Socket Mount (Bandwidth Ratio 3.6:1).

STANDARDS

FEDERAL

FED STD No. 356 - Commercial Packaging of Supplies and Equipment.

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
- MIL-STD-1285 - Marking of Electrical and Electronic Parts.

(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.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- B16 - Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines.
- B21 - Naval Brass Rod, Bar, and Shapes.
- B26 - Aluminum Alloy Sand Castings.
- B85 - Aluminum Alloy Die Castings.
- B108 - Aluminum Alloy Permanent Mold Castings.
- B124 - Copper and Copper Alloy Forging Rod, Bar, and Shapes.
- B140 - Leaded Red Brass (Hardware Bronze) Rod, Bar and Shapes.
- B143 - Tin Bronze and Leaded Tin Bronze Sand Castings.
- B221 - Aluminum Alloy Extruded Bars, Rods, Shapes and Tubes.

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

Y14.5-1973 - Dimensioning and Tolerancing.

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

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

B46.1 - Surface Texture (Surface Roughness, Waviness and Lay).

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

NATIONAL BUREAU OF STANDARDS

Handbook H28 - Screw-Thread Standards for Federal Services.

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(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between requirements of this specification and the specification sheet, the latter shall govern.

3.2 Material. The material shall be as specified (see 3.1). Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.2.1 Copper alloys.

3.2.1.1 Bar stock. When fabricated from bar stock, flanges shall be of leaded red brass, naval brass, or free-cutting 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 ASTM B140.

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

3.2.1.1.3 Free-cutting brass. Free-cutting brass shall conform to the chemical composition requirements of ASTM B16, half-hard.

3.2.1.2 Casting. When fabricated by casting, flanges shall be of tin bronze conforming to the composition for alloy 1A or 1B of ASTM B143.

3.2.1.3 Forging. When fabricated by forging, flanges shall be of leaded brass conforming to composition for alloy 2 of ASTM B124, or naval brass conforming to composition for alloy A, half-hard, of ASTM B21, or free-cutting brass conforming to composition of ASTM B16, half-hard.

3.2.2 Aluminum 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 ASTM B221. 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 ZC61A, condition T5, of ASTM B26.

3.2.2.3 Die casting. When fabricated by die casting, flanges shall be of an aluminum alloy conforming to the composition for alloy C8A or SC100A of ASTM B85.

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 ASTM B108.

3.2.3 Silicone rubber. When gaskets are required for use with individual types of flanges (see 3.1), the material shall be silicone rubber conforming to ZZ-R-765, class 2b.

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3.3 Design and construction. Waveguide flanges shall be of the design, construction, and physical dimensions specified (see 3.1). Dimensions and tolerances shall be interpreted in accordance with ANSI Y14.5.

3.3.1 Condition. Flanges shall be annealed before finish machining, when specified (see 6.2).

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

3.3.3 Cap screws. Cap screws shall be type II, style 10P, grade 8, alloy steel, cadmium plated, in accordance with FF-S-85 or type VI, alloy steel, cadmium plated, in accordance with FF-S-86, whichever is applicable (see 3.1).

3.3.4 Hexagon nuts. Hexagon nuts shall be type II, style 4, carbon steel, cadmium plated in accordance with FF-N-836.

3.3.5 Lock washers. Lock washers shall be class A, style 2, cadmium plated in accordance with FF-W-84.

3.4 Surface roughness. When measured as specified in 4.6.2, flange surface roughness (in root mean square microinches) shall not exceed the value specified (see 3.1).

3.5 Marking. Waveguide flanges shall be marked in accordance with MIL-STD-1285, with the part number and the manufacturer's source code. The numbers shall be marked in depressed or raised characters in proportion to the size of the flange and at least 1/32 inch high, in the place specified (see 3.1).

3.6 Workmanship. Waveguide flanges shall be produced 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. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained by the contractor.

4.2 Classification of inspections. The inspections specified herein are classified as follows:

- a. Materials inspection (see 4.3).
- b. Quality conformance inspections (see 4.5).

4.3 Materials inspection. Materials inspection shall consist of certification supported by verifying data 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 alloys:	3.2.1	
Bar stock:	3.2.1.1	
Leaded red brass - - - - -	3.2.1.1.1	B140
Naval brass- - - - -	3.2.1.1.2	B21
Free-cutting brass - - - - -	3.2.1.1.3	B16
Casting (tin bronze) - - - - -	3.2.1.2	B143
Forging:		
Leaded brass - - - - -	3.2.1.3	B124
Naval brass - - - - -	3.2.1.3	B21
Free-cutting brass - - - - -	3.2.1.3	B16
Aluminum alloys: - - - - -	3.2.2	
Bar stock and forging- - - - -	3.2.2.1	B221
Sand casting - - - - -	3.2.2.2	B26
Die casting- - - - -	3.2.2.3	B85
Permanent mold casting - - - - -	3.2.2.4	B108
Silicone rubber- - - - -	3.2.3	ZZ-R-765

4.4 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-202.

4.5 Quality conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspection.

4.5.1.1 Inspection lot. An inspection lot shall consist of all waveguide flanges of the same part number produced under essentially the same conditions, and offered for inspection at one time.

4.5.1.2 Group A inspection. Group A inspection shall consist of the inspections specified in table II, in the order shown.

4.5.1.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for general inspection level II. The acceptable quality level (AQL) shall be as specified in table II.

TABLE II. Group A inspection.

Inspection	Requirement paragraph	Test method paragraph	AQL (percent defective)	
			Major	Minor
Visual and mechanical inspection- -	3.1, 3.3 thru 3.3.5, 3.5 and 3.6	4.6.1	4	1
Surface roughness - - - - -	3.4	4.6.2	4	1

4.5.1.2.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

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4.5.2 Inspection of packaging. Except when commercial packaging is specified, the sampling and inspection of the preservation-packaging and interior package marking shall be in accordance with the group A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification and the marking requirements of MIL-STD-129. The inspection of commercial packaging shall be as specified in the contract (see 6.2).

4.6 Methods of inspection.

4.6.1 Visual and mechanical inspection. 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 through 3.3.5, 3.5 and 3.6).

4.6.2 Surface roughness. Surface roughness shall be determined in accordance with ANSI B46.1.

5. PACKAGING

5.1 Preservation-packaging. Preservation-packaging shall be level A or C, or as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Cleaning. Waveguide flanges shall be cleaned in accordance with MIL-P-116, process C-1.

5.1.1.2 Drying. Waveguide flanges shall be dried in accordance with MIL-P-116.

5.1.1.3 Preservative application. Preservatives shall not be used.

5.1.1.4 Unit packaging. Unless otherwise specified (see 6.2), each waveguide flange shall be individually unit packaged in accordance with MIL-P-116, submethod IA-8 insuring compliance with the applicable requirements of that specification. Each waveguide flange shall be placed in a supplementary container conforming to PPP-B-566 or PPP-B-676.

5.1.1.5 Intermediate packaging. Waveguide flanges, packaged as specified in 5.1.1.4, shall be placed in intermediate containers conforming to PPP-B-566 or PPP-B-676. Intermediate containers shall be uniform in size, shape and quantities, shall be of minimum tare and cube and shall contain multiples of five unit packages, not to exceed 100 unit packages. No intermediate packaging is required when the total quantity shipped to a single destination is less than 100 unit packages.

5.1.2 Level C. Waveguide flanges shall be clean, dry and packaged in a manner that will afford adequate protection against corrosion, deterioration and physical damage during shipment from supply source to the first receiving activity. This level may conform to the contractor's commercial practice when such meets the requirements of this level.

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

5.2.1 Level A. The packaged waveguide flanges shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant, style optional, special requirements. In lieu of the closure and waterproofing requirement in the appendix of PPP-B-636, closure and waterproofing shall be accomplished by sealing all seams, corners and manufacturer's joint with tape, 2 inches minimum width, conforming to PPP-T-60, class 1 or PPP-T-76. Banding (reinforcement requirements) shall be applied in accordance with the appendix to PPP-B-636 using nonmetallic or tape banding only.

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5.2.2 Level B. The packaged waveguide flanges shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirements. Closures shall be in accordance with the appendix thereto.

5.2.3 Level C. The packaged waveguide flanges shall be packed in shipping containers in a manner that will afford adequate protection against damage during direct shipment from the supply source to the first receiving activity. These packs shall conform to the applicable carrier rules and regulations and may be the contractor's commercial practice when such meets the requirements of this level.

5.3 Marking. In addition to any special marking required by the contract (see 6.2), each unit package and supplementary, intermediate and exterior container shall be marked in accordance with MIL-STD-129.

5.4 General.

5.4.1 Exterior containers. Exterior containers (see 5.2.1, 5.2.2, and 5.2.3) shall be of a minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered items to the greatest extent practicable.

5.4.2 Packaging inspection. The inspection of these packaging requirements shall be in accordance with 4.5.2.

5.4.3 Army procurements.

5.4.3.1 Level A (maximum military protection) unit and intermediate packaging. MIL-P-116 submethod IC-1 shall be used in lieu of submethod IA-8. All supplementary and intermediate containers shall either be overwrapped with waterproof barrier materials or shall conform to PPP-B-566 or PPP-B-676, variety 2 or 4 (see 5.1.1.4, 5.1.1.5, and 6.2).

5.4.3.2 Level A (maximum military protection) and Level B (minimum military protection) packing. For level A packing the fiberboard containers shall not be banded but shall be placed in a close fitting box conforming to PPP-B-601, overseas type; PPP-B-621, class 2, style 4 or PPP-B-585, class 3, style 2 or 3. Closure and strapping shall be in accordance with applicable container specification except that metal strapping shall conform to QQ-S-781, type I, finish A. When the gross weight exceeds 200 pounds or the container length and width is 48 x 24 inches or more and the weight exceeds 100 pounds, 3 x 4 inch skids (laid flat) shall be applied in accordance with the requirements of the container specification. If not described in the container specification, the skids shall be applied in a manner that will adequately support the item and facilitate the use of material handling equipment. For level B packing, fiberboard boxes shall be weather resistant as specified in level A and the containers shall be banded (see 5.2.1 and 5.2.2).

5.4.3.3 Commercial packaging. Commercial packaging (including unit and intermediate packaging, packing and marking) shall be in accordance with Federal Standard No. 356.

6. NOTES

6.1 Intended use. Waveguide flanges covered by this specification are intended for use as coupling devices for waveguides and waveguide components used in military electronic equipment and systems.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. The complete part number (see 3.1).
- c. Whether flanges are to be annealed before finish machining (see 3.3.1).

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- d. Inspection of commercial packaging (see 4.5.2).
- e. Levels of preservation-packaging and packing required (see 5.1 and 5.2).
- f. Method of preservation, if other than submethod IA-8 (see 5.1.1.4 and 5.4.3.1).
- g. Special marking, if required (see 5.3).

6.3 Engineering information. Additional engineering information for waveguide flanges is available in MIL-HDBK-216, "RF Transmission Lines and Fittings", copies are available upon request from the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

Custodians:

Army - EL
Navy - EC
Air Force - 85

Preparing activity:

Navy - EC

Agent:

DLA - ES

Review activities:

Army -
Navy - SH
Air Force - 11, 99
DLA - ES

(Project 5985-0854)

User activities:

Army - AV, AR
Navy - MC, AS, OS, SH, CG
Air Force - 14, 19

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