

INCH-POUND

MIL-DTL-3922C
 6 March 2000
 SUPERSEEDING
 MIL-F-3922B
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DETAIL SPECIFICATION

 FLANGES, WAVEGUIDE, GENERAL PURPOSE,
 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 general purpose waveguide flanges that 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 MIL-STD-196 and from the Part or Identifying Number (PIN) (see 3.1, 6.1 and 6.3).

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

FF-S-85	-	Screw, Cap, Slotted and Hexagon Head.
FF-S-86	-	Screw, Cap, Socket Head.
FF-W-84	-	Washers, Lock (Spring).

STANDARDS

FEDERAL

FED-STD-H28	-	Screw-Thread Standards for Federal Services.
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DEPARTMENT OF DEFENSE

MIL-STD-130	-	Identification Marking of U.S. Military Property.
MIL-STD-196	-	Joint Electronics Type Designation System.

(See Supplement 1 for applicable detail specifications.)

Beneficial comments (recommendations, additions, deletions) and pertinent data for improving this document should be addressed to: Defense Supply Center Columbus, Attn: DSCC-VAT, P.O. Box 3990, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) at the end of this document or by letter.

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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 are the issues of the DODISS cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z540.1 - Calibration Laboratories and Measuring and Test Equipment (DoD adopted).

(Application for copies should be addressed to American National Standards Institute, 11 West 42nd Street, New York, NY 10036.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

B16/B16M - Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines (DoD adopted).
 B21 - Naval Brass Rod, Bar and Shapes (DoD adopted).
 B26/B26M - Aluminum-Alloy Sand Castings (DoD adopted).
 B80 - Magnesium-Alloy Sand Castings (DoD adopted).
 B85 - Aluminum-Alloy Die Castings (DoD adopted).
 B91 - Magnesium-Alloy Forgings (DoD adopted).
 B94 - Magnesium-Alloy Die Castings (DoD adopted).
 B107/B107M - Magnesium-Alloy Extruded Bars, Rods, Shapes, Tubes and Wire (DoD adopted).
 B108 - Aluminum-Alloy Permanent Mold Castings (DoD adopted).
 B124 - Copper and Copper-Alloy Forging Rod, Bar, and Shapes (DoD adopted).
 B140/B140M - Copper-Zinc-Lead (Red Brass or Hardware Bronze) Rod, Bar and Shapes (DoD adopted).
 B211 - Aluminum and Aluminum-Alloy Bar, Rod, and Wire (DoD adopted).
 B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes (DoD adopted).
 B308/B308M - Aluminum-Alloy 6061-T6 Standard Structural Shapes (DoD adopted).
 B584 - Copper Alloy Sand Castings for General Applications (DoD adopted).
 F836 - Stainless Steel Metric Nuts (DoD adopted).

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

B46.1 - Surface Texture (Surface Roughness, Waviness, and Lay), (DoD adopted).
 Y14.5 - Dimensioning and Tolerancing (DoD adopted).

(Application for copies should be addressed to American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE AMS3304 - Silicone Rubber, General Purpose 70 Durometer.

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

3. Requirements.

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets (see Supplement 1). In the event of conflict between the requirements of this specification and those of the specification sheets, the latter shall govern.

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, of naval brass, or, with procuring activity approval, of free-cutting brass (Copper Alloy UNS No. C36000), in accordance with ASTM B16/B16M.

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/B140M.

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

3.2.1.2 Casting. When fabricated by casting, flanges shall be of tin bronze conforming to the composition for Copper Alloy UNS No. C90300 or C90500, in accordance with ASTM B584.

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.

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 ASTM B221 or ASTM B211, or aluminum alloy 6063 conforming to ASTM B221 and ASTM B308/B308M. Bar stock shall be tempered 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 ASTM B26/B26M.

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 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 B108.

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 ASTM B107/B107M.

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 ASTM B80.

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 ASTM B94.

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

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 SAE AMS3304.

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 ASME Y14.5.

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 FED-STD-H28.

3.3.3 Cap screws. Cap screws shall be type II, style 10P, steel alloy, in accordance with FF-S-85 or type I, style 11, steel alloy in accordance with FF-S-86, whichever is applicable.

3.3.4 Hexagon nuts. Hexagon nuts shall be group B, type 1 steel, in accordance with ASTM F836. .

3.3.5 Lock washers. Lock washers shall be class A, steel, in accordance with FF-W-84. The thickness shall be as specified (see 3.1).

3.3.6 Plating. A non-toxic, durable, corrosion-resistant plating shall be used employing best commercial practices.

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.

3.5 Marking. Waveguide flanges shall be marked in accordance with MIL-STD-130, with the part number and the manufacturer cage code. The numbers shall be marked in depressed or raised characters in proportion to the size of the flange and at least 0.0312 inch high, in the place specified (see 3.1). No periods shall be used either between the numbers or at the end of the cage code. With procuring activity approval, the marking may be ink stamped in an appropriate size.

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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.

3.7 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs. All components supplied shall be new and unused.

4. VERIFICATION

4.1 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 and maintain a calibration system to control the accuracy of measuring and test equipment in accordance with ANSI Z540-1.

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

- (a) Materials inspection (see 4.3).
- (b) Conformance inspection (see 4.5).
 - (1) Inspection of product for delivery (see 4.5.1).

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 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	ASTM B140/B140M
Naval brass	3.2.1.1.2	ASTM B21
Free-cutting brass	3.2.1.1	ASTM B16/B16M
Casting (tin bronze)	3.2.1.2	ASTM B584
Forging:		
Leaded brass	3.2.1.3	ASTM B124
Naval brass	3.2.1.3	ASTM B21
Aluminum-base alloys:	3.2.2	
Bar stock and forging	3.2.2.1	ASTM B221, B211, B308/B308M
Sand casting	3.2.2.2	ASTM B26/B26M
Die casting	3.2.2.3	ASTM B85
Permanent mold casting	3.2.2.4	ASTM B108
Magnesium-base alloys:	3.2.3	
Bar stock	3.2.3.1	ASTM B107/B107M
Sand casting	3.2.3.2	ASTM B80
Die casting	3.2.3.3	ASTM B94
Forging	3.2.3.4	ASTM B91
Silicone rubber	3.2.4	SAE AMS3304
Cap screws	3.3.3	FF-S-85 or FF-S-86
Hexagon nuts	3.3.4	ASTM F836
Lock washers	3.3.5	FF-W-84

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

4.5 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 is 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.

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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
Visual and mechanical examination		4.6.1
Design and construction	3.1 and 3.3 to 3.3.5 inclusive	---
Marking	3.5	4.6.1
Workmanship	3.6	4.6.1
Surface roughness	3.4	4.6.2

4.5.1.3.1 Sampling plan. Statistical sampling and inspection shall be performed on an inspection lot basis with a random sample of flanges selected in accordance with table III. The acceptance level shall be based upon the zero defective sampling plan. No failures shall be permitted.

Table III. Group A sampling plan.

Lot size	Sample size
1-13	100 percent
14-125	13
126-150	13
151-280	20
281-500	29
501-1200	34
1201-3200	42
3201-10,000	50
10,001-35,000	60
35,001-150,000	74
150,001-500,000	90
500,001 and over	102

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 inclusive, 3.5, and 3.6).

4.6.2 Surface roughness. Surface roughness shall be determined in accordance with ASME B46.1 (see 3.4).

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 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 PIN or AN nomenclature (see 1.2.1 and 3.1).
- (c) That the supplier must not substitute for a specified material or fabricated part without approval from the Government. Evidence to substantiate claims that a substitute is suitable must be submitted with this request.
- (d) Whether flanges are annealed before finish machining (see 3.3.1).

6.2 Engineering information. Illustrations and additional information for these waveguide parts are available in MIL-HDBK-216, "R.F. Transmission Lines and Fittings."

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6.3 Part or Identifying Number (PIN). The PIN for flanges covered by this specification consists of the letter M followed by the basic number of the specification sheet and an assigned dash number (see 3.1).

Example: PIN	-	M3922/XX-XXX
Military designator and specification sheet number	-	M3922/XX
Dash number designated in Specification sheet (see 3.1).	-	-XXX

6.4 Subject item (key word) listing.

Aluminum
Bar stock
Casting
Copper
Couple
Electrical
Forging
Magnesium
Mechanical
Radio frequency
Surface roughness

Custodians:
Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5985-1127)

Review activities:
Army - AR, AV, MI
Navy - AS, MC, OS
Air Force - 19, 99

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, and send to preparing activity.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER
MIL-DTL-3922C

2. DOCUMENT DATE (YYYYMMDD)
20000306

3. DOCUMENT TITLE FLANGES, WAVEGUID, GENERAL PURPOSE, GENERAL SPECIFICATION FOR

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
(YYYYMMDD)

8. PREPARING ACTIVITY

a. NAME DSCC-VAT

b. TELEPHONE (Include Area Code)
(1) Commercial (614) 692-0506 (2) AUTOVON 850-0506

c. ADDRESS (Include Zip Code)
DEFENSE SUPPLY CENTER COLUMBUS, P.O. BOX 3990 COLUMBUS,
OH 43216-5000

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
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