

**MIL-STD-1358B**

6 March 1978

**SUPERSEDING**

**MIL-STD-1358A**

15 October 1974

# **MILITARY STANDARD**

**WAVEGUIDES, RECTANGULAR,  
RIDGE AND CIRCULAR,  
SELECTION OF**



**FSC 5985**

MIL-STD-1358B  
6 March 1978

DEPARTMENT OF DEFENSE  
WASHINGTON, D.C. 20301

Waveguides, Rectangular, Ridged and Circular, Selection of.

MIL-STD-1358B

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Recommended corrections, additions, or deletions should be addressed to Commander, Naval Electronic Systems Command, ELEX 5043, Washington, D.C. 20360.

## CONTENTS

	Page
1. SCOPE - - - - -	1
1.1 Scope - - - - -	1
1.2 Purpose - - - - -	1
2. REFERENCED DOCUMENTS- - - - -	1
3. DEFINITIONS - - - - -	1
4. GENERAL REQUIREMENTS- - - - -	1
4.1 Selection of waveguides- - - - -	1
4.2 Criteria for inclusion- - - - -	1
4.3 Electrical and physical tolerances- - - - -	1
4.4 Detailed requirements - - - - -	2
5. DETAILED REQUIREMENTS - - - - -	2
6. NOTES - - - - -	2

## TABLES

I. Rigid rectangular waveguides (MIL-W-85) - - - - -	3
II. Rigid circular waveguides (MIL-W-23068) - - - - -	9
III. Single-ridge waveguides, bandwidth ratio 3.6:1 (MIL-W-23351) - - - - -	10
IV. Double-ridge waveguides, bandwidth ratio 3.6:1 (MIL-W-23351) - - - - -	12
V. Single-ridge waveguides, bandwidth ratio 2.4:1 (MIL-W-23351) - - - - -	14
VI. Double-ridge waveguides, bandwidth ratio 2.4:1 (MIL-W-23351) - - - - -	17
VII. Cross-reference of AN nomenclature to part number (MIL-W-85 only) - - - - -	20

## 1. SCOPE

1.1 Scope. This standard provides standard sizes of rigid rectangular, rigid circular, single-ridge, and double-ridge waveguides considered by the Department of Defense as standard for use in military equipment and applications.

1.2 Purpose. The purpose of this standard is to:

- a. Provide the equipment designer with a list of waveguides considered standard for use in military applications.
- b. Restrict and minimize the variety of waveguides for use in military applications in order to provide effective logistic support of equipment.
- c. Establish criteria pertinent to choice and application of waveguides for use in military equipment.

## 2. REFERENCED DOCUMENTS

2.1 The issues of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein.

## SPECIFICATIONS

## MILITARY

- MIL-W-85 - Waveguides, Rigid, Rectangular, General Specification for.  
 MIL-W-23068 - Waveguides, Rigid, Circular.  
 MIL-W-23351 - Waveguides, Single Ridge and Double Ridge (Bandwidth Ratios 3.6:1 and 2.4:1), General Specification for.

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

## 3. DEFINITIONS

3.1 The terms used in this standard are those commonly encountered in microwave engineering practice.

## 4. GENERAL REQUIREMENTS

4.1 Selection of waveguides. Waveguides to be used in military applications shall be selected from those listed in tables I through VI.

4.2 Criteria for inclusion. The criteria for the selection of waveguide types for inclusion in this standard are:

- a. The waveguide shall be considered by representatives of the military departments the best available type for current application.
- b. Availability of the waveguide shall be reasonably certain.
- c. The waveguide shall have an approved military specification.

4.3 Electrical and physical tolerances. Waveguides used in military applications shall be representative of manufactured lots possessing acceptable material and physical and electrical characteristics and shall in no manner degrade the operational characteristics of the equipment in which used.

4.4 Detailed requirements. The detailed requirements for waveguides listed in this standard are covered by the applicable MIL-W-85, MIL-W-23068, or MIL-W-23351 specification sheet.

MIL-STD-1358B  
6 March 1978

5. DETAILED REQUIREMENTS. Not applicable.
6. NOTES. Not applicable.

TABLE I. Rigid rectangular waveguides (MIL-W-85)

Part number	Recommended frequency range for TE <sub>10</sub> mode	Nominal cross-sectional dimensions (inches)				Material	Flange used with		Theoretical 2/ attenuation lowest to highest frequency	Theoretical 3/ peak power lowest to highest frequency	Theoretical 4/ CW power rating lowest to highest frequency
		Inside		Outside			UG-(	)U			
		Width	Height	Width	Height						
SPECIFICATION SHEET MIL-W-85/1											
M85/1-	GHz							dB/100 ft	Watts	Kilowatts	
001	0.32-0.49	23.000	11.500	23.376	11.876	1100	76-07	0.040-0.026	528.3-753.8	1702-2618	
002	0.32-0.49	23.000	11.500	23.376	11.876	6081	76-07	0.047-0.031	528.3-753.8	1437-2194	
161	0.32-0.49	23.000	11.500	23.376	11.876	6063	76-07	0.047-0.028	528.3-753.8	1582-2429	
003	0.35-0.53	21.000	10.500	21.376	10.876	1100	76-06	0.045-0.031	439.3-625.4	1375-2040	
004	0.35-0.53	21.000	10.500	21.376	10.876	6081	76-06	0.054-0.036	439.3-625.4	1170-1756	
162	0.35-0.53	21.000	10.500	21.376	10.876	6063	76-06	0.050-0.034	439.3-625.4	1264-1859	
005	0.41-0.625	18.000	9.000	18.250	9.250	1100	76-05	0.057-0.045	325.1-461.4	973.0-1450	
006	0.41-0.625	18.000	9.000	18.250	9.250	6061	76-05	0.062-0.041	325.1-461.4	827.2-1232	
163	0.41-0.625	18.000	9.000	18.250	9.250	6083	76-05	0.062-0.041	325.1-461.4	893.9-1352	
007	0.49-0.75	15.000	7.500	15.250	7.750	1100	71-04	0.076-0.051	224.1-320.4	630.1-939.0	
008	0.49-0.75	15.000	7.500	15.250	7.750	6061	71-04	0.089-0.060	224.1-320.4	537.7-797.6	
164	0.49-0.75	15.000	7.500	15.250	7.750	6083	71-04	0.082-0.055	224.1-320.4	583.6-870.1	
009	0.64-0.96	11.500	5.750	11.750	6.000	1100	76-03	0.113-0.076	132.0-186.9	342.8-509.7	
010	0.64-0.96	11.500	5.750	11.750	6.000	6061	76-03	0.133-0.089	132.0-186.9	297.0-434.9	
165	0.64-0.96	11.500	5.750	11.750	6.000	6083	76-03	0.122-0.082	132.0-186.9	317.3-472.1	
011	0.75-1.12	9.750	4.875	10.000	5.250	1100	76-02	0.147-0.098	93.81-133.7	212.2-346.9	
012	0.75-1.12	9.750	4.875	10.000	5.250	6061	76-02	0.173-0.115	93.81-133.7	196.4-295.4	
166	0.75-1.12	9.750	4.875	10.000	5.250	6083	76-02	0.159-0.106	93.81-133.7	213.6-320.3	
013	0.86-1.45	7.700	3.850	7.950	4.100	1100	72-01	0.205-0.139	59.67-84.18	137.8-204.3	
014	0.86-1.45	7.700	3.850	7.950	4.100	6061	72-01	0.240-0.161	59.67-84.18	117.6-173.2	
167	0.86-1.45	7.700	3.850	7.950	4.100	6083	72-01	0.222-0.151	59.67-84.18	127.9-187.0	
015	1.12-1.70	6.500	3.250	6.660	3.410	C	52-001, 52-023, 58-007	0.213-0.141	41.34-59.74	114.8-173.6	
017						CA	1714, 1362, 4178	0.316-0.209		80.53-121.8	
018						1100		0.273-0.180		88.45-135.7	
019						6061		0.320-0.212		76.26-115.7	
168	1.12-1.70	6.500	3.250	6.660	3.410	6061	52-002, 52-024, 58-008	0.295-0.195	41.34-59.74	82.72-123.7	
021	1.45-2.20	5.100	2.550	5.260	2.710	C	1715, 1718	0.440-0.299	26.19-37.00	68.22-100.4	
023						CA		0.380-0.258		47.82-70.44	
025						6061		0.446-0.303		52.19-78.24	
026						6063		0.411-0.279		49.14-72.39	
169	1.45-2.20	5.100	2.550	5.260	2.710	6063	52-004, 52-026	0.393-0.261	26.19-37.00	45.14-68.00	
027	1.70-2.60	4.300	2.150	4.460	2.310	C	1716, 1344, 4258	0.502-0.374	18.23-26.26	35.30-51.05	
029						1100	52-005, 52-027, 58-009	0.562-0.424		39.03-55.60	
030						6061	52-006, 52-028, 58-010	0.590-0.492		31.67-47.71	
031						6063	52-007, 52-029, 58-011	0.503-0.387		32.52-49.08	
170	1.70-2.60	4.300	2.150	4.460	2.310	6063	52-008, 52-030, 58-012	0.544-0.406	18.23-26.26	27.82-40.00	
033	2.20-3.30	3.400	1.700	3.560	1.960	C	1717, 1346, 533A	0.532-0.411	11.87-16.44	21.73-31.28	
035						1100	52-009, 52-031, 58-013	0.662-0.474		18.50-26.60	
036						6061	58-012	0.801-0.557		19.52-28.07	
037						CA	52-007, 52-029, 58-011	0.791-0.550		20.05-28.83	
171	2.20-3.30	3.400	1.700	3.560	1.960	6063	52-008, 52-030, 58-012	0.739-0.514	11.87-16.44	17.19-25.11	
039						C	1726, 1348, 53A	0.742-0.508	7.645-10.85	13.42-19.59	
041						1100	52-002, 52-001	0.950-0.651		11.42-16.69	
1042	2.60-3.95	2.840	1.340	3.000	1.500	6061	61-002, 61-001	1.116-0.764	7.645-10.85		
		2.840	1.340	3.000	1.500		52-010, 52-032, 56-002, 61-001, 64-002				

See footnotes at end of table.

TABLE 1. Rigid rectangular waveguides (MIL-W-85) - Continued.

Part number	Recommended frequency range for TE <sub>10</sub> mode	Nominal cross-sectional dimensions (inches)				Material	Flange used with		Theoretical 2/ attenuation lowest to highest frequency	Theoretical 3/ peak power rating lowest to highest frequency	Theoretical 4/ CW power rating lowest to highest frequency
		Width	Height	Width	Height		MIL-F-3922/ UG-( )/U				
SPECIFICATION SHEET MIL-W-85/1											
MBS/1-											
043	2.60-3.95	2.840	1.340	3.000	1.500	CA	52-009, 52-031, 56-001, 61-002, 64-001	1724, 1348, 53, 548, 1479	7.645-10.85	12.06-17.62	
172	2.60-3.95	2.840	1.340	3.000	1.500	6063	52-010, 52-032, 56-002, 61-001, 64-002	1725, 1349, 584, 585A, 1484	7.645-10.85	12.39-18.12	
045	3.30-4.90	2.290	1.145	2.418	1.273	C	52-011, 52-033	1726, 1350	5.475-7.549	11.52-16.23	
047						1100	52-012, 52-034	1727, 1351		8.99-12.69	
048						6061	52-011, 52-033	1726, 1350		7.659-10.79	
049						CA	52-012, 52-034	1727, 1351		8.083-11.39	
173	3.30-4.90	2.290	1.145	2.418	1.273	6063	52-013, 52-035, 57-002, 62-002, 63-001	1728, 1352, 149A, 148C, 1475	5.475-7.549	8.307-11.71	
051	3.95-5.85	1.872	0.872	2.000	1.000	C	52-014, 52-036, 57-001, 62-001, 63-005	1729, 1353, 407, 406B, 1480	3.296-4.697	6.612-9.534	
053						1100	52-015, 52-037, 57-002, 62-001, 63-005	1728, 1352, 149A, 148C, 1475		5.165-7.436	
054						6061	52-016, 52-038, 57-001, 62-001, 63-005	1729, 1353, 407, 406B, 1480		4.397-6.340	
055						CA	52-017, 52-039, 55-001, 60-001, 63-002	1730, 1354, ---		4.639-6.690	
174	3.95-5.85	1.872	0.872	2.000	1.000	6063	52-018, 52-040, 55-002, 60-002, 63-002	1731, 1355, ---	3.296-4.697	4.767-6.874	
057	4.90-7.05	1.590	0.795	1.718	0.923	C	52-019, 52-041, 53-002, 59-015, 63-003	1732, 1356, 344, 343B, 1476	2.792-3.719	5.374-7.193	
059						1100	52-020, 52-042, 53-004, 54-006, 54-012, 59-009, 59-016, 63-007	1733, 1357, 441, 440B, 1481		4.196-5.617	
060						6061	52-021, 52-043, 53-001, 52-020, 54-012, 59-009, 59-016, 63-007	1731, 1355, ---		3.574-4.783	
061						CA	52-022, 52-044, 53-002, 59-015, 63-003	1730, 1354, ---		3.771-5.047	
175	4.90-7.05	1.590	0.795	1.718	0.923	6063	52-023, 52-045, 53-003, 59-016, 63-007	1731, 1355, ---	2.792-3.719	3.876-5.187	
063	5.85-8.20	1.372	0.622	1.500	0.750	C	52-024, 52-046, 53-004, 54-006, 54-011, 59-007, 59-015, 63-003	1732, 1356, 344, 343B, 1476	1.975-2.531	3.708-4.695	
065						1100	52-025, 52-047, 53-005, 59-017, 63-008	1733, 1357, 441, 440B, 1481		2.076-3.667	
066						6061	52-026, 52-048, 53-006, 59-018, 63-009	1732, 1356, 344, 343B, 1476		1.768-3.122	
067						CA	52-027, 52-049, 53-007, 59-019, 63-010	1733, 1357, 441, 440B, 1481		2.602-3.294	
176	5.85-8.20	1.372	0.622	1.500	0.750	6063	52-028, 52-050, 53-008, 54-007, 54-013, 59-010, 59-019, 63-011	1734, 1358, 51, ---, 52B, 1477	1.975-2.531	1.917-3.387	
069	7.05-10.0	1.122	0.497	1.250	0.625	C	52-029, 52-051, 53-009, 59-020, 63-012	1734, 1358, 51, ---, 52B, 1477	1.284-1.702	2.290-2.946	
071						1100	52-030, 52-052, 53-010, 59-021, 63-013	1735, 1359, 138, ---, 137B, 1482		1.788-2.301	
072						6061	52-031, 52-053, 53-011, 59-022, 63-014	1734, 1358, 51, ---, 52B, 1477		1.523-1.958	
073						CA	52-032, 52-054, 53-012, 59-023, 63-015	1735, 1359, 138, ---, 137B, 1482		1.607-2.067	
177	7.05-10.0	1.122	0.497	1.250	0.625	6063	52-033, 52-055, 53-013, 59-024, 63-016	1735, 1359, 138, ---, 137B, 1482	1.284-1.702	1.652-2.124	
075	8.20-12.40	0.900	0.400	1.000	0.500	C	52-034, 52-056, 53-014, 59-025, 63-017	1736, 1360, 39, ---, 40B, ---, 147B	0.758-1.124	1.229-1.776	

See footnotes at end of table.

TABLE 1. Rigid rectangular waveguides (MIL-H-85) - Continued.

Part number	Recommended frequency range for TE <sub>10</sub> mode	Nominal cross-sectional dimensions (inches)				Material	Flange used with		Theoretical 2/ attenuation highest frequency	Theoretical 3/ peak power rating lowest to highest frequency	Theoretical 4/ CW power rating lowest to highest frequency
		Width	Height	Inside Width	Outside Height		MIL-F-3922/	UG-( )/U			
077	8.20-12.40	0.900	0.400	1.000	0.500	1100	MIL-F-3922/	5.540-3.833	0.758-1.124	0.9593-1.386	
078	8.20-12.40	0.900	0.400	1.000	0.500	6061	MIL-F-3922/	6.506-4.502	0.758-1.124	0.8169-1.180	
079	8.20-12.40	0.900	0.400	1.000	0.500	CA	MIL-F-3922/	6.424-4.445	0.758-1.124	0.8621-1.246	
178	8.20-12.40	0.900	0.400	1.000	0.500	6063	MIL-F-3922/	5.998-4.150	0.758-1.124	0.8860-1.280	
081	10.00-15.00	0.750	0.375	0.850	0.475	C	MIL-F-3922/	5.121-3.577	0.622-0.903	0.9436-1.351	
083	10.00-15.00	0.750	0.375	0.850	0.475	1100	MIL-F-3922/	6.554-4.578	0.622-0.903	0.7368-1.055	
084	10.00-15.00	0.750	0.375	0.850	0.475	6061	MIL-F-3922/	7.698-5.377	0.622-0.903	0.6273-0.8982	
085	10.00-15.00	0.750	0.375	0.850	0.475	CA	MIL-F-3922/	7.601-5.309	0.622-0.903	0.6621-0.9479	
179	10.00-15.00	0.750	0.375	0.850	0.475	6063	MIL-F-3922/	7.097-4.957	0.622-0.903	0.6804-0.9473	
087	12.40-18.00	0.622	0.311	0.702	0.391	C	MIL-F-3922/	6.451-4.743	0.457-0.633	0.6432-0.8749	
089	12.40-18.00	0.622	0.311	0.702	0.391	CA	MIL-F-3922/	8.528-7.041	0.457-0.633	0.4513-0.6139	
090	12.40-18.00	0.622	0.311	0.702	0.391	1100	MIL-F-3922/	8.259-6.071	0.457-0.633	0.5022-0.6832	
091	12.40-18.00	0.622	0.311	0.702	0.391	6061	MIL-F-3922/	9.700-7.131	0.457-0.633	0.4276-0.5816	
093	12.40-18.00	0.622	0.311	0.702	0.391	S	MIL-F-3922/	6.910-5.079	0.457-0.633	0.6016-0.8184	
180	12.40-18.00	0.622	0.311	0.702	0.391	6063	MIL-F-3922/	8.943-6.574	0.457-0.633	0.4638-0.6309	
094	15.00-22.00	0.510	0.255	0.590	0.335	C	MIL-F-3922/	8.812-6.384	0.312-0.433	0.4132-0.5701	
096	15.00-22.00	0.510	0.255	0.590	0.335	CA	MIL-F-3922/	11.08-9.477	0.312-0.433	0.2899-0.4080	
097	15.00-22.00	0.510	0.255	0.590	0.335	6061	MIL-F-3922/	11.27-8.172	0.312-0.433	0.3228-0.4452	
098	15.00-22.00	0.510	0.255	0.590	0.335	6063	MIL-F-3922/	13.25-9.598	0.312-0.433	0.2746-0.3791	
181	15.00-22.00	0.510	0.255	0.590	0.335	C	MIL-F-3922/	12.21-8.849	0.312-0.433	0.2979-0.4111	
190	18.00-26.50	0.420	0.170	0.500	0.250	CA	MIL-F-3922/	13.80-10.13	0.171-0.246	0.2230-0.3038	
192	18.00-26.50	0.420	0.170	0.500	0.250	6061	MIL-F-3922/	20.48-15.04	0.171-0.246	0.1565-0.2132	
103	18.00-26.50	0.420	0.170	0.500	0.250	6063	MIL-F-3922/	17.68-12.97	0.171-0.246	0.1742-0.2392	
104	18.00-26.50	0.420	0.170	0.500	0.250	C	MIL-F-3922/	20.74-15.23	0.171-0.246	0.1483-0.2020	
106	18.00-26.50	0.420	0.170	0.500	0.250	CA	MIL-F-3922/	14.77-10.85	0.171-0.246	0.2087-0.2842	
182	22.00-33.00	0.340	0.170	0.420	0.210	S	MIL-F-3922/	19.12-14.04	0.139-0.209	0.1608-0.2191	
187	22.00-33.00	0.340	0.170	0.420	0.210	6063	MIL-F-3922/	16.86-11.73	0.139-0.209	0.1678-0.2410	
109	22.00-33.00	0.340	0.170	0.420	0.210	C	MIL-F-3922/	25.03-17.41	0.139-0.209	0.1176-0.1691	

See footnotes at end of table.



MIL-STD-13589  
6 March 1978

TABLE I. Rigid rectangular waveguides (MIL-W-85) - Continued.

Part number	Recommended frequency range for IF mode	Nominal cross-sectional dimensions (inches)		Material	Flange used with		Theoretical 2/ attenuation lowest to highest frequency	Theoretical 3/ peak power rating lowest to highest frequency	Theoretical 4/ CW power rating lowest to highest frequency
		Width	Height		MIL-F-3922/	UG-( )/U			
SPECIFICATION SHEET MIL-W-85/1									
M85/1-									
110	22.00-33.00 GHz	0.340	0.170	0.420	0.250	63-010	21.58-15.01	0.139-0.209	0.1309-0.1883
111							25.35-17.63		0.114-0.1603
113						63-009	16.16-11.25		0.1250-0.2517
183	22.00-33.00 GHz	0.340	0.170	0.420	0.250	63-010	23.37-16.28	0.139-0.209	0.1209-0.1738
155	7.00-11.00 GHz	1.020	0.510	1.48	0.638	1494, 1493, ---	5.219-3.791	1.017-1.534	1.220-1.935
156							3.516-2.217		1.725-2.735
157							4.500-2.838		1.350-2.154
158							5.285-3.333		1.156-1.834
160	7.00-11.00 GHz	1.020	0.510	1.148	0.638	---	4.873-3.073	1.017-1.534	1.254-1.989
SPECIFICATION SHEET MIL-W-85/2 (heavy wall)									
M85/2-									
001	2.60-3.95 GHz	2.840	1.340	3.238	1.738	1725, 1349, 584,	0.950-0.651	7.645-10.85	14.56-21.25
002	2.60-3.95 GHz	2.840	1.340	3.238	1.738	---	1.116-0.764	7.645-10.85	12.39-18.08
003	3.95-5.85 GHz	1.872	0.872	2.172	1.172	1729, 1353, 407,	1.785-1.238	3.296-4.697	5.637-8.127
004	2.60-3.95 GHz	2.840	1.340	3.238	1.738	4068, 1480	1.028-0.705	7.645-10.85	13.48-19.63
005	3.95-5.85 GHz	1.872	0.872	2.172	1.172	5854, 1484	1.933-1.340	3.296-4.697	5.206-7.506
006	3.95-5.85 GHz	1.872	0.872	2.122	1.122	---	1.399-0.970	3.296-4.697	6.961-10.05
007	7.05-10.0 GHz	1.122	0.497	1.378	0.753	---	2.772-2.159	1.284-1.702	2.066-2.382
008	8.20-12.40 GHz	0.900	0.400	1.000	0.600	---	4.339-3.003	0.758-1.124	4.788-3.314
009	8.20-12.40 GHz	0.900	0.400	1.000	0.600	---	4.339-3.003	0.758-1.124	4.788-3.314
SPECIFICATION SHEET MIL-W-85/3 (unit meter)									
006	26.50-40.00 GHz	0.2800	0.1400	0.360	0.220	600A, ---, 599,	21.55-16.80	96.0-146	103.1-150.1
007						---	23.02-15.77	96.0-146	109.7-160.1
008						---	21.99-15.06	96.0-146	115.1-168.0
009	26.50-40.00 GHz	0.2800	0.1400	0.360	0.220	---	34.46-23.59	96.0-146	73.27-107.0
010	33.00-50.00 GHz	0.2240	0.1120	0.304	0.192	---	34.57-23.50	64.4-97.0	64.73-95.30
011						383, ---	32.44-22.05		68.89-101.4
012						---	30.98-21.06		72.29-106.3
013	33.00-50.00 GHz	0.2240	0.1120	0.304	0.192	---	48.53-32.29	64.4-97.0	46.05-67.74
014	40.00-60.00 GHz	0.1880	0.0940	0.268	0.174	---	42.39-30.46	48-70	48.38-87.21
015						---	39.81-28.60		51.32-71.43
016	40.00-60.00 GHz	0.1880	0.0940	0.268	0.174	---	38.02-27.32	48-70	53.85-74.94
017	50.00-75.00 GHz	0.1480	0.0740	0.228	0.154	---	64.23-43.89	30-40	28.46-41.44
018						1523, 385, ---	60.25-41.17	30-40	30.27-44.30
019	50.00-75.00 GHz	0.1480	0.0740	0.228	0.154	---	57.53-39.32	20-30	31.76-46.49
020	60.00-90.00 GHz	0.1220	0.0610	0.202	0.141	---	82.78-58.86	20-30	19.15-28.56
021						---	82.37-55.22		20.37-30.38
022	60.00-90.00 GHz	0.1220	0.0610	0.202	0.141	387, 1522	78.67-52.74	20-30	21.37-31.88

See footnotes at end of table.

TABLE 1. Rigid rectangular waveguides (MIL-M-85) - Continued.

Part number	Recommended frequency range for TE <sub>10</sub> mode	Nominal cross-sections (inches)				Material	Flange used with		Theoretical 2/ attenuation lowest to highest frequency	Theoretical 3/ peak power rating lowest to highest frequency	Theoretical 4/ CW power rating lowest to highest frequency
		Inside		Outside			MIL-F-3922/ UG-( )/U				
		Width	Height	Width	Height						
SPECIFICATION SHEET MIL-M-85/3 (millimeter)											
M85/3-	GHz										
023	75.00-110.00	0.1000	0.0500	0.180	0.130	S	66-007, 67-010	1528, ---	14-20	13.82-19.63	
024	75.00-110.00	0.1000	0.0500	0.180	0.130	C	66-007, 67-010	1528, ---	14-20	14.73-20.86	
025	75.00-110.00	0.1000	0.0500	0.180	0.130	CA/S	66-007, 67-010	1528, ---	14-20	15.40-21.88	
026	90.00-140.00	0.0800	0.0400	0.1600	0.1200	S	74-001	---	8-8-13	8.618-13.43	
027	90.00-140.00	0.0800	0.0400	0.1600	0.1200	C	74-001	---	8-8-13	9.161-14.27	
028	90.00-140.00	0.0800	0.0400	0.1600	0.1200	CA/S	74-001	---	8-8-13	9.610-14.97	
029	110.00-170.00	0.0650	0.0325	0.1450	0.1125	S	74-002	---	5-9-9-3	5.652-8.934	
030	110.00-170.00	0.0650	0.0325	0.1450	0.1125	C	74-002	---	5-9-9-3	6.019-9.494	
031	110.00-170.00	0.0650	0.0325	0.1450	0.1125	CA/S	74-002	---	5-9-9-3	6.315-9.954	
032	140.00-220.00	0.0510	0.0255	0.1310	0.1025	S	74-003	---	3-7-6-1	3.674-5.844	
033	140.00-220.00	0.0510	0.0255	0.1310	0.1025	C	74-003	---	3-7-6-1	3.904-6.211	
034	140.00-220.00	0.0510	0.0255	0.1310	0.1025	CA/S	74-003	---	3-7-6-1	4.096-6.517	
035	170.00-260.00	0.0430	0.0215	0.1230	0.1015	S	74-004	---	2-8-4-5	2.832-4.282	
036	170.00-260.00	0.0430	0.0215	0.1230	0.1015	C	74-004	---	2-8-4-5	3.010-4.571	
037	170.00-260.00	0.0430	0.0215	0.1230	0.1015	CA/S	74-004	---	2-8-4-5	3.484-4.774	
038	220.00-325.00	0.0340	0.0170	0.1140	0.0970	S	74-005	---	1-9-2-6	2.148-3.159	
039	220.00-325.00	0.0340	0.0170	0.1140	0.0970	C	74-005	---	1-9-2-6	2.253-3.313	
040	220.00-325.00	0.0340	0.0170	0.1140	0.0970	CA/S	74-005	---	1-9-2-6	2.442-10.04	
041	90.00-140.00	0.0800	0.0400	0.120	0.080	S	66-006	1527	8-8-13	6.847-10.67	
042	90.00-140.00	0.0800	0.0400	0.120	0.080	C	66-006	1527	8-8-13	7.181-11.19	
043	90.00-140.00	0.0800	0.0400	0.120	0.080	CA/S	66-006	1527	8-8-13	7.438-6.888	
044	110.00-170.00	0.0650	0.0325	0.105	0.0725	S	66-004	1525	5-9-9-3	4.506-7.107	
045	110.00-170.00	0.0650	0.0325	0.105	0.0725	C	66-004	1525	5-9-9-3	4.727-7.159	
046	110.00-170.00	0.0650	0.0325	0.105	0.0725	CA/S	66-004	1525	5-9-9-3	4.958-7.421	
047	140.00-220.00	0.0510	0.0255	0.091	0.0655	S	66-003	1524	3-7-6-1	2.833-4.901	
048	140.00-220.00	0.0510	0.0255	0.091	0.0655	C	66-003	1524	3-7-6-1	2.972-4.729	
049	140.00-220.00	0.0510	0.0255	0.091	0.0655	CA/S	66-003	1524	3-7-6-1	3.119-3.233	
050	170.00-260.00	0.0430	0.0215	0.083	0.0615	S	66-005	1526	2-8-4-5	2.475-3.97	
051	170.00-260.00	0.0430	0.0215	0.083	0.0615	C	66-005	1526	2-8-4-5	2.614-4.21	
052	220.00-325.00	0.0340	0.0170	0.074	0.057	S	5/	---	1-9-2-6	1.395-2.093	
053	220.00-325.00	0.0340	0.0170	0.074	0.057	C	5/	---	1-9-2-6	1.483-2.181	
054	220.00-325.00	0.0340	0.0170	0.074	0.057	CA/S	5/	---	1-9-2-6	1.556-2.289	
055	220.00-325.00	0.0340	0.0170	0.074	0.057	CA/S	5/	---	1-9-2-6	1.556-2.289	

See footnotes at end of table.

MIL-STD-13588  
6 March 1978

TABLE I. Rigid rectangular waveguides (MIL-W-85) - Continued.

Part number	Recommended frequency range for TE <sub>10</sub> mode	Nominal cross-sectional dimensions (inches)		Material	Flange used with		Theoretical 2/ attenuation lowest to highest frequency	Theoretical 3/ peak power rating lowest to highest frequency	Theoretical 4/ CM power rating lowest to highest frequency
		Width	Height		MIL-F-3922/	UG-( )/U			
SPECIFICATION SHEET MIL-W-85/4 (reduced heights)									
M85/4-							<u>dB/100 ft</u>	<u>Megawatts</u>	<u>Kilowatts</u>
001	2.60-5.85 <u>1/</u>	2.840	1.004	3.000	1.164	CA	1.131-0.947	5.720-8.911	10.25-12.24
002	2.60-5.85 <u>1/</u>	2.840	1.004	3.000	1.164	6061	1.145-0.959	5.720-8.911	10.12-12.09
003	5.85-12.40 <u>8/</u>	1.372	0.487	1.500	0.615	CA	3.399-2.174	1.577-2.174	1.912-2.305
004	5.85-12.40 <u>8/</u>	1.372	0.487	1.500	0.615	6061	3.442-2.854	1.577-2.174	1.888-2.276
007	2.60-5.85 <u>1/</u>	2.840	1.004	3.000	1.164	6063	1.056-0.884	5.720-8.911	10.98-13.11
008	5.85-12.40 <u>8/</u>	1.372	0.487	1.500	0.615	6063	3.174-2.665	1.577-2.174	2.048-2.469
009	0.75-1.12	9.750	2.436	10.000	2.686	CA	0.181-0.134	46.89-66.76	159.6-216.2
010				10.000	2.686	6061	0.272-0.202		106.4-143.2
011				10.000	2.686	6063	0.251-0.195		115.3-153.5
012				10.250	2.936	CA	0.181-0.134		64.0-223.3
013				10.250	2.936	6061	0.272-0.202		110.0-148.1
014	0.75-1.12	9.750	2.436	10.250	2.936	6063	0.251-0.186	46.89-66.76	119.2-160.8
015	2.60-3.95	2.840	0.670	3.000	0.830	CA	1.187-0.897	3.879-5.497	9.203-12.27
016	2.60-3.95	2.840	0.670	3.000	0.830	6061	1.781-1.348	3.879-5.497	6.171-8.167
017	2.60-3.95	2.840	0.670	3.000	0.830	6063	1.645-1.241	3.879-5.497	6.692-8.856
018	3.95-5.85	1.872	0.372	2.000	0.500	C	2.530-1.958	1.427-2.039	3.059-3.953
019	3.95-5.85	1.872	0.372	2.000	0.500	6061	3.803-2.943	1.427-2.039	2.051-2.651
020	3.95-5.85	1.872	0.372	2.000	0.500	6063	3.506-2.274	1.427-2.039	2.225-3.431

1/ CA = copper alloy; 1100 = aluminum alloy 1100; 6061 = aluminum alloy 6061; 6063 = aluminum alloy 6063; C = copper (OF-DLP)  
 2/ S = silver, grade C; CA/S = silver, grade A laminated on copper alloy.  
 3/ Typical resistivities of materials (at 20°C): Copper (OF-DLP) = 1.78 microhm-cm; aluminum 1100 = 2.90 microhm-cm; aluminum 6061 = 4.00 microhm-cm; copper alloy = 3.9 microhm-cm; silver, grade A = 1.63 microhm-cm; silver, grade C = 2.03 microhm-cm; aluminum 6063 = 3.4 microhm-cm.  
 4/ These values were determined by calculating the unpressurized air dielectric breakdown strength produced by considering the E field within the waveguide. This determination was based on the peak value of a continuous wave (cw) signal. For further information or to calculate for other situations, see Gould and Gildden's "Handbook of High Power Capabilities of Waveguide Systems" (available from Microwave Associates, Burlington, Massachusetts).  
 5/ These values were determined by calculation of the rate of heat loss to the ambient, considering a nonpressurized air dielectric waveguide in air using no artificial heat sink. A maximum waveguide temperature of 71°C, 1:1 VSWR, and an ambient temperature of 30°C were assumed. For further information or to calculate for other situations, see H. E. King, "Rectangular Waveguide Theoretical CM Average Power Rating", IRE Transactions PGMTT-9 pp 349-357, July 1961.  
 6/ No military specifications exist for these flange sizes. Commercial items are available.  
 7/ The ends of these waveguides are milled down to permit installation of the listed flanges.  
 8/ These waveguides will propagate the TE<sub>20</sub> mode at frequencies above 4.160 GHz.  
 9/ These waveguides will propagate the TE<sub>20</sub> mode at frequencies above 8.570 GHz.

TABLE II. Rigid circular waveguides (MIL-W-23068).

Type 1/	Recommended frequency Range (GHz)		Nominal dimensions (inch)	
	TE <sub>01</sub> mode	TE <sub>11</sub> mode	Inside diameter	Outside diameter 2/
WRC312U14-	0.683- 0.940	0.312- 0.427	25.508	---
WRC365U14-	0.799- 1.100	0.365- 0.500	21.791	---
WRC427U14-	0.936- 1.290	0.427- 0.586	18.616	---
WRC500U14-	1.100- 1.510	0.500- 0.686	15.903	---
WRC586U14-	1.280- 1.770	0.586- 0.803	13.585	---
WRC686U14-	1.500- 2.070	0.686- 0.939	11.606	---
WRC803U14-	1.760- 2.420	0.803- 1.100	9.915	---
WRC939U14-	2.060- 2.830	0.939- 1.290	8.470	---
WRC110D14-	2.410- 3.310	1.100- 1.510	7.235	---
WRC129D14-	2.820- 3.880	1.290- 1.760	6.181	6.781
WRC151D14-	3.300- 4.540	1.510- 2.070	5.280	5.880
WRC176D14-	3.860- 5.320	1.760- 2.420	4.511	5.111
WRC207D14-	4.520- 6.220	2.070- 2.830	3.853	4.253
WRC242D14-	5.290- 7.280	2.420- 3.310	3.292	3.692
WRC283D14-	6.190- 8.530	2.830- 3.880	2.812	3.112
WRC331D14-	7.250- 9.980	3.310- 4.540	2.403	2.703
WRC389D14-	8.510- 11.700	3.890- 5.330	2.047	2.307
WRC454D14-	9.950- 13.700	4.540- 6.230	1.750	2.010
WRC530D14-	11.600- 16.000	5.300- 7.270	1.500	1.700
WRC621D14-	13.600- 18.700	6.210- 8.510	1.281	1.441
WRC727D14-	15.900- 21.900	7.270- 9.970	1.094	1.224
WRC849D14-	18.600- 25.600	8.490- 11.600	0.938	1.068
WRC997D14-	21.900- 30.100	9.970- 13.700	0.797	0.897
WRC116C14-	25.300- 34.900	11.600- 15.900	0.688	0.788
WRC134C14-	29.300- 40.400	13.400- 18.400	0.594	0.674
WRC159C14-	34.800- 48.000	15.900- 21.800	0.500	0.580
WRC182C14-	39.800- 54.800	18.200- 24.900	0.438	0.518
WRC212C14-	46.400- 63.900	21.200- 29.100	0.375	0.435
WRC243C14-	53.100- 73.100	24.300- 33.200	0.328	0.388
WRC283C14-	61.900- 85.200	28.300- 38.800	0.281	0.341
WRC318C14-	69.700- 95.900	31.800- 43.600	0.250	0.290
WRC364C14-	79.600-110.000	36.400- 49.800	0.219	0.259
WRC424C14-	92.900-128.000	42.400- 58.100	0.188	0.228
WRC463C14-	101.000-139.000	46.300- 63.500	0.172	0.212
WRC566C14-	124.000-171.000	56.600- 77.500	0.141	0.181
WRC635C14-	139.000-192.000	63.500- 87.200	0.125	0.155
WRC727C14-	159.000-219.000	72.700- 99.700	0.109	0.139
WRC848C14-	186.000-256.000	84.800-116.000	0.094	0.124

1/ An additional letter added to the type number indicates material as:  
A -- Aluminum alloy; B -- Brass; C -- Copper; S -- Silver alloy.

2/ Dimensions on outside diameter are omitted on types WRC312U14- to WRC110D14- inclusive, because manufacturing methods on these sizes may vary widely, depending on the individual application.

MIL-STD-1358B  
6 March 1978

TABLE III. Single-ridge waveguides, bandwidth ratio 3.6:1 (MIL-M-23551).

Part number M23551/1-	Nominal cross-sectional dimensions (inch)				Recommended frequency range TE <sub>10</sub> mode (GHz)	Material	Flange used with		f = $\sqrt{3} f_{c10}$ /	
	Inside		Outside				MIL-F-39000/ ( )	UG- ( )/U	Theoretical Attenuation 1/ Decibels/foot	Peak power rating 2/ Kilowatts
	Width	Height	Width	Height						
001	31.218	14.048	31.468	14.298	0.108-0.390	Aluminum Alloy Brass Copper Silver Alloy	---	---	0.0024 0.0024 0.0016 0.0017	14,550
005	12.542	5.644	12.792	5.894	0.270-0.970	Aluminum Alloy Brass Copper Silver Alloy	---	---	0.0098 0.0096 0.0065 0.0070	2,348
009	8.677	3.905	8.927	4.155	0.390-1.400	Aluminum Alloy Brass Copper Silver Alloy	---	---	0.0168 0.0166 0.0112 0.0120	1,124
013	3.494	1.572	3.654	1.732	0.970-3.500	Aluminum Alloy Brass Copper Silver Alloy	2-001 2-002 2-002	1604 1605 1605	0.0658 0.0650 0.0438 0.0469	182.2
017	2.422	1.090	2.582	1.250	1.40-5.00	Aluminum Alloy Brass Copper Silver Alloy	2-004 2-005 2-005 2-005	1607 1608 1608 1608	0.114 0.113 0.0758 0.0812	87.56
021	0.968	0.436	1.068	0.536	3.50-12.40	Aluminum Alloy Brass Copper Silver Alloy	2-007 2-008 2-008 2-008	1610 1611 1611 1611	0.451 0.445 0.300 0.321	13.99

See footnotes at end of table.

TABLE III. Single-ridge waveguides, bandwidth ratio 3.6:1 (MIL-W-23351) - Continued.

Part number M23351/1-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE <sub>10</sub> mode (GHz)	Material	Flange used with		$f = \sqrt{3} f_{c10}$ 1/	
	Inside		Outside				MIL-F-39000/( )	UG-( )/U	Theoretical Attenuation 1/ Decibels/foot	Peak power rating 2/ Kilowatts
	Width	Height	Width	Height						
025	0.678	0.305	0.778	0.405	5.00-18.00	Aluminum Alloy Brass Copper Silver Alloy	2-010 2-011 2-011 2-011	1613 1614 1614 1614	0.771 0.761 0.513 0.549	6.857
029	0.273	0.123	0.353	0.203	12.40-40.00	Aluminum Alloy Brass Copper Silver Alloy	2-013 2-014 2-014 2-014	1616 1617 1617 1617	3.019 2.981 2.008 2.150	1.115

1/ Actual attenuation of waveguides may be considerably greater depending upon operating frequency and temperature. For further information or to calculate frequencies, see S. Hopfer, "The Design of Ridged Waveguides," IRE Transactions on Microwave Theory and Techniques, MTT-3 pp 20-29, October 1955, and MIL-HDBK-216, Transmission Lines and Fittings, chapter 6. Typical resistivities of materials (at 20°C): Aluminum alloy (6061)\*4.0 microhms-cm; Copper alloy (brass)\*3.9 microhms-cm; Copper\*1.77 microhms-cm; Silver alloy (coin silver)\*2.03 microhms-cm.  $f_{c10}$  = cutoff frequency for TE<sub>10</sub> mode (see specification sheet for values).

2/ Actual power handling capability of waveguides may be considerably less depending upon waveguide temperature, altitude, operating frequency, etc. For further information or to calculate values for frequencies see referenced documents in footnote 1/. The tabulated values were calculated based upon the E field produced breakdown in a nonpressurized air dielectric waveguide under continuous wave (CW) conditions. The breakdown strength of air was considered to be 15,000 volts per centimeter, corner radii considered.

MIL-STD-1358B  
6 March 1978

TABLE IV. Double-Ridge waveguides, bandwidth ratio 3.6:1 (MIL-N-23551).

Part number M23551/2-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE <sub>10</sub> mode (GHz)	Material	Flange used with		$f = \sqrt{3} \epsilon_{10}^{-1/2}$	
	Inside		Outside				MIL-F-39000/( )	UG-( )/U	Theoretical Attenuation 1/ Decibels/foot	Peak power rating 2/ Kilowatts
	Width	Height	Width	Height						
001	34.638	14.894	34.888	15.144	0.108-0.390	Aluminum Alloy	---	---	0.0065	28,830
002						Brass	---	---	0.0064	
003						Copper	---	---	0.0043	
004						Silver Alloy	---	---	0.0046	
005	13.916	5.984	14.166	6.234	0.270-0.970	Aluminum Alloy	---	---	0.00235	4,653
006						Brass	---	---	0.00232	
007						Copper	---	---	0.00156	
008						Silver Alloy	---	---	0.00167	
009	9.628	4.140	9.878	4.390	0.390-1.400	Aluminum Alloy	---	---	0.00415	2,227
010						Brass	---	---	0.00410	
011						Copper	---	---	0.00276	
012						Silver Alloy	---	---	0.00296	
013	3.877	1.667	4.037	1.827	0.970-3.500	Aluminum Alloy	4-001	1589	0.0155	361.2
014						Brass	4-002	1590	0.0153	
015						Copper	4-002	1590	0.0103	
016						Silver Alloy	4-002	1590	0.0110	
017	2.687	1.155	2.847	1.315	1.40-5.00	Aluminum Alloy	4-004	1592	0.0283	173.5
018						Brass	4-005	1593	0.0279	
019						Copper	4-005	1593	0.0188	
020						Silver Alloy	4-005	1593	0.0201	
021	1.074	0.462	1.174	0.562	3.50-12.40	Aluminum Alloy	4-007	1595	0.110	27.74
022						Brass	4-008	1596	0.108	
023						Copper	4-008	1596	0.0729	
024						Silver Alloy	4-008	1596	0.0781	

See footnotes at end of table.



TABLE IV. Double-ridge waveguides, bandwidth ratio 3.6:1 (MIL-W-23351) - Continued.

Part number M23351/2-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE <sub>10</sub> mode (GHz)	Material	Flange used with		f = $\sqrt{3} f_{c10}$ 1/	
	Inside		Outside				MIL-F-39000/( )	UG-( )/U	Theoretical Attenuation 1/ decibels/foot	Peak power rating 2/ Kilowatts
	Width	Height	Width	Height						
025	0.752	0.323	0.852	0.423	5.00-18.00	Aluminum Alloy Brass Copper Silver Alloy	4-010 4-011 4-011 4-011	1598 1599 1599 1599	0.1926 0.1801 0.1281 0.1372	13.59
029	0.303	0.130	0.383	0.210	12.40-40.00	Aluminum Alloy Brass Copper Silver Alloy	4-013 4-014 4-014 4-014	1601 1602 1602 1602	0.737 0.727 0.490 0.525	2.210

1/ Actual attenuation of waveguides may be considerably greater depending upon operating frequency and temperature. For further information or to calculate frequencies, see S. Hoyer, "The Design of Ridged Waveguides," IRE Transactions on Microwave Theory and Techniques, MTT-3 pp 20-29, October, 1955, and MIL-HDBK-216, Transmission Lines and Fittings, chapter 6. Typical resistivities of materials (at 20°C): Aluminum alloy (6061)=4.0 microhm-cm; Copper alloy (brass)=3.9 microhm-cm; Copper=1.77 microhm-cm; Silver alloy (coin silver)=2.03 microhm-cm.  $f_{c10}$  = cutoff frequency for TE<sub>10</sub> mode (see specification sheet for values).

2/ Actual power handling capability of waveguides may be considerably less depending upon waveguide temperature, altitude, operating frequency, etc. For further information or to calculate values for frequencies, see referenced documents in footnote 1/. The tabulated values were calculated based upon the E field produced breakdown in a nonpressurized air dielectric waveguide under continuous wave (CW) conditions. The breakdown strength of air was considered to be 15,000 volts per centimeter corner radii considered.



MIL-STD-1358B  
48 APR 68

TABLE V. Single-ridge waveguides, bandwidth ratio 2.4:1 (MIL-W-23351).

Part number M23351/J-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE <sub>10</sub> (GHz)	Material	Flange used with		F = $\sqrt{3} f_c / 10$	
	Inside		Outside				MIL-P-39000/( )	UG-( )/U	Theoretical Attenuation dB/foot	Peak power rating 2/ Kilowatts
	Width	Height	Width	Height						
001	28.129	12.658	28.379	12.908	0.175-0.420	Aluminum Alloy	---	---	0.00036	32,870
002						Brass	---	---	0.00036	
003						Copper	---	---	0.00024	
004						Silver Alloy	---	---	0.00026	
005	18.421	8.289	18.671	8.539	0.267-0.640	Aluminum Alloy	---	---	0.00068	14,100
006						Brass	---	---	0.00067	
007						Copper	---	---	0.00045	
008						Silver Alloy	---	---	0.00048	
009	11.695	5.263	11.945	5.513	0.420-1.000	Aluminum Alloy	---	---	0.00130	5,682
010						Brass	---	---	0.00129	
011						Copper	---	---	0.00087	
012						Silver Alloy	---	---	0.00093	
013	7.682	3.457	7.932	3.707	0.640-1.530	Aluminum Alloy	---	---	0.00247	2,451
014						Brass	---	---	0.00243	
015						Copper	---	---	0.00164	
016						Silver Alloy	---	---	0.00176	
017	5.847	2.631	6.007	2.791	0.840-2.000	Aluminum Alloy	1-001	1541	0.00375	1,421
018						Brass	1-002	1542	0.00368	
019						Copper	1-002	1542	0.00248	
020						Silver Alloy	1-002	1542	0.00266	
021	3.276	1.474	3.436	1.634	1.500-3.600	Aluminum Alloy	1-004	1544	0.00888	445.8
022						Brass	1-005	1545	0.00877	
023						Copper	1-005	1545	0.00591	
024						Silver Alloy	1-005	1545	0.00633	
025	2.456	1.105	2.616	1.265	2.000-4.800	Aluminum Alloy	1-007	1547	0.0136	250.6
026						Brass	1-008	1548	0.0135	
027						Copper	1-008	1548	0.00908	
028						Silver Alloy	1-008	1548	0.00972	

See footnotes at end of table.

TABLE V. Single-ridge waveguides, bandwidth ratio 2.4:1 (MIL-M-2335L) - Continued.

Part number M2335L/3-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE <sub>10</sub> mode (GHz)	Material	Flange used with		Theoretical Attenuation 1/ Decibels/foot	Peak power rating 2/ Kilowatts	$f = \sqrt{3} f_{c10} 1/$
	Inside		Outside				MIL-P-39000/( )	UG-( )/U			
	Width	Height	Width	Height							
029	1.404	0.632	1.532	0.760	3.500-8.200	Aluminum Alloy	1-010	1550	0.0319	81.97	
030						Brass	1-011	1551	0.0315		
031						Copper	1-011	1551	0.0212		
032						Silver Alloy	1-011	1551	0.0227		
033	1.034	0.465	1.134	0.565	4.750-11.000	Aluminum Alloy	1-013	1553	0.0501	44.43	
034						Brass	1-014	1554	0.0494		
035						Copper	1-014	1554	0.0333		
036						Silver Alloy	1-014	1554	0.0357		
037	0.655	0.295	0.755	0.395	7.500-18.000	Aluminum Alloy	1-016	1556	0.0994	17.82	
038						Brass	1-017	1557	0.0981		
039						Copper	1-017	1557	0.0661		
040						Silver Alloy	1-017	1557	0.0708		
041	0.446	0.2010	0.527	0.281	11.000-26.500	Aluminum Alloy	1-019	1559	0.176	8.285	
042						Brass	1-020	1560	0.174		
043						Copper	1-020	1560	0.117		
044						Silver Alloy	1-020	1560	0.125		
045	0.2729	0.1228	0.353	0.203	18.000-40.000	Aluminum Alloy	1-022	1562	0.370	3.095	
046						Brass	1-023	1563	0.365		
047						Copper	1-023	1563	0.246		
048						Silver Alloy	1-023	1563	0.263		

See footnotes on next page.

MIL-STD-13588  
6 March 1978

- 1/ Actual attenuation of waveguides may be considerably greater depending upon operating frequency and temperature. For further information or to calculate frequencies, see S. Hopfer, "The Design of Ridged Waveguides," IRE Transactions on Microwave Theory and Techniques, MTT-3 pp 20-29, October 1955, and MIL-HDBK-216, Transmission Lines and Fittings, chapter 6. Typical resistivities of materials (at 20°C): Aluminum alloy (6061)=4.0 microhm-cm; Copper alloy (brass)=3.9 microhm-cm; Copper=1.77 microhm-cm; Silver alloy (coin silver)=2.03 microhm-cm.  $f_{c10}$  = cutoff frequency for TE<sub>10</sub> mode (see specification sheet for values).
- 2/ Actual power handling capability of waveguides may be considerably less depending upon waveguide temperature, altitude, operating frequency, etc. For further information or to calculate values for frequencies see referenced documents in footnote 1/. The tabulated values were calculated based upon the E field produced breakdown in a nonpressurized air dielectric waveguide under continuous wave (CW) conditions. The breakdown strength of air was considered to be 15,000 volts per centimeter, corner radii considered.

TABLE VI. Double-ridge waveguides, bandwidth ratio 2.4:1 (MIL-W-23351).

Part number M23351/4-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE <sub>10</sub> mode (GHz)	Material	Flange used with		f = $\sqrt{3} f_{c10} \frac{1}{c}$	
	Inside		Outside				MIL-F-39000/( )	UG-( )/U	Theoretical Attenuation 1/ Decibels/foot	Peak power rating 2/ Kilowatts
	Width	Height	Width	Height						
001	29.667	13.795	29.917	14.045	0.175-0.420	Aluminum Alloy Brass Copper Silver Alloy	---	---	0.00035 0.00034 0.00023 0.00025	61,960
002										
003										
004										
005	19.428	9.034	19.678	9.284	0.267-0.640	Aluminum Alloy Brass Copper Silver Alloy	---	---	0.00065 0.00064 0.00043 0.00046	26,570
006										
007										
008										
009	12.333	5.737	12.583	5.987	0.420-1.000	Aluminum Alloy Brass Copper Silver Alloy	---	---	.00128 .00126 .00085 .00091	10,710
010										
011										
012										
013	8.100	3.767	8.350	4.017	0.640-1.530	Aluminum Alloy Brass Copper Silver Alloy	---	---	0.0024 0.0024 0.0016 0.0017	4,620
014										
015										
016										
017	6.167	2.868	6.417	3.118	0.840-2.000	Aluminum Alloy Brass Copper Silver Alloy	3-001 3-002 3-002 3-002	1565 1566 1566 1566	0.0036 0.0036 0.0024 0.0026	2,676
018										
019										
020										
021	3.455	1.607	3.615	1.767	1.500-3.600	Aluminum Alloy Brass Copper Silver Alloy	3-004 3-005 3-005 3-005	1568 1569 1569 1569	0.0087 0.0086 0.0058 0.0062	840.5
022										
023										
024										
025	2.590	1.205	2.750	1.365	2.000-4.800	Aluminum Alloy Brass Copper Silver Alloy	3-007 3-008 3-008 3-008	1571 1572 1572 1572	0.0134 0.0132 0.0089 0.0095	472.5
026										
027										
028										

See footnotes at end of table.

MIL-STD-1358B  
6 March 1978

TABLE VI. Double-ridge waveguides, bandwidth ratio 2.4:1 (MIL-W-23351) - Continued.

Part number M23351/4-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE <sub>10</sub> mode (GHz)	Material	Flange used with		f = $\sqrt{3} f_{c10}$ l/	
	Inside		Outside				MIL-F-39000/( )	UG-( )/U	Theoretical Attenuation l/ Decibels/foot	Peak power rating 2/ Kilowatts
	Width	Height	Width	Height						
029	1.480	0.688	1.608	0.816	3.500-8.200	Aluminum Alloy	3-010	1574	0.0507	151.3
030						Brass	3-011	1575	0.0303	
031						Copper	3-011	1575	0.0204	
032						Silver Alloy	3-011	1575	0.0218	
033	1.090	0.506	1.190	0.606	4.750-11.000	Aluminum Alloy	3-013	1577	0.0487	83.72
034						Brass	3-014	1578	0.0481	
035						Copper	3-014	1578	0.0324	
036						Silver Alloy	3-014	1578	0.0347	
037	0.691	0.321	0.791	0.421	7.500-18.000	Aluminum Alloy	3-016	1580	0.0964	33.58
038						Brass	3-017	1581	0.0951	
039						Copper	3-017	1581	0.0641	
040						Silver Alloy	3-017	1581	0.0686	
041	0.471	0.219	0.551	0.299	11.000-26.500	Aluminum Alloy	3-019	1583	0.171	15.63
042						Brass	3-020	1584	0.169	
043						Copper	3-020	1584	0.114	
044						Silver Alloy	3-020	1584	0.122	
045	0.288	0.134	0.368	0.214	18.000-40.000	Aluminum Alloy	3-022	1586	0.358	5.834
046						Brass	3-023	1587	0.353	
047						Copper	3-023	1587	0.238	
048						Silver Alloy	3-023	1587	0.255	

See footnotes on next page.

MIL-STD-1358B  
6 March 1978

- 1/ Actual attenuation may be considerably greater depending upon operating frequency and temperature. For further information or to calculate frequencies, see S. Hopfer, "The Design of Ridged Waveguides," IRE Transactions on Microwave Theory and Techniques, MTT-3 pp 20-29, October, 1955, and MIL-HDBK-216, Transmission Lines and Fittings, chapter 6. Typical resistivities of materials (at 20°C): Aluminum alloy (6061)=4.0 microhm-cm; Copper alloy (brass)=3.9 microhm-cm; Copper=1.77 microhm-cm; Silver alloy (coin silver)=2.03 microhm-cm.  $f_{c10}$ =cutoff frequency for TE<sub>10</sub> mode (see specification sheet for values.
- 2/ Actual power handling capability of waveguides may be considerably less depending upon waveguide temperature, altitude, operating frequency, etc. For further information or to calculate values for frequencies see referenced documents in footnote 1/. The tabulated values were calculated based upon the E field produced breakdown in a nonpressurized air dielectric waveguide under continuous wave (CW) conditions. The breakdown strength of air was considered to be 15,000 volts per centimeter, corner radii considered.

MIL-STD-1358B  
6 March 1978

TABLE VII. Cross-reference of AN nomenclature to part number (MIL-W-85 only).

AN nomenclature	Part number MIL-W-85/( )	AN nomenclature	Part number MIL-W-85/( )
RG-48/U	1-043	RG-271/U	3-008
RG-49/U	1-055	RG-272/U	3-012
RG-50/U	1-067	RG-273/U	3-019
RG-51/U	1-073	RG-274/U	3-022
RG-52/U	1-079	RG-275/U	3-049
RG-53/U	1-102	RG-276/U	3-046
RG-66/U	1-106	RG-277/U	3-052
RG-67/U	1-077	RG-278/U	3-043
RG-68/U	1-071	RG-290/U	1-001
RG-69/U	1-017	RG-291/U	1-003
RG-75/U	1-041	RG-320/U	1-155
RG-91/U	1-089	RG-337/U	1-023
RG-95/U	1-053	RG-338/U	1-025
RG-96/U	3-006	RG-340/U	1-049
RG-97/U	3-010	RG-341/U	1-047
RG-98/U	3-017	RG-343/U	1-061
RG-99/U	3-020	RG-344/U	1-059
RG-103/U	1-018	RG-346/U	1-085
RG-104/U	1-031	RG-347/U	1-083
RG-105/U	1-029	RG-349/U	1-090
RG-106/U	1-065	RG-351/U	1-097
RG-107/U	1-093	RG-352/U	1-094
RG-109/U	4-001	RG-353/U	1-096
RG-110/U	4-003	RG-354/U	1-109
RG-112/U	1-037	RG-355/U	1-110
RG-113/U	1-035	RG-357/U	1-113
RG-121/U	1-103	RG-358/U	3-016
RG-201/U	1-005	RG-359/U	3-025
RG-202/U	1-007	RG-375/U	2-001
RG-203/U	1-009		
RG-204/U	1-011		
RG-205/U	1-013		

Custodians:

Army - EL  
Navy - EC  
Air Force - 85

Review activities:

Army - MI, AR  
Navy - OS  
Air Force - 11, 17, 99  
DLA - ES

User activities:

Army - AV, ME  
Navy - AS, CG, SH  
Air Force - 19

Preparing activity:

Navy - EC

Agent:

DLA - ES

(Project 5985-0858)

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE NAVY



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE \$300

**BUSINESS REPLY MAIL**  
FIRST CLASS PERMIT NO. 12503 WASHINGTON D. C.

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

COMMANDER  
NAVAL ELECTRONIC SYSTEMS COMMAND (ELEX 8111)  
WASHINGTON, DC 20360





## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION (Mark one) <input type="checkbox"/> VENDOR  <input type="checkbox"/> USER  <input type="checkbox"/> MANUFACTURER  <input type="checkbox"/> OTHER (Specify): _____
b. ADDRESS (Street, City, State, ZIP Code)	
5. PROBLEM AREAS	
a. Paragraph Number and Wording:	
b. Recommended Wording:	
c. Reason/Rationale for Recommendation:	
6. REMARKS	
7a. NAME OF SUBMITTER (Last, First, MI) - Optional	b. WORK TELEPHONE NUMBER (Include Area Code) - Optional
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional	8. DATE OF SUBMISSION (YYMMDD)

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)