MIL-STD-1358B
6 March 1978
SUPERSEDING
MIL-STD-1358A
15 October 1974

MILITARY STANDARD

WAVEGUIDES, RECTANGULAR, RIDGE AND CIRCULAR, SELECTION OF

FSC 5985

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

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.

5. DETAILED REQUIREMENTS. Not applicable.

6. NOTES. Not applicable.

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

Part number	Recommended frequency range for TE_{10} mode	Nominal cross-sectional dimensions (inches) Inside Width	Inside Height	Outside Width	Outside Height	Material 1/	Flange used with MIL-F-3922/	Flange used with UG-( )/U	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
SPECIFICATION SHEET MIL-W-85/1											
M85/1-	GHz								dB/100 ft	Megawatts	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	6061	76-07	---	0.047-0.031	528.3-753.8	1447-2194
161	0.32-0.49	23.000	11.500	23.376	11.876	6063	76-07	---	0.043-0.028	528.3-753.8	1582-2429
003	0.35-0.53	21.000	10.500	21.376	10.876	1100	76-06	---	0.046-0.031	439.3-625.4	1375-2040
004	0.35-0.53	21.000	10.500	21.376	10.876	6061	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	---	0.057-0.038	325.1-461.4	973.0-1450
006	0.41-0.625	18.000	9.000	18.250	9.250	6061	76-05	---	0.067-0.045	325.1-461.4	827.2-1232
163	0.41-0.625	18.000	9.000	18.250	9.250	6063	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	76-04	---	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	76-04	---	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	6063	76-04	---	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	291.0-434.9
165	0.64-0.96	11.500	5.750	11.750	6.000	6063	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	5.125	1100	76-02	---	0.147-0.098	93.81-133.7	231.2-346.9
012	0.75-1.12	9.750	4.875	10.000	5.125	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	5.125	6063	76-02	---	0.159-0.106	93.81-133.7	213.6-320.5
013	0.96-1.45	7.700	3.850	7.950	4.100	1100	76-01	---	0.205-0.139	59.67-84.18	137.8-203.3
014	0.96-1.45	7.700	3.850	7.950	4.100	6061	76-01	---	0.240-0.163	59.67-84.18	117.6-173.2
167	0.96-1.45	7.700	3.850	7.950	4.100	6063	76-01	---	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	1714, 1362, 417B	0.213-0.141	41.34-59.74	114.8-173.6
017						CA			0.316-0.209		80.53-121.8
018						1100			0.273-0.180		88.45-135.7
019						6061	52-002, 52-024, 58-008	1720, 1343, 418B	0.320-0.212		76.26-115.1
168	1.12-1.70	6.500	3.250	6.660	3.410	6063			0.295-0.195	41.34-59.74	82.72-125.1
021	1.45-2.20	5.100	2.550	5.260	2.710	C	52-003, 52-025	1715, 1718	0.296-0.201	26.19-37.00	68.22-100.4
023						CA			0.440-0.299		47.87-70.44
025						1100	52-004, 52-026	1717, 1719	0.380-0.258		53.19-78.24
026						6061			0.446-0.303		45.29-66.67
169	1.45-2.20	5.100	2.550	5.260	2.710	6063			0.411-0.279	26.19-37.00	49.14-72.39
027	1.70-2.60	4.300	2.150	4.460	2.310	C	52-005, 52-027, 58-009	1716, 1344, 435B	0.393-0.261	18.23-26.26	45.14-68.00
029						1100	52-006, 52-028, 58-010	1711, 1345, 437B	0.502-0.334		35.30-53.05
030						6061			0.590-0.392		30.03-45.20
031						CA	52-005, 52-027, 58-009	1716, 1344, 435B	0.583-0.387		31.67-47.71
170	1.70-2.60	4.300	2.150	4.460	2.310	6063	52-006, 52-028, 52-010	1711, 1345, 437B	0.544-0.361	18.23-26.26	32.57-49.08
033	2.20-3.30	3.400	1.700	3.560	1.860	C	52-007, 52-029, 58-011	1712, 1346, 553A	0.533-0.371	11.87-16.44	27.82-40.00
035						1100	52-008, 52-030, 58-012	1713, 1347 554A	0.682-0.474		21.73-31.26
036						6061			0.801-0.557		18.50-26.60
037						CA	52-007, 52-029, 58-011	1712, 1346, 553A	0.791-0.550		19.52-28.07
171	2.20-3.30	3.400	1.700	3.560	1.860	6063	52-008, 52-030, 58-012	1713, 1347, 554A	0.739-0.514	11.87-16.44	20.05-28.83
039	2.60-3.95	2.840	1.340	3.000	1.500	C	52-009, 52-031, 56-001, 61-002, 64-001	1724, 1348, 53, 548, 1479	0.742-0.508	7.645-10.85	17.19-25.11
041						1100	52-010, 52-032, 56-002, 61-001, 64-002	1725, 1349, 584 585A, 1484	0.950-0.651		13.42-19.59
042	2.60-3.95	2.840	1.340	3.000	1.500	6061			1.116-0.764	7.645-10.85	11.42-16.69

See footnotes at end of table.

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

Part number	Recommended frequency range for TE_{10} mode	Nominal cross-sectional dimensions (inches) Inside Width	Inside Height	Outside Width	Outside Height	Material 1/	Flange used with MIL-F-3922/	Flange used with UG-( )/U	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
SPECIFICATION SHEET MIL-W-85/1											
MB5/1-	GHz								dB/100 ft	Megawatts	Kilowatts
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	1.102-0.754	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	1.029-0.704	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	0.946-0.671	5.475-7.549	11.52-16.23
047						1100	52-012, 52-034	1727, 1351	1.211-0.858		8.991-12.69
048						6061			1.422-1.009		7.659-10.79
049						CA	52-011, 52-033	1726, 1350	1.404-0.996		8.083-11.39
173	3.30-4.90	2.290	1.145	2.418	1.273	6063	52-012, 52-034	1727, 1351	1.311-0.930	5.475-7.549	8.307-11.71
051	3.95-5.85	1.872	.872	2.000	1.000	C	52-013, 52-035, 57-002, 62-002, 63-001	1728, 1352, 149A, 148C, 1475	1.395-0.967	3.296-4.697	6.612-9.534
053						1100	52-014, 52-036, 57-001, 62-001, 63-005	1729, 1353, 407, 406B, 1480	1.785-1.238		5.165-7.446
054						6061			2.097-1.454		4.397-6.340
055						CA	52-013, 52-035, 57-002, 62-002, 63-001	1728, 1352, 149A, 148C, 1475	2.071-1.436		4.639-6.690
174	3.95-5.85	1.872	0.872	2.000	1.000	6063	52-014, 52-036, 57-001, 62-001, 63-005	1729, 1353, 407, 406B, 1480	1.934-1.341	3.296-4.697	4.767-6.874
057	4.90-7.05	1.590	0.795	1.718	0.923	C	52-015, 52-037, 71-05, 71-11, 71-17, 71-23	1730, 1354, ---, ---, 1907, ---	1.553-1.160	2.792-3.719	5.374-7.193
059						1100	52-016, 52-038, 71-06	1731, 1355, ---	1.988-1.485		4.196-5.617
060						6061	71-12, 71-18, 71-24	---	2.334-1.744		3.574-4.783
061						CA	52-015, 52-037, 71-05 71-11, 71-17, 71-23	1730, 1354, --- ---, 1907, ---	2.305-1.722		3.771-5.047
175	4.90-7.05	1.590	0.795	1.718	0.923	6063	52-016, 52-038, 71-06, 71-12, 71-18, 71-24	1731, 1355, --- ---	2.152-1.608	2.792-3.719	3.876-5.187
063	5.85-8.20	1.372	0.622	1.500	0.750	C	52-017, 52-039, 55-001, 60-001, 63-002	1732, 1356, 344, 343B, 1476	1.978-1.562	1.975-2.531	3.708-4.695
065						1100	52-018, 52-040, 55-002,	1733, 1357, 441,	3.532-1.999		2.076-3.667
066						6061	60-002, 63-006	440B, 1481	4.148-2.348		1.760-3.122
067						CA	52-017, 52-039, 55-001, 60-001, 63-002	1732, 1356, 344, 343B, 1476	2.936-2.319		2.602-3.294
176	5.85-8.20	1.372	0.622	1.500	0.750	6063	52-018, 52-040, 55-002, 60-002, 63-006	1733, 1357, 441 440B, 1481	3.824-2.164	1.975-2.531	1.917-3.387
069	7.05-10.0	1.122	0.497	1.250	0.625	C	52-019, 52-041, 53-002, 54-005, 54-011, 59-007, 59-015, 63-003	1734, 1358, 51, ---, ---, 52B, ---, 1477	2.776-2.154	1.284-1.702	2.290-2.946
071						1100	52-020, 52-042, 53-004, 54-006, 54-012, 59-009,	1735, 1359, 138, ---, ---, 137B,	3.548-2.756		1.788-2.301
072						6061	59-016, 63-007	---, 1482	4.166-3.238		1.523-1.958
073						CA	52-019, 52-041, 53-002, 54-005, 54-011, 59-007, 59-015, 63-003	1734, 1358, 51, ---, ---, 52B, ---, 1477	4.114-3.197		1.607-2.067
177	7.05-10.0	1.122	0.497	1.250	0.625	6063	52-020, 52-042, 53-004, 54-006, 54-012, 59-009, 59-016, 63-007	1735, 1359, 138, ---, ---, 137B ---, 1482	3.841-2.985	1.284-1.702	1.652-2.124
075	8.20-12.40	0.900	0.400	1.000	0.500	C	52-021, 52-043, 53-001, 53-009, 53-015, 54-007, 54-013, 59-006, 59-013, 63-004	1736, 1360, 39, ---, ---, ---, ---, ---, 408, ---, 1478	4.328-2.995	0.758-1.124	1.229-1.776

See footnotes at end of table.

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

Part number	Recommended frequency range for TE_{10} mode	Nominal cross-sectional dimensions (inches) Inside Width	Inside Height	Outside Width	Outside Height	Material 1/	Flange used with MIL-F-3922/	Flange used with UG-( )/U	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
						SPECIFICATION SHEET MIL-W-85/1			dB/100 ft	Megawatts	Kilowatts
M85/1-	GHz										
077	8.20-12.40	0.900	0.400	1.000	0.500	1100	52-022, 52-044, 53-003, 53-010, 53-016, 54-008, 54-014, 59-008, 59-014	1737, 1361, 135, ---, ---, ---, ---, 1368, ---, 1483	5.540-3.833	0.758-1.124	0.9593-1.386
078						6061	63-008		6.506-4.502		0.8169-1.180
079						CA	52-021, 52-043, 53-001, 53-009, 53-015, 54-007, 54-013, 59-006, 59-013, 63-004	1736, 1360, 39, ---, ---, ---, ---, 408, ---, 1478	6.424-4.445		0.8621-1.246
178	8.20-12.40	0.900	0.400	1.000	0.500	6063	52-022, 52-044, 53-003, 53-010, 53-016, 54-008, 54-014, 59-008, 59-014, 63-008	1737, 1361, 135, ---, ---, ---, ---, 1368, ---, 1483	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	53-007, 53-013, 59-010, 70-004, 70-016	---	5.121-3.577	0.622-0.903	0.9436-1.351
083						1100	53-008, 53-014, 59-011, 70-005, 70-006, 70-017, 70-018	---	6.554-4.578		0.7368-1.055
084						6061			7.698-5.377		0.6273-0.8982
085						CA	53-007, 53-013, 59-010, 70-004, 70-016	---	7.601-5.309		0.6621-0.9479
179	10.00-15.00	0.750	0.375	0.850	0.475	6063	53-008, 53-014, 59-011, 70-005, 70-016, 70-017, 70-018	---	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	53-005, 53-011, 53-017, 54-009, 54-015, 59-001, 70-007, 70-019	419, ---, ---, ---, ---, 541A, ---, ---	6.451-4.743	0.457-0.633	0.6432-0.8749
089						CA			9.578-7.041		0.4513-0.6139
090						1100	53-006, 53-012, 53-018, 54-010, 54-016, 59-002, 70-008, 70-009, 70-020, 70-021	1665, ---, ---, ---, ---, 1666, --- ---	8.259-6.071		0.5022-0.6832
091						6061			9.700-7.131		0.4276-0.5816
093						S	53-005, 53-011, 53-017, 54-009, 54-015, 59-001, 70-007, 70-019	419, ---, ---, ---, ---, 541A, --- ---	6.910-5.079		0.6016-0.8184
180	12.40-18.00	0.622	0.311	0.702	0.391	6063	53-006, 53-012, 53-018, 54-010, 54-016, 59-002, 70-021	1665, ---, ---, ---, ---, 1666, ---	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	69-004, 70-010, 70-022	---	8.812-6.384	0.312-0.433	0.4132-0.5701
096						CA			13.08-9.477		0.2899-0.4000
097						1100	69-005, 69-006, 70-011, 70-012, 70-023, 70-024	---	11.27-8.172		0.3228-0.4452
098						6061			13.25-9.598		0.2746-0.3791
181	15.00-22.00	0.510	0.255	0.590	0.335	6063			12.21-8.849	0.312-0.433	0.2979-0.4111
100	18.00-26.50	0.420	0.170	0.500	0.250	C	54-001, 59-003, 67-004	595, 596A, ---	13.80-10.13	0.171-0.246	0.2230-0.3038
102						CA			20.48-15.04		0.1565-0.2132
103						1100	54-002, 59-004, 67-011	597, 598A, ---	17.66-12.97		0.1742-0.2392
104						6061			20.74-15.23		0.1483-0.2020
106						S	54-001, 59-003, 67-004	595, 596A, ---	14.77-10.85		0.2087-0.2842
182	18.00-26.50	0.420	0.170	0.500	0.250	6063	54-002, 59-004, 67-011	597, 598A, ---	19.12-14.04	0.171-0.246	0.1609-0.2191
107	22.00-33.00	0.340	0.170	0.420	0.250	C	63-009	1530	16.86-11.73	0.139-0.209	0.1676-0.2410
109	22.00-33.00	0.340	0.170	0.420	0.250	CA			25.03-17.41	0.139-0.209	0.1176-0.1691

See footnotes at end of table.

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

Part number	Recommended frequency range for TE_{10} mode	Nominal cross-sectional dimensions (inches) Inside Width	Inside Height	Outside Width	Outside Height	Material 1/	Flange used with: MIL-F-3922/	Flange used with: UG-( )/U	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
SPECIFICATION SHEET MIL-W-85/1											
M85/1-	GHz								dB/100 ft	Megawatts	Kilowatts
110	22.00-33.00	0.340	0.170	0.420	0.250	1100	63-010	---	21.58-15.01	0.139-0.209	0.1309-0.1883
111						6061			25.35-17.63		0.1114-0.1603
113						CA/S	63-009	1530	16.18-11.25		0.1750-0.2517
183	22.00-33.00	0.340	0.170	0.420	0.250	6063	63-010	---	23.37-16.26	0.139-0.209	0.1209-0.1738
155	7.00-11.00	1.020	0.510	1.148	0.638	CA	69-001, 70-001, 70-013, 72-01, 72-03, 72-05,	1494, 1493, ---	5.219-3.291	1.017-1.534	1.220-1.935
156						C	72-07, 73-01, 73-03, 73-05, 73-07	--- --- ---	3.516-2.217		1.725-2.735
157						1100	69-002, 69-003, 70-002,		4.500-2.838		1.358-2.154
158						6061	70-003, 72-02, 72-04, 72-06, 72-08, 73-02,	---	5.285-3.333		1.156-1.834
160	7.00-11.00	1.020	0.510	1.148	0.638	6063	73-04, 73-06, 73-08		4.873-3.073	1.017-1.534	1.254-1.989
SPECIFICATION SHEET MIL-W-85/2 (heavy wall)											
M85/2-	GHz								dB/100 ft	Megawatts	Kilowatts
001	2.60-3.95	2.840	1.340	3.238	1.738	1100	52-010, 52-032, 56-002, 61-001, 64-002 6/	1725, 1349, 584,	0.950-0.651	7.645-10.85	14.56-21.25
002	2.60-3.95	2.840	1.340	3.238	1.738	6061			1.116-0.764	7.645-10.85	12.39-18.08
003	3.95-5.85	1.872	0.872	2.172	1.172	1100	52-014, 52-036, 57-001, 62-001, 63-005 6/	1729, 1353, 407, 406B, 1480	1.785-1.238	3.296-4.697	5.637-8.127
004	2.60-3.95	2.840	1.340	3.238	1.738	6063	52-010, 52-032, 56-002, 61-001, 64-002 6/	1725, 1349, 584 585A, 1484	1.028-0.705	7.645-10.85	13.48-19.63
005	3.95-5.85	1.872	0.872	2.172	1.172	6063	52-014, 52-036, 57-001, 62-001, 63-005 6/	1729, 1353, 407 406B, 1480	1.933-1.340	3.296-4.697	5.206-7.506
006	3.95-5.85	1.872	0.872	2.172	1.172	C	5/	---	1.399-0.970	3.296-4.697	6.961-10.05
007	7.05-10.0	1.122	0.497	1.378	0.753	C	5/	---	2.779-2.159	1.288-1.702	3.066-2.382
008	8.20-12.40	0.900	0.400	1.100	0.600	C	5/	---	4.339-3.003	0.758-1.124	4.788-3.314
009	8.20-12.40	0.900	0.400	1.100	0.600	C	5/	---	4.339-3.003	0.758-1.124	4.788-3.314
SPECIFICATION SHEET MIL-W-85/3 (millimeter)											
006	26.50-40.00	0.2800	0.1400	0.360	0.220	S	59-005, 59-012, 59-003,	600A, ---, 599,	24.55-16.80	96.0-146	103.1-150.1
007						C	67-005, 68-001, 63-002,	---, ---, ---,	23.02-15.77	96.0-146	109.7-160.1
008						CA/S	68-003	---	21.99-15.06	96.0-146	115.1-168.0
009	26.50-40.00	0.2800	0.1400	0.360	0.220	6061	67-012	---	34.46-23.59	96.0-146	73.22-107.0
010	33.00-50.00	0.2240	0.1120	0.304	0.192	S	67-001, 67-006	383, ---	34.57-23.50	64.4-97.0	64.73-95.30
011						C			32.44-22.05		68.89-101.4
012						CA/S			30.98-21.06		72.29-106.3
013	33.00-50.00	0.2240	0.1120	0.304	0.192	6061	67-013	---	48.53-32.99	64.4-97.0	46.05-67.74
014	40.00-60.00	0.1680	0.0940	0.268	0.174	S	67-007	---	42.39-30.46	48-70	48.30-67.21
015						C			39.81-28.60		51.12-71.43
016	40.00-60.00	0.1680	0.0940	0.268	0.174	CA/S			38.02-27.32	48-70	53.85-74.94
017	50.00-75.00	0.1480	0.0740	0.228	0.154	S	66-002, 67-002, 67-008	1523, 385, ---	64.23-43.89	30-40	28.46-41.44
018						C			60.25-41.17	30-40	30.27-44.30
019	50.00-75.00	0.1480	0.0740	0.228	0.154	CA/S			57.55-39.32	30-40	31.76-46.49
020	60.00-90.00	0.1220	0.0610	0.202	0.141	S	67-003, 66-001, 67-009	387, 1522	87.79-58.86	20-30	19.15-28.56
021						C			82.37-55.22		20.37-30.38
022	60.00-90.00	0.1220	0.0610	0.202	0.141	CA/S			78.67-52.74	20-30	21.37-31.88

See footnotes at end of table.

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

Part number	Recommended frequency range for TE_{10} mode	Nominal cross-sectional dimensions (inches) Inside Width	Inside Height	Outside Width	Outside Height	Material 1/	Flange used with MIL-F-3922/	Flange used with UG-( )/U	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
SPECIFICATION SHEET MIL-W-85/3 (millimeter)									dB/100 ft	Kilowatts	Watts
M85/3-	GHz										
023	75.00-110.00	0.1000	0.0500	0.180	0.130	S	66-007, 67-010	1528, ---	112.5-79.26	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, ---	105.6-74.37	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, ---	100.9-71.03	14-20	15.40-21.88
026	90.00-140.00	0.0800	0.0400	0.1600	0.1200	S	74-001	---	171.4-110.0	8.8-13	8.618-13.43
027	90.00-140.00	0.0800	0.0400	0.1600	0.1200	C	74-001	---	160.9-103.3	8.8-13	9.161-14.27
028	90.00-140.00	0.0800	0.0400	0.1600	0.1200	CA/S	74-001	---	153.7-98.67	8.8-13	9.610-14.97
029	110.00-170.00	0.0650	0.0325	0.1450	0.1125	S	74-002	---	238.1-150.9	5.9-9.3	5.662-8.934
030	110.00-170.00	0.0650	0.0325	0.1450	0.1125	C	74-002	---	223.5-141.7	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	---	213.5-135.3	5.9-9.3	6.315-9.964
032	140.00-220.00	0.0510	0.0255	0.1310	0.1055	S	74-003	---	343.6-216.0	3.7-6.1	3.674-5.844
033	140.00-220.00	0.0510	0.0255	0.1310	0.1055	C	74-003	---	322.7-202.8	3.7-6.1	3.904-6.211
034	140.00-220.00	0.0510	0.0255	0.1310	0.1055	CA/S	74-003	---	308.2-193.7	3.7-6.1	4.096-6.517
035	170.00-260.00	0.0430	0.0215	0.1230	0.1015	S	74-004	---	428.2-283.2	2.8-4.5	2.832-4.282
036	170.00-260.00	0.0430	0.0215	0.1230	0.1015	C	74-004	---	412.0-265.9	2.8-4.5	3.010-4.551
037	170.00-260.00	0.0430	0.0215	0.1230	0.1015	CA/S	74-004	---	384.0-254.0	2.8-4.5	3.484-4.774
038	220.00-325.00	0.0340	0.0170	0.1140	0.0970	S	74-005	---	570.9-388.0	1.9-2.6	2.021-2.973
039	220.00-325.00	0.0340	0.0170	0.1140	0.0970	C	74-005	---	536.0-364.4	1.9-2.6	2.148-3.159
040	220.00-325.00	0.0340	0.0170	0.1140	0.0970	CA/S	74-005	---	512.0-348.0	1.9-2.6	2.253-3.315
041	90.00-140.00	0.0800	0.0400	0.120	0.080	S	66-006	1527	171.4-110.0	8.8-13	6.442-10.04
042	90.00-140.00	0.0800	0.0400	0.120	0.080	C	66-006	1527	160.9-103.3	8.8-13	6.847-10.67
043	90.00-140.00	0.0800	0.0400	0.120	0.080	CA/S	66-006	1527	153.7-98.67	8.8-13	7.183-11.19
044	110.00-170.00	0.0650	0.0325	0.105	0.0725	S	66-004	1525	238.1-150.9	5.9-9.3	4.238-6.688
045	110.00-170.00	0.0650	0.0325	0.105	0.0725	C	66-004	1525	223.5-141.7	5.9-9.3	4.506-7.107
046	110.00-170.00	0.0650	0.0325	0.105	0.0725	CA/S	66-004	1525	213.5-135.3	5.9-9.3	4.727-7.459
047	140.00-220.00	0.0510	0.0255	0.091	0.0655	S	66-003	1524	343.6-216.0	3.7-6.1	2.666-4.241
048	140.00-220.00	0.0510	0.0255	0.091	0.0655	C	66-003	1524	322.7-202.8	3.7-6.1	2.833-4.507
049	140.00-220.00	0.0510	0.0255	0.091	0.0655	CA/S	66-003	1524	308.2-193.7	3.7-6.1	2.972-4.729
050	170.00-260.00	0.0430	0.0215	0.083	0.0615	S	66-005	1526	428.2-283.2	2.8-4.5	2.012-3.042
051	170.00-260.00	0.0430	0.0215	0.083	0.0615	C	66-005	1526	402.0-265.9	2.8-4.5	2.139-3.233
052	170.00-260.00	0.0430	0.0215	0.083	0.0615	CA/S	66-005	1526	384.0-254.0	2.8-4.5	2.475-3.392
053	220.00-325.00	0.0340	0.0170	0.074	0.057	S	5/	---	570.9-388.0	1.9-2.6	1.395-2.053
054	220.00-325.00	0.0340	0.0170	0.074	0.057	C	5/	---	536.0-364.4	1.9-2.6	1.483-2.181
055	220.00-325.00	0.0340	0.0170	0.074	0.057	CA/S	5/	---	512.0-348.0	1.9-2.6	1.556-2.289

See footnotes at end of table.

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

Part number	Recommended frequency range for TE_{10} mode	Nominal cross-sectional dimensions (inches) Inside Width	Inside Height	Outside Width	Outside Height	Material 1/	Flange used with MIL-F-3922/	Flange used with UG-( )/U	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
SPECIFICATION SHEET MIL-W-85/4 (reduced height)									dB/100 ft	Megawatts	Kilowatts
M85/4-	GHz										
001	2.60-5.85 7/	2.840	1.004	3.000	1.164	CA	71-01, 71-07, 71-13, 71-19, 75-01	---	1.131-0.947	5.720-8.911	10.25-12.24
002	2.60-5.85 7/	2.840	1.004	3.000	1.164	6061	71-02, 71-08, 71-14, 71-20, 75-02	---	1.145-0.959	5.720-8.911	10.12-12.09
003	5.85-12.40 8/	1.372	0.487	1.500	0.615	CA	71-03, 71-09, 71-15, 71-21, 75-03	---	3.399-2.174	1.577-2.174	1.912-2.305
004	5.85-12.40 8/	1.372	0.487	1.500	0.615	6061	71-04, 71-10, 71-16, 71-22, 75-04	---	3.442-2.854	1.577-2.174	1.888-2.276
007	2.60-5.85 7/	2.840	1.004	3.000	1.164	6063	71-02, 71-08, 71-14, 71-20, 75-02	---	1.056-0.884	5.720-8.911	10.98-13.11
008	5.85-12.40 8/	1.372	0.487	1.500	0.615	6063	71-04, 71-10, 71-16, 71-22, 75-04	---	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	5/	---	0.181-0.134	46.89-66.76	158.6-214.2
010	↓	↓	↓	10.000	2.686	6061	5/	---	0.272-0.202	↓	106.4-143.2
011				10.000	2.686	6063	5/	---	0.251-0.186		115.3-155.5
012				10.250	2.936	CA	5/	---	0.181-0.134		164.0-223.3
013				10.250	2.936	6061	75-15	---	0.272-0.202		110.0-148.1
014	0.75-1.12	9.750	2.436	10.250	2.936	6063	75-15	---	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	75-05	---	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	75-06	---	1.784-1.348	3.879-5.497	6.171-8.167
017	2.60-3.95	2.840	0.670	3.000	0.830	6063	75-06	---	1.645-1.243	3.879-5.497	6.692-8.856
018	3.95-5.85	1.872	0.372	2.000	0.500	C	75-07	---	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	75-08	---	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	75-08	---	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)
S = silver, grade C; CA/S = silver, grade A laminated on copper alloy.

2/ 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.

3/ 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 Gilden's "Handbook of High Power Capabilities of Waveguide Systems" (available from Microwave Associates, Burlington, Massachusetts).

4/ 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 CW Average Power Rating", IRE Transactions PGMTT-9 pp 349-357, July 1961.

5/ No military specifications exist for these flange sizes. Commercial items are available.

6/ The ends of these waveguides are milled down to permit installation of the listed flanges.

7/ These waveguides will propagate the TE_{20} mode at frequencies above 4.160 GHz.

8/ These waveguides will propagate the TE_{20} 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_{01} mode	TE_{11} 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.

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

Part number M2335i/1-	Nominal cross-sectional dimensions (inch)				Recommended frequency range TE_{10} mode (GHz)	Material	Flange used with		$f = \sqrt{3}\, f_{c_{10}}$ 1/	
	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	---	---	0.0024	14,550
002						Brass	---	---	0.0024	
003						Copper	---	---	0.0016	
004						Silver Alloy	---	---	0.0017	
005	12.542	5.644	12.792	5.894	0.270-0.970	Aluminum Alloy	---	---	0.0098	2,348
006						Brass	---	---	0.0096	
007						Copper	---	---	0.0065	
008						Silver Alloy	---	---	0.0070	
009	8.677	3.905	8.927	4.155	0.390-1.400	Aluminum Alloy	---	---	0.0168	1,124
010						Brass	---	---	0.0166	
011						Copper	---	---	0.0112	
012						Silver Alloy	---	---	0.0120	
013	3.494	1.572	3.654	1.732	0.970-3.500	Aluminum Alloy	2-001	1604	0.0658	182.2
014						Brass	2-002	1605	0.0650	
015						Copper	2-002	1605	0.0438	
016						Silver Alloy	2-002	1605	0.0469	
017	2.422	1.090	2.582	1.250	1.40-5.00	Aluminum Alloy	2-004	1607	0.114	87.56
018						Brass	2-005	1608	0.113	
019						Copper	2-005	1608	0.0758	
020						Silver Alloy	2-005	1608	0.0812	
021	0.968	0.436	1.068	0.536	3.50-12.40	Aluminum Alloy	2-007	1610	0.451	13.99
022						Brass	2-008	1611	0.445	
023						Copper	2-008	1611	0.300	
024						Silver Alloy	2-008	1611	0.321	

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_{10} 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						
025 026 027 028	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
029 030 031 032	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 microhm-cm; Copper=1.77 microhm-cm; Silver alloy (coin silver)=2.03 microhm-cm. f_{c10} = cutoff frequency for TE_{10} 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 IV. Double-ridge waveguides, bandwidth ratio 3.6:1 (MIL-W-23351).

Part number M23351/2-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE_{10} mode (GHz)	Material	Flange used with		$f = \sqrt{3} f_{c_{10}}$ 1/	
	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_{10} mode (GHz)	Material	Flange used with		$f = \sqrt{3}\, f_{c_{10}}$ 1/	
	Inside		Outside				MIL-F-39000/( )	UG-( )/U	Theoretical Attenuation 1/ Decibels/foot	Peak power rating 2/ Kilowatts
	Width	Height	Width	Height						
025 026 027 028	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
029 030 031 032	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. 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 microhm-cm; Copper=1.77 microhm-cm; Silver alloy (coin silver)=2.03 microhm-cm. f_{c10} = cutoff frequency for TE_{10} 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 V. Single-ridge waveguides, bandwidth ratio 2.4:1 (MIL-W-23351).

Part number M23351/3-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE_{10} mode (GHz)	Material	Flange used with		$f = \sqrt{3}\, f_{c_{10}}$ 1/	
	Inside		Outside				MIL-F-39000/( )	UG-( )/U	Theoretical Attenuation 1/ Decibels/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-W-23351) - Continued.

Part number M23351/3-	Nominal cross-sectional dimensions (inches)				Recommended frequency range TE_{10} mode (GHz)	Material	Flange used with		$f = \sqrt{3}\, f_{c_{10}}$ 1/	
	Inside		Outside				MIL-P-39000/( )	UG-( )/U	Theoretical Attenuation 1/ Decibels/foot	Peak power rating 2/ Kilowatts
	Width	Height	Width	Height						
029 030 031 032	1.404	0.632	1.532	0.760	3.500-8.200	Aluminum Alloy Brass Copper Silver Alloy	1-010 1-011 1-011 1-011	1550 1551 1551 1551	0.0319 0.0315 0.0212 0.0227	81.87
033 034 035 036	1.034	0.465	1.134	0.565	4.750-11.000	Aluminum Alloy Brass Copper Silver Alloy	1-013 1-014 1-014 1-014	1553 1554 1554 1554	0.0501 0.0494 0.0333 0.0357	44.43
037 038 039 040	0.655	0.295	0.755	0.395	7.500-18.000	Aluminum Alloy Brass Copper Silver Alloy	1-016 1-017 1-017 1-017	1556 1557 1557 1557	0.0994 0.0981 0.0661 0.0708	17.82
041 042 043 044	0.446	0.2010	0.527	0.281	11.000-26.500	Aluminum Alloy Brass Copper Silver Alloy	1-019 1-020 1-020 1-020	1559 1560 1560 1560	0.176 0.174 0.117 0.125	8.285
045 046 047 048	0.2729	0.1228	0.353	0.203	18.000-40.000	Aluminum Alloy Brass Copper Silver Alloy	1-022 1-023 1-023 1-023	1562 1563 1563 1563	0.370 0.365 0.246 0.263	3.095

See footnotes on next page.

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 microhm-cm; Copper=1.77 microhm-cm; Silver alloy (coin silver) =2.03 microhm-cm. f_{c10} = cutoff frequency for TE_{10} 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-M-23351).

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

See footnotes at end of table.

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_{10} mode (GHz)	Material	Flange used with		$f = \sqrt{3} f_{c_{10}}$ 1/	
	Inside		Outside				MIL-F-39000/( )	UG-( )/U	Theoretical Attenuation 1/ 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	0.0307	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.

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 microhms-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_{10} 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 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		

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Navy - EC
Air Force - 85

Review activities:
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Navy - OS
Air Force - 11, 17, 99
DLA - ES

User activities:
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Navy - AS, CG, SH
Air Force - 19

Preparing activity:
Navy - EC

Agent:
DLA - ES

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