

INCH-POUND

MIL-DTL-287/3F
14 April 2009
SUPERSEDING
MIL-DTL-287/3E
4 December 1998

DETAIL SPECIFICATION SHEET

WAVEGUIDE ASSEMBLIES, FLEXIBLE, TWISTABLE, CLASS 1

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

The requirements for acquiring the waveguide assemblies described herein shall consist of this specification sheet and MIL-DTL-287.

REQUIREMENTS: See table I.

Part or Identifying Number (PIN): See table I.

First article approval by similarity: First article approval obtained for one waveguide assembly shall, with acquiring activity approval, enable first article approval for other waveguide assemblies as specified in table II.

Cross reference information: See table III.

Substitution data: See table IV.

MIL-DTL-287/3F

TABLE I. Flexible, twistable waveguide assemblies.

Group number	PIN M287/3-1/	TE ₁₀ mode frequency range (GHz)	Minimum centerline bending radius (inch)		Repeated twist (degrees/ft)		Insertion loss (dB/ft)	Axial twist (degrees/ft)	Pressurization lb _f /in ² gage	VSWR ₂ / (max) at			
			E plane	H plane	400 cycles	1x10 ⁵ cycles				12"	24"	36"	>36"
I	01-XXXX	1.12 - 1.70	24.12	48.08	5.0	1.5	0.005	10	2	1.05	1.06	1.07	1.10
	02-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	60-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
I	03-XXXX	1.70 - 2.60	12.39	25.95	7.50	2.25	0.01	15	4	1.06	1.07	1.08	"
	04-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	61-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
I	05-XXXX	2.20 - 3.30	11.14	19.64	11.0	3.3	0.015	22	5	"	"	"	"
	06-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	62-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
I	07-XXXX	2.60 - 3.95	6.88	14.38	14.5	4.5	0.02	28	15	1.08	1.09	1.10	1.12
	08-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	09-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	10-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	11-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	12-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	13-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	14-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	63-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
II	15-XXXX	3.95 - 5.85	4.94	12.04	25.0	7.5	0.05	50	30	"	"	"	"
	16-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	17-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	18-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	19-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	20-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	21-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	22-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	64-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
II	23-XXXX	5.85 - 8.20	3.88	9.25	35.0	10.5	0.08	70	"	"	"	"	"
	24-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	25-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	26-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	27-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	28-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	29-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	30-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	65-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
II	31-XXXX	7.05 - 10.0	3.57	8.38	42.5	12.75	"	85	"	1.12	1.14	1.15	1.18
	32-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	33-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	34-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	35-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	36-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	37-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	38-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	66-XXXX	"	"	"	"	"	"	"	"	"	"	"	"

See footnotes at end of table.

MIL-DTL-287/3F

TABLE I. Flexible, twistable waveguide assemblies - Continued.

Flexure (degrees/ft) 1x10 ⁵ cycles		Jacket material	Retention force (lbf)	Operating temperature range -55°C to	Mates with standard rigid waveguide M85/1-	Flanges		
E plane	H plane					Flange 1 M3922/()	Flange 2 M3922/()	Material 3/
4.5 4.5 4/	2.2 2.2 4/	Neoprene	N/A	+100°C	017 018 017	58-007 (contact) 58-008 (contact) 58-007 (contact)	58-007 (contact) 58-008 (contact) 58-007 (contact)	CU AL CU
7.50 7.50 4/	3.6 3.6 4/	"	"	"	031 029 031	58-009 (contact) 58-010 (contact) 58-009 (contact)	58-009 (contact) 58-010 (contact) 58-009 (contact)	CU AL CU
9.0 9.0 4/	5.25 5.25 4/	"	"	"	037 035 037	58-011 (contact) 58-012 (contact) 58-011 (contact)	58-011 (contact) 58-012 (contact) 58-011 (contact)	CU AL CU
13.3 " " " " " " 4/	6.4 " " " " " " 4/	"	"	"	043 041 043 041 043 041 043 041 043	64-001 (contact) 64-002 (contact) 56-001 (cover) 56-002 (cover) 61-002 (choke) 61-001 (choke) 61-002 (choke) 61-001 (choke) 61-002 (choke)	64-001 (contact) 64-002 (contact) 56-001 (cover) 56-002 (cover) 56-001 (cover) 56-002 (cover) 61-002 (choke) 61-001 (choke) 56-001 (cover)	CU AL CU AL CU AL CU AL CU
18.7 " " " " " " " 4/	7.6 " " " " " " 4/	"	"	"	055 053 055 053 055 053 055 053 055	63-001 (contact) 63-005 (contact) 57-002 (cover) 57-001 (cover) 62-002 (choke) 62-001 (choke) 62-002 (choke) 62-001 (choke) 63-001 (contact)	63-001 (contact) 63-005 (contact) 57-002 (cover) 57-001 (cover) 57-002 (cover) 57-001 (cover) 62-002 (choke) 62-001 (choke) 63-001 (contact)	CU AL CU AL CU AL CU AL CU
24.0 " " " " " " " 4/	10.2 " " " " " " 4/	"	"	"	067 065 067 065 067 065 067 065 067	63-002 (contact) 63-006 (contact) 55-001 (cover) 55-002 (cover) 60-001 (choke) 60-002 (choke) 60-001 (choke) 60-002 (choke) 63-002 (contact)	63-002 (contact) 63-006 (contact) 55-001 (cover) 55-002 (cover) 55-001 (cover) 55-002 (choke) 60-001 (choke) 60-002 (choke) 63-002 (contact)	CU AL CU AL CU AL CU AL CU
26.1 " " " " " " " 4/	11.1 " " " " " " 4/	"	"	"	073 071 073 071 073 071 073 071 073	63-003 (contact) 63-007 (contact) 53-002 (cover) 53-004 (cover) 59-007 (choke) 59-009 (choke) 59-007 (choke) 59-007 (choke) 63-003 (contact)	63-003 (contact) 63-007 (contact) 53-002 (cover) 53-004 (cover) 53-002 (cover) 53-004 (cover) 59-007 (choke) 59-009 (choke) 63-003 (contact)	CU AL CU AL CU AL CU AL CU

See footnotes at end of table.

MIL-DTL-287/3F

TABLE I. Flexible, twistable waveguide assemblies - Continued.

Group number	PIN M287/3-1/	TE ₁₀ mode frequency range (GHz)	Minimum centerline bending radius (inch)		Repeated twist (degrees/ft)		Insertion loss (dB/ft)	Axial twist (degrees/ft)	Pressurization lb _f /in ² gage	VSWR <u>2</u> / (max) at			
			E plane	H plane	400 cycles	1x10 ⁵ cycles				12"	24"	36"	>36"
II	39-XXXX	8.20 - 12.40	3.38	7.51	47.5	14.25	0.1	95	30	1.14	1.15	1.16	1.19
	40-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	41-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	42-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	43-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	44-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	45-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	46-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
III	47-XXXX	12.4 - 18.00	2.75	5.75	60.0	18.0	0.25	120	"	1.13	"	1.19	1.24
	48-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	49-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	50-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	51-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	52-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	53-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	68-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
III	54-XXXX	18.0 - 26.5	2.33	4.5	82.5	24.25	0.35	165	"	1.14	1.16	1.20	1.25
	55-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	56-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	57-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	58-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
	59-XXXX	"	"	"	"	"	"	"	"	"	"	"	"
III	69-XXXX	"	"	"	"	"	"	"	"	"	"	"	"

See footnotes at end of table.

MIL-DTL-287/3F

TABLE I. Flexible, twistable waveguide assemblies - Continued.

Flexure (degrees/ft) 1×10^5 cycles		Jacket material	Retention force (lbf)	Operating temperature range -55°C to	Mates with standard rigid waveguide M85/1-	Flanges		
E plane	H plane					Flange 1 M3922/()	Flange 2 M3922/()	Material <u>3/</u>
27.5	12.3	Neoprene	N/A	+100°C	079	63-004 (contact)	63-004 (contact)	CU
"	"	"	"	"	077	63-008 (contact)	63-008 (contact)	AL
"	"	"	"	"	079	53-001 (cover)	53-001 (cover)	CU
"	"	"	"	"	077	53-003 (cover)	53-003 (cover)	AL
"	"	"	"	"	079	59-006 (choke)	53-001 (cover)	CU
"	"	"	"	"	077	59-008 (choke)	53-003 (cover)	AL
"	"	"	100	"	079	59-006 (choke)	59-006 (choke)	CU
"	"	"	100	"	077	59-008 (choke)	59-008 (choke)	AL
<u>4/</u>	<u>4/</u>	"	N/A	"	079	63-004 (contact)	63-004 (contact)	CU
33.7	16.2	"	"	"	089	53-005 (cover)	53-005 (cover)	CU
"	"	"	"	"	090	53-006 (cover)	53-006 (cover)	AL
"	"	"	"	"	089	59-001 (choke)	53-005 (cover)	CU
"	"	"	"	"	090	59-002 (choke)	53-006 (cover)	AL
"	"	"	"	"	089	59-001 (choke)	59-001 (choke)	CU
"	"	"	"	"	090	59-002 (choke)	59-002 (choke)	AL
"	"	Plastic	"	+65°C	089	53-005 (cover)	53-005 (cover)	CU
<u>4/</u>	<u>4/</u>	Neoprene	"	+100°C	089	53-005 (cover)	53-005 (cover)	CU
45.0	22.5	"	"	"	102	54-001 (cover)	54-001 (cover)	CU
"	"	"	"	"	103	54-002 (cover)	54-002 (cover)	AL
"	"	"	"	"	102	59-003 (choke)	54-001 (cover)	CU
"	"	"	"	"	103	59-004 (choke)	54-002 (cover)	AL
"	"	"	"	"	102	59-003 (choke)	59-003 (choke)	CU
"	"	"	"	"	103	59-004 (choke)	59-004 (choke)	AL
<u>4/</u>	<u>4/</u>	"	"	"	102	54-001 (cover)	54-001 (cover)	CU

1/ The PIN shall be the number shown and a four-digit number indicating the nominal relaxed length in inches.

2/ The VSWR value for any length between the lengths specified shall be the next higher value (e.g., for a 15-inch length of M287/03-01, the VSWR would be 1.06:1).

3/ CU = copper alloy, AL = aluminum alloy.

4/ These assemblies are constructed from beryllium copper and the flexure cycle is 10^6 rather than 10^5 . All other characteristics are as listed.

MIL-DTL-287/3F

TABLE II. Grouping for first article approval.

Group number	First article approved dash number	Dash numbers of first articles approved by similarity, with procuring activity approval
I	04	01, 02, 03, 05, 06, 07, 08, 09, 10, 11, 12, 13, and 14
I	61	60, 62, and 63
II	24	15 through 23 and 25 through 46
II	65	64, 66, and 67
III	47	48 through 53
III	55	54, 56 through 59
III	69	68

TABLE III. Cross reference (type designation to PIN).

Type designation	PIN M287/3- ()	Type designation	PIN M287/3- ()
FG650AEEB	01	FG042ACCB	56
FG430AEEB	03	FG284ACCA	12
FG340AEEB	05	FG187ACCA	20
FG284AEEB	07	FG137ACCA	28
FG187AEEB	15	FG112ACCA	36
FG137AEEB	22	FG090ACCA	44
FG112AEEB	31	FG062ACCA	50
FG090AEEB	39	FG042ACCA	57
FG650AEEA	02	FG284ADDB	09
FG430AEEA	04	FG187ADDB	17
FG340AEEA	06	FG137ADDB	25
FG284AEEA	08	FG112ADDB	33
FG187AEEA	16	FG090ADDB	41
FG137AEEA	24	FG062ADDB	47
FG112AEEA	32	FG042ADDB	54
FG090AEEA	40	FG284ADDA	10
FG284ACCB	11	FG187ADDA	18
FG187ACCB	19	FG137ADDA	26
FG137ACCB	27	FG112ADDA	34
FG112ACCB	35	FG090ADDA	42
FG090ACCB	43	FG062ADDA	48
FG062ACCB	49	FG042ADDA	55

MIL-DTL-287/3F

TABLE IV. Substitution data. 1/

Dash number	Manufacturer's code (CAGE)	Manufacturer's PIN	Dash number	Manufacturer's code (CAGE)	Manufacturer's PIN
01	80006	AT2B650	28	80006	AT-7B137
01	06351	TL-105064	28	06351	TL-72315
01	54647	MTP360300	28	54647	MTP360327
02	80006	AT6B650	29	80006	AT4B137
02	06351	TL-102065	29	54647	MTP360328
02	54647	MTP360301			
03	80006	AT2B430	30	80006	AT8B137
03	06351	TL-94158	30	54647	MTP360329
03	54647	MTP360302			
04	80006	AT6B430	31	80006	AT12B112
04	06351	TL-94154	31	06351	TL-68223
04	54647	MTP360303	31	54647	MTP360330
05	80006	AT2B340	32	80006	AT16B112
05	54647	MTP360304	32	06351	TL-68224
			32	54647	MTP360331
06	80006	AT6B340	33	80006	AT2B112
06	54647	MTP360305	33	06351	TL-68216
			33	54647	MTP360332
07	80006	AT12B284	34	80006	AT6B112
07	06351	TL-86161	34	06351	TL-68205
07	54647	MTP360306	34	54647	MTP360333
08	80006	AT16B284	35	80006	AT3B112
08	06351	TL86162	35	06351	TL-68213
08	54647	MTP360307	35	54647	MTP360334
09	80006	AT2B284	36	80006	AT7B112
09	06351	TL-86164	36	06351	TL-68208
09	54647	MTP360308	36	54647	MTP360335
10	80006	AT6B284	37	80006	AT4B112
10	06351	TL-86165	37	54647	MTP360336
10	54647	MTP360309			
11	80006	AT3B284	38	80006	AT8B112
11	06351	TL-86150	38	54647	MTP360337
11	54647	MTP360310			
12	80006	AT7B284	39	80006	AT12B090
12	06351	TL-86163	39	06351	TL-64449
12	54647	MTP360311	39	54647	MTP360338
13	80006	AT4B284	40	80006	AT16B090
13	54647	MTP360312	40	06351	TL-64450
			40	54647	MTP360339
14	80006	AT8B284	41	80006	AT2B090
14	54647	MTP360313	41	06351	TL-64445
			41	54647	MTP360340
15	80006	AT12B187	42	80006	AT6B090
15	06351	TL-78173	42	06351	TL-64451
15	54647	MTP360314	42	54647	MTP360341
16	80006	AT16B187	43	80006	AT3B090
16	06351	TL-78174	43	06351	TL-64443
16	54647	MTP360315	43	54647	MTP360342
17	80006	AT2B187	44	80006	AT7B090
17	06351	TL-78175	44	06351	TL-64444
17	54647	MTP360316	44	54647	MTP360342
18	80006	AT6B187	47	80006	AT2B062
18	06351	TL-78176	47	06351	TL-57108
18	54647	MTP360317	47	54647	MTP360346
19	80006	AT3B187	48	80006	AT6B062
19	06351	TL-78167	48	06351	TL-57110
19	54647	MTP360318	48	54647	MTP360347
20	80006	AT7B187	49	80006	AT3B062
20	06351	TL-78172	49	06351	TL-57109
20	54647	MTP360319	49	54647	MTP360348
21	80006	AT4B187	50	80006	AT7B062
21	54647	MTP360320	50	06351	TFT-57067
			50	54647	MTP360349

MIL-DTL-287/3F

TABLE IV. Substitution data. 1/ - continued

Dash number	Manufacturer's code (CAGE)	Manufacturer's PIN	Dash number	Manufacturer's code (CAGE)	Manufacturer's PIN
22	80006 54647	AT8B187 MTP360321	51	80006 54647	AT4B062 MTP360350
23	80006 06351 54647	AT12B137 TL-72312 MTP360322	52	80006 54647	AT8B062 MTP360351
24	80006 06351 54647	AT16B137 TL-72313 MTP360323	53	80006	AT2B062
25	80006 06351 54647	AT2B137 TL-72316 MTP360324	54	54647	MTP360352
26	80006 06351 54647	AT6B137 TL-72317 MTP360325	55	54647	MTP360353
27	80006 06351 54647	AT3B137 TL-72314 MTP360326	56	54647	MTP360354
			57	54647	MTP360355
			58	54647	MTP360356
			59	54647	MTP360357

1/ Assemblies covered by this specification sheet are substitutable for the manufacturer's PINs shown. This information in no way implies that the manufacturer's part is substitutable for the military part.

80006

Airtron Division
Litton Systems Incorporated
200 East Hanover Avenue
Morris Plains, NJ 07950-2442

06351

Microwave Engineering Corporation
1551 Osgood Street
North Andover, MA 01845-1012

54647

Microtech, Inc.
1425 Highland Ave.
Cheshire, CT 06410-1216
USA
<http://www.microtech-inc.com>

Referenced documents. This document only references MIL-DTL-287.

Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - CR
Navy - EC
Air Force - 85
DLA-CC

Preparing activity:
DLA - CC

(Project 5985-2009-015)

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

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.