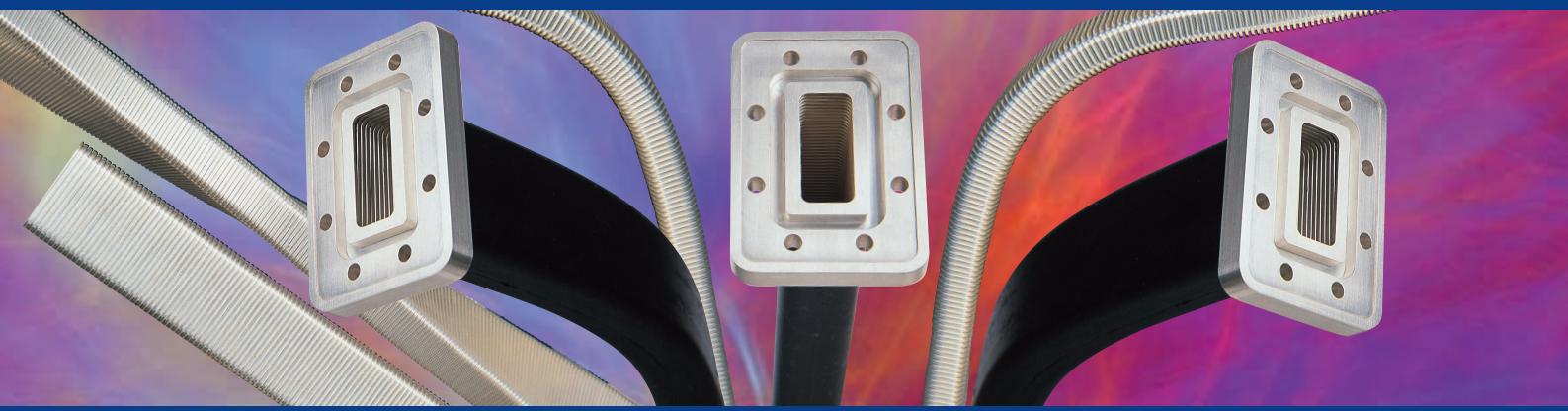
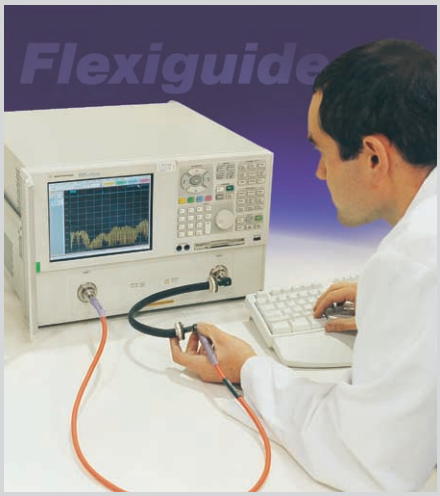
Flexiguide



World Leaders in Flexible Waveguide Technology

The Company

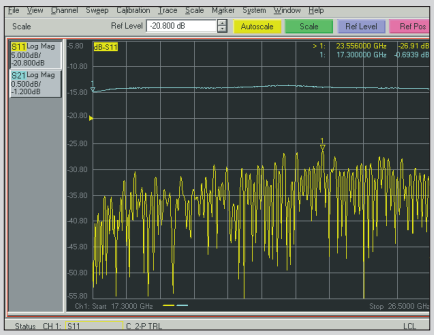
Flexiguide specialize in the manufacture of flexible and flexible / twistable waveguide and associated waveguide products. Using advanced manufacturing techniques and innovative processes, we can offer rapid delivery and exceptional performance.



State of the art test equipment.

Design and Development

Our flexible / twistable waveguide is manufactured using purpose built, precision winding machines, designed and built in house using innovative new techniques in precision metal manipulation. The unique design of these machines has set new levels of performance for flexible / twistable waveguide without the need to dent tune. Our engineering team are qualified with many years experience of waveguide and its' applications and can offer custom design solutions to meet your demanding requirements.



Typical full band performance.

Flexiguide modern manufacturing premises.

Quality

Flexiguide is dedicated to providing the highest level of quality assurance. We are proud of our high manufacturing yields, excellent record of on-time delivery and product reliability. Rapid response to technical requests and price / delivery enquiries ensure customer satisfaction at all times.

The company offers state of the art test and measurement facilities up to 50 GHz. Unique serial numbers are allocated to all items and test results or plots are recorded and kept for a period of five years. Fully traceable materials are used at all stages of manufacture of our flexible waveguide products.

Our dedication to customer service and value has established our reputation for being the supplier of choice in a global market, not just for the product we supply, but for the service we provide.

Our rapidly growing production facility in the UK supplies many of the Worlds leading OEM's through direct sales and a network of agents.

In-house production lines.

Warehouse despatch centre.

Flexiguide

"Delivering reliable performance"

Applications and Markets

Flexible and flexible / twistable waveguide are used in a wide variety of telecom, satcom, military and aerospace applications. Waveguide carries the high frequency radio (microwave) signals in both communication and radar systems. Due to its' helically wound design, flexible / twistable waveguide can be simultaneously twisted and bent in both planes.

TELECOM

The principle applications are:

- An aid to positioning parabolic reflectors in line of sight microwave radio links.
- The elimination of installation difficulties caused by misalignment or system variations.
- To isolate vibration.
- To permit the relative movement of equipment due to thermal expansion.
- To accommodate moving equipment in radar scanners.

Source: SES ASTRA

SATCOM

Photograph by: Mark Owens © Crown Copywrite/MOD image from www.photos.mod.uk

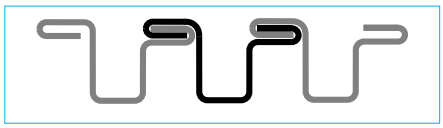
MILITARY

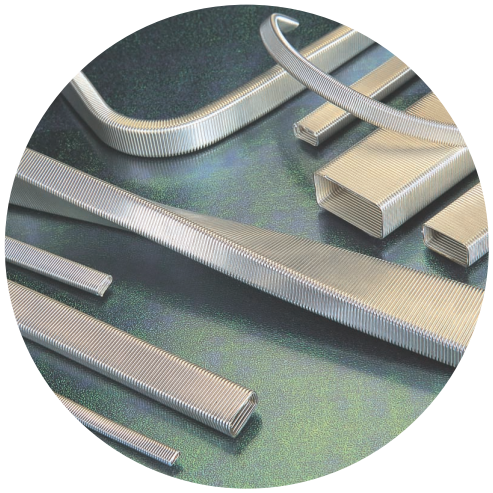
AEROSPACE

Waveguide Construction

Flexible / Twistable

Flexible / twistable waveguide core starts life as a spool of 0.1mm thick, silver plated, brass strip. The strip is then precision rolled into a three-dimensional profile before being helically wound around a rotating mandrel to form a continuous rectangular tube with uniform cross section and internal silver plating to minimize loss.
Flexible / twistable waveguide is not pressure tight without a jacket.



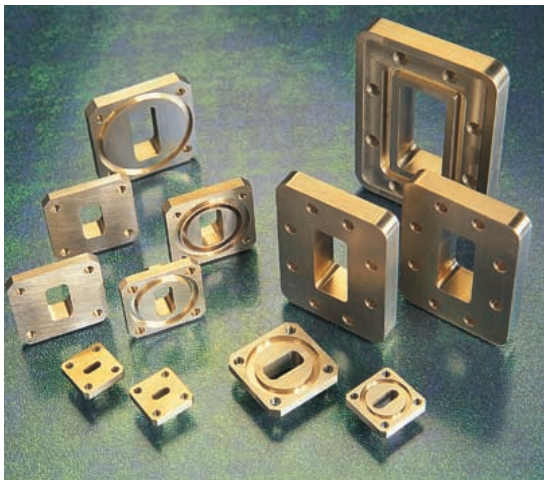


Flexible Waveguide

There are two types of flexible waveguide:

Flexible / non-twistable waveguide which is manufactured in a similar way to flexible / twistable waveguide with the addition of a solder wire which is later melted to prevent the waveguide twisting. This also reduces any RF leakage.

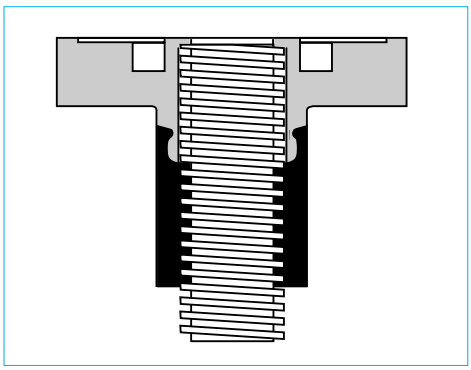
Seamless flexible waveguide is manufactured from a thin brass tube, which is mechanically manipulated into a corrugated form to produce a seamless flexible waveguide. The seamless construction generally allows for greater power and pressure handing although length is limited to 1 metre.



Flanges

Flexiguide offer a wide variety of flanges including European "154 IEC" standard, American MIL specification "UG" flanges and American EIA "CPR" types. Standard flanges are CNC machined from corrosion resistant, marine grade brass and are supplied un-plated unless otherwise specified. Special flanges can be supplied upon request.

The unique design of the flange rear ensures that the moulded rubber jacket overlaps to create a secure, permanent environmental seal.



Flange Finish

Tin

Tin plating improves the compatibility of standard brass flanges with aluminium by reducing differential electrode potentials. It also provides increased resistance to corrosion in hostile environments.

Silver

Silver plating of the flanges provides increased corrosion resistance for hostile environments.

Protective Jacket

Silicone: -70 to 170°C

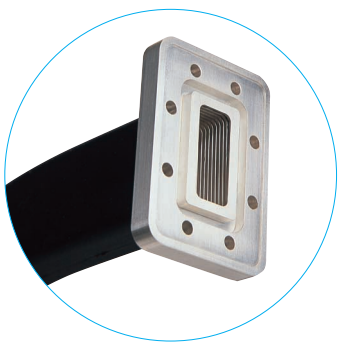
Our standard flexible waveguide is encapsulated using injection moulded silicone rubber to provide a high degree (IP68) of environmental protection. Silicone is proven to be more resistant to ozone, UV, water and extremes of temperature than the inferior neoprene alternative offered by other waveguide manufacturers.

Polyurethane: -30 to 90°C

Polyurethane offers an excellent alternative to neoprene where the temperature range of silicone is not required.

Polyolefin: -20 to 100°C

For a limited number of applications and for longer lengths we can offer an adhesive lined polyolefin heat-shrink jacket. Due to the nature of the jacket, moulds are not required and lengths up to 5 metre are available depending upon waveguide size. These jackets are not recommended for use in pressurised systems above 40kPa.



ELECTRICAL SPECIFICATIONS

WG DESIGNATION			FREQUENCY RANGE	PEAK POWER**	SUGGESTED AVERAGE POWER LIMIT**	INSERTION LOSS dB	RETURN LOSS dB*		
WG	WR	R	GHz	MW	kW	dB/m	300mm	600mm	1000mm
10	284	32	2.60-3.95	2.2	4	0.11	31.4	30.0	29.5
11A	229	40	3.30-4.90	1.8	4	0.15	31.0	29.5	28.8
12	187	48	3.95-5.85	1.4	3	0.16	31.0	28.8	28.3
13	159	58	4.90-7.05	0.6	2.5	0.18	31.0	28.3	27.8
14	137	70	5.85-8.20	0.56	2	0.28	30.2	27.8	27.3
15	112	84	7.05-10.00	0.33	1.5	0.30	30.2	27.3	27.1
16	90	100	8.20-12.40	0.22	1	0.40	30.2	27.1	27.0
17	75	120	10.00-15.00	0.18	0.75	0.50	29.4	27.0	26.4
18	62	140	12.40-18.00	0.12	0.4	0.80	29.4	26.4	26.0
19	51	180	15.00-22.00	0.085	0.2	1.00	26.4	25.0	24.5
20	42	220	17.70-26.50	0.045	0.1	1.20	23.0	22.1	21.1
21	34	260	22.00-33.00	0.031	0.085	1.50	22.1	21.0	20.0
22	28	320	26.50-40.00	0.022	0.075	2.00	21.0	17.7	17.1
23	22	400	33.00-50.00	N/A	N/A	2.50	20.0	16.5	16.0
24	19	500	40.00-60.00	N/A	N/A				
25	15	620	50.00-75.00	N/A	N/A				

Notes:

1) *Return Loss performance is degraded if Choke Flanges are specified.

2) **Power figures are for guidance only.

MECHANICAL SPECIFICATIONS

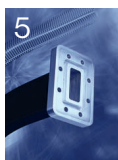
WG DESIGNATION			MINIMUM CENTRE LINE BENDING RADII				MAX TWIST STATIC	MAX TWIST REPEATED	
			STATIC E-PLANE	STATIC H-PLANE	REPEATED E-PLANE	REPEATED H-PLANE			
WG	WR	R	mm	mm	mm	mm	Deg/m	Deg/m	
10	284	32	206	412	824	1648	105	25	
11A	229	40	166	332	654	1328	130	35	
12	187	48	136	272	544	1088	155	40	
13	159	58	116	232	464	928	185	45	
14	137	70	100	200	400	800	210	52	
15	112	84	82	164	328	656	260	68	
16	90	100	66	132	264	528	315	76	
17	75	120	54	108	216	432	365	92	
18	62	140	46	92	184	368	445	112	
19	51	180	38	76	152	304	445	112	
20	42	220	30	60	120	240	630	157	
21	34	260	24	48	96	192	630	157	
22	28	320	20	40	80	160	920	230	
23	22	400	18	38	78	158	920	230	
24	19	500	18	38	78	158	920	230	
25	15	620	16	36	76	156	920	230	

Notes:

1) Standard lengths are as follows: 100, 200, 300, 400, 500, 600, 900, 1000, 1200, 1500, 2000 mm.

2) Other lengths are available on request and may be subject to tooling and design charges.

3) Length tolerance = 1.5% or +/-2mm which ever is the greater.



Considerations for use

Storage

To prevent dirt and moisture ingress waveguide assemblies should be transported and stored in their original packaging until the point of installation. Flexiguide standard packing includes a sealed polythene moisture barrier to protect the contents form humidity and moisture ingress.

Handling

To maximize performance, waveguides are manufactured to high tolerances. Any physical damage or force, which alters the cross sectional profile, will be detrimental to the electrical performance. Waveguide assemblies must not be bent beyond the minimum bend radii as detailed in the mechanical specification table. Waveguide assemblies must not be stretched or installed under tension.

Electrical

Whilst Insertion Loss (attenuation) and Return Loss (VSWR) performance will be maintained during flexing, a flexible waveguide assembly cannot be considered phase stable during flexing due to the changing path length.
Full details of the electrical performance can be found in the table on page 5.

Environmental

Humidity

Jacketed waveguide assemblies are not affected by humidity, although condensation may penetrate non-sealed flanges.

Vibration

Waveguide assemblies have a low primary resonant frequency due to their low spring stiffness. Assemblies should therefore be supported at regular intervals to prevent large magnitude oscillations due to variable wind loading. In cold climates, consideration should also be given to potential ice loading and appropriate support provided.

Ordering Information

FT | 15 | K | M – 0600 – T

- **Flange Finish**
  - N = No plating (standard)
  - S = Silver (optional extra)
  - T = Tin (optional extra)
- **Length in mm** (use 4 digits)
- **Second Flange Code**
  Select from Chart
- **First Flange Code**
  Select from Chart

Place in alphabetical order

- **Waveguide Designation**
  Use British (WG - -)
- **Core Type**
  - FT = Flexible Twistable
  - FO = Flexible Only
  - FS = Flexible Seamless (Silver Plated)
  - FN = Flexible Seamless (No Plating)

Eg. The part number FT15KM-0600-T shown above describes a flexible twistable WG15, 600mm long with tin plated PBR and UBR flanges.

154 IEC FLANGES

Flexiguide flange codes

DESIGNATION			154 IEC FLANGES															
			SQUARE			RECTANGULAR						CIRCULAR						
			CBR	PBR	UBR	PDR			UDR			UAR		PAR		CAR	
WG	WR	R	4 HOLE	4 HOLE	4 HOLE	6 HOLE	8 HOLE	10 HOLE	6 HOLE	8 HOLE	10 HOLE	6 HOLE	8 HOLE	6 HOLE	8 HOLE	6 HOLE	8 HOLE
10	284	32						H			L		Q		R		W
11A	229	40						H			L						
12	187	48					H			L			Q		R		W
13	159	58					H			L		Q		R		W	
14	137	70					H			L		Q		R		W	
15	112	84	G	K	M		H			L							
16	90	100	G	K	M		H			L							
17	75	120	G	K	M	H			L								
18	62	140	G	K	M	H			L								
19	51	180	G	K	M	H			L								
20	42	220	G	K	M												
21	34	260	G	K	M												
22	28	320	G	K	M												
23	22	400															

AMERICAN FLANGES

DESIGNATION			AMERICAN FLANGES														
			UG-CHOKE (MIL-F-3922/-)			UG-COVER (MIL-F-3922/-)				UG-COVER +GASKET				CPR ( )G		CPR ( )F	
			SQ	CIRCULAR		SQ	CIRCULAR			SQ	CIRCULAR			RECTANGULAR			
			4 HOLE	6 HOLE	8 HOLE	4 HOLE	4 HOLE	6 HOLE	8 HOLE	4 HOLE	4 HOLE	6 HOLE	8 HOLE	8 HOLE	10 HOLE	8 HOLE	10 HOLE
WG	WR	R															
10	284	32													C		D
11A	229	40													C		D
12	187	48			A				B				Y	C		D	
13	159	58												C		D	
14	137	70		A				B				Y		C		D	
15	112	84	A			B				Y				C		D	
16	90	100	A			B				Y				C		D	
17	75	120	A			B				Y							
18	62	140	A			B				Y							
19	51	180															
20	42	220	A			B				Y							
21	34	260	A			B				Y							
22	28	320	A			B				Y							
23	22	400					B				Y						

Fixing Kits

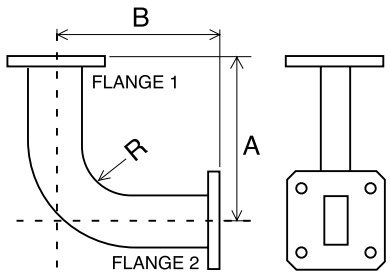
Sets of Nuts, Bolts, Washers and O-Rings / Gaskets are available to mate appropriate flanges. Each kit contains the correct hardware to mate correctly one pair of flanges. All fixings are corrosion resistant stainless steel.

Other Products

Rigid Waveguide Bends

Flexiguide offer a range of Rigid E and H plane bends to suit a wide variety of applications. Standard bends are 90 degrees with 30 and 45 degree models available upon request.

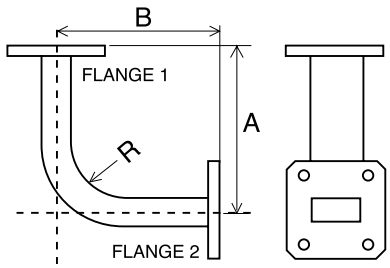
90° H-Plane



Straight Rigid Waveguides

Straight Rigid waveguides are available in sizes from WG10 (R32 / WR284) through to WG23 (R400 / WR22). Lengths from 50 mm to 3000 mm can be supplied to meet you requirements.

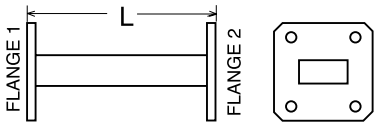
90° E-Plane



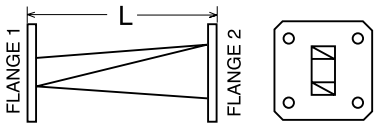
Rigid Waveguide Twists

Flexiguide offer a range of 90 degree Rigid waveguide twists to complement the other Rigid waveguide products.

Straight



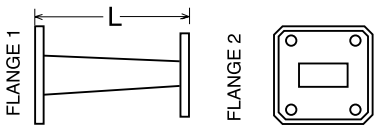
90° Twist



Taper or Stepped Transitions

Taper or Stepped Transitions are available to convert from one waveguide size to another.

Taper



Material and Finish for Standard Rigid Waveguides

Bends, Twists, Straights and Taper Transitions can be supplied with any of the standard flanges listed in the Flexiguide Flange Code table and custom flanges are available upon request. Standard Rigid waveguides are manufactured from Brass / Copper and finished in matt black paint.

Please contact Flexiguide or your local Flexiguide Agent for further information.

Flexiguide

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