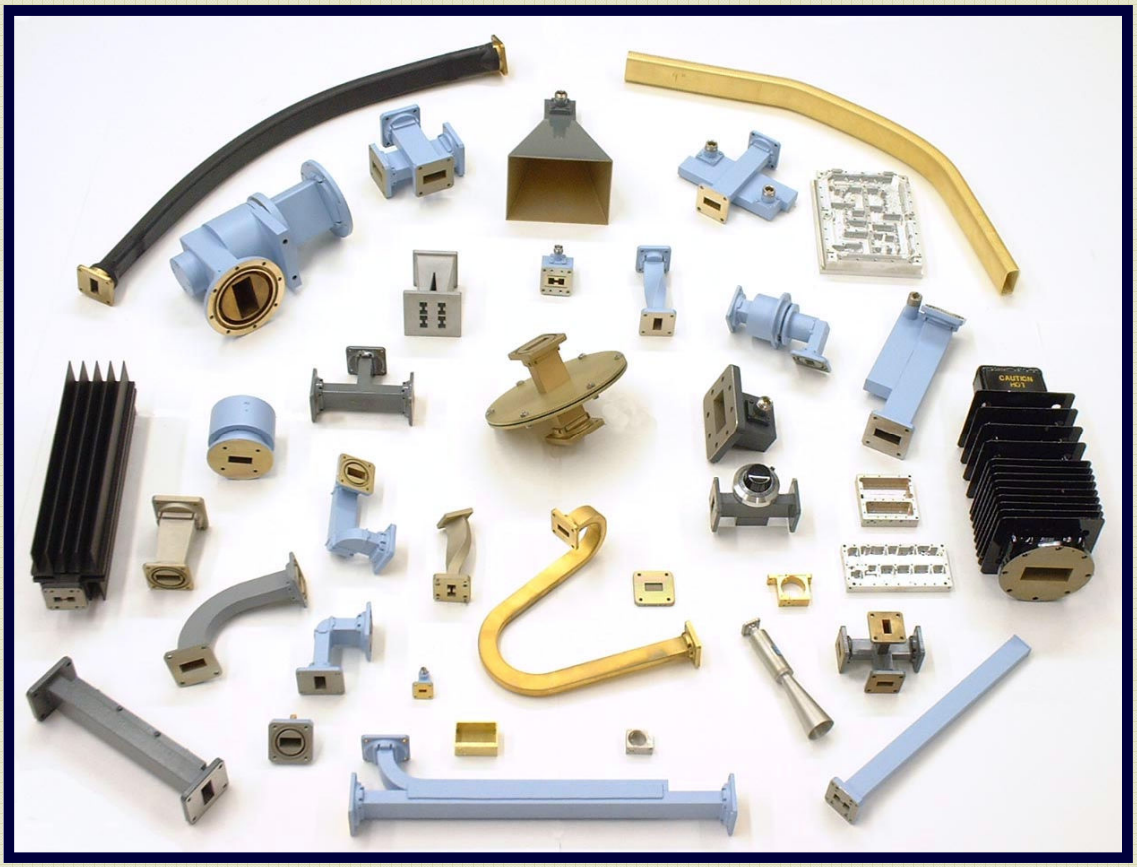

Space Machine & Engineering CORP.

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www.space-machine.com
Email: sales@space-machine.com

QUALITY POLICY

Space Machine and Engineering Corp. recognizes that the quality of its products, the satisfaction of its customers and the health and safety of its workers are integral parts of its management function. To this end, The Company has developed a quality management system based on ISO 9001:2008 standards and seeks to continually improve processes that enhance product quality and customer satisfaction, and to annually review the system for its efficiency at achieving these objectives.

THE COMPANY WILL:

- Have as its goal the continual maintenance of superior quality in its manufactured products that shall meet or exceed customer expectations
- Work closely with its customers and suppliers in seeking to establish the highest standards for product quality and on-time delivery
- Ensure that all test and inspection activities are always carried out in accordance with stated methods and customer requirements
- Implement continual improvement initiatives to sustain Quality excellence and make best use of its management resources
- Communicate its objectives, and its performance in achieving these objectives throughout the organization
- Take due care to ensure that activities are safe for employees and visitors

SALES AND SERVICE

ORDERING INFORMATION:
The information contained in this catalog should be sufficient to select an appropriate SME product. However, if additional data is required, our sales department will gladly supply you with any additional information. Please specify the catalog model number when ordering. When any non-standard features are required please fully describe them when ordering to avoid any misunderstanding.

SPECIFICATIONS:
Although drawings and specifications were correct at the time the catalog was printed, such information is subject to change without notice. Please consult the factory prior to ordering.

WARRANTY:
All products supplied by Space Machine & Engineering Corp. are warranted against defects in material and workmanship for a period of one year after delivery to the original purchaser. If any SME product is found to be defective, SME shall repair or replace, at its option, said defective unit. Any product found by SME to have been modified, disassembled or subjected to conditions beyond its normal operating limitations will not be covered. This is the extent of SME's warranty. No other warranty either expressed or implied will be honored.

RETURN POLICY:
All discrepancies must be reported within 10 working days of shipment. All returns must be authorized. A Return Material Authorization Number will be issued by SME for approved returns. A restocking charge may be applicable.
NO RETURNS WILL BE ACCEPTED WITHOUT A MATERIAL RETUN AUTHORIZATION NUMBER.

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Table of Contents

Table of Contents

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Table of Contents

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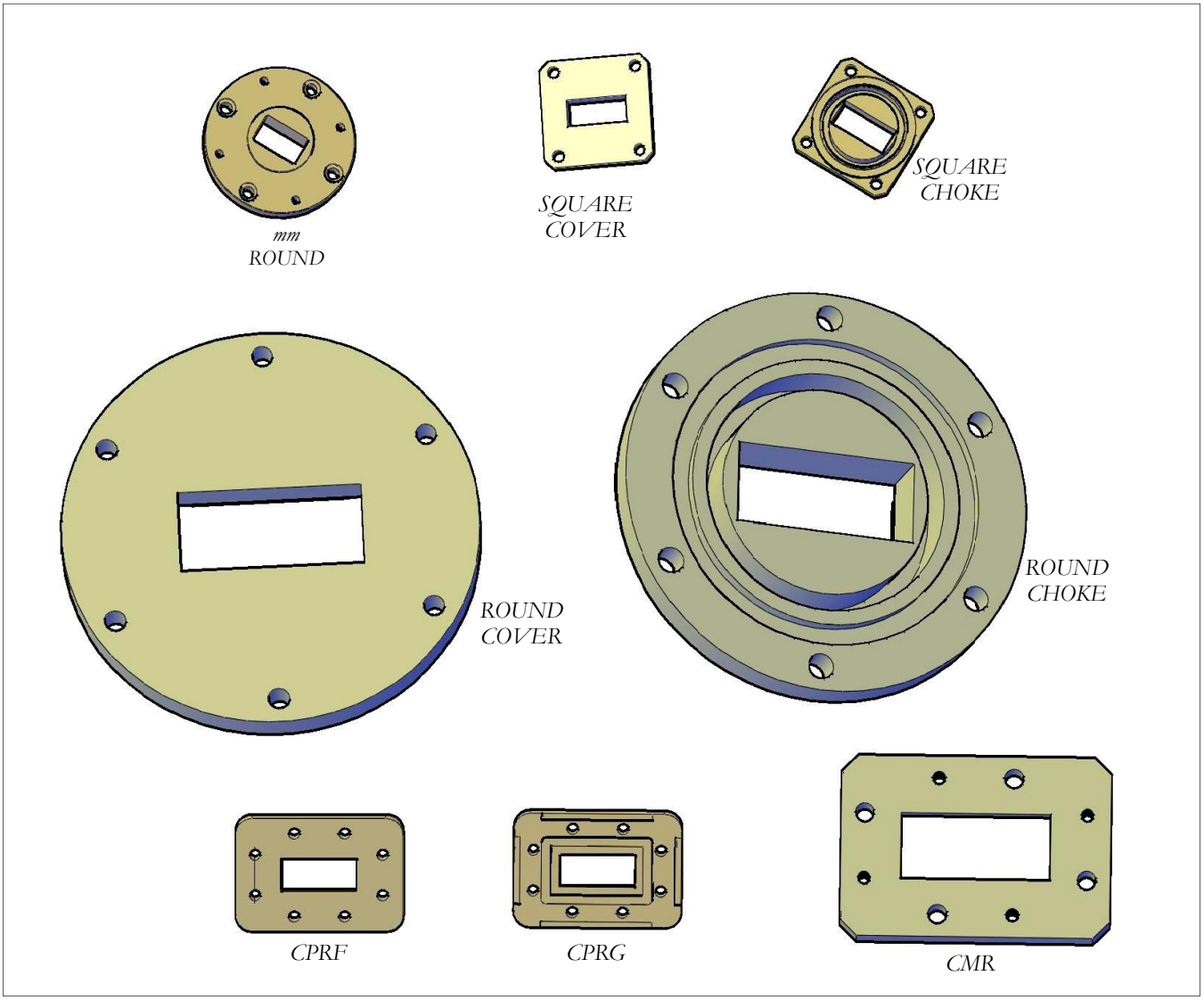
Table of Contents

Rectangular Waveguide Flanges



Space Machine offers a standard product line of flanges covering waveguide sizes WR10 thru WR650.
Additional material, sizes and configurations are available upon request.
See appendix I for flange part number conversion chart.

Ordering Information:

		WGF	wr	-m	f
Rectangular Waveguide Flange, WR137, Brass, CMR Flange UG1476/U.	**Example part number:**	WGF	137	-B	03

Series (WGF):

Waveguide Size (wr): WR10 thru WR650

Material (-m): A – 6061 Aluminum, B – 360 Brass, O – Other

Flange (f): See Appendix G

Space Machine & Engineering CORP.

Dual Sidewall Pressurized Flat and Choke Flanges

Space Machine offers a standard product line of dual sidewall flanges both cleared and tapped. Additional material, sizes and configurations are available upon request.

Ordering Information:		**DSF**	**wr**	**-m**	**t**
Dual Sidewall Pressurized Flanges, WR284, Brass	**Example part number:**	DSF	284	-B	F

Series (DSF):

Flat Waveguide Size (wr):WR62,WR90,WR112,WR137, WR187, WR284, and WR650
Choke Waveguide Size (wr):WR42, WR62,WR90,WR112

Material (-m): A – 6061 Aluminum, B – 360 Brass, O – Other

Type (-t): F - flat, C– choke

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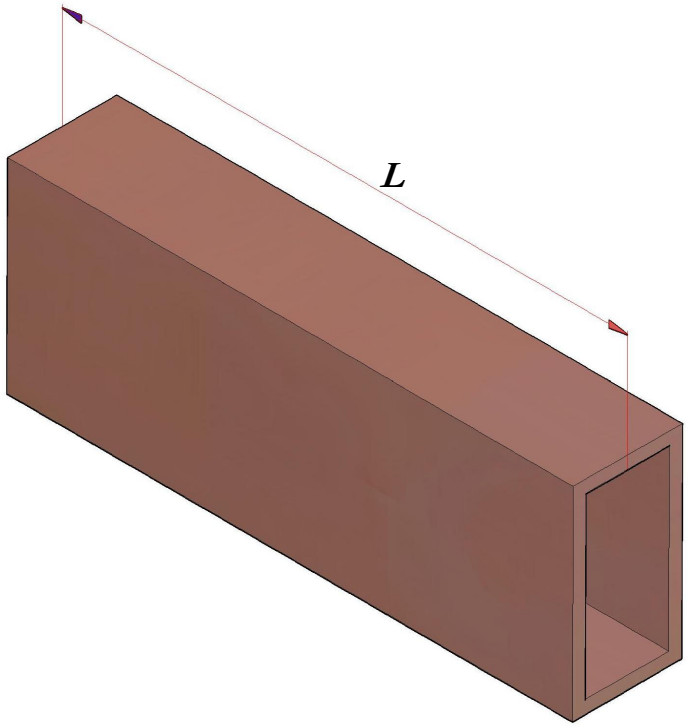
Rectangular Waveguide Tubing



Space Machine offers a standard product line of raw waveguide tubing ranging in size from WR10 thru WR650. These include both standard wall and heavy wall thickness and reduced height. Other configurations can be made to order.

Ordering Information:

		RWT	wr*	-m	l
Rectangular Waveguide Tubing, WR90, OFHC Copper, 144 in. long.	**Example part number:**	RWT	90	-C	144

Series (RWT):

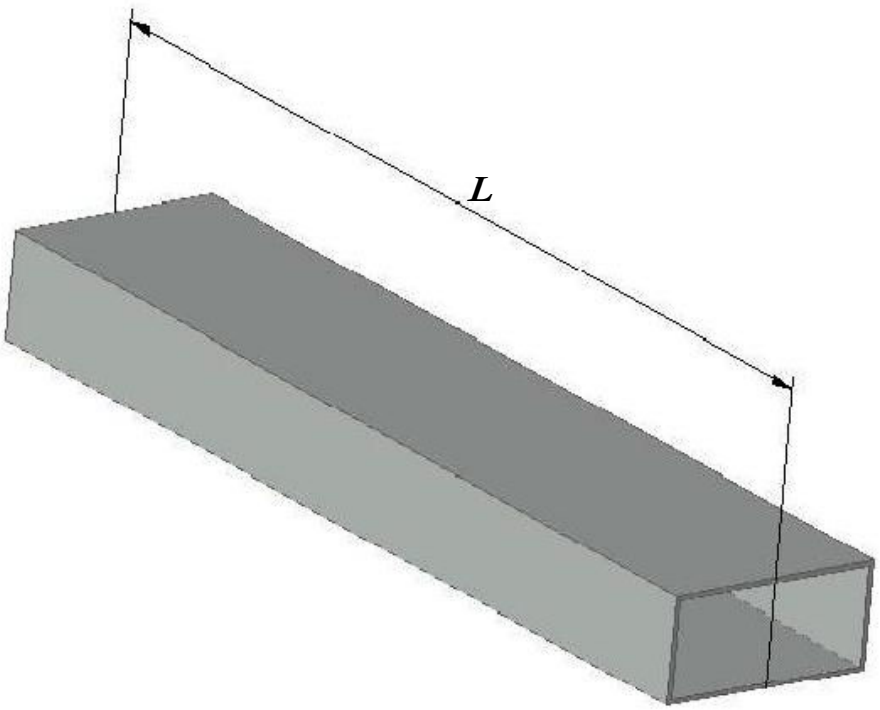
Waveguide Size (wr)*: WR10 thru WR650

Material (-m): A – 6061 Aluminum, B – Bronze 90/10, C – OFHC Copper,
S – Coin Silver, O – Other

Length (l): Inches

wr* Add **HW** to the part number if ordering heavy wall waveguide tubing. ***Example: RWT90HW-A144***
wr* Add **RH** to the part number if ordering reduced height waveguide tubing. ***Example: RWT90RH-A144***

Rectangular Waveguide Thin Wall Tubing



Space Machine offers a standard product line of raw aluminum waveguide thin wall tubing covering the following waveguide sizes: WR75, WR90, WR112 or WR137.
See appendix A for rectangular waveguide thin wall physical dimensions.
See appendix B for rectangular waveguide thin wall electrical data.

Ordering Information:		**RWT**	**wr**	**TW**	**-l**
Rectangular Waveguide Thin Wall Tubing, WR90 144 in. long.	**Example part number:**	RWT	90	TW	-144
Series (RWT):					
Waveguide Size (wr): WR75, WR90, WR112 and WR137					
Thin Wall (TW): A – 6061 Aluminum					
Length (l): Inches					

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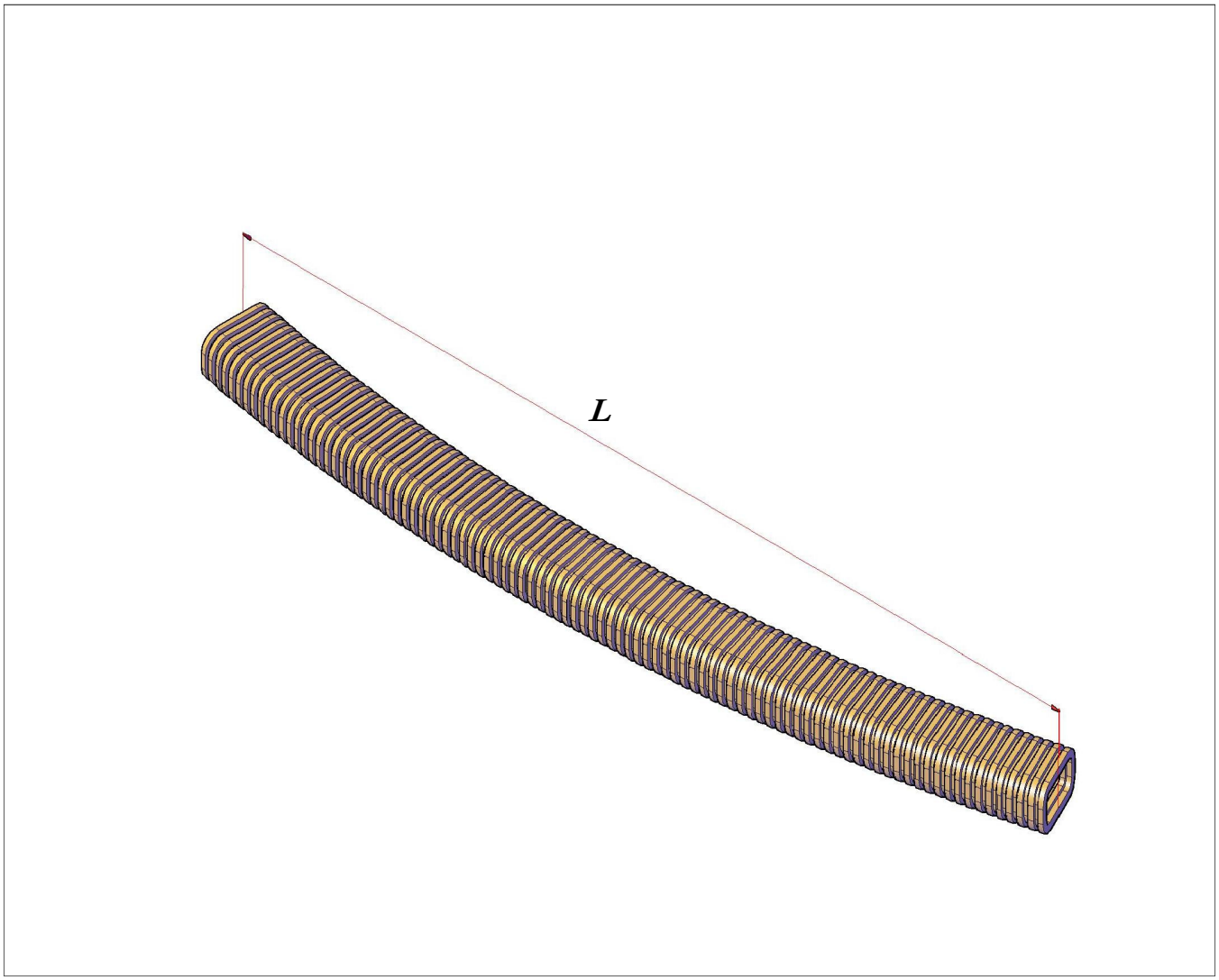
Rectangular Waveguide Raw Seamless Flex



Space Machine offers a standard product line of raw seamless flex ranging in size from WR28 thru WR284.
See appendix M for specification.

Ordering Information:

		WFS	wr	-m	l
Seamless Flexible Waveguide, WR137, 12“ Long, Brass	**Example part number:**	WFS	137	-B	12

Series (WFS):Waveguide seamless flex

Waveguide Size (wr): WR28 thru WR284

Material (-m): B- Brass, D-Beryllium Copper, BS - Brass Silver Plated,
DS - Beryllium Copper Silver Plated

Length (l): Inches

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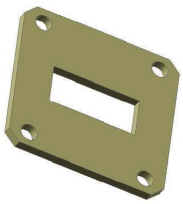
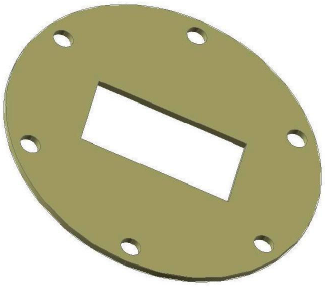
Rectangular Waveguide EMI/RFI Gaskets

Gasket Option - 1E Type

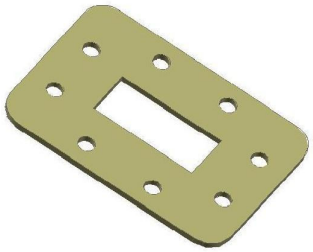


W.G. sizes WR28—WR112



W.G. sizes WR137—WR284

Gasket Option - 4E Type



W.G. sizes WR75—WR650

Space Machine offers a standard product line of EMI/RFI gaskets covering waveguide sizes from WR28 thru WR650. EMI/RFI gaskets are conductive and are die cut from a silver impregnated elastomer. The standard gaskets are made to fit UG, CPR, and CMR flange types. However, additional sizes and configurations are available upon request. Space Machine EMI/RFI gaskets are made from conductive silicone elastomer with either Silver/Aluminum or Silver/ Copper fillers (meets MIL-83528 Type B or K). These materials have very good shielding properties and conductivity, excellent sealing at temperature extremes, and have a long shelf life.
See appendix P for Physical Properties and Temperature Range.

Ordering Information:

		WOR	wr	-g
Waveguide EMI/RFI gasket, WR90, for Cover flange.	**Example part number:**	WOR	90	-1E

Series (WOR):

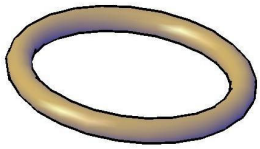
Waveguide Size (wr): WR28 thru WR650

Gasket Type (-g): 1E -1E type, 4E - 4E type

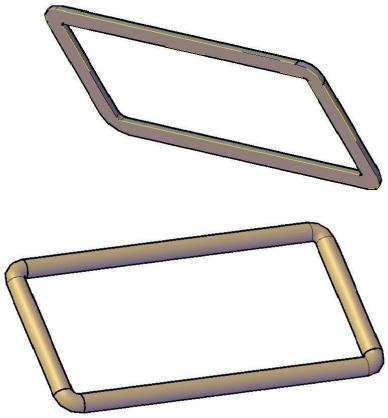
Space Machine & Engineering CORP.

Choke and CPRG Rectangular Waveguide Gaskets and O-rings

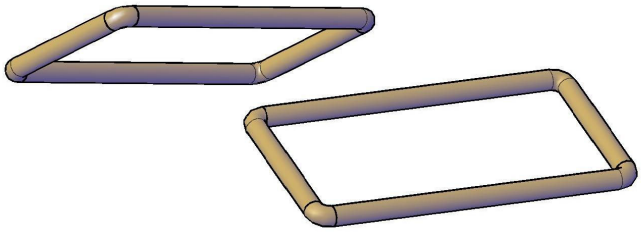
2- Choke
2C- Choke, Conductive



4H - CPRG Half Gasket
4HC - CPRG Half Gasket, Conductive



4F - CPRG Full Gasket
4FC - CPRG Full Gasket, Conductive



Space Machine offers a standard product line of Gaskets and O-Rings, both conductive and nonconductive, covering waveguide sizes from WR28 thru WR650 to fit UG, CPR and CMR flange types.
Additional sizes and configurations are available upon request.

Ordering Information:		**WOR**	**wr**	**-g**
Waveguide O-Ring, WR90, Full gasket for CPRG 90 flange, Nonconductive.	**Example part number:**	WOR	90	-4F
Series (WOR):				
Waveguide Size (wr): WR28 thru WR650				
Gasket Type (-g): nonconductive: 2 - Choke, 4F - CPRG Full Gasket, 4H - CPRG Half Gasket 5 - UAR, 6- PDR, 7 - CBR, 8 - CAR conductive: 2C - Choke, 4FC - CPRG Full Gasket, 4HC - CPRG Half Gasket 5C - UAR Conductive, 6C - PDR Conductive, 7C - CBR Conductive, 8C - CAR Conductive				

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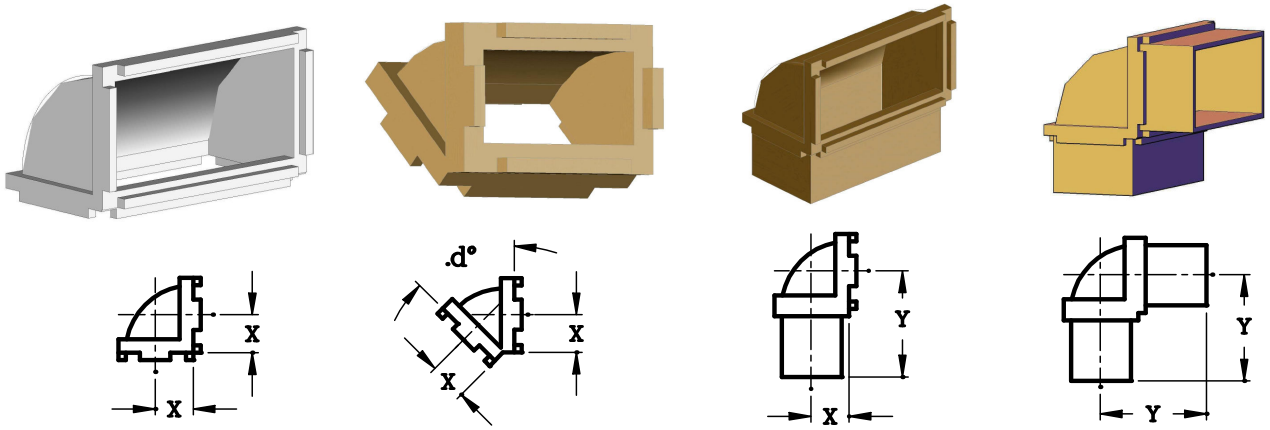
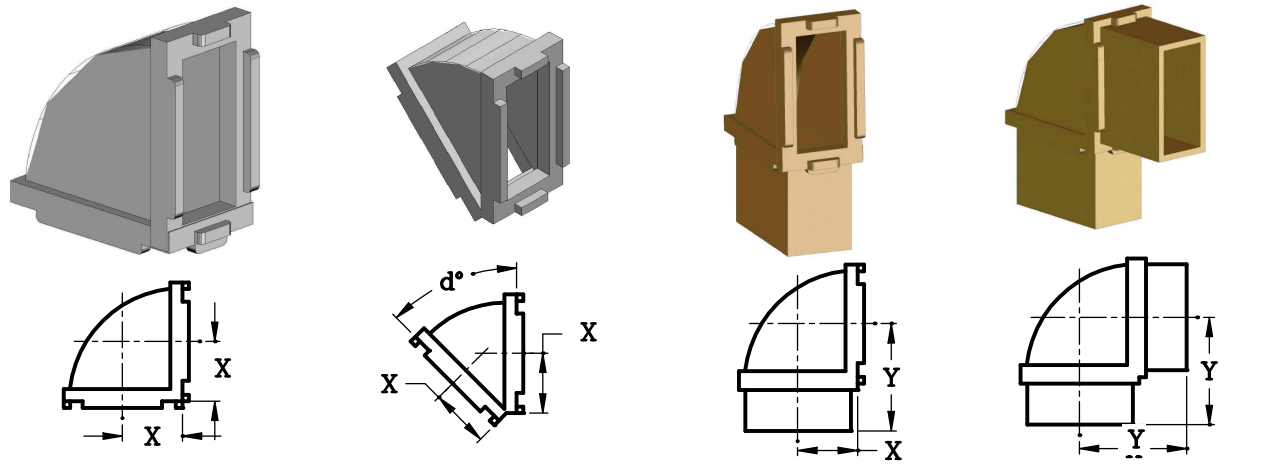
Rectangular Waveguide Cast E & H Plane Bends

E PLANE



CONFIGURATION 11 *CONFIGURATION 12* *CONFIGURATION 22*

H PLANE



CONFIGURATION 11 *CONFIGURATION 12* *CONFIGURATION 22*

Space Machine offers a standard product line of E and H Plane cast bends covering the waveguide sizes WR28 thru WR284. Additional sizes and configurations are available upon request.

Ordering Information:		**d**	**CtB**	**wr**	**-m**	**con**
90° Cast E-Bend, WR112, Aluminum, Configuration 11.	**Example part number:**	90	CEB	112	-A	11
Degree of bend (d): 30, 45, 60, 90						
Series (CEB): E – Plane (CHB): H – Plane						
Waveguide Size (wr): WR28 thru WR284						
Material (-m): A – Aluminum, C – Copper Alloy						
Configuration (con): See above						

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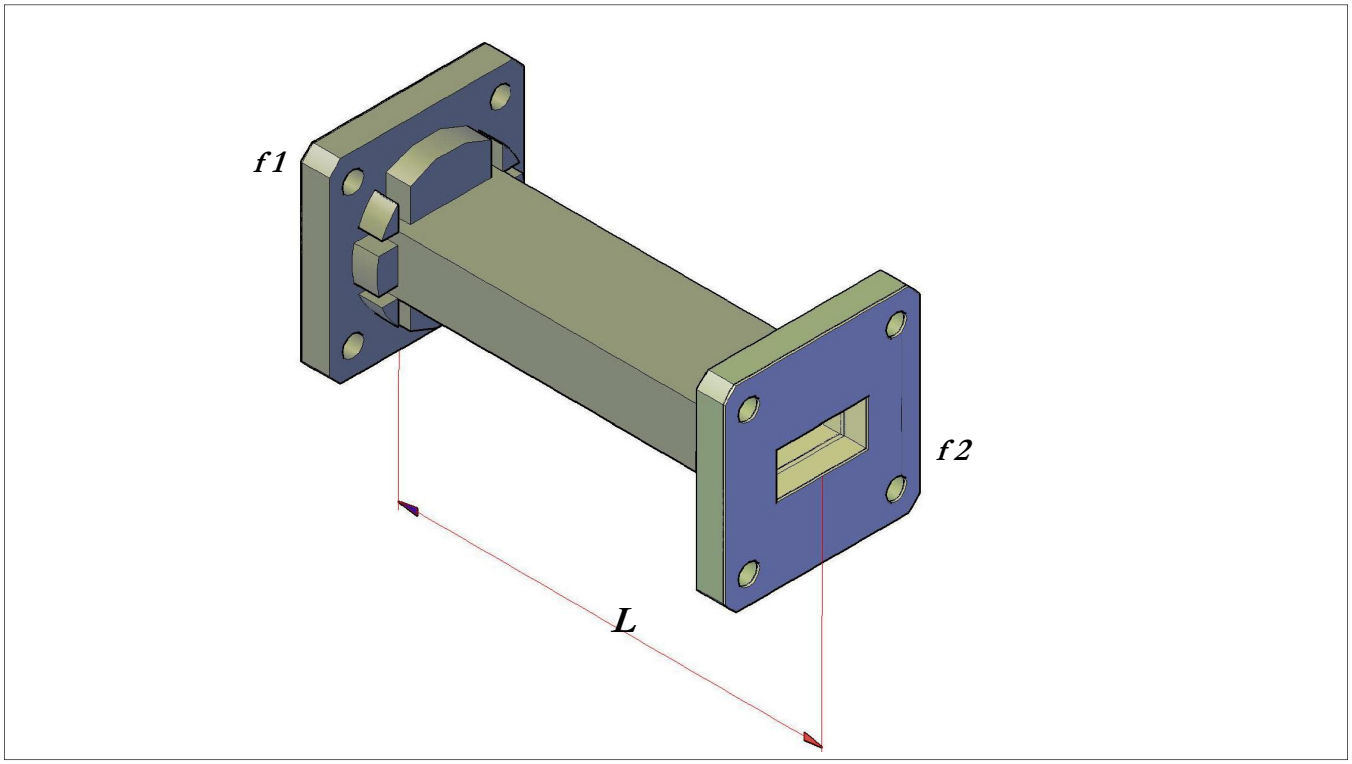
Rectangular Waveguide Straight Assemblies



Space Machine will custom fabricate flanged straight sections covering the waveguide sizes WR10 to WR650. Length and flange types made to customer specifications. VSWR is less than 1.05:1 over the full waveguide band.

wr* - add **HW, RH** or **TW** to the part number if ordering heavy wall waveguide tubing (HW), reduced height waveguide tubing (RH) or thin wall waveguide tubing (TW). See appendix A for waveguide physical dimensions.

Example: WSS90TW-12.0A0101-NN

Ordering Information:

Waveguide Straight Section, WR112, 12.0" Long, Bronze, Cover / Choke Flanges, Chromated, Paint Space Machine Gray.

	WSS	wr*	-l	m	f1 f2	-p	f
Example part number:	WSS	112	-12.0	B	01 02	-C	P

Series (WSS):

Waveguide Size (wr): WR22 thru WR650

Length (-l): (inches)

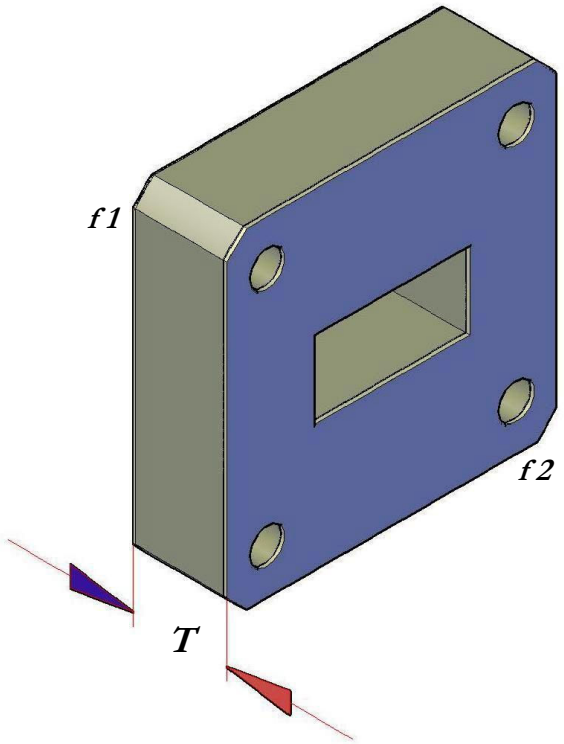
Waveguide Material (m): A – Aluminum, B – Bronze, C – OFHC Copper
O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Rectangular Waveguide Shims



Space Machine will custom fabricate shims covering the waveguide sizes WR10 to WR650. Thickness and flange types made to customer specifications.

Ordering Information:

Rectangular Waveguide Shim, WR112, 0.250" Thickness, Bronze, Cover / Cover Flanges, Chromated, Paint Space Machine Gray.

Example part number:

RWS	wr	-T	m	f1 f2	-p	f
RWS	112	-0.250	B	01 02	-C	P

Series (RWS):

Waveguide Size (wr): WR10 thru WR650

Thickness (-T): (inches)

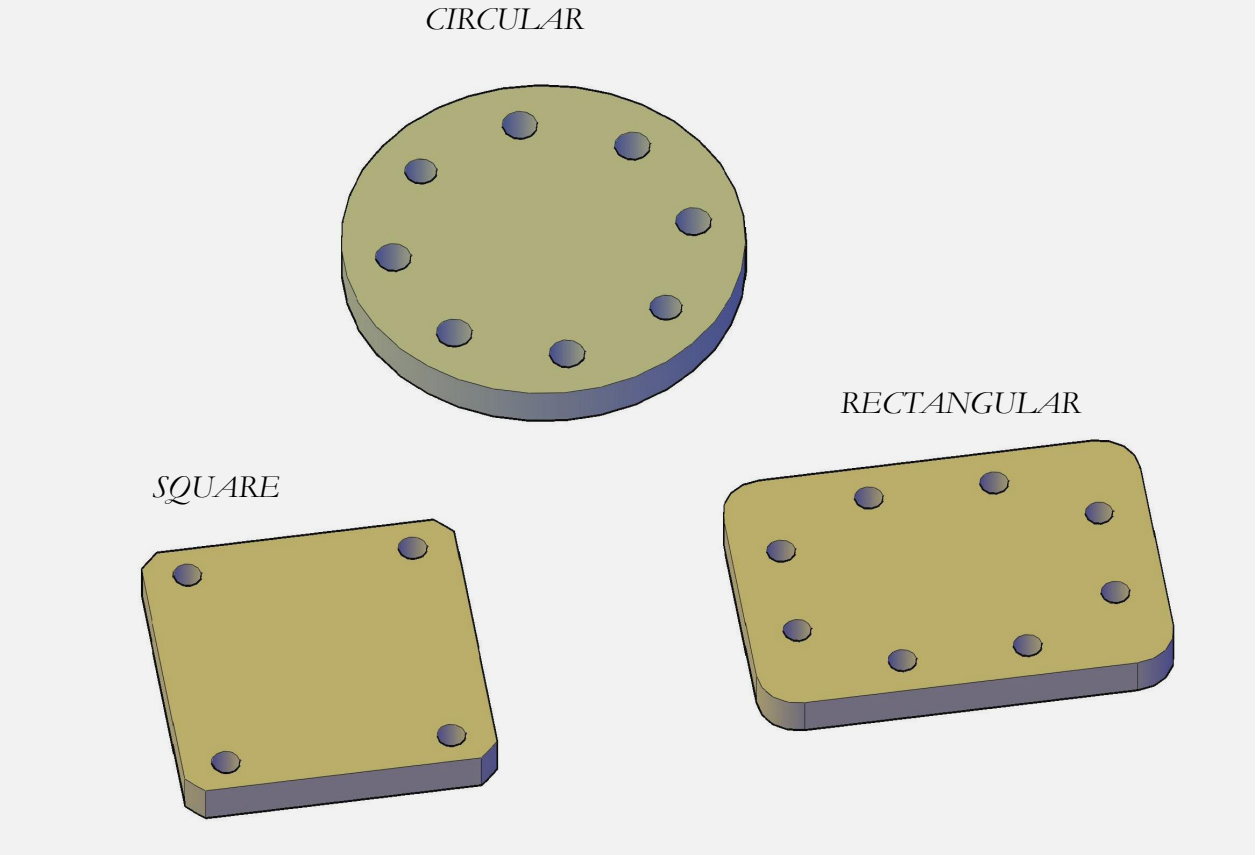
Waveguide Material (m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Rectangular Waveguide Shorts



Space Machine offers a standard product line of shorts covering waveguide sizes WR22 thru WR650.
Thickness is 0.19" for WR22 thru WR62 and 0.25" for all other sizes.

Ordering Information:

Waveguide Short, WR137, Brass,
Cover Flange Face, Chromated,
Paint Space Machine Gray.

	WGS	wr	-m	f	-p	f
Example part number:	WGS	137	-B	01	-C	P

Series (WGS):

Waveguide Size (wr): WR22 thru WR650

Flange Material (-m): A - Aluminum, B - Brass, C - Copper, O - Other

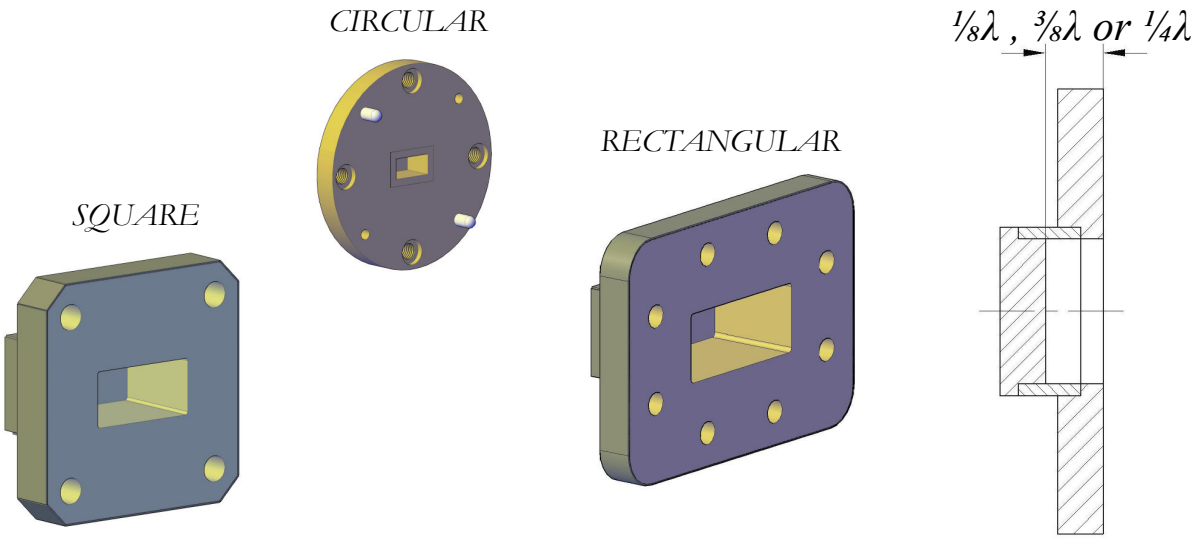
Flange (f): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Space Machine & Engineering CORP.

Rectangular Waveguide Offset Shorts



Model	WR #	Frequency (GHz)
WOS22-	22	33.00 - 50.00
WOS28-	28	26.50 - 40.00
WOS34-	34	22.00 - 33.00
WOS42-	42	18.00 - 26.50
WOS51-	51	15.00 - 22.00
WOS62-	62	12.40 - 18.00
WOS75-	75	10.00 - 15.00

Model	WR #	Frequency (GHz)
WOS90-	90	8.20 - 12.40
WOS102-	102	7.00 - 11.00
WOS112-	112	7.05 - 10.00
WOS137-	137	5.85 - 8.20
WOS159-	159	4.90 - 7.05
WOS187-	187	3.95 - 5.85
WOS229-	229	3.30 - 4.90

Model	WR #	Frequency (GHz)
WOS284-	284	2.60 - 3.95
WOS340-	340	2.20 - 3.30
WOS430-	430	1.70 - 2.60
WOS510-	510	1.45 - 2.20
WOS650-	650	1.12 - 1.70
WOS770-	770	0.96 - 1.45
WOS975-	975	0.75 - 1.12

Space Machine offers a standard product line of fabricated rectangular waveguide offset shorts covering sizes WR22 thru WR975. Standard product length of offset is 1/8, 3/8 and 1/4 wavelengths. Other lengths available upon request.

Ordering Information:

Waveguide Offset Short, WR137, Brass, Cover Flange Face, Chromated, Paint Space Machine Gray.

Example part number:

WOS	wr	-λ	-m	f	-p	f
WOS	137	-1/8	-B	01	-C	P

Series (WOS):

Waveguide Size (wr): WR22 thru WR975

Length (-λ): 1/8, 3/8, 1/4

Flange Material (-m): A - Aluminum, B - Brass, O - Other

Flange (f): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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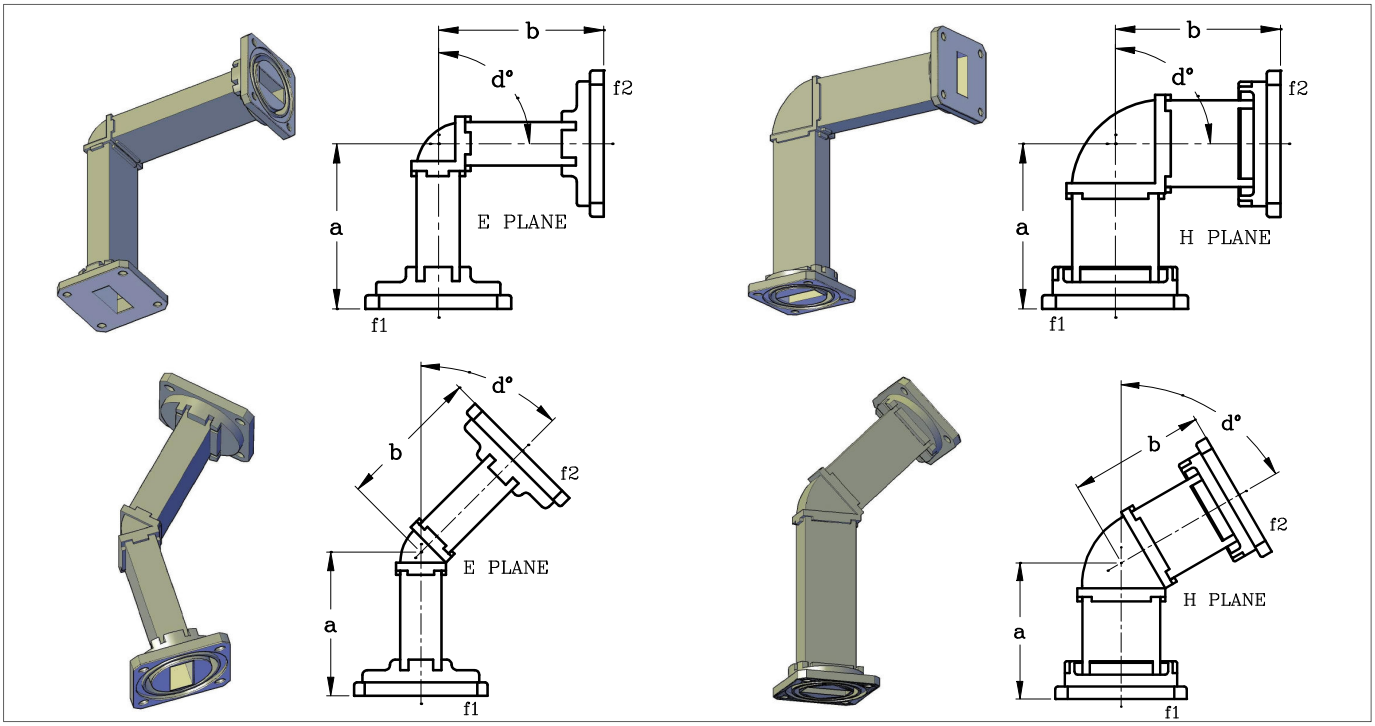
Rectangular Waveguide Cast E & H Plane Bend Assemblies



Space Machine offers a standard product line of cast E and H plane bend assemblies covering waveguide sizes WR28 thru WR284. Leg lengths and flange types are made to customer specifications. VSWR is less than 1.10:1 over the full waveguide band.

wr* - add HW, RH or TW to the part number if ordering heavy wall waveguide tubing (HW), reduced height waveguide tubing (RH) or thin wall waveguide tubing (TW). See appendix A for waveguide physical dimensions.

Example: 90CEA284HW-3X3A0102-NN

Ordering Information:

90° Cast E Bend Assembly, WR90, 3 inch X 3 inch legs, Aluminum, Cover Flange, Choke Flange, Chromated, Paint Space Machine Gray.

Example part number:

d	CtA	wr*	-a	xb	m	f1 f2	-p	f
90	CEA	90	-3	x3	A	01 02	-C	P

Degree of Bend: 30, 45, 60, 90,

Series (CEA): E – Plane
(CHA): H – Plane

Waveguide Size (wr): WR28 thru WR284

Leg Length (-a):

Leg Length (b):

Material (m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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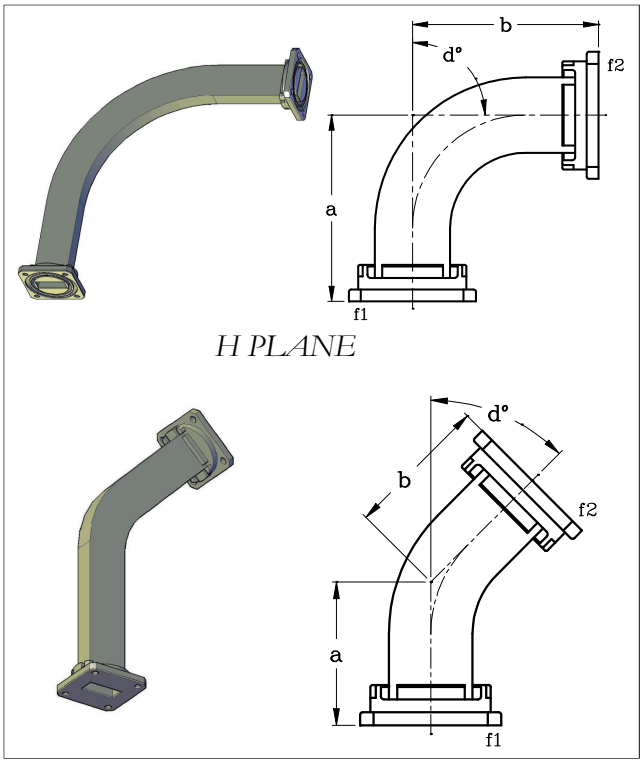
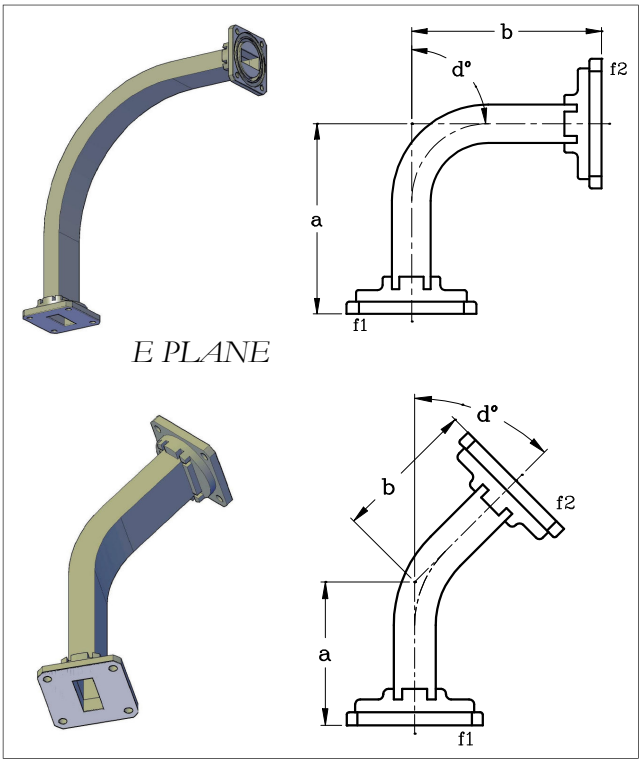
Space Machine & Engineering CORP.

Rectangular Waveguide Formed E & H Plane Bend Assemblies





Space Machine offers a standard product line of formed E and H plane bend assemblies covering waveguide sizes WR10 thru WR430. Degree of bend, leg lengths and flange type are made to customer specifications. VSWR is less than 1.10:1 over the full waveguide band. See appendix O for inside bend radius.

wr* - add HW, RH or TW to the part number if ordering heavy wall waveguide tubing (HW), reduced height waveguide tubing (RH) or thin wall waveguide tubing (TW). See appendix A for waveguide physical dimensions.

Example: 90FEB75TH-6.0A0101-NN

Ordering Information:

90° Formed E Bend Assembly, WR90, 3 inch X 3 inch legs, Aluminum, Choke Flange, Cover Flange, Chromated, Paint Space Machine Gray.

	d	FtB	wr*	-a	xb	m	f1 f2	-p	f
Example part number:	90	FEB	90	-3	x3	A	01 02	-C	P

Degree of Bend: 30, 45, 60, 90, or as needed.

Series (FEB): E – Plane
(FHB): H – Plane

Waveguide Size (wr): WR22 thru WR430

Leg Length (-a):

Leg Length (b):

Material (m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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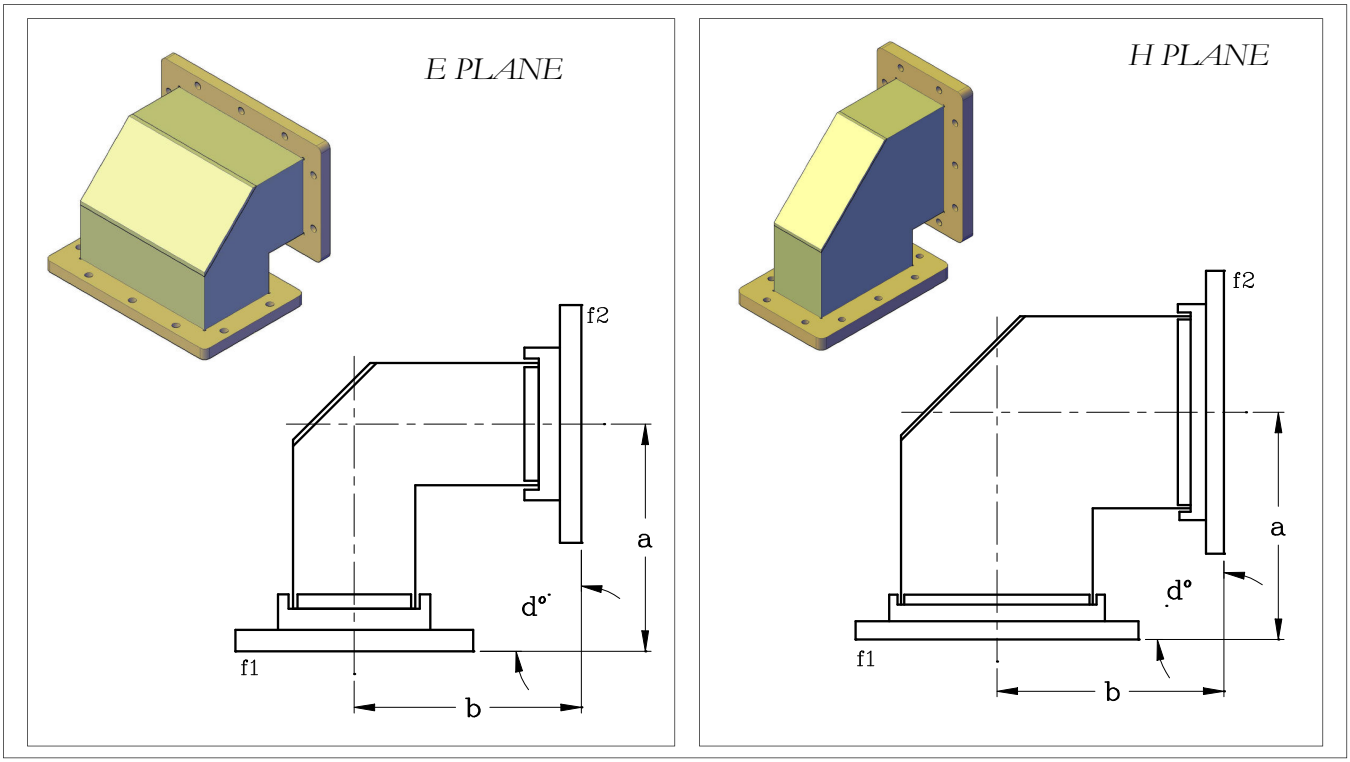
Space Machine & Engineering CORP.

Rectangular Waveguide Mitered E & H Plane Bend Assemblies



Space Machine offers a standard product line of mitered E and H plane mitered bends covering the waveguide sizes WR28 thru WR650. VSWR is less than 1.10:1 over the full waveguide band.

wr* - add HW, RH or TW to the part number if ordering heavy wall waveguide tubing (HW), reduced height waveguide tubing (RH) or thin wall waveguide tubing (TW). See appendix A for waveguide physical dimensions.

Example: 90MBE284HW-6.0X6.0A0101-CP

Ordering Information:

	d	MBt	wr*	-a	xb	m	f1 f2	-p	f
90° Mitered bend, E-Plane, WR430, 6 inch X 6 inch, Bronze, CPRG / CPRF Flanges Socket type, Chromated, No paint. **Example part number:**	90	MBE	430	-6	x6	B	04 05	-C	N

Degree of bend (d):

Series (MBE): E – Plane
(MBH): H – Plane

Waveguide size (wr): WR28 thru WR650

Leg Length (-a):

Leg Length (b):

Material (m): A – Aluminum, B – Bronze, O – Other

Flanges (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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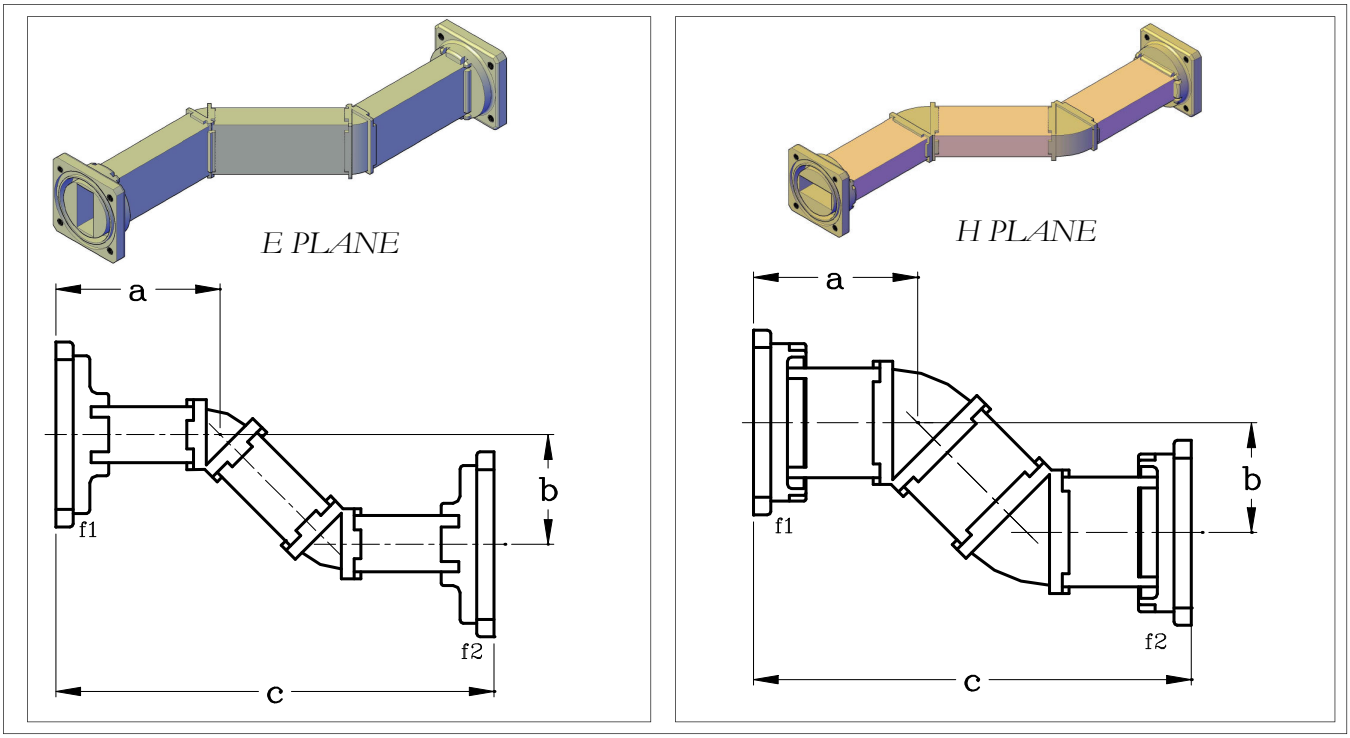
Space Machine & Engineering CORP.

Rectangular Waveguide Cast E & H Plane Offset Assemblies



Space Machine offers a standard product line of cast E and H plane offset assemblies covering waveguide sizes WR28 thru WR284. Offset, leg lengths and flange types are made to customer specifications. VSWR is less than 1.10:1 over the full waveguide band.

wr* - add HW, RH or TW to the part number if ordering heavy wall waveguide tubing (HW), reduced height waveguide tubing (RH) or thin wall waveguide tubing (TW). See appendix A for waveguide physical dimensions.

Example: CEO75TW-6X1X4A0101-CP

Ordering Information:

Cast E Offset Assembly, WR90, 2 inch leg X 1 inch offset X 9 inch leg, Aluminum, Choke Flange, Cover Flange, Chromated, Paint Space Machine Gray.

Example part number:

CtO	wr*	-a	xb	xc	m	f1 f2	-p	f
CEO	90	-2	x1	x9	A	02 01	-C	P

Series (CEO): E – Plane
(CHO): H – Plane

Waveguide Size (wr): WR28 thru WR284

Leg Length (-a):

Offset Length (b):

Leg Length (c):

Material (m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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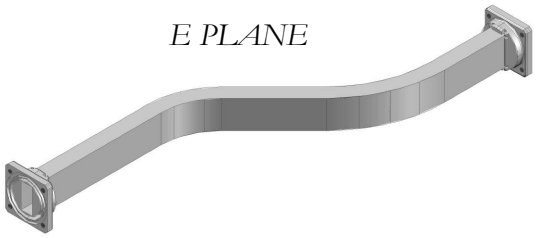
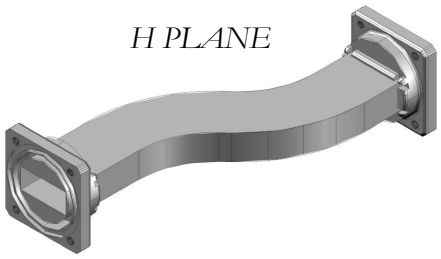
Space Machine & Engineering CORP.

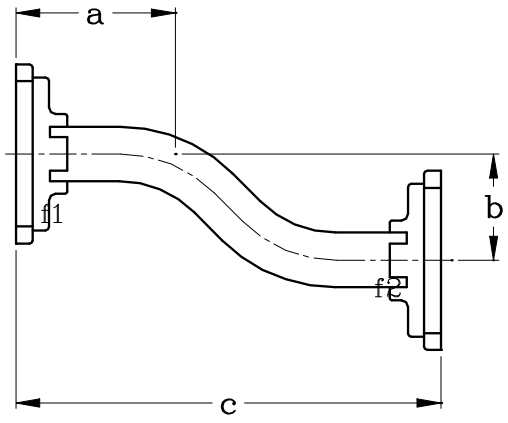
Rectangular Waveguide Formed E & H Plane Offset Assemblies

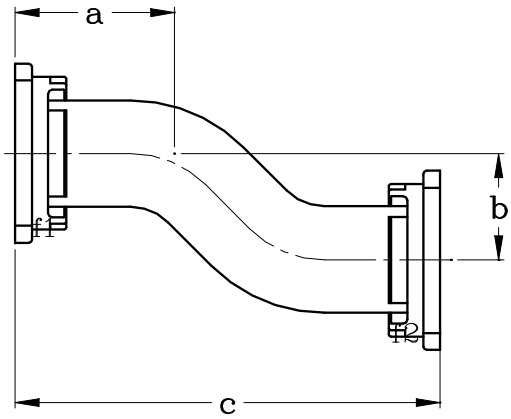
E PLANE



H PLANE







Space Machine offers a standard product line of formed E and H plane offset assemblies covering waveguide sizes WR28 thru WR284. Offset, leg lengths and flange types are made to customer specifications. VSWR is less than 1.10:1 over the full waveguide band.

wr* - add HW, RH or TW to the part number if ordering heavy wall waveguide tubing (HW), reduced height waveguide tubing (RH) or thin wall waveguide tubing (TW). See appendix A for waveguide physical dimensions.

Example: FHO75TW-4X2X6A0101-CP

Ordering Information:

Formed H Offset Assembly, WR90, 4 inch leg X 2 inch offset X 6 inch leg, Aluminum, Cover Flange, Choke Flange, Chromated, Paint Space Machine Gray.

Example part number:

FtO	wr*	-a	xb	xc	m	f1 f2	-p	f
FHO	90	-4	x2	x6	A	01 02	-C	P

Series (FEO): E – Plane
(FHO): H – Plane

Waveguide Size (wr): WR28 thru WR284

Leg Length (-a):

Offset Length (b):

Leg Length (c):

Material (m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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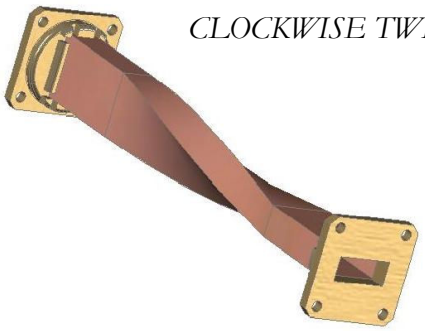
Space Machine & Engineering CORP.

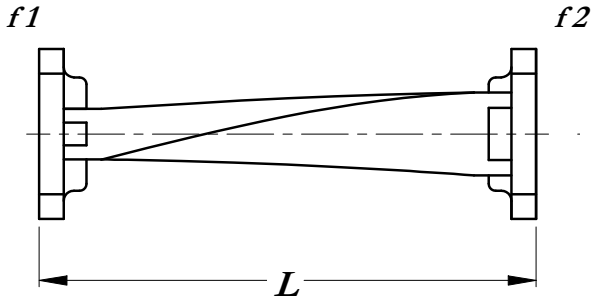
Rectangular Waveguide Twist Assemblies

CLOCKWISE TWIST



45 DEG. TWIST

COUNTERCLOCKWISE TWIST



Space Machine will custom fabricate waveguide twists covering the waveguide sizes WR10 to WR430. Degree of twist, length and flange types made to customer specifications. VSWR is less than 1.10:1 over the full waveguide band.
SME standard twist direction is clockwise*. To order counterclockwise** twist add a dash and "CCT" after Part Number.
Example: 90-WTW62-6.0B0102-CP-CCT

* "Clockwise Twist" - when the assembly is held vertically and viewed from above, the twist of the tubing progresses in a clockwise direction from top to bottom.

** "Counterclockwise Twist" - when the assembly is held vertically and viewed from above, the twist of the tubing progresses in a counterclockwise direction from top to bottom.

wr* - add HW, RH or TW to the part number if ordering heavy wall waveguide tubing (HW), reduced height waveguide tubing (RH) or thin wall waveguide tubing (TW). See appendix A for waveguide physical dimensions.

Example: 45WTW90HW-8C0101-CP

Ordering Information:

90º Waveguide Twist, WR62, 6.0" Long, Bronze, Cover / Choke Flanges, Chromated, Paint Space Machine Gray.

	d	WTW	wr*	-l	m	f1 f2	-p	f
Example part number:	90	WTW	62	-6.0	B	01 02	-C	P

Degree of Twist: 30, 45, 60, 90, or as required.

Series (WTW):

Waveguide Size (wr): WR22 thru WR430

Length (-l): (inches)

Waveguide Material (m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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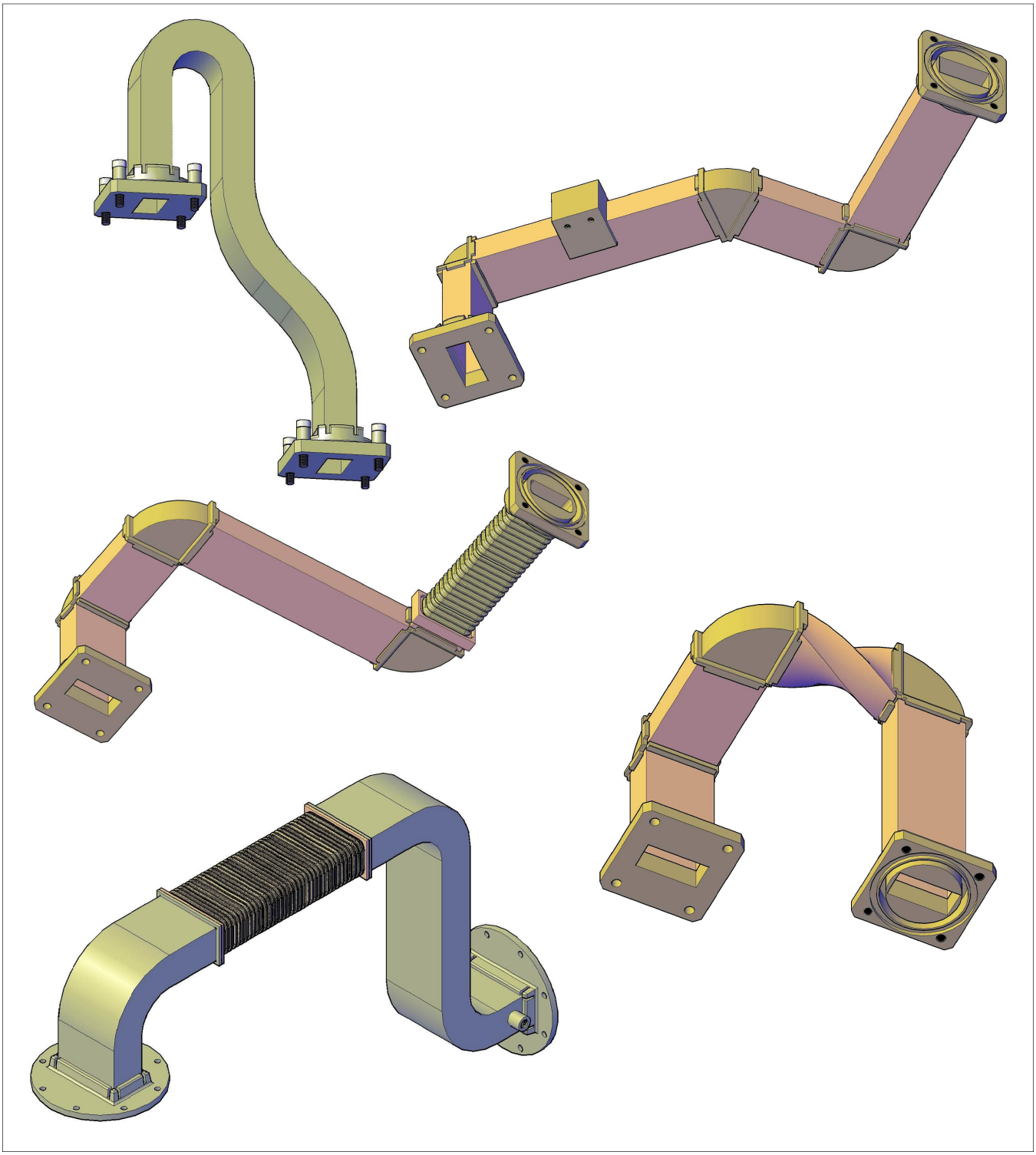
Space Machine & Engineering CORP.

Rectangular Waveguide Specialized Bend Assemblies



Space Machine can customize any waveguide bend assembly that you require.
Please contact the company with drawings, sketch or word descriptions for quote.

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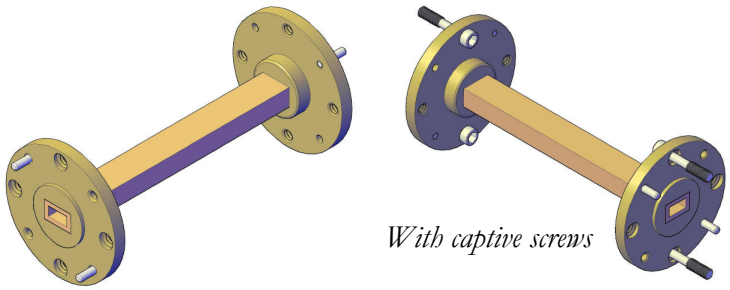
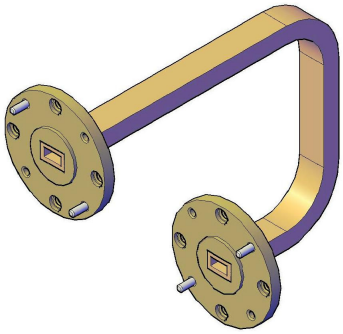
Millimeter Waveguide Assemblies

Millimeter Waveguide Straight Assembly

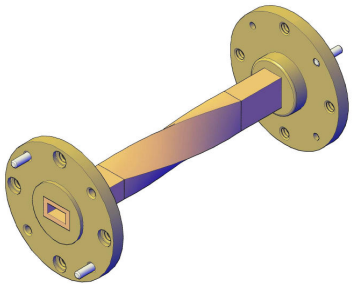


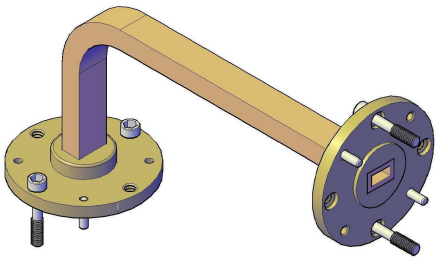
With captive screws

Millimeter Waveguide Bend Assembly



Millimeter Waveguide Twist Assembly





With captive screws

Space Machine offers a standard product line of millimeter waveguide assemblies.
Frequency band coverage from 18 to 220 GHz. For frequencies 40 GHz and higher, manufacture only, no testing capabilities above 40 GHz.
SME offers standard millimeter waveguide E– and H– plane bends with angles 30 deg., 45 deg., 60 deg. and 90 deg. The twists are supplied with angles of 45 deg. and 90 deg. The standard millimeter flange material is brass. Custom bends or twists are available upon request.
In addition, for easy installation and removal of attached pieces, Space Machine can supply millimeter waveguide assembly with captive screw kit .

Ordering Information:

	MWx	wr	- f1 f2	-p	j	k
Example part number:	MWS	19	06 06	-C	N	0

Millimeter Waveguide Straight Assy, WR19, Round Brass Flanges w/tapped holes, Chromated, Paint none, No Captive Screw Kit.

Series (MWS): Millimeter Waveguide Straight Assy.
(MWB): Millimeter Waveguide Bend Assy.
(MWT): Millimeter Waveguide Twist Assy.

Waveguide Size (wr): WR10 thru WR28

Flanges (-f1 f2): See Appendix G2

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P– Paint Space Machine Gray, N - None, O - Other

Captive Screw Kit (k): 0 -No, 1 -Yes

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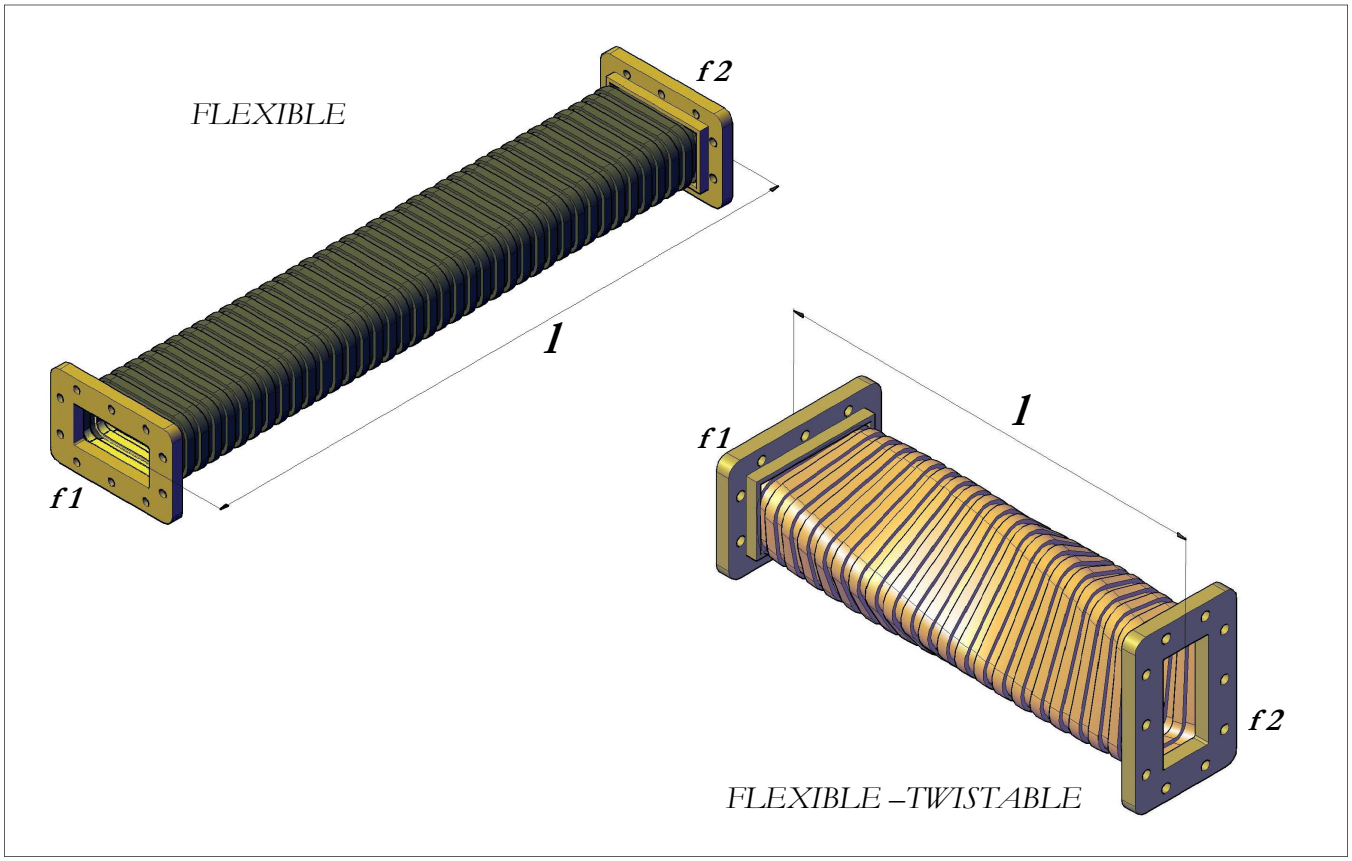
Space Machine & Engineering CORP.

Rectangular Waveguide Flexible & Flexible – Twistable Assemblies



Space Machine offers a standard product line of flexible and flexible – twistable rectangular waveguide covering waveguide sizes WR10 thru WR650. The standard waveguide material is silver-clad brass.
See appendixes K and L for specifications.

Ordering Information:

Flexible – Twistable Waveguide, WR284, 12“ Long, Cover / Cover Brass Flanges, Neoprene Jacket.

Example part number:

WFx	wr	-l	f	f1 f2	-p	j
WFT	284	-12	B	04 04	-S	N

Series (WFL): Flexible
(WFT): Flexible – Twistable

Waveguide Size (wr): WR22 thru WR650

Length (-l): (inches)

Flange material (m): A - Aluminum, B – Brass, O – Other

Flanges (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Jacket (j): N – Neoprene, S – Silicone, V – Vinyl, P – Polysulfide

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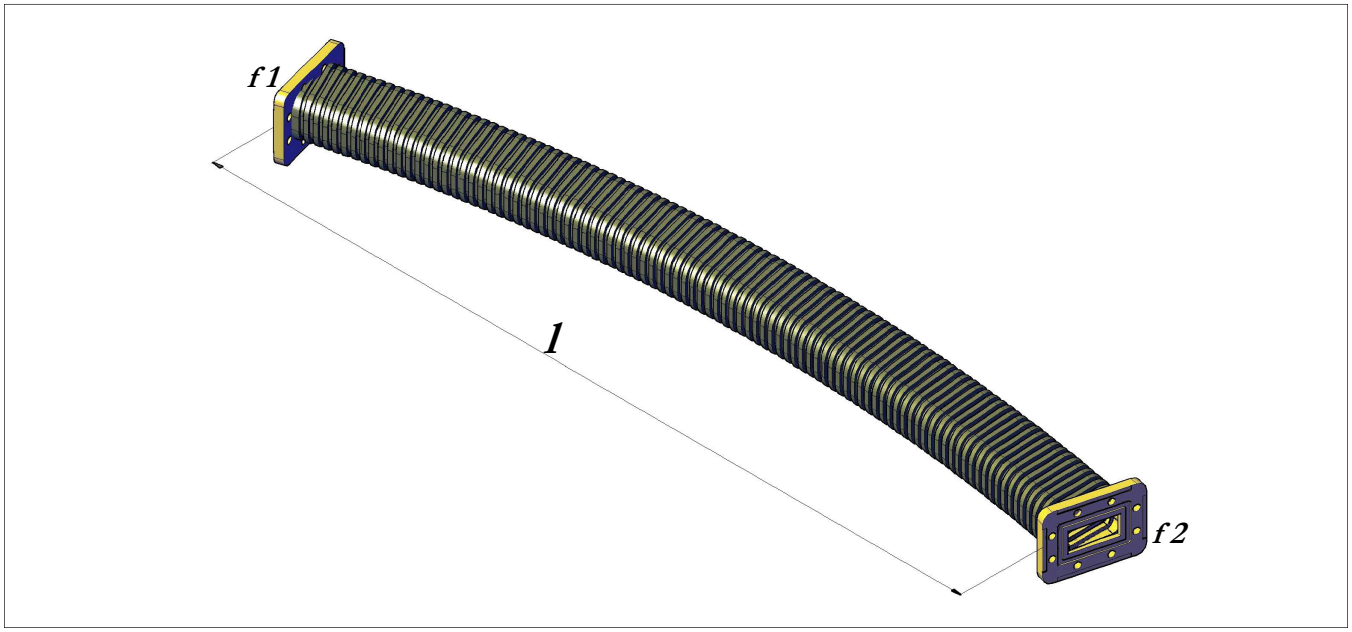
Rectangular Waveguide Seamless Flexible Assemblies



Space Machine offers a standard product line of seamless flexible rectangular waveguide covering waveguide sizes WR28 thru WR650.
Additional sizes and configurations are available upon request. See appendix M for specification.

Length will be supplied with a tolerance +/- 1/8" per foot of length for flexible waveguide.

Ordering Information:

	WFS	wr	-l	m	p	- f1 f2	fm	fp	-j
Seamless Flexible Waveguide Assembly, WR137, 12" Long, Beryllium Copper Flex, Chromated, CPRG / CPRG Chromated Brass Flanges, Neoprene Jacket. **Example part number:**	WFS	137	-12	D	C	-04 04	B	C	-N

Series (WFS): Seamless flex

Waveguide Size (wr): WR28 thru WR650

Length (-l): (inches)

Flex material (m): B -Brass, D-Beryllium Copper, P-Phosphor Bronze

Flex Plating (p): C - Chromate, S - Silver, G - Gold, O - Other, N - None

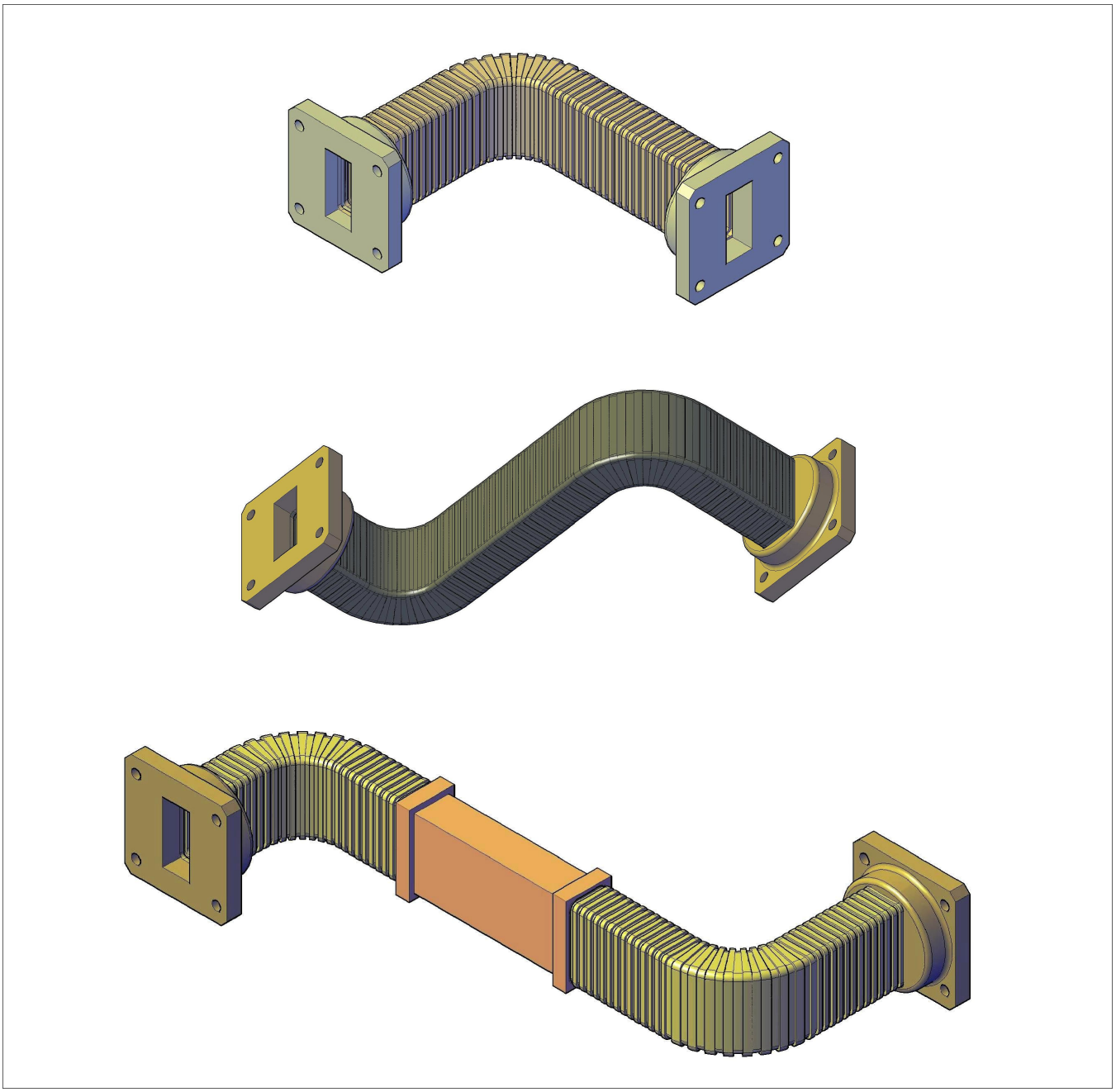
Flanges (f1 f2): See Appendix G

Flange material (fm): A - Aluminum, B – Brass, O – Other

Flange Plating (fp): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Jacket (-j): N – Neoprene, S – Silicone, V – Vinyl, P – Polysulfide, A – No Jacket

Rectangular Waveguide Preformed Seamless Flexible Assemblies



Space Machine can supply preformed seamless flexible rectangular waveguide bend assemblies covering sizes WR28 thru WR650. Flex material may be brass, beryllium copper, or phosphor bronze.
A chromate coating is standard, but other types of plating are available upon request, including Silver and Gold plating. Flexible waveguide assemblies can be supplied without jacket, or with a molded rubber jacket. See appendix M for specification.
Please contact the company with drawings, sketch or word descriptions for quote.

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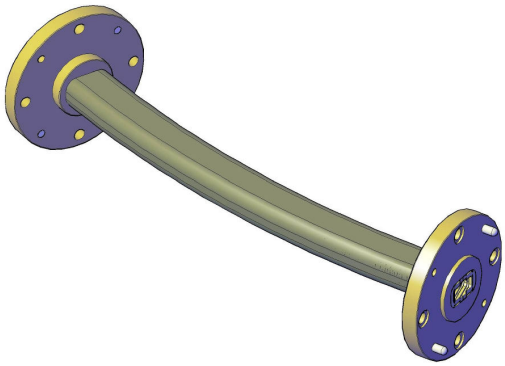
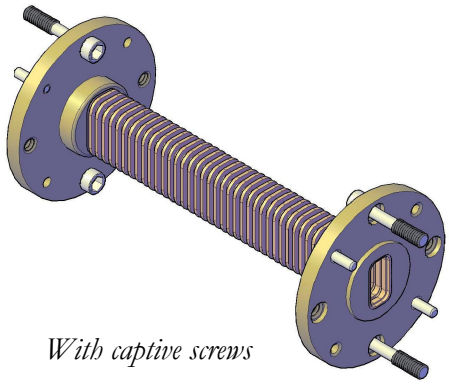
Millimeter Seamless Flexible Waveguide Assemblies





With captive screws

Space Machine offers a standard product line of millimeter seamless flexible waveguide covering waveguide sizes WR10 thru WR28. The max. length of assembly is 4 inches with a tolerance +/- 0.010 per inch. The standard millimeter flange material is brass.
In addition, for easy installation and removal of attached pieces, Space Machine can supply millimeter waveguide flex assemblies with captive screw kit .
For Electrical Specification See appendix M .

Ordering Information:

	MWF	wr	-l	m	f1 f2	-p	j	k
Example part number:	MWF	10	-3	B	06 06	-S	N	1

Millimeter Seamless Flexible Waveguide Assy, WR10, 3" Long, Round Brass Flanges w/tapped holes, Captive Screws, Neoprene Jacket.

Series (MWF): Millimeter Waveguide Flex Assy.

Waveguide Size (wr): WR10 thru WR28

Length (l): (inches)

Flange material (m): A– Aluminum, B - Brass, S - SST

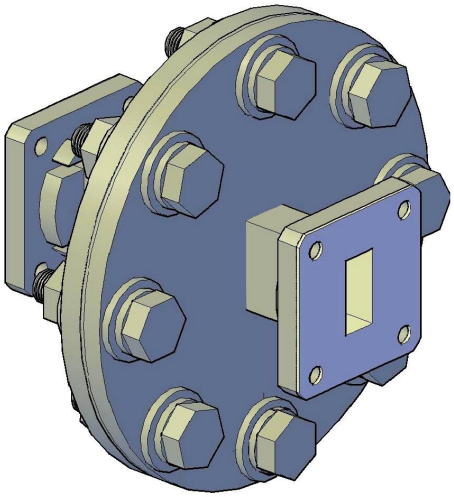
Flanges (-f1 f2): See Appendix G2

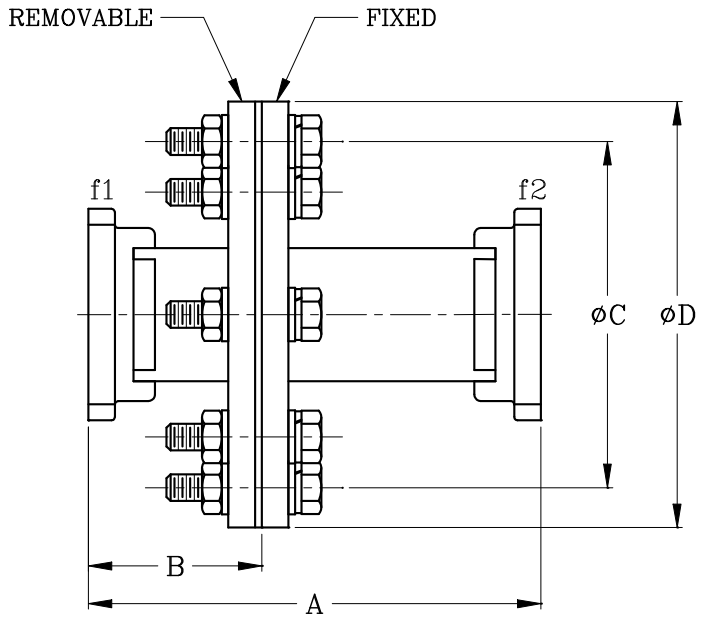
Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Jacket (j): N – Neoprene, S – Silicone, V – Vinyl, P – Polysulfide

Captive Screw Kit (k): 0 -No, 1 -Yes

Rectangular Waveguide Bulkhead Feed Unit





Model	WR #	Frequency (GHz)	A	B	C	D
BFU28-	28	26.50 - 40.00	3.00	1.00	2.50	3.00
BFU34-	34	22.00 - 33.00	3.00	1.00	2.50	3.00
BFU42-	42	18.00 - 26.50	3.00	1.00	2.50	3.00
BFU51-	51	15.00 - 22.00	3.00	1.00	2.50	3.00
BFU62-	62	12.40 - 18.00	3.00	1.00	2.63	3.25
BFU75-	75	10.00 - 15.00	3.75	1.38	2.88	3.50
BFU90-	90	8.20 - 12.40	3.75	1.38	2.88	3.50

Model	WR #	Frequency (GHz)	A	B	C	D
BFU102-	102	7.00 - 11.00	4.25	1.63	3.25	4.00
BFU112-	112	7.05 - 10.00	4.25	1.63	3.25	4.00
BFU137-	137	5.85 - 8.20	4.25	1.63	4.00	4.75
BFU159-	159	4.90 - 7.05	4.25	1.63	5.25	6.00
BFU187-	187	3.95 - 5.85	4.25	1.63	5.25	6.00
BFU229-	229	3.30 - 4.90	4.25	1.63	6.00	6.75
BFU284-	284	2.60 - 3.95	4.25	1.63	6.50	7.25

Space Machine offers a standard product line of bulkhead feed units covering waveguide sizes WR28 thru WR284. Custom bulkhead flange patterns and waveguide lengths are available upon request.

Ordering Information:

Bulkhead Feed Unit, WR112, Aluminum, Cover / Choke Flanges, Chromated, Paint Space Machine Gray.

	BFU	wr	-m	f1 f2	-p	f
Example part number:	BFU	112	-A	01 02	-C	P

Series (BFU):

Waveguide Size (wr): WR28 thru WR284

Material (-m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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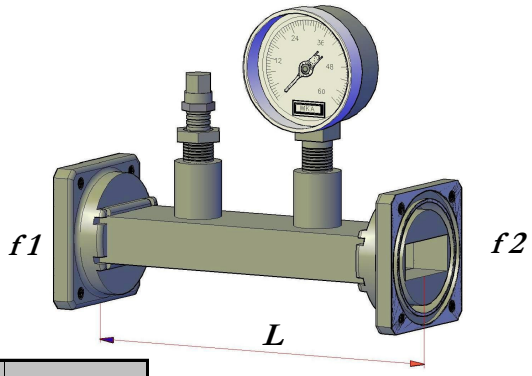
Space Machine & Engineering CORP.

Rectangular Waveguide Pressure Adapter



Model	WR#	Frequency (GHz)	Length (l)
WPA28-	28	26.5 - 40.0	4.0
WPA34-	34	22.0 - 33.0	4.0
WPA42-	42	18.0 - 26.5	4.0
WPA51-	51	15.0 - 22.0	4.0
WPA62-	62	12.4 - 18.0	4.0
WPA75-	75	10.0 - 15.0	4.0
WPA90-	90	8.20 - 12.4	4.0
WPA112-	112	7.05 - 10.0	4.0

Model	WR#	Frequency (GHz)	Length (l)
WPA137-	137	5.85 - 8.20	5.0
WPA159-	159	4.90 - 7.05	5.0
WPA187-	187	3.95 - 5.85	6.0
WPA229-	229	3.30 - 4.90	6.0
WPA284-	284	2.60 - 3.95	6.0
WPA340-	340	2.20 - 3.30	6.0
WPA430-	430	1.70 - 2.60	6.0

Space Machine offers a standard product line of pressure adapters covering waveguide sizes WR28 thru WR430.
VSWR is less than 1.10:1 over the full waveguide band. 15 psi capacity gauge is standard. If other than 15 psi capacity is required, please specify when ordering.
Different types of pressure fittings available in standard SME pressure units, such as Schrader Valve, Flared Compression Fitting, Pipe Threads, or Barbed Fitting.
Additional sizes and configurations are available upon request.

Ordering Information:

	WPA	wr	-l	m	f1 f2	v	-p	f
Example part number:	WPA	75	-4.0	A	01 02	SV	-C	P

Waveguide Pressure Adapter, WR75, 4 inches long, Aluminum, Cover / Choke Flanges, with Schrader Valve Chromate, Paint Space Machine Gray.

Series (WPA):

Waveguide Size (wr): WR28 thru WR430

Length (-l): (inches)

Material (m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flanges (f1 f2): See Appendix G

Pressure Fitting (v): Schrader Valve-SV, Flared Compression Fitting-FF, Pipe Threads-PT, Barbed Fitting-BF

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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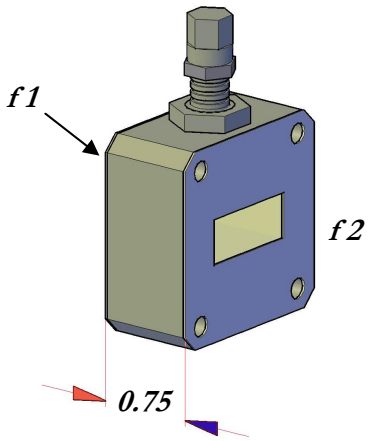
Space Machine & Engineering CORP.

Rectangular Waveguide Pressure Flange



Model	WR#	Frequency (GHz)
WPF28-	28	26.5 - 40.0
WPF34-	34	22.0 - 33.0
WPF42-	42	18.0 - 26.5
WPF51-	51	15.0 - 22.0
WPF62-	62	12.4 - 18.0

Model	WR#	Frequency (GHz)
WPF75-	75	10.0 - 15.0
WPF90-	90	8.20 - 12.4
WPF112-	112	7.05 - 10.0
WPF137-	137	5.85 - 8.20
WPF159-	159	4.90 - 7.05

Model	WR#	Frequency (GHz)
WPF187-	187	3.95 - 5.85
WPF229-	229	3.30 - 4.90
WPF284-	284	2.60 - 3.95
WPF340-	340	2.20 - 3.30
WPF430-	430	1.70 - 2.60

Space Machine offers a standard product line of pressure flanges covering waveguide sizes WR28 thru WR430.
VSWR is less than 1.10:1 over the full waveguide band. Pressure flange standard thickness is 0.75".
Custom thickness is available upon request.
Different types of pressure fittings available in standard SME pressure flange assembly, such as Schrader Valve, Flared Compression Fitting, Pipe Threads, or Barbed Fitting. Pressure inlet can be substituted with drain unit or pressure drain unit.
Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide Pressure Flange, WR75, Aluminum, Cover / Cover Flanges, with Schrader Valve, Chromate, Paint Space Machine Gray.

Example part number:

WPF	wr	-m	f1 f2	v	-p	f
WPF	75	-A	01 01	SV	-C	P

Series (WPF):

Waveguide Size (wr): WR28 thru WR430

Material (-m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flanges (f1 f2): See Appendix G

Pressure Fitting (v): Schrader Valve-SV, Flared Compression Fitting– FF, Pipe Threads-PT, Barbed Fitting– BF

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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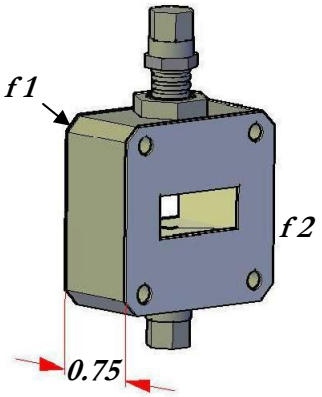
Space Machine & Engineering CORP.

Rectangular Waveguide Dual Fitting Pressure Flange



Model	WR#	Frequency (GHz)
WDPF28-	28	26.5 - 40.0
WDPF34-	34	22.0 - 33.0
WDPF42-	42	18.0 - 26.5
WDPF51-	51	15.0 - 22.0
WDPF62-	62	12.4 - 18.0

Model	WR#	Frequency (GHz)
WDPF75-	75	10.0 - 15.0
WDPF90-	90	8.20 - 12.4
WDPF112-	112	7.05 - 10.0
WDPF137-	137	5.85 - 8.20
WDPF159-	159	4.90 - 7.05

Model	WR#	Frequency (GHz)
WDPF187-	187	3.95 - 5.85
WDPF229-	229	3.30 - 4.90
WDPF284-	284	2.60 - 3.95
WDPF340-	340	2.20 - 3.30
WDPF430-	430	1.70 - 2.60

Space Machine offers a standard product line of dual fitting pressure flanges covering waveguide sizes WR28 thru WR430.
VSWR is less than 1.10:1 over the full waveguide band. Dual fitting pressure flange standard thickness is 0.75".
Custom thickness is available upon request.
Different types of pressure fittings available in standard SME pressure flange assembly, such as Schrader Valve, Flared Compression Fitting, Pipe Threads, or Barbed Fitting. Pressure inlet can be substituted with drain unit or pressure drain unit.
Additional sizes and configurations are available upon request.

Ordering Information:

	WDPF	wr	-m	f1 f2	v	-p	f
Example part number:	WDPF	75	-A	01 01	SV	-C	P

Waveguide Dual Fitting Pressure Flange, WR75, Aluminum, Cover / Cover Flanges, with Schrader Valve, Chromate, Paint Space Machine Gray.

Series (WDPF):

Waveguide Size (wr): WR28 thru WR430

Material (-m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flanges (f1 f2): See Appendix G

Pressure Fitting (v): Schrader Valve-SV, Flared Compression Fitting– FF, Pipe Threads-PT, Barbed Fitting– BF

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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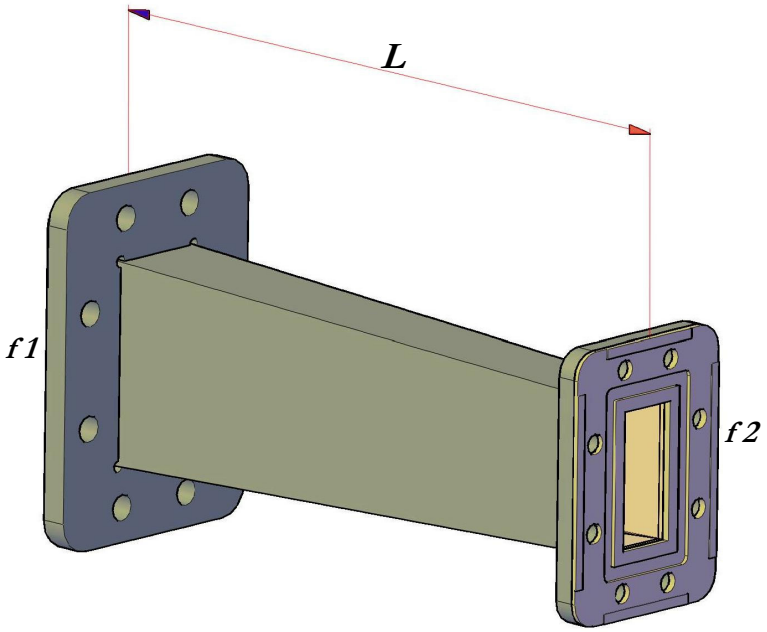
Rectangular To Rectangular Waveguide Transitions



Space Machine offers a standard product line of transitions covering waveguide sizes WR10 thru WR975.
VSWR is 1.05 typical in the overlapping frequency bands. Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide To Waveguide Transition, WR137 CPRF Flange to WR112 CPRG Flange, Brass, 5.0" Long, Chromated, Paint Space Machine Gray.

Example part number:

WWT	wr1	-f1	-wr2	-f2	m	l	-p	f
WWT	137	-05	-112	-04	B	5.0	-C	P

Series (WWT):

Waveguide Size 1 (wr1): WR10 thru WR975

Flange 1 (-f1): See Appendix G

Waveguide Size 2 (-wr2): WR10 thru WR975

Flange 2 (-f2): See Appendix G

Material (m): A – Aluminum, B – Brass, C – OFHC Copper, O – Other

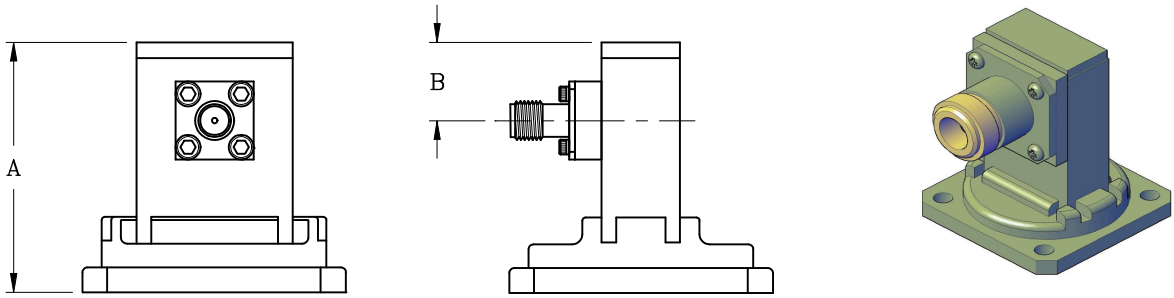
Length (l): (inches)

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Space Machine & Engineering CORP.

Rectangular Waveguide To Coax Adapters



Model	WR #	Frequency (GHz)	A	B
WCA28-	28	26.50 - 40.00	0.96	0.34
WCA34-	34	22.00 - 33.00	1.00	0.36
WCA42-	42	18.00 - 26.50	1.00	0.39
WCA51-	51	15.00 - 22.00	1.20	0.43
WCA62-	62	12.40 - 18.00	1.85	0.45
WCA75-	75	10.00 - 15.00	2.00	0.50
WCA90-	90	8.20 - 12.40	2.00	0.54
WCA102-	102	7.00 - 11.00	2.00	0.60
WCA112-	112	7.05 - 10.00	2.00	0.63
WCA137-	137	5.85 - 8.20	2.20	0.66

Model	WR #	Frequency (GHz)	A	B
WCA159-	159	4.90 - 7.05	2.25	0.76
WCA187-	187	3.95 - 5.85	2.34	0.88
WCA229-	229	3.30 - 4.90	2.53	1.04
WCA284-	284	2.60 - 3.95	3.36	1.23
WCA340-	340	2.20 - 3.30	3.50	1.50
WCA430-	430	1.70 - 2.60	4.00	1.71
WCA510-	510	1.45 - 2.20	5.00	2.01
WCA650-	650	1.12 - 1.70	6.00	2.49
WCA770-	770	0.96 - 1.45	7.50	2.95
WCA975-	975	0.75 - 1.12	8.25	3.61

Space Machine offers a standard product line of waveguide to coax adapters covering waveguide sizes WR28 thru WR975. VSWR is 1.20:1 typical. Additional sizes and configurations available upon request. See next page for common connectors used and specs. Please contact us for addition information in regards to coax power handling.
wr* - add HW, RH or TW to the part number if ordering heavy wall waveguide tubing (HW), reduced height waveguide tubing (RH) or thin wall waveguide tubing (TW). See appendix A for waveguide physical dimensions.

Ordering Information:

Waveguide To Coax Adapter, WR112, Bronze, Cover Flange, SMA Female Connector, Chromated, Paint Space Machine Gray.

	WCA	wr*	-m	f	cnt	-p	f
Example part number:	WCA	112	-B	01	SF	-C	P

Series (WCA):

Waveguide Size (wr): WR28 thru WR975

Material (-m): A – Aluminum, B – Bronze, C - OFHC Copper, O – Other

Flange (f): See Appendix G

Connector (cnt): See Appendix E

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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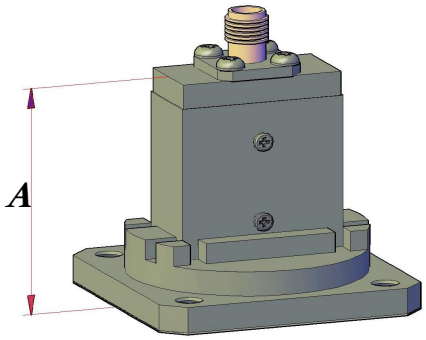
Space Machine & Engineering CORP.

Rectangular Waveguide To Coax End Launch Adapters



Model	WR #	Frequency (GHz)	A
WCA28EL	28	26.50 - 40.00	1.50
WCA34EL	34	22.00 - 33.00	1.75
WCA42EL	42	18.00 - 26.50	1.90
WCA51EL	51	15.00 - 22.00	2.00
WCA62EL	62	12.40 - 18.00	2.25
WCA75EL	75	10.00 - 15.00	2.50
WCA90EL	90	8.20 - 12.40	3.00
WCA102EL	102	7.00 - 11.00	3.50

Model	WR #	Frequency (GHz)	A
WCA112EL	112	7.05 - 10.00	4.00
WCA137EL	137	5.85 - 8.20	4.50
WCA159EL	159	4.90 - 7.05	5.00
WCA187EL	187	3.95 - 5.85	6.00
WCA229EL	229	3.30 - 4.90	7.25
WCA284EL	284	2.60 - 3.95	9.00
WCA340EL	340	2.20 - 3.30	11.00
WCA430EL	430	1.70 - 2.60	12.00

Space Machine offers a standard product line of end launch waveguide to coax adapters covering waveguide sizes WR28 thru WR430. VSWR is 1.35:1 max. Improved VSWR performance can be obtained over a reduced bandwidth.
Space Machine's End-Launch Adapters use a transition whose center conductor is structurally tied to the waveguide, for excellent mechanical and thermal stability. Additional sizes and configurations available upon request.

Ordering Information:

	WCA	wr	EL	-m	f	cnt	-p	f
Example part number:	WCA	112	EL	-B	01	SF	-C	P

Waveguide To Coax End Launch Adapter, WR112, Bronze, Cover Flange, SMA Female Connector, Chromate, Paint Space Machine Gray.

Series (WCA):

Waveguide Size (wr): WR28 thru WR430

End Launch (EL)

Material (-m): A – Aluminum, B – Bronze, C - OFHC Copper, O – Other

Flange (f): See Appendix G

Connector (cnt): See Appendix E

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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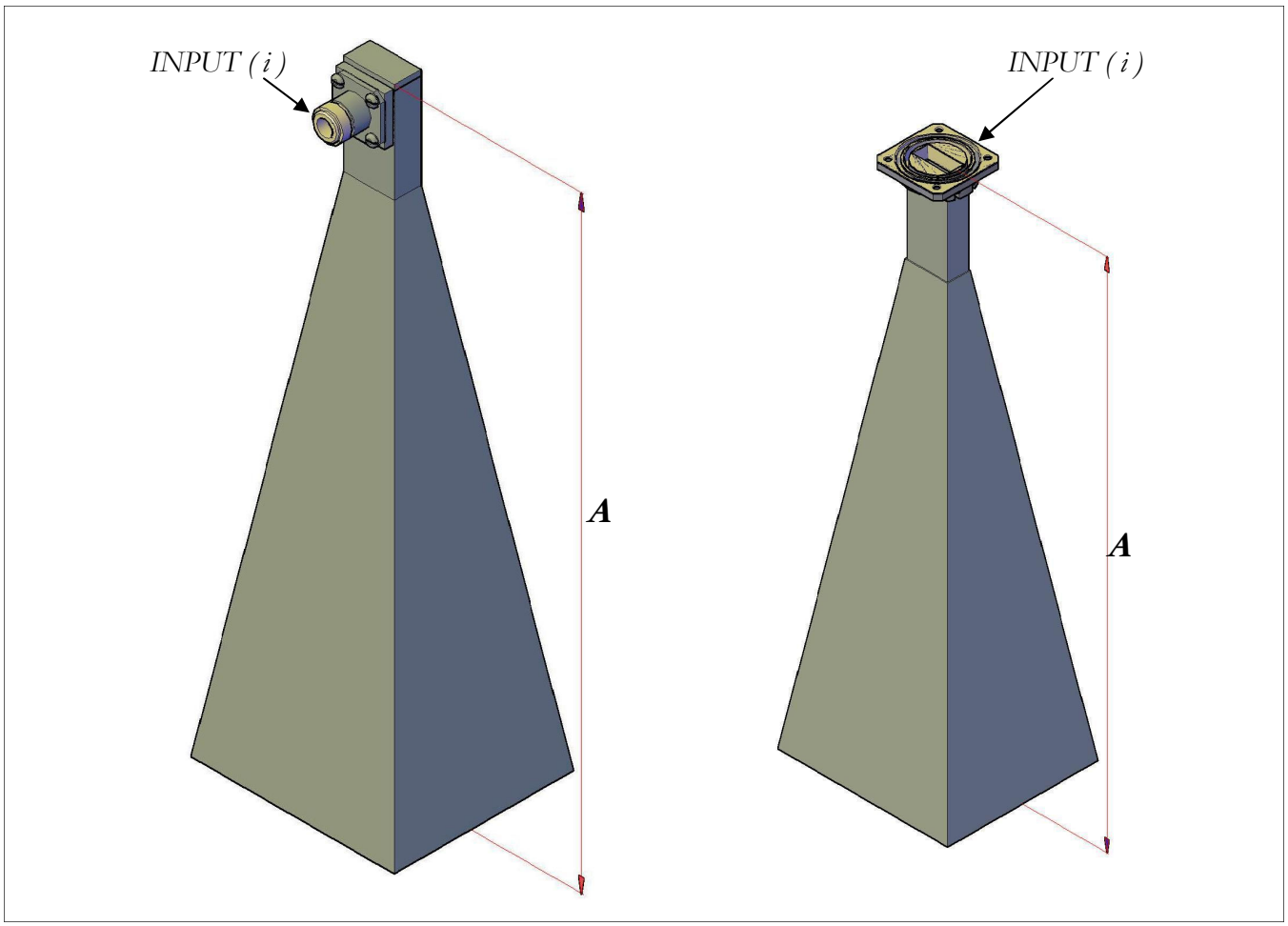
Rectangular Waveguide Standard Gain Horns



Space Machine offers a product line of standard gain horns covering waveguide sizes WR28 thru WR975. VSWR is 1.30:1 with connector input, 1.20:1 with flange input. Gain is ± 1dB maximum. See next page for dimensions. Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide Standard Gain Horn, WR112, Brass, SMA Female Input, Chromated, Paint Space Machine Gray.

	WSH	wr	-m	i	-p	f
Example part number:	WSH	112	-B	SF	-C	P

Series (WSH):

Waveguide Size (wr): WR28 thru WR975

Material (-m): A – Aluminum, B – Brass, C – OFHC Copper, O – Other

Input (i): Connector (See Appendix E)
Flange (See Appendix G)

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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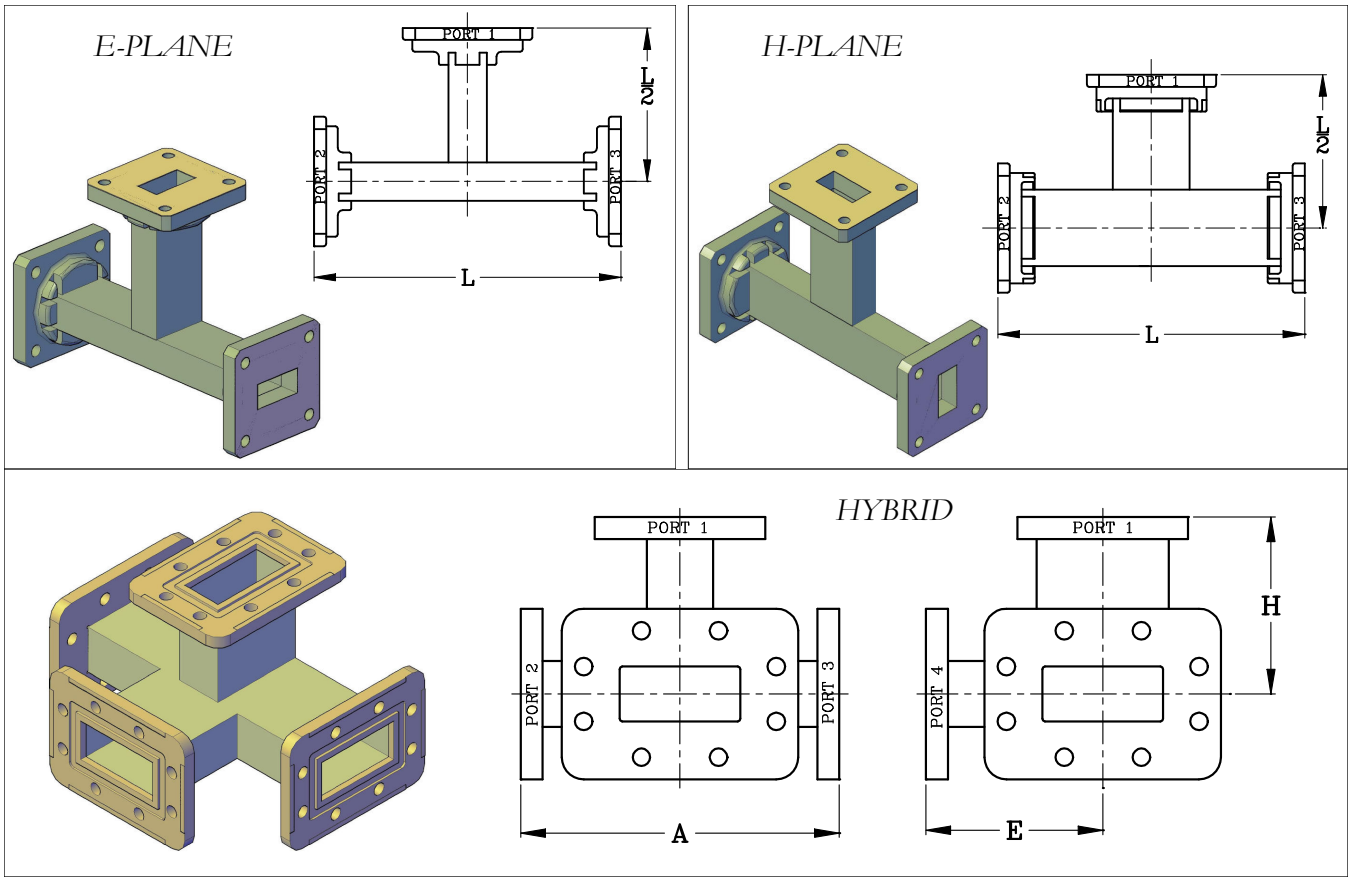
Rectangular Waveguide Standard Gain Horn Dimensions

Model	WR #	Frequency (GHz)	Gain* (dB)	A
WSH28-	28	26.50 – 40.00	24.7	6.67
WSH34-	34	22.00 – 33.00	24.7	9.21
WSH42-	42	18.00 – 26.50	24.7	9.50
WSH51-	51	15.00 – 22.00	24.7	13.38
WSH62-	62	12.40 – 18.00	24.7	14.41
WSH75-	75	10.00 – 15.00	25.0	17.50
WSH90-	90	8.20 – 12.40	22.1	13.41
WSH112-	112	7.05 – 10.00	18.0	7.45
WSH137-	137	5.85 – 8.20	22.1	19.07
WSH159-	159	4.90 – 7.05	18.0	9.45
WSH187-	187	3.95 – 5.85	18.0	12.25
WSH229-	229	3.30 – 4.90	18.0	13.50
WSH284-	284	2.60 – 3.95	18.0	18.00
WSH340-	340	2.20 – 3.30	18.0	13.00
WSH430-	430	1.70 – 2.60	15.5	15.00
WSH510-	510	1.45 – 2.20	15.5	17.50
WSH650-	650	1.12 – 1.70	15.5	22.80
WSH770-	770	0.96 – 1.45	13.7	24.80
WSH975-	975	0.75 – 1.12	13.7	24.50

*Nominal gain at midband.

Space Machine & Engineering CORP.

Rectangular Waveguide E-Plane (Series), H-Plane (Shunt), & Hybrid Tees



Space Machine offers a standard product line of waveguide tees covering waveguide sizes WR28 thru WR284. Additional sizes and configurations are available on request. For E and H plane tees please specify whether the tee is to be used as a combiner or divider. Over 20% bandwidth VSWR is 1.2:1 max for all ports, power split is ± 0.1dB and collinear arm isolation is 15 dB minimum. For hybrid tees, over 20% bandwidth VSWR is 1.2:1 max for all ports, power split is ± 0.1dB and E and H arm isolation is 30dB minimum. See next page for standard dimensions.

Ordering Information:

	Ttt	wr	-m	f	-p	f
Example part number:	THB	137	-B	04	-C	P

Waveguide Tee Hybrid, WR137, Bronze, CPRG Flange, Chromated, Paint Space Machine Gray.

Series (TEP): E – Plane Tee
(THP): H – Plane Tee
(THB): Hybrid Tee

Waveguide Size (wr): WR28 thru WR284

Material (-m): A – Aluminum, B – Bronze, C - OFHC Copper, O – Other

Flange (f): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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Rectangular Waveguide E-Plane (Series), H-Plane (Shunt), &Hybrid Tees

E and H Plane Tees

Model	WR #	Frequency (GHz)	L
TxP28-	28	26.50 – 40.00	2.00
TxP34-	34	22.00 – 33.00	2.00
TxP42-	42	18.00 – 26.50	2.00
TxP51-	51	15.00 – 22.00	2.00
TxP62-	62	12.40 – 18.00	3.00
TxP75-	75	10.00 – 15.00	3.00
TxP90-	90	8.20 – 12.40	4.00

Model	WR #	Frequency (GHz)	L
TxP102-	102	7.00 – 11.00	4.00
TxP112-	112	7.05 – 10.00	4.00
TxP137-	137	5.85 – 8.20	5.00
TxP159-	159	4.90 – 7.05	6.00
TxP187-	187	3.95 – 5.85	7.00
TxP229-	229	3.30 – 4.90	8.00
TxP284-	284	2.60 – 3.95	9.00

Hybrid Tees

Model	WR #	Frequency (GHz)	A	E	H
THB28-	28	26.50 – 40.00	2.25	1.25	1.25
THB34-	34	22.00 – 33.00	2.25	1.25	1.25
THB42-	42	18.00 – 26.50	2.25	1.25	1.25
THB51-	51	15.00 – 22.00	2.75	1.50	1.50
THB62-	62	12.40 – 18.00	2.75	1.50	1.50
THB75-	75	10.00 – 15.00	2.75	1.50	1.50
THB90-	90	8.20 – 12.40	3.25	1.75	1.75

Model	WR #	Frequency (GHz)	A	E	H
THB112-	112	7.05 – 10.00	3.75	2.00	2.00
THB137-	137	5.85 – 8.20	5.25	2.75	2.75
THB159-	159	4.90 – 7.05	5.75	3.00	3.00
THB187-	187	3.95 – 5.85	6.25	3.25	3.25
THB229-	229	3.30 – 4.90	8.25	4.25	4.25
THB284-	284	2.60 – 3.95	10.25	5.25	5.25

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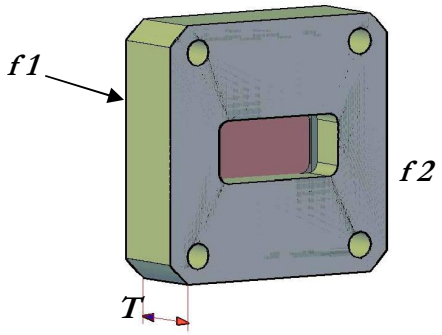
Space Machine & Engineering CORP.

Teflon/Fiberglass Rectangular Waveguide Pressure Windows



Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*
WPWT28-	28	26.50 - 40.00	40	0.18
WPWT34-	34	22.00 - 33.00	50	0.18
WPWT42-	42	18.00 - 26.50	80	0.18
WPWT51-	51	15.00 - 22.00	80	0.18
WPWT62-	62	12.40 - 18.00	200	0.18
WPWT75-	75	10.00 - 15.00	300	0.18*
WPWT90-	90	8.20 - 12.40	400	0.18*
WPWT102-	102	7.00 - 11.00	500	0.18*

Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*
WPWT112-	112	7.05 - 10.00	500	0.25
WPWT137-	137	5.85 - 8.20	750	0.25
WPWT159-	159	4.90 - 7.05	1000	0.25
WPWT187-	187	3.95 - 5.85	1200	0.25
WPWT229-	229	3.30 - 4.90	1500	0.25
WPWT284-	284	2.60 - 3.95	1800	0.25
WPWT340-	340	2.20 - 3.30	2000	0.38
WPWT430-	430	1.70 - 2.60	2200	0.38

Space Machine offers a standard product line of teflon / fiberglass pressure windows covering waveguide sizes WR28 thru WR430. VSWR is 1.10:1 maximum, while insertion loss is 0.1dB maximum over the full waveguide bandwidth. Pressure handling capability is 20 PSI minimum, however, higher capacities up to 30 PSI are usually obtained. Please specify pressure requirements when ordering. Additional sizes and configurations are available upon request.
* Thickness noted when using a cover/cover flange configuration. When using a CPR or CMR flange type configuration, thickness is 0.25". A choke flange face configuration requires a greater thickness.

Ordering Information:

Teflon / Fiberglass Waveguide Pressure Window, WR90, Aluminum, Cover / Cover Flanges, Chromated, Paint Space Machine Gray.

Example part number:

WPWT	wr	-m	f1 f2	-p	f
WPWT	90	-A	01 01	-C	P

Series (WPWT):

Waveguide Size (wr): WR28 thru WR430

Flange Material (-m): A – Aluminum, B – Brass, O – Other

Flanges (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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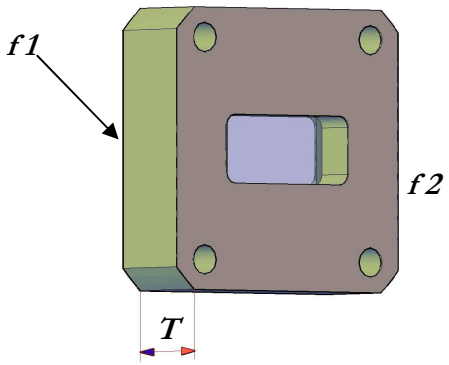
Kapton Rectangular Waveguide Pressure Windows



Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*
WPWK28-	28	26.50 - 40.00	100	0.18
WPWK34-	34	22.00 - 33.00	100	0.18
WPWK42-	42	18.00 - 26.50	100	0.18
WPWK51-	51	15.00 - 22.00	150	0.18
WPWK62-	62	12.40 - 18.00	200	0.18
WPWK75-	75	10.00 - 15.00	400	0.18*
WPWK90-	90	8.20 - 12.40	600	0.18*

Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*
WPWK102-	102	7.00 - 11.00	650	0.18*
WPWK112-	112	7.05 - 10.00	750	0.25
WPWK137-	137	5.85 - 8.20	1000	0.25
WPWK159-	159	4.90 - 7.05	1250	0.25
WPWK187-	187	3.95 - 5.85	1500	0.25
WPWK229-	229	3.30 - 4.90	1800	0.25
WPWK284-	284	2.60 - 3.95	2000	0.25

Space Machine offers a standard product line of kapton pressure windows covering waveguide sizes WR28 thru WR284.
VSWR is 1.10:1 maximum, while insertion loss is 0.1dB maximum over the full waveguide bandwidth.
Pressure handling capability is 20 PSI maximum. Additional sizes and configurations are available upon request.
This window is well suited for vacuum applications.
* Thickness noted when using a cover/cover flange configuration. When using a CPR or CMR flange type configuration, thickness is 0.25". A choke flange face configuration requires a greater thickness.

Ordering Information:

Kapton Waveguide Pressure Window, WR112, Brass, Cover / Cover Flanges, Chromated, Paint Space Machine Gray.

	WPWK	**wr**	**-m**	**f1 f2**	**-p**	**f**
Example part number:	WPWK	112	-B	01 01	-C	P

Series (WPWK):

Waveguide Size (wr): WR28 thru WR284

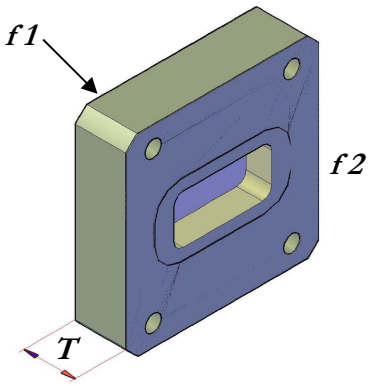
Flange Material (-m): A – Aluminum, B – Brass, O – Other

Flanges (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Mica Rectangular Waveguide Pressure Windows



Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*
WPWM28-	28	26.50 - 40.00	200	0.18
WPWM34-	34	22.00 - 33.00	200	0.18
WPWM42-	42	18.00 - 26.50	200	0.18
WPWM51-	51	15.00 - 22.00	250	0.18
WPWM62-	62	12.40 - 18.00	500	0.18
WPWM75-	75	10.00 - 15.00	750	0.18*
WPWM90-	90	8.20 - 12.40	1000	0.18*

Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*
WPWM102-	102	7.00 - 11.00	1250	0.18*
WPWM112-	112	7.05 - 10.00	1500	0.25
WPWM137-	137	5.85 - 8.20	1750	0.25
WPWM159-	159	4.90 - 7.05	2000	0.25
WPWM187-	187	3.95 - 5.85	2200	0.25
WPWM229-	229	3.30 - 4.90	2500	0.25
WPWM284-	284	2.60 - 3.95	2500	0.25

Space Machine offers a standard product line of mica pressure windows covering waveguide sizes WR28 thru WR284.
VSWR is 1.15:1 maximum, while insertion loss is 0.15dB maximum over the full waveguide bandwidth.
Pressure handling capability is 10 PSI maximum. Additional sizes and configurations are available upon request.
This window is well suited for high power and vacuum applications.
* Thickness noted when using a cover/cover flange configuration. When using a CPR or CMR flange type configuration, thickness is 0.25". A choke flange face configuration requires a greater thickness.

Ordering Information:

Mica Waveguide Pressure Window, WR112, Aluminum, Cover / Cover Flanges, Chromated, Paint Space Machine Gray.

	WPWM	wr	-m	f1 f2	-p	f
Example part number:	WPWM	112	-A	01 01	-C	P

Series (WPWM):

Waveguide Size (wr): WR28 thru WR284

Flange Material (-m): A – Aluminum, B – Brass, O – Other

Flanges (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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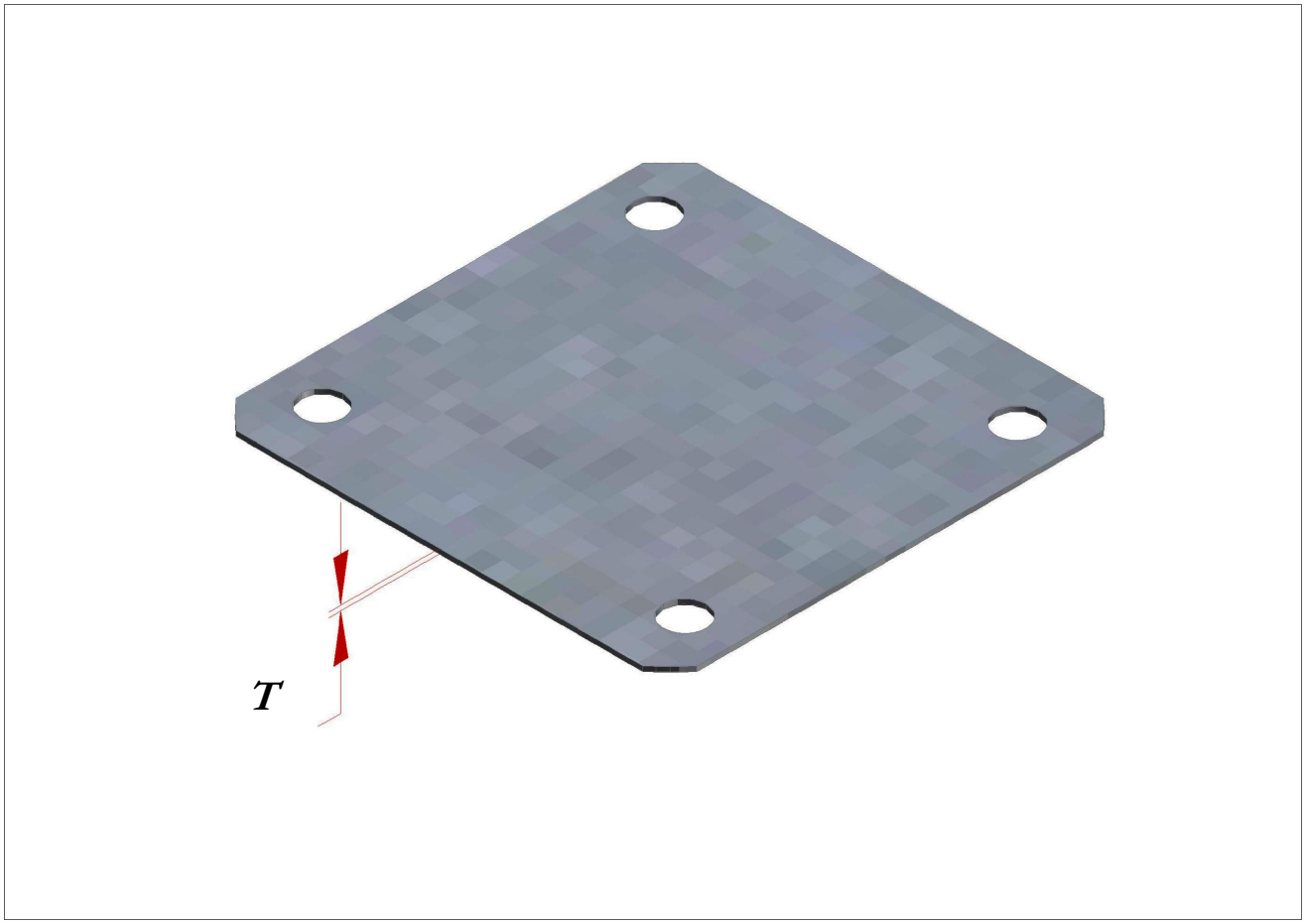
Space Machine & Engineering CORP.

Rectangular Waveguide Pressure Gasket



Space Machine offers a standard product line of pressure gaskets covering waveguide sizes WR28 thru WR430. VSWR is 1.05:1 maximum, while insertion loss is 0.05dB maximum over the full waveguide bandwidth. Pressure handling capability is proportional with thickness. Additional sizes and configurations are available upon request.

Ordering Information:

		WPG	wr	-m	f	-t
Waveguide Pressure Gasket, WR112, Mylar, 0.010 thick.	**Example part number:**	WPG	112	-MY	01	-10

Series (WPG)

Waveguide Size (wr): WR28 thru WR430

Material (-m): T – Teflon, TF – Teflon/Fiberglass, MY – Mylar, K – Kapton

Flange (f): See Appendix G

Thickness (-t): 5, 10, 15, 20 (thousandths of an inch)

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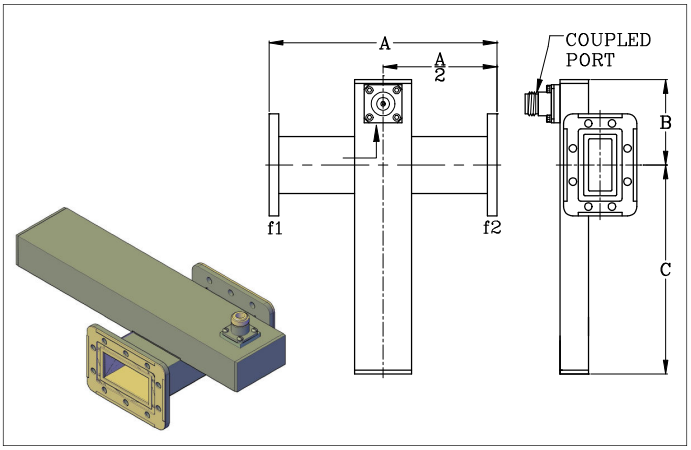
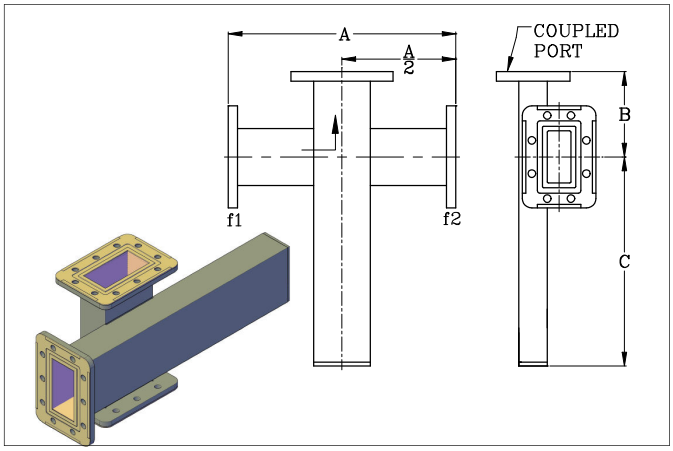
Rectangular Waveguide Cross Guide Couplers





Model	WR #	Frequency (GHz)	A	B	C
DCG28-	28	26.50 - 40.00	2.00	1.00	2.50
DCG34-	34	22.00 - 33.00	2.00	1.00	2.50
DCG42-	42	18.00 - 26.50	2.00	1.25	3.00
DCG51-	51	15.00 - 22.00	3.00	1.25	3.00
DCG62-	62	12.40 - 18.00	3.25	1.50	3.00
DCG75-	75	10.00 - 15.00	3.50	1.50	3.00
DCG90-	90	8.20 - 12.40	4.00	2.00	4.00

Model	WR #	Frequency (GHz)	A	B	C
DCG102-	102	7.00 - 11.00	4.00	2.00	4.00
DCG112-	112	7.05 - 10.00	4.00	2.00	4.50
DCG137-	137	5.85 - 8.20	4.25	3.00	4.50
DCG159-	159	4.90 - 7.05	5.00	3.00	5.50
DCG187-	187	3.95 - 5.85	5.00	3.50	6.50
DCG229-	229	3.30 - 4.90	5.50	4.00	7.00
DCG284-	284	2.60 - 3.95	6.00	6.00	7.50

Space Machine custom fabricates a standard product line of cross guide couplers covering waveguide sizes WR28 thru WR284. Coupling variation is typically ± 1dB over the full waveguide band. Directivity is 20dB minimum. Additional sizes and configurations are available upon request.

Ordering Information:

DCG	wr	-m	c	cp	-f1 f2	-p	f
DCG	137	-B	30	NF	-05 04	-C	P

Cross Guide Coupler, WR137, Bronze, 30dB Coupling, Type N Female Coupled Port, CPRF / CPRG Flanges, Chromated, Paint Space Machine Gray. **Example part number:**

Series (DCG):

Waveguide Size (wr): WR28 thru WR284

Material (-m): A – Aluminum, B – Bronze, O – Other

Coupling (c): 20 - 60 dB

Coupled Port (cp): Connector – See Appendix E
Flange – See Appendix G

Flange (-f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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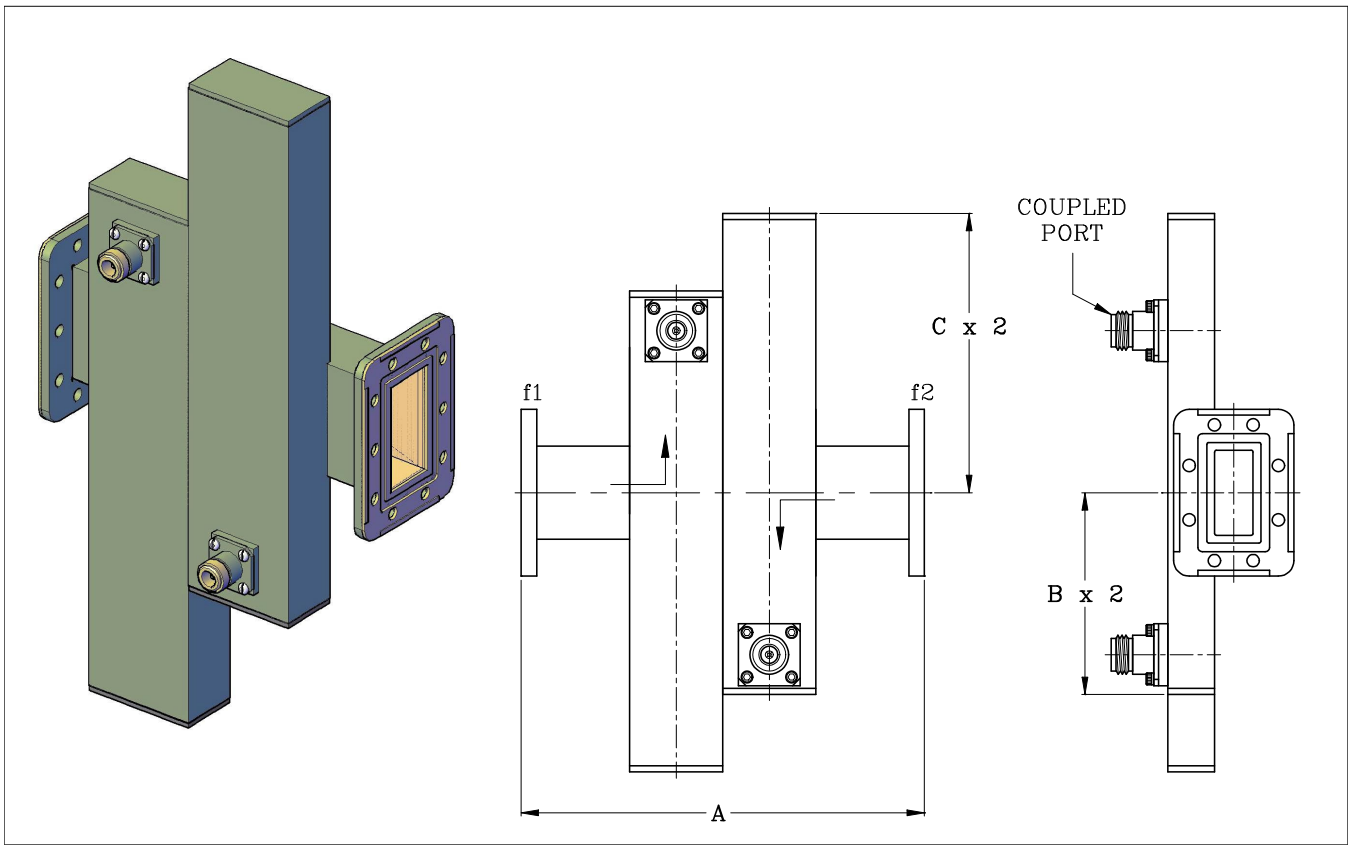
Rectangular Waveguide Dual Cross Guide Couplers



Space Machine custom fabricates a standard product line of dual cross guide couplers covering waveguide sizes WR28 thru WR284. Coupling variation is typically ± 2dB over the full waveguide band. Directivity is 20dB minimum. Additional sizes and configurations are available upon request. See next page for standard dimensions.

Ordering Information:

	DCB	wr	m	c	cp	-f1 f2	-p	f
Dual Cross Guide Coupler, WR137, Bronze, 30dB Coupling, Type N Female Coupled Port, CPRF / CPRG Flanges, Chromated, Paint Space Machine Gray. **Example part number:**	DCB	137	-B	30	NF	-05 04	-C	P

Series (DCB):

Waveguide Size (wr): WR28 thru WR284

Material (-m): A – Aluminum, B – Bronze, O – Other

Coupling (c): 20 - 60 dB

Coupled Port (cp): Connector – See Appendix E
Flange – See Appendix G

Flange (-f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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Rectangular Waveguide Dual Cross Guide Coupler Dimensions

Model	WR #	Frequency (GHz)	A	B	C
DCB28-	28	26.50 – 40.00	2.75	1.25	2.00
DCB34-	34	22.00 – 33.00	3.00	1.25	2.00
DCB42-	42	18.00 – 26.50	3.25	1.25	2.50
DCB51-	51	15.00 – 22.00	3.50	1.25	2.75
DCB62-	62	12.40 – 18.00	3.50	1.50	2.75
DCB75-	75	10.00 – 15.00	4.00	1.50	3.25
DCB90-	90	8.20 – 12.40	4.25	2.00	3.50
DCB102-	102	7.00 – 11.00	4.50	2.00	3.75
DCB112-	112	7.05 – 10.00	5.00	2.00	4.00
DCB137-	137	5.85 – 8.20	6.00	3.00	5.00
DCB159-	159	4.90 – 7.05	7.00	3.00	6.00
DCB187-	187	3.95 – 5.85	7.50	3.50	6.25
DCB229-	229	3.30 – 4.90	8.50	4.00	6.50
DCB284-	284	2.60 – 3.95	9.50	6.00	7.25

All dimensions are in inches and given for couplers with connectors on the coupled port.

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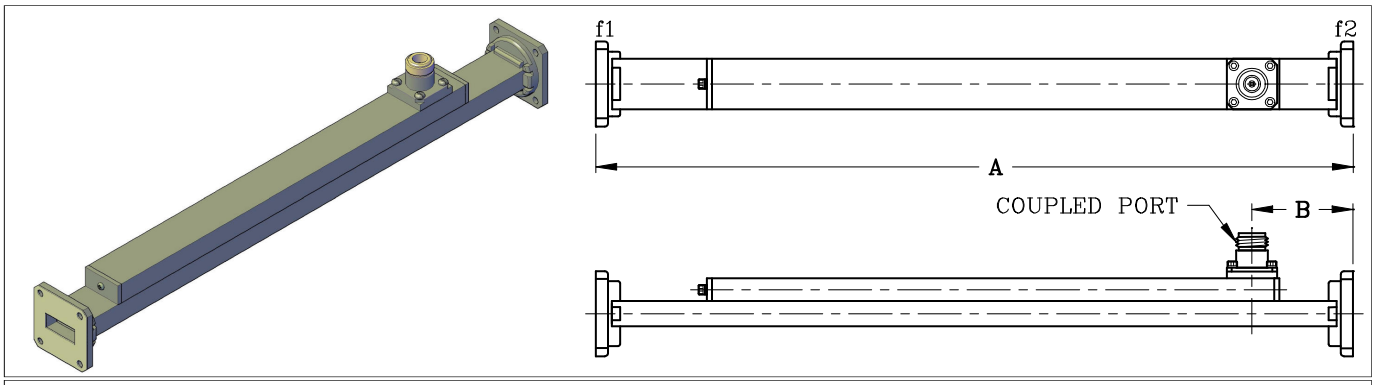
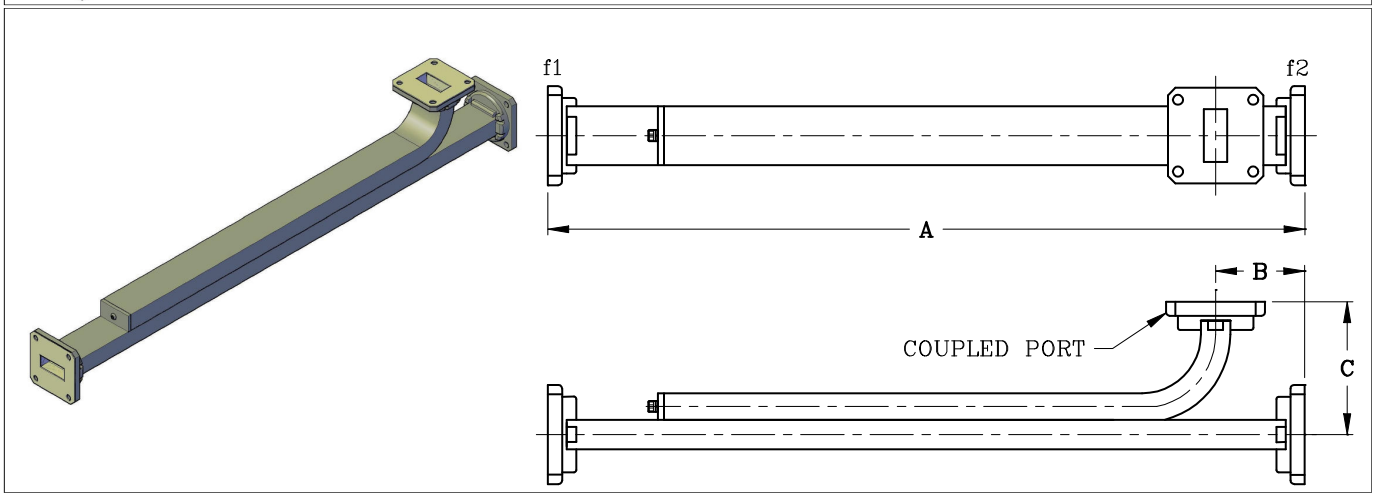
Rectangular Waveguide Topwall Couplers





Space Machine custom fabricates a standard product line of topwall couplers covering waveguide sizes WR28 thru WR284. Coupling variation is typically ± 0.5dB over the full waveguide band. Directivity is 35dB minimum.
Additional sizes and configurations are available upon request. See next page for standard dimensions.

Ordering Information:

Topwall Coupler, WR90, Aluminum, 30dB Coupling, Type N Female Coupled Port, Cover / Choke Flanges, Chromated, Paint Space Machine Gray.

Example part number:

DTC	wr	-m	c	cp	-f1 f2	-p	f
DTC	90	-A	30	NF	-01 02	-C	P

Series (DTC):

Waveguide Size (wr): WR28 thru WR284

Material (-m): A – Aluminum, B – Bronze, O – Other

Coupling (c): 20 - 60 dB

Coupled Port (cp): Connector – See Appendix E
Flange – See Appendix G

Flange (-f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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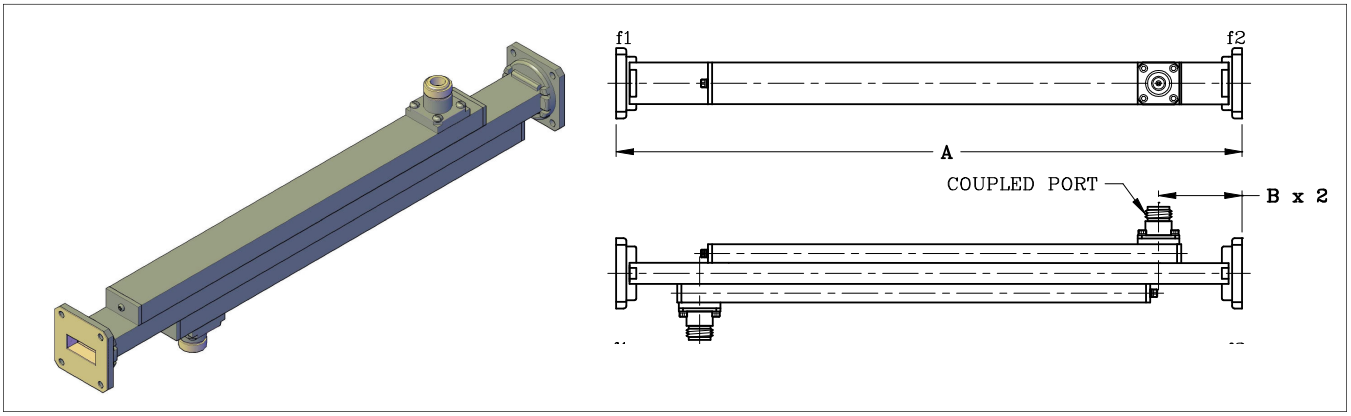
Rectangular Waveguide Top Wall Coupler Dimensions

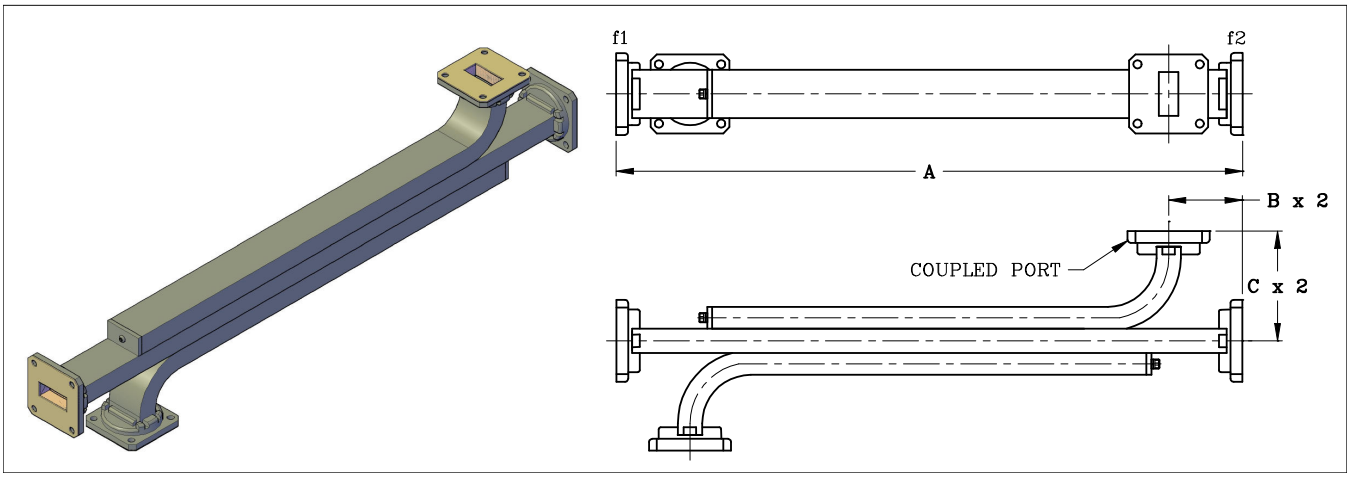
Model	WR #	Frequency (GHz)	A	B	C
DTC28-	28	26.50 - 40.00	9.25	1.00	1.50
DTC34-	34	22.00 - 33.00	10.75	1.00	1.50
DTC42-	42	18.00 - 26.50	10.75	1.00	1.63
DTC51-	51	15.00 - 22.00	11.75	1.20	2.25
DTC62-	62	12.40 - 18.00	12.75	1.20	2.25
DTC75-	75	10.00 - 15.00	14.25	1.20	2.25
DTC90-	90	8.20 - 12.40	17.25	1.50	2.25
DTC102-	102	7.00 - 11.00	19.00	1.50	3.25
DTC112-	112	7.05 - 10.00	19.55	1.50	3.25
DTC137-	137	5.85 - 8.20	22.25	1.70	3.25
DTC159-	159	4.90 - 7.05	25.25	2.00	4.25
DTC187-	187	3.95 - 5.85	30.25	2.20	4.50
DTC229-	229	3.30 - 4.90	35.25	2.20	5.25
DTC284-	284	2.60 - 3.95	46.25	2.70	6.75

All dimensions are in inches.

Space Machine & Engineering CORP.

Rectangular Waveguide Dual Topwall Couplers





Space Machine custom fabricates a standard product line of dual topwall couplers covering waveguide sizes WR28 thru WR284. Coupling variation is typically ± 0.5dB over the full waveguide band. Directivity is 35dB minimum. Additional sizes and configurations are available upon request. See next page for standard dimensions.

Ordering Information:

Dual Topwall Coupler, WR112, Bronze, 30dB Coupling, Type N Female Coupled Port, Cover / Choke Flanges, Chromated, Paint Space Machine Gray.

Example part number:

DBC	wr	-m	c	cp	-f1 f2	-p	f
DBC	112	-B	30	NF	-01 02	-C	P

Series (DBC):

Waveguide Size (wr): WR28 thru WR284

Material (-m): A – Aluminum, B – Bronze, O – Other

Coupling (c): 10 – 40 dB

Coupled Port (cp): Connector – See Appendix E
Flange – See Appendix G

Flange (-f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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Rectangular Waveguide Dual Top Wall Coupler Dimensions

Model	WR #	Frequency (GHz)	A	B	C
DBC28-	28	26.50 - 40.00	12.25	1.00	1.50
DBC34-	34	22.00 - 33.00	14.25	1.00	1.50
DBC42-	42	18.00 - 26.50	14.75	1.00	1.63
DBC51-	51	15.00 - 22.00	16.25	1.20	2.25
DBC62-	62	12.40 - 18.00	18.25	1.20	2.25
DBC75-	75	10.00 - 15.00	20.25	1.20	2.25
DBC90-	90	8.20 - 12.40	22.25	1.50	2.25
DBC102-	102	7.00 - 11.00	23.25	1.50	3.25
DBC112-	112	7.05 - 10.00	24.25	1.50	3.25
DBC137-	137	5.85 - 8.20	28.25	1.70	3.25
DBC159-	159	4.90 - 7.05	32.25	2.00	4.25
DBC187-	187	3.95 - 5.85	36.25	2.20	4.25
DBC229-	229	3.30 - 4.90	46.25	2.20	4.25
DBC284-	284	2.60 - 3.95	46.25	2.70	4.48

All dimensions are in inches.

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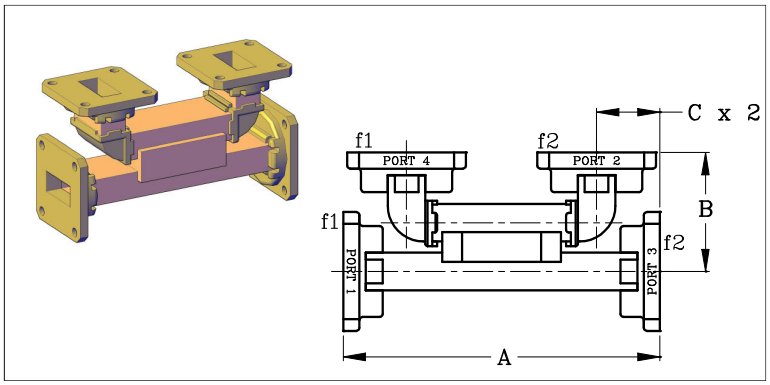
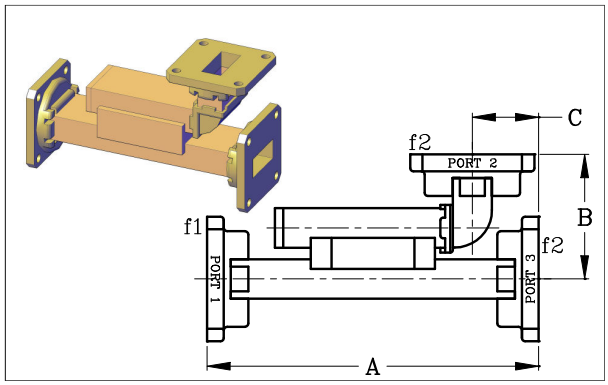
Space Machine & Engineering CORP.

Rectangular Waveguide Branch Guide Couplers





Model	WR #	Frequency (GHz)	A	B	C
BGC62-	62	12.40 – 18.00	4.00	1.50	0.75
BGC75-	75	10.00 – 15.00	4.00	1.50	0.75
BGC90-	90	8.20 –12.40	6.00	2.50	1.00
BGC102-	102	7.00 – 11.00	7.00	2.50	1.00
BGC112-	112	7.05 – 10.00	8.00	2.50	1.00
BGC137-	137	5.85 – 8.20	10.00	2.75	1.50
BGC159-	159	4.90 – 7.05	10.00	3.00	2.00
BGC187-	187	3.95 – 5.85	11.00	3.50	2.00
BGC229-	229	3.30 – 4.90	12.00	4.00	2.50
BGC284-	284	2.60 – 3.95	12.00	4.00	3.00

Space Machine custom fabricates a standard product line of branch guide couplers covering waveguide sizes WR62 thru WR284. Inherently full band coupling is not very flat, but coupling over 25% bandwidth is held to ± 0.5dB. Directivity is 20dB minimum. Additional sizes and configurations are available upon request.

Ordering Information:

Branch Guide Coupler, WR112, Bronze, 3dB Coupling, Cover / Cover Flanges, Chromated, Paint Space Machine Gray.

Example part number:

BGC	wr	-m	c	-f1 f2	-p	f
BGC	112	-B	3	-01 01	-C	P

Series (BGC):

Waveguide Size (wr): WR62 thru WR284

Material (-m): A – Aluminum, B – Bronze, O – Other

Coupling (c): 3 – 15 dB

Flange (-f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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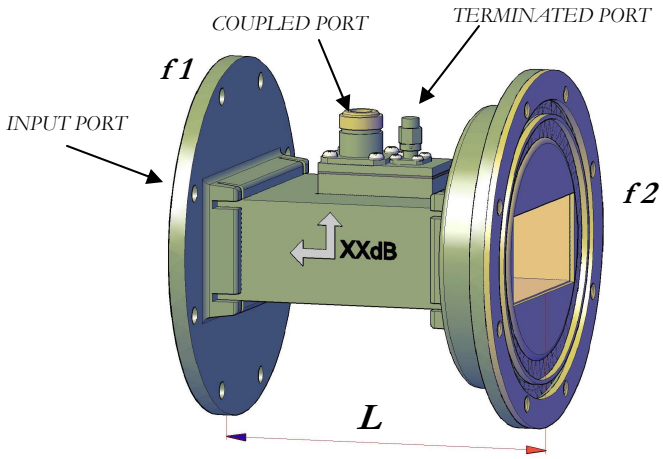
Rectangular Waveguide Loop Couplers



Model	WR #	Frequency (GHz)	Length (L)
WLC62-	62	12.40 - 18.00	4.00
WLC75-	75	10.00 - 15.00	4.00
WLC90-	90	8.20 - 12.40	4.00
WLC102-	102	7.00 - 11.00	4.00
WLC112-	112	7.05 - 10.00	4.00
WLC137-	137	5.85 - 8.20	4.50

Model	WR #	Frequency (GHz)	Length (L)
WLC159-	159	4.90 - 7.05	4.50
WLC187-	187	3.95 - 5.85	5.00
WLC229-	229	3.30 - 4.90	5.00
WLC284-	284	2.60 - 3.95	5.00
WLC340-	340	2.20 - 3.30	5.00
WLC430-	430	1.70 - 2.60	5.00

Space Machine custom fabricates a standard product line of loop couplers covering waveguide sizes WR62 thru WR430. These loop couplers are ideally suited for 25% bandwidths with coupling variation of ± 0.5dB. Over the full waveguide band, coupling variation is ± 2.5dB. Directivity is 18dB minimum.
Main arm VSWR is 1.08:1 and secondary arm VSWR is 1.3:1.

Ordering Information:

Loop Coupler, WR284, Bronze, 50dB Coupling, N Female Coupled Port, Cover / Choke Flanges, Chromated, Paint Space Machine Gray.

	WLC	wr	-m	c	cnt	-f1 f2	-p	f
Example part number:	WLC	284	-B	50	NF	-01 02	-C	P

Series (WLC):

Waveguide Size (wr): WR62 thru WR430

Material (-m): A – Aluminum, B – Bronze, O – Other

Coupling (c): 30 - 60 dB

Connector Type (cnt): See Appendix E

Flange (-f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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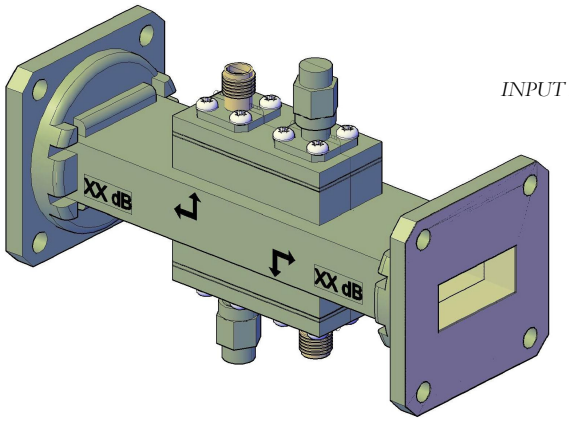
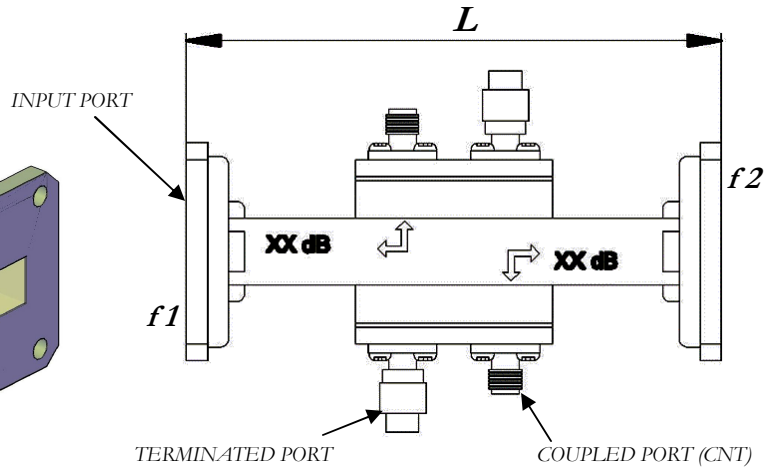
Space Machine & Engineering CORP.

Rectangular Waveguide Dual Loop Couplers





Model	WR #	Frequency (GHz)	Length (L)
WLD62-	62	12.40 - 18.00	4.00
WLD75-	75	10.00 - 15.00	4.00
WLD90-	90	8.20 - 12.40	4.00
WLD102-	102	7.00 - 11.00	4.00
WLD112-	112	7.05 - 10.00	4.00
WLD137-	137	5.85 - 8.20	4.50

Model	WR #	Frequency (GHz)	Length (L)
WLD159-	159	4.90 - 7.05	4.50
WLD187-	187	3.95 - 5.85	5.00
WLD229-	229	3.30 - 4.90	5.00
WLD284-	284	2.60 - 3.95	5.00
WLD340-	340	2.20 - 3.30	5.00
WLD430-	430	1.70 - 2.60	5.00

Space Machine custom fabricates a standard product line of dual loop couplers covering waveguide sizes WR62 thru WR430. These loop couplers are ideally suited for 25% bandwidths with coupling variation of ± 0.5dB. Over the full waveguide band, coupling variation is ± 2.5dB. Directivity is 18dB minimum.
Main arm VSWR is 1.08:1 and secondary arm VSWR is 1.3:1.

Ordering Information:

	WLD	wr	-m	c1	c2	cnt	-f1 f2	-p	f
Example part number:	WLD	90	-B	30	50	SF	-01 01	-C	P

Dual Loop Coupler, WR90, Bronze, 30dB and 50db Coupling, SMA Female Coupled Ports, Cover / Cover Flanges, Chromated, Paint Space Machine Gray.

Series (WLD):

Waveguide Size (wr): WR62 thru WR430

Material (-m): A – Aluminum, B – Bronze, O – Other

Coupling (c1, c2): 30 - 60 dB

Connector Type (cnt): See Appendix E

Flange (-f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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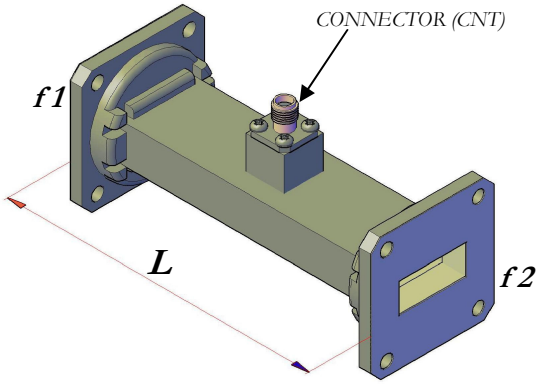
Space Machine & Engineering CORP.

Rectangular Waveguide Power Sampler



Model	WR #	Frequency (GHz)	Length (L)
WSP28-	28	26.50 - 40.00	2.00
WSP34-	34	22.00 - 33.00	2.00
WSP42-	42	18.00 - 26.50	2.00
WSP51-	51	15.00 - 22.00	2.00
WSP62-	62	12.40 - 18.00	2.50
WSP75-	75	10.00 - 15.00	2.50
WSP90-	90	8.20 - 12.40	2.50
WSP102-	102	7.00 - 11.00	2.50

Model	WR #	Frequency (GHz)	Length (L)
WSP112-	112	7.05 - 10.00	2.50
WSP137-	137	5.85 - 8.20	2.50
WSP159-	159	4.90 - 7.05	3.00
WSP187-	187	3.95 - 5.85	3.00
WSP229-	229	3.30 - 4.90	3.50
WSP284-	284	2.60 - 3.95	4.00
WSP340-	340	2.20 - 3.30	4.00
WSP430-	430	1.70 - 2.60	4.00

Space Machine offers a standard product line of power samplers covering waveguide sizes WR28 thru WR430.
These devices are used for monitoring power when directivity is not a concern.
Main line VSWR is held to 1.10:1 maximum over the full waveguide band. While coupling variation is held to ± 1dB.
Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide Power Sampler,WR112, Aluminum, 40dB Coupling, SMA Female, Cover / Cover Flanges, Chromated, Paint Space Machine Gray.

Example part number:

WSP	wr	-m	c	cnt	-f1 f2	-p	f
WSP	112	-A	40	SF	-01 01	-C	P

Series (WSP):

Waveguide Size (wr): WR28 thru WR430

Material (-m): A – Aluminum, B – Bronze, C – OFHC Copper, O - Other

Coupling (c): 30 - 60 dB

Connector (cnt): See Appendix E

Flange (-f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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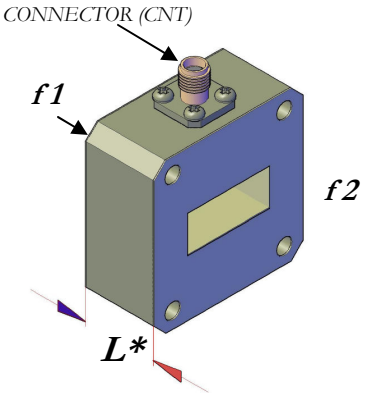
Space Machine & Engineering CORP.

Rectangular Waveguide Power Flange Sampler



Model	WR #	Frequency (GHz)	Thick. (L*)	
			Type N	Others
WSFP28-	28	26.50 - 40.00	N/A	0.75
WSFP34-	34	22.00 - 33.00	N/A	0.75
WSFP42-	42	18.00 - 26.50	N/A	0.75
WSFP51-	51	15.00 - 22.00	N/A	0.75
WSFP62-	62	12.40 - 18.00	1.00	0.75*
WSFP75-	75	10.00 - 15.00	1.00	0.75*
WSFP90-	90	8.20 - 12.40	1.00	0.75*

Model	WR #	Frequency (GHz)	Thick. (L*)		
			Type N	Others	
WSFP102-	102	7.00 - 11.00	1.00	0.75*	
WSFP112-	112	7.05 - 10.00	1.00	0.75*	
WSFP137-	137	5.85 - 8.20	1.00	0.75*	CPR style only
WSFP159-	159	4.90 - 7.05	1.00	0.75*	CPR style only
WSFP187-	187	3.95 - 5.85	1.00	0.75*	CPR style only
WSFP229-	229	3.30 - 4.90	1.00	0.75*	CPR style only

Space Machine offers a standard product line of power flange samplers covering waveguide sizes WR28 thru WR430. These devices are used for monitoring power when directivity is not a concern.
Main line VSWR is held to 1.10:1 maximum over the full waveguide band. While coupling variation is held to ± 1dB.
Additional sizes and configurations are available upon request.
When a Type N connector is required, thickness will be 1.00".

Ordering Information:

	WSFP	wr	-m	c	cnt	-f1 f2	-p	f
Example part number:	WSFP	112	-A	40	SF	-01 01	-C	P

Waveguide Power Flange Sampler, WR112, Aluminum, 40dB Coupling, SMA Female, Cover / Cover Flanges, Chromated, Paint Space Machine Gray.

Series (WSFP):

Waveguide Size (wr): WR28 thru WR430

Material (-m): A – Aluminum, B – Bronze, C – OFHC, O - Other

Coupling (c): 30 - 60 dB

Connector (cnt): See Appendix E

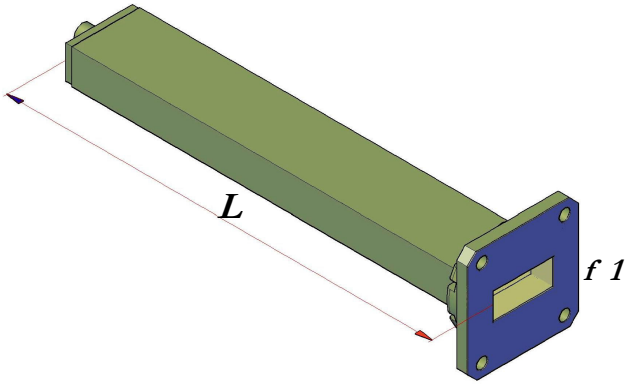
Flange (-f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

2327 16TH AVENUE NORTH, ST. PETERSBURG, FLORIDA 33713 * PHONE (727) 323-2221 * FAX (727) 323-2376

Rectangular Waveguide Precision Termination



Model	WR #	Frequency (GHz)	Avg. Power (W)	Length (L)
WTP28-	28	26.50 - 40.00	0.5	3.00
WTP34-	34	22.00 - 33.00	0.5	3.00
WTP42-	42	18.00 - 26.50	0.5	3.00
WTP51-	51	15.00 - 22.00	1.0	3.25
WTP62-	62	12.40 - 18.00	1.5	4.00
WTP75-	75	10.00 - 15.00	2.0	5.00
WTP90-	90	8.20 - 12.40	3.0	6.00
WTP102-	102	7.00 - 11.00	3.0	6.00
WTP112-	112	7.05 - 10.00	4.0	6.25

Model	WR #	Frequency (GHz)	Avg. Power (W)	Length (L)
WTP137-	137	5.85 - 8.20	5.0	6.50
WTP159-	159	4.90 - 7.05	6.0	7.00
WTP187-	187	3.95 - 5.85	8.0	7.00
WTP229-	229	3.30 - 4.90	10.0	8.00
WTP284-	284	2.60 - 3.95	10.0	13.00
WTP340-	340	2.20 - 3.30	12.0	13.00
WTP430-	430	1.70 - 2.60	17.0	16.00
WTP650-	650	1.12 - 1.70	25.0	21.00

Space Machine offers a standard product line of precision terminations covering waveguide sizes WR28 thru WR650.
VSWR is held to 1.03:1 maximum over the full waveguide band.
Additional sizes and configurations are available upon request.

Ordering Information:

Precision Waveguide Termination, WR62, Bronze, Cover Flange, Chromated, Paint Space Machine Gray.

Example part number:

WTP	wr	-m	f	-p	f
WTP	62	-B	01	-C	P

Series (WTP):

Waveguide Size (wr): WR28 thru WR650

Material (-m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

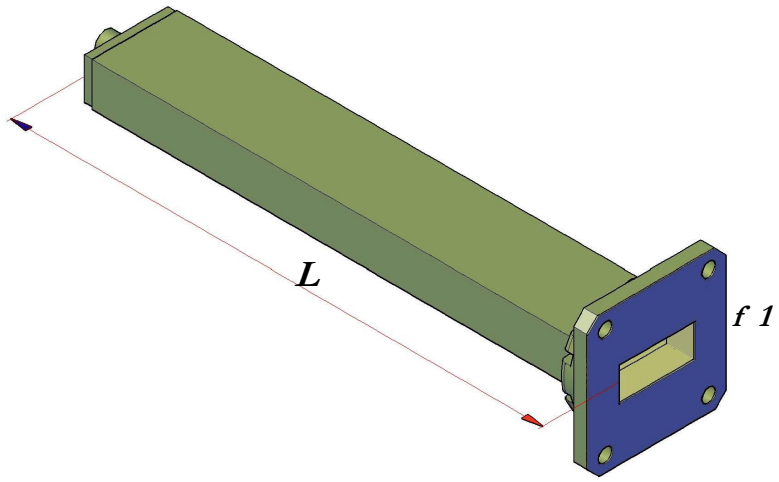
Flange (f): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Space Machine & Engineering CORP.

Rectangular Waveguide Low Power Termination



Model	WR #	Frequency (GHz)	Avg. Power (W)	Length (L)
WTL28-	28	26.50 - 40.00	20	3.50
WTL34-	34	22.00 - 33.00	20	4.00
WTL42-	42	18.00 - 26.50	30	4.00
WTL51-	51	15.00 - 22.00	40	4.00
WTL62-	62	12.40 - 18.00	65	4.00
WTL75-	75	10.00 - 15.00	75	5.00
WTL90-	90	8.20 - 12.40	80	6.00
WTL102-	102	7.00 - 11.00	100	7.50

Model	WR #	Frequency (GHz)	Avg. Power (W)	Length (L)
WTL112-	112	7.05 - 10.00	100	7.50
WTL137-	137	5.85 - 8.20	125	8.50
WTL159-	159	4.90 - 7.05	150	9.00
WTL187-	187	3.95 - 5.85	200	9.00
WTL229-	229	3.30 - 4.90	250	10.50
WTL284-	284	2.60 - 3.95	300	12.00
WTL340-	340	2.20 - 3.30	375	13.00
WTL430-	430	1.70 - 2.60	450	14.00

Space Machine offers a standard product line of low power terminations covering waveguide sizes WR28 thru WR430.
VSWR is held to 1.10:1 maximum over the full waveguide band.
Additional sizes and configurations are available upon request.

Ordering Information:

Low Power Termination, WR62, Bronze, Cover Flange, Chromated, Paint Space Machine Gray.

Example part number:

WTL	wr	-m	f	-p	f
WTL	62	-B	01	-C	P

Series (WTL):

Waveguide Size (wr): WR28 thru WR430

Material (-m): A – Aluminum, B – Bronze, C – OFHC Copper, O - Other

Flange (f): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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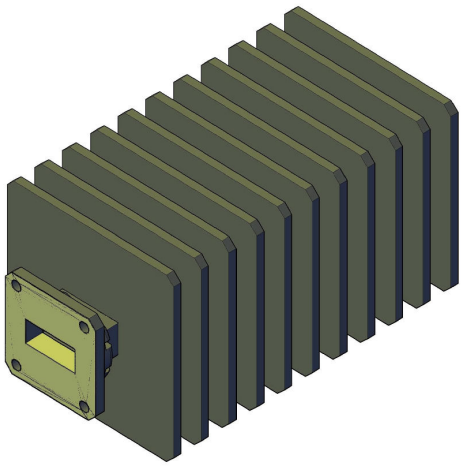
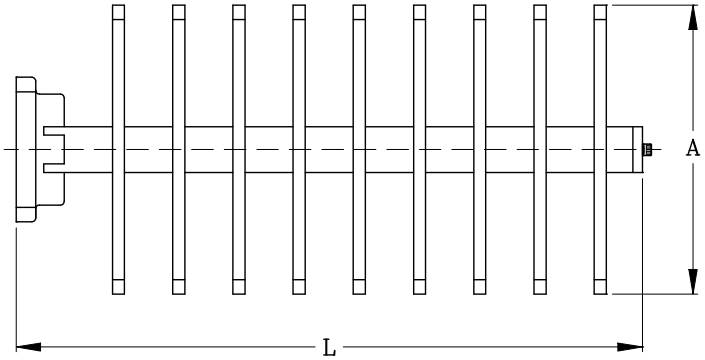
Rectangular Waveguide Medium Power Termination





Model	WR #	Frequency (GHz)	Avg. Power (W)	A	L
WTM28-	28	26.50 - 40.00	50	2.25	5.00
WTM34-	34	22.00 - 33.00	75	2.50	5.00
WTM42-	42	18.00 - 26.50	90	2.50	5.00
WTM51-	51	15.00 - 22.00	100	2.50	5.00
WTM62-	62	12.40 - 18.00	150	2.50	5.00
WTM75-	75	10.00 - 15.00	175	3.00	5.50
WTM90-	90	8.20 - 12.40	250	3.00	6.00
WTM102-	102	7.00 - 11.00	275	3.00	8.00

Model	WR #	Frequency (GHz)	Avg. Power (W)	A	L
WTM112-	112	7.05 - 10.00	325	3.25	8.00
WTM137-	137	5.85 - 8.20	450	3.50	9.00
WTM159-	159	4.90 - 7.05	625	4.00	10.00
WTM187-	187	3.95 - 5.85	750	4.50	10.00
WTM229-	229	3.30 - 4.90	900	5.00	11.50
WTM284-	284	2.60 - 3.95	1000	6.00	13.00
WTM340-	340	2.20 - 3.30	1150	7.00	14.00
WTM430-	430	1.70 - 2.60	1300	8.00	15.00

Space Machine offers a standard product line of medium power terminations covering waveguide sizes WR28 thru WR430.
VSWR is 1.10:1 maximum over the full waveguide bandwidth.
Additional sizes and configurations are available upon request.

Ordering Information:

Medium Power Termination, WR90, Aluminum, Cover Flange, Chromated, Paint Heat Resistant Flat Black.

Example part number:

WTM	wr	-m	f	-p	f
WTM	90	-A	01	-C	O

Series (WTM):

Waveguide Size (wr): WR28 thru WR430

Material (-m): A – Aluminum, B – Bronze, C - OFHC Copper, O – Other

Flange (f): See Appendix G

Plating (-p): C – Chromate

Finish (f): N – None, O – Heat Resistant Flat Black

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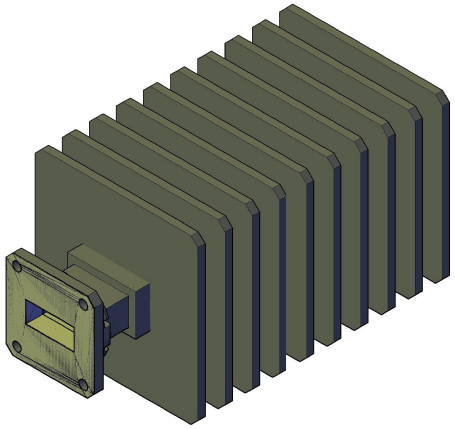
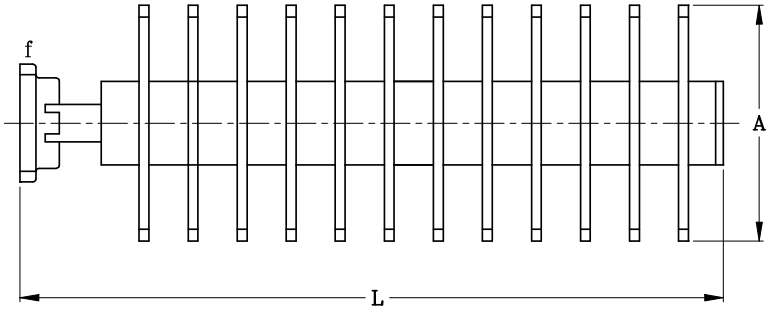
Space Machine & Engineering CORP.

Rectangular Waveguide High Power Termination





Model	WR #	Frequency (GHz)	Avg. Power (W)	A	L
WTH28-	28	26.50 - 40.00	200	3.00	6.00
WTH34-	34	22.00 - 33.00	225	3.00	7.00
WTH42-	42	18.00 - 26.50	250	3.00	8.00
WTH51-	51	15.00 - 22.00	300	3.00	10.00
WTH62-	62	12.40 - 18.00	500	3.00	11.00
WTH75-	75	10.00 - 15.00	750	3.00	12.00
WTH90-	90	8.20 - 12.40	1000	4.00	14.00

Model	WR #	Frequency (GHz)	Avg. Power (W)	A	L
WTH102-	102	7.00 - 11.00	1200	4.00	15.00
WTH112-	112	7.05 - 10.00	1500	5.00	16.00
WTH137-	137	5.85 - 8.20	2000	5.00	18.00
WTH159-	159	4.90 - 7.05	2500	6.00	24.00
WTH187-	187	3.95 - 5.85	3000	6.00	26.00
WTH229-	229	3.30 - 4.90	3500	8.00	28.00
WTH284-	284	2.60 - 3.95	4000	8.00	32.00

Space Machine offers a standard product line of high power terminations covering waveguide sizes WR28 thru WR284.
VSWR is 1.15:1 maximum over the full waveguide bandwidth.
Additional sizes and configurations are available upon request.

Ordering Information:

High Power Termination, WR90, Aluminum, Cover Flange, Chromated, Paint Heat Resistant Flat Black.

Example part number:

WTH	wr	-m	f	-p	f
WTH	90	-A	01	-C	O

Series (WTH):

Waveguide Size (wr): WR28 thru WR284

Material (-m): A – Aluminum, B – Bronze, C - OFHC Copper, O – Other

Flange (f): See Appendix G

Plating (-p): C – Chromate

Finish (f): N – None, O – Heat Resistant Flat Black

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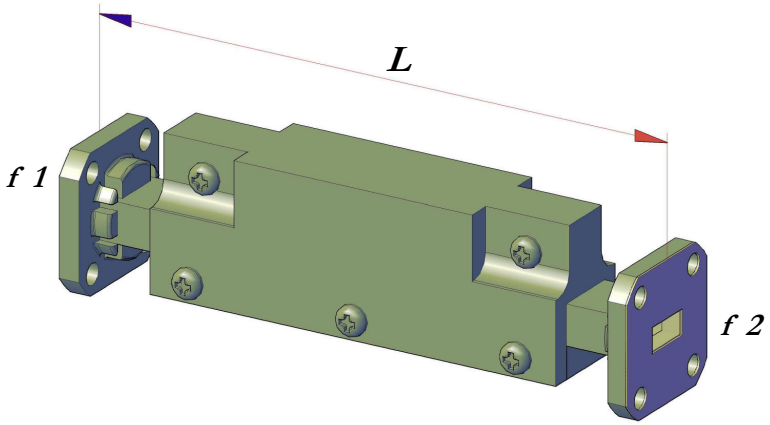
Space Machine & Engineering CORP.

Rectangular Waveguide Low Power Fixed Attenuator



Model	WR #	Frequency (GHz)	Length (L)
WAFL28-	28	26.50 - 40.00	3.00
WAFL34-	34	22.00 - 33.00	3.00
WAFL42-	42	18.00 - 26.50	3.25
WAFL51-	51	15.00 - 22.00	3.25
WAFL62-	62	12.40 - 18.00	3.50
WAFL75-	75	10.00 - 15.00	3.50
WAFL90-	90	8.20 - 12.40	3.50

Model	WR #	Frequency (GHz)	Length (L)
WAFL102-	102	7.00 - 11.00	3.50
WAFL112-	112	7.05 - 10.00	3.50
WAFL137-	137	5.85 - 8.20	4.00
WAFL159-	159	4.90 - 7.05	5.00
WAFL187-	187	3.95 - 5.85	6.00
WAFL229-	229	3.30 - 4.90	7.00
WAFL284-	284	2.60 - 3.95	8.00

Space Machine offers a standard product line of low power fixed attenuators covering waveguide sizes WR28 thru WR284.
VSWR is held to 1.10:1 while flatness is held to ± 1.5dB over the full waveguide band.
The maximum power rating for all sizes is 1 watt average.
Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide Low Power Fixed Attenuator, WR112, 10dB Attenuation, Bronze, Choke / Cover, Chromated, Paint Space Machine Gray.

Example part number:

WAFL	wr	-a	m	f1 f2	-p	f
WAFL	112	-10	B	-02 01	-C	P

Series (WAFL):

Waveguide Size (wr): WR28 thru WR284

Attenuation (-a): 3 – 40 dB

Material (-m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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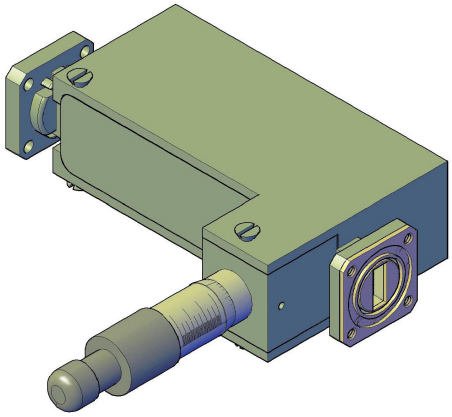
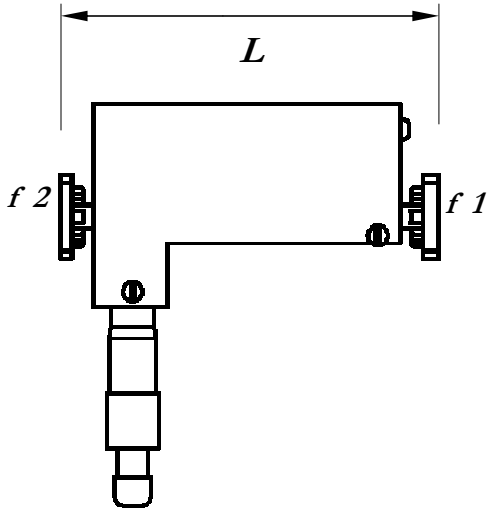
Space Machine & Engineering CORP.

Rectangular Waveguide Low Power Variable Attenuator





Model	WR #	Frequency (GHz)	L
WAVL28-	28	26.50 - 40.00	4.00
WAVL34-	34	22.00 - 33.00	4.00
WAVL42-	42	18.00 - 26.50	4.00
WAVL51-	51	15.00 - 22.00	5.00
WAVL62-	62	12.40 - 18.00	5.00
WAVL75-	75	10.00 - 15.00	6.00
WAVL90-	90	8.20 - 12.40	6.00

Model	WR #	Frequency (GHz)	L
WAVL102-	102	7.00 - 11.00	6.00
WAVL112-	112	7.05 - 10.00	7.00
WAVL137-	137	5.85 - 8.20	8.00
WAVL159-	159	4.90 - 7.05	9.00
WAVL187-	187	3.95 - 5.85	10.00
WAVL229-	229	3.30 - 4.90	12.00
WAVL284-	284	2.60 - 3.95	12.00

Space Machine offers a standard product line of low power variable attenuators covering waveguide sizes WR28 thru WR284. Attenuation will range from 0 – 30dB while flatness is held to ± 1.5dB. VSWR is held to 1.10:1 maximum over the full waveguide band. Additional sizes and configurations are available upon request.
Maximum power rating for all sizes is 1 watt average.

Ordering Information:

Waveguide Low Power Variable Attenuator, WR112, Bronze, Cover / Choke Flanges, Chromated, Paint Space Machine Gray.

Example part number:

WAVL	wr	-m	f1 f2	-p	f
WAVL	112	-B	-01 02	-C	P

Series (WAVL):

Waveguide Size (wr): WR28 thru WR284

Material (-m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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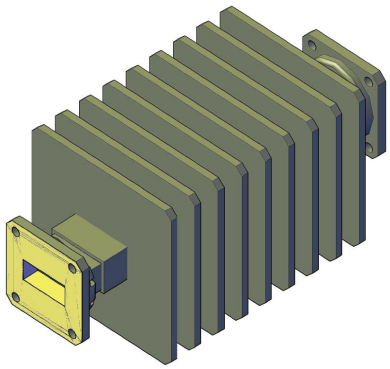
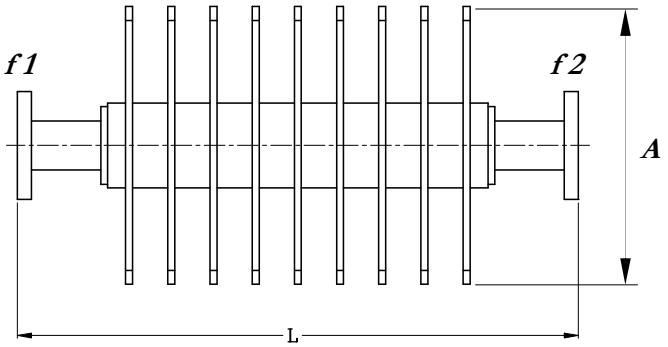
Space Machine & Engineering CORP.

Rectangular Waveguide High Power Fixed Attenuator





Model	WR #	Frequency (GHz)	Length (L)		A	Max Avg Power (Watts)
			UP TO 10 dB	UP TO 30 dB		
WAFH28-	28	26.50 - 40.00	6.00	12.00	3.00	200
WAFH42-	42	18.00 - 26.50	6.00	12.00	3.00	350
WAFH51-	51	15.00 - 22.00	6.50	13.00	3.00	400
WAFH62-	62	12.40 - 18.00	7.00	18.00	3.00	500
WAFH75-	75	10.00 - 15.00	8.00	18.00	3.00	550
WAFH90-	90	8.20 - 12.40	8.00	20.00	4.00	700

Model	WR #	Frequency (GHz)	Length (L)		A	Max Avg Power (Watts)
			UP TO 10 dB	UP TO 30 dB		
WAFH102-	102	7.00 - 11.00	8.50	21.00	4.00	750
WAFH112-	112	7.05 - 10.00	9.00	22.00	5.00	850
WAFH137-	137	5.85 - 8.20	10.00	24.00	5.00	1000
WAFH159-	159	4.90 - 7.05	11.00	26.00	6.00	1250
WAFH187-	187	3.95 - 5.85	13.00	28.00	6.00	1500
WAFH229-	229	3.30 - 4.90	14.00	30.00	8.00	1650
WAFH284-	284	2.60 - 3.95	15.00	32.00	8.00	2000

Space Machine offers a standard product line of high power fixed attenuators covering waveguide sizes WR28 thru WR284. VSWR is 1.15:1. Flatness is held to ± 1.0dB maximum over the full waveguide band.
Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide High Power Fixed Attenuator, WR112, 10dB Attenuation, Bronze, Cover / Cover Flanges, Chromated, Paint Heat Resistant Flat Black.

Example part number:

WAFH	wr	-a	m	f1 f2	-p	f
WAFH	112	-10	B	01 01	-C	O

Series (WAFH):

Waveguide Size (wr): WR28 thru WR284

Attenuation (-a): 3 – 30 dB

Material (-m): A – Aluminum, B – Bronze, C – OFHC Copper, O – Other

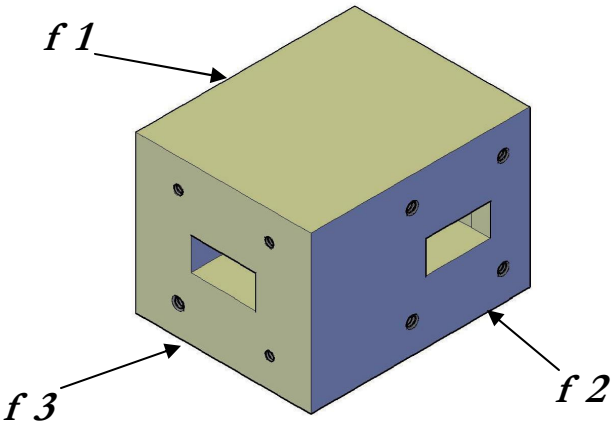
Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate

Finish (f): N – None, O – Heat Resistant Flat Black

2327 16TH AVENUE NORTH, ST. PETERSBURG, FLORIDA 33713 * PHONE (727) 323-2221 * FAX (727) 323-2376

Rectangular Waveguide Circulators



Model	WR #	Frequency (GHz)	Isolation (dB)	Insertion Loss (dB) Max.	VSWR	Maximum Average Power (W)	Maximum Peak Power (KW)
WFC284	284	2.60 - 3.95	18	0.4	1.30:1	1500	1250
WFC187	187	3.95 - 5.85	18	0.4	1.30:1	1250	1000
WFC159	159	4.90 - 7.05	18	0.4	1.30:1	1000	850
WFC137	137	5.85 - 8.20	18	0.4	1.30:1	750	500
WFC112	112	7.05 - 10.00	18	0.4	1.30:1	600	350
WFC90	90	8.20 - 12.40	18	0.4	1.35:1	400	150
WFC75	75	10.00 - 15.00	15	0.5	1.35:1	250	100
WFC62	62	12.40 - 18.00	15	0.5	1.40:1	150	75

Space Machine & Engineering offers a standard product line of rectangular waveguide ferrite Circulators covering waveguide sizes WR62 thru WR284. These Circulators are permanent magnet 3 port devices that use a Y-junction structure housed in standard rectangular waveguide. Greater isolation, better insertion loss and VSWR are achievable with reduced bandwidths. Please specify required bandwidth and pressurization requirements when ordering.

Ordering Information:

Rectangular Waveguide Circulator, WR90, Aluminum, Cover Flanges Chromated, Paint None.

Example part number:

WFC	wr	-m	f1 f2 f3	-p	f
WFC	112	-A	01 01 01	-C	N

Series (WFC):

Waveguide Size (wr): WR62 thru WR284

Material (-m): A – Aluminum, B – Bronze, O – Other

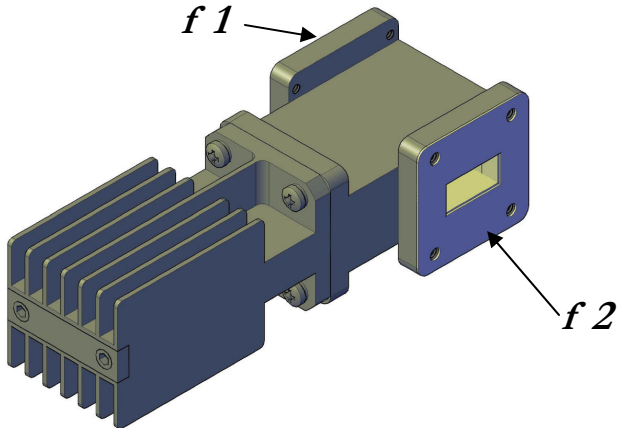
Flange (f1 f2 f3): See Appendix G

Plating (-p): C – Chromate

Finish (f): N – None, O – Heat Resistant Flat Black

2327 16TH AVENUE NORTH, ST. PETERSBURG, FLORIDA 33713 * PHONE (727) 323-2221 * FAX (727) 323-2376

Rectangular Waveguide Isolators



Model	WR #	Frequency (GHz)	Isolation (dB)	Insertion Loss (dB) Max.	VSWR	Maximum Average Power (W)	Maximum Peak Power (KW)
WFI284	284	2.60 - 3.95	18	0.4	1.30:1	1500	1250
WFI187	187	3.95 - 5.85	18	0.4	1.30:1	1250	1000
WFI159	159	4.90 - 7.05	18	0.4	1.30:1	1000	850
WFI137	137	5.85 - 8.20	18	0.4	1.30:1	750	500
WFI112	112	7.05 - 10.00	18	0.4	1.30:1	600	350
WFI90	90	8.20 - 12.40	18	0.4	1.35:1	400	150
WFI75	75	10.00 - 15.00	15	0.5	1.35:1	250	100
WFI62	62	12.40 - 18.00	15	0.5	1.40:1	150	75

Space Machine & Engineering offers a standard product line of rectangular waveguide ferrite Isolators covering waveguide sizes WR62 thru WR284. These Isolators are permanent magnet 3 port devices that use a Y-junction structure housed in standard rectangular waveguide with the addition of a matched termination. Greater isolation, better insertion loss and VSWR are achievable with reduced bandwidths. Please specify required bandwidth and pressurization requirements when ordering.

Ordering Information:

Rectangular Waveguide Isolator, WR90, Aluminum, Cover Flanges Chromated, Paint Heat Resistant Flat Black.

Example part number:

WFI	wr	-m	f1 f2	-p	f
WFI	112	-A	01 01	-C	O

Series (WFI):

Waveguide Size (wr): WR62 thru WR284

Material (-m): A – Aluminum, B – Bronze, O – Other

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate

Finish (f): N – None, O – Heat Resistant Flat Black

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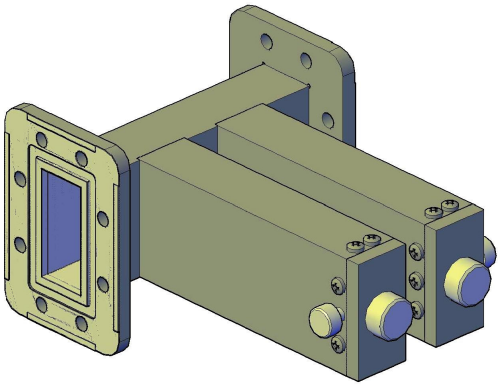
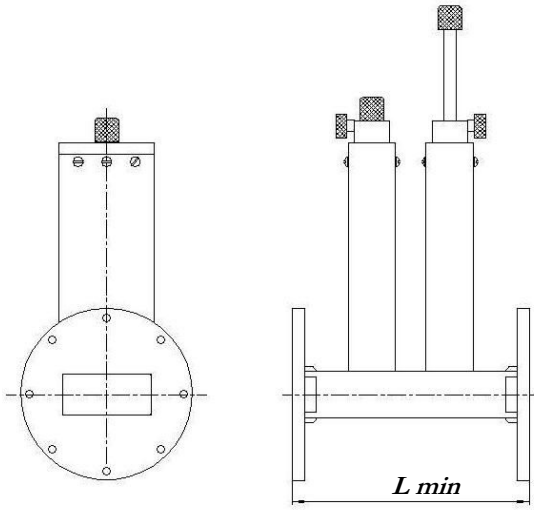
Space Machine & Engineering CORP.

Rectangular Waveguide Dual Stub Tuner





Model	WR #	Frequency (GHz)	Stub Travel	L min
WST284	284	2.60 - 3.95	5.0	8.0
WST187	187	3.95 - 5.85	4.0	5.0
WST159	159	4.90 - 7.05	3.5	4.5
WST137	137	5.85 - 8.20	3.0	4.5
WST112	112	7.05 - 10.00	3.0	4.0
WST90	90	8.20 - 12.40	3.0	4.0

Model	WR #	Frequency (GHz)	Stub Travel	L min
WST75	75	10.00 - 15.00	2.0	3.0
WST62	62	12.40 - 18.00	2.0	3.0
WST51	51	15.00 - 22.00	2.0	2.5
WST42	42	18.00 - 26.50	1.75	2.0
WST34	34	22.00 - 33.00	1.5	2.0
WST28	28	26.50 - 40.00	1.5	1.5

Space Machine & Engineering offers a standard product line of dual stub tuners, covering waveguide sizes WR28 thru WR284. Rectangular waveguide dual stub tuners allow precision matching within RF systems and subsystems to ensure optimum power transmission from source to load. VSWR is 1.15:1. Additional sizes and configurations are available upon request.

Ordering Information:

	WST	wr	-m	M	f1 f2	-p	f
Example part number:	WST	112	-A	M	01 01	-C	O

Rectangular Waveguide Dual Stub Tuner, WR187, Aluminum, Cover Flanges Chromated, Paint SME Grey.

Series (WST):

Waveguide Size (wr): WR28 thru WR284

Material (-m): A – Aluminum, B – Bronze, O – Other

M: Manual

Flange (f1 f2): See Appendix G

Plating (-p): C – Chromate

Finish (f): Paint Space Machine Gray, N – None, O – Other

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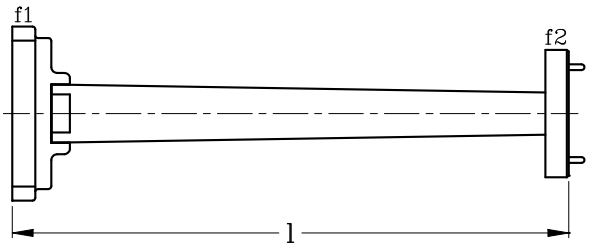
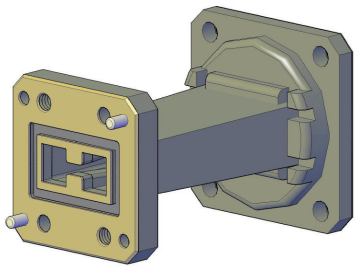
Space Machine & Engineering CORP.

Rectangular To Double Ridge Waveguide Transitions





Transition Sizes	WR 28	WR 34	WR 42	WR 51	WR 62	WR 75	WR 90	WR 102	WR 112	WR 137	WR 159	WR 187	WR 229	WR 284
WRD180														
WRD110														
WRD750														
WRD650														
WRD580														
WRD500														
WRD475														
WRD350														
WRD250														
WRD200														

Space Machine offers a standard product line of rectangular to double ridge waveguide transitions. Please see above chart to select transition requirements. VSWR is 1.10:1 typical in the overlapping frequency bands. Additional sizes and configurations are available upon request.

Ordering Information:

WDT	wr1	-f1	-wrd2	-f2	m	l	-p	f
WDT	90	-01	-650	-01	A	5.0	-C	P

Rectangular to Double Ridge Transition, WR90 Cover Flange, WRD650 Cover Flange, Aluminum, 5.0" Long, Chromated, Paint Space Machine Gray. **Example part number:**

Series (WDT):

Waveguide Size 1 (wr1): WR28 thru WR284

Flange 1 (-f1): See Appendix G

Waveguide Size 2 (-wrd2): WRD180 thru WRD200

Flange 2 (-f2): Appendix H

Material (m): A – Aluminum, B- Brass, O - Other

Length (l): (inches)

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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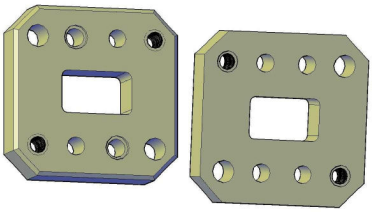
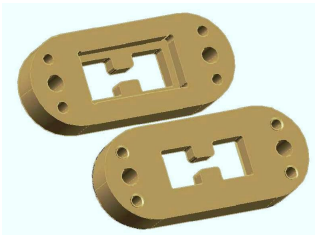
Space Machine & Engineering CORP.

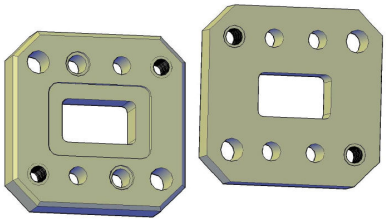
Double Ridge Waveguide Flanges



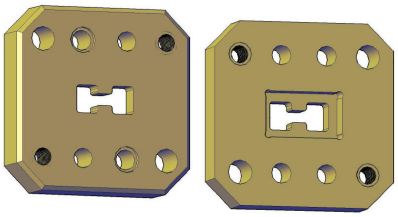
COVER FLANGE (THRU TYPE)



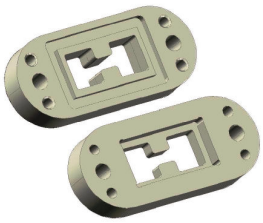
COVER FLANGE SLIM-LINE (SOCKET TYPE)*



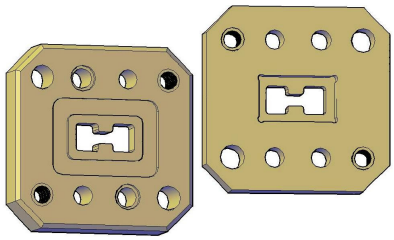
GASKET FLANGE (THRU TYPE)



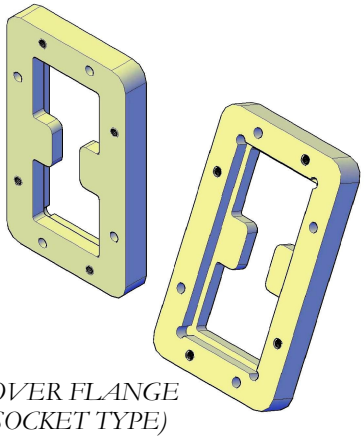
COVER FLANGE (SOCKET TYPE)



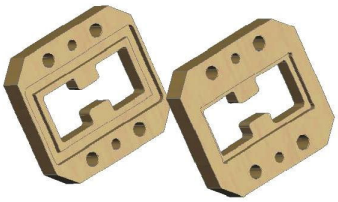
GASKET FLANGE SLIM-LINE (SOCKET TYPE)*



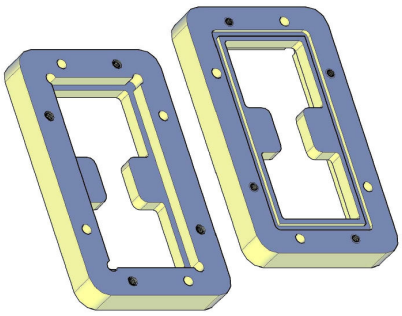
GASKET FLANGE (SOCKET TYPE)



COVER FLANGE (SOCKET TYPE)



GASKET FLANGE SLIM-LINE (SOCKET TYPE)*



GASKET FLANGE (SOCKET TYPE)

Space Machine offers a standard product line of double ridge flanges covering waveguide sizes WRD180 thru WRD200. Additional sizes and configurations are available upon request.

Ordering Information:

	DGF	wrd	-m	f
Example part number:	DGF	650	-A	01

Double Ridge Waveguide Flange, WRD650, Aluminum, Cover, Socket Type.

Series (DGF):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum, B - Brass, O - Other

Flange (f): 1 – Cover, 2 – Gasket (See above) Appendix H

* Add **SL** to the Part Number if ordering Slim-Line Flange. ***Example: WGF650-A11 SL***

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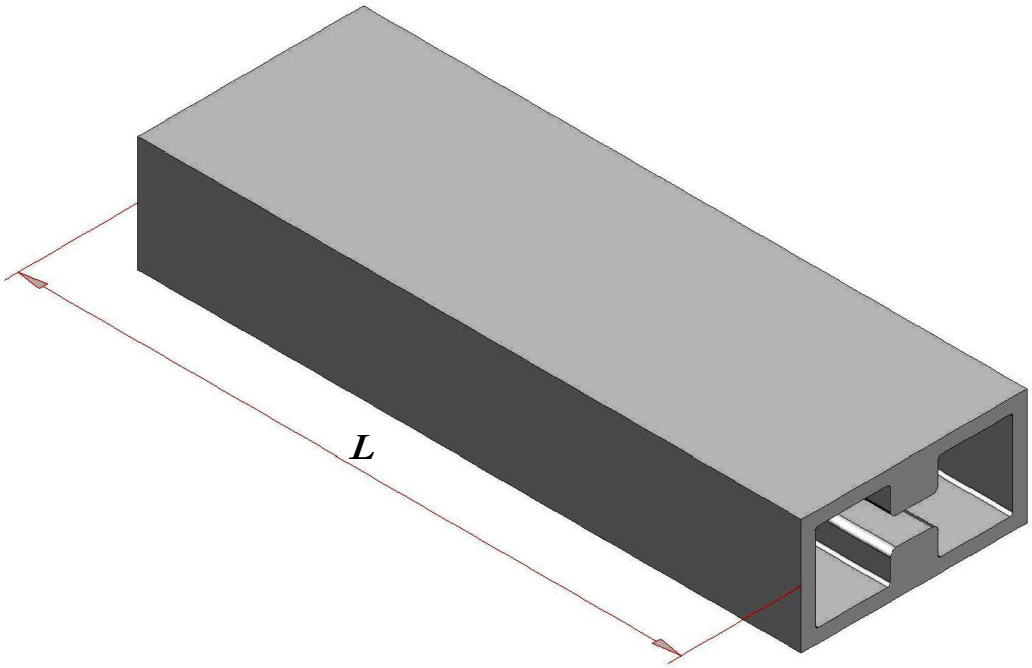
Double Ridge Waveguide Tubing



Space Machine offers a standard product line of raw double ridge waveguide tubing covering waveguide sizes WRD180 thru WRD200. The standard material is aluminum. Other materials may be available for special order.

Ordering Information:

		DWT	wrd	-m	l
Double Ridge Waveguide Tubing, WRD180, Aluminum, 144 in. long.	**Example part number:**	DWT	180	-A	144

Series (DWT):

Waveguide Size (wrd): WR180 thru WR200

Material (-m): A – Aluminum

Length (l): Inches

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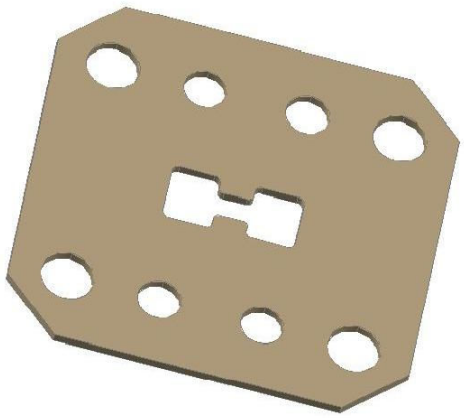
Double Ridge Waveguide EMI/RFI Gaskets



1- EMI/RFI GASKET

Space Machine offers a standard product line of double ridge EMI/RFI gaskets covering waveguide sizes WRD180 thru WRD200. Additional sizes and configurations are available upon request.
EMI/RFI gaskets are conductive and are die cut from a silver impregnated elastomer. Space Machine EMI/RFI gaskets are made from conductive silicone elastomer with either Silver/Aluminum or Silver/Copper fillers (meets MIL-83528 Type B or K). These materials have very good shielding properties and conductivity, excellent sealing at temperature extremes, and have a long shelf life.
See appendix P for Physical Properties and Temperature Range.

Ordering Information:		**DOR**	**wrd**	**-g**
Double Ridge Waveguide gasket, WRD650, EMI / RFI gasket for WRD650 flange.	**Example part number:**	DOR	650	-1
Series (DOR):				
Waveguide Size (wrd): WRD180 thru WRD200				
Gasket Type: conductive: 1 - EMI/RFI				

Space Machine & Engineering CORP.

Double Ridge Waveguide Mating Gaskets

2 - MATING GASKET
2C - MATING GASKET, CONDUCTIVE

Space Machine offers a standard product line of double ridge mating gaskets covering waveguide sizes from WRD180 thru WRD200. Additional sizes and configurations are available upon request. Mating gaskets are usually not conductive but can be upon request.

Ordering Information:		**DOR**	**wrd**	**-g**
Double Ridge Waveguide Nonconductive Mating Gasket WRD650 for WRD650 flange.	**Example part number:**	DOR	650	-2
Series (DOR):				
Waveguide Size (wrd): WRD180 thru WRD200				
Gasket Type: nonconductive: 2 – Mating Gasket conductive: 2C - Mating Gasket				

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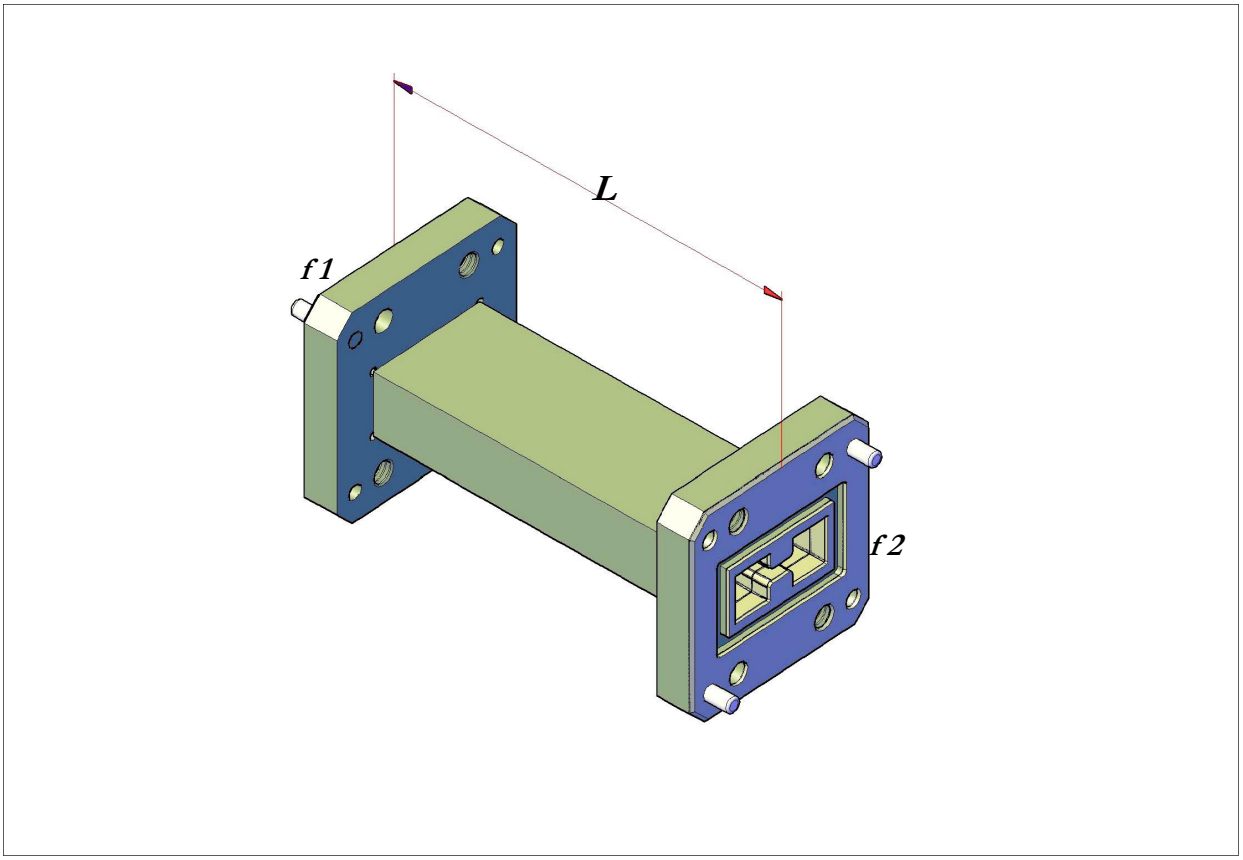
Double Ridge Waveguide Straight Assemblies



Space Machine will custom fabricate flanged double ridge straight sections covering the waveguide sizes WRD180 to WRD200. Length and flange types are made to customer specifications. VSWR is 1.10:1 maximum over the full waveguide bandwidth.

Ordering Information:

Double Ridge Waveguide Straight Section, WRD650, 12.0" Long, Aluminum, Cover Flange, Gasket Flange, Chromated, Paint Space Machine Gray.

Example part number:

DSS	wrd	-l	m	f1 f2	-p	f
DSS	650	-12.0	A	01 02	-C	P

Series (DSS):

Waveguide Size (wrd): WRD180 thru WRD200

Length (-l): (inches)

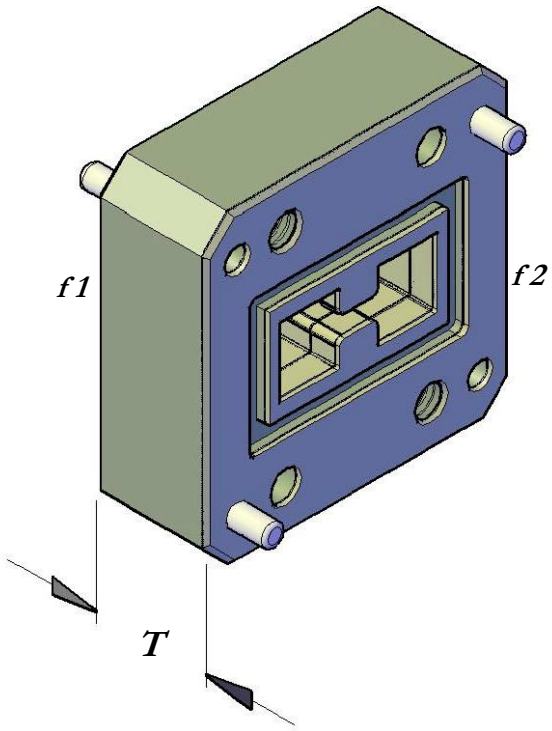
Waveguide Material (m): A – Aluminum

Flange (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Double Ridge Waveguide Shims



Space Machine will custom fabricate shims covering the double ridge waveguide sizes WRD180 to WRD200. Thickness and flange types made to customer specifications.

Ordering Information:

Double Ridge Waveguide Shim, WRD650, 0.375" Thickness, Aluminum, Cover / Gasket Flanges, Chromated, Paint Space Machine Gray.

	DWS	wrd	-T	m	f1 f2	-p	f
Example part number:	DWS	650	-0.375	A	01 02	-C	P

Series (DWS):

Waveguide Size (wrd): WRD180 thru WRD200

Thickness (-T): (inches)

Waveguide Material (m): A – Aluminum

Flange (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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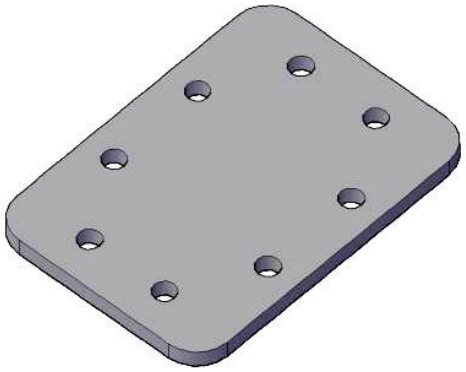
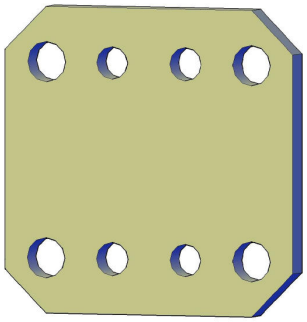
Double Ridge Waveguide Shorts



RECTANGULAR



SQUARE

Space Machine offers a standard product line of double ridge shorts covering waveguide sizes WRD180 thru WRD200.

Ordering Information:

Double Ridge Waveguide Short, WRD650, Aluminum, Cover Flange Face, Chromated, Paint Space Machine Gray.

	DSH	wrd	-m	f	-p	f
Example part number:	DSH	650	-A	01	-C	P

Series (DSH):

Waveguide Size (wrd): WRD180 thru WRD200

Flange Material (-m): A – Aluminum

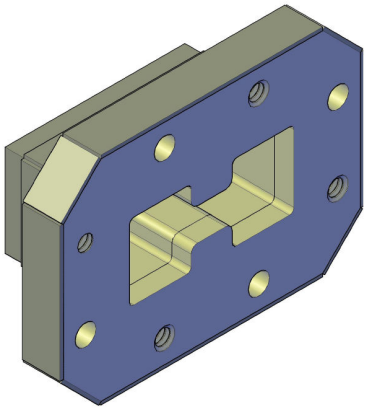
Flange (f): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

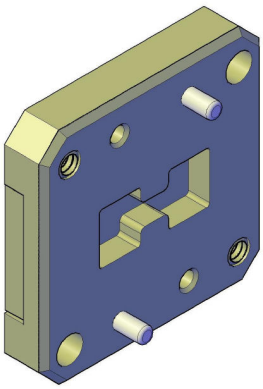
Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Space Machine & Engineering CORP.

Double Ridge Waveguide Offset Shorts

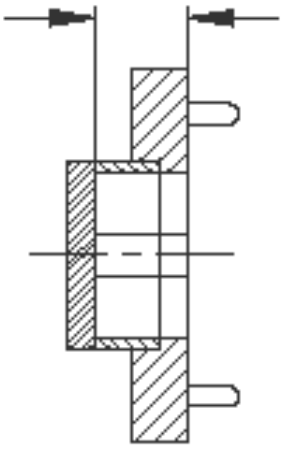


RECTANGULAR



SQUARE

⅛λ , ⅜λ or ¼λ



Model	WRD #	Frequency (GHz)
DOS200-	200	2.00 - 4.80
DOS250-	250	2.60 - 7.80
DOS350-	350	3.50 - 8.20
DOS475-	475	4.75 - 11.00
DOS500-	500	5.00 - 18.00

Model	WRD #	Frequency (GHz)
DOS580-	580	5.80 - 16.00
DOS650-	650	6.50 - 18.00
DOS750-	750	7.50 - 18.00
DOS110-	110	11.00 - 26.50
DOS180-	180	18.00 - 40.00

Space Machine offers a standard product line of fabricated double ridge waveguide offset shorts covering sizes WRD180 thru WRD200. Standard product length of offset is 1/8, 3/8 and 1/4 wavelengths. Other lengths available upon request.

Ordering Information:

Double Ridge Waveguide Offset Short, WRD650, Aluminum, Cover Flange Face, Chromated, Paint Space Machine Gray.

	DOS	wrd	-λ	-m	f	-p	f
Example part number:	DOS	650	-1/8	-A	01	-C	P

Series (DOS):

Waveguide Size (wrd): WRD180 thru WRD200

Length (-λ): 1/8, 3/8, 1/4

Flange Material (-m): A – Aluminum

Flange (f): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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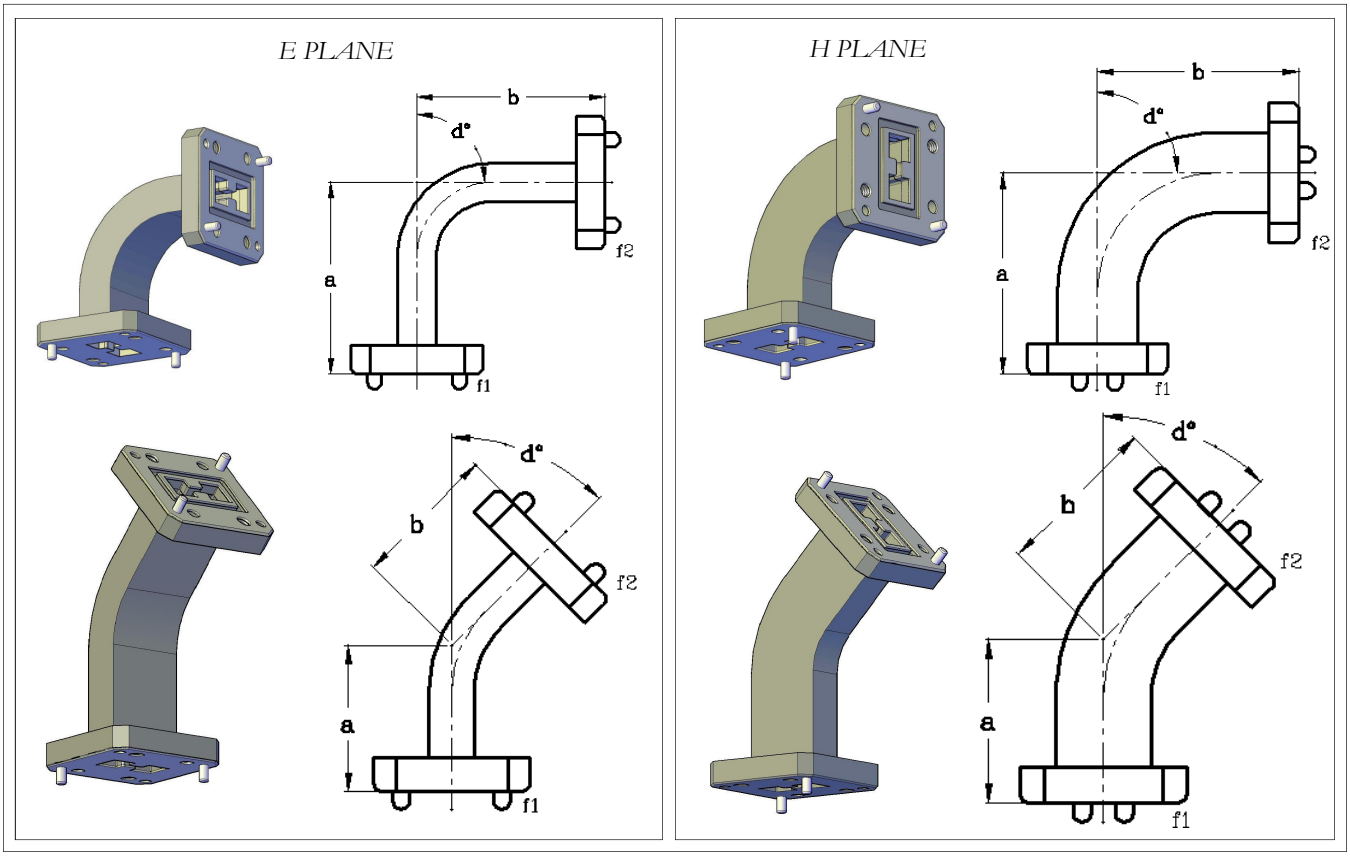
Space Machine & Engineering CORP.

Double Ridge Waveguide Formed E & H Plane Bend Assemblies



Space Machine will custom fabricate double ridge formed E and H plane bend assemblies covering waveguide sizes WRD180 thru WRD200. Degree of bend, leg lengths and flange types are made to customer specifications. VSWR is 1.15:1 over the full waveguide band.

Ordering Information:

	d	DtB	wrd	-a	xb	m	f1 f2	-p	f
Example part number:	90	DEB	650	-3	x3	A	01 02	-C	P

90° Double Ridge Formed E Bend Assembly, WRD650, 3 inch X 3 inch legs, Aluminum, Cover Flange, Gasket Flange Chromated, Paint Space Machine Gray.

Degree of Bend: 30, 45, 60, 90, or as required

Series (DEB): E – Plane
(DHB): H – Plane

Waveguide Size (wrd): WRD180 thru WRD200

Leg Length (-a):

Leg Length (b):

Material (m): A – Aluminum

Flange (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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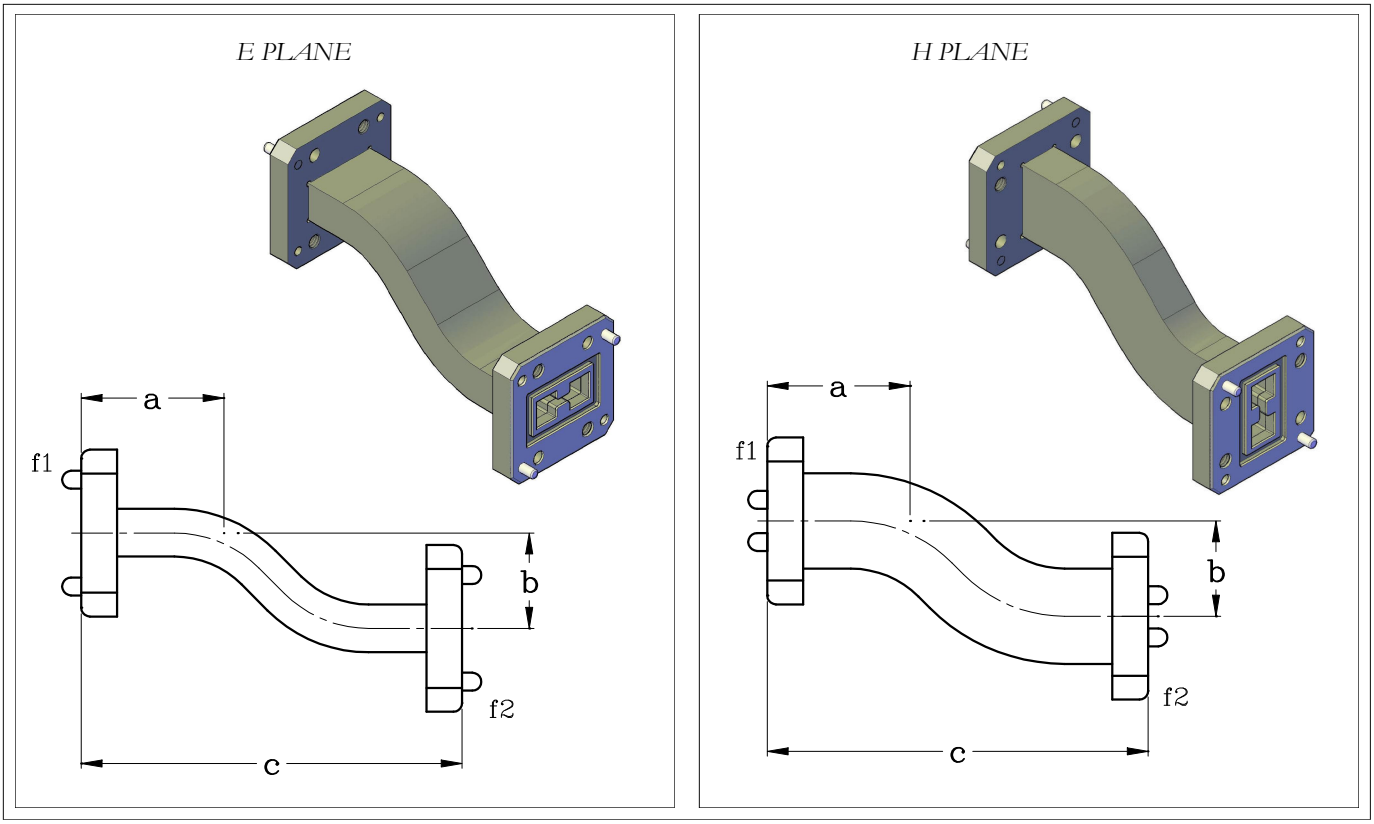
Space Machine & Engineering CORP.

Double Ridge Waveguide Formed E & H Plane Offset Assemblies



Space Machine will custom fabricate double ridge formed E and H plane offset assemblies covering waveguide sizes WRD180 thru WRD200. Offset distance, leg lengths and flange types are made to customer specifications. VSWR is 1.15:1 over the full waveguide band.

Ordering Information:

	DtO	wrd	-a	xb	xc	m	f1 f2	-p	f
Example part number:	DEO	650	-3	x2	x4	A	01 02	-C	P

Double Ridge Formed E Offset Assembly, WRD650, 3 inch leg X 2 inch offset X 4 inch leg, Aluminum, Cover Flange, Gasket Flange, Chromated, Paint Space Machine Gray.

Series (DEO): E – Plane
(DHO): H – Plane

Waveguide Size (wrd): WRD180 thru WRD200

Leg Length (-a):

Offset Length (b):

Leg Length (c):

Material (m): A – Aluminum

Flange (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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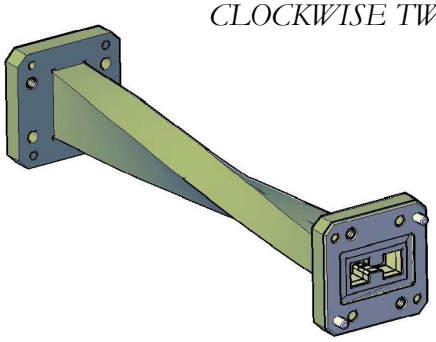
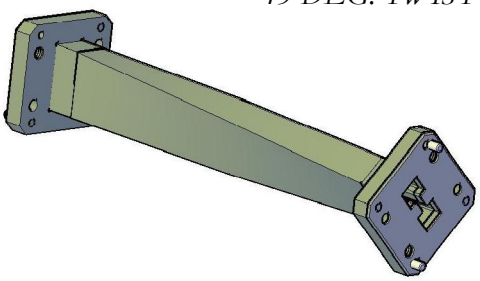
Double Ridge Waveguide Twist Assemblies

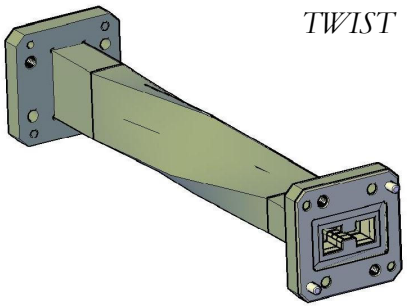
CLOCKWISE TWIST

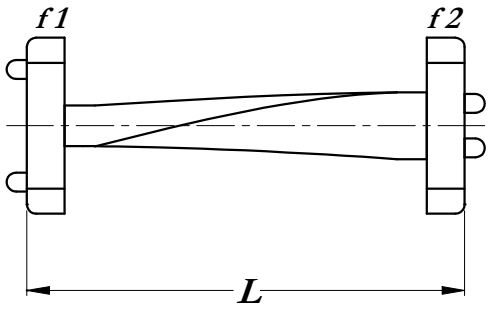


45 DEG. TWIST



COUNTERCLOCKWISE TWIST





Space Machine will custom fabricate double ridge twist sections covering the waveguide sizes WRD180 to WRD200. Degree of twist, length and flange types made to customer specifications. VSWR is less than 1.15:1 over the full waveguide band.
SME standard twist direction is clockwise*. To order counterclockwise** twist add a dash and "CCT" after Part Number. Example: 90-DTW650-6.0A0102-CP-CCT

* "Clockwise Twist" - when the assembly is held vertically and viewed from above, the twist of the tubing progresses in a clockwise direction from top to bottom.

** "Counterclockwise Twist" - when the assembly is held vertically and viewed from above, the twist of the tubing progresses in a counterclockwise direction from top to bottom.

Ordering Information:

	d	DTW	wrd	-l	m	f1 f2	-p	f
Example part number:	90	DTW	650	-6.0	A	01 02	-C	P

90° Double Ridge Waveguide Twist, WRD650, 6.0" Long, Aluminum, Cover Flange, Gasket Flange, Chromated, Paint Space Machine Gray.

Degree of Twist: 30, 45, 60, 90, or as required.

Series (DTW):

Waveguide Size (wrd): WRD180 thru WRD200

Length (-l): (inches)

Waveguide Material (m): A – Aluminum

Flange (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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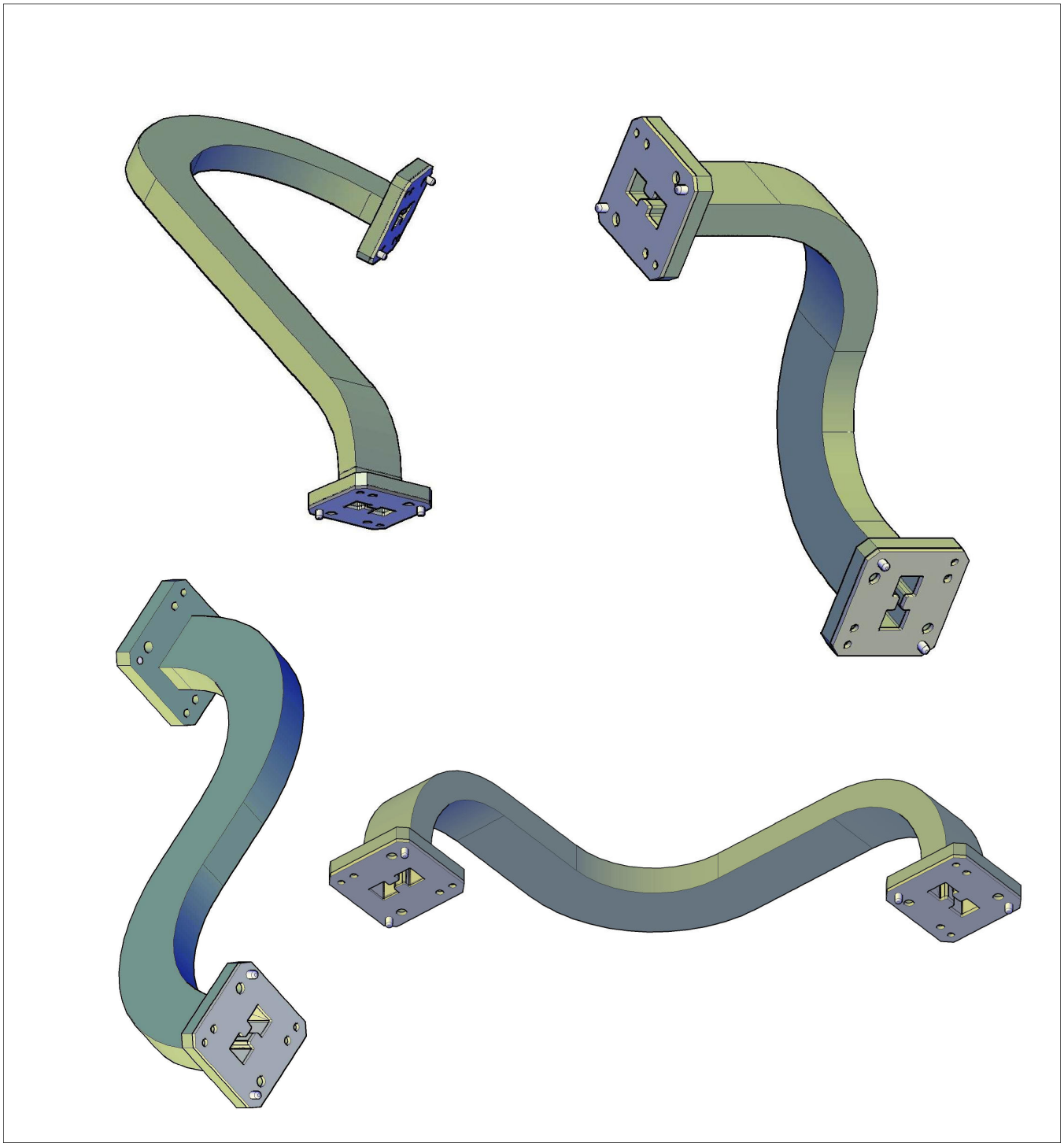
Double Ridge Waveguide Specialized Bend Assemblies



Space Machine can customize any double ridge waveguide bend assembly that you require. Please contact the company with drawings, sketch or word description for a quotation.

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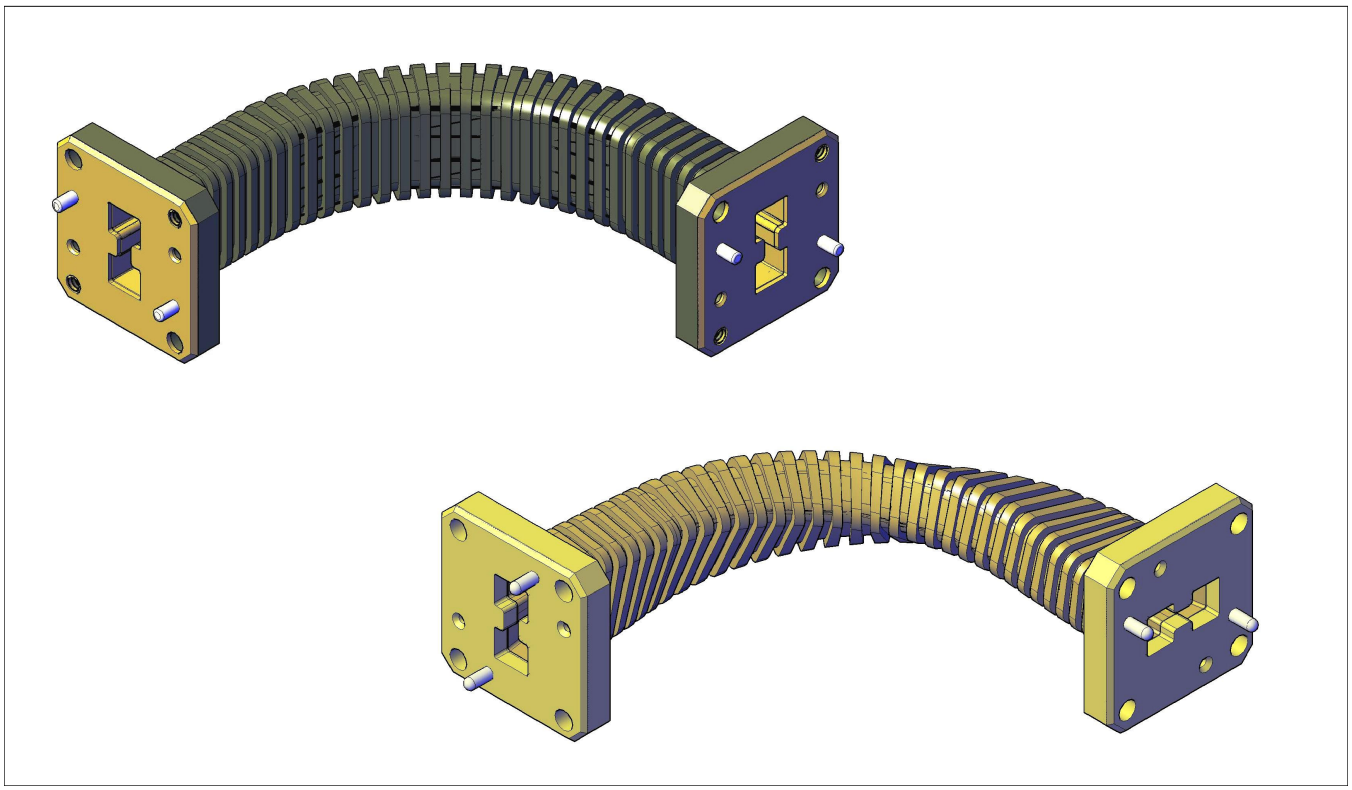
Double Ridge Waveguide Flexible & Flexible – Twistable Assemblies



Space Machine offers a standard product line of flexible and flexible – twistable double ridge waveguide covering waveguide sizes WRD180 thru WRD200. The standard waveguide material is silver-clad brass.
Additional sizes and configurations are available upon request. See appendix N for specification.

Ordering Information:

Flexible Double Ridge, WRD750, 12“ Long, Aluminum, Cover Flanges, Chromated, Neoprene Jacket.

Example part number:

DFx	wrd	-l	m	f1 f2	-p	j
DFL	750	-12	A	01 01	-C	N

Series (DFL): Flexible
(DFT): Flexible – Twistable

Waveguide Size (wrd): WRD180 thru WRD200

Length (-l): (inches)

Flange material (m): A - Aluminum, B – Brass, O – Other

Flanges (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Jacket (j): N – Neoprene, S – Silicone, V – Vinyl, P – Polysulfide,

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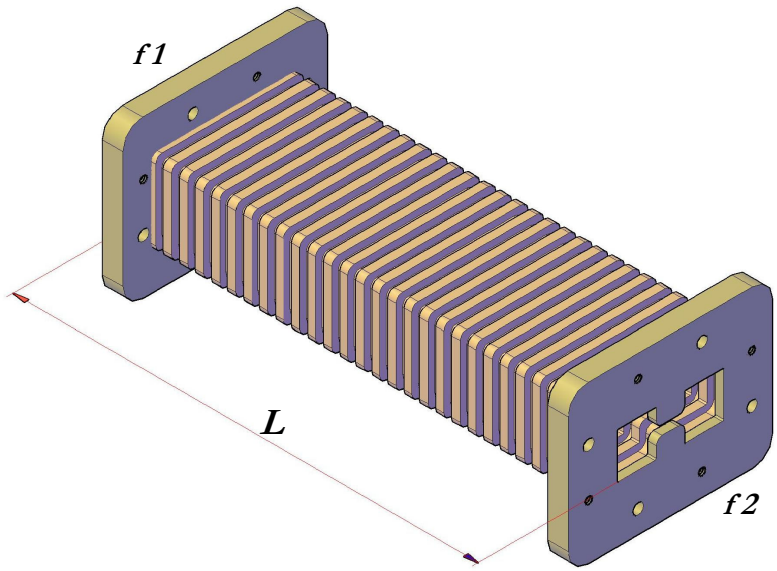
Space Machine & Engineering CORP.

Double Ridge Waveguide Seamless Flexible Assemblies



Space Machine offers a standard product line of seamless flexible double ridge waveguide covering waveguide sizes WRD650 thru WRD200. The standard waveguide material is silver-clad brass or beryllium copper.
Additional sizes and configurations are available upon request. See appendix N for specification.
Length will be supplied with a tolerance +/- 1/8" per foot of length for flexible waveguide.

Ordering Information:

Seamless Flexible Double Ridge, WRD350, 12" Long, Chromated Brass Flex, Chromated Brass Cover Flanges, No Jacket.

	DFS	wrd	-l	m	p	-f1 f2	fm	fp	-j
Example part number:	DFS	350	-12	B	C	-01 01	B	C	-A

Series (DFS): Seamless Flex

Waveguide Size (wrd): WRD650 thru WRD200

Length (-l): (inches)

Flex material (m):B - Brass, D- Beryllium Copper, P- Phosphor Bronze

Flex Plating (p): C - Chromate, S - Silver, G - Gold,
O - Other, N - None

Flanges (-f1 f2): See Appendix H

Flange material (fm): A - Aluminum, B – Brass, O – Other

Flange Plating (fp): C – Chromate, S – Silver, G – Gold,
O – Other, N – None

Jacket (-j): N – Neoprene, S – Silicone, V – Vinyl,
P – Polysulfide, A – No Jacket

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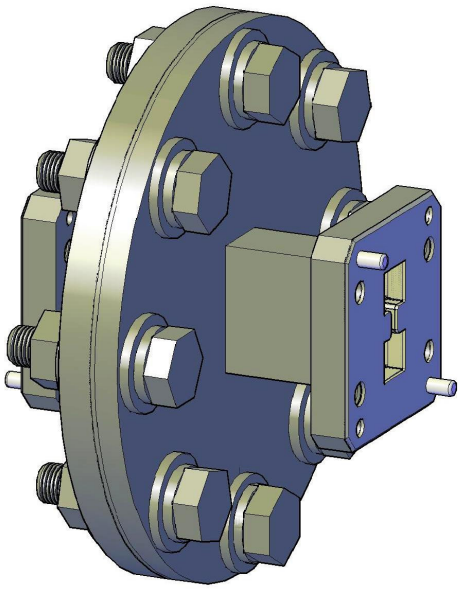
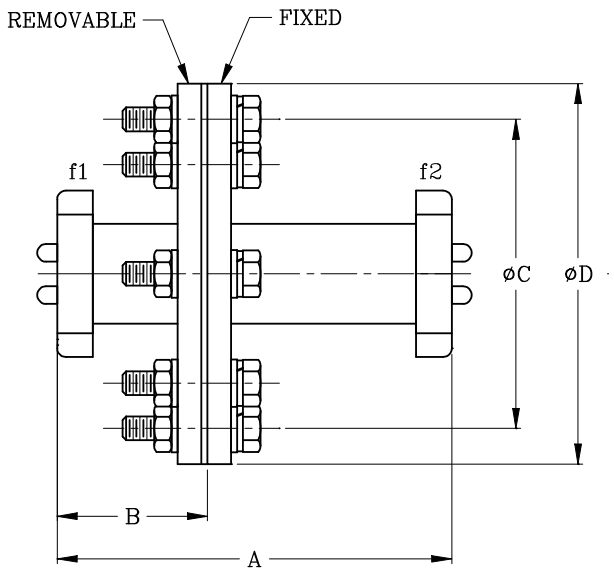
Double Ridge Waveguide Bulkhead Feed Unit





Model	WRD #	Frequency (GHz)	A	B	C	D
DFU180-	180	18.00 - 40.00	3.00	1.00	2.50	3.00
DFU110-	110	11.00 - 26.50	3.00	1.00	2.50	3.00
DFU750-	750	7.50 - 18.00	3.75	1.38	2.88	3.50
DFU650-	650	6.50 - 18.00	3.75	1.38	2.88	3.50
DFU580-	580	5.80 - 16.00	3.75	1.38	2.88	3.50

Model	WRD #	Frequency (GHz)	A	B	C	D
DFU500-	500	5.00 - 18.00	3.75	1.38	2.88	3.50
DFU475-	475	4.75 - 11.00	4.25	1.63	3.25	4.00
DFU350-	350	3.50 - 8.20	4.25	1.63	4.00	4.75
DFU250-	250	2.60 - 7.80	4.25	1.63	5.25	6.00
DFU200-	200	2.00 - 4.80	5.00	1.75	6.00	6.75

Space Machine offers a standard product line of double ridge bulkhead feed units covering waveguide sizes WRD180 thru WRD200. Custom bulkhead flange patterns and waveguide lengths are available upon request.

Ordering Information:

Double Ridge Bulkhead Feed Unit, WRD650, Aluminum, Cover Flanges, Chromated, Paint Space Machine Gray.

	DFU	wrd	-m	f1 f2	-p	f
Example part number:	DFU	650	-A	01 01	-C	P

Series (DFU):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Flange (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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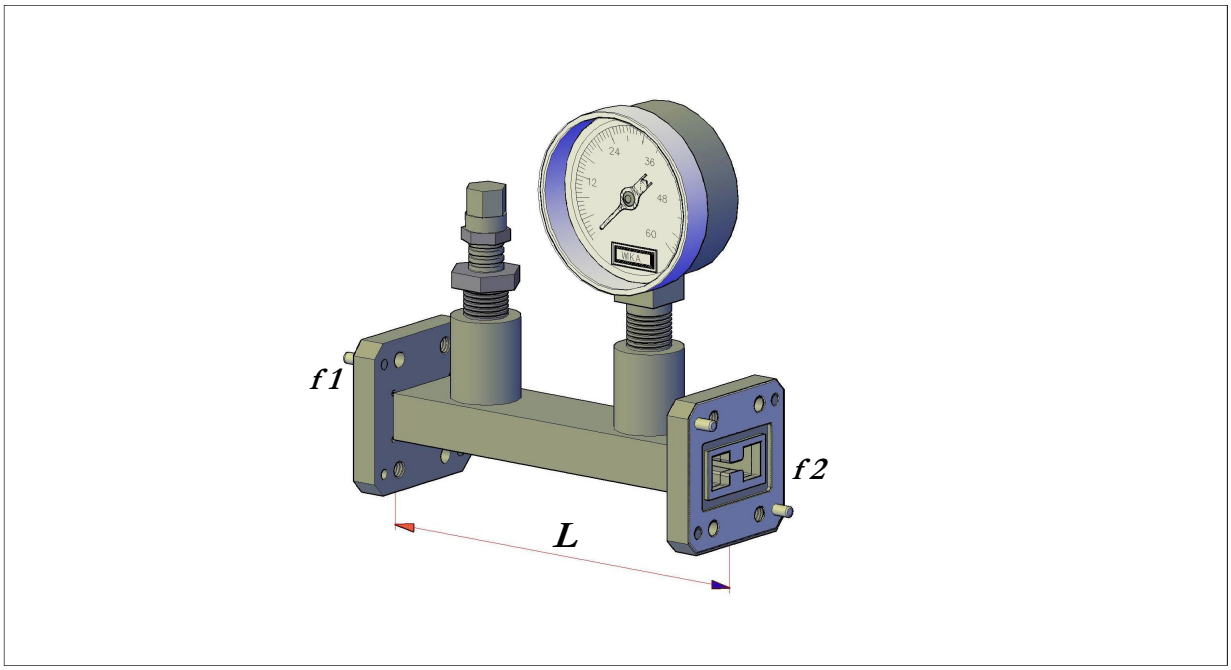
Space Machine & Engineering CORP.

Double Ridge Waveguide Pressure Adapter



Space Machine offers a standard product line of double ridge pressure adapters covering waveguide sizes WRD180 thru WRD200. VSWR is 1.15:1 over the full waveguide band. 15 psi gauge capacity is standard. If other than 15 psi is required, please specify when ordering.
Different types of pressure fittings available in standard SME pressure units, such as Schrader Valve, Flared Compression Fitting, Pipe Threads, or Barbed Fitting.
Additional sizes and configurations are available upon request.

Ordering Information:		**DPA**	**wrd**	**-l**	**m**	**f1 f2**	**v**	**-p**	**f**
Double Ridge Waveguide Pressure Adapter, WRD650, 4 inches long, Aluminum, Cover Flange, Gasket Flange, with Schrader Valve, Chromate, Paint Space Machine Gray.	**Example part number:**	DPA	650	-4.0	A	01 02	SV	-C	P

Series (DPA):

Waveguide Size (wrd): WRD180 thru WRD200

Length (-l): (inches)

Material (m): A – Aluminum

Flanges (f1 f2): See Appendix H

Pressure Fitting (v): Schrader Valve-SV, Flared Compression Fitting-FF, Pipe Threads-PT, Barbed Fitting-BF

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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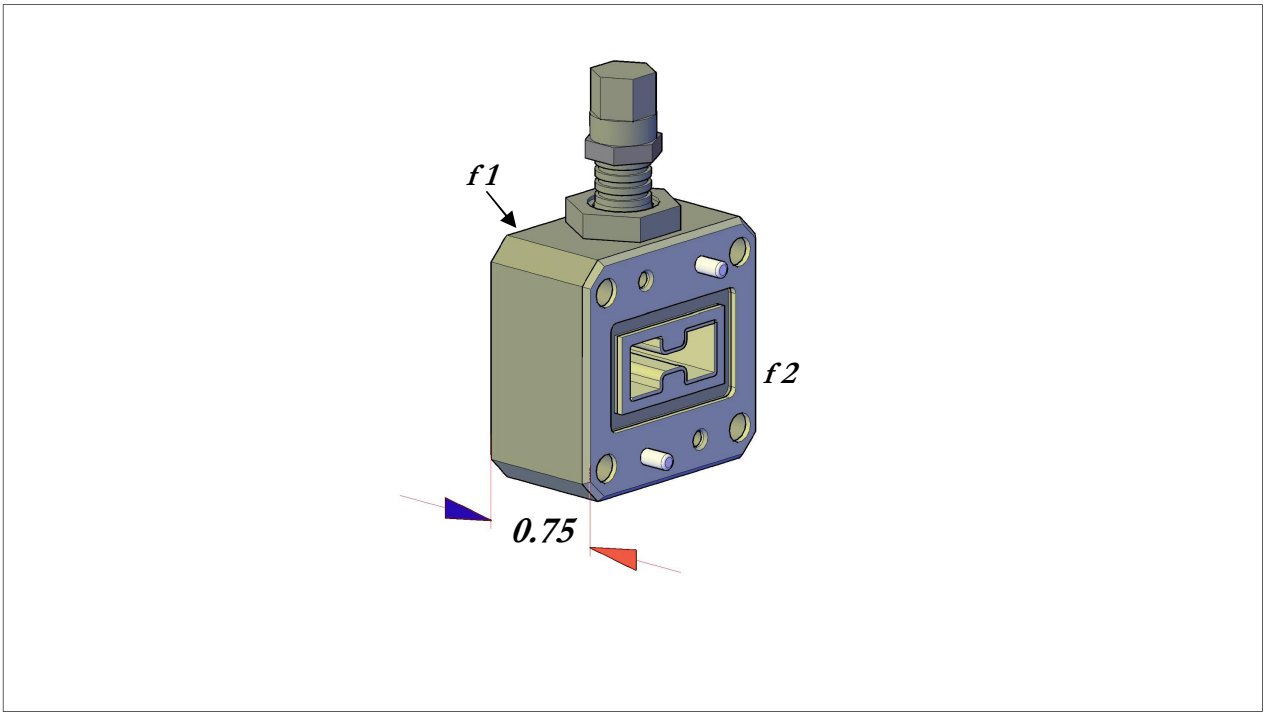
Double Ridge Waveguide Pressure Flange



Space Machine offers a standard product line of double ridge pressure flanges covering waveguide sizes WRD180 thru WRD200. VSWR is 1.15:1 over the full waveguide band. Double ridge waveguide pressure flange standard thickness is 0.75". Custom thickness is also available upon request.
Different types of pressure fittings available in standard SME pressure flange assembly, such as Schrader Valve, Flared Compression Fitting, Pipe Threads, or Barbed Fitting. Pressure inlet can be substituted with drain unit or pressure drain unit. Additional sizes and configurations are available upon request.

Ordering Information:

	DPF	wrd	-m	f1 f2	v	-p	f
Example part number:	DPF	650	-A	01 02	SV	-C	P

Double Ridge Waveguide Pressure Flange, WRD650, Aluminum, Cover Flange, Gasket Flange, with Schrader Valve, Chromate, Paint Space Machine Gray.

Series (DPF):

Waveguide Size (wrd): WRD180 thru WRD200

Material (m): A – Aluminum

Flanges (f1 f2): See Appendix H

Pressure Fitting (v): Schrader Valve-SV, Flared Compression Fitting-FF, Pipe Threads-PT, Barbed Fitting-BF

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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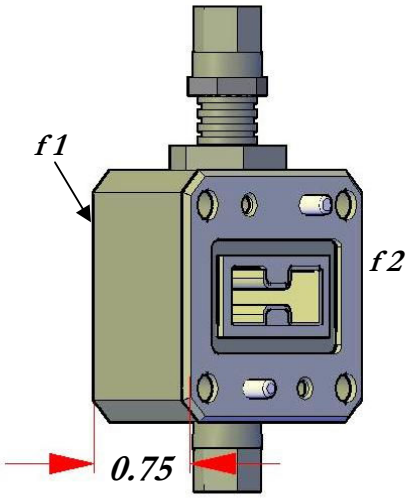
Double Ridge Waveguide Dual Fitting Pressure Flange



Space Machine offers a standard product line of double ridge dual fitting pressure flanges covering waveguide sizes WRD180 thru WRD200. VSWR is 1.15:1 over the full waveguide band. Double ridge waveguide dual fitting pressure flange standard thickness is 0.75". Custom thickness is also available upon request.
Different types of pressure fittings available in standard SME pressure flange assembly, such as Schrader Valve, Flared Compression Fitting, Pipe Threads, or Barbed Fitting. Pressure inlet can be substituted with drain unit or pressure drain unit. Additional sizes and configurations are available upon request.

Ordering Information:

	DDPF	wrd	-m	f1 f2	v	-p	f
Example part number:	DDPF	650	-A	01 02	SV	-C	P

Double Ridge Waveguide Dual Fitting Pressure Flange, WRD650, Aluminum, Cover Flange, Gasket Flange, with Schrader Valve, Chromate, Paint Space Machine Gray.

Series (DDPF):

Waveguide Size (wrd): WRD180 thru WRD200

Material (m): A – Aluminum

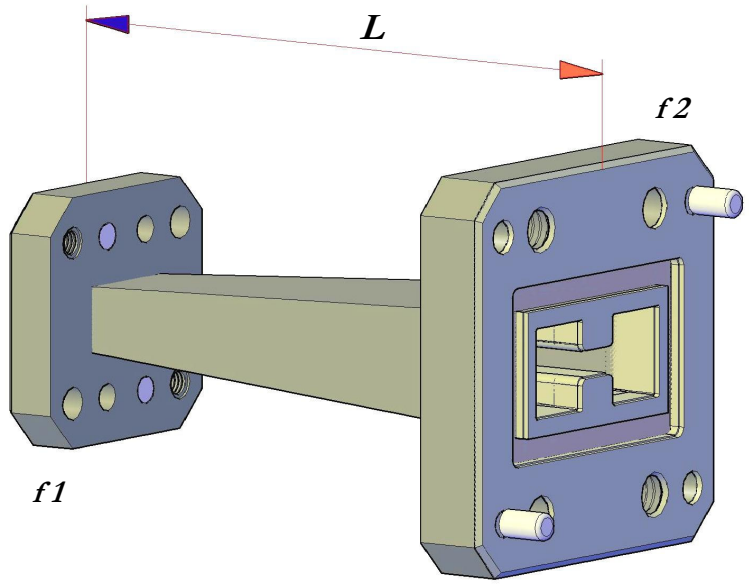
Flanges (f1 f2): See Appendix H

Pressure Fitting (v): Schrader Valve-SV, Flared Compression Fitting-FF, Pipe Threads-PT, Barbed Fitting-BF

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Double Ridge To Double Ridge Waveguide Transitions



Space Machine offers a standard product line of double ridge to double ridge transitions covering waveguide sizes WRD180 thru WRD200. VSWR is 1.10:1 typical in the overlapping frequency bands.
Additional sizes and configurations are available upon request.

Ordering Information:

	DDT	wrd1	-f1	-wrd2	-f2	m	l	-p	f
Example part number:	DDT	650	-02	-750	-02	A	5.0	-C	P

Double Ridge To Double Ridge Transition, WRD650 Gasket Flange to WRD750 Gasket Flange, Aluminum, 5.0" Long, Chromated, Paint Space Machine Gray.

Series (DDT):

Waveguide Size 1 (wrd1): WRD180 thru WRD200

Flange 1 (-f1): See Appendix H

Waveguide Size 2 (-wrd2): WRD180 thru WRD200

Flange 2 (-f2): See Appendix H

Material (m): A – Aluminum

Length (l): (inches)

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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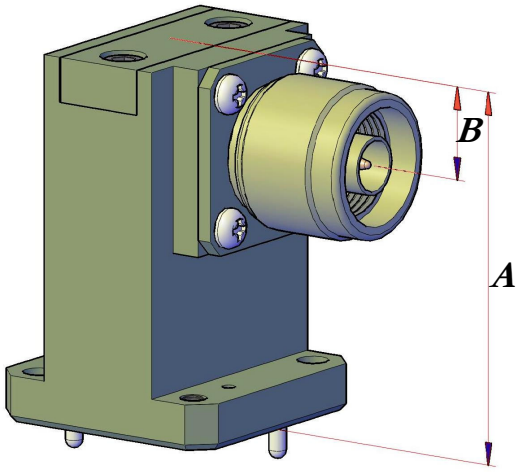
Double Ridge Waveguide To Coax Adapters



Model	WRD #	Frequency (GHz)	A	B
DCA180-	180	18.00 - 40.00	1.00	0.50
DCA110-	110	11.00 - 26.50	1.00	0.50
DCA750-	750	7.50 - 18.00	2.00	0.50
DCA650-	650	6.50 - 18.00	2.00	0.50
DCA580-	580	5.80 - 16.00	2.00	0.75

Model	WRD #	Frequency (GHz)	A	B
DCA500-	500	5.00 - 18.00	2.00	0.75
DCA475-	475	4.75 - 11.00	2.50	1.00
DCA350-	350	3.50 - 8.20	2.50	1.00
DCA250-	250	2.60 - 7.80	2.75	1.25
DCA200-	200	2.00 - 4.80	3.00	1.10

Space Machine custom fabricates a standard product line of double ridge waveguide to coax adapters covering waveguide sizes WRD180 thru WRD200. VSWR is 1.35:1 typical.
Additional sizes and configurations available upon request.

Ordering Information:

Double Ridge Waveguide To Coax Adapter, WRD180, Aluminum, Cover Flange, TNC Female Connector, Chromated, Paint Space Machine Gray.

Example part number:

DCA	wrd	-m	f	cnt	-p	f
DCA	180	-A	01	TF	-C	P

Series (DCA):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Flange (f): See Appendix H

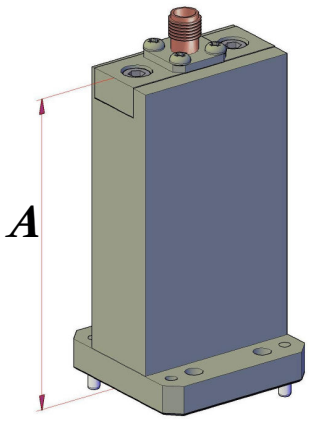
Connector (cnt): See Appendix E

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Space Machine & Engineering CORP.

Double Ridge Waveguide To Coax End Launch Adapters



Model	WRD #	Frequency (GHz)	A
DCA750EL	750	7.50 - 18.00	2.75
DCA650EL	650	6.50 - 18.00	2.75
DCA580EL	580	5.80 - 16.00	3.00
DCA500EL	500	5.00 - 18.00	3.25

Model	WRD #	Frequency (GHz)	A
DCA475EL	475	4.75 - 11.00	4.50
DCA350EL	350	3.50 - 8.20	5.50
DCA250EL	250	2.60 - 7.80	7.00
DCA200EL	200	2.00 - 4.80	9.00

Space Machine offers a standard product line of double ridge waveguide to coax end launch adapters covering sizes WRD750 thru WRD200. VSWR is 1.50:1 max. Improved VSWR performance can be obtained over a reduced bandwidth. Space Machine's End-Launch Adapters use a transition whose center conductor is structurally tied to the waveguide, for excellent mechanical and thermal stability. Additional sizes and configurations available upon request.

Ordering Information:

Double Ridge Waveguide To Coax End Launch Adapter, WRD650, Aluminum, Cover Flange, SMA Female Connector, Chromated, Paint Space Machine Gray.

	DCA	wrd	EL	-m	f	cnt	-p	f
Example part number:	DCA	650	EL	-A	01	SF	-C	P

Series (DCA):

Waveguide Size (wrd): WRD750 thru WRD200

End Launch (EL)

Material (-m): A – Aluminum

Flange (f): See Appendix H

Connector (cnt): See Appendix E

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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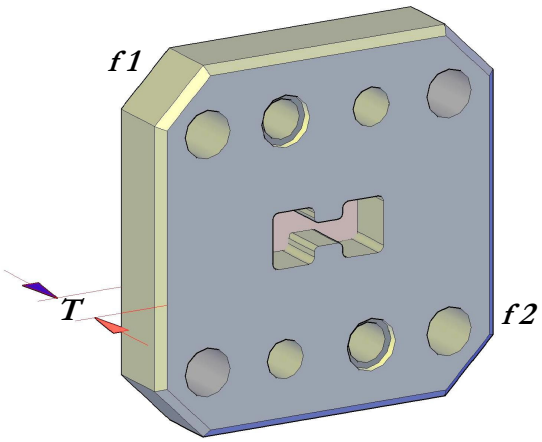
Teflon/Fiberglass Double Ridge Waveguide Pressure Windows



Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T“)
DPWT180-	180	18.00 - 40.00	50	0.38
DPWT110-	110	11.00 - 26.50	70	0.38
DPWT750-	750	7.50 - 18.00	100	0.38
DPWT650-	650	6.50 - 18.00	100	0.38
DPWT580-	580	5.80 - 16.00	150	0.38

Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T“)
DPWT500-	500	5.00 - 18.00	280	0.38
DPWT475-	475	4.75 - 11.00	400	0.38
DPWT350-	350	3.50 - 8.20	500	0.38
DPWT250-	250	2.60 - 7.80	750	0.38
DPWT200-	200	2.00 - 4.80	1000	0.38

Space Machine offers a standard product line of teflon / fiberglass double ridge pressure windows covering waveguide sizes WRD180 thru WRD200. VSWR is 1.15:1 maximum, while insertion loss is 0.1dB maximum over the full waveguide bandwidth. Pressure handling capability is 20 PSI minimum, however higher capacities up to 30 PSI are usually obtained. Please specify pressure requirements when ordering. Additional sizes and configurations are available upon request.

Ordering Information:

Teflon / Fiberglass Double Ridge Pressure Window, WRD750, Aluminum, Cover Flanges, Chromated, Paint Space Machine Gray.

Example part number:

DPWT	wrd	-m	f1 f2	-p	f
DPWT	750	-A	01 01	-C	P

Series (DPWT):

Waveguide Size (wrd): WRD180 thru WRD200

Flange Material (-m): A – Aluminum

Flanges (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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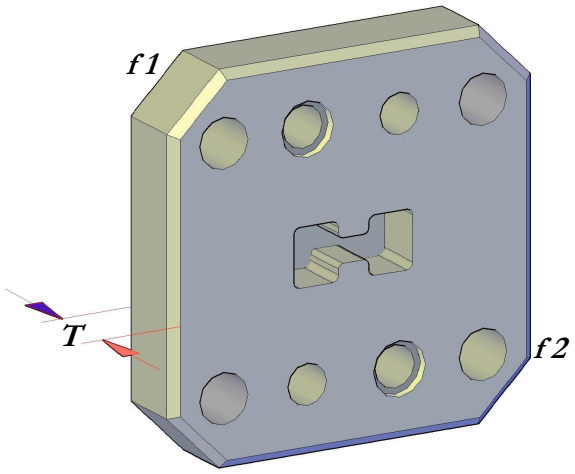
Space Machine & Engineering CORP.

Kapton Double Ridge Waveguide Pressure Windows



Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T“)
DPWK180-	180	18.00 - 40.00	100	0.38
DPWK110-	110	11.00 - 26.50	150	0.38
DPWK750-	750	7.50 - 18.00	400	0.38
DPWK650-	650	6.50 - 18.00	400	0.38
DPWK580-	580	5.80 - 16.00	500	0.38

Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T“)
DPWK500-	500	5.00 - 18.00	500	0.38
DPWK475-	475	4.75 - 11.00	750	0.38
DPWK350-	350	3.50 - 8.20	1000	0.38
DPWK250-	250	2.60 - 7.80	1000	0.38
DPWK200-	200	2.00 - 4.80	1200	0.38

Space Machine offers a standard product line of kapton double ridge pressure windows covering waveguide sizes WRD180 thru WRD200. VSWR is 1.15:1 maximum, while insertion loss is 0.1dB maximum over the full waveguide bandwidth. Pressure handling capability is 20 PSI minimum, however higher capacities up to 30 PSI are usually obtained. Please specify pressure requirements when ordering. Additional sizes and configurations are available upon request.

Ordering Information:

Kapton Double Ridge Pressure Window, WRD180, Aluminum, Cover Flanges, Chromated, Paint Space Machine Gray.

Example part number:

DPWK	wrd	-m	f1 f2	-p	f
DPWK	180	-A	01 01	-C	P

Series (DPWK):

Waveguide Size (wrd): WRD180 thru WRD200

Flange Material (-m): A – Aluminum

Flanges (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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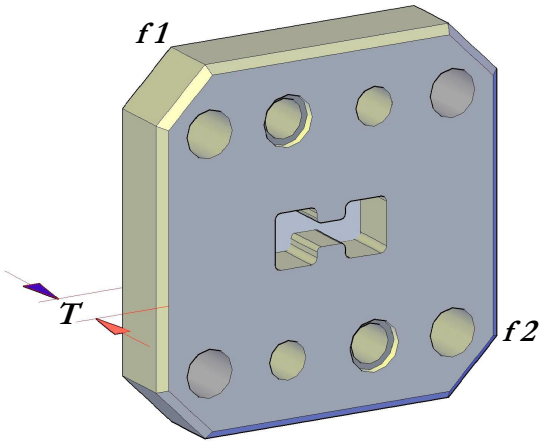
Space Machine & Engineering CORP.

Mica Double Ridge Waveguide Pressure Windows



Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T“)
DPWM180-	180	18.00 - 40.00	150	0.38
DPWM110-	110	11.00 - 26.50	200	0.38
DPWM750-	750	7.50 - 18.00	700	0.38
DPWM650-	650	6.50 - 18.00	700	0.38
DPWM580-	580	5.80 - 16.00	800	0.38

Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thick-ness (T“)
DPWM500-	500	5.00 - 18.00	800	0.38
DPWM475-	475	4.75 - 11.00	1000	0.38
DPWM350-	350	3.50 - 8.20	1250	0.38
DPWM250-	250	2.60 - 7.80	1500	0.38
DPWM200-	200	2.00 - 4.80	2000	0.38

Space Machine offers a standard product line of mica double ridge pressure windows covering waveguide sizes WRD180 thru WRD200. VSWR is 1.15:1 maximum, while insertion loss is 0.1dB maximum over the full waveguide bandwidth. Pressure handling capability is 20 PSI minimum, however higher capacities up to 30 PSI are usually obtained. Please specify pressure requirements when ordering. Additional sizes and configurations are available upon request.

Ordering Information:

Mica Double Ridge Pressure Window, WRD180, Aluminum, Cover Flanges, Chromated, Paint Space Machine Gray.

Example part number:

DPWM	wrd	-m	f1 f2		-p	f
DPWM	180	-A	01	01	-C	P

Series (DPWM):

Waveguide Size (wrd): WRD180 thru WRD200

Flange Material (-m): A – Aluminum

Flanges (f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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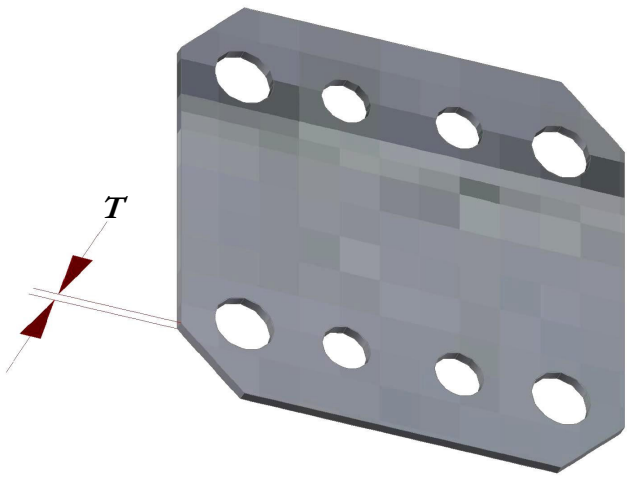
Space Machine & Engineering CORP.

Double Ridge Waveguide Pressure Gasket



Space Machine offers a standard product line of double ridge pressure gaskets covering waveguide sizes WRD180 thru WRD200. VSWR is 1.05:1 maximum, while insertion loss is 0.05dB maximum over the full waveguide bandwidth. Pressure handling capability is proportional with thickness.
Additional sizes and configurations are available upon request.

Ordering Information:

	DPG	wrd	-m	-t
Double Ridge Pressure Gasket, WRD650, Mylar, 0.010 thick. **Example part number:**	DPG	650	-MY	-10

Series (DPG):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): T – Teflon, TF – Teflon/Fiberglass, MY – Mylar, K – Kapton

Thickness (-t): 5, 10, 15, 20 (thousandths of an inch)

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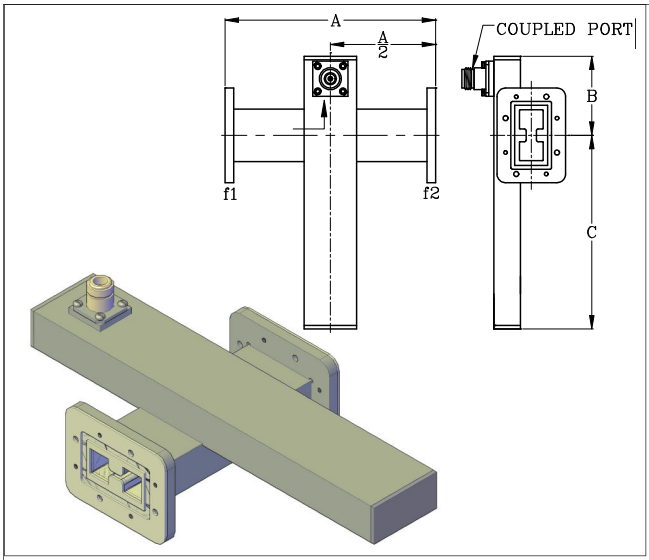
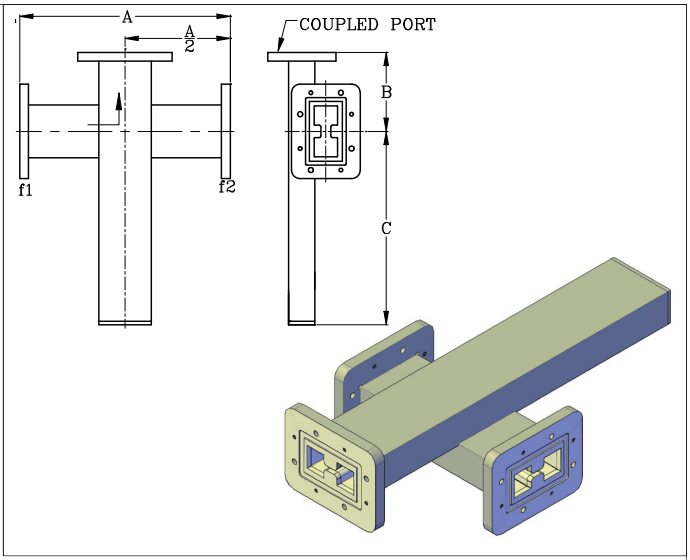
Double Ridge Waveguide Cross Guide Couplers





Model	WRD #	Frequency (GHz)	A	B	C
DDG180-	180	18.00 - 40.00	2.50	1.25	6.50
DDG110-	110	11.00 - 26.50	2.50	1.25	7.50
DDG750-	750	7.50 - 18.00	2.75	2.00	9.50
DDG650-	650	6.50 - 18.00	3.00	2.00	9.75
DDG580-	580	5.80 - 16.00	3.00	2.25	9.75

Model	WRD #	Frequency (GHz)	A	B	C
DDG500-	500	5.00 - 18.00	3.00	2.25	10.50
DDG475-	475	4.75 - 11.00	3.25	2.50	11.75
DDG350-	350	3.50 - 8.20	3.75	3.25	14.50
DDG250-	250	2.60 - 7.80	4.00	3.75	16.25
DDG200-	200	2.00 - 4.80	5.00	6.00	18.00

Space Machine custom fabricates a standard product line of double ridge cross guide couplers covering waveguide sizes WRD180 thru WRD200. Coupling variation is typically ± 5dB over the full waveguide band. Directivity is 12dB minimum. Additional sizes and configurations are available upon request.

Ordering Information:

	DDG	wrd	-m	c	cp	-f1 f2	-p	f
Example part number:	DDG	350	-A	40	NF	-02 01	-C	P

Double Ridge Cross Guide Coupler, WRD350, Aluminum, 40dB Coupling, Type N Female Coupled Port, Casket / Cover Flanges, Chromated, Paint Space Machine Gray.

Series (DDG):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Coupling (c): 35 - 60 dB

Coupled Port (cp): Connector – See Appendix E,
Flange – See Appendix H

Flange (-f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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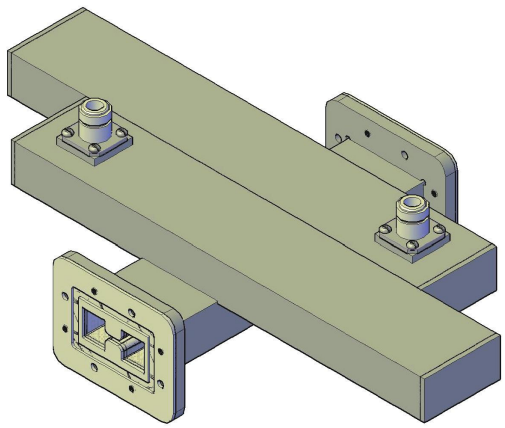
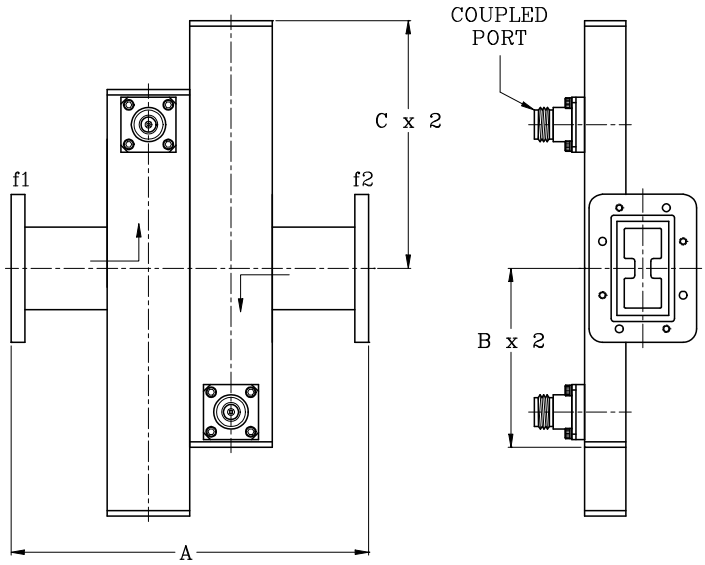
Space Machine & Engineering CORP.

Double Ridge Waveguide Dual Cross Guide Couplers





Space Machine custom fabricates a standard product line of double ridge dual cross guide couplers covering waveguide sizes WRD180 thru WRD200. Coupling variation is typically ± 5dB over the full waveguide band. Directivity is 12dB minimum. Additional sizes and configurations are available upon request. See next page for standard dimensions.

Ordering Information:

Double Ridge Dual Cross Guide Coupler, WRD500, Aluminum, 40dB Coupling, Type N Female Coupled Port, Gasket Flanges, Chromated, Paint Space Machine Gray.

	DDB	wrd	-m	c	cp	-f1 f2	-p	f
Example part number:	DDB	500	-A	40	NF	-02 02	-C	P

Series (DDB):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A-Aluminum

Coupling (c): 35 - 60 dB

Coupled Port (cp): Connector – See Appendix E,
Flange – See Appendix H

Flange (-f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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Double Ridge Waveguide Dual Cross Guide Coupler Dimensions

Model	WRD #	Frequency (GHz)	A	B	C
DDB180-	180	18.00 - 40.00	3.00	1.25	6.50
DDB110-	110	11.00 - 26.50	3.00	1.25	7.50
DDB750-	750	7.50 - 18.00	3.50	2.00	9.50
DDB650-	650	6.50 - 18.00	4.00	2.00	9.75
DDB580-	580	5.80 - 16.00	4.00	2.25	9.75
DDB500-	500	5.00 - 18.00	4.00	2.25	10.50
DDB475-	475	4.75 - 11.00	4.25	2.50	11.75
DDB350-	350	3.50 - 8.20	5.25	3.25	14.50
DDB250-	250	2.60 - 7.80	6.00	3.75	16.25
DDB200-	200	2.00 - 4.80	8.00	6.00	18.00

All dimensions are in inches.

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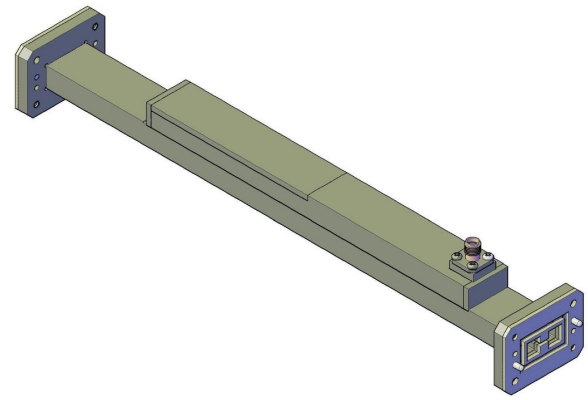
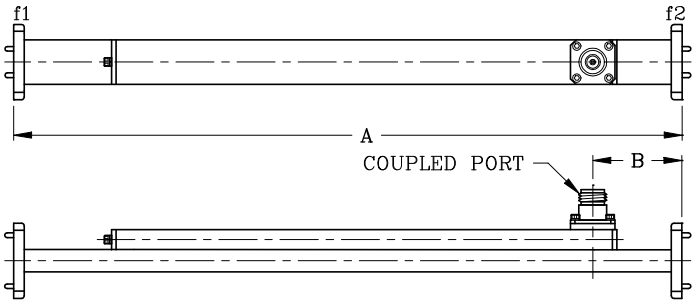
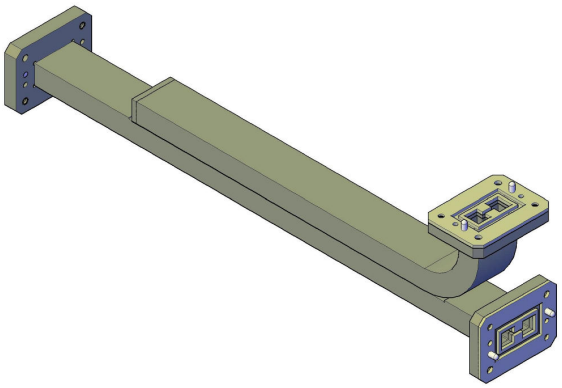
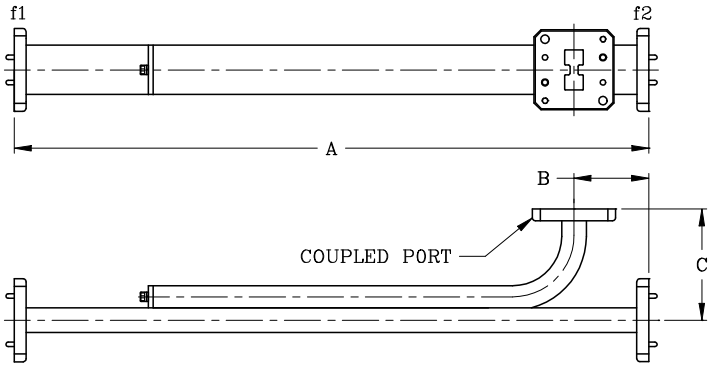
Space Machine & Engineering CORP.

Double Ridge Waveguide Topwall Couplers









Space Machine custom fabricates a standard product line of double ridge topwall couplers covering waveguide sizes WRD180 thru WRD200. Coupling variation is typically ± 2dB over the full waveguide band. Directivity is 20dB minimum. Additional sizes and configurations are available upon request. See next page for standard dimensions.

Ordering Information:

Double Ridge Topwall Coupler, WRD500, Aluminum, 30dB Coupling, Type N Female Coupled Port, Gasket Flanges, Chromated, Paint Space Machine Gray.

	DRT	wrd	-m	c	cp	-f1 f2	-p	f
Example part number:	DRT	500	-A	30	NF	-02 02	-C	P

Series (DRT):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Coupling (c): 20 - 60 dB

Coupled Port (cp): Connector – See Appendix E,
Flange – See Appendix H

Flange (-f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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Double Ridge Waveguide Topwall Coupler Dimensions

Model	WRD #	Frequency (GHz)	A	B	C
DRT180-	180	18.00 - 40.00	12.00	1.30	1.40
DRT110-	110	11.00 - 26.50	16.00	1.30	1.70
DRT750-	750	7.50 - 18.00	22.00	1.60	2.00
DRT650-	650	6.50 - 18.00	22.00	1.60	2.00
DRT580-	580	5.80 - 16.00	22.00	1.60	2.00
DRT500-	500	5.00 - 18.00	22.00	1.60	2.00
DRT475-	475	4.75 - 11.00	32.00	1.80	2.40
DRT350-	350	3.50 - 8.20	35.00	2.00	2.70
DRT250-	250	2.60 - 7.80	40.00	2.20	3.00
DRT200-	200	2.00 - 4.80	40.00	2.75	5.00

All dimensions are in inches.

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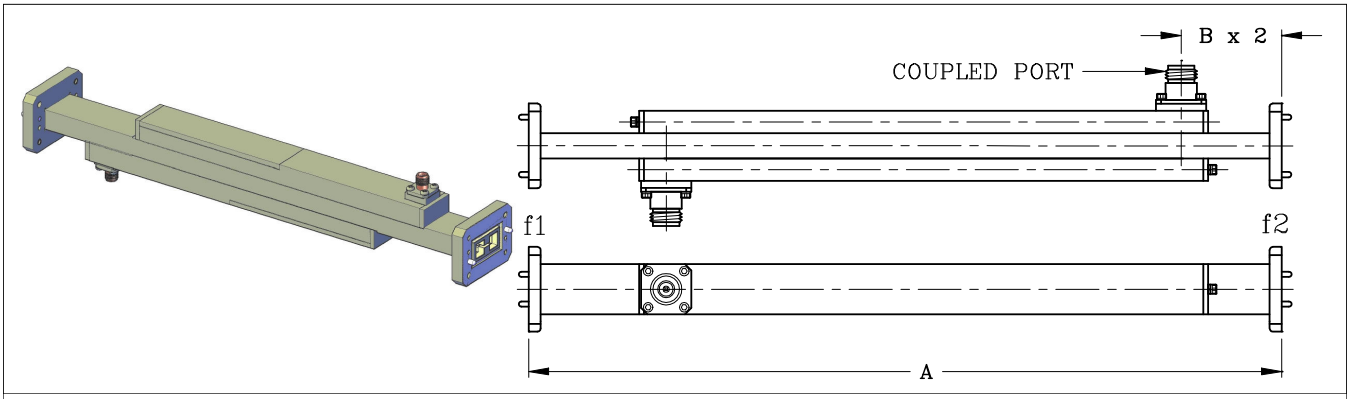
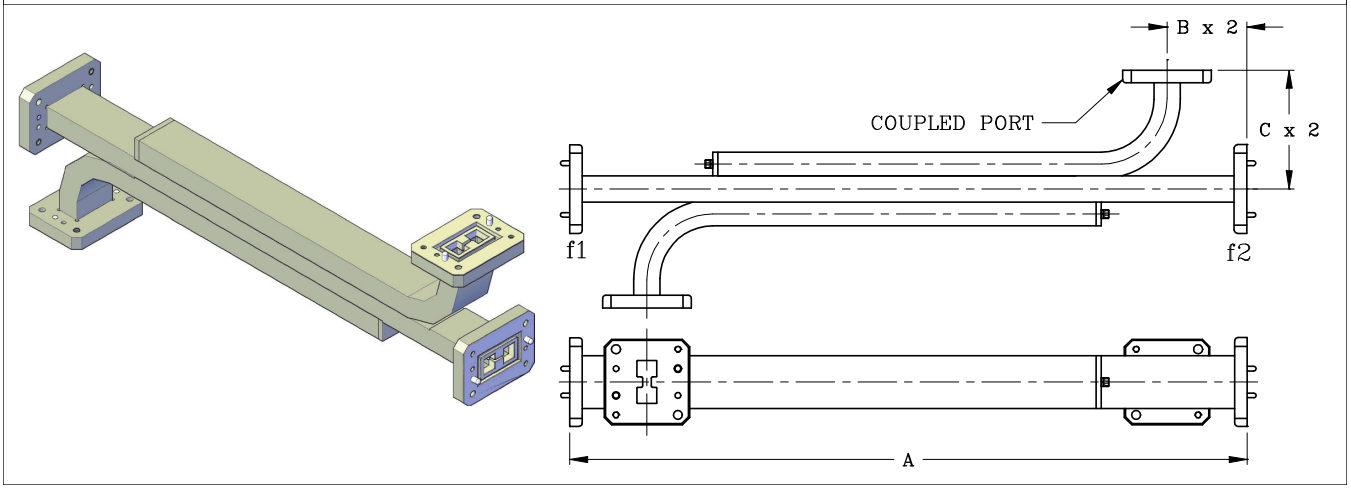
Double Ridge Waveguide Dual Topwall Couplers





Space Machine custom fabricates a standard product line of double ridge dual topwall couplers covering waveguide sizes WRD180 thru WRD200. Coupling variation is typically ± 2dB over the full waveguide band. Directivity is 20dB minimum. Additional sizes and configurations are available upon request. See next page for standard dimensions.

Ordering Information:

Double Ridge Dual Topwall Coupler, WRD500, Aluminum, 30dB Coupling, Type N Female Coupled Port, Gasket Flanges, Chromated, Paint Space Machine Gray.

Example part number:

DRB	wrd	-m	c	cp	-f1 f2	-p	f
DRB	500	-A	30	NF	-02 02	-C	P

Series (DRB):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Coupling (c): 20 – 60 dB

Coupled Port (cp): Connector – See Appendix E,
Flange – See Appendix H

Flange (-f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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Double Ridge Waveguide Dual Topwall Coupler Dimensions

Model	WRD #	Frequency (GHz)	A	B	C
DRB180-	180	18.00 - 40.00	15.00	1.30	1.40
DRB110-	110	11.00 - 26.50	20.00	1.30	1.70
DRB750-	750	7.50 - 18.00	24.00	1.60	2.00
DRB650-	650	6.50 - 18.00	24.00	1.60	2.00
DRB580-	580	5.80 - 16.00	24.00	1.60	2.00
DRB500-	500	5.00 - 18.00	24.00	1.60	2.00
DRB475-	475	4.75 - 11.00	36.00	1.80	1.40
DRB350-	350	3.50 - 8.20	40.00	2.00	2.70
DRB250-	250	2.60 - 7.80	42.00	2.20	3.00
DRB200-	200	2.00 - 4.80	44.00	2.75	5.00

All dimensions are in inches.

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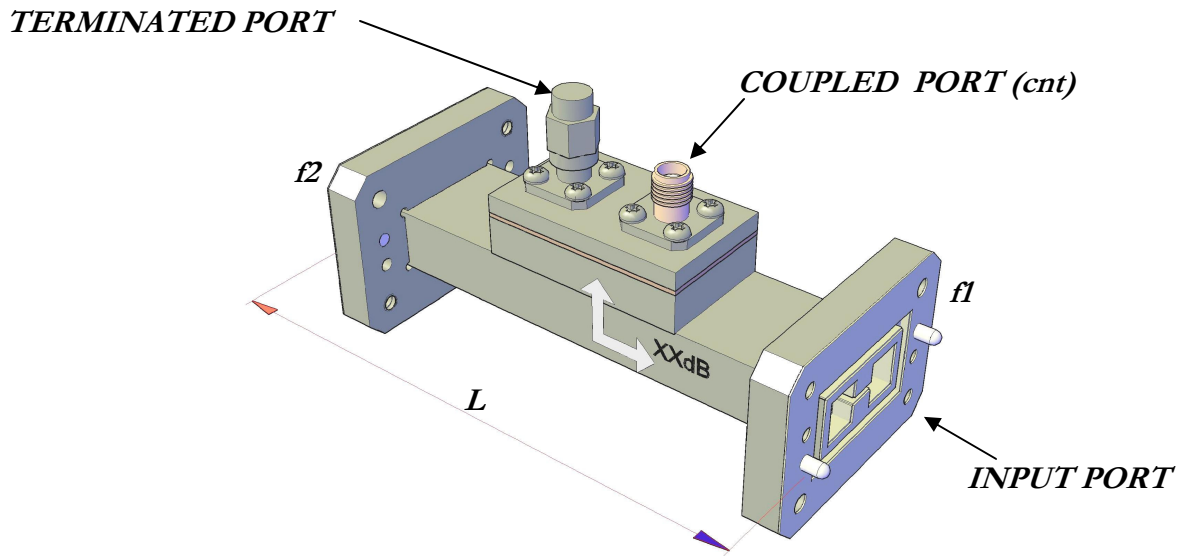
Double Ridge Waveguide Loop Couplers



Model	WRD #	Frequency (GHz)	Length (L)
DLC750-	750	7.50 - 18.00	3.00
DLC650-	650	6.50 - 18.00	3.00
DLC580-	580	5.80 - 16.00	3.00
DLC500-	500	5.00 - 18.00	3.00

Model	WRD #	Frequency (GHz)	Length (L)
DLC475-	475	4.75 - 11.00	3.50
DLC350-	350	3.50 - 8.20	3.50
DLC250-	250	2.60 - 7.80	4.00
DLC200-	200	2.00 - 4.80	5.00

Space Machine custom fabricates a standard product line of double ridge loop couplers covering waveguide sizes WRD750 thru WRD200. These loop couplers are ideally suited for 25% bandwidths with coupling variation of ± 0.5dB. Over the full waveguide band, coupling variation is ± 2.5dB. Directivity is 15dB minimum. Main arm VSWR is 1.15:1 and secondary arm VSWR is 1.3:1.

Ordering Information:

	DLC	wrd	-m	c	cnt	-f1 f2	-p	f
Example part number:	DLC	500	-A	30	SF	-02 02	-C	P

Double Ridge Loop Coupler, WRD500, Aluminum, 30dB Coupling, SMA Female Coupled Port, Gasket Flanges, Chromated, Paint Space Machine Gray.

Series (DLC):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Coupling (c): 30 - 60 dB

Connector Type (cnt): See Appendix E

Flange (-f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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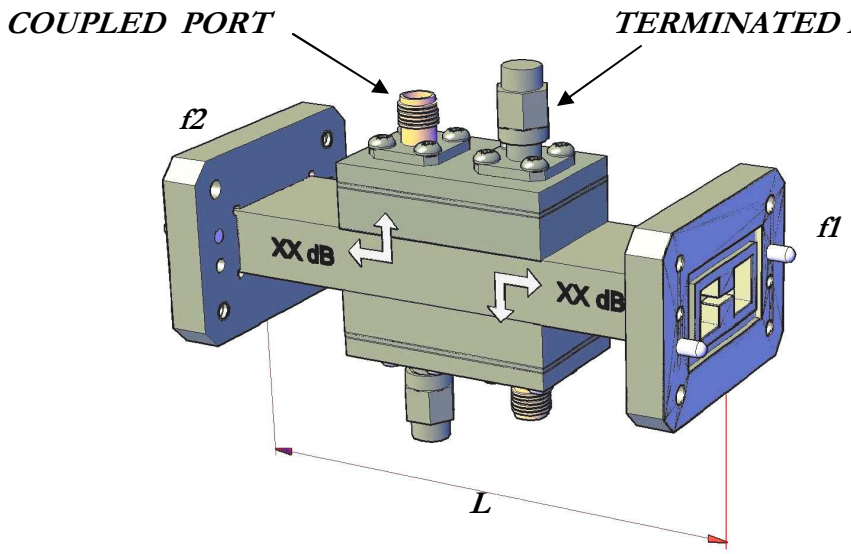
Double Ridge Waveguide Dual Loop Couplers



Model	WRD #	Frequency (GHz)	Length (L)
DLD750-	750	7.50 - 18.00	3.00
DLD650-	650	6.50 - 18.00	3.00
DLD580-	580	5.80 - 16.00	3.00
DLD500-	500	5.00 - 18.00	3.00

Model	WRD #	Frequency (GHz)	Length (L)
DLD475-	475	4.75 - 11.00	3.50
DLD350-	350	3.50 - 8.20	3.50
DLD250-	250	2.60 - 7.80	4.00
DLD200-	200	2.00 - 4.80	5.00

Space Machine custom fabricates a standard product line of double ridge dual loop couplers covering waveguide sizes WRD750 thru WRD200. These loop couplers are ideally suited for 25% bandwidths with coupling variation of ± 0.5dB. Over the full waveguide band, coupling variation is ± 2.5dB. Directivity is 15dB minimum. Main arm VSWR is 1.15:1 and secondary arm VSWR is 1.3:1.

Ordering Information:

Double Ridge Dual Loop Coupler, WRD500, Aluminum, 30dB and 50db Coupling, SMA Female Coupled Ports, Gasket Flanges, Chromated, Paint Space Machine Gray.

Example part number:

DLD	wrd	-m	c1	c2	cnt	-f1 f2	-p	f
DLD	500	-A	30	50	SF	-02 02	-C	P

Series (DLD):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Coupling (c1, c2): 30 - 50 dB

Connector Type (cnt): See Appendix E

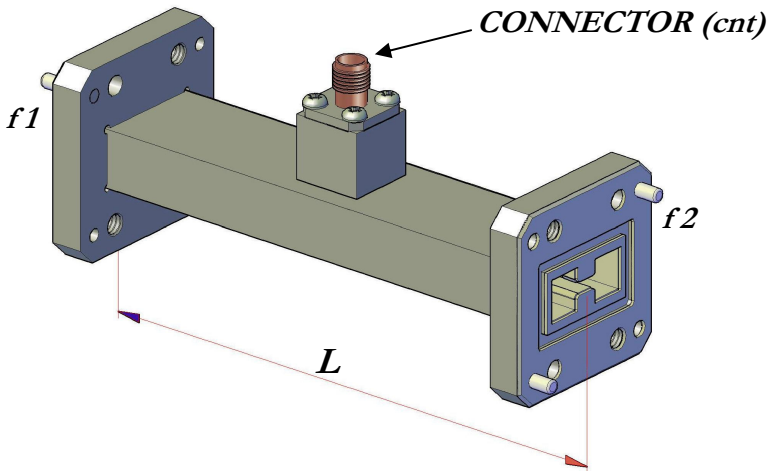
Flange (-f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Space Machine & Engineering CORP.

Double Ridge Waveguide Power Sampler



Model	WRD #	Frequency (GHz)	Length (L)
DSP180-	180	18.00 - 40.00	2.50
DSP110-	110	11.00 - 26.50	2.50
DSP750-	750	7.50 - 18.00	3.00
DSP650-	650	6.50 - 18.00	3.00
DSP580-	580	5.80 - 16.00	3.00

Model	WRD #	Frequency (GHz)	Length (L)
DSP500-	500	5.00 - 18.00	3.00
DSP475-	475	4.75 - 11.00	3.50
DSP350-	350	3.50 - 8.20	3.50
DSP250-	250	2.60 - 7.80	4.00
DSP200-	200	2.00 - 4.80	5.00

Space Machine offers a standard product line of double ridge power samplers covering waveguide sizes WRD180 thru WRD200. These devices are used for monitoring power when directivity is not a concern. Main line VSWR is held to 1.15:1 maximum over the full waveguide band, while coupling is held to ± 1dB. Additional sizes and configurations are available upon request.

Ordering Information:

Double Ridge Waveguide Power Sampler, WRD650, Aluminum, 40dB Coupling, SMA Female, Gasket flanges, Chromate, Paint Space Machine Gray.

Example part number:

DSP	wrd	-m	c	cnt	-f1 f2	-p	f
DSP	650	-A	40	SF	-02 02	-C	P

Series (DSP):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Coupling (c): 30 - 60 dB

Connector (cnt): See Appendix E

Flange (-f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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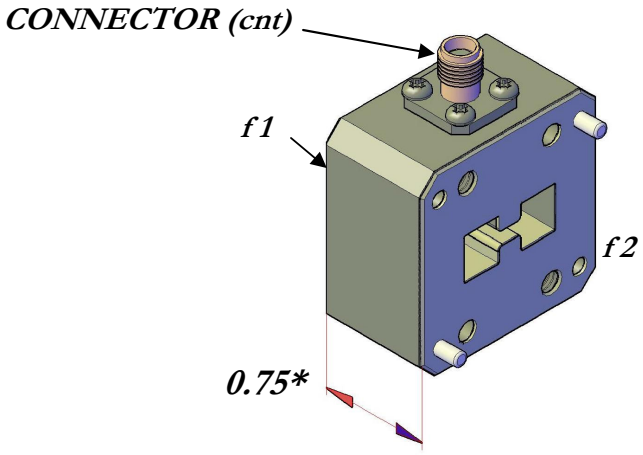
Double Ridge Waveguide Power Flange Sampler



Model	WRD #	Frequency (GHz)
DSFP180-	180	18.00 - 40.00
DSFP110-	110	11.00 - 26.50
DSFP750-	750	7.50 - 18.00
DSFP650-	650	6.50 - 18.00
DSFP580-	580	5.80 - 16.00

Model	WRD #	Frequency (GHz)
DSFP500-	500	5.00 - 18.00
DSFP475-	475	4.75 - 11.00
DSFP350-	350	3.50 - 8.20
DSFP250-	250	2.60 - 7.80
DSFP200-	200	2.00 - 4.80

Space Machine offers a standard product line of double ridge power flange samplers covering waveguide sizes WRD180 thru WRD200. These devices are used for monitoring power when directivity is not a concern. Main line VSWR is held to 1.15:1 maximum over the full waveguide band, while coupling is held to ± 1dB.
Additional sizes and configurations are available upon request.
**** When a Type N connector is required, thickness will be 1.00".***

Ordering Information:

	DSFP	wrd	-m	c	cnt	-f1 f2	-p	f
Example part number:	DSFP	650	-A	40	SF	-01 01	-C	P

Double Ridge Waveguide Power Flange Sampler, WRD650, Aluminum, 40dB Coupling, SMA Female, Cover flanges, Chromate, Paint Space Machine Gray.

Series (DSFP):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Coupling (c): 30 - 60 dB

Connector (cnt): See Appendix E

Flange (-f1 f2): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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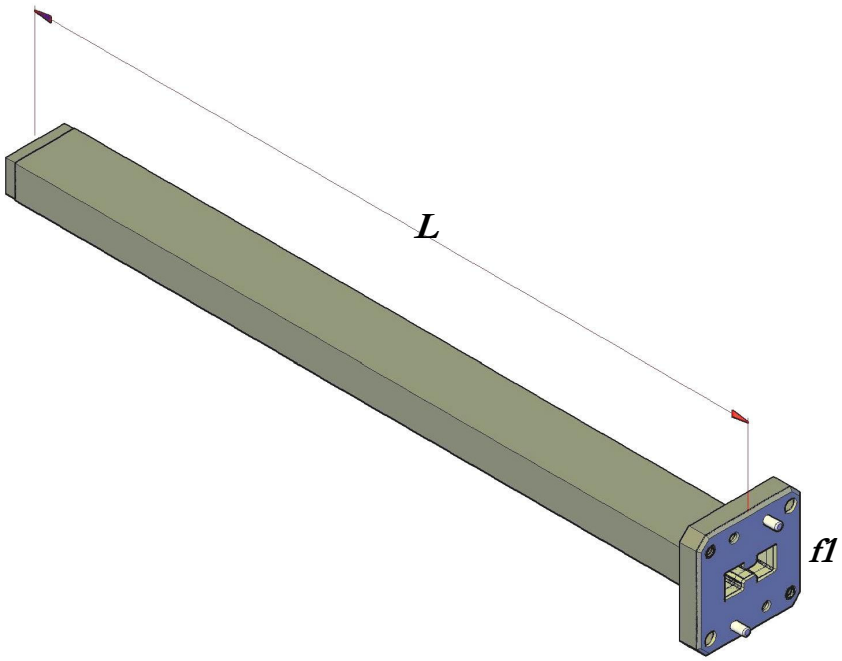
Space Machine & Engineering CORP.

Double Ridge Waveguide Low Power Termination



Model	WRD #	Frequency (GHz)	Avg. Power (W)	Length (L)
DTL180-	180	18.00 - 40.00	50	5.00
DTL110-	110	11.00 - 26.50	75	6.00
DTL750-	750	7.50 - 18.00	100	10.00
DTL650-	650	6.50 - 18.00	100	10.00
DTL580-	580	5.80 - 16.00	100	10.00

Model	WRD #	Frequency (GHz)	Avg. Power (W)	Length (L)
DTL500-	500	5.00 - 18.00	100	10.00
DTL475-	475	4.75 - 11.00	200	12.00
DTL350-	350	3.50 - 8.20	400	13.50
DTL250-	250	2.60 - 7.80	550	14.00
DTL200-	200	2.00 - 4.80	700	18.00

Space Machine offers a standard product line of low power double ridge terminations covering waveguide sizes WRD180 thru WRD200. VSWR is held to 1.15:1 maximum over the full waveguide band. Additional sizes and configurations are available upon request.

Ordering Information:

Double Ridge Termination, Low Power, WRD180, Aluminum, Cover Flange, Chromated, Paint Space Machine Gray.

	DTL	wrd	-m	f	-p	f
Example part number:	DTL	180	-A	01	-C	P

Series (DTL):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Flange (f): See Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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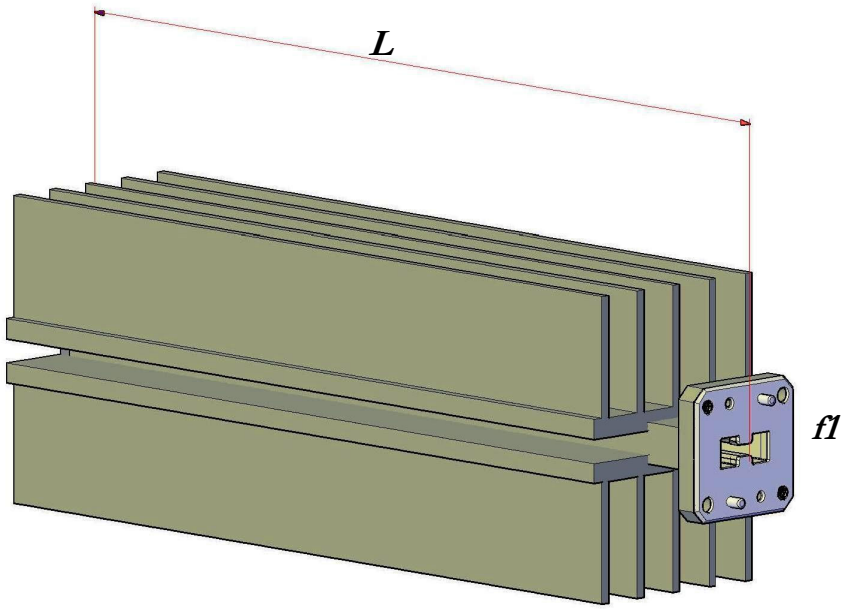
Double Ridge Waveguide High Power Termination



Model	WRD #	Frequency (GHz)	Avg. Power (W)	Length (L)
DTH180-	180	18.00 - 40.00	100	5.00
DTH110-	110	11.00 - 26.50	100	6.00
DTH750-	750	7.50 - 18.00	600	10.00
DTH650-	650	6.50 - 18.00	600	10.00
DTH580-	580	5.80 - 16.00	600	10.00

Model	WRD #	Frequency (GHz)	Avg. Power (W)	Length (L)
DTH500-	500	5.00 - 18.00	600	11.00
DTH475-	475	4.75 - 11.00	800	12.00
DTH350-	350	3.50 - 8.20	1000	13.50
DTH250-	250	2.60 - 7.80	1200	14.00
DTH200-	200	2.00 - 4.80	1300	18.00

Space Machine offers a standard product line of high power double ridge terminations covering waveguide sizes WRD180 thru WRD200. VSWR is held to 1.15:1 maximum over the full waveguide band. Additional sizes and configurations are available upon request.

Ordering Information:

Double Ridge Termination, High Power, WRD650, Aluminum, Cover Flange, Chromated, Paint Heat Resistant Flat Black.

	DTH	wrd	-m	f	-p	f
Example part number:	DTH	650	-A	01	-C	O

Series (DTH):

Waveguide Size (wrd): WRD180 thru WRD200

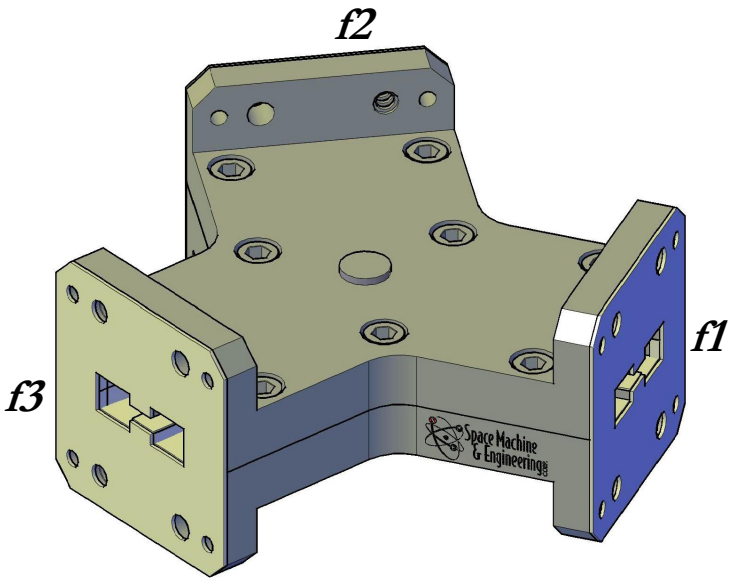
Material (-m): A – Aluminum

Flange (f): See Appendix H

Plating (-p): C – Chromate

Finish (f): N – None, O – Heat Resistant Flat Black

Double Ridge Waveguide Circulators



Model	WRD #	Frequency (GHz)	Isolation (dB)	Insertion Loss (dB) Max.	VSWR	Maximum Average Power (W)	Maximum Peak Power (KW)
DFC580	580	8.00 - 18.00	15	0.5	1.35:1	250	2
DFC650	650	8.00 - 18.00	15	0.5	1.45:1	250	2
DFC750	750	8.00 - 18.00	15	0.5	1.40:1	250	2

Space Machine & Engineering offers a standard product line of double ridge ferrite Circulators. These circulators are permanent magnet 3-port devices that use a Y-junction structure housed in standard double ridge waveguide. Greater isolation, better insertion loss and VSWR are achievable with reduced bandwidths. Please specify required bandwidth and pressurization requirements when ordering. Additional sizes and configurations are available upon request.

Ordering Information:

	DFC	wrd	-m	f1	f2	f3	-p	f
Example part number:	DFC	650	-A	01	01	01	-C	O

Double Ridge Circulator, WRD650, Aluminum, Cover Flanges, Chromated, Paint Heat Resistant Flat Black.

Series (DFC):

Waveguide Size (wrd): WRD580 thru WRD750

Material (-m): A – Aluminum

Flange (f1 f2 f3): See Appendix H

Plating (-p): C – Chromate

Finish (f): N – None, O – Heat Resistant Flat Black

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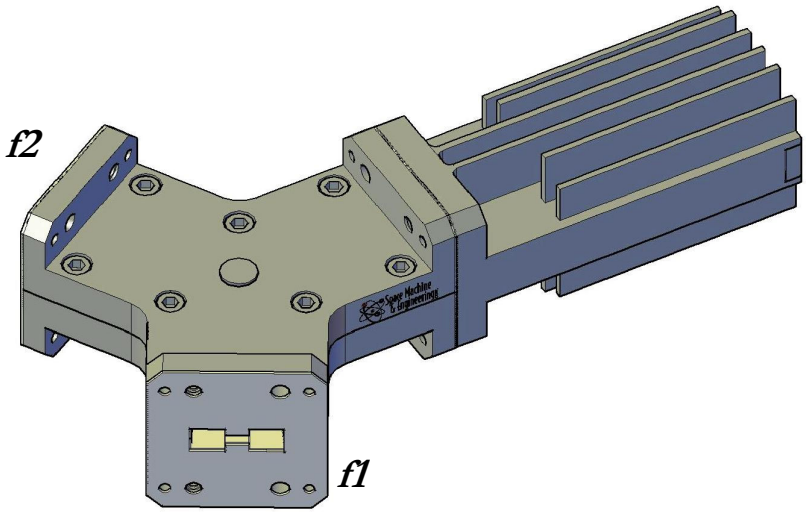
Double Ridge Waveguide Isolators



Model	WRD #	Frequency (GHz)	Isolation (dB)	Insertion Loss (dB) Max.	VSWR	Maximum Average Power (W)	Maximum Peak Power (KW)
DFI580	580	8.00 - 18.00	15	0.5	1.35:1	250	2
DFI650	650	8.00 - 18.00	15	0.5	1.45:1	250	2
DFI750	750	8.00 - 18.00	15	0.5	1.40:1	250	2

Space Machine & Engineering offers a standard product line of double ridge ferrite isolators. These isolators are permanent magnet 3 port devices that use a Y-junction structure housed in standard double ridge waveguide with one addition of a matched termination. Greater isolation, better insertion loss and VSWR are achievable with reduced bandwidths. Please specify required bandwidth and pressurization requirements when ordering. Additional sizes and configurations are available upon request.

Ordering Information:

Double Ridge Isolator,
WRD650, Aluminum, Cover Flanges,
Chromated, Paint Heat Resistant Flat Black.

Example part number:

DFI	wrd	-m	f1	f2	-p	f
DFI	650	-A	01	01	-C	O

Series (DFI):

Waveguide Size (wrd): WRD580 thru WRD750

Material (-m): A – Aluminum

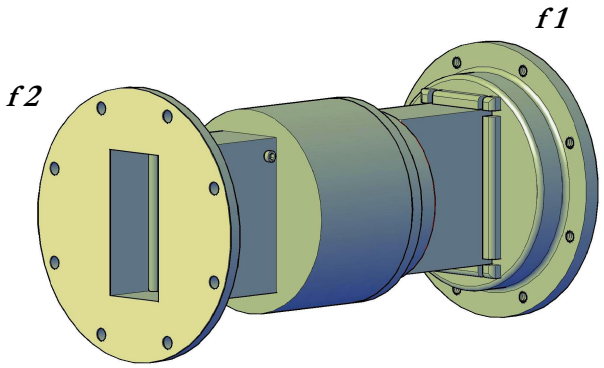
Flange (f1f2): See Appendix H

Plating (-p): C – Chromate

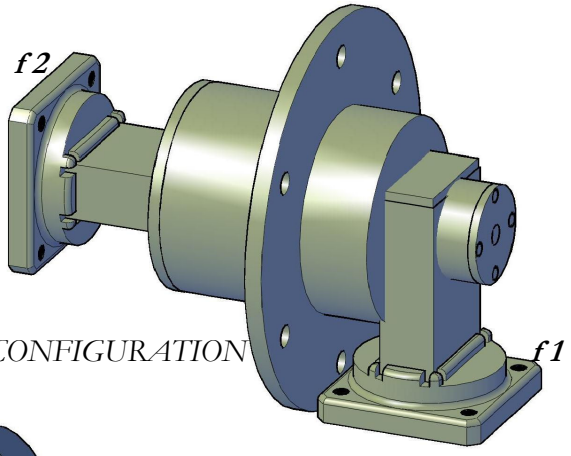
Finish (f): N – None, O – Heat Resistant Flat Black

Space Machine & Engineering CORP.

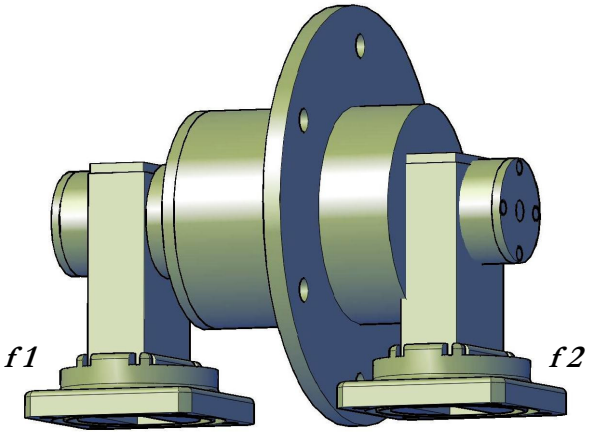
Single Channel Rectangular Waveguide Rotary Joints



I CONFIGURATION



L CONFIGURATION



U CONFIGURATION

Space Machine offers a standard product line of single channel waveguide rotary joints covering waveguide sizes WR28 thru WR430. Additional sizes and configurations are available upon request. VSWR is 1.15:1 and insertion loss is 0.15 dB typical over 25% of the waveguide band. Please specify pressure, power handling, frequency and dimensional requirements when ordering.

Ordering Information:

	WRJ	wr	-m	f1 f2	con	-p	f
Example part number:	WRJ	112	-B	01 02	I	-C	P

Waveguide Rotary Joint, WR112, Bronze, Cover / Choke Flanges, Configuration I, Chromated, Paint Space Machine Gray.

Series (WRJ):

Waveguide Size (wr): WR28 thru WR430

Flange Material (-m): A – Aluminum, B – Bronze, O – Other

Flange (f1 f2): See Appendix G

Configuration (con): I, L, U

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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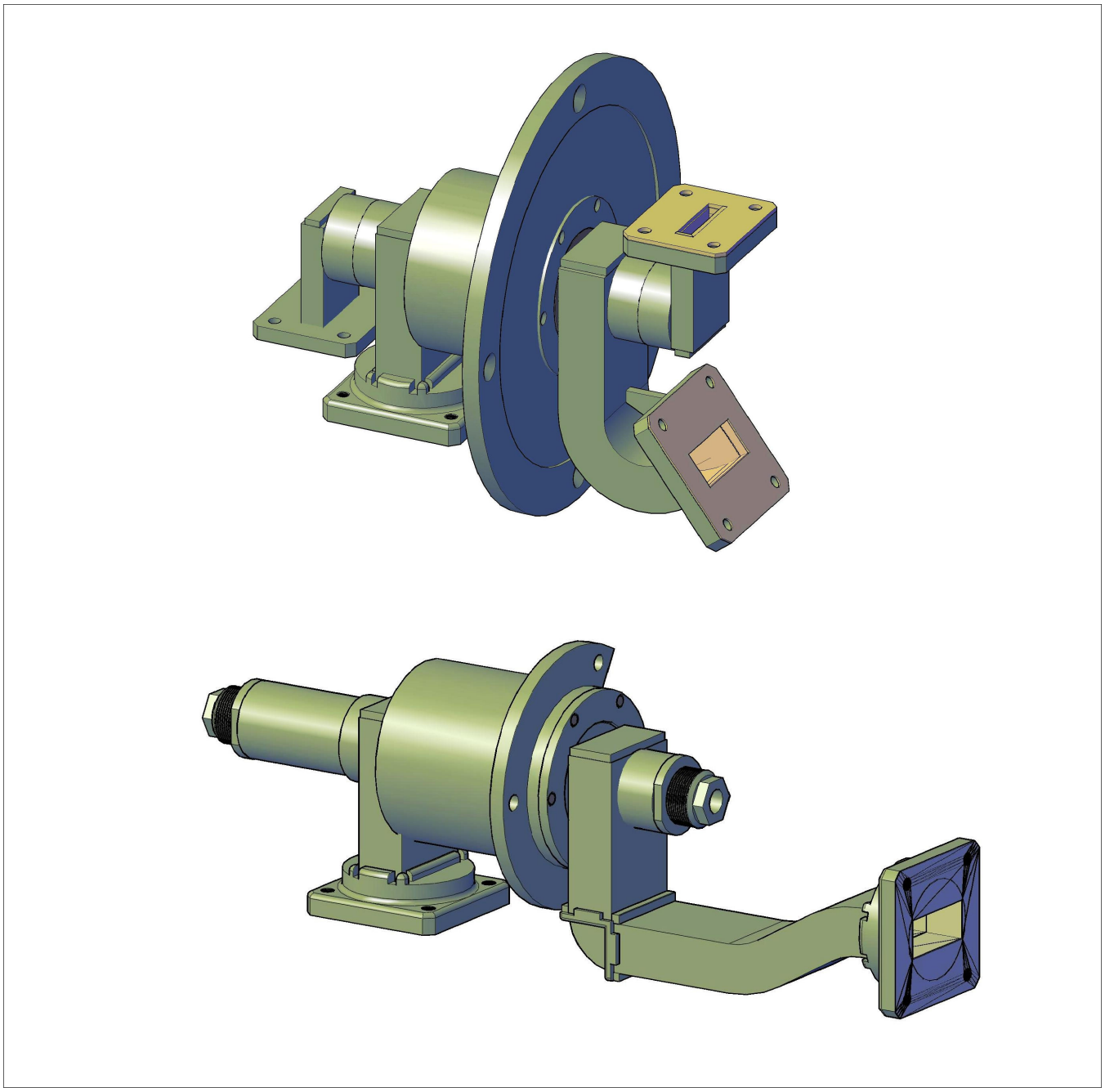
Dual Channel Rotary Joints



Space Machine offers a wide variety of dual channel rotary joints.
All of our dual channel rotary joints are custom built to customer specifications.
Most units cover 25% of the waveguide band with VSWR at 1.20:1 maximum, insertion loss at 0.2dB maximum and at least 50dB of isolation between channels. Please contact the company with your requirements.

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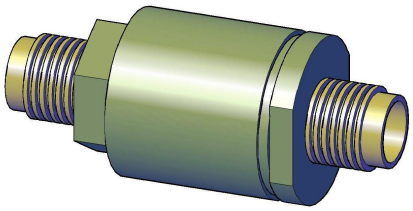
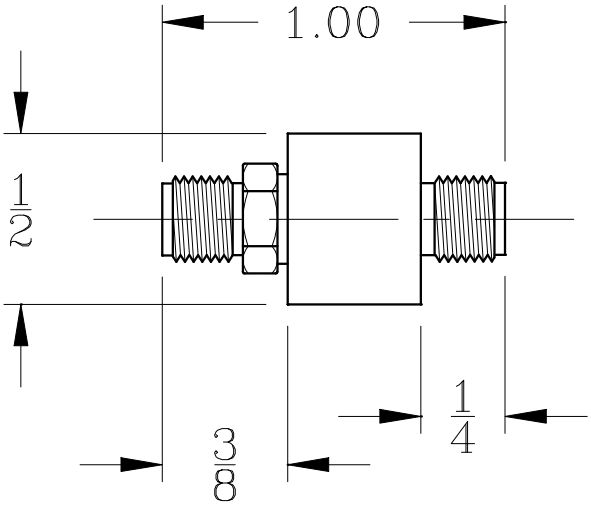
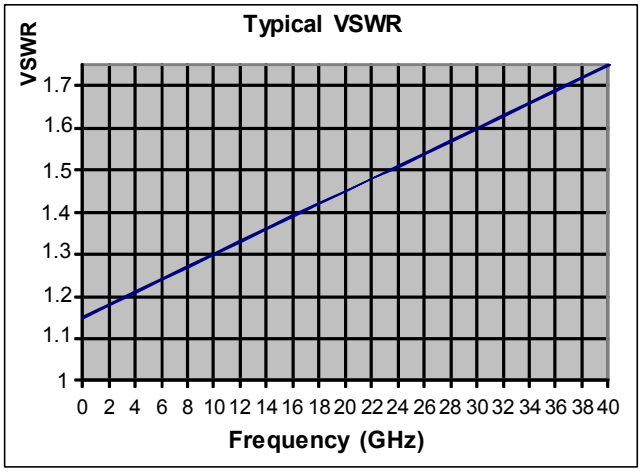
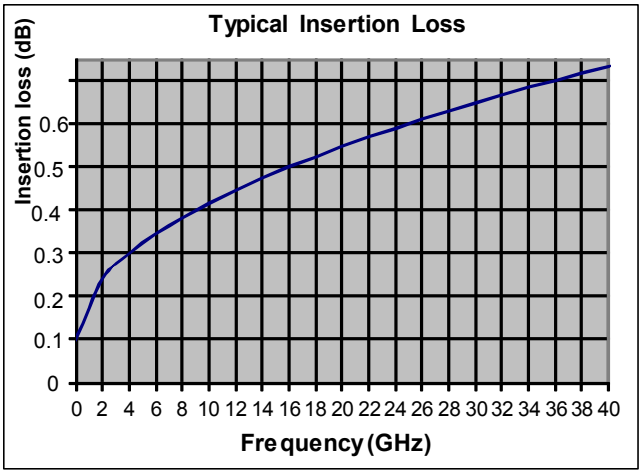
Space Machine & Engineering CORP.

K-Type Coaxial Rotary Joint









Space Machine custom fabricates K-Type coaxial rotary joints to meet your specific needs. Our rotary joints have a long life and are very durable. Please see graphs for typical insertion loss and VSWR plots. Frequency range is from DC to 40.0 GHz. Average power is calculated by 50/√(fGHz) W max. Peak power is 500 W max. Starting torque is 5 oz.-in.

Ordering Information:

	CRJ	-cnt	-cnt	-p	f
K-Type coaxial rotary joint, K-type female, K-type female, silver plated, Paint Space Machine Grey. **Example part number:**	CRJ	-KF	-KF	-S	P
Series (CRJ):					
Connector (-cnt): KF - Female K-Type, KM - Male K-Type					
Connector (-cnt): KF - Female K-Type, KM - Male K-Type					
Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None					
Finish (f): P – Paint Space Machine Gray, N – None, O – Other					

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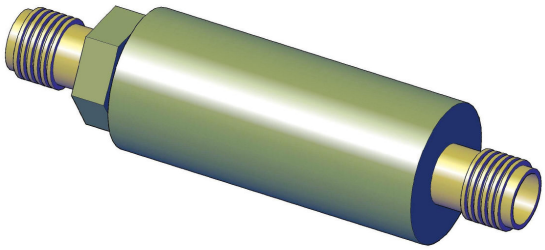
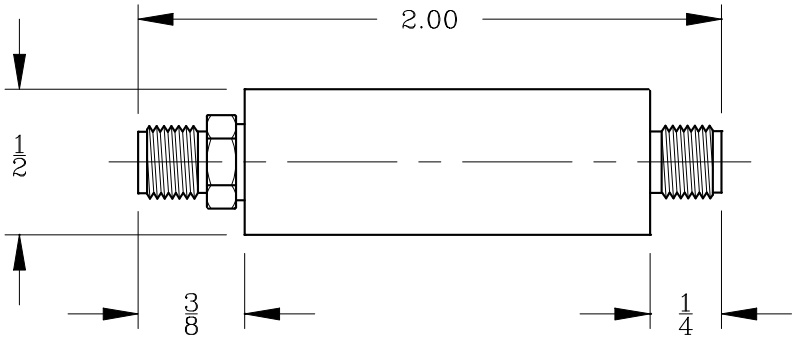
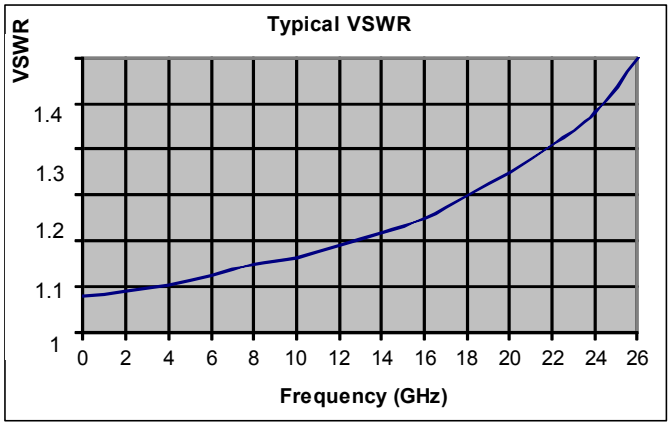
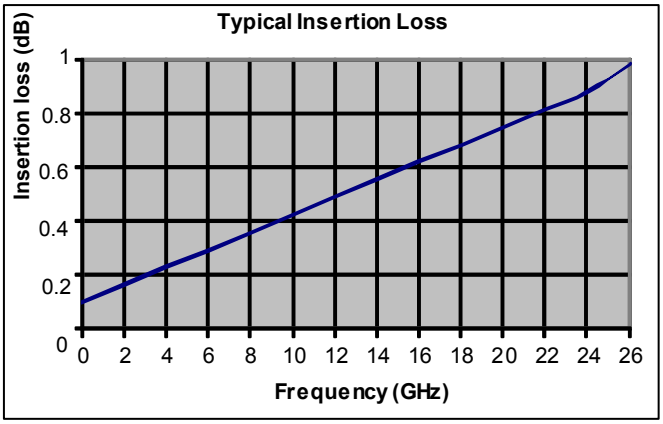
Space Machine & Engineering CORP.

SMA Coaxial Rotary Joint









Space Machine custom fabricates SMA coaxial rotary joints to meet your specific needs. Our rotary joints have a long life and are very durable. Please see graphs for typical insertion loss and VSWR plots. Frequency range is from DC to 26.5 GHz. Peak power is 5 kW @ 1GHz, 100 W average. Starting torque is 5 oz.-in.

Ordering Information:

	CRJ	-cnt	-cnt	-p	f
SMA coaxial rotary joint, SMA female, SMA female, silver plated, Paint Space Machine Grey. **Example part number:**	CRJ	-SF	-SF	-S	P

Series (CRJ):

Connector (-cnt): SF - Female SMA, SM - Male SMA

Connector (-cnt): SF - Female SMA, SM - Male SMA

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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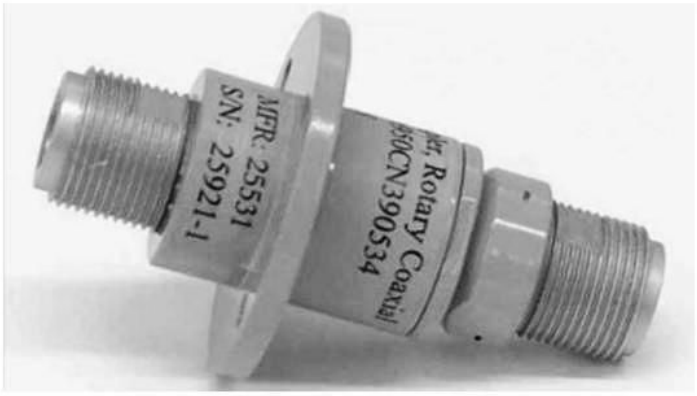
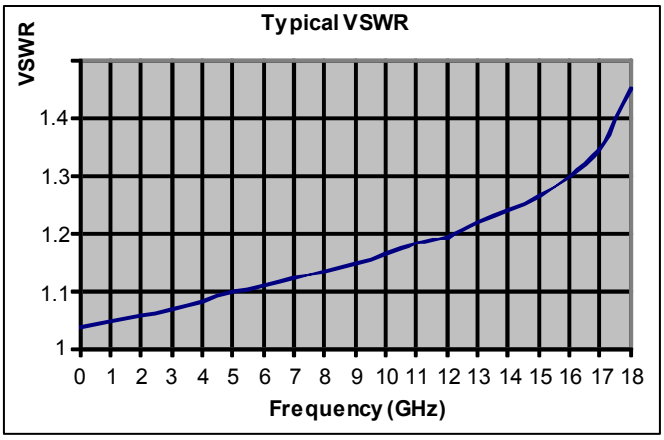
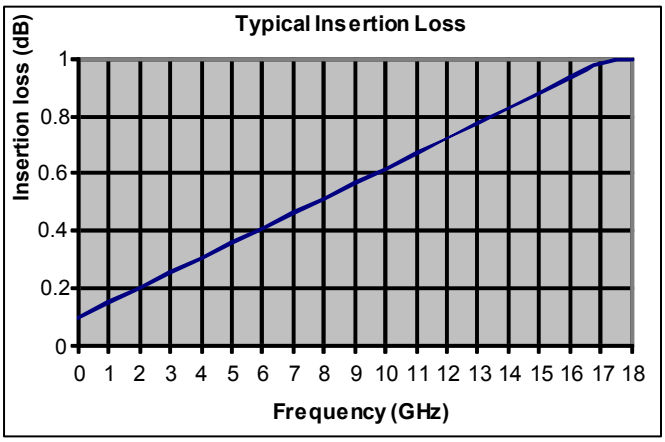
Space Machine & Engineering CORP.

Type N and TNC Coaxial Rotary Joint







Space Machine custom fabricates Type-N and TNC coaxial rotary joints to meet your specific needs. Our rotary joints have a long life and are very durable. Please see graphs for typical insertion loss and VSWR plots. Frequency range is from DC to 18.0 GHz. Peak power is 20 kW @ 1 GHz, 500 W average for Type-N rotary joint. Peak power is 6 kW @ 1 GHz, 100 W average for TNC. Starting torque is 8 oz.-in for both. See next page for standard dimensions.

Ordering Information:

	CRJ	-cnt	-cnt	-p	f
Type-N coaxial rotary joint, Type-N female, Type-N male, silver plated, Paint Space Machine Grey. **Example part number:**	CRJ	-NF	-NM	-S	P

Series (CRJ):

Connector (-cnt): NF - Type N Female, NM-Male N, TF - Female TNC, TM - Male TNC

Connector (-cnt): NF - Type N Female, NM - Male N, TF - Female TNC, TM - Male TNC

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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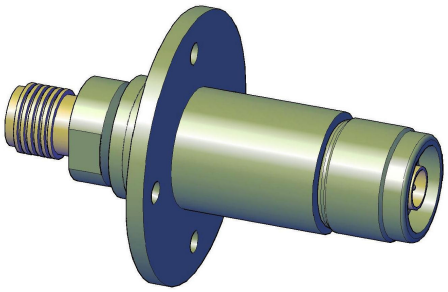
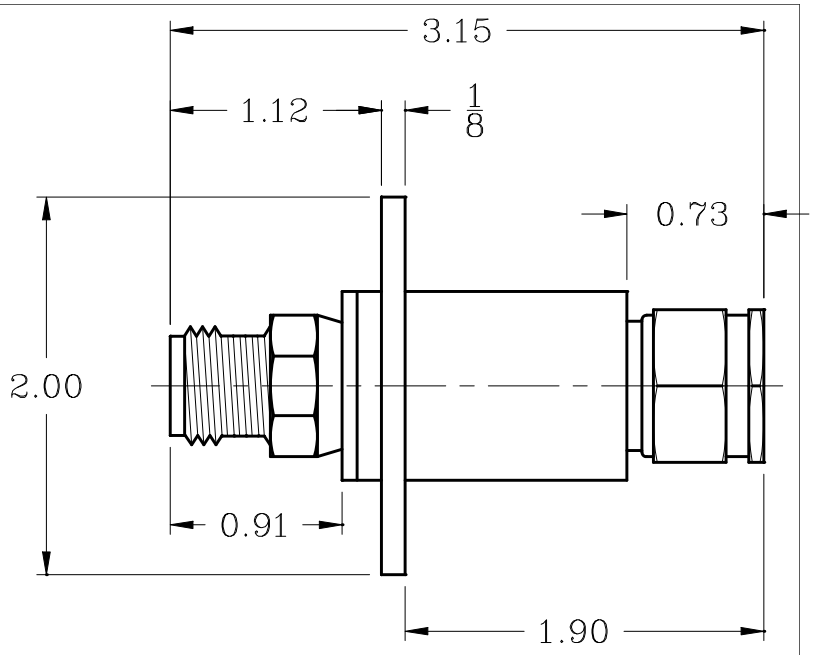
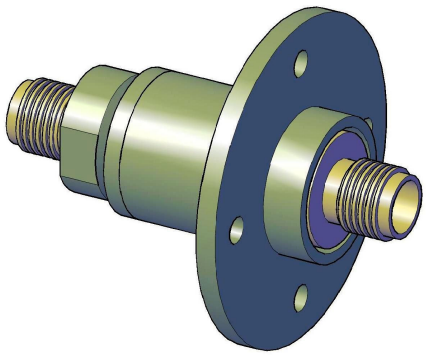
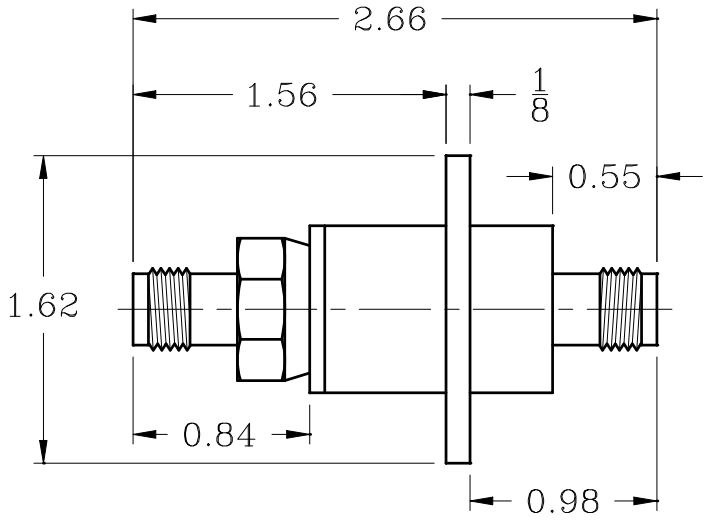
Type N and TNC Dimensions





Part Number: CRJ-NF-NM-pf





Part Number: CRJ-TF-TF-pf

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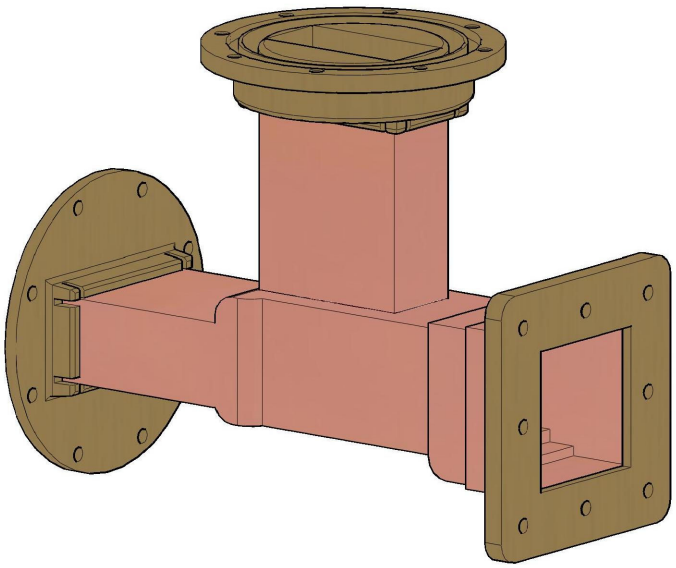
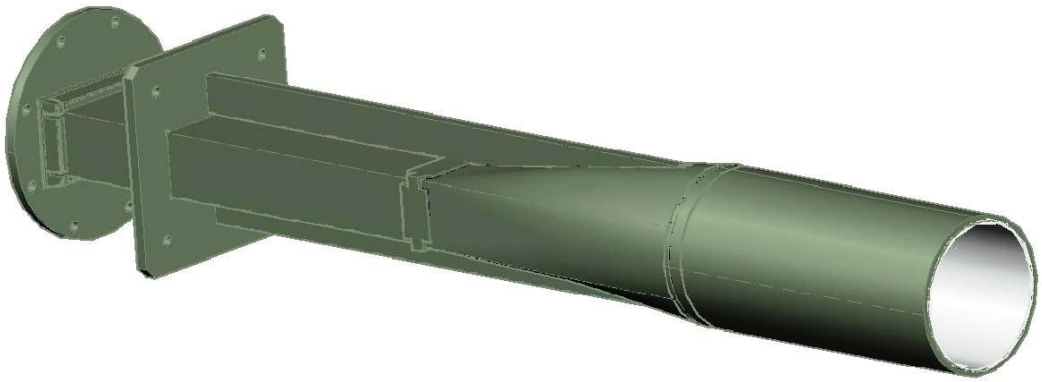
Custom Components





Space Machine offers a wide variety of custom waveguide components. From filters to orthomode transducers, to variable phase shifters, our engineering department utilizes the latest in CAD/CAM software to design your product from scratch and deliver it with uncompromising quality.
Please contact our engineering department with your requirements.

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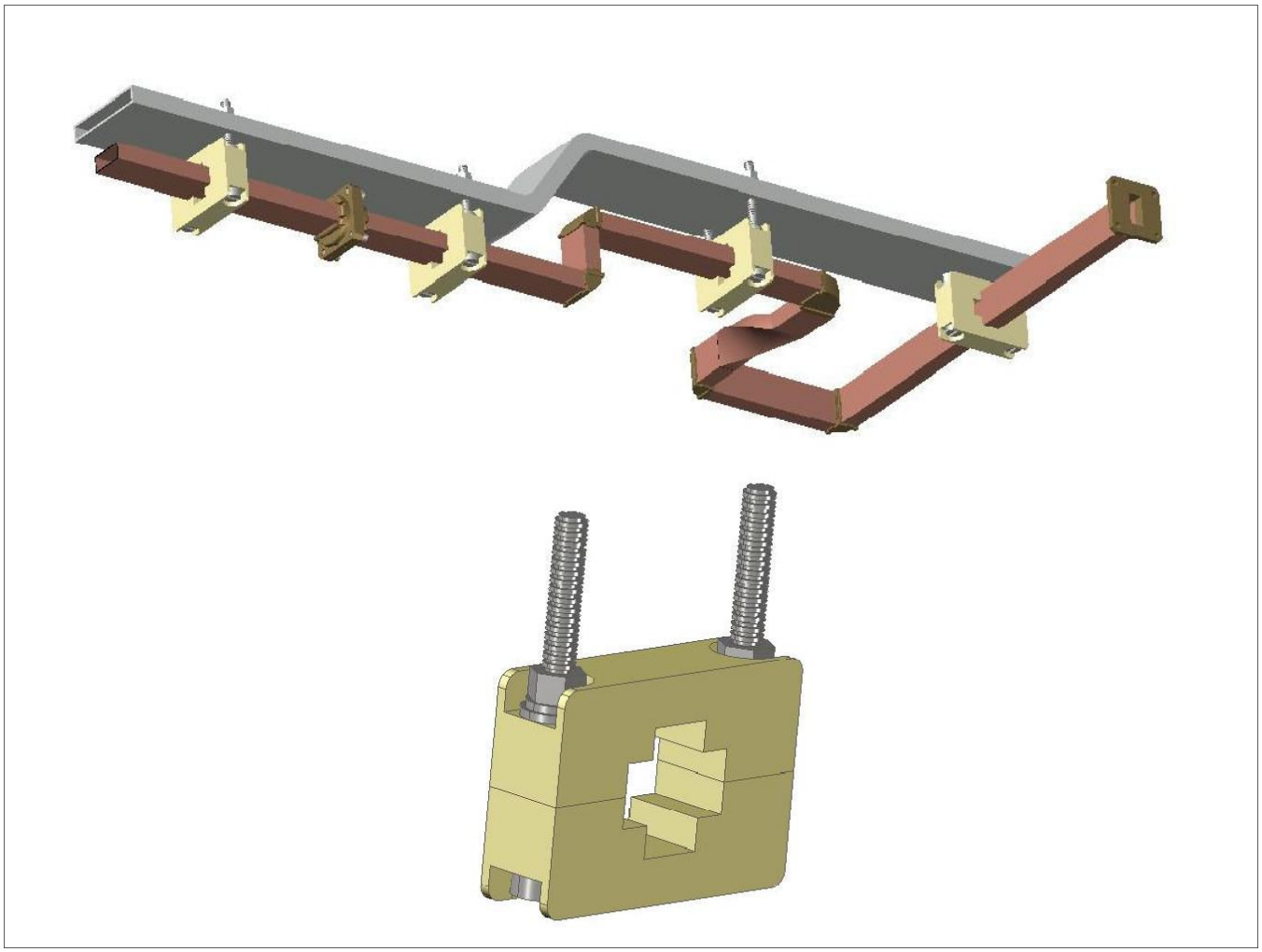
Waveguide Standoffs



Space Machine offers a standard product line of waveguide standoffs with hardware for all waveguide sizes. These waveguide clamps are used to hold waveguides in either "E" or "H" plane and furnished with stainless steel mounting hardware. Additional sizes, including Double Ridge Waveguides, are available upon request.

Ordering Information:

		WSO	wr
Waveguide Standoff, WR90 With Hardware	**Example part number:**	WSO	90

Series (WSO):

Waveguide Size (wr): WR28 - WR284

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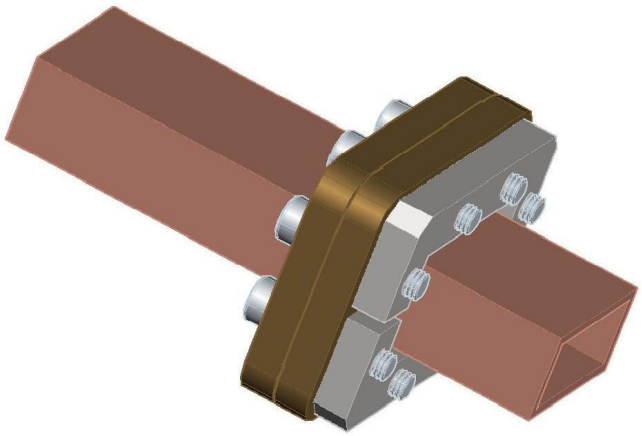
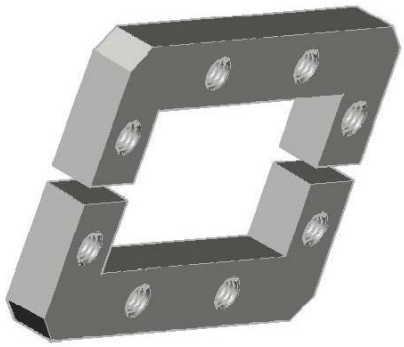
Waveguide Flange Nut Bracket



Waveguide and
Nut Bracket Assembly



Waveguide Flange Nut Bracket

For easy installation and removal of attached pieces, Space Machine offers a standard product line of Waveguide Flange Nut Brackets for CPR type Flanges from waveguide sizes WR75 thru WR975.
The standard Nut Bracket material is Stainless Steel.

Ordering Information:

		FNB	wr
Waveguide Flange Nut Bracket For WR112 CPR Flange	**Example part number:**	FNB	112

Series (FNB):

Waveguide Size (wr): WR75 thru WR975

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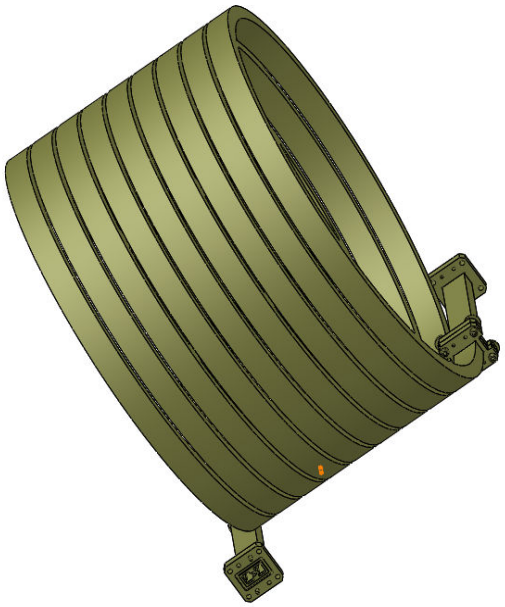
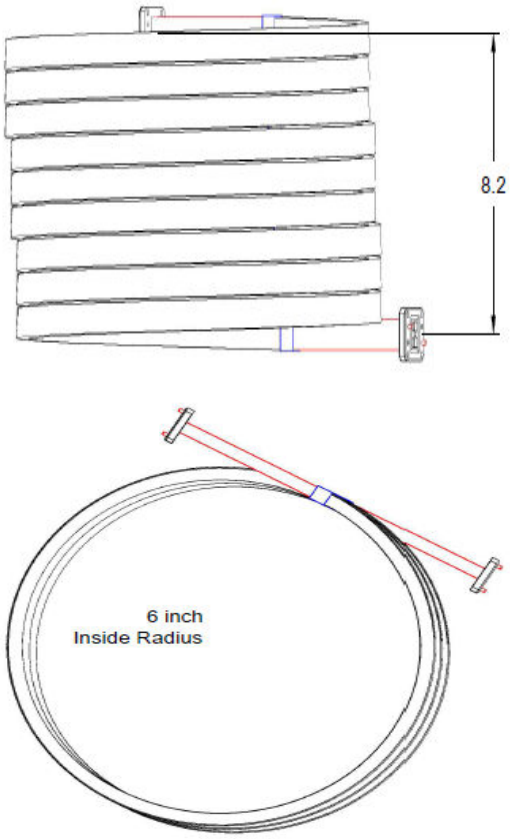
Space Machine & Engineering CORP.

Coiled Delay Line Assembly





Space Machine fabricates custom product line of coiled delay line assemblies covering rectangular and double ridge waveguides. Contact SME for additional information regarding configuration and electrical length.

Ordering Information:

	tCL	wr	-l	m	- f1 f2	-p	f
Double ridge coiled delay Line assembly, WRD750, 360" long , Aluminum, Cover Flanges, Chromate, Paint Space Machine Gray. **Example part number:**	DCL	750	-360	A	0101	C	P

Series (WCL): Rectangular waveguide
(DCL): Double ridge waveguide

Waveguide Size (wr): Please specify

Length (-l): (inches)

Material (m): A - Aluminum, B – Brass, O – Other

Flanges (f1 f2): See Appendix G

Plating (-p): C – Chromate, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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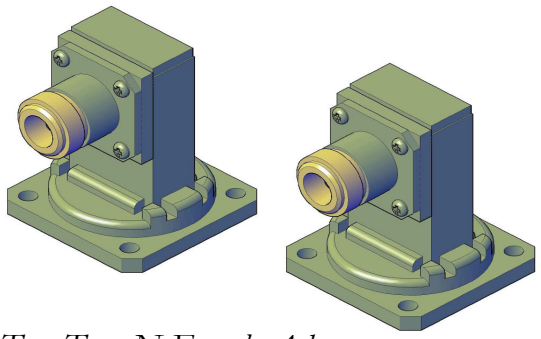
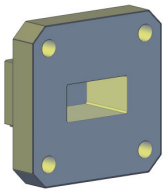
Space Machine & Engineering CORP.

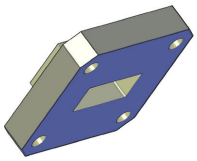
Waveguide Calibration Kit



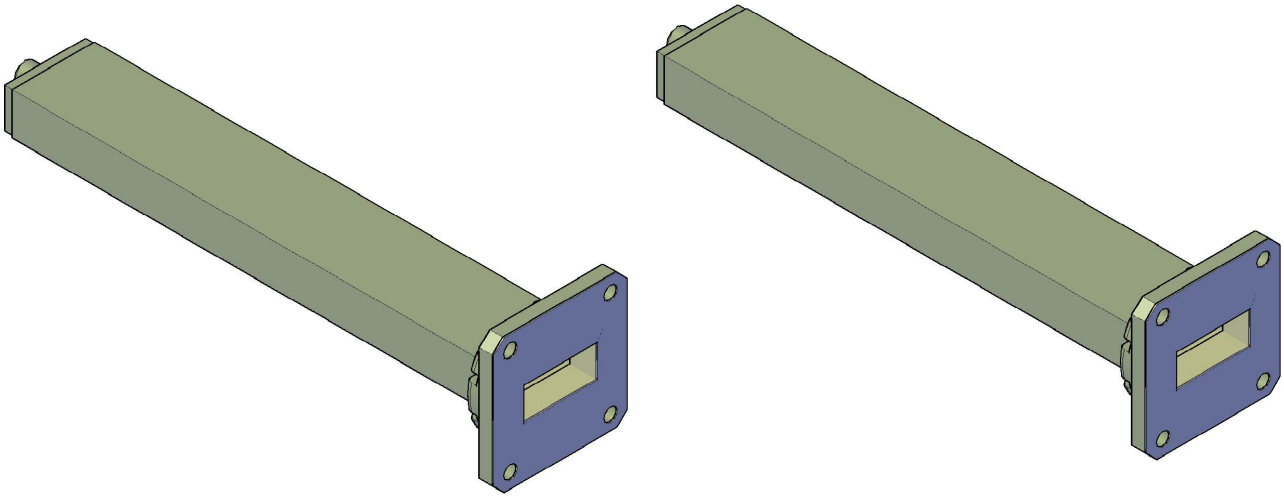
Two Type N Female Adapters



3/8 Offset Short



1/8 Offset Short



Two Precision Terminations

Space Machine offers a standard product line of waveguide calibration kits. The kit is available for rectangular waveguide sizes ranging from WR28 thru WR650. Standard kit includes: two precision tuned SMA female waveguide to coax adapters, two offset shorts (1/8 and 3/8 wavelength), and two precision terminations. Double ridge waveguide calibration kits are also available upon request.

Ordering Information:

		WCK	wr	-m	f	-p	f
Waveguide Calibration Kit, WR90	**Example part number:**	WCK	90	-A	01	C	P

Series (WCK):

Waveguide Size (wr): WR28 thru WR650

Material (-m): A-Aluminum, B-Bronze, C-OFHC Copper, O-Other

Flange (f): See Appendix G or Appendix H

Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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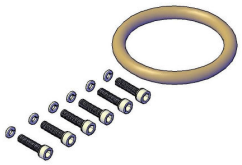
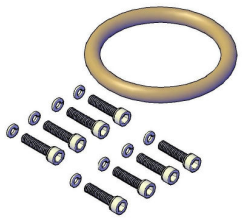
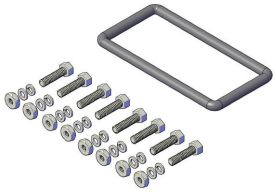
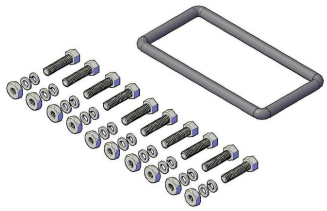
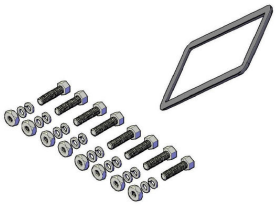
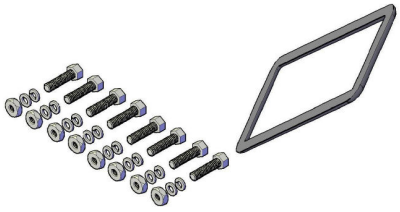
Space Machine & Engineering CORP.

Rectangular Waveguide Gasket Kit

Gasket Type

2 - CHOKE		
W.G. sizes WR28 THRU WR112	*W.G. size WR137*	*W.G. size WR187 and WR284*
		
4F – CPRG FULL GASKET		
W.G. sizes WR75, WR90 and WR137 THRU WR187	*W.G. sizes WR229 and WR284*	
		
4H – CPRG HALF GASKET		
W.G. sizes WR75, WR90 and WR137 THRU WR187	*W.G. sizes WR229 and WR284*	
		

Space Machine offers a standard product line of gasket kits available for all gasket types covering waveguide sizes WR28 thru WR650. Gasket Kit includes gaskets, screws, nuts and washers. Additional sizes and configurations are available upon request.

Ordering Information:

	WOR	wr	-g	KIT
Example part number:	WOR	90	-4F	KIT

Waveguide gasket kit, WR90
With CPRG Full Gasket for WR90 flange.

Series (WOR):

Waveguide Size (wr): WR28 thru WR650

Gasket Type (-g): 1 – EMI/RFI Gasket, 2 – Nonconductive Choke, 2C-Conductive Choke,
4F –Nonconductive CPRG Full Gasket, 4FC –Conductive CPRG Full Gasket,
4H – Nonconductive CPRG Half Gasket, 4HC– Conductive CPRG Half Gasket

KIT (KIT)

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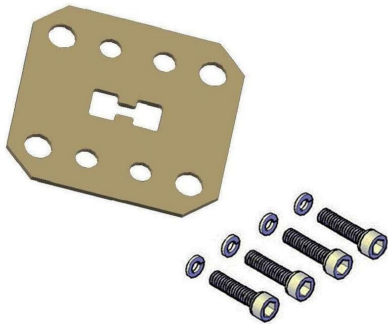
Double Ridge Waveguide Gasket Kit

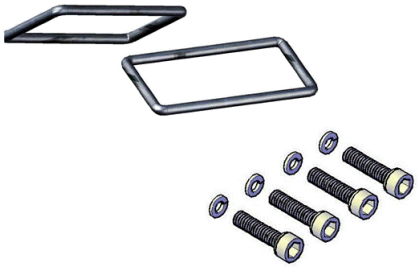
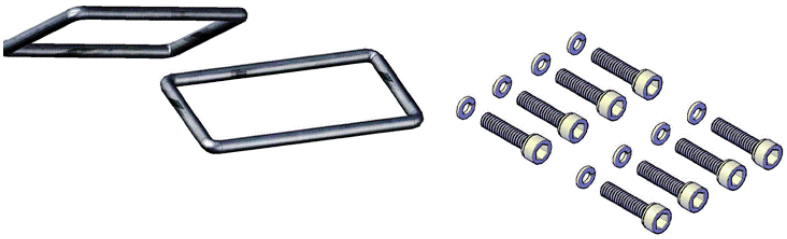
Gasket Type

1– EMI / RFI

Double Ridge W.G. size WRD200 thru WRD180



2 – MATING GASKET

Double Ridge W.G. size WRD180 thru WRD500	*Double Ridge W.G. size WRD200 thru WRD475*
	

Space Machine offers a standard product line of gasket kits available for all gasket types covering double ridge waveguide sizes WRD200 thru WRD180. Gasket Kit includes gaskets, screws, nuts and washers. Additional sizes and configurations are available upon request.

Ordering Information:

		DOR	wrd	-g	KIT
Double Ridge Waveguide gasket kit, WRD650, With EMI / RFI gasket for WRD650 flange.	**Example part number:**	DOR	650	-1	KIT

Series (DOR):

Waveguide Size (wrd): WRD180 thru WRD200

Gasket Type (-g): 1 – EMI/RFI, 2 – Nonconductive Mating, 2C - Conductive Mating Gasket

KIT (KIT)

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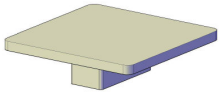
Space Machine & Engineering CORP.

Waveguide Covers

(CWR) Square Waveguide Covers (SQ)

TYPE 1

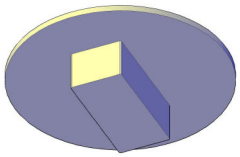
TYPE 2



(CWR) Round Waveguide Covers (RD)

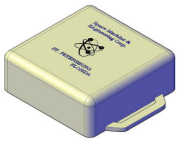
TYPE 1

TYPE 2

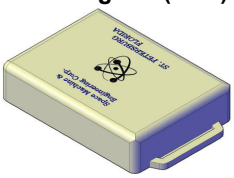


(CWRD) Double Ridge Waveguide Covers Wave-

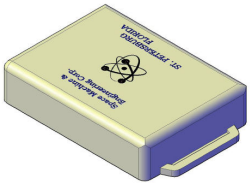
Square (SQ)

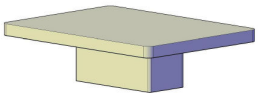


Rectangular (RCT)



(CWR) Rectangular Waveguide Covers (RCT)





Waveguide Cover

CWR	SQ		RCT		RD	
	Type 1	Type 2	Type 1	Type 2	Type 1	Type 2
CWR10	-	-	-	-	03	31
CWR12	-	-	-	-	03	31
CWR15	-	-	-	-	03	31
CWR19	-	-	-	-	03	31
CWR22	01	11	-	-	03	31
CWR28	01	11	-	-	03	31
CWR34	01	11	-	-	-	-
CWR42	01	11	-	-	-	-
CWR51	01	11	-	-	-	-
CWR62	01	11	-	-	-	-
CWR75	01	11	02	21	-	-
CWR90	01	11	02	21	-	-

Waveguide Cover

CWR	SQ		RCT		RD	
	Type 1	Type 2	Type 1	Type 2	Type 1	Type 2
CWR102	01	11	02	21	-	-
CWR112	01	11	02	21	-	-
CWR137	-	-	02	21	03	31
CWR159	-	-	02	21	03	31
CWR187	-	-	02	21	03	31
CWR229	-	-	02	21	-	-
CWR284	-	-	02	21	03	31
CWR340	-	-	02	21	-	-
CWR430	-	-	02	21	-	-
CWR510	-	-	02	21	-	-
CWR650	-	-	02	21	-	-

Waveguide Cover

CWRD	SQ	RCT
CWRD200	-	02
CWRD250	-	02
CWRD350	-	02
CWRD475	-	02
CWRD500	-	02
CWRD580	01	-
CWRD650	01	-
CWRD750	01	-
CWRD110	01	-
CWRD180	01	-

Space Machine offers Protective Plastic Waveguide Covers for product protection during shipping, packaging, or production processes. The Waveguide Covers are available for both rectangular waveguide flanges WR10 thru WR650 and double ridge waveguide flanges WRD200 thru WRD180. Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide Cover CWR112 for Square Waveguide Flange.

Example part number:

CWR (CWRD)	wr (wrd)	-s
CWR	112	-01

Series (CWR or CWRD):

Waveguide Size (wr or wrd):

Waveguide Cover Shape (-s): SQ Type 1 - 01; SQ Type 2 - 11;
RCT Type 1 - 02; RCT Type 2 - 21; RD Type1 - 03; RD Type 2 - 31

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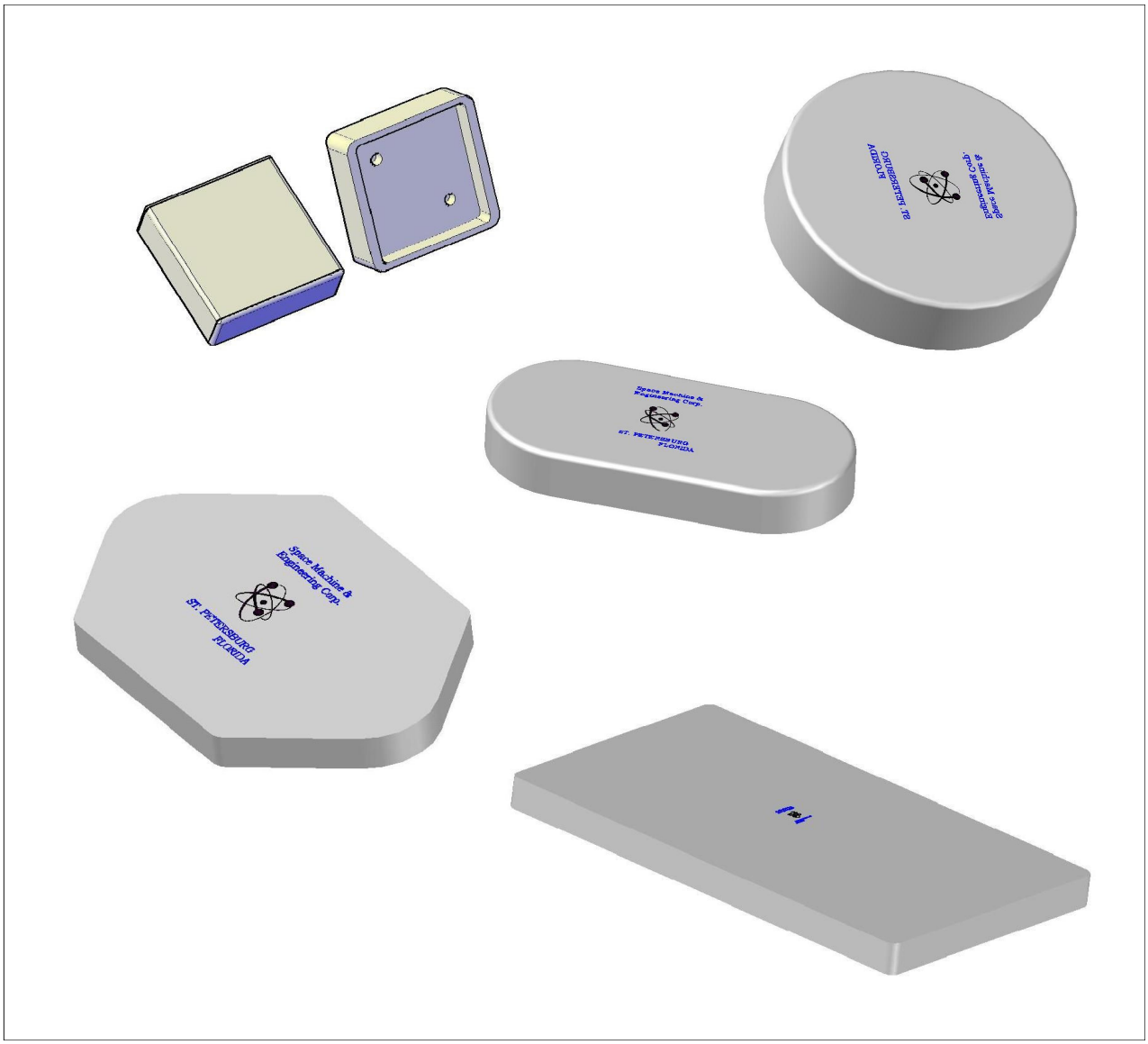
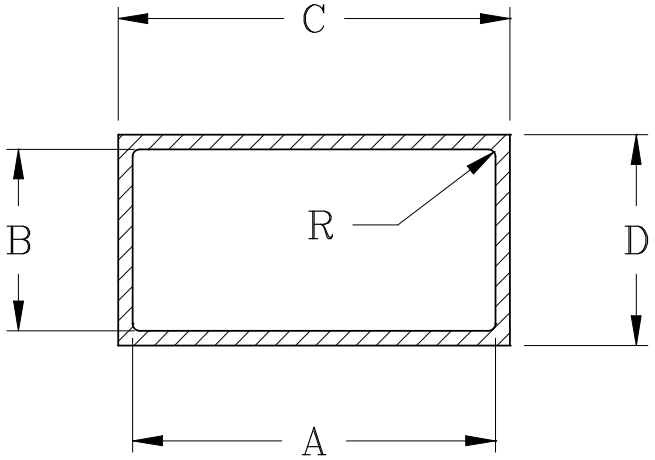
Custom Waveguide Covers



Space Machine offers Custom Plastic Waveguide Covers for nonstandard sizes and shapes to protect product during shipping, packaging, or production processes. Please contact the company with drawings, sketch or word description for a quotation.

Appendix A

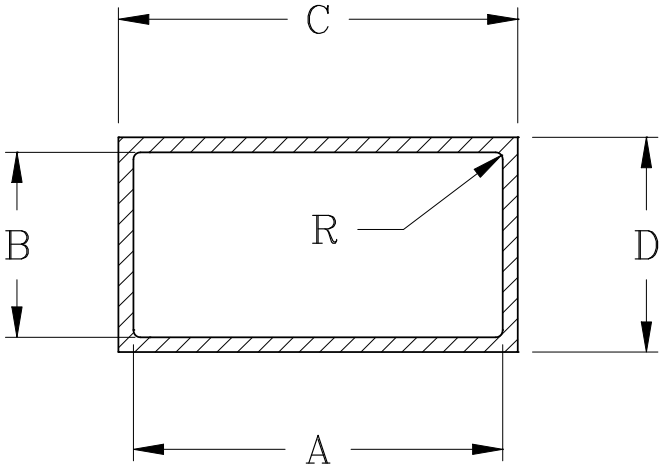
Rectangular Waveguide Physical Dimensions



WR	Band	A (in)	B (in)	Tolerance (+/-)	C (in)	D (in)	Tolerance (+/-)	Nom. Wall Thickness (in)	Max Inner Radius R
975	-	9.750	4.875	0.0100	10.000	5.125	0.010	0.125	0.063
770	-	7.700	3.850	0.0100	7.950	4.100	0.010	0.125	0.063
650	T	6.500	3.250	0.0080	6.660	3.410	0.008	0.080	0.047
510	-	5.100	2.550	0.0080	5.268	2.710	0.008	0.080	0.047
430	L	4.300	2.150	0.0080	4.460	2.310	0.008	0.080	0.047
340	F	3.400	1.700	0.0060	3.560	1.860	0.006	0.080	0.047
284	S	2.840	1.340	0.0060	3.000	1.500	0.006	0.080	0.047
284HW	S	2.840	1.340	0.0050	3.238	1.738	0.005	0.199	0.047
229	U	2.290	1.145	0.0060	2.418	1.273	0.006	0.064	0.031
187	G	1.872	0.872	0.0050	2.000	1.000	0.005	0.064	0.031
187HW	G	1.872	0.872	0.0050	2.172	1.172	0.005	0.150	0.031
159	D	1.590	0.795	0.0050	1.718	0.923	0.005	0.064	0.031
137	C	1.372	0.622	0.0040	1.500	0.750	0.004	0.064	0.031
137TW	C	1.372	0.622	0.0040	1.412	0.662	0.004	0.020	0.031
112	H	1.122	0.497	0.0040	1.250	0.625	0.004	0.064	0.031
112HW	H	1.122	0.497	0.0030	1.378	0.753	0.005	0.128	0.030
112TW	H	1.122	0.497	0.0030	1.162	0.537	0.005	0.020	0.030

2327 16TH AVENUE NORTH, ST. PETERSBURG, FLORIDA 33713 * PHONE (727) 323-2221 * FAX (727) 323-2376

Appendix A
Rectangular Waveguide Physical Dimensions



WR	Band	A (in)	B (in)	Tolerance (+/-)	C (in)	D (in)	Tolerance (+/-)	Nom. Wall Thickness (in)	Max Inner Radius R
102	-	1.020	0.510	0.0030	1.148	0.638	0.005	0.064	0.016
90	X	0.900	0.400	0.0040	1.000	0.500	0.004	0.050	0.031
90HW	X	0.900	0.400	0.0040	1.100	0.600	0.004	0.100	0.031
90TW	X	0.900	0.400	0.0040	0.940	0.440	0.004	0.020	0.031
75	M	0.750	0.375	0.0030	0.850	0.475	0.003	0.050	0.031
75TW	M	0.750	0.375	0.0030	0.790	0.415	0.003	0.020	0.031
62	Ku	0.622	0.311	0.0025	0.702	0.391	0.003	0.040	0.016
51	N	0.510	0.255	0.0025	0.590	0.335	0.003	0.040	0.016
42	K	0.420	0.170	0.0020	0.500	0.250	0.003	0.040	0.016
34	Ka	0.340	0.170	0.0020	0.420	0.250	0.003	0.040	0.016
28	Ka	0.280	0.140	0.0015	0.360	0.220	0.002	0.040	0.008
22	Q	0.224	0.112	0.0010	0.304	0.192	0.002	0.040	0.007
19	-	0.118	0.094	0.0010	0.268	0.174	0.002	0.040	0.006
15	-	0.148	0.074	0.0010	0.228	0.154	0.002	0.040	0.006
12	-	0.122	0.061	0.0010	0.202	0.141	0.002	0.040	0.006
10	-	0.100	0.050	0.0010	0.180	0.130	0.002	0.040	0.006

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Appendix B
Rectangular Waveguide Electrical Data

WR	M85/	RG-	Material	Frequency (GHz)	Cutoff TE10 (GHz)	Attenuation (Low-High) dB/100ft	Peak Power (Low-High) MW	CW Power (Low-High) KW
975	1-011 1-012 1-166	204/U - -	1100 6061 6063	0.750 – 1.120	0.605	0.147-0.098 0.173-0.115 0.159-0.106	93.81-133.7	231.2-346.9 196.4-295.4 213.6-320.5
770	1-013 1-014 1-167	205/U - -	1100 6061 6063	0.960 – 1.450	0.766	0.205-0.139 0.240-0.163 0.222-0.151	59.67-84.18	137.8-203.3 117.6-173.2 127.9-187.0
650	1-015 1-017 1-018 1-019 1-168	- 69/U 103/U - -	OF-DLP Cu Alloy 1100 6061 6063	1.120 – 1.700	0.908	0.213-0.141 0.316-0.209 0.273-0.180 0.320-0.212 0.295-0.195	41.34-59.74	114.8-173.6 80.53-121.8 88.45-135.7 76.26-115.1 82.72-125.1
510	1-021 1-023 1-025 1-026 1-169	- 337/U 338/U - -	OF-DLP Cu Alloy 1100 6061 6063	1.450 – 2.200	1.154	0.296-0.201 0.440-0.299 0.380-0.258 0.446-0.303 0.411-0.279	26.19-37.00	68.22-100.4 47.87-70.44 53.19-78.34 45.29-66.67 49.14-72.39
430	1-027 1-029 1-030 1-031 1-170	- 105/U - 104/U -	OF-DLP 1100 6061 Cu Alloy 6063	1.700 – 2.600	1.375	0.393-0.261 0.502-0.334 0.509-0.392 0.583-0.387 0.544-0.361	18.23-26.26	45.14-68.00 35.30-53.05 30.03-45.20 31.67-41.71 32.57-49.08
340	1-033 1-035 1-036 1-037 1.171	- 113/U - 112/U -	OF-DLP 1100 6061 Cu Alloy 6063	2.200 – 3.300	1.737	0.533-0.371 0.682-0.474 0.801-0.557 0.791-0.550 0.739-0.514	11.87-16.44	27.82-40.00 21.73-31.26 18.50-26.60 19.52-28.07 20.05-28.83
284	1-039 1-041 1-042 1-043 1-172	- 75/U - 48/U -	OF-DLP 1100 6061 Cu Alloy 6063	2.600 – 3.950	2.080	0.742-0.508 0.950-0.651 1.116-0.764 1.102-0.754 1.029-0.704	7.645-10.85	17.19-25.11 13.42-19.59 11.42-16.69 12.06-17.62 12.39-18.12
284HW	2-001 2-002 2-004	375/U - -	1100 6061 6063	2.600-3.950	2.080	0.950-0.651 1.116-0.764 1.028-0.705	7.645-10.85	14.56-21.25 12.39-18.08 13.48-19.63

Appendix B
Rectangular Waveguide Electrical Data

WR	M85/	RG-	Material	Frequency (GHz)	Cutoff TE10 (GHz)	Attenuation (Low-High) dB/100ft	Peak Power (Low-High) MW	CW Power (Low-High) KW
229	1-045 1-047 1-048 1-049 1-173	- 341/U - 340/U -	OF-DLP 1100 6061 Cu Alloy 6063	3.300 – 4.900	2.577	0.946-0.671 1.211-0.858 1.422-1.009 1.404-0.996 1.311-0.930	5.475-7.549	11.52-16.23 8.993-12.69 7.659-10.79 8.083-11.39 8.307-11.71
187	1-051 1-053 1-054 1-055 1-174	- 95/U - 49/U -	OF-DLP 1100 6061 Cu Alloy 6063	3.950 – 5.850	3.155	1.395-0.967 1.785-1.238 2.097-1.454 2.071-1.436 1.934-1.341	3.296-4.697	6.612-9.354 5.165-7.446 4.397-6.340 4.369-6.690 4.767-6.874
187HW	2-003 2-006 2-005	- - -	1100 6063 OF-DLP	3.950 – 5.850	3.155	1.785-1.238 1.933-1.340 1.399-0.970	3.296-4.697	5.673-8.127 5.206-7.506 6.961-10.05
159	1-057 1-059 1-060 1-061 1-175	- 344/U - 343/U -	OF-DLP 1100 6061 Cu Alloy 6063	4.900 – 7.050	3.705	1.533-1.160 1.988-1.485 2.334-1.744 2.305-1.722 2.152-1.608	2.792-3.719	5.374-7.193 4.196-5.617 3.574-4.783 3.771-5.047 3.876-5.187
137	1-063 1-065 1-066 1-067 1-176	- 106/U - 50/U -	OF-DLP 1100 6061 Cu Alloy 6063	5.850 – 8.200	4.285	1.978-1.562 5.320-1.999 4.148-2.348 2.936-2.319 3.824-2.164	1.975-2.531	3.708-4.695 2.076-3.667 1.768-3.122 2.602-3.294 1.917-3.387
137TW	-	-	6061	5.850 – 8.200	4.285	4.148-2.348	1.975-2.531	1.768-3.122
112	1-069 1-071 1-072 1-073 1-177	- 68/U - 51/U -	OF-DLP 1100 6061 Cu Alloy 6063	7.050 – 10.00	5.260	2.776-2.154 3.548-2.756 4.166-3.238 4.144-3.197 3.841-2.985	1.284-1.702	2.290-2.946 1.788-2.301 1.523-1.958 1.607-2.067 1.652-2.124
112HW	2-007	-	OF-DLP	7.050 – 10.00	5.260	2.779-2.159	1.284-1.702	2.382-3.066
112TW	-	-	6061	7.050 – 10.00	5.260	4.166-3.238	1.284-1.702	1.523-1.958

Appendix B
Rectangular Waveguide Electrical Data

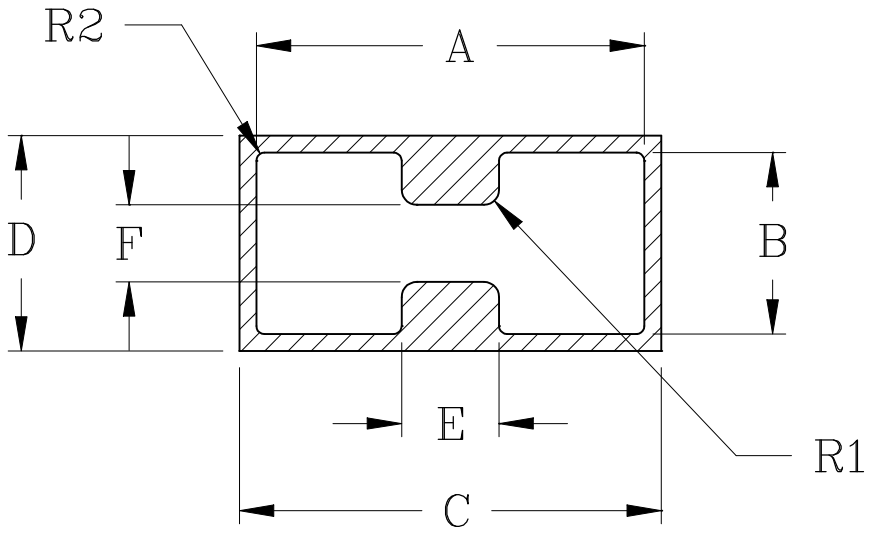
WR	M85/	RG-	Material	Frequency (GHz)	Cutoff TE10 (GHz)	Attenuation (Low-High) dB/100ft	Peak Power (Low-High) MW	CW Power (Low-High) KW
102	1-155 1-156 1-157 1-158 1-160	320/U - - - -	Cu Alloy OF-DLP 1100 6061 6063	7.000 – 11.000	5.780	5.219-3.291 3.516-2.217 4.500-2.838 5.285-3.333 4.874-3.073	1.017-1.534	1.220-1.935 1.725-2.735 1.358-2.154 1.156-1.834 1.254-1.989
90	1-075 1-077 1-078 1-079 1-178	- 67/U - 52/U -	OF-DLP 1100 6061 Cu Alloy 6063	8.200 – 12.40	6.560	4.328-2.995 5.540-3.883 6.506-4.502 6.424-4.445 5.998-4.150	0.758-1.124	1.229-1.776 0.959-1.386 0.817-1.180 0.862-1.246 0.886-1.280
90HW	2-008 2-009	- -	OF-DLP OF-DLP	8.200 – 12.40	6.560	4.339-3.003 4.339-3.003	0.758-1.124	3.314-4.788 3.314-4.788
90TW	-	-	6061	8.200 – 12.40	6.560	6.506-4.502	0.758-1.124	0.817-1.180
75	1-081 1-083 1-084 1-085 1-179	- 347/U - 346/U -	OF-DLP 1100 6061 Cu Alloy 6063	10.00 – 15.00	7.847	5.121-3.577 6.554-4.578 7.698-5.377 7.601-5.309 7.097-4.957	0.622-0.903	0.944-1.351 0.737-1.055 0.627-0.898 0.662-0.948 0.680-0.947
75TW	-	-	6061	10.00 – 15.00	7.847	7.698-5.377	0.622-0.903	0.627-0.898
62	1-087 1-089 1-090 1-091 1-093 1-180	- 91/U 349/U - 107/U -	OF-DLP Cu Alloy 1100 6061 Ag 6063	12.40 – 18.00	9.490	6.451-4.743 9.578-7.041 8.259-6.071 9.700-7.131 6.910-5.079 8.943-6.574	0.457-0.633	0.643-0.875 0.451-0.614 0.502-0.683 0.428-0.582 0.602-0.818 0.464-0.631
51	1-094 1-096 1-097 1-098 1-181	352/U 353/U 351/U - -	OF-DLP Cu Alloy 1100 6061 6063	15.00 – 22.00	11.54	8.812-6.384 13.08-9.477 11.27-8.172 13.25-9.598 12.21-8.849	0.312-0.433	0.413-0.570 0.290-0.400 0.323-0.445 0.275-0.379 0.298-0.411

Appendix B
Rectangular Waveguide Electrical Data

WR	M85/	RG-	Material	Frequency (GHz)	Cutoff TE10 (GHz)	Attenuation (Low-High) dB/100ft	Peak Power (Low-High) MW	CW Power (Low-High) KW
42	1-100 1-102 1-103 1-104 1-106 1-182	- 53/U 121/U - 66/U -	OF-DLP Cu Alloy 1100 6061 Ag 6063	18.00 – 26.50	14.08	13.80-10.13 20.48-15.04 17.66-12.97 20.74-15.23 14.77-10.85 19.12-14.04	0.171-0.246	0.223-0.304 0.157-0.213 0.174-0.237 0.148-0.202 0.209-0.284 0.161-0.219
34	1-107 1-109 1-110 1-111 1-113 1-183	- 354/U 355/U - 357/U -	OF-DLP Cu Alloy 1100 6061 Ag&Cu Alloy 6063	22.00 – 33.00	17.28	16.86-11.73 25.03-17.41 21.58-15.01 25.35-17.63 16.18-11.25 23.37-16.26	0.139-0.209	0.168-0.241 0.118-0.169 0.131-0.188 0.111-0.160 0.175-0.252 0.121-0.174
28	3-006 3-007 3-008 3-009	96/U - 271/U -	Ag OF-DLP Ag&Cu Alloy 6061	26.50 – 40.00	21.10	24.55-16.80 23.02-15.77 21.99-15.06 34.46-23.59	96.0-146.0 KW	103.1-150.1 109.7-160.1 115.1-168.0 73.27-107.0
22	3-010 3-011 3-012 3-013	97/U - 272/U -	Ag OF-DLP Ag&Cu Alloy 6061	33.00 – 50.00	26.35	34.57-23.50 32.44-22.05 30.98-21.06 48.53-32.99	64.4-97.0 KW	64.73-95.30 68.89-101.4 72.29-106.3 46.05-67.74
19	3-014 3-015 3-016	- - 358/U	Ag OF-DLP Ag&Cu Alloy	40.00 – 60.00	30.69	42.39-30.46 39.81-28.60 38.02-27.32	48.0-70.0 KW	43.30-67.21 51.32-71.43 53.85-74.94
15	3-017 3-018 3-019	98/U - 273/U	Ag OF-DLP Ag&Cu Alloy	50.00 – 75.00	39.90	64.23-43.89 60.25-41.17 57.55-39.32	30.0-40.0 KW	28.46-41.44 30.27-44.30 32.76-46.49
12	3-020 3-021 3-022	99/U - 274/U	Ag OF-DLP Ag&Cu Alloy	60.00 – 90.00	48.40	87.89-58.86 82.37-55.22 78.67-52.74	20.0-30.0 KW	19.15-28.56 20.37-30.38 21.37-31.88
10	3-023 3-024 3-025	- - 359/U	Ag OF-DLP Ag&Cu Alloy	75.00 – 110.00	58.85	112.5-79.26 105.6-74.37 100.9-71.03	14.0-20.0 KW	13.82-19.63 14.73-20.86 15.40-21.88

Appendix C

Double Ridge Waveguide Physical Dimensions



WRD	A	B	C	D	E	F	R1	R2
200D24	2.590	1.205	2.750	1.365	0.648	0.512	0.102	0.050
250D30	1.655	0.715	2.000	1.000	0.440	0.150	0.092	0.020
350D24	1.480	0.688	1.608	0.816	0.370	0.292	0.058	0.030
475D24	1.090	0.506	1.190	0.606	0.272	0.215	0.043	0.030
500D36	0.752	0.323	0.852	0.423	0.188	0.063	0.013	0.015
580D28	0.780	0.370	0.880	0.470	0.200	0.120	0.043	0.015
650D28	0.720	0.321	0.820	0.421	0.173	0.101	0.022	0.020
750D24	0.691	0.321	0.791	0.421	0.173	0.136	0.027	0.020
110C24	0.471	0.219	0.551	0.299	0.118	0.093	0.019	0.015
180C24	0.288	0.134	0.368	0.214	0.072	0.057	0.011	0.015

All dimensions are in inches.

Appendix D
Double Ridge Waveguide Electrical Data

WRD	Mil-W-23351	Material	Frequency TE10 Mode (GHz)	Cutoff TE10 (GHz)	Attenuation dB/ft	Peak Power KW	CW Power KW
200D24	4-025 4-026 4-027 4-028	Aluminum Brass Copper Silver	2.00 – 4.80	1.614	0.0134 0.0132 0.0089 0.0095	470	49.0
250D30		Aluminum Brass Copper Silver	2.60 – 7.80	1.985	0.025 0.025 0.018 0.018	120	24.0
350D24	4-029 4-030 4-031 4-032	Aluminum Brass Copper Silver	3.50 – 8.20	2.895	0.0307 0.0303 0.0204 0.0218	150	18.0
475D24	4-033 4-034 4-035 4-036	Aluminum Brass Copper Silver	4.75 – 11.00	3.934	0.0487 0.0481 0.0324 0.0347	85	8.0
500D36	2-025 2-026 2-027 2-028	Aluminum Brass Copper Silver	5.00 – 18.00	4.391	0.146 0.141 0.095 0.102	15	4.0
580D28		Aluminum Brass Copper Silver	5.80 – 16.00	5.096	0.100 0.098 0.067 0.070	32	5.2
650D28		Aluminum Brass Copper Silver	6.50 – 18.00	5.567	0.106 0.105 0.070 0.076	25	4.0
750D24	4-037 4-038 4-039 4-040	Aluminum Brass Copper Silver	7.50 – 18.00	6.195	0.0964 0.0951 0.0641 0.0686	35	4.8
110C24	4-041 4-042 4-043 4-044	Aluminum Brass Copper Silver	11.00 – 26.50	9.092	0.171 0.169 0.114 0.122	15	1.4
180C24	4-045 4-046 4-047 4-048	Aluminum Brass Copper Silver	18.00 – 40.00	14.88	0.358 0.353 0.238 0.255	5	0.8

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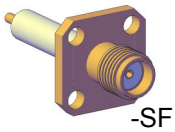
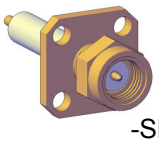
Appendix E
Connector Options

Space Machine offers a wide variety of connector options. Our standard options are listed and described below. Other options such as 3.5mm, 7/16 DIN, E.I.A. varieties and HN are available upon request. All of the connectors we offer are manufactured IAW Mil-PRF-39012 where applicable. Graphs illustrating the maximum power capacity are on the following pages.



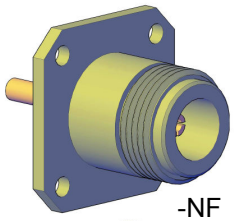
-SF



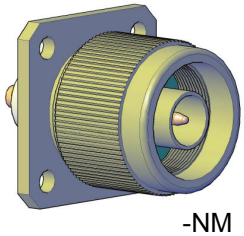
-SM

SMA

This is one of the most popular and least expensive types of microwave connectors. It has an upper frequency limit of 26.5 GHz making it usable on waveguides down to WR42, WRD650 and 750. Due to it's small size, it's generally not recommended on waveguide sizes larger than WR650. Straight configurations as shown are standard, other options such as right angle and with a two hole pattern flange are available upon request. Generally, SMA connectors will hold pressures of approximately 20 PSIG with only a slight amount of leakage around the center pin and dielectric. However, Space Machine does offer a hermetic version where absolute pressurization is a necessity.
SMA connectors are compatible with the K (2.92mm) and 3.5mm connectors.



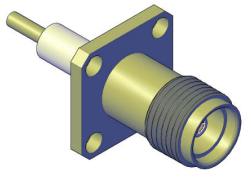
-NF



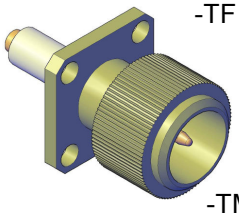
-NM

TYPE N

This is another one of the most popular and least expensive types of microwave connectors. Space Machine utilizes two types, a standard version which has an upper frequency limit of 10 GHz and a high frequency model that is usable up to 18 GHz. The standard model we use on waveguide sizes down to WR112 and WRD350 while the high frequency model is used on waveguide sizes WR90, WR75, WR62, WRD475, WRD500, WRD580, WRD650 and WRD750. Straight configurations as shown are standard, other options such as right angle and a thread on configuration are available upon request. Generally, Type N connectors will hold pressures of approximately 20 PSIG with only a slight amount of leakage around the center pin and dielectric. However, Space Machine does offer a hermetic version where absolute pressurization is a necessity.



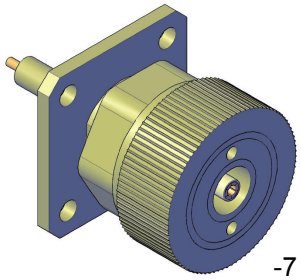
-TF



-TM

TNC

The TNC is considered a ruggedized connector. Space Machine utilizes two types, a standard version which has an upper frequency limit of 14 GHz and a high frequency model that is usable up to 18 GHz. The standard model we use on waveguide sizes down to WR112, WR90, WRD350 and WRD475 while the high frequency model is used on waveguide sizes WR75, WR62, WRD500, WRD580, WRD650 and WRD750. Straight configurations as shown are standard, other options such as right angle and a thread on configuration are available upon request. Generally, TNC connectors will hold pressures of approximately 20 PSIG with only a slight amount of leakage around the center pin and dielectric however, Space Machine does offer a hermetic version where absolute pressurization is a necessity.

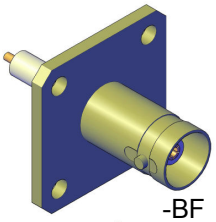


-7

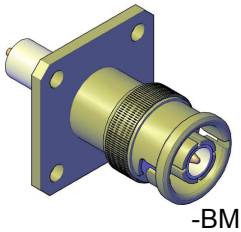
7mm

7mm are precision sexless connectors that are durable and can tolerate many repeatable connections. They also offer a low VSWR and are usable up to 18 GHz. The 7mm is most commonly used in precision applications such as waveguide to coax adapters that are used in calibration kits. The 7mm is an air dielectric connector and is not suitable for use in a pressurized system.

Appendix E
Connector Options



-BF

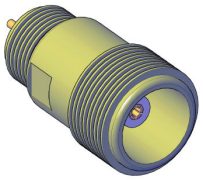


-BM

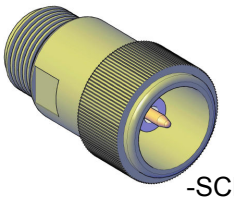
BNC

The BNC is a ruggedized all purpose connector for low frequency applications. The upper frequency limit is 4 GHz which restricts it's use down to waveguide size WR284 and larger.

Straight configurations as shown are standard, other options such as right angle and a thread on configurations are available upon request. Generally, BNC connectors will hold pressures of approximately 20 PSIG with only a slight amount of leakage around the center pin and dielectric.



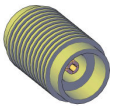
-SCF



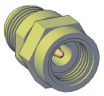
-SCM

SC

The SC is a specialized connector for medium frequency applications. The upper frequency limit is 10 GHz which makes its uses similar to that of the standard Type N. SC connectors will not generally hold pressure and should be avoided in pressurized applications.



-KF

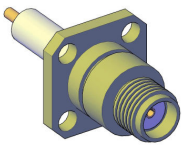


-KM

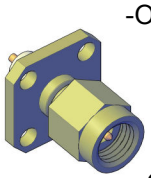
K* Type (2.92mm)

K connectors are precision connectors that are the most commonly used connector for high frequency applications. They have an upper frequency limit of 46 GHz, making them usable for waveguide sizes down to WR28 and WRD180. Due to it's small size, it's generally not recommended using on waveguide sizes larger than WR51 or WRD110. The K connector is an air dielectric connector and is not suitable for use in a pressurized or vacuum system. K connectors are compatible with the SMA and 3.5mm connectors.

**K is a trademark of the Anritsu Company.*



-OSF



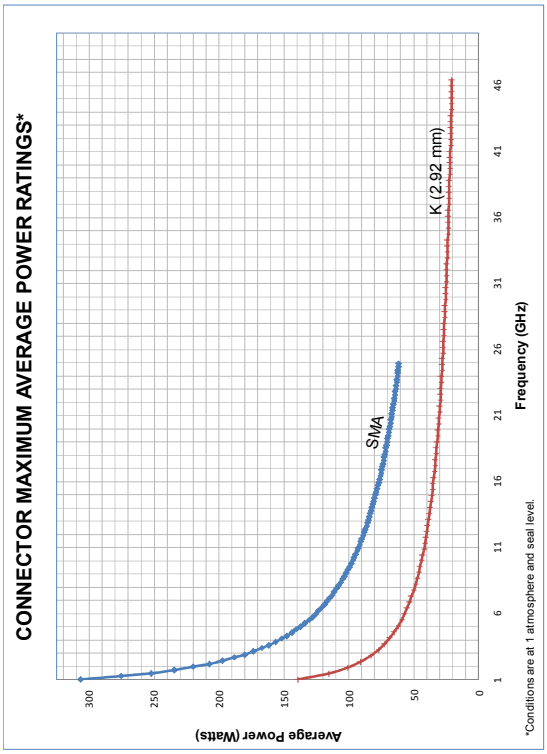
-OSM

2.4mm (OS-50)

The 2.4mm is another option for high frequency uses. It has an upper frequency limit of 50 GHz making it usable on waveguide sizes down to WR22 and WRD180. Due to its small size, it's generally not recommended using on waveguide sizes larger than WR51 or WRD110. Generally, 2.4mm connectors will hold pressure of approximately 20 PSIG with only a slight amount of leakage around the center pin and dielectric however, Space Machine does offer a hermetic version where absolute pressurization is a necessity.

Appendix E
Connector Options

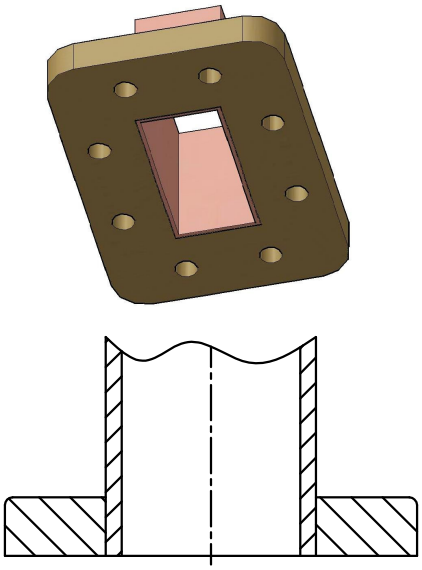
[redacted]



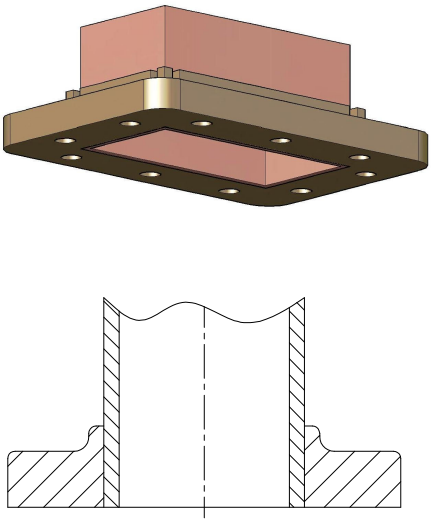
[redacted]

[redacted]

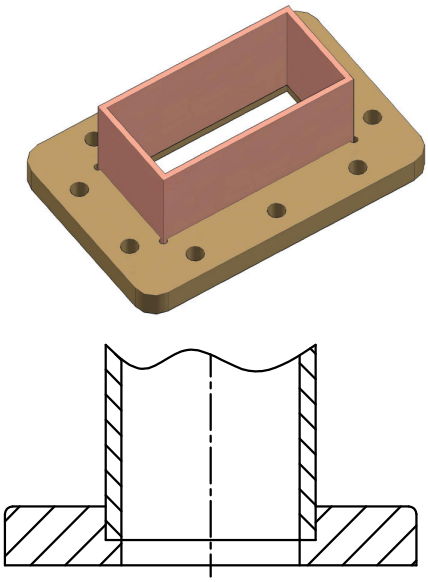
Appendix F
Waveguide Flange Mounting Methods



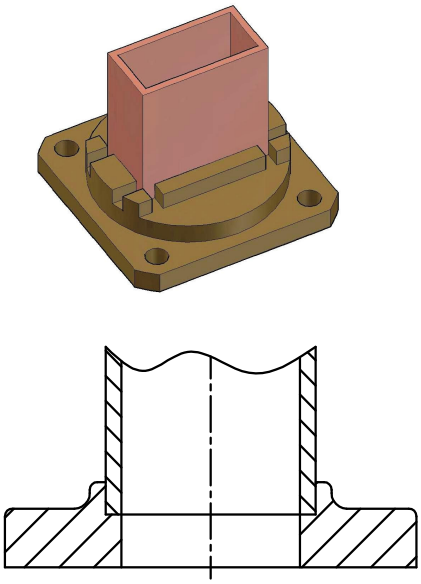
Thru Type



Butt Type,
Corral Thru Type



Butt Type,
Socket



Butt Type,
Corral

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Appendix G

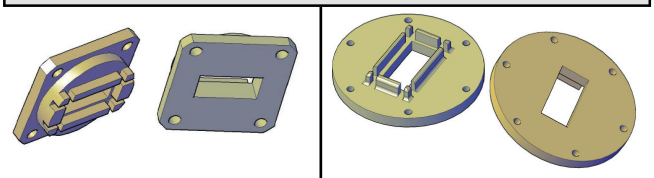
Rectangular Waveguide Flange Options

UG Style

see Appendix I for Flange Part Number Conversion Chart

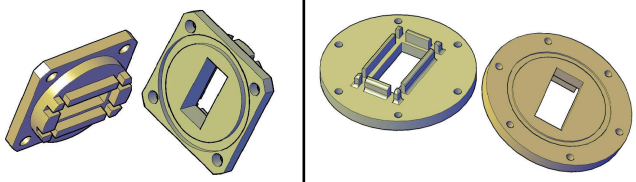
W.G. sizes WR22—WR112 | W.G. sizes WR137—WR284

Flange Option –01, 11 (Cover, Butt Type, Corral*)



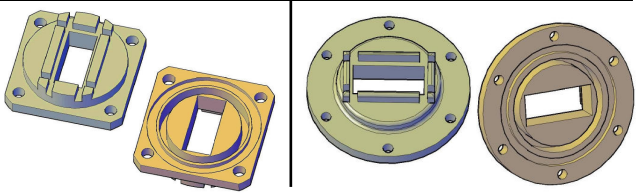
W.G. sizes WR22—WR112 | W.G. sizes WR137—WR284

Flange Option –14, 15 (Grooved, Butt Type, Corral*)



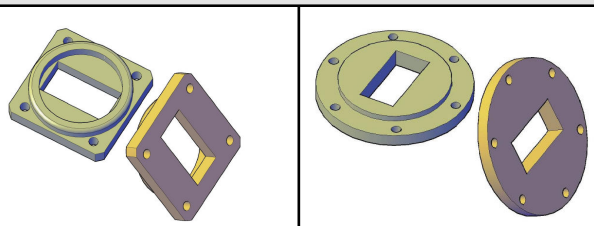
W.G. sizes WR22—WR112 | W.G. sizes WR137—WR284

Flange Option –02, 21 (Choke, Butt Type, Corral*)



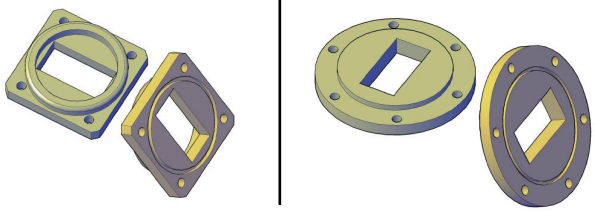
W.G. sizes WR22—WR112 | W.G. sizes WR137—WR284

Flange Option –12, 13 (Cover, Thru Type*)



W.G. sizes WR22—WR112 | W.G. sizes WR137—WR284

Flange Option –22, 23 (Grooved, Thru Type*)



	UG Style									
Standard	COVER				GROOVED				CHOKE	
	Butt Type, Corral		Thru		Butt Type, Corral		Thru		Butt Type, Corral	
Mounting Holes	**All Clear**	**All Tapped**	**All Clear**	**All Tapped**	**All Clear**	**All Tapped**	**All Clear**	**All Tapped**	**All Tapped**	**All Clear**
WR28	01	11	12	13	14	15	22	23	02	21
WR34	01	11	12	13	14	15	22	23	02	21
WR42	01	11	12	13	14	15	22	23	02	21
WR51	01	11	12	13	14	15	22	23	02	21
WR62	01	11	12	13	14	15	22	23	02	21
WR75	01	11	12	13	14	15	22	23	02	21
WR90	01	11	12	13	14	15	22	23	02	21
WR102	01	11	12	13	14	15	22	23	02	21
WR112	01	11	12	13	14	15	22	23	02	21
WR137	01	11	12	13	14	15	22	23	02	21
WR159	01	11	12	13	14	15	22	23	02	21
WR187	01	11	12	13	14	15	22	23	02	21
WR284	01	11	12	13	14	15	22	23	02	21

*** See appendix F for explanation of flange type.**

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Appendix G
Rectangular Waveguide Flange Options

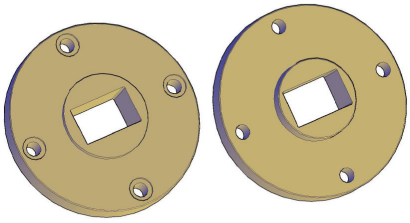
Millimeter (mm)

see Appendix I for Flange Part Number Conversion Chart

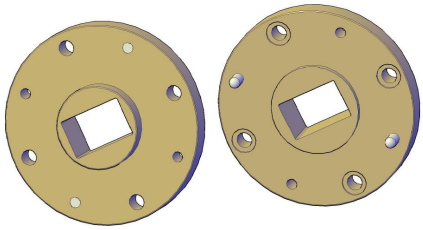
Flange Option –06, 61 (mm Round, Thru Type*)

	MM	
Standard	ROUND	
	Thru	
Mounting Holes	**All Tapped**	**All Clear**
WR10	06	61
WR12	06	61
WR15	06	61
WR19	06	61
WR22	06	61
WR28	06	61

W.G. sizes WR10—WR28



Flange before brazing



Finished Flange after brazing

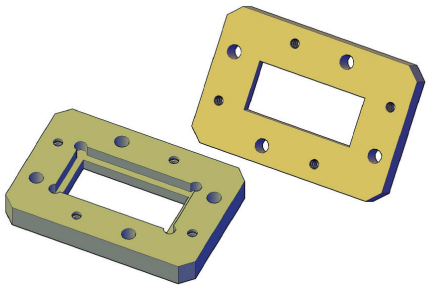
* See appendix F for explanation of flange type.

CMR (*NON PRESSURIZABLE*)

Flange Option – 03, 31, 32 (CMR, Butt Type, Socket*)

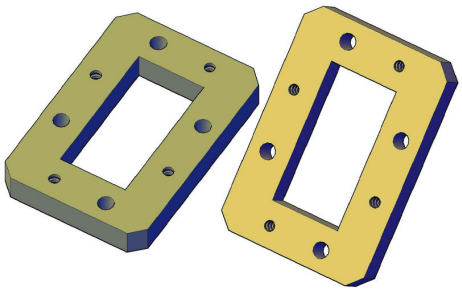
	CMR					
Standard	COVER					
	Butt Type, Socket			Thru		
Mounting Holes	**Alt. Clear/ Tapped**	**All Clear**	**All Tapped**	**Alt. Clear/ Tapped**	**All Clear**	**All Tapped**
WR90	03	31	32	33	34	35
WR102	03	31	32	33	34	35
WR112	03	31	32	33	34	35
WR137	03	31	32	33	34	35
WR159	03	31	32	33	34	35
WR187	03	31	32	33	34	35
WR229	03	31	32	33	34	35
WR284	03	31	32	33	34	35

W.G. sizes WR90—WR284



Flange Option – 33-35 (CMR, Thru Type*)

W.G. sizes WR90—WR284



* See appendix F for explanation of flange type.

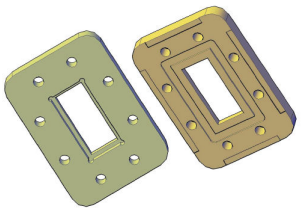
Appendix G
Rectangular Waveguide Flange Options

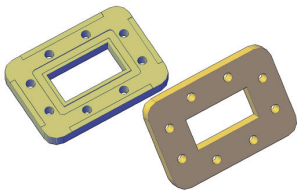
CPR

see Appendix I for Flange Part Number Conversion Chart

Flange Option –04, 41, 42 (CPR, Grooved, Butt Type, Socket *)	Flange Option – 43 44 (CPR, Grooved, Thru Type*)

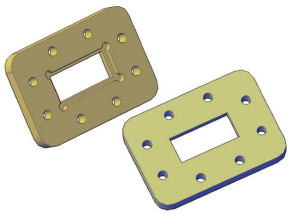
W.G. sizes WR75—WR975

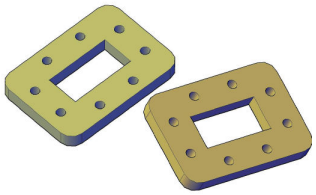




Flange Option –05, 51, 52 (CPR, Flat, Butt Type, Socket *)	Flange Option – 53, 54 (CPR, Flat, Thru Type*)

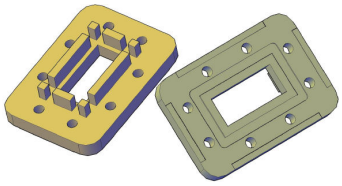
W.G. sizes WR75—WR975

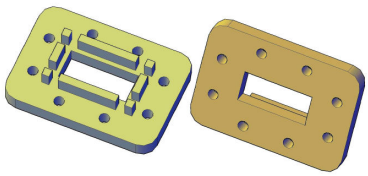




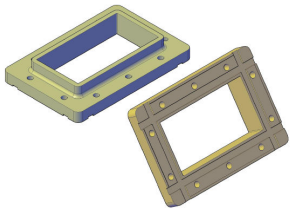
Flange Option – 07, 71 (CPR, Grooved, Butt Type, Corral*)	Flange Option – 08, 81 (CPR, Flat, Butt Type, Corral*)	Flange Option – 72, 73 (CPR, Grooved, Butt Type, Corral Thru*)

W.G. sizes WR75—WR975





W.G. sizes WR340—WR650



	CPR																
Standard	GROOVED (Contact)									FLAT							
Style	Butt Type, Socket			Thru		Butt Type, Corral		Butt Type, Corral Thru		Butt Type, Socket			Thru		Butt Type, Corral	
Mounting Holes	**All Clear**	**All Tapped**	**3/8" Thick**	**All Clear**	**All Tapped**	**All Clear**	**All Tapped**	**All Clear**	**All Tapped**	**All Clear**	**All Tapped**	**3/8" Thick**	**All Clear**	**All Tapped**	**All Clear**	**All Tapped**
WR75	04	41		43	44	07	71			05	51	52	53	54	08	81
WR90	04	41		43	44	07	71			05	51	52	53	54	08	81
WR112	04	41	42	43	44	07	71			05	51	52	53	54	08	81
WR137	04	41	42	43	44	07	71			05	51	52	53	54	08	81
WR159	04	41	42	43	44	07	71			05	51	52	53	54	08	81
WR187	04	41	42	43	44	07	71			05	51	52	53	54	08	81
WR229	04	41	42	43	44	07	71			05	51	52	53	54	08	81
WR284	04	41	42	43	44	07	71			05	51	52	53	54	08	81
WR340	04	41	42	43	44	07	71	72	73	05	51	52	53	54	08	81
WR430	04	41	42	43	44	07	71	72	73	05	51	52	53	54	08	81
WR510	04	41	42	43	44	07	71			05	51	52	53	54	08	81
WR650	04	41	42	43	44	07	71	72	73	05	51	52	53	54	08	81
WR770	04	41	42	43	44					05	51	52	53	54		
WR975	04	41	42	43	44					05	51	52	53	54		

* See appendix F for explanation of flange type.

2327 16TH AVENUE NORTH, ST. PETERSBURG, FLORIDA 33713 * PHONE (727) 323-2221 * FAX (727) 323-2376

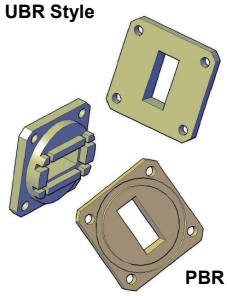
Appendix G
Rectangular Waveguide Flange Options

EUROPEAN (IEC Standard)

see Appendix I for Flange Part Number Conversion Chart

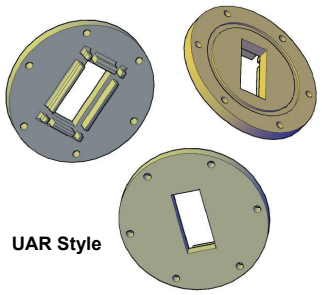
Flange Option – 16-19 (Cover, Grooved Butt Type, Corral*)

UBR Style



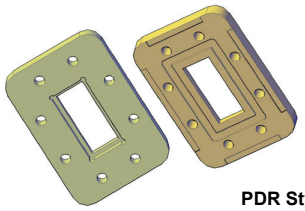
PBR Style

PAR Style



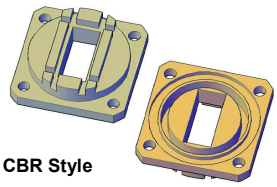
UAR Style

Flange Option – 45, 46 (Grooved Butt Type, Socket Back*)

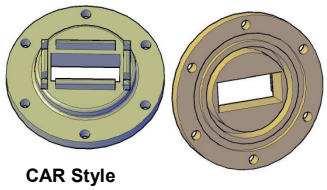


PDR Style

Flange Option – 26, 27 (Choke, Butt Type, Corral*)

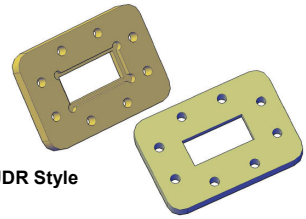


CBR Style



CAR Style

Flange Option – 55, 56 (Flat Butt Type Socket Back*)



UDR Style

Waveguide Size			EUROPEAN (IEC Standard)															
EIA	RCSC	IEC	UBR		PBR		CBR		UAR		PAR		CAR		PDR		UDR	
Mounting Holes			All Clear	All Tapped	All Clear	All Tapped	All Clear	All Tapped	All Clear	All Tapped	All Clear	All Tapped	All Clear	All Tapped	All Clear	All Tapped	All Clear	All Tapped
WR28	WG22	R320	16	18	17	19												
WR34	WG21	R260	16	18	17	19												
WR42	WG20	R220	16	18	17	19	26	27										
WR51	WG19	R180	16	18	17	19												
WR62	WG18	R140	16	18	17	19	26	27										
WR75	WG17	R120	16	18	17	19	26	27							45	46	55	56
WR90	WG16	R100	16	18	17	19	26	27							45	46	55	56
WR112	WG15	R84	16	18	17	19	26	27			26	27			45	46	55	56
WR137	WG14	R70							17	19	26	27	16	18	45	46	55	56
WR159	WG13	R58							17	19	26	27	16	18	45	46	55	56
WR187	WG12	R48							17	19	26	27	16	18	45	46	55	56
WR229	WG11A	R40													45	46	55	56
WR284	WG10	R32							17	19	26	27	16	18	45	46	55	56
WR340	WG9A	R26													45	46	55	56
WR430	WG8	R22													45	46	55	56
WR650	WG6	R14													45	46	55	56

* See appendix F for explanation of flange type.

Space Machine & Engineering CORP.

Appendix H

Double Ridge Waveguide Flange Options

see Appendix I for Flange Part Number Conversion Chart

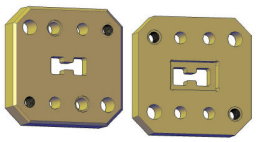
	COVER					
Standard	**Butt Type, Socket**			**Thru Type**		
Mounting Holes	**Alt. Clear/ Tapped**	**All Clear**	**All Tapped**	**Alt. Clear/ Tapped**	**All Clear**	**All Tapped**
WRD200	01	11	12	13	14	15
WRD250	01	11	12	13	14	15
WRD350	01	11	12	13	14	15
WRD475	01	11	12	13	14	15
WRD500	01	11	12	13	14	15
WRD580	01	11	12	13	14	15
WRD580 SL	N/A	11	12	N/A	N/A	N/A
WRD650	01	11	12	13	14	15
WRD650 SL	N/A	11	12	N/A	N/A	N/A
WRD750	01	11	12	13	14	15
WRD750 SL	N/A	11	12	N/A	N/A	N/A
WRD110	01	11	12	13	14	15
WRD180	01	11	12	13	14	15

	Gasket					
Standard	**Butt Type, Socket**			**Thru Type**		
Mounting Holes	**Alt. Clear/ Tapped**	**All Clear**	**All Tapped**	**Alt. Clear/ Tapped**	**All Clear**	**All Tapped**
WRD200	02	21	22	23	24	25
WRD250	02	21	22	23	24	25
WRD350	02	21	22	23	24	25
WRD475	02	21	22	23	24	25
WRD475 SL	N/A	21	22	N/A	N/A	N/A
WRD500	02	21	22	23	24	25
WRD580	02	21	22	23	24	25
WRD580 SL	N/A	21	22	N/A	N/A	N/A
WRD650	02	21	22	23	24	25
WRD650 SL	N/A	21	22	N/A	N/A	N/A
WRD750	02	21	22	23	24	25
WRD750 SL	N/A	21	22	N/A	N/A	N/A
WRD110	02	21	22	23	24	25
WRD180	02	21	22	23	24	25

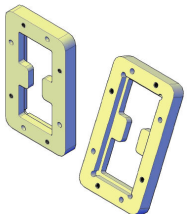
*** See appendix F for explanation of flange type.**

Flange Option – 01, 11, 12 (Cover, Butt Type, Socket *)

W.G. sizes WRD750-WRD580

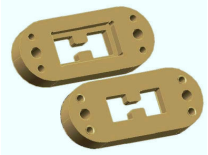


W.G. sizes WRD500—WRD250



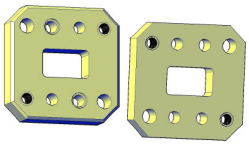
Flange Option – 11,12 (Cover, Butt Type, Socket*)

W.G. size WRD580, WRD650, WRD750 Slim-Line



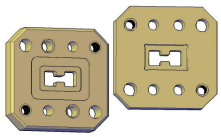
Flange Option – 13-15 (Cover, Thru Type*)

W.G. sizes WRD180—WRD110

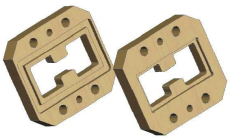


Flange Option – 02, 21, 22 (Gasket, Butt Type, Socket *)

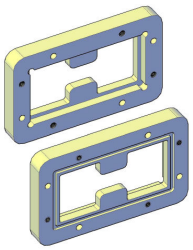
W.G. sizes WRD750-WRD580



W.G. sizes WRD475 Slim-Line

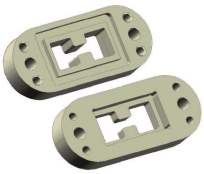


W.G. sizes WRD500—WRD250



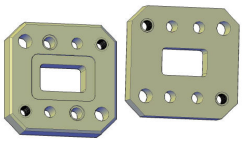
Flange Option – 21, 22 (Gasket, Butt Type, Socket *)

W.G. size WRD580, WRD650, WRD750 Slim-Line



Flange Option – 23-25 (Gasket, Thru Type*)

W.G. sizes WRD180 - WRD110



Alignment pins are installed after assembly. Standard hole pattern is alternate tapped and thru holes. Other hole configuration are possible, please contact us for custom configurations.

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Appendix I
Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF10-B06	67-010		Round mm
WGF12-B06	67-009	387/U	Round mm
WGF15-B06	67-008	385/U	Round mm
WGF19-B06	67-007		Round mm
WGF22-A01			Cover Butt
WGF22-A12			Cover Thru
WGF22-A06			Round mm
WGF22-B01			Cover Butt
WGF22-B12			Cover Thru
WGF22-B06	67-006	383/U	Round mm
WGF28-A01			Cover Butt
WGF28-A12			Cover Thru
WGF28-A02			Choke Butt
WGF28-A06	67-012		Round mm
WGF28-B01	68-001		Cover Butt
WGF28-B12	54-003	599/U	Cover Thru
WGF28-B02	59-005	600A/U	Choke Butt
WGF28-B06	67-005	381/U	Round mm
WGF42-A01	70-028		Cover Butt
WGF42-A12	54-002	597/U	Cover Thru
WGF42-A02	59-004	598A/U	Choke Butt
WGF42-A06	67-011		Round mm
WGF42-B01	70-027		Cover Butt
WGF42-B12	54-001	595/U	Cover Thru
WGF42-B02	59-003	596A/U	Choke Butt
WGF42-B06	67-004	425/U	Round mm

2327 16TH AVENUE NORTH, ST. PETERSBURG, FLORIDA 33713 * PHONE (727) 323-2221 * FAX (727) 323-2376

Appendix I
Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF51-A01	70-023		Cover Butt
WGF51-A12			Cover Thru
WGF51-A02	69-005		Choke Butt
WGF51-B01	70-022		Cover Butt
WGF51-B12			Cover Thru
WGF51-B02	69-004		Choke Butt
WGF62-A01	70-020		Cover Butt
WGF62-A12	53-006	1665/U	Cover Thru
WGF62-A02	59-002	1666/U	Choke Butt
WGF62-B01	70-019		Cover Butt
WGF62-B12	53-005	419/U	Cover Thru
WGF62-B02	59-001	541/U	Choke Butt
WGF75-A01	70-005		Cover Butt
WGF75-A12	53-008		Cover Thru
WGF75-A02	59-011		Choke Butt
WGF75-A04			CPRG Butt
WGF75-A05			CPRF Butt
WGF75-B01	70-004		Cover Butt
WGF75-B12	53-007		Cover Thru
WGF75-B02	59-010		Choke Butt
WGF75-B04			CPRG Butt
WGF75-B05			CPRF Butt
WGF90-A01	54-014		Cover Butt
WGF90-A12	53-003	135/U	Cover Thru
WGF90-A02	59-008	136B/U	Choke Butt
WGF90-A03			CMR Butt

Appendix I
Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF90-A33	63-008	1483/U	CMR Thru
WGF90-A04			CPRG Butt
WGF90-A05			CPRF Butt
WGF90-A07	52-044	1361/U	Contact Grooved Butt
WGF90-A08	52-022	1737/U	Contact Flat Butt
WGF90-B01	54-013		Cover Butt
WGF90-B12	53-001	39/U	Cover Thru
WGF90-B02	59-006	40B/U	Choke Butt
WGF90-B03			CMR Butt
WGF90-B33	63-004	1478/U	CMR Thru
WGF90-B04			CPRG Butt
WGF90-B05			CPRF Butt
WGF90-B07	52-043	1360/U	Contact Grooved Butt
WGF90-B08	52-021	1736/U	Contact Flat Butt
WGF102-A01	70-014		Cover Butt
WGF102-A12			Cover Thru
WGF102-A02	69-002		Choke Butt
WGF102-B01	70-013	1493/U	Cover Butt
WGF102-B12			Cover Thru
WGF102-B02	69-001	1494/U	Choke Butt
WGF112-A01	54-012		Cover Butt
WGF112-A12	53-004	138/U	Cover Thru
WGF112-A02	59-009	137B/U	Choke Butt
WGF112-A03			CMR Butt
WGF112-A33	63-007	1482/U	CMR Thru
WGF112-A04			CPRG Butt

Appendix I
Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF112-A05			CPRF Butt
WGF112-A07	52-042	1359/U	Contact Grooved Butt
WGF112-A08	52-020	1735/U	Contact Flat Butt
WGF112-B01	54-011		Cover Butt
WGF112-B12	53-002	51/U	Cover Thru
WGF112-B02	59-007	52B/U	Choke Butt
WGF112-B03			CMR Butt
WGF112-B33	63-003	1477U	CMR Thru
WGF112-B04			CPRG Butt
WGF112-B05			CPRF Butt
WGF112-B07	52-041	1358/U	Contact Grooved Butt
WGF112-B08	52-019	1734/U	Contact Flat Butt
WGF137-A01			Cover Butt
WGF137-A12	55-002	441/U	Cover Thru
WGF137-A02	60-002	440B/U	Choke Butt
WGF137-A03			CMR Butt
WGF137-A33	63-006	1481/U	CMR Thru
WGF137-A04			CPRG Butt
WGF137-A05			CPRF Butt
WGF137-A07	52-040	1357/U	Contact Grooved Butt
WGF137-A08	52-018	1733/U	Contact Flat Butt
WGF137-B01			Cover Butt
WGF137-B12	55-001	344/U	Cover Thru
WGF137-B02	60-001	343B/U	Choke Butt
WGF137-B03			CMR Butt
WGF137-B33	63-002	1476U	CMR Thru

Appendix I
Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF137-B04			CPRG Butt
WGF137-B05			CPRF Butt
WGF137-B07	52-039	1356/U	Contact Grooved Butt
WGF137-B08	52-017	1732/U	Contact Flat Butt
WGF159-A01			Cover Butt
WGF159-A12			Cover Thru
WGF159-A02			Choke Butt
WGF159-A03			CMR Butt
WGF159-A04			CPRG Butt
WGF159-A05			CPRF Butt
WGF159-A07	52-038	1355/U	Contact Grooved Butt
WGF159-A08	52-016	1731/U	Contact Flat Butt
WGF159-B01			Cover Butt
WGF159-B12			Cover Thru
WGF159-B02			Choke Butt
WGF159-B03			CMR Butt
WGF159-B04			CPRG Butt
WGF159-B05			CPRF Butt
WGF159-B07	52-037	1354/U	Contact Grooved Butt
WGF159-B08	52-015	1730/U	Contact Flat Butt
WGF187-A01			Cover Butt
WGF187-A12	57-001	407/U	Cover Thru
WGF187-A02	62-001	406B/U	Choke Butt
WGF187-A03			CMR Butt
WGF187-A33	63-005	1480/U	CMR Thru
WGF187-A04			CPRG Butt

Appendix I
Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF187-A05			CPRF Butt
WGF187-A07	52-036	1353/U	Contact Grooved Butt
WGF187-A08	52-014	1729/U	Contact Flat Butt
WGF187-B01			Cover Butt
WGF187-B12	57-002	149A/U	Cover Thru
WGF187-B02	62-002	148C/U	Choke Butt
WGF187-B03			CMR Butt
WGF187-B33	63-001	1475U	CMR Thru
WGF187-B04			CPRG Butt
WGF187-B05			CPRF Butt
WGF187-B07	52-035	1352/U	Contact Grooved Butt
WGF187-B08	52-013	1728/U	Contact Flat Butt
WGF229-A03			CMR Butt
WGF229-A04			CPRG Butt
WGF229-A05			CPRF Butt
WGF229-A07	52-034	1351/U	Contact Grooved Butt
WGF229-A08	52-012	1727/U	Contact Flat Butt
WGF229-B03			CMR Butt
WGF229-B04			CPRG Butt
WGF229-B05			CPRF Butt
WGF229-B07	52-033	1350/U	Contact Grooved Butt
WGF229-B08	52-011	1726/U	Contact Flat Butt
WGF284-A01			Cover Butt
WGF284-A12	56-002	584/U	Cover Thru
WGF284-A02	61-001	585A/U	Choke Butt
WGF284-A03			CMR Butt

Appendix I
Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF284-A33	64-002	1484/U	CMR Thru
WGF284-A04			CPRG Butt
WGF284-A05			CPRF Butt
WGF284-A07	52-032	1349/U	Contact Grooved Butt
WGF284-A08	52-010	1725/U	Contact Flat Butt
WGF284-B01			Cover Butt
WGF284-B12	56-001	53/U	Cover Thru
WGF284-B02	62-002	54B/U	Choke Butt
WGF284-B03			CMR Butt
WGF284-B33	64-001	1479/U	CMR Thru
WGF284-B04			CPRG Butt
WGF284-B05			CPRF Butt
WGF284-B07	52-031	1348U	Contact Grooved Butt
WGF284-B08	52-009	1724/U	Contact Flat Butt
WGF340-A04			CPRG Butt
WGF340-A05			CPRF Butt
WGF340-A07	52-030	1347/U	Contact Grooved Butt
WGF340-A72	58-012	554A/U	Contact Grooved Thru
WGF340-A08	52-008	1713/U	Contact Flat Butt
WGF340-B04			CPRG Butt
WGF340-B05			CPRF Butt
WGF340-B07	52-029	1346/U	Contact Grooved Butt
WGF340-B72	58-011	552A/U	Contact Grooved Thru
WGF340-B08	52-007	1712/U	Contact Flat Butt
WGF430-A04			CPRG Butt
WGF430-A05			CPRF Butt

Appendix I
Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF430-A07	52-028	1345/U	Contact Grooved Butt
WGF430-A72	58-010	437B/U	Contact Grooved Thru
WGF430-A08	52-006	1711/U	Contact Flat Butt
WGF430-B04			CPRG Butt
WGF430-B05			CPRF Butt
WGF430-B07	52-027	1344/U	Contact Grooved Butt
WGF430-B72	58-007	435B/U	Contact Grooved Thru
WGF430-B08	52-005	1716/U	Contact Flat Butt
WGF650-A04			CPRG Butt
WGF650-A05			CPRF Butt
WGF650-A07	52-024	1343/U	Contact Grooved Butt
WGF650-A72	58-008	418B/U	Contact Grooved Thru
WGF650-A08	52-002	1720/U	Contact Flat Butt
WGF650-B04			CPRG Butt
WGF650-B05			CPRF Butt
WGF650-B07	52-023	1362/U	Contact Grooved Butt
WGF650-B72	58-007	417B/U	Contact Grooved Thru
WGF650-B08	52-001	1714/U	Contact Flat Butt

Appendix I

Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M39000/	EQUIVALENT UG-	NAME
DGF200-A01	3-024	-	Double Ridge Cover
DGF200-A02	3-048	-	Double Ridge Groove
DGF200-B01	3-025	-	Double Ridge Cover
DGF200-B02	3-049	-	Double Ridge Groove
DGF250-A01	-	-	Double Ridge Cover
DGF250-A02	-	-	Double Ridge Groove
DGF250-B01	-	-	Double Ridge Cover
DGF250-B02	-	-	Double Ridge Groove
DGF350-A01	3-030	-	Double Ridge Cover
DGF350-A02	3-054	-	Double Ridge Groove
DGF350-B01	3-031	-	Double Ridge Cover
DGF350-B02	3-055	-	Double Ridge Groove
DGF475-A01	3-036	-	Double Ridge Cover
DGF475-A02	3-060	-	Double Ridge Groove
DGF475-A22 SL	-	-	Double Ridge Groove Slim - Line
DGF475-B01	3-037	-	Double Ridge Cover
DGF475-B02	3-061	-	Double Ridge Groove
DGF475-B22 SL	-	-	Double Ridge Groove Slim - Line
DGF500-A01	-	-	Double Ridge Flat
DGF500-A02	4-022	-	Double Ridge Groove Thru
DGF500-A25	4-010	1596/U	Double Ridge Cover Thru
DGF500-B01	-	-	Double Ridge Flat
DGF500-B02	4-023	-	Double Ridge Groove Thru

Appendix I

Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M39000/	EQUIVALENT UG-	NAME
DGF500-B25	4-011	1599/U	Double Ridge Cover Thru
DGF580-A01	-	-	Double Ridge Flat
DGF580-A11 SL	-	-	Double Ridge Flat Slim-Line
DGF580-A02	-	-	Double Ridge Groove
DGF580-A21 SL	-	-	Double Ridge Groove Slim-Line
DGF580-B01	-	-	Double Ridge Flat
DGF580-B11 SL	-	-	Double Ridge Flat Slim-Line
DGF580-B02	-	-	Double Ridge Groove
DGF580-B21 SL	-	-	Double Ridge Groove Slim-Line
DGF650-A01	-	-	Double Ridge Flat
DGF650-A11 SL	-	-	Double Ridge Flat Slim-Line
DGF650-A02	-	-	Double Ridge Groove
DGF650-A22 SL	-	-	Double Ridge Groove Slim-Line
DGF650-B01	-	-	Double Ridge Flat
DGF650-B11 SL	-	-	Double Ridge Flat Slim-Line
DGF650-B02	-	-	Double Ridge Groove
DGF650-B22 SL	-	-	Double Ridge Groove Slim-Line
DGF750-A01	4-076	-	Double Ridge Flat
DGF750-A11 SL	-	-	Double Ridge Flat Slim-Line
DGF750-A02	4-078	-	Double Ridge Groove

Appendix I
Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M39000/	EQUIVALENT UG-	NAME
DGF750-A22 SL	-	-	Double Ridge Groove Slim-Line
DGF750-B01	4-077	-	Double Ridge Flat
DGF750-B11 SL	-	-	Double Ridge Flat Slim-Line
DGF750-B02	4-079	-	Double Ridge Groove
DGF750-B22 SL	-	-	Double Ridge Groove Slim-Line
DGF110-A01	-	-	Double Ridge Flat
DGF110-B01	-	-	Double Ridge Flat
DGF180-A01	-	-	Double Ridge Flat
DGF180-A02	-	-	Double Ridge Groove
DGF180-B01	-	-	Double Ridge Flat
DGF180-B02	-	-	Double Ridge Groove
DGF10-A01	3-042	-	Double Ridge Flat
DGF10-A02	-	-	Double Ridge Groove
DGF10-B01	3-043	-	Double Ridge Flat
DGF10-B02	-	-	Double Ridge Groove

Appendix J
Recommended Waveguide Flange Torque

Screw Size	Threads Per Inch	Recommended Torque	Tension (lb.)
No. 4	40 80	4.5 5.5	235 280
No. 6	32 40	8.5 10	360 410
No. 8	32 36	18 20	625 685
No. 10	24 32	23 32	705 940
1/4”	20 28	80 100	1800 2200
5/16”	18 24	140 150	2540 2620
3/8”	16 24	250 275	3740 3950
7/16”	14 20	400 425	4675 4700
1/2”	13 20	550 575	6110 6140

Appendix K
Flexible Non-Twistable Waveguide

WR	Frequency Range (GHz)	VSWR	Insertion Loss (dB/foot)	CW Power (Watts)	Peak Power (kW)	Bend Radii With Jacket	
						E-Plane	H-Plane
28	26.5-40.0	1.30	0.50	150	20	0.75	1.13
34	22.0-33.0	1.20	0.35	200	30	0.75	1.13
42	18.0-26.5	1.20	0.32	300	39	0.88	1.25
51	15.0-22.0	1.20	0.32	500	70	0.88	1.25
62	12.4-18.0	1.12	0.15	1000	100	1.00	1.88
75	10.0-15.0	1.12	0.13	1500	140	1.13	2.25
90	8.2-12.4	1.10	0.09	3000	180	1.75	2.50
102	7.0-11.0	1.10	0.08	4000	300	2.00	2.88
112	7.05-10.0	1.10	0.06	4000	315	2.25	3.25
137	5.85-8.2	1.10	0.05	5000	500	2.38	3.38
159	4.9-7.05	1.10	0.04	6000	1100	4.00	6.00
187	3.95-5.85	1.10	0.03	6500	1250	4.38	6.50
229	3.3-4.9	1.10	0.02	8000	1550	6.50	8.00
284	2.6-3.95	1.10	0.02	10000	2000	7.00	9.50
340	2.2-3.3	1.10	0.01	16000	3700	10.00	16.00
430	1.7-2.6	1.10	0.01	20000	4700	12.00	25.00
650	1.12-1.7	1.10	0.01	20000	10700	20.00	40.00

Appendix L
Flexible-Twistable Waveguide

WR	Frequency Range (GHz)	VSWR	Insertion Loss (dB/foot)	CW Power (Watts)	Peak Power (kW)	Bend Radii With Jacket	
						E-Plane	H-Plane
28	26.5-40.0	1.30	0.60	75	20	0.75	1.13
34	22.0-33.0	1.30	0.50	100	30	0.75	1.13
42	18.0-26.5	1.20	0.35	100	39	0.88	1.25
51	15.0-22.0	1.20	0.35	200	70	0.88	1.25
62	12.4-18.0	1.12	0.20	400	100	1.00	1.88
75	10.0-15.0	1.12	0.15	750	140	1.13	2.25
90	8.2-12.4	1.10	0.10	1000	180	1.75	2.50
102	7.0-11.0	1.10	0.09	1500	300	2.00	2.88
112	7.05-10.0	1.10	0.08	1500	315	2.25	3.25
137	5.85-8.2	1.10	0.07	2000	500	2.38	3.38
159	4.9-7.05	1.10	0.06	2500	1100	4.00	6.00
187	3.95-5.85	1.10	0.05	3000	1250	4.38	6.50
229	3.3-4.9	1.10	0.02	4000	1550	6.50	8.00
284	2.6-3.95	1.10	0.02	4000	2000	7.00	9.50
340	2.2-3.3	1.10	0.01	8000	3700	10.00	16.00
430	1.7-2.6	1.10	0.01	10000	4700	12.00	25.00

Appendix M
Flexible Seamless Waveguide

WR	Frequency Range (GHz)	VSWR	Insertion Loss (dB/foot)	CW Power (Watts)	Peak Power (kW)	Bend Radii With Jacket	
						E-Plane	H-Plane
28	26.5-40.0	1.30	0.65	75	20	0.44	0.94
34	22.0-33.0	1.30	0.50	100	30	0.44	0.94
42	18.0-26.5	1.20	0.35	100	39	0.57	1.00
51	15.0-22.0	1.20	0.35	200	70	0.57	1.00
62	12.4-18.0	1.12	0.20	400	100	0.69	1.25
75	10.0-15.0	1.10	0.15	750	140	0.63	1.25
90	8.2-12.4	1.10	0.10	1000	180	1.25	1.50
102	7.0-11.0	1.10	0.09	1500	300	1.30	1.94
112	7.05-10.0	1.10	0.08	1500	315	1.40	1.82
137	5.85-8.2	1.10	0.07	2000	500	1.50	2.07
159	4.9-7.05	1.10	0.06	2500	1100	1.60	2.25
187	3.95-5.85	1.10	0.05	3000	1250	1.94	3.00
229	3.3-4.9	1.10	0.02	4000	1550	2.13	3.25
284	2.6-3.95	1.10	0.02	4000	2000	2.94	5.50

Flexible Seamless Millimeter Waveguide Assemblies

WR	Frequency Range (GHz)	VSWR	Insertion Loss (dB/foot)	Avg. Power (Watts)	Peak Power (kW)
10	75.00-110.00	1.15	0.25	30	2.5
12	60.00-90.00	1.12	0.20	40	3.8
15	50.00-75.00	1.10	0.11	50	5.7
19	40.00-60.00	1.10	0.08	60	10
22	33.00-50.00	1.10	0.05	75	12
28	26.50-40.00	1.10	0.04	150	20

2327 16TH AVENUE NORTH, ST. PETERSBURG, FLORIDA 33713 * PHONE (727) 323-2221 * FAX (727) 323-2376

Appendix N

Double Ridge Flexible Waveguide Specifications

WRD SIZE	Frequency Range (GHz)	VSWR	Insertion Loss (dB/foot) *	CW Power (Watts)	Peak Power (kW)	Bend Radii	
						E-Plane	H-Plane
180	18.0-40.0	1.35	1.00	150	2.5	1.00	3.00
650	6.5-18.0	1.30	0.35	600	12.0	2.50	5.00
750	7.5-18.0	1.25	0.35	750	15.0	2.50	5.00
580	5.8-16.0	1.20	0.25	1500	20.0	2.50	3.25
475	4.75-11.0	1.20	0.20	1750	40.0	3.00	6.50
350	3.5-8.2	1.20	0.15	2000	75.0	4.50	8.00
250	2.6-7.8	1.20	0.15	3000	150.0	8.00	12.00
200	2.0-4.8	1.15	0.10	4000	200.0	10.00	16.00

Double Ridge Flexible-Twistable Waveguide Specifications

WRD SIZE	Frequency Range (GHz)	VSWR	Insertion Loss (dB/foot) *	CW Power (Watts)	Peak Power (kW)	Bend Radii	
						E-Plane	H-Plane
180	18.0-40.0	1.35	1.50	50	2.5	1.00	3.00
650	6.5-18.0	1.30	0.40	200	12.0	2.50	5.00
750	7.5-18.0	1.25	0.40	250	15.0	2.50	5.00
580	5.8-16.0	1.20	0.30	500	20.0	2.50	3.25
475	4.75-11.0	1.20	0.25	700	40.0	3.00	6.50
350	3.5-8.2	1.20	0.20	750	75.0	4.50	8.00
250	2.6-7.8	1.20	0.20	1000	150.0	8.00	12.00
200	2.0-4.8	1.15	0.15	1500	200.0	10.00	16.00

*Attenuation values are for silver plated waveguide.

Appendix O
Inside Bend Radius for Formed Bends

WR SIZE	Minimum Inside Bend Radius		Standard Inside Bend Radius	
	E-Plane	H-Plane	E-Plane	H-Plane
28	1/4	5/16	1/2	1/2
34	1/4	5/16	1/2	1/2
42	1/4	5/16	1/2	1/2
51	5/16	7/16	1/2	1/2
62	3/8	1/2	5/8	3/4
75	7/16	5/8	3/4	1.0
90	1/2	3/4	1.0	1-1/4
102	3/4	1.0	1-1/4	1-1/2
112	3/4	1.0	1-1/4	1-1/2
137	7/8	1-1/4	1-5/16	1-5/8
159	1.0	1-1/2	1-1/2	1-3/4
187	1.0	1-1/2	1-1/2	1-3/4
229	1-1/2	2.0	2.0	2-1/2
284	2.0	2-1/2	2-1/2	3.0

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Appendix P
EMI/RFI Gaskets Physical Properties & Temperature Range

Elastomer		**Conductive Silicone**	**Conductive Silicone**
MIL-83528		Type B	Type K
Temperature Range	Min	-48°C	-43°C
	Max	+71°C	+52°C
Hardness	Shore A	65	85
Tensile Strength PSI		200	400
Tear Strength PI		30	40
Elongation %	Min	100	100
	Max	300	300
Compression Deflection (% min)		3.5	2.5
Compression Set (%)		32	35
Tear Strength lb/in		30	40
Shielding Effectiveness	100 MHz	120	120
	500 MHz	120	120
	2 GHz	115	120
	10GHz	115	120
Shelf Life years		15	15

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Appendix Q
Waveguide to Coax adapters, Connectors & Electrical Specs

WG Size	Frequency (GHZ)	Connector Type	VSWR	Power CW (Watts)	Insertion Loss (dB)
WR28	26.5 - 40.0	K-female	1.2	10	0.35
WR34	22.0 - 33.0	K-female	1.2	10	0.35
WR42	18.0 - 26.5	SMA-female	1.2	50	0.3
WR51	15.0 - 22.0	SMA-female	1.2	50	0.3
WR62	12.4 - 18.0	SMA-female	1.2	50	0.25
WR62	12.4 - 18.0	N-female	1.2	100	0.25
WR75	10.0 - 15.0	SMA-female	1.2	50	0.25
WR75	10.0 - 15.0	N-female	1.2	100	0.25
WR90	8.20 - 12.4	SMA-female	1.2	50	0.22
WR90	8.20 - 12.4	N-female	1.2	100	0.22
WR102	7.00 - 11.0	SMA-female	1.2	50	0.22
WR102	7.00 - 11.0	N-female	1.2	200	0.22
WR112	7.05 - 10.0	SMA-female	1.2	50	0.2
WR112	7.05 - 10.0	N-female	1.2	200	0.2
WR137	5.85 - 8.20	SMA-female	1.2	50	0.2
WR137	5.85 - 8.20	N-female	1.2	200	0.2
WR159	4.90 - 7.05	SMA-female	1.2	50	0.18
WR159	4.90 - 7.05	N-female	1.2	200	0.18
WR187	3.95 - 5.85	SMA-female	1.2	50	0.17
WR187	3.95 - 5.85	N-female	1.2	200	0.17
WR229	3.30 - 4.90	SMA-female	1.2	50	0.16
WR229	3.30 - 4.90	N-female	1.2	200	0.16
WR284	2.60 - 3.95	SMA-female	1.2	50	0.15
WR284	2.60 - 3.95	N-female	1.2	200	0.15
WR340	2.20 - 3.30	SMA-female	1.2	50	0.13
WR340	2.20 - 3.30	N-female	1.2	200	0.13
WR430	1.70 - 2.60	SMA-female	1.2	50	0.13
WR430	1.70 - 2.60	N-female	1.2	200	0.13
WR650	1.12 - 1.70	SMA-female	1.2	50	0.12
WR650	1.12 - 1.70	N-female	1.2	200	0.12
WR975	0.75 - 1.12	N-female	1.2	50	0.1

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