

Space Machine & Engineering Corp.

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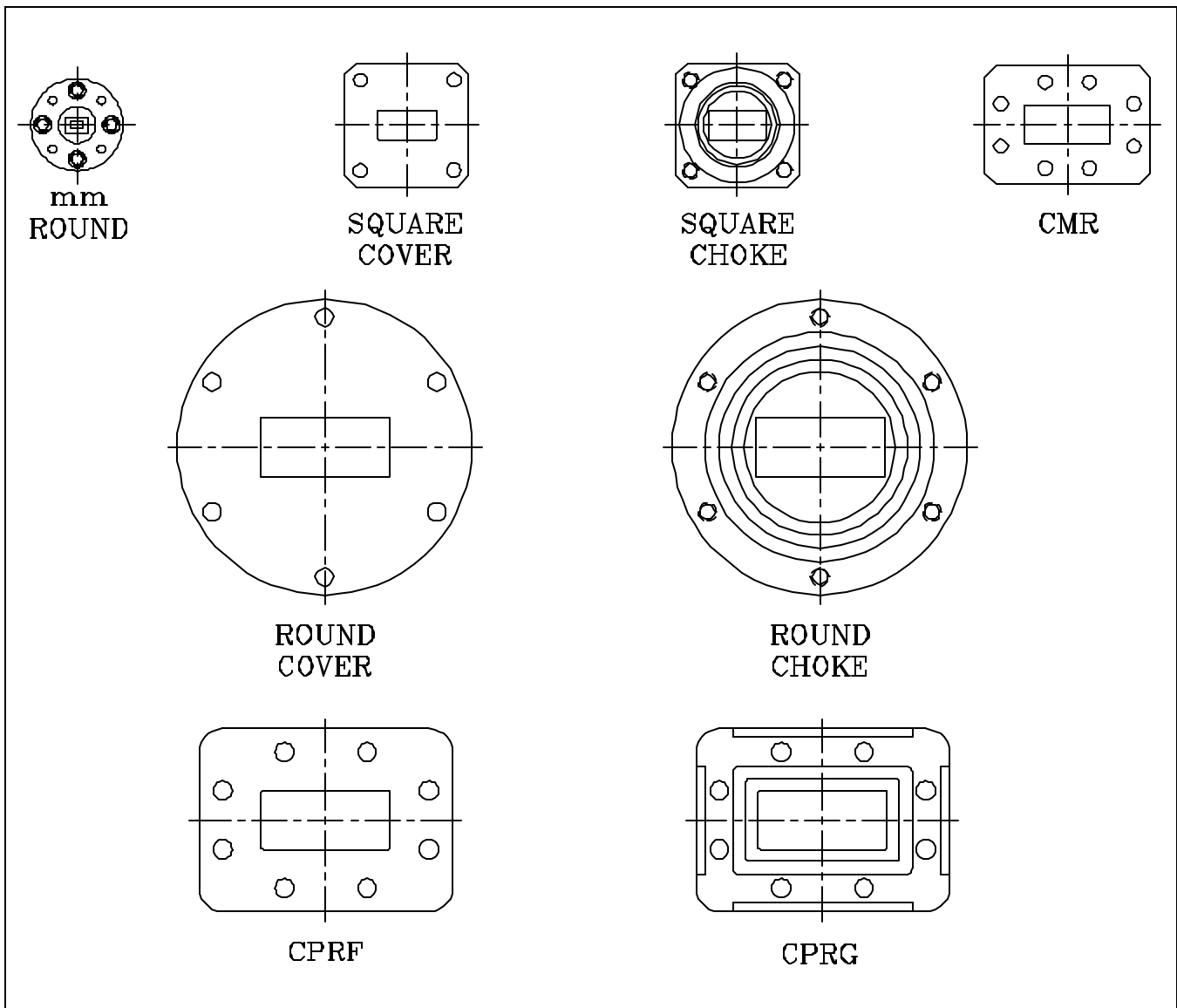
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Rectangular Waveguide Flanges



Space Machine offers a standard product line of flanges covering waveguide sizes WR10 thru WR650. Additional material, sizes and configurations are available on request.

Ordering Information:

Rectangular Waveguide Flange, WR137,
Brass, CMR Flange UG1476/U, Butt Type.

Example part number:

WGF	wr	-m	f	t
WGF	137	-B	03	B

Series (WGF):

Waveguide Size (wr): WR10 thru WR650

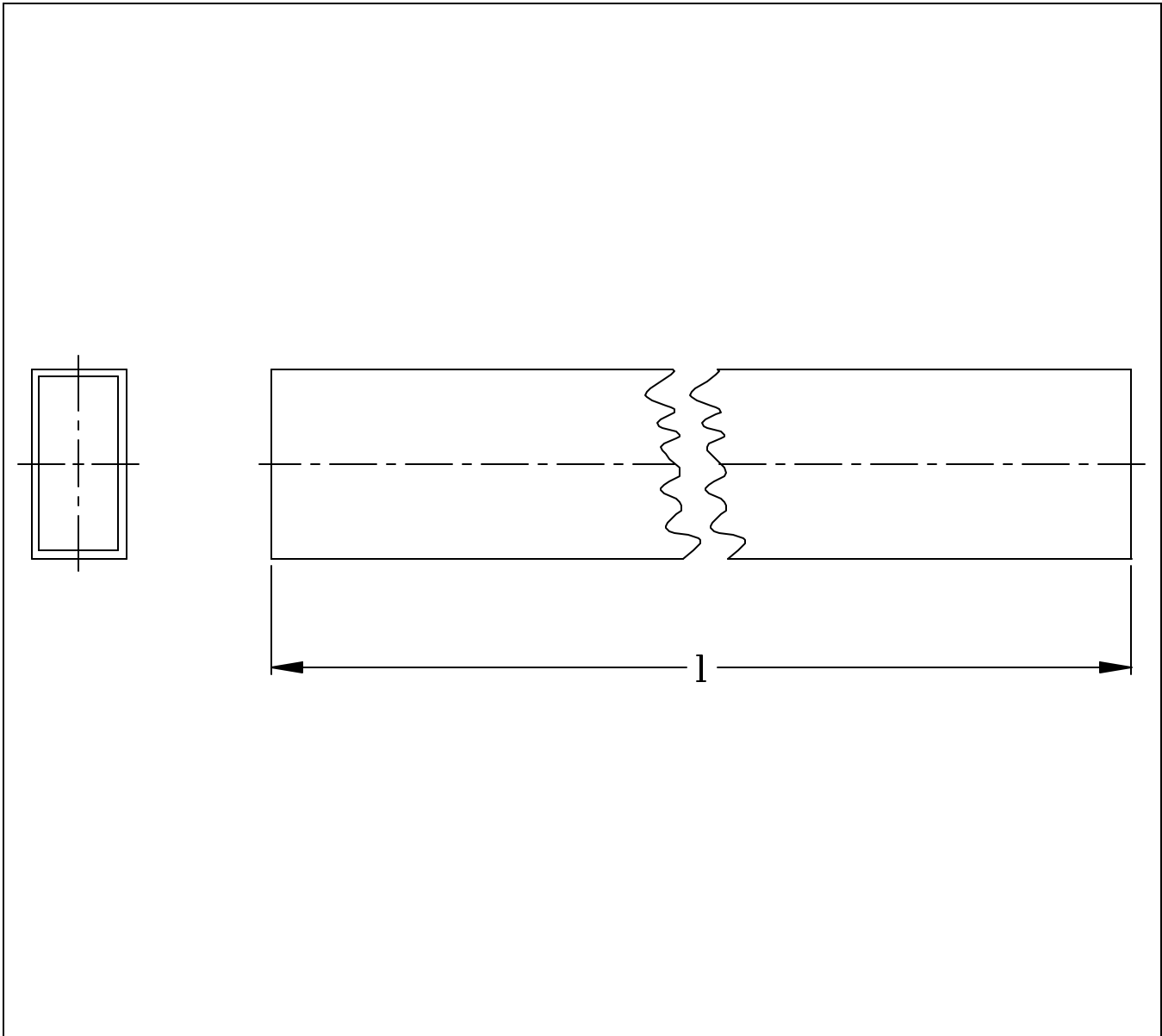
Material (-m): A – 6061 Aluminum, B – 360 Brass, C - OFHC Copper, O – Other

Flange (f): See [Appendix E](#)

Type (t): B – Butt, T – Thru, O – Other

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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 heavywall thickness and reduced height. Other configurations can be made to order.

Ordering Information:

Rectangular Waveguide Tubing, WR90 Heavywall, OFHC Copper, 144 in. long.

Example part number:

<u>RWT</u>	<u>wr</u>	<u>-m</u>	<u>l</u>
RWT	90HW	-C	144

Series (RWT):

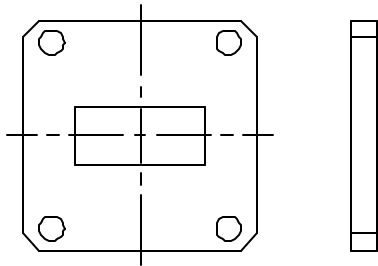
Waveguide Size (wr): WR10 thru WR650

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

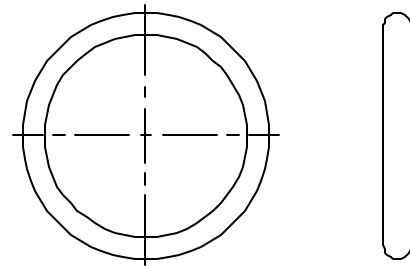
Length (l): Inches

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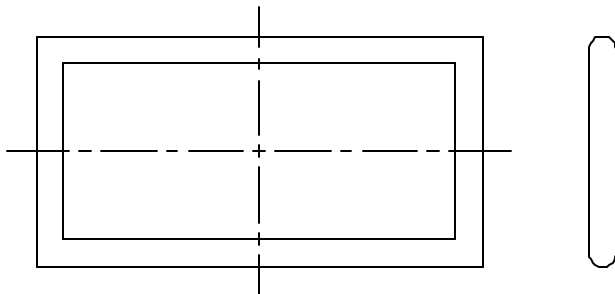
Rectangular Waveguide Gaskets and O-rings



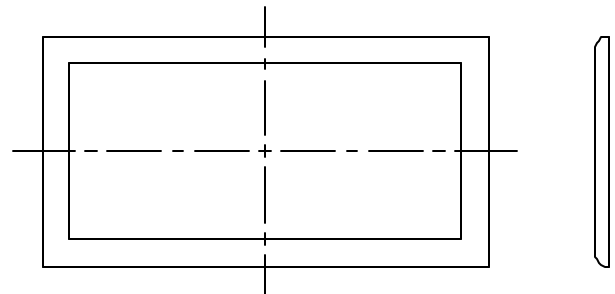
1-EMI/RFI GASKET



2-CHOKE



4F-CPRG FULL GASKET



4H-CPRG HALF GASKET

Space Machine offers a standard product line of gaskets and o-rings covering waveguide sizes from WR28 thru WR650. Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide gasket, WR90,
Full gasket for CPRG 90 flange.

Example part number:

<u>WOR</u>	<u>wr</u>	<u>-g</u>
WOR	90	-4F

Series (WOR):

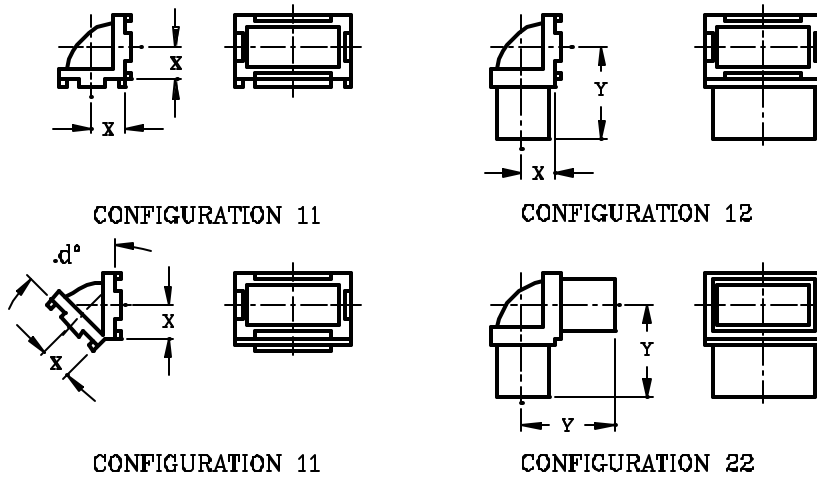
Waveguide Size (wr): WR28 thru WR650

Gasket Type (-g): 1 - EMI/RFI Gasket, 2 - Choke, 4F - CPRG Full Gasket, 4H - CPRG Half Gasket

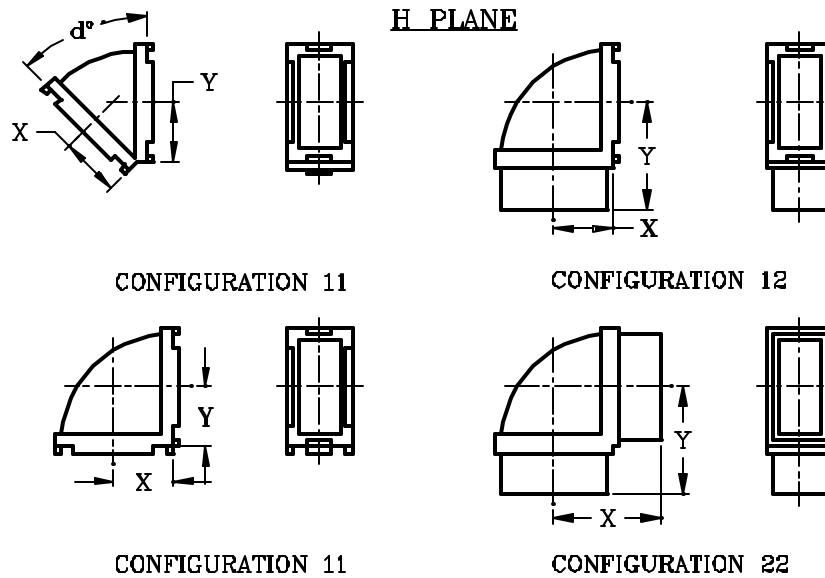
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Rectangular Waveguide Cast E & H Plane Bends

E PLANE



H PLANE



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 on request.

Ordering Information:

90° Cast E-Bend, WR112, Aluminum, Configuration 11.

Example part number:

<u>d</u>	<u>CtB</u>	<u>wr</u>	<u>-m</u>	<u>con</u>
90	CEB	112	-A	11

Degree of bend (d): 30, 45, 60, 90

Series (CEB): E – Plane
(CHB): H – Plane

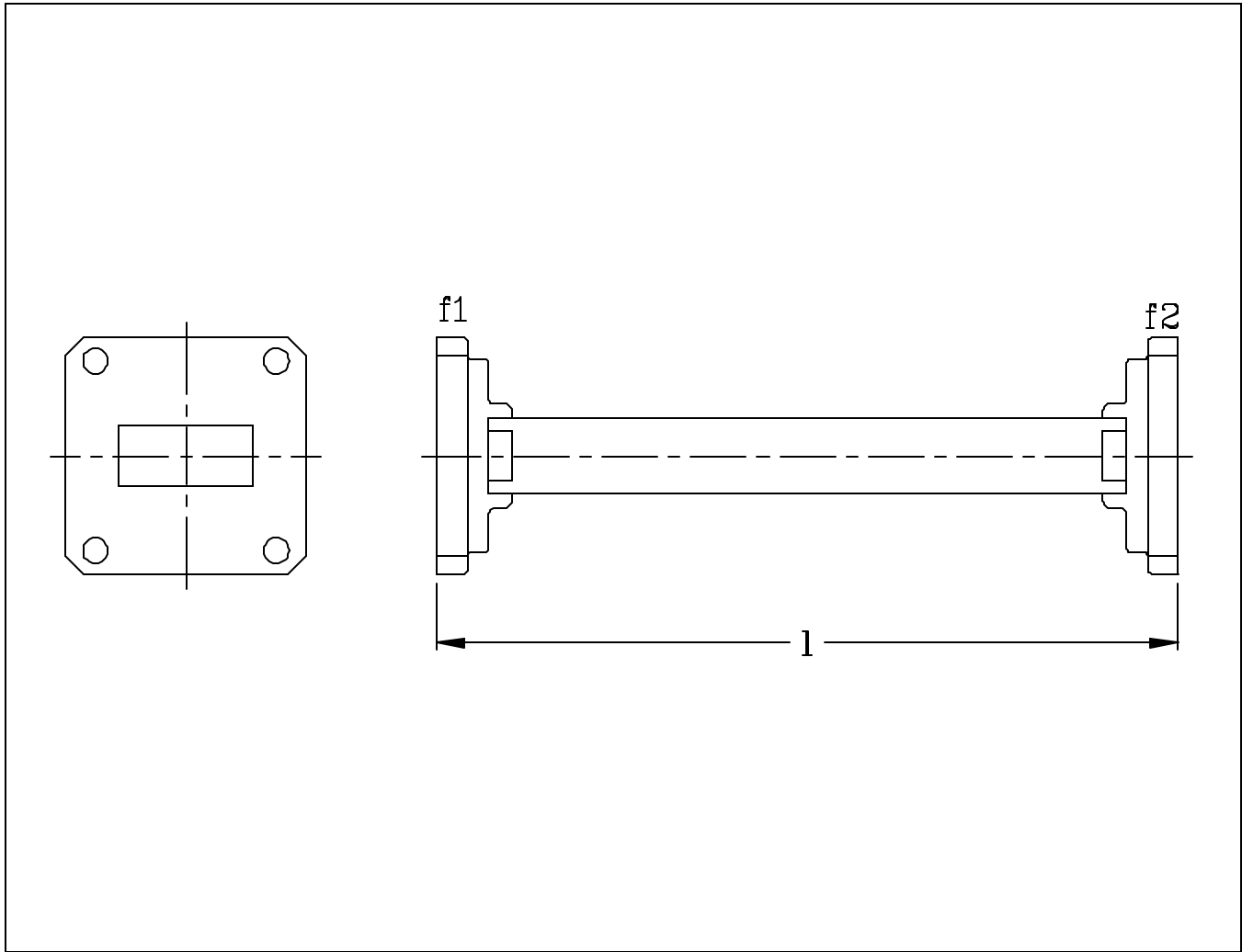
Waveguide Size (wr): WR28 thru WR284

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 1.05:1 maximum over the full waveguide bandwidth.

Ordering Information:

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

Example part number:

<u>WSS</u>	<u>wr</u>	<u>-l</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>f</u>
WSS	112	-12.0	B	01 02	-S	P

Series (WSS):

Waveguide Size (wr): WR10 thru WR650

Length (-l): (inches)

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

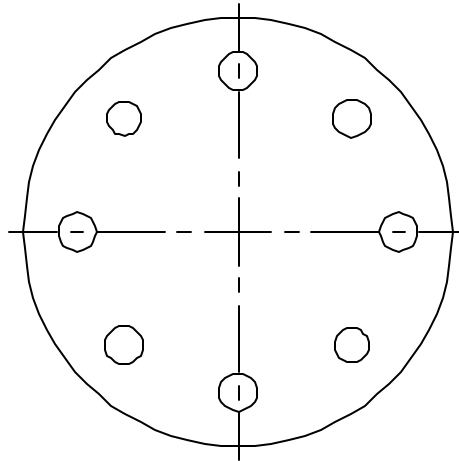
Flange (f1 f2): See [Appendix F](#)

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

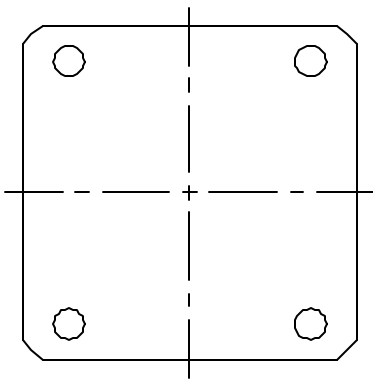
Finish (f): P – Paint Space Machine Gray, N – None, O – Other

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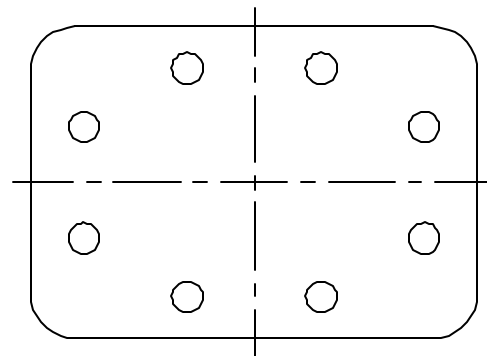
Rectangular Waveguide Shorts



CIRCULAR



SQUARE



RECTANGULAR

Space Machine offers a standard product line of shorts covering waveguide sizes WR22 thru WR650. Offset shorts of various wavelengths are also available. 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.

Example part number:

<u>WGS</u>	<u>wr</u>	<u>-m</u>	<u>f</u>	<u>-p</u>	<u>f</u>
WGS	137	-B	01	-C	P

Series (WGS):

Waveguide Size (wr): WR22 thru WR650

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

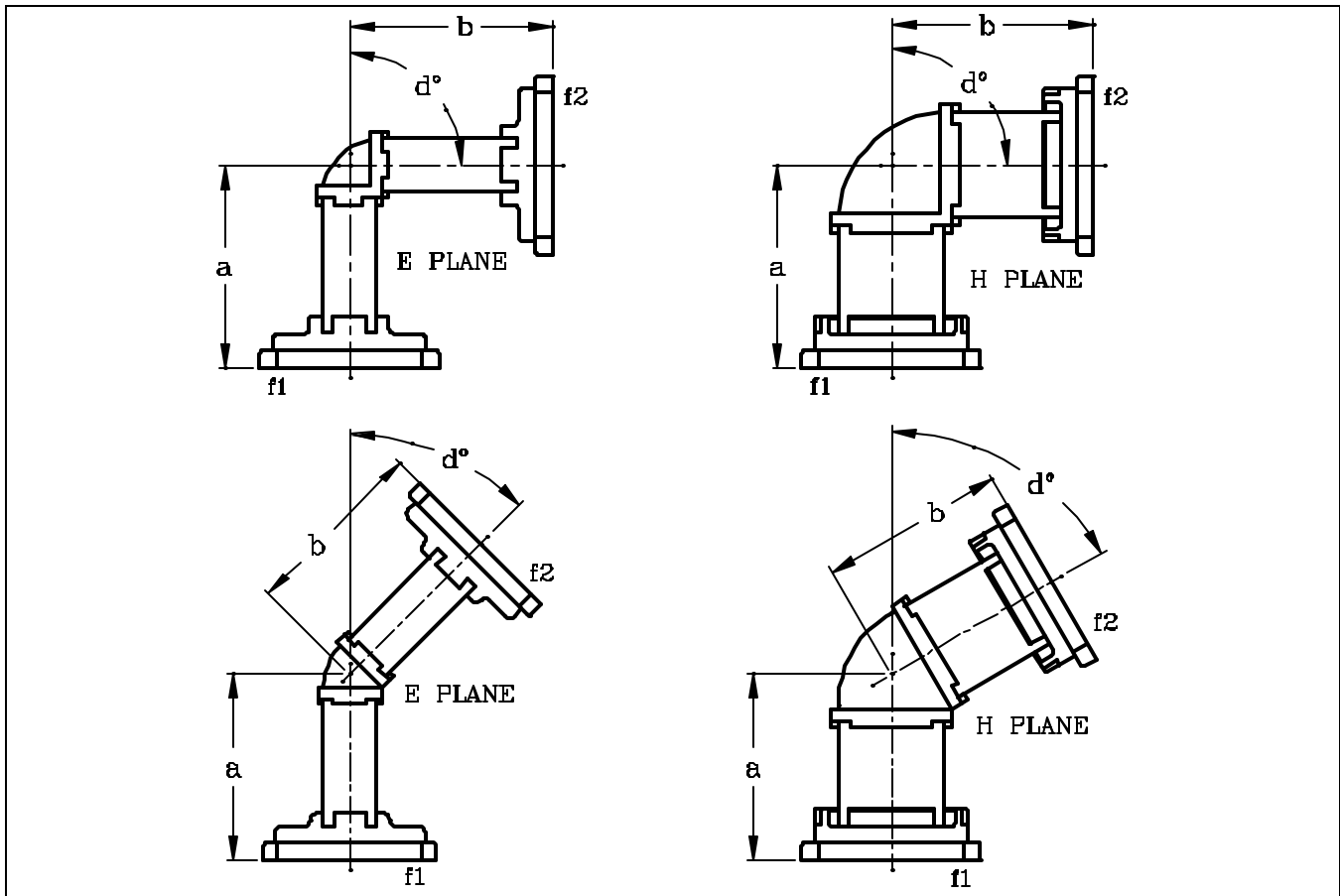
Flange (f): See [Appendix F](#)

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 1.10:1 over the full waveguide band.

Ordering Information:

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

Example part number:

<u>d</u>	<u>CtA</u>	<u>wr</u>	<u>-a</u>	<u>xb</u>	<u>m</u>	<u>f1</u>	<u>f2</u>	<u>-p</u>	<u>f</u>
90	CEA	90	-3	x3	A	02	01	-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

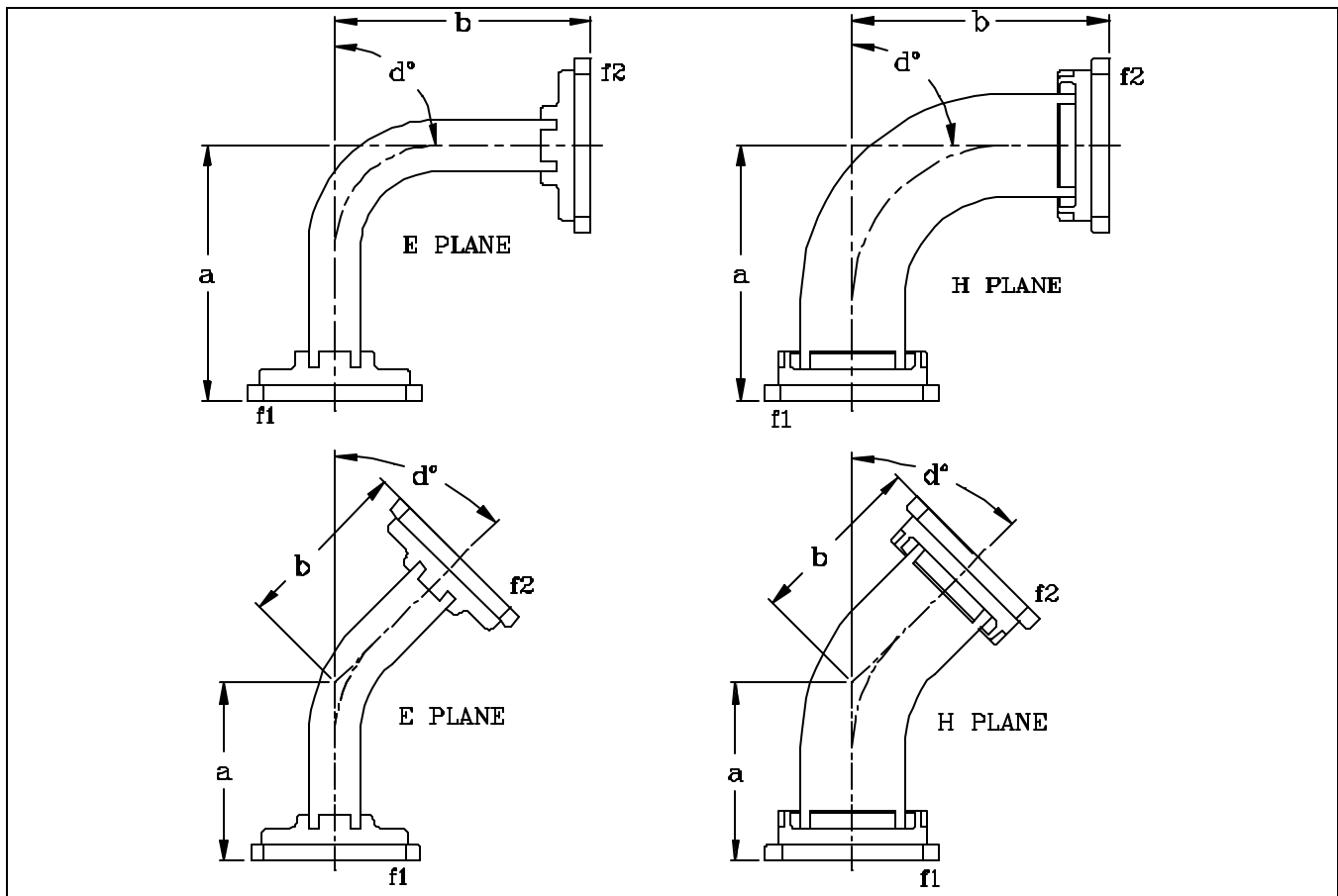
Flange (f1 f2): See [Appendix F](#)

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 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.

Ordering Information:

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

Example part number:

<u>d</u>	<u>FtB</u>	<u>wr</u>	<u>-a</u>	<u>xb</u>	<u>m</u>	<u>f1</u>	<u>f2</u>	<u>-p</u>	<u>f</u>
90	FEB	90	-3	x3	A	02	01	-C	P

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

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

Waveguide Size (wr): WR10 thru WR430

Leg Length (-a):

Leg Length (b):

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

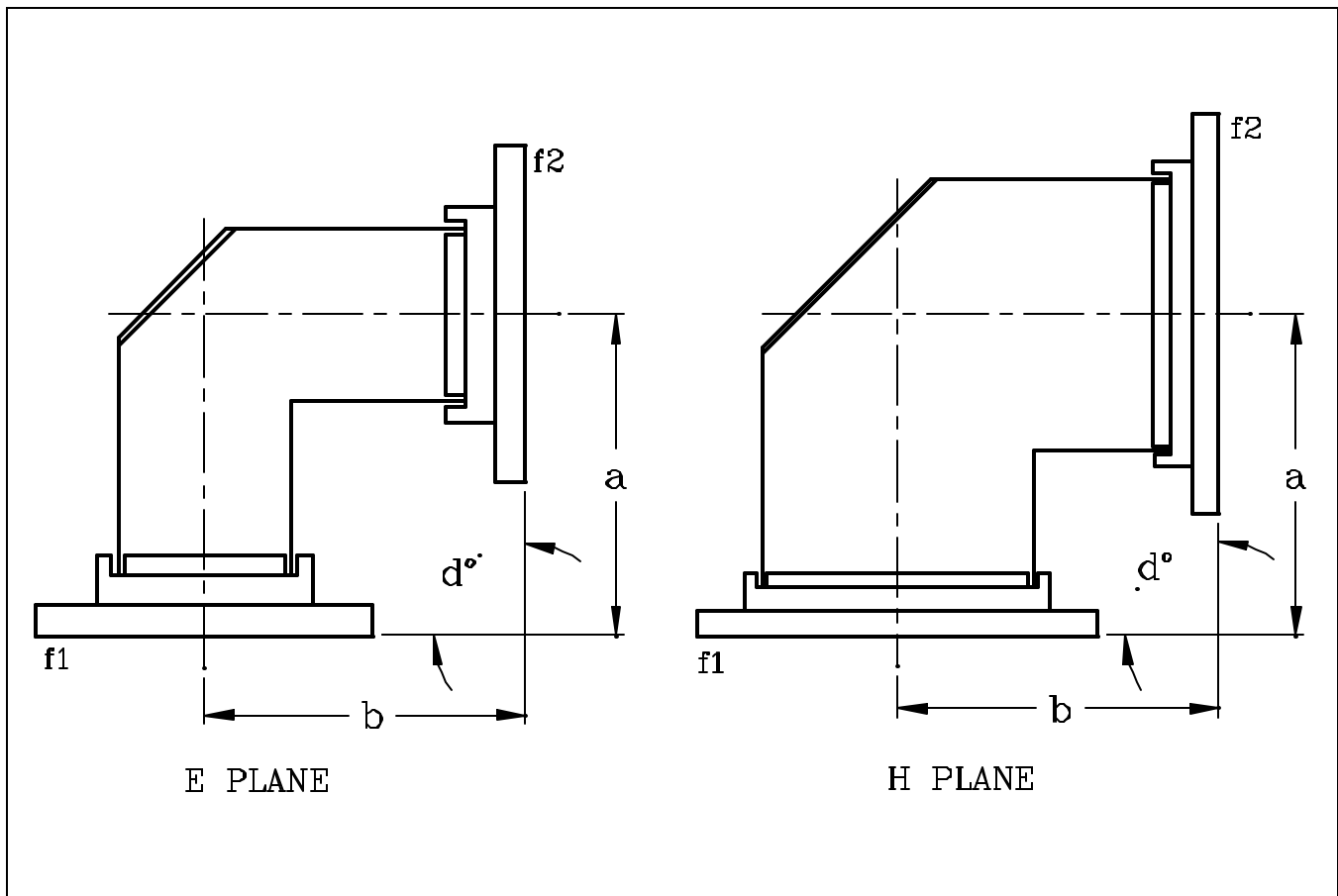
Flange (f1 f2): See [Appendix F](#)

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 Mitered E & H Plane Bend Assemblies



Space Machine offers a standard product line of mitered E and H mitered bends covering the waveguide sizes WR28 thru WR650. VSWR is less than 1.10 maximum over the full waveguide band. Degree of bend, leg lengths and flange types are made to customer specifications.

Ordering Information:

90° Mitered bend, E-Plane, WR430,
6 inch X 6 inch, Aluminum,
CPRG / CPRF Flanges w/Corrals,
Chromated, No paint.

Example part number:

<u>d</u>	<u>MBt</u>	<u>wr</u>	<u>-a</u>	<u>xb</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>f</u>
90	MBE	430	-6	x6	A	07 08	-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

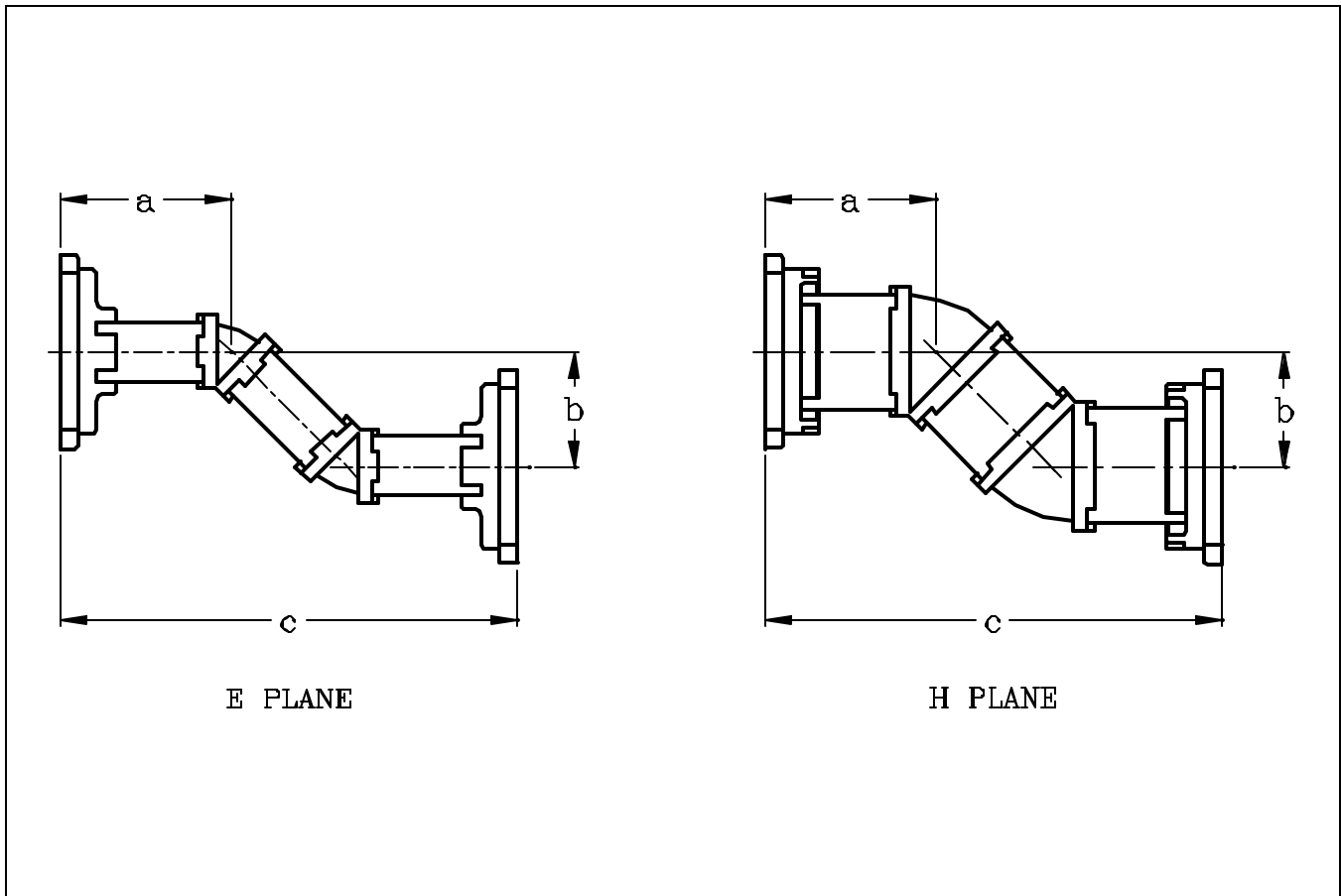
Flanges (f1 f2): See [Appendix F](#)

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 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.

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:

<u>CtO</u>	<u>wr</u>	<u>-a</u>	<u>xb</u>	<u>xc</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>f</u>
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

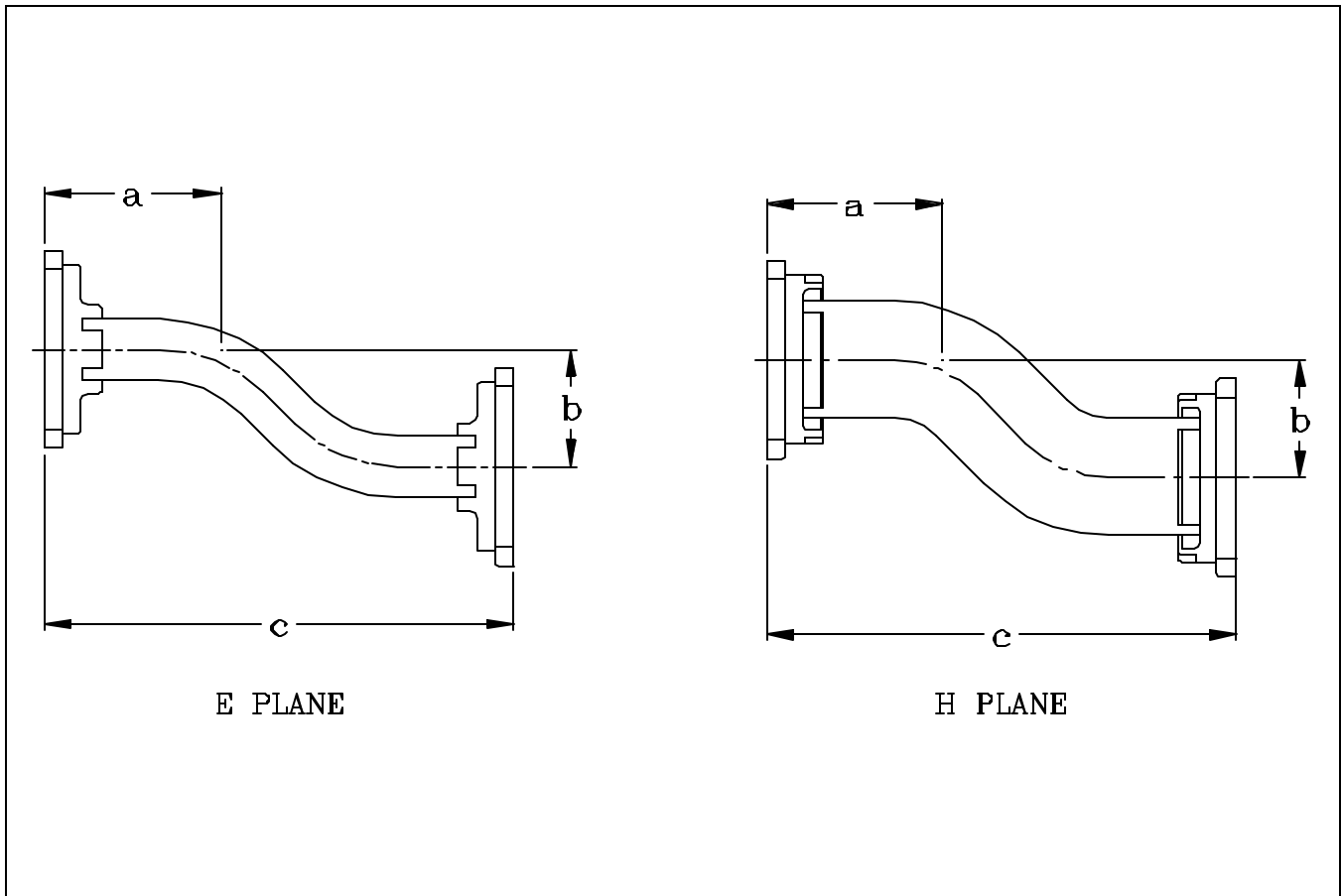
Flange (f1 f2): See [Appendix F](#)

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 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.

Ordering Information:

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

Example part number:

<u>FtO</u>	<u>wr</u>	<u>-a</u>	<u>xb</u>	<u>xc</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>f</u>
FHO	90	-4	x2	x6	B	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

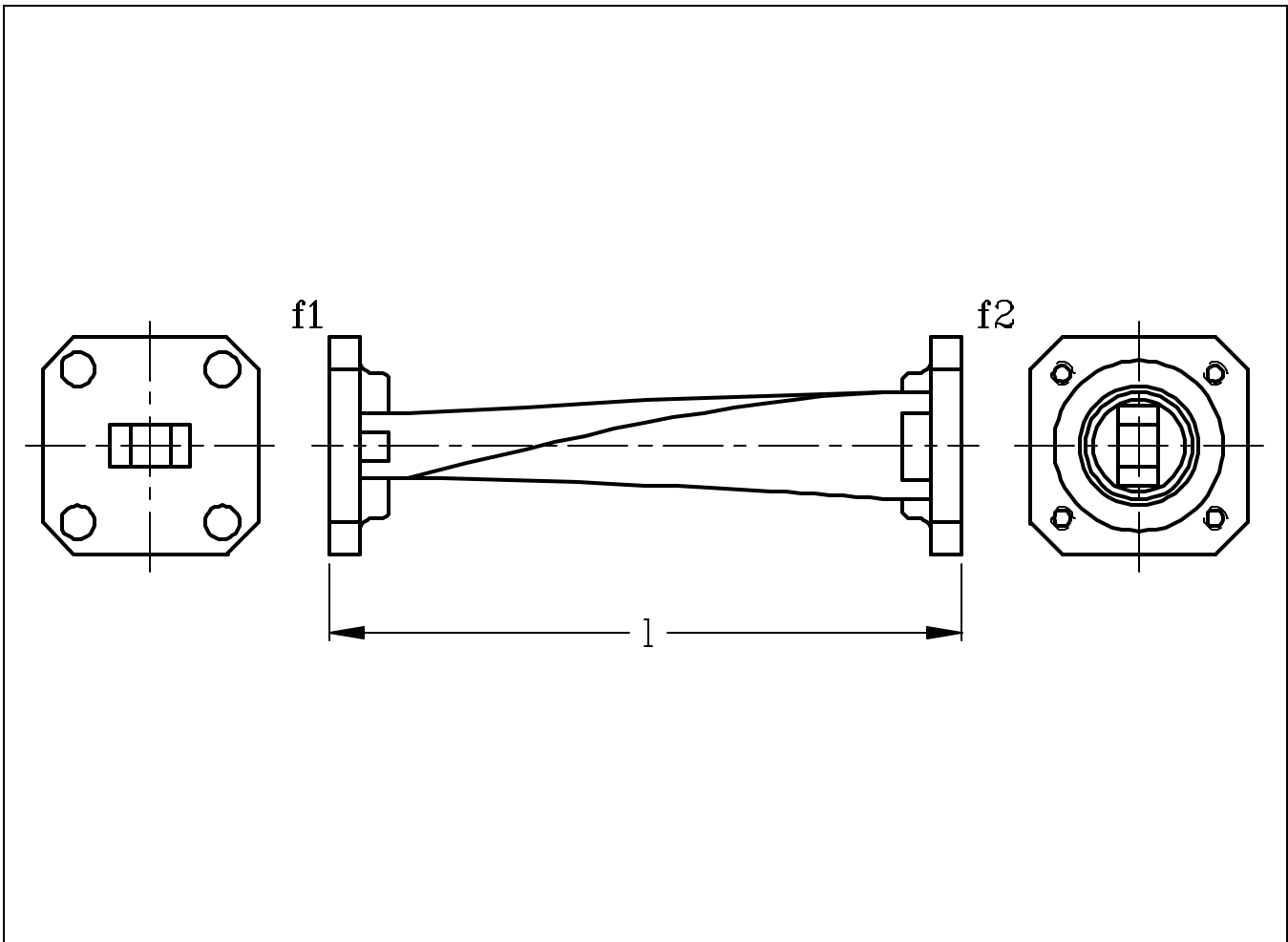
Flange (f1 f2): See [Appendix F](#)

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 Twist Assemblies



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.

Ordering Information:

90° Waveguide Twist, WR62,
6.0" Long, Bronze, Cover / Choke Flanges,
Silver Plated, Paint Space Machine Gray.

Example part number:

<u>d</u>	<u>WTW</u>	<u>wr</u>	<u>-l</u>	<u>m</u>	<u>f1</u>	<u>f2</u>	<u>-p</u>	<u>f</u>
90	WTW	62	-6.0	B	01	02	-S	P

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

Series (WTW):

Waveguide Size (wr): WR10 thru WR430

Length (-l): (inches)

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

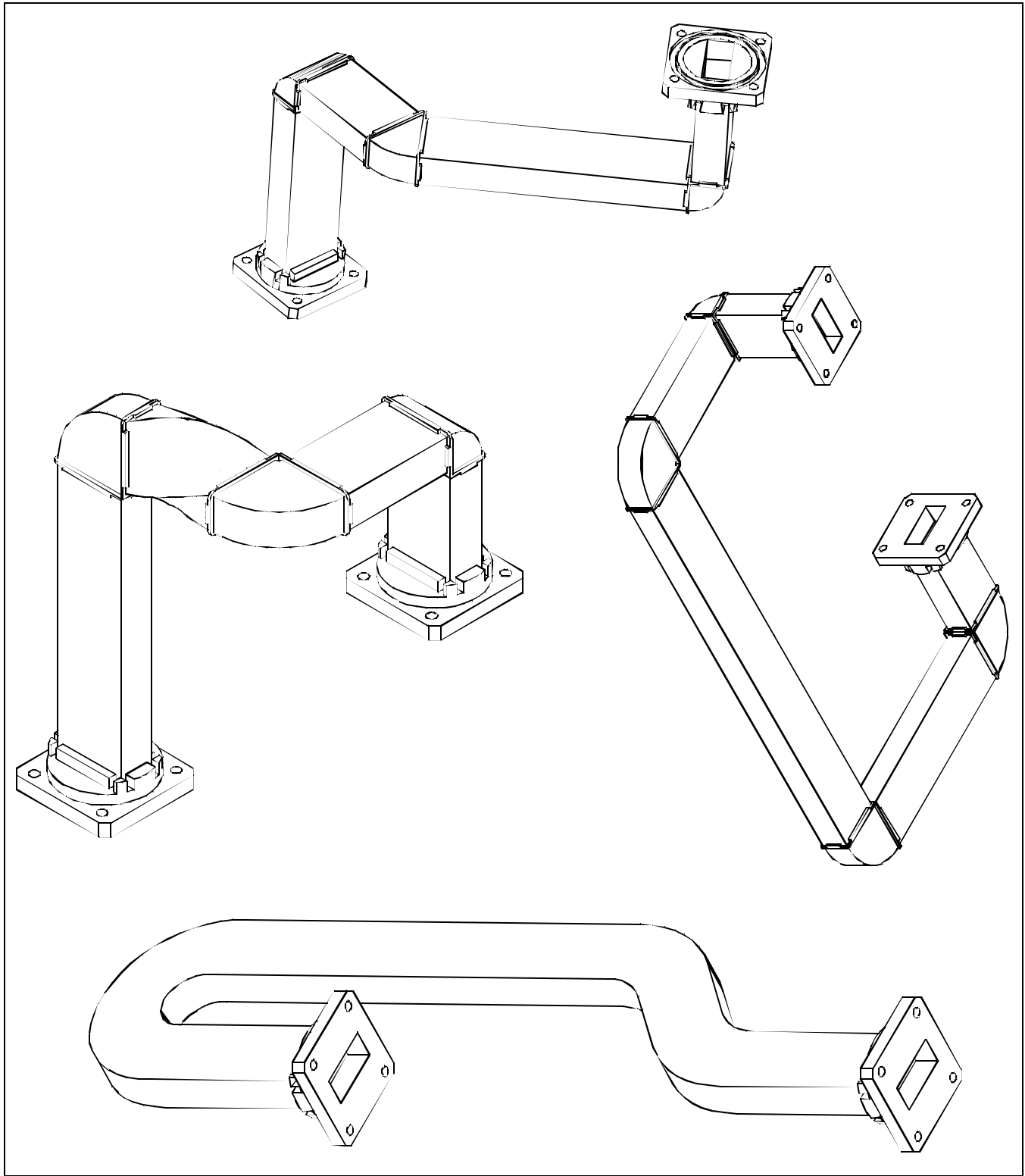
Flange (f1 f2): See [Appendix F](#)

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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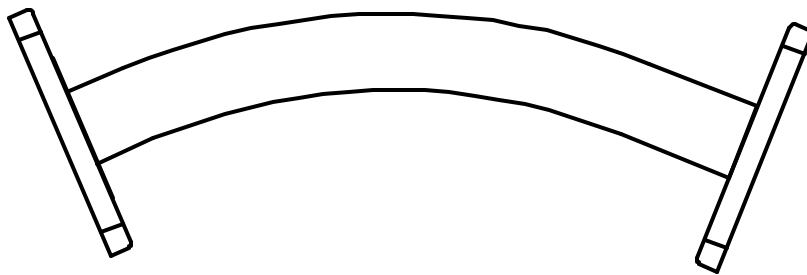
Rectangular Waveguide Specialized Bend Assemblies



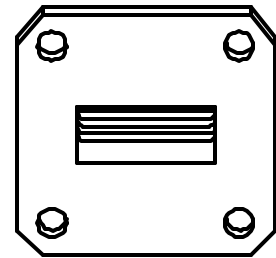
Space Machine can customize any waveguide bend assembly that you require.
Please contact the company with drawings, sketch or word descriptions for quote.

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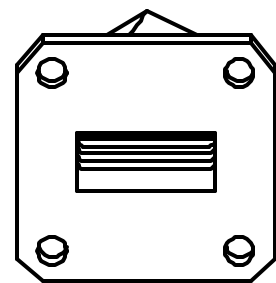
Rectangular Waveguide Flexible & Flexible – Twistable Assemblies



FLEXIBLE



FLEXIBLE – TWISTABLE



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.

Ordering Information:

Flexible – Twistable Waveguide, WR112,
12" Long, Brass, Cover / Cover Flanges,
Silver, Neoprene Jacket.

Example part number:

<u>WFx</u>	<u>wr</u>	<u>-l</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>j</u>
WFT	112	-12	B	01 01	-S	N

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

Waveguide Size (wr): WR10 thru WR650

Length (-l): (inches)

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

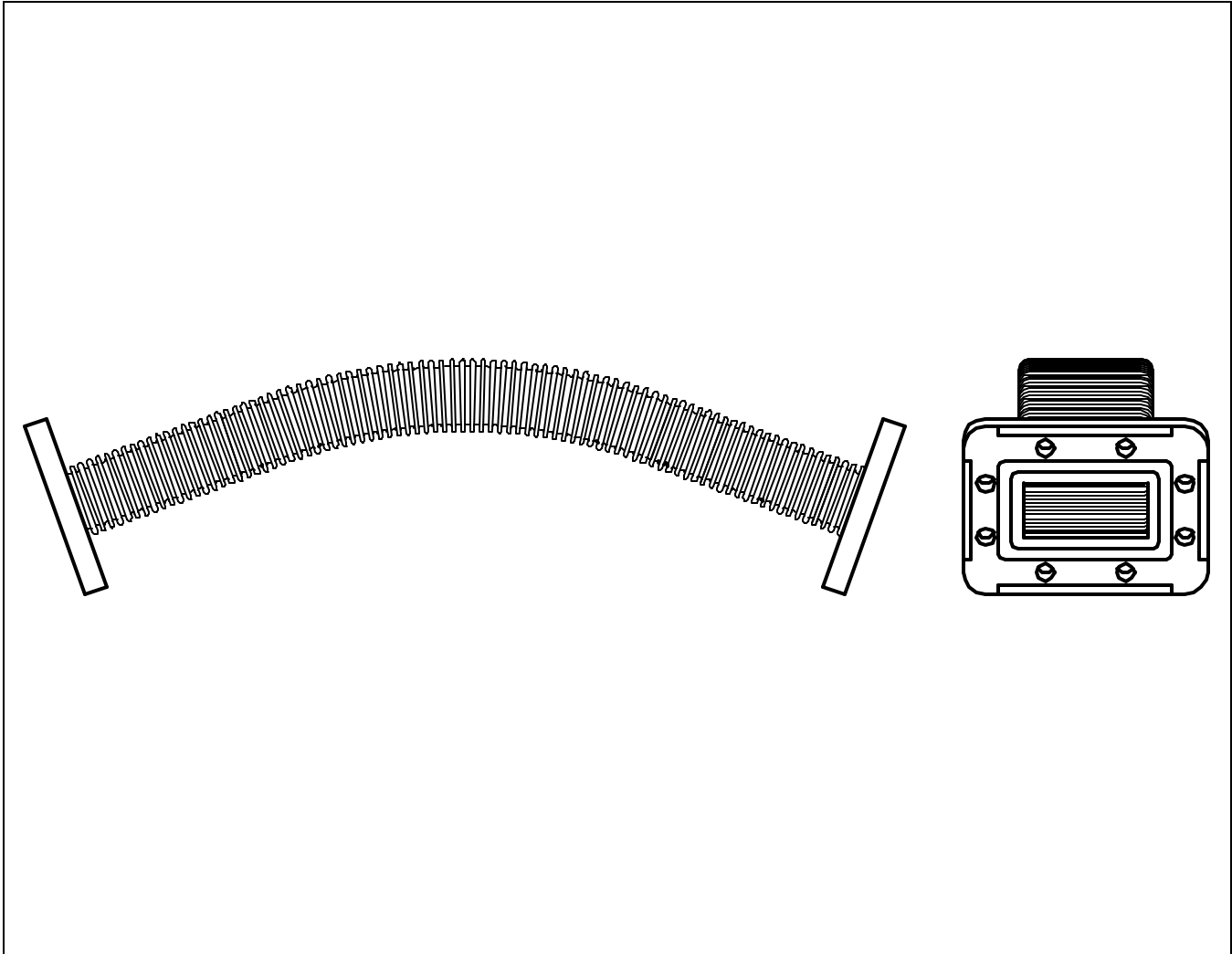
Flanges (f1 f2): See [Appendix F](#)

Plating (-p): 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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Rectangular Waveguide Seamless Flexible Assemblies



Space Machine offers a standard product line of seamless flexible rectangular waveguide covering waveguide sizes WR42 thru WR284. The standard waveguide material is silver-clad brass or beryllium copper.

Ordering Information:

**Seamless Flexible Waveguide, WR137,
12" Long, Brass, CPRG / CPRG Flanges,
Chromate d, Neoprene Jacket.**

Example part number:

<u>WFS</u>	<u>wr</u>	<u>-l</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>j</u>
WFS	137	-12	B	04 04	-C	N

Series (WFS): Seamless flex

Waveguide Size (wr): WR42 thru WR284

Length (-l): (inches)

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

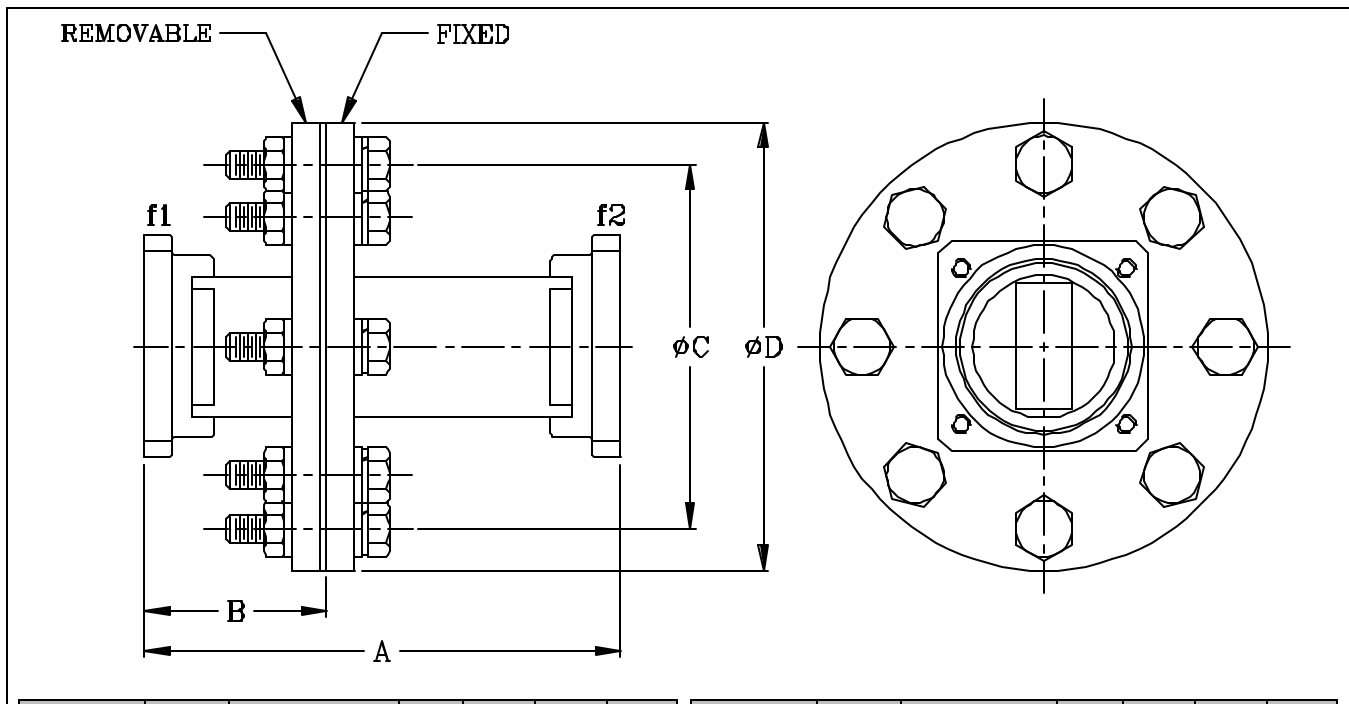
Flanges (f1 f2): See [Appendix F](#)

Plating (-p): 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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Rectangular Waveguide Bulkhead Feed Unit



Model	WR #	Frequency (GHz)	A	B	C	D	Model	WR #	Frequency (GHz)	A	B	C	D
BFU28-	28	26.50 - 40.00	3.00	1.00	2.50	3.00	BFU102-	102	7.00 - 11.00	4.25	1.63	3.25	4.00
BFU34-	34	22.00 - 33.00	3.00	1.00	2.50	3.00	BFU112-	112	7.05 - 10.00	4.25	1.63	3.25	4.00
BFU42-	42	18.00 - 26.50	3.00	1.00	2.50	3.00	BFU137-	137	5.85 - 8.20	4.25	1.63	4.00	4.75
BFU51-	51	15.00 - 22.00	3.00	1.00	2.50	3.00	BFU159-	159	4.90 - 7.05	4.25	1.63	5.25	6.00
BFU62-	62	12.40 - 18.00	3.00	1.00	2.63	3.25	BFU187-	187	3.95 - 5.85	4.25	1.63	5.25	6.00
BFU75-	75	10.00 - 15.00	3.75	1.38	2.88	3.50	BFU229-	229	3.30 - 4.90	4.25	1.63	6.00	6.75
BFU90-	90	8.20 - 12.40	3.75	1.38	2.88	3.50	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.

Example part number:

BFU **wr** **-m** **f1 f2** **-p f**
 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

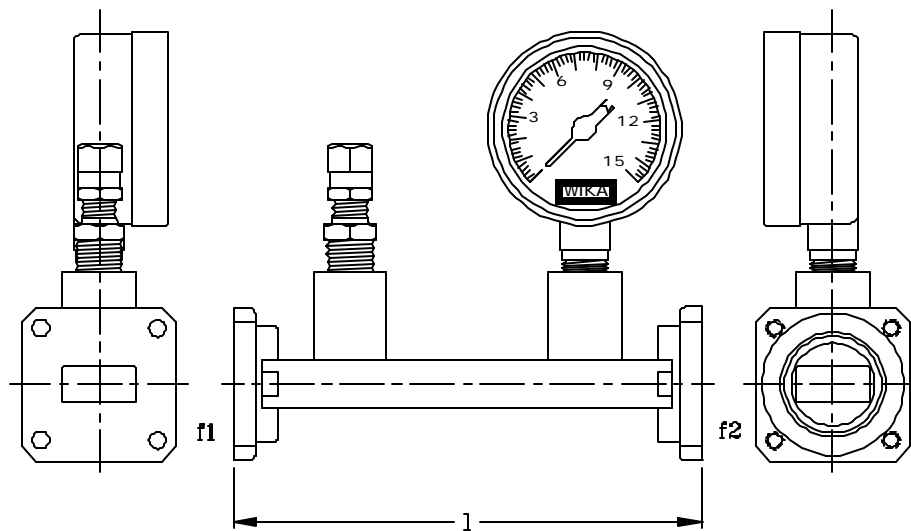
Flange (f1 f2): See [Appendix F](#)

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 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. 1/8" Schrader inlet valve included in standard assembly. Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide Pressure Adapter, WR75,
4 inches long, Bronze, Cover / Choke Flanges,
Chromate, Paint Space Machine Gray.

Example part number:

WPA **wr** **-l** **m** **f1 f2** **-p** **f**
WPA 75 -4.0 B 01 02 -C P

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 F](#)

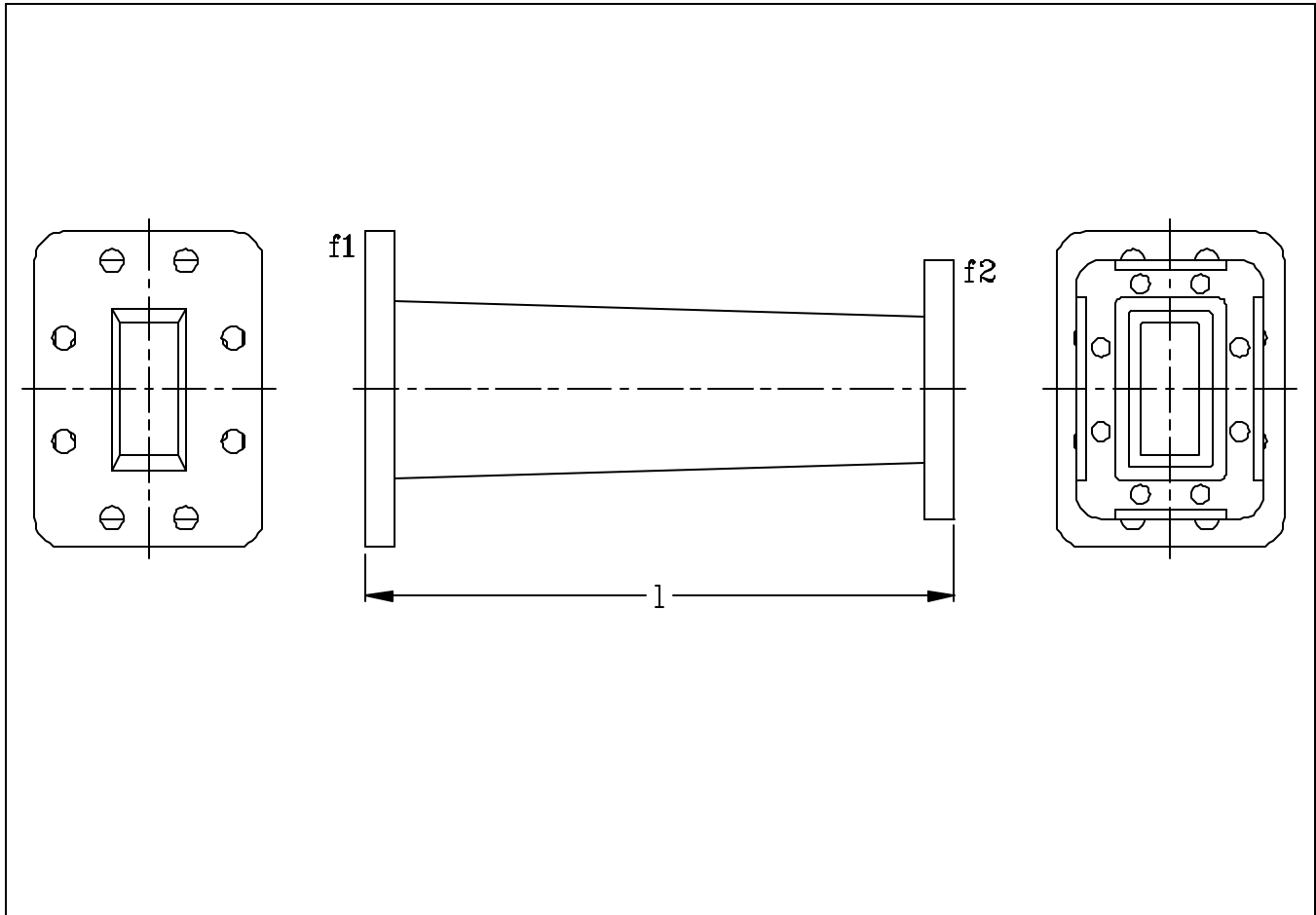
Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

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

Space Machine & Engineering Corp.

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, Example part number:
 WR137 CPRF Flange to WR112 CPRG Flange,
 Brass, 5.0" Long, Silver Plated,
 Paint Space Machine Gray.

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

Series (WWT):

Waveguide Size 1 (wr1): WR10 thru WR975

Flange 1 (-f1): See [Appendix F](#)

Waveguide Size 2 (-wr2): WR10 thru WR975

Flange 2 (-f2): See [Appendix F](#)

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

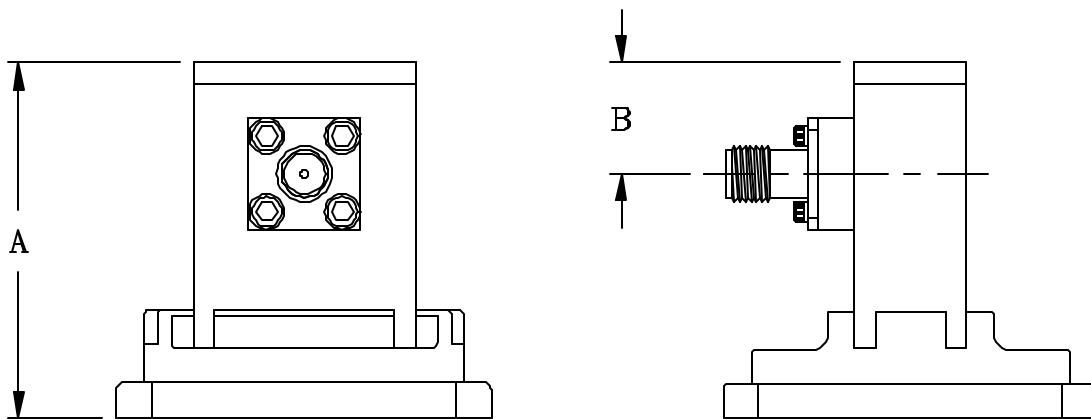
Length (l): (inches)

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	Model	WR #	Frequency (GHz)	A	B
WCA28-	28	26.50 - 40.00	0.96	0.34	WCA159-	159	4.90 - 7.05	2.25	0.76
WCA34-	34	22.00 - 33.00	1.00	0.36	WCA187-	187	3.95 - 5.85	2.34	0.88
WCA42-	42	18.00 - 26.50	1.00	0.39	WCA229-	229	3.30 - 4.90	2.53	1.04
WCA51-	51	15.00 - 22.00	1.20	0.43	WCA284-	284	2.60 - 3.95	3.36	1.23
WCA62-	62	12.40 - 18.00	1.85	0.45	WCA340-	340	2.20 - 3.30	3.50	1.50
WCA75-	75	10.00 - 15.00	2.00	0.47	WCA430-	430	1.70 - 2.60	4.00	1.71
WCA90-	90	8.20 - 12.40	2.00	0.54	WCA510-	510	1.45 - 2.20	5.00	2.01
WCA102-	102	7.00 - 11.00	2.00	0.60	WCA650-	650	1.12 - 1.70	6.00	2.49
WCA112-	112	7.05 - 10.00	2.00	0.63	WCA770-	770	0.96 - 1.45	7.50	2.95
WCA137-	137	5.85 - 8.20	2.20	0.66	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 max and insertion loss is 0.2 dB max. Additional sizes and configurations available upon request.

Ordering Information:

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

Example part number:

WCA	wr	-m	f	cnt	-p	f
WCA	112	-B	01	SF	-S	P

Series (WCA):

Waveguide Size (wr): WR10 thru WR975

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

Flange (f): See [Appendix F](#)

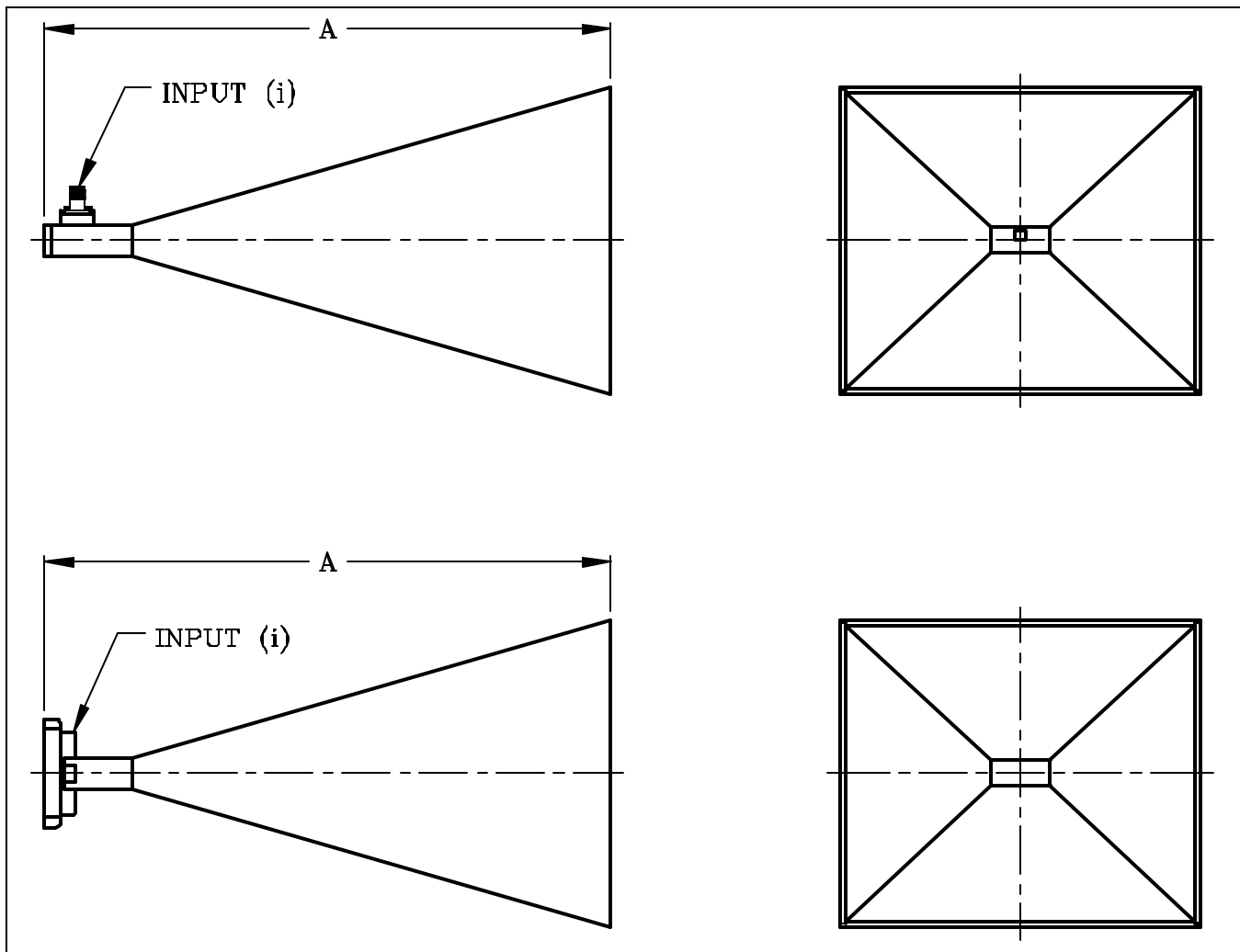
Connector (cnt): See [Appendix E](#)

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.

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 ± 1 dB maximum. See next page for dimensions. Additional sizes and configurations are available on request.

Ordering Information:

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

Example part number: **WSH wr -m i -p f**
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 F](#))

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.

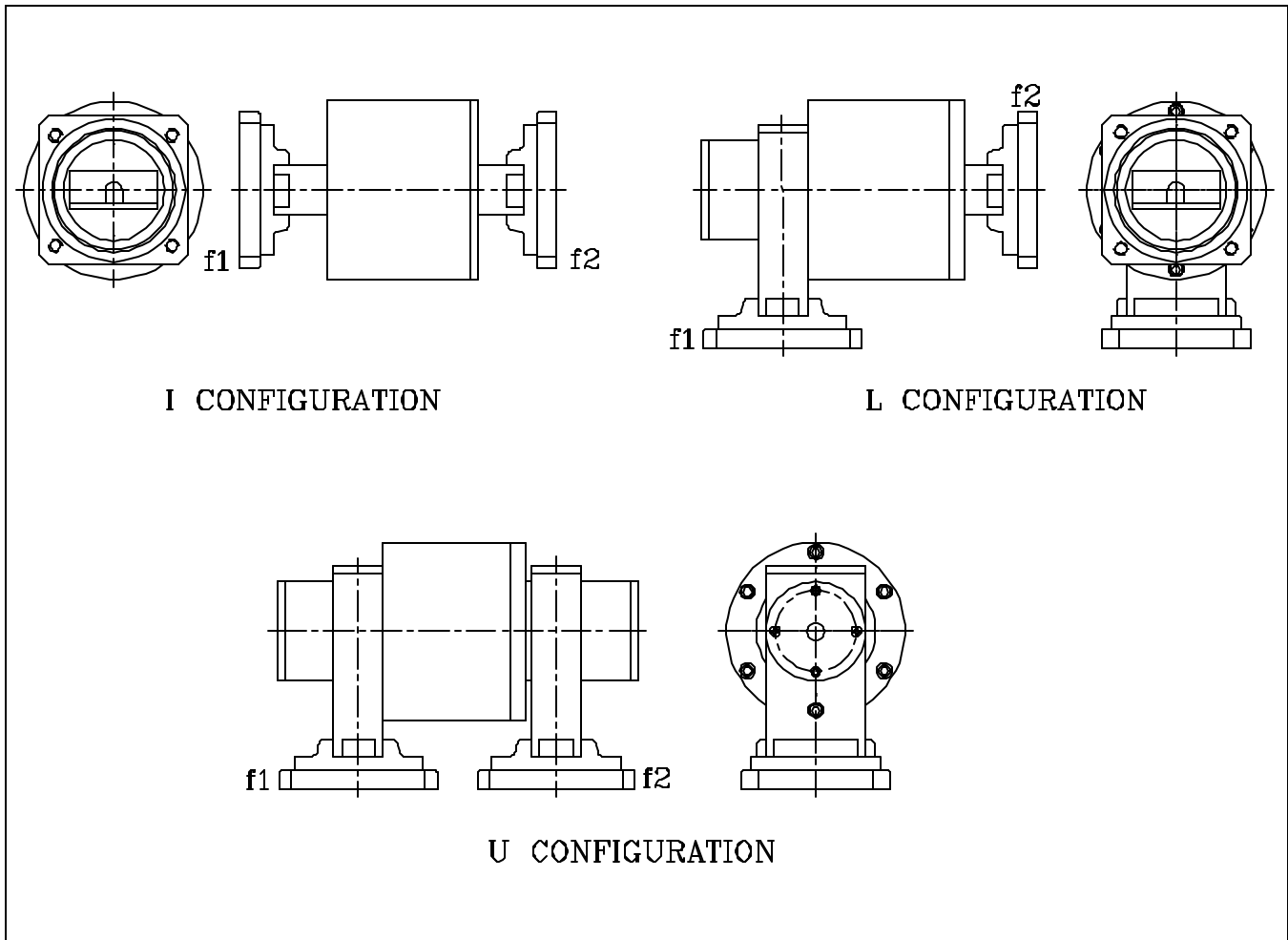
Rectangular Waveguide Standard Gain Horn Dimensions

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	22.1	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.

Single Channel Rectangular Waveguide Rotary Joints



Space Machine offers a standard product line of single channel waveguide rotary joints covering waveguide sizes WR28 thru WR284. 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:

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

Example part number:

<u>WRJ</u>	<u>wr</u>	<u>-m</u>	<u>f1 f2</u>	<u>con</u>	<u>-p</u>	<u>f</u>
WRJ	112	-B	01 02	I	-C	P

Series (WRJ):

Waveguide Size (wr): WR28 thru WR284

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

Flange (f1 f2): See [Appendix F](#)

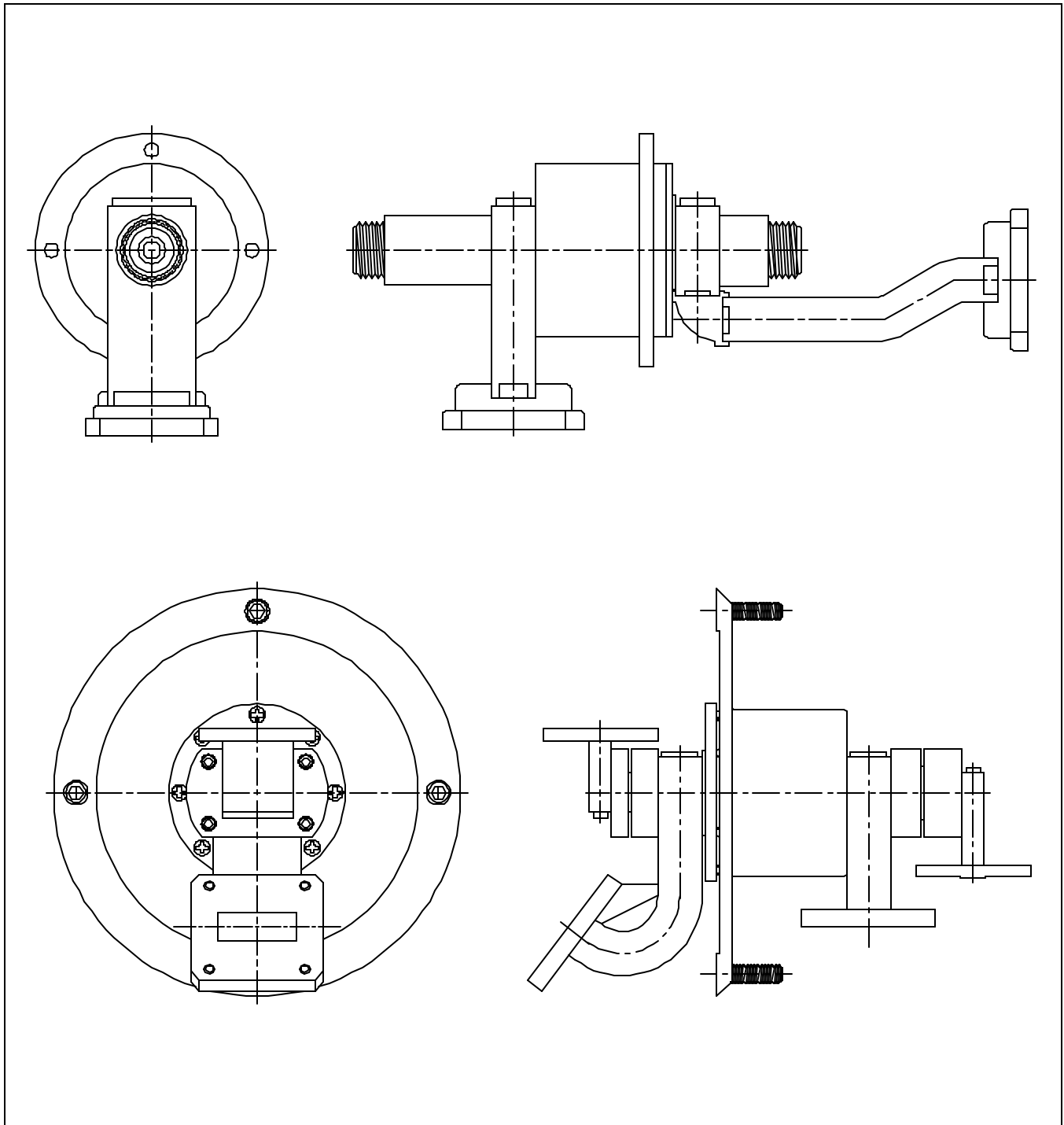
Configuration (con): I, L, U

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

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

Space Machine & Engineering Corp.

Dual Channel Rotary Joints



Space Machine offers a wide variety of dual channel rotary joints.

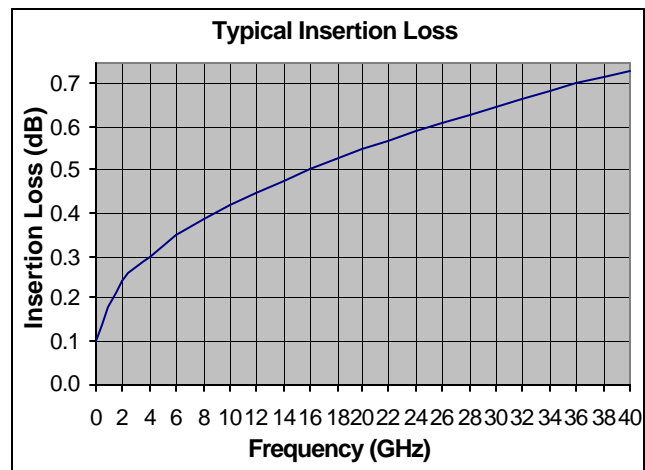
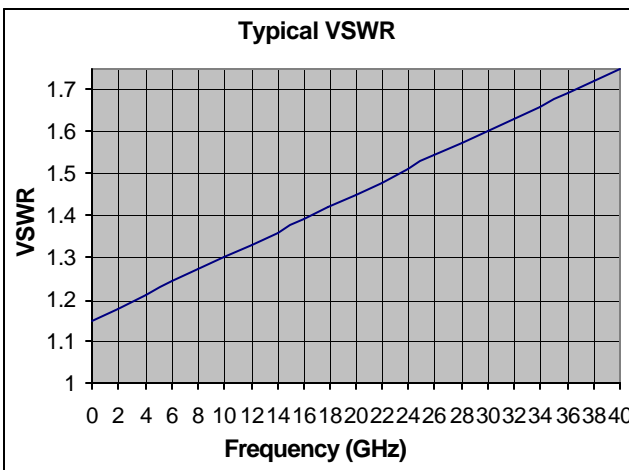
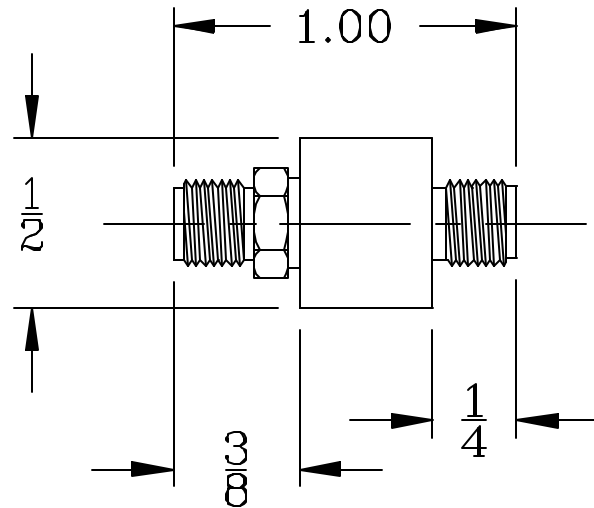
All of our dual channel rotary joints are custom built to customer specifications.

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.

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 $50/\sqrt{f}$ (GHz) W max. Peak power is 500 W max. Starting torque is 5 oz-in.

Ordering Information:

**K-Type coaxial rotary joint,
K-type female, K-type female, silver plated,
Paint Space Machine Grey.**

Example part number:

<u>CRJ</u>	<u>-cnt</u>	<u>-cnt</u>	<u>-p</u>	<u>f</u>
CRJ	KF	KF	S	P

Series (CRJ):

Connector (-cnt): KF - Female K-Type, KM - Male K-Type

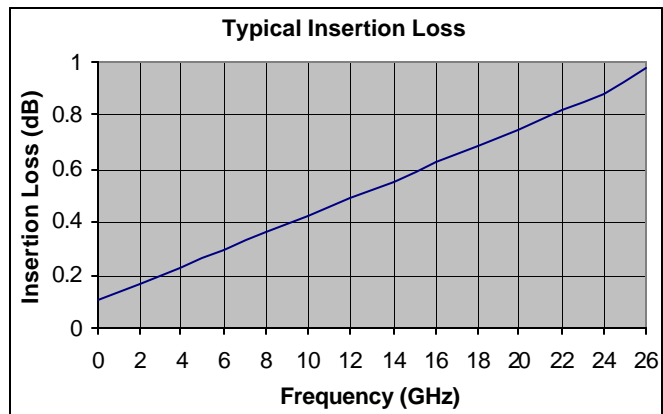
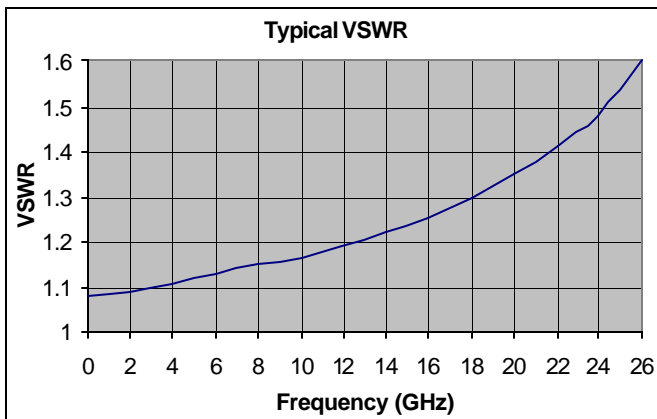
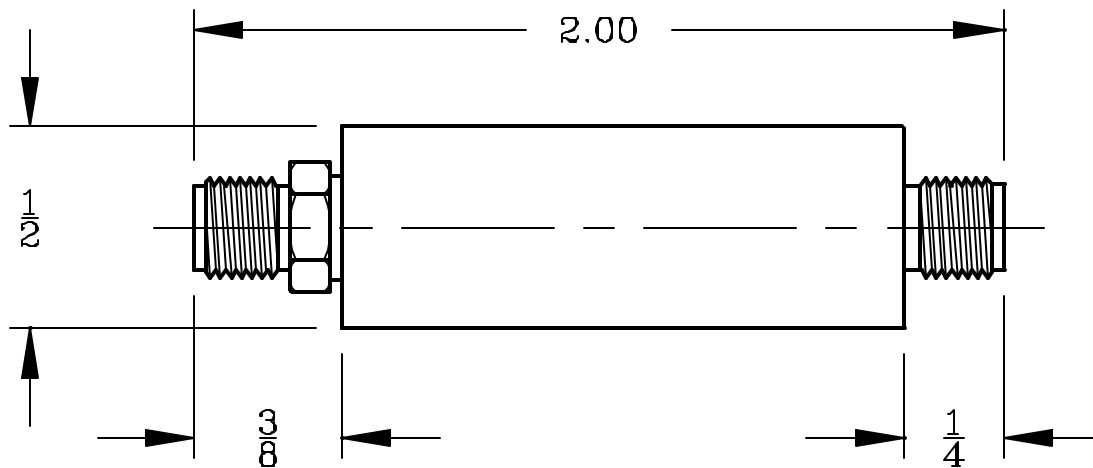
Connector (-cnt): KF - Female K-Type, KM - Male K-Type

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

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

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 @ 1 GHz, 100 W average. Starting torque is 5 oz-in.

Ordering Information:

SMA coaxial rotary joint,
SMA female, SMA female, silver plated,
Paint Space Machine Grey.

Example part number:

<u>CRJ</u>	<u>-cnt</u>	<u>-cnt</u>	<u>-p</u>	<u>f</u>
CRJ	SF	SF	S	P

Series (CRJ):

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

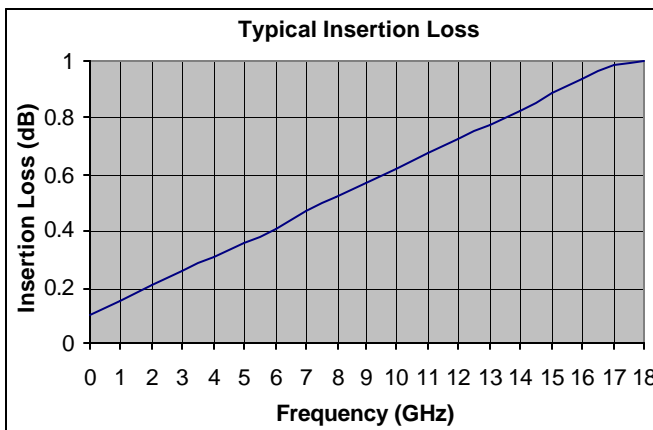
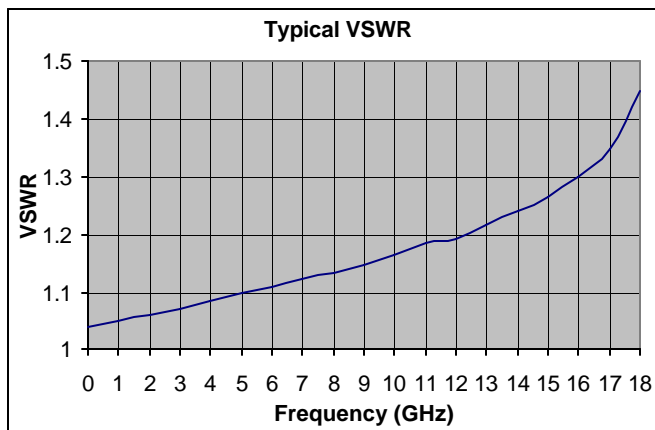
Connector (-cnt): SF - Female SMA, SM - Male SMA

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

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

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.

Ordering Information:

Type-N coaxial rotary joint,
Type-N female, Type-N male, silver plated,
Paint Space Machine Grey.

Example part number:

<u>CRJ</u>	<u>-cnt</u>	<u>-cnt</u>	<u>-p</u>	<u>f</u>
CRJ	NF	NM	S	P

Series (CRJ):

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

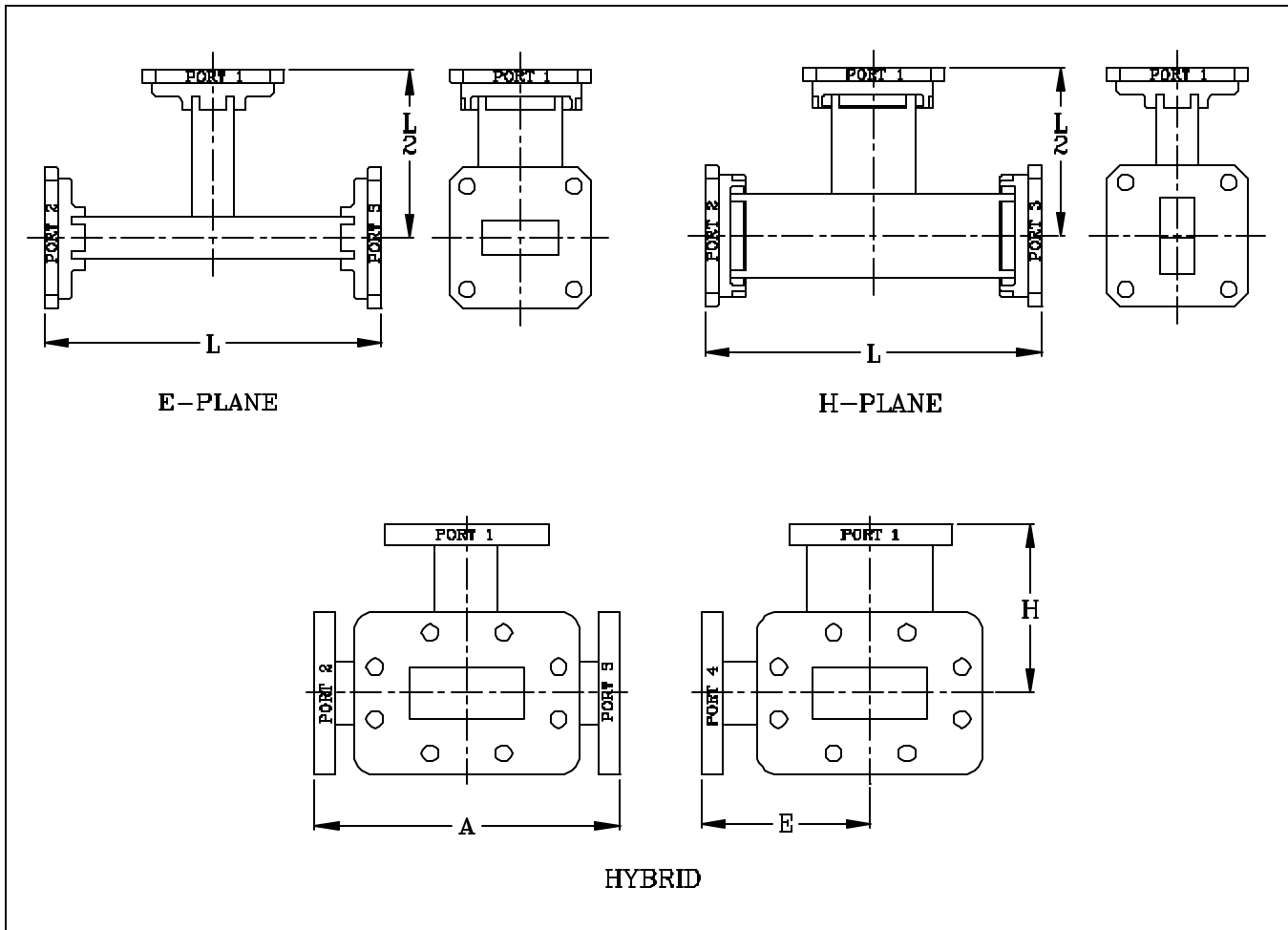
Connector (-cnt): NF - Female SMA, NM - Male SMA, TF - Female TNC, TM - Male TNC

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

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

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 ± 0.1 dB 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 ± 0.1 dB and E and H arm isolation is 30dB minimum.

Ordering Information:

Waveguide Tee Hybrid, WR137, Bronze,
CPRF Flange, Silver Plated, Paint Space Machine Gray.

Example part number:

Tt	wr	-m	f	-p	f
THB	137	-B	05	-S	P

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 F](#)

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

E and H Plane Tees

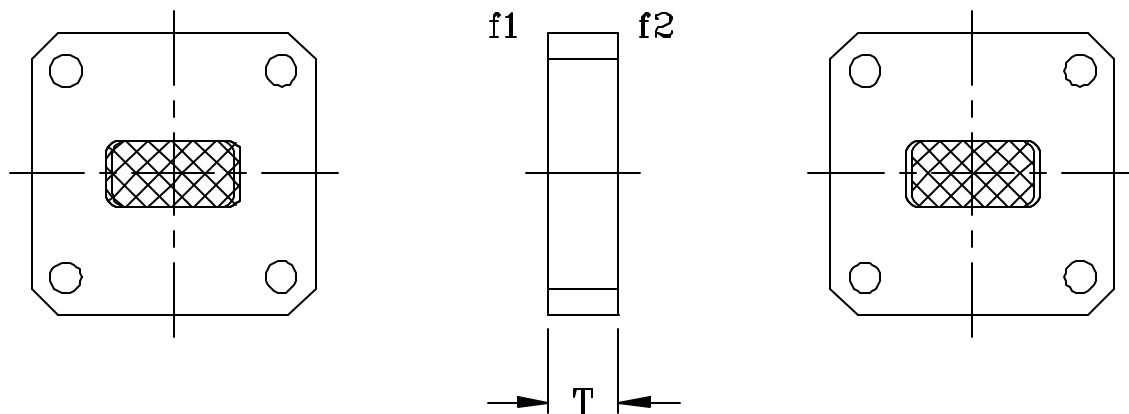
Model	WR #	Frequency (GHz)	L	Model	WR #	Frequency (GHz)	L
TxP28-	28	26.50 – 40.00	2.00	TxP102-	102	7.00 – 11.00	4.00
TxP34-	34	22.00 – 33.00	2.00	TxP112-	112	7.05 – 10.00	4.00
TxP42-	42	18.00 – 26.50	2.00	TxP137-	137	5.85 – 8.20	5.00
TxP51-	51	15.00 – 22.00	2.00	TxP159-	159	4.90 – 7.05	6.00
TxP62-	62	12.40 – 18.00	3.00	TxP187-	187	3.95 – 5.85	7.00
TxP75-	75	10.00 – 15.00	3.00	TxP229-	229	3.30 – 4.90	8.00
TxP90-	90	8.20 – 12.40	4.00	TxP284-	284	2.60 – 3.95	9.00

Hybrid Tees

Model	WR #	Frequency (GHz)	A	E	H	Model	WR #	Frequency (GHz)	A	E	H
THB28-	28	26.50 – 40.00	2.25	1.25	1.25	THB112-	112	7.05 – 10.00	3.75	2.00	2.00
THB34-	34	22.00 – 33.00	2.25	1.25	1.25	THB137-	137	5.85 – 8.20	5.25	2.75	2.75
THB42-	42	18.00 – 26.50	2.25	1.25	1.25	THB159-	159	4.90 – 7.05	5.75	3.00	3.00
THB51-	51	15.00 – 22.00	2.75	1.50	1.50	THB187-	187	3.95 – 5.85	6.25	3.25	3.25
THB62-	62	12.40 – 18.00	2.75	1.50	1.50	THB229-	229	3.30 – 4.90	8.25	4.25	4.25
THB75-	75	10.00 – 15.00	2.75	1.50	1.50	THB284-	284	2.60 – 3.95	10.25	5.25	5.25
THB90-	90	8.20 – 12.40	3.25	1.75	1.75						

Space Machine & Engineering Corp.

Teflon/Fiberglass Rectangular Waveguide Pressure Windows



Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*	Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*
WPWT28-	28	26.50 - 40.00	40	0.18	WPWT112-	112	7.05 - 10.00	500	0.25
WPWT34-	34	22.00 - 33.00	50	0.18	WPWT137-	137	5.85 - 8.20	750	0.25
WPWT42-	42	18.00 - 26.50	80	0.18	WPWT159-	159	4.90 - 7.05	1000	0.25
WPWT51-	51	15.00 - 22.00	80	0.18	WPWT187-	187	3.95 - 5.85	1200	0.25
WPWT62-	62	12.40 - 18.00	200	0.18	WPWT229-	229	3.30 - 4.90	1500	0.25
WPWT75-	75	10.00 - 15.00	300	0.18*	WPWT284-	284	2.60 - 3.95	1800	0.25
WPWT90-	90	8.20 - 12.40	400	0.18*	WPWT340-	340	2.20 - 3.30	2000	0.38
WPWT102-	102	7.00 - 11.00	500	0.18*	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, Brass, Cover / Cover Flanges,
Chromated, Paint Space Machine Gray.

Example part number:

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

Series (WPWT):

Waveguide Size (wr): WR28 thru WR430

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

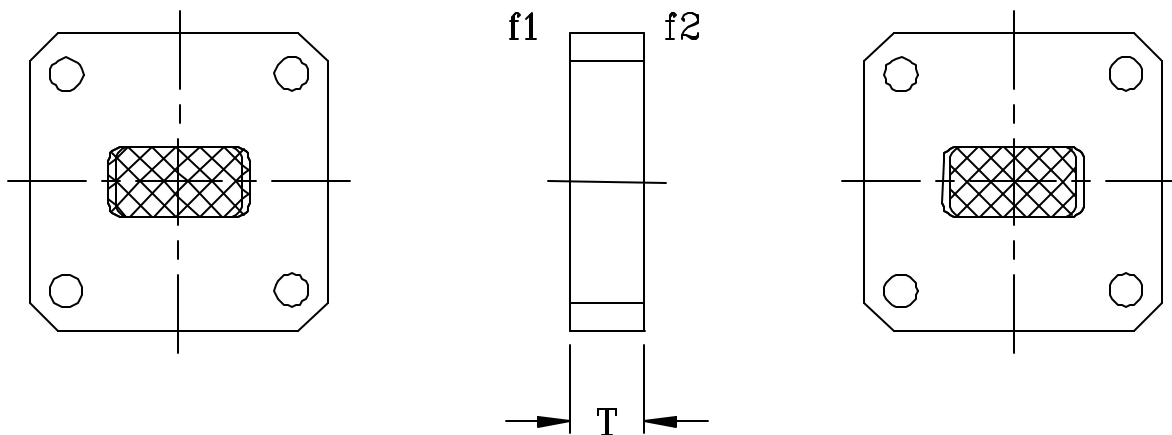
Flanges (f1 f2): See [Appendix F](#)

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.

Kapton Rectangular Waveguide Pressure Windows



Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*	Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*
WPWK28-	28	26.50 - 40.00	100	0.18	WPWK102-	102	7.00 - 11.00	650	0.18*
WPWK34-	34	22.00 - 33.00	100	0.18	WPWK112-	112	7.05 - 10.00	750	0.25
WPWK42-	42	18.00 - 26.50	100	0.18	WPWK137-	137	5.85 - 8.20	1000	0.25
WPWK51-	51	15.00 - 22.00	150	0.18	WPWK159-	159	4.90 - 7.05	1250	0.25
WPWK62-	62	12.40 - 18.00	200	0.18	WPWK187-	187	3.95 - 5.85	1500	0.25
WPWK75-	75	10.00 - 15.00	400	0.18*	WPWK229-	229	3.30 - 4.90	1800	0.25
WPWK90-	90	8.20 - 12.40	600	0.18*	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.

Example part number:

<u>WPWK</u>	<u>wr</u>	<u>-m</u>	<u>f1 f2</u>	<u>-p</u>	<u>f</u>
WPWK	112	-B	01 01	-C	P

Series (WPWK):

Waveguide Size (wr): WR28 thru WR284

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

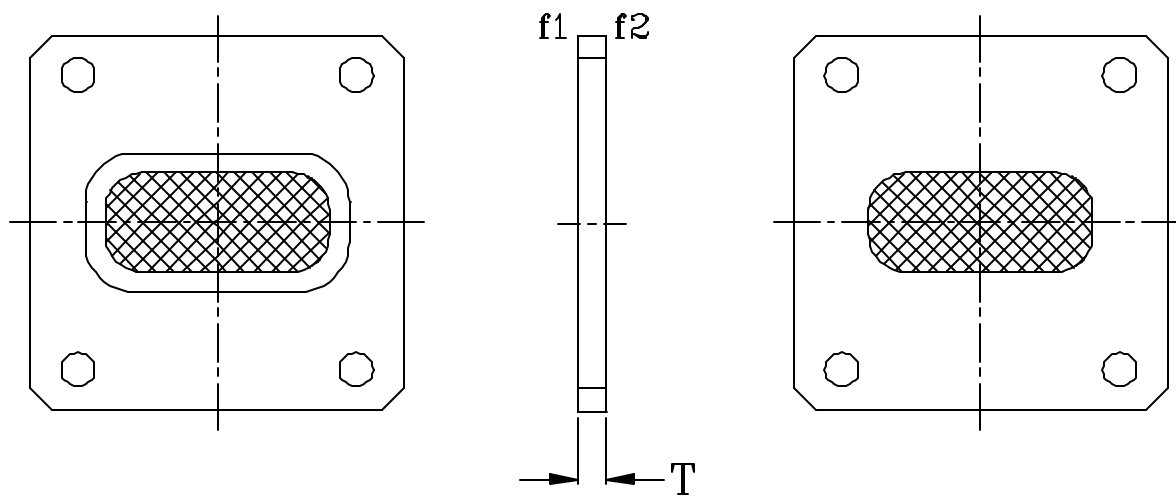
Flanges (f1 f2): See [Appendix F](#)

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.

Mica Rectangular Waveguide Pressure Windows



Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*	Model	WR #	Frequency (GHz)	Avg. Power (W)	Thickness (T)*
WPWM28-	28	26.50 - 40.00	200	0.18	WPWM102-	102	7.00 - 11.00	1250	0.18*
WPWM34-	34	22.00 - 33.00	200	0.18	WPWM112-	112	7.05 - 10.00	1500	0.25
WPWM42-	42	18.00 - 26.50	200	0.18	WPWM137-	137	5.85 - 8.20	1750	0.25
WPWM51-	51	15.00 - 22.00	250	0.18	WPWM159-	159	4.90 - 7.05	2000	0.25
WPWM62-	62	12.40 - 18.00	500	0.18	WPWM187-	187	3.95 - 5.85	2200	0.25
WPWM75-	75	10.00 - 15.00	750	0.18*	WPWM229-	229	3.30 - 4.90	2500	0.25
WPWM90-	90	8.20 - 12.40	1000	0.18*	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 1.10:1 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 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, Brass, Cover / Cover Flanges,
Chromated, Paint Space Machine Gray.

Example part number:

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

Series (WPWM):

Waveguide Size (wr): WR28 thru WR284

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

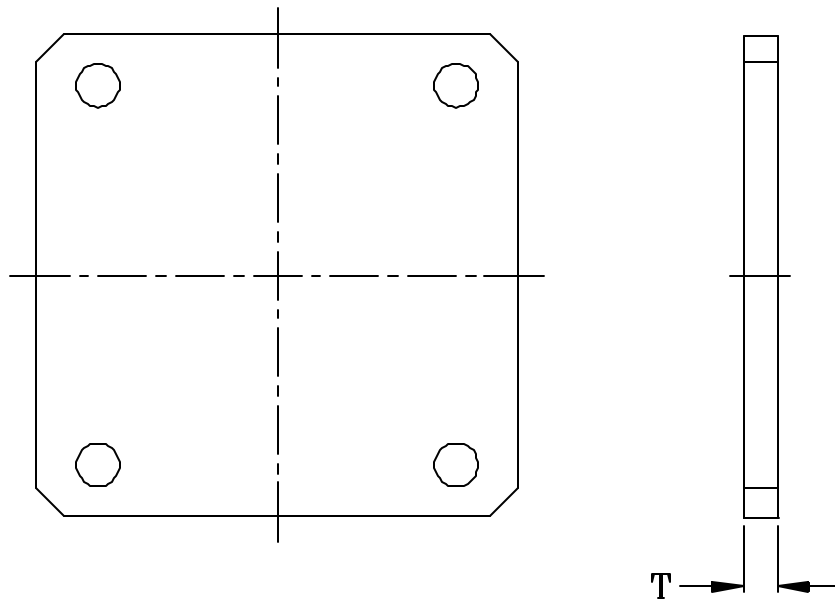
Flanges (f1 f2): See [Appendix F](#)

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 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:

Waveguide Pressure Gasket, WR112,
Mylar, 0.010 thick.

Example part number:

<u>WPG</u>	<u>wr</u>	<u>-m</u>	<u>-t</u>
WPG	112	-MY	10

Series (WPG):

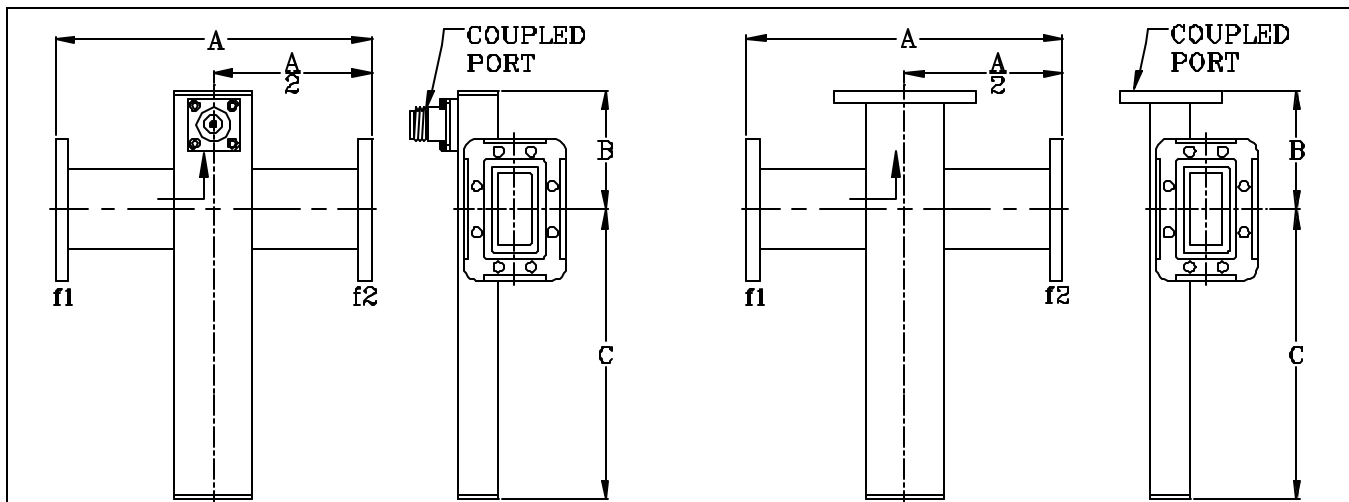
Waveguide Size (wr): WR28 thru WR430

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

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

Space Machine & Engineering Corp.

Rectangular Waveguide Cross Guide Couplers



Model	WR #	Frequency (GHz)	A	B	C
DCG28-	28	26.50 - 40.00	2.00	1.25	2.00
DCG34-	34	22.00 - 33.00	2.00	1.25	2.00
DCG42-	42	18.00 - 26.50	2.00	1.25	2.50
DCG51-	51	15.00 - 22.00	3.00	1.25	2.75
DCG62-	62	12.40 - 18.00	3.25	1.50	3.00
DCG75-	75	10.00 - 15.00	3.50	1.50	3.25
DCG90-	90	8.20 - 12.40	4.00	2.00	3.50

Model	WR #	Frequency (GHz)	A	B	C
DCG102-	102	7.00 - 11.00	4.00	2.00	3.75
DCG112-	112	7.05 - 10.00	4.00	2.00	4.00
DCG137-	137	5.85 - 8.20	4.25	3.00	5.00
DCG159-	159	4.90 - 7.05	5.00	3.00	5.75
DCG187-	187	3.95 - 5.85	5.00	3.50	6.25
DCG229-	229	3.30 - 4.90	5.50	4.00	6.50
DCG284-	284	2.60 - 3.95	6.00	6.00	7.25

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

Ordering Information:

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

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

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 F](#)

Flange (-f1 f2): See [Appendix F](#)

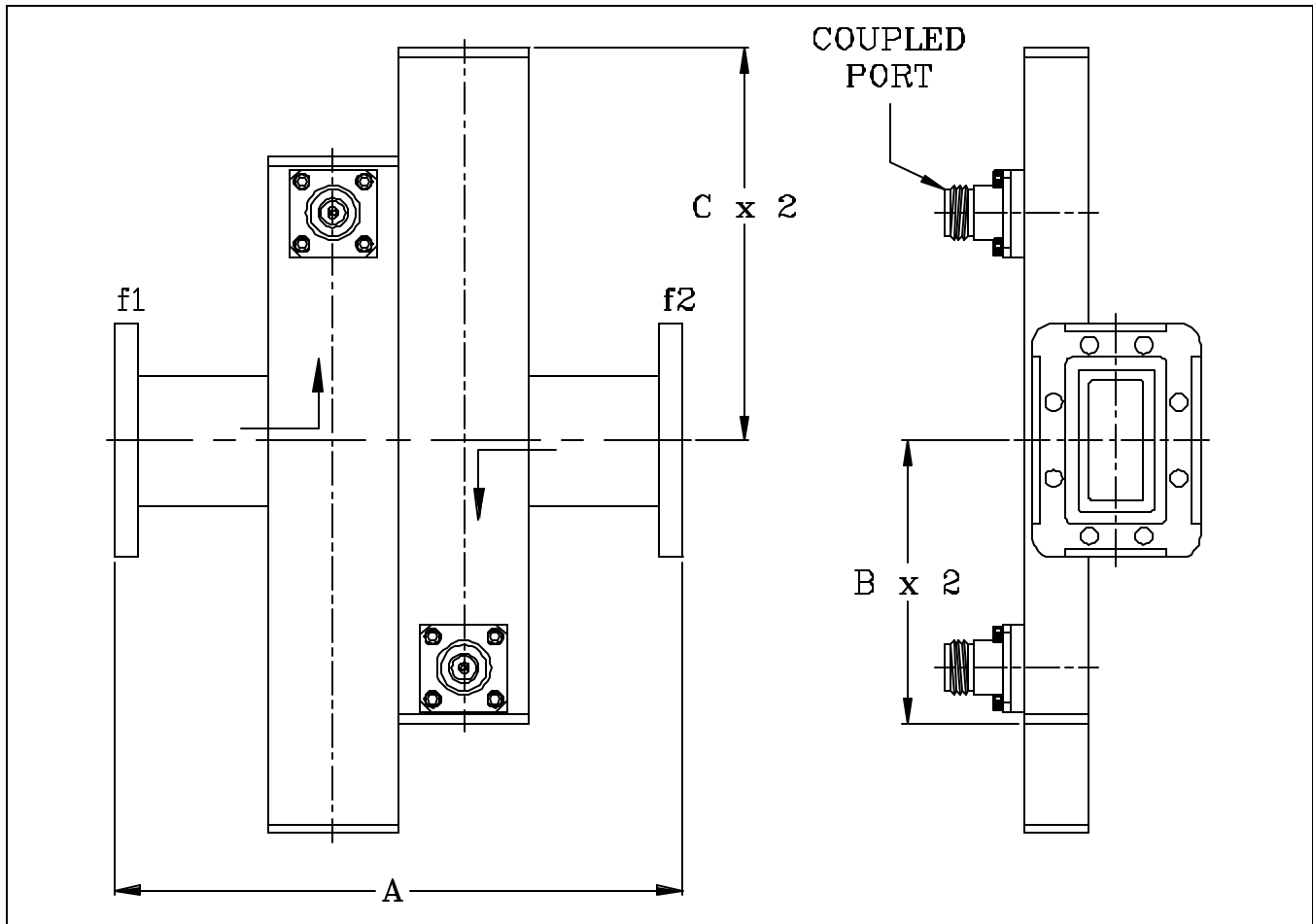
Plating (-p): C – Chromate, S – Silver, G – Gold, O – Other, N – None

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 ± 2 dB 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:

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

DCB	wr	-m	c	cp	-f1 f2	-p	f
DCB	137	-B	30	NF	-05 04	-S	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 F](#)

Flange (-f1 f2): See [Appendix F](#)

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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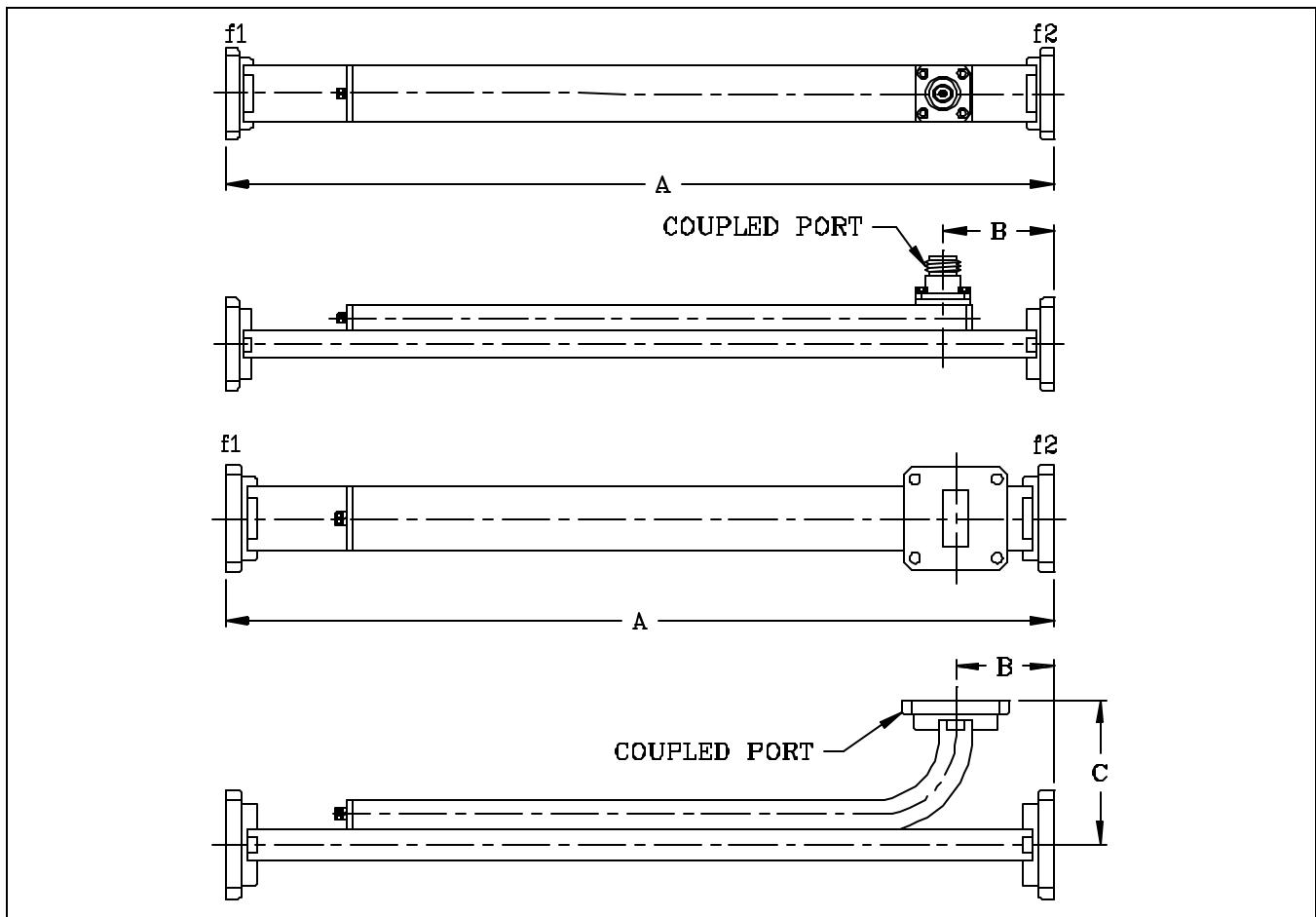
Rectangular Waveguide Dual Cross Guide Coupler Dimensions

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.

Space Machine & Engineering Corp.

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 $\pm 0.5\text{dB}$ 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, Bronze, Example part number:
 30dB Coupling, Type N Female Coupled Port,
 Cover / Choke Flanges, Silver Plated, Paint Space Machine Gray.

DTC	wr	-m	c	cp	-f1 f2	-p	f
DTC	90	-B	30	NF	-01 02	-S	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 F](#)

Flange (-f1 f2): See [Appendix F](#)

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.

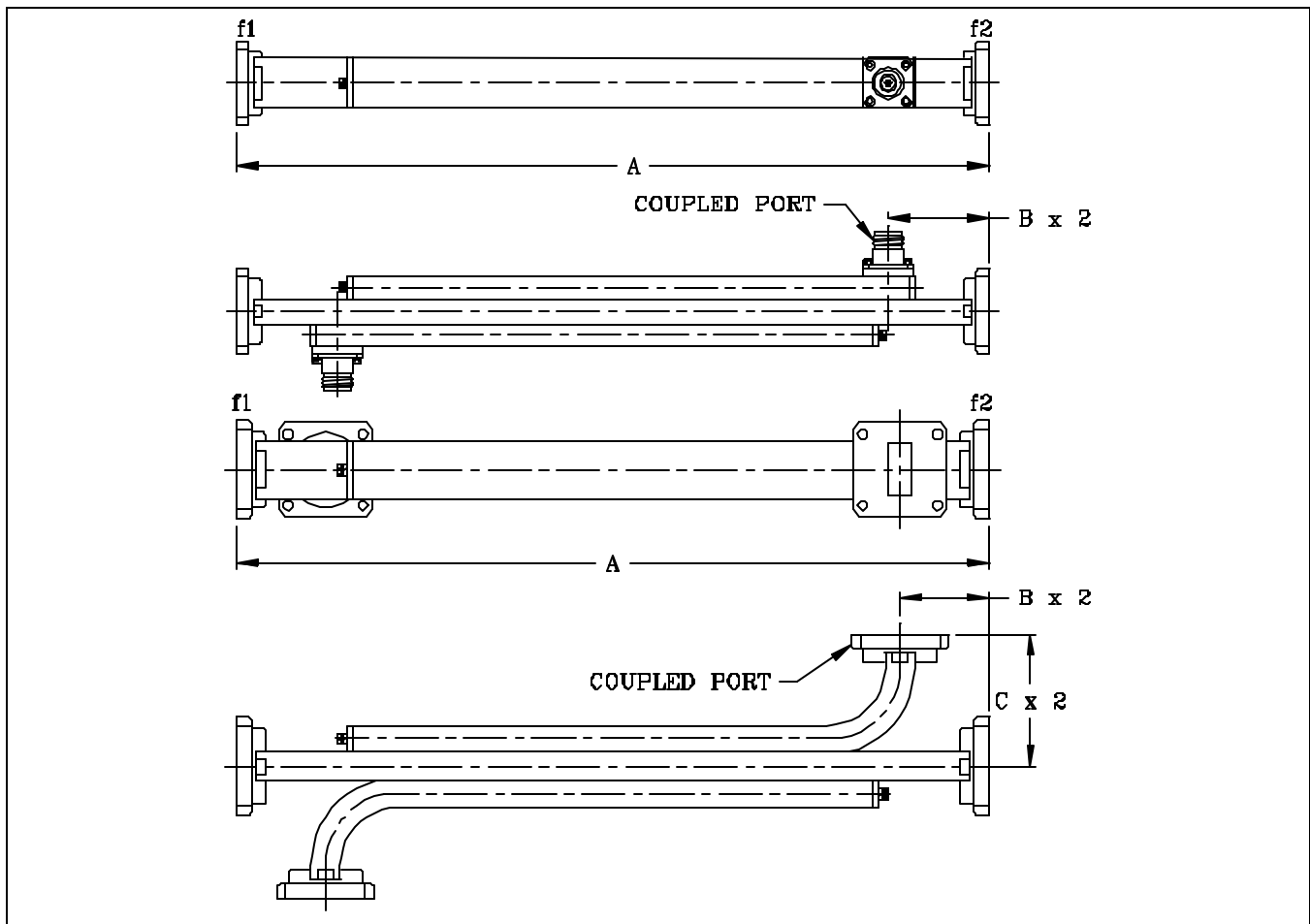
Rectangular Waveguide Top Wall Coupler Dimensions

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 $\pm 0.5\text{dB}$ 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, Silver Plated, Paint Space Machine Gray.

Example part number:

DBC	wr	-m	c	cp	-f1	f2	-p	f
DBC	112	-B	30	NF	-01	02	-S	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 F](#)

Flange (-f1 f2): See [Appendix F](#)

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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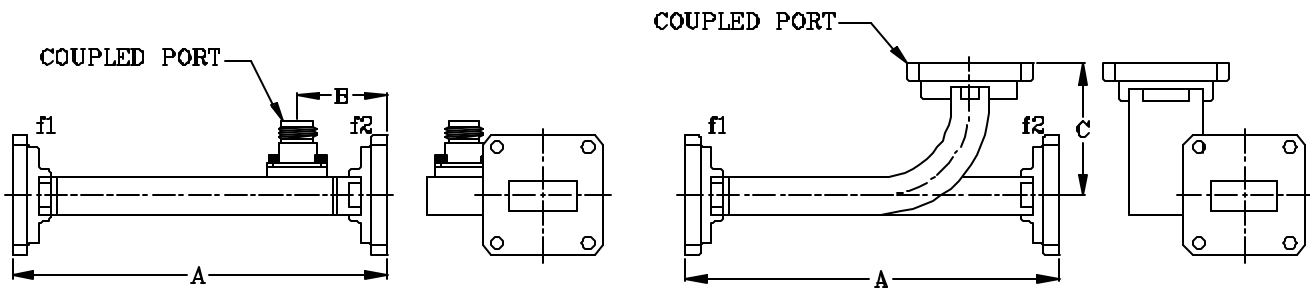
Rectangular Waveguide Dual Top Wall Coupler Dimensions

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	4.50
DBC229-	229	3.30 - 4.90	48.25	2.20	5.25
DBC284-	284	2.60 - 3.95	60.25	2.70	6.75

All dimensions are in inches.

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Rectangular Waveguide Sidewall Couplers



Model	WR #	Frequency (GHz)	A	B	C	Model	WR #	Frequency (GHz)	A	B	C
DSC28-	28	26.50 - 40.00	9.25	1.00	1.50	DSC102-	102	7.00 - 11.00	19.00	1.50	2.00
DSC34-	34	22.00 - 33.00	10.75	1.00	1.50	DSC112-	112	7.05 - 10.00	19.55	1.50	2.50
DSC42-	42	18.00 - 26.50	10.75	1.00	1.50	DSC137-	137	5.85 - 8.20	22.25	1.70	3.00
DSC51-	51	15.00 - 22.00	11.75	1.20	1.50	DSC159-	159	4.90 - 7.05	25.25	2.00	3.50
DSC62-	62	12.40 - 18.00	12.75	1.20	1.50	DSC187-	187	3.95 - 5.85	30.25	2.20	3.50
DSC75-	75	10.00 - 15.00	14.25	1.20	1.50	DSC229-	229	3.30 - 4.90	35.25	2.20	4.00
DSC90-	90	8.20 - 12.40	17.25	1.50	2.00	DSC284-	284	2.60 - 3.95	46.25	2.70	5.25

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

Ordering Information:

Sidewall Coupler, WR112, Bronze,
30dB Coupling, Type N Female Coupled Port,
Cover / Cover Flanges, Silver Plated, Paint Space Machine Gray.

Example part number:

DSC **wr** **-m** **c** **cp** **-f1 f2** **-p** **f**
DSC 112 -B 30 NF -01 01 -S P

Series (DSC):

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 F](#)

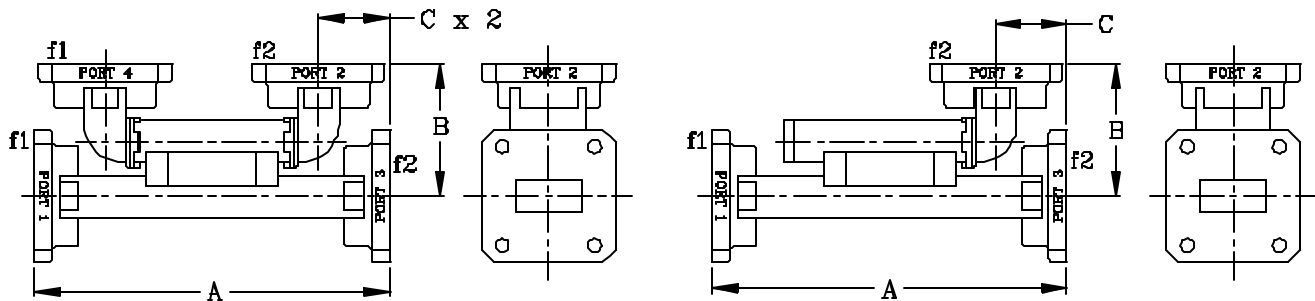
Flange (-f1 f2): See [Appendix F](#)

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 Branch Guide Couplers



Model	WR #	Frequency (GHz)	A	B	C
BGC62-	62	12.40 – 18.00	4.00	1.50	1.00
BGC75-	75	10.00 – 15.00	4.00	1.50	1.00
BGC90-	90	8.20 – 12.40	6.00	2.50	1.50
BGC102-	102	7.00 – 11.00	7.00	2.50	1.50
BGC112-	112	7.05 – 10.00	8.00	2.50	1.50
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 ± 0.5 dB. Directivity is 20dB minimum. Additional sizes and configurations are available upon request.

Ordering Information:

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

Example part number:

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

Series (BGC):

Waveguide Size (wr): WR62 thru WR284

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

Coupling (c): 3 – 15 dB

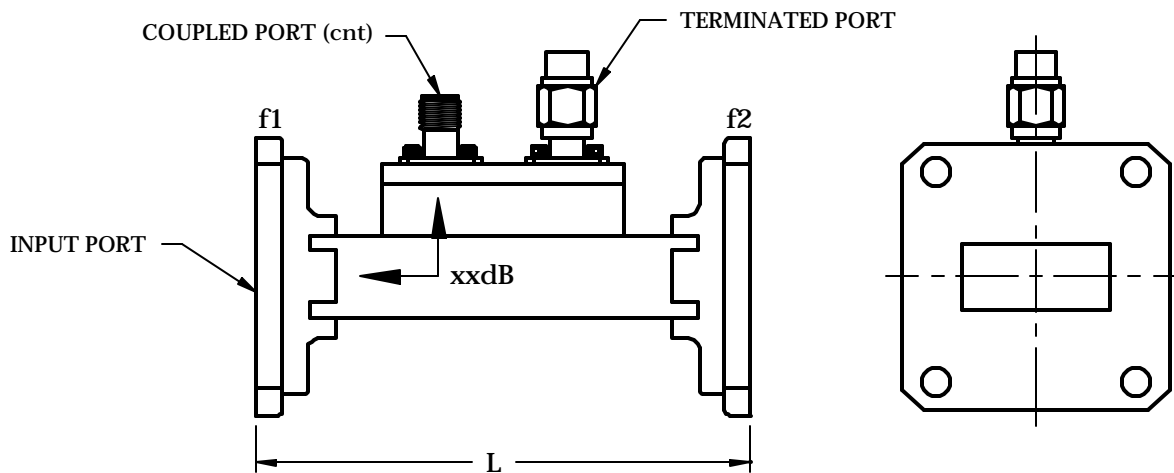
Flange (-f1 f2): See [Appendix F](#)

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 Loop Couplers



Model	WR #	Frequency (GHz)	Length (L)	Model	WR #	Frequency (GHz)	Length (L)
WLC62-	62	12.40 - 18.00	4.00	WLC159-	159	4.90 - 7.05	4.50
WLC75-	75	10.00 - 15.00	4.00	WLC187-	187	3.95 - 5.85	5.00
WLC90-	90	8.20 - 12.40	4.00	WLC229-	229	3.30 - 4.90	5.00
WLC102-	102	7.00 - 11.00	4.00	WLC284-	284	2.60 - 3.95	5.00
WLC112-	112	7.05 - 10.00	4.00	WLC340-	340	2.20 - 3.30	5.00
WLC137-	137	5.85 - 8.20	4.50	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 $\pm 0.5\text{dB}$. Over the full waveguide band, coupling variation is $\pm 2.5\text{dB}$. Directivity is 18dB minimum. Main arm VSWR is 1.08:1 and secondary arm VSWR is 1.3:1.

Ordering Information:

Loop Coupler, WR90, Bronze, Example part number: WLC90-B30-SF-0101-S P
 30dB Coupling, SMA Female Coupled Port,
 Cover / Cover Flanges, Silver Plated, Paint Space Machine Gray.

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](#)

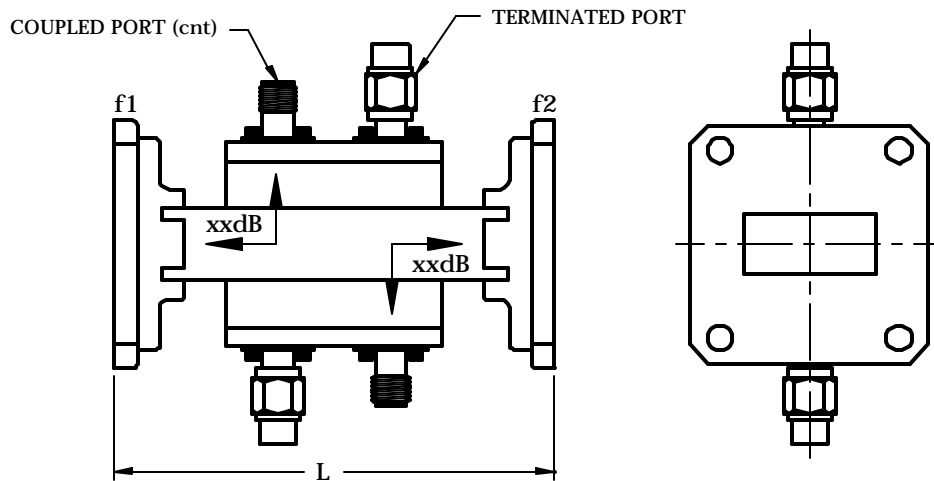
Flange (-f1 f2): See [Appendix F](#)

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 Dual Loop Couplers



Model	WR #	Frequency (GHz)	Length (L)	Model	WR #	Frequency (GHz)	Length (L)
WLD62-	62	12.40 - 18.00	4.00	WLD159-	159	4.90 - 7.05	4.50
WLD75-	75	10.00 - 15.00	4.00	WLD187-	187	3.95 - 5.85	5.00
WLD90-	90	8.20 - 12.40	4.00	WLD229-	229	3.30 - 4.90	5.00
WLD102-	102	7.00 - 11.00	4.00	WLD284-	284	2.60 - 3.95	5.00
WLD112-	112	7.05 - 10.00	4.00	WLD340-	340	2.20 - 3.30	5.00
WLD137-	137	5.85 - 8.20	4.50	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 $\pm 0.5\text{dB}$. Over the full waveguide band, coupling variation is $\pm 2.5\text{dB}$. Directivity is 18dB minimum. Main arm VSWR is 1.08:1 and secondary arm VSWR is 1.3:1.

Ordering Information:

Dual Loop Coupler, WR90, Bronze, 30dB and 50db Coupling, SMA Female Coupled Ports, Cover / Cover Flanges, Silver Plated, Paint Space Machine Gray. Example part number:

WLD **wr** **-m** **c1** **c2** **cnt** **-f1 f2** **-p** **f**
WLD 90 -B 30 50 SF -01 01 -S P

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](#)

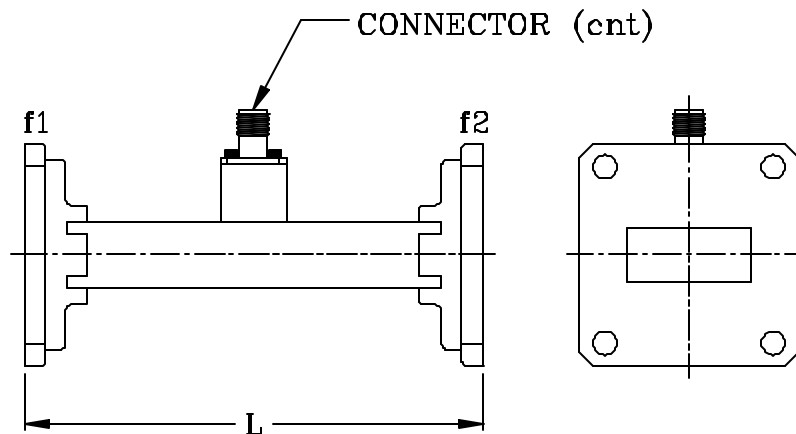
Flange (-f1 f2): See [Appendix F](#)

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 Power Sampler



Model	WR #	Frequency (GHz)	Length (L)	Model	WR #	Frequency (GHz)	Length (L)
WSP28-	28	26.50 - 40.00	2.00	WSP112-	112	7.05 - 10.00	2.50
WSP34-	34	22.00 - 33.00	2.00	WSP137-	137	5.85 - 8.20	2.50
WSP42-	42	18.00 - 26.50	2.00	WSP159-	159	4.90 - 7.05	3.00
WSP51-	51	15.00 - 22.00	2.00	WSP187-	187	3.95 - 5.85	3.00
WSP62-	62	12.40 - 18.00	2.50	WSP229-	229	3.30 - 4.90	3.50
WSP75-	75	10.00 - 15.00	2.50	WSP284-	284	2.60 - 3.95	4.00
WSP90-	90	8.20 - 12.40	2.50	WSP340-	340	2.20 - 3.30	4.00
WSP102-	102	7.00 - 11.00	2.50	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 ± 1 dB. Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide Power Sampler, WR112, Bronze, Example part number:
40dB Coupling, SMA Female,
Cover / Cover Flanges, Chromated, Paint Space Machine Gray.

WSP **wr** **-m** **c** **cnt** **-f1 f2** **-p** **f**
WSP 112 -B 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](#)

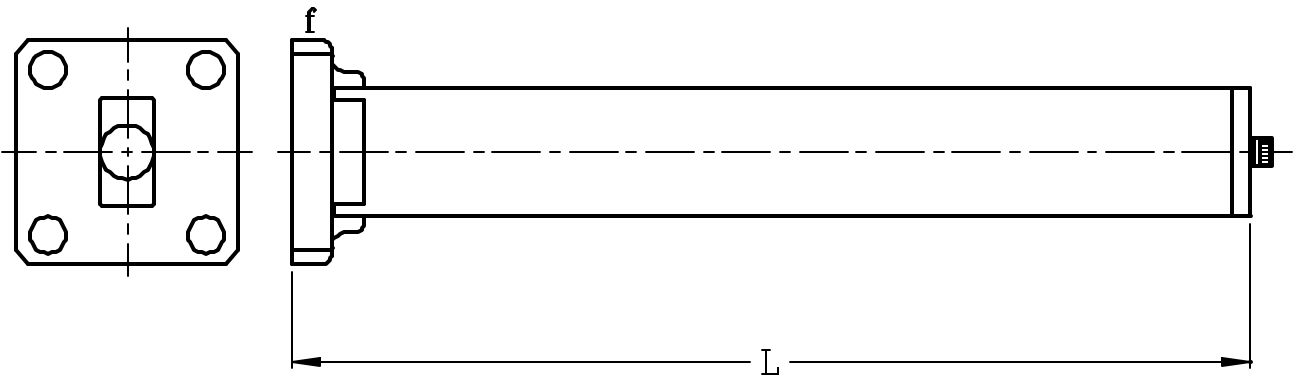
Flange (-f1 f2): See [Appendix F](#)

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 Precision Termination



Model	WR #	Frequency (GHz)	Avg. Power (W)	Length (L)	Model	WR #	Frequency (GHz)	Avg. Power (W)	Length (L)
WTP28-	28	26.50 - 40.00	0.5	3.00	WTP137-	137	5.85 - 8.20	5.0	6.50
WTP34-	34	22.00 - 33.00	0.5	3.00	WTP159-	159	4.90 - 7.05	6.0	7.00
WTP42-	42	18.00 - 26.50	0.5	3.00	WTP187-	187	3.95 - 5.85	8.0	7.00
WTP51-	51	15.00 - 22.00	1.0	3.25	WTP229-	229	3.30 - 4.90	10.0	8.00
WTP62-	62	12.40 - 18.00	1.5	4.00	WTP284-	284	2.60 - 3.95	10.0	13.00
WTP75-	75	10.00 - 15.00	2.0	5.00	WTP340-	340	2.20 - 3.30	12.0	13.00
WTP90-	90	8.20 - 12.40	3.0	6.00	WTP430-	430	1.70 - 2.60	17.0	16.00
WTP102-	102	7.00 - 11.00	3.0	6.00	WTP650-	650	1.12 - 1.70	25.0	21.00
WTP112-	112	7.05 - 10.00	4.0	6.25					

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:

<u>WTP</u>	<u>wr</u>	<u>-m</u>	<u>f</u>	<u>-p</u>	<u>f</u>
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 F](#)

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	5.00
WTL42-	42	18.00 - 26.50	30	5.00
WTL51-	51	15.00 - 22.00	40	5.00
WTL62-	62	12.40 - 18.00	65	5.00
WTL75-	75	10.00 - 15.00	75	5.50
WTL90-	90	8.20 - 12.40	80	7.00
WTL102-	102	7.00 - 11.00	100	7.50
WTL112-	112	7.05 - 10.00	100	8.00

Model	WR #	Frequency (GHz)	Avg. Power (W)	Length (L)
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

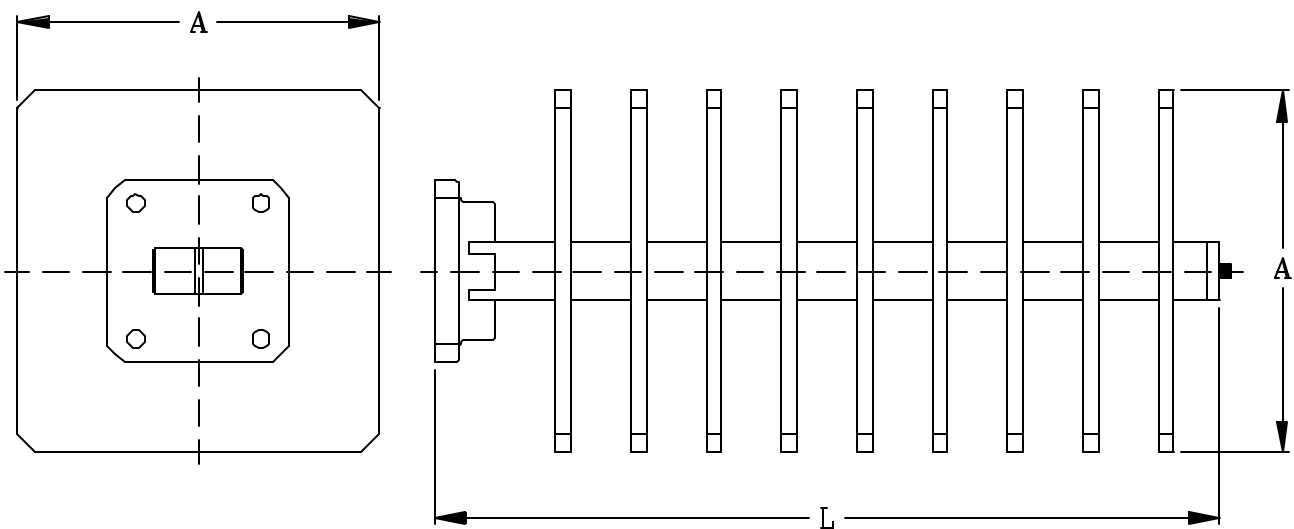
Flange (f): See [Appendix F](#)

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 Medium Power Termination



Model	WR #	Frequency (GHz)	Avg. Power (W)	A	L
WTM28-	28	26.50 - 40.00	50	2.25	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	7.00
WTM112-	112	7.05 - 10.00	325	3.25	7.50

Model	WR #	Frequency (GHz)	Avg. Power (W)	A	L
WTM137-	137	5.85 - 8.20	450	3.50	8.50
WTM159-	159	4.90 - 7.05	625	4.00	9.00
WTM187-	187	3.95 - 5.85	750	4.50	9.00
WTM229-	229	3.30 - 4.90	900	5.00	10.50
WTM284-	284	2.60 - 3.95	1000	6.00	12.00
WTM340-	340	2.20 - 3.30	1150	7.00	13.50
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, Bronze,
Cover Flange, Chromated, Paint Heat Resistant Flat Black.

Example part number:

WTM **wr** **-m** **f** **-p** **f**
WTM 90 -B 01 -C O

Series (WTM):

Waveguide Size (wr): WR28 thru WR284

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

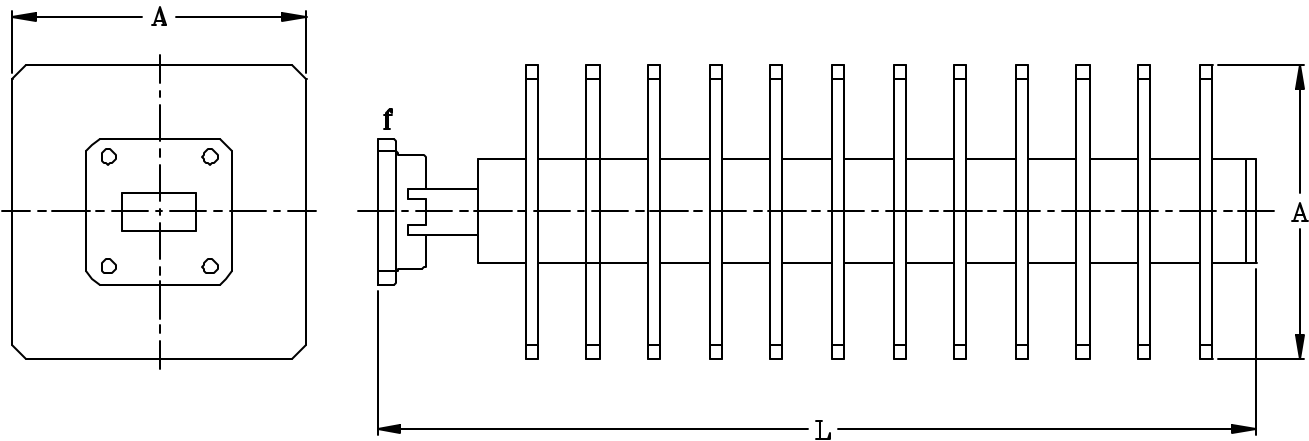
Flange (f): See [Appendix F](#)

Plating (-p): C – Chromate

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

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
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
WTH102-	102	7.00 - 11.00	1200	4.00	15.00

Model	WR #	Frequency (GHz)	Avg. Power (W)	A	L
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 1.10:1 maximum over the full waveguide bandwidth. Additional sizes and configurations are available upon request.

Ordering Information:

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

Example part number:

WTH **wr** **-m** **f** **-p** **f**
WTH 90 -B 01 -C O

Series (WTH):

Waveguide Size (wr): WR28 thru WR284

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

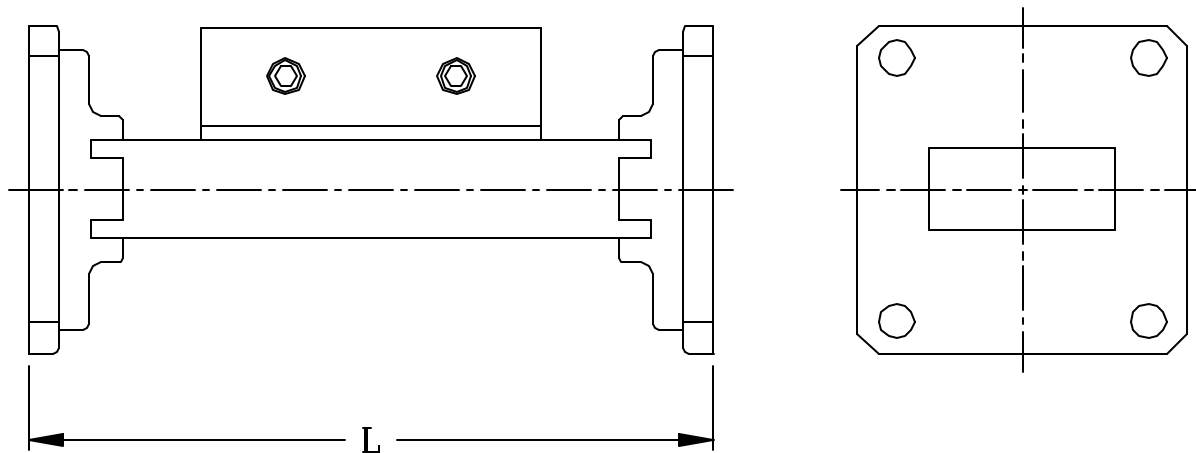
Flange (f): See [Appendix F](#)

Plating (-p): C – Chromate

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

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 ± 1.5 dB 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

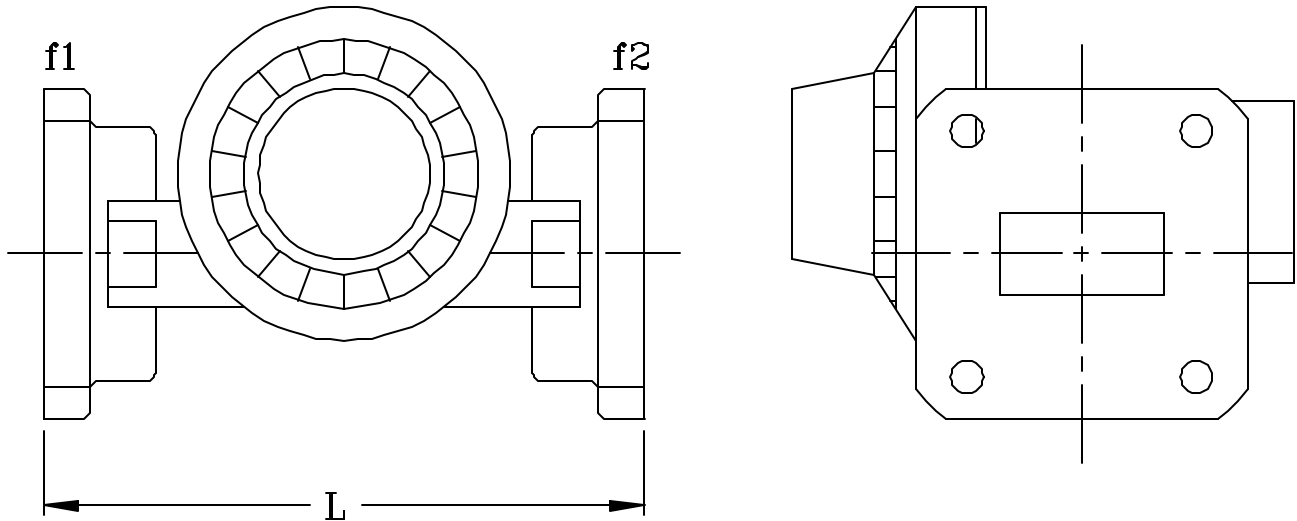
Flange (f1 f2): See [Appendix F](#)

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 Variable Attenuator



Model	WR #	Frequency (GHz)	L	Model	WR #	Frequency (GHz)	L
WAVL28-	28	26.50 - 40.00	3.00	WAVL102-	102	7.00 - 11.00	3.50
WAVL34-	34	22.00 - 33.00	3.00	WAVL112-	112	7.05 - 10.00	3.50
WAVL42-	42	18.00 - 26.50	3.25	WAVL137-	137	5.85 - 8.20	4.00
WAVL51-	51	15.00 - 22.00	3.25	WAVL159-	159	4.90 - 7.05	5.00
WAVL62-	62	12.40 - 18.00	3.50	WAVL187-	187	3.95 - 5.85	6.00
WAVL75-	75	10.00 - 15.00	3.50	WAVL229-	229	3.30 - 4.90	7.00
WAVL90-	90	8.20 - 12.40	3.50	WAVL284-	284	2.60 - 3.95	8.00

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 ± 1.5 dB. 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 / Cover Flanges,
Chromated, Paint Space Machine Gray.

Example part number:

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

Series (WAVL):

Waveguide Size (wr): WR28 thru WR284

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

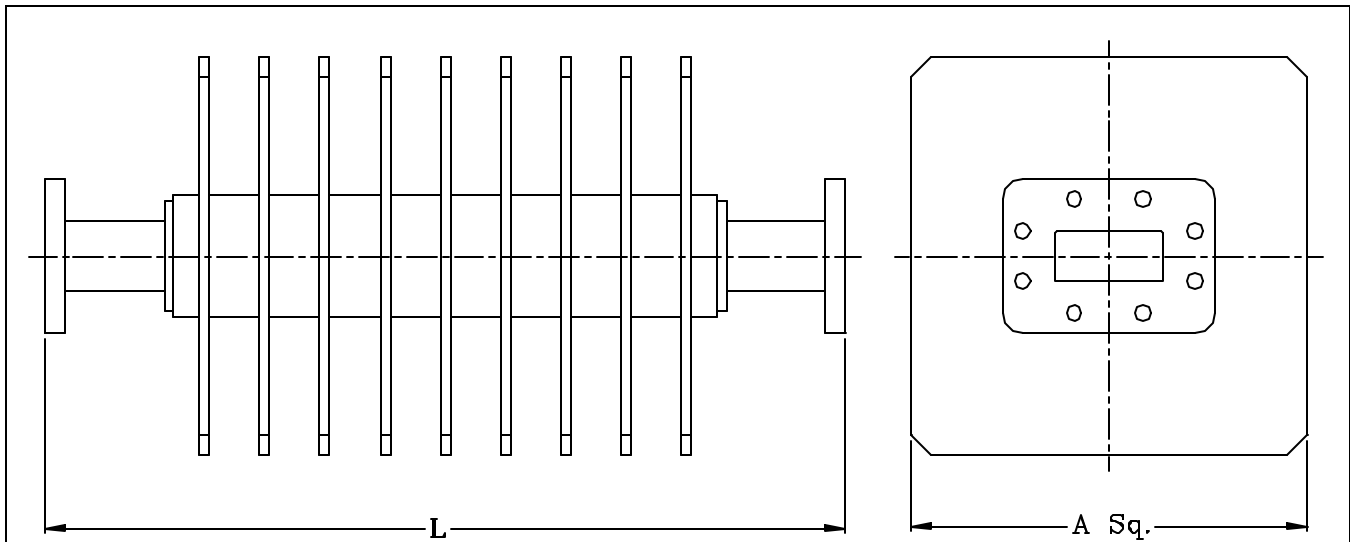
Flange (f1 f2): See [Appendix F](#)

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 High Power Fixed Attenuator



Model	WR #	Frequency (GHz)	Length (L)	A	Max Avg Power (Watts)	Model	WR #	Frequency (GHz)	Length (L)	A	Max Avg Power (Watts)
WAFH28-	28	26.50 - 40.00	6.00	3.00	200	WAFH102-	102	7.00 - 11.00	8.50	4.00	750
WAFH42-	42	18.00 - 26.50	6.00	3.00	350	WAFH112-	112	7.05 - 10.00	9.00	5.00	850
WAFH51-	51	15.00 - 22.00	6.50	3.00	400	WAFH137-	137	5.85 - 8.20	10.00	5.00	1000
WAFH62-	62	12.40 - 18.00	7.00	3.00	500	WAFH159-	159	4.90 - 7.05	11.00	6.00	1250
WAFH75-	75	10.00 - 15.00	8.00	3.00	550	WAFH187-	187	3.95 - 5.85	13.00	6.00	1500
WAFH90-	90	8.20 - 12.40	8.00	4.00	700	WAFH229-	229	3.30 - 4.90	14.00	8.00	1650
						WAFH284-	284	2.60 - 3.95	15.00	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 while flatness is held to ± 1.0 dB maximum over the full waveguide band. Additional sizes and configurations are available upon request.

Ordering Information:

Waveguide High Power Fixed Attenuator, Example part number:
 WR112, 10dB Attenuation, Bronze, WAFH 112 -10 B 04 05 -C O
 CPRG / CPRF Flanges, Chromated, Paint Heat Resistant Flat Black.

Series (WAFH):

Waveguide Size (wr): WR28 thru WR284

Attenuation (-a): 3 – 30 dB

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

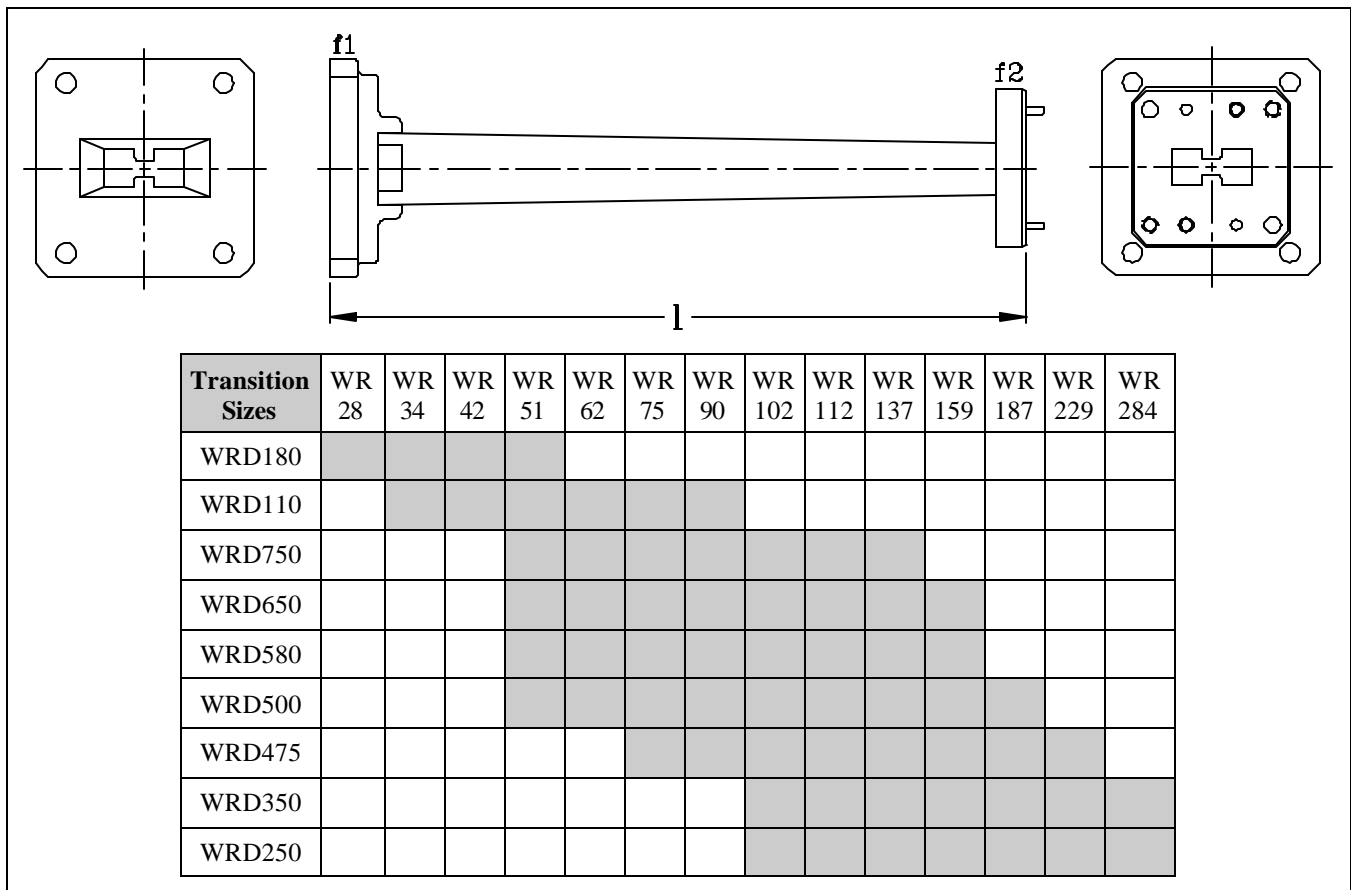
Flange (f1 f2): See [Appendix F](#)

Plating (-p): C – Chromate

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

Space Machine & Engineering Corp.

Rectangular To Double Ridge Waveguide Transitions



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:

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

WDT	wr1	-f1	-wr2	-f2	m	l	-p	f
WDT	90	-01	-650	-01	A	5.0	-S	P

Series (WDT):

Waveguide Size 1 (wr1): WR28 thru WR284

Flange 1 (-f1): See [Appendix F](#)

Waveguide Size 2 (-wr2): WRD180 thru WRD250

Flange 2 (-f2): [Appendix G](#)

Material (m): A – Aluminum

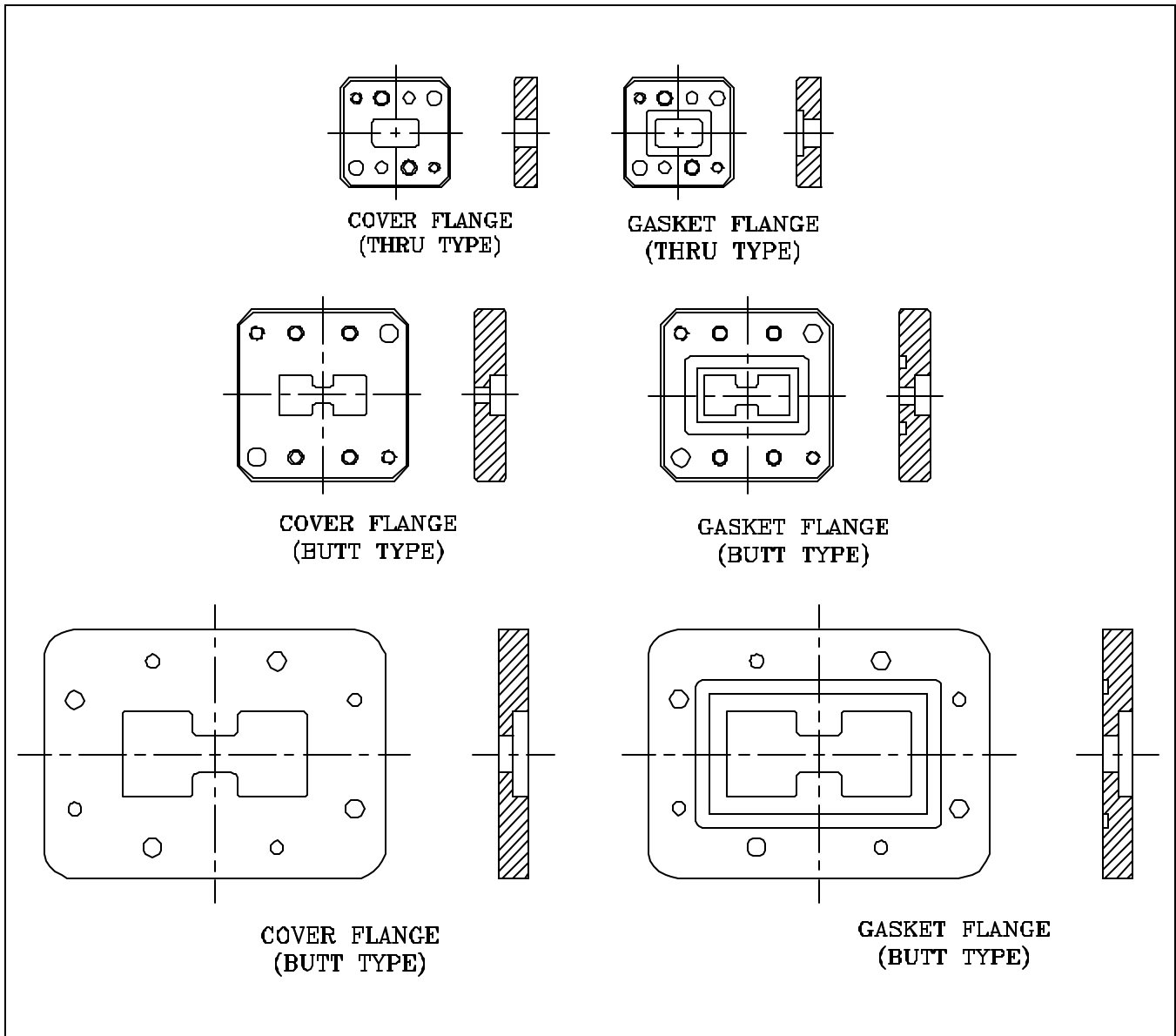
Length (l): (inches)

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

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

Space Machine & Engineering Corp.

Double Ridge Waveguide Flanges



Space Machine offers a standard product line of double ridge flanges covering waveguide sizes WRD180 thru WRD250. Additional sizes and configurations are available on request.

Ordering Information:

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

Example part number:

<u>DGF</u>	<u>wrd</u>	<u>-m</u>	<u>f</u>	<u>t</u>
DGF	650	-A	01	B

Series (DGF):

Waveguide Size (wrd): WRD180 thru WRD250

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

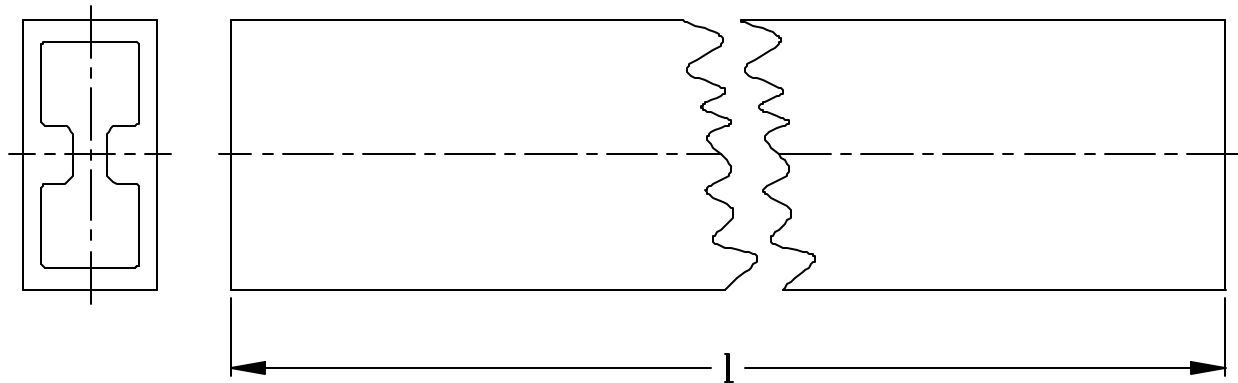
Flange (f): 1 - Cover, 2 - Gasket (See above)

Type (t): B - Butt, T - Thru

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

Space Machine & Engineering Corp.

Double Ridge Waveguide Tubing



Space Machine offers a standard product line of raw double ridge waveguide tubing ranging in size from WRD180 thru WRD250. The standard material is aluminum. Other materials may be available for special order.

Ordering Information:

**Double Ridge Waveguide Tubing, WRD180,
Aluminum, 144 in. long.**

Example part number:

<u>DWT</u>	<u>wrd</u>	<u>-m</u>	<u>l</u>
DWT	180	-A	144

Series (DWT):

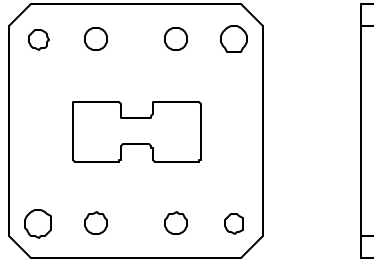
Waveguide Size (wrd): WR180 thru WR250

Material (-m): A – Aluminum

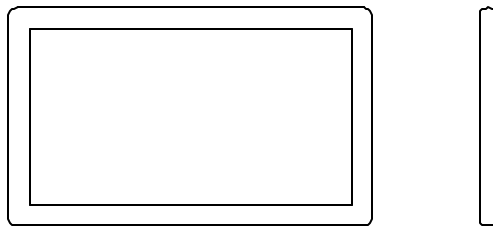
Length (l): Inches

Space Machine & Engineering Corp.

Double Ridge Waveguide Gaskets



1 - EMI/RFI GASKET



2 - MATING GASKET

Space Machine offers a standard product line of double ridge gaskets covering waveguide sizes from WRD180 thru WRD250. Additional sizes and configurations are available upon request.

Ordering Information:

Double Ridge Waveguide gasket, WRD650,
EMI / RFI gasket for WRD650 flange.

Example part number:

<u>DOR</u>	<u>wrd</u>	<u>-g</u>
DOR	650	-1

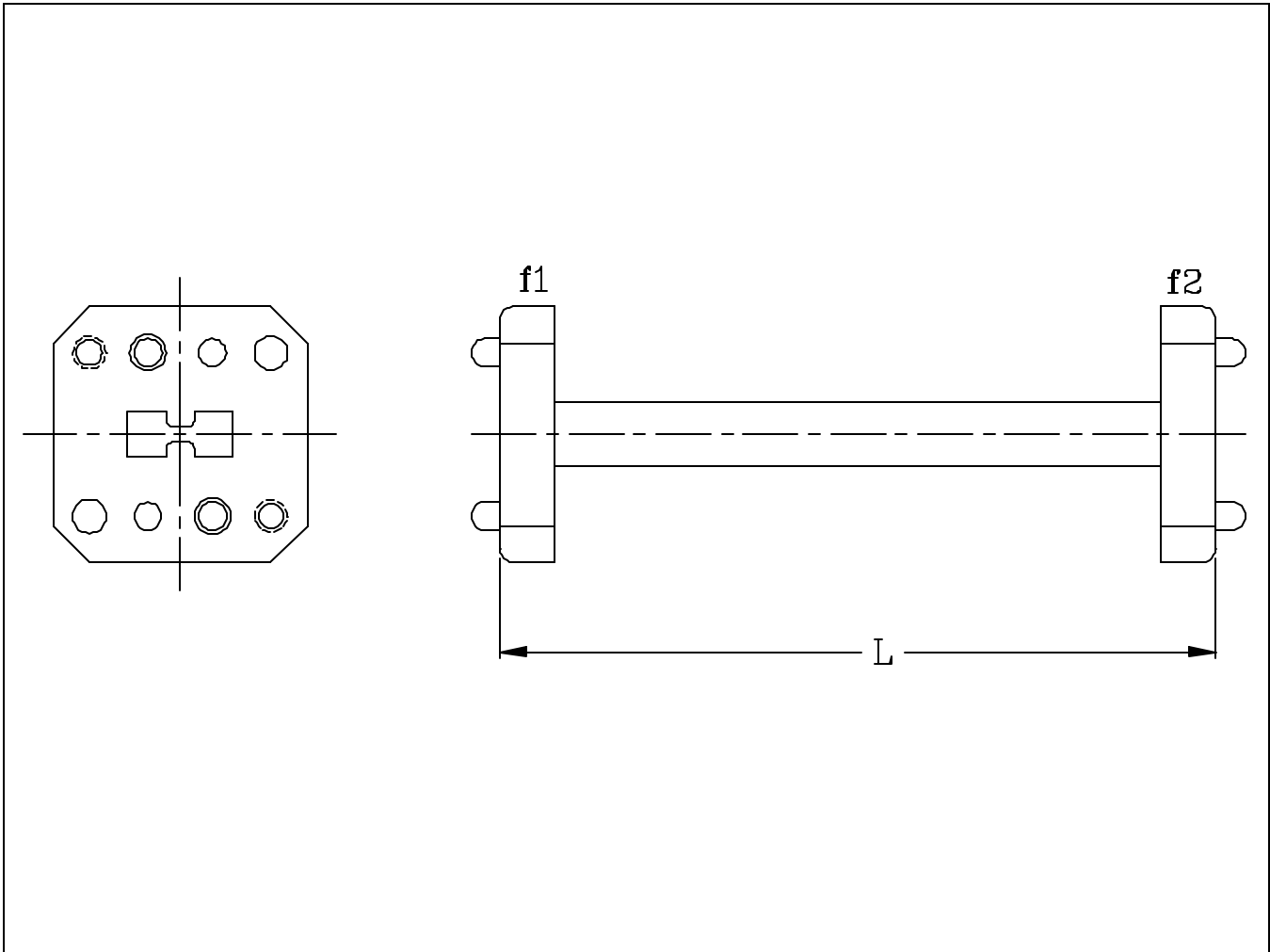
Series (DOR):

Waveguide Size (wrd): WRD180 thru WRD250

Gasket Type: 1 - EMI/RFI, 2 - Mating

Space Machine & Engineering Corp.

Double Ridge Waveguide Straight Assemblies



Space Machine will custom fabricate flanged double ridge straight sections covering the waveguide sizes WRD180 to WRD250. Length and flange types are made to customer specifications. VSWR is 1.1:1 maximum over the full waveguide bandwidth.

Ordering Information:

Double Ridge Waveguide Straight Section,
WRD180, 12.0" Long, Aluminum, Cover Flanges,
Silver Plated, Paint Space Machine Gray.

Example part number:

<u>DSS</u>	<u>wrd</u>	<u>-l</u>	<u>m</u>	<u>f1</u>	<u>f2</u>	<u>-p</u>	<u>f</u>
DSS	180	-12.0	A	01	01	-S	P

Series (DSS):

Waveguide Size (wrd): WRD180 thru WRD250

Length (-l): (inches)

Waveguide Material (m): A – Aluminum

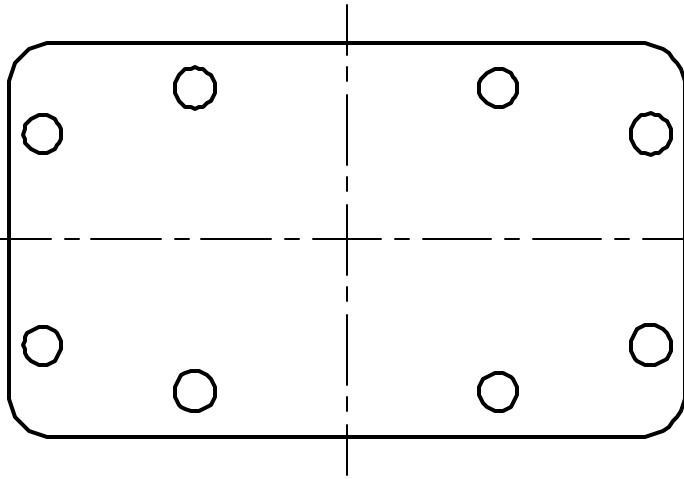
Flange (f1 f2): See [Appendix G](#)

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

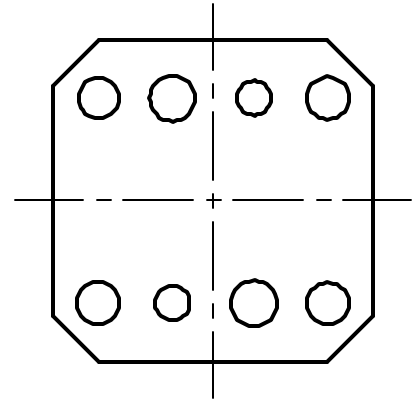
Finish (f): P – Paint Space Machine Gray, N – None, O – Other

Space Machine & Engineering Corp.

Double Ridge Waveguide Shorts



RECTANGULAR



SQUARE

Space Machine offers a standard product line of double ridge shorts covering waveguide sizes WRD180 thru WRD250. Offset shorts of various wavelengths are also available.

Ordering Information:

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

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

Series (DSH):

Waveguide Size (wrd): WRD180 thru WRD250

Flange Material (-m): A – Aluminum

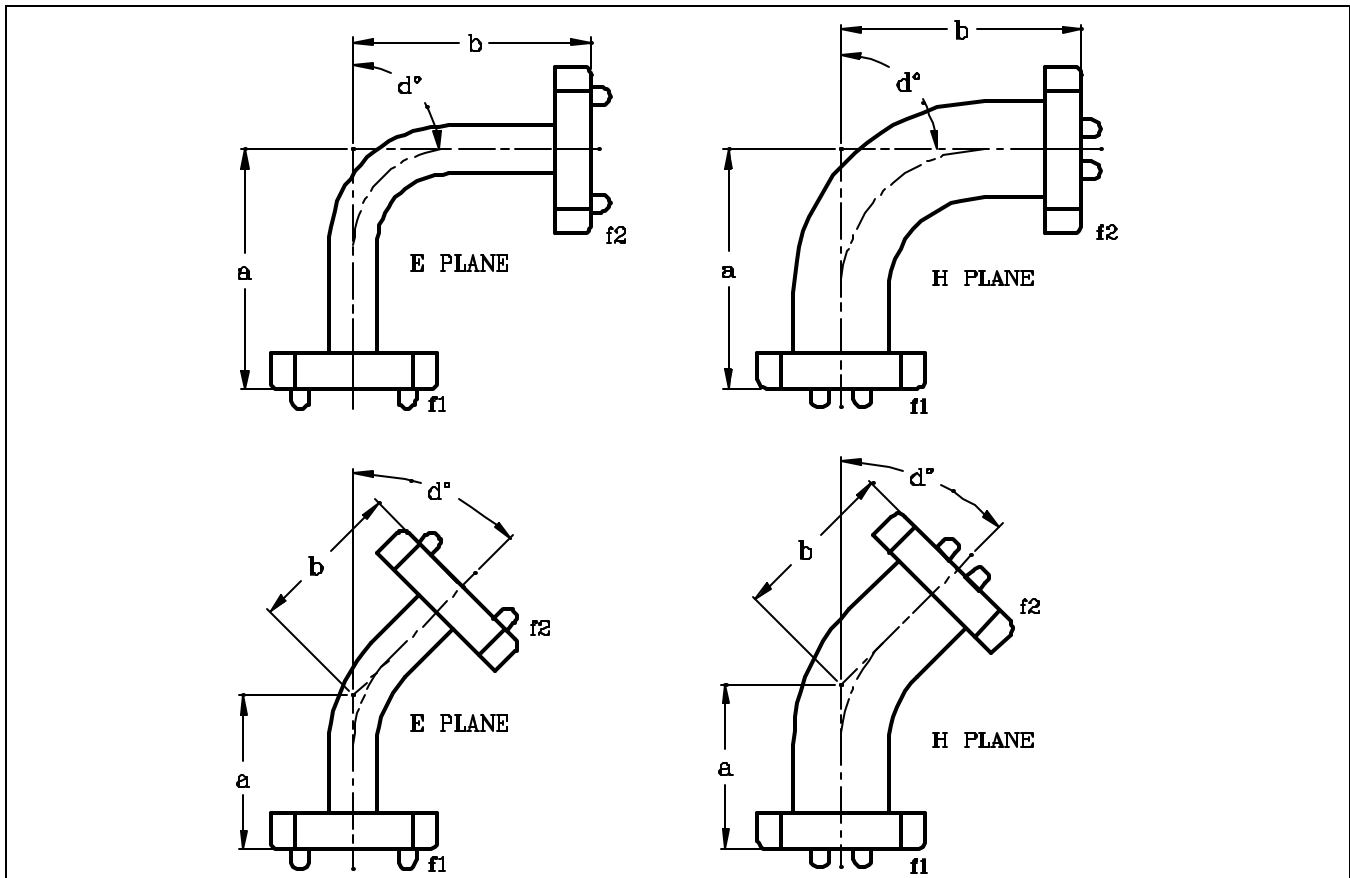
Flange (f): See [Appendix G](#)

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.

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 WRD250. 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:

90° Double Ridge Formed E Bend Assembly, Example part number:
WRD180, 3 inch X 3 inch legs, Aluminum,
Cover Flanges, Chromated, Paint Space Machine Gray.

<u>d</u>	<u>DtB</u>	<u>wrd</u>	<u>-a</u>	<u>xb</u>	<u>m</u>	<u>f1</u>	<u>f2</u>	<u>-p</u>	<u>f</u>
90	DEB	180	-3	x3	A	01	01	-C	P

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

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

Waveguide Size (wrd): WRD180 thru WRD250

Leg Length (-a):

Leg Length (b):

Material (m): A – Aluminum

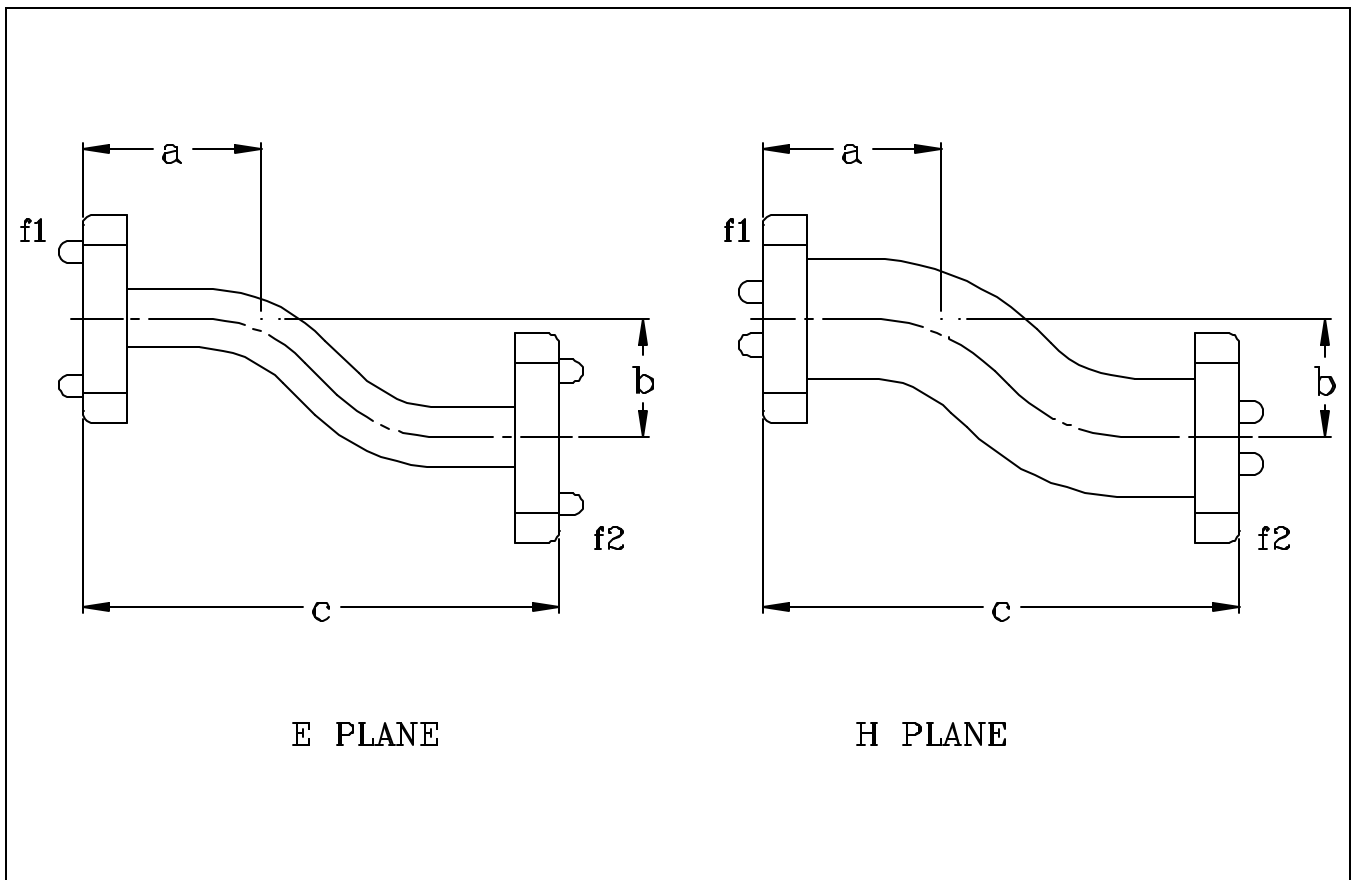
Flange (f1 f2): See [Appendix G](#)

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

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

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 WRD250. Offset distance, leg lengths and flange types are made to customer specifications. VSWR is 1.15:1 over the full waveguide band.

Ordering Information:

Double Ridge Formed E Offset Assembly, WRD180, 3 inch leg X 2 inch offset X 4 inch leg, Aluminum, Cover Flanges, Chromated, Paint Space Machine Gray.

Example part number:

DtO	wrd	-a	xb	xc	m	f1 f2	-p	f
DEO	180	-3	x2	x4	A	01 01	-C	P

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

Waveguide Size (wrd): WRD180 thru WRD250

Leg Length (-a):

Offset Length (b):

Leg Length (c):

Material (m): A – Aluminum

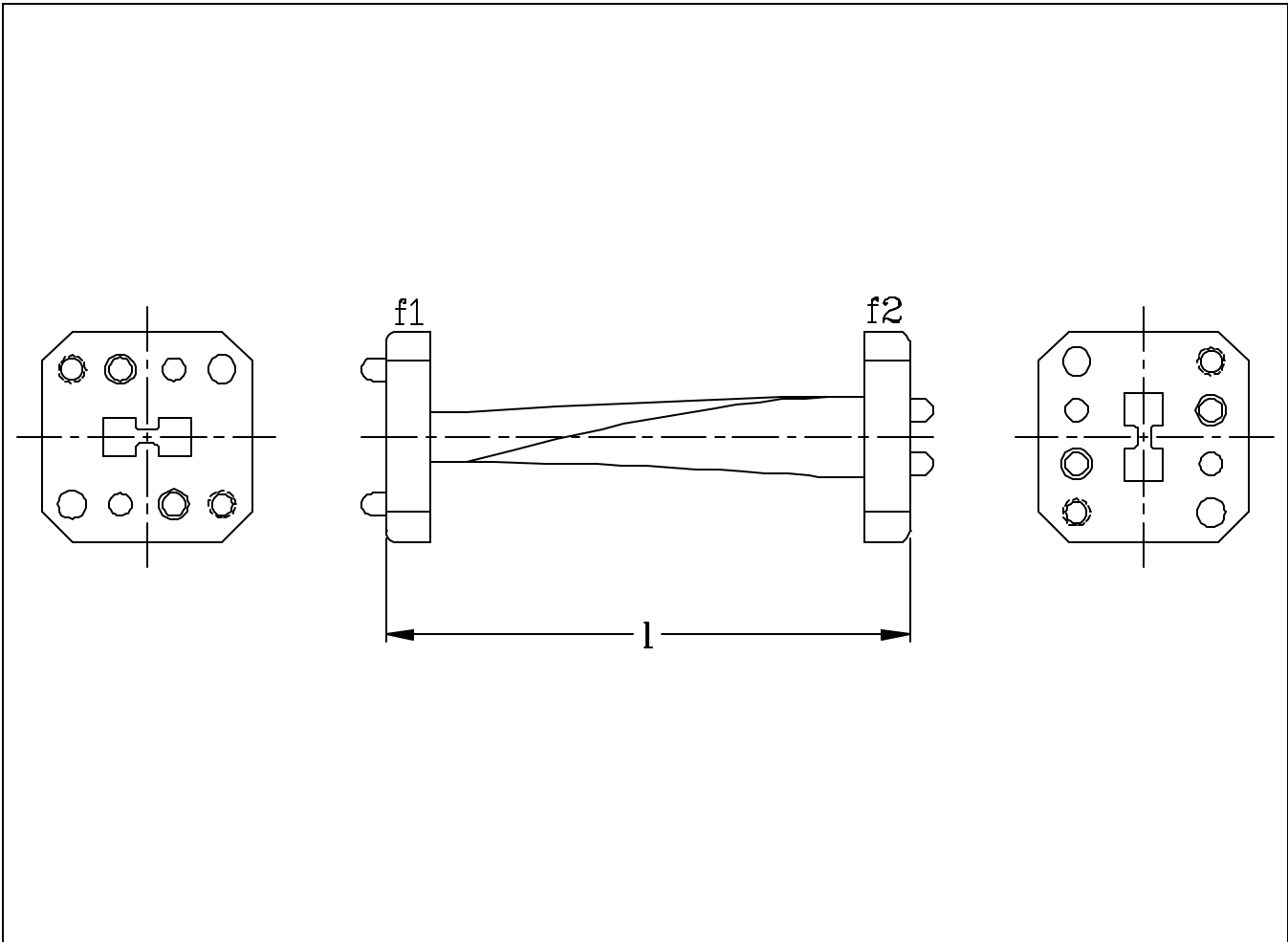
Flange (f1 f2): See [Appendix G](#)

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

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

Space Machine & Engineering Corp.

Double Ridge Waveguide Twist Assemblies



Space Machine will custom fabricate double ridge twist sections covering the waveguide sizes WRD180 to WRD250. Degree of twist, length and flange types made to customer specifications. VSWR is less than 1.15:1 over the full waveguide band.

Ordering Information:

90° Double Ridge Waveguide Twist, WRD180, 6.0" Long, Aluminum, Cover Flanges, Silver Plated, Paint Space Machine Gray.

Example part number:

<u>d</u>	<u>DTW</u>	<u>wrd</u>	<u>-l</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>f</u>
90	DTW	180	-6.0	A	01 01	-S	P

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

Series (DTW):

Waveguide Size (wrd): WRD180 thru WRD250

Length (-l): (inches)

Waveguide Material (m): A – Aluminum

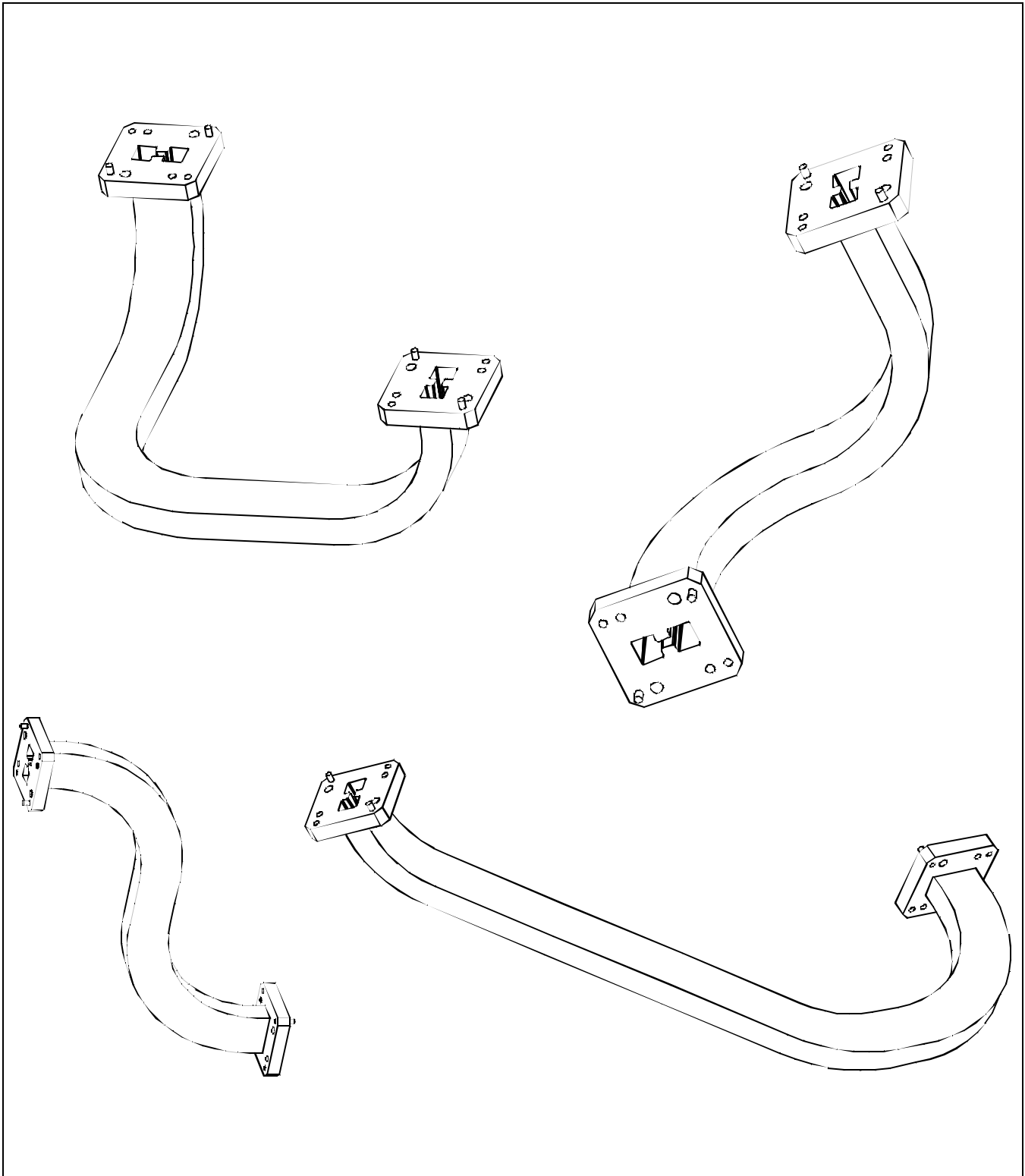
Flange (f1 f2): See [Appendix G](#)

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

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

Space Machine & Engineering Corp.

Double Ridge Waveguide Specialized Bend Assemblies

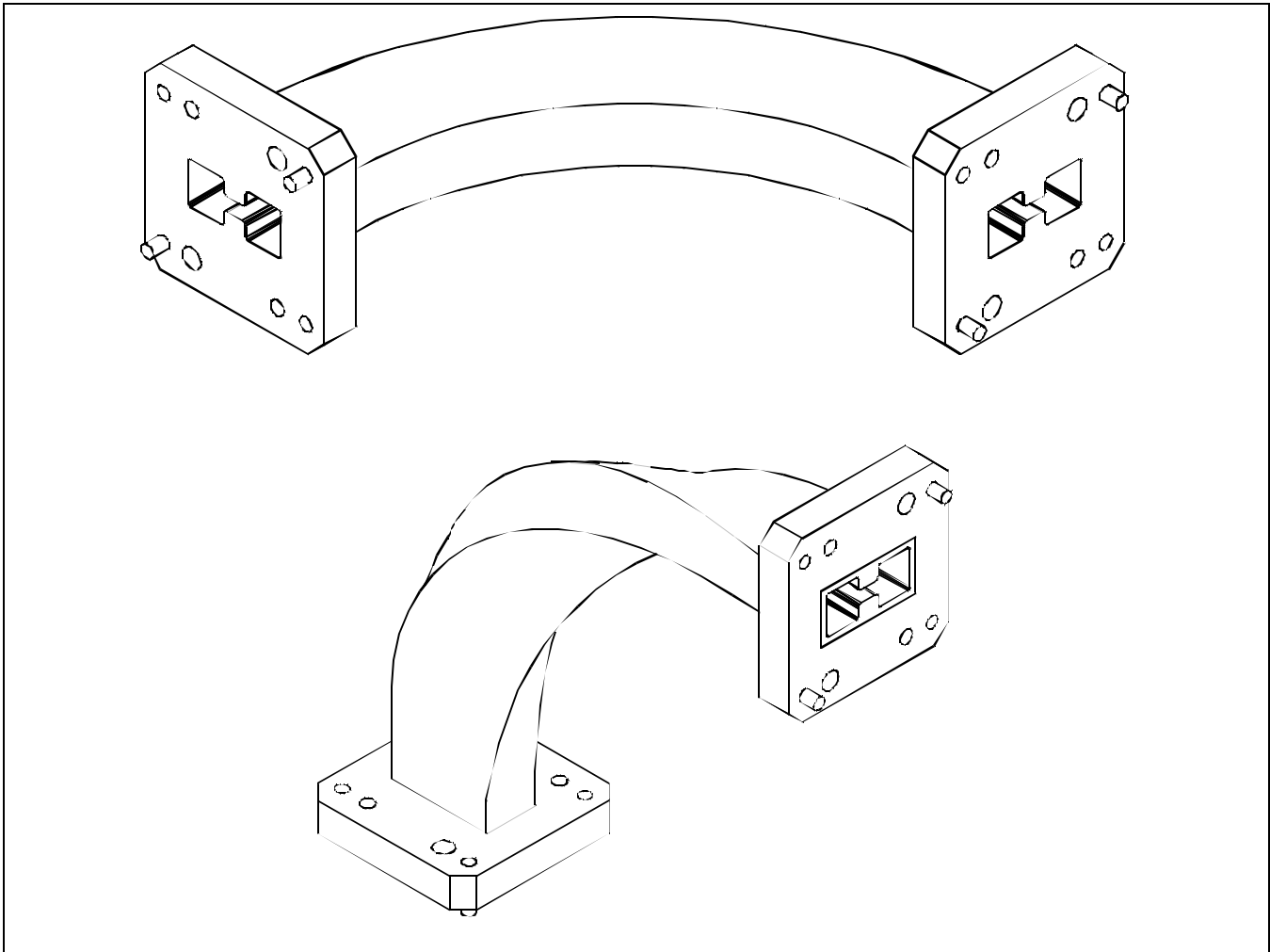


Space Machine can customize any double ridge waveguide bend assembly that you require. Please contact the company with drawings, sketch or word description for a quotation.

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Space Machine & Engineering Corp.

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 WRD250. The standard waveguide material is silver-clad brass. Additional sizes and configurations are available on request.

Ordering Information:

**Flexible Double Ridge, WRD650,
12“ Long, Aluminum, Cover Flanges,
Chromated, Neoprene Jacket.**

Example part number:

<u>DFx</u>	<u>wrd</u>	<u>-l</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>j</u>
DFL	650	-12	A	01 01	-C	N

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

Waveguide Size (wrd): WRD180 thru WRD250

Length (-l): (inches)

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

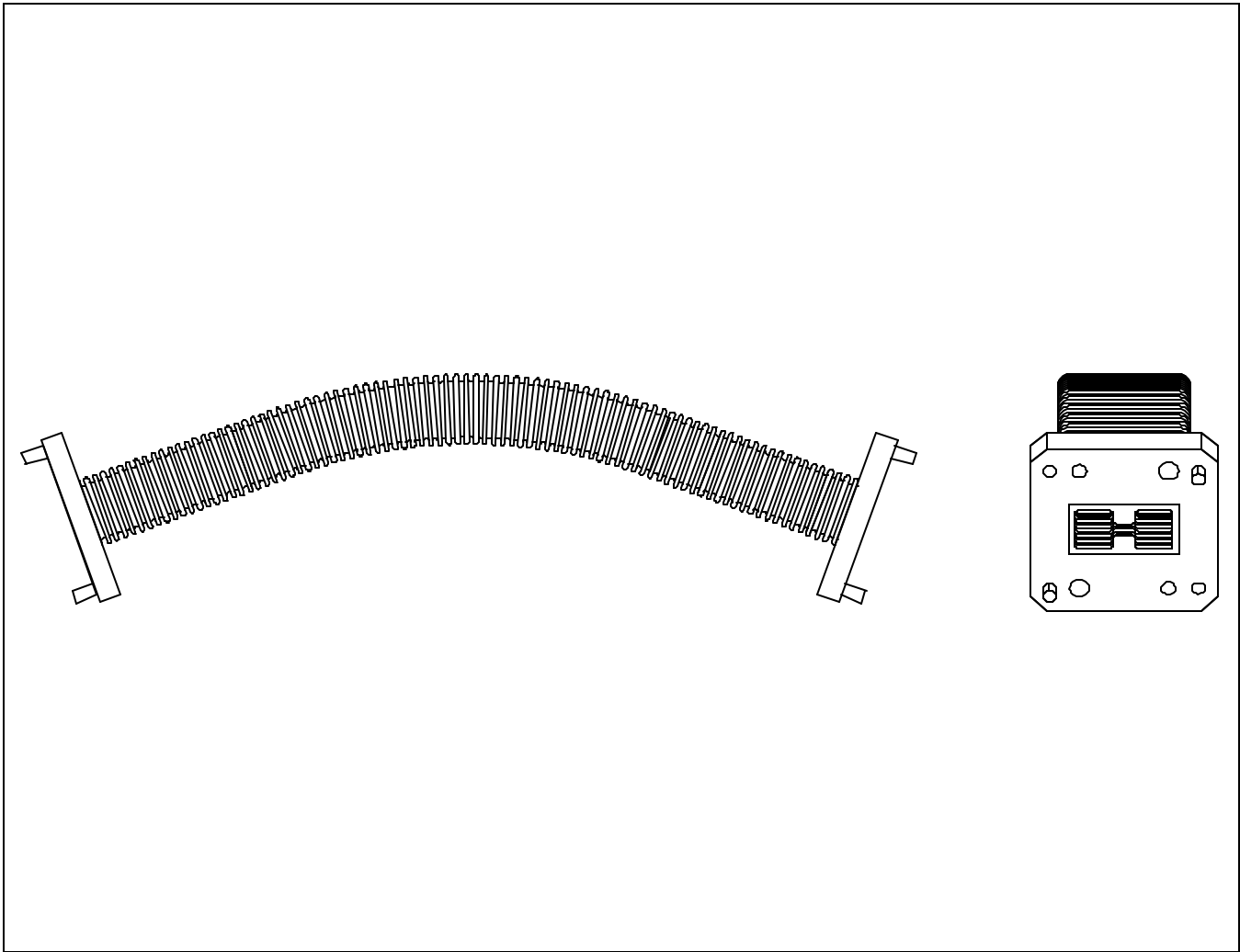
Flanges (f1 f2): See [Appendix G](#)

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

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

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 WRD250. The standard waveguide material is silver-clad brass or beryllium copper. Additional sizes and configurations are available on request.

Ordering Information:

Seamless Flexible Double Ridge, WRD650, 12" Long, Aluminum, Cover Flanges, Chromated, Neoprene Jacket.

Example part number:

<u>DFS</u>	<u>wrd</u>	<u>-l</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>j</u>
DFS	650	-12	A	01 01	-C	N

Series (DFS): Seamless Flex

Waveguide Size (wrd): WRD650 thru WRD250

Length (-l): (inches)

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

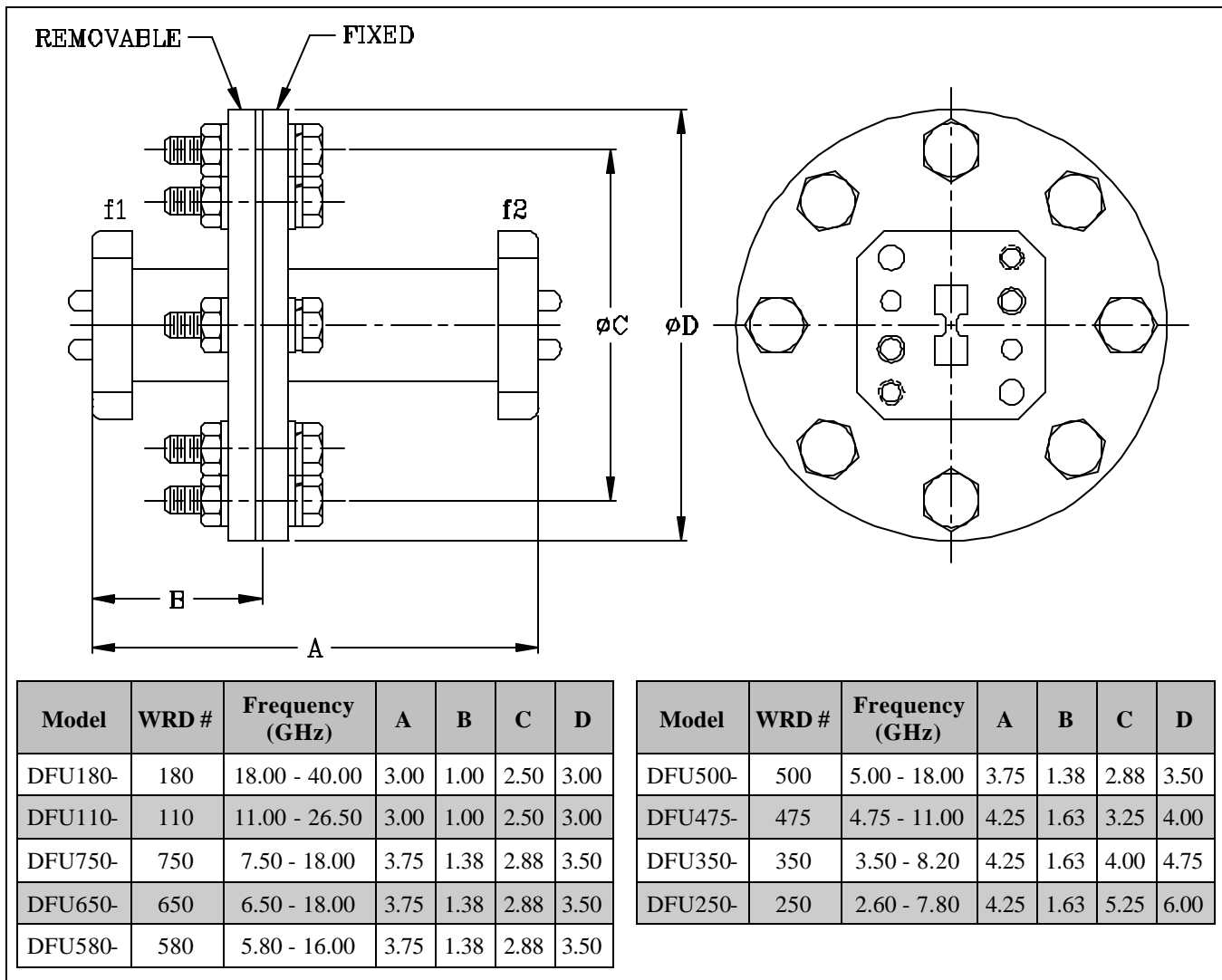
Flanges (f1 f2): See [Appendix G](#)

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

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

Space Machine & Engineering Corp.

Double Ridge Waveguide Bulkhead Feed Unit



Space Machine offers a standard product line of double ridge bulkhead feed units covering waveguide sizes WRD180 thru WRD250. 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.

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

Series (DFU):

Waveguide Size (wrd): WRD180 thru WRD250

Material (-m): A – Aluminum

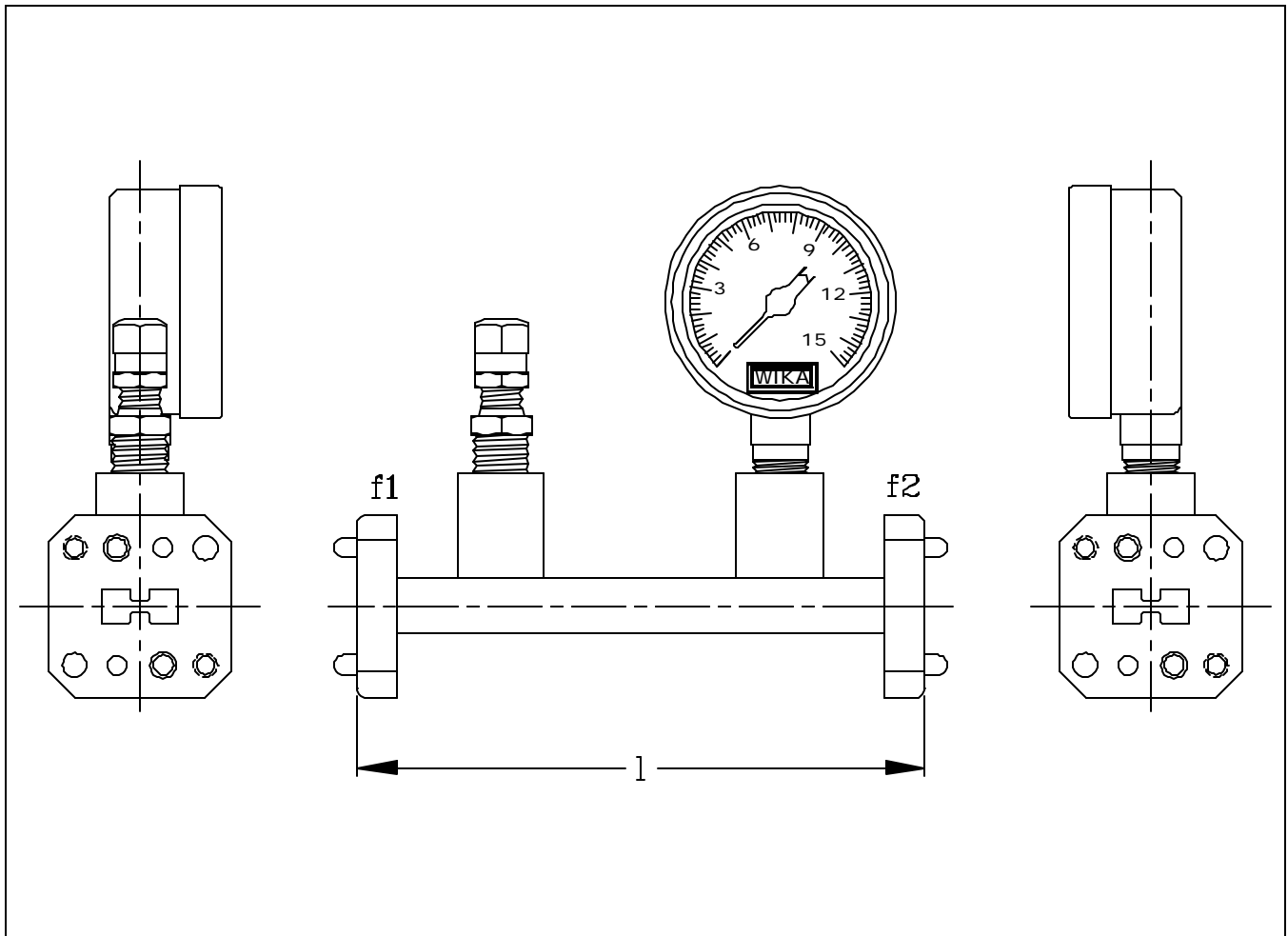
Flange (f1 f2): See [Appendix G](#)

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

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

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 WRD250. Additional sizes and configurations are available upon request.

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.

1/8" Schrader inlet valve included in standard assembly.

Ordering Information:

Double Ridge Waveguide Pressure Adapter,
WRD180, 4 inches long, Aluminum, Cover Flanges,
Chromate, Paint Space Machine Gray.

Example part number:

<u>DPA</u>	<u>wrd</u>	<u>-l</u>	<u>m</u>	<u>f1 f2</u>	<u>-p</u>	<u>f</u>
DPA	180	-4.0	A	01 01	-C	P

Series (DPA):

Waveguide Size (wrd): WRD180 thru WRD250

Length (-l): (inches)

Material (m): A – Aluminum

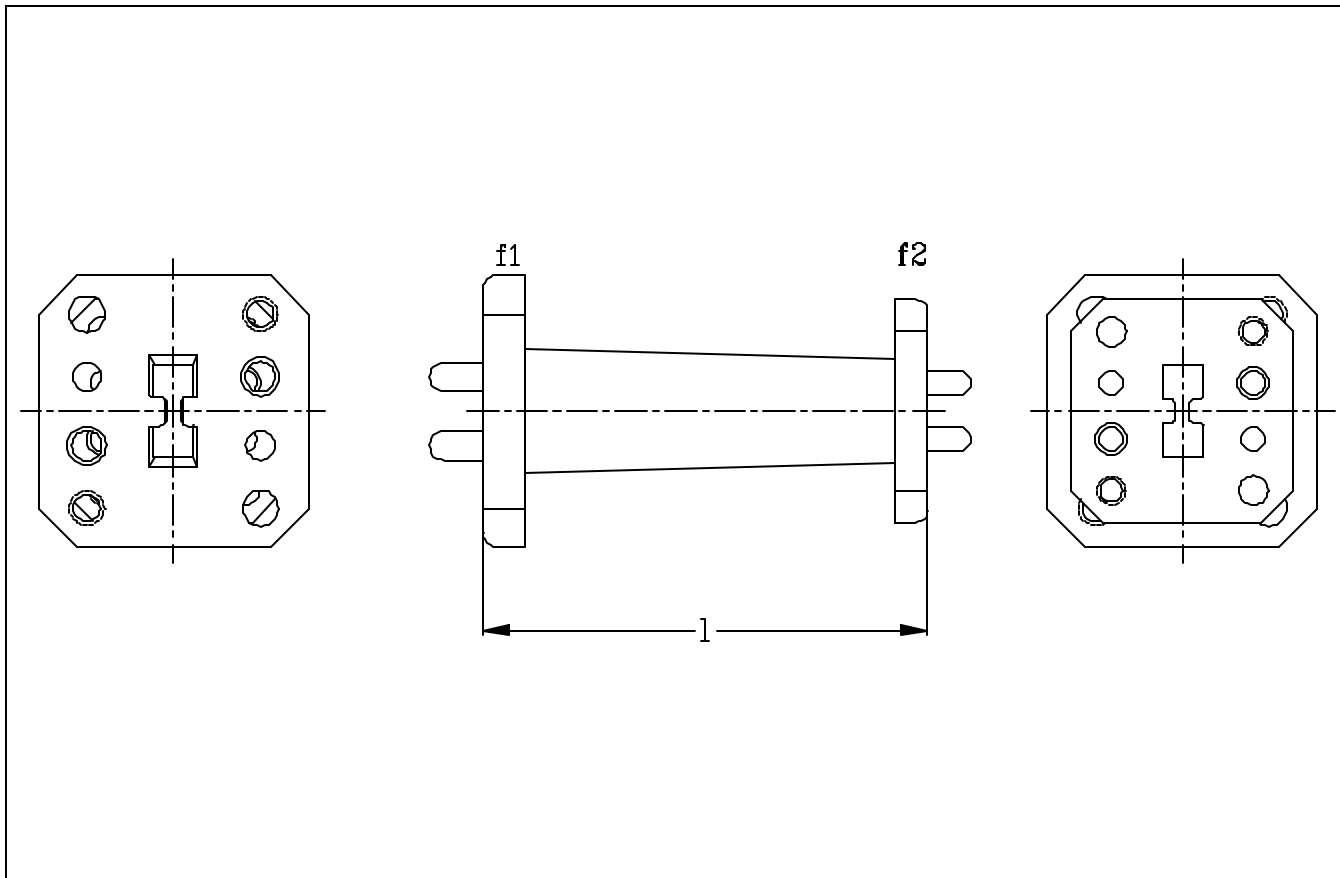
Flanges (f1 f2): See [Appendix G](#)

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

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

Space Machine & Engineering Corp.

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 WRD250. VSWR is 1.10:1 typical in the overlapping frequency bands. Additional sizes and configurations are available upon request.

Ordering Information:

Double Ridge To Double Ridge Transition, WRD650 Cover Flange to WRD750 Cover Flange, Aluminum, 5.0" Long, Silver Plated, Paint Space Machine Gray.

Example part number:

<u>DDT</u>	<u>wrd1</u>	<u>-f1</u>	<u>-wrd2</u>	<u>-f2</u>	<u>m</u>	<u>l</u>	<u>-p</u>	<u>f</u>
DDT	650	-01	-750	-01	A	5.0	-S	P

Series (DDT):

Waveguide Size 1 (wrd1): WRD180 thru WRD250

Flange 1 (-f1): See [Appendix G](#)

Waveguide Size 2 (-wrd2): WRD180 thru WRD250

Flange 2 (-f2): See [Appendix G](#)

Material (m): A – Aluminum

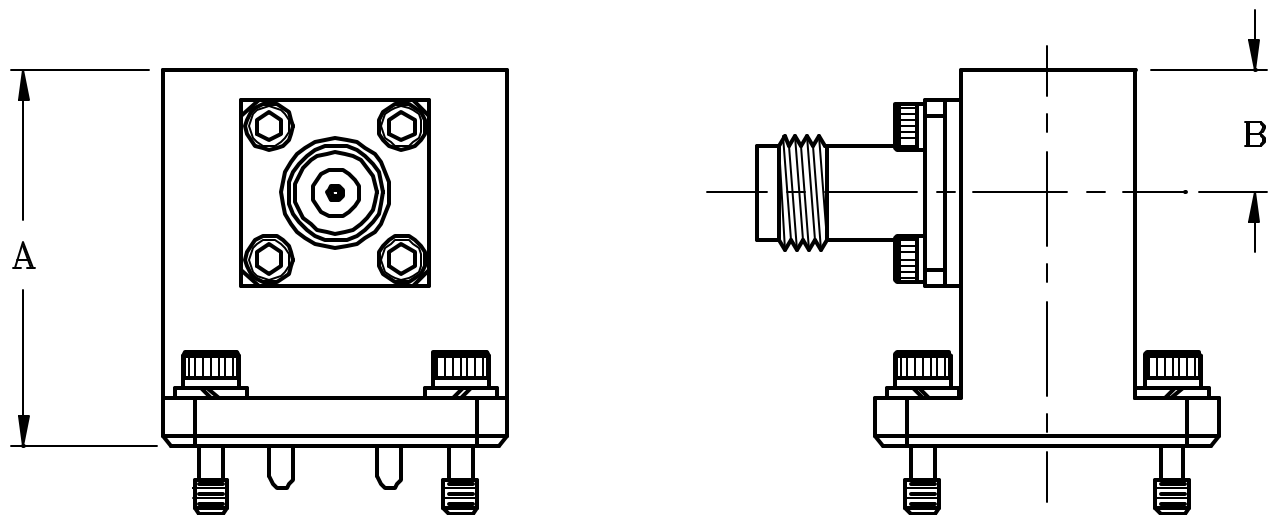
Length (l): (inches)

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

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

Space Machine & Engineering Corp.

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

Space Machine custom fabricates a standard product line of double ridge waveguide to coax adapters covering waveguide sizes WRD180 thru WRD250. VSWR is 1.35:1 and insertions loss is 0.35 dB max. Additional sizes and configurations available upon request.

Ordering Information:

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

Example part number:

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

Series (DCA):

Waveguide Size (wrd): WRD180 thru WRD250

Material (-m): A – Aluminum

Flange (f): See [Appendix G](#)

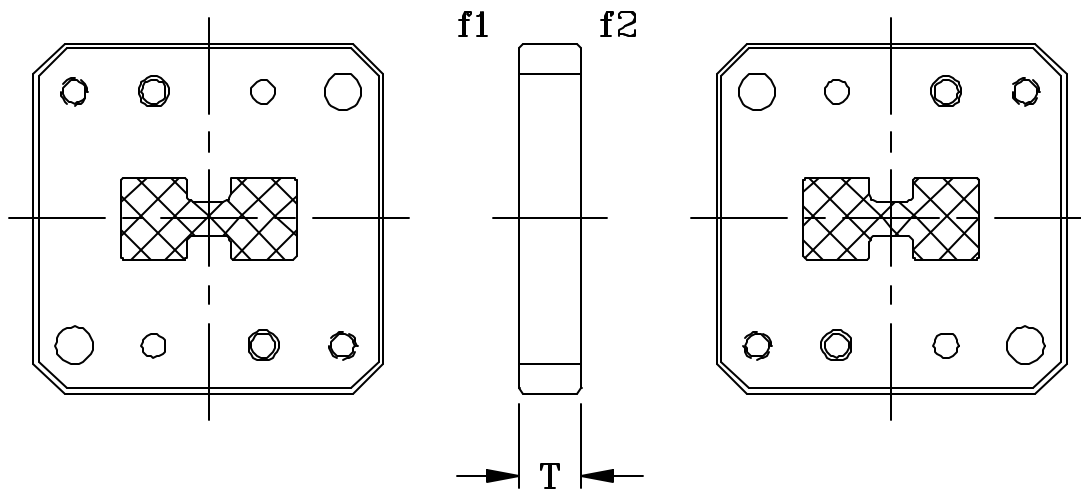
Connector (cnt): See [Appendix E](#)

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

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

Space Machine & Engineering Corp.

Teflon/Fiberglass Double Ridge Waveguide Pressure Windows



Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T ^{''})	Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T ^{''})
DPWT180-	180	18.00 - 40.00	50	0.25	DPWT500-	500	5.00 - 18.00	280	0.25
DPWT110-	110	11.00 - 26.50	70	0.25	DPWT475-	475	4.75 - 11.00	400	0.38
DPWT750-	750	7.50 - 18.00	100	0.25	DPWT350-	350	3.50 - 8.20	500	0.38
DPWT650-	650	6.50 - 18.00	100	0.25	DPWT250-	250	2.60 - 7.80	750	0.38
DPWT580-	580	5.80 - 16.00	150	0.25					

Space Machine offers a standard product line of teflon / fiberglass double ridge pressure windows covering waveguide sizes WRD180 thru WRD250. 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,
WRD650, Aluminum, Cover Flanges,
Chromated, Paint Space Machine Gray.

Example part number:

DPWT wrd -m f1 f2 -p f
DPWT 650 -A 01 01 -C P

Series (DPWT):

Waveguide Size (wrd): WRD180 thru WRD250

Flange Material (-m): A – Aluminum

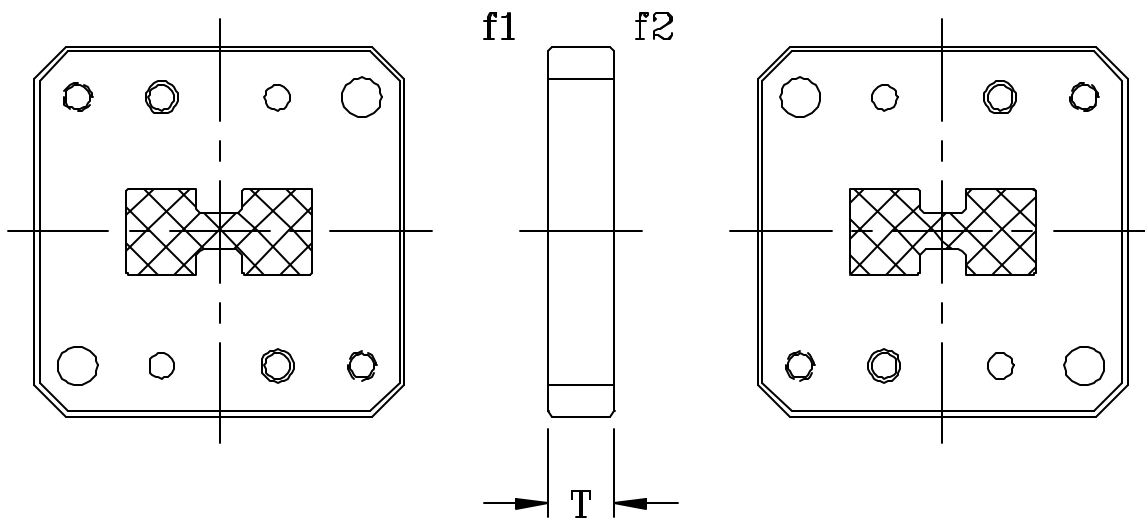
Flanges (f1 f2): See [Appendix G](#)

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

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

Space Machine & Engineering Corp.

Kapton Double Ridge Waveguide Pressure Windows



Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T ^{''})	Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T ^{''})
DPWK180-	180	18.00 - 40.00	100	0.25	DPWK500-	500	5.00 - 18.00	500	0.25
DPWK110-	110	11.00 - 26.50	150	0.25	DPWK475-	475	4.75 - 11.00	750	0.38
DPWK750-	750	7.50 - 18.00	400	0.25	DPWK350-	350	3.50 - 8.20	1000	0.38
DPWK650-	650	6.50 - 18.00	400	0.25	DPWK250-	250	2.60 - 7.80	1000	0.38
DPWK580-	580	5.80 - 16.00	500	0.25					

Space Machine offers a standard product line of kapton double ridge pressure windows covering waveguide sizes WRD180 thru WRD250. 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 WRD250

Flange Material (-m): A – Aluminum

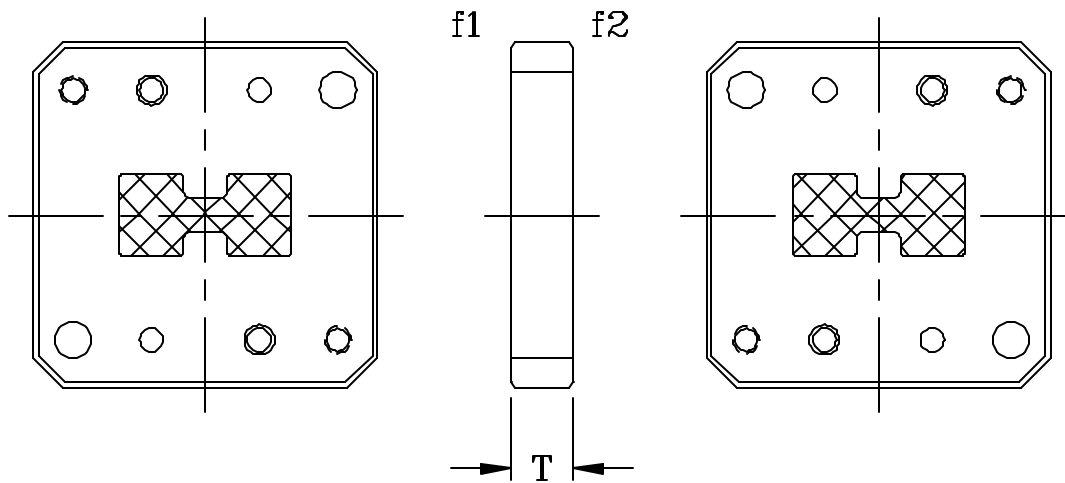
Flanges (f1 f2): See [Appendix G](#)

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

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

Space Machine & Engineering Corp.

Mica Double Ridge Waveguide Pressure Windows



Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T ^o)	Model	WRD #	Frequency (GHz)	Avg. Power (W)	Thickness (T ^o)
DPWM180-	180	18.00 - 40.00	150	0.25	DPWM500-	500	5.00 - 18.00	800	0.25
DPWM110-	110	11.00 - 26.50	200	0.25	DPWM475-	475	4.75 - 11.00	1000	0.38
DPWM750-	750	7.50 - 18.00	700	0.25	DPWM350-	350	3.50 - 8.20	1250	0.38
DPWM650-	650	6.50 - 18.00	700	0.25	DPWM250-	250	2.60 - 7.80	1500	0.38
DPWM580-	580	5.80 - 16.00	800	0.25					

Space Machine offers a standard product line of mica double ridge pressure windows covering waveguide sizes WRD180 thru WRD250. 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 WRD250

Flange Material (-m): A – Aluminum

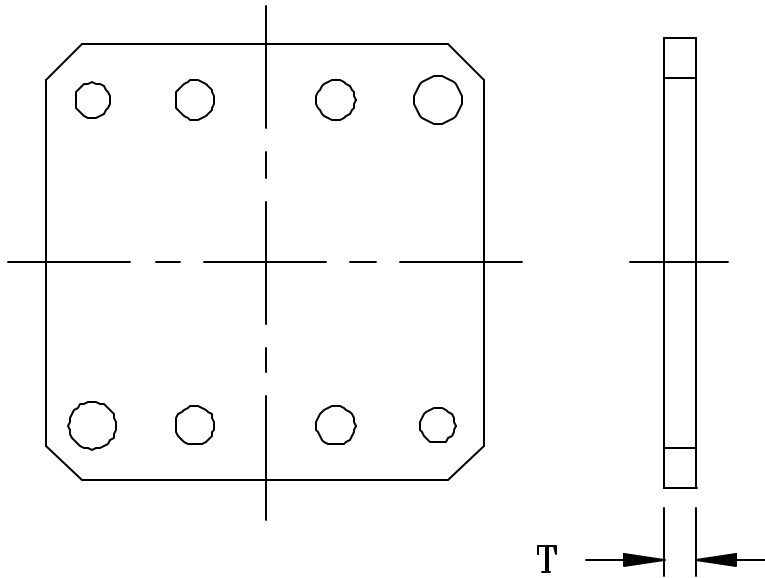
Flanges (f1 f2): See [Appendix G](#)

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

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

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 WRD250. 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:

**Double Ridge Pressure Gasket,
WRD650, Mylar, 0.010 thick.**

Example part number:

<u>DPG</u>	<u>wrd</u>	<u>-m</u>	<u>-t</u>
DPG	650	-MY	-10

Series (DPG):

Waveguide Size (wrd): WRD180 thru WRD250

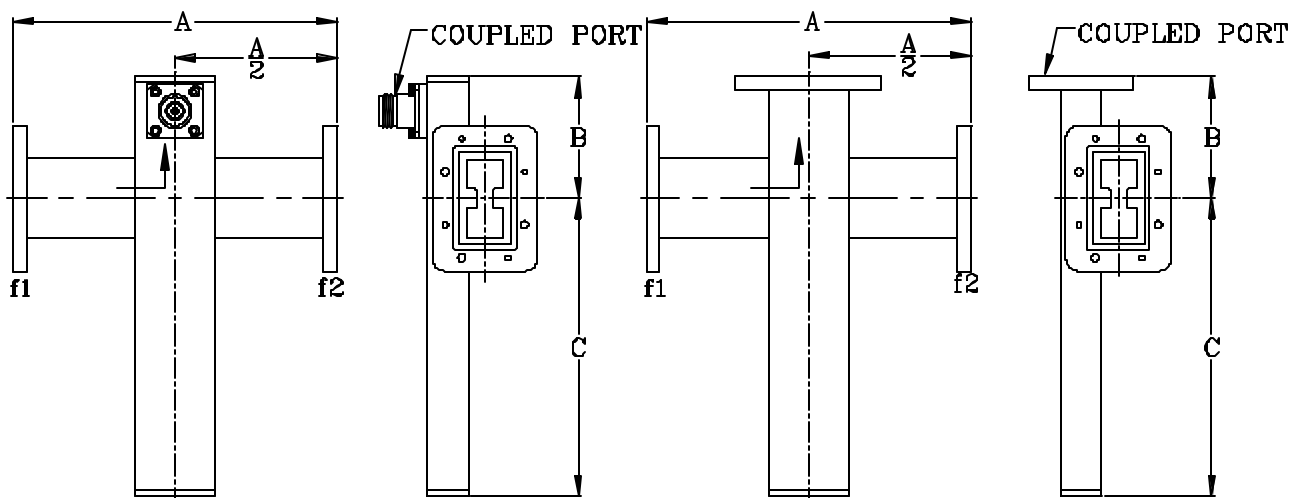
Material (-m): T – Teflon, TF – Teflon/Fiberglass, MY – Mylar, K – Kapton, M – Mica

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

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Space Machine & Engineering Corp.

Double Ridge Waveguide Cross Guide Couplers



Model	WRD #	Frequency (GHz)	A	B	C	Model	WRD #	Frequency (GHz)	A	B	C
DDG180-	180	18.00 - 40.00	2.50	1.25	6.50	DDG500-	500	5.00 - 18.00	3.00	2.25	10.50
DDG110-	110	11.00 - 26.50	2.50	1.25	7.50	DDG475-	475	4.75 - 11.00	3.25	2.50	11.75
DDG750-	750	7.50 - 18.00	2.75	2.00	9.50	DDG350-	350	3.50 - 8.20	3.75	3.25	14.50
DDG650-	650	6.50 - 18.00	3.00	2.00	9.75	DDG250-	250	2.60 - 7.80	4.00	3.75	16.25
DDG580-	580	5.80 - 16.00	3.00	2.25	9.75	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 ± 5 dB over the full waveguide band. Directivity is 12dB minimum. Additional sizes and configurations are available upon request.

Ordering Information:

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

Example part number:

DDG **wrd** **-m** **c** **cp** **-f1 f2** **-p** **f**
DDG 350 -A 40 NF -01 02 -S P

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 G](#)

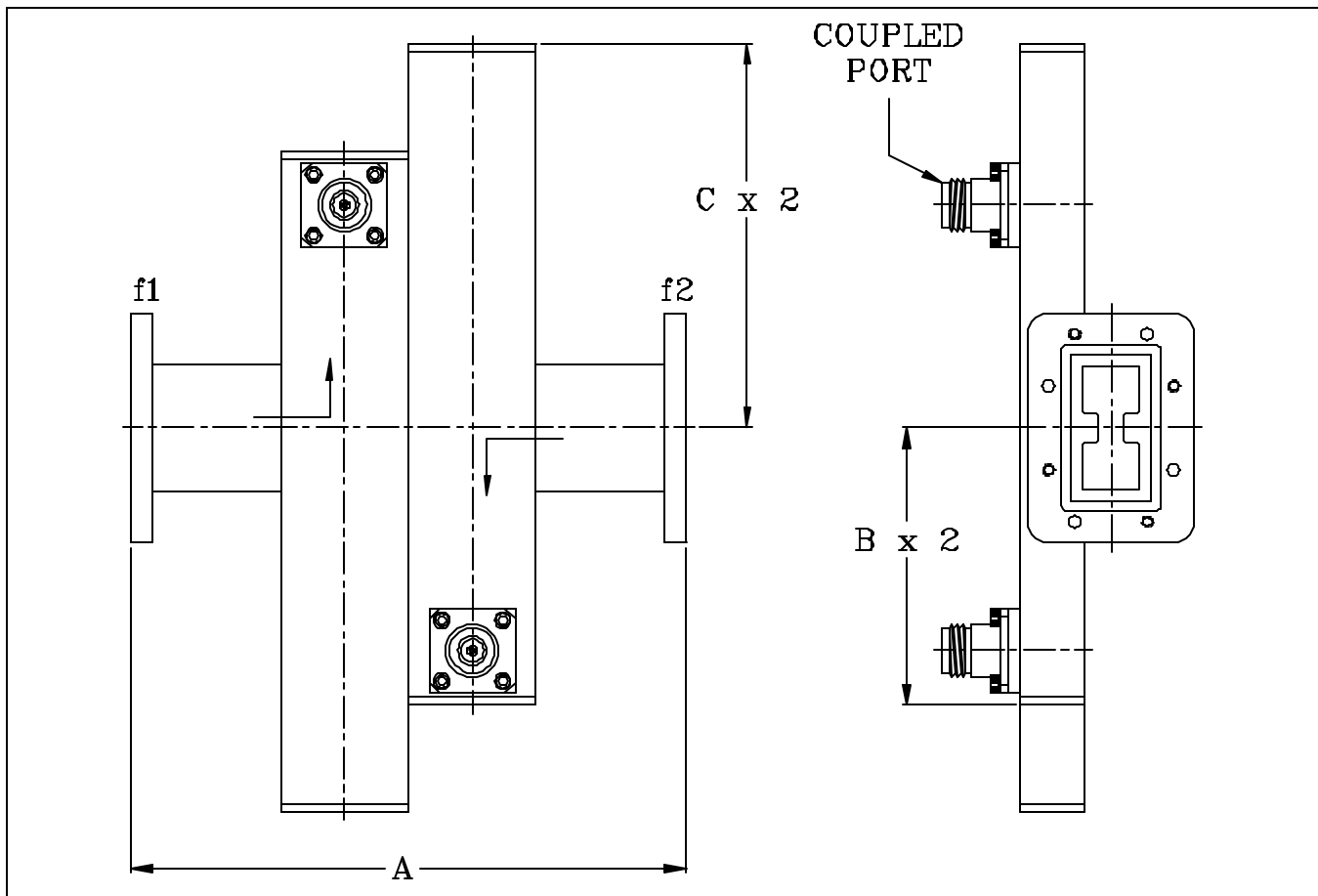
Flange (-f1 f2): See [Appendix G](#)

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

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

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 ± 5 dB 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, Cover /Gasket Flanges,
Silver Plated, Paint Space Machine Gray.

Example part number:

<u>DDB</u>	<u>wrd</u>	<u>-m</u>	<u>c</u>	<u>cp</u>	<u>-f1</u>	<u>f2</u>	<u>-p</u>	<u>f</u>
DDB	500	-A	40	NF	-01	02	-S	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 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

Space Machine & Engineering Corp.

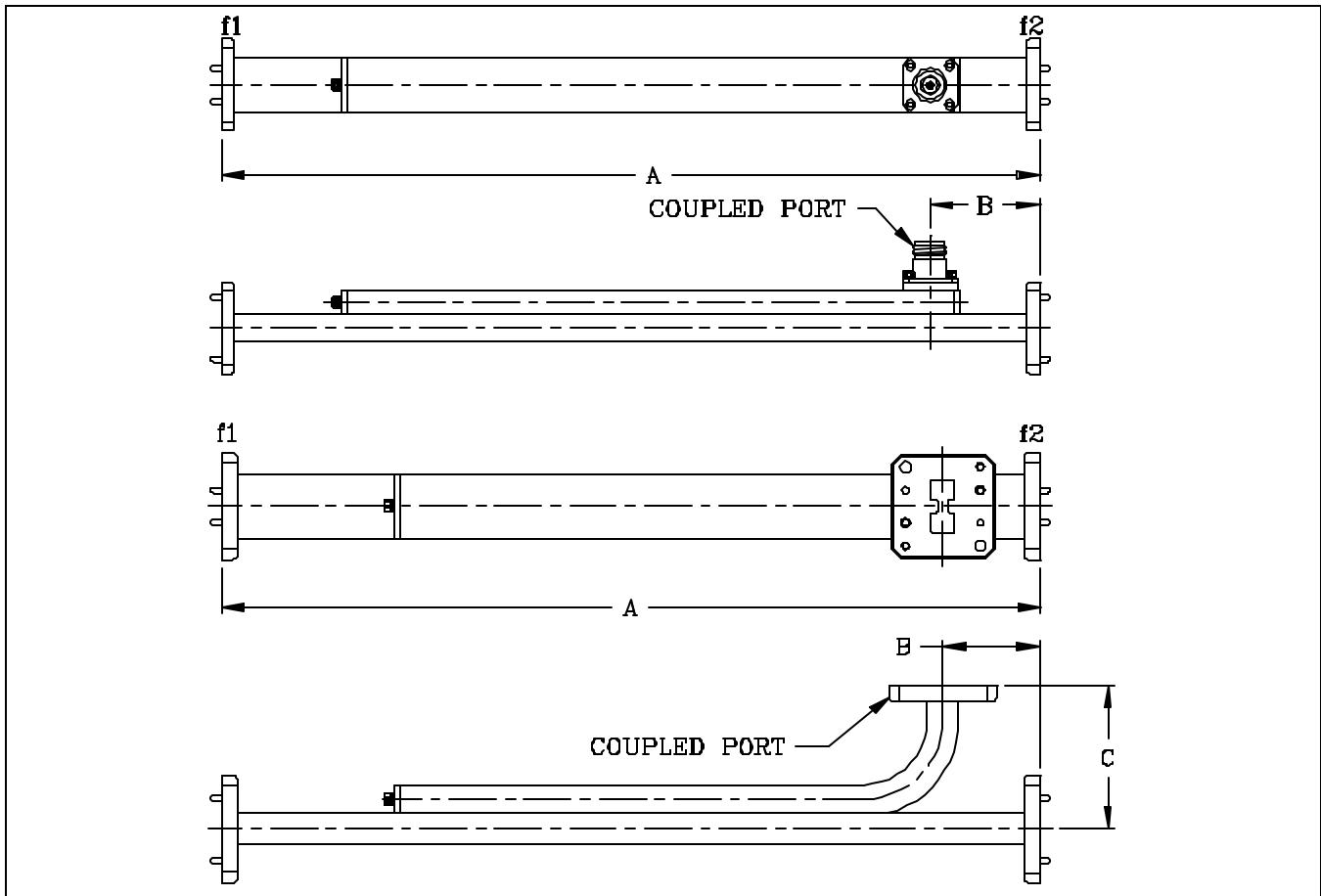
Double Ridge Waveguide Dual Cross Guide Coupler Dimensions

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.

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 ± 2 dB 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,
WRD180, Aluminum, 30dB Coupling,
Type N Female Coupled Port, Cover Flanges,
Silver Plated, Paint Space Machine Gray.**

Example part number:

<u>DRT</u>	<u>wrd</u>	<u>-m</u>	<u>c</u>	<u>cp</u>	<u>-f1</u>	<u>f2</u>	<u>-p</u>	<u>f</u>
DRT	180	-A	30	NF	-01	01	-S	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 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

Space Machine & Engineering Corp.

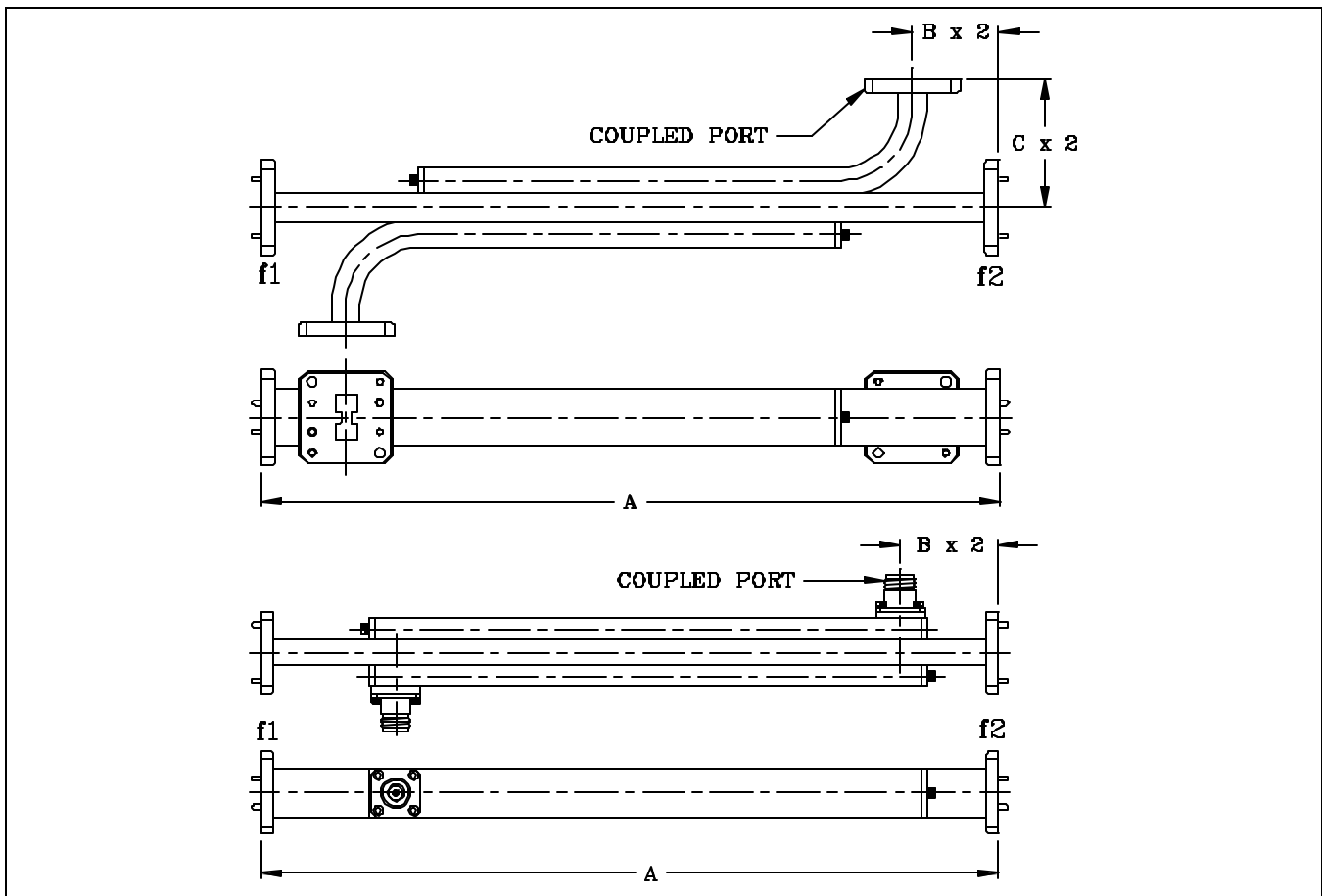
Double Ridge Waveguide Topwall Coupler Dimensions

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.

Space Machine & Engineering Corp.

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 ± 2 dB 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,
WRD650, Aluminum, 30dB Coupling,
Type N Female Coupled Port, Cover Flanges,
Silver Plated, Paint Space Machine Gray.**

Example part number:

<u>DRB</u>	<u>wrd</u>	<u>-m</u>	<u>c</u>	<u>cp</u>	<u>-f1</u>	<u>f2</u>	<u>-p</u>	<u>f</u>
DRB	650	-A	30	NF	-01	01	-S	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 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

Space Machine & Engineering Corp.

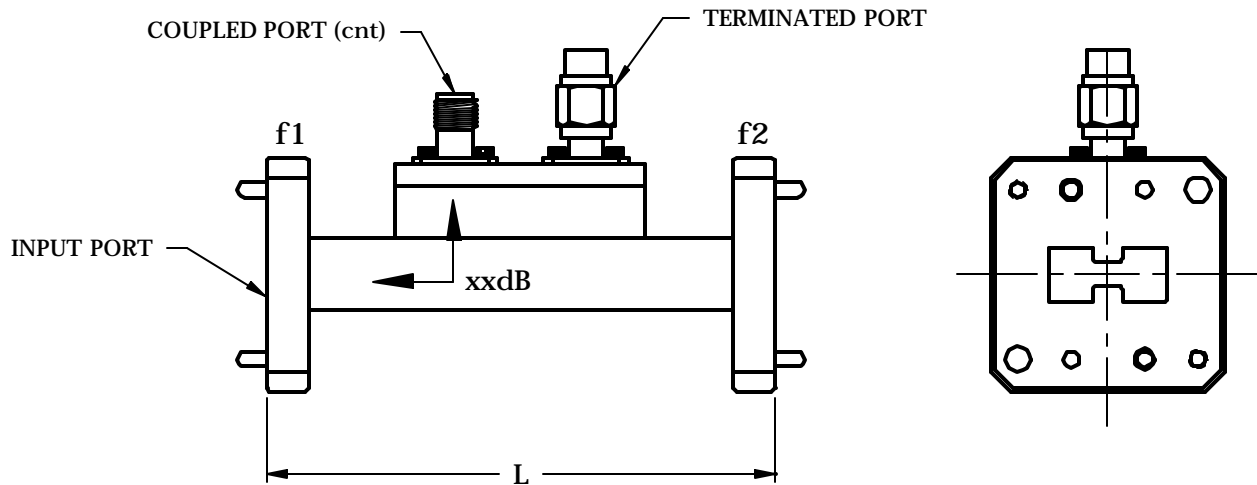
Double Ridge Waveguide Dual Topwall Coupler Dimensions

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.

Space Machine & Engineering Corp.

Double Ridge Waveguide Loop Couplers



Model	WRD #	Frequency (GHz)	Length (L)	Model	WRD #	Frequency (GHz)	Length (L)
DLC750-	750	7.50 - 18.00	3.00	DLC475-	475	4.75 - 11.00	3.50
DLC650-	650	6.50 - 18.00	3.00	DLC350-	350	3.50 - 8.20	3.50
DLC580-	580	5.80 - 16.00	3.00	DLC250-	250	2.60 - 7.80	4.00
DLC500-	500	5.00 - 18.00	3.00	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 $\pm 0.5\text{dB}$. Over the full waveguide band, coupling variation is $\pm 2.5\text{dB}$. Directivity is 15dB minimum. Main arm VSWR is 1.08:1 and secondary arm VSWR is 1.3:1.

Ordering Information:

**Double Ridge Loop Coupler,
WRD180, Aluminum, 30dB Coupling,
SMA Female Coupled Port, Cover Flanges,
Silver Plated, Paint Space Machine Gray.**

Example part number:

DLC	wrd	-m	c	cnt	-f1 f2	-p	f
DLC	180	-A	30	SF	-01 01	-S	P

Series (DLC):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Coupling (c): 30 - 60 dB

Connector Type (cnt): See [Appendix E](#)

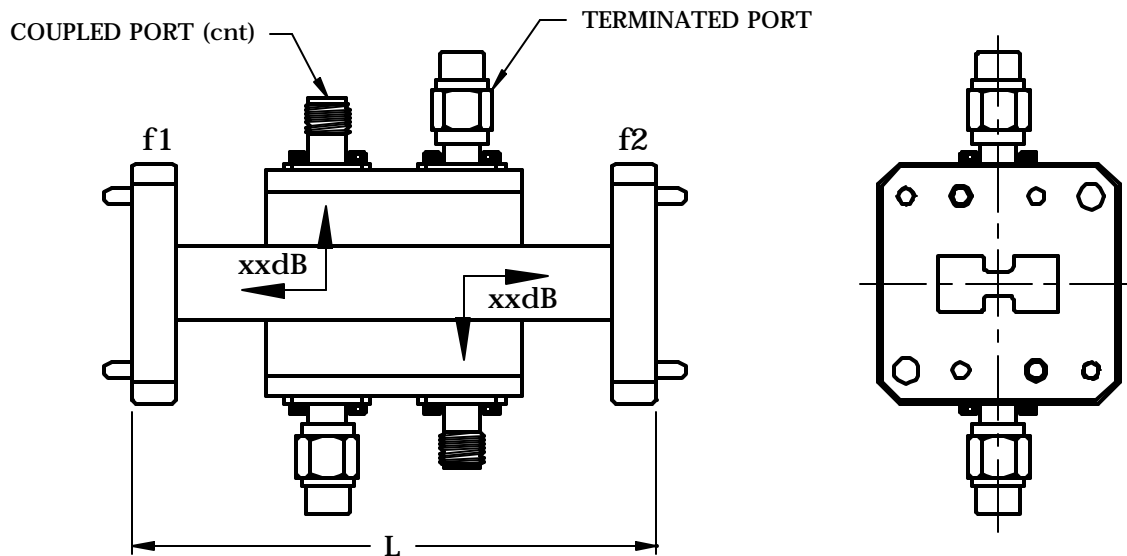
Flange (-f1 f2): See [Appendix G](#)

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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Double Ridge Waveguide Dual Loop Couplers



Model	WRD #	Frequency (GHz)	Length (L)	Model	WRD #	Frequency (GHz)	Length (L)
DLD750-	750	7.50 - 18.00	6.00	DLD475-	475	4.75 - 11.00	7.00
DLD650-	650	6.50 - 18.00	6.00	DLD350-	350	3.50 - 8.20	7.00
DLD580-	580	5.80 - 16.00	6.00	DLD250-	250	2.60 - 7.80	8.00
DLD500-	500	5.00 - 18.00	6.00	DLD200-	200	2.00 - 4.80	9.00

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 ± 0.5 dB. Over the full waveguide band, coupling variation is ± 2.5 dB. Directivity is 15dB minimum. Main arm VSWR is 1.08:1 and secondary arm VSWR is 1.3:1.

Ordering Information:

Double Ridge Dual Loop Coupler, WRD180, Aluminum, 30dB and 50db Coupling, SMA Female Coupled Ports, Cover Flanges, Silver Plated, Paint Space Machine Gray.

Example part number:

DLD wrd -m c1 c2 cnt -f1 f2 -p f
 DLD 180 -A 30 50 SF -01 01 -S 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](#)

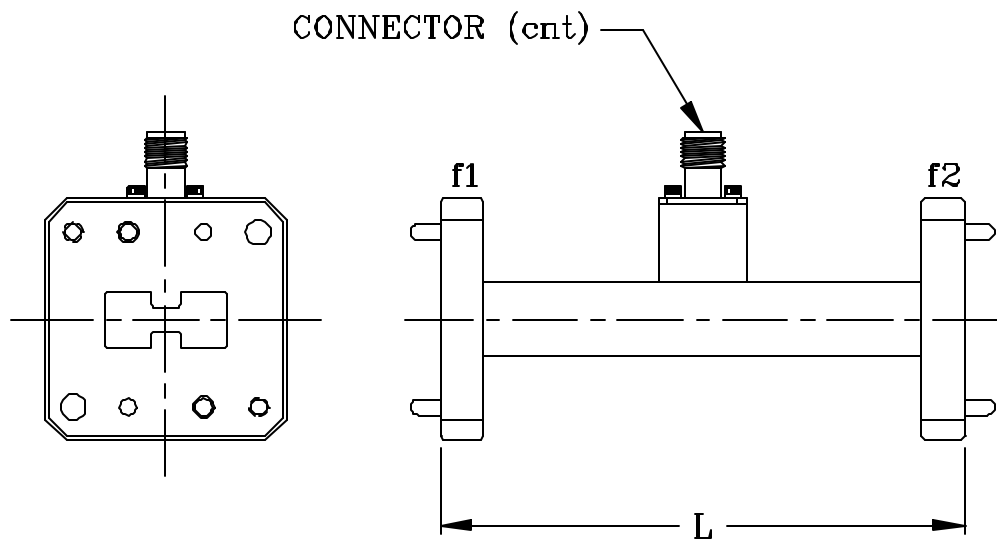
Flange (-f1 f2): See [Appendix G](#)

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.

Double Ridge Waveguide Power Sampler



Model	WRD #	Frequency (GHz)	Length (L)	Model	WRD #	Frequency (GHz)	Length (L)
DSP180-	180	18.00 - 40.00	2.50	DSP500-	500	5.00 - 18.00	3.00
DSP110-	110	11.00 - 26.50	2.50	DSP475-	475	4.75 - 11.00	3.50
DSP750-	750	7.50 - 18.00	3.00	DSP350-	350	3.50 - 8.20	3.50
DSP650-	650	6.50 - 18.00	3.00	DSP250-	250	2.60 - 7.80	4.00
DSP580-	580	5.80 - 16.00	3.00	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 1.10:1 maximum over the full waveguide band, while coupling is held to ± 1 dB. Additional sizes and configurations are available upon request.

Ordering Information:

Double Ridge Waveguide Power Sampler,
WRD180, Aluminum, 40dB Coupling,
SMA Female, Cover flanges, Chromate,
Paint Space Machine Gray.

Example part number:

DSP wrd -m c cnt -f1 f2 -p f
 DSP 180 -A 40 SF -01 01 -C P

Series (DSP):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

Coupling (c): 30 - 60 dB

Connector (cnt): See [Appendix E](#)

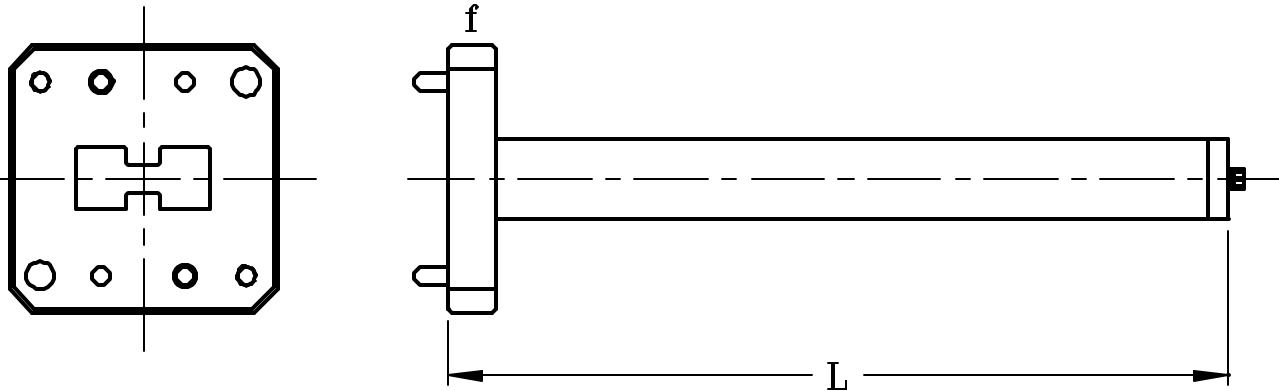
Flange (-f1 f2): See [Appendix G](#)

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.

Double Ridge Waveguide Low Power Termination



Model	WRD #	Frequency (GHz)	Avg. Power (W)	Length (L)	Model	WRD #	Frequency (GHz)	Avg. Power (W)	Length (L)
DTL180-	180	18.00 - 40.00	50	6.00	DTL500-	500	5.00 - 18.00	100	9.50
DTL110-	110	11.00 - 26.50	75	7.00	DTL475-	475	4.75 - 11.00	200	12.00
DTL750-	750	7.50 - 18.00	100	9.50	DTL350-	350	3.50 - 8.20	400	13.50
DTL650-	650	6.50 - 18.00	100	9.50	DTL250-	250	2.60 - 7.80	550	14.00
DTL580-	580	5.80 - 16.00	100	9.50	DTL200-	200	2.00 - 4.80	700	19.00

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.

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

Series (DTL):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

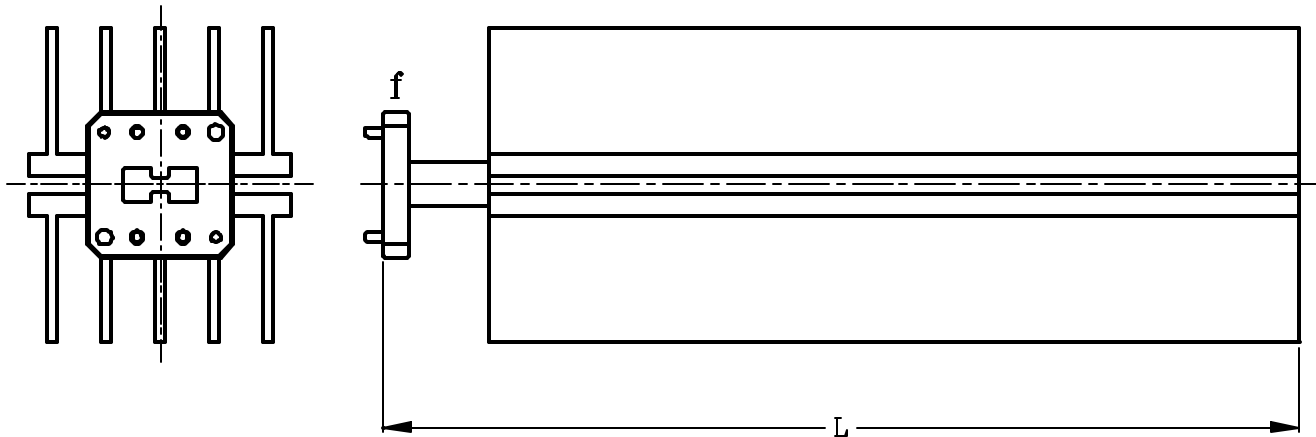
Flange (f): See [Appendix G](#)

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.

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.

Example part number:

DTH wrd -m f -p f
DTH 650 -A 01 -C O

Series (DTH):

Waveguide Size (wrd): WRD180 thru WRD200

Material (-m): A – Aluminum

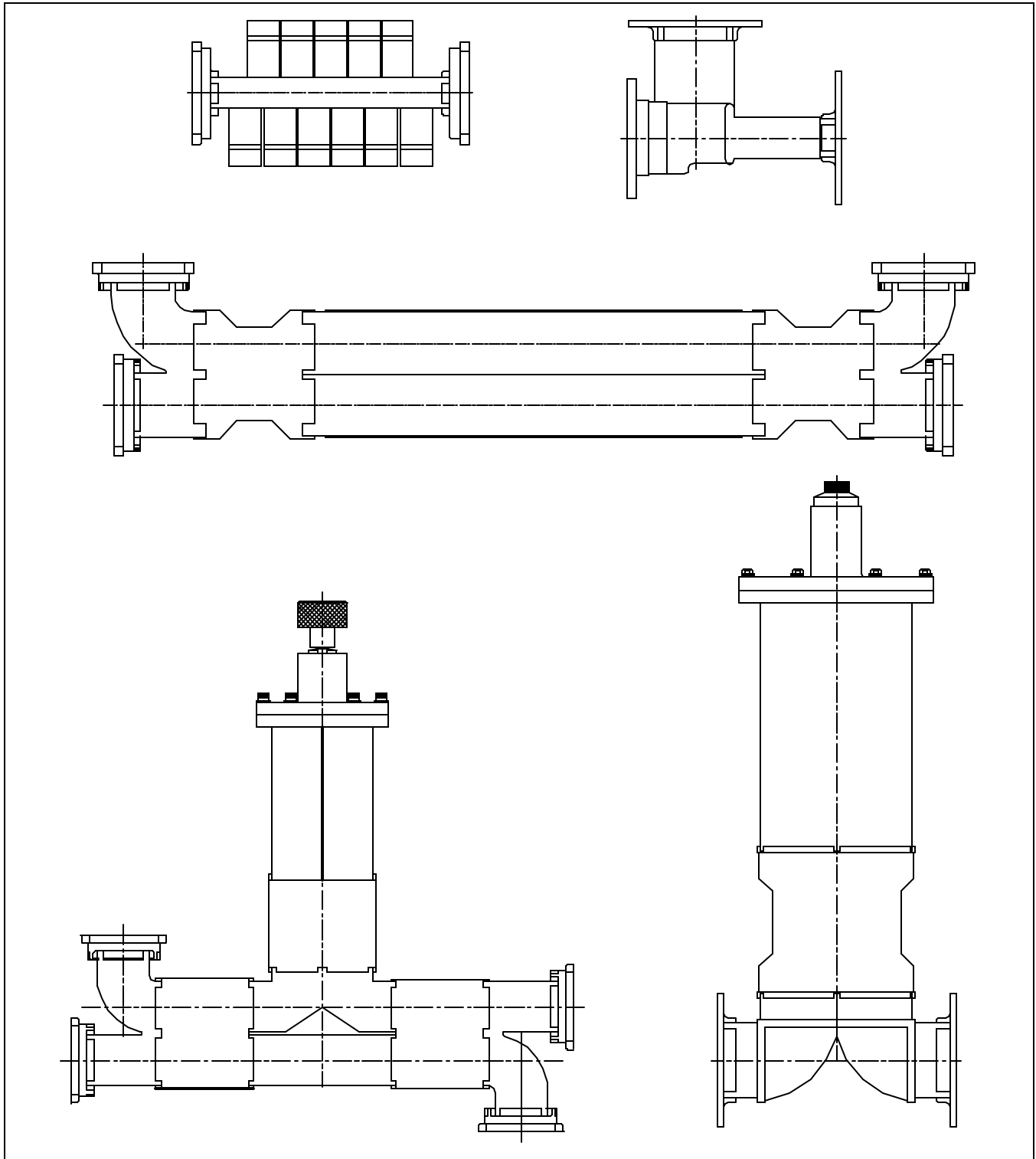
Flange (f): See [Appendix G](#)

Plating (-p): C – Chromate

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

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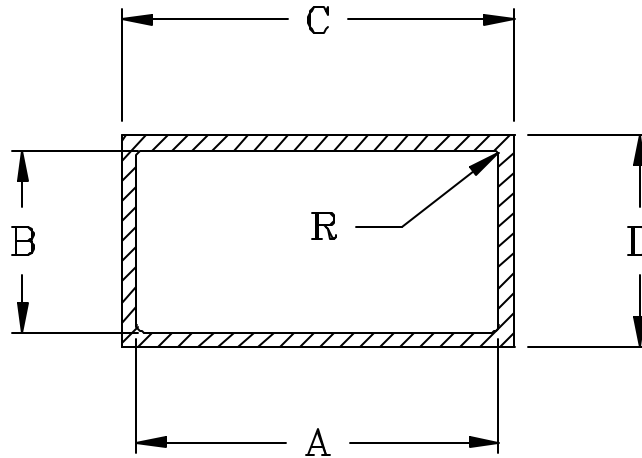
Custom Components



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.

Space Machine & Engineering Corp.

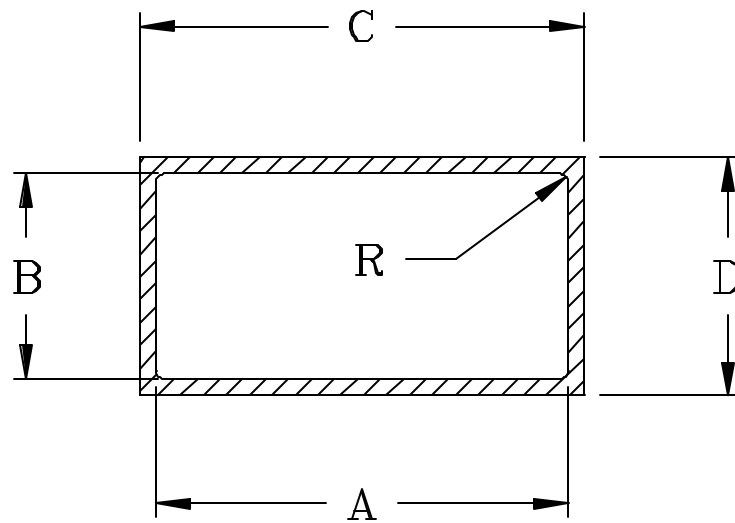
Appendix A Rectangular Waveguide Physical Dimensions



WR	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	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	4.300	2.150	0.0080	4.460	2.310	0.008	0.080	0.047
340	3.400	1.700	0.0060	3.560	1.860	0.006	0.080	0.047
284	2.840	1.340	0.0060	3.000	1.500	0.006	0.080	0.047
284HW	2.840	1.340	0.0050	3.238	1.738	0.005	0.199	0.047
229	2.290	1.145	0.0060	2.418	1.273	0.006	0.064	0.031
187	1.872	0.872	0.0050	2.000	1.000	0.005	0.064	0.031
187HW	1.872	0.872	0.0050	2.172	1.172	0.005	0.150	0.031
159	1.590	0.795	0.0050	1.718	0.923	0.005	0.064	0.031
137	1.372	0.622	0.0040	1.500	0.750	0.004	0.064	0.031
112	1.122	0.497	0.0040	1.250	0.625	0.004	0.064	0.031
112HW	1.122	0.497	0.0030	1.378	0.753	0.005	0.128	0.030

Space Machine & Engineering Corp.

Appendix A Rectangular Waveguide Physical Dimensions



WR	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	0.900	0.400	0.0040	1.000	0.500	0.004	0.050	0.031
90HW	0.900	0.400	0.0040	1.100	0.600	0.004	0.100	0.031
75	0.750	0.375	0.0030	0.850	0.475	0.003	0.050	0.031
62	0.622	0.311	0.0025	0.702	0.391	0.003	0.040	0.016
51	0.510	0.255	0.0025	0.590	0.335	0.003	0.040	0.016
42	0.420	0.170	0.0020	0.500	0.250	0.003	0.040	0.016
34	0.340	0.170	0.0020	0.420	0.250	0.003	0.040	0.016
28	0.280	0.140	0.0015	0.360	0.220	0.002	0.040	0.008
22	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 TE ₁₀ (GHz)	Attenuation (Low-High) dB/100ft	Peak Power (Low-High) MW	CW Power (Low-High) KW
975	1-011	204/U	1100	0.750 – 1.120	0.605	0.147-0.098 0.173-0.115 0.159-0.106	231.2-346.9 196.4-295.4 213.6-320.5
	1-012	-	6061				
	1-166	-	6063				
770	1-013	205/U	1100	0.960 – 1.450	0.766	0.205-0.139 0.240-0.163 0.222-0.151	137.8-203.3 117.6-173.2 127.9-187.0
	1-014	-	6061				
	1-167	-	6063				
650	1-015	-	OF-DLP	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	114.8-173.6 80.53-121.8 88.45-135.7 76.26-115.1 82.72-125.1
	1-017	69/U	Cu Alloy				
	1-018	103/U	1100				
	1-019	-	6061				
	1-168	-	6063				
510	1-021	-	OF-DLP	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	68.22-100.4 47.87-70.44 53.19-78.34 45.29-66.67 49.14-72.39
	1-023	337/U	Cu Alloy				
	1-025	338/U	1100				
	1-026	-	6061				
	1-169	-	6063				
430	1-027	-	OF-DLP	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	45.14-68.00 35.30-53.05 30.03-45.20 31.67-41.71 32.57-49.08
	1-029	105/U	1100				
	1-030	-	6061				
	1-031	104/U	Cu Alloy				
	1-170	-	6063				
340	1-033	-	OF-DLP	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	27.82-40.00 21.73-31.26 18.50-26.60 19.52-28.07 20.05-28.83
	1-035	113/U	1100				
	1-036	-	6061				
	1-037	112/U	Cu Alloy				
	1.171	-	6063				
284	1-039	-	OF-DLP	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	17.19-25.11 13.42-19.59 11.42-16.69 12.06-17.62 12.39-18.12
	1-041	75/U	1100				
	1-042	-	6061				
	1-043	48/U	Cu Alloy				
	1-172	-	6063				
284HW	2-001	375/U	1100	2.600- 3.950	2.080	0.950-0.651 1.116-0.764 1.028-0.705	14.56-21.25 12.39-18.08 13.48-19.63
	2-002	-	6061				
	2-004	-	6063				

Space Machine & Engineering Corp.

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

Space Machine & Engineering Corp.

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	375/U - - - -	Cu Alloy	7.000 – 11.000	5.780	5.219-3.291	1.017-1.534	1.220-1.935
	1-156		OF-DLP			3.516-2.217		1.725-2.735
	1-157		1100			4.500-2.838		1.358-2.154
	1-158		6061			5.285-3.333		1.156-1.834
	1-160		6063			4.874-3.073		1.254-1.989
90	1-075	-	OF-DLP	8.200 – 12.40	6.560	4.328-2.995	0.758-1.124	1.229-1.776
	1-077	67/U	1100			5.540-3.883		0.959-1.386
	1-078	-	6061			6.506-4.502		0.817-1.180
	1-079	52/U	Cu Alloy			6.424-4.445		0.862-1.246
	1-178	-	6063			5.998-4.150		0.886-1.280
90HW	2-009	-	OF-DLP	8.200 – 12.40	6.560	4.339-3.003	0.758-1.124	3.314-4.788
	2-009	-	OF-DLP			4.339-3.003		3.314-4.788
75	1-081	-	OF-DLP	10.00 – 15.00	7.847	5.121-3.577	0.622-0.903	0.944-1.351
	1-083	347/U	1100			6.554-4.578		0.737-1.055
	1-084	-	6061			7.698-5.377		0.627-0.898
	1-085	346/U	Cu Alloy			7.601-5.309		0.662-0.948
	1-179	-	6063			7.097-4.957		0.680-0.947
62	1-087	-	OF-DLP	12.40 – 18.00	9.490	6.451-4.743	0.457-0.633	0.643-0.875
	1-089	91/U	Cu Alloy			9.578-7.041		0.451-0.614
	1-090	349/U	1100			8.259-6.071		0.502-0.683
	1-091	-	6061			9.700-7.131		0.428-0.582
	1-093	107/U	Ag			6.910-5.079		0.602-0.818
	1-180	-	6063			8.943-6.574		0.464-0.631
51	1-094	352/U	OF-DLP	15.00 – 22.00	11.54	8.812-6.384	0.312-0.433	0.413-0.570
	1-096	353/U	Cu Alloy			13.08-9.477		0.290-0.400
	1-097	351/U	1100			11.27-8.172		0.323-0.445
	1-098	-	6061			13.25-9.598		0.275-0.379
	1-181	-	6063			12.21-8.849		0.298-0.411
42	1-100	-	OF-DLP	18.00 – 26.50	14.08	13.80-10.13	0.171-0.246	0.223-0.304
	1-102	53/U	Cu Alloy			20.48-15.04		0.157-0.213
	1-103	121/U	1100			17.66-12.97		0.174-0.237
	1-104	-	6061			20.74-15.23		0.148-0.202
	1-106	66/U	Ag			14.77-10.85		0.209-0.284
	1-182	-	6063			19.12-14.04		0.161-0.219

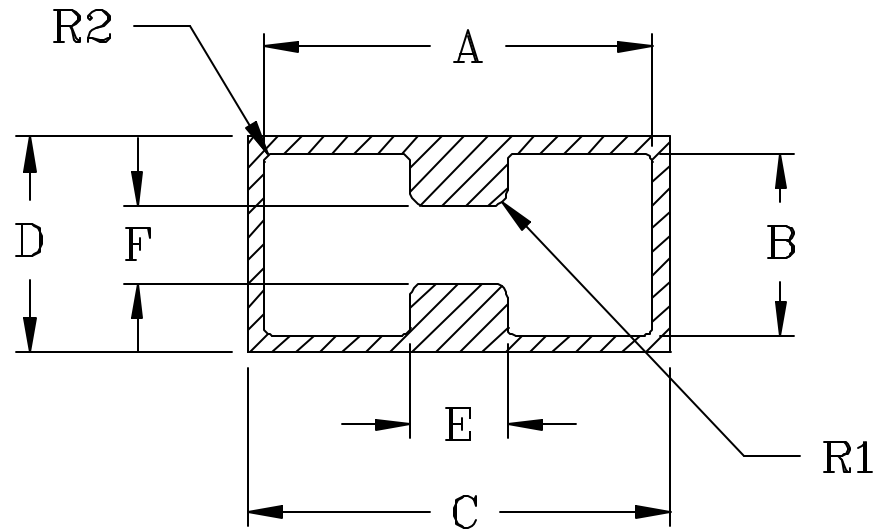
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Appendix B Rectangular Waveguide Electrical Data

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

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Appendix C Double Ridge Waveguide Physical Dimensions



WRD	A	B	C	D	E	F	R1	R2
200D24	2.590	1.205	2.750	1.366	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	0.721	0.321	0.821	0.421	0.173	0.101	0.027	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.

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

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Appendix E *Connector Options*

Connector Option (cnt)	Type	Maximum Frequency (GHz)	Maximum Average Power (Watts)
-SF -SM	SMA Female SMA Male	26.5	95
-NF -NM	N Female N Male	Up to 10 Up to 18	950 95
-KF -KM	K (2.9mm) Female K (2.9mm) Male	46	50
-TF -TM	TNC Female TNC Male	Up to 15 Up to 18	420 100
-7F -7M	7mm Female 7mm Male	18	100
-OSF -OSM	OS-50(2.4mm) Female OS-50 (2.4mm) Male	50	50
-BF -BM	BNC Female BNC Male	4	420

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Appendix F Rectangular Waveguide Flange Options

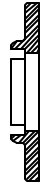
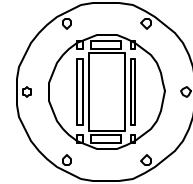
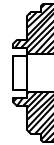
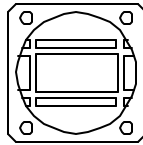
UG Style

Standard	UG Style							
	COVER						CHOKE	
	Butt		Thru		Grooved		Butt	
	All Clear	All Tap	All Clear	All Tap	All Clear	All Tap	All Tap	All Clear
WR22	01	11	12	13	14	15	02	21
WR28	01	11	12	13	14	15	02	21
WR34	01	11	12	13	14	15	02	21
WR42	01	11	12	13	14	15	02	21
WR51	01	11	12	13	14	15	02	21
WR62	01	11	12	13	14	15	02	21
WR75	01	11	12	13	14	15	02	21
WR90	01	11	12	13	14	15	02	21
WR102	01	11	12	13	14	15	02	21
WR112	01	11	12	13	14	15	02	21
WR137	01	11	12	13	14	15	02	21
WR159	01	11	12	13	14	15	02	21
WR187	01	11	12	13	14	15	02	21
WR229	01	11	12	13	14	15	02	21
WR284	01	11	12	13	14	15	02	21

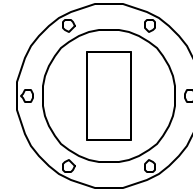
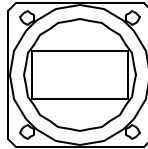
W.G. sizes WR22—WR112

W.G. sizes WR137—WR284

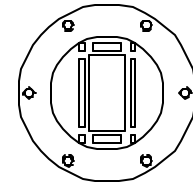
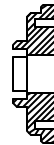
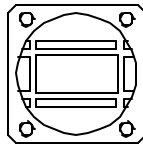
Flange Option -01 (Cover, Butt Type)



Flange Option -12 (Cover, Thru Type)



Flange Option -02 (Choke, Butt Type)

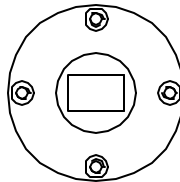


Millimeter (MM)

Standard	MM	
	ROUND	
	Thru	
	All Tap	All Clear
WR10	06	61
WR12	06	61
WR15	06	61
WR19	06	61
WR22	06	61
WR28	06	61

Flange Option -06 (mm Round, Thru Type)

W.G. sizes WR10—WR28



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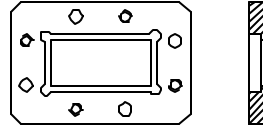
Appendix F Rectangular Waveguide Flange Options

CMR

		CMR					
Standard	COVER						
		Butt			Thru		
	Alt. Clear/ Tap	All Clear	All Tap	Alt. Clear/ Tap	All Clear	All Tap	
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	

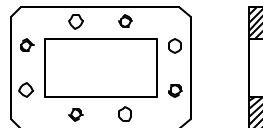
Flange Option -03 (CMR, Butt Type)

W.G. sizes WR90—WR284



Flange Option -03 (CMR, Thru Type)

W.G. sizes WR90—WR284



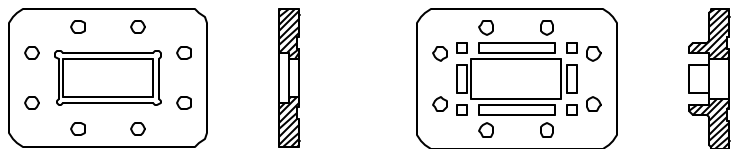
CPR

		CPR							
Standard	GROOVED (Contact)				FLAT				
		Socket		Corral		Socket		Corral	
	All Clear	All Tap	All Clear	All Tap	All Clear	All Tap	All Clear	All Tap	
WR75	04	41	07	71	05	51	08	81	
WR90	04	41	07	71	05	51	08	81	
WR102	04	41	07	71	05	51	08	81	
WR112	04	41	07	71	05	51	08	81	
WR137	04	41	07	71	05	51	08	81	
WR159	04	41	07	71	05	51	08	81	
WR187	04	41	07	71	05	51	08	81	
WR229	04	41	07	71	05	51	08	81	
WR284	04	41	07	71	05	51	08	81	
WR340	04	41	07	71	05	51	08	81	
WR430	04	41	07	71	05	51	08	81	
WR510	04	41	07	71	05	51	08	81	
WR650	04	41	07	71	05	51	08	81	
WR770	04	41	07	71	05	51	08	81	
WR975	04	41	07	71	05	51	08	81	

Flange Option -04 (CPR, Grooved, Socket Back)

Flange Option -07 (CPR, Grooved, Corral Back)

W.G. sizes WR75—WR975



Flange Option -05 (CPR, Flat, Socket Back)

Flange Option -08 (CPR, Flat, Corral Back)

W.G. sizes WR75—WR975



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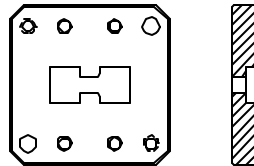
Appendix G Double Ridge Waveguide Flange Options

Standard	COVER					
	Butt Type			Thru Type		
	Alt. Clear/ Tap	All Clear	All Tap	Alt. Clear/ Tap	All Clear	All Tap
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
WRD650	01	11	12	13	14	15
WRD750	01	11	12	13	14	15
WRD110	01	11	12	13	14	15
WRD180	01	11	12	13	14	15

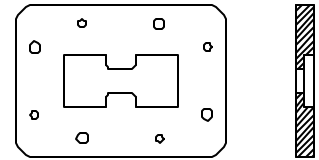
Standard	Gasket					
	Butt Type			Thru Type		
	Alt. Clear/ Tap	All Clear	All Tap	Alt. Clear/ Tap	All Tap	All Clear
WRD200	02	21	22	23	24	25
WRD250	02	21	22	23	24	25
WRD350	02	21	22	23	24	25
WRD475	02	21	22	23	24	25
WRD500	02	21	22	23	24	25
WRD580	02	21	22	23	24	25
WRD650	02	21	22	23	24	25
WRD750	02	21	22	23	24	25
WRD110	02	21	22	23	24	25
WRD180	02	21	22	23	24	25

Flange Option -01 (Cover, Butt Type)

W.G. sizes
WRD750-WRD580

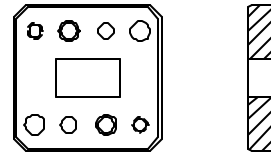


W.G. sizes
WRD500-WRD250



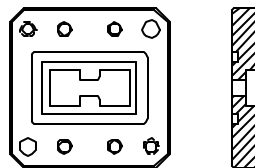
Flange Option -13 (Cover, Thru Type)

W.G. sizes WRD180-WRD110

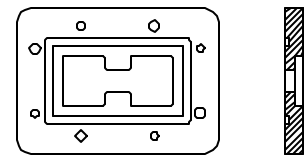


Flange Option -02 (Gasket, Butt Type)

W.G. sizes
WRD750-WRD580

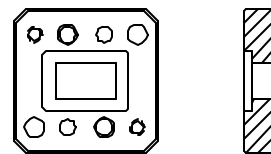


W.G. sizes
WRD500-WRD250



Flange Option -23 (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 configurations are possible, please contact us for custom configurations.

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Appendix H Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF10-B06T	67-010		Round mm
WGF12-B06T	67-003	387/U	Round mm
WGF15-B06T	67-002	385/U	Round mm
WGF19-B06T	67-007		Round mm
WGF22-A01B			Cover Butt
WGF22-A12T			Cover Thru
WGF22-A06T			Round mm
WGF22-B01B			Cover Butt
WGF22-B12T			Cover Thru
WGF22-B06T	67-001	383/U	Round mm
WGF28-A01B			Cover Butt
WGF28-A12T			Cover Thru
WGF28-A02B	59-012		Choke Butt
WGF28-A06T	67-012		Round mm
WGF28-B01B	68-001		Cover Butt
WGF28-B12T	54-003	599/U	Cover Thru
WGF28-B02B	59-005	600A/U	Choke Butt
WGF28-B06T	67-005		Round mm
WGF42-A01B			Cover Butt
WGF42-A12T	54-002	597/U	Cover Thru
WGF42-A02B	59-004	598A/U	Choke Butt
WGF42-A06T	67-011		Round mm
WGF42-B01B			Cover Butt
WGF42-B12T	54-001	595/U	Cover Thru
WGF42-B02B	59-003	596A/U	Choke Butt
WGF42-B06T	67-004		Round mm

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Appendix H Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF51-A01B	70-024		Cover Butt
WGF51-A12T			Cover Thru
WGF51-A02B	69-005		Choke Butt
WGF51-B01B	70-022		Cover Butt
WGF51-B12T			Cover Thru
WGF51-B02B	69-004		Choke Butt
WGF62-A01B	70-020		Cover Butt
WGF62-A12T	53-006	1665/U	Cover Thru
WGF62-A02B	59-002	1666/U	Choke Butt
WGF62-B01B	70-019		Cover Butt
WGF62-B12T	53-005	419/U	Cover Thru
WGF62-B02B	59-001	541/U	Choke Butt
WGF75-A01B	70-018		Cover Butt
WGF75-A12T	53-008		Cover Thru
WGF75-A02B	59-011		Choke Butt
WGF75-A04B			CPRG Butt
WGF75-A05B			CPRF Butt
WGF75-B01B	70-016		Cover Butt
WGF75-B12T	53-007		Cover Thru
WGF75-B02B	59-010		Choke Butt
WGF75-B04B			CPRG Butt
WGF75-B05B			CPRF Butt
WGF90-A01B	54-014		Cover Butt
WGF90-A12T	53-003	135/U	Cover Thru
WGF90-A02B	59-008	136B/U	Choke Butt
WGF90-A03B			CMR Butt

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Appendix H Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF90-A33T	63-008	1483/U	CMR Thru
WGF90-A04B			CPRG Butt
WGF90-A05B			CPRF Butt
WGF90-A07B	52-044	1361/U	Contact Grooved Butt
WGF90-A08B	52-022	1737/U	Contact Flat Butt
WGF90-B01B	54-013		Cover Butt
WGF90-B12T	53-001	39/U	Cover Thru
WGF90-B02B	59-006	40B/U	Choke Butt
WGF90-B03B			CMR Butt
WGF90-B33T	63-004	1478/U	CMR Thru
WGF90-B04B			CPRG Butt
WGF90-B05B			CPRF Butt
WGF90-B07B	52-043	1360/U	Contact Grooved Butt
WGF90-B08B	52-021	1736/U	Contact Flat Butt
WGF102-A01B	70-014		Cover Butt
WGF102-A12T			Cover Thru
WGF102-A02B	69-002		Choke Butt
WGF102-B01B	70-013	1493/U	Cover Butt
WGF102-B12T			Cover Thru
WGF102-B02B	69-001	1494/U	Choke Butt
WGF112-A01B	54-012		Cover Butt
WGF112-A12T	53-004	138/U	Cover Thru
WGF112-A02B	59-009	137B/U	Choke Butt
WGF112-A03B			CMR Butt
WGF112-A33T	63-007	1482/U	CMR Thru
WGF112-A04B			CPRG Butt

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Appendix H Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF112-A05B			CPRF Butt
WGF112-A07B	52-042	1359/U	Contact Grooved Butt
WGF112-A08B	52-020	1735/U	Contact Flat Butt
WGF112-B01B	54-011		Cover Butt
WGF112-B12T	53-002	51/U	Cover Thru
WGF112-B02B	59-007	52B/U	Choke Butt
WGF112-B03B			CMR Butt
WGF112-B33T	63-003	1477U	CMR Thru
WGF112-B04B			CPRG Butt
WGF112-B05B			CPRF Butt
WGF112-B07B	52-041	1358/U	Contact Grooved Butt
WGF112-B08B	52-019	1734/U	Contact Flat Butt
WGF137-A01B			Cover Butt
WGF137-A12T	55-002	441/U	Cover Thru
WGF137-A02B	60-002	440B/U	Choke Butt
WGF137-A03B			CMR Butt
WGF137-A33T	63-006	1481/U	CMR Thru
WGF137-A04B			CPRG Butt
WGF137-A05B			CPRF Butt
WGF137-A07B	52-040	1357/U	Contact Grooved Butt
WGF137-A08B	52-018	1733/U	Contact Flat Butt
WGF137-B01B			Cover Butt
WGF137-B12T	55-001	344/U	Cover Thru
WGF137-B02B	60-001	343B/U	Choke Butt
WGF137-B03B			CMR Butt
WGF137-B33T	63-002	1476U	CMR Thru

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Appendix H Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF137-B04B			CPRG Butt
WGF137-B05B			CPRF Butt
WGF137-B07B	52-039	1356/U	Contact Grooved Butt
WGF137-B08B	52-017	1732/U	Contact Flat Butt
WGF159-A01B			Cover Butt
WGF159-A12T			Cover Thru
WGF159-A02B			Choke Butt
WGF159-A03B			CMR Butt
WGF159-A04B			CPRG Butt
WGF159-A05B			CPRF Butt
WGF159-A07B	52-038	1355/U	Contact Grooved Butt
WGF159-A08B	52-016	1731/U	Contact Flat Butt
WGF159-B01B			Cover Butt
WGF159-B12T			Cover Thru
WGF159-B02B			Choke Butt
WGF159-B03B			CMR Butt
WGF159-B04B			CPRG Butt
WGF159-B05B			CPRF Butt
WGF159-B07B	52-037	1354/U	Contact Grooved Butt
WGF159-B08B	52-015	1730/U	Contact Flat Butt
WGF187-A01B			Cover Butt
WGF187-A12T	57-001	407/U	Cover Thru
WGF187-A02B	62-001	406B/U	Choke Butt
WGF187-A03B			CMR Butt
WGF187-A33T	63-005	1480/U	CMR Thru
WGF187-A04B			CPRG Butt

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Appendix H Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF187-A05B			CPRF Butt
WGF187-A07B	52-036	1353/U	Contact Grooved Butt
WGF187-A08B	52-014	1729/U	Contact Flat Butt
WGF187-B01B			Cover Butt
WGF187-B12T	57-002	149A/U	Cover Thru
WGF187-B02B	62-002	148C/U	Choke Butt
WGF187-B03B			CMR Butt
WGF187-B33T	63-001	1475U	CMR Thru
WGF187-B04B			CPRG Butt
WGF187-B05B			CPRF Butt
WGF187-B07B	52-035	1352/U	Contact Grooved Butt
WGF187-B08B	52-013	1728/U	Contact Flat Butt
WGF229-A12T			Cover Thru
WGF229-A03B			CMR Butt
WGF229-A04B			CPRG Butt
WGF229-A05B			CPRF Butt
WGF229-A07B	52-034	1351/U	Contact Grooved Butt
WGF229-A08B	52-012	1727/U	Contact Flat Butt
WGF229-B12T			Cover Thru
WGF229-B03B			CMR Butt
WGF229-B04B			CPRG Butt
WGF229-B05B			CPRF Butt
WGF229-B07B	52-033	1350/U	Contact Grooved Butt
WGF229-B08B	52-011	1726/U	Contact Flat Butt
WGF284-A01B			Cover Butt
WGF284-A12T	56-002	584/U	Cover Thru

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Appendix H Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF284-A02B	61-001	585A/U	Choke Butt
WGF284-A03B			CMR Butt
WGF284-A33T	64-002	1484/U	CMR Thru
WGF284-A04B			CPRG Butt
WGF284-A05B			CPRF Butt
WGF284-A07B	52-032	1349/U	Contact Grooved Butt
WGF284-A08B	52-010	1725/U	Contact Flat Butt
WGF284-B01B			Cover Butt
WGF284-B12T	56-001	53/U	Cover Thru
WGF284-B02B	62-002	54B/U	Choke Butt
WGF284-B03B			CMR Butt
WGF284-B33T	64-001	1479/U	CMR Thru
WGF284-B04B			CPRG Butt
WGF284-B05B			CPRF Butt
WGF284-B07B	52-031	1348U	Contact Grooved Butt
WGF284-B08B	52-009	1724/U	Contact Flat Butt
WGF340-A04B			CPRG Butt
WGF340-A05B			CPRF Butt
WGF340-A07B	52-030	1347/U	Contact Grooved Butt
WGF340-A07T	58-012	554A/U	Contact Grooved Thru
WGF340-A08B	52-008	1713/U	Contact Flat Butt
WGF340-B04B			CPRG Butt
WGF340-B05B			CPRF Butt
WGF340-B07B	52-029	1346/U	Contact Grooved Butt
WGF340-B07T	58-011	552A/U	Contact Grooved Thru
WGF340-B08B	52-007	1712/U	Contact Flat Butt

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Appendix H Flange Part Number Conversion Chart

SPACE MACHINE PART NUMBER	EQUIVALENT M3922/	EQUIVALENT UG-	NAME
WGF430-A04B			CPRG Butt
WGF430-A05B			CPRF Butt
WGF430-A07B	52-028	1345/U	Contact Grooved Butt
WGF430-A07T	58-010	437B/U	Contact Grooved Thru
WGF430-A08B	52-006	1711/U	Contact Flat Butt
WGF430-B04B			CPRG Butt
WGF430-B05B			CPRF Butt
WGF430-B07B	52-027	1344/U	Contact Grooved Butt
WGF430-B07T	58-009	435B/U	Contact Grooved Thru
WGF430-B08B	52-005	1716/U	Contact Flat Butt
WGF650-A04B			CPRG Butt
WGF650-A05B			CPRF Butt
WGF650-A07B	52-024	1343/U	Contact Grooved Butt
WGF650-A07T	58-008	418B/U	Contact Grooved Thru
WGF650-A08B	52-002	1720/U	Contact Flat Butt
WGF650-B04B			CPRG Butt
WGF650-B05B			CPRF Butt
WGF650-B07B	52-023	1362/U	Contact Grooved Butt
WGF650-B07T	58-007	417B/U	Contact Grooved Thru
WGF650-B08B	52-001	1714/U	Contact Flat Butt

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Appendix I *Recommended Waveguide Flange Torque*

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