Corso di Misure a Microonde

Guide d'onda

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- Denominazioni e campi di frequenze
- Costante di perdita
- Flange
- Transizioni guida/cavo coassiale

Tipi di guide d’onda

- rettangolari
- circolari
- ridge

Guide d'onda rettangolari

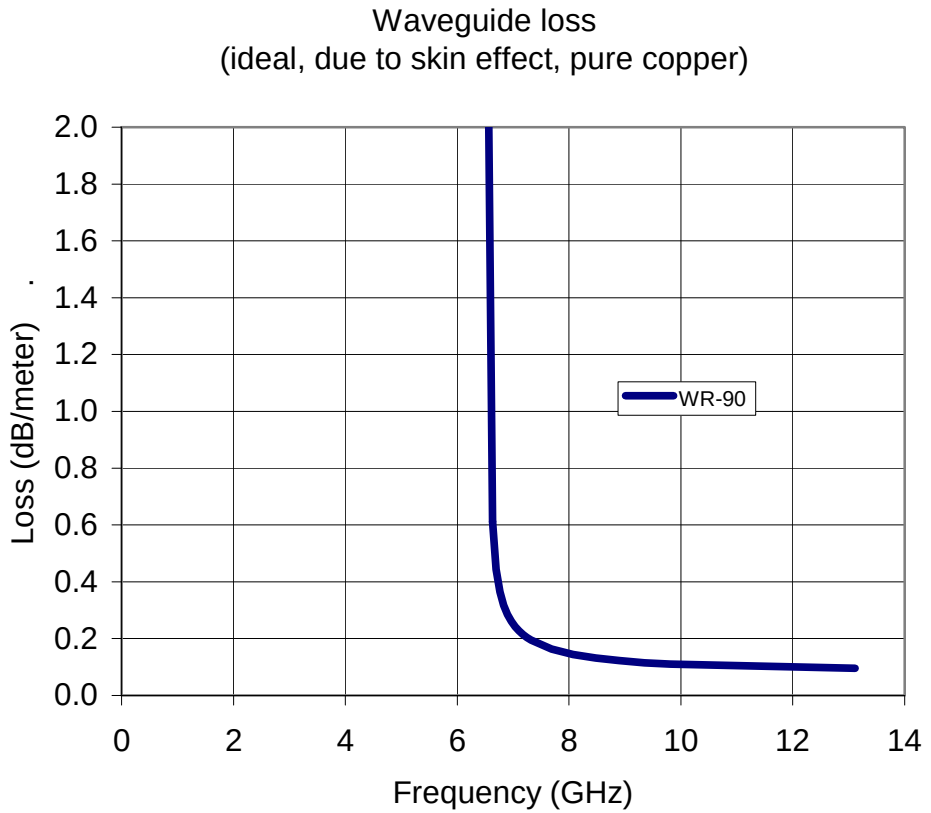
Designation			Frequency Range		Cut-off freq.	UK Band	US Band	INTERNAL WG Dims (mm)		Aspect Ratio	INTERNAL WG Dims (ins)		Wall Thickness	EXTERNAL WG Dims (mm)		EXTERNAL WG Dims (ins)	
UK	US	I.E.C.	Lower	Upper	GHz			A	B		A	B	mm	A	B	A	B
WG6	WR650	R14	1.12	1.70	0.908		L	165.100	82.550	2	6.500	3.250	2.03	169.164	86.614	6.660	3.410
WG7	WR510	R18	1.45	2.20	1.157	L		129.540	64.770	2	5.100	2.550	2.03	133.604	68.834	5.260	2.710
WG8	WR430	R22	1.70	2.60	1.372			109.220	54.610	2	4.300	2.150	2.03	113.284	58.674	4.460	2.310
WG9A	WR340	R26	2.20	3.30	1.735			86.360	43.180	2	3.400	1.700	2.03	90.424	47.244	3.560	1.860
WG10	WR284	R32	2.60	3.95	2.077	S	S	72.136	34.036	2.12	2.840	1.340	2.03	76.200	38.100	3.000	1.500
WG11A	WR229	R40	3.30	4.90	2.576			58.166	29.083	2	2.290	1.145	1.63	61.417	32.334	2.418	1.273
WG12	WR187	R48	3.95	5.85	3.152	C	C	47.549	22.149	2.15	1.872	0.872	1.63	50.800	25.400	2.000	1.000
WG13	WR159	R58	4.90	7.05	3.711			40.386	20.193	2	1.590	0.795	1.63	43.637	23.444	1.718	0.923
WG14	WR137	R70	5.85	8.20	4.300			34.849	15.799	2.21	1.372	0.622	1.63	38.100	19.050	1.500	0.750
WG15	WR112	R84	7.05	10.0	5.259		XL	28.499	12.624	2.26	1.122	0.497	1.63	31.750	15.875	1.250	0.625
WG16	WR90	R100	8.2	12.4	6.556	X	X	22.860	10.160	2.25	0.900	0.400	1.27	25.400	12.700	1.000	0.500
WG17	WR75	R120	10.0	15.0	7.867			19.050	9.525	2	0.750	0.375	1.27	21.590	12.065	0.850	0.475
WG18	WR62	R140	12.4	18.0	9.486	J	Ku	15.799	7.899	2	0.622	0.311	1.02	17.831	9.931	0.702	0.391
WG19	WR51	R180	15.0	22.0	11.569			12.954	6.477	2	0.510	0.255	1.02	14.986	8.509	0.590	0.335
WG20	WR42	R220	18.0	26.5	14.048		K	10.668	4.318	2.47	0.420	0.170	1.02	12.700	6.350	0.500	0.250
WG21	WR34	R260	22.0	33.0	17.353			8.636	4.318	2	0.340	0.170	1.02	10.668	6.350	0.420	0.250
WG22	WR28	R320	26.5	40.0	21.072	Q	Ka	7.112	3.556	2	0.280	0.140	1.02	9.144	5.588	0.360	0.220
WG23	WR22	R400	33	50	26.340		Q	5.690	2.845	2	0.224	0.112	1.02	7.722	4.877	0.304	0.192

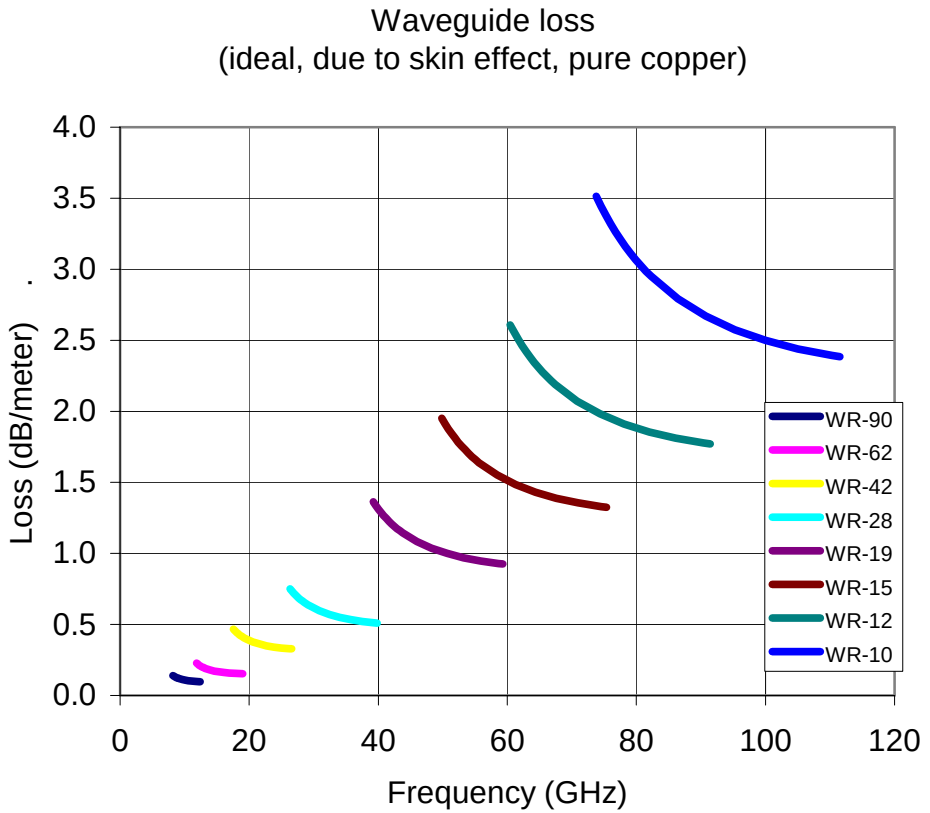
Guide d'onda rettangolari

Waveguide Frequency Ranges, Dimensions and Designations

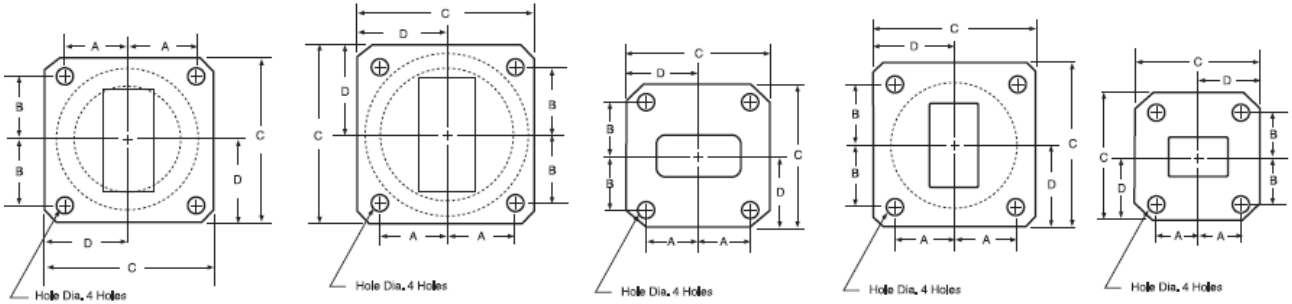
Range	Internal	Internal	Official Designations			Commercial Designations							
GHz	(inches)	(mm. approx)	I.E.C.	U.K. (RCSC)	U.S. (EIA)	U.S. (JAN)	U K	D-B	H-P	MRI	Narda	Philips	TRG
0.32 - 0.49	23.0 x 11.0	584.0 x 292.0		WG00	WR2300								
0.35 - 0.53	21.0 x 10.5	533.0 x 267.0		WG0	WR2100								
0.41 - 0.625	18.0 x 9.0	457.0 x 229 0		WG1	WR1800	RG-201/U							
0.49 - 0 75	15.0 x 7.5	381.0 x 191.0		WG2	WR1500	RG-202/U							
0.64 - 0.96	11.5 x 5.75	292.0 x 146 0		WG3	WR1150	RG-203/U							
0.75 - 1.12	9.75 x 4.875	248.0 x 124.0		WG4	WR975	RG-204/U			P				
0.96 - 1.45	7.7 x 3.85	196.0 x 98.0		WG5	WR770	RG-205/U							
1.12 - 1.7	6.5 x 3.25	165.0 x 83.0	R14	WG6	WR650	RG-69/U	L		L	L	L	L(25cm)	L
1.45 - 2.2	5.1 x 2.55	131.0 x 65.0	R18	WG7	WR510							D	
1.7 - 2.6	4.3 x 2.15	109.0 x 55.0	R22	WG8	WR430	RG-104/U				M	LS		
2.2 - 3.3	3.4 x 1.7	86.0 x 43.0	R26	WG9A	WR340	RG-112/U							
2.6 - 3.95	2.84 x 1.34	72.0 x 34.0	R32	WG10	WR284	RG-48/U	S	L	S	S	S	S(10cm)	S
3.3 - 4.9	2.29 x 1.145	59.0 x 29.0	R40	WG11A	WR229						A(7.5cm)		
3.95 - 5.85	1.872 x 0.872	48.0 x 22.0	R48	WG12	WR187	RG-49/U	C	K	G	C	C	C(6cm)	C
4.9 - 7.05	1.59 x 0.795	40.0 x 20.0	R58	WG13	WR159			C				C	
5.85 - 8.2	1.372 x 0.622	35.0 x 16.0	R70	WG14	WR137	RG-50/U		J	J	XB	XN	J(4.5cm)	
7.05 - 10.0	1.122 x 0.497	29.0 x 13.0	R84	WG15	WR112	RG-51/U		H	H	XL	XB	H(3.5cm)	XL
8.2 - 12.4	0.9 x 0.4	23.0 x 10.0	R100	WG16	WR90	RG-52/U	X	G	X	X	X	X(3cm)	X
10.0 - 15.0	0.75 x 0.375	19.0 x 9.5	R120	WG17	WR75			FA	M				
12.4 - 18.0	0.622 x 0.311	16.0 x 7.9	R140	WG18	WR62	RG-91/U	J	FA	P	KU	KU	P(2cm)	Ku
15.0 - 22.0	0.510 x 0.255	13.0 x 5.8	R180	WG19	WR51			N	K				
18.0 - 26.5	0.420 x 0.170	11.0 x 4.3	R220	WG20	WR42	RG-53/U		E	K		K		K
22.0 - 33.0	0.340 x 0.170	8.6 x 4.3	R260	WG21	WR34					I			
26.5 - 40.0	0.280 x 0.140	7.1 x 3.6	R320	WG22	WR28	RG-96/U	Q	D	R		V	Q(8mm)	A
33.0 - 50.0	0.224 x 0.112	5.7 x 2.9	R400	WG23	WR22	RG-97/U		C			Q		B
40.0 - 60.0	0.188 x 0.094	4.8 x 2.4	R500	WG24	WR19								U
50.0 - 75.0	0.148 x 0.074	3.8 x 1.9	R620	WG25	WR15	RG-98/U		B			M		V
60.0 - 90.0	0.122 x 0.061	3.1 x 1.6	R740	WG26	WR12	RG-99/U	O	A			E	E(4mm)	E
75.0 - 110.0	0.100 x 0.050	2.4 x 1.3	R900	WG27	WR10								W
90.0 - 140.0	0.080 x 0.040	2.0 x 1.0	R1200	WG28	WR8	RG-138/U		W			N		F
110.0 - 170.0	0.065 x 0.0325	1.7 x 0.82		WG29	WR7	RG-136/U						B(2mm)	D
140.0 - 220.0	0.051 x 0.0255	1.3 x 0.65		WG30	WR5	RG-135/U					A(7.5cm)		G
170.0 - 260.0	0.043 x 0.0215	1.1 x 0.55		WG31	WR4	RG-137/U							H
220.0 - 325.0	0.034 x 0.017	0.87 x 0.44		WG32	WR3	RG-139/U					R		J

Perdite nelle guide d'onda rettangolari





Flange



BAND*	TYPE	A	B	C	D	HOLE DIA.
X	UG-39/U	.640	.610	1.625	.813	.169
XB	UG-51/U	.737	.676	1.875	.938	.169
K	UG-595/U	.320	.335	.875	.438	.116
KU	UG-419/U	.478	.497	.313	.656	.144
V	UG-599/U	.250	.265	.750	.375	.116

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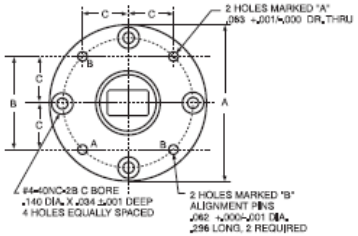
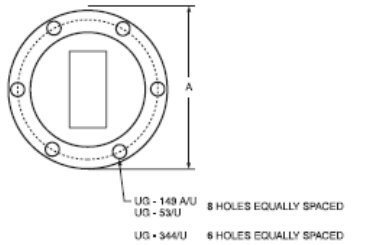
an L3 communications company



K, V, Q, M, E BAND

BAND*	TYPE	A	B	C
K	UG-425/U	1.125	.937	.331
V	UG-381/U	1.125	.937	.331
Q	UF-383/U	1.125	.937	.331
M	UF-385/U	.75	.562	.199
E	UG-387/U	.75	.562	.199

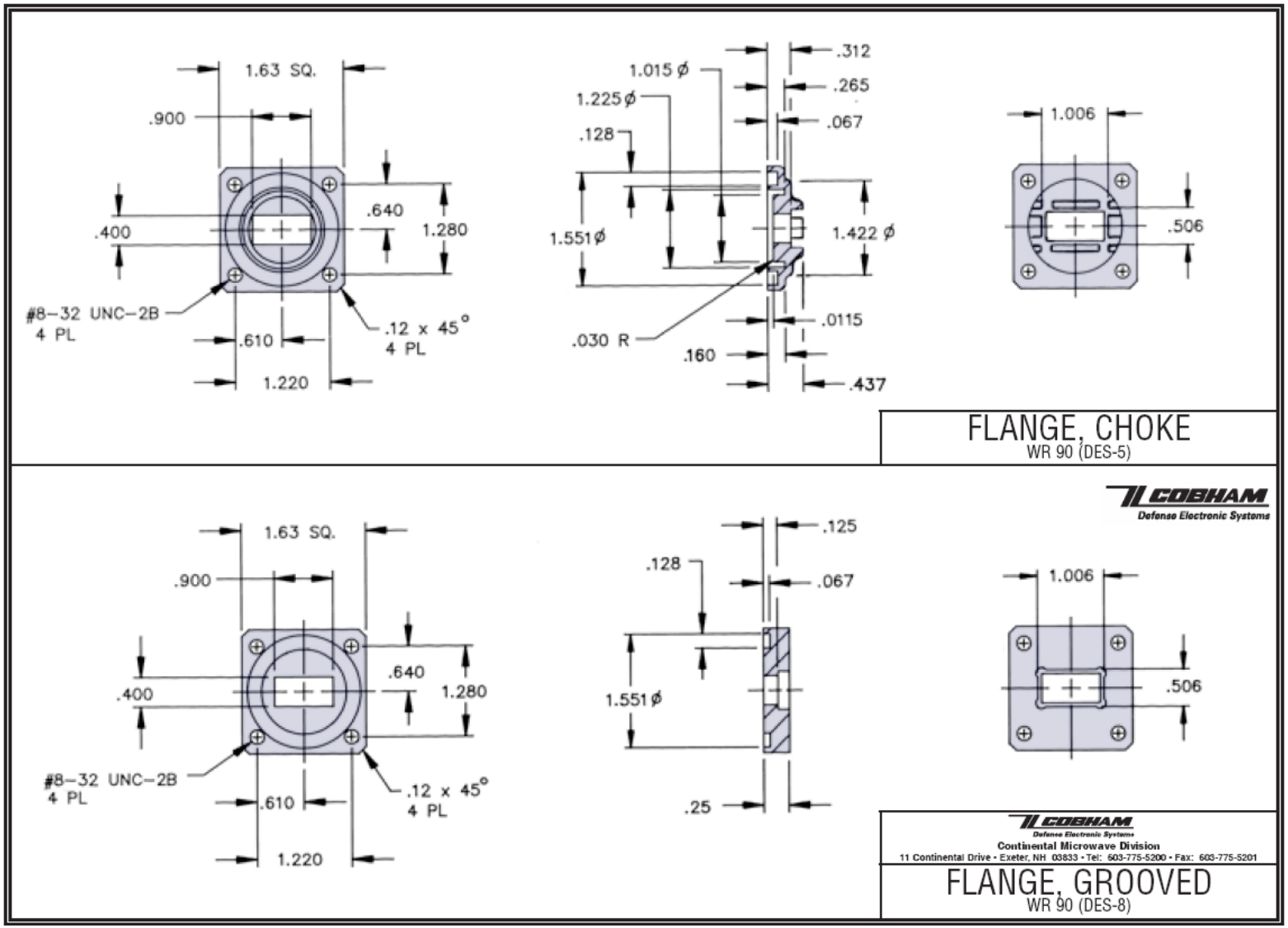


XN, C, S BAND

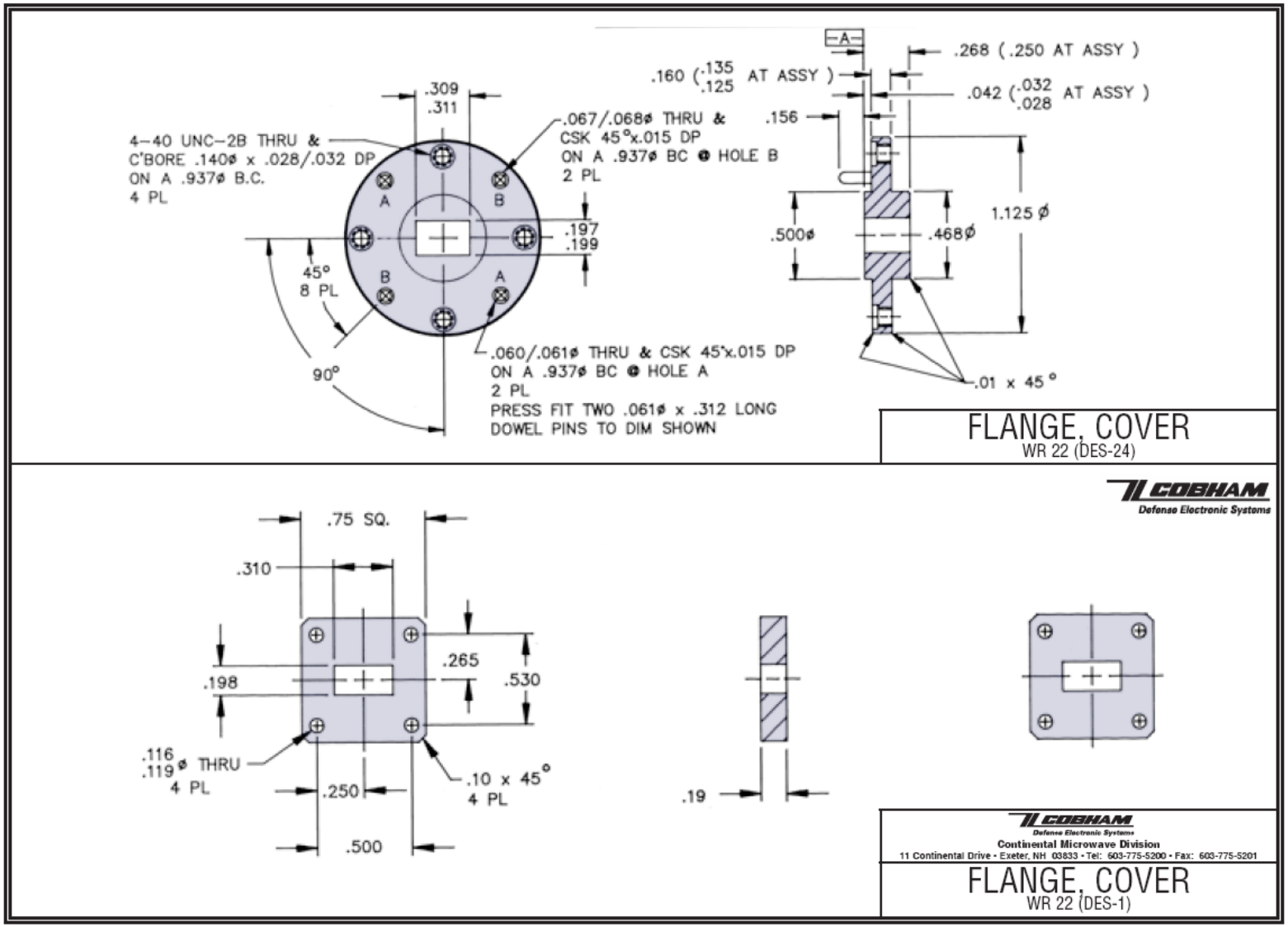
BAND*	TYPE	A	HOLE DIA.
S	UG-53/U	5.313	.257
C	UG-149A/U	3.625	.199

*For a complete listing of all band letters and codes in use, refer to Band Designation Table on page 176.

Flange


1.63 SQ.
.900
.640
1.280
.400
#8–32 UNC–2B
4 PL
.610
.12 x 45°
4 PL
1.220
1.015 ø
1.225 ø
.128
1.551 ø
.030 R
.312
.265
.067
1.422 ø
.0115
.160
.437
1.006
.506
FLANGE, CHOKE
WR 90 (DES-5)
COBHAM
Defense Electronic Systems
1.63 SQ.
.900
.640
1.280
.400
#8–32 UNC–2B
4 PL
.610
.12 x 45°
4 PL
1.220
.125
.128
.067
1.551 ø
.25
1.006
.506
COBHAM
Defense Electronic Systems
Continental Microwave Division
11 Continental Drive • Exeter, NH 03833 • Tel: 603-775-5200 • Fax: 603-775-5201
FLANGE, GROOVED
WR 90 (DES-8)

Flange


4–40 UNC–2B THRU &
C'BORE .140ø x .028/.032 DP
ON A .937ø B.C.
4 PL
.309
.311
.067/.068ø THRU &
CSK 45°x.015 DP
ON A .937ø BC ⌖ HOLE B
2 PL
.197
.199
45°
8 PL
90°
.060/.061ø THRU & CSK 45°x.015 DP
ON A .937ø BC ⌖ HOLE A
2 PL
PRESS FIT TWO .061ø x .312 LONG
DOWEL PINS TO DIM SHOWN
–A–
.160 (.135 .125 AT ASSY)
.268 (.250 AT ASSY)
.042 (.032 .028 AT ASSY)
.156
1.125 ø
.500ø
.468ø
.01 x 45 °
FLANGE, COVER
WR 22 (DES-24)
COBHAM
Defense Electronic Systems
.75 SQ.
.310
.265
.530
.198
.116
.119ø THRU
4 PL
.250
.500
.10 x 45°
4 PL
.19
COBHAM
Defense Electronic Systems
Continental Microwave Division
11 Continental Drive • Exeter, NH 03833 • Tel: 603-775-5200 • Fax: 603-775-5201
FLANGE, COVER
WR 22 (DES-1)

Transizione guida/coassiale

1.12-18 GHz

Waveguide to Type N Coaxial Adapters

- Low VSWR
- Low Insertion Loss
- Lightweight

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Specifications

FREQUENCY RANGE (GHz)	MODEL	BAND*	WAVEGUIDE SIZE	FLANGE TYPE	FLANGE Equivalent To	VSWR (Max)	WEIGHT Lbs	WEIGHT Kg
Type N								
2.60-3.95	614A	S	WR-284	Cover	UG-584/U	1.25	2.8	1.3
Type N								
3.95-5.85	613A	C	WR-187	Cover	UG-407/U	1.25	0.5	.3
Type N								
5.85-8.20	612A	XN	WR-137	Cover	UG-441/U	1.35	0.5	.3
Type N								
8.20-12.4	601A	X	WR-90	Cover	UG-135/U	1.25	0.25	.1
Type N								
12.4-18.0	609	KU	WR-62	Cover	UG-419/U	1.50	0.25	.1

Transizione guida/coassiale

5.85-26.5 GHz

Miniature Waveguide To Coaxial Adapters SMA, 3.5mm, 2.9mm Types

- Low VSWR
- Low Insertion Loss
- Lightweight
- Precision Coaxial Connectors Either SMA, 3.5mm or 2.9mm

Specifications

FREQUENCY RANGE (GHz)	MODEL	BAND*	WAVEGUIDE SIZE	FLANGE TYPE	FLANGE Equivalent To	VSWR (Max)	WEIGHT Oz	WEIGHT Gr
SMA								
5.85-8.2	4602	C	WR-137	Cover	UG-441/U	1.1	6	171
8.2-12.4	4601	X	WR-90	Cover	UG-135/U	1.25	4.0	113
12.4-18.0	4609	KU	WR-62	Cover	UG-418/U	1.25	4.0	113
3.5 mm								
18.0-26.5	4608B	K	WR-42	Cover	UG-595/U	1.25	4.0	113
2.9 mm								
26.5-40	V4607	Ka	WR-28	Cover	UG599/U	1.20	2	60

Transizione guida/coassiale

WiseWave Technologies, Inc.

Waveguide to Coax Adapters

Model Number	Frequency (GHz)	Waveguide Size	Coax Connector	Insertion Loss (dB, Max)	Return Loss (dB, Min)	Flange Type	Outline Drawing
PTC-90SF-01	8.2 to 12.4	WR-90	SMA (F)	0.20	20.0	UG39/U	WT-E-5
PTC-90SM-01	8.2 to 12.4	WR-90	SMA (M)	0.20	20.0	UG39/U	WT-E-5
PTC-75SF-01	10.0 to 15.0	WR-75	SMA (F)	0.20	20.0	Square	WT-E-5
PTC-75SM-01	10.0 to 15.0	WR-75	SMA (M)	0.20	20.0	Square	WT-E-5
PTC-62SF-01	12.4 to 18.0	WR-62	SMA (F)	0.25	20.0	UG419/U	WT-E-5
PTC-62SM-01	12.4 to 18.0	WR-62	SMA (M)	0.25	20.0	UG419/U	WT-E-5
PTC-42KF-01	18.0 to 26.5	WR-42	K (F)	0.30	20.0	UG595/U	WT-E-5
PTC-42KM-01	18.0 to 26.5	WR-42	K (M)	0.30	20.0	UG595/U	WT-E-5
PTC-34KF-01	22.0 to 33.0	WR-34	K (F)	0.30	20.0	UG1530/U	WT-E-5
PTC-34KM-01	22.0 to 33.0	WR-34	K (M)	0.30	20.0	UG1530/U	WT-E-5
PTC-28KF-01	26.5 to 40.0	WR-28	K (F)	0.35	20.0	UG599/U	WT-E-5
PTC-28KM-01	26.5 to 40.0	WR-28	K (M)	0.35	20.0	UG599/U	WT-E-5
PTC-222F-01	33.0 to 50.0	WR-22	2.4 mm (F)	0.40	18.0	UG383/U	WT-E-5
PTC-222M-01	33.0 to 50.0	WR-22	2.4 mm (M)	0.40	18.0	UG383/U	WT-E-5
PTC-19VF-01	40.0 to 60.0	WR-19	V (F)	0.40	17.0	UG383/U-M	WT-E-5
PTC-19VM-01	40.0 to 60.0	WR-19	V (M)	0.40	17.0	UG383/U-M	WT-E-5
PTC-15VF-01	50.0 to 70.0	WR-15	V (F)	0.50	16.0	UG385/U	WT-E-5
PTC-15VM-01	50.0 to 70.0	WR-15	V (M)	0.50	16.0	UG385/U	WT-E-5