

Flare for Septum polarization feed

OK1DFC – 12/2002

After many questions about possibilities us a Septum feed for different f/D I have done the calculation sheet and mechanical solution. More details you can see on my web page.

1. Table of Diagonal and Circular WG limitations 1296 MHz

Diagonal WG – mm A x A	Circular WG – mm diameter	F. min – MHz	F. max – MHz
130	147	1198,5	1565,0
135	152	1154,1	1507,0
140	158	1112,9	1453,2
145	164	1074,5	1403,1
150	169	1038,7	1356,3
155	175	1005,2	1312,5

Table of Diagonal and Circular WG limitations 2320 MHz

Diagonal WG – mm A x A	Circular WG – mm diameter	F. min – MHz	F. max – MHz
70	79	2225,8	2906,4
75	85	2077,4	2712,6
80	90	1947,5	2543,1
85	96	1830,0	2393,5
90	102	1731,1	2260,5
95	107	1640,0	2141,5

Remarks:

F min = lower cutoff FRQ.

F max = transition FRQ. To higher mode

Blue field marked my choose solution for feeds.

Circular solution is not recommended because the feed will be us for big power.

2. Table of WG compare beam width 1296 MHz

Septum feed size A x A	E-H ° for 10 dB beamwidth	Optimum for f/D dish	
		Low noise	Max.gain
130	154	0,31	0,39
135	148	0,33	0,41
140	142	0,35	0,43
145 x 145	137	0,37	0,45
150	127	0,41	0,47

Table of WG compare beam width 2320 MHz

Septum feed size	E-H ° for 10 dB beamwidth	Optimum for f/D dish	
		Low noise	Max.gain
80 x 80	137	0,37	0,45

Septum size 145 x 145 mm is very good usable for dishes with f/D from 0,37 up to 0,45 without flare. Sizes for flare optimization are following.

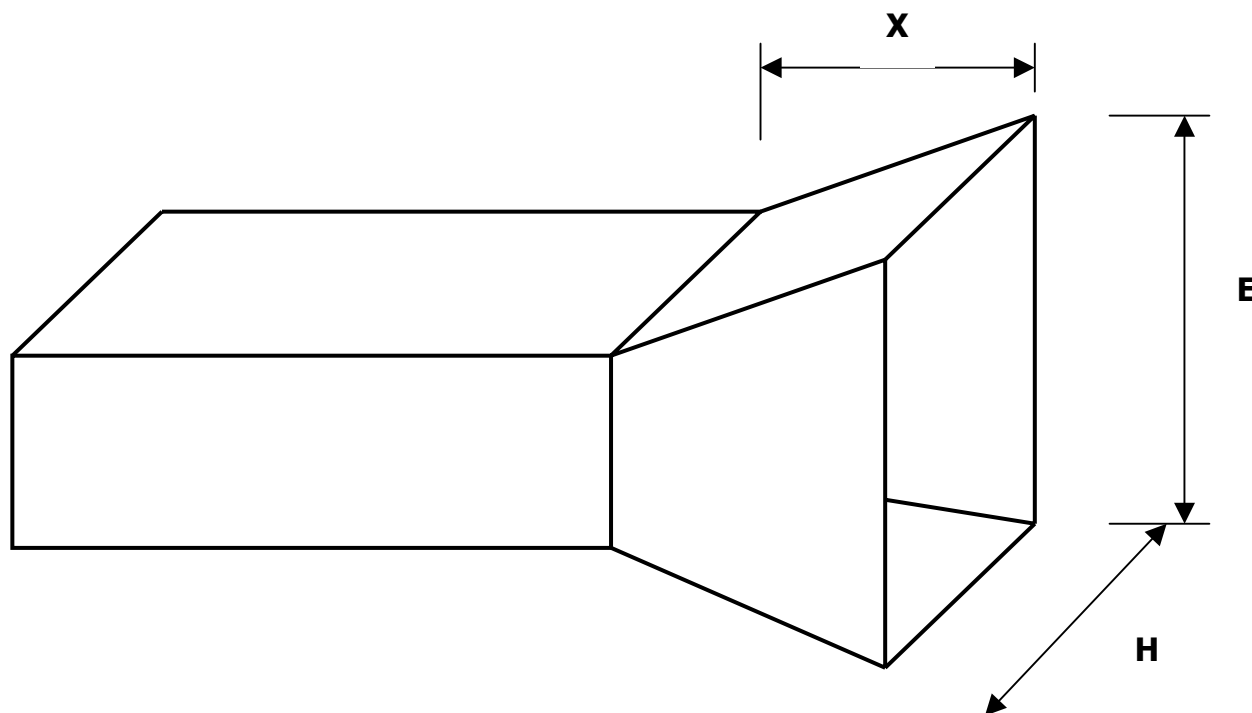
3. Table of sizes for optimization flares 1296 MHz

f/D ratio	H aperture mm H	E aperture mm E	Axial length X	H-plane phase center wave length	E-plane phase center wave length
0,6	264	209	135	0,139	0,124
0,5	198	169	44	0,119	0,168
0,45	165	149	13	0,0988	0,055
0,4	No possible calculate, below size of feed aperture				

Table of sizes for optimization flares 2320 MHz

f/D ratio	H aperture mm H	E aperture mm E	Axial length X	H-plane phase center wave length	E-plane phase center wave length
0,6	148	117	76	0,138	0,123
0,5	111	95	25	0,117	0,165
0,45	92	83	8	0,140	0,139
0,4	No possible calculate, below size of feed aperture				

Practical solution for Septum polarization transformer feed.



Practical solution 1296 MHz show, that for f/D 0,5 ratio is optimum size 180 x 180 mm on the flare aperture and f/D ratio 0,45 is optimum size 157 x 157 mm.