

Circular Waveguide and Flange Technical References

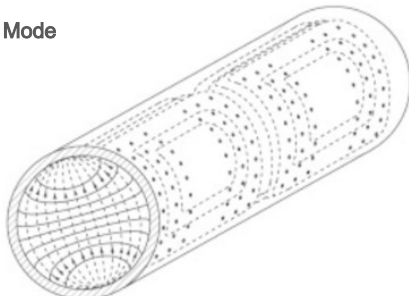
The dimensions of the circular waveguide are related to which waveguide mode the waveguide is operating in. Two popular circular waveguide modes are used, namely TE_{11} mode and TE_{01} mode. TE_{11} is the fundamental mode and TE_{01} is a higher order mode. Due to the fact that the electric field is perpendicular to the waveguide wall of TE_{01} mode, there is no conductive loss during the wave propagation. Therefore, TE_{01} mode is widely used in the industry for low loss and high power transmission. Circular waveguide dimensions for both operating modes are given. The EM field distributions of both TE_{11} and TE_{01} modes can be seen in the diagrams below.

TE ₁₁ Mode Circular Waveguide Parameters						TE ₀₁ Mode Circular Waveguide Parameters			
Band	Frequency Range (GHz)		Inner diameter (Inches)	Cut-Off Frequency (GHz)	Historic Flange 1,2	Frequency Range (GHz)	Inner diameter (Inches)	Cut-Off Frequency (GHz)	Historic Flange 1,2
X	Low	8.20 to 9.97	1.094	6.33	UG-39/U-M	11.0 to 16.0	1.500	6.03	-
	Medium	8.50 to 11.6	0.938	7.38		13.2 to 18.9	1.265	7.15	UG-419/U-M
	High	9.97 to 12.4	0.797	8.68		15.9 to 21.9	1.106	8.18	UG-419/U-M
Ku	Low	12.4 to 15.9	0.688	10.06	UG-419/U-M	18.6 to 25.6	0.951	9.51	UG-595/U-M
	Medium	13.4 to 18.0	0.584	11.85		25.3 to 35.0	0.686	13.18	UG-595/U-M
	High	15.9 to 18.0	0.500	13.84		27.3 to 38.0	0.643	14.06	UG-595/U-M
K	Low	17.5 to 20.5	0.470	14.73	UG-595/U-M	32.0 to 44.0	0.545	16.59	UG-383/U-M
	Medium	20.0 to 24.5	0.396	17.48		34.8 to 48.0	0.370	24.44	UG-383/U-M
	High	24.0 to 26.5	0.328	21.10		46.4 to 63.9	0.353	25.61	UG-387/U-M
Ka (A)	Low	26.0 to 33.0	0.315	21.97	UG-599/U-M	62.0 to 84.0	0.291	31.07	UG-387/U-M
	Medium	33.0 to 38.5	0.250	27.69		70.0 to 96.0	0.249	36.31	UG-387/U-M
	High	38.5 to 43.0	0.219	31.60		86.0 to 115.0	0.201	44.98	UG-387/U-M
Q (B)	Low	33.0 to 38.5	0.250	27.69	UG-383/U-M	93.0 to 128.0	0.186	48.6	UG-387/U-M
	Medium	38.5 to 43.0	0.219	31.60					
	High	43.0 to 50.0	0.188	36.82					
U	Low	38.5 to 43.0	0.219	31.60	UG-383/U-M				
	Medium	43.0 to 50.0	0.188	36.82					
	High	50.0 to 60.0	0.165	41.95					
V	Low	50.0 to 58.0	0.165	41.95	UG-385/U-M				
	Medium	58.0 to 68.0	0.141	49.09					
	High	68.0 to 77.0	0.125	55.37					
E	Low	58.0 to 68.0	0.141	49.09	UG-387/U-M				
	Medium	68.0 to 77.0	0.125	55.37					
	High	77.0 to 87.0	0.110	62.92					
W	Low	77.0 to 87.0	0.110	62.92	UG-387/U-M				
	Medium	87.0 to 100	0.094	73.63					
	High	100 to 112	0.082	84.41					
F	Low	87.0 to 100	0.094	73.63	UG-387/U-M				
	Medium	100 to 112	0.082	84.41					
	High	112 to 125	0.075	92.28					
D	Low	100 to 112	0.082	84.41	UG-387/U-M				
	Medium	112 to 125	0.075	92.28					
	High	125 to 140	0.067	117.31					
G	Low	125 to 140	0.067	103.30	UG-387/U-M				
	Medium	140 to 160	0.059	117.31					
	High	160 to 220	0.050	138.43					

Note: 1) The flange designators shown are for brass, cover flange types only. If the flange material is aluminum or non cover type, the designator is different.

2) Flange UG-387/U-M means that only the waveguide has been modified. All other flange parameters remain the same as UG-387/U.

TE₁₁ Mode



— E Field
- - - M Field

TE₀₁ Mode

