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Rectangular waveguide dimensions

Updated November 3, 2012

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New for October 2012! We've updated the table to include WR-75, often used in SatCom work (thanks to Doug), and we've added a column for waveguide dimensions in millimeters.

We have a more complete waveguide table [available in our download area](#), thanks to Alan D!

For the information below we reference [Penn Engineering](#), and also a combination of material borrowed from Maury Microwave and ZAX Millimeter Wave Corporation web sites. The lower seven waveguide series were contributed by "Nameless Individual" from LockMart.

Although there are disagreements between waveguide vendors, our table is representative of the US system (other countries such as the U.K. have their own crappy nomenclature that is just as confusing). Note that two letters (F and G) are used twice in the table, illustrating the lack of industry-wide agreement.

The interior of a standard rectangular waveguide has a 2:1 aspect ratio in most cases (not exactly true for WR-90 and there are plenty of other exceptions). That is, the broad wall is twice the dimension of the narrow wall, or very nearly so. Rectangular waveguides support E-M waves only over a certain frequency band, depending on the cross-sectional dimensions. The bigger the size of the waveguide, the lower in frequency it works. Waveguides are specified in WR numbers. WR stands for "rectangular waveguide" except the military long ago decided that all adjectives must follow nouns for some reason.

Word of caution: depending on what reference you use, we have seen some disagreement in the height of the waveguide dimension, especially on the larger waveguide series such as WR650.

Further caution: the dimensions in millimeters were hand-calculated and it is always possible that they may suffer from key-punch error... these were directly calculated by multiplying inches by 25.4 with no rounding.

WR-159 was corrected on November 3, 2012 thanks to Steve...

Waveguide frequency bands and interior dimensions				
Frequency Band	Waveguide Standard	Frequency Limits (GHz)	Inside Dimensions (inches)	Inside Dimensions (mm)
	WR-2300	0.32 - 0.49	23.000 x 11.500	584.2 x 292.1
	WR-2100	0.35 - 0.53	21.000 x 10.500	533.4 x 266.7
	WR-1800	0.43 - 0.62	18.000 x 9.000	457.2 x 228.6
	WR-1500	0.49 - 0.74	15.000 x 7.500	381.0 x 190.5
	WR-1150	0.64 - 0.96	11.500 x 5.750	292.1 x 146.05
	WR-1000	0.75 - 1.1	9.975 x 4.875	253.365 x 126.6825
	WR-770	0.96 - 1.5	7.700 x 3.385	195.58 x 97.79
	WR-650	1.12 to 1.70	6.500 x 3.250	165.1 x 82.55
R band	WR-430	1.70 to 2.60	4.300 x 2.150	109.22 x 54.61
D band	WR-340	2.20 to 3.30	3.400 x 1.700	86.36 x 43.18
S band	WR-284	2.60 to 3.95	2.840 x 1.340	72.136 x 34.036
E band	WR-229	3.30 to 4.90	2.290 x 1.150	58.166 x 29.21

G band	WR-187	3.95 to 5.85	1.872 x 0.872	47.5488 x 22.1488
F band	WR-159	4.90 to 7.05	1.590 x 0.795	40.386 x 20.193
C band	WR-137	5.85 to 8.20	1.372 x 0.622	34.8488 x 15.7988
H band	WR-112	7.05 to 10.00	1.122 x 0.497	28.4988 x 12.6238
X band	WR-90	8.2 to 12.4	0.900 x 0.400	22.86 x 10.16
X-Ku band	WR-75	10.0 to 15.0	0.750 x 0.375	19.05 x 9.525
Ku band	WR-62	12.4 to 18.0	0.622 x 0.311	15.7988 x 7.8994
K band	WR-51	15.0 to 22.0	0.510 x 0.255	12.954 x 6.477
K band	WR-42	18.0 to 26.5	0.420 x 0.170	10.668 x 4.318
Ka band	WR-28	26.5 to 40.0	0.280 x 0.140	7.112 x 3.556
Q band	WR-22	33 to 50	0.224 x 0.112	5.6896 x 2.8448
U band	WR-19	40 to 60	0.188 x 0.094	4.7752 x 2.3876
V band	WR-15	50 to 75	0.148 x 0.074	3.7592 x 1.8796
E band	WR-12	60 to 90	0.122 x 0.061	3.0988 x 1.5494
W band	WR-10	75 to 110	0.100 x 0.050	2.54 x 1.27
F band	WR-8	90 to 140	0.080 x 0.040	2.032 x 1.016
D band	WR-6	110 to 170	0.0650 x 0.0325	1.651 x 0.8255
G band	WR-5	140 to 220	0.0510 x 0.0255	1.2954 x 0.6477
	WR-4	170 to 260	0.0430 x 0.0215	1.0922 x 0.5461
	WR-3	220 to 325	0.0340 x 0.0170	0.8636 x 0.4318
Y-band	WR-2	325 to 500	0.0200 x 0.0100	0.508 x 0.254
	WR-1.5	500 to 750	0.0150 x 0.0075	0.381 x 0.1905
	WR-1	750 to 1100	0.0100 x 0.0050	0.254 x 0.127



Waveguide dimension rule of thumb

How do you know what WR number a waveguide is just by looking at it? The number is simply the dimension of the broad wall in mils, divided by 10. Thus the waveguide depicted below is WR-62 (if you look closely at the caliper it indicates 620 mils), which is used in Ku-band.



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