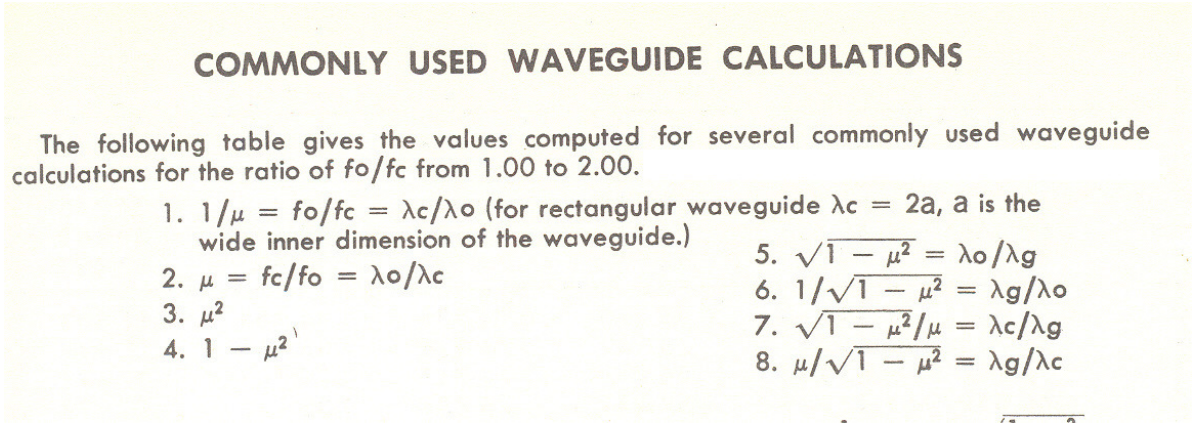
Waveguide Calculations
By
Dr. Gerald N. Johnson
KØCQ

From The Microwave Engineer's Handbook 1961-1962.



COMMONLY USED WAVEGUIDE CALCULATIONS

The following table gives the values computed for several commonly used waveguide calculations for the ratio of f_o/f_c from 1.00 to 2.00.

1. $1/\mu = f_o/f_c = \lambda_c/\lambda_o$ (for rectangular waveguide $\lambda_c = 2a$, a is the wide inner dimension of the waveguide.)
2. $\mu = f_c/f_o = \lambda_o/\lambda_c$
3. μ^2
4. $1 - \mu^2$
5. $\sqrt{1 - \mu^2} = \lambda_o/\lambda_g$
6. $1/\sqrt{1 - \mu^2} = \lambda_g/\lambda_o$
7. $\sqrt{1 - \mu^2}/\mu = \lambda_c/\lambda_g$
8. $\mu/\sqrt{1 - \mu^2} = \lambda_g/\lambda_c$

WR90 at 10.368 GHz. Fc is 6.557 GHz and λc = 4.5722 cm. At 10.368 GHz λ = 2.8916 cm.
μ = f c / f = 0,632527, μ^2 = 0,399964. 1 – μ^2 = 0.600036. SQRT (0.60036) = 0.774620
so λg = 3.732926 cm.

WR62 at 10.368 GHz. Fc is 9.486 GHz and λc = 3.160 cm. At 10.368 GHz λ = 2.8916 cm.
μ = f c / f = 0,914931, μ^2 = 0,837098. 1 – μ^2 = 0.162902. SQRT (0.162902) = 0.403611
so λg = 7.164324 cm.