

Types of Terminations

Narda offers a large variety of coaxial and waveguide terminations and dummy loads which meet the requirements of all microwave measurement systems and most other applications for high quality loads. The many types of coaxial fixed terminations range from small ½ watt instrument loads to 500 watt loads to terminate high power transmitters. Medium power loads (10 to 40 watts with low VSWR) are used in many system and measurement applications. High power dummy loads with cooling fins of unique design provide optimum dissipation of large amounts of microwave power.

Criteria for Selecting Terminations

Criteria which should be evaluated for selecting terminations, whether fixed or tuneable, are frequency range, power handling capabilities, reflection coefficient, connectors and cost.

Frequency Range

Narda coaxial terminations are generally available in two types: a resistive matched load which offers an excellent impedance match to 50 ohms over the DC, 12.4, 18, 26.5 or 40 GHz range; and an absorptive load which offers superior VSWR performance in the 0.7 or 2 to 18 GHz range but does not operate down to DC.

Power Handling

Terminations are rated according to the amount of power they can dissipate at a specific ambient temperature. These parameters are included in the basic electrical specifications. A termination which is used at a higher power level or higher ambient temperature than it is rated may either burn out or suffer irreversible changes from excessive heat which it fails to dissipate. When terminations are to be used at higher ambient temperatures than specified, the maximum power handling capability must be decreased in accordance with a derating curve. Derating curves are available for most series of terminations.

In most applications, heat leaves the termination by convection and/or radiation. Low and medium power loads (up to 200 W) do not rise to a temperature for which radiation is the major factor. Terminations in this power range, therefore, are designed with appropriate fin surfaces, in a manner to pass air freely around and through the fins. For higher power levels, up to the kilowatt range, radiation is predominant. Fins and external surfaces are designed to radiate heat away from the load. All high power loads and many medium power loads rise to a temperature too hot to touch, and may rise to a level where special safety precautions are required. Above these power levels, liquid cooling is used.

Terminations Used with Adapters

It would seem simple enough to select a termination for either waveguide or coaxial use and to add an adapter, but this is a practice which should be discouraged. The introduction of an adapter between the main transmission line and the termination adds physical discontinuities and, therefore, increases the reflections of main line power. Also, many adapters cannot handle power in the 100-500 watt range.

The type of connector should be suitable to mate with the transmission line or device to be terminated. Narda offers a complete line of terminations in SMA, N, 2.92, and 3.5 mm, with average power ratings from 0.5 to 500 watts. Terminations with the popular N and SMA connectors are widely used in commercial and military systems as well as in bench test applications.

Reflection Coefficient (VSWR)

Reflection, as measured in VSWR (voltage standing wave ratio), is a measure of the return loss, or proportion of incident power that is reflected. The value required for a particular application is determined by the maximum allowable load VSWR of a generator, or by the accuracy required for a measurement.