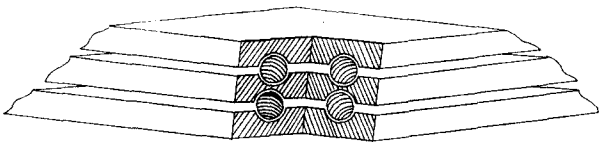

FIG. 1. Cross sectional drawing of vibration-elimination mounting.

dimensions of the boards should not exceed the area of the apparatus to be isolated (Fig. 1).

We have found that the elimination of low frequency vibrations was the most essential; therefore, in some cases only handballs were utilized. In other cases, a combination of the two types of antivibration mountings were required.

The authors wish to thank B. Dezendorf of the American Optical Company for his helpful suggestions concerning this problem.

Microwave Frequency Feedthrough for Vacuum Systems*

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THERE are myriads of microwave window designs, each for a particular application. This deals not with a window design but instead with the inexpensive reworking of standard components so as to yield a vacuum-tight rf feedthrough. Herein described is a device suitable for use up to X band, though the selection of RG-119/U somewhat restricts usage to the lower end of the microwave spectrum. Low loss over a broad band as well as low VSWR characterize this feedthrough assembly (see Fig. 1).

The coaxial line chosen is of the Teflon filled, rigid type. Any coaxial line of this type can be used, depending only upon the operating frequency band. The connectors selected for this feedthrough are type N; either male or female can be used. A blank insert for a vacuum flange is required to make the feedthrough assembly detachable. The only other component required is a small amount of type 304 stainless steel or grade A nickel.

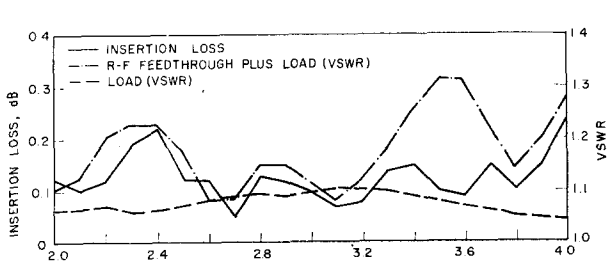

FIG. 1. Microwave characteristics.

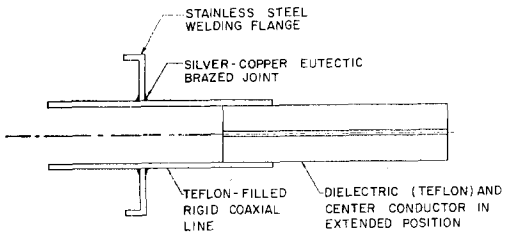

FIG. 2. Configuration for brazing.

A length of the chosen coaxial line several cm longer than required is held in a collet so that the Teflon dielectric and the center conductor can be displaced 7.5 to 10 cm as shown in Fig. 2. The stainless adapter is positioned and brazed with silver-copper eutectic alloy in a dry hydrogen atmosphere. Heating by radiation and convection has worked well.

The Teflon and center conductor are then pushed back into position. While attached to a leak detector the copper outer conductor is crimped using a large radius tool adapted to a tubing cutter. Crimping is done in two locations and progresses until a satisfactory level of vacuum-tightness is achieved. This assembly is then Heliarc welded to the mating vacuum flange as shown in Fig. 3. Radio frequency connectors are attached using pure tin as a solder due to its excellent vapor pressure even at temperatures above its melting point.

It is possible to construct a wideband mirowave vacuum feedthrough from standard components at reasonable cost even though they are unavailable on the market. Techniques developed can be applied to making feedthroughs suitable for use in any portion of the microwave spectrum where coaxial cable can be used.

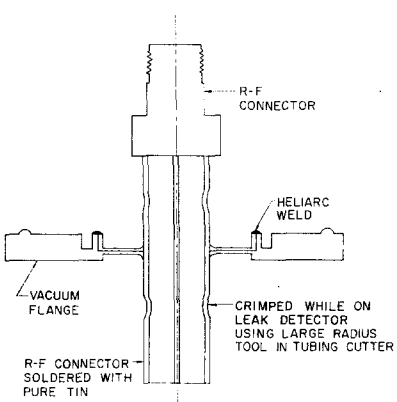

FIG. 3. Feedthrough assembly.

In order to make the device bakeable at higher temperatures a nickel sleeve should be used in place of the silver plated brass which is part of the standard rf connector package. This nickel sleeve could be hard brazed in position.

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