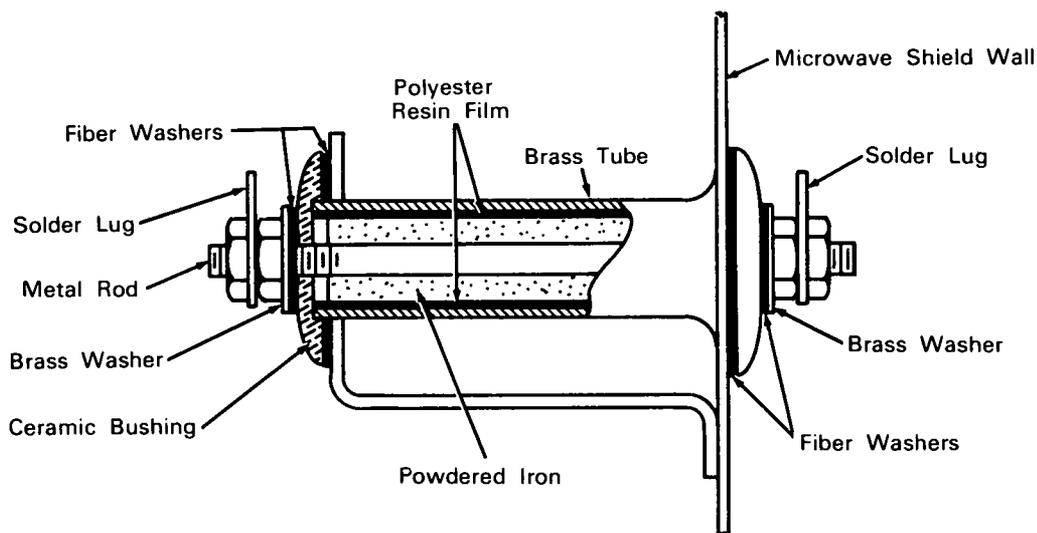


NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

Modified Filter Prevents Conduction of Microwave Signals Along High-Voltage Power Supply Leads



The problem: To prevent conduction of microwave signals along high-voltage (4500-volt) power-supply leads. It is very difficult to construct ordinary lumped-constant filters for high-voltage supplies that provide sufficient attenuation at microwave (X-band) frequencies.

The solution: A simple filter consisting of a short section of coaxial transmission line in which the dielectric material has been replaced by a very lossy powdered iron material contained in a lining of a polyester resin (polyethylene terephthalate). Any X-band signals that may propagate along the power-supply leads of a microwave power source (klystrons, magnetrons) are absorbed by the lossy material in the coaxial section.

How it's done: A brass tube, having one end soldered to a microwave shield wall and the other end to a support bracket is lined with a thin (0.001-inch-thick) polyester resin tube. A metal rod, with male threads on both ends and having a substantially smaller outside diameter than the inside diameter of the brass tube, is positioned centrally by two ceramic bushings. Powdered iron is packed around the central metal rod to fill the space between the rod and the polyester resin lining. Two pairs of fiber washers seal the faces of the ceramic bushings. The two smaller fiber washers are protected by two brass bearing washers. A pair of nuts on each end holds the assembly together. Each pair of nuts is separated by solder lugs for the power leads.

(continued overleaf)

Notes:

1. The powdered-iron material without the polyester resin tube will ordinarily break down when subjected to more than 1,100 volts.
2. For further information about this innovation inquiries may be directed to:
Technology Utilization Officer
Jet Propulsion Laboratory
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Reference: B63-10091

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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