



High Frequency Circuit Materials

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Rogers RT/duroid® Material Provides Flexible Substrate in New Conical Antenna

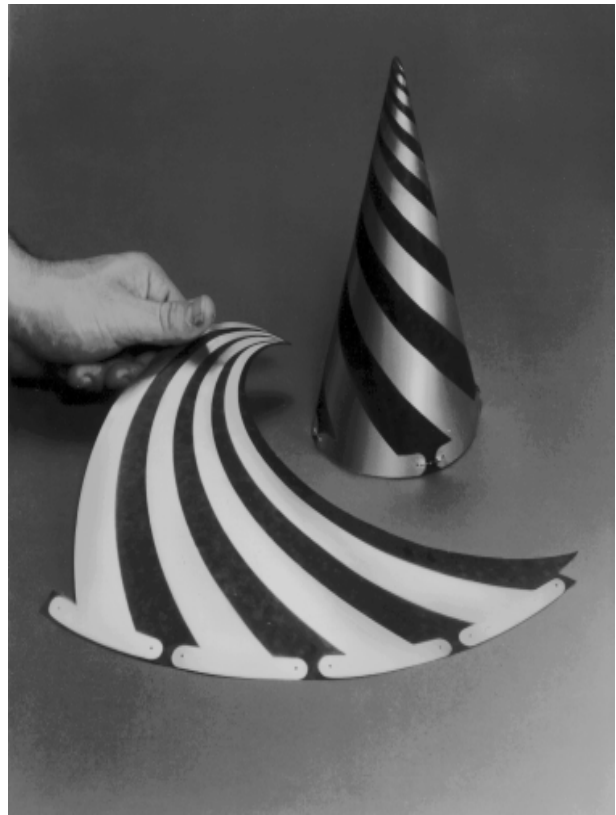
Rogers RT/duroid® microwave materials enabled American Nucleonics Corporation to develop a reliable four-arm conical spiral antenna, part of an advanced direction-finding system. With superior physical and electrical qualities, RT/duroid materials provided the most cost-effective substrate.

Due to the antenna's unusual shape—an 8 inch tall cone with a 4-inch diameter base—American Nucleonics of Westlake Village, CA, determined that the flexibility of Rogers RT-duroid 5880 material was ideally suited to this application. It involved etching the pattern on flat copper-clad sheets, cutting precisely to size, and wrapping around the cone without substrate or conductor failure.

The antenna's log spirals were etched by American Nucleonics from 5-mil thick RT/duroid 5880 laminate clad with 1-ounce electrodeposited copper. Then, using a steel template, the substrate was cut to the exact shape. According to American Nucleonics, the homogeneity of RT/duroid 5880 non-woven material allowed them to easily machine the pattern, resulting in a sharp, clean edge. RT/duroid material cut cleaner and faster without warpage, a significant advantage over woven glass substrates.

Flexibility of the RT/duroid 5880 material enabled American Nucleonics to then form the etched, trimmed substrate around a pre-molded dielectric foam cone and secure in place. This was accomplished without cracking, fracturing, or loosening copper... and without a tendency for the substrate to unwarpage, assuring reliable long-life performance of the antenna.

RT/duroid material flexibility is related to its unique, short non-woven microfiber construction that is easily formed to specific shapes, while retaining physical stability. Further, its superior bond strength helped prevent the copper from separating when the substrate was wrapped around the cone.



Superior physical and electrical properties of Roger RT/duroid® 5880 microwave material enabled American Nucleonics Corporation to develop this advanced four-arm conical spiral antenna. Non-woven RT/duroid material's homogeneity allowed easy machining to precise shape. Its flexibility provided forming and securing in place without cracking, fracturing, loosening copper, or tendency to unwrap, assuring reliable, long-life performance of the antenna. Dielectric constant of 2.20 was uniform from sheet-to-sheet and constant over the antenna's wide frequency range of 2.0 GHz. RT/duroid 5880 material is a high-quality, non-woven glass microfiber-reinforced PTFE composite. Glass microfibers are individually encapsulated with PTFE and evenly dispersed throughout the material with random orientation in the sheet plane.

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