



MATERION

CASE STUDY

SUPPLING HIGH-QUALITY BERYLLIUM OXIDE CERAMICS

HOW MATERION HELPS
SHENZHEN YULONGTONG
ELECTRON CO., LTD.
MEET DEMAND



THE CHALLENGE

In the world of high frequency power resistors, the size, weight and thermal conductivity of manufactured components are critically important to winning and keeping business.

At China-based Shenzhen Yulongtong Electron Co., Ltd., that's a lesson the company had to learn the hard way, as keeping up with growing demand for the research, development and production of radio frequency components at one time presented quality and supply challenges.

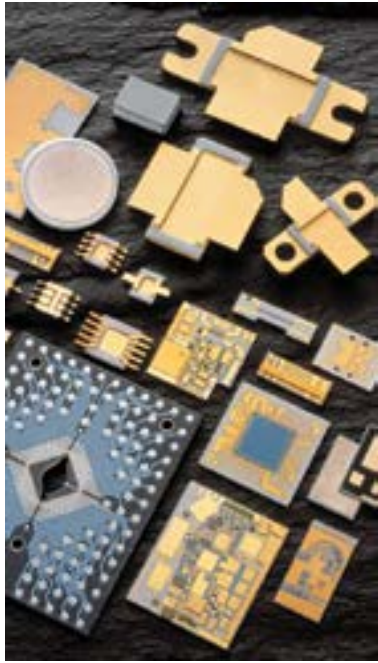
Yulongtong develops power resistors, power terminators, power attenuators and other products used in the rapidly expanding global telecommunication, radio frequency (RF) and microwave products markets. Achieving the desired characteristics of these high-tech components requires incorporating high quality materials into the manufacturing process. For example, Yulongtong uses beryllium oxide (BeO) products instead of aluminum nitride (AlN) products in its resistors. The company and its customers recognize the importance of the higher thermal conductivity and lower dielectric constant that BeO ceramics, or beryllia, provide over AlN ceramics. That difference enables Yulongtong to produce smaller resistor components that manage higher frequencies, facilitating overall product miniaturization.

Over the past 15 years as growth in telecommunications has skyrocketed, Yulongtong found that its domestic supplier of beryllia could not keep up with the company's quality and supply demands.

MEETING DEMAND, OPENING NEW MARKETS

Customers of Yulongtong buy the company's high frequency resistors for use in medical devices, telecommunications equipment and electrical power systems. To meet the standards set by its clients, Yulongtong requires a consistent source of high quality beryllia. When that became an issue for its domestic supplier, Yulongtong looked abroad for a solution, finding one in Materion.

“Materion’s quality of beryllia is quite stable,” says Ya Gu, a Shenzhen Yulongtong Electron Co. engineer. “Combined with our increasing volume of work and need for a second supplier, we chose Materion.”



Today, Yulongtong counts on Materion as its primary beryllia supplier, retaining its domestic supplier as a secondary source. Using Materion beryllia, Gu said that Yulongtong's resistors provide higher flexural strength and higher thermal conductivity. This allows the company to produce smaller parts that can handle greater power and higher frequencies without cracking under intense heat.

Gu also notes that not only has the performance of Materion's beryllia been "very good," it has also opened the door to serving a new industry - high-power thick-film circuit applications. Thick-film circuitry is widely used in automotive and other applications where high reliability is required. Often, the applications that incorporate thick-film circuitry are subject to extended temperature ranges and significant thermocycling, all without failure.

Materion BeO ceramics are available in a range of thermal conductivities. Thermalox[®] V ceramic offers the lowest level at 220 W/m•K as our baseline. On the upper end of the range, BW3250[®] beryllium oxide ceramic can reach thermal conductivity of at least 325 W /m•K.

Thanks to the stability of Materion beryllia, Shenzhen Yulongtong can produce high-quality, immersion-proof, thick-film circuit resistors. These circuits are designed to manage the high-power demands for oil and gas meters and gauges, and are durable enough to be submerged in a storage tank to monitor, for example, oil volume.

To learn how Materion can help your company meet the demands of the market and stand out among its competitors, [talk with our ceramics engineers.](#)