

F A B S *and* L A B S

An Icon in Filters, K&L Microwave Has An Inside Advantage



K&L Microwave is one of the icons of the microwave industry, a name that has been around as long as anyone can remember, a name synonymous with high performance filters. Formed in 1970, K&L began by developing custom filters for defense programs in a small, 1,400 square foot office. In 1983, K&L was purchased by Dover Corporation, ultimately becoming a member of Dover's Microwave Products Group. Throughout its history, K&L has successfully expanded in all directions: filter technology, products, markets and facilities. Yet the founding vision has not changed, to be the preferred supplier of filters and integrated filter products.

Today, K&L ships more than 100,000 filters each year from four facilities filling 182,000 square feet. Three are located in Salisbury, Maryland, where K&L was born; the fourth, in the Dominican Republic, focuses on low-cost, high volume products. K&L has a Technical Assistance Agreement that allows the Dominican Republic facility to support ITAR-controlled products, important because the company's filters are widely used on radar, electronic warfare, communications and missile systems. Roughly 75 percent of K&L's business comes from defense and space programs, with the remainder from telecommunications and industrial applications. K&L has an enviable heritage in space, with filters on Apollo 17, Iridium, GPS, the Mars Science Lab and numerous other missions.

Performance, size and cost requirements dictate the optimum filter technology. To offer customers the best options, K&L has developed one of the widest portfolios of filter technology, from machined cavities for the highest performance to lumped-element, surface-mount designs for the lowest cost. To make it easier for customers to determine the best filter option, K&L developed an online filter wizard, which takes a customer's specifications and identifies the filters best matching the requirements, with the option to request a quote for a custom filter.

K&L's filter products are grouped in four families: chip and wire, ceramic, cavity and multi-function assemblies, the latter integrating filters with other circuits such as amplifiers, switches and limiters. Engineering and manufacturing are organized as teams dedicated to each family, ensuring tight feedback loops between engineering and manufacturing and between assembly and test. Dedicated teams develop expertise with a filter technology, resulting in higher quality and faster time-to-market.

A key element of K&L's success is vertical integration, which means handling most manufacturing operations internally, from winding coils to grinding resonators to machining cavities in the largest CNC machine shop dedicated to RF/microwave filters. The plating capability includes silver, nickel, copper and chromate conversion coating, with X-ray fluorescence to verify thickness. To hermetically seal modules, K&L can perform laser, seam and solder sealing. The company even fabricates printed circuit boards, enabling quick-turn prototypes and production of small lots. For environment testing, K&L can perform thermal shock, temperature cycling, random vibration, mechanical shock, salt spray and moisture resistance/humidity to MIL-STD-202, -810 and -883. For RF test, K&L has a suite of approximately 125 network analyzers with automated test capability. With vertically-integrated manufacturing, K&L can produce some 5,000 chip and wire, 7,500 ceramic, 850 cavity and 75 multi-function assemblies each week.

Equally important as the filter technology, K&L is focused on customer satisfaction through continuous improvement, with formal Kaizen projects to improve on-time delivery, eliminate late backlog and reduce customer returns. Considering the breadth of filter products and the commitment to customer satisfaction, it is no surprise that K&L has been a market leader for nearly 50 years and is well-positioned for another 50.

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