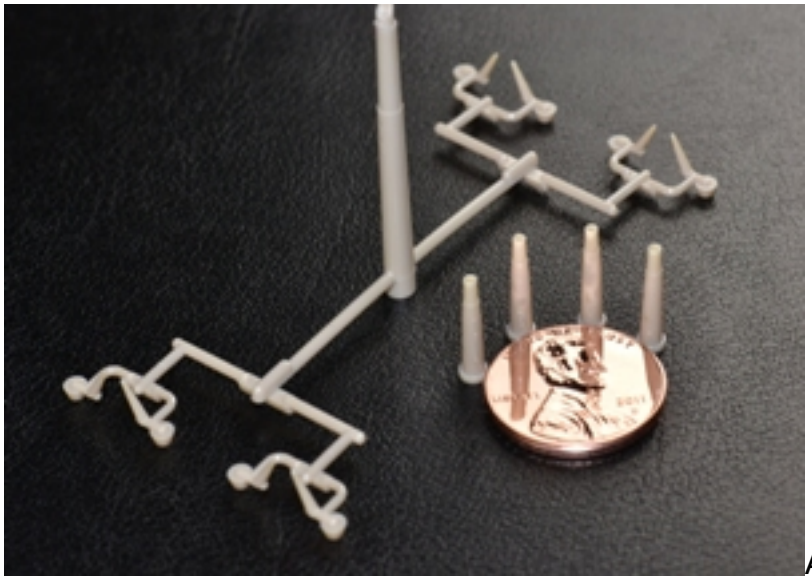
Peek Polymers Can Reduce Weight, Improve Reliability



Aerospace, automotive, and electronics engineers have been tasked with finding material solutions that can reduce weight, improve functionality, and help consolidate or miniaturize parts in some of the most demanding environments. VICTREX® 90-Series high flow PEEK polymers were developed specifically for thin-walled, intricate component applications and offer higher mechanical properties with improvements in modulus, toughness, and coefficient of thermal expansion. Available in unfilled, carbon and glass-filled grades, these specialty polymers help facilitate the replacement of metals, thermosets, and ceramics due to their ability to reduce weight up to 80% and improve reliability due to their inherent thermal and mechanical properties.

When Mold Craft, a mold designer that specializes in small, intricate components, was challenged with molding a funnel tip with a 0.038cm (0.015in) wall by 0.945cm (0.372in) long followed by a 0.020cm (0.008in) wall by 0.254cm (0.100in) long, they selected VICTREX 90G as their material of choice for the application. According to Justin McPhee, Vice President of Engineering for Mold Craft, “the VICTREX 90G material was chosen due to its high strength properties and the polymer’s extremely high melt flow.” As this was no easy task for the designer and molder, Mold Craft worked hand-in-hand with Victrex during the design and process development phases of the program. “There was much work done by Victrex in defining the exact material to use and supporting us to get the temperatures correct to optimize the parts. With their assistance, we were able to build an application that is working well for the customer,” says McPhee.

VICTREX 90-Series polymers are widely specified in applications like brackets, clamps, stand-offs and fasteners for the aerospace industry due to the significant weight savings achieved that increase the fuel economy of the aircraft. Automotive bearings and bushings made from PEEK thermoplastics also help to reduce vehicle weight and have no creep deformation after running at 5,000 RPM continuously for

more than 2,000 hours, which improves the overall fuel economy and reliability of the vehicle. In electronics, VICTREX 90-Series grades are used in connectors, capacitors, sensors, bobbins and switches due to lower outgassing, increased ductility, higher knit line strength, and the ability to withstand the lead-free soldering process which can reach temperatures up to 280°C (536°F).

With higher filler loadings, up to 60% of the total polymer weight, the VICTREX 90-Series grades are outperforming materials like liquid crystal polymers (LCP), polyphenylenesulfides (PPS), and ceramics because of their enhanced mechanical properties and toughness. Also, these highly-filled PEEK compounds have similar, or sometimes lower, viscosities versus LCP, PPS, and epoxy thermosets. This leads to shorter cycle times and lower manufacturing costs due to faster crystallization and smoother melt flow during the injection molding process. VICTREX PEEK polymers exhibit outstanding chemical and hydrolysis resistance including showing no loss of tensile or flexural strength after conditioning at 200°C (392°F) in 1.4MPa (203psi) steam for over 2,500 hours. VICTREX 90-Series PEEK also shows very consistent electrical properties after high temperature exposure.

For supply assurance and peace of mind for engineers, designers and sourcing professionals, Victrex has the ability to provide PEEK polymers at a time when many other polymer manufacturers are struggling to keep up with customer demand. Victrex has a proven track record of investing in capacity ahead of demand, creating a stable supply position for its global customers. Victrex offers delivery for its standard products used in the transportation and electronics markets including VICTREX 90G, 90GL30, 90GL60, 90HMF20, and 90HMF40 with a maximum lead time of 5-7 days around the globe.

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