MCM Composites Details Precision Insert Molding Service for Thermoset Applications

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MCM Composites, LLC, a custom thermoset plastic molder, has released new details about its precision insert molding service, which embeds metal components directly into molded thermoset parts for manufacturers in the aerospace, appliance, electronics, food and beverage, furniture, and medical device industries. The company is drawing attention to the service as original equipment manufacturers look for ways to cut assembly steps, reduce part weight, and improve how components perform at high temperatures.

Insert molding places metal hardware such as threaded fasteners, bushings, or electrical contacts into a mold cavity before thermoset resin is introduced. As the material cures around the insert, the two are joined into a single part without secondary fastening, press-fitting, or adhesive bonding. The approach can consolidate several components into one and remove labor from downstream assembly lines.

"Many of the parts our customers bring to us used to be assemblies of three or four pieces, with fasteners and adhesives holding everything together," said Michael Fredrich, CEO of MCM Composites. "Molding the metal directly into the thermoset gives them one part that goes straight to the line, and it takes a lot of variability out of their process."

MCM Composites runs the service on injection molding presses ranging from 75 to 500 tons and compression molding equipment ranging from 50 to 800 tons. Its injection systems include degas sequences, gate cut technology, core pull mechanisms, and runnerless injection compression capabilities, which help the resin fully encapsulate each insert while limiting voids and flash. Platen sizes range from 18.7 by 20.7 inches up to 67.0 by 63.0 inches.

The company reports holding tolerances to plus or minus 0.0015 inches. Injection-molded parts can weigh from 0.1 grams to 10 pounds, while compression-molded parts can reach 80 pounds. Production volumes run from single pieces to more than one million parts per year.

Material selection is a central part of each insert molding project. MCM Composites processes phenolics for heat resistance and electrical insulation, alkyds for surface finish and chemical resistance, and polyester in both bulk molding compound (BMC) and sheet molding compound (SMC) formats. The company also molds epoxies and melamine phenolics for adhesion and flame retardancy, carbon fiber compounds for strength and stiffness, and vinyl ester for corrosion resistance.

Because thermoset resins cure through an irreversible chemical cross-linking reaction, finished parts do not soften when reheated the way thermoplastics do. MCM Composites produces components for operating temperatures up to 204 degrees Celsius (400 degrees Fahrenheit), which makes the process suitable for electrical housings, appliance components, and other parts exposed to sustained heat.

"Thermoset materials get chosen for these applications because they stay dimensionally stable when things get hot," Fredrich said. "When a metal insert is locked into that material during the cure, the bond holds up under heat, vibration, and electrical load in ways a pressed-in or glued insert often cannot."

Tooling for insert molding is built in single-cavity, multi-cavity, and family mold configurations. Insert-specific tools use precision shut-offs and insert placement systems to keep hardware positioned correctly during the molding cycle and to keep resin off threads and contact surfaces.

After molding, MCM Composites offers secondary operations including deflashing, drilling, machining, tapping, painting, metallizing, post bake, potting, epoxy application, component assembly, and custom packaging. Keeping these steps with a single supplier can shorten lead times and reduce the number of vendors a manufacturer has to manage.

The company operates under an ISO 9001:2015 certified quality management system, which governs process controls, inspection, and documentation across its molding operations. That framework applies to insert molded parts from the first article through full production runs.

Interest in thermoset insert molding reflects broader efforts among manufacturers to replace heavier metal parts with composite components and to simplify their supply chains. Sectors such as aerospace and medical devices also place heavy emphasis on repeatable part quality, which insert molding supports by reducing the number of manual assembly steps where errors can occur.

MCM Composites, LLC is a custom thermoset molder that provides compression, injection, and insert molding along with finishing and assembly services for customers across multiple industries.

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For more information about MCM Composites, contact the company here:MCM CompositesMichael Fredrich920-684-7800info@mcmusa.net1315 S. 41st StManitowoc, WI 54220

MCM Composites

MCM Composites is a trusted leader in custom molding, providing high-quality solutions to a diverse clientele across the globe

Website: https://www.mcmusa.net/

Email: info@mcmusa.net

Phone: 920-684-7800