

## Hollow Core Refrigerator Handle

<b>Resin</b>	Unsaturated Polyester
<b>Composite Application</b>	Refrigerator Handle
<b>Manufacturing Process</b>	Injection Molding with Gas Evacuation Technique (GET)
<b>Special Feature</b>	Hollow Core
<b>Length</b>	42 inches (107 centimeters)
<b>Largest cross Section diameter</b>	1.5 inch (3.8 centimeters)
<b>Weight</b>	2 pounds (0.9 kilogram)



A refrigerator handle is the first commercial application of GET technology for hollow thermoset composite parts. (Photo courtesy of BMCI)

When Bulk Molding Compounds Inc. (BMCI) developed the revolutionary Gas Evacuation Technology, unsaturated polyester from AOC emerged as the optimum resin for the technology's first commercial application -- a refrigerator handle.

The handle is injection molded with BMC 310, an appliance grade, fiberglass-reinforced bulk molding compound which meets Underwriters Laboratory Inc.® 5-V standard at a 0.125-inch (3.2-millimeter) thickness. BMC 310 is pigmentable in a wide range of colors and can be injection, compression or transfer molded.

“AOC supplies the base resin for our BMC 310 appliance grade product,” says Len Nunnery, BMCI's Director of Sales and Marketing. “The AOC resin component is a very consistent, high quality product that we have noted as a ‘go to’

for more demanding, aesthetically critical molding applications. This resin allows our molding customers to achieve the gloss, food stain and heat resistance necessary to meet the difficult surface requirements imposed by major appliance OEMs.”

### GET benefits

The GET process results in parts that use up to 40% less material and are molded in up to 60% less time. The technology allows thermoset composites to regain a cost advantage that was temporarily lost to thermoplastic parts that were gas-assist injection molded. Gas-assist molding consumes less material by leaving a hollow cavity in elongated sections.

# Hollow Core Refrigerator Handle, continued

The hollow core design results in stiffness properties that are equal to or greater than those of a solid part.

Len Nunnery and Fran Zappitelli, Executive Vice President Corporate for BMCI, felt they could regain the cost advantage for thermosets by developing a cavity-forming technology for that family of polymers. With a lot of sweat and a little serendipity, they got to GET which combines a special fiberglass-reinforced thermoset polyester bulk molding compound (BMC) with pressurized gas.

## How GET works

With GET, the BMC is injected into the cavity or cavities of a heated mold and held under pressure until a “skin” of material has cured to produce the desired net shape of the part. Pressurized gas is then introduced into the center of the material at the end of flow. The pressure forces the uncured BMC back through the part and runner/manifold, and into the barrel of the molding machine.

The gas-evacuated material is effectively reclaimed and positioned in front of the injection screw check ring as part of the next molded shot. The recovery of uncured material for reuse is the key to making GET competitive with gas-assist injection molded thermoplastics which, unlike thermosets, do not crosslink under heat.

In the commercial debut of GET, custom molder Dickten & Masch, Nashotah, Wisconsin, uses AOC resin-based BMC 310 to injection mold a 42-inch (107-centimeter) long refrigerator handle. The handle is roughly 1.5-inches (3.8 centimeters) in diameter at its largest cross-section and weighs about 2 pounds (0.9 kilogram).

“Gas assist processing with BMC is drawing the attention of the composite manufacturing community,” Nunnery states. “This is a solid advancement for thermosets.”

## About BMCI

Bulk Molding Compounds Inc., is the world leader in thermoset bulk molding compound technology and volume. The company is headquartered in West Chicago, Illinois, and has facilities in the United States, Mexico, China, Germany and Brazil. For more information about GET and high quality polyester and vinyl ester molding compounds, contact Len Nunnery by phoning (630) 377-1065 or e-mailing [lennunnery@earthlink.net](mailto:lennunnery@earthlink.net).

## About AOC

AOC is a leading global supplier of resins, gel coats, colorants, additives and synergistic systems for composites and cast polymers. AOC products are manufactured in facilities strategically located in North America, Europe and Asia. AOC-owned manufacturing plants have quality systems that are certified to ISO 9001:2000 standards, use proprietary technology to ensure resin consistency, and adhere to the principles of Six Sigma-Lean. For more information on AOC resins and technology for closed molding, e-mail Mike Dettre at [mdettre@aoc-resins.com](mailto:mdettre@aoc-resins.com), phone him at (901) 854-2800 or visit [www.aoc-resins.com](http://www.aoc-resins.com) on the Internet.