

ENGINEERED MOLDING COMPOUND (EMC): OPTIMIZING THE DESIGN, PERFORMANCE, AND ECONOMICS OF CARBON FIBER COMPOSITES FOR INDUSTRIAL APPLICATIONS

Jason Reese, Dow Chemical, USA
jreese@dow.com

Dave Bank, Dow Chemical, USA

Patrick Blanchard, Ford Motor Company

Johnathan Goodsell, Purdue Composites Manufacturing and Simulation Center

Key Words: Molding Compound, Compression Molding, Automotive, Design, Validation

This work describes development of a new carbon fiber engineered molding compound (EMC) designed to be compatible with conventional high volume sheet molding compound (SMC) compression molding methods. The new material offers a threefold increase in elastic modulus compared to typical glass based SMC solutions. The increase in intrinsic stiffness enables section properties to be maintained within the constraints of a design package space. This allows for a low investment pathway to lightweight design using a process offering the design freedom of compression molding in combination with high volume of a premium reinforcement fiber. Each step of the process was optimized: chemistry reaction speed, resin impregnation into fiber, optimizing the sheet fiber orientation, translating sheet fiber orientation into molded part fiber orientation. To demonstrate the capabilities of the EMC solution, an automotive rear decklid assembly was built and tested to confirm performance and suitability for use in a high volume manufacturing scenario.