

Premix-Hadlock Composites, LLC

Company Overview

Premix-Hadlock Composites

Two molding locations

Premix / North Kingsville, OH – 330,000 sq. ft.
Compression, Injection and Transfer Molding (53)
Total presses.

Hadlock / Geneva, OH – 120,000 sq. ft.
Compression (13) Total Presses.

Compression – 50 to 300 Ton (42) Presses

Compression – 400 to 800 Ton (10) Presses

Compression – 1,000 to 2,000 Ton (9) Presses

Thermoset Injection – Up to 500 Ton (8)





What can we do?

- Compression Molding
- Injection Molding
- Machining
- Select Assembly
- Engineering/Tooling Support





What can we do?

- Compression Molding
- Machining
- Value-Added Assembly
- Low Volume Painting & Shielding
- Engineering



Concept to Production Process

CONCEPT	Review ideas and potential solutions with the understanding of the application end use requirements, environment, and conditions.
DESIGN	Optimize design for best performance, cost, and manufacturing methods.
MATERIAL DEVELOPMENT	Select the proper material(s) for the application use and requirements. Develop solutions where no standard material fits.
FEA	Virtually evaluate structural integrity and establish predicted performance of concepts and designs.
PROTOTYPE	Prototype solutions using low cost tooling to fabricate parts that will simulate a production process and part.
TEST AND VALIDATE	Design and build test fixtures to simulate real world conditions to validate production intent prototype parts .
PROCESS DEVELOPMENT	Process development begins at the concept stage and is refined at the prototype stage.
PRODUCTION PART	Scale up production launch assisted by the program lead and support engineers involved with the program development.



Technical Support

- Concept development
- FEA analysis
- Design review/recommendation
- Prototype build
- Part testing and validation

Field Technology

- Process optimization
- Material conformity
- PD property assimilation
- Part completion



Molding Process Comparison



Compression

- Used with BMC, SMC, TMC and ESC[®]
- Large part capability
- Highest strength parts
- Minimal glass degradation
- Lower tooling cost
- Pressure/heat combination allows for higher flow

Injection

- Most commonly used with BMC or TMC
- Better for small to medium part sizes (0.1 lbs. to 6 lbs.)
- High volume automation
- Tight tolerances
- Very good small part strength (TMC)
- Better aesthetics
- Complex parts possible

Compression Molding

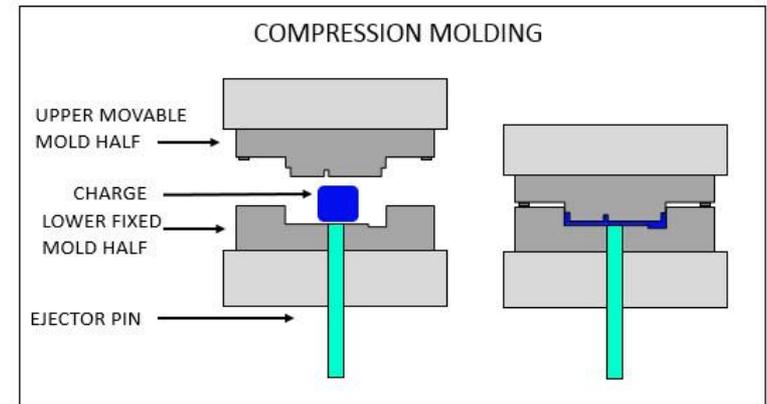


Patterns are cut manually or automatically and then stacked/arranged in a specific configuration (optimal final part performance) in the fixed, lower mold half.

Upper mold half moves down and compresses charge pattern. The material flows (not a stamping process).

Advantages

- Very large parts (> 250 lbs.) can be produced with minimal fiberglass degradation
- Optimal fiber orientation in critical locations achievable through charge pattern (no injection gates)
- Combinations (i.e., mat, unidirectional) can be utilized together for ideal part strength
- Well suited for molded-in inserts, design flexibility, and thickness variations within the part
- High flow due to heat/pressure combination
- An economical choice for moderate (< 10,000) to very large volumes using single or multiple cavity tooling



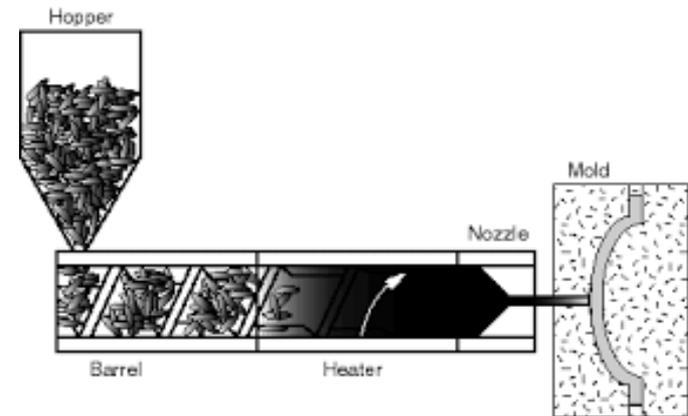
Injection Molding



Compound is fed via stuffer unit into an injection barrel equipped with a reciprocating screw or plunger, and then injected into a mold via runners after the mold has been clamped shut by platens.

Advantages

- Ideal for small to medium part sizes (0.1 lbs. to 6 lbs.) with high volume requirements
- Allows for consistent material delivery into the mold cavities
- Very tight tolerances can be achieved
- TMC usage can give very good small part strength
- Complex designs possible
- Multi-cavity tooling possible for high production volume



Transfer Molding of BMC or TMC



Molding compound is loaded into a transfer pot chamber of a specially equipped compression press, vertical mold is closed, and a plunger forces the molding compound through a runner system into the mold cavity.

Advantages

- Ideal for small to medium part sizes in medium to high volume
- Good for molded-in complex metallic inserts (encapsulation)
- Tight tolerances achievable
- Runner system balances material delivery into multiple mold cavities similar to injection molding

- Strategic Conversions – Metal to Thermoset Composites
- Automotive (engine components: valve covers, oil pans, etc)
- HVAC
- Oil & Gas
- Electrical (breakers, cross-bars, bus supports, lighting, etc)
- Miscellaneous Markets:
 - Safety & Security
 - Medical
 - Construction
 - Communication
 - Cases/ Enclosures
 - RV components

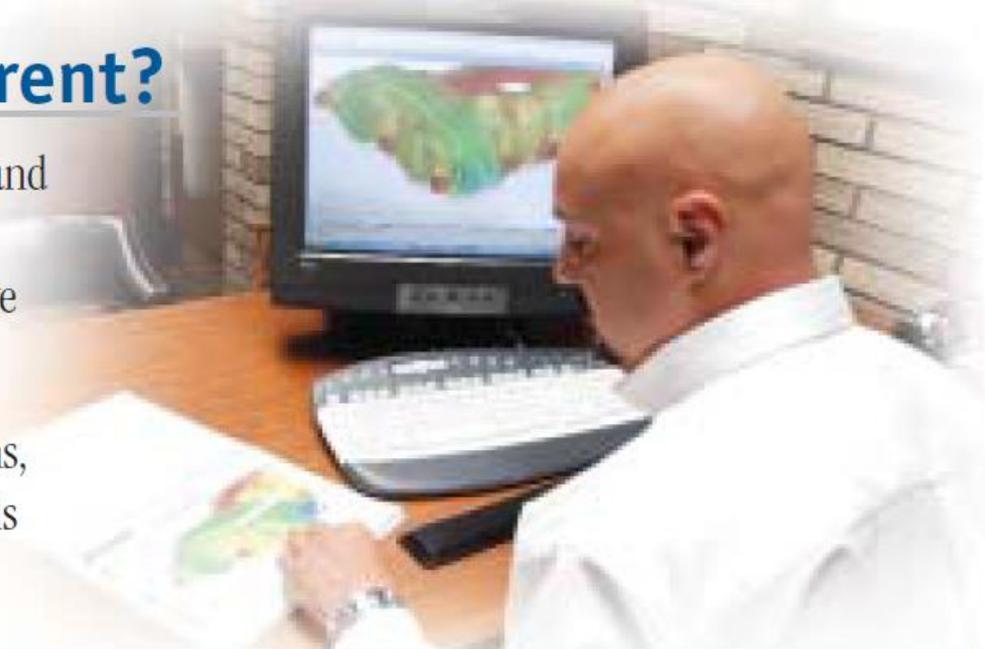
Customer Sampling



What makes us different?

Simply put, our team has the experience and dedication to facilitate a conversion from competing materials to composites, and we know what's important.

Customers need quick validation of designs, and we can perform finite element analysis in-house in one to three days.



Our total conversion process reduces product development cycle time and costs. Here's just one example:

In less than 12 months, we designed composite valve covers for Cummins Signature 600 DOHC without prototypes – a substantial reduction of the typical 18- to 24-month program. These composite valve covers resulted in a cost reduction of \$10 per component.

Thank You

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