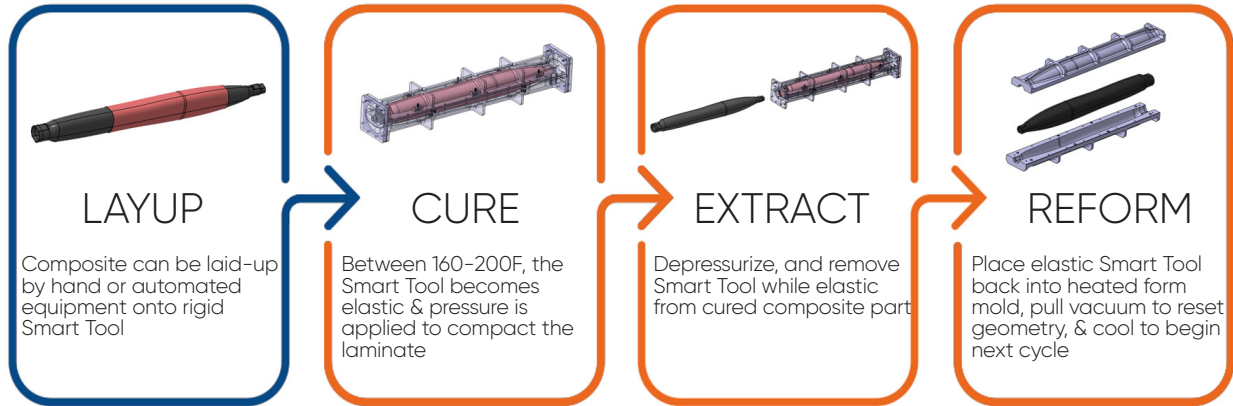


PRODUCT OVERVIEW:
SMART TOOLS THAT ACT AS
BLADDERS



THE PROCESS:

Smart Tools that act as bladders are manufactured to the inside mold line (IML) of the composite part minus bulk factor and are rigid at room temperature. After a release film is applied to the Smart Tool, composite material can be placed directly onto the Smart Tool.

During cure, our Smart Tools that act as bladders become elastic and translate internal pressure to compact the composite laminate against the cure mold that determines the

outside surface geometry of the composite, eliminating air and excess resin to improve part quality. While still elastic, Smart Tools are easily extracted from the cured composite part and can be reformed and reused.

Smart Tools allow composite material to be laid up on the male Smart Tool and cured, eliminating the need to layup into angular female cavity cure molds that are prone to bridging and results in composite part porosity and resin rich areas.

FEATURES & BENEFITS:

- Reduced Labor Hours
- Improved Quality
- Higher Throughput
- Lower Consumable Cost
- Formable
- Reuseable
- Low Force Extraction
- Enables Unitization
- Clean Process

COMPATIBLE WITH:

- Hand Lay-up
- Filament Winding
- Automated Fiber Placement (AFP)
- Resin Transfer Molding (RTM)
- Vacuum Assisted RTM (VARTM)
- Injection Molding
- Autoclave Cure
- Oven Cure
- Heated/Cooled Molds
- Heated Press
- Automation

SPECIFICATIONS:

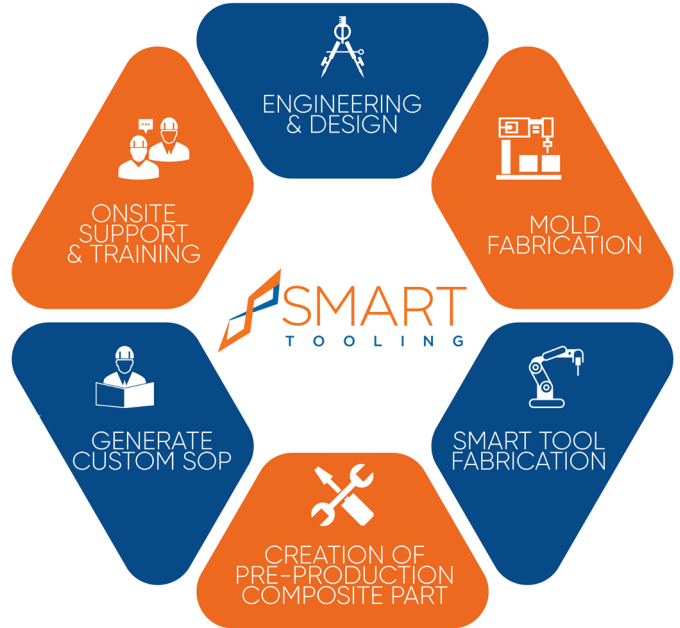
- Maximum Cure Temp: 375°F (190°C)
- Minimum Pressurization Temp: 160°F (70°C)
- Minimum Reforming Temp: 200°F (95°C)
- Specific Heat: 110 J/Kg-K
- Density: 1.13 g/cc

WHY SMART TOOLING?

Ensuring Success of Complex Composites

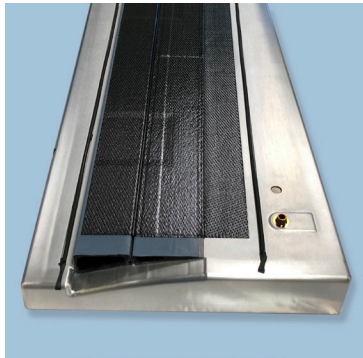
Smart Tooling offers more than just tooling. We offer total solutions that ensures successful manufacturing of your composite part. Those solutions include custom tooling engineering and design, fabrication of molds, fabrication of Smart Tools, manufacturing of the initial composite part(s), custom standard operating procedures, onsite start-up support and training, and more.

Fortune favors the bold; it's time to move on from traditional tooling methods and start manufacturing with Smart Tooling. Let's make a successful complex composite, together!

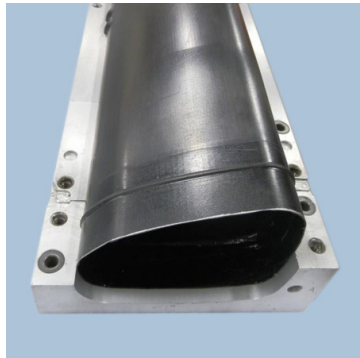


EXAMPLES:

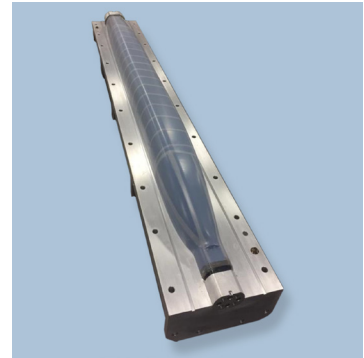
SMART TOOLS THAT ACT AS BLADDERS



Two Smart Tool bladders in cure mold to create trailing edge composite



Smart Tool bladder for composite ECS duct in forming mold



Smart Tool bladder for composite fuselage with trapped geometry in forming mold

READY FOR THE BENEFITS OF SMART TOOLING?
LET'S MAKE A SUCCESSFUL COMPOSITE PART



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