Production of Molds and Tools by the EC Group

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Selection criteria and production technology for molds

Mold building at EC: Sample application

GRP and CRP mold production with resin infusion technology

New concept for tool production: EC-Tool
The EC-Group manufactures for customers and its own needs the following molds and tools:

- CNC fixtures
- FSW fixtures
- Fixtures/Tooling for the Cut & Fold processing of Sandwich panels
- Tools for the contouring of honeycomb parts
- Molds for design models as a basis for the production of lamination molds
- Tools and molds for the honeycomb forming process
- Molds for the resin infusion technology (RI) (RT, 135-180° C)
- Molds for sandwich parts (oven curing with vacuum bag up to 135° C)
- Molds for sandwich parts (autoclave curing with vacuum bag up to 135° C)
- Molds for honeycomb core detail stabilization with adhesive film up to 135° C
- Molds for sandwich parts (oven curing with vacuum bag up to 180° C)
- Molds for sandwich parts (autoclave curing with vacuum bag up to 180° C)
- Molds for honeycomb core detail stabilization with adhesive film up to 180° C
- Special use molds (RTM, RTM-light, Inspections tools ...)

Overview: Production of Molds and Tools by EC

The EC Group manufactures for customers and its own needs the following molds and tools.
Samples for mold and tool making at EC

- Wooden fixture tool
- Sandwich part tool for oven curing at 135°C
- Metal mold for oven or autoclave curing
- Polyurethane (PU) tool as a CNC milling fixture
- Steel tool for honeycomb heat forming
- Tool produced with RI for the contouring of formed honeycomb core details
- Coated PU tool for model making
- RI-mold for parts made with oven or autoclave curing
- RTM light mold
### Selection criteria and production technology for molds

#### Technical Requirements

- **Part specification**
  - Geometrical requirements
  - Temperature resistance
  - Process requirements

- **Surface quality**

- **Material properties**
  - Steel, INVAR, GRP, CRP, PU, Wood, Aluminum, Combinations ....
  - Mechanical properties

- **Quality**

- **Repeatability**

#### Cost effectiveness

- Investment
- Labor cost
- Material cost
- Batch size
- Cycle time
- Industrial safety
Prototype production of shaped part in resin infusion with honeycomb (EC-HLM)

Here: Production of the PU fixture for the milling of the formed honeycomb
Prototype production of a shaped part in resin infusion with honeycomb (EC-HLM) Here:
RI production of a CRP tool on a PU model (all by EC)
Properties:

• High quality GRP and CRP laminates (Fiber volume content >55%)
• Closed mold technology (no direkt contact with resin)
• Durability in an autoclave: >150 cycles
• Mold are completely vacuum-tight
• Temperature resistance: 180°C
• Comparatively low weight
• Good cost-performance ratio
• Low thermal expansion coefficient
• Production from negative mold
Vacuum injection or RTM-Light process:
New concept for tool production: EC-Tool

Production of tools and molds on the basis of honeycomb sheets and pastes

1. Step: Cutting of honeycomb core parts, bonding with paste and rough milling
New concept for tool production: EC-Tool

Production of tools and molds on the basis of honeycomb sheets and pastes

2. Step: Application of the paste on the blank mold and final milling of the surface
New concept for tool production: EC-Tool

EC can manufacture the following mold types with the EC-TOOL process for you:

**Temperature resistance up to 60°C:**
- CNC fixtures
- Tools for honeycomb contouring
- Model making
- Tool and mold construction

**Temperature resistance up to 200°C: (under final evaluation)**
- Molds for sandwich parts (oven curing with vacuum sack up to 180°C)
- Molds for sandwich parts (autoclave curing with vacuum sack up to 180°C)
- Molds for honeycomb core detail stabilization with adhesive film up to 180°C
- Tool and mold construction
New concept for tool production: EC-Tool

Advantages:

- Cost reduction with EC-Tool compared to the use of PU panels
- 50% weight reduction compared to the current process with bonded PU panels
- Better surface quality and vacuum tightness
- With honeycomb core a high-tensile mold construction in terms of mechanical and temperature resistance properties is possible
- Combination of honeycomb and paste allows a direct mold production by CNC milling
- Process is suitable for small as well as for extremely large molds
Thank you very much for your attention

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