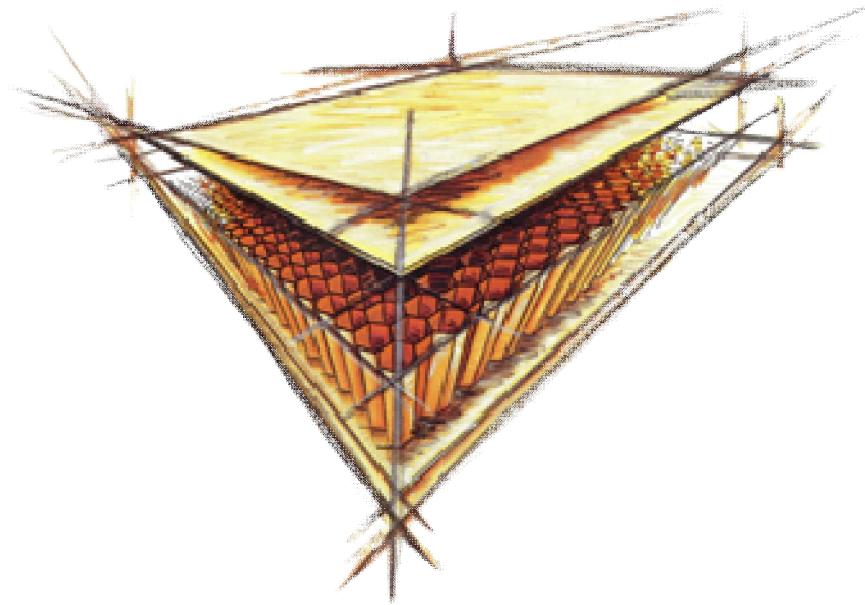


# Production of Molds and Tools by the EC Group



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## Production of Molds and Tools

### **Content:**

Overview: Production of Molds and Tools by EC

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



## Overview: Production of Molds and Tools by EC

### **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 ...)

# Samples for mold and tool making at EC



Wooden fixture tool



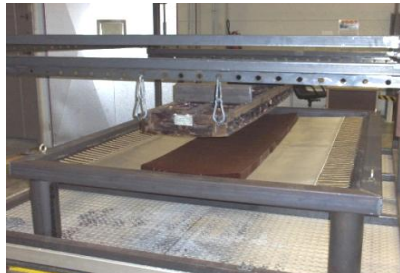
Sandwich part tool for oven curing at 135° C



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



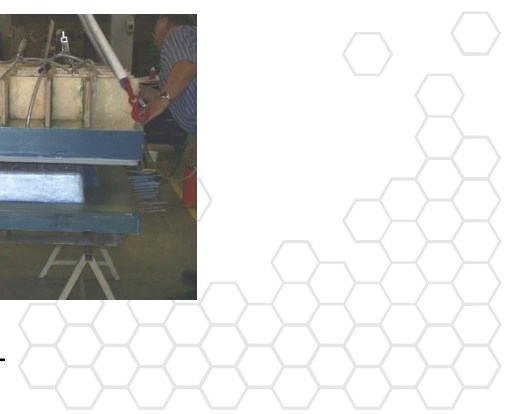
Coated PU tool for model making



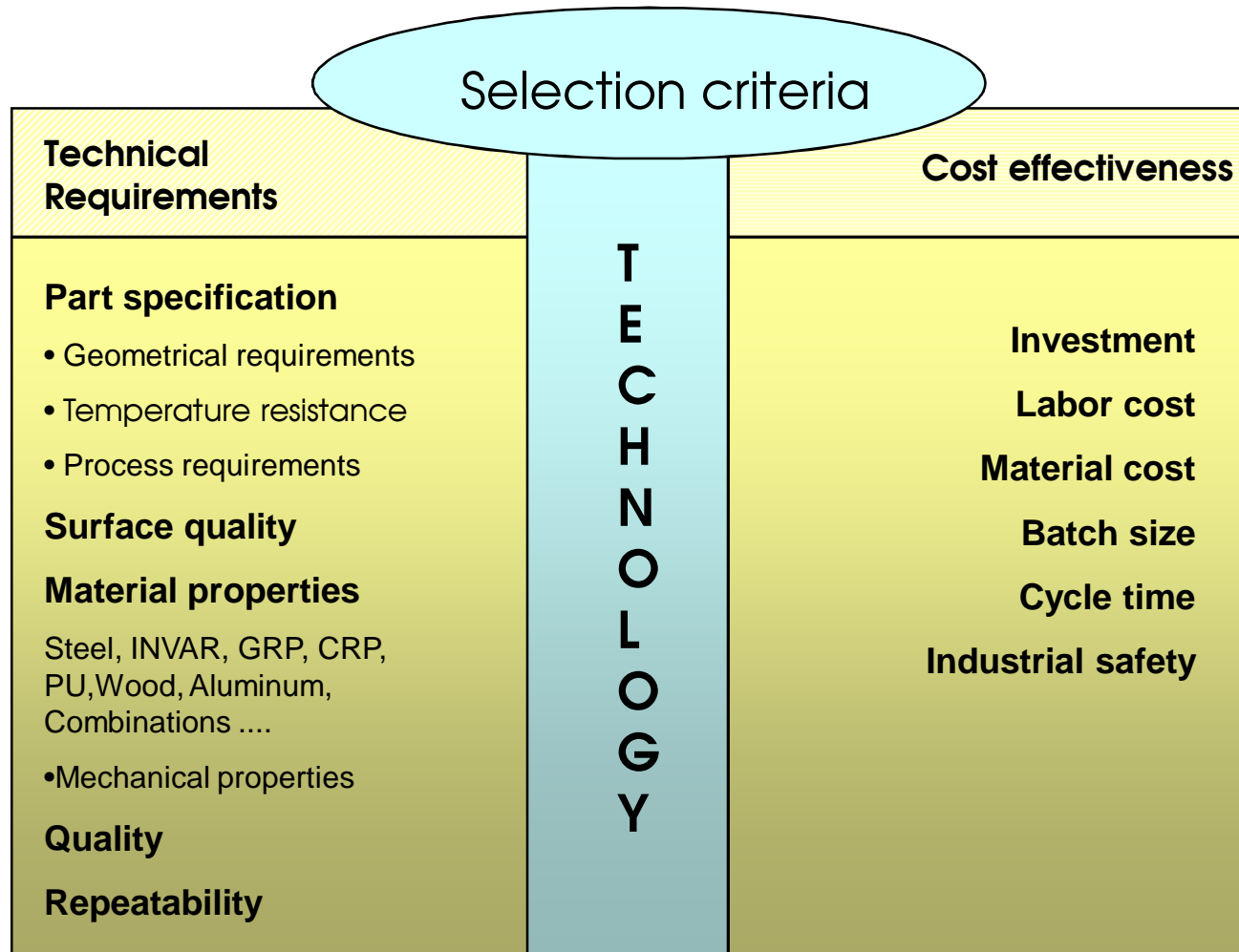
RI-mold for parts made with oven or autoclave curing



RTM light mold



# Selection criteria and production technology for molds

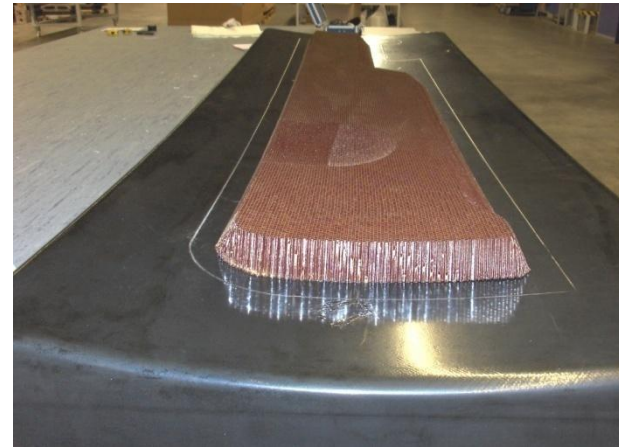
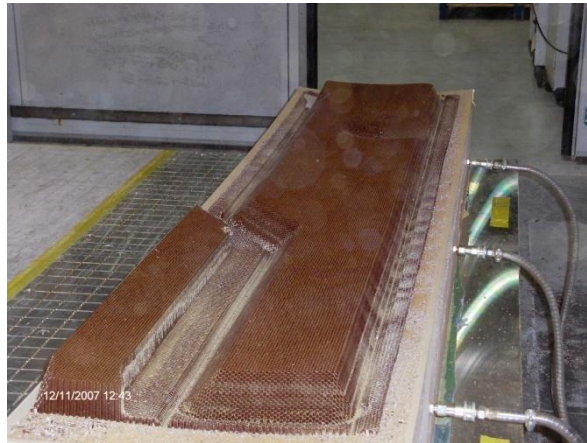




## Mold building at EC: Sample application (1)

**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



## Mold building at EC: Sample application (2)

**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)**



## GRP and CRP mold production with resin infusion technology

### Properties:

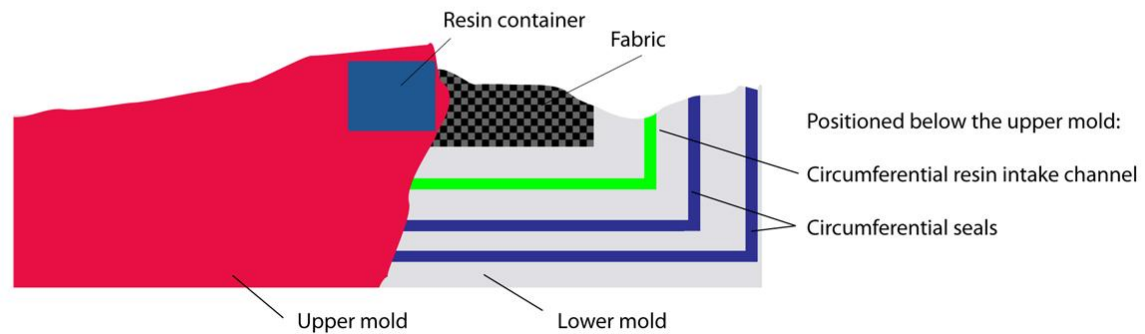
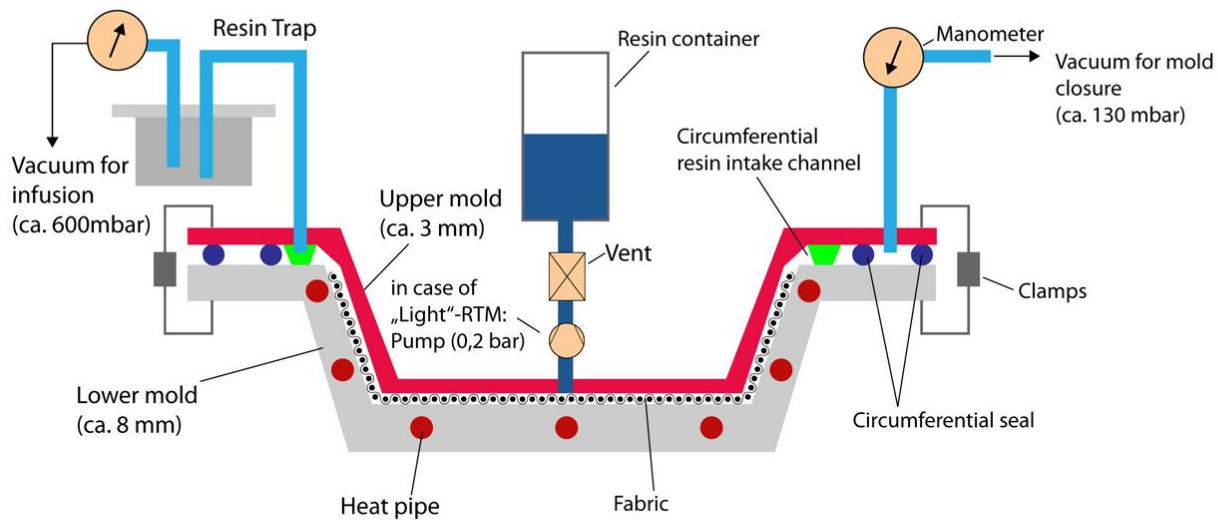
- High quality GRP and CRP laminates (Fiber volume content >55%)
- Closed mold technology (no direct contact with resin)
- Durability in an autoclave: >150 cycles
- Mold are completely vacuum-tight
- Temperature resistance: 180° C
- Comparatively low weight
- Good cost-performance ratio
- Low thermal expansion coefficient
- Production from negative mold





# GRP and CRP mold production with resin infusion technology

## 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**

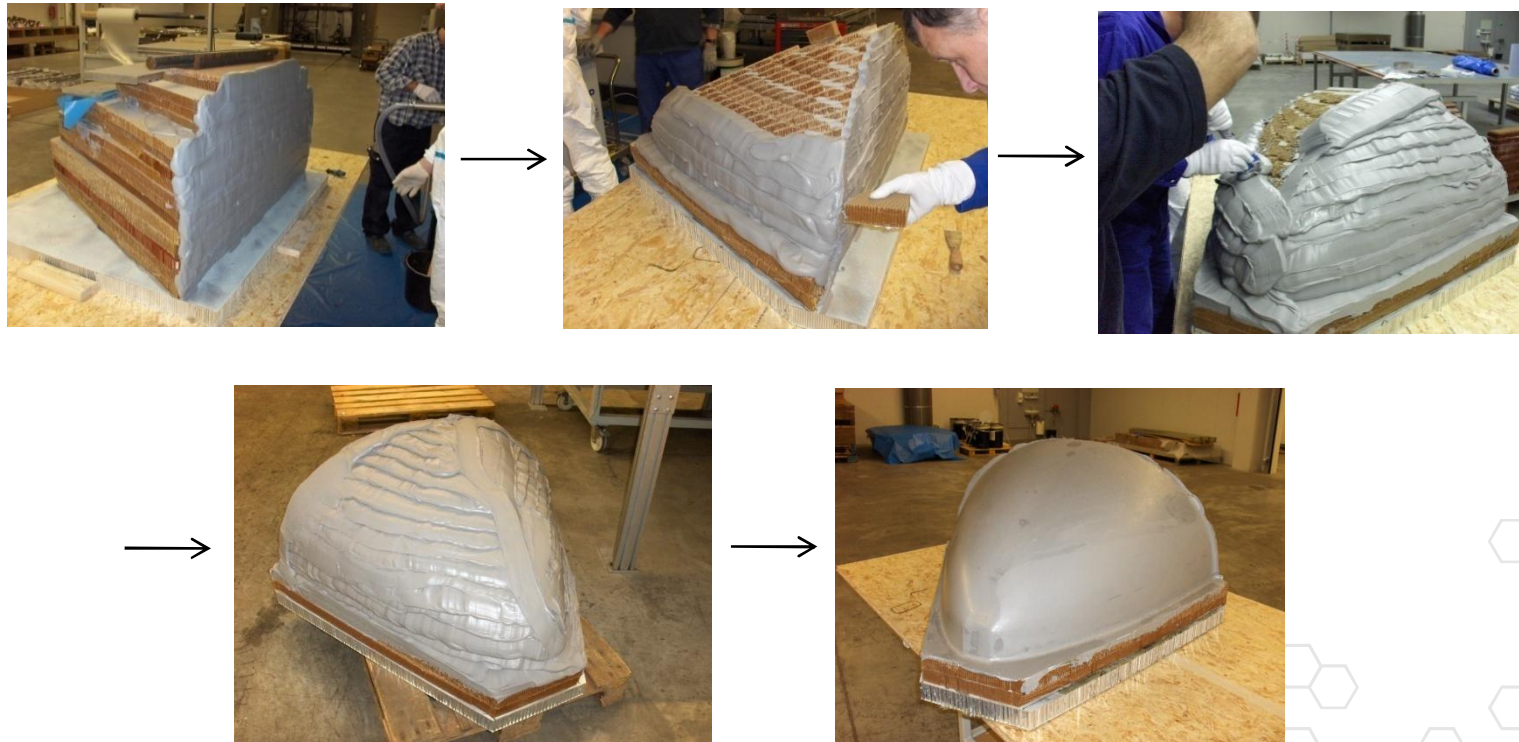
**1. Step:** Cutting of honeycomb core parts, bonding with paste and rough milling



## 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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