Process technologies and automated production cells for large-scale manufacturing of lightweight thermoplastic composites for automotive applications

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Session II – Technology adoption in the industrial sector

Technology transfer: paving the way for advanced manufacturing Committe of the Regions (COR) – Brussels 25 February 2015
Our Vision

BE THE FIRST – World market leader in creating customer benefit in injection moulding solutions
| **Facts** |
|-----------------|---------------------------------|
| **Turnover** ENGEL worldwide (FY 14/15) | 1,050 billion Euro |
| **Breakdown of turnover** by continents | 54% Europe, 25% America, 21% Asia |
| **Staff** ENGEL worldwide (FY 13/14) | 4,500 employees |
| **Staff** ENGEL Austria (FY 13/14) | 2,800 employees |
| **Average growth** since FY 07/08 | 10% |
| **Ownership** | The company is 100% family owned |
| **R&D investment** per year | 50 million Euro |
Internationality | **Production Plants**

- 8 Production plants
- 29 Subsidiaries
- 60 Representatives
Customer Focus | Business Units

AUTOMOTIVE

MEDICAL

PACKAGING

TECHNICAL MOULDING

TELETRONICS
Lightweight engineering means diversity

- Determining the ideal material mix

- Combining various process technologies for the automated and economical production of structural components using endless fibre reinforced polymers

Research partner

Audi

ZF

Johnson Controls

FILL

Polymer Technology Center JKU

MAN
### Composite process technologies

#### Process technologies for lightweight composites

**Use of**
- Semi-finished products
- Dry fibers with reactive technologies

**Polymer matrix**

<table>
<thead>
<tr>
<th>Thermoplastic</th>
<th>Thermoset</th>
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<tbody>
<tr>
<td>Organic sheets</td>
<td>Epoxy and PUR resins</td>
</tr>
<tr>
<td>Tapes</td>
<td></td>
</tr>
<tr>
<td>Organic sheets</td>
<td></td>
</tr>
<tr>
<td>Tailored blanks</td>
<td></td>
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<tr>
<td>PP, PA6, PA6.6, PA12, TPU, PPS</td>
<td>HP-RTM</td>
</tr>
<tr>
<td>(fibre volume content: 25 up to 85%)</td>
<td>High pressure-transfer injection molding</td>
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Challenges

- Adjusted R&D activities in a technology map
- Education and skills
- Technology and know-how transfer
Activities

- Set-up a Polymer Technology Center (PTC) at the University of LINZ /Upper Austria
- More than 120 researchers from 8 European countries (knowledge transfer to industry and SME’s)
- Excellent education of students in polymer technologies and science
Activities

- Injection moulding is the main processing technology for the economic mass production of 3D-shaped components in application areas like automotive industry, medical and information engineering.

- Goal of this project to shorten the lead time in the development process from part design to an energy efficient production down to a few weeks.

- Therefor it is necessary to link the digital/virtual world with the physical world.

We have to improve our activities along the value chain – (Focus has to be the envolvement of industry and SME’s).

13 participants:
- SME: Mould and tool makers (5)
- Industry (2)
- Research centers and institutes (6)
Developments that will shape the future