C-RTM process

Full Scale Structural Composite Parts with a Two Minute Cycle Time
C-RTM process

1. Rapid closure of the press to a precision gap, full vacuum is applied to the tool cavity.
2. Precisely metered resin is rapidly injected into the gap on top of the preform surface.
3. Press is closed completely compacting and fully impregnating the preform to the final part dimensions.

Process

<table>
<thead>
<tr>
<th></th>
<th>C-RTM</th>
<th>HP-RTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cycle time</td>
<td>2 min</td>
<td>4 to 10 min</td>
</tr>
<tr>
<td>Iso cycle time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent of part size</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Net Shape</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>100% Raw Material usage</td>
<td>✓</td>
<td>X - Sprue</td>
</tr>
<tr>
<td>Thermoset resins compatible</td>
<td></td>
<td>under certain conditions</td>
</tr>
<tr>
<td>Thermoplastic resins compatible</td>
<td></td>
<td>under certain conditions</td>
</tr>
<tr>
<td>High Pressure (HP) injection compatible</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Applications

Automotive
- Structural and non-structural parts
  - Body in white
  - Side door beams, door panels, lift gates, interior components
- Exterior parts
  - Hood, roof, fender, front clip

Aerospace
- Low temperature component
- Secondary structure, cabin interior components
- Blades

Industries
- Railway interior components
- Building construction
- Naval
- Sports and leisure

Performance

Product performance
- Fiber Volume: up to 60%
- Porosity <2%
- No fiber distortion from process
- Yields stable part geometry

Process performances
- Repeatability
- On line monitoring
- Flexible - Supports several manufacturing processes
- Lights out manufacturing: fully automated

CAPEX* / Production volume

Comparison of high volume production technologies.

* Capital Expenditure
Tailored engineering services on a dedicated Industrial pilot line
- Part design and dimensioning
- Process development and simulations: injection strategy, materials, toolings, automation
- Prototyping, pre-industrialisation and low volume productions
- Quantify economical advantages of C-RTM process

Design and supplier of the C-RTM technology and turnkey production lines.
- Pinette P.E.I. acts as a general contractor and coordinates integrating the complete technology including the injection systems and heated tools.
- Process commissioning at customers facility
- Training & production launch support
- Maintenance

The C-RTM pilot line is available for trials and new projects
based at IRT M2P | 57870 Porcellette | France

Expert partners in C-RTM technology can provide efficient support

Thermoplastic resins Thermoset resins C-RTM Tooling Textile reinforcements Composite characterization
NDT (US, thermography...)
Thermoplastic Composite Welding (induction, resistive...)

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