Example: Model wheel

Material: EPP + PP + TPE
- Part weight: 4 g + 3.5 g + 5.5 g
- Foaming: 110 s (with multi-cavity moulds)
- Injection moulding: 40 s

A hydraulic two-component ALLROUNDER S first moulds a PP wheel onto an EPP tyre. The tyre is then overmoulded with TPE. A six-axis robotic system automatically performs insertion, transfer and removal of the parts. The result is a fully functional lightweight component at a reduced unit cost:

• Material: EPP + PP
• Part weight: 357 g + 52.5 g
• Foaming incl. in-mould foaming: 320 s
• Injection moulding: 45 s

Example: Door cladding with integrated mounting

A hydraulic two-component ALLROUNDER S first moulds a PP element on an EPP moulded part. The resulting mountings are integrated at the chosen positions while the door cladding is foamed. The result is a lightweight component with individually adapted holding functions:

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At a glance
- New lightweight construction process
- Combining the benefits of particle foam and thermoplastics
- Low weight functional composite parts
- Highly-resilient positive bond
- Stable production process and high productivity

Particle-foam Composite Injection Moulding®
Lightweight construction with functional integration

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In cooperation with:
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Specialised technology is vital in order to introduce lightweight, force-absorbent particle-foams into the mould in a reliable way and then to overmould them without deformation or damage:

- Well-coordinated mix of materials and suitable program for combining both materials
- Precise particle-foam inserts with high-contour accuracy
- Near-contour, segmented mould temperature control
- Specially designed sprue system
- Reliable handling and precise positioning of foamed inserts by means of a robotic system
- Precisely regulated, multi-stage injection process
- The SELOGICA control system integrates complete peripherals for individual process control

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Cooperation between technology leaders

The very best combined. This is how both PCM and the partnership between RUCH NOVAPLAST, Krallmann and ARBURG can be described:

- Bringing together different technologies and specific expertise
- Development of a reproducible production process for composite parts made from particle foam and thermoplastic
- PCM is a patented process
- The project was initiated by RUCH NOVAPLAST and the Krallmann Group

New mix of materials, new solutions

Multi-material design using particle-foam and thermoplastics eliminates the weaknesses of both materials and combines their advantages to produce fully functional lightweight parts:

- Strong items with low weight
- Energy-absorbent parts with an attractive tactile surface
- Thermally insulating products with integrated mounting and holding functions
- Noise-reducing, easy-to-assemble housing
- Insulating lightweight parts with enhanced rigidity

As the polymer component is injected, the surface of the expanded polypropylene (EPP) or polystyrene (EPS) melts onto it in a defined way. A strong, permanent, positive bond is created between the two components. The composite parts are produced in a single step. This means:

- Integrated functionality without downstream assembly
- Positive bond is ideal for high loads
- Cost-effective series production at reduced unit costs

<table>
<thead>
<tr>
<th>Particle-foamed part</th>
<th>Plastic part</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Low volumetric weight</td>
<td>+ Relatively high volumetric weight</td>
</tr>
<tr>
<td>+ High force absorption</td>
<td>- Low force absorption</td>
</tr>
<tr>
<td>+ High thermal insulation</td>
<td>- Low thermal insulation</td>
</tr>
<tr>
<td>- Limited surface</td>
<td>+ Functional surfaces</td>
</tr>
<tr>
<td>- Limited attachment options</td>
<td>+ A wide range of attachment options</td>
</tr>
</tbody>
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