Sustainable Foams for Automotive

New Vehicle Interiors with OBoNature™
A New Foam Family Based on Sustainable Raw Materials, Tailored to the Respective Areas of Application

The OBoNature™ product family consists of different grades to meet specific application requirements: OBoSky® Nature is the product of choice for headliners, OBoTrim™ Nature for door panels and armrests and OBoSeat® Nature for car seats.

What all products have in common is that they are based on sustainable raw materials, are very low in emissions and odors and at the same time have excellent hydrolytic stability and mechanical properties. A further advantage is their good laminating behavior even with faster manufacturing processes.

**OBoSky® Nature for headliner**
OBoSky® Nature 3540 T is a particularly fine-pored foam with a very homogeneous cell structure and uniform color. The foam is characterized by a pronounced elastic behavior due to its optimized elongation at break and tensile strength. This ensures excellent thermoformability even in critical radii. Optimum surface structure results can be achieved without undesirable "orange peel" effects.

**OBoTrim™ Nature for vehicle interior**
OBoTrim™ Nature 3540 T, with slightly less fine pores, stands out by its good processing properties thanks to its good elongation at break and tensile strength, thus offering improved recovery after thermo-compression. The foam is particularly suitable for top-quality door panels and armrests with “soft-touch-feel” surfaces.

**OBoSeat® Nature for seating applications**
OBoSeat® Nature 3540 T is especially designed for seating applications. Its pore size, elongation at break and tensile strength ensure excellent sewing properties of the seat covers as well as high seating comfort.
Demand for sustainable products is growing steadily as consumers increasingly consider health benefits and environmental aspects in their purchasing decisions. This applies to many consumer goods and, of course, also to vehicle purchases. At the same time, as regulatory requirements around the world become more stringent, the automotive industry is constantly looking for the latest material innovations for use in the components of its next vehicle models. This is not only about sustainable benefits such as a healthier air climate in the vehicle interior, but also about performance optimization to increase service life and save material and operating costs.

As a leading supplier to the automotive industry along the entire value chain, we understand the needs of OEMs, Tier 1 and Tier 2, and know how to translate customer and consumer demands into the right product properties of our PUR foams. For use in modern vehicle interiors with the highest quality requirements, we have therefore developed special innovative foam products - marketed under the family name OBoNature™ - which combine various sustainability aspects with superior functionality.

### Sustainability Drives Innovation for New Automotive Materials

#### Trends and needs of the automotive industry

- Sustainability as a buying criterion for consumer decisions
- Healthier interior climate in the vehicle
- Optimized functionality and durability of components in the vehicle interior
- Efficient production to save operational costs

#### Requirements of PUR-foams for use in vehicle interiors

- Conservation of resources through use of sustainable raw materials, higher material efficiency, prolonged durability
- Low emission (very low content of VOC, FOG, aldehyde), no odor, no pollutants
- Excellent mechanical properties & hydrolytic stability at reduced material usage (thinner foam layers)
- Faster lamination speeds with reduced foam burn off and increased adhesion
Optimized Processing Performance With Low Emission Values

**Efficient production through optimized processing performance**

OBoNature™ products* provide excellent lamination properties compared to standard ether-based PUR foams with flame lamination properties and with comparable material density. Application field tests have shown that OBoNature™ products can be processed at a lamination speed that is more than 10% faster, while at the same time the material loss caused by the flame lamination is reduced more than by 5% and the adhesive performance is even significantly improved. This means that OBoNature™ products can be used at reduced foam thickness and still achieve excellent lamination results. This helps to reduce both material and manufacturing costs.

**Health protection thanks to low emission characteristics**

The VOC and fogging content of OBoNature™ products* is much lower than standard ether-based PUR foams at comparable material density, but is also well below the limits of VDA 278. (Note: The VOC/FOG values refer to typical average measured values.)

---

**Resource conservation** - Responsible manufacturing through the use of sustainable raw materials derived from by-products (waste streams) of the chemical industry; thus 20 % less crude oil is needed in the raw material production. The sustainable share in the final foam is >13 %.

**Material efficiency** – Prolonged service life thanks to excellent hydrolytic stability and material resistance. Our unique 120 m block technology minimizes adhesive seams by 50 %. Also, the material thickness of OBoNature™ foams can be reduced by while maintaining the same laminating performance.

**Health protection** - Low emission characteristics in accordance with measurement methods VDA 278 and VDA 270. Use of halogen-free flame-retardant additives to ensure passenger safety according to FMVSS 302.

**Efficient production** - Easier processing due to excellent lamination behavior even with faster lamination processes helps to save operating costs.

**Global availability** – Production currently at our Duderstadt site/Germany. Local stocks can be set up in our warehouses in Greer/US, Changzhou/CN if required.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable share</td>
<td>13 %</td>
<td>13 %</td>
<td>13 %</td>
</tr>
<tr>
<td>Density [kg/m³]</td>
<td>ISO 845</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Tensile strength [kPa]</td>
<td>ISO 1798</td>
<td>&gt; 110</td>
<td>&gt; 100</td>
</tr>
<tr>
<td>Elongation at break [%]</td>
<td>ISO 1798</td>
<td>&gt; 200</td>
<td>&gt; 180</td>
</tr>
<tr>
<td>Compression set [%]</td>
<td>ISO 1856</td>
<td>&lt; 6</td>
<td>&lt; 6</td>
</tr>
<tr>
<td>Pore structure</td>
<td>very fine</td>
<td>fine</td>
<td>normal</td>
</tr>
<tr>
<td>Thermoforming properties</td>
<td>excellent</td>
<td>good</td>
<td>normal</td>
</tr>
<tr>
<td>Flame lamination</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hydrolytic stability</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Low emissions</td>
<td>VDA 278</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Flame retardancy</td>
<td>FMVSS 302</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Recticel Engineered Foams applies industry-leading knowledge, resources and experience to offer the tailored solutions our customers need to stay ahead. Our unique portfolio of foams and systems – spanning industrial, mobility, consumer & medical care, living & care applications – is one of the most comprehensive in the market. We focus strongly on sustainable innovation and strive to provide answers to societal challenges, including climate protection and conservation of resources.

Our passion for comfort
The key to the success of PU foams is their seemingly endless versatility. They can be tailored to almost any application and we are continually innovating to optimise our product range in line with new demands and ideas. Many everyday consumer goods would be unimaginable without their unique benefits, which include silencing, sealing, filtering, carrying, protecting, supporting and comforting attributes. These can be provided in almost any combination, allowing us to develop solutions and systems with the exact functionalities required by every market we serve.