Backlack

The innovative joining technique

Benefits of Backlack technology
The most flexible possibility for processing a stack of electrical steel lamellas is full-face bonding by using Backlack. Optimized performance and a high degree of efficiency in electric machines are achieved for the following reasons:

» Freedom of design
» Mechanical stability and geometric accuracy
» Acoustic advantages
» Improved thermal conductivity
» Maintenance of magnetic properties

Characteristic properties
High bonding strength and no squeeze-out after applying the correct processing parameters during the bonding process are characteristic for all Backlack coatings available at voestalpine. All Backlack coatings are characterized by the following properties:

» Epoxy-resin base
» Layer thickness ranging from 2 to 8 µm
» Temperature Class H (up to 180 °C)
» Free from chromium
» Water base
Applications and fields of use
Depending on the component geometry and processing possibilities at the customer, voestalpine supplies Backlack coatings with excellent properties that are primarily differentiated according to processing properties.

EB549i is characterized by very short bonding time at a high temperature. This enables high cycle and unit numbers. The coating is optimized for inductive heating. This tends to limit the unit size to medium-size and small parts.

EB549n can be described as a classic Backlack and is optimized for a conventional heating process. The coating covers the entire range of component sizes.

backlack-v® has been developed and optimized for medium-size and large components. The adhesive insulation coating is particularly characterized by very economical processing parameters. The bonding temperature and/or pressure can be reduced as compared to conventional varnish systems. Shorter bonding times can also be achieved for large components.

The indicated areas of application are typical recommendations and do not represent an exhaustive list.

Please refer to the processing instructions for Backlack for a detailed description of the adhesive bonding process. www.voestalpine.com/isovac/en/Product-overview/Backlack

General information: valid for all Backlack systems

Backlack coated electrical steel must not be stamped with lubricants. The coating has a lubricating effect and prolongs tool service life (as compared to uncoated condition).

The bonding strength depends on surface properties and chemical composition of the base material. Usually the bonding strength decreases with increasing silicon content of the core plate steel.

Backlack coated material is not suitable for a welding process and for stress relieve annealing.

For a more precise evaluation of the bonding strength and to eliminate the influence of mechanical properties and thickness of the steel the bonding force is tested according EN 1465 (reinforced tensile lap-shear test, see processing instructions).
Properties of the cured coating in B-stage: valid for all Backlack systems

<table>
<thead>
<tr>
<th>Properties of the coating</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelf life</td>
<td>6 months, for more details see processing instructions</td>
</tr>
<tr>
<td>Colour</td>
<td>colourless</td>
</tr>
<tr>
<td>Bending over cylindrical mandrel, ISO 1519</td>
<td>Crack-free</td>
</tr>
<tr>
<td>Cross cut test, DIN 53151</td>
<td>GT 0B</td>
</tr>
<tr>
<td>Enhancement of punchability (compared to bare steel without lubrication)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Properties of the fully cured coating in C-stage: assumed applying appropriate processing parameters (see processing instructions) the following values are valid for all available Backlack systems at voestalpine.

The following properties refer to a typical coating thickness of 5 µm on both sides on isovac HP NO30-15 Y420. Typical values are given in the table.

<table>
<thead>
<tr>
<th>Properties of the coating</th>
<th>Typical values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface resistivity, ASTM A717 (Franklin)</td>
<td>&gt; 1000 Ω·cm²/lam.</td>
</tr>
<tr>
<td>Tensile lap-shear strength at room temperature, according to EN 1465 (reinforced specimen)</td>
<td>&gt; 20 N/mm²</td>
</tr>
<tr>
<td>Tensile lap-shear strength at 180°C, according to EN 1465 (reinforced specimen)</td>
<td>&gt; 4 N/mm²</td>
</tr>
</tbody>
</table>

The processing instructions for Backlack have to be considered:

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