LOCTITE® Nordbak® High Temperature Brushable Ceramic™

PRODUCT DESCRIPTION

LOCTITE® Nordbak® High Temperature Brushable Ceramic™ provides the following product characteristics:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Epoxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Type</td>
<td>Epoxy</td>
</tr>
<tr>
<td>Appearance (Resin)</td>
<td>Red.&lt;sup&gt;MS&lt;/sup&gt;</td>
</tr>
<tr>
<td>Appearance (Hardener)</td>
<td>Amber.&lt;sup&gt;MS&lt;/sup&gt;</td>
</tr>
<tr>
<td>Appearance (Mixture)</td>
<td>Red liquid</td>
</tr>
<tr>
<td>Components</td>
<td>Two component - requires mixing</td>
</tr>
<tr>
<td>Mix Ratio, by weight - Resin : Hardener</td>
<td>4.25 : 1</td>
</tr>
<tr>
<td>Mix Ratio, by volume - Resin : Hardener</td>
<td>2.6 : 1</td>
</tr>
<tr>
<td>Cure</td>
<td>Room temperature cure</td>
</tr>
<tr>
<td>Application</td>
<td>Coating</td>
</tr>
<tr>
<td>Specific Benefit</td>
<td>● Ceramic reinforced</td>
</tr>
<tr>
<td></td>
<td>● Easy to mix and use</td>
</tr>
<tr>
<td></td>
<td>● High temperature resistance</td>
</tr>
<tr>
<td></td>
<td>● High gloss finish</td>
</tr>
<tr>
<td></td>
<td>● Superior adhesion</td>
</tr>
</tbody>
</table>

LOCTITE® Nordbak® High Temperature Brushable Ceramic™ is an ultra smooth, ceramic reinforced epoxy that provides a high gloss, low friction coating designed to protect against turbulence and abrasion under typical dry service temperatures of -29 to 288 °C. Used by itself, LOCTITE® Nordbak® High Temperature Brushable Ceramic™ is recommended for sealing and protecting equipment from corrosion and wear. It also works as a top coat over Loctite® Nordbak® Wearing Compounds for applications requiring surface rebuilding and lasting protection. Typical applications include providing a smooth, protective abrasion resistant coating, repairing heat exchangers and condensers, lining tanks and chutes, resurfacing and repairing rudders and pintel housings, and repairing cooling pump impellers and butterfly valves.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

| Viscosity, Brookfield - RV, 25 °C, mPa·s (cP): | 140,000 to 200,000<sup>MS</sup> |
| Spindle 7, speed 20 rpm |  |
| Weight per volume | 1.58 to 1.65<sup>MS</sup> (lbs/gal) |
| Coverage | 1.1 m² @ 0.5 mm thick/1 kg (12 ft² @ 20 mil thick/2 lb) |

Hardener:

| Viscosity, Brookfield - RV, 25 °C, mPa·s (cP): | 1,300 to 3,000<sup>MS</sup> |
| Spindle 3, speed 20 rpm |  |
| Weight per volume | 0.98 to 1.01<sup>MS</sup> (lbs/gal) |
| Flash Point - See MSDS |  |

Mixed:

| Viscosity, Cone & Plate, 25 °C, mPa·s (cP): | 33,000 |
| Shear rate 10 s<sup>-1</sup> |  |
| Density @ 23 °C, g/cm³ | 1.38 |
| Coverage |  |
| Flash Point - See MSDS |  |

Curing Properties

| Gel Time @ 25 °C, hours | 5 to 6<sup>MS</sup> |
| Recover Time @ 25 °C, hours | 1 to 6 |
| Wet Temperature Resistance, °C | >93 |

Cure Speed vs. Temperature

The graph below shows the shear strength developed with time on grit blasted steel lap shears at different temperatures and tested according to ISO 4587.
TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:
- Shore Hardness, ISO 868, Shore D 88
- Abrasion Resistance, ASTM D4060: mg 11.2
- 1 Kg load, CS-10 wheels, Weight of Material Lost 11.2
- Coefficient of Thermal Conductivity ASTM F 433, W/(m·K) 0.466
- Glass Transition Temperature ISO 11359-2, °C 56
- Compressive Strength, ISO 604 N/mm² 102 (psi) (14,800)
- Compressive Modulus, ISO 604 N/mm² 3.165 (psi) (459,000)
- Tensile Strength, ISO 527-2 N/mm² 37 (psi) (5,360)
- Tensile Modulus, ISO 527-2 N/mm² 5.340 (psi) (774,000)
- Elongation at break, % 0.8

Coefficient of Thermal Expansion, ISO 11359-2, K⁻¹:
- Below Tg 40
- Above Tg 110

Electrical Properties:
- Volume Resistivity, IEC 60093, ohm-cm 57×10¹²
- Surface Resistivity, IEC 60093, ohms 1.1×10¹⁵

TYPICAL PERFORMANCE OF CURED MATERIAL

Lap Shear Strength, ISO 4587:
- Grit Blasted Mild Steel (GBMS) N/mm² 16.7 (psi) (2,425)

GENERAL INFORMATION

This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.

For safe handling information on this product, consult the Material Safety Data Sheet (MSDS).

Directions for use:
Surface Preparation
Proper surface preparation is critical to the long-term performance of this product. The exact requirements vary with the severity of the application, expected service life, and initial substrate conditions.
1. Clean, dry and abrade application surface. The more thorough the degree of surface preparation the better the performance of the application. If possible, it is recommended that the surface be grit blasted to a Near White Metal (SSPC-SP10/NACE No. 2) Standard. For less severe applications roughening the surface with hand tools is suitable.
2. Solvent cleaning with a residue-free solvent is recommended as the final step to aid in adhesion.

Mixing:
1. Material temperature should be between 20 to 30 °C.
2. Add hardener contents to resin. Mix material vigorously until uniform in color. Be sure to mix along the bottom and sides of mixing container. Mix three to five minutes.

Application Method:
1. Apply fully mixed material to the prepared surface.
2. Cure time is 8 hours followed by a 3 hour post-cure at 150°C.

Caution: Use approved, positive-pressure, supplied-air respirator when welding or torch cutting near cured compound. Use approved self-contained breathing apparatus when burning, welding, or torch cutting indoors near cured compound. Use approved respirator for dusts and mists when grinding or machining cured compound. DO NOT use open flame on compound. See other cautions on Material Safety Data Sheet.
Technical Tips for Working With Epoxies

Working time and cure depends on temperature and mass:
- The higher the temperature, the faster the cure.
- The larger the mass of material, the faster the cure.

To speed the cure of epoxies at low temperatures:
- Store epoxy at room temperature.
- Pre-heat repair surface until warm to the touch.

To slow the cure of epoxies at high temperatures:
- Mix epoxy in small masses to prevent rapid curing.
- Cool resin/hardener component(s).

Loctite Material Specification

LMS dated June 26, 2001 (Resin) and LMS dated June 27, 2001 (Hardener). Test reports for each batch are available for the indicated properties. LMS test reports include selected QA QC test parameters considered appropriate to specifications for customer use. Additionally, comprehensive controls are in place to assure product quality and consistency. Special customer specification requirements may be coordinated through Henkel Loctite Quality.

Storage

Store product in the unopened container in a dry location. Material removed from containers may be contaminated during use. Do not return liquid to original container. Storage information may be indicated on the product container labeling.

Optimal Storage: 8 °C to 21 °C. Storage below 8 °C or greater than 28 ºC can adversely affect product properties.

Henkel cannot assume responsibility for product which has been contaminated or stored under conditions other than those recommended. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

Conversions

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
μm / 25.4 = mil
N x 0.225 = lb
N/mm 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

Disclaimer

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Colombiana, S.A.S. the following disclaimer is applicable:

The information included in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. Henkel cannot assume responsibility for product which has been contaminated or stored under conditions other than those recommended. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

Henkel France SA please additionally note the following:

In case Henkel would be nevertheless held liable, on whatever legal ground, Henkel’s liability will in no event exceed the amount of the concerned delivery.

In case products are delivered by Henkel Belgique SA, Henkel Etablissements SA, Henkel France SA, Henkel Nederland BV, Henkel Technologies France SAS and

Henkel Americas
+860.571.5100

Henkel Europe
+49.89.320800.1800

Henkel Asia Pacific
+86.21.2891.8863

For the most direct access to local sales and technical support visit: www.henkel.com/industrial

Reference 1.3