LOCTITE® Nordbak® High Temperature Brushable Ceramic™

February 2013

PRODUCT DESCRIPTION

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

Technology	Epoxy
Chemical Type	Epoxy
Appearance (Resin)	Red[LMS]
Appearance (Hardener)	Amber[LMS]
Appearance (Mixture)	Red liquid
Components	Two component - requires mixing
Mix Ratio, by weight - Resin : Hardener	4.25 : 1
Mix Ratio, by volume - Resin : Hardener	2.6 : 1
Cure	Room temperature cure
Application	Coating
Specific Benefit	• Ceramic reinforced • Easy to mix and use • High temperature resistance • High gloss finish • Superior adhesion

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):

Spindle 7, speed 20 rpm		140,000 to 200,000[LMS]
Weight per volume	kg/L (lbs/gal)	1.58 to 1.65 (13.2 to 13.75[LMS])
Flash Point - See MSDS		

Hardener:

Viscosity, Brookfield - RV, 25 °C, mPa·s (cP):

Spindle 3, speed 20 rpm,		1,300 to 3,000[LMS]
Weight per volume	kg/L (lbs/gal)	0.98 to 1.01 (8.15 to 8.4[LMS])
Flash Point - See MSDS		

Mixed:

Viscosity, Cone & Plate, 25 °C, mPa·s (cP):

Shear rate 10 s^{-1}	33,000
Density @ 23 °C, g/cm³	1.38
Coverage	1.1 m² @ 0.5 mm thick/1 kg (12 ft² @ 20 mil thick/2 lb)
Flash Point - See MSDS	

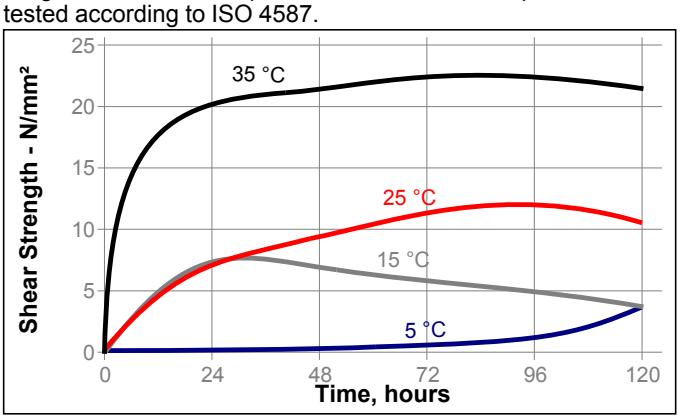
TYPICAL CURING PERFORMANCE

Curing Properties

Gel Time @ 25 °C, hours	5 to 6[LMS]
Recoat 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 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 (psi)	102 (14,800)
Compressive Modulus, ISO 604	N/mm² (psi)	3,165 (459,000)
Tensile Strength, ISO 527-2	N/mm² (psi)	37 (5,360)
Tensile Modulus, ISO 527-2	N/mm² (psi)	5,340 (774,000)
Elongation at break, %	0.8	
Coefficient of Thermal Expansion, ISO 11359-2, K^{-1}:		
Below Tg		40
Above Tg		110
Flexural strength , ASTM D790	N/mm² (psi)	91 (13,250)
Flexural modulus , ASTM D790	N/mm² (psi)	9,180 (1,331,000)

Electrical Properties:

Volume Resistivity, IEC 60093, ohm-cm	57×10^{12}
Surface Resistivity, IEC 60093, ohms	1.1×10^{15}

TYPICAL PERFORMANCE OF CURED MATERIAL

Lap Shear Strength, ISO 4587:

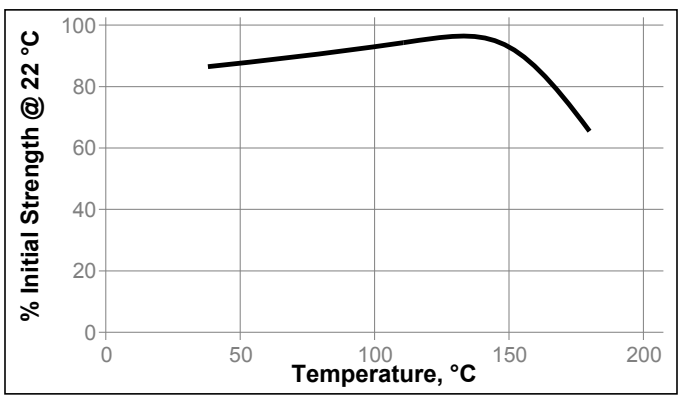
Grit Blasted Mild Steel (GBMS)	N/mm² (psi)	16.7 (2,425)

TYPICAL ENVIRONMENTAL RESISTANCE

Lap Shear Strength, ISO 4587:
Grit Blasted Mild Steel (GBMS)

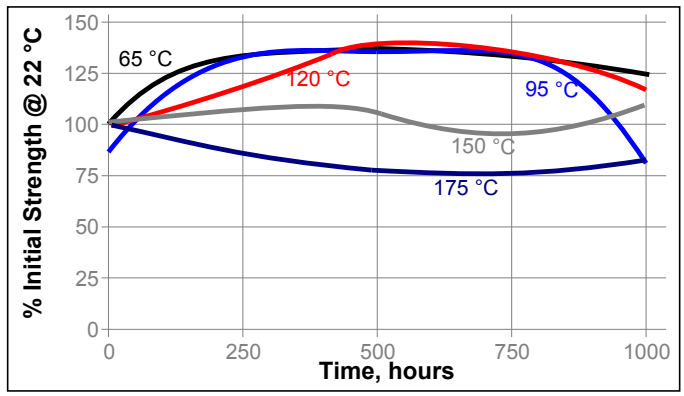
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C



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]
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 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 °C 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 x 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
Note:
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. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. 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.
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Reference 1.3