

## LOCTITE® PC 3965

Known as LOCTITE® Fixmaster® Fast Set Steel Epoxy  
September 2015

### PRODUCT DESCRIPTION

LOCTITE® PC 3965 provides the following product characteristics:

<b>Technology</b>	Epoxy
Appearance (Resin)	Dark gray <sup>LMS</sup>
Appearance (Hardener)	Light gray <sup>LMS</sup>
Appearance (Mixed)	Metallic gray
Components	Two components - requires mixing
Mix Ratio, by volume - Resin : Hardener	1 : 1
Mix Ratio, by weight - Resin : Hardener	100 : 73
<b>Cure</b>	Room temperature cure
<b>Application</b>	Repair
Specific Benefit	<ul style="list-style-type: none"><li>Non-sag paste - allows application versatility for overhead and vertical surfaces</li><li>Hardens in 10 minutes - fast emergency repairs that reduce downtime</li><li>High steel content - cures to a metal-like finish</li><li>Bonds to steel, cast iron, stainless steel, concrete, copper, aluminum, and clean and abraded bronze</li></ul>

LOCTITE® PC 3965 is a unique, two-part epoxy steel filled system that is fast to mix and apply. Once hardened, it can be machined, drilled, tapped or filed just like the original metal. It is an excellent material for fast, cost effective repairs to all ferrous materials. Applications include casting metal parts and pouring molds, parts and fixtures. This product is typically used in applications with an operating range of -30 °C to 95 °C (-20F to 200F).

### TYPICAL PROPERTIES OF UNCURED MATERIAL

#### Resin:

Weight per volume kg/L 1.57 to 1.62  
(lbs/gal) (13.1 to 13.5<sup>LMS</sup>)

Viscosity, Brookfield - RV, 25 °C, mPa·s (cP):  
Spindle 7., speed 20 rpm 95,000 to 115,000<sup>LMS</sup>

Flash Point - See SDS

#### Hardener:

Weight per volume kg/L 1.15 to 1.19  
(lbs/gal) (9.6 to 9.9<sup>LMS</sup>)

Viscosity, Brookfield - RV, 25 °C, mPa·s (cP):  
Spindle 2, speed 20 rpm 130,000 to 160,000<sup>LMS</sup>

Flash Point - See SDS

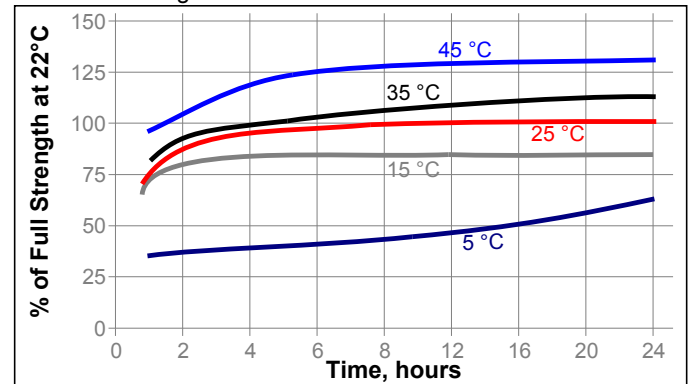
### TYPICAL CURING PERFORMANCE

#### Curing Properties

Cure Time @ 25 °C, minutes 10 to 15  
Gel Time @ 25 °C, minutes 4 to 6<sup>LMS</sup>  
Working life, minutes 3 to 4

#### 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

Cured @ 25 °C except where noted

#### Physical Properties:

Abrasion Resistance, ASTM D4060: mg 48.8  
1 Kg load, CS-10 wheels, Weight of Material Lost  
Shore Hardness, ISO 868, Durometer D 62  
Flexural strength, ASTM D790 N/mm<sup>2</sup> 52  
(psi) (7,530)  
Flexural modulus, ASTM D790 N/mm<sup>2</sup> 1,860  
(psi) (269,480)

Compressive Strength, ISO 604	N/mm <sup>2</sup> 68 (psi) (9,870)
Compressive Modulus, ISO 604	N/mm <sup>2</sup> 3,340 (psi) (483,580)
Tensile Strength, ISO 527-2	N/mm <sup>2</sup> 20 (psi) (2,930)
Tensile Modulus, ISO 527-2	N/mm <sup>2</sup> 3,490 (psi) (505,120)
Elongation, ISO 527-2, %	0.64
Coefficient of Thermal Conductivity ASTM F 433, W/(m·K)	0.286
Glass Transition Temperature, ASTM E 1640, °C	58
Coefficient of Thermal Expansion, ISO 11359-2 K <sup>-1</sup> :	
Below Tg	60×10 <sup>-6</sup>
Above Tg	215×10 <sup>-6</sup>

**Electrical Properties:**

Volume Resistivity, IEC 60093, ohm-cm	0.47×10 <sup>15</sup>
Surface Resistivity, IEC 60093, ohms	39×10 <sup>15</sup>

**TYPICAL PERFORMANCE OF CURED MATERIAL****Shear Strength**

Lap Shear Strength, ISO 4587:

Grit Blasted Mild Steel (GBMS)	N/mm <sup>2</sup> 23.9 (psi) (3,460)
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**TYPICAL ENVIRONMENTAL RESISTANCE**

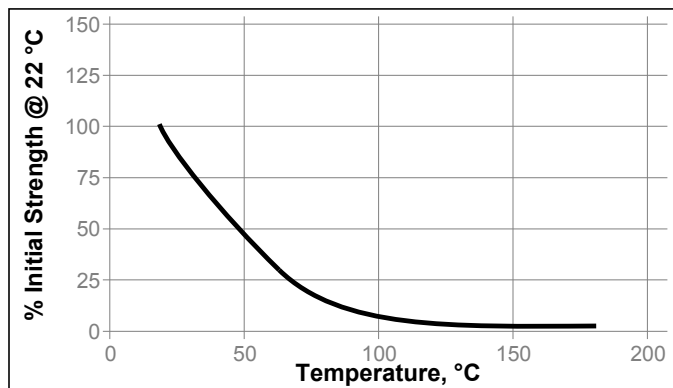
Cured for 72 hours @ 21 °C

Lap Shear Strength, ISO 4587:

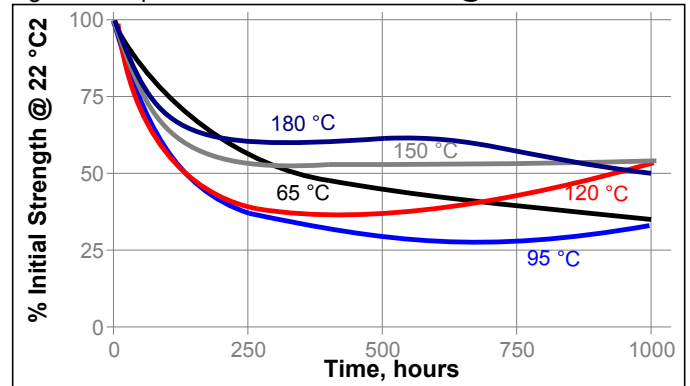
Grit Blasted Mild Steel (GBMS)

**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 Safety Data Sheet (SDS).

**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. Thoroughly clean and abrade surfaces (grit blast if possible), finally clean with a Loctite® cleaning solvent, e.g. Loctite® SF 7063™ or Loctite® SF 7070. The more thorough the degree of surface preparation the better the performance of the application.
2. (**Note:** A mold release agent should be used on surfaces where adhesion is not desired).

**Application:**

1. **Cartridge Preparation:** To begin using a new cartridge, remove cartridge cap and dispense a small amount of adhesive, making sure both parts A&B are extruding. Attach nozzle and dispense a small amount of material until a consistent color with no streaks is achieved..
2. For maximum bond strength apply adhesive evenly to both surfaces to be joined.
3. Application to the substrates should be made within 4 minutes. Larger quantities and/or higher temperatures will reduce this working time.
4. Join the adhesive coated surfaces and allow to cure. Higher temperatures will speed up curing.
5. Keep assembled parts from moving during cure. The bond should be allowed to develop full strength before subjecting to any service load.
6. Excessive uncured adhesive can be cleaned up with ketone type solvents.

**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<sup>LMS</sup>

LMS dated May 21, 2001 (Resin) and LMS dated May 21, 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. 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.** Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

#### Conversions

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 $\text{kV/mm} \times 25.4 = \text{V/mil}$   
 $\text{mm} / 25.4 = \text{inches}$   
 $\mu\text{m} / 25.4 = \text{mil}$   
 $\text{N} \times 0.225 = \text{lb}$   
 $\text{N/mm} \times 5.71 = \text{lb/in}$   
 $\text{N/mm}^2 \times 145 = \text{psi}$   
 $\text{MPa} \times 145 = \text{psi}$   
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$   
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$   
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$   
 $\text{mPa}\cdot\text{s} = \text{cP}$

#### 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 0.1