

# LOCTITE<sup>®</sup> PC 3471

Known as LOCTITE<sup>®</sup> Fixmaster<sup>®</sup> Steel Putty  
December 2013

## PRODUCT DESCRIPTION

LOCTITE<sup>®</sup> PC 3471 provides the following product characteristics:

<b>Technology</b>	Epoxy
<b>Chemical Type</b>	Epoxy
<b>Appearance (uncured)</b>	Steel Colored Paste
<b>Components</b>	Two components - requires mixing
<b>Mix Ratio, by volume - Resin : Hardener</b>	2.5 : 1
<b>Mix Ratio, by weight - Resin : Hardener</b>	6.25 : 1
<b>Cure</b>	Room temperature cure
<b>Application</b>	Bonding
<b>Specific Benefit</b>	<ul style="list-style-type: none"> <li>• Will not sag or shrink</li> <li>• Rebuilds worn parts fast - limits downtime</li> <li>• High steel content - cures to a metal-like finish</li> <li>• Superior adhesion - bonds well to all metal substrates</li> </ul>

LOCTITE<sup>®</sup> PC 3471 is a steel reinforced, two-part epoxy repair putty that cures to a metal-like finish and can be machined, drilled, tapped or filed. Typical applications include repairing non-structural defects in castings, making jigs and fixtures, sealing vessels, tanks and valves, resurfacing worn air seals and filling cavitated areas. This product is typically used in applications with an operating range of -30 °C to 105 °C.

## TYPICAL PROPERTIES OF UNCURED MATERIAL

### Resin:

Density @ 22 °C 2.43

Flash Point - See SDS

### Hardener:

Density @ 22 °C 1.08

Flash Point - See SDS

## Mixed:

Weight per volume kg/L 2.64 to 2.76  
(lbs/gal) (22 to 23)

Coverage 278 cm<sup>2</sup> @ 6 mm thick per 0.45 kg kit  
(43 in<sup>2</sup> @ 0.25 in thick per 1 lb kit)

Flash Point - See SDS

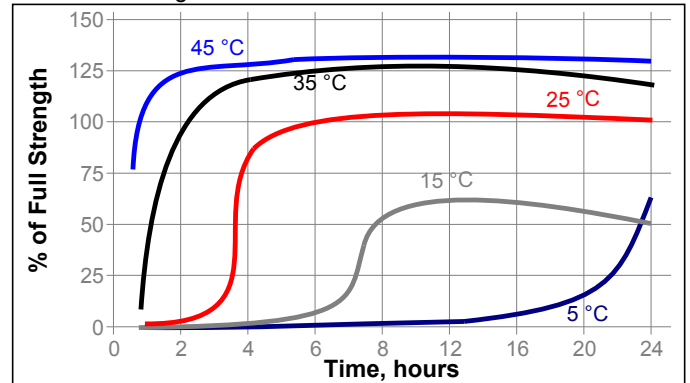
## TYPICAL CURING PERFORMANCE

### Curing Properties

Cure Time @ 25 °C, hours 6  
Gel Time @ 21 °C, minutes 35 to 40  
Working life, minutes 30

### 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 156  
1 Kg load, CS-10 wheels, Weight of Material Lost  
Shore Hardness, ISO 868, Shore D 82  
Volume Shrinkage, % 1.63  
Elongation, ISO 527-2, % 0.49

Compressive Strength, ISO 604	N/mm <sup>2</sup>	61.7
	(psi)	(8,940)
Compressive Modulus, ISO 604	N/mm <sup>2</sup>	3,400
	(psi)	(521,740)
Tensile Strength, ISO 527-2	N/mm <sup>2</sup>	27.8
	(psi)	(4,040)
Tensile Modulus, ASTM D638	N/mm <sup>2</sup>	9,360
	(psi)	(1,357,180)
Flexural strength , ASTM D790	N/mm <sup>2</sup>	56.4
	(psi)	(8,190)
Flexural modulus	N/mm <sup>2</sup>	3,500
	(psi)	(507,540)
Coefficient of Thermal Conductivity ASTM F 433, W/(m·K)		0.523
Glass Transition Temperature, ASTM E 1640, °C		60
Coefficient of Thermal Expansion, ISO 11359-2 K <sup>-1</sup> :		
Below Tg		43×10 <sup>-06</sup>
Above Tg		125×10 <sup>-06</sup>
<b>Electrical Properties:</b>		
Volume Resistivity, IEC 60093, ohm-cm		1.1×10 <sup>15</sup>
Surface Resistivity, IEC 60093, ohms		3.1×10 <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>	9.6
	(psi)	(1,395)

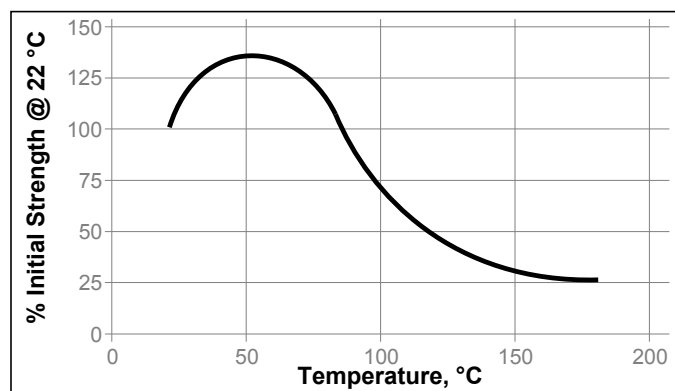
## TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 72 hours @ 21 °C

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

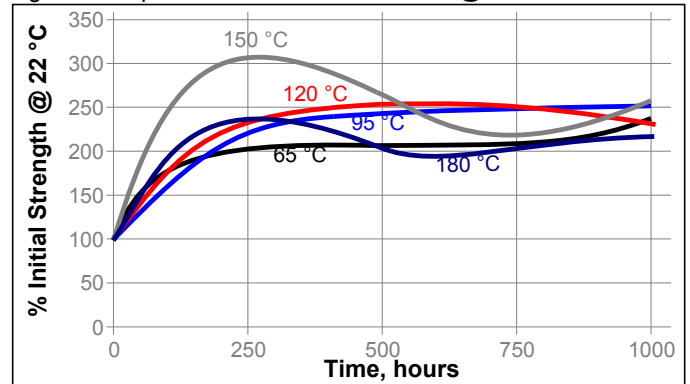
### Hot Strength

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.

### Metal:

- 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 or grinding is suitable.
- Solvent cleaning with a residue-free solvent is recommended at the final step to aid in adhesion.

### Mixing:

- Mix 2.5 parts resin to 1 part hardener by volume (6.25 to 1 by weight), or transfer entire kit onto a clean and dry mixing surface and mix thoroughly until color is consistent.

### Application:

- Apply fully mixed material to the prepared surface .
- At 25 °C working time is 30 minutes and functional cure time is 6 hours.

If using to rebuild shaft, the following applies:

- Machine the worn area down 0.3mm (0.125 in) to produce a square shoulder on part. The material is stronger with a square edge versus a feathered edge.
- Machine a spiral cut in bottom of area to be repaired to provide mechanical keying into surface.
- Apply excess product to ensure small shrinkage during cure does not produce depression.
- Machine the surface to original dimensions prior to full cure, as the product is very wear resistant.

**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 mixed, 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).

**Not for product specifications**

The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on specifications for this product.

**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**

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 kV/mm x 25.4 = V/mil  
 mm / 25.4 = inches  
 $\mu\text{m} / 25.4 = \text{mil}$   
 N x 0.225 = lb  
 N/mm x 5.71 = lb/in  
 N/mm<sup>2</sup> 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

**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.

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 Belgium NV, Henkel Electronic Materials NV, Henkel Nederland BV, Henkel Technologies France SAS and 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 Colombiana, S.A.S. the following**

**disclaimer is applicable:**

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 Corporation, Resin Technology Group, Inc., or Henkel Canada Corporation, the following disclaimer is applicable:**

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

**Trademark usage**

Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

Reference 0.1