Technical Data Sheet

Loctite® PC 7210™

Known as Loctite® 7210™
October 2015

PRODUCT DESCRIPTION

Loctite® PC 7210™ provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (Resin)	Light gray
Appearance (Hardener)	Transparent, Red-Brown
Appearance (Mixture)	Light Orange Paste
Components	Two part - Resin & Hardener
Mix Ratio, by volume - Resin : Hardener	100 : 55
Mix Ratio, by weight - Resin : Hardener	100 : 40
Cure	Room temperature cure after mixing
Application	Industrial maintenance
Product Benefits	• Structural, toughened epoxy • Room temperature cure, post cure possible • Chemical resistant • Corrosion resistant • Temperature resistant

Loctite® PC 7210™ is a two-component, room temperature curing toughened epoxy. This product is used in combination with Loctite® 5085, a multi-axial, multi-ply fabric, as a composite repair system to repair and protect metal pipes and tanks in the petroleum, petrochemical and natural gas industry. It can be used to repair damaged and corroded parts where high strength is required, together with corrosion protection and chemical resistance. Typical applications include sealing and repairing cracked tanks, pipes, pipe joints and reinforcing tanks, joints and elbows.

ISO TS 24817 - Composite Repairs for Pipework - Qualification and Design, Installation, Testing and Inspection

The standard gives requirements and recommendations for the qualification and design, installation, testing and inspection for the external application of composite repairs to corroded or damaged pipework used in the petroleum, petrochemical and natural gas industries. The composite repair system consisting of Loctite® 7210 and Loctite® 5085 is certified according to ISO TS 24817. **Note:** Please contact your local Technical Service Center for more information and clarification.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin

Specific Gravity @ 25 °C	1.32
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C	14,000

Hardener

Specific Gravity @ 25 °C	0.97
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C	11,500

Mixed

Specific Gravity @ 25 °C	1.2
Vertical Sag Resistance, ASTM D 4400, mm:	
25°C	1.3
40°C	1.3

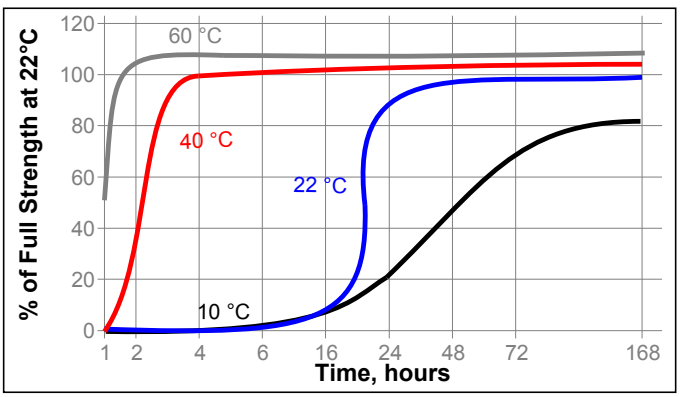
Flash Point - See SDS

TYPICAL CURING PERFORMANCE

Working Life @ 25 °C, minutes	30
Working Life @ 40 °C, minutes	20

Cure Speed vs. Time, Temperature

The rate of cure will depend on the ambient temperature, elevated temperatures may be used to accelerate the cure. The graph below shows shear strength developed with time at various temperatures on grit blasted steel lap shears and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 7 days @ 22 °C

Physical Properties:

Glass Transition Temperature, °C:	
(Tg) by DMA , ASTM E 1640	100
Shore Hardness, ISO 868, Shore D	77

TYPICAL PROPERTIES OF CURED REPAIR SYSTEM

The following properties were tested on the cured repair system consisting of Loctite® 7210 and Loctite® 5085

Cured for 7 days @ 22 °C

Physical Properties:

Poisson's Ratio, ISO 527-5		0.16
Elongation, ISO 527-5, %		2.0
Tensile Strength, ISO 527-5	N/mm²	325
	(psi)	(46,850)
Young's Modulus, ISO 527-5	N/mm²	17,000
	(psi)	(2,458,500)
Shear Strength, ASTM D 5379 (V-notched beam)	N/mm²	29.1
	(psi)	(4,225)
Shear Modulus, ASTM D 5379 (V-notched beam)	N/mm²	1,410
	(psi)	(204,750)

TYPICAL PERFORMANCE OF CURED MATERIAL

Cured for 7 days @ 22 °C

Lap Shear Strength, ISO 4587:

Mild Steel (grit blasted)	N/mm²	34.5
	(psi)	(5,000)
Aluminum (Gritblasted)	N/mm²	29.1
	(psi)	(4,220)
Stainless steel (grit blasted)	N/mm²	27.2
	(psi)	(3,950)

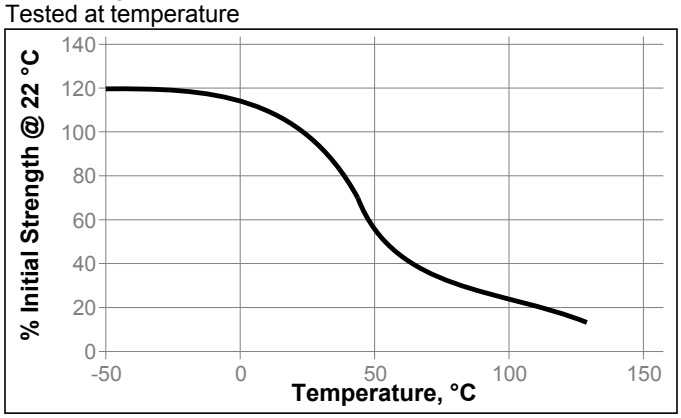
TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 7 days @ 22 °C

Lap Shear Strength, ISO 4587

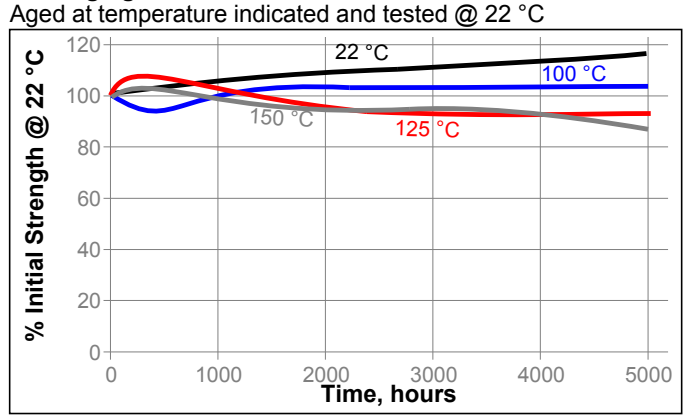
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical Resistance

Tables below show chemical resistance @ 22°C. Tested on product specimens, immersed up to 5,000 hours @ 22°C in fluids indicated.

Acids

10 % hydrochloric	Continuous long term immersion
36 % hydrochloric	Short term or intermittent immersion
10 % sulphuric	Short term or intermittent immersion
10 % nitric	Continuous long term immersion
5 % phosphoric	Short term or intermittent immersion

Alkalis

40 % sodium hydroxide	Continuous long term immersion
25 % ammonium hydroxide	Continuous long term immersion
36 % ammonium sulphate	Continuous long term immersion
30 % hydrogen peroxide	Spill, splash with immediate cleanup

Solvents

Deionized Water	Continuous long term immersion
10% Salt Water	Continuous long term immersion
Methanol	Short term or intermittent immersion
Methylethylketone (MEK)	Spill, splash with immediate cleanup
Xylene	Short term or intermittent immersion

Petrochemicals

ATF - Maxol Gear Oil 80W90 @120°C	Continuous long term immersion
Mineral Oil - Fortech Mineral Engine Oil @150°C	Continuous long term immersion
Motor Oil - Synthetic - Shell Helix Ultra 5W30 @120°C	Continuous long term immersion
Motor Oil - Synthetic - Shell Helix Ultra 5W30 @150°C	Continuous long term immersion

TYPICAL ENVIRONMENTAL RESISTANCE OF CURED REPAIR SYSTEM

The following properties were tested on the cured repair system consisting of Loctite® 7210 and Loctite® 5085
Cured for 7 days @ 22°C

Chemical/Solvent Resistance

The table below shows chemical resistance. Tested on product specimens, immersed up to 1,000 hours in fluids and temperature indicated

All these fluids have been successfully tested according to ISO/TS 24817

		% of initial strength
Environment	**°C**	**1000 h**
Water	40	80
Benzine	40	90
Fuel	40	90
Hydrochloric Acid, 37%	23	90

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:

NOTE: Composite repairs according to ISO 24817 have to be calculated and designed by Henkel TCS partners.

Application has to be carried out by certified applicators trained by Henkel TCS. The following text gives only a brief summary on the application process in general.

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. Remove dirt, oil, grease etc with a suitable cleaner, e.g. high pressure water cleaning system using Loctite® 7840™ or Loctite® Natural Blue® cleaner/degreaser.
2. Blast all surfaces to be coated with a sharp edged angular grit to a depth of profile of 75 to 100 microns (3 to 4 mils), and a degree of cleanliness of SA 2.5 to SA 3.0.
3. After blasting, metal surfaces should be cleaned, e.g. with Loctite® 7063™ or Loctite® ODC Free Cleaner and Degreaser, and be coated with Loctite® 7515 before any oxidation or contamination takes place.
4. Metal that has been in contact with salt solutions, e.g. seawater, should be grit blasted and high-pressure water blasted, left for 24 hours to allow any salts in the metal to sweat to the surface. A test for chloride contamination should be performed. The procedure should be repeated until chloride concentration on the surface is below 3 µg/cm² .

Mixing:

1. Add hardener completely to resin. Mix material vigorously until uniform in color. Continue mixing for another 3 to 5 minutes. Be sure to mix along the bottom and sides of mixing container.
2. Heat buildup during and after mixing is normal. To reduce the likelihood of exothermic reaction or excessive heat buildup, mix less than 1,000 grams at a time. Mixing smaller amounts will minimize heat buildup.

Impregnation

1. Start the impregnation process immediately after mixing.
2. Impregnate the multi axial, multi-ply fabric, Loctite® 5085 thoroughly with mixed Loctite® PC 7210™.

Application:

1. Ensure component temperature is between 15 to 30°C (60 to 85F).
2. For non-through-wall defects, use Loctite® EA 3478 to rebuild external part design. .
3. Apply a layer of Loctite® PC 7210™ at least 200 microns (8 mil) thick onto the surface of the repair area by spatula.
4. Press the impregnated fabric firmly onto the surface. Ensure that no air is trapped between the surface and the fabric.
5. A minimum of two layers is needed to seal the surface properly.
6. Application of the product must proceed quickly so as not to exceed the working time of 30 minutes (depending on temperature).
7. To improve weathering resistance, fire resistance or esthetical aspects, a layer of Loctite® PC 7255 should be applied on top by spraying or brushing.

Clean-up:

1. Immediately after use clean tools with suitable cleaner, e.g. Teroson® PU 8550. Once cured, the material can only be removed mechanically.

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. 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

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 0.2