

PRODUCT DESCRIPTION

LOCTITE® Product 3421 is a two component epoxy adhesive which cures slowly at room temperature after mixing. It is a general purpose, flowable adhesive which develops high strength and high moisture resistance.

TYPICAL APPLICATIONS

The gap filling properties make this adhesive system suitable for rough or poorly fitting surfaces made from metal, ceramic, wood, or rigid plastics.

PROPERTIES OF UNCURED MATERIAL

Part A (Resin)

Chemical Type	Epoxy
Appearance	Clear
Specific Gravity @ 25°C	1.0-1.2
Viscosity Characteristics	Slightly Shear Thinning Thixotropic
Viscosity, mPas (Haake PK1 2° Cone, 10 sec ⁻¹ @ 23°C)	16,500
Brookfield Viscosity mPas (Spindle 6 @ 5rpm @ 23°C)	60,000-100,000

Part B (Hardener)

Chemical Type	Epoxy
Appearance	Clear Yellow
Specific Gravity @ 25°C	0.9-1.1
Viscosity Characteristics	Newtonian
Viscosity, mPas (Haake PK1, 2° Cone, 10 sec ⁻¹ @ 23°C)	15,000
Brookfield Viscosity (Spindle 6 @ 5rpm, 23°C)	9,000-19,000

Mixed Adhesive

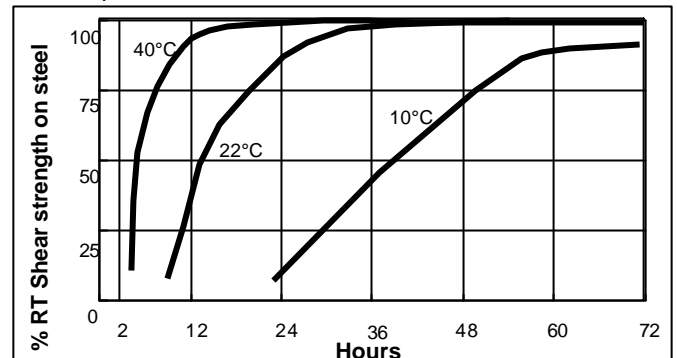
Appearance	Clear Amber-Yellow
Working Time in Static Mixer Nozzle	180-210 minutes
Maximum Gap Fill (mm)	1
Open Time (minutes) of mixed adhesive 25°C (6-10g mix)	150
Mix Ratio by Volume	1:1
Mix Ratio by Weight (g) (Resin/Hardener)	520/473
Fixture Time (light handling, 0.1N/mm ²) @23°C (GBMS 0.05mm gap)	280 minutes

TYPICAL CURING PERFORMANCE

Cure Speed vs. time/temperature

When mixed in a 1:1 ratio by volume Product 3421 develops high strength at room temperature within 36 hours. The assembled parts will be fixtured for light handling (0.1N/mm²) after 4 hours at room temperature in a 0.05mm GBMS gap. Elevated temperatures may be used to accelerate the cure. Typical accelerated cure cycles would be 16 hours at 40°C, or 2 hours at 80°C, or paint bake cycle after assembly.

The following graph indicates development of shear strength on a steel lap shear with 0.05mm gap as a function of time and temperature.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Coefficient of thermal conductivity, W.m ⁻¹ K ⁻¹ (ASTM C177)	0.28
Coefficient of Thermal Expansion μm/m/°C (ASTM E831-86)	95
Hardness (Shore D)	70-80
Glass Transition Temperature T _g °C (ASTM E1545-95a)	36

PERFORMANCE OF CURED MATERIAL

(7 days cure at 23°C, tested at 23°C)

Shear Strength, ASTM D1002/DIN 53283 (0.05mm bond gap unless otherwise stated)

	Typical Value N/mm ² (psi)	Range N/mm ²
Steel Grit Blasted	23 (3300)	20-25
Steel, Grit Blasted, 1mm open gap	19.5 (2850)	16-23
Stainless Steel	11 (1760)	9-12
Zinc Dichromate Steel	10 (1470)	7-12
Aluminium Abraded	10 (3640)	8-12
Brass	10 (1470)	8-11
GRP	1.2 (176)	0.5-2
Phenolic	3.5 (514)	2.5-4.5
ABS	0.75 (110)	0.5-1
Hardwood (Mahogany)	11 (1760)	6-15
Softwood (Red Deal)	9 (1323)	8-10
Polycarbonate	3.2 (470)	2.5-4

NOT FOR PRODUCT SPECIFICATIONS.

THE TECHNICAL DATA CONTAINED HEREIN ARE INTENDED AS REFERENCE ONLY.

PLEASE CONTACT LOCTITE CORPORATION QUALITY DEPARTMENT FOR ASSISTANCE AND RECOMMENDATIONS ON SPECIFICATIONS FOR THIS PRODUCT.

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180° Rigid Peel Strength N/mm (GBMS)
(ASTM D1876)

1 0.7-1.5

TYPICAL ENVIRONMENTAL RESISTANCE

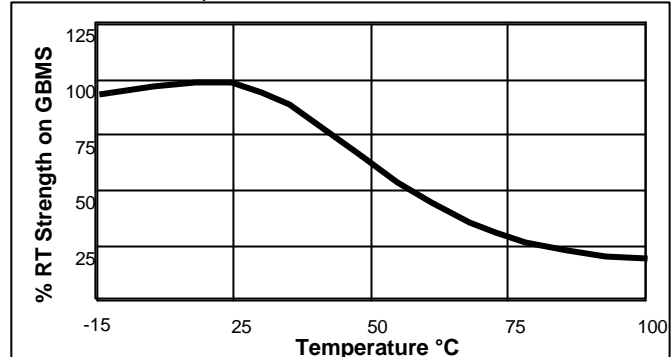
Test Procedure : DIN 53283

Substrate: Grit Blasted Mild Steel (0.05mm bond gap)

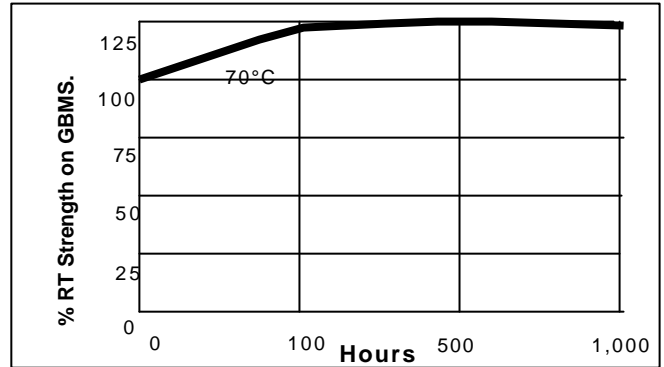
Cure procedure: 7 days @ 23°C

Strength at Temperature

Tested at the temperature indicated.



Heat Ageing.



Aged at temperature indicated and tested at 23°C

Chemical / Solvent Resistance

Solvent	Temp.	% Initial Strength retained after		
		100 hr	400 hr	1000 hr
Motor Oil	23°C	100	100	50
Acetic Acid 10%	23°C	73	70	60
7.5% NaCl	23°C	100	100	55
6.5% H ₂ SO ₄	23°C	100	100	100
Water	60°C	100	90	90
Water	90°C	75	75	75
Humidity 98% RH	40°C	100	100	100

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 oxidising materials.

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

Where aqueous washing systems are used to clean the surfaces before bonding, it is important to check for compatibility of the washing solution with the adhesive.

Directions for use

For best performances bond surfaces should be clean and free from grease. Resin and hardener should be blended to form a homogeneous mix. Product can be applied directly from cartridges by dispensing (1:1) through mixer head supplied or hand mixing with spatula in ratio recommended (volume or weight). Open time (working time) of the mixed adhesive in small quantities is about 150 mins at 25°C for small (6g) quantities. Higher temperature, or larger mixed quantities will shorten working time. Clear Yellow Amber (homogeneous) is the colour of the correctly mixed product. The first 5cm of bead dispensed from the mixer nozzle should be discarded to ensure only fully mixed product is applied in the bondline. Product supplied in quart cans should be stirred for 2-4 minutes before mixing.

The recommended bondline gap is 0.05 to 1.00mm. Parts should be assembled immediately after mixed adhesive has been applied to one surface. Excess adhesive can be wiped away with organic solvent (e.g. acetone). The bond should be clamped until adhesive has fixtured. The joint should be allowed to develop full strength before subjecting to any service loads. After use and before adhesive hardens mixing and dispensing equipment should be cleaned with hot soapy water.

Loctite Product 3421 is suitable for use in the fabrication of metal products which will be subsequently subjected to a paint bake cycle after assembly. Tests of shear strength at 23°C after 180°C for 30 minutes in such a cycle gave excellent results.

Storage (Part A Resin and Part B Hardener)

Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 21°C unless otherwise labelled. Optimal storage is at the lower half of this temperature range. To prevent contamination of unused product, do not return any material to its original container. For further specific shelf life information, contact your local Technical Service Centre.

Note

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, Loctite Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Loctite Corporation's products. Loctite 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 Loctite Corporation patents which may cover such processes or compositions. We recommend that each prospective user test his proposed applications before repetitive use, using this data as a guide. This product may be covered by one or more patents or patent applications.