LOCTITE®

Research, Development & Engineering
Tallaght Business Park,
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Technical Data Sheet
Hysol® 3421

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PRODUCT DESCRIPTION

Loctite Hysol 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 has excellent moisture resistance.

TYPICAL APPLICATIONS

The long working life and medium viscosity make this adhesive system suitable for large surfaces and where adjustment time is needed after assembly. Excellent on surfaces made from metal, ceramic, wood, glass or rigid plastics.

PROPERTIES OF UNCURED MATERIAL

Part A (Resin)	**Value**
Chemical Type	Epoxy
Appearance	Clear
Specific Gravity @ 25°C	1.0-1.2
Viscosity Characteristics	Slightly Shear Thinning Thixotropic
Brookfield Viscosity, mPas (Spindle 6 @ 5rpm)	60,000-100,000

Part B (Hardener)

Chemical Type	Epoxy
Appearance	Clear Yellow
Specific Gravity @ 25°C	0.9-1.1
Viscosity Characteristics	Newtonian
Brookfield Viscosity, mPas (Spindle 6 @ 5rpm)	9,000-19,000

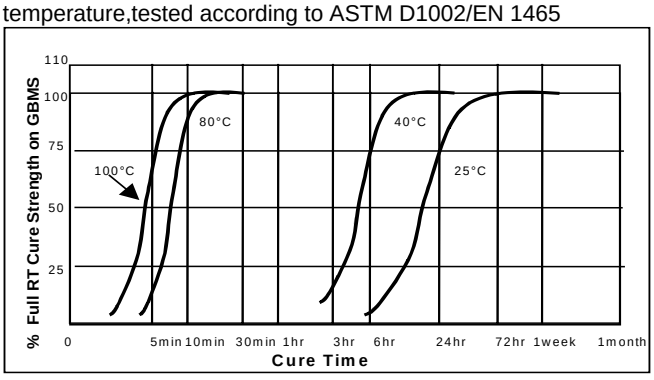
Mixed Adhesive

Appearance	Clear Amber-Yellow
Maximum Gap Fill (mm)	1
Working Life of mixed adhesive 25°C (6-10g mix), minutes	180
Mix Ratio by Volume	1:1
Mix Ratio by Weight (g) (Resin/Hardener)	100:90
Fixture Time (light handling, 0.1N/mm²) @23°C, minutes	240

TYPICAL CURING PERFORMANCE

Cure Speed vs. time/temperature

Hysol 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 gap. Elevated temperatures may be used to accelerate the cure. The following graph indicates development of shear strength on a steel lap shear with 0.05mm gap as a function of time and temperature,tested according to ASTM D1002/EN 1465



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 E831-93)	
(16.8° to 40°)	45
(55.4° to 199.4°)	173
Hardness (Shore D)	70-80
Glass Transition Temperature Tg °C (ASTM E1640-99)	55
Tensile Strength (ASTM D882) (N/mm²)	28
% Elongation (ASTM D882)	6
Modulus (ASTM D882) (N/mm²)	963

PERFORMANCE OF CURED MATERIAL

(7 days cure at 23°C, tested at 23°C)

Shear Strength, ASTM D1002/EN 1465 (0.05mm bond gap unless otherwise stated)

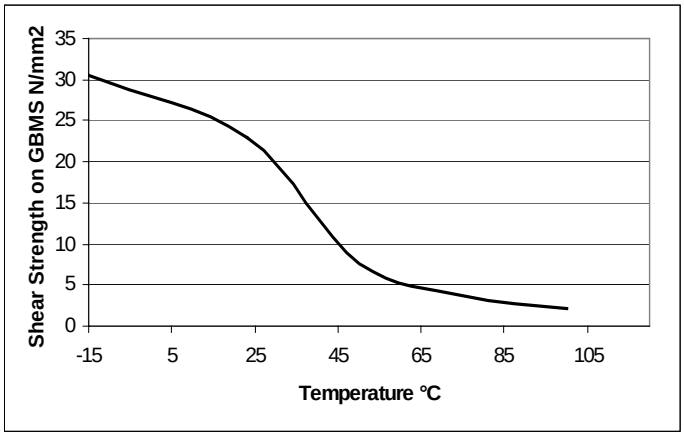
	Typical	
	Value	**Range**
Steel Grit Blasted (GB), N/mm²	23	20-25
(psi)	(3300)	
Stainless Steel GB, N/mm²	11	9-12
(psi)	(1760)	
Zinc Dichromate N/mm²	10	7-12
(psi)	(1470)	
Aluminium Abraded, N/mm²	10	8-12
(psi)	(1470)	
Aluminium Etched, N/mm²	14.4	12-16
(psi)	(2089)	
Hot Dipped Galvanised N/mm²	9.4	
(psi)	(1363)	
Brass, N/mm²	10	8-11
(psi)	(1470)	
GRP, N/mm²	1.2	0.5-2
(psi)	(176)	
Phenolic, N/mm²	3.5	2.5-4.5
(psi)	(514)	
ABS, N/mm²	0.75	0.5-1
(psi)	(110)	
Hardwood (Mahogany), N/mm²	11	6-15
(psi)	(1760)	
Softwood (Red Deal), N/mm²	9	8-10
(psi)	(1323)	
Polycarbonate, N/mm²	3.2	2.5-4
(psi)	(470)	
180° Rigid Peel Strength N/mm (GBMS) (ASTM D1876)	2.5	2-3
(in.lb)	(15)	
Tensile Strength GB Mild Steel Pin to Soda Glass N/mm²	16	13-18
(psi)	(2320)	

TYPICAL ENVIRONMENTAL RESISTANCE

Test Procedure :	ASTM D1002/EN 1465
Substrate:	Grit Blasted Mild Steel (0.05mm bond gap)
Cure procedure:	7 days @ 23°C

Strength at Temperature

Tested at the temperature indicated.



Temperature Storage

Cured for 5 days at 22°C on GBMS with no induced gap, stored in air at temperature indicated and tested at 22°C.

Temperature	% Initial Strength retained		
	500 Hr	1000 Hr	3000 Hr
100°C	113	99	97
125°C	119	119	128
150°C		111	116

Chemical/Solvent Resistance

Immersed in the conditions indicated and tested at 23°C

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_2SO_4	23°C	100	100	100
Water	60°C	100	90	90
Water	90°C	75	75	90
Humidity 98% RH	40°C	100	100	100
Tensile Strength GBMS Pin to Soda Glass				
Humidity 98% RH	40°C		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

1. For best performance surfaces for bonding should be clean, dry and free of grease. For high strength structural bonds, special surface treatments can increase the bond strength and durability .
2. To use, resin and hardener must be blended. Product can be applied directly from dual cartridges by dispensing through the mixer head supplied. Discard the first 3-5 cm of bead dispensed. Using bulk containers, mix thoroughly by weight or volume in the proportions specified in Properties of Uncured Material section. For hand mixing , weigh or measure out the desired amount of resin and hardener and mix thoroughly. Mix approximately 15 seconds after uniform colour is obtained.
3. Do not mix quantities greater than 4 kg as excessive heat build-up can occur. Mixing smaller quantities will minimise the heat build-up.
4. Apply the adhesive as quickly as possible after mixing to one surface to be joined. For maximum bond strength apply adhesive evenly to both surfaces. Parts should be assembled immediately after mixed adhesive has been applied.
5. Working life of the mixed adhesive is 180 minutes at 25°C. Higher temperature and larger quantities will shorten this working time.
6. Keep the assembled parts from moving during cure. The joint should be allowed to develop full strength before subjecting to any service loads.
7. Excess uncured adhesive can be wiped away with organic solvent (e.g. acetone).
8. After use and before adhesive hardens mixing and dispensing equipment should be cleaned with hot soapy water.

Storage

Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 21°C (46°F to 70°F) 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.

Data Ranges

The data contained herein may be reported as a typical value and/or range. Values are based on actual test data and are verified on a periodic basis.

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 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.

Bulk Numbers: Part A: 209049
Part B: 209053