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Technical Data Sheet

Product 302

Worldwide Version, October 1995

PRODUCT DESCRIPTION

LOCTITE® Product 302 is a single component low viscosity adhesive designed for bonding clear plastic to metal substrates. The product cures when exposed to suitable ultra violet radiation.

TYPICAL APPLICATIONS

Bonds and seals plastic to metal (e.g. disposable medical devices). Low viscosity makes it ideal for applications where wicking of the adhesive into pre-assembled parts is required or for components with close fitting tolerances. Loctite 302 has USP Class VI certification.

PROPERTIES OF UNCURED MATERIAL

	Value	Typical Range
Chemical Type	Acrylate	
Appearance	Clear, light amber liquid	
Specific Gravity @ 25°C	1.04	
Viscosity @ 25°C, mPa.s (cP)		
Brookfield RVT		
Spindle 1 @ 20 rpm	110	70 to 150
DIN 54453, MV		
D = 277s ⁻¹ after t=180secs	100	80 to 120
Flash Point (COC), °C	>100	

TYPICAL CURING PERFORMANCE

This product is cured when exposed to UV radiation of 365nm. To obtain a full cure on surfaces exposed to air, radiation at 250nm is also required. The speed of cure will depend on the UV intensity as measured at the product surface. Typical cure condition is 20 - 30 seconds at 100mW/cm² using a medium pressure, quartz envelope, mercury vapor UV lamp.

NOTE: UV intensities where quoted are measured at 365nm using an OAI 206 UV meter.

Fixture Time

The fixture time is the time required for a glass microslide to be irradiated with light energy so to prevent separation in shear mode.

FIXTURE TIME, secs	UV Intensity, mW/cm ²	
LAMP TYPE	10	100
Med. Pressure Hg.	3-8	1-5

Surface Cure Time

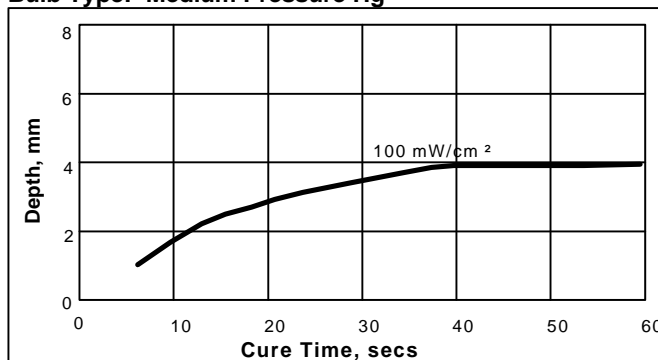
This is the time required to achieve a tack free surface.

SURFACE CURE TIME, secs	UV Intensity, mW/cm ²	
LAMP TYPE	10	100
Med. Pressure Hg.	Not recommended	5-10

Depth of Cure vs. UV Intensity

The following graph shows the increase in depth of cure with time at 100mW/cm² as measured from the thickness of the cured pellet formed in a 15mm diameter PTFE die.

Bulb Type: Medium Pressure Hg



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Coefficient of thermal expansion, ASTM D696, K ⁻¹	100 x 10 ⁻⁶
Coefficient of thermal conductivity, ASTM C177, W.m ⁻¹ . K ⁻¹	0.1
Tensile strength at break, ASTM D638, N/mm ²	9
(psi)	(1300)
Elongation to break, ASTM D638, %	160
Modulus, ASTM D638, N/mm ²	420
(psi)	(61000)
Hardness (Shore D), ASTM D2240	68
Shrinkage %	8
Glass Transition Temp (T _g), °C	45

PERFORMANCE OF CURED MATERIAL

(Cured 40 secs @ 100mW/cm², 365nm UV)

Tensile strength, ASTM D2095

	Value	Typical Range
Grit blasted mild steel to glass, N/mm ²	10	5 to 15
(psi)	(1500)	(730 to 2200)

Tensile strength is measured using a test method based on ASTM D2095. A metal pin (Ø12.7mm x 38mm) is bonded at one end to 6mm thick Pilkington float glass (50mm x 50mm). The pin is then pulled axially from the glass.

Shear strength, ASTM D1002

PVC to Glass, N/mm ²	2.5	1 to 5
(psi)	(360)	(150 to 730)
PC to Glass, N/mm ²	2.5	1 to 5
(psi)	(360)	(150 to 730)
ABS to Glass, N/mm ²	2.5	1 to 5
(psi)	(360)	(150 to 730)

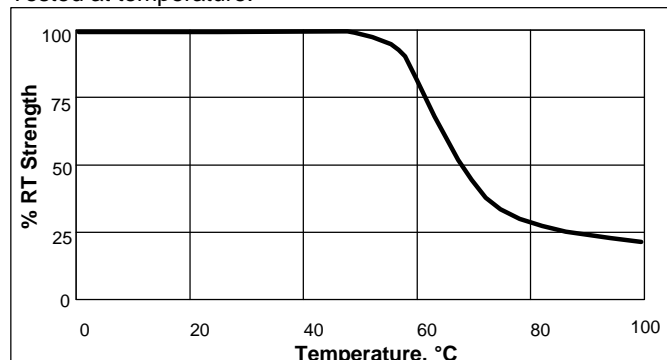
NOTE: Performance on plastics will vary depending on grade

TYPICAL ENVIRONMENTAL RESISTANCE

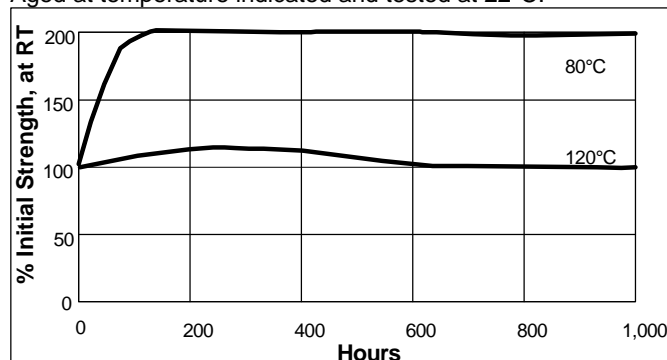
Test procedure : Tensile Strength
 Substrate: Grit blasted mild steel pin to glass
 Cure procedure: 10 secs at 100mW/cm² @ 365nm UV
 + 1 week @ 22°C.

Hot Strength

Tested at temperature.

**Heat Aging**

Aged at temperature indicated and tested at 22°C.

**Chemical/Solvent Resistance**

Aged under conditions indicated and tested at 22°C.

Solvent	Temp.	% Initial Strength retained at		
		100 hr	500 hr	1000 hr
90% R.H.:	40°C	65	40	30
Petrol:	22°C	85	85	85
Freon TA:	22°C	85	75	0
Industrial methylated spirit:	22°C	80	10	0

Effects of Sterilization

Components bonded with 302 and subjected to standard sterilization by ETO or Gamma Radiation (2.5 and 7.0 Megarads) resulted in no deterioration of bond strength.

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 Material Safety Data Sheet, (MSDS).

Approvals

Cured product conforms to the requirements of:
USP VI Biological Tests.

Directions for use

This product is UV sensitive. Exposure to daylight, UV light and artificial lighting should be kept to a minimum during storage and handling. Product should be dispensed from applicators with black feed lines. For best performance bond surfaces should be clean and free from grease.

UV cure rate is dependent on lamp intensity, distance from light source, depth of cure needed or bondline gap and light transmittance of the substrate through which the radiation must pass.

Recommended intensity for cure in bondline situation is 5mW/cm² minimum (measured at the bondline) with an exposure time of 4-5 times the fixture time at this same intensity. For dry curing of exposed surfaces higher intensity UV is required (100mW/cm² minimum).

Cooling should be provided for temperature sensitive substrate such as thermoplastics. Plastic grades should be checked for risk of stress cracking when exposed to liquid adhesive. Excess adhesive can be wiped away with organic solvent. Bonds should be allowed to cool before subjecting to any service loads.

Storage

Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 28°C (46°F to 82°F) unless otherwise labeled. 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 Center.

Data Ranges

The data contained herein may be reported as a typical value and/or range (based on the mean value ± 2 standard deviations). 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 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.