LOCTITE® 3102™

September 2004

PRODUCT DESCRIPTION

LOCTITE® 3102™ provides the following product characteristics:

Technology	Acrylic
Chemical Type	Acrylated urethane
Appearance (uncured)	Transparent to slightly hazy liquid[LMS]
Components	One component - requires no mixing
Viscosity	Medium, thixotropic
Cure	Ultraviolet (UV)/ visible light
Cure Benefit	Production - high speed curing
Application	Bonding
Key Substrates	Polycarbonate
Flexibility	Enhances load bearing & shock absorbing characteristics of the bond area.

LOCTITE® 3102™ is primarily designed for bonding polycarbonate to itself, while not inducing stress cracking under typical molded stress levels. The product has shown excellent adhesion to a wide variety of substrates including glass, many plastics and most metals. The thixotropic nature of LOCTITE® 3102™ reduces the migration of liquid product after application to the substrate.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.13
Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):	
Spindle 4, speed 20 rpm	2,500 to 5,000[LMS]
Refractive Index, ASTM 542	1.48
Flash Point - See MSDS	

TYPICAL CURING PERFORMANCE

LOCTITE® 3102™ can be cured by exposure to UV and/or visible light of sufficient intensity. Surface cure is enhanced by exposure to UV light in the 220 to 260 nm range. Cure rate and ultimate depth of cure depend on light intensity, spectral distribution of the light source, exposure time and light transmittance of the substrate through which the light must pass.

Stress Cracking

Liquid adhesive is applied to a polycarbonate bar 6.4 cm by 13 mm by 3 mm which had been flexed to induce a known stress level.

Stress Cracking, ASTM D 3929, minutes:	
17 N/mm² stress on bar	>15

Fixture Time

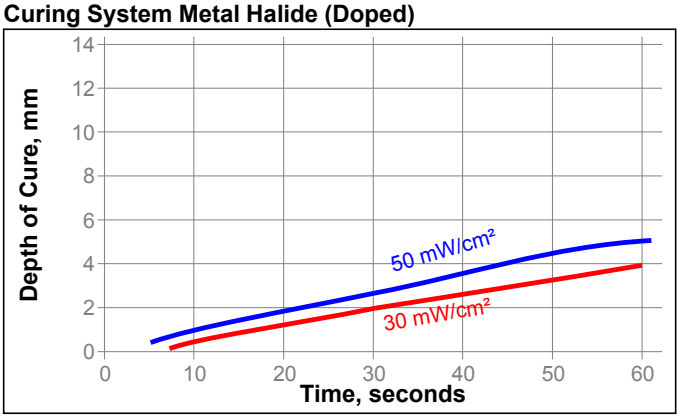
UV fixture time is defined as the light exposure time required to develop a shear strength of 0.1 N/mm² .

UV Fixture Time, Polycarbonate, seconds:	
Metal halide bulb (doped):	
30 mW/cm² @ 365 nm	5 to 10
50 mW/cm² @ 365 nm	5 to 10
Electrodeless system, Fusion® H light source:	
50 mW/cm² @ 365 nm	5 to 10
Electrodeless system, Fusion® V light source:	
50 mW/cm² @ 365 nm	5 to 10
Electrodeless system, Fusion® D light source:	
50 mW/cm² @ 365 nm	5 to 10
UV Fixture Time, Glass microscope slides, seconds:	
Black light:	
6 mW/cm² @ 365 nm	≤20[LMS]

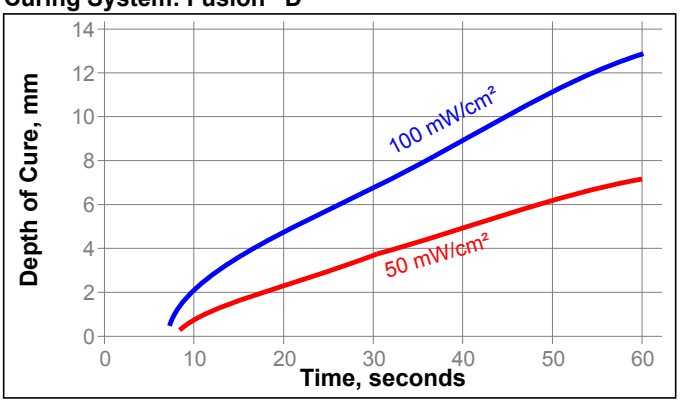
Depth of Cure

Cure depth depends both on external factors including the type of light source, light intensity and exposure time and on internal factors including composition of the adhesive . The following graph shows the effect of light source, light intensity and exposure time on depth of cure for LOCTITE® 3102™.

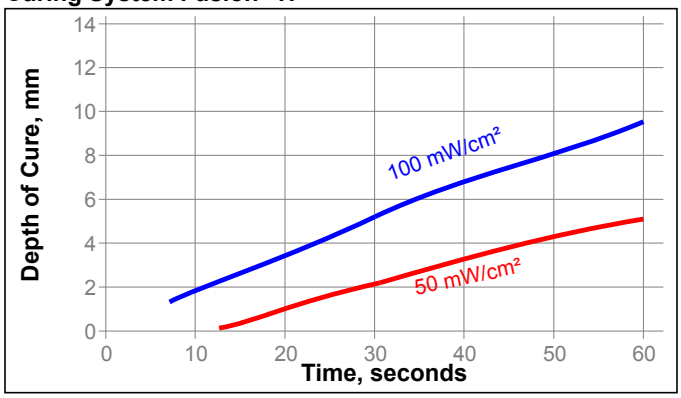
Curing System Metal Halide (Doped)



Curing System: Fusion® D



Curing System Fusion® H



TYPICAL PROPERTIES OF CURED MATERIAL

Cured @ 30 mW/cm² @ 365 nm for 80 seconds using a metal halide light source

Physical Properties:

Tensile Strength, at break, ASTM D 882	N/mm² (psi)	18 (2,610)
Tensile Modulus, ASTM D 882	N/mm² (psi)	297 (43,000)
Elongation, at break, ASTM D 882, %		265
Shore Hardness, ASTM D 2240, Durometer D		59
Refractive Index, ASTM 542		1.5
Water Absorption, %:		
2 hours in boiling water		2.61

Electrical Properties:

Dielectric Constant / Dissipation Factor, ASTM D 150:	
0.1 kHz	5.391 / 0.047
1 kHz	5.227 / 0.0193
1,000 kHz	4.863 / 0.0407
Volume Resistivity, ASTM D 257, Ω·cm	0.87×10^{15}
Surface Resistivity, ASTM D 257, Ω	0.90×10^{15}
Dielectric Breakdown Strength, ASTM D 149, kV/mm	25

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured @ 30 mW/cm² @ 365 nm for 80 seconds using a metal halide light source

Lap Shear Strength, ISO 4587:

Polycarbonate to Aluminum (etched):		
Initial	N/mm² (psi)	6.54 (948)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	7.48 (1,085)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	4.1 (595)
Polycarbonate to Aluminum (as received):		
Initial	N/mm² (psi)	5.14 (746)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	1.76 (255)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	3.08 (447)
Polycarbonate to Steel:		
Initial	N/mm² (psi)	4.97 (720)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	5.23 (759)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	4.96 (719)
Polycarbonate to Glass:		
Initial	N/mm² (psi)	5.99 (868)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	5.58 (809)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	5.52 (800)
Polycarbonate to Phenolic:		
Initial	N/mm² (psi)	5.62 (815)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	5.66 (821)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	6.01 (872)
Polycarbonate to Polycarbonate:		
Initial	N/mm² (psi)	15.8 (2,291)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	7.57 (1,098)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	5.13 (744)
Polycarbonate to Epoxyglass:		
Initial	N/mm² (psi)	4.39 (636)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	4.65 (674)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	4.43 (642)
Polycarbonate to PVC:		
Initial	N/mm² (psi)	5.03 (730)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	6.02 (873)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	4.61 (669)
Polycarbonate to ABS:		
Initial	N/mm² (psi)	4.79 (694)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	5.23 (758)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	5.19 (753)
Polycarbonate to Acrylic:		
Initial	N/mm² (psi)	4.68 (678)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	4.52 (656)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	4.55 (660)
Polycarbonate to Nylon:		
Initial	N/mm² (psi)	5.86 (850)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	5.32 (772)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	5.59 (811)
Polycarbonate to Valox:		
Initial	N/mm² (psi)	5.1 (740)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	5.03 (729)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	5.11 (741)

TYPICAL ENVIRONMENTAL RESISTANCE

Cured @ 30 mW/cm² @ 365 nm for 80 seconds using a metal halide light source

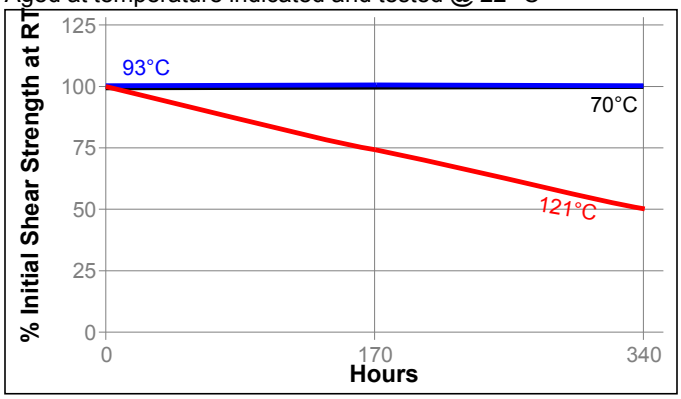
Lap Shear Strength, ISO 4587:

Polycarbonate to Polycarbonate:

0.5 mm gap

Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

		% of initial strength		
Environment	**°C**	**2 h**	**24 h**	**170 h**
Water	100	75	----------	----------
Water	49	----------	----------	60
Alcohol, Isopropyl	22	----------	95	----------
Heat/Humidity	38	----------	----------	80

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).

Directions for use

1. This product is light sensitive; exposure to daylight, UV light and artificial lighting should be kept to a minimum during storage and handling.
2. The product should be dispensed from applicators with black feedlines.
3. For best performance bond surfaces should be clean and free from grease.
4. 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.
5. Cooling should be provided for temperature sensitive substrates such as thermoplastics.
6. Crystalline and semi-crystalline thermoplastics should be checked for risk of stress cracking when exposed to liquid adhesive.
7. Excess adhesive can be wiped away with organic solvent.
8. Bonds should be allowed to cool before subjecting to any service loads.

Loctite Material Specification[LMS]

LMS dated September 01, 1995. Test reports for each batch are available for the indicated properties. LMS test reports include selected QC test parameters considered appropriate to specifications for customer use. Additionally, comprehensive controls are in place to assure product quality and consistency. Special customer specification requirements may be coordinated through Henkel Quality.

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

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
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·mm x 0.142 = oz·in
mPa·s = cP

Note

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