



# LOCTITE® 3103™

January 2009

## PRODUCT DESCRIPTION

LOCTITE® 3103™ provides the following product characteristics:

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

LOCTITE® 3103™ is primarily designed for bonding polycarbonate to itself, while not inducing stress cracking under typical molded stress levels. LOCTITE® 3103™ cures rapidly to form flexible, transparent bonds when exposed to ultraviolet light and/or visible light of sufficient irradiance and has shown excellent adhesion to a wide variety of substrates including glass, many plastics and most metals. The thixotropic nature of LOCTITE® 3103™ reduces the migration of liquid product after application to the substrate.

## TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.13
Refractive Index	1.48
Flash Point - See MSDS	
Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):	
Spindle 5, speed 20 rpm	8,000 to 14,500 <sup>LMS</sup>

## TYPICAL CURING PERFORMANCE

LOCTITE® 3103™ can be cured by exposure to UV and/or visible light of sufficient intensity. To obtain full cure on surfaces exposed to air, radiation @ 220 to 260 nm is also required. The speed of cure will depend upon the UV intensity and spectral distribution of the light source, the exposure time and the light transmittance of the substrates.

## Stress Cracking

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

Stress Cracking, ASTM D 3929, minutes:	
17 N/mm <sup>2</sup> stress on bar	>15

## Fixture Time

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm<sup>2</sup>.

UV Fixture Time, Glass microscope slides, seconds:

Black light, Zeta® 7500 light source:	
6 mW/cm <sup>2</sup> , measured @ 365 nm	≤18 <sup>LMS</sup>

UV Fixture Time, Polycarbonate, seconds:

Metal halide bulb (doped), Zeta® 7400:	
30 mW/cm <sup>2</sup> , measured @ 365 nm,	5 to 10

Electrodeless, H & V bulbs:

50 mW/cm <sup>2</sup> , measured @ 365 nm,	<5
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Electrodeless, D bulb:

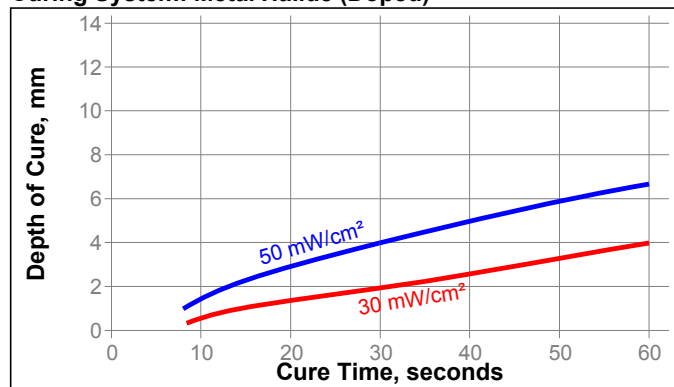
50 mW/cm <sup>2</sup> , measured @ 365 nm,	<5
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## Depth of Cure vs. Irradiance (365 nm)

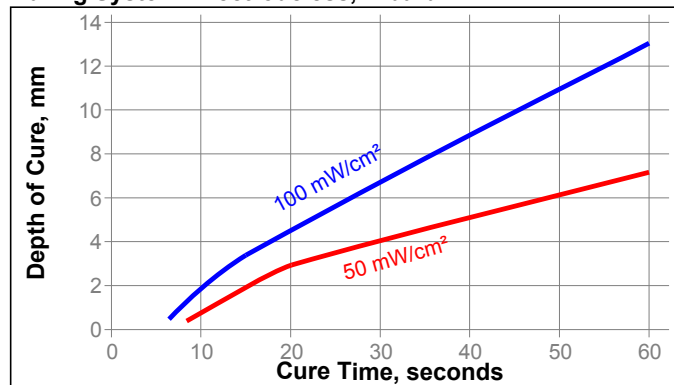
The graph below shows the increase in depth of cure with time at 50mW/cm<sup>2</sup> - 100mW/cm<sup>2</sup> as measured from the thickness of the cured pellet formed in a 15mm diameter PTFE die.

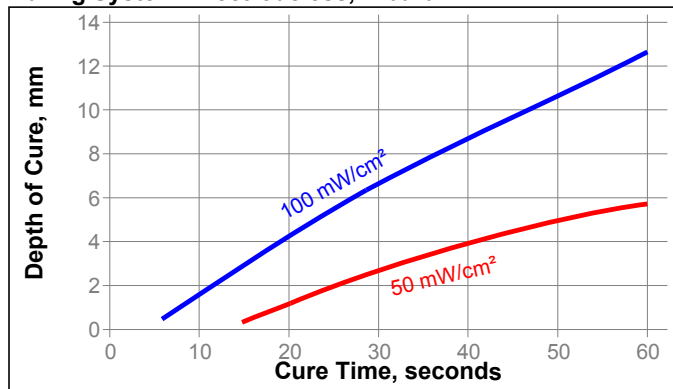
Note: When exposed to a V Bulb at irradiances of 50 and 100 mW/cm<sup>2</sup> for 30 to 60 seconds, a depth of cure greater than 13 mm was achieved. The performance for medium pressure Hg will be similar to Electrodeless system, H bulb.

### Curing System: Metal Halide (Doped)



### Curing System: Electrodeless, D bulb



**Curing System: Electrodeless, H bulb****TYPICAL PROPERTIES OF CURED MATERIAL**

Cured @ 30 mW/cm<sup>2</sup>, measured @ 365 nm, for 80 seconds using a glass filtered metal halide light source

**Physical Properties:**

Shore Hardness, ISO 868, Durometer D	51
Refractive Index	1.5
Water Absorption, ISO 62, %:	
2 hours in boiling water	2.72
Elongation, at break, ISO 527-3, %	260
Tensile Modulus, ISO 527-3	N/mm <sup>2</sup> 207 (psi) (30,000)
Tensile Strength, at break, ISO 527-3	N/mm <sup>2</sup> 17 (psi) (2,500)

**Electrical Properties:**

Surface Resistivity, IEC 60093, Ω·cm	8.7×10 <sup>14</sup>
Volume Resistivity, IEC 60093, Ω·cm	8.9×10 <sup>14</sup>
Dielectric Breakdown Strength, IEC 60243-1, 24 kV/mm	
Dielectric Constant / Dissipation Factor, IEC 60250:	
100 Hz	5.69 / 0.04
1 kHz	5.61 / 0.02
1 MHz	5.13 / 0.04

**TYPICAL PERFORMANCE OF CURED MATERIAL****Adhesive Properties**

Cured @ 30 mW/cm<sup>2</sup>, measured @ 365 nm, for 80 seconds using a metal halide light source, (samples with 0.5 mm gap).

Lap Shear Strength, ISO 4587:

Polycarbonate	N/mm <sup>2</sup> 11 (psi) (1,600)
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**TYPICAL ENVIRONMENTAL RESISTANCE**

Cured @ 30 mW/cm<sup>2</sup>, measured @ 365 nm, for 80 seconds using a metal halide light source, (samples with 0.5 mm gap).

Lap Shear Strength, ISO 4587:

Polycarbonate

**Heat Aging**

Aged at temperature indicated and tested @ 22 °C

Lap Shear Strength, ISO 4587, % of initial strength:

Polycarbonate:

Aged @ 71 °C for 170 hours	100
Aged @ 71 °C for 340 hours	100
Aged @ 93 °C for 170 hours	100
Aged @ 93 °C for 340 hours	100
Aged @ 121 °C for 170 hours	75
Aged @ 121 °C for 340 hours	60

**Chemical/Solvent Resistance**

Aged under conditions indicated and tested @ 22 °C.

Environment	°C	% of initial strength		
		2 h	24 h	170 h
Boiling water	100	70	-----	-----
Water immersion	49	-----	-----	60
Isopropanol immersion	22	-----	95	-----
Heat/humidity	38	-----	-----	75

**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. Recommended intensity for cure in bondline situation is 5 mW/cm<sup>2</sup> minimum (measured at the bondline) with an exposure time of 4-5 times the fixture time at the same intensity.
6. For dry curing of exposed surfaces, higher intensity UV is required (100 mW/cm<sup>2</sup>).
7. Cooling should be provided for temperature sensitive substrates such as thermoplastics.
8. Plastic grades should be checked for risk of stress cracking when exposed to liquid adhesive.
9. Excess uncured adhesive can be wiped away with organic solvent (e.g. Acetone).
10. Bonds should be allowed to cool before subjecting to any service loads.

**Loctite Material Specification<sup>LMS</sup>**

LMS dated November 30, 2001. 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**

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 $\text{kV/mm} \times 25.4 = \text{V/mil}$   
 $\text{mm} / 25.4 = \text{inches}$   
 $\mu\text{m} / 25.4 = \text{mil}$   
 $\text{N} \times 0.225 = \text{lb}$   
 $\text{N/mm} \times 5.71 = \text{lb/in}$   
 $\text{N/mm}^2 \times 145 = \text{psi}$   
 $\text{MPa} \times 145 = \text{psi}$   
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$   
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$   
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$   
 $\text{mPa}\cdot\text{s} = \text{cP}$

**Note**

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Reference 1.3