Technical Data Sheet

LOCTITE® AA 3104™

Known as LOCTITE® 3104™
January 2015

PRODUCT DESCRIPTION

LOCTITE® AA 3104™ provides the following product characteristics:

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

LOCTITE® AA 3104™ is primarily designed for bonding rigid or flexible PVC to polycarbonate. These characteristics enable easy assembly of components with close fitting tolerances (i.e. joining polycarbonate to flexible PVC tubing). The product has shown excellent adhesion to a wide variety of substrates including glass, many plastics and most metals.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.13
Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):	
Spindle 1, speed 20 rpm,	90 to 210[LMS]
Refractive Index, ASTM D542	1.48
Flash Point - See SDS	

TYPICAL CURING PERFORMANCE

LOCTITE® AA 3104™ 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 is then flexed to induce a known stress level.

Stress Cracking, ASTM D 3929, minutes:

7 N/mm² stress on bar	>15
12 N/mm² stress on bar	3 to 4

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 to PVC, seconds:

Zeta® 7400 light source, Metal Halide bulb (Indium):

30 mW/cm² , measured @ 400 nm	<5
50 mW/cm² , measured @ 400 nm	<5

Electrodeless system, V bulb:

50 mW/cm² , measured @ 400 nm	<5

Electrodeless system, H bulb:

50 mW/cm² , measured @ 365 nm,	<5

Electrodeless system, D bulb:

50 mW/cm² , measured @ 365 nm,	<5

UV Fixture Time, Glass microscope slides, seconds:

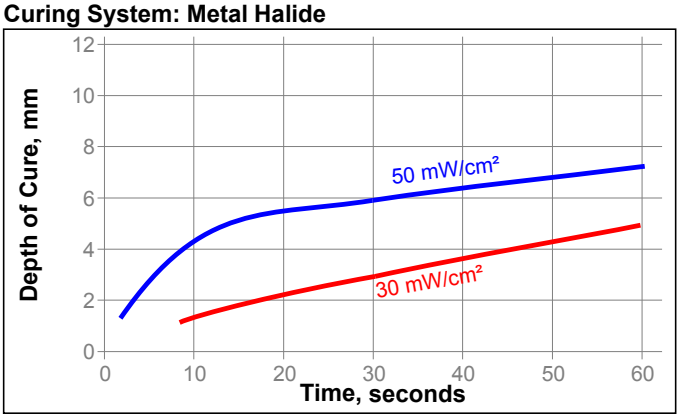
Black light, Zeta® 7500:

6 mW/cm² , measured @ 365 nm,	≤15[LMS]

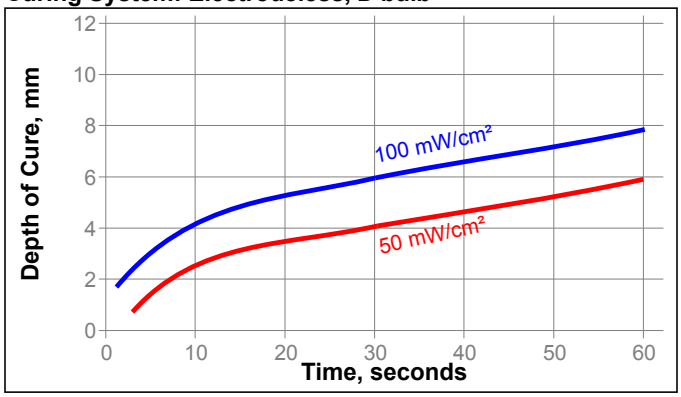
Depth of Cure

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® AA 3104™.

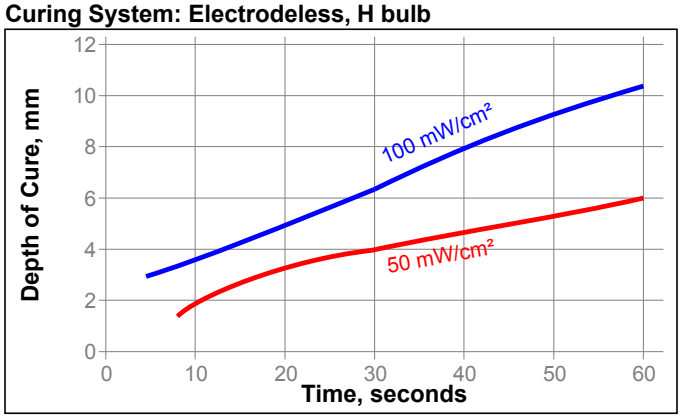
Curing System: Metal Halide



Curing System: Electrodeless, D bulb



Curing System: Electrodeless, H bulb



TYPICAL PROPERTIES OF CURED MATERIAL

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

Physical Properties:

Tensile Strength, at break, ISO 527-3	N/mm² (psi)	19 (2,755)
Tensile Modulus, ISO 527-3	N/mm² (psi)	738 (107,000)
Elongation, at break, ISO 527-3, %		50
Shore Hardness, ISO 868, Durometer D		69
Refractive Index, ASTM D542		1.51
Water Absorption, ISO 62, %:		
2 hours in boiling water		3

Electrical Properties:

Dielectric Constant / Dissipation Factor, IEC 60250:	
0.1 kHz	3.888 / 0.0445
1 kHz	3.78 / 0.0149
1,000 kHz	3.61 / 0.0254
Volume Resistivity, IEC 60093, Ω·cm	0.92×10^{15}
Surface Resistivity, IEC 60093, Ω	0.97×10^{15}
Dielectric Breakdown Strength, IEC 60243-1, kV/mm	34

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

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

Lap Shear Strength, ISO 4587:

Polycarbonate to Aluminum (etched):		
Initial	N/mm² (psi)	4.98 (722)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	4.14 (600)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	3.72 (539)
Polycarbonate to Aluminum (as received):		
Initial	N/mm² (psi)	3.61 (523)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	0.7 (101)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	0.84 (122)
Polycarbonate to Steel:		
Initial	N/mm² (psi)	3.19 (463)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	2.64 (383)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	3.13 (454)
Polycarbonate to Glass:		
Initial	N/mm² (psi)	3.25 (471)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	3.74 (543)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	3.68 (534)
Polycarbonate to Phenolic:		
Initial	N/mm² (psi)	3.3 (479)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	6.62 (525)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	4.19 (608)
Polycarbonate to Polycarbonate:		
Initial	N/mm² (psi)	21.8 (3,155)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	13.2 (1,910)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	9.85 (1,428)
Polycarbonate to Epoxyglass:		
Initial	N/mm² (psi)	3.66 (530)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm² (psi)	3.92 (568)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm² (psi)	2.63 (382)

Polycarbonate to PVC:

Initial	N/mm²	9.78
	(psi)	(1,418)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm²	11.4
	(psi)	(1,647)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm²	8.17
	(psi)	(1,185)

Polycarbonate to ABS:

Initial	N/mm²	22.0
	(psi)	(3,184)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm²	13.3
	(psi)	(1,926)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm²	9.62
	(psi)	(1,395)

Polycarbonate to Acrylic:

Initial	N/mm²	8.66
	(psi)	(1,256)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm²	8.3
	(psi)	(1,204)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm²	5.64
	(psi)	(818)

Polycarbonate to Nylon:

Initial	N/mm²	2.74
	(psi)	(397)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm²	3.2
	(psi)	(464)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm²	4.8
	(psi)	(696)

Polycarbonate to Polybutylene Terephthalate (PBT):

Initial	N/mm²	6.85
	(psi)	(993)
Aged @ 49 °C / condensed humidity for 300 hours	N/mm²	6.88
	(psi)	(997)
Aged @ 49 °C / condensed humidity for 500 hours	N/mm²	7.54
	(psi)	(1,094)

TYPICAL ENVIRONMENTAL RESISTANCE

Cured @ 30 mW/cm² , measured @ 365 nm, for 80 seconds

Lap Shear Strength, ISO 4587:

Polycarbonate:

0.5 mm gap

Heat Aging

Aged at temperature indicated and tested @ 22 °C

Lap Shear Strength, ISO 4587:

Polycarbonate:

% of initial strength retained

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

Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

		% of initial strength		
Environment	**°C**	**2 h**	**24 h**	**170 h**
Boiling water	100	100	----------	----------
Water immersion	49	----------	----------	100
Water immersion	87	----------	----------	35
Isopropanol	22	----------	100	----------
Heat/humidity	38	----------	----------	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 oxidizing materials.

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

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 October 02, 2000. 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
µm / 25.4 = mil
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·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

Note:
The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.
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Reference 1.2