

# LOCTITE® AA 3944™

Known as LOCTITE® 3944™  
January 2015

## PRODUCT DESCRIPTION

LOCTITE® AA 3944™ provides the following product characteristics:

|                             |                                    |
|-----------------------------|------------------------------------|
| <b>Technology</b>           | Acrylic                            |
| <b>Chemical Type</b>        | Acrylated urethane                 |
| <b>Appearance (uncured)</b> | Transparent to hazy liquid         |
| <b>Fluorescence</b>         | Positive under UV light            |
| <b>Components</b>           | One component – requires no mixing |
| <b>Viscosity</b>            | Medium                             |
| <b>Cure</b>                 | Ultraviolet (UV) / Visible light   |
| <b>Cure Benefit</b>         | Production - high speed curing     |
| <b>Application</b>          | Bonding                            |

LOCTITE® AA 3944™ is primarily designed for bonding plastic substrates where a flexible, tough bond is required. Its flexibility enhances the load bearing and shock absorbing characteristics of the bond area. It has also shown excellent adhesion to a wide variety of substrates including glass and most metals. Suitable for use in the assembly of **disposable medical devices**.

## ISO-10993

An ISO 10993 Test Protocol is an integral part of the Quality Program for LOCTITE® AA 3944™. LOCTITE® AA 3944™ has been qualified to Henkel's ISO 10993 Protocol as a means to assist in the selection of products for use in the medical device industry. Certificates of Compliance are available on Henkel's website or through the Henkel Quality Department.

## TYPICAL PROPERTIES OF UNCURED MATERIAL

|   |       |
|---|-------|
| Specific Gravity @ 25 °C  | 1.1   |
| Refractive Index  | 1.48  |
| Viscosity, Brookfield - RVT, 25°C , mPa·s (cP):<br>Spindle 4, speed 20 rpm, | 5,000 |

## TYPICAL CURING PERFORMANCE

LOCTITE® AA 3944™ can be cured by exposure to UV and/or visible light of sufficient intensity. To obtain full cure on surfaces exposed to air, radiation of 250 nm is also required. 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.

## 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:<br>6 mW/cm <sup>2</sup> , measured @ 365 nm | ≤7 |
|---|----|

## Tack Free Time

Tack Free Time is the time required to achieve a tack free surface.

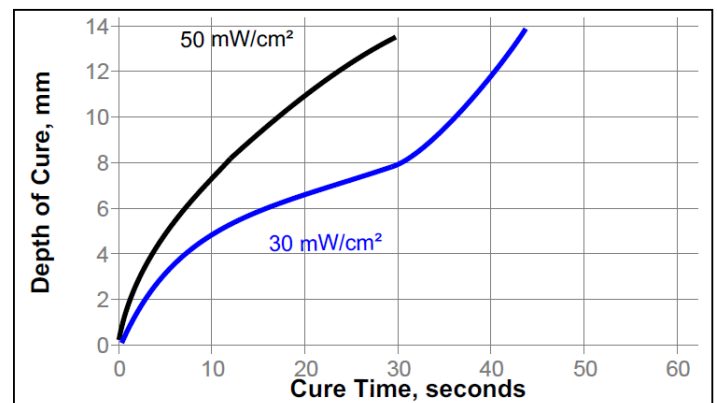
Tack Free Time, seconds:

|  |          |
|--|----------|
| Metal halide bulb:                         |          |
| 30 mW/cm <sup>2</sup> , measured @ 365 nm  | <5       |
| 50 mW/cm <sup>2</sup> , measured @ 365 nm  | <5       |
| 50 mW/cm <sup>2</sup> , measured @ 400 nm  | 20 to 30 |
| Electrodeless, H bulb:                     |          |
| 100 mW/cm <sup>2</sup> , measured @ 365 nm | <5       |
| Electrodeless, D bulb:                     |          |
| 100 mW/cm <sup>2</sup> , measured @ 365 nm | <5       |
| Electrodeless, V bulb:                     |          |
| 250 mW/cm <sup>2</sup> , measured @ 400 nm | <5       |
| Medium pressure mercury arc:               |          |
| 100 mW/cm <sup>2</sup> , measured @ 365 nm | <5       |

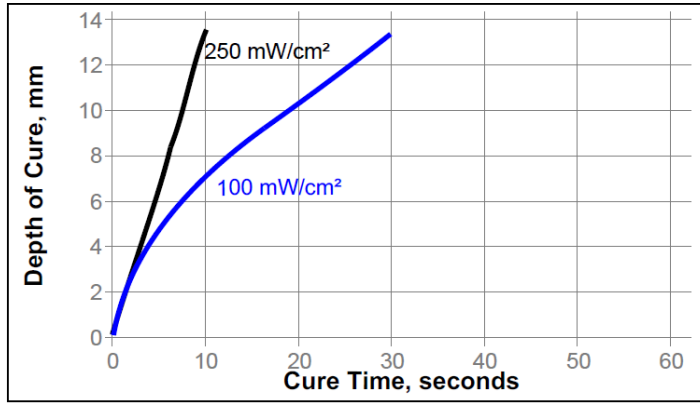
## Depth of Cure vs. Irradiance (365 nm)

The graphs below show the increase in depth of cure with time as measured from the thickness of the cured product formed in a 15mm diameter PTFE die. When exposed to a V Bulb at irradiances of 250 and 500 mW/cm<sup>2</sup> for 10 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.

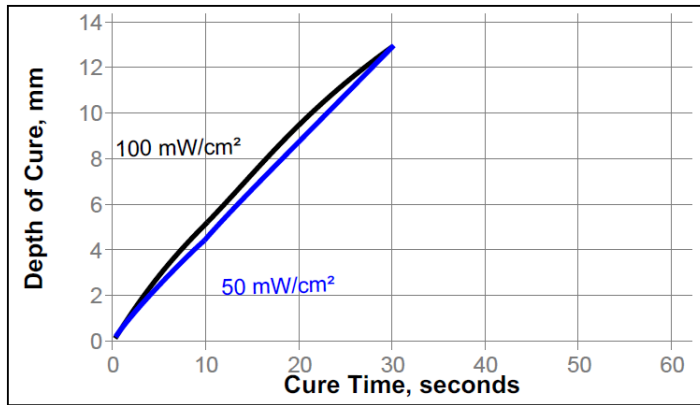
## Curing System: Metal Halide



**Curing System: Electrodeless, D bulb**



**Curing System: Electrodeless, H bulb**



**TYPICAL PROPERTIES OF CURED MATERIAL**

25 mW/cm², measured @ 365 nm, for 15 seconds per side, using a metal halide light source

**Physical Properties:**

|  |                   |                      |
|--|-------------------|----------------------|
| Coefficient of Thermal Expansion, ISO 11359-2, K <sup>-1</sup> |                   |                      |
| Pre Tg   |                   | 125x10 <sup>-6</sup> |
| Post Tg  |                   | 190x10 <sup>-6</sup> |
| Water Absorption, ISO 62, %                                    |                   |                      |
| 2 hours in boiling water                                       |                   | 8.17                 |
| Refractive Index   |                   | 1.5                  |
| Elongation, at break, ISO 527-3, %                             |                   | 86                   |
| Tensile Strength, at break, ISO 527-3                          | N/mm <sup>2</sup> | 20.7                 |
|  | (psi)             | (3,000)              |
| Tensile Modulus, ISO 527-3                                     | N/mm <sup>2</sup> | 393                  |
|  | (psi)             | (57,000)             |

**TYPICAL PERFORMANCE OF CURED MATERIAL**

**Adhesive Properties:**

Cured @ 50 mW/cm², measured @ 365 nm, for 10 seconds using a Zeta® 7200 light source.

|                                  |                   |          |
|----------------------------------|-------------------|----------|
| Block Shear Strength, ISO 13445: | N/mm <sup>2</sup> | ≥10.3    |
| Polycarbonate to Polycarbonate   | (psi)             | (≥1,493) |

Cured @ 50 mW/cm², measured @ 365 nm, for 30 seconds using a metal halide light source.

Block Shear Strength, ISO 13445:

|   |                   |         |
|---|-------------------|---------|
| Polycarbonate to Polycarbonate  | N/mm <sup>2</sup> | 18.0    |
|   | (psi)             | (2,610) |
| Polycarbonate to PVC  | N/mm <sup>2</sup> | 11.8    |
|   | (psi)             | (1,710) |
| Polycarbonate to ABS  | N/mm <sup>2</sup> | 6.1     |
|   | (psi)             | (880)   |
| Polycarbonate to Steel  | N/mm <sup>2</sup> | 4.8     |
|   | (psi)             | (700)   |
| Polycarbonate to Aluminum   | N/mm <sup>2</sup> | 1.6     |
|   | (psi)             | (230)   |
| Polycarbonate to Nylon  | N/mm <sup>2</sup> | 2.0     |
|   | (psi)             | (290)   |
| Polycarbonate to Glass  | N/mm <sup>2</sup> | 3.6     |
|   | (psi)             | (520)   |
| Polycarbonate to Polycarbonate:<br>Aged @ 49 °C / 100% RH for 4 weeks | N/mm <sup>2</sup> | 6.7     |
|   | (psi)             | (970)   |
| Polycarbonate to PVC:<br>Aged @ 49 °C / 100% RH for 4 weeks           | N/mm <sup>2</sup> | 9.7     |
|   | (psi)             | (1,410) |
| Polycarbonate to ABS:<br>Aged @ 49 °C / 100% RH for 4 weeks           | N/mm <sup>2</sup> | 3.0     |
|   | (psi)             | (435)   |
| Polycarbonate to Steel:<br>Aged @ 49 °C / 100% RH for 4 weeks         | N/mm <sup>2</sup> | 2.5     |
|   | (psi)             | (360)   |

**TYPICAL ENVIRONMENTAL RESISTANCE**

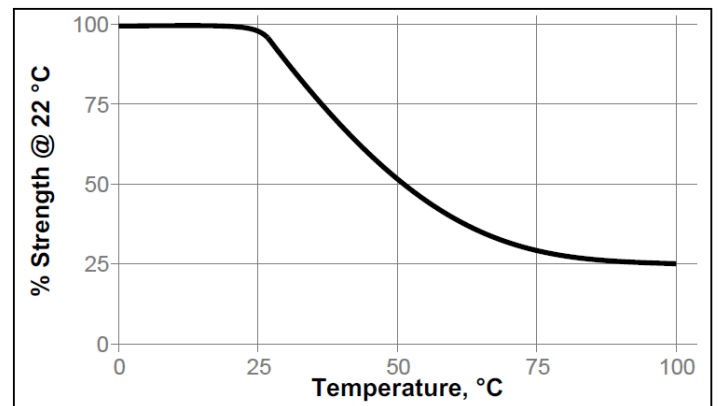
Cured @ 50 mW/cm², measured @ 365 nm, for 30 seconds using a metal halide light source.

Block Shear Strength, ISO 13445:

Polycarbonate to Polycarbonate

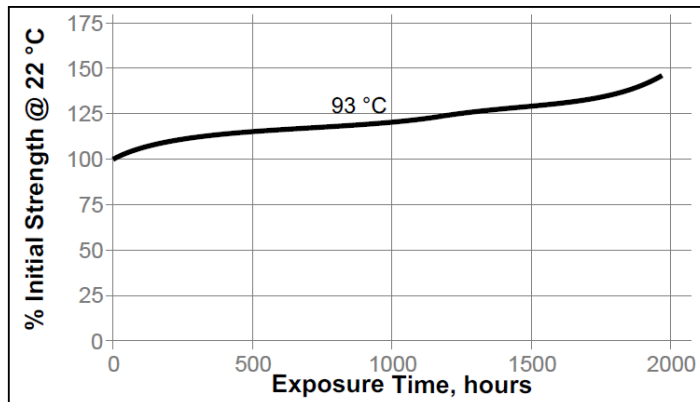
**Hot Strength**

Tested at temperature



**Heat Aging**

Aged at temperature indicated and tested @ 22 °C.

**Chemical/Solvent Resistance**

Aged under conditions indicated and tested @ 22 °C.

**Polycarbonate to Polycarbonate**

| Environment             | °C | % of initial strength |        |
|-------------------------|----|-----------------------|--------|
|                         |    | 500 h                 | 1000 h |
| Unleaded gasoline       | 22 | 75                    | 45     |
| Motor oil (MIL-L-46152) | 65 | 100                   | 75     |
| Salt fog                | 35 | 125                   | 70     |
| Isopropanol             | 22 | 55                    | 25     |

**Polycarbonate to Steel**

| Environment             | °C | % of initial strength |        |
|-------------------------|----|-----------------------|--------|
|                         |    | 500 h                 | 1000 h |
| Unleaded gasoline       | 22 | 20                    | 25     |
| Motor oil (MIL-L-46152) | 65 | 100                   | 70     |

**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 transmission of the substrate through which the radiation must pass.
5. Cooling should be provided for temperature sensitive substrates such as thermoplastics.
6. Plastic grades should be checked for risk of stress cracking when exposed to liquid adhesive.
7. Excess uncured adhesive can be wiped away with organic solvent (e.g. Acetone).
8. Bonds should be allowed to cool before subjecting to any service loads.

**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:**

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.

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Reference 1.1