



# LOCTITE® 3504™

February 2010

## PRODUCT DESCRIPTION

LOCTITE® 3504™ provides the following product characteristics:

<b>Technology</b>	Acrylic
<b>Chemical Type</b>	Urethane methacrylate
<b>Appearance (uncured)</b>	Amber liquid <sup>LMS</sup>
<b>Components</b>	One component - requires no mixing
<b>Viscosity</b>	Medium
<b>Cure</b>	Anaerobic
<b>Secondary Cure</b>	UV
<b>Cure Benefit</b>	Room temperature cure
<b>Application</b>	Bonding

LOCTITE® 3504™ typical applications include bonding ferrites to plated materials in electric motors, loudspeaker hardware and jewelry where fast fixturing is required and where product outside the bondline must be completely cured.

## TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.1
Flash Point - See MSDS	
Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP): Spindle 3, speed 20 rpm	800 to 1,300 <sup>LMS</sup>

## TYPICAL CURING PERFORMANCE

LOCTITE® 3504™ can be cured when exposed to UV radiation of 365 nm. To obtain full cure on surfaces exposed to air, radiation at 250 nm is also required. The speed of cure will depend on the UV intensity as measured at the product surface. Typical cure condition is 20 to 30 seconds at 100 mW/cm<sup>2</sup> using a medium pressure, quartz envelope, mercury vapour UV lamp.

### 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:	
6 mW/cm <sup>2</sup> , measured @ 365 nm	≤20 <sup>LMS</sup>
10 mW/cm <sup>2</sup> , measured @ 365 nm	8
100 mW/cm <sup>2</sup> , measured @ 365 nm	5

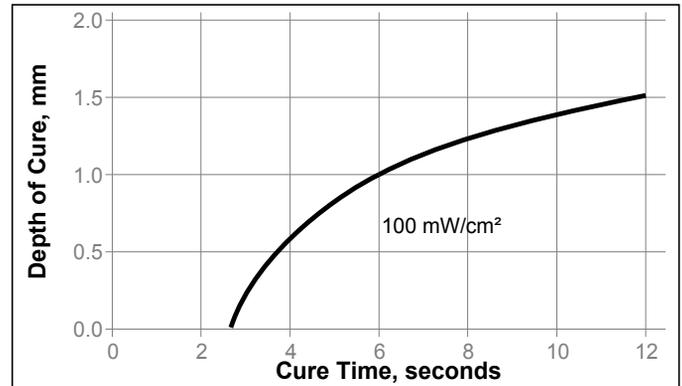
### Tack Free Time

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

Tack Free Time, seconds:	
100 mW/cm <sup>2</sup> , measured @ 365 nm	20

## Depth of Cure vs. Intensity

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



## TYPICAL PROPERTIES OF CURED MATERIAL

### Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K <sup>-1</sup>	80×10 <sup>-6</sup>
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)	0.1
Shore Hardness, ISO 868, Durometer D	45

### Electrical Properties:

Dielectric Breakdown Strength, IEC 60243-1, kV/mm	30
Volume Resistivity, IEC 60093, Ω·cm	2×10 <sup>13</sup>
Dielectric Constant / Dissipation Factor, IEC 60250:	
100 Hz	5.3 / 0.03
1 kHz	5.3 / 0.03
10 kHz	5.3 / 0.03

## TYPICAL PERFORMANCE OF CURED MATERIAL

### Adhesive Properties

Cured for 20 seconds @ 100 mW/cm <sup>2</sup> , measured @ 365 nm	
Tensile Strength, ISO 6922:	
Steel pin to Glass	N/mm <sup>2</sup> 10 (psi) (1,450)

Cured for 24 hours @ 22 °C, Activator 7649™ on 1 side and 0.05 mm gap	
Lap Shear Strength, ISO 4587:	
Steel (grit blasted)	N/mm <sup>2</sup> ≥22 <sup>LMS</sup> (psi) (≥3,200)

## TYPICAL ENVIRONMENTAL RESISTANCE

Cured @ 100 mW/cm <sup>2</sup> , measured @ 365 nm, for 20 seconds plus 1 week @ 22 °C	
Lap Shear Strength, ISO 4587:	
Steel (grit blasted)	



**Chemical/Solvent Resistance**

Aged under conditions indicated and tested @ 22 °C.

Environment	°C	% of initial strength
		500 h
100% RH	50	50
Leaded Petrol	22	60
Transmission fluid	87	100
Water/glycol 50/50	87	40
Phosphate ester	87	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 Material Safety Data Sheet (MSDS).**

Where aqueous washing systems are used to clean the surfaces before bonding, it is important to check for compatibility of the washing solution with the adhesive. In some cases these aqueous washes can affect the cure and performance of the adhesive.

This product is not normally recommended for use on plastics (particularly thermoplastic materials where stress cracking of the plastic could result). Users are recommended to confirm compatibility of the product with such substrates.

**Directions for use:**

1. LOCTITE® 3504™ is UV 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<sup>LMS</sup>**

LMS dated December 02, 2005. 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 1.2