Technical Data Sheet

LOCTITE® 3851™

January 2009

PRODUCT DESCRIPTION

LOCTITE® 3851™ provides the following product characteristics:

Technology	Acrylic
Chemical Type	Urethane methacrylate
Appearance (uncured)	Pale yellow liquid[LMS]
Components	One component - requires no mixing
Viscosity	Medium
Cure	Ultraviolet (UV) light
Secondary Cure	Anaerobic with activator
Cure Benefit	Production - high speed curing
Application	Bonding
Maximum Gap	0.25 mm

LOCTITE® 3851™ typical applications include bonding glass to metal for structural or decorative purposes, particularly where some parts of the bondline are shaded from UV light.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C 1.1

Flash Point - See SDS

Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):

Spindle 4, speed 20 rpm, 3,000 to 7,000[LMS]

TYPICAL CURING PERFORMANCE

This product is cured when exposed to UV radiation of 365nm. To obtain a full cure on surfaces exposed to air, radiation at 250nm is also required. The speed of cure will depend on the UV intensity as measured at the product surface.

Fixture Time

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm² .

UV Fixture Time, Glass, seconds:

Medium Pressure Hg Arc bulb, Zeta® 7200 light source:

10 mW/cm² , measured @ 365 nm 9

100 mW/cm² , measured @ 365 nm 6

Fixture Time, ISO 4587, seconds:

Steel (grit blasted), with Activator 7649™ on 2 sides ≤25[LMS]

Tack Free Time

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

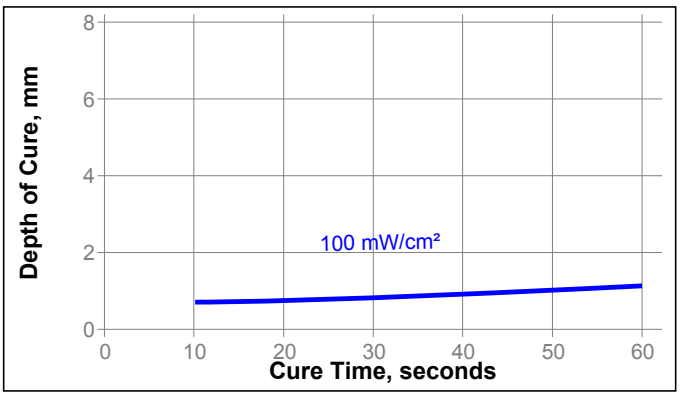
Tack Free Time, seconds:

Medium Pressure Hg Arc bulb, Zeta® 7200 light source:

100 mW/cm² , measured @ 365 nm,, 0.1 mm film ≤20[LMS]

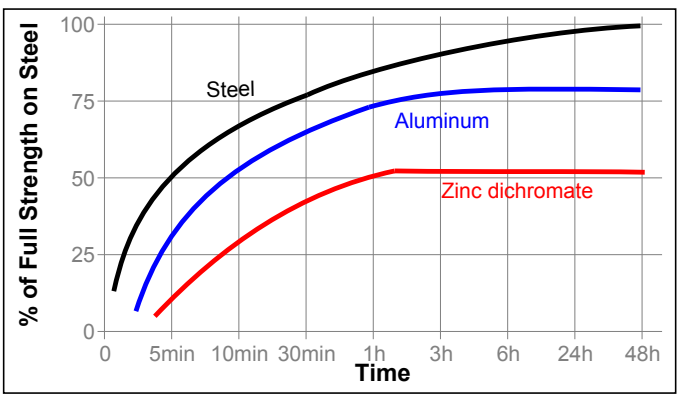
Depth of Cure

The graph below shows the increase in depth of cure with time at 100mW/cm² as measured from the thickness of the cured pellet formed in a 15mm diameter PTFE die.



Cure Speed vs. Substrate

The rate of cure will depend on the substrate used. The graph below shows the shear strength developed with time on grit blasted steel lap shears compared to different materials and tested according to ISO 4587. (Activator 7649 applied to one surface).



TYPICAL PROPERTIES OF CURED MATERIAL

Cured @ 150 mW/cm² , measured @ 365 nm, for 30 seconds per side

Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K^{-1}	100×10^{-6}
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)	0.1
Shore Hardness, ISO 868, Durometer A	60
Specific Heat, kJ/(kg·K)	0.3
Water Absorption, ISO 62, %:	
24 hours in water @ 22 °C	0.9
1 hour in water @ 100 °C	1.3

Electrical Properties:

Surface Resistivity, IEC 60093, Ω	4×10^{14}
Volume Resistivity, IEC 60093, Ω·cm	9×10^{13}
Dielectric Breakdown Strength, IEC 60243-1, kV/mm	60
Dielectric Constant / Dissipation Factor, IEC 60250:	
1 kHz	4.2 / 0.03
100 kHz	3.7 / 0.04
1 MHz	3.5 / 0.04
10 MHz	3.3 / 0.05

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured @ 100 mW/cm² , measured @ 365 nm, for 60 seconds plus 24 hours @ 22 °C

Tensile Strength, ISO 6922:

Steel pin (grit blasted) to Soda glass	N/mm² (psi)	8 to 26 (1,160 to 3,770)
Zinc dichromate to Soda glass	N/mm² (psi)	4 to 15 (580 to 2,175)
Aluminum to Soda glass	N/mm² (psi)	5 to 20 (725 to 2,900)

Cured for 24 hours @ 22 °C

Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm² (psi)	5 to 20 (725 to 2,900)
Steel (grit blasted), with Activator 7649™ on 1 side	N/mm² (psi)	10 to 25[LMS] (1,450 to 3,625)

Cured for 168 hours @ 22 °C

Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm² (psi)	10 to 20 (1,450 to 2,900)
Steel (grit blasted), with Activator 7649™ on 1 side	N/mm² (psi)	10 to 20 (1,450 to 2,900)

TYPICAL ENVIRONMENTAL RESISTANCE

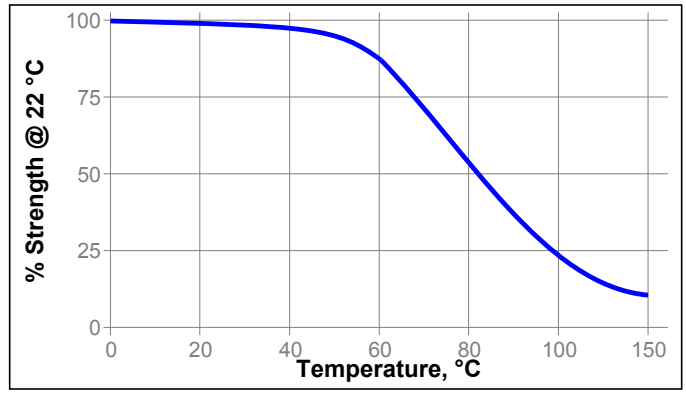
After 24 hours at @ 22 °C, Activator 7649™ on 1 side

Lap Shear Strength, ISO 4587:

Steel (grit blasted)

Hot Strength

Tested at temperature

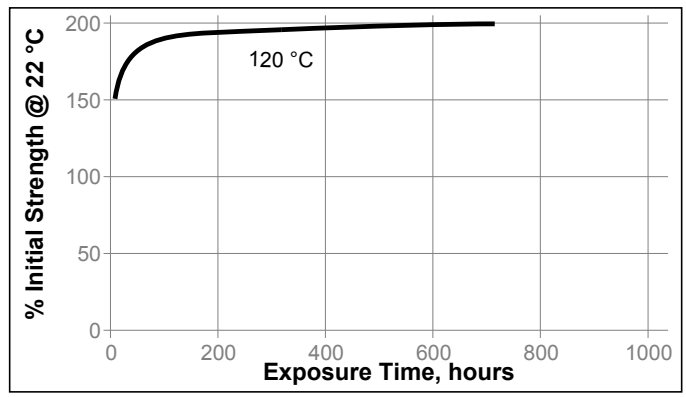


Heat Aging

100 mW/cm² , measured @ 365 nm, for 60 seconds plus 1 week @ 22 °C

Tensile Strength, ISO 6922:

Steel (grit blasted) to Soda glass



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

		% of initial strength		
Environment	**°C**	**100 h**	**500 h**	**1000 h**
95% RH	22	100	100	100
1,1,1 Trichloroethane	40	100	80	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).

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. 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/cm² 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/cm²).
7. Cooling should be provided for temperature sensitive substrates such as thermoplastics.
8. Crystalline and semi-crystalline thermoplastics should be checked for risk of stress cracking when exposed to liquid adhesive.
9. Excess adhesive can be wiped away with organic solvent.
10. Bonds should be allowed to cool before subjecting to any service loads.

Loctite Material Specification[LMS]

LMS dated July 28, 1998. 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