LOCTITE® 3011™

June 2009

PRODUCT DESCRIPTION

LOCTITE® 3011™ provides the following product characteristics:

Technology	Acrylic
Chemical Type	Acrylate
Appearance (uncured)	Transparent, pale straw colored liquid[LMS]
Components	One component - requires no mixing
Viscosity	Low
Cure	Ultraviolet (UV) light
Cure Benefit	Production - high speed curing
Application	Bonding

LOCTITE® 3011™ is designed for bonding and sealing clear plastic to metal substrates (e.g. disposable medical devices). Low viscosity makes it ideal for applications where wicking of the adhesive into pre-assembled parts is required or for components with close fitting tolerances. 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® 3011™. LOCTITE® 3011™ 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	1.03
Flash Point - See MSDS	
Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):	
Spindle 1, speed 20 rpm	60 to 120[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. Typical cure condition is 20-30 seconds at 100mW/cm² using a medium pressure, quartz envelope, mercury vapor lamp.

Fixture Time

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

UV Fixture Time, Glass microscope slides, seconds:

Black light, Zeta® 7500 light source:	
6 mW/cm² , measured @ 365 nm	≤10[LMS]
Medium pressure mercury arc:	
100 mW/cm² , measured @ 365 nm	≤5

Surface Cure

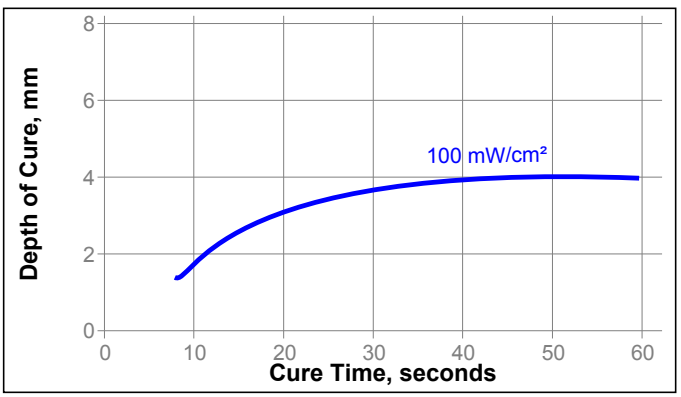
Tack Free Time is the time in seconds required to achieve a tack free surface

Tack Free Time, seconds:

Medium pressure mercury arc:	
100 mW/cm² , measured @ 365 nm,	5 to 10

Depth of Cure vs. Intensity

The graph below shows the increase in depth of cure with time at 100 mW/cm² 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^{-1}		100×10^{-6}
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)		0.1
Glass Transition Temperature, ASTM E 228, °C		45
Volume Shrinkage, %		8
Shore Hardness, ISO 868, Durometer D		68
Elongation, at break, ISO 527-3, %		160
Tensile Strength, at break, ISO 527-3	N/mm²	9
	(psi)	(1,300)
Tensile Modulus, ISO 527-3	N/mm²	420
	(psi)	(61,000)

UV Depth of Cure, mm:
100 mW/cm² , measured @ 365 nm, for 20 seconds ≥0.8[LMS]

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured @ 100 mW/cm² , measured @ 365 nm, for 40 seconds
Lap Shear Strength, ISO 4587:

PVC to Glass	N/mm²	1 to 5
	(psi)	(145 to 725)
Polycarbonate to Glass	N/mm²	1 to 5
	(psi)	(145 to 725)
ABS to Glass	N/mm²	1 to 5
	(psi)	(145 to 725)

Tensile Strength, ISO 6922:

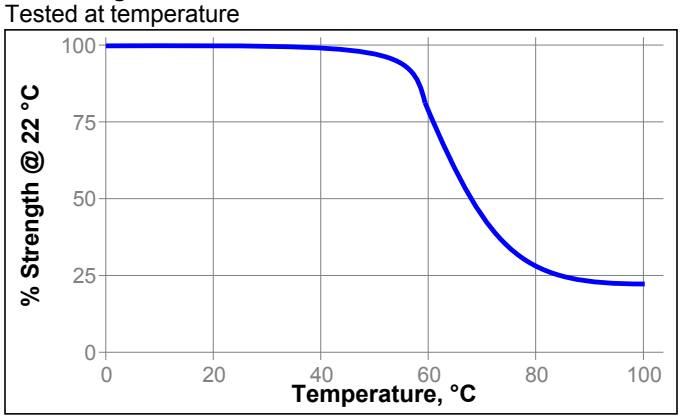
Steel pin (grit blasted) to Glass	N/mm²	5 to 15
	(psi)	(725 to 2,175)

TYPICAL ENVIRONMENTAL RESISTANCE

Cured @ 100 mW/cm² , measured @ 365 nm, for 10 seconds plus 1 week @ 22 °C
Tensile Strength, ISO 6922:
Steel pin (grit blasted) to Glass

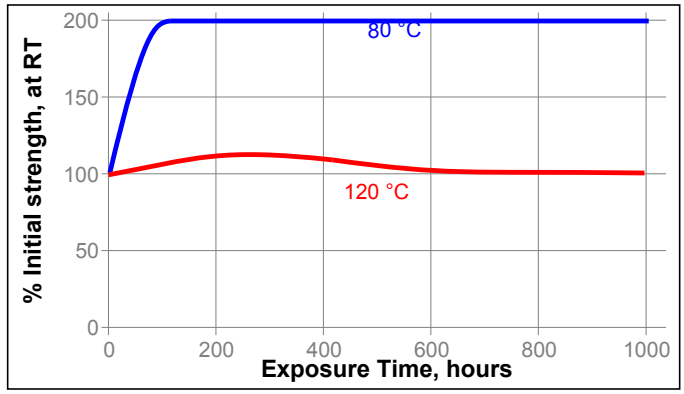
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

		% of initial strength		
Environment	**°C**	**100 h**	**500 h**	**1000 h**
Heat/humidity 90% RH	40	65	40	30
Gasoline	22	85	85	85
Freon TA	22	85	75	0
Industrial methylated spirits	22	80	10	0

Effects of Sterilization

In general, products similiar in composition to LOCTITE® 3011™ subjected to standard sterilization methods, such as EtO and Gamma Radiation (25 to 50 kiloGrays cumulative) show excellent bond strength retention. LOCTITE® 3011™ maintains bond strength after 1 cycle of steam autoclave. It is recommended that customers test specific parts after subjecting them to the perferred sterilization method. Consult with Loctite® for a product recommendation if your device will see more than 3 sterilization cycles.

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/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. 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[LMS]

LMS dated February 19, 2003. 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 data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

Trademark usage

Reference 1.1