LOCTITE® 3936™

July 2005

PRODUCT DESCRIPTION

LOCTITE® 3936™ provides the following product characteristics:

Technology	Acrylic
Chemical Type	UV acrylic
Appearance (uncured)	Transparent to slightly hazy liquid[LMS]
Fluorescence	Positive under UV light[LMS]
Components	One component - requires no mixing
Viscosity	Medium
Cure	Ultraviolet (UV)/ visible light
Cure Benefit	Production - high speed curing
Application	Bonding

LOCTITE® 3936™ is suitable for a wide variety of applications that require fast cure, flexibility, high adhesion and autoclave resistance. LOCTITE® 3936™ cures in seconds when exposed to light of the proper wavelength and intensity and achieves excellent adhesion to glass, plastics and metal. The ability of this product to fluoresce under black light facilitates inspection of bonded assemblies for adhesive presence. LOCTITE® 3936™ was specifically designed for bonding stainless steel cannulae into hubs, syringes and lancets for needle assemblies. The viscosity of this product makes the adhesive well suited for applications where the adhesive will be dispensed on the cannulae before assembly with the hub, needles with large gaps, or cannulae that end in the core pinbore to minimize the potential for blocking cannulae. 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® 3936™. LOCTITE® 3936™ has been qualified to Loctite'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 at www.loctite.com or through the Henkel Loctite Quality Department.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.1
Flash Point - See MSDS	
Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):	
Spindle 5, speed 20 rpm	8,000 to 14,000[LMS]

TYPICAL CURING PERFORMANCE

Fixture Time

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

UV Fixture Time, ISO 4587, Glass microscope slides, seconds:

Black light:	
6 mW/cm² @ 365 nm	≤15[LMS]
Zeta® 7410 light source:	
30 mW/cm² @ 365 nm	<5
Fusion® D light source:	
100 mW/cm² @ 365 nm	<5

Tack Free Time

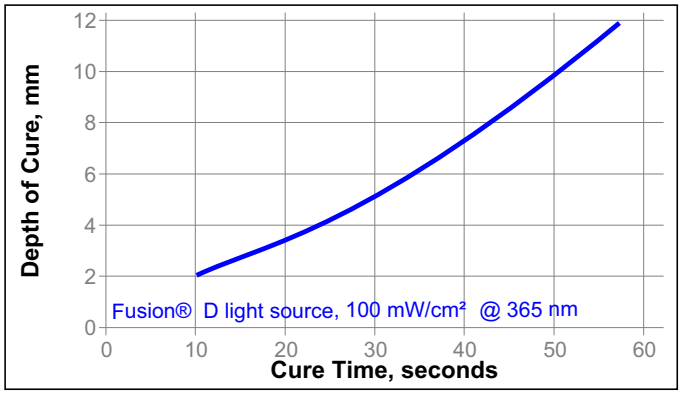
Tack Free Time is the time required to achieve a tack free surface.

Tack Free Time, seconds:

Zeta® 7410 light source:	
30 mW/cm² @ 365 nm	>60
Fusion® D light source:	
100 mW/cm² @ 365 nm	>60

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 product formed in an aluminum weighing dish.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured @ 100 mW/cm² @ 365 nm for 30 seconds per side using a Fusion® D light source

Physical Properties:

Coefficient of Thermal Expansion, ASTM D 696, K^{-1}:		
Pre Tg		111
Post Tg		203
Glass Transition Temperature, ASTM E 228, °C		66
Water Absorption, ISO 62, %:		
2 hours in boiling water		4.1
7 days in water @ 22 °C		3.0
Linear Shrinkage, %		1.8
Shore Hardness, ISO 868, Durometer D		55
Elongation, at break, ISO 527, %		300
Tensile Strength, ISO 527	N/mm²	19
	(psi)	(2,780)
Tensile Modulus, ISO 527	N/mm²	169
	(psi)	(24,500)

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured @ 1,000 mW/cm² @ 365 nm for 10 seconds using a Fusion® D light source

Needle Pullout Strength:

Material	22 Gauge Cannula	27 Gauge Cannula
ABS	N 98	N 76
	(lb) (22)	(lb) (17)
Acrylic	N 102	N 71
	(lb) (23)	(lb) (16)
Polycarbonate	N 147	N 71
	(lb) (33)	(lb) (16)
Polyethylene	N 31	N 36
	(lb) (7)	(lb) (8)
Polyethylene (plasma treated)	N 76	N 76
	(lb) (17)	(lb) (16)
Polypropylene	N 80	N 44
	(lb) (18)	(lb) (10)
Polypropylene (plasma treated)	N 80	N 71
	(lb) (18)	(lb) (16)
Polystyrene	N 138	N 71
	(lb) (31)	(lb) (16)
Polyurethane	N 111	N 62
	(lb) (25)	(lb) (14)

Cured @ 100 mW/cm² @ 365 nm for 30 seconds

Block Shear Strength, ISO 13445:

Acrylic to Glass	N/mm²	6.1
	(psi)	(880)
Acrylic to Acrylic	N/mm²	4.6
	(psi)	(670)
G-10 Epoxyglass to Glass	N/mm²	8.1
	(psi)	(1,170)
Nylon to Glass	N/mm²	5.4
	(psi)	(790)
Polybutylene Terephthalate to Glass	N/mm²	4.8
	(psi)	(690)
Polycarbonate to Polycarbonate	N/mm²	19.0
	(psi)	(2,760)
Polyvinylchloride to Glass	N/mm²	5.7
	(psi)	(830)
Aluminum (grit blasted) to Glass	N/mm²	7.9
	(psi)	(1,140)
Steel (grit blasted) to Glass	N/mm²	9.7
	(psi)	(1,400)

TYPICAL ENVIRONMENTAL RESISTANCE

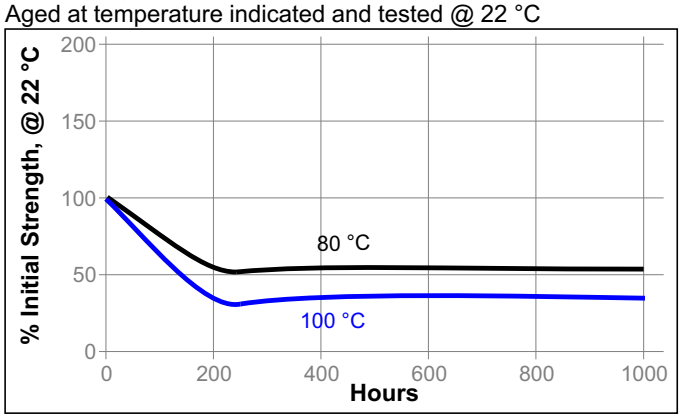
Cured @ 100 mW/cm² @ 365 nm for 30 seconds

Block Shear Strength, ISO 13445:

Polycarbonate

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**	**24 h**	**100 h**	**500 h**	**1000 h**
95% RH	40	-----	65	30	25
Water immersion	22	-----	70	55	45
Isopropanol	22	75	-----	-----	-----
Heptane	22	90	-----	-----	-----

Thermal Stability of Needle Assemblies

Aged @ 60°C and tested @ 22 °C

Needle Pullout Strength, % of initial strength	**4 weeks**	**8 weeks**:
Polycarbonate:		
22 Gauge Cannula	105	100
27 Gauge Cannula	85	85
Polypropylene (plasma treated):		
22 Gauge Cannula	85	90
27 Gauge Cannula	60	105
Polystyrene:		
22 Gauge Cannula	95	100
27 Gauge Cannula	135	125

Sterilization Resistance of Needle Assemblies

Sterilized as indicated and tested @ 22 °C

Needle Pullout Strength, % of initial strength:

	Gamma	**ETO**	**Autoclave**	
	30kGy	1 Cycle	1 Cycle	5 Cycles
Polycarbonate:				
22 Gauge Cannula	65	105	100	65
27 Gauge Cannula	150	115	90	40
Polypropylene (plasma treated):				
22 Gauge Cannula	95	110	85	75
27 Gauge Cannula	135	120	115	100
Polystyrene:				
22 Gauge Cannula	55	95	----	----
27 Gauge Cannula	185	120	----	----

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. 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.

Loctite Material Specification[LMS]

LMS dated April 24, 2001. 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

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Trademark usage

Reference 1.0