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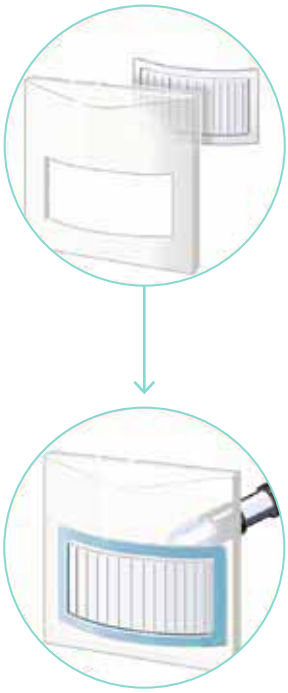
Product Selector

Industrial Adhesive, Sealant and
Functional Coating Solutions

Henkel

Issue 3

Light Cure Adhesives
For Fast Processing



Why use a LOCTITE Light Cure Adhesive?

In addition to their excellent bonding characteristics and transparency, light cure adhesives also provide unique processing advantages and process cost reduction benefits. When exposed to sufficient light of the appropriate wavelength, they cure very rapidly and allow fast production cycles, in-line quality control and fast cycling to subsequent process steps.

LOCTITE light cure equipment is engineered to match the adhesives with respect to intensity and radiation spectrum, and suits specific part size and manufacturing process requirements.

Advantages of LOCTITE Light Cure Adhesives

Cure on demand
- Material remains liquid until exposed to light systems, then cures in seconds
- Allows time to align parts precisely prior to cure
- Choice of cure system determines cure time

High speed of cure
- Achieves high process speeds for maximum throughput
- Fast cycling to subsequent process steps

Optical clarity
- Ideal for bonding clear and transparent substrates with perfect aesthetic finish
- Greatly expands the design options

Quality assurance
- Product presence monitoring by fluorescence
- Fast-snap cure allows 100% in-line inspection
- Monitoring functions for cure parameters

One part systems
- Automated accurate dispensing
- No need to measure or mix, no working life concerns
- Solvent-free

Choosing the Right LOCTITE Light Cure Adhesive

To ensure reliable curing, it is essential that the light reaches the adhesive. At least one of the bonded parts must be transparent to the curing wavelength of the adhesive selected. For UV-stabilised plastics, for example, visible light cure adhesives should be selected.

Dual cure capability, triggered by heat or activator, or as moisture or anaerobic cure, can also be provided to cure adhesives in shaded areas. Dual cure expands the benefits of light cure technology to non-transparent substrates and other application areas.

The targeted radiation wavelength is another key factor. Visible light offers a safer working environment. Light cure adhesives are designed to cure solely with low-energy light in the visible spectrum. This eliminates the need for ventilation, reduces energy usage, and saves money due to fewer replacement parts, as well as reduced maintenance and repair.

Last but not least, adhesive performance is an important factor to consider. LOCTITE light cure adhesives cover the broadest range of adhesive technologies:

LOCTITE Light Cure Adhesive Technologies

- Light cure acrylics offer the most extensive variety of properties of all light cure chemistries. A transparency equal to glass and clear plastics, as well as versatile adhesion characteristics are among their most notable properties
- Light cure silicones, which cure into soft, flexible thermoset elastomers, are excellent for elastic bonding, sealing and leak-proofing
- Light cure cyanoacrylates offer outstanding plastic bonding capabilities combined with rapid cure at low-intensity light irradiation
- Light cure anaerobics show excellent metal-bonding capabilities and offer outstanding chemical resistance combined with shadow cure

Surface Preparation

Correct surface preparation is a key factor in ensuring the total success of any adhesive performance.

- The surfaces to be bonded should be clean, dry and free of grease. If necessary, clean the parts with LOCTITE SF 7063 or LOCTITE SF 7070 and allow to dry (see Cleaning on page 110)

Dispensing Equipment and Light Cure Systems

For some jobs it is sufficient to dispense the product manually from the bottle onto the parts to be bonded. In other cases, however, more precise hand-held or stationary automated dispensing equipment is required. LOCTITE dispensing equipment is specially designed to make application and use of our products fast, precise, clean and economical:

Semi-Automatic Dispensing System LOCTITE 97152 / 97108 / 98009
The system is suitable for dispensing dots or beads of low to medium-viscosity LOCTITE light cure adhesives, and is designed for integration into automated assembly lines. The valve is of modular design to facilitate field repairs. The reservoir holds up to 1 litre LOCTITE bottles. The controller interfaces with a reservoir and dispense value to provide all the controls required for accurate and repeatable dispensing.

97152 / 97108 / 98009

Light Cure Systems
LOCTITE light cure systems are available for manual workstations as well as for production line integration. Various bulb and LED technologies ensure the proper wavelength adapted to the adhesive selected and the transparency of the parts to be bonded (for more details, see Light Cure Equipment on page 160).

97055

For information on semi- or fully automatic dispensing equipment, available valves, spare parts, accessories and dispensing tips, please refer to pages 152 – 163 or the LOCTITE Equipment Sourcebook.

Light Cure Adhesives
Product Table

Is a shaded area created by a non-transparent substrate? Is a secondary cure needed for shaded areas?

No

Are you bonding glass?

Glass and other substrates

High strength &

	Capillary	Ultra clear	Fast cure	Low viscosity
Solution	**LOCTITE AA 3081**	**LOCTITE AA 3491**	**LOCTITE AA 3494**	**LOCTITE AA 3922**
				
Chemistry	Acrylic	Acrylic	Acrylic	Acrylic
Viscosity	100 mPa·s	1,100 mPa·s	6,000 mPa·s	300 mPa·s
Colour	Clear	Clear	Clear	Transparent, colourless
Fluorescence	Yes	No	No	Yes
Service temperature range	-40°C to +120°C	-40°C to +130°C	-40°C to +120°C	-40°C to +130°C
Pack sizes	1 ltr	25ml, 1 ltr	25ml, 1 ltr	25ml, 1 ltr
	LOCTITE AA 3081 • UV-light curing acrylic • Low viscosity, wicking grade for post-assembly applications • For bonding glass, plastics, metals, etc.	**LOCTITE AA 3491** • UV-light curing acrylic • Low yellowing in sunlight environment • For bonding glass, plastics, metals etc.	**LOCTITE AA 3494** • UV-light and/or visible light curing acrylic • Low yellowing in sunlight environment • For bonding glass, plastics, metals etc.	**LOCTITE AA 3922** • UV-light and/or visible light curing acrylic • Low yellowing in sunlight environment • For bonding plastics, metals etc.

* For more products with a secondary cure mechanism, please see table on page 42

Yes*

No glass

bendable / deformable

High strength

High strength

Highly elastic

High viscosity

Toughened

Very fast

Instant adhesive

Silicone

LOCTITE AA 3926

Acrylic	
5,500 mPa·s	
Transparent, colourless	
Yes	
-40°C to +150°C	
25ml, 1 ltr	

LOCTITE AA 3926
- UV-light and/or visible light curing acrylic
- Low yellowing in sunlight environment
- For bonding plastics, metals etc.

LOCTITE AA 3525

Acrylic	
15,000 mPa·s	
Clear	
No	
-40°C to +140°C	
25ml, 1 ltr	

LOCTITE AA 3525
- UV-light and/or visible light curing acrylic
- Low yellowing in sunlight environment
- For bonding plastics, metals etc.

LOCTITE AA 3556

Acrylic	
5,000 mPa·s	
Transparent, yellow	
Yes	
-40°C to +100°C	
1 ltr	

LOCTITE AA 3556
- Very fast light cure acrylic
- Cures with UV-light and visible light
- For bonding plastics, metals etc.

LOCTITE 4304

Cyanoacrylate	
20 mPa·s	
Transparent, pale green	
No	
-40°C to +100°C	
28g	

LOCTITE 4304
- UV-light and/or visible light curing cyanoacrylate
- Cures in bond gaps by surface humidity
- For bonding plastics, metals, paper etc.

LOCTITE SI 5091

Silicone	
5,000 mPa·s	
Translucent, slightly milky	
No	
-60°C to +180°C	
300ml	

LOCTITE SI 5091
- UV-light curing silicone with secondary RTV cure
- For elastic sealing and bonding applications
- Good adhesion on metals, glass and most plastics

Light Cure Adhesives
Product List

Product / grade	Chemical basis	Suitable wavelengths for cure	Secondary cure system	Viscosity	Service temperature range	Depth of cure	Colour	Fluorescence
LOCTITE AA 322	Acrylic	UV	No	5,500 mPa·s	-40°C to +100°C	4 mm	Transparent, light amber	No
LOCTITE AA 350	Acrylic	UV	No	4,500 mPa·s	-40°C to +120°C	4 mm	Transparent, light amber	No
LOCTITE AA 352	Acrylic	UV	Activator 7075	15,000 mPa·s	-40°C to +150°C	4 mm	Transparent, amber	No
LOCTITE AA 3011[Med]	Acrylic	UV	No	110 mPa·s	-40°C to +100°C	4 mm	Transparent, light amber	No
LOCTITE AA 3081[Med]	Acrylic	UV	No	100 mPa·s	-40°C to +120°C	4 mm	Clear	Yes
LOCTITE AA 3211[Med]	Acrylic	UV/VIS	No	10,000 mPa·s thixotropic	-40°C to +140°C	> 13 mm	Transparent, amber	No
LOCTITE AA 3301[Med]	Acrylic	UV/VIS	No	160 mPa·s	-40°C to +130°C	> 13 mm	Transparent, colourless	No
LOCTITE AA 3311[Med]	Acrylic	UV/VIS	No	300 mPa·s	-40°C to +130°C	> 13 mm	Transparent, colourless	No
LOCTITE AA 3321[Med] **LOCTITE AA 3106**	Acrylic	UV/VIS	No	5,500 mPa·s	-40°C to +150°C	> 13 mm	Transparent, light yellow	No
LOCTITE AA 3341[Med]	Acrylic	UV/VIS	No	500 mPa·s	-40°C to +100°C	> 13 mm	Transparent, light yellow	Yes
LOCTITE AA 3345[Med]	Acrylic	UV	No	1,500 mPa·s	-40°C to +120°C	4 mm	Transparent, light amber	No
LOCTITE AA 3381[Med]	Acrylic	UV	No	5,100 mPa·s	-40°C to +130°C	4 mm	Translucent, colourless	No
LOCTITE AA 3491	Acrylic	UV	No	1,100 mPa·s	-40°C to +130°C	4 mm	Clear	No
LOCTITE AA 3494	Acrylic	UV/VIS	No	6,000 mPa·s	-40°C to +120°C	> 13 mm	Clear	No
LOCTITE AA 3525	Acrylic	UV/VIS	No	15,000 mPa·s	-40°C to +140°C	> 13 mm	Clear	Yes

Med = Certified according to ISO 10993 for medical device manufacturing

* Cured with LOCTITE 97055, 100 mW/cm^2 at 365 nm
** Irradiated with 6 mW/cm^2 at 365 nm

Tack-free time*	Fixturing time**	Shore hardness	Substrates				Pack sizes	Comments
			Glass	Plastics	Metals	Ceramics		
4 sec.	10 sec.	D 68	•	• •	•	•	250ml, 1 ltr	Fast surface cure
20 sec.	15 sec.	D 70	• •	•	• •	•	50ml, 250ml, 1 ltr	High humidity and chemical resistance
17 sec.	10 sec.	D 60	• •		• •	• •	50ml, 250ml, 1 ltr	High humidity and chemical resistance, toughened
8 sec.	10 sec.	D 68		• •	•	•	Not available in the U.K.	Fast surface cure
8 sec.	10 sec.	D 74	• •	• •	•	•	1 ltr	Fast surface cure
> 30 sec.	12 sec.	D 51	•	• •	• •	•	25ml, 1 ltr	For stress-sensitive plastics
> 30 sec.	12 sec.	D 69	•	• •	• •	•	25ml	For stress-sensitive plastics
> 30 sec.	12 sec.	D 64	•	• •	• •	•	25ml, 1 ltr	For stress-sensitive plastics
> 30 sec.	12 sec.	D 53	•	• •	• •	•	25ml, 1 ltr	For stress-sensitive plastics
15 sec.	8 sec.	D 27		• •	•	•	25ml, 1 ltr	Highly flexible, for soft PVC
30 sec.	15 sec.	D 70	• •	•	• •	•	Not available in the U.K.	High humidity and chemical resistance
> 30 sec.	30 sec.	A 72	•	• •	•	•	25ml, 1 ltr	Highly flexible, high thermal cycle resistance
15 sec.	12 sec.	D 75	• •	• •	• •	•	25ml, 1 ltr	High transparency, low yellowing
> 30 sec.	8 sec.	D 65	• •	• •	• •	•	25ml, 1 ltr	High transparency, low yellowing
10 sec.	5 sec.	D 60	•	• •	• •	•	25ml, 1 ltr	High strength, toughened

•• Well suited for
• Suited for

Light Cure Adhesives
Product List

Product / grade	Chemical basis	Suitable wavelengths for cure	Secondary cure system	Viscosity	Service temperature range	Depth of cure	Colour	Fluorescence
LOCTITE 4304[Med]	Cyano-acrylate	UV/VIS	Surface moisture	20 mPa·s	-40°C to +100°C	> 13 mm	Transparent, pale green	No
LOCTITE 4305[Med]	Cyano-acrylate	UV/VIS	Surface moisture	900 mPa·s	-40°C to +100°C	> 13 mm	Transparent, pale green	No
LOCTITE AA 3556[Med]	Acrylic	UV/VIS	No	5,000 mPa·s	-40°C to +100°C	> 13 mm	Transparent, yellow	Yes
LOCTITE AA 3921[Med]	Acrylic	UV/VIS	No	150 mPa·s	-40°C to +130°C	> 13 mm	Transparent, colourless	Yes
LOCTITE AA 3922[Med]	Acrylic	UV/VIS	No	300 mPa·s	-40°C to +130°C	> 13 mm	Transparent, colourless	Yes
LOCTITE AA 3926[Med]	Acrylic	UV/VIS	No	5,500 mPa·s	-40°C to +150°C	> 13 mm	Transparent, colourless	Yes
LOCTITE AA 3936[Med]	Acrylic	UV/VIS	No	11,000 mPa·s	-40°C to +140°C	> 13 mm	Transparent, colourless	Yes
LOCTITE AA 3972	Acrylic	UV/VIS	No	4,600 mPa·s	-40°C to +100°C	> 13 mm	Transparent, light amber	Yes
LOCTITE SI 5083	Silicone	UV	Atmospheric moisture	Thixotropic paste	-60°C to +200°C	5 mm	Translucent, slightly milky	No
LOCTITE SI 5088 / LOCTITE SI 5248[Med]	Silicone	UV	Atmospheric moisture	65,000 mPa·s	-60°C to +200°C	1.5 mm	Translucent, straw coloured	No
LOCTITE SI 5091	Silicone	UV	Atmospheric moisture	5,000 mPa·s	-60°C to +180°C	4 mm	Translucent, slightly milky	No

Med = Certified according to ISO 10993 for medical device manufacturing

* Cured with LOCTITE 97055, 100 mW/cm^2 at 365 nm
** Irradiated with 6 mW/cm^2 at 365 nm

Tack-free time*	Fixturing time**	Shore hardness	Substrates				Pack sizes	Comments
			Glass	Plastics	Metals	Ceramics		
< 5 sec	2 sec	D 72		●●	●	●	28.3g	High plastic adhesion, low-intensity cure
< 5 sec	2 sec	D 77		●●	●	●	28g, 454g	High plastic adhesion, low-intensity cure
10 sec	5 sec	D 68		●●	●	●	1 ltr	Fast cure, for coloured transparent substrates
> 30 sec	3 sec	D 67	●	●●	●	●	25ml, 1 ltr	For stress-sensitive plastics
> 30 sec	5 sec	D 66	●	●●	●	●	25ml, 1 ltr	For stress-sensitive plastics
> 30 sec	3 sec	D 57	●	●●	●	●	25ml, 1 ltr	For stress-sensitive plastics
> 30 sec	12 sec	D 55	●	●●	●	●	25ml, 1 ltr	For stress-sensitive plastics
5 sec	5 sec	D 68		●●	●●		15 ltr	Fast cure, high adhesion to soft PVC
20 sec	> 30 sec	A 55	●●	●	●●	●●	300ml, 18kg	Highly flexible, acetoxy silicone
> 30 sec	> 30 sec	A 30	●●	●	●●	●●	Not available in the U.K.	Highly flexible, alkoxy silicone
30 sec	> 30 sec	A 34	●●	●	●●	●●	300ml	Highly flexible, acetoxy silicone

●● Well suited for
● Suited for