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Technical Data Sheet

Product 4303

Industrial Version, August 2000

PRODUCT DESCRIPTION

LOCTITE® Product 4303 is a medium viscosity, two-part, UV curing cyanoacrylate adhesive. The product is specifically formulated for an extremely rapid UV cure with a cyanoacrylate secondary cure mechanism.

TYPICAL APPLICATIONS

Loctite Product 4303 is designed for bonding applications that require very rapid fixturing, fillet cure or surface cure. The products UV cure mechanism offers an alternative to solvent borne accelerators (for accelerating cure and minimizing blooming) without the expense or environmental concerns. Since the product cures via an anionic polymerization, it is not inhibited by oxygen. This results in an extremely rapid surface cure which makes this adhesive well suited for coatings.

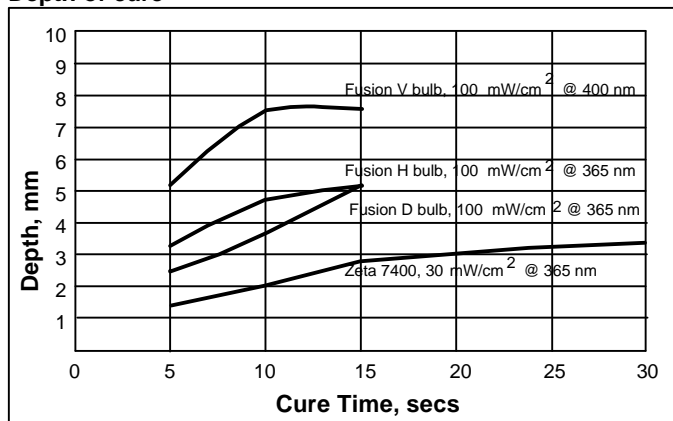
PROPERTIES OF UNCURED MATERIAL

	Typical Value	Range
Chemical Type	Photoinitiated ethyl cyanoacrylate	
Appearance	Light amber to a faint green (catalyzed)	
Specific Gravity @ 25°C	1.05	
Viscosity @ 25°C, mPa.s (cP)	900	600 to 1,200
Flash Point, Adhesive (TCC), °C (°F)	66 to 93 (150 to 200)	
Flash Point, Activator (TCC), °C (°F)	>93 (>200)	
Pot life, days (once mixed)	5	

TYPICAL CURING PERFORMANCE

Primary Cure Mechanism, UV

Depth of cure



Tack Free Time

Bulb Type	Intensity	Tack Free Time (sec)
Fusion V bulb	30 mW/cm ² @ 365nm	≤ 5
Fusion H bulb	100 mW/cm ² @ 365nm	≤ 5
Fusion D bulb	100 mW/cm ² @ 365nm	≤ 5
Zeta 7400 bulb	30 mW/cm ² @ 365nm	≤ 5

Effect of substrate transparency and light source

Block shear strength, ASTM D-4501, 20 mil gap.

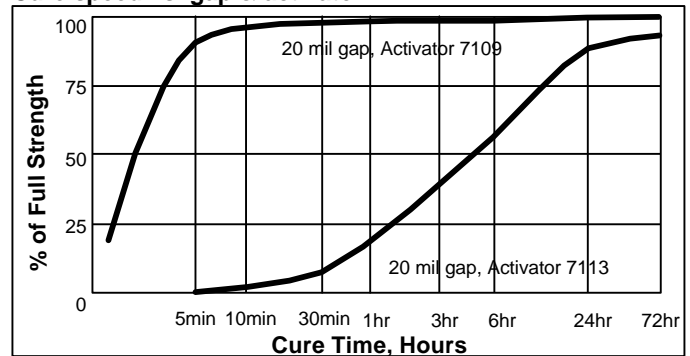
Zeta 7400, 25 mW/cm² @ 10 seconds.

Fusion V bulb, 100 mW/cm² @ 10 seconds.

Material	UV Cure	Post UV cure	Strength psi(N/mm ²)
polycarbonate	UV blocking	Zeta 7400 2 min @ RT	960 (6.6)
		Zeta 7400 24 hr @ RT	240 (1.6)
		Fusion V bulb 2 min @ RT	2,140 (14.7)
		Fusion V bulb 24 hr @ RT	2,410 (16.6)
Zeta 7400, 30 mW/cm ² @ 10 seconds.			
Fusion V bulb, 100 mW/cm ² @ 5 seconds.			
polycarbonate	UV transmitting	Zeta 7400 2 min @ RT	2,410 (16.6)
		Zeta 7400 24 hr @ RT	2,100 (14.4)
		Fusion V bulb 2 min @ RT	2,380 (16.4)
		Fusion V bulb 24 hr @ RT	1,920 (13.2)

Secondary Cure Mechanism, Cyanoacrylate

Cure speed vs. gap & activator



Fixture speed vs. substrate

The rate of cure will depend on the substrate used. The table below shows the fixture time achieved on different materials at 22°C, 50% relative humidity. This is defined as the time to develop a shear strength of 0.1 N/mm² (14.5 psi) tested according to ASTM D1002.

Substrate	Fixture Time, seconds
ABS	>5 ≤10
Acrylic	>5 ≤15
Aluminum (etched)	>20 ≤45
Neoprene	≤ 10
Phenolic	>240 ≤ 270
Polycarbonate	>45 ≤ 60
Polyethylene	>5 ≤ 10
Polypropylene	≤10
PVC	>60 ≤ 75
Steel (grit blasted)	>120 ≤ 240

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

	Typical Value
Cured with Fusion V, 100mW/cm ² @ 400 nm, 10 seconds per side	
Tensile Strength @ Break, ASTM D-882, psi (N/mm ²)	4,610 (31.8)
Elongation @ Break, ASTM D-882, %	23
Modulus, ASTM D-882, psi (N/mm ²)	206,500 (1424.1)
Hardness, ASTM D2240, Shore D-2	65
Shrinkage, ASTM D-792, %	13

Electrical Properties

Cured sheets (~.027" thick) with Fusion V bulb, 100 mW/cm² at 365nm, 10 seconds per side and 24 hour room temperature cure.

	Constant	Loss
Dielectric constant & loss, 25°C, ASTM D150 measured at		
100Hz	4.09	0.042
1kHz	3.83	0.044
10kHz	3.20	0.060
Volume Resistivity, ASTM D257, Ω.cm	3.90 x 10 ¹⁵	
Surface Resistivity, ASTM D257, Ω	4.42 x 10 ¹⁵	
Dielectric strength, ASTM D149, V/mil	768	

PERFORMANCE OF CURED MATERIAL

Shear Strength, ASTM D-4501

Zeta 7400, 30 mW/cm ² @ 365 nm for 10 sec Polycarbonate	Psi	Typical Value (N/mm ²)
	2,100	(14.5)

72 hour room temperature cure (non-UV)

ABS	4,895	(33.7)
Acrylic	1,550	(10.7)
Aluminum (etched)	3,360	(23.2)
Neoprene	115	(0.8)
Phenolic	1,670	(11.5)
Polycarbonate	1,660	(11.4)
Polypropylene (High Density)	90	(0.6)
Polypropylene (Low Density)	160	(1.1)
PVC	830	(5.7)
Steel (grit blasted)	2,490	(17.2)

Activator 7113 cure with 10 mil gap for 24 hours

Acrylic, psi	1,780	(12.3)
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TYPICAL ENVIRONMENTAL RESISTANCE

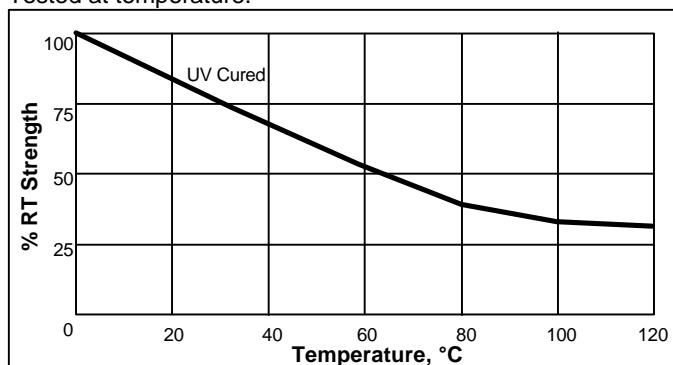
Test Procedure : ASTM D-4501

Substrate: Polycarbonate

Cure procedure: Zeta 7400, 30 mW/cm² @ 365 nm for 10 seconds and 24 hour room temperature cure.

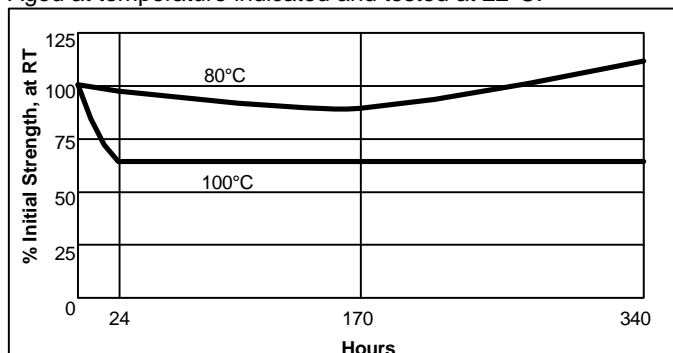
Hot Strength

Tested at temperature.



Heat Aging

Aged at temperature indicated and tested at 22°C.



Chemical / Solvent Resistance

Aged under conditions indicated and tested at 22°C.

Solvent	Temp.	% Initial strength retained at		
		24 hrs	170 hrs	340 hrs
Motor Oil	22°C	94	98	120
Water	22°C	80	96	112
Isopropanol	22°C	97	103	117
Humidity 100% RH	40°C	99	112	143

Sterilization Resistance

Polycarbonate blocks cured for 10 seconds with Zeta 7400 @ 30 nmW/cm² @ 365nm

Sterilization	% Initial strength retained
Autoclave	56
ETO, one cycle	100
ETO, two cycle	130
Gamma, 2.5 MRads	200
Gamma, 5.0 MRads	160

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).

Approvals

Product 4303 has been granted USP Class VI certification which makes it particularly suited for use in medical devices.

Directions for use

The activator and adhesive are packaged as two-part. Mix by pouring the pre-measured activator into the adhesive bottle and lightly shaking the solution for 60 seconds. Since its pot life, once mixed, at room temperature is approximately 5 days, the material is a very process friendly two-part adhesive. Once mixed, the product should be shielded from exposure to UV and visible light, including ambient light.

Storage

Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 21°C (46°F to 70°F) unless otherwise labeled. Optimal storage conditions for unopened containers of cyanoacrylate products are achieved with refrigeration: 2°C to 8°C (36°F to 46°F). Refrigerated packages shall be allowed to return to room temperature prior to opening and use. To prevent contamination of unused product, do not return any material to its original container. For specific shelf life information contact your local Technical Service Center.

Data Ranges

The data contained herein may be reported as a typical value and/or range. Values are based on actual test data and are verified on a periodic basis.

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, **Loctite Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Loctite Corporation's products. Loctite 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 Loctite 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.