Technical Data Sheet

LOCTITE® HY 4090™

July 2019

PRODUCT DESCRIPTION

LOCTITE® HY 4090™ provides the following product characteristics:

Technology	Cyanoacrylate / Epoxy Hybrid
Chemical Type (Part A)	Cyanoacrylate
Chemical Type (Part B)	Epoxy
Appearance (Comp. A)	Transparent colorless to straw colored liquid[LMS]
Appearance (Comp. B)	Off-white to light yellow gel[LMS]
Appearance (Mixture)	Off-white to light yellow gel
Components	Two components - requires mixing
Mix Ratio by volume: Part A: Part B	1 : 1
Viscosity	High
Cure	Room temperature cure after mixing
Application	Bonding

LOCTITE® HY 4090™ is a two component, general purpose adhesive which provides a very fast fixture at room temperature. It is designed to bond a variety of substrates including metals, most plastics and rubbers. LOCTITE® HY 4090™ provides good temperature and moisture resistance which also makes it suitable for applications in high temperature/humidity environments. The thixotropic nature makes it suitable for applications where good gap filling properties on rough and poorly fitting surfaces are required.

ISO-10993

An ISO 10993 Test Protocol is an integral part of the Quality Program for LOCTITE® HY 4090™. LOCTITE® HY 4090™ has been tested to Henkel's test protocols based on ISO 10993 biocompatibility standards, 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

Part A:

Specific Gravity, g/cm³	1.01
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C	4,000 to 7,000[LMS]
Flash Point - See SDS	

Part B:

Specific Gravity, g/cm³	1.06
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C	25,000 to 40,000[LMS]
Flash Point - See SDS	

TYPICAL CURING PERFORMANCE

Curing is initiated on mixing the Part A and Part B components. Handling strength is achieved rapidly; full strength is achieved over time.

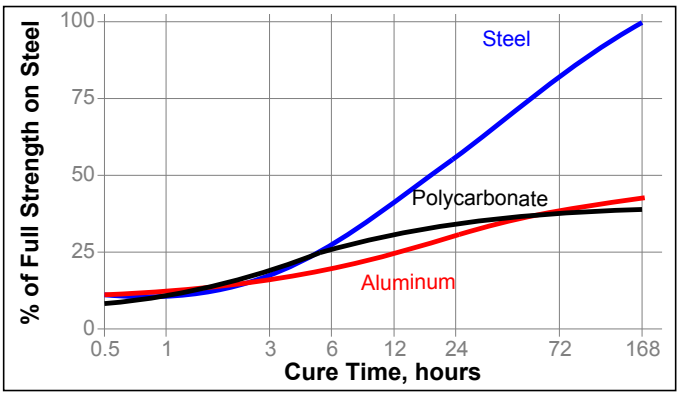
Fixture Time

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

Fixture Time @ 25°C, seconds	<180[LMS]

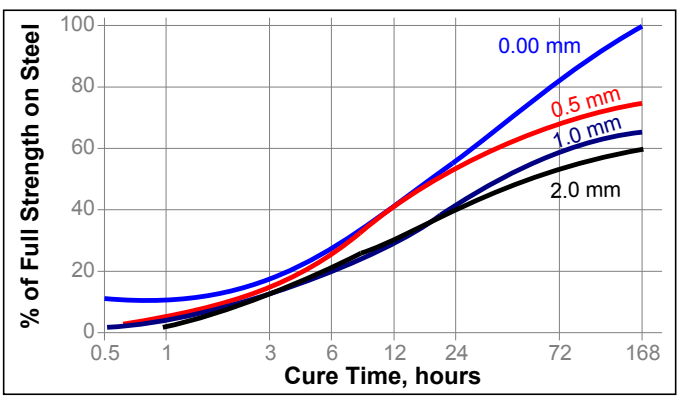
Cure Speed vs. Substrate

The rate of cure will depend on the substrate used. The graph below shows the shear strength developed with time on steel lap shears compared to different materials and tested according to ISO 4587.

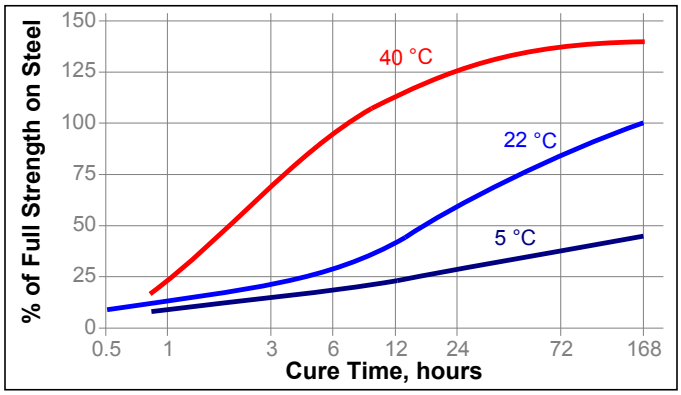


Cure Speed vs. Bond Gap

The rate of cure will depend on the bondline gap. The following graph shows the shear strength developed with time on grit blasted mild steel lap shears at different controlled gaps and tested according to ISO 4587.



Cure Speed vs. Temperature
The rate of cure will depend on the ambient temperature. The graph below shows the shear strength developed with time at different temperatures on grit blasted mild steel lap shears and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 1 week @ 22 °C

Physical Properties:

Glass Transition Temperature, ISO 11359-2, °C		88
Coefficient of Thermal Expansion, ISO 11359-2 K^{-1}:		
Below Tg (88°C)		71×10^{-06}
Above Tg (88°C)		175×10^{-06}
Shore Hardness, ISO 868, Durometer D		65 to 69
Tensile Strength, at break, ISO 527-3	N/mm²	7.1
	(psi)	(1,025)
Tensile Modulus, ISO 527-3	N/mm²	565
	(psi)	(81,800)
Elongation, at break, ISO 527-3, %		3.6

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 168 hours @ 22 °C

Shear Strength, Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm²	17
	(psi)	(2,420)
Aluminum	N/mm²	7.6
	(psi)	(1,100)
Aluminum (etched)	N/mm²	13
	(psi)	(1,900)
Zinc dichromate	N/mm²	9.1
	(psi)	(1,320)
Stainless steel	N/mm²	15
	(psi)	(2,120)
ABS	N/mm²	5.2
	(psi)	(750)
Phenolic	N/mm²	3.2
	(psi)	(460)
Polycarbonate	N/mm²	6.9
	(psi)	(1,000)
Nitrile	N/mm²	0.7
	(psi)	(100)
Wood (Oak)	N/mm²	4.8
	(psi)	(700)
Epoxy	N/mm²	9.1
	(psi)	(1,320)
Polyethylene	N/mm²	0.5
	(psi)	(72)
Polypropylene	N/mm²	0.6
	(psi)	(87)

TYPICAL ENVIRONMENTAL RESISTANCE

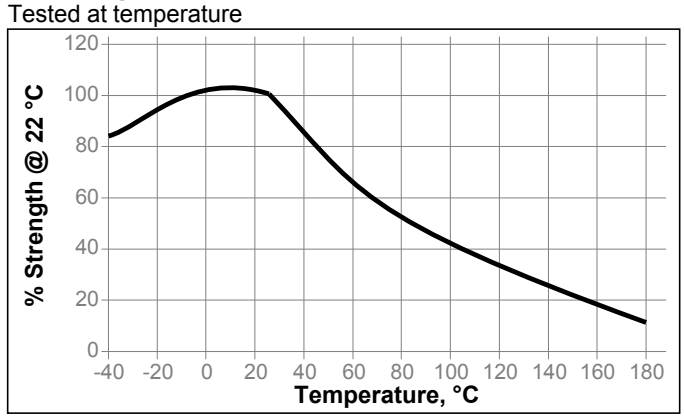
Cured for 1 week @ 22 °C

Lap Shear Strength, ISO 4587:

Steel (grit blasted)

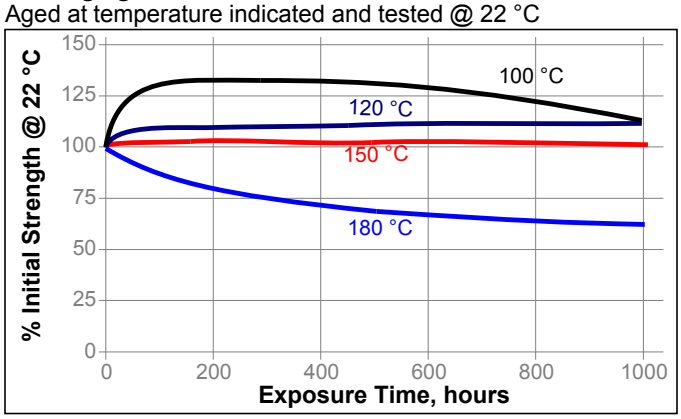
Hot Strength

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**
Water	22	90	75	70
Water	60	80	55	55
Motor oil	40	120	130	130
Unleaded gasoline	22	95	100	105
Ethanol	22	85	90	90
Isopropanol	22	100	100	95
Water/glycol 50/50	87	50	5	5
98% RH	40	85	70	70
95% RH	65	95	85	65

Lap Shear Strength, ISO 4587:
Polycarbonate

		% of initial strength		
Environment	**°C**	**100 h**	**500 h**	**1000 h**
98% RH	40	100	90	80

Lap Shear Strength, ISO 4587:
Aluminum

		% of initial strength		
Environment	**°C**	**100 h**	**300 h**	**500 h**
95% RH	65	100	95	85

Sterilization Resistance

Cured for 1 week @ 22 °C

Block Shear Strength, according to ISO 13445 ,
PC to PC, tested @ 22°C

Treatment Time	% of Initial Strength
Ethylene Oxide, 1 cycle	85
Ethylene Oxide, 2 cycle	94
GAMMA, >50 Kilo gray	109
Autoclave, 1 cycle	45
Autoclave, 5 cycles	31

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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.

Directions for use:

1. Bond areas should be clean and free from grease. Clean all surfaces with a Loctite® cleaning solvent and allow to dry.
2. To use, Part A and Part B must be blended. Product can be applied directly from dual cartridge by dispensing through the mixer head supplied.
3. **50g Dual Cartridge:** Stand dual cartridge upright for 1 minute. Keeping the cartridge in an upright position, insert it into the application gun, remove cap and expel a small amount of adhesive to be sure both sides are flowing evenly and freely. Attach the mixing nozzle.
4. **400g Dual Cartridge:** Stand dual cartridge upright for 1 minute. Remove the cartridge cap and locking ring, attach the mixing nozzle and secure with the locking ring. Load cartridge into the application gun so that the yellow label on cartridge is visible above the nozzle. Holding the application gun at a 45° angle, with the nozzle tip pointing upwards, begin dispensing the adhesive until the product reaches the nozzle tip.
   NOTE: A pneumatic application gun is required to apply the product from the 400g dual cartridge at a maximum dispense pressure of 2 bar (30 psi).
5. Dispense and discard a bead as long and as wide as the mixing nozzle, to ensure sufficient mixing.
6. Apply the mixed adhesive to one of the bond surfaces to be joined. Parts should be assembled immediately after the mixed adhesive has been applied.
7. Bonds should be held fixed or clamped until adhesive has fixtured.
8. Keep assembled parts from moving during cure. The bond should be allowed to develop full strength before subjecting to any service load.

Loctite Material Specification[LMS]

LMS dated May 27, 2013 (Part A) and LMS dated June 10, 2013 (Part B). 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 Loctite Quality.

Storage

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Optimal Storage: 2°C to 21°C. Storage below 2°C or greater than 21°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 0.7