

LOCTITE[®] HY 4060GY[™]

July 2017

PRODUCT DESCRIPTION

LOCTITE[®] HY 4060GY[™] provides the following product characteristics:

Technology	Cyanoacrylate / Epoxy Hybrid
Chemical Type (Part A)	Cyanoacrylate
Chemical Type (Part B)	Epoxy
Appearance (Comp. A)	Black liquid ^{LMS}
Appearance (Comp. B)	White gel ^{LMS}
Appearance (Mixture)	Grey
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 4060GY[™] is a two component, general purpose hybrid adhesive that provides a high strength combined with fast fixture at room temperature. LOCTITE[®] HY 4060GY[™] provides good temperature and moisture resistance which also makes it suitable for applications in high temperature/humidity environments. It is designed to bond a variety of substrates including metals, most plastics and rubbers. This product is ready-to-use and can be dispensed directly from the pack without additional equipment. The two colored components of LOCTITE[®] HY 4060GY[™] allow for indication of proper mixing.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Part A:

Specific Gravity, g/cm ³	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/cm ³	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.

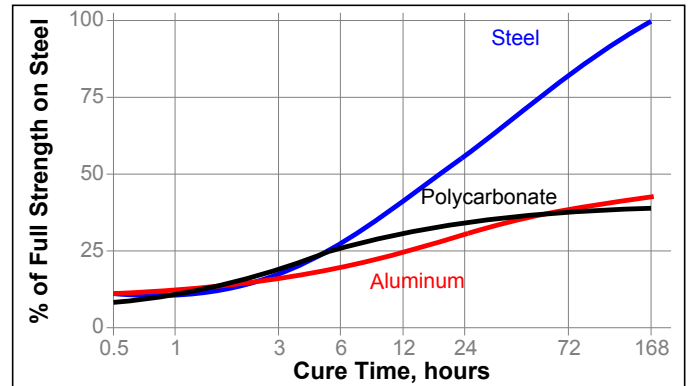
Fixture Time

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

Fixture Time @ 25°C, seconds <180^{LMS}

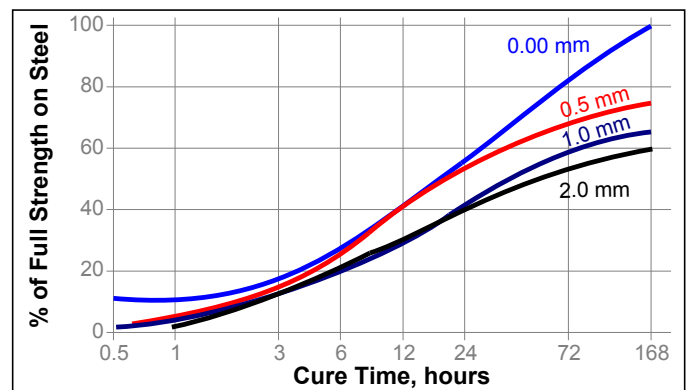
Cure Speed vs. Substrate

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.



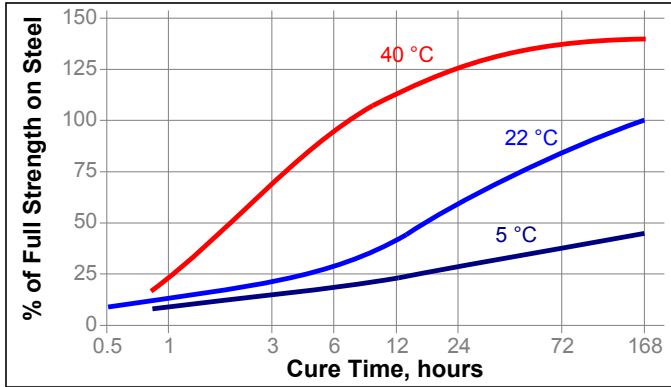
Cure Speed vs. Bond Gap

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:

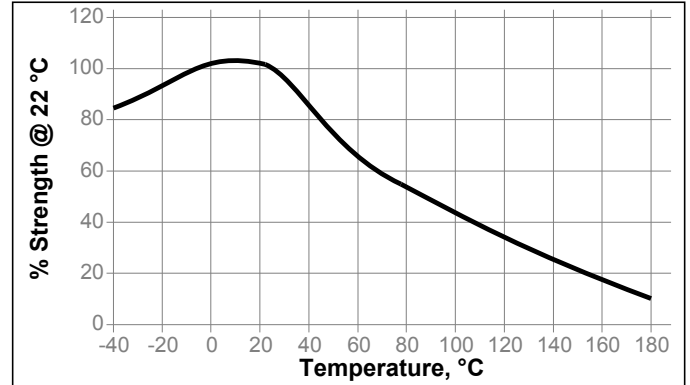
Steel (grit blasted)	N/mm ² 17	(psi) (2,420)
Aluminum	N/mm ² 7.6	(psi) (1,100)
Aluminum (etched)	N/mm ² 13	(psi) (1,900)
Zinc dichromate	N/mm ² 9.1	(psi) (1,320)
Stainless steel	N/mm ² 15	(psi) (2,120)
ABS	N/mm ² 5.2	(psi) (750)
Phenolic	N/mm ² 3.2	(psi) (460)
Polycarbonate	N/mm ² 6.9	(psi) (1,000)
Nitrile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

TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 1 week @ 22 °C
Lap Shear Strength, ISO 4587:
Steel (grit blasted)

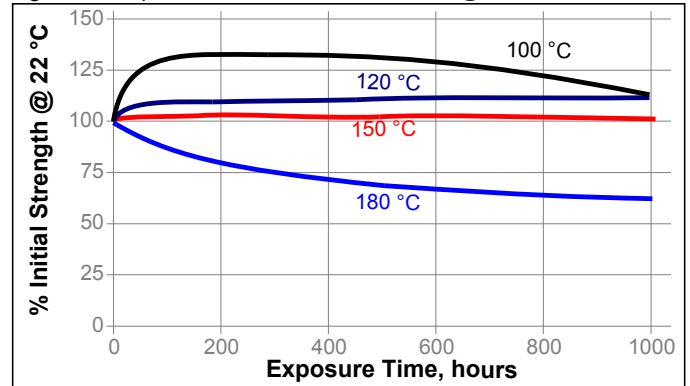
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

Environment	°C	% of initial strength		
		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

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

Lap Shear Strength, ISO 4587:
Aluminum

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

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.
3. Remove the cap and dispense both components onto a clean surface or into a dish. Use a device to mix for approximately 15 seconds until no more black or white streaks can be recognized and uniform grey color is obtained.
4. 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.
5. Bonds should be held fixed or clamped until adhesive has fixtured.
6. Keep assembled parts from moving during cure. The bond should be allowed to develop full strength before subjecting to any service load.
7. Excess uncured adhesive can be wiped away with organic solvent (e.g. Acetone).

Loctite Material Specification^{LMS}

LMS dated June 8, 2016 (Part A) and LMS dated June 8, 2016 (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

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$
 $\text{kV/mm} \times 25.4 = \text{V/mil}$
 $\text{mm} / 25.4 = \text{inches}$
 $\mu\text{m} / 25.4 = \text{mil}$
 $\text{N} \times 0.225 = \text{lb}$
 $\text{N/mm} \times 5.71 = \text{lb/in}$
 $\text{N/mm}^2 \times 145 = \text{psi}$
 $\text{MPa} \times 145 = \text{psi}$
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$
 $\text{mPa}\cdot\text{s} = \text{cP}$

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 0.1