



# LOCTITE<sup>®</sup> H4000<sup>™</sup>

May 2010

## PRODUCT DESCRIPTION

LOCTITE<sup>®</sup> H4000<sup>™</sup> provides the following product characteristics:

<b>Technology</b>	Acrylic
<b>Chemical Type</b>	Methacrylate
<b>Appearance (Part A)</b>	Milky white
<b>Appearance (Part B)</b>	Orange to brown
<b>Appearance (Mixture)</b>	Pale yellow <sup>LMS</sup>
<b>Components</b>	Two component - requires mixing
<b>Mix Ratio, by volume - Part A: Part B</b>	10 : 1
<b>Key Substrates</b>	PVC, Polycarbonate, Acrylic, ABS, Stainless Steel, Epoxy-coated metal and FRP
<b>Cure</b>	Room temperature cure
<b>Application</b>	Bonding
<b>Specific Benefit</b>	<ul style="list-style-type: none"> <li>• Excellent environmental resistance</li> <li>• Excellent tolerance to off-ratio mixing</li> <li>• Superior impact and peel strength</li> <li>• Non-sagging gaps filled to 12.7 mm</li> </ul>

LOCTITE<sup>®</sup> H4000<sup>™</sup> is a methacrylate adhesive system that forms resilient bonds and maintains its strength over a wide range of temperatures.

## TYPICAL PROPERTIES OF UNCURED MATERIAL

### Part A:

Specific Gravity @ 25 °C 1.02  
Flash Point - See MSDS

Viscosity, Cone & Plate, 25 °C, mPa·s (cP):

Cone CP50-1 @ shear rate 50 s<sup>-1</sup> 9,000

Viscosity, Brookfield - HBD, 25 °C, mPa·s (cP):

Spindle 4, speed 10 rpm 60,000 to 150,000

### Part B:

Specific Gravity @ 25 °C 1.06  
Flash Point - See MSDS

Viscosity, Cone & Plate, 25 °C, mPa·s (cP):

Cone CP50-1 @ shear rate 50 s<sup>-1</sup> 8,300

Viscosity, Brookfield - HBD, 25 °C, mPa·s (cP):

Spindle 6, speed 20 rpm 25,000 to 100,000

### Mixed:

Specific Gravity @ 25 °C 1.02

Working Time @ 25 °C, minutes  
(maximum time before assembly):

Polyethylene 30

Steel 30

Aluminum 30

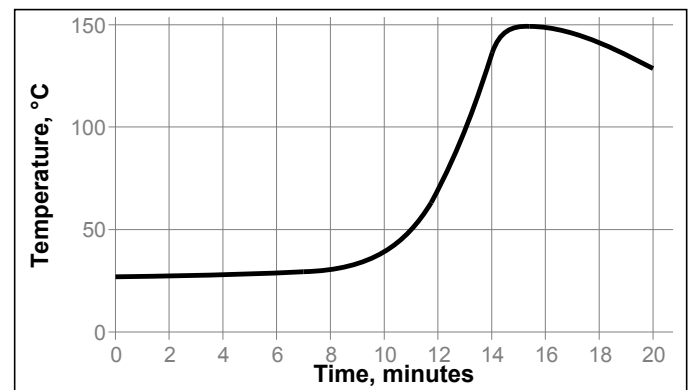
## TYPICAL CURING PERFORMANCE

### Fixture Time

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm<sup>2</sup>.

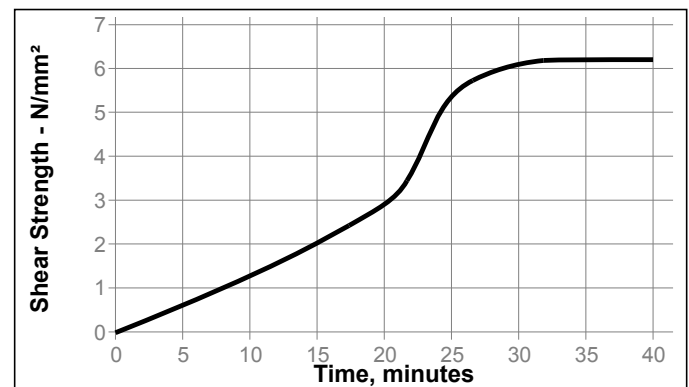
Fixture Time @ 22°C, (mixed), minutes 35 to 40

### Peak Exotherm Curve - 10 gram mass



### Development of Bond Strength

Strength build on FRP



## TYPICAL PROPERTIES OF CURED MATERIAL

### Physical Properties:

Shore Hardness, ISO 868, Durometer D	75 to 80
Elongation, ISO 527-2, %	30 to 40
Tensile Strength, ISO 527-2	N/mm <sup>2</sup> 18.6 to 20 (psi) (2,700 to 2,900)

**TYPICAL PERFORMANCE OF CURED MATERIAL****Adhesive Properties**

Cured for 24 hours @ 22 °C.

Lap Shear Strength, ISO 4587:

Aluminum (etched)	N/mm <sup>2</sup>	≥20.69 <sup>LMS</sup>
	(psi)	(≥3,000)

Cured for 72 hours @ 22 °C

Impact Strength, ISO 9653, J:

Grit Blasted Mild Steel (GBMS)	10
Aluminum (abraded)	9
Grit Blasted Mild Steel (GBMS) @ -40 °C	5

"T" Peel Strength, ISO 11339:

Steel	N/mm	8.5
	(lb/in)	(49)
Aluminum	N/mm	4.5
	(lb/in)	(26)

Block Shear Strength, ISO 13445:

Ferrite Magnet to Steel	N/mm <sup>2</sup>	13
	(psi)	(1,870)
Phenolic	N/mm <sup>2</sup>	4.7
	(psi)	(680)
Glass	N/mm <sup>2</sup>	1.7
	(psi)	(255)
Acrylic	N/mm <sup>2</sup>	2.7
	(psi)	(400)
Epoxy	N/mm <sup>2</sup>	2.6
	(psi)	(380)
ABS	N/mm <sup>2</sup>	1.1
	(psi)	(160)
PVC	N/mm <sup>2</sup>	0.7
	(psi)	(100)
Polycarbonate	N/mm <sup>2</sup>	1.4
	(psi)	(200)

Lap Shear Strength, ISO 4587:

Grit Blasted Mild Steel (GBMS)	N/mm <sup>2</sup>	8.3
	(psi)	(1,200)
Aluminum	N/mm <sup>2</sup>	15
	(psi)	(2,200)
Stainless Steel	N/mm <sup>2</sup>	13
	(psi)	(1,900)
Galvanized Steel	N/mm <sup>2</sup>	6
	(psi)	(850)
FRP	N/mm <sup>2</sup>	6.5
	(psi)	(940)
Gelcoat	N/mm <sup>2</sup>	3.5
	(psi)	(510)

**TYPICAL ENVIRONMENTAL RESISTANCE**

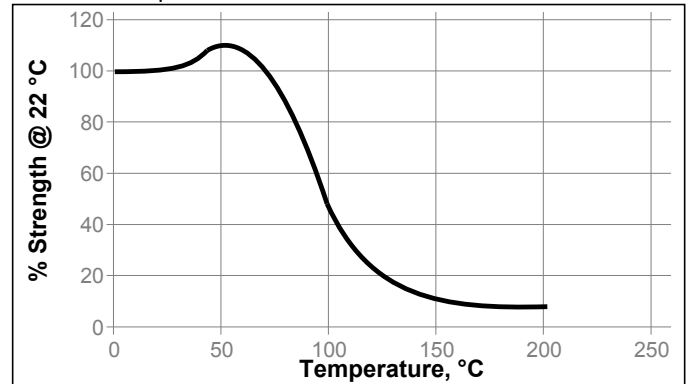
Cured for 72 hours @ 22 °C

Lap Shear Strength, ISO 4587:

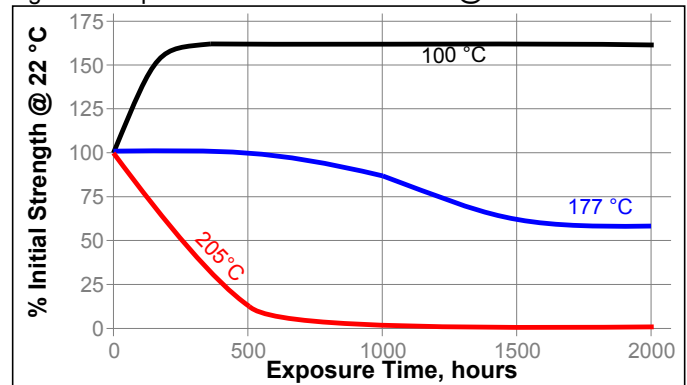
Grit Blasted Mild Steel (GBMS)

**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	
		500 h	1000 h
Air	87	130	180
Water	22	100	100
95% RH	40	170	110
Salt fog	35	100	100
Condensing Humidity	49	100	80

**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. For high strength structural bonds, remove surface contaminants such as paint, oxide films, oils, dust, mold release agents and all other surface contaminants.
2. Use gloves to minimize skin contact. DO NOT use solvents for cleaning hands.
3. **Dual Cartridges:** To begin using a new cartridge, remove cartridge cap and dispense a small amount of adhesive, making sure both parts A&B are extruding. Attach nozzle and dispense approximately 25 to 50mm, before applying onto part to be bonded. Partially used cartridges can be stored with the mixing nozzle attached. To reuse, remove and discard old nozzle, attach the new nozzle, dispense approximately 25 to 50mm, before applying onto part to be bonded.  
**Bulk Containers:** Normally material is dispensed through volumetric metered mixing equipment, attached to static mix nozzles.
4. For maximum bond strength apply adhesive evenly to both surfaces to be joined.
5. Application to the substrates should be made as soon as possible. Larger quantities and/or higher temperatures will reduce the working time.
6. Join the adhesive coated surfaces and allow to cure. Higher temperatures will speed up curing.
7. Keep assembled parts from moving during cure. The bond should be allowed to develop full strength before subjecting to any service load.
8. Excessive uncured adhesive can be cleaned up with ketone type solvents.

**Loctite Material Specification<sup>LMS</sup>**

LMS dated September 26, 2007. 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**

The product is classified as flammable and must be stored in an appropriate manner in compliance with relevant regulations. Do not store near oxidizing agents or combustible materials. Store product in the unopened container in a dry location. Storage information may also be indicated on the product container labelling.

**Optimal Storage: 2 °C to 8 °C. Storage below 2 °C or greater than 8 °C can adversely affect product properties.**

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel 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**

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Reference 0.0