LOCTITE® H4500™

May 2010

PRODUCT DESCRIPTION

LOCTITE® H4500™ provides the following product characteristics:

Technology	Acrylic
Chemical Type	Methacrylate
Appearance (Part A)	White
Appearance (Part B)	Black viscous liquid
Appearance (Mixture)	Grey[LMS]
Components	Two component - requires mixing
Mix Ratio, by volume - Part A: Part B	10 : 1
Thixotropic	Reduced migration of liquid product after application to substrate
Key Substrates	Steel, Aluminum, Stainless Steel, Epoxy-coated metal, SMC and Plastics
Cure	Room temperature cure
Application	Bonding
Specific Benefit	• Excellent environmental resistance • Excellent tolerance to off-ratio mixing • Superior impact and peel strength • Primer not required • Non-sagging gaps filled to 12.7 mm • Non-corrosive

LOCTITE® H4500™ 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	0.99
Flash Point - See MSDS	

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

Cone CP50-1 @ shear rate 50 s^{-1}	14,900

Part B:

Specific Gravity @ 25 °C	0.96
Flash Point - See MSDS	

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

Cone CP50-1 @ shear rate 50 s^{-1}	9,200

Mixed:

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

Polyethylene	15
Steel	15
Aluminum	15

TYPICAL CURING PERFORMANCE

Fixture Time

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

Fixture Time, ISO 4587, minutes:

Grit Blasted Mild Steel	10 to 15

Peak Exotherm Temperature

Peak Exotherm Temperature, 10 gram mass:

Peak Temperature Time, minutes	27
Peak Temperature, °C	140

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

Glass Transition Temperature (Tg), ISO 11359-2, °C		107
Coefficient of Thermal Expansion, ISO 11359-2, K^{-1}:		
Pre Tg		107×10^{-6}
Post Tg		219×10^{-6}
Shore Hardness, ISO 868, Durometer D		73
Linear Shrinkage, %		6.2
Volume Shrinkage, %		17.5
Elongation, at break, ISO 527-2, %		11
Elongation, at yield, ISO 527-2, %		5
Tensile Strength, at break, ISO 527-2	N/mm²	19.5
	(psi)	(2,830)
Tensile Strength, at yield, ISO 527-2	N/mm²	32
	(psi)	(4,660)
Tensile Modulus, ISO 527-2	N/mm²	1,370
	(psi)	(198,700)

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 24 hours @ 22 °C.

Lap Shear Strength, ISO 4587:

Stainless steel	N/mm²	≥20.69[LMS]
	(psi)	(≥3,000)

Cured for 72 hours @ 22 °C

Impact Strength, ISO 9653, J:

Grit Blasted Mild Steel (GBMS)	12
Aluminum (abraded)	11
Grit Blasted Mild Steel (GBMS) @ -40 °C	5

"T" Peel Strength, ISO 11339:

Steel	N/mm	10
	(lb/in)	(58)
Aluminum	N/mm	5
	(lb/in)	(29)

Block Shear Strength, ISO 13445:

Ferrite Magnet to Steel	N/mm²	21
	(psi)	(3,020)
Phenolic	N/mm²	3.3
	(psi)	(475)
Glass	N/mm²	5.3
	(psi)	(770)
Acrylic	N/mm²	3.3
	(psi)	(490)
Epoxy	N/mm²	7.9
	(psi)	(1,140)
ABS	N/mm²	2.4
	(psi)	(345)
PVC	N/mm²	1.1
	(psi)	(160)
Polycarbonate	N/mm²	4.1
	(psi)	(590)

Lap Shear Strength, ISO 4587:

Grit Blasted Mild Steel (GBMS)	N/mm²	11
	(psi)	(1,610)
Aluminum	N/mm²	21
	(psi)	(2,990)
Stainless Steel	N/mm²	20.7
	(psi)	(3,000)
Galvanized Steel	N/mm²	15
	(psi)	(2,140)
FRP	N/mm²	9.7
	(psi)	(1,410)
Gelcoat	N/mm²	4
	(psi)	(570)

TYPICAL ENVIRONMENTAL RESISTANCE

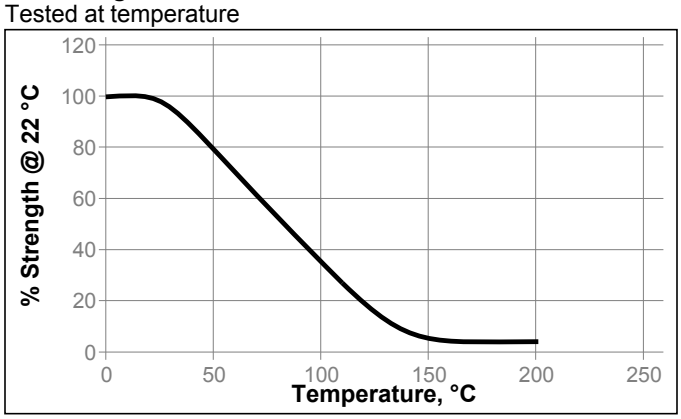
Cured for 72 hours @ 22 °C

Lap Shear Strength, ISO 4587:

Grit Blasted Mild Steel (GBMS)

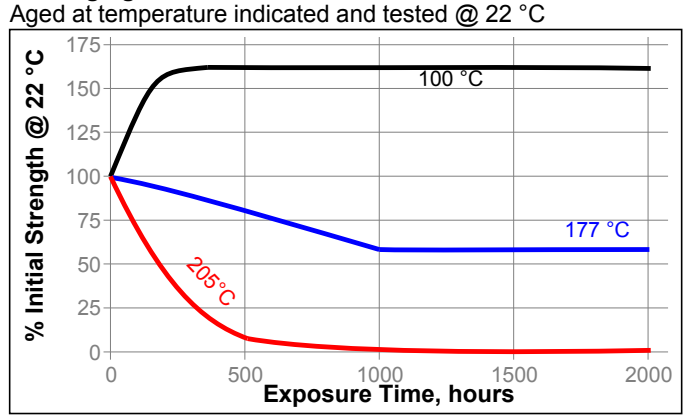
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

		% of initial strength	
Environment	**°C**	**500 h**	**1000 h**
Air	87	150	150
Water	22	150	150
95% RH	40	90	130
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[LMS]
LMS dated April 14, 2009. 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 Representive.

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
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Reference 0.0