LOCTITE® Hysol® 9460™

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PRODUCT DESCRIPTION

LOCTITE® Hysol® 9460™ provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (Resin)	White[LMS]
Appearance (Hardener)	Black[LMS]
Appearance (Mixed)	Grey
Components	Two part - Resin & Hardener
Mix Ratio, by weight - Resin : Hardener	1 : 1
Mix Ratio, by volume - Resin : Hardener	1 : 1
Cure	Room temperature cure after mixing
Secondary Cure	Heat
Application	Bonding
Specific Benefit	• Non-sag slump resistance • Smooth paste • Easy to mix • Easy to dispense • Extended working life • Quick heat response • Resistant to automotive fluids • Impact resistant • Fatigue resistant

LOCTITE® Hysol® 9460™ is a thixotropic, modified, two-component epoxy adhesive formulated for ease of use as well for a good balance of properties. This two-part adhesive is formulated to give very high peel strength coupled with excellent shear strength. The flexibility of the cured adhesive makes it useful for bonding dissimilar substrates. Recommended substrates include metals, engineering thermoplastics, and thermoset laminates such as sheet molding compound (SMC) without the use of primers.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

Specific Gravity @ 25 °C	1.35
Viscosity, Brookfield - HB, 25 °C, mPa·s (cP):	
Spindle 6, speed 20 rpm	150,000 to 300,000[LMS]
Weight Per Gallon, lbs/gal	11.3
Flash Point - See MSDS	

Hardener:

Specific Gravity @ 25 °C	1.31
Viscosity @ 25°C, mPa·s (cP)	100,000 to 250,000
Weight Per Gallon, lbs/gal	10.9
Flash Point - See MSDS	

Mixed:

Specific Gravity @ 25 °C	1.33
Viscosity @ 25°C, mPa·s (cP)	150,000 to 250,000
Peak Exotherm Temperature, °C,	93
Weight Per Gallon, lbs/gal	11.1
Pot life @ 25 °C, minutes	40 to 65[LMS]

TYPICAL PROPERTIES OF CURED MATERIAL

Cured @ 25 °C except where noted

Physical Properties:

Shore Hardness, ISO 868, Durometer D:		
Cured for 2 hours @ 60 °C		≥75[LMS]
Glass Transition Temperature, °C		68
Elongation, ISO 527-2, %		3.5
Tensile Strength, ISO 527-2	N/mm²	30.3
	(psi)	(4,400)
Tensile Modulus, ISO 527-2	N/mm²	2,758
	(psi)	(400,000)

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 3 days @ 25 °C

Lap Shear Strength, ISO 4587:

Aluminum (etched):		
0.125 mm gap, tested @ -53 °C	N/mm²	20.7
	(psi)	(3,000)
0.125 mm gap, tested @ 25 °C	N/mm²	24.1
	(psi)	(3,500)
0.125 mm gap, tested @ 82 °C	N/mm²	6.7
	(psi)	(1,000)
0.125 mm gap, tested @ 121 °C	N/mm²	2.1
	(psi)	(300)
0.25 mm gap, tested @ 25 °C	N/mm²	22.1
	(psi)	(3,200)
0.75 mm gap, tested @ 25 °C	N/mm²	15.2
	(psi)	(2,200)
1.5 mm gap, tested @ 25 °C	N/mm²	13.8
	(psi)	(2,000)
Aluminum (degreased):		
0.125 mm gap, tested @ 25 °C	N/mm²	22.1
	(psi)	(3,200)
Aluminum (grit blasted):		
0.125 mm gap, tested @ 25 °C	N/mm²	24.1
	(psi)	(3,500)
Steel (cold rolled) (grit blasted):		
0.125 mm gap, tested @ 25 °C	N/mm²	24.1
	(psi)	(3,500)
Steel (cold rolled) (degreased):		
0.125 mm gap, tested @ 25 °C	N/mm²	22.1
	(psi)	(3,200)
Primed steel (black e-coated):		
0.75 mm gap, tested @ 25 °C	N/mm²	9.0
	(psi)	(1,300)

Steel (coil coated):
0.75 mm gap, tested @ 25 °C N/mm² 13.8 (psi) (2,000)

Rynite:
0.75 mm gap, tested @ 25 °C N/mm² 1.7 (psi) (250)

ABS:
0.75 mm gap, tested @ 25 °C N/mm² 2.8 (psi) (400)

PVC (clear):
0.75 mm gap, tested @ 25 °C N/mm² 4.3 (psi) (620)

PVC (filled):
0.75 mm gap, tested @ 25 °C N/mm² 3.7 (psi) (540)

Polycarbonate:
0.75 mm gap, tested @ 25 °C N/mm² 4.8 (psi) (700)

Eagle Picher 218-2, SMC:
0.75 mm gap, tested @ 25 °C N/mm² 3.4 (psi) (500)
0.75 mm gap, tested @ 82 °C N/mm² 2.8 (psi) (400)

Budd DSM-950, SMC:
0.75 mm gap, tested @ 25 °C N/mm² 3.9 (psi) (560)
0.75 mm gap, tested @ 82 °C N/mm² 3.1 (psi) (450)

Diversitech 8002:
0.75 mm gap, tested @ 25 °C N/mm² 3.7 (psi) (535)
0.75 mm gap, tested @ 82 °C N/mm² 2.4 (psi) (350)

Premix EMS 30271, SMC:
0.75 mm gap, tested @ 25 °C N/mm² 3.4 (psi) (500)
0.75 mm gap, tested @ 82 °C N/mm² 2.9 (psi) (425)

Ashland Phase Alpha:
0.75 mm gap, tested @ 25 °C N/mm² 3.1 (psi) (445)
0.75 mm gap, tested @ 82 °C N/mm² 2.0 (psi) (290)

Rockwell 9465:
0.75 mm gap, tested @ 25 °C N/mm² 3.8 (psi) (550)
0.75 mm gap, tested @ 82 °C N/mm² 3.8 (psi) (550)

Derakane 790 HSMC:
0.75 mm gap, tested @ 25 °C N/mm² 7.6 (psi) (1,100)

Fiberite:
0.75 mm gap, tested @ 25 °C N/mm² 6.8 (psi) (980)

Lytex 9063 Epoxy SMC:
0.75 mm gap, tested @ 25 °C N/mm² 8.6 (psi) (1,250)

Graphite Epoxy Laminate:
0.75 mm gap, tested @ 25 °C N/mm² 13.8 (psi) (2,000)

Spectrim HF-85 RIM:
0.75 mm gap, tested @ 25 °C N/mm² 2.7 (psi) (390)

Arimax RTM:
0.75 mm gap, tested @ 25 °C N/mm² 6.6 (psi) (950)

Peel Strength, ASTM D 3167:
Aluminum (etched):
Tested @ -55 °C N 4.4 (lb) (25)
Tested @ 25 °C N 5.3 (lb) (30)

"T" Peel Strength, ISO 11339:
Aluminum (etched):
Tested @ -55 °C N 3.5 (lb) (20)
Tested @ 25 °C N 2.6 (lb) (15)

Cured for 8 hours @ 25 °C followed by 1 hour @ 121 °C
Peel Strength, ASTM D 3167:
Aluminum (etched):
Tested @ -55 °C N 7.0 (lb) (40)
Tested @ 25 °C N 5.3 (lb) (30)

"T" Peel Strength, ISO 11339:
Aluminum (etched):
Tested @ -55 °C N 4.4 (lb) (25)
Tested @ 25 °C N 3.5 (lb) (20)

TYPICAL ENVIRONMENTAL RESISTANCE

Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C

		% of initial strength
Environment	**°C**	**720 h**
Air	25	100
Water	54	75
Salt fog	35	63
Water/glycol 50/50	130	50
ATF	25	100
ATF	82	100
Brake fluid	25	100
Windshield wiper fluid	25	88
Motor oil (10W40)	25	100
Motor oil (10W40)	141	100
Gasoline (unleaded)	25	100
Diesel fuel	25	100
100% RH	38	75

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
Mixing:

1. **When mixing by hand**, combine Part A (Resin) and Part B (Hardener) in the correct ratio and mix thoroughly until the color and consistency are uniform. EPOXI-PATCH® Tube Kits have been designed so that squeezing **EQUAL LENGTH BEADS of Part A & Part B** will give the proper ratio.
2. Mixing the adhesive just prior to use is recommended. The temperature of the separate components prior to mixing is not critical, but they should be close to room temperature.
3. Heat buildup during and after mixing is normal. To reduce the likelihood of exothermic reaction or excessive heat buildup, mix less than 4,500 grams at a time. Mixing smaller amounts will minimize heat buildup.
4. **When mixing using a cartidge**, place cartridge in proper dispenser. To begin using a new cartridge, remove the cap and dispense a small amount of adhesive, making sure both parts A & B are extruding. Attach nozzle and dispense approximately 2.5 to 5.0 cm before applying onto the part to be bonded. Partially used cartridges should be stored with the mixing nozzle attached. To reuse, remove and discard the old nozzle, attach the new nozzle, and begin dispensing.

Applying

1. Bonding surfaces should be clean, dry, and free of contamination.
2. Once the adhesive is applied, the bonded parts should be held in contact until the part has developed handling strength. Fixturing can be removed at this point. Since the full bond strength has not yet been attained, load application should be small at this time.

Cure

1. Complete cure is obtained after 72 hours @ 25 °C. LOCTITE® Hysol® 9460™ can also be fully cured with heat such as; 6 to 8 hours at a maximum temperature of 149 °C.
2. After 24 hours, approximately 90% of full cure properties are attained at room temperature.
3. Other times and temperatures (149°C is a suggested maximum) can be used depending on the application.
4. Heat cures can be modified to achieve a desired degree of cure from handling strength to full cure.

Clean up

1. It is important to clean up excess adhesive from the work area and application equipment before it hardens.
2. Denatured alcohol and many common industrial solvents are suitable for removing uncured adhesive.

Loctite Material Specification[LMS]
LMS dated June 10, 2005 (Resin) and LMS dated October 18, 2004 (Hardener). 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: 8 °C to 21 °C. Storage below 8 °C or greater than 28 °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/mm^2 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