

LOCTITE[®] EA M-21HP[™]

Known as LOCTITE® M-21HP™ September 2020

PRODUCT DESCRIPTION

LOCTITE.

LOCTITE $\ensuremath{\mathbb{R}}$ EA M-21HP $\ensuremath{\mathbb{M}}$ provides the following product characteristics:

Technology	Ероху	
Chemical Type	Ероху	
Appearance (resin)	Off-white to beige liquid	
Appearance (hardener)	Light straw colored liquid	
Appearance (mixed)	Off-white	
Components	Two part - Resin & Hardener	
Viscosity	Medium	
Mix Ratio by Weight (Resin/Hardener)	100 : 55	
Mix Ratio by Volume (Resin/Hardener)	2:1	
Cure	Room temperature cure after mixing	
Application	Bonding	

LOCTITE® EA M-21HP[™] cures at room temperature once mixed, to form a tough, off-white bondline which provides high peel resistance and high shear strengths. The fully cured epoxy is resistant to a wide range of chemicals and solvents, and acts as an excellent electrical insulator. LOCTITE® EA M-21HP[™] high performance epoxy provides excellent bond strengths to a wide variety of substrates including glass, plastics and metals. Suitable for use in the assembly of **disposable medical devices**.

ISO-10993

LOCTITE® EA M-21HP[™] 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.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin

Specific Gravity @ 25°C Viscosity, Brookfield - RVT @ 25 °C, mPa·s (cP): Spindle 7, Speed 20 rpm	1.0 65,000
Hardener Specific Gravity @ 25°C Viscosity, Brookfield - RVT @ 25 °C, mPa·s (cP): Spindle 6, Speed 50 rpm	1.1 7,000
Mixed Specific Gravity @ 25°C	1.03

TYPICAL CURING PERFORMANCE

Gel Time

Gel time, 22°C, minutes	10 to 25

Working Life	
Working life, minutes	20

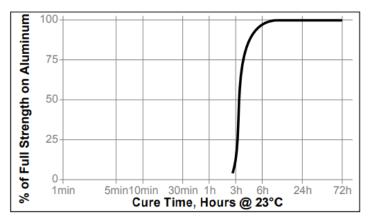
Tack Free Time

Tack Free Time is the time required to achieve a tack free surface

Tack Free Time, minutes 40

Cure Speed vs. Time

The graph below shows shear strength developed with time on Aluminum (etched & abraded) lapshears @ 25°C with an average bondline gap of 0.1 to 0.2 mm and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 5 hours @ 25 °C:

Physical Properties: Glass Transition Temperature,		60
ASTM E 228, °C Elongation, ISO 527-2, % Tensile Strength, ISO 527-2	N/mm ²	8 39
	(psi)	(5,700)
Shore Hardness, ISO 868, Durometer D: Cured @ 22°C for 16 to 18 hours followed by 2 hours @ 65°C		74 to 84
Electrical Properties: Dielectric Breakdown Strength, IEC 60243-1, kV/mm		20



TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive properties

Cured @ 65°C for 2 hours

Lap Shear Strength:		
Aluminum (etched & abraded), 0.127	N/mm ²	≥6.9
mm gap	(psi)	(≥1,000)

Cured @ 22°C for 5 days Lap Shear Strength:

Lap Shear Shengin.		
Steel (grit blasted)	N/mm² (psi)	22.6 (3,270)
Aluminum (etched & abraded), 0.1 to 0.2 mm gap	N/mm² (psi)	28.2 (4,090)
Aluminum (Anodized)	N/mm² (psi)	17.4 (2,530)
Stainless Steel	N/mm² (psi)	22.0 (3,190)
Polycarbonate	N/mm² (psi)	3.9 (560)
Nylon	N/mm² (psi)	1.8 (260)
Wood (Fir)	N/mm ² (psi)	11.4 (1,660)

Block Shear Strength, ISO 13445:

PVC	N/mm ² (psi)	7.9 (1,140)
ABS	N/mm ² (psi)	10.4 (1,510)
Epoxyglass	N/mm ² (psi)	28.6 (4,140)
Acrylic	N/mm ² (psi)	2.0 (290)
Glass	N/mm ² (psi)	32.3 (4,690)

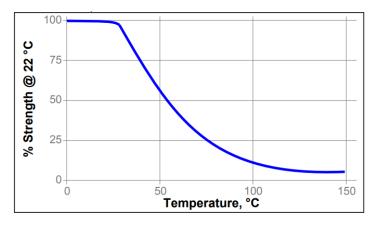
TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 12 hours @ 65° C followed by 4 hours @ 22° C Lap Shear Strength:

Aluminum (etched & abraded), 0.1 to 0.2 mm gap

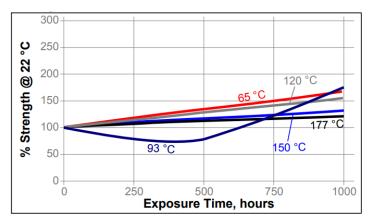
Hot Strength

Tested at temperature



Heat Aging

Cured for 5 days @ 22°C, on steel, aged at temperatures indicated, tested @22°C



Chemical/Solvent Resistance

Cured for 5 days @ 22°C, on steel, aged under conditions indicated and tested @ 22°C

		% of initial strength		
Environment	°C	500 h	1000 h	
Air	87		135	
Motor oil (10W30)	87	160	170	
Unleaded gasoline	87	105	80	
Water/glycol 50/50	87	120	125	
Salt fog	22		70	
95% RH	38		100	
Condensing Humidity	49		90	
Water	22		80	
Acetone	22	75	95	
Isopropanol	22	85	125	

Effects of Sterilization

In general, products similiar in composition to LOCTITE® EA M-21HP[™] subjected to standard sterilization methods, such as EtO and Gamma Radiation (25 to 50 kiloGrays cumulative) show excellent bond strength retention.

LOCTITE® EA M-21HP[™] maintains bond strength after 1 cycle of steam autoclave. It is recommended that customers test specific parts after subjecting them to the preferred sterilization method. Consult with Loctite® for a product recommendation, if your device will see more than 3 sterilization cycles.

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.



Direction 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 use, simply insert the cartridge into the application gun and start the plunger into the cylinders using light pressure on the trigger. Next, remove the cartridge cap and expel a small amount of adhesive to be sure both sides are flowing evenly and freely. If automatic mixing of resin and hardener is desired, attach the mixing nozzle to the end of the cartridge and begin dispensing the adhesive. For hand mixing, expel the desired amount of the adhesive and mix thoroughly. Mix for approximately 15 seconds after uniform color is obtained.
- 4. For maximum bond strength apply adhesive evenly to both surfaces to be joined.
- Application to the substrates should be made promptly. Larger quantities and/or higher temperatures will reduce this working time.
- 6. Join the adhesive coated surfaces and allow to cure at 25 °C for 24 hours for high strength. Heat up to 93 °C will speed curing.
- Keep parts from moving during cure. Contact pressure is neccesary. Maximum shear strength is obtained with a 0.1 to 0.2 mm bond line.
- 8. Excessive uncured adhesive can be cleaned up with ketone type solvents.

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 Henkel representative.

Conversions

 $(^{\circ}C \times 1.8) + 32 = ^{\circ}F$ kV/mm x 25.4 = V/mil mm / 25.4 = inches μ m / 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

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Reference 1.4