PRODUCT DESCRIPTION

LOCTITE® M-11FL™ provides the following product characteristics:

Technology	Urethane
Chemical Type	Polyisocyanate
Appearance (Resin)	Water white clear liquid[LMS]
Appearance (Hardener)	Water white clear liquid[LMS]
Appearance (Mixture)	Ultra clear liquid
Components	Two part - Resin & Hardener
Viscosity	Low
Mix Ratio, by weight - Resin : Hardener	100 : 91
Mix Ratio, by volume - Resin : Hardener	1 : 1
Cure	Room temperature cure after mixing
Application	Bonding

LOCTITE® M-11FL™ cures at room temperature once mixed, to form an ultra-clear, highly flexible bondline which provides excellent peel strength. Typical applications include bonding polycarbonate, and a wide variety of other plastics, as well as glass and metal. LOCTITE® M-11FL™ is suitable for applications requiring a clear, non-yellowing bondline. Suitable for use in the assembly of **disposable medical devices**.

ISO-10993

An ISO 10993 Test Protocol is an integral part of the Quality Program for LOCTITE® M-11FL™. LOCTITE® M-11FL™ has been qualified to Henkel's ISO 10993 Protocol as a means to assist in the selection of products for use in the medical device industry. Certificates of Compliance are available on Henkel's website or through the Henkel Quality Department.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

Specific Gravity @ 25 °C	1.1
Flash Point - See MSDS	
Viscosity, Brookfield, 25 °C, mPa·s (cP):	
Spindle 6, speed 50 rpm	5,000 to 15,000[LMS]

Hardener:

Specific Gravity @ 25 °C	1.0
Flash Point - See MSDS	
Viscosity, Brookfield, 25 °C, mPa·s (cP):	
Spindle 5, speed 100 rpm	600 to 2,000[LMS]

Mixed:

Specific Gravity @ 25 °C	1.05

TYPICAL CURING PERFORMANCE

Working Life

Working life, minutes	10

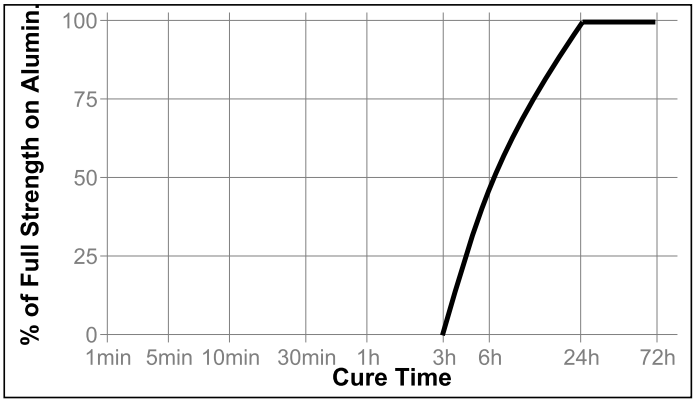
Tack Free Time

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

Tack Free Time, hours	3 to 24

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 @ 25 °C except where noted

Physical Properties:

Glass Transition Temperature, ASTM E 228, °C		-20
Elongation, ISO 527-2, %		170
Tensile Strength, ISO 527-2	N/mm²	3.4
	(psi)	(490)
Shore Hardness, ISO 868, Durometer D:		
Cured @ 22 °C for 16 to 18 hours followed by 2 hours @ 65 °C		35 to 60[LMS]

Electrical Properties:

Dielectric Breakdown Strength, IEC 60243-1, kV/mm	16

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured @ 22 °C for 5 days

Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm²	1.1
	(psi)	(160)
Aluminum (etched & abraded), 0.1 to 0.2 mm gap	N/mm²	12.8
	(psi)	(1,850)
Aluminum (anodised)	N/mm²	1.0
	(psi)	(140)
Stainless steel	N/mm²	2.2
	(psi)	(320)

Polycarbonate	N/mm² (psi)	10.8 (1,570)
Nylon	N/mm² (psi)	1.6 (230)
Wood (Fir)	N/mm² (psi)	1.1 (160)

Block Shear Strength, ISO 13445:

PVC	N/mm² (psi)	7.8 (1,130)
ABS	N/mm² (psi)	2.0 (290)
Epoxyglass	N/mm² (psi)	15.8 (2,290)
Acrylic	N/mm² (psi)	2.0 (290)
Glass	N/mm² (psi)	2.4 (350)

Cured @ 65 °C for 2 hours

Lap Shear Strength, ISO 4587:

Aluminum (acid etched)	N/mm² (psi)	≥3.5[LMS] (≥507)

TYPICAL ENVIRONMENTAL RESISTANCE

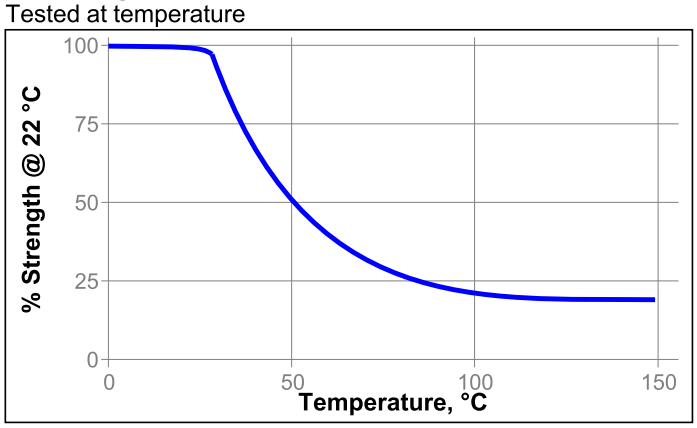
Cured for 12 hours @ 65 °C followed by 4 hours @ 22 °C

Lap Shear Strength, ISO 4587:

Aluminum (etched), 0.1 to 0.2 mm gap

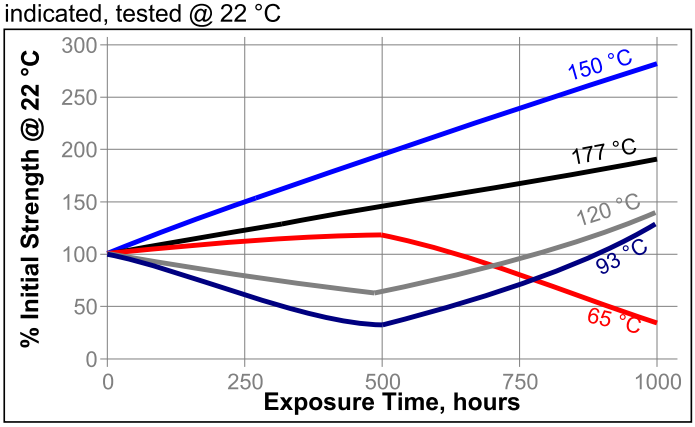
Hot Strength

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	30	35
Motor oil (10W30)	87	30	0
Unleaded gasoline	87	60	60
Water/glycol 50/50	87	70	15
Salt fog	22	45	0
95% RH	38	80	105
Condensing Humidity	49	25	25
Water	22	35	15
Acetone	22	0	0
Isopropanol	22	0	0

Effects of Sterilization

In general, products similiar in composition to LOCTITE® M-11FL™ subjected to standard sterilization methods, such as EtO and Gamma Radiation (25 to 50 kiloGrays cumulative) show excellent bond strength retention. LOCTITE® M-11FL™ maintains bond strength after 1 cycle of steam autoclave. It is recommended that customers test specific parts after subjecting them to the perferred 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 (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 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.
5. Application to the substrates should be made within . 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.
7. 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.

Loctite Material Specification[LMS]
LMS dated August 18, 2010. 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
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/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
The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

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Reference 2.1