PRO-SET®

Technical Data
LAM-135
LAM-224

LAMINATING EPOXY

COMBINED FEATURES

Medium viscosity for good wet out of all synthetic composite fabrics and core materials.

Fast cure speed hardener provides a 40 minutes working time at 77°F (25°C). A typical laminate will be gelled in 1.5 to 2 hours.

Optimized for hand wet out and machine impregnation in contact molding, vacuum bagging and filament winding applications.

Excellent for taping and tabbing operations in composite structure assembly.

Room temperature cure properties suitable for many composite components and structures.

T_g as high as 223°F (106°C) with proper post cure providing excellent temperature stability and great part cosmetics.

Cost effective, high performance epoxy formulation for synthetic composite manufacturing.

Quality-control tinting is available at no extra charge; simply add "QC" after the product code on your order.

Shelf life is 3 years for resin and 2 years for hardener when properly stored[3].

The New Standard

EPOXIES for
Laminating
Infusion
Tooling
Assembly

Rev 3 / Dec 2015

HANDLING PROPERTIES

Property	Standard	Units	72°F (22°C)	77°F (25°C)	85°F (29°C)
150g Pot Life	ASTM D2471	minutes	13-17	11-15	9-11
500g Pot Life	ASTM D2471	minutes	13-17	11-15	9-11
Viscosity Mixed	ASTM D2196	cP	1705	1360	970
Viscosity (resin)	ASTM D2196	cP	6890		
Viscosity (hardener)	ASTM D2196	cP	75		

MIX RATIO

Method	Resin:Hardener	Resin:Hardener
Weight	3.5:1	100:28.8
Weight Range	3.25:1–3.97:1	100:30.8–100:25.2
Volume	3.00:1	100:33.3
Volume Range	2.80:1–3.43:1	100:35.7–100:29.2

DENSITY

State	Units	72°F (22°C)
Cured	lb/gal (g/cc)	9.76 (1.17)
Resin	lb/gal (g/cc)	9.71 (1.16)
Hardener	lb/gal (g/cc)	8.38 (1.00)

VISCOSITY VS TEMPERATURE
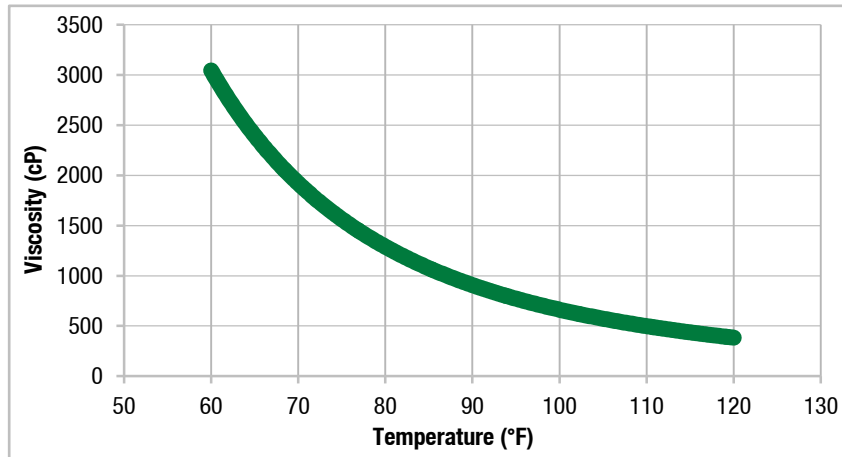
Test specimens were neat epoxy (without fiber reinforcement).
Typical values, not to be construed as specification.

LAM-135~LAM-224

LAMINATING EPOXY

MECHANICAL PROPERTIES

Property	Standard	Units	72°F (22°C) x 4 wk	77°F (25°C) x 2 wk	RT Gelation + 120°F (49°C) x 8 hrs	RT Gelation + 140°F (60°C) x 8 hrs	RT Gelation + 180°F (82°C) x 8 hrs
Hardness	ASTM D2240	Type D	86	88	83	85	87
Compression Yield	ASTM D695	psi (MPa)	15,100 (104)	14,200 (98)	15,000 (103)	15,000 (103)	15,000 (103)
Tensile Strength	ASTM D638	psi (MPa)	10,800 (74)	11,100 (77)	11,000 (76)	11,000 (76)	11,500 (79)
Tensile Modulus	ASTM D638	psi (GPa)	5.61E+05 (3.87)	5.49E+05 (3.79)	5.44E+05 (3.75)	4.93E+05 (3.4)	4.75E+05 (3.28)
Tensile Elongation	ASTM D638	%	3.1	4.9	4.4	4.4	6.7
Flexural Strength	ASTM D790	psi (MPa)	17,800 (123)	17,000 (117)	18,400 (127)	18,600 (128)	20,300 (140)
Flexural Modulus	ASTM D790	psi (GPa)	5.45E+05 (3.76)	4.72E+05 (3.25)	5.24E+05 (3.61)	5.07E+05 (3.5)	4.88E+05 (3.36)

THERMAL PROPERTIES

Property	Standard	Units	72°F (22°C) x 4 wk	77°F (25°C) x 2 wk	RT Gelation + 120°F (49°C) x 8 hrs	RT Gelation + 140°F (60°C) x 8 hrs	RT Gelation + 180°F (82°C) x 8 hrs
Tg DMA Peak Tan Delta	ASTM E1640[1]	°F (°C)	180 (82)	177 (80)	208 (98)	216 (102)	242 (117)
Tg DMA Onset Storage Modulus	ASTM E1640[1]	°F (°C)	151 (66)	151 (66)	166 (75)	181 (83)	223 (106)
Tg DSC Onset– 1st Heat	ASTM E1356	°F (°C)	137 (58)	135 (57)	165 (74)	182 (84)	211 (99)
Heat Deflection Temperature	ASTM D648	°F (°C)	138 (59)	137 (58)	154 (68)	169 (76)	186 (86)
Tg DSC Ultimate	ASTM E1356	°F (°C)	213 (101)[2]				

[1] 1 Hz, 3°C per minute.

[2] Additional post cure may be required; contact Technical Department for details.

[3] Store PRO-SET® Epoxy resins and hardeners at room temperature in sealed containers until shortly before use. As with many high-performance epoxy resins, repeated exposure to low temperatures during storage may cause the resin to crystallize. If this occurs, warm the resin to 125° F and stir to dissolve crystals. Hardeners may form carbamation when exposed to CO_2 and moisture in the atmosphere for extended periods of time. Prevent carbamation by protecting hardeners from exposure until immediately prior to processing.

135.02
224.01