

# PRO-SET®

## Technical Data

# LAM-135 LAM-226

## LAMINATING EPOXY

The New  
Standard  
2013

EPOXIES for  
Laminating  
Infusion  
Tooling  
Assembly

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ISO9001:2008 Certified

Rev 0 / Jan 2013

### COMBINED FEATURES

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

**Medium cure speed** hardener provides 2 to 3 hours of working time at 77°F (25°C). A typical laminate will be gelled in 4 to 5 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.

**Tg as high as 214° F (101°C)** with proper post cure providing excellent temperature stability and great part cosmetics.

**Cost Effective - High Performance** Epoxy formulation for synthetic composite manufacturing.

### HANDLING PROPERTIES

Property	Standard	Units	72°F (21°C)	77°F (25°C)	85°F (29°C)
150g Pot Life	ASTM D2471	minutes	75	52	40
500g Pot Life	ASTM D2471	minutes	56	52	36
Viscosity Mixed	ASTM D2196	cP	1076	958	705
Viscosity (resin)	ASTM D2196	cP	6890		
Viscosity (hardener)	ASTM D2196	cP	40		

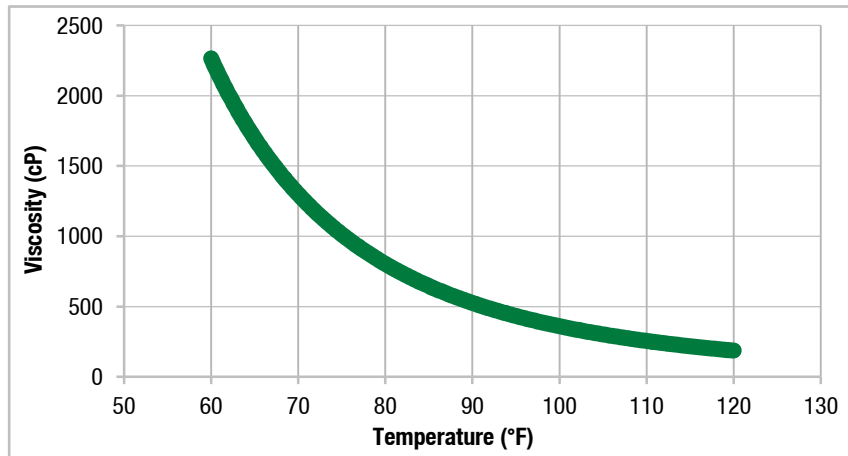
### MIX RATIO

Method	Resin:Hardener	Resin:Hardener
Weight	3.5:1	100:28.6
Weight Range	3.70:1–3.09:1	100:27.0–100:32.4
Volume	3.00:1	100:33.3
Volume Range	3.10:1–2.59:1	100:32.2–100:38.6

### DENSITY

State	Units	72°F (21°C)
Cured	lb/gal (g/cc)	9.76 (1.17)
Resin	lb/gal (g/cc)	9.71 (1.16)
Hardener	lb/gal (g/cc)	8.15 (0.98)

### VISCOSITY VS TEMPERATURE



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

# LAM-135 / LAM-226

## 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	Shore D	86	86	87	87	88
Compression Yield	ASTM D695	psi (MPa)	15,800 (109)	15,600 (108)	14,700 (101)	14,700 (101)	14,700 (101)
Tensile Strength	ASTM D638	psi (MPa)	8,130 (56)	8,470 (58)	10,500 (72)	10,500 (72)	10,900 (75)
Tensile Modulus	ASTM D638	psi (GPa)	5.41E+05 (3.73)	5.67E+05 (3.91)	5.32E+05 (3.67)	5.38E+05 (3.71)	4.71E+05 (3.25)
Tensile Elongation	ASTM D638	%	1.7	1.7	3.3	3.3	6.3
Flexural Strength	ASTM D790	psi (MPa)	11,500 (79)	13,000 (90)	17,500 (121)	17,500 (121)	17,500 (121)
Flexural Modulus	ASTM D790	psi (GPa)	5.20E+05 (3.59)	5.20E+05 (3.59)	5.01E+05 (3.45)	4.60E+05 (3.17)	4.27E+05 (2.94)

### 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 <sup>1</sup>	°F (°C)	158 (70)	155 (69)	186 (86)	203 (95)	232 (111)
Tg DMA Onset Storage Modulus	ASTM E1640 <sup>1</sup>	°F (°C)	144 (62)	141 (61)	168 (75)	183 (84)	214 (101)
Tg DSC Onset– 1st Heat	ASTM E1356	°F (°C)	140 (60)	134 (57)	158 (70)	167 (75)	204 (95)
Heat Deflection Temperature	ASTM D648	°F (°C)	131 (55)	129 (54)	151 (66)	166 (74)	191 (88)
Tg DSC Ultimate	ASTM E1356	°F (°C)			220 (104) <sup>2</sup>		

<sup>1</sup> 1 Hz, 3°C per minute.

<sup>2</sup> Additional post cure may be required; contact Technical Department for details.

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