



# PRO-SET®

## Technical Data

# LAM-145

# LAM-239

EPOXIES for  
Laminating  
Infusion  
Tooling  
Assembly

## LAMINATING EPOXY

### COMBINED FEATURES

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

**Thixotropic** to prevent drain out in heavy fabrics and on vertical surfaces.

**High tack** to help hold heavy fabric and core in place on vertical surfaces.

**Extended open time** hardener provides 8 to 9 hours of working time at 85°F (29°C). A typical laminate will be gelled in 12 to 14 hours at 85°F (29°C).

**Optimized** for hand wet out and machine impregnation in contact molding, vacuum bagging and Light RTM applications.

**Elevated temperature cure is required;** thermal and mechanical properties suitable for composite components and high-temperature tooling and molds.

**T<sub>g</sub> as high as 215°F (102°C)** with proper post cure providing excellent temperature stability and great part cosmetics.

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

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ISO9001:2015 Certified

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### HANDLING PROPERTIES

Property	Standard	Units	72°F (22°C)	77°F (25°C)	85°F (29°C)
150g Pot Life	ASTM D2471	minutes	223-273	187-229	142-174
500g Pot Life	ASTM D2471	minutes	162-198	123-151	94-116
Viscosity Mixed	ASTM D2196	cP	2599	1974	1291
Viscosity (resin)	ASTM D2196	cP	10,000		
Viscosity (hardener)	ASTM D2196	cP	116		
Shear Thinning Inde:	ASTM D2196	–	1.1		

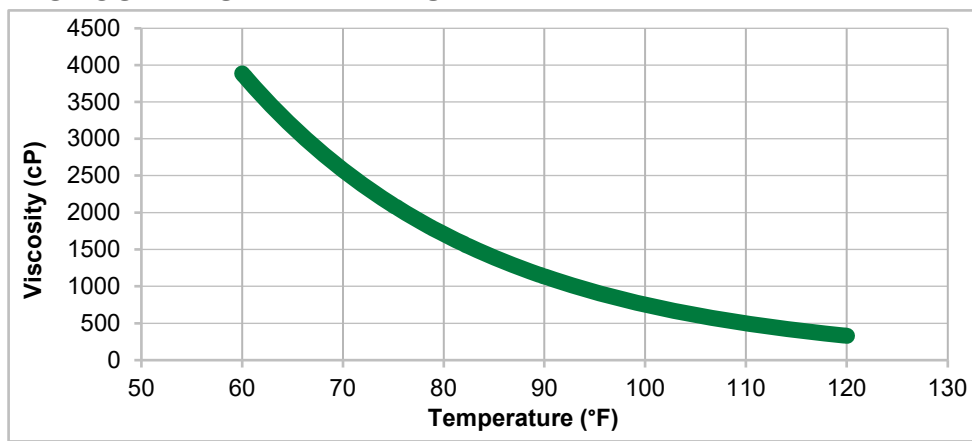
### MIX RATIO

Method	Resin:Hardener	Resin:Hardener
Weight	3.5:1	100:27.8
Weight Range	4.28:1–3.10:1	100:23.4–100:32.3
Volume	3.00:1	100:33.3
Volume Range	3.57:1–2.58:1	100:28.0–100:38.7

### DENSITY

State	Units	72°F (22°C)
Cured	lb/gal (g/cc)	9.68 (1.16)
Resin	lb/gal (g/cc)	9.75 (1.17)
Hardener	lb/gal (g/cc)	8.14 (0.98)

### VISCOSITY VS TEMPERATURE



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

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# LAM-145~LAM-239

## LAMINATING EPOXY

### MECHANICAL PROPERTIES

Property	Standard	Units	RT Gelation + 140°F (60°C) x 8 hrs	RT Gelation + 140°F (60°C) x 16 hrs	RT Gelation + 180°F (82°C) x 8 hrs
Hardness	ASTM D2240	Type D	86	91	86
Compression Yield	ASTM D695	psi (MPa)	14,100 (97)	14,100 (97)	14,100 (97)
Tensile Strength	ASTM D638	psi (MPa)	10,200 (70)	10,200 (70)	10,300 (71)
Tensile Modulus	ASTM D638	psi (GPa)	4.83E+05 (3.33)	4.58E+05 (3.16)	4.05E+05 (2.79)
Tensile Elongation	ASTM D638	%	4.8	6.2	6.3
Flexural Strength	ASTM D790	psi (MPa)	17,700 (122)	17,700 (122)	17,700 (122)
Flexural Modulus	ASTM D790	psi (GPa)	4.84E+05 (3.34)	4.84E+05 (3.34)	4.21E+05 (2.9)

### THERMAL PROPERTIES

Property	Standard	Units	RT Gelation + 140°F (60°C) x 8 hrs	RT Gelation + 140°F (60°C) x 16 hrs	RT Gelation + 180°F (82°C) x 8 hrs
Tg DMA Peak Tan Delta	ASTM E1640 <sup>1</sup>	°F (°C)	210 (99)	219 (104)	241 (116)
Tg DMA Onset Storage Modulus	ASTM E1640 <sup>1</sup>	°F (°C)	181 (83)	188 (87)	215 (102)
Tg DSC Onset- 1st Heat	ASTM E1356	°F (°C)	167 (75)	169 (76)	215 (102)
Heat Deflection Temperature	ASTM D648	°F (°C)	162 (72)	174 (79)	208 (98)
Tg DSC Ultimate	ASTM E1356	°F (°C)	224 (107) <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.

<sup>3</sup> 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<sub>2</sub> and moisture in the atmosphere for extended periods of time. Prevent carbamation by protecting hardeners from exposure until immediately prior to processing.

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Shelf Life



QC Tinting Available