



LAMINATING
EPOXY

ADHESIVES

PROCESS
EQUIPMENT

Technical Data

135/M2009 Laminating Epoxy

Latent Cure System

The 135/M2009 latent cure epoxy system is formulated for laminating synthetic composite structures where a long open time is required. Use 135/M2009 for primary laminating applications. 135/M2009 will provide up to 16 hours of open laminating time at 72°F and up to 10 hours at 90°F. This resin and hardener system requires elevated temperature cure. See Curing section and properties page for complete cure information.

MIXING

Combine the 135 Resin with M2009 Hardener following the ratio shown in the table. Stir the mixture thoroughly and transfer to impregnator or apply directly to the laminate or surface.

CURING

135/M2009 mixtures maintain excellent working properties until gellation begins. Viscosity will increase gradually over time at room temperature and will vitrify to a very brittle solid after 16 hours. **This combination will not cure to a usable state at room temperature. Elevated temperature cure is required.** A vitrified mixture may become softer and flowable during the initial portion of the elevated temperature cure stage. Higher cure temperatures reduce required cure time and increase the cured properties. Minimum cure temperature is 125°F. Maximum cure temperature is 210°F. Refer to the Physical Properties section for recommended cure schedules.

We recommend building and testing sample panels using proposed materials and manufacturing processes to confirm working and curing characteristics under anticipated use conditions. This evaluation will help determine cure ramp rates necessary to control resin flow and exotherm during cure. Exotherm temperature should not exceed target cure temperature by more than 20°F. All measuring, mixing and application equipment contaminated with mixed liquid resin and hardener must be cured at elevated temperature prior to disposal. Contact Pro-Set Inc. for additional information.

HANDLING CHARACTERISTICS *(Not for specification purposes)*

Property

Mixed Viscosity @ 72°F (ASTM D-2393-80) 2050 cps
Mixed Density (g/ml)..... 1.17

Mix Ratio (135:M2007)	Target	Acceptable Range
by weight.....	100:15	100:16.6 to 100:13.3
by volume.....	100:17.8	100:19.7 to 100:15.8

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LAMINATING EPOXY – PHYSICAL PROPERTIES

135 Resin/M2009 Hardener

Physical Property	Test Method	Cure Schedule				
		RT x 24 hr + 125°F x 16 hr	RT x 24 hr + 140°F x 8 hr	RT x 24 hr + 140°F x 16 hr	RT x 24 hr + 180°F x 4 hr	RT x 24 hr + 180°F x 8 hr
Hardness (Shore D)	ASTM D-2240	88	86	85	88	88
Compression Yield (psi)	ASTM D-695	18,797	18,164	18,511	17,975	18,025
Tensile Strength (psi)	ASTM D-638	11,066	11,581	12,172	12,188	11,840
Tensile Elongation (%)	ASTM D-638	2.6	3.4	3.8	4.5	4.2
Tensile Modulus (psi)	ASTM D-638	5.22E+05	5.33E+05	5.11E+05	4.48E+05	4.49E+05
Flexural Strength (psi)	ASTM D-790	21,526	21,189	20,061	21,918	22,175
Flexural Modulus (psi)	ASTM D-790	6.15E+05	5.39E+05	5.59E+05	5.35E+05	5.48E+05
Heat Deflection Temperature (HDT) (°F)	ASTM D-648	166	184	188	206	212
Onset of Tg by DSC (°F) **		175	186	192	211	216
Ultimate Tg by DSC (°F) **		216	216	216	216	216
Izod Impact, notched (Ft-lb/in)	ASTM D-256	0.38	0.43	0.32	0.39	0.48

** Determined using a Differential Scanning Calorimeter (DSC).

Value reported is the onset of the glass transition

Test Specimens were neat epoxy (without fiber reinforcement)

Typical Values; not to be construed as specification

RT = Room Temperature

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