



LAMINATING
EPOXY

ADHESIVES

PROCESS
EQUIPMENT

Technical Data

M1002 Resin/239 Hardener

Toughened Laminating Epoxy

The M1002/239 laminating epoxy system is formulated for high load or high peel applications and situations where the bondline area is less than optimum. Examples are carbon fiber skins on honeycomb core material or taping with carbon onto cured carbon skinned panels or structures. The 239 Hardener provides approximately 6-8 hrs. of open time at 72° F.

MIXING

Combine the M1002 Resin with PRO-SET 239 Hardener following the ratios by weight or volume shown in the table. Stir the mixture thoroughly and transfer to impregnator, roller pan, or apply directly to the laminate surface.

CURING

The M1002/239 mixtures maintain excellent working properties until gel takes place. The mixture will initially cure to a brittle B-stage. Elevated temperature post cure of 125° to 180°F is required for the mixture to reach final cure.

We recommend building sample panels using proposed materials and manufacturing processes to confirm working and curing characteristics under your shop conditions.

HANDLING CHARACTERISTICS *(Not for specification purposes)*

Property	Mixed	
Viscosity @ 72° F (ASTM D-2393-86)	1,600 cps	
Mix Ratio (M1002:239)	Target	Acceptable Range
By weight	100:24	100:26.8 – 100:21.5
By volume	100:30	100:33.3 – 100:26.6
Pot Life (ASTM D-2471-71)	100g	
@ 72° F	137 minutes	

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TOUGHENED LAMINATING EPOXY – PHYSICAL PROPERTIES

M1002 Resin/239 Hardener

Physical Property	Test Method	Cure Schedule		
		RT x 15 hr + 140°F x 8 hr	RT x 15 hr + 140°F x 16 hr	RT x 15 hr + 180°F x 8 hr
Hardness (Shore D)	ASTM D-2240	82	83	83
Compression Yield (psi)	ASTM D-695	13,910	13,736	13,839
Tensile Strength (psi)	ASTM D-638	9,722	9,637	9,498
Tensile Elongation (%)	ASTM D-638	4.5	4.5	6.4
Tensile Modulus (psi)	ASTM D-638	4.29E+05	4.00E+05	3.86E+05
Flexural Strength (psi)	ASTM D-790	18,453	18,248	17,523
Flexural Modulus (psi)	ASTM D-790	5.56E+05	5.45E+05	5.07E+05
Heat Deflection Temperature (HDT) (°F)	ASTM D-648	166.0 °F	169.0 °F	184.0 °F
Onset of Tg by DSC (°F) **		175.3 °F	178.2 °F	193.1 °F
Ultimate Tg by DSC (°F) **		193.1 °F	193.1 °F	193.1 °F
Izod Impact, notched (Ft-lb/in)	ASTM D-256	0.694	0.714	0.554

Test Specimens were neat epoxy (without fiber reinforcement)

** Determined using a Differential Scanning Calorimeter (DSC). Value reported is the onset of the glass transition

Typical Values; not to be construed as specification