



LAMINATING
EPOXY

ADHESIVES

PROCESS
EQUIPMENT

Technical Data

M1012 Resin/M2010 Hardener

Laminating Epoxy

The M1012/M2010 Epoxy system is formulated for laminating synthetic composite structures, and works well for pultrusion and filament winding. Use M1012/M2010 for primary laminating applications. The M1012/M2010 mixture will provide a working time of approximately 300 minutes at 72° F, but will provide very rapid and controlled cure in 3 to 10 minutes at elevated temperatures up to 350° F. The low viscosity allows processing at room temperature. A typical laminate will be gelled in approximately 7-10 hours at 72° F. This combination will provide very high thermal properties when fully cured.

MIXING

Combine PRO-SET M1012 Resin with PRO-SET M2010 Hardener following the ratios by weight or volume shown in the table. Stir thoroughly and transfer to impregnator, resin bath or apply direct to the fabric.

CURING

PRO-SET M1012/M2010 mixtures maintain excellent working properties until gel takes place, and at room temperature, will cure to a brittle B-stage. An elevated temperature cure or post-cure of 140°F to 250° F **is required** for mixture to reach final cure.

We recommend building sample panels using proposed materials and procedures to understand working and curing characteristics under your shop conditions.

HANDLING CHARACTERISTICS *(Not for specification purposes)*

Property	Mixed Resin/Hardener
Density.....	9.2 lb/gal
Viscosity @ 72°F (ASTM D-2393).....	1,100 cps
Viscosity @ 100°F.....	300 cps

Mix Ratio (M1012 Resin:M2010 Hardener)Target	Acceptable Range
by weight	100:30.4 to 100:29.1
by volume.....	100:37.3 to 100:35.8
Pot Life (ASTM D-2471)	500g
@72°F	135 min
@100°F.....	42 min

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LAMINATING EPOXY – PHYSICAL PROPERTIES

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Physical Property	Test Method	Cure Schedule			
		RT x 15 hr + 140°F x 8 hr	RT x 15 hr + 180°F x 8 hr	250°F x 10 min.	350°F x 4 min.
Hardness (Shore D)	ASTM D-2240	86	86	88	87
Compression Yield (psi)	ASTM D-695	16,240	15,796	15,112	15,678
Tensile Strength (psi)	ASTM D-638	11,949	11,793	11,736	11,350
Tensile Elongation (%)	ASTM D-638	5.8	6.8	7.5	6.7
Tensile Modulus (psi)	ASTM D-638	4.41E+05	4.13E+05	3.85E+05	3.79E+05
Flexural Strength (psi)	ASTM D-790	21,136	21,497	21,163	18,888
Flexural Modulus (psi)	ASTM D-790	4.79E+05	4.52E+05	4.54E+05	4.02E+05
Heat Deflection Temperature (HDT) (°F)	ASTM D-648	201	220	229	255
Onset of Tg by DSC (°F) **		185	217	234	266
Ultimate Tg by DSC (°F) **		270	270	270	270
Izod Impact, notched (Ft-lb/in)	ASTM D-256	1.063	0.896	0.610	0.498

** 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

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