



LAMINATING
EPOXY

ADHESIVES

PROCESS
EQUIPMENT

Technical Data

M1002 Resin/224 Hardener

Toughened Laminating Epoxy

The M1002/224 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 224 Hardener will provide a working time of 25 minutes at 72° F. A typical laminate will be gelled in approximately 1.5 hours at 72° F.

MIXING

Combine the M1002 Resin with PRO-SET 224 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 M1002/224 mixtures maintain excellent working properties until gel takes place. The mixture will temper and continue to cure over the next several days at room temperature, and after two weeks will reach an acceptable degree of cure for many applications. Elevated temperature post cure will increase the degree of cure and improve the mechanical and thermal properties.

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	
Density.....	9.8 lb/gal	
Viscosity @ 72° F (ASTM D-2393-86).....	2,775 cps	
Mix Ratio (M1002:224)	Target	Acceptable Range
by weight.....	100:25	100:26.4 – 100:22.4
by volume.....	100:27	100:28.4 – 100:24.1
Pot Life (ASTM D-2471-71)	100g	
@ 65° F.....	22 minutes	
@ 72° F.....	17 minutes	
@ 80° F.....	14 minutes	

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LAMINATING EPOXY – PHYSICAL PROPERTIES

M1002 Resin/224 Hardener

Physical Property	Test Method	Cure Schedule				
		Room Temp. x 2 weeks	RT x 15 hr + 110°F x 8 hr	RT x 15 hr + 125°F x 8 hr	RT x 15 hr + 140°F x 8 hr	RT x 15 hr + 180°F x 8 hr
Hardness (Shore D)	ASTM D-2240	82	83	83	84	84
Compression Yield (psi)	ASTM D-695	13,290	13,825	14,018	14,215	13,596
Tensile Strength (psi)	ASTM D-638	8,489	8,666	9,278	9,987	9,248
Tensile Elongation (%)	ASTM D-638	4.2	3.9	3.9	4.1	4.3
Tensile Modulus (psi)	ASTM D-638	4.68E+05	4.54E+05	4.52E+05	4.80E+05	4.53E+05
Flexural Strength (psi)	ASTM D-790	14,795	15,819	15,641	15,682	15,497
Flexural Modulus (psi)	ASTM D-790	4.64E+05	4.53E+05	4.22E+05	4.49E+05	4.30E+05
Heat Deflection Temperature (HDT) (°F)	ASTM D-648	129	142	148	152	155
Onset of Tg by DSC (°F) **		130	143	141	151	153
Ultimate Tg by DSC (°F) **		162	162	162	162	162
Izod Impact, notched (Ft-lb/in)	ASTM D-256	0.36	0.43	0.38	0.39	0.37

** 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