

# PRO-SET®

## Technical Data

# M1002

# LAM-224

## TOUGHENED LAMINATING EPOXY

### COMBINED FEATURES

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

**Fast cure speed** hardener provides a 20 minute working time at 22°C. A typical laminate will be gelled in about 1 hour.

**Room temperature cure** properties suitable for many composite components and structures.

**Tg as high as 83°C** with proper post cure providing excellent temperature stability and great part cosmetics.

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

**Shelf life** is 2 years for resin and hardener when properly stored<sup>3</sup>.

### HANDLING PROPERTIES

Property	Standard	Units	22°C
100g Pot Life	ASTM D2471	minutes	8
Viscosity Mixed	ASTM D2196	mPas	1650
Viscosity (resin)	ASTM D2196	mPas	5549
Viscosity (hardener)	ASTM D2196	mPas	55

### MIX RATIO

Method	Resin:Hardener	Resin:Hardener
Weight	4.3:1	100:23.2
Volume	3.6:1	100:27.7

### DENSITY

State	Units	21°C
Cured	gcm <sup>-3</sup>	1.13
Resin	gcm <sup>-3</sup>	1.16
Hardener	gcm <sup>-3</sup>	1.00

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

PRO-SET M1002/LAM-224 toughened 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 fibre skins on honeycomb core material or taping with carbon onto cured carbon skinned panels and structures.

The New  
Standard

EPOXIES for  
Laminating  
Infusion  
Tooling  
Assembly

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& Adhesives

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## TOUGHENED LAMINATING EPOXY

### MECHANICAL PROPERTIES

Property	Standard	Units	22°C x 4 Weeks	RT Gelation + 49°C x 8 hrs	RT Gelation + 60°C x 8 hrs	RT Gelation + 82°C x 8 hrs
Hardness	ASTM D2240	Shore D	83	84	83	84
Compression Yield	ASTM D695	MPa	106	102	104	101
Tensile Strength	ASTM D638	MPa	60	66	69	67
Tensile Modulus	ASTM D638	GPa	3.4	3.2	3.4	3.3
Tensile Elongation	ASTM D638	%	2.7	3.8	4.3	4.6
Flexural Strength	ASTM D790	MPa	118	124	126	131
Flexural Modulus	ASTM D790	GPa	3.4	3.1	2.9	3.0

### THERMAL PROPERTIES

Property	Standard	Units	22°C x 4 Weeks	RT Gelation + 49°C x 8 hrs	RT Gelation + 60°C x 8 hrs	RT Gelation + 82°C x 8 hrs
Tg DMA Peak Tan Delta	ASTM E1640*1	°C	54.5	70.2	76.6	82.9
Tg DSC Onset - 1st Heat	ASTM E1356	°C	55.0	65.9	71.9	76.8
Tg DSC Ultimate	ASTM E1356	°C	83*2			

\*1 1Hz, 3°C per minute.

\*2 Additional post cure may be required; contact Technical Department for details.

Test specimens were neat epoxy (without fibre reinforcement).

These are typical properties and cannot be construed as a specification. The end users should test the products to ensure the products are suitable for the intended application. Any information, data, advice or recommendation published by Wessex Resins or obtained from Wessex Resins by other means and whether relating to Wessex Resins' materials or other materials, is given in good faith and believed to be reliable.

\*3 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 crystallise. If this occurs, warm the resin to 50°C 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.