PRO-SET®

LAMINATING EPOXY

ADHESIVES

PROCESS EQUIPMENT

Technical Data

# 135 Resin/M2014 Hardener

## Laminating Epoxy

The 135/M2014 Epoxy system is formulated for laminating synthetic composite structures. Use 135/M2014 for primary laminating applications. The 135/M2014 mixture will provide a working time of approximately 120 minutes at 72° F. A typical laminate will be gelled in approximately 3-4 hours at 72° F.

**MIXING**

Combine PRO-SET 135 Resin with PRO-SET M2014 Hardener following the ratios by weight or volume shown in the table. Stir thoroughly and transfer to impregnator, roller pan, or apply direct to the laminate.

**CURING**

PRO-SET 135/M2014 mixtures maintain excellent working properties until gel takes place, and at room temperature, will reach an acceptable level of cure over several days. An elevated temperature cure or post-cure of 125°F to 180°F **is recommended** for mixture to reach final cure and ultimate properties**.** In many cases, room temperature cure will provide acceptable and functional laminate properties.

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 | 9.3 lb/gal |
| Viscosity @ 72°F (ASTM D-2393-80) | 1,020 cps |

| **Mix Ratio (135 Resin:M2014 Hardener)** | **Target** | **Acceptable Range** |
|---|---|---|
| by weight | 100:24 (4.1:1) | 100:27 to 100:22 |
| by volume | 100:29 (3.4:1) | 100:31 to 100:26 |

| **Pot Life (ASTM D-2427-71)** | **100g** | **500g** |
|---|---|---|
| @72°F | 40 min | 25 min |
| @85°F | 35 min | 20 min |

**Pro-Set Inc.**
P.O. Box 656
Bay City, MI 48707 USA
888-377-6738
prosetepoxy.com



*September 2009*

PRO-SET®

LAMINATING EPOXY— PHYSICAL PROPERTIES

# 135 Resin/M2014 Hardener

| Physical Property | Test Method | Cure Schedule | | |
|---|---|---|---|---|
| | | 72°F x 2 wks | 85°F x 2 wks | 72°F x 15 hr + 140°F x 8 hr |
| Hardness (Shore D) | ASTM D-2240 | 85 | 86 | 86 |
| Compression Yield (psi) | ASTM D-695 | 15,184 | 14,855 | 14,269 |
| Tensile Strength (psi) | ASTM D-638 | 8,233 | 9,551 | 10,642 |
| Tensile Elongation (%) | ASTM D-638 | 1.8 | 2.1 | 6.0 |
| Tensile Modulus (psi) | ASTM D-638 | 5.57E+05 | 5.88E+05 | 5.21E+05 |
| Flexural Strength (psi) | ASTM D-790 | 13,661 | 14,680 | 19,362 |
| Flexural Modulus (psi) | ASTM D-790 | 5.51E+05 | 5.57E+05 | 5.17E+05 |
| Heat Deflection Temperature (HDT) (°F) | ASTM D-648 | 122 | 134 | 154 |
| Onset of Tg by DSC (°F) ** | | 131 | 140 | 152 |
| Ultimate Tg by DSC (°F) ** | | 167 | 167 | 167 |
| Izod Impact, notched (Ft-lb/in) | ASTM D-256 | 0.60 | 0.73 | 0.88 |

** 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

**October 2009**

PRO-SET®

## 135/M2014 Viscosity Curve