

PRO-SET®

Technical Data

M1002 M2015

The New
Standard

TOUGHENED LAMINATING EPOXY

COMBINED FEATURES

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

Extra Fast cure speed hardener provides a 25 minute working time at 72°F (22°C). A typical laminate will be gelled in about 1 to 2 hours.

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

T_g as high as 162°F (72°C) with proper post cure providing excellent temperature stability and great part cosmetics.

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

Quality-control tinting is available at no extra charge; simply add "QC" after the product code on your order.

Shelf life is 3 years for resin and 2 years for hardener when properly stored².

EPOXIES for
Laminating
Infusion
Tooling
Assembly

HANDLING PROPERTIES

| Property | Standard | Units | 72°F (22°C) |
|----------------------|------------|---------|-------------|
| 100g Pot Life | ASTM D2471 | minutes | 15-19 |
| Viscosity Mixed | ASTM D2196 | cP | 2775 |
| Viscosity (resin) | ASTM D2196 | cP | 4,800 |
| Viscosity (hardener) | ASTM D2196 | cP | 2,400 |

MIX RATIO

| Method | Resin:Hardener | Resin:Hardener |
|--------------|----------------|-----------------|
| Weight | 4.0:1 | 100:25.0 |
| Weight Range | 3.78:1–4.46:1 | 26.40:1–22.40:1 |
| Volume | 3.70:1 | 100:27.0 |
| Volume Range | 3.52:1–4.15:1 | 28.40:1–24.10:1 |

DENSITY

| State | Units | 72°F (22°C) |
|-------|---------------|-------------|
| Cured | lb/gal (g/cc) | 9.8 (1.17) |

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

Gougeon Brothers, Inc.
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ISO9001:2008 Certified

Rev 4/ Dec 2015

M1002~M2015

TOUGHENED LAMINATING EPOXY

MECHANICAL PROPERTIES

| Property | Standard | Units | 72°F (22°C) x 2 wk | RT Gelation + 110°F (43°C) x 8 hrs | RT Gelation + 125°F (52°C) x 8 hrs | RT Gelation + 140°F (60°C) x 8 hrs | RT Gelation + 180°F (82°C) x 8 hrs |
|--------------------|------------|-----------|-----------------------|--|--|--|--|
| Hardness | ASTM D2240 | Type D | 82 | 83 | 83 | 84 | 84 |
| Compression Yield | ASTM D695 | psi (MPa) | 13,290 (92) | 13,800 (95) | 14,000 (97) | 14,200 (98) | 13,600 (94) |
| Tensile Strength | ASTM D638 | psi (MPa) | 8,490 (59) | 8,670 (60) | 9,280 (64) | 10,000 (69) | 9,250 (64) |
| Tensile Modulus | ASTM D638 | psi (GPa) | 4.68E+05 (3.23) | 4.54E+05 (3.13) | 4.52E+05 (3.12) | 4.80E+00 (.) | 4.53E+05 (3.12) |
| Tensile Elongation | ASTM D638 | % | 4.2 | 3.9 | 3.9 | 4.1 | 4.3 |
| Flexural Strength | ASTM D790 | psi (MPa) | 14,800 (102) | 15,819 (109) | 15,600 (108) | 15,700 (108) | 15,500 (107) |
| Flexural Modulus | ASTM D790 | psi (GPa) | 4.64E+05 (3.2) | 4.53E+05 (3.12) | 4.52E+05 (3.12) | 4.49E+05 (3.1) | 4.53E+05 (3.12) |

THERMAL PROPERTIES

| Property | Standard | Units | 72°F (22°C) x 2 wk | RT Gelation + 110°F (43°C) x 8 hrs | RT Gelation + 125°F (52°C) x 8 hrs | RT Gelation + 140°F (60°C) x 8 hrs | RT Gelation + 180°F (82°C) x 8 hrs |
|-----------------------------|------------|---------|-----------------------|--|--|--|--|
| Tg DSC Onset– 1st Heat | ASTM E1356 | °F (°C) | 130 (54) | 143 (62) | 141 (61) | 151 (66) | 153 (67) |
| Heat Deflection Temperature | ASTM D648 | °F (°C) | 129 (54) | 142 (61) | 148 (64) | 152 (67) | 155 (68) |
| Tg DSC Ultimate | ASTM E1356 | °F (°C) | | | 162 (72) ¹ | | |

¹ Additional post cure may be required; contact Technical Department for details.

² 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 crystallize. If this occurs, warm the resin to 125° F and stir to dissolve crystals. Hardeners may form carbamation when exposed to CO₂ and moisture in the atmosphere for extended periods of time. Prevent carbamation by protecting hardeners from exposure until immediately prior to processing.

Rev 4/ Dec 2015

PRO-SET®

Technical Data

M1002 M2042

TOUGHENED LAMINATING EPOXY

COMBINED FEATURES

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

Extra Slow cure speed hardener provides 6 to 8 hours of working time at 72°F (22°C).

Elevated temperature cure is required; thermal and mechanical properties suitable for composite components and high temperature tooling and molds.

T_g as high as 193°F (89°C) with proper post cure providing excellent temperature stability and great part cosmetics.

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

Quality-control tinting is available at no extra charge; simply add "QC" after the product code on your order.

Shelf life is 3 years for resin and 18 months for hardener when properly stored².

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Infusion
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Some separation may occur during storage. Stir resin before mixing with hardener.

HANDLING PROPERTIES

| Property | Standard | Units | 72°F (22°C) |
|----------------------|------------|---------|-------------|
| 100g Pot Life | ASTM D2471 | minutes | 123-151 |
| Viscosity Mixed | ASTM D2196 | cP | 1,600 |
| Viscosity (resin) | ASTM D2196 | cP | 4,800 |
| Viscosity (hardener) | ASTM D2196 | cP | 40 |

MIX RATIO

| Method | Resin:Hardener | Range | Resin:Hardener | Range |
|--------|----------------|---------------|----------------|---------------------|
| Weight | 4.17:1 | 3.73:1–4.65:1 | 100:24.0 | 100:26.80–100:21.50 |
| Volume | 3.33:1 | 3.00:1–3.76:1 | 100:30.0 | 100:33.30–100:26.60 |

DENSITY

| State | Units | 72°F (22°C) |
|-------|---------------|-------------|
| Cured | lb/gal (g/cc) | 9.81 (1.17) |

MECHANICAL PROPERTIES

| Property | Standard | Units | RT Gelation + 140°F (60°C) x 8 hrs | RT Gelation + 180°F (82°C) x 8 hrs |
|--------------------|------------|-----------|--|--|
| Hardness | ASTM D2240 | Type D | 82 | 83 |
| Compression Yield | ASTM D695 | psi (MPa) | 13,900 (96) | 13,800 (95) |
| Tensile Strength | ASTM D638 | psi (MPa) | 9,722 (67) | 9,500 (66) |
| Tensile Modulus | ASTM D638 | psi (MPa) | 4.29E+05 (2.96) | 3.86E+05 (2.66) |
| Tensile Elongation | ASTM D638 | % | 4.5 | 6.4 |
| Flexural Strength | ASTM D790 | psi (MPa) | 18,500 (128) | 17,500 (121) |
| Flexural Modulus | ASTM D790 | psi (MPa) | 5.56E+05 (3.83) | 5.07E+05 (3.5) |

THERMAL PROPERTIES

| Property | Standard | Units | RT Gelation + 140°F (60°C) x 8 hrs | RT Gelation + 180°F (82°C) x 8 hrs |
|-----------------------------------|------------|---------|--|--|
| T _g DSC Onset–1st Heat | ASTM E1356 | °F (°C) | 175 (79) | 193 (89) |
| Heat Deflection Temperature | ASTM D648 | °F (°C) | 166 (74) | 184 (84) |
| Ultimate T _g by DSC | ASTM E1356 | °F (°C) | 193 (89) ¹ | |

¹ Additional post cure may be required; contact Technical Department for details.

² 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 crystallize. If this occurs, warm the resin to 125° F and stir to dissolve crystals. Hardeners may form carbamation when exposed to CO₂ and moisture in the atmosphere for extended periods of time. Prevent carbamation by protecting hardeners from exposure until immediately prior to processing.

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

PRO-SET®

Technical Data

M1002 M2043

TOUGHENED LAMINATING EPOXY

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COMBINED FEATURES

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

Fast cure speed hardener provides 1.5 to 2.5 hours of working time at 72°F (22°C).

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

T_g as high as 172°F (78°C) with proper post cure providing excellent temperature stability and great part cosmetics.

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

Quality-control tinting is available at no extra charge; simply add "QC" after the product code on your order.

Shelf life is 3 years for resin and 2 years for hardener when properly stored².

Some separation may occur during storage. Stir resin before mixing with hardener.

HANDLING PROPERTIES

| Property | Standard | Units | 72°F (22°C) |
|----------------------|------------|---------|-------------|
| 100g Pot Life | ASTM D2471 | minutes | 25-31 |
| Viscosity Mixed | ASTM D2196 | cP | 2,200 |
| Viscosity (resin) | ASTM D2196 | cP | 4,800 |
| Viscosity (hardener) | ASTM D2196 | cP | 180 |

MIX RATIO

| Method | Resin:Hardener | Range | Resin:Hardener | Range |
|--------|----------------|---------------|----------------|---------------------|
| Weight | 4.17:1 | 4.07:1–4.78:1 | 100:24.0 | 100:24.60–100:20.90 |
| Volume | 3.57:1 | 3.46:1–4.07:1 | 100:28.0 | 100:28.90–100:24.60 |

DENSITY

| State | Units | 72°F (22°C) |
|-------|---------------|-------------|
| Cured | lb/gal (g/cc) | 9.81 (1.17) |

MECHANICAL PROPERTIES

| Property | Standard | Units | 72°F (22°C) x 2 wk | RT Gelation + 140°F (60°C) x 8 hrs |
|--------------------|------------|-----------|-----------------------|--|
| Hardness | ASTM D2240 | Type D | 82 | 83 |
| Compression Yield | ASTM D695 | psi (MPa) | 13,800 (95) | 14,600 (101) |
| Tensile Strength | ASTM D638 | psi (MPa) | 7,160 (49) | 9,600 (66) |
| Tensile Modulus | ASTM D638 | psi (MPa) | 4.86E+05 (3.35) | 4.59E+05 (3.16) |
| Tensile Elongation | ASTM D638 | % | 2.0 | 3.4 |
| Flexural Strength | ASTM D790 | psi (MPa) | 12,500 (86) | 18,300 (126) |
| Flexural Modulus | ASTM D790 | psi (MPa) | 4.72E+05 (3.25) | 5.96E+05 (4.11) |

THERMAL PROPERTIES

| Property | Standard | Units | 72°F (22°C) x 2 wk | RT Gelation + 140°F (60°C) x 8 hrs |
|-----------------------------------|------------|---------|-----------------------|--|
| T _g DSC Onset–1st Heat | ASTM E1356 | °F (°C) | 128 (53) | 161 (72) |
| Heat Deflection Temperature | ASTM D648 | °F (°C) | 125 (52) | 159 (71) |
| Ultimate T _g by DSC | ASTM E1356 | °F (°C) | 172 (78) ¹ | |

¹ Additional post cure may be required; contact Technical Department for details.

² 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 crystallize. If this occurs, warm the resin to 125° F and stir to dissolve crystals. Hardeners may form carbamation when exposed to CO₂ and moisture in the atmosphere for extended periods of time. Prevent carbamation by protecting hardeners from exposure until immediately prior to processing.

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

PRO-SET®

Technical Data

M1002 M2044

TOUGHENED LAMINATING EPOXY

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COMBINED FEATURES

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

Medium cure speed hardener provides 2.5 to 4.5 hours of working time at 72°F (22°C).

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

T_g as high as 162°F (72°C) with proper post cure providing excellent temperature stability and great part cosmetics.

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

Quality-control tinting is available at no extra charge; simply add "QC" after the product code on your order.

Shelf life is 3 years for resin and 2 years for hardener when properly stored².

Some separation may occur during storage. Stir resin before mixing with hardener.

HANDLING PROPERTIES

| Property | Standard | Units | 72°F (22°C) |
|----------------------|------------|---------|-------------|
| 100g Pot Life | ASTM D2471 | minutes | 48-60 |
| Viscosity Mixed | ASTM D2196 | cP | 1,400 |
| Viscosity (resin) | ASTM D2196 | cP | 4,800 |
| Viscosity (hardener) | ASTM D2196 | cP | 75 |

MIX RATIO

| Method | Resin:Hardener | Range | Resin:Hardener | Range |
|--------|----------------|---------------|----------------|---------------------|
| Weight | 4.17:1 | 3.91:1–4.61:1 | 100:24.0 | 100:25.60–100:21.70 |
| Volume | 3.45:1 | 3.25:1–3.82:1 | 100:29.0 | 100:30.80–100:26.20 |

DENSITY

| State | Units | 72°F (22°C) |
|-------|---------------|-------------|
| Cured | lb/gal (g/cc) | 9.81 (1.17) |

MECHANICAL PROPERTIES

| Property | Standard | Units | 72°F (22°C) x 2 wk | RT Gelation + 140°F (60°C) x 8 hrs |
|--------------------|------------|-----------|-----------------------|--|
| Hardness | ASTM D2240 | Type D | 80 | 84 |
| Compression Yield | ASTM D695 | psi (MPa) | 13,600 (94) | 14,100 (97) |
| Tensile Strength | ASTM D638 | psi (MPa) | 7,550 (52) | 9,690 (67) |
| Tensile Modulus | ASTM D638 | psi (MPa) | 4.76E+05 (3.28) | 4.52E+05 (3.12) |
| Tensile Elongation | ASTM D638 | % | 2.1 | 4.0 |
| Flexural Strength | ASTM D790 | psi (MPa) | 12,400 (85) | 14,100 (97) |
| Flexural Modulus | ASTM D790 | psi (MPa) | 4.73E+05 (3.26) | 5.99E+05 (4.13) |

THERMAL PROPERTIES

| Property | Standard | Units | 72°F (22°C) x 2 wk | RT Gelation + 140°F (60°C) x 8 hrs |
|-----------------------------------|------------|---------|-----------------------|--|
| T _g DSC Onset–1st Heat | ASTM E1356 | °F (°C) | 127 (53) | 153 (67) |
| Heat Deflection Temperature | ASTM D648 | °F (°C) | 124 (51) | 162 (72) |
| Ultimate T _g by DSC | ASTM E1356 | °F (°C) | 162 (72) ¹ | |

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

PRO-SET®

Technical Data

M1002 M2046

TOUGHENED LAMINATING EPOXY

COMBINED FEATURES

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

Slow cure speed hardener provides 4.5 to 6 hours of working time at 72°F (22°C).

Elevated temperature cure is required; thermal and mechanical properties suitable for composite components and high temperature tooling and molds.

T_g as high as 197°F (92°C) with proper post cure providing excellent temperature stability and great part cosmetics.

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

Quality-control tinting is available at no extra charge; simply add "QC" after the product code on your order.

Shelf life is 3 years for resin and 18 months for hardener when properly stored².

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Some separation may occur during storage. Stir resin before mixing with hardener.

HANDLING PROPERTIES

| Property | Standard | Units | 72°F (22°C) |
|----------------------|------------|---------|-------------|
| 100g Pot Life | ASTM D2471 | minutes | 72-88 |
| Viscosity Mixed | ASTM D2196 | cP | 2,100 |
| Viscosity (resin) | ASTM D2196 | cP | 4,800 |
| Viscosity (hardener) | ASTM D2196 | cP | 115 |

MIX RATIO

| Method | Resin:Hardener | Range | Resin:Hardener | Range |
|--------|----------------|---------------|----------------|---------------------|
| Weight | 4.17:1 | 3.83:1–4.78:1 | 100:24.0 | 100:26.10–100:20.90 |
| Volume | 3.57:1 | 3.16:1–3.95:1 | 100:28.0 | 100:31.60–100:25.30 |

DENSITY

| State | Units | 72°F (22°C) |
|-------|---------------|-------------|
| Cured | lb/gal (g/cc) | 9.81 (1.17) |

MECHANICAL PROPERTIES

| Property | Standard | Units | RT Gelation + 140°F (60°C) x 8 hrs | RT Gelation + 180°F (82°C) x 8 hrs |
|--------------------|------------|-----------|--|--|
| Hardness | ASTM D2240 | Type D | 83 | 83 |
| Compression Yield | ASTM D695 | psi (MPa) | 14,100 (97) | 13,900 (96) |
| Tensile Strength | ASTM D638 | psi (MPa) | 10,000 (69) | 9,590 (66) |
| Tensile Modulus | ASTM D638 | psi (MPa) | 4.33E+05 (2.99) | 3.94E+05 (2.72) |
| Tensile Elongation | ASTM D638 | % | 5.5 | 5.7 |
| Flexural Strength | ASTM D790 | psi (MPa) | 18,800 (130) | 1,770 (12) |
| Flexural Modulus | ASTM D790 | psi (MPa) | 5.55E+05 (3.83) | 5.14E+05 (3.54) |

THERMAL PROPERTIES

| Property | Standard | Units | RT Gelation + 140°F (60°C) x 8 hrs | RT Gelation + 180°F (82°C) x 8 hrs |
|-----------------------------|------------|---------|--|--|
| Tg DSC Onset–1st Heat | ASTM E1356 | °F (°C) | 176 (80) | 197 (92) |
| Heat Deflection Temperature | ASTM D648 | °F (°C) | 170 (77) | 189 (87) |
| Ultimate Tg by DSC | ASTM E1356 | °F (°C) | 197 (92) ¹ | |

¹ Additional post cure may be required; contact Technical Department for details.

² 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 crystallize. If this occurs, warm the resin to 125° F and stir to dissolve crystals. Hardeners may form carbamation when exposed to CO₂ and moisture in the atmosphere for extended periods of time. Prevent carbamation by protecting hardeners from exposure until immediately prior to processing.

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