



8020 RAPI-PLY

Structural Component Manufacture using 8020 Rapi-Ply Technology

Rapi-Ply materials achieve excellent quality laminates from vacuum bag processing. Surfacing films are available to modify the properties of the laminate surface.

8020 resin is one of our new generation of toughened Epoxy resin systems offering an excellent balance of mechanical properties. The resin system has been developed to offer long outlife, flexible cure schedules and high flow characteristics to ensure the fiber is fully impregnated.

CHARACTERISTICS:

- Flexible low to medium cure schedules
70°C (158°F) to 130°C (266°F)
- High strength and toughness
- Outstanding vacuum-only processing capability
- No debulking required
- Significantly reduced lay-up times (up to 75%) compared with traditional prepreg routes
- Drapeable & Conformable
- Tg (DMTA – Peak Tan δ) 137°C (279°F) after 30 minutes at 120°C (248°F)
- 7 days useable outlife at 20°C (68°C) – 12 months freezer storage life (-18°C)

RESIN MATRIX PROPERTIES	
Density	1.2 g/cm ³ (79.3lbs/ft ³) at 23°C (73°F)
Tg (DMTA) after 30 minutes at 120°C (248°F)	Onset: 104°C (219°F) Peak Tan δ: 137°C (279°F)



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PRODUCT RANGE:

The 8020 Rapi-Ply range includes:

- 8020 Rapi-Ply - Structural system
- 8020 Rapi-Core - A low weight, low density core material
- 8020 Surface film - Modifies the properties of the laminate surface

All products including 8020 structural prepreg can be co-cured. Please refer to individual data sheets for further detail. Rapi-Ply is available in a wide range of reinforcing fabrics. Standard configurations include:

Description	Rapi-Ply Construction	Width	Molded thickness
Carbon fabrics			
8020 RP 101	HS Carbon 300 g/m ² 2/2 twill 6K 43% / HS Carbon 300 g/m ² 2/2 twill 6K 43%	1.0m	0.76mm
8020 RP 102	HS Carbon 300 g/m ² 2/2 twill 6K 43% / HS Carbon 285 g/m ² 2/2 twill 12K 43%	1.0m	0.78mm
8020 RP 103	HS Carbon 300 g/m ² 2/2 twill 6K 43% / HS Carbon 650 g/m ² 2/2 twill 12K 43%	1.0m	1.14mm
8020 RP 104	HS Carbon 600 g/m ² 2/2 twill 12K 40% / HS Carbon 650 g/m ² 2/2 twill 12K 40%	1.0m	1.45mm
Glass fabrics			
8020 RP 201	E Glass 390 g/m ² 2/2 twill 35% / E Glass 390 g/m ² 2/2 twill 35%	1.0m	0.7mm
8020 RP 202	E Glass 300 g/m ² 8HS 35% / E Glass 300 g/m ² 8HS 35%	1.0m	0.55mm
8020 RP 203	E Glass 600 g/m ² PW WR 35% / E Glass 600 g/m ² PW WR 35%	1.0m or 1.2m	1.1 mm
8020 RP 204	E Glass 450 g/m ² ±45° 35% / E Glass 450 g/m ² ±45° 35%	1.27m	0.88 mm
8020 RP 205	E Glass 600 g/m ² 8HS 35% / E Glass 600 g/m ² 8HS 35%	1.20m	1.02 mm
8020 RP 206	E Glass 280 g/m ² PW WR 35% / E Glass 280 g/m ² PW WR 35%	1.00m	0.48 mm



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PROCESSING

Following removal from the freezer, allow the Rapi-Ply to reach room temperature before opening the polythene bag to avoid moisture condensation. Typically, thaw time for a full roll of material from storage at -18°C will be 4 to 6 hours.

If a surface ply is required, this should be applied directly to the tool face prior to lay-up of Rapi-Ply (refer to Surface Film datasheet).

Cut patterns to size and lay up the laminate in line with design instructions taking care not to distort the Rapi-Ply.

Note: It is important that dry glass tows are inserted at approx 0.5m intervals between plies of Rapi-Ply and at the front and back surfaces to provide an air evacuation path out of the laminate into the breather.

De-bulking of the laminates should not be necessary under normal circumstances.

Use of a non-perforated release film on the Rapi-Ply surface trimmed to within 25-30mm of Rapi-Ply edge is recommended for the cure.

Rapi-ply can be successfully cured by either vacuum-only or autoclave moulding processes.

8020 RECOMMENDED CURE TIMES

Cure temperature	Recommended cure time (hrs)
70°C (158°F)	12
80°C(176°F)	5.5
100°C (212°F)	2
120°C (248°F)	0.5

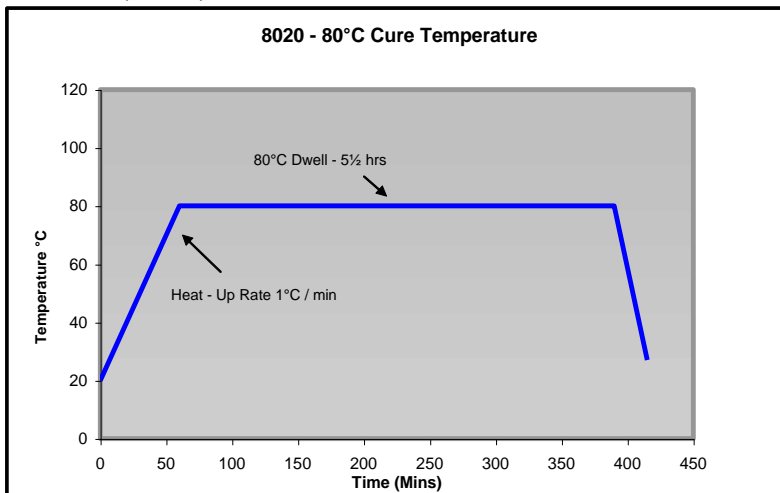


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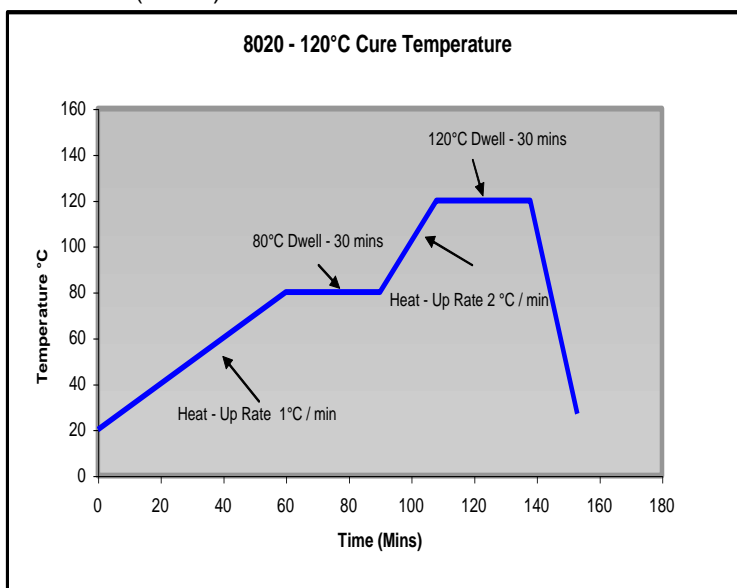
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TYPICAL CURE PROFILES

80°C (176°F) Cure Temperature Total Time: 6½ hours
1.0°C (1.8°F) / minute ramp to 80°C (176°F)
5½ hours dwell @ 80°C (176°F)



120°C Cure Temperature Total Time: 2hours 20 minutes
1.0°C (1.8°F) / minute ramp to 80°C (176°F)
30 minute dwell @ 80°C (176°F)
2.0°C (3.6°F) / minute ramp to 120°C (248°F)
30 minute dwell @ 120°C (248°F)





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EXOTHERM

In certain circumstances, such as the production of thick section laminates, rapid heat up rates or highly insulating masters, 8020 resin can undergo exothermic heating leading to rapid temperature rise and component degradation in extreme cases.

The risk of exotherm increases with lay-up thickness and increasing cure temperature. It is strongly recommended that trials, representative of all the relevant circumstances, are carried out by the user to allow a safe cure cycle to be specified.

TYPICAL LAMINATE PROPERTIES (at Room Temperature)

RP102 0/90° configuration woven laminates, cured 30 minutes at 120°C (248°F), results normalised to 55% Vf.

Tensile Strength	1022 MPa	EN 2597
Tensile Modulus	75.4 GPa	EN 2597
Tensile Poisson's Ratio	0.07	EN 2597
Compression Strength	637.7 MPa	EN 2850
Compression Modulus	75.4 GPa	EN 2850
In-Plane Shear Strength	80.5 MPa	EN 6031
In-Plane Shear Modulus	2.68 GPa	EN 6031
Flexural Strength	1171 MPa	EN 2562
Flexural Modulus	68.3 GPa	EN 2562
Apparent ILSS	68.3 MPa	EN 2563

POSTCURE

In applications demanding maximum temperature or environmental resistance e.g. 120°C (248°F) service temperature, it is essential to develop the glass transition temperature to the maximum level by a suitable postcure.

Ramp from initial cure temperature to 120°C (248°F) at 20°C (36°F) / hr and hold for 30 minutes minimum, this postcure will result in a Tg of approximately 128°C (262°F).

Laminates may be postcured unsupported unless the size, shape and laminate thickness would allow excessive distortion under self-weight.



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STORAGE

The Rapi-Ply should be supported at either end so that the material does not initiate premature resin flow through the fabric.

The self-impregnation of Rapi-ply will occur over a period of time at ambient temperature 20°C (68°F) and this can compromise its ability to generate high quality laminates as the air breathing properties decrease. Self-impregnation will vary from product to product but at ambient temperature 20°C (68°F) self-impregnation will occur in approximately 1 week.

Out life of resin is 30 days ambient temperature 20°C (68°F).

Refrigerated storage life is 12 months at -18°C (0°F)

HANDLING SAFETY

8020 Rapi-Ply contains epoxy resin, which can cause allergic reactions by skin contact. Avoid prolonged or repeated contact with skin – wear disposable nitrile gloves.

Wash the skin thoroughly with soap and water or resin removing cream after handling. Do not use solvents for cleaning skin.

Care should always be taken when handling dry carbon, glass or other fibers. Contact with skin should be prevented and egress of fibers into the workplace should be controlled. Carbon fiber is electrically conductive and electrical equipment should be protected from carbon fibers and dust.

Amber Composites Ltd produces a separate full Material Safety Data Sheet for this product. Please ensure that you have the correct Material Safety Data for the materials you are using before commencing work.

FURTHER INFORMATION - PROCESSING DETAILS

Please contact Amber Composites for additional information.

This is not a specification. The information given in this data sheet in relation to the performance, storage and other characteristics of the product is based on results gained from experience and tests and is believed to be accurate. Given, however, that conditions of use and storage will vary, Amber Composites will not be liable for any loss or damage resulting from reliance upon such information. The purchaser is recommended to carry out his own tests to establish the suitability of the product for its particular purpose. The use of the product in certain processes may require third party consent.