

# PRODUCT DATASHEET



TENCATE ADVANCED COMPOSITES

## TenCate 8020 Rapi-Ply Toughened epoxy resin system

### PRODUCT TYPE

70°C (158°F) to 130°C (266°F) cure structural component manufacture using 8020 Rapi-Ply technology

### TYPICAL APPLICATIONS

- Automotive bodywork
- Large marine structures

### SHELF LIFE

#### Out life

7 days at @ 18°C (64°F)

#### Storage life

12 months @ -18°C (0°F)

Out life is the maximum time allowed at room temperature before cure.

#### To avoid moisture condensation:

Following removal from cold storage, allow the prepreg to reach room temperature before opening the polythene bag. Typically the thaw time for a full roll of material will be 4 to 6 hours.

### PRODUCT DESCRIPTION

TenCate 8020 Rapi-Ply materials achieve excellent quality laminates from vacuum bag processing.

TenCate 8020 resin is a new generation of toughened epoxy resin systems offering an excellent balance of mechanical properties. The TenCate resin system has been developed to offer long outlife, flexible cure schedules and high flow characteristics to ensure the fibre is fully impregnated during the component manufacture process.

### TENCATE 8020 RAPI-PLY PREPREG BENEFITS/FEATURES

- 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
- T<sub>g</sub> (DMTA -onset) 111°C (232°F) after 30 minute cure at 120°C (248°F)
- 7 days useable outlife at 18°C (64°C)

### TYPICAL NEAT RESIN PROPERTIES

Density ..... 1.2 g/cm<sup>3</sup> (79.3lbs/ft<sup>3</sup>) at 23°C (73°F)

T<sub>g</sub> (DMTA) after 30 mins at 120°C (248°F)..... Onset 111°C (232°F)

Peak tan δ: 135°C (275°F)

### TYPICAL LAMINATE PROPERTIES

#### TENCATE 8020 RP102 0/90° CONFIGURATION WOVEN LAMINATES, CURED 30 MINUTES AT 120°C (248°F)

Property	Condition	Method	Results	
Tensile Strength	RTD	EN 2597	1022 MPa	148 ksi
Tensile Modulus	RTD	EN 2597	75.4 GPa	10.9 Msi
Poisson's Ratio	RTD		0.07	
Compression Strength	RTD	EN2580	638 MPa	93 ksi
Compression Modulus	RTD	EN2580	75.4 GPa	10.9 Msi
In-Plane Shear Strength	RTD	EN 6031	81 MPa	12 ksi
In-Plane Shear Modulus	RTD	EN 6031	2.68 GPa	0.4 Msi
Flexural Strength	RTD	EN 2562	1171 MPa	170 ksi
Flexural Modulus	RTD	EN 2562	68.3 GPa	9.9 Msi
ILSS	RTD	EN 2563	68.3 MPa	10 ksi

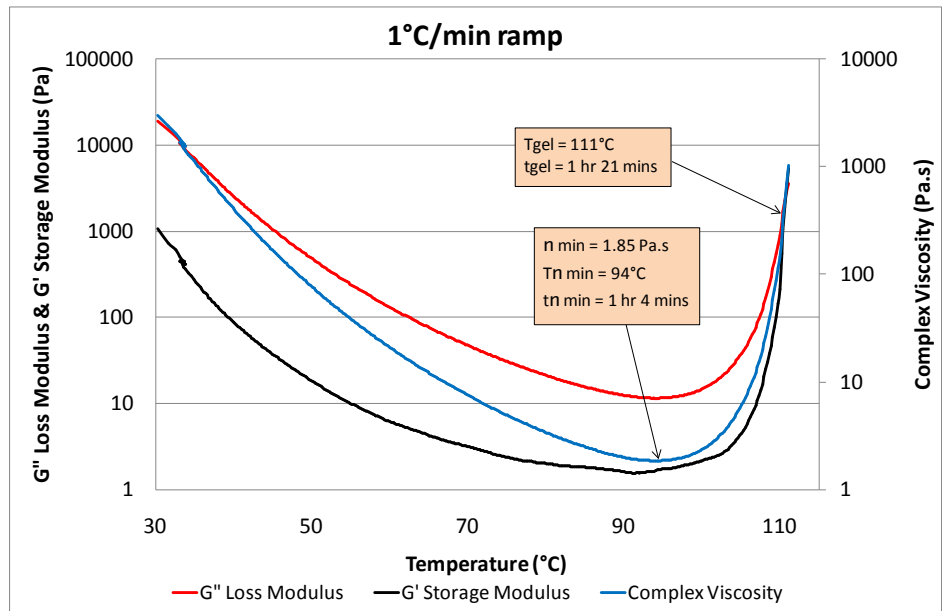
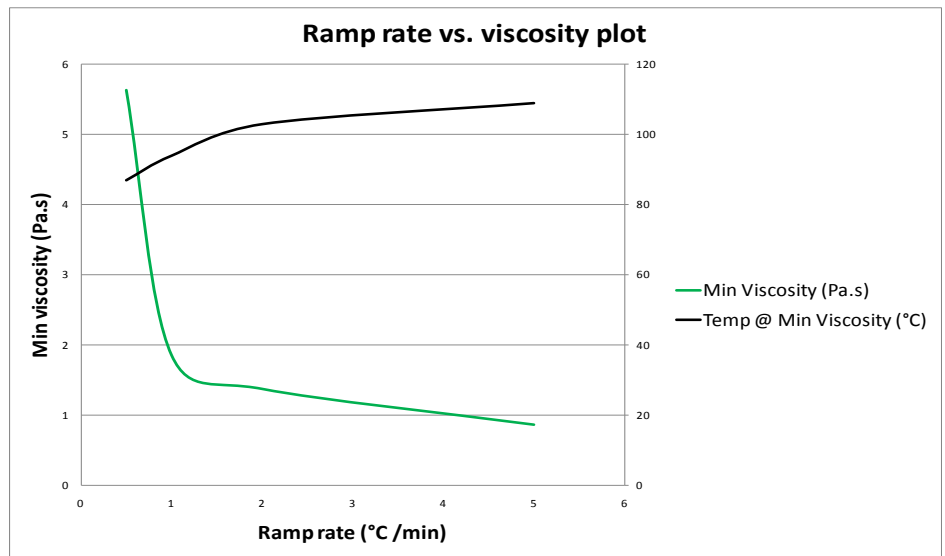
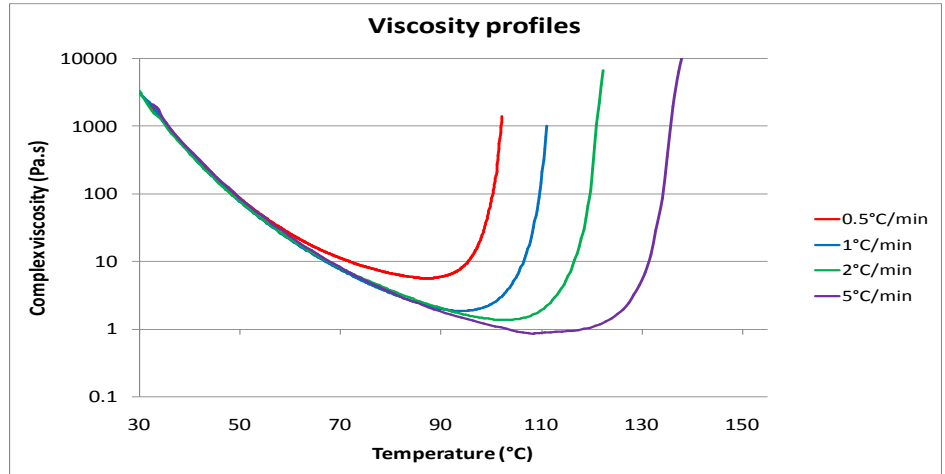
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TENCATE ADVANCED COMPOSITES

## TenCate 8020 Rapi-Ply Toughened epoxy Resin System

### VISCOSITY AND RHEOLOGY PROFILES



# PRODUCT DATASHEET



TENCATE ADVANCED COMPOSITES

## TenCate 8020 Rapi-Ply Toughened epoxy Resin System

### RECOMMENDED CURE TIMES

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

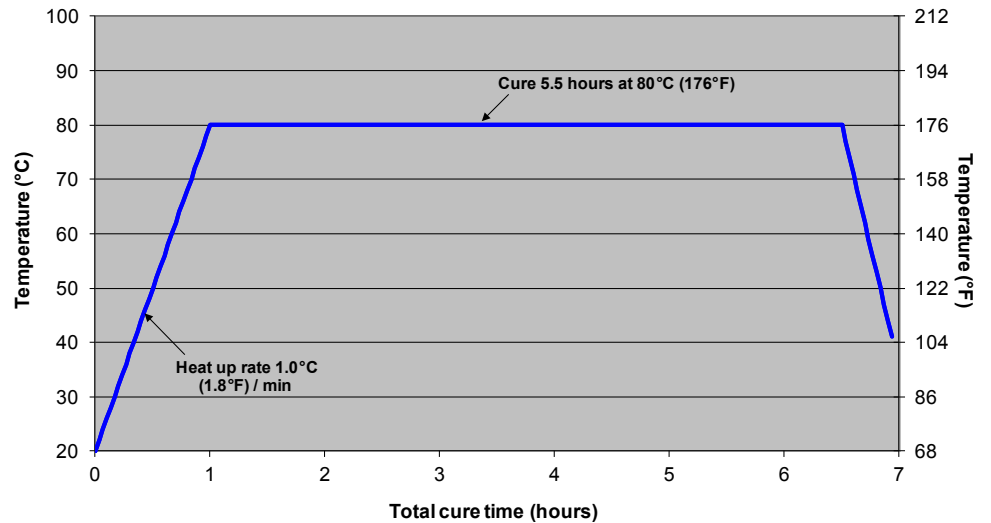
### TYPICAL CURE PROFILES

#### 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)



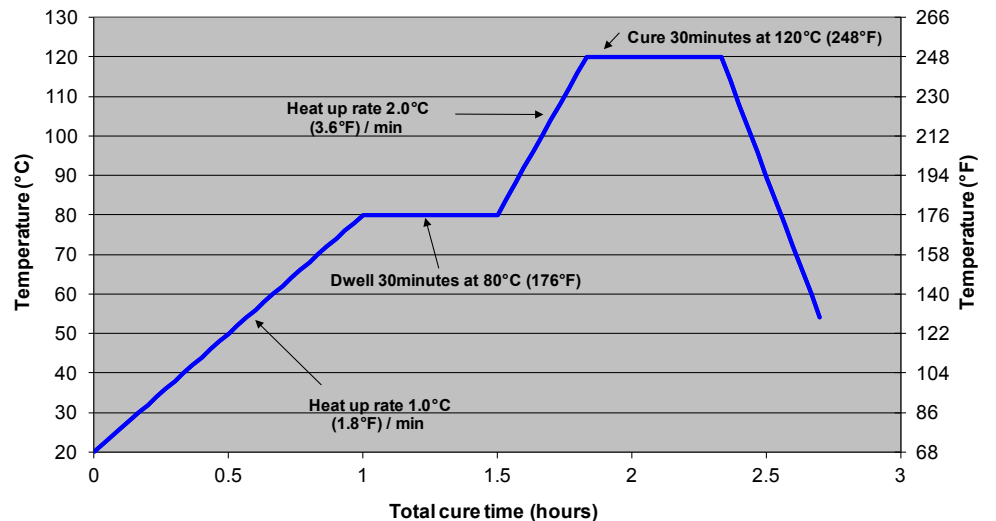
#### 120°C (248°F) Cure temperature

Total Time: 2 hours 20 min.

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)



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TENCATE ADVANCED COMPOSITES

## TenCate 8020 Rapi-Ply Toughened epoxy resin system

### CURE PROPERTIES: VISCOSITY PROFILE (30°C TO 135°C OR 86°F TO 275°F)

Ramp rate [°C (°F) /min]	Min viscosity (Pa.s)	Temp @ min viscosity (°C/°F)
0.5 (1)	5.63	87°C (192°F)
1 (1.8)	1.85	94°C (205°F)
2 (3.6)	1.37	103°C (223°F)
5 (9.0)	0.86	109°C (241°F)

### POST CURE

- In applications demanding maximum temperature or environmental resistance e.g. 93°C (200°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) / hour and hold for 30 minutes minimum.
- Laminates may be postcured unsupported unless the size, shape and laminate thickness would allow excessive distortion under self-weight.

### FORMAT

TenCate Rapi-Ply materials consist of a layer of fibre reinforcement either side of a layer of resin film and therefore has the appearance of a dry reinforcement:



Schematic of 1 ply of Rapi-Ply

### TENCATE RAPI-PLY IS AVAILABLE IN A WIDE RANGE OF HIGH PERFORMANCE REINFORCING FABRICS, STANDARD CONFIGURATIONS INCLUDE:

#### Carbon fabrics

Description	Rapi-Ply construction	Width	Moulded thickness
8020 RP 102	HS carbon 300 g/m <sup>2</sup> 2/2 twill 6K 43% / HS carbon 285 g/m <sup>2</sup> 2/2 twill 12K 43%	1.0m	0.78mm
8020 RP 103	HS carbon 300 g/m <sup>2</sup> 2/2 twill 6K 43% / HS carbon 650 g/m <sup>2</sup> 2/2 twill 12K 43%	1.0m	1.14mm
8020 RP 104	HS carbon 600 g/m <sup>2</sup> 2/2 twill 12K 40% / HS carbon 650 g/m <sup>2</sup> 2/2 twill 12K 40%	1.0m	1.45mm

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TENCATE ADVANCED COMPOSITES

## TenCate 8020 Rapi-Ply Toughened epoxy resin system

### Glass fabrics

Description	Rapi-Ply construction	Width	Moulded thickness
8020 RP 201	E glass 390 g/m <sup>2</sup> 2/2 twill 35% / E glass 390 g/m <sup>2</sup> 2/2 twill 35%	1.0m	0.7 mm
8020 RP 202	E glass 300 g/m <sup>2</sup> 8HS 35% / E glass 300 g/m <sup>2</sup> 8HS 35%	1.0m	0.55 mm
8020 RP 203	E glass 600 g/m <sup>2</sup> PW WR 35% / E glass 600 g/m <sup>2</sup> PW WR 35%	1.0 of 1.2 m	1.1 mm
8020 RP 205	E glass 600 g/m <sup>2</sup> 8HS 35% E glass 600 g/m <sup>2</sup> 8HS 35%	1.20m	1.02 mm
8020 RP 206	E glass 280 g/m <sup>2</sup> PW WR 35% / E glass 280 g/m <sup>2</sup> PW WR 35%	1.0m	0.48 mm

All materials are supplied on a roll length of 20 linear metres - minimum order quantity 100 msq.

All materials are supplied with a light tack for use on vertical surfaces with the exception of TenCate 8020 RP 202 and RP 205 which are supplied tack-free.

The standard resin system is pigmented black.

### PRODUCT RANGE

The TenCate 8020 Rapi-Ply range includes:	
TenCate 8020 Rapi-Ply	Structural system
TenCate Amlite SC8020A	Incorporates a light weight syntactic core

All products including TenCate 8020 structural prepreg can be co-cured.

Please refer to individual product data sheets for further detail.

## TenCate 8020 Rapi-Ply Toughened epoxy resin system

### PROCESSING

Following removal from the freezer, allow the TenCate 8020 Rapi-Ply to reach room temperature before opening the polythene bag, to avoid moisture condensation. Typically, the thaw time for a full roll of material from storage at -18°C (0°F) will be 4 to 6 hours.

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

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

### EXOTHERM

In certain circumstances, such as the production of thick section laminates, rapid heat up rates or highly insulating masters, TenCate 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.

### HANDLING SAFETY

Although TenCate Rapi-Ply may offer improved health & safety compared with traditional prepregs TenCate 8020 Rapi-Ply does contain 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 be taken when handling dry fibres while handling material to prevent contact with skin and to control the egress of fibres into the workplace. Carbon fibre is electrically conductive and electrical equipment should be protected from carbon fibres and dust.

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

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*All data given is based on representative samples of the materials in question. Since the method and circumstances under which these materials are processed and tested are key to their performance, and TenCate Advanced Composites has no assurance of how its customers will use the material, the corporation cannot guarantee these properties.*

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