Toray AmberTool® HX56

Toray Advanced Composites

PRODUCT DATA SHEET

DESCRIPTION

Toray AmberTool® HX56 is a low temperature curing epoxy composite tooling prepreg. After a suitable post cure, an end use temperature of 180°C (356°F) is achieved. Toray AmberTool® HX56 achieves an excellent surface finish for small to medium sized autoclave tooling.

FEATURES

- **Excellent surface finish from autoclave curing**
- **Low initial cure temperature**
- **Maximum 180°C (356°F) tool end use temperature**
- **Excellent drape for complex shapes**
- **60 hours out life at 18°C (64°F)**
- **Capable of freestanding post cure**
- **Low prepreg volatile content**
- **Low coefficient of thermal expansion (CTE)**
- **Surface machinable following post cure**

PRODUCT TYPE

40–55°C (104–131°F) Curing Epoxy Tooling Prepreg with Improved Handling Properties

TYPICAL APPLICATIONS

- Small-to-medium-sized autoclave tooling with fast cure and excellent surface finish

SHELF LIFE

Out Life:	60 hours at 18°C (64°F)
Storage Life:	6 months at -18°C (0°F)

Out life is the maximum time allowed at ambient 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.

TYPICAL NEAT RESIN PROPERTIES

Density	1.23 g/cm^3 (77lbs/ft^3) at 23°C (73°F)
T_g (DMTA) after 190°C (374°F) post cure	Onset: 185°C (365°F); Peak tan δ: 209°C (408°F)
Typical CTE for a carbon tool	3.2 x 10^{-6}/°C*

**CTE is dependent on construction and processing. Figures quoted are based on standard 1-8-1 quasi-isotropic tooling laminates.*

Contact us for more information:

North America/Asia/Pacific
e explore@toraytac-usa.com
t +1 408 465 8500

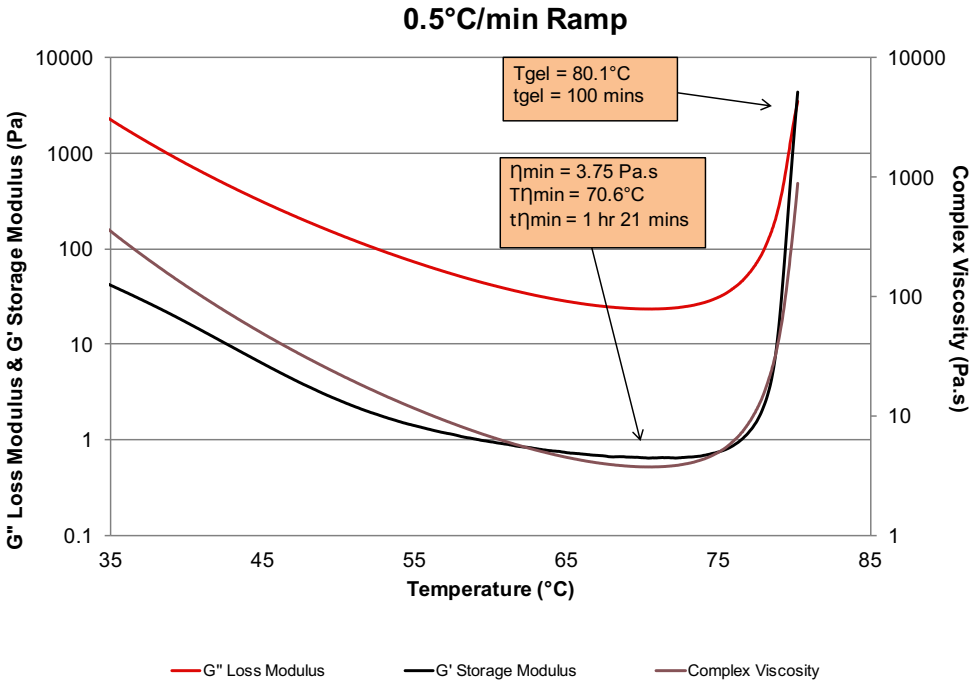
Europe/Middle East/Africa
e explore@toraytac-europe.com
t +44 (0)1773 530899

PRODUCT DATA SHEET

REINFORCEMENTS AVAILABLE

Fibre Type	Weight (gsm)	Weave Style	Standard Resin Content w/o	Molded Thickness (mm)
Standard modulus 3K carbon	205	2x2 twill	46 (surface ply)	0.23
Standard modulus 12K carbon	650	2x2 twill	35 (bulk ply)	0.62
Other fabrics and resin weights available on request				

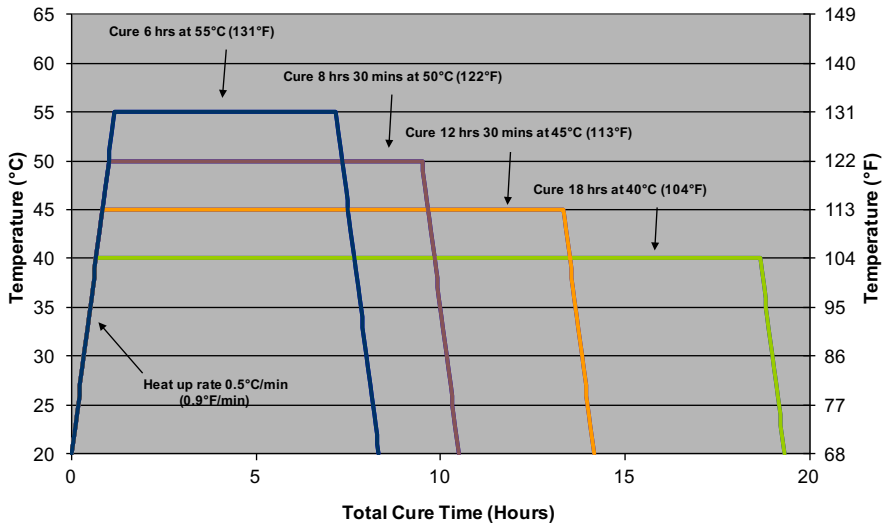
RHEOLOGY



INITIAL MINIMUM CURE TIMES

Temperature	Time (hrs)
40°C (104°F)	18
45°C (113°F)	12.5
50°C (122°F)	8.5
55°C (131°F)	6

INITIAL MINIMUM CURE SCHEDULE



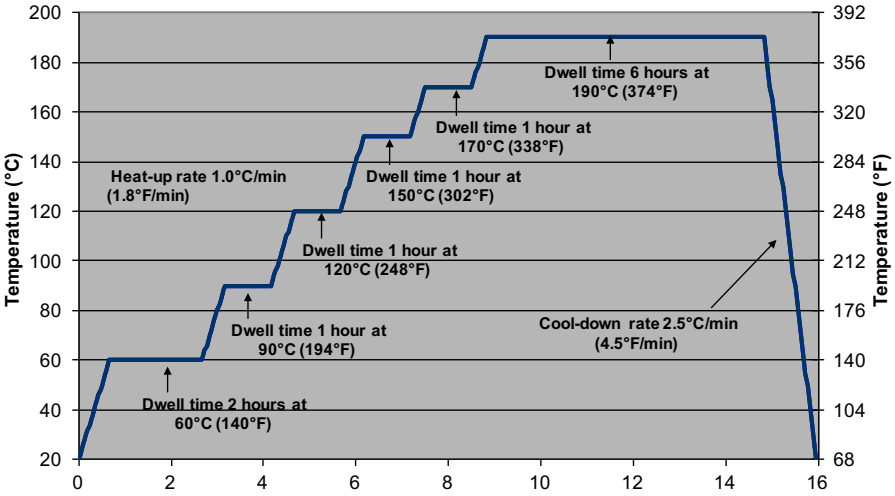
Alternative cure cycles at higher temperature may be used e.g., 4 hours at 60°C (140°F)
Caution: Toray AmberTool® HX56 prepreg contains a reactive resin system and care must be taken to avoid exothermic heating during the initial cure. Avoid exceeding 65°C (149°F) during the initial cure.

POST CURE TIME

Post Cure Schedule A		
Ramp	1°C (1.8°F)/min to 60°C (140°F)	Dwell for 2 hours
Ramp	1°C (1.8°F)/min to 90°C (194°F)	Dwell for 1 hour
Ramp	1°C (1.8°F)/min to 120°C (248°F)	Dwell for 1 hour
Ramp	1°C (1.8°F)/min to 150°C (302°F)	Dwell for 1 hour
Ramp	1°C (1.8°F)/min to 170°C (338°F)	Dwell for 1 hour
Ramp	1°C (1.8°F)/min to 190°C (374°F)	Dwell for 6 hours
Cool to 50°C (122°F) at 2.5°C/min (4.5°F/min)		

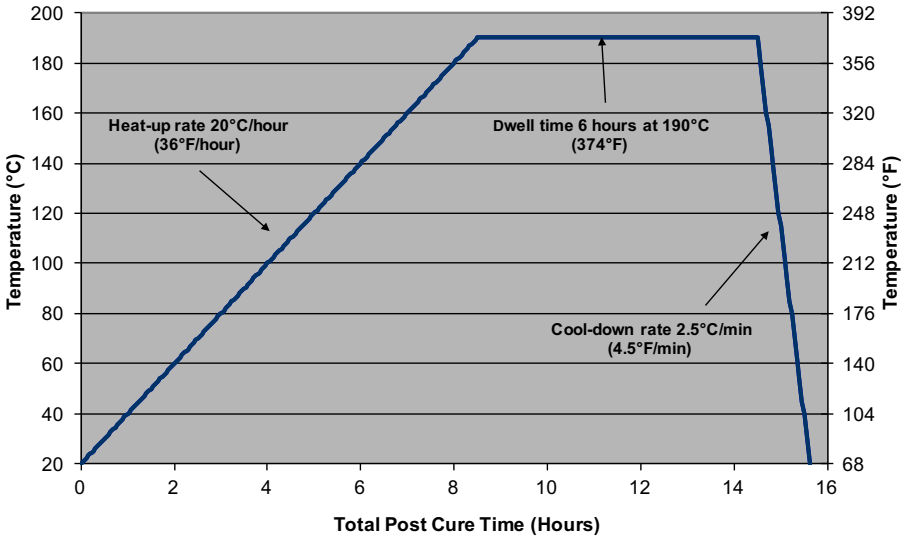
Following the initial cure, it is essential to carry out a post cure in order to develop the glass transition temperature to a level suitable for the end use temperature of the tool. Laminates may be post cured unsupported, provided that the slow ramp-rates recommended in schedule A are observed. This allows time for the T_g to step ahead of the oven temperature throughout the post cure, thus preventing the matrix from softening significantly.

POST CURE SCHEDULE A



POST CURE SCHEDULE B

An alternative post cure schedule may also be used as follows.



HANDLING SAFETY

Observe established precautions for handling epoxy resins and fibrous materials. Ensure adequate ventilation and wear gloves and protective clothing. For further information, refer to our Safety Data Sheet available from Toray Advanced Composites.

PROCESSING

Processing parameters and instructions are provided in the Toray AmberTool® material processing information guide from Toray Advanced Composites at www.toraytac.com/tooling.

Toray Advanced Composites

AmberTool®

18255 Sutter Blvd.
Morgan Hill, CA 95037, USA
t +1 408 465 8500

2450 Cordelia Road
Fairfield, CA 94534, USA
t +1 707 359 3400

Amber Drive, Langley Mill
Nottingham, NG16 4BE, UK
t +44 (0)1773 530899

www.toraytac.com
explore@toraytac-usa.com (North America/Asia/Pacific)
explore@toraytac-europe.com (Europe/Middle East/Africa)