HexPly® M47

135°C curing epoxy matrix

HEXCEL®

Product Data Sheet

Description

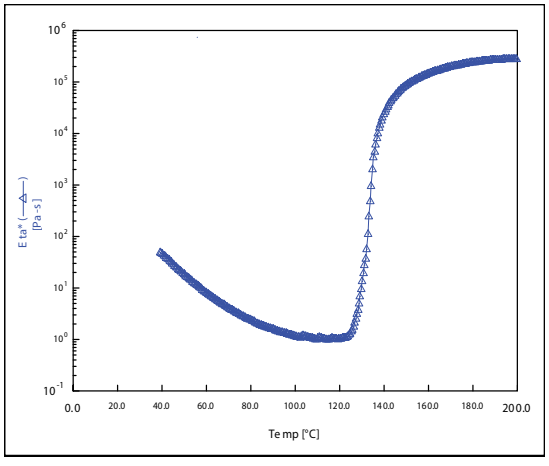
HexPly® M47 is a 135°C curing toughened epoxy matrix, self-extinguishing (depending standard used) that has been developed for the high performance car market. The matrix exhibits good strength retention at elevated temperature, good process ability and good surface finish. Its Tg allows HexPly® M47 to be considered as an alternative to 180°C curing matrices when a high loaded part in hot environment (80°C) is required.

Benefits and Features

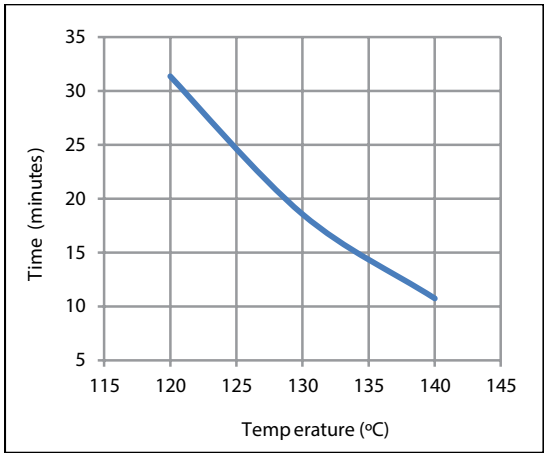
- Good toughened epoxy
- Tg : 135°C
- Good strength retention at high temperatures (80°C)
- Good surface finish
- Long shelf life and out life at room temperature
- Good tack and drape

Resin Matrix Properties

Rheology (EN 604 3-A, 2°C/min)



Gel time (hot plate)



Colour	Transparent
Density	1,24 g/cm^3
Glass Transition Temperature after 90min at 135°C, TG onset dry	135°C

Alternative Cure Cycles

The nominal cure is 90 minutes at 135°C, 1 to 7 bar pressure and heat up rate from 1 to 3°C/minute but alternative cure cycles can be used:

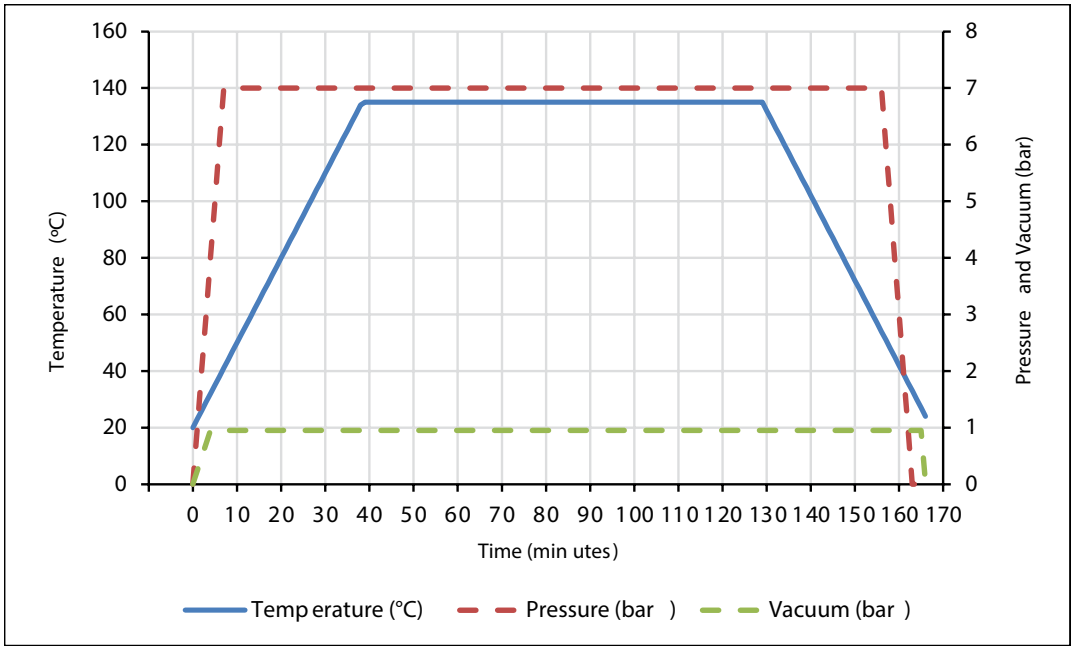
Cure Temperature	120°C	120°C	135°C	140°C	140°C
Time	60 min	90 min	90 min	60 min	90 min
Tg onset dry	Up to 135°C*				

**Depending of the reinforcement*

Curing at temperature above 140°C does not further increase the glass transition temperature.

Curing Conditions

Typical cure cycle



Heat-up rates are dependent on component thickness, eg, slow heat-up rates should be used for thicker components and large tools. Accurate temperature measurements of the component should be made during the cure cycles by using thermocouples. For a honeycomb sandwich panel, a cure cycle of 1 to 3 bar should be used, dependent on honeycomb density.

Performance testing should accompany alternative cure cycles to ensure suitability for the particular application.

Prepreg Physical Properties (Examples only. For the wider prepreg range contact Hexcel)

Product Designation		M47/38%/ UD150/ T700	M47/47%/ 200T2x2/ AS4-3K	M47/42%/ 370T2/ CHS-12K	M47/42%/ 375S5/ AS4-6K	M47/38%/ 660T2x2/ T700-12K
Fibre Tow Weave Mass	- - - g/m²	HS Carbon 12K UD tape 150	HS Carbon 3K Twill 2x2 200	HS Carbon 12K Twill 2x2 370	HS Carbon 6K Satin 5 375	HS Carbon 12K Twill 2x2 660
Nominal Cured Ply Thickness	mm	0.158	0.255	0.424	0.430	0.693
Nominal Fibre Voume	%	52.9	44.0	49.0	49.0	52.9
Nominal Laminate Density	g/cm³	1.54	1.47	1.51	1.50	1.54

Cured Prepreg Mechanical Properties (Examples only. For the wider prepreg range contact Hexcel)
Mechanical Properties are based on 135°C cure for 90 minutes, at 7 bar pressure and -0.9 bar vacuum.

Data is the result from several tests on autoclave cured laminates. Some of the values achieved will have been higher, and some lower than the figure quoted. These are nominal values.

Test	Methods	Units	M47/38%/ UD150/ T700	M47/47%/ 200T2x2/ AS4-3K	M47/42%/ 370T2/ CHS-12K	M47/42%/ 375S5/ AS4-6K	M47/38%/ 660T2x2/ T700-12K
Tensile Strength	EN2561	MPa	2750	930	1100	790	900
Tensile Modulus		GPa	140	69	66	64	61
Flexural Strength	EN 2562	MPa	1580	950	900	850	810
Flexural Modulus		GPa	117	56	53	60	50
ILSS	EN 2563	MPa	83	63	48	60	48
Comp. Strength	EN 2850 B	MPa	1450	830	800	710	530

NB : Data normalised to Fibre Volume Content (55% for fabrics; 60% for UD) except for ILSS and Flexural.

Prepreg Storage Life

Shelf Life[1]: 12 months at -18°C/0°F (from date of manufacture).

[1] Shelf Life: The maximum storage life for HexPly® prepreg, when stored continuously, in a sealed moisture-proof bag, at -18°C/0°F or 5°C/41°F. To accurately establish the exact expiry date, consult the box label.

Out Life[2]: 30 days at room temperature (25°C max).

2 The maximum accumulated time allowed at room temperature between removal from the freezer and cure.

Tack Life[3]: Up to 30 days (depending of the reinforcements and the resin content) at room temperature (25°C max).

[3] Tack Life: The time, at room temperature, during which prepreg retains enough tack for easy component lay-up.

Storage Conditions

HexPly® M47 prepregs should be stored as received in a cool dry place or in a refrigerator. After removal from refrigerator storage, prepreg should be allowed to reach room temperature before opening the polythene bag, thus preventing condensation (a full reel in its packaging can take up to 48 hours).

Precautions for Use

The usual precautions when handling uncured synthetic resins and fibrous materials should be observed. A Safety Data Sheet is available for this product. The use of clean, disposable, inert gloves provides protection for the operator and avoids contamination of material and components.

For more information

Hexcel is a leading worldwide supplier of composite materials to aerospace and industrial markets.
Our comprehensive range includes:

- HexTow® carbon fibers
- HexForce® reinforcements
- HiMax® multiaxial reinforcements
- HexPly® prepregs
- HexMC®-i molding compounds
- HexFlow® RTM resins
- HexBond™ adhesives
- HexTool® tooling materials
- HexWeb® honeycombs
- Acousti-Cap® sound attenuating honeycomb
- Engineered core
- Engineered products
- Polyspeed® laminates & pultruded profiles
- HexAM® additive manufacturing

For U.S. quotes, orders and product information call toll-free 1-800-688-7734. For other worldwide sales office telephone numbers and a full address list, please go to:

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