



HexPly[®] M18/1

180°C curing epoxy matrix



Product Data Sheet

Description

HexPly[®] M18/1 is a high performance, self extinguishing, tough epoxy matrix for use in primary aerospace structures. It exhibits low moisture absorption at saturation.

HexPly[®] M18/1 is a toughened epoxy resin system supplied with unidirectional and woven carbon fibres.

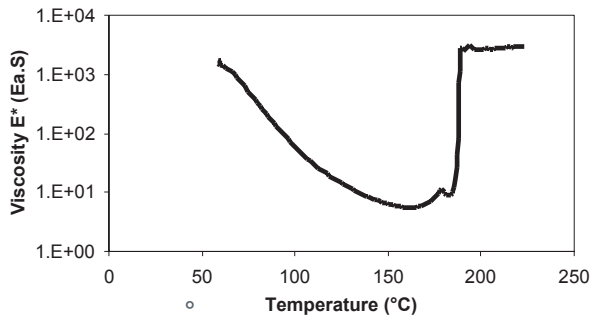
HexPly[®] M18/1 was developed as a controlled flow system to operate in environments up to 135°C.

Benefits and Features

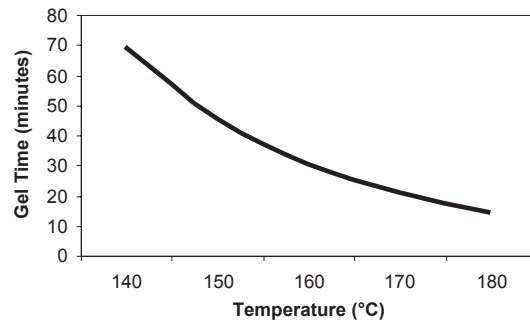
- Hot melt chemistry (nominal 180°C cure)
- Self extinguishing
- Very high temperature wet performances (135°C wet continuous service temperature)
- Low moisture absorption (0.74% after 1 week at 70°C 95% relative humidity (RH) and 3 weeks at 70°C 85% RH, measured on carbon fibre laminate)
- Flexible cure cycle (from 135°C to 210°C with or without post-cure)

Resin Matrix Properties

Viscosity



Gel Time



Cured Matrix Properties

Color	Orange	
Density	1.22 g/cm ³	
Glass Transition T° (Dry)	200 ±5°C	DMA onset according to EN6032 (Single cantilever, 1Hz, 5µm)
Glass Transition T° (Wet)	170±5°C	DMA onset according to EN6032 (Single cantilever, 1Hz, 5µm)
Tensile Strength	66 MPa	
Tensile Modulus	4.2 GPa	
Tensile Strain	1.58 %	
Poisson Ratio	0.40%	
Linear coefficient of thermal expansion	55.10-6 °K ⁻¹	
Fracture toughness, K _{1c}	0.93 MPa.√m	
Strain energy release rate, G _{1c}	230 J/m ²	

Wet Ageing using accelerated method, 14 days submerged in 70°C water



Prepreg Properties – HexPly® M18/1 UD and Woven Carbon Prepregs

Physical Properties

	Units	42% G947 UD	43% G939 Fabric
Fibre Density	g/cm ³	1.78	1.78
Filament count/tow		3000	3000
Resin Density	g/cm ³	1.22	1.22
Fibre areal weight	g/m ²	160	220
Nominal Cured Ply Thickness	mm	0.165	0.227
Nominal Fibre Volume	%	55	55

Mechanical Properties

Test	Standard	Units	Temp (°C)	Condition UD	42% G947 Fabric	43% G939
0° Tensile Strength	EN2561	MPa	-55	Dry	1750	750
			RT	Dry	1750	800
			135	Wet	1700	800
90° Tensile Strength		MPa	RT	Dry	55	800
0° Tensile Modulus	EN2561	GPa	-55	Dry	127	67
			RT	Dry	128	65
			135	Wet	133	67
90° Tensile Modulus		GPa	RT	Dry	9.3	67
0° Compression Strength	EN2850 Type A	MPa	-55	Dry	1500	850
			RT	Dry	1200	800
			135	Wet	750	500
90° Compression Strength		MPa	RT	Dry	220	800
0° Compression Modulus	EN2850 Type A	GPa	-55	Dry	121	62
			RT	Dry	121	64
			135	Wet	121	63
90° Compression Modulus		GPa	RT	Dry	10.2	62
0° ILSS (Short beam shear)	EN2563	MPa	RT	Dry	95	70
			75	Wet	65	56
			135	Wet	50	40
In-plane Shear Strength	EN6031	MPa	RT	Dry	95	100
			75	Wet	90	85
			135	Wet	70	65

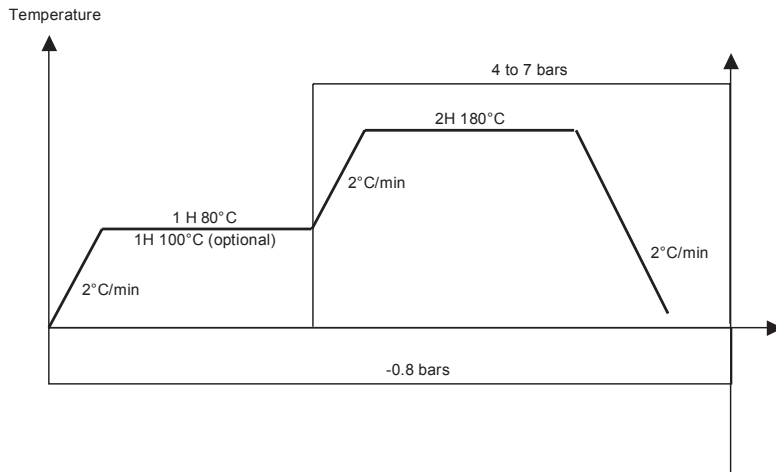
Wet : 1 week at 70°C 95% relative humidity (RH) and 3 weeks at 70°C 85% RH

These are values obtained on a 55% fibre volume content laminate (i.e. a cured ply thickness of approx. 0.165mm with G947 and 0.227 mm with G939).

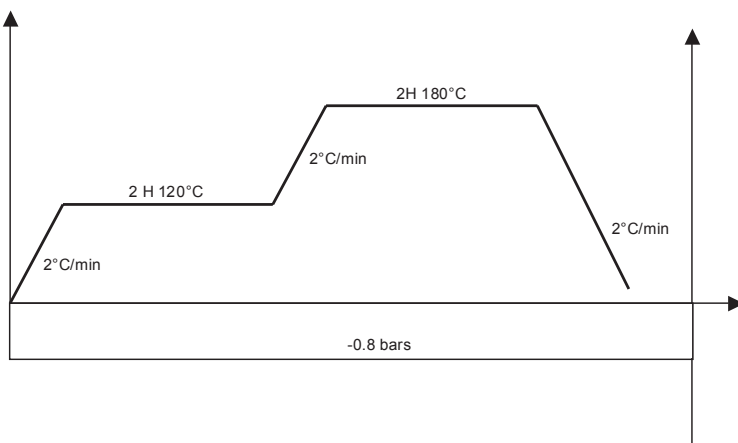
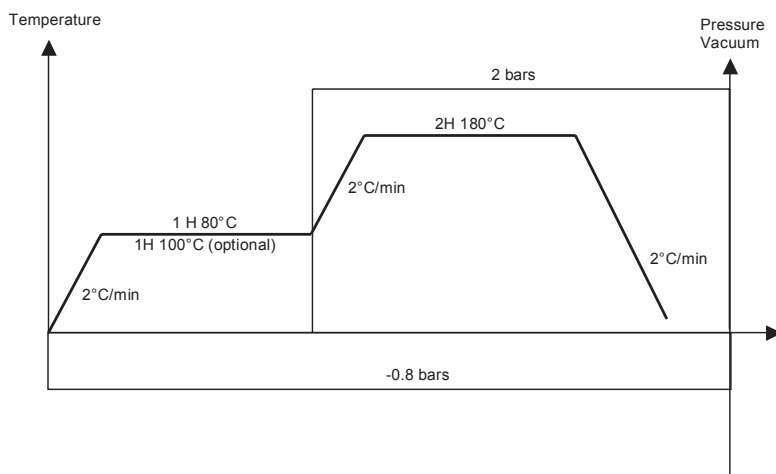


Curing Conditions

Monolithic Parts (autoclave)



Sandwich parts (autoclave)





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Prepreg Storage Life

- Tack Life: 13 days at RT (23°)
- Out Life: 15 days at RT (23°C)
- Shelf Life: 12 months at -18°C (from date of manufacture)

Definitions:

- Tack Life: The time, at room temperature, during which prepreg retains enough tack for easy component lay-up.
- Out Life: The maximum accumulated time allowed at room temperature between removal from the freezer and cure.
- Shelf Life: The maximum storage for HexPly® prepreg from manufacture, when stored continuously, in a sealed moisture-proof bag, at -18°C. To accurately establish the exact expiry date, consult the box label.

HexPly® M18/1 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 polyethylene bag, thus preventing condensation (A full reel in it's packaging can take up to 48 hours).

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

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:

<https://www.hexcel.com/contact>

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