HexPly® M42

180°C curing epoxy matrix

Product Data Sheet

Description

HexPly® M42 is a high performance, self extinguishing, self adhesive, tough epoxy matrix for use in primary aerospace sandwich structures. It exhibits very high impact resistance and damage tolerance for a wide range of applications.

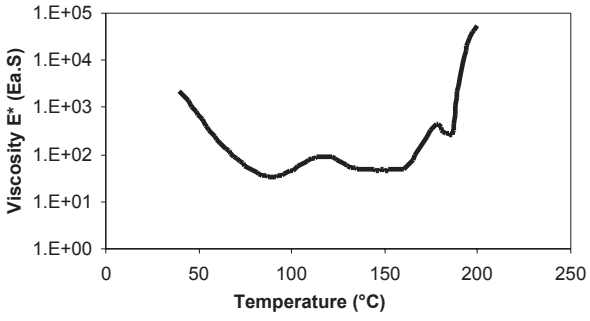
HexPly® M42 is a toughed epoxy resin system supplied with woven glass, carbon and hybrid glass/carbon fibres. HexPly® M42 was developed as a controlled flow system to operate in environments up to 120-130°C.

Benefits and Features

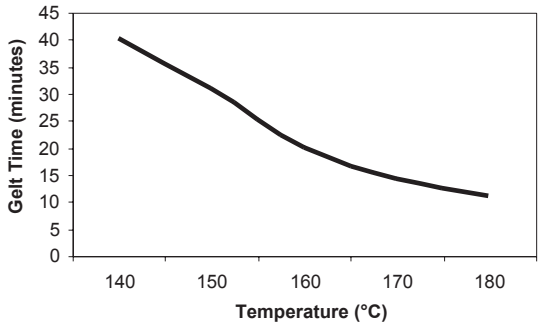
- Hot melt chemistry (nominal 180°C cure)
- Self extinguishing
- Self adhesive on honeycomb (autoclave or vacuum bag)
- Very high temperature wet performances (120°C wet continuous service temperature)
- Low moisture absorption (0.74% after 1 week at 70°C 95% relative humidity (RH) and 3 weeks at 70°C 85% RH, measured on carbon/glass fibre laminate)
- Flexible cure cycle (from 135°C to 210°C with or without post-cure)
- High damage resistance

Resin Matrix Properties

Viscosity



Gel Time



Typical Neat Resin Data

Colour	Brown
Density	1.26 g/cm^3
Glass Transition Temperature Tg Dry	193 °C
Glass Transition Temperature Tg wet	
14 days in water @70°C	153 °C
Tensile Strength	77 MPa
Tensile Modulus	4.0 GPa
Tensile Strain	1.59 %
Poisson Ratio	0.40%
Linear coefficient of thermal expansion	59.10^{-6} °K^{-1}
Fracture toughness, K1c	1.83 MPa.√m
Strain energy release rate, G1C	990 J/m^2

Prepreg Properties – HexPly® M42 Woven Carbon and Hybrid Prepregs

Physical Properties

	Units	52%/G1177 Glass/Carbon	63%/120 E-Glass	50%/G939 HS Carbon	54%/G1088 Glass/Carbon
Fibre Density	g/cm^3	2.1	2.6	1.78	2.25
Resin Density	g/cm^3	1.26	1.26	1.26	1.26
Fibre areal weight	g/m^2	185	107	220	135
Nominal Cured Ply Thickness	mm	0.21	0.15	0.22	0.11
Nominal Fibre Volume	%	42	35	55	53

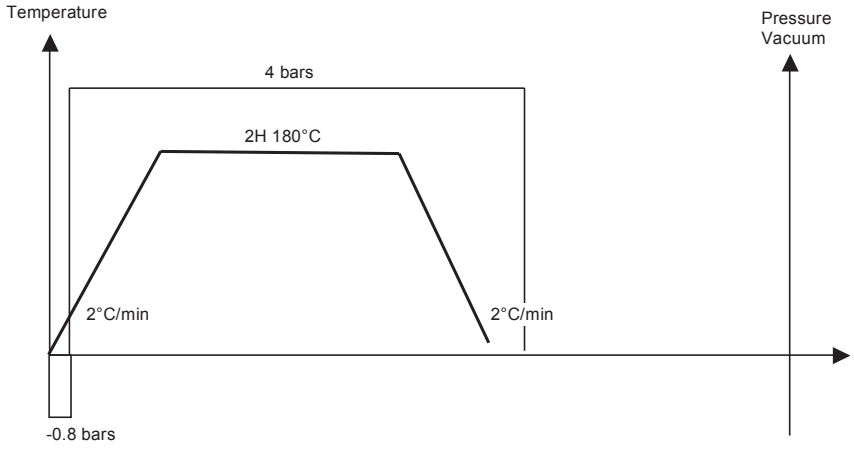
Mechanical Properties

Test	Standard	Units	Temp (°C)	Condition	52%/G1177 HS Carbon	63%/120 E-Glass	50%/G939 HS Carbon	54%/G1088 Glass/Carbon
90° Tensile Strength	EN2561	MPa	RT	Dry	400	280	850	377
			23	Wet	370	-	-	-
			130	Wet	320	-	-	-
			135	Wet	-	-	750	-
90° Tensile Modulus		GPa	RT	Dry	38	17	62.8	28
			23	Wet	37	-	-	-
			130	Wet	37	-	--	-
			135	Wet	-	-	60.0	-
90° Compression Strength	EN2850 Type B	MPa	RT	Dry	650	-	730	-
			23	Wet	590	-		-
			130	Wet	390	-		-
			135	Wet	-	-	530	-
			150	Wet	-	-	-	370
90° Compression Modulus		MPa	RT	Dry	37	-		-
			23	Wet	38	-		-
			130	Wet	36	-		-
0° ILSS	EN2563 Short beam shear	MPa	RT	Dry	-	55	65	48
			120	Dry	-	-	49	-
			135	Wet	-	-	35	32
			150	Wet	-	-	-	27
90° ILSS			RT	Dry	68	49.7	-	-
			130	Wet	34	-	-	-
			150	Wet	31	-	-	-
In-plane Shear Strength	EN 6031	MPa	RT	Dry	79			108
			100	Wet	54			
			130	Wet	48			
			150	Wet	-	-	-	58
In-plane Shear Modulus		GPa	RT	Dry	3.58			3.0
			100	Wet	-			
			130	Wet	2.4			2.0
			150	Wet	-	-	-	
Climbing Drum Peel	EN 2243-3	MPa	RT	Dry Top	-	-	49	47
			RT	Dry Bottom	-	-	59	53

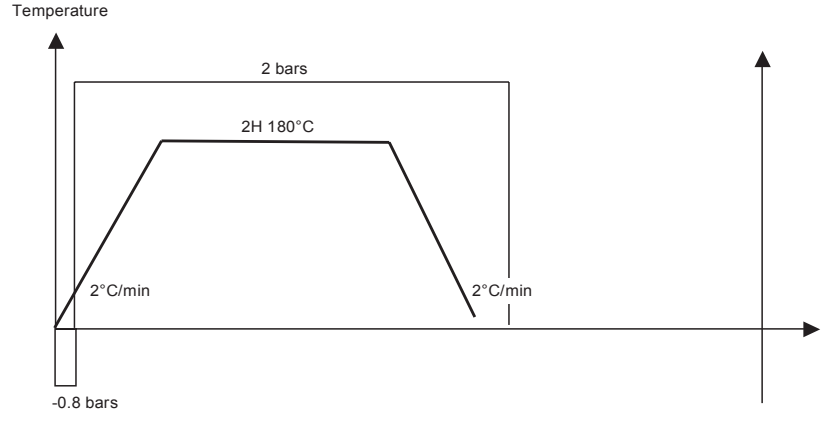
Wet : 1 week at 70°C 95% relative humidity (RH) and 3 weeks at 70°C 85% RH
These are values obtained for G1177 with 0.21mm/ply, for 120 with 0.115mm/ply, for G939 with 0.22mm and for G1088 with 0.11mm.

Curing Conditions

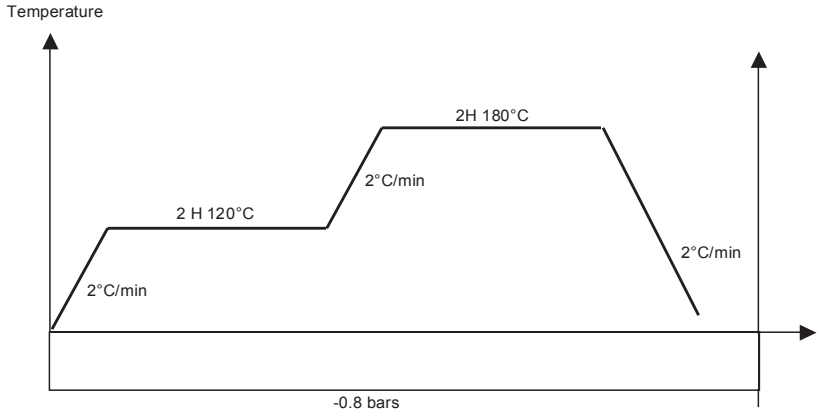
Monolithic Parts (autoclave)



Sandwich parts (autoclave)



Vacuum bag cycle (monolithic and sandwich parts):



Prepreg Storage Life

Out Life: 18 days at RT (23°C)

Shelf Life: 12 months at -18°C (from date of manufacture)

Definitions:

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

Shelf Life: The maximum storage life for HexPly® prepreg, when stored continuously, in a closed moisture-proof bag, at -18°C. To accurately establish the exact expiry date, consult the box label.

HexPly® M42 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 its 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
- Polyspeed® laminates & pultruded profiles
- HexAM® additive manufacturing

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