

MTM[®] 49-1L

MTM[®] 49-1L is an 80 to 160°C (176 to 320°F) curing, toughened epoxy matrix resin developed for component manufacture.

MTM49-1L prepregs exhibit excellent ambient and hot mechanical performance combined with good impact resistance.

Features and Benefits

- 30 days out life at 21°C (70°F)
- 12 months storage at -18°C (0°F)
- Good tack and drape
- Autoclave or press moulding
- Range of end use temperatures, depending on application and post-cure
- Good compression after impact performance
- Damage tolerant

RELATED DOCUMENTS

- De-bulking guidelines (TDS1036)
- Autoclave processing lay-up and bagging guidelines (TDS1037)

RELATED PRODUCTS

- MTA240 adhesive film (PDS1166)
- VTF266 surface improvement film (PDS1255)

CURE CYCLE

Autoclave cure

Vacuum bag pressure	Minimum of 980mbar (29"Hg) ^{* †}
Autoclave pressure	6.2 bar (90 psi) ^{**}
Ramp rate	1 to 3°C (1.8 to 5.4°F)/minute
Recommended cure cycle	90 minutes hour at 135°C (275°F)
Cool down	Maximum of 3°C (5.4°F)/minute to 60°C (140°F)

*This is the ideal vacuum level, however, it is recognised that it is not always possible to attain. If in doubt, please contact our technical support staff for advice.

†If manufacturing complex shapes, the vacuum can be vented when the pressure reaches 2 bar (30psi) if there is a perceived risk of a bag burst and hence the need to avoid pressurised air going down the vacuum line.

**If producing sandwich panels, apply the maximum pressure allowable for the honeycomb type.

MTM[®] 49-1L PREPREG



Press cure

Mould tools should restrain the flow sufficiently under moulding conditions to avoid fabric or fibre distortion.

Press pressure	Minimum of 2.8 bar (40 psi)/Maximum 3.4 bar (50 psi)
Ramp rate	A suitable rate (dependent on mould tooling)
Recommended cure cycle	90 minutes hour at 135°C (275°F)
Cool down	A suitable rate (dependent on mould tooling) to 70°C (158°F)

Notes:

- Demoulding at the cure temperature may be possible if the tooling is suitably designed. A specific trial is recommended.
- Alternative cure cycles may be employed, but trials should be performed to determine their suitability prior to committing to full-scale production.

POST-CURE

Ramp rate	0.3°C (0.5°F)/minute*
Recommended post-cure cycle	2 hours (-0/+30 minutes) at 180°C (356°F)
Cool down	Maximum of 3°C (5.4°F)/minute to 60°C (140°F)

* Temperature must be measured by the lagging thermocouple attached to the part.

Notes:

- Parts may be loaded into a pre-heated oven or heated at 3°C (5.4°F)/minute to the initial cure temperature.
- Large components should be adequately supported to avoid distortion.

PHYSICAL PROPERTIES

Test	Sample conditions	Results	
Cured resin density	1 hour at 120°C (248°F)	1.23 g/cm ³	
DMA E' onset Tg	90 minutes at 135°C (275°F)	dry	136°C (277°F)
	1 hour at 120°C (248°F) + 1 hour at 180°C (356°F)	wet*	105°C (221°F)
	Maximum Tg	dry	170°C (338°F)

*Wet conditioning: 14 days immersion in water at 70°C (158°F)



MECHANICAL PROPERTIES

Material: MTM49-1L
 Cure cycle: 90 minutes at 135°C (275°F), 6.2 bar (90 psi)
 Test conditions: Room temperature, dry

Test	Test method	Units	MTM49-1L/ CF3529* -40%	MTM49-1L/ CF0304** -38%
0° Tensile strength	ASTM D3039	MPa (ksi)	1088 (157)	949 (138)
0° Tensile modulus		GPa (msi)	65.0 (9.43)	66.0 (9.57)
0° Compression strength	ASTM D3410	MPa (ksi)	815 (118)	855 (124)
0° Compression modulus		GPa (msi)	59.0 (8.56)	60.0 (8.70)
0° In-plane shear strength (IPSS)	ASTM D3518	MPa (ksi)	89.0 (12.9)	104 (15.1)
0° In-plane shear modulus (IPSM)		GPa (msi)	3.90 (0.57)	3.90 (0.57)
0° Flexural strength	CRAG 200	MPa (ksi)	1271 (184)	1192 (173)
0° Flexural modulus		GPa (msi)	49.2 (7.13)	62.0 (9.00)
0° Interlaminar shear strength (ILSS)	ASTM D2344	MPa (ksi)	49.0 (7.10)	75.0 (10.9)

Data normalised to 55%Vf except for ILSS and IPSS & IPSM.

*CF3529 is a 2x2 twill, 380 g/m2 fabric with 12k fibres.

**CF0304 is a 2x2 twill, 199 g/m2 fabric with 3k fibres.

AVAILABILITY

MTM49-1L prepregs are available in a wide range of reinforcing fabrics and unidirectional tapes, including glass, carbon, aramid and hybrids.

STORAGE

Out life* at 21°C (70°F)	30 days
Storage at -18°C (0°F)	12 months from date of manufacture

*Out life refers to accumulated time out of the freezer before the part is cured.

Note:

The actual freezer storage life and out life are dependent on a number of factors, including; fibre type, format and application. For certain formats, it may be possible for the storage life and out life to be longer than stated. Please contact our technical support staff for advice.



EXOTHERM

MTM[®] 49-1L prepregs are reactive formulations which can undergo severe exothermic heat up during the initial curing process if incorrect curing procedures are followed.

Great care must be taken to ensure that safe heating rates, dwell temperatures and lay-up/bagging procedures are adhered to, especially when moulding solid laminates in excess of 10mm (0.4in) thickness. 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. It is also important to recognise that the model or tool material and its thermal mass, combined with the insulating effect of breather/bagging materials can affect the risk of exotherm in particular cases.

HEALTH & SAFETY

Please refer to the product MSDS for safe handling, personal protective equipment recommendations and disposal considerations.

