MTM® 110 SERIES

MTM110 series prepregs are high temperature resistant, inherently flame-retardant, cyanate ester matrices suitable for initial cure at 135°C (275°F). After a suitable post-cure, the glass transition temperature can be increased to a maximum of 330°C (626°F), thus allowing components to withstand short duration thermal spikes up to this temperature.

MTM110 series autoclave processing prepregs have been specially developed for applications where extended room temperature out life is important.

Features and Benefits

- 135°C (275°F) initial cure
- 30 days outlife at 21°C (70°F)
- Autoclave cure
- Good thermal durability up to 250°C (482°F) after post-cure
- Good dielectric properties for radar transparency
- Maximum Tg of 330°C (626°F); can withstand thermal spikes to 330°C (626°F)
- Inherently flame retardant, with low toxic gas and smoke generation

PRODUCT VARIANTS

- MTM110-5: For unidirectional prepregs
- MTA110-5: Film for bonding applications

RELATED DOCUMENTS

- De-bulking guidelines (TDS1036)
- Cyanate ester prepreg – lay-up and bagging guidelines (TDS1039)

CURE CYCLE

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	2 hours at 135°C, +5/-0°C (257°F, +9/-0°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 producing sandwich panels, apply the maximum pressure allowable for the honeycomb type.

POST-CURE

In applications demanding maximum temperature or environmental resistance, it is essential that the component is post- cured to fully develop the glass transition temperature.

Syensqo recommends performing the post-cure immediately after the initial cure has been completed, and that a minimum post-cure of 1 hour at 150°C (302°F) is applied. This will avoid the risk of moisture absorption by the partially cured polymer and the subsequent problems, see TDS1039 for further information.

Post-curing above 250°C (482°F) will increase the Tg to a maximum of 330°C (626°F). However, there will be degradation and possible charring of the polymer which can limit the in-service life and may impact dielectric and mechanical performance.

Ramp rate	0.3°C (0.5°F)/minute
Recommended post-cure cycle	2 hours at 250°C -0/+5°C (482°F -0/+9°F) for prolonged use at 250°C (482°F)*
Maximum temperature post-cure cycle	2 hours at 300°C -0/+5°C (572°F -0/+9°F) for thermal spiking to 330°C (626°F)*
Cool down	2°C (3.6°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	2 hours at 135°C (257°F) + 2 hours at 250°C (482°F)	1.28 g/cm^3	
DMA E′ onset Tg	3 hours at 135°C (275°F), dry 2 hours at 250°C (482°F), dry 2 hours at 300°C (572°F), dry	145°C (293°F) 300°C (572°F) 330°C (626°F)	
Cured resin dielectric properties	2 hours at 135°C (257°F) + 2 hours at 250°C (482°F)	Dielectric constant e′ Loss factor* e″	2.98 0.005

*Loss factor was measured by the slotted wave-guide technique, but is approximate due to inaccuracies in machining.

MECHANICAL PROPERTIES

Material: MTM110/Quartz 581 fabric

Cure: 3 hours at 135°C (275°F), 6 bar (87psi) pressure

Test conditions: Room temperature, dry

Test	Test method	Units	Results
0° Tensile strength	ASTM D3039	MPa (ksi)	618 (89.6)
90° Tensile strength	ASTM D3039	MPa (ksi)	588 (85.2)
90° Tensile modulus		GPa (msi)	28 (4.06)
90° Compression strength	ASTM D3410	MPa (ksi)	443 (64.2)
90° Compression modulus		GPa (msi)	29 (4.21)
In-plane shear strength (IPSS)	ASTM D3518	MPa (ksi)	82 (11.9)
0° Flexural strength	ASTM D790	MPa (ksi)	799 (116)
0° Flexural modulus		GPa (msi)	26 (3.77)

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

AVAILABILITY

MTM110 series prepregs are available in a wide range of reinforcing fabrics and unidirectional tapes, including glass, carbon, aramid and hybrids.

MTA110-5 is available in film weights of 150 to 300g/m^2.

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® 110 Series 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 SDS for safe handling, personal protective equipment recommendations and disposal considerations.