VTM® 260 SERIES

VTM® 260 series resins are toughened, 65°C to 120°C (149°F to 248°F) curing epoxy resin matrices specifically developed for oven vacuum bag processing of large structures. These resins are particularly suited to the marine and industrial markets.

Features and Benefits

- Outstanding vacuum only processing capability on a wide range of reinforcements
- Flexible curing capability
- Up to 30 days out life at 21°C (70°F)
- 12 months storage at -18°C (0°F)
- Service temperature up to 100°C (212°F)
- Available in ZPREG® selective impregnation formats
- Suitable for component and tooling manufacture
- Fully co-curable with the VTM260 range of adhesives, surfacing films and syntactic plies

PRODUCT VARIANTS

- VTM263: High viscosity, low flow variant - suitable for selective impregnation of fabrics or full impregnation of lightweight fabric reinforcements
- VTM264: Intermediate viscosity and tack - suitable for full impregnation of light and medium weight unidirectional and fabric reinforcements
- VTM264B : Black pigmented version of VTM264
- VTM266: Low viscosity - suitable for the full impregnation of heavyweight fabric reinforcements up to 2400g/m²
- VTM267: Controlled tack for sided impregnation and film infusion
- VTM267FRB and VTM264FRB: Flame-retarded resin systems are also available, see (PDS1180)

RELATED DOCUMENTS

- Recommendations for manufacturing large marine mould tools from LTF/VTM260 series materials (TDS1011)
- De-bulking guidelines (TDS1036)
- Oven vacuum bag processing – lay-up and bagging guidelines (TDS1041)

RELATED PRODUCTS

- VTA260 adhesive film (PDS1174)
- VTS263 syntactic film (PDS1165)
- VTF261 surfacing ply (PDS1194)
- VTF266 surface improvement film (PDS1255)
- FS201 lightweight syntactic filler (PDS1015)
- VTM264-1 prepreg (PDS1268)
- VTM264S-1 prepreg (PDS1268)
- VTM264FRB prepreg (PDS1180)
- VTM267FRB prepreg (PDS1180)

CURE CYCLE

Vacuum bag pressure	Minimum of 980mbar (29"Hg)*
Ramp rate	0.5 to 2°C (0.9 to 3.6°F)/minute
Minimum temperature cure cycle	16 hours at 65°C (149°F)
Cool down	Maximum of 3°C (5.4°F)/minute to room temperature

*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.

Alternative Cure Cycles

Temperature	Duration
80°C (176°F)	5 hours
100°C (212°F)	2 hours
120°C (248°F)	1 hour

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.

Ramp rate	0.3°C (0.5°F)/minute
Post-cure cycle	Minimum of 1 hour at 120°C -0/+2°C (248°F-0/+4°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.
- Alternative post-cures are possible. Please contact our technical support staff for advice.

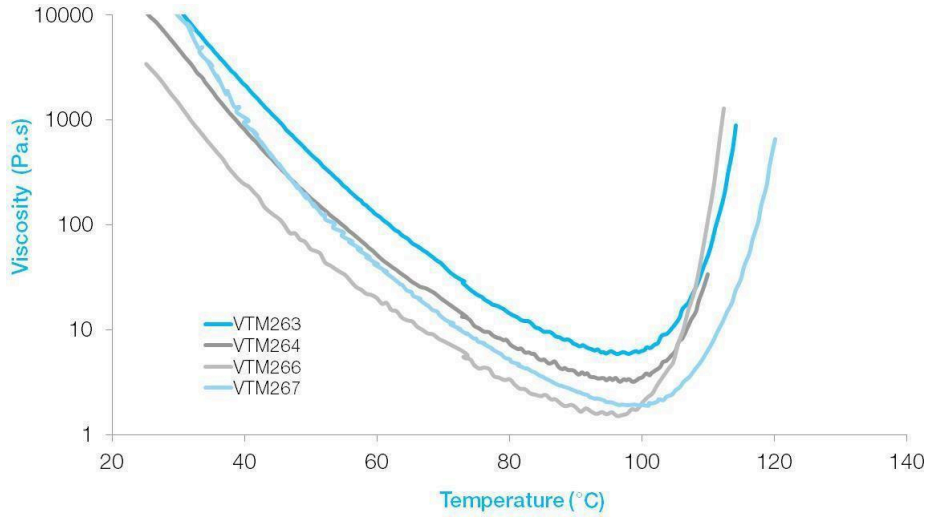
PHYSICAL PROPERTIES

Resin Selector Guide

Resin	Tack at 15°C (60°F)	Tack at 21°C (70°F)	Glass UD	Carbon UD	Glass woven	Carbon woven
VTM263	low	low/medium	N/A	N/A	<300 g/m2	<300 g/m2
VTM264	low	medium	<400 g/m2	<450 g/m2	<900 g/m2	<900 g/m2
VTM266	medium	high	<600 g/m2	<600 g/m2	>900 g/m2	>900 g/m2
VTM267	very low	low	differential coating of heavy reinforcements			

Test	Sample cure conditions		Results
Cured resin density	1 hour at 120°C (248°F)	All variants	1.20 g/cm3
DMA E' onset Tg	16 hours at 65°C (149°F), dry		80°C (176°F)
	5 hours at 80°C (176°F), dry		95°C (203°F)
	2 hours at 100°C (212°F), dry		115°C (239°F)
	1 hour at 120°C (248°F), dry		120°C (248°F)

Dynamic Viscosity at 2°C (3.6°F)/Minute



MECHANICAL PROPERTIES

Material: VTM264/CF0302*-42%

Cure Cycle: 5 hours at 80°C (176°F), oven vacuum bag cure

Test Conditions: Room temperature, dry

Property	Test method	Units	Results
0° Tensile strength	ASTM D3039	MPa (ksi)	700 (102)
0° Tensile modulus		GPa (msi)	60.0 (8.70)
90° Tensile strength		MPa (ksi)	745 (108)
90° Tensile modulus		GPa (msi)	60.5 (8.77)
0° Compressive strength	ASTM D3410	MPa (ksi)	540 (78.3)
0° Compressive modulus		GPa (msi)	54.0 (7.83)
90° Compressive strength		MPa (ksi)	560 (81.2)
90° Compressive modulus		GPa (msi)	53.0 (7.69)
In-plane shear strength (IPSS)	ASTM D3518	MPa (ksi)	95.0 (13.8)
In-plane shear modulus (IPSM)		GPa (msi)	3.90 (0.57)
0° Interlaminar shear strength (ILSS)	ASTM D2344	MPa (ksi)	71.0 (10.3)

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

*CF0302 is a 2x2 twill, 199 g/m2 fabric with 3k FT300B 40B fibres.

Material: VTM264/T700-35%

Cure Cycle: 5 hours at 80°C (176°F), oven vacuum bag cure

Test Conditions: Room temperature, dry

Property	Test method	Units	Results
0° Tensile strength	ASTM D3039	MPa (ksi)	2575 (374)
0° Tensile modulus		GPa (msi)	131 (19.0)
90° Tensile strength		MPa (ksi)	40 (5.80)
90° Tensile modulus		GPa (msi)	9.1 (1.32)
0° Compressive strength	ASTM D695 (MOD)	MPa (ksi)	1235 (179)
0° Compressive modulus		GPa (msi)	118 (17.1)
90° Compressive strength		MPa (ksi)	182 (26.4)
90° Compressive modulus		GPa (msi)	-
In-plane shear strength (IPSS)	ASTM D3518	MPa (ksi)	85.7 (12.4)
In-plane shear modulus (IPSM)		GPa (msi)	3.94 (0.57)
0° Interlaminar shear strength (ILSS)	ASTM D2344	MPa (ksi)	88.6 (12.9)

Data normalised to 60%Vf except for ILSS and IPSS & IPSM

AVAILABILITY

VTM260 series prepregs are available in a wide range of reinforcing fabrics and unidirectional tapes including glass, carbon, aramid and hybrids. Materials can also be supplied in full and ZPREG selectively impregnated formats.

STORAGE

Out life* at 21°C (70°F)	VTM263 VTM264 VTM266	30 days
	VTM267	21 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

VTM260 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.

Please contact our technical support staff for further information on exotherm behaviour of this prepreg.

HEALTH & SAFETY

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