HMT504

NEWPORT-FTP® TOWPREG TECHNOLOGY

230-300°F (110-149°C) Cure Hot-melt Towpreg

Typical applications
Marine
Medical
Industrial
Sporting goods

Out life
6 months at 70°F (21°C)

Shelf life
12 months at 40°F (4°C)
24 months at 0°F (-18°C)

Description
HMT504 is a 230°-300°F (110°-149°C) cure, hot melt towpreg, utilizing a toughened, controlled flow epoxy resin matrix. The flat tow structure, which is produced by our special coating process has more consistent fiber impregnation compared to the round tow structure which enables more precise bandwidth control with reduced gap formation and increased adhesion. The unique resin formulation allows the high performance fiber of HMT504 to perform to its maximum strength potential, which has led to superior burst pressure and cycle life in composite overwrapped pressure vessel (COPV) burst testing.

Benefits/features
- Environmentally friendly (solvent free, no release paper and cover film)
- Consistent resin content
- Stable bandwidth
- Easy de-spooling
- Moderate tack (adjustable)
- Excellent mechanical properties
- High ultimate burst strength and long cycle life in COPV test

Variant
•504L: Decreased tack

Application
HMT504 is specifically designed for pressure vessel applications and is well suited for fiber placement. Easy handling, versatile processing, and excellent mechanical properties make HMT504 suitable for a variety of applications in sporting goods, marine, medical, industrial manufacturing, Long out time also makes Newport-FTP® HMT504 ideal for large scale parts where a layup process can take days or weeks.

HMT504 can be supplied with most commercially available fibers, including carbon, quartz, aramid, S-glass, E-glass and other specialty fibers.

Recommended processing conditions
HMT504 can be cured at temperatures from 230°-300°F (110°-149°C) depending on part size and complexity. Low, medium, and high pressure molding techniques may be used to cure HMT504 product. Recommended cure cycle is 50–100psi (345–690kPa), 3°F/min (1.7°C/min) ramp to 180°F (82°C), dwell for 30-60 min, ramp to 275°F (135°C), hold for 90-120 min, cool to <140°F (<60°C).

Dwell can be adjusted depending on curing conditions.

MITSUBISHI CHEMICAL CARBON FIBER AND COMPOSITES

Technical Data Sheet

Neat resin [values are average and do not constitute a specification]

Property	Value
Gel time @ 275°F (135°C), minutes	8 - 12
Specific gravity	1.20
T_g (DMA, E'), °F (°C)	266 (130)

HMT504 Neat resin, cured, 90 minutes at 275°F, as tested

Property	Test method	RT
0° Tensile strength, ksi (MPa)	ASTM D638 Type I	13.4 (92.4)
0° Tensile modulus, Msi (GPa)		0.39 (2.7)
Strain at break, (%)		5.7
G_{IC}, (J/m^2)	ASTMD 5045-99 SENB	428
K_{IC} , (MPa · $m^{1/2}$)		1.14

275°F Cure Mechanical data [values are average and do not constitute a specification]

HMT504 TRH50 18K, 25%RC, autoclave cured, 80 psi, 90 minutes at 275°F, as tested

Property	Test method	RT
0° Tensile strength, ksi (MPa)	ASTM D3039	442 (3050)
0° Tensile modulus, Msi (GPa)		22.8 (157)
Position ratio		0.286 (1.97)
90° Tensile strength, ksi (MPa)		7.78 (53.6)
90° Tensile modulus, Msi (GPa)		1.48 (10.2)
0° Compressive strength, ksi (MPa)	ASTM D695mod	225 (1550)
0° Compressive modulus, Msi (GPa)		23.1 (159)
90° Compressive strength, ksi (MPa)		38.3 (264)
90° Compressive modulus, Msi (GPa)		1.51 (10.4)
0° Flexural strength, ksi (MPa)	ASTM D790	255 (1760)
0° Flexural modulus, Msi (GPa)		22.8 (157)
±45° In plane shear strength, ksi (MPa)*	ASTM D3518	9.35 (64.5)*
±45° In plane shear modulus, Msi (GPa)		0.650 (4.48)
0° Short beam shear strength, ksi (MPa)	ASTM D2344	12.9 (88.9)

* @5% Shear strain

HMT504L, TRH50 18K, 28%RC, autoclave cured, 80 psi, 90 minutes at 275°F, as tested

Property	Test method	RT
0° Tensile strength, ksi (MPa)	ASTM D3039	392 (2700)
0° Tensile modulus, Msi (GPa)		21.1 (145)
Position ratio		0.22
90° Tensile strength, ksi (MPa)		8.6 (59.3)
90° Tensile modulus, Msi (GPa)		1.19 (8.20)
0° Short beam shear strength, ksi (MPa)	ASTM D2344	12.7 (87.5)

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230°F Cure Mechanical data [values are average and do not constitute a specification]

HMT504L, TRH50 18K, 28%RC, autoclave cured, 80 psi, 360 minutes at 230°F, as tested

Property	Test method	RT
0° Tensile strength, ksi (MPa)	ASTM D3039	415 (2860)
0° Tensile modulus, Msi (GPa)		21.2 (146)
Position ratio		0.25
90° Tensile strength, ksi (MPa)		9.7 (66.8)
90° Tensile modulus, Msi (GPa)		1.26 (8.68)
0° Short beam shear strength, ksi (MPa)	ASTM D2344	12.8 (88.2)

HMT504L, 37-800 30K, 28%RC, autoclave cured, 80 psi, 360 minutes at 230°F, as tested

Property	Test method	
0° Tensile strength, ksi (MPa)	ASTM D3039	392 (2700)
0° Tensile modulus, Msi (GPa)		20.8 (143)
Position ratio		0.26
90° Tensile strength, ksi (MPa)		8.5 (58.6)
90° Tensile modulus, Msi (GPa)		1.20 (8.27)
0° Short beam shear strength, ksi (MPa) – RT	ASTM D2344	12.7 (87.5)
0° Short beam shear strength, ksi (MPa) - 185°F		10.3 (71.0)
0° Short beam shear strength, ksi (MPa) - RT wet*		10.7 (73.7)
0° Short beam shear strength, ksi (MPa) - 185°F wet*		6.9 (47.5)
T_g (DMA, E'), °F (°C)		264 (129)
T_g (DMA, E'), °F (°C) – wet*		229 (109)

*24 hour water boil

Composite overwrapped pressure vessel (COPV) data

TRH50 18K, 25%RC, type 3 COPV, aluminum 7.5 liter liner, cycled at 50% of ultimate burst pressure

Ultimate burst pressure	7470 psi (51Mpa)
Cycle life	8270 cycles at 3550 psi (24MPa)

97-99% delivered fiber strength

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Newport-FTP® is a registered trademark of Mitsubishi Chemical Carbon Fiber & Composites

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