

ST 70FR

FIRE RETARDANT STRUCTURAL SPRINT™

- ▮ Award winning SPRINT™ matrix
- ▮ Low smoke toxicity
- ▮ Suitable for rail, marine and civil engineering structures
- ▮ Self extinguishing
- ▮ Halogen-free
- ▮ 70°C Curable
- ▮ Suitable for Lloyds and MCA Compliant Structures
- ▮ Suitable for monolithic and sandwich structures
- ▮ Excellent laminate quality, from vacuum-only processing

INTRODUCTION

ST 70FR is part of the range of SPRINT™ products. This unique range provides technically and commercially competitive engineering materials, ideal for use either solely, or in conjunction with other products from within the product range along with other Gurit products.

ST 70FR is a fire retardant hot melt, Diuron free epoxy SPRINT™. This is ideally suited to the manufacture of thick sections requiring fire protection. It can be cured at temperatures as low as 70°C, but can also be used for the rapid manufacture of components through its 60-minute cure at 110°C. All of this can be achieved together with an outlife of 14 days at 21°C.

ST 70FR is designed for vacuum bag processing and offers excellent mechanical performance on glass fibre reinforcements. Currently ST 70FR is manufactured into a Single Sided SPRINT™ structure primarily with fibreglass reinforcements such as woven WRE581T, WRE850T fabrics and multiaxial XE905 and QE1174 stitched fabrics.

Other styles will be available to order.

INSTRUCTIONS FOR USE

ST70 FR SPRINT™ materials can be used with both SPRINT™ and prepreg products. It is supplied with a paper backer and should be applied with resin film against the mould. This facilitates placement and improves the fire resistance of the moulded surface.

The moulding surface must first be treated with a release agent. The required number of plies of SPRINT™ are then placed on the tool and a thermocouple inserted into the layup outside the net trim line. Dry glass tows are inserted between the plies of SPRINT™ to provide air evacuation paths out of the laminate. The ends of the tows should be arranged so as to be in contact with the vacuum breather.

If required, peel ply can be applied over the top of the laminate stack. For a good secondary bond Gurit recommend the use of a non-release coated peel ply such as Stitch ply A. The peel ply is then covered with a low bleed release film such as P90 or RP2. Next, a breather material such as Econoweave 44W is placed over the whole of the stack making sure it connects with the glass strands.

Once the layup is complete a vacuum bag is installed by standard techniques. Two vacuum stems should be inserted through the bag, one to provide a vacuum source and one at the far end of the panel for connection of a vacuum gauge to test the vacuum integrity. The major benefit of SPRINT™ is that it enables all of the air in the laminate to be withdrawn prior to fibre wet out and cure. For this it is essential that a perfect vacuum is achieved. (at least 95%). It is recommended that the vacuum is applied at ambient temperature and held for between 10 minutes and an hour prior to cure. Full vacuum should be maintained for the full cure.

General prepreg working practices apply to these products, details of which can be obtained from the Gurit Guide to Composites or by contacting the above department.

PRODUCT INFORMATION

In order to maximise the potential of ST 70FR product range please contact the Gurit Technical Department. Contact details are on the back of this Product Data Sheet.

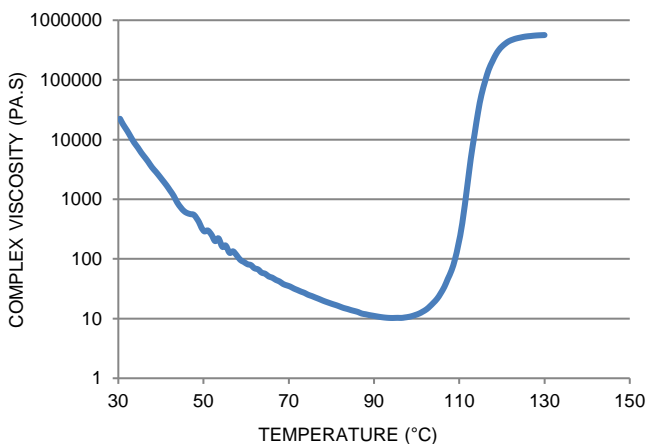
PROPERTY	UNIT	QE1174/SS	XE905/SS	WRE581T/SS	WRE850T
Tack	-	Medium	Medium	Medium	Medium
Resin Content	%	45	45	39	39
Fibre Weight	g/m ²	1200	900	850	850
Total Areal Weight	g/m ²	1925	1475	1393	1393
Weave Type	-	Quadraxial E-Glass	Biaxial E-Glass	2x2 Twill E-Glass	2x2 Twill E-Glass
Backer Configuration	-	1 x Siliconised Paper	1 x Siliconised Paper	1 x Siliconised Paper	1 x Siliconised Paper
Available Roll Width	mm	1270	1270	1250	1250
Packaging Type	-	300mm (outer diameter) core, supplied in a cardboard box or metal stillage (dependant on roll length).			

PREPREG PROPERTIES

RHEOLOGY DATA

ST 70FR resin viscosity profile conducted at 1°C (1.8°F) / minute.

PROPERTY	VALUE	
Minimum Viscosity	9.52 Pa.s	95.2 P
Temperature at Minimum Viscosity	94 °C	201 °F



TRANSPORT & STORAGE

When stored sealed & out of direct sunlight.

STORAGE TEMP	UNIT	VALUE
-18°C	0°F	months
+5°C	41°F	months
21°C	70°F	days

All SPRINT™ materials should be stored in a freezer when not in use to maximise their useable life, since the low temperature reduces the reaction of resin and catalyst to virtually zero. However, even at -18°C (0°F), the temperature of most freezers, some reaction will still occur. In most cases after some years, the material will become unworkable. To avoid condensation on the rolls allow to reach room temperature before unwrapping.

HEALTH AND SAFETY

Please refer to product SDS for up to date information specific to this product.

MINIMUM CURE TIME & TEMPERATURE

The following cure schedules have been shown to produce good results in laminates built. A two hour dwell is useful for allowing fibre impregnation and air evacuation before the resin starts to dwell. However the optimum cure cycle will depend on the part size and construction. Heat up ramp rates and dwell periods may need to be tailored to take consideration of oven capacity, thermal mass of tool, laminate construction etc. The temperatures and dwell times shown in the table below indicate laminate temperatures, oven air temperatures may need to be higher.

Other cure cycles can be used and it is recommended that Gurit be contacted for further advice concerning cure cycles.

PROPERTY	70°C CURE CYCLE	85°C CURE CYCLE	90°C CURE CYCLE	110°C CURE CYCLE
Processing Method	Vacuum Bag (-1bar)			
Typical Ramp Rate	0.5°C (0.9°F) per minute			
Cure Temperature	55°C (131°F)			
Cure Dwell Time	120 minutes			
Post-Cure Temperature	70°C (158°F)	85°C (185°F)	90°C (194°F)	110°C (230°F)
Post-Cure Dwell Time	16 hours	6hrs	4.5hrs	1hr

At the end of any cure cycle it is recommended that the part be allowed to cool under vacuum until a sensibly handle-able temperature is achieved (<40°C). It is strongly recommended that laminate temperatures are monitored throughout the cure

LAMINATE PROPERTIES

CURED RESIN PROPERTIES

Resin cast oven cured using standard processing techniques and standard cure of 16 hours at 70°C (158°F)

PROPERTY	SYMBOL	16 HOURS @ 70 °C (158°F)		TEST STANDARD
Resin Matrix Density	ρ_{RESIN}	1.3 g/cm ³		Archimedes Principle
Resin Matrix Colour	-	Brown		-
Tensile Strength	σ_T	57 MPa	ksi	ISO 527-2
Tensile Modulus	E_T	3 GPa	Msi	ISO 527-2
Compressive Strength	σ_C	125 MPa	ksi	ISO 604
Compressive Modulus	E_C	4 GPa	Msi	ISO 604

CURED LAMINATE PROPERTIES

Cured using standard vacuum bag processing techniques and standard cure of 16 hours at 70°C (158°F)

PROPERTY	SYMBOL	QE1174/SS	XE905/SS	WRE581T/SS	WRE850T	TEST STANDARD
Resin Content*	-	39	39	39	39	-
Glass Transition Temperature (DMA)	T_{g1}	94°C (201°F)				ISO 6721
0° Tensile Strength	X_T	331 MPa 48 ksi	458 MPa 66 ksi	491 MPa 71 ksi	466 MPa 68 ksi	ISO 527-4
0° Tensile Modulus	E_t	19 GPa 2.76 msi	23 GPa 3.34 msi	28 GPa 4.06 msi	28 GPa 4.06 msi	ISO 527-4
0° Compressive Strength	X_C	387 MPa 56 ksi	522 MPa 76 ksi	489 MPa 71 ksi	548 MPa 79 ksi	SACMA SRM1-94
0° Compressive Modulus	E_c	19 GPa 2.8 msi	23 GPa 3.3 msi	28 GPa 4.1 msi	30 GPa 4.4 msi	SACMA SRM1-94
0° ILSS	V_f	34 MPa 4.9 ksi	42 MPa 6.1 ksi	54 MPa 7.8 ksi	39 MPa 5.7 ksi	ISO 14130
±45° Tensile Strength	$X_{T,12}$	-	106 MPa ksi	-	-	ISO 14129
±45° Tensile Modulus	$E_{T,12}$	-	12.5 GPa msi	-	-	ISO 14129

*Resin content includes fire retardant filler

FIRE PERFORMANCE

PROPERTY	ST 70FR / WRE581T / 39%		TEST STANDARD
Surface Spread of Flame	< 165mm	Class 1	BS 476 Part 7
Fire Propagation	$I = 11.3 (i_1 1.7, i_2 7.3, i_3 2.3)$	Class 0	BS 476 Part 6
Area Based Toxicity	$R = 1.2$	-	BS 6853 Annexe B.2

NOTICE

All advice, instruction or recommendation is given in good faith but the selling Gurit entity (the Company) only warrants that advice in writing is given with reasonable skill and care. No further duty or responsibility is accepted by the Company. All advice is given subject to the terms and conditions of sale (the Conditions) which are available on request from the Company or may be viewed at Gurit's Website: www.gurit.com/terms-and-conditions.aspx

The Company strongly recommends that Customers make test panels in the final process conditions and conduct appropriate testing of any goods or materials supplied by the Company prior to final use to ensure that they are suitable for the Customer's planned application. Such testing should include testing under conditions as close as possible to those to which the final component may be subjected. The Company specifically excludes any warranty of fitness for purpose of the goods other than as set out in writing by the Company. Due to the varied nature of end-use applications, the Company does, in particular, not warrant that the test panels in the final process conditions and/or the final component pass any fire standards.

The Company reserves the right to change specifications and prices without notice and Customers should satisfy themselves that information relied on by the Customer is that which is currently published by the Company on its website. Any queries may be addressed to the Technical Services Department.

Gurit is continuously reviewing and updating literature. Please ensure that you have the current version by contacting your sales contact and quoting the revision number in the bottom left-hand corner of this page.

TECHNICAL CONTACT INFORMATION

For all other enquiries such as technical queries:

Telephone + 44 1983 828000 (08:30 – 17:00 GMT)
Email technical.support@gurit.com

24-HOUR CHEMICAL EMERGENCY NUMBER

For advice on chemical emergencies, spillages, fires or exposures:

Europe +44 1273 289451
Americas +1 646 844 7309
APAC +65 3158 1412

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E customer.support@gurit.com

W www.gurit.com