ST 90FR

Fire Retardant SPRINT® System

- **Fire retardant**
- **Black tinted resin**
- **Outstanding compressive properties**
- **Rated to FAR25.853 and FMVSS302**
- **Controlled flow**
- **Light tack**
- **Suitable for thick and thin sections**
- **Meets DIN4102-B1 in conjunction with SF 80FRBL**

Introduction

ST 90FR is a fire-retardant, hot-melt, epoxy prepreg system that offers an extremely good balance of mechanical properties. It has been tested to MVSS302 and FAR25.853 (60 secs and 12 secs vertical burn) fire safety standards. When used in conjunction with SF 80FRBL, meets DIN4102-B1 fire test specification.

The system is ideal for structural components where self-extinguishing fire performance and high load bearing capability are desired.

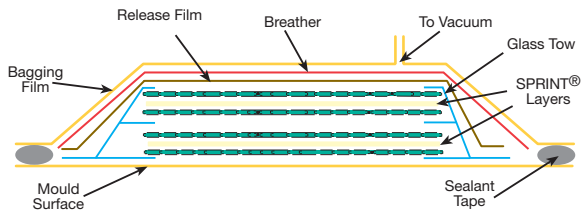
ST 90FR can be cured at 90°C, yet retains an outlife of up to 56 days at 23°C. With its 90 minute cure at 120°C, it is also suitable for the quick manufacture of parts, and is also used in the development of trial components.

Instructions for Use

1. The moulding surface must first be treated with a release agent. If a Surface Film is required, this should be applied directly to the tool face prior to the layup of SPRINT®. Please refer to Processing Notes for application details.

The required number of plies of SPRINT® are then placed on to the tool and a thermocouple inserted into the lay-up outside the net trim line. Dry glass tows should be inserted between plies of SPRINT® to provide an air evacuation path out of the laminate. The second end of the tow should be made available for contact with the breather

2. If required, a peel ply, pre-impregnated or dry, can be applied over the top of the laminate stack. Note that for good secondary bonding of a peel-plied surface of a laminate, a nylon peel ply such as Tygavac Stitch Ply A, is strongly recommended. The peel plyis covered entirely with a non-perforated release film such as Tygavac WL3600 or a low bleed release film, such as WL3600RP2. The release film is then covered with breather material, such as Tygavac Econoweave 44W, so that it extends over the release film in all directions and contacts the dry glass strands.



Typical processing diagram showing two SPRINT® layers

3. Once the lay up is complete, a vacuum bag is installed by standard techniques. At least two vacuum stems should be inserted through the bag, one connecting to the vacuum source and the other, at a point on the part furthest from the source, to a calibrated vacuum gauge. The major benefit of SPRINT® is that it enables all of the air to be removed from the laminate prior to fibre wet out and resin cure. It is recommended that a vacuum is applied at ambient temperature prior to cure, to fully evacuate the laminate stack. This should be held for between 5 minutes and 1 hour, depending upon the size and thickness of the component. Full vacuum is then maintained throughout the cure.

PLEASE NOTE: Further advice can be found in the SPRINT® Processing Notes or by contacting Technical Services.

4. Cure the laminate in accordance with the specification given later in this data sheet.

Properties

Uncured Properties	
Out-Life @ 18-22°C	8 wks
Storage Life @ -18°C	2 years
Hazard Designation	Xi, N
Risk Phrases	36/38, 43, 51/53
Safety Phrases	24, 26, 28, 37/39, 57

Cured System Physical Properties		
	Cure	**Tg (°C)**
Tg DMTA (Peak Tan δ) (°C)	90 minutes @ 120°C	177
Tg1 DMTA (°C)	90 minutes @ 120°C	129.5
Tg2 by DSC (°C)	8 hrs @ 90°C	108.5
Tg2 by DSC (°C)	12 hrs @ 90°C	109.7
Uncured Resin Density (g/cm^3)	-	1.31

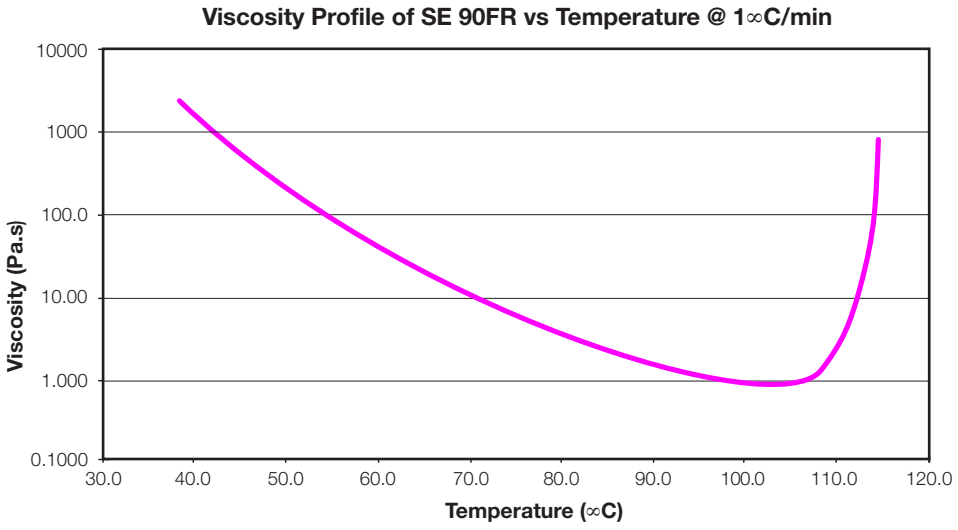
Working Properties	
Minimum Cure Temperature (°C)	90
Minimum Cure Time (@ minimum cure temperature) (hrs)	12
Minimum Viscosity (isothermal @ minimum cure temperature) (P)	50
Minimum Viscosity (1°C/minute ramp) (P)	23
Temperature @ minimum viscosity (1°C/minute ramp) (°C)	100°C
Minimum Cure Time @ 90°C (hrs:mins)	12:00
Minimum Cure Time @ 100°C (hrs:mins)	6:00
Minimum Cure Time @ 110°C (hrs:mins)	3:00
Minimum Cure Time @ 120°C (hrs:mins)	1:30

Notes: For an explanation of test methods used see 'SP Prepregs Technical Characteristics'.
All figures quoted are indicative of the properties of the product concerned. Some batch to batch variation may occur.

Properties (cont'd)

Mechanical Properties			
	ST 90FR / QE1174 / P	**300g HEC U/D High Strength Carbon**	**300g HEC U/D High Strength Carbon**
Cure (time/temp/pressure)	1.5 hrs / 120°C / 1 Bar	12 hrs / 90°C / 1 Bar	1.5 hrs / 120°C
Process	Vacuum Bag	Vacuum Bag	Vacuum Bag
Fibre weight (g/sqm)	1200	300	300
Prepreg areal weight (g/sqm)	2400	462	462
Prepreg resin content (% bw)	50	35	35
Tensile laminate fibre volume (%)	34.0	57.4	57.8
Cured ply thickness (mm)	1.4	0.271	0.263
Tensile Strength (MPa)*	280	2137	2158
Tensile Modulus (GPa)*	18.0	132	134
Compressive Strength (MPa)*	390	1157	1376
Compressive Modulus (GPa	17.8	122	123
Interlaminar Shear Strength (MPa)*	40	78	84

* Calculated values from measured resin and fibre properties



Notes: *C.P.T. is of tensile laminate unless no tensile data is given.
For an explanation of test methods used see 'SP Prepregs Technical Characteristics'.
All figures quoted are indicative of the properties of the product concerned. Some batch to batch variation may occur.

Health and Safety

Although ST 90FR SPRINTs have greatly improved health and safety characteristics when compared to wet lay-up epoxy systems, the following points must still be considered:-

1. Avoid skin contact - wear disposable rubber gloves and use skin barrier creams.

2. Avoid eye contact. If this occurs, flush with water for 15 minutes and seek medical advice.

3. Ensure good ventilation of vacuum pump exhaust during laminate cure.

4. Avoid inhalation and eye contact with sanding dust. After any sanding operation of reasonable size a shower or bath should be taken and should include hair washing.

5. Wear overalls or other protective clothing. Thoroughly clean or discard soiled garments.

6. Use only resin removing creams/soap and water on exposed skin. Do not use solvents.

Washing should be part of routine practice:

- before eating or drinking
- before smoking
- before using the lavatory
- after finishing work

Gurit produces a separate full Materials Safety Data Sheet for this product covering usage, transport, storage and emergencies. Please ensure that you have the correct MSDS's to hand for the materials you are using before commencing work.

Applicable Risk & Safety Phrases

R 36/38, 43, 51/53
S 24, 26, 28, 37/39, 57, 60

Transport & Storage

When not in use SE 90FRBL products should be maintained at -18°C. Shelf life for SE 90FRBL is two years at -18°C and six weeks at 18-22°C. To avoid condensation on their surfaces, allow rolls to reach room temperature before unwrapping.

Notice

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