WE91-1

Prepreg

- **High flow matrix**
- **Zero Volatile/Solvent Content**
- **Improved Health and Safety: Diuron-Free**
- **Long outlife at room temperature**
- **Available with a range of reinforcements**
- **Suitable for a range of pressures**
- **Low exothermic properties**
- **Controllable in thick sections**
- **Recommended cure between 85ºC and 120ºC**
- **Excellent laminate quality, low bleed**

Introduction

The WE91 series is part of the WE and WT range of prepreg, SPRINT®, and AIRSTREAM™ products. This unique product range provides technically and commercially competitive engineering materials, ideal for use either solely, or in conjunction with other SP products from within the range.

There are two tack variants of the WE91 resin matrix; WE91-1 and WE91-2. This datasheet details the properties of the higher tack variant, WE91-1.

WE91-1 is a high flow, Diuron free epoxy prepreg ideally suited to the manufacture of thick sections. It can be cured at temperatures as low as 85°C, but can also be used for the rapid manufacture of components through its 45-minute cure at 120°C. All of this can be achieved together with an out-life of 60 days at 21°C.

WE91-1 is designed for vacuum bag processing and offers excellent mechanical performance on glass and carbon fibre reinforcements. WE91-1 is pre-impregnated into three types E-glass fibre, unidirectional, biaxial and triaxial, all of which are manufactured in large volumes in order to make it a cost-effective composite building block for a range of applications. Other WE91 products include pre-impregnated peel ply, and needlemat.

The unidirectional glass prepreg uses E-glass in 600, 1200, 1500 and 1600g fibre weights. This provides a very economical way of laying down a large thickness of high performance material. It is particularly suitable as the primary composite material in structures which are subjected to longitudinal compression and bending, such as masts, poles and other beam like structures. It can be supplied in widths of up to 1470mm.

The unidirectional carbon prepreg is suited for use when high mechanical properties are required, it is available in either 500 or 600g fibre weights.

The biaxial prepreg is a ± 45º stitched E-glass fabric using a fibre weight of either 300, 600, 1000 or 1800g. This material can either be used alone as a thick drapeable fabric or as a secondary product in conjunction with the unidirectional product, where it imparts tensile and torsional strength and shear stiffness. It can be supplied in widths of up to 1250 wide.

The triaxial prepreg is a ± 45º biaxial E-glass stitched to unidirectional fabric giving a total fibre weight of either 900 or 1200g. This material can be used as a thick drapable fabric. The triaxial prepreg is available with a glass tissue on the biax side, which helps to prevent print-through.

Instructions for Use

WE91-1 prepreg can be used with both SPRINT® or prepreg products. It is supplied with a poly backer and can be applied to the substrate with either side against the tool.

In order to maximise the potential of WE91 product range please contact the SP Technical Department. Contact details are on the back of this Product Data Sheet.

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

Matrix Properties

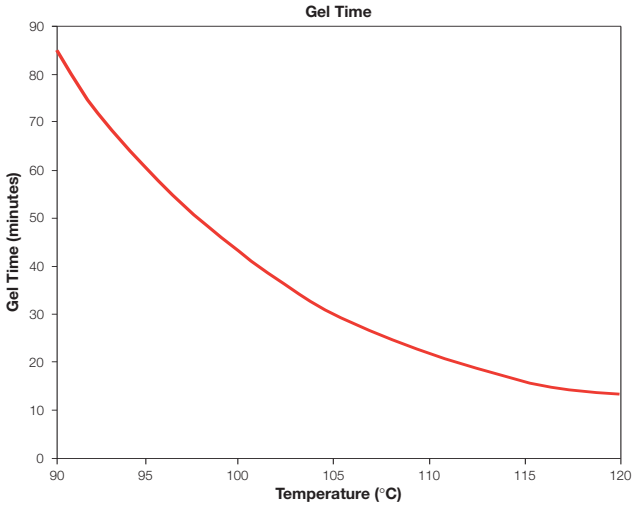
Uncured

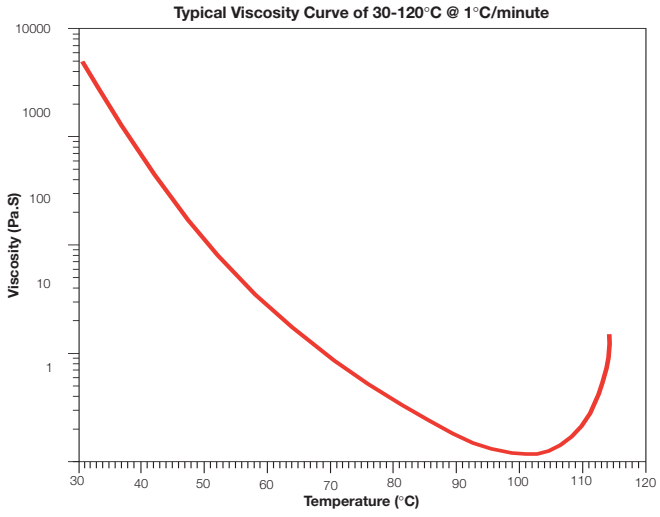
Thermal properties (20ºC-250ºC @ 10°C/minute)	
Enthalpy (J/g)	270

Colour	
Matrix	Translucent
Resin	Clear
Catalyst	White

Time to 95% Cure	
Minimum Cure Temperature (°C)	85
Time @ minimum cure temp (hours)	10
90°C (minutes)	195
100°C (minutes)	70
110°C (minutes)	60
120°C (minutes)	40

Rheology		
	30-120°C @ 1°C/minute	**30-120°C @ 2°C/minute**
Temperature @ minimum Viscosity (°C)	103	111





Cured

Mechanical Properties	
Tensile Strength (MPa)	86
Tensile Modulus (GPa)	3.3
Tensile Strain (%)	5.0
Compression Strength (MPa)	117
Compression Modulus (GPa)	3.4
Matrix density (g/cm^3)	1.2

Thermal properties (Cured between 90°C-120°C)	
DSC T_{g2} (°C)	110-120

Prepreg Properties

Uncured

Outlife	
At -18°C (months)	18
At 5°C (months)	6
At 21°C (days)	60

Material Safety Information	
Hazard Code	Xi, N
Risk Phrases	36/38, 43, 51/53
Safety Phrases	24, 26, 28, 37/39, 57, 60
Solvent Content	0
Volatiles Content	0

Prepreg Reinforcements				
	500g Unidirectional Low Modulus Carbon	**600g Glass Fleeced Biax**	**600g UD Glass**	**1600g UD Glass**
Resin Content (%)	38	35	32	32
Tack	4 (medium tack)			
Fibre Weight (g/m^2)	500	600 + 50 Fleeced	600	1600
Aerial Weight (g/m^2)	806	1000	882	2363
Stitch Type	None	Polyester	None	None
Fleeced	No	Yes 50g	No	No
Backer Type	MDPE	MDPE	MDPE	MDPE
Available Roll Length (m)	-	-	-	-
Available Roll Width (mm)	1260	1250	1260	1260
Packaging Type	Packaging Type is dependant on the length of roll requested			

Cured

Prepreg Reinforcement					
	500g Low Modulus Carbon*	**600g Glass Fleeced Biax**	**600g UD Glass**	**1600g UD Glass**	**Test Method**
0° Tensile Strength (MPa)	2020	140	1230	1185	BS EN ISO 527
0° Tensile Modulus (GPa)	125	15	50	50	BS EN ISO 527
0° Tensile Strain to Failure (%)	1.75	0.95	2.45	2.4	BS EN ISO 527
0° Compressive Strength (MPa)	1200	-	1065	-	ISO 14126
0° Compressive Modulus (GPa)	120	-	-	-	ISO 14126
0° Compressive Strain to Failure (%)	1.01	-	-	-	ISO 14126
0° ILSS (MPa)	70	-	70	60	BS EN ISO 14130
45° Tensile Strength (MPa)	-	480	-	-	BS EN ISO 527
45° Tensile Modulus (GPa)	-	25	-	-	BS EN ISO 527
45° Tensile Strain to Failure (%)	-	1.95	-	-	BS EN ISO 527
45° ILSS (MPa)	-	35	-	-	BS EN ISO 14130

* Please note carbon prepreg properties are heavily dependant on the fibre type

Health and Safety

The following points must be considered:

1. Skin contact must be avoided by wearing gloves. Gurit recommends the use of disposable nitrile gloves for most applications. The use of barrier creams is not recommended, but to preserve skin condition a moisturising cream should be used after washing.

2. If working in an enclosed area, local extraction and ventilation should be used.

3. Overalls or other protective clothing should be worn when laminating or sanding. Contaminated work clothes should be thoroughly cleaned before re-use.

4. Eye-protection should be worn. If contamination of the eyes occurs then flush the eye with water for 15 minutes, holding the eyelid open, and seek medical attention.

5. If the skin becomes contaminated then the area must be immediately cleansed. The use of resin-removing cleansers is recommended. To finish, wash with soap and warm water. The use of solvents on the skin to remove resins etc. must be avoided.

Washing should be part of routine practice:

- Before eating or drinking
- Before smoking
- Before using the lavatory
- After finishing work

6. The inhalation of sanding dust should be avoided. If it settles on the skin then it should be washed off. After more sanding operations, a shower/bath and hair wash is advised.

Gurit produces a separate full Material Safety Data Sheet (MSDS) for all hazardous products. Please ensure that you have the correct MSDS to hand for the materials you are using before commencing work. A more detailed guide for the safe use of Gurit resin systems is also available and can be found on our website at www.gurit.com. Note: safety datasheet legislation can vary with country of use.

CPDS are also available upon request.

Applicable Risk & Safety Phrases

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

Transport & Storage

All prepreg 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, the temperature of most freezers, some reaction will still occur. In most cases after some years, the material will become unworkable.

Notice

All advice, instruction or recommendation is given in good faith but Gurit AG (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 the Company's Website: www.gurit.com/termsandconditions_en.html.

The Company strongly recommends that Customers make test panels and conduct appropriate testing of any goods or materials supplied by the Company 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. 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 are continuously reviewing and updating literature. Please ensure that you have the current version, by contacting Gurit Marketing Communications or your sales contact and quoting the revision number in the bottom right-hand corner of this page.

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