SKYFLEX

# K51 EPOXY PREPREG

**Technical Data Sheet**

## Description

SKYFLEX K51 is SK Chemicals's standard prepreg based on 125℃ curing flow controlled, toughened epoxy resin system. SKYFLEX K51 is a versatile and high performance prepreg with well balanced properties between static and dynamic mechanical properties. SKYFLEX K51 can be used for sports-leisure products like fishing rods, golf shafts, bike parts, rackets, and arrow shafts etc. And due to its well balanced static modulus and toughness, it can be widely used for industrial applications like automotive parts, electronics housing and other structural parts.

SKYFLEX K51 shows a good shelf life up to 4 weeks at room temperature and it can be maintained optimum working condition up to 6 months at –18℃. SKYFLEX K51 has a good handleability before curing and it shows excellent mechanical properties after curing. SKYFLEX K51 can be used in various processes i.e. Autoclave, vacuum bag curing, and press molding, as well as conventional processes like sheet rolling technique. The high tack / high flow grade, K52 also available by customer's requirement.

## Features and Benefits

- SK Standard Epoxy Prepreg
- Versatile processing: Sheet rolling, Autoclave, Vacuum bag, Pressure bag and Press molding
- Wide processing range from 100℃ to 160℃
- Prepreg from hot melt process, providing least void composites.
- Easy-to-handle with desirable tack and resin strength.
- Wide Product Range according to Fiber and Resin Content
- Long shelf life: more than 4 weeks at R.T.

## Overview

*: Well Balanced Thermal / Mechanical Properties*

## Suggested Applications

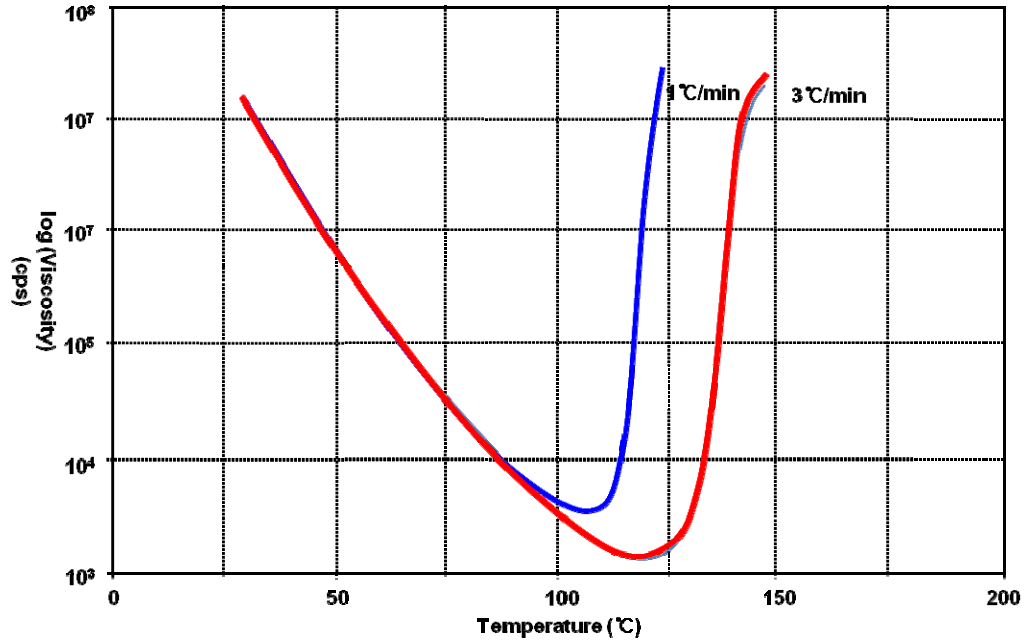
- Sporting Goods: Golf Shafts, Fishing Rods, Bicycle parts, etc.
- Industrial Applications: Composite Robot Hands and Other LCD / Semiconductor Application, Composite Roller, Automotive Parts, Electronic Applications, etc.



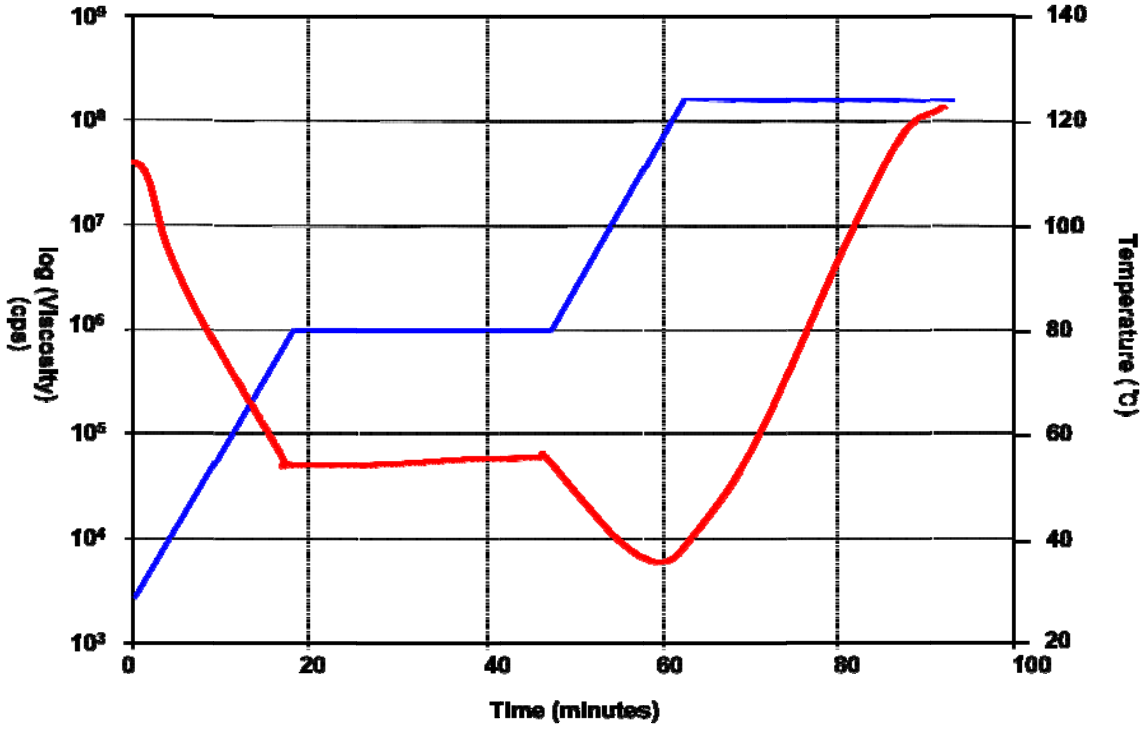


## Resin Matrix Properties

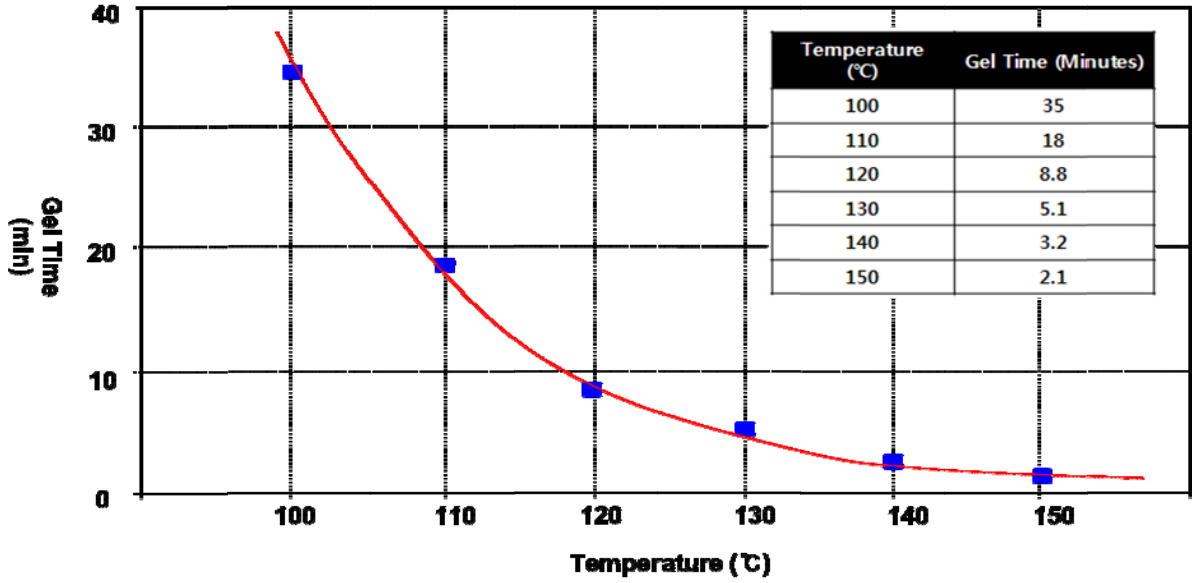
■ Viscosity Profile (Straight Heat up cure cycle)




■ Viscosity Profile (Stepped Cure Cycle)

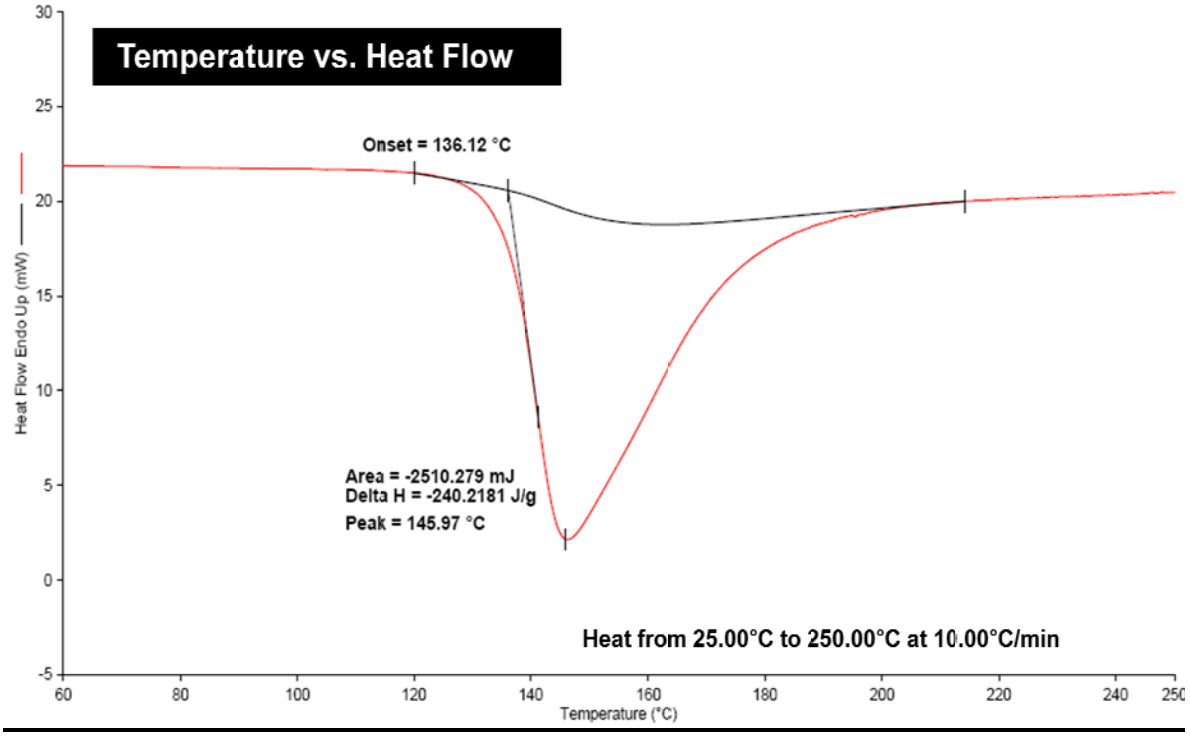


■ Gel Time vs. Temperature



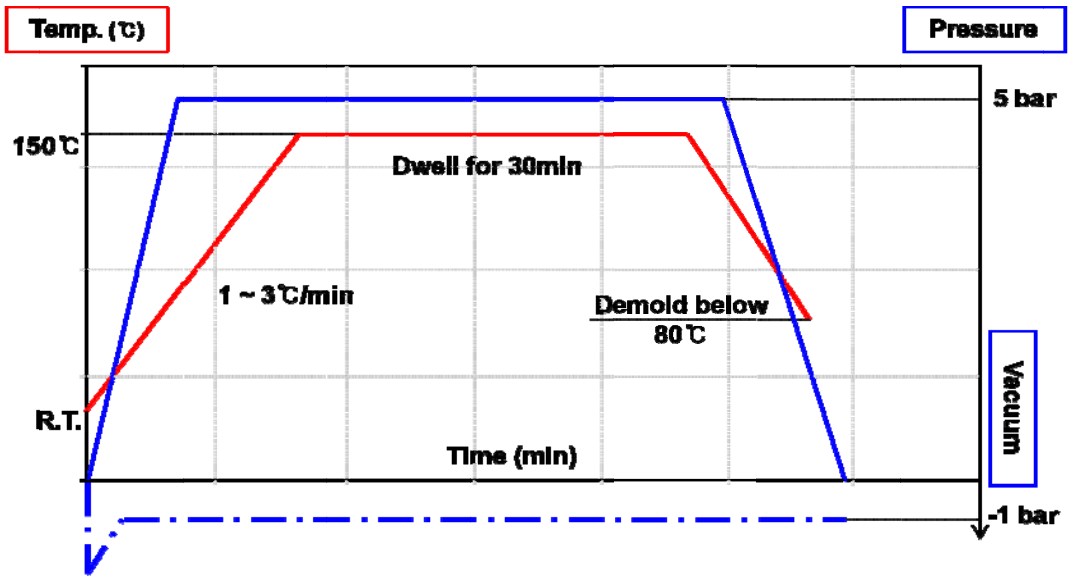

| Temperature (℃) | Gel Time (Minutes) |
|---|---|
| 100 | 35 |
| 110 | 18 |
| 120 | 8.8 |
| 130 | 5.1 |
| 140 | 3.2 |
| 150 | 2.1 |

■ DSC Study

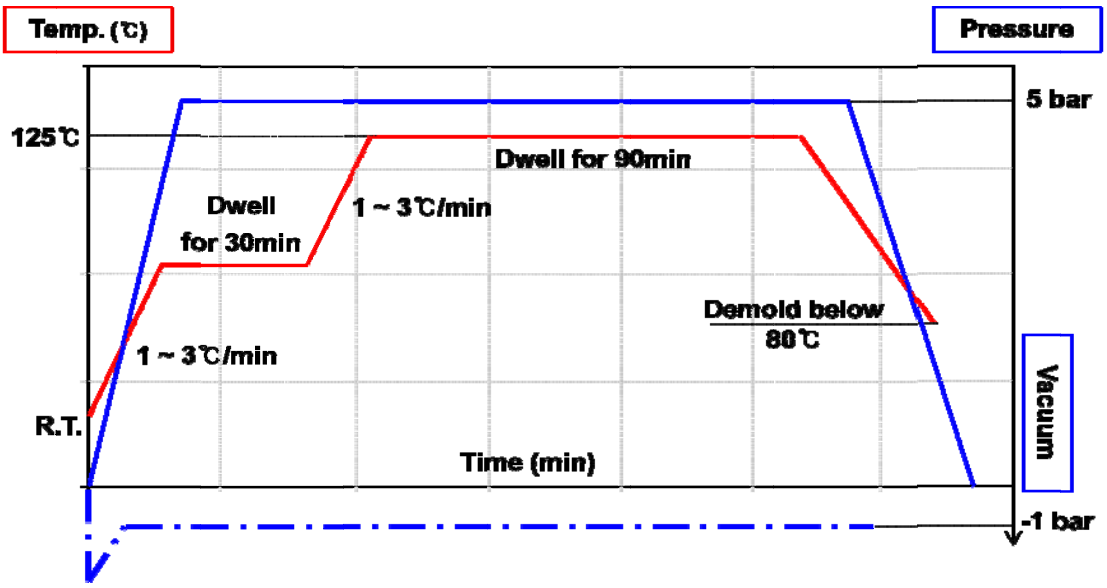


## Recommended Processing Conditions

- Recommended processing: Pressure Bag (Bladder Molding)
- Typical Applications: Bicycle Parts, Ice Hockey Stick, Tennis Racket etc.




- Recommended processing: Sheet Rolling, Autoclave Process
- Typical Applications: Gold Shaft, Fishing Rod and other industrial applications



## Cured Prepreg Properties

■ Cured Laminate Properties

The mechanical properties listed in the following table are average values obtained from the example prepreg, USN150A and WSN3KY. Values are based using an autoclave cured at 125℃ for 90minutes with 5 bar pressure.

| Properties | Test Method | Prepreg | |
|---|---|---|---|
| | | **USN150A** (TR50 applied, FAW 150gsm, RC 36%) | **WSN3KY** (TR30 applied plain weave, FAW 200gsm, RC 40%) |
| **Physical Properties** | | | |
| **Cured Resin Density (g/m$^3$)** | | 1.20 | 1.20 |
| **Fiber Density (g/m$^3$)** | | 1.82 | 1.79 |
| **Tg: DMA, E' (℃)** | **ASTM 7028** | 122.83 | |
| **Tg: DMA, Peak tanδ (℃)** | | 136.47 | |
| **Mechanical Properties** | | | |
| **0° Tensile** | | | |
| **Strength (MPa)** | **ASTM D3039** | 2500 | 1000 |
| **Modulus (GPa)** | | 125.3 | 60.7 |
| **90° Tensile** | | | |
| **Strength (MPa)** | **ASTM D3039** | 60 | 850 |
| **Modulus (GPa)** | | 8.4 | 55.8 |
| **0° Compression** | | | |
| **Strength (MPa)** | **ASTM D695** | 1200 | 780 |
| **Modulus (GPa)** | | - | - |
| **0° Flexural** | | | |
| **Strength (MPa)** | **ASTM D790** | 1150 | - |
| **Modulus (GPa)** | | - | - |
| **Interlaminar Shear Strength (MPa)** | **ASTM D2344** | 88.5 | - |
| **Impact Strength** | | | |
| **Izod, Unnotched (KJ/m$^2$)** | **ASTM D256** | 130 | - |

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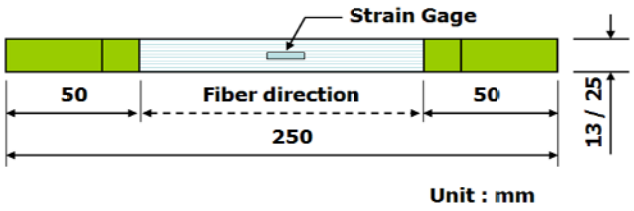
■ Tensile Properties of UD Prepreg

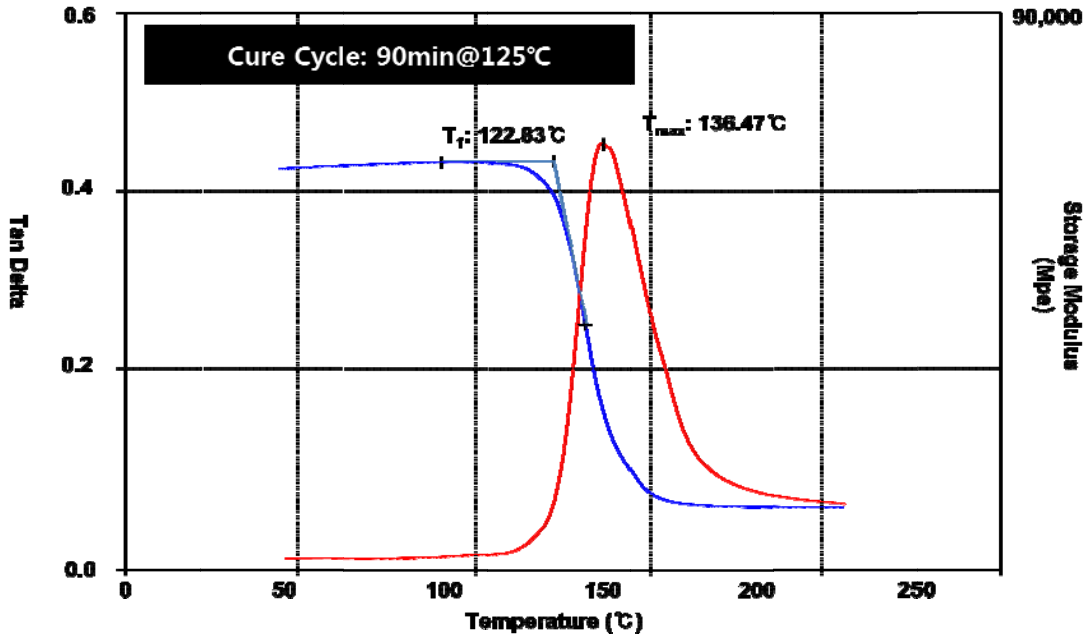
<Test Method>

• ASTM D3039




| | Fiber | Fiber Areal Wt. ($g/m^2$) | Resin Content (%) | Tensile Strength ($kgf/mm^2$) | | Tensile Strength ($Ton/mm^2$) | |
|---|---|---|---|---|---|---|---|
| | | | | Test Value | Normalize to 60% fiber vol. | Test Value | Normalize to 60% fiber vol. |
| USN150B | Pyrofil® TR50S | 150 | 33 | 261.2 | 273.8 | 12.49 | 13.08 |
| UIN150B | Pyrofil® MR60 | | | 287.5 | 300.7 | 14.40 | 15.06 |
| UMN150B | Pyrofil® MS40 | | | 212.3 | 219.9 | 16.50 | 17.09 |
| UHN150B | Pyrofil® HR40 | | | 240.8 | 252.4 | 19.00 | 19.92 |
| UPN150B | Pyrofil® HS40 | | | 203.7 | 215.0 | 20.87 | 22.03 |
| URN300B | Dialead® K63712 | 300 | | 132.0 | 148.3 | 30.30 | 34.04 |

■ DMA Trace (3min/℃ Lamp. Scan)



## Storage Conditions

- Out Life: 30 days at 23 ℃
- Storage Life: 12 months at -18 ℃

SKYFLEX K51 prepreg should be stored as received in a cool dry place or in a refrigerator. After removal from refrigerator storage, prepreg should be allowed to reach room temperature before opening the polyethylene bag, thus preventing condensation.

## Handling and Safety

SK Chemicals recommends wearing clean, impervious gloves when working with epoxy resin systems to reduce skin contact and to avoid contamination of the product.
Material Safety Data Sheets (MSDS) and product labels are available upon request and can be obtained from our sales representatives.

## Product Range

SKYFLEX K51 can be supplied with most commercially available fibers including Carbon fiber, E-Glass fiber, S-Glass fiber and other fibers, in both woven (Coded as WSN, GEP) as well as unidirectional forms. (Coded USN ~ URN)

Our standard product ranges;
FAW: 20 ~ 350gsm
RC (Resin content): 25 ~ 40%
Prepreg Standard Width: 1020 mm

Some product characteristics such as fiber areal weight, resin content, tack, gel time can be tailored by meeting user's requirements.

*For orders, pricing, availability, technical assistance or other inquiries please contact:*

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