

EP-PREG® S933 275-347°F (135-175°C) CURING EPOXY PREPREG

DESCRIPTION

Ep-preg® S933 is an epoxy prepreg based on a Bisphenol-A modified resin. It is designed for the vacuum bagging and the compression molding processes. It is recommended for thin and thick composite parts requiring high thermal resistance.

Dynamic scan using Differential Thermal Analysis (DTA) showed that Ep-preg® S933 starts curing at about 110°C. DTA isothermal curing at 135°C and 175°C illustrated that, respectively, nearly 1 hour and 30 min dwell times are required to achieve an almost full curing.

Glass transition temperature (T_g) was measured by DTA and found up to 170°C.

PREPREG FEATURES

- Tack time: minimum 3 weeks @ 20°C (after, heat gun may be used to increase the flexibility and the tackiness during the draping)
- Shelf life: 5-7 weeks @ 20°C, 5-6 months @ 4°C, & 18 months @ -18°C
- Good flexibility and easy handling
- Environmentally friendly and retains its tack for several weeks
- Suitable for thin and thick laminates

CURED MATRIX PROPERTIES

	1 hr @ 135°C (+ 30 min @ 175°C)	Method
Fracture Toughness K_{1C} (MPa√m)	0.65 – 0.75	ISO 13586
Fracture Energy G_{1C} (J/m ²)	120 - 140	ISO 13586
Flexural Strength (MPa)	140 - 160	ISO R178
Flexural Modulus (GPa)	3.0 – 3.2	ISO R178
Strain (%)	6.0 - 8.0	ISO R178
Density (g/cm ³)	1.14 - 1.16	
Glass Transition Temperature (°C)	~ 170	DSC - 10°C/min

TYPICAL APPLICATIONS

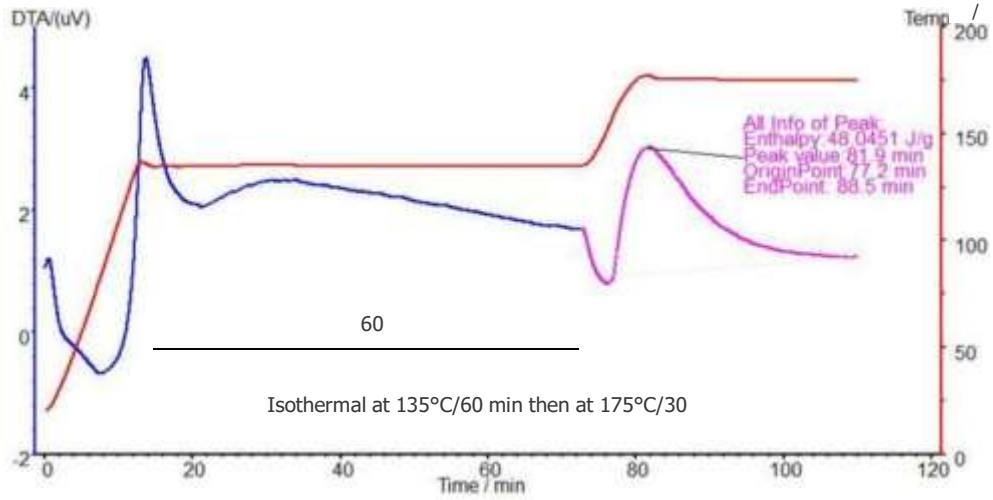
- Industrial composites
- High temperature applications

STORAGE AND HANDLING

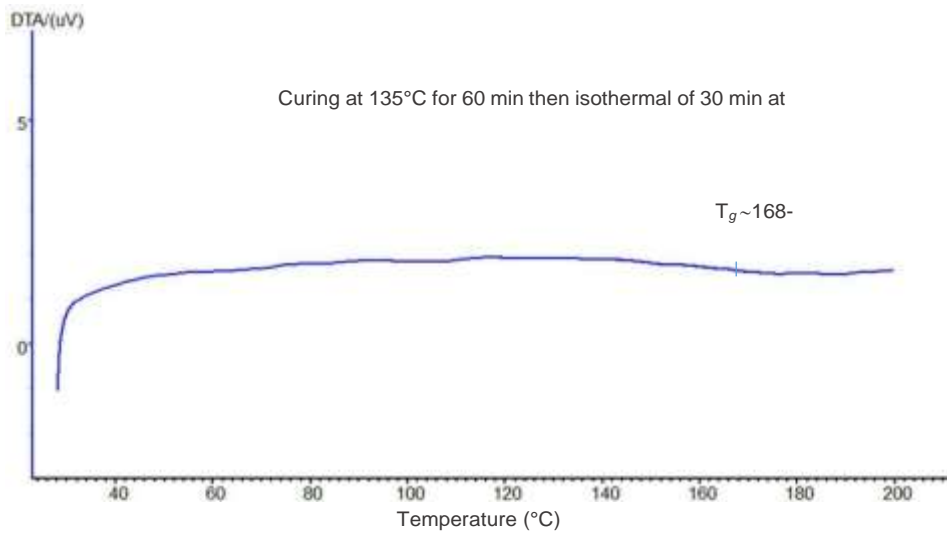
All Ep-preg® prepregs are wrapped in a barrier film immediately after impregnation. During storing and handling, the following notes must be considered:

- Ep-preg® prepregs should be stored in their original packaging barrier film, or an equivalent film, at -18°C.
- Before use, the prepreg roll has to be out of the freezer and remain tightly sealed for 48 hours, time required to reach ambient room temperature.
- It is highly recommended to handle the prepreg at a clean area where relative humidity is ≤ 52% and ambient temperature is 20-23°C.

DTA CURING THERMOGRAMS



GLASS TRANSITION TEMPERATURE



TYPICAL OVEN VACUUM CURING CYCLE

- Apply 24" Hg vacuum for 5-10 minutes before beginning heat cycle.
- Raise laminate temperature from room temperature to 185°F (85°C) within 30-45 min.
- Hold laminate at 185°F (85°C) for 30 min.
- Raise laminate temperature from 185°F (85°C) to 275°F (135°C).
- Hold laminate at 275°F (135°C) for 60 min.
- Raise laminate temperature from 275°F (135°C) to 347°F (175°C), then hold the laminate at 347°F (175°C) for 30 min.
- Cool the laminate to at least 176°F (80°C), prior to release vacuum pressure.

Notice:

- It must be understood that the curing time starts only after the prepreg temperature achieves the recommended temperature. The use of a thermocouple is a must to monitor the actual prepreg temperature.
- In case of vacuum bag processing, one ply of lightweight breather, 120 gsm, is recommended. A heavyweight breather, 340 gsm, has to be used in case of Autoclave processing. In both cases, two or three additional layers of breather have to be applied locally beside the vacuum ports.

SAFETY PRECAUTIONS

Usual precautions, as following, must be considered:

- During lamination, workers must avoid skin contact by wearing appropriate disposable protective gloves.
- Clean protective coveralls or equivalent clothes must be worn before laminating and also sanding.
- Protective glasses must be worn to avoid eyes contamination. In case of contamination, eyes must be flushed for 15 min and then medical treatment must be applied.
- After working, hands and contaminated skin, if any, have to be washed with soap and warm water. This has to be implemented as a routine practice.