

EP-PREG® T353 185-250°F (85-121°C) CURING EPOXY PREPREG

DESCRIPTION

Ep-preg® T353 is a toughened epoxy prepreg suitable for vacuum curing process. It has been designed to withstand severe weathering and mechanical stresses. It is available in different glass and carbon reinforcements. A high-quality surface is easy to obtain when the prepreg is processed and cured properly.

Ep-preg® T353 represents a great choice for many structural applications.

KEY FEATURES AND BENEFITS

- Long storing life, 10-12 weeks @ 20-23°C & 18 months @ -18°C.
- Versatile curing temperature 185-250°F (85-121°C).
- Suitable for low pressure curing (1 bar).
- Self-adhesive for core materials and secondary bonding.
- Good flexibility and easy handling.
- Environmentally friendly and retains its tack for several weeks.
- Suitable for thin and thick laminates.
- Superior impact performance.
- Excellent surface finish.
- Good mechanical properties.

PHYSICAL PROPERTIES WITH STANDARD REINFORCEMENTS

Fiber	E-Glass	Carbon		
		3K 0/90	6K 0/90	12K UD
Weave	8H 7781	3K 0/90	6K 0/90	12K UD
Fiber Area Weight (g/m ²)	300	200	320	300
Resin Content by Weight, R.C. (%)	40±2	42±2	42±2	37±2
Prepreg Roll Width (cm)	100 / 127	102 / 127	102 / 127	60 / 120
Volatile content (%)	<1	<1	<1	<1
R.C. flowing in vacuum curing 2-3 mm thick laminate (%)	3-4	4-5	4-5	3-4
Vacuum cured 1 ply thickness (mm)	0.266	0.236	0.377	0.318

TYPICAL APPLICATIONS

- Aircraft structural parts.
- Advanced composites requiring good durability and fatigue resistance.
- High performance sporting goods.
- Racing vehicles.

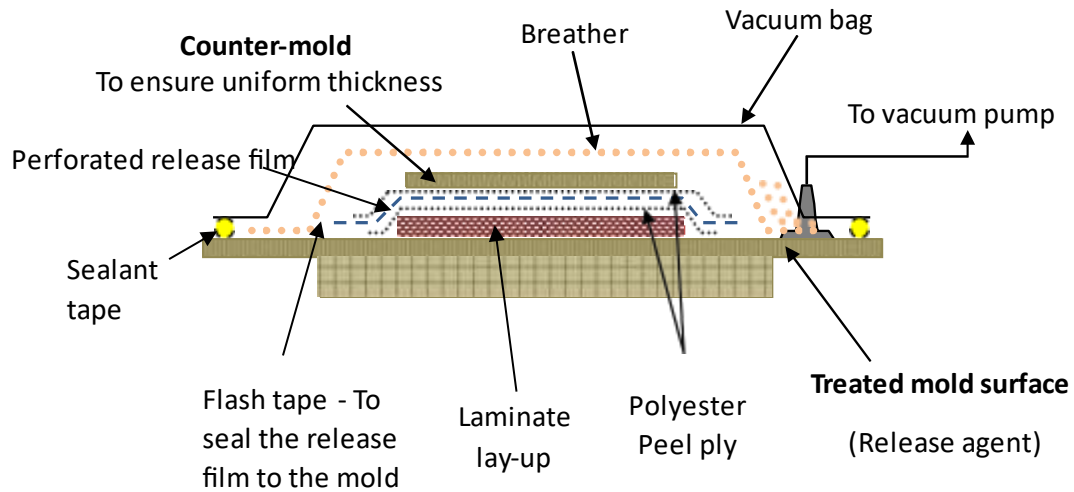
TYPICAL OVEN VACUUM CURING CYCLE

- 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 194°F (90°C) for 30 min.
- Raise laminate temperature from 194°F (90°C) to 250°F (121°C).
- Hold laminate at 250°F (121°C) for 120 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.

Recommended Bagging Arrangement



OTHER VACUUM CURING CYCLES

Temperature (°F/°C)	Gel time (min)	Dwell time (Hrs.)	DSC T _g (°C)
185/85	120-150	8	80-85
194/90	80-95	6	85-90
212/100	35-45	6	95-100
212/100	35-45	7	100-105
230/110	15-20	4	100-105

VACUUM CURED STITCHED FIBER LAMINATES

30 min @ 90°C & 2 hrs @ 120° C

Reinforcement		12K UD TFX Toho, UTS50	6K 2X2 Toho, HTS40	3K 2X2 T300-3000-40B	7781 E-Glass
Fiber Areal Weight	(gsm)	200	320	200	300
Resin Content	(%)	34.3	36.6	36.1	36.1
Laminate Thickness	(mm)	2.0	2.7	2.5	2.6
Number of plies		10	8	12	10
Fiber Volume Fraction	(%)	55.5	52.6	53.3	45.9
T _g (dry, by DSC)	(°C)	112			
T _g (wet, by DSC)	(°C)	100			
Tensile*	ASTM D-3039				
σ Dry-23°C	MPa/ksi	1931/280	877/127	950/138	589/85.4
σ Wet-70°C	MPa/ksi	1737/252	791/115	848/123	373/54
E Dry-23°C	GPa/msi	127/18.4	60/8.7	59/8.6	27/3.9
E Wet-70°C	GPa/msi	120/17.4	56/8.1	55/8.0	23/3.3
Compression	ASTM D-3410				
σ Dry-23°C	MPa/ksi	1075/156	770/112	805/117	530/77
σ Wet-70°C	MPa/ksi	940/136	673/98	680/99	350/51
E Dry-23°C	GPa/msi	120/17.4	56/8.1	56/8.1	28/4.1
E Wet-70°C	GPa/msi	112/16.2	53/7.7	52/7.5	24/3.5
In-Plane Shear	ASTM D-3518				
σ Dry-23°C	MPa/ksi	-	80/11.6	95/13.8	-
σ Wet-70°C	MPa/ksi	-	58/8.4	70/10.1	-
E Dry-23°C	GPa/msi	-	4.6/0.66	4.5/0.64	-
E Wet-70°C	GPa/msi	-	3.1/0.44	3.0/0.43	-
Inter-laminar Shear	ASTM D-2344				
σ Dry-23°C	MPa/ksi	90/13.1	72/10.4	75/10.9	65/9.4
σ Wet-70°C	MPa/ksi	42/6.1	37/5.4	39/5.7	35/5.1

* Tensile strength is normalized to 60% FVF, in case of carbon, and 53% FVF, in case of glass.

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 $\leq 52\%$ and ambient temperature is 20-23°C.

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.