



# **Notus N-EFT**

**Epoxy Film Technology**



## DESCRIPTION

**Notus N-EFT** is a cost-effective solution designed to overcome the challenges that can be encountered in Resin Infusion, VARTM /RTM and Prepreg processing techniques, which can include:

Dedicated low viscosity unfilled resins and specialist fabrics if resin infusion pathways are long.  
Expensive and complex matched moulds for RTM type processes.

Operator exposure to uncured resins and high VOC levels.

An even more significant customer benefit of N-EFT processing is the unlimited customization that is possible, with the user being able to create their own material combinations using dry reinforcements and N-EFT films that they have available.

Notus N-EFT produces components that are directly comparable with prepreg parts with lower storage costs and the ability to produce the required materials on demand.

## FEATURES AND BENEFITS

- Dry reinforcements are consolidated, N-EFT impregnated and cured in a single step.
- High fiber volumes can be accurately achieved with low void contents.
- Environment friendly, clean lay-up like prepreg with no hazardous fumes.
- More cost-effective than prepreg with comparable properties.
- Improved cycle times.
- Air removal pathways within the laminate stack remove the need to debulk.
- Reduced frozen storage requirement - only N-EFT materials in freezer, no reinforcements.
- Unlimited combinations of reinforcement and resin matrix on demand.

## APPLICATIONS

N-EFT resin films can be used across all composite material applications. They offer a flexible production format that can be tailored to suit every application.

## CURE SCHEDULE

**NB. All Notus prepreg resin systems are available as N-EFT resin films. Data below for Notus NE6 film**

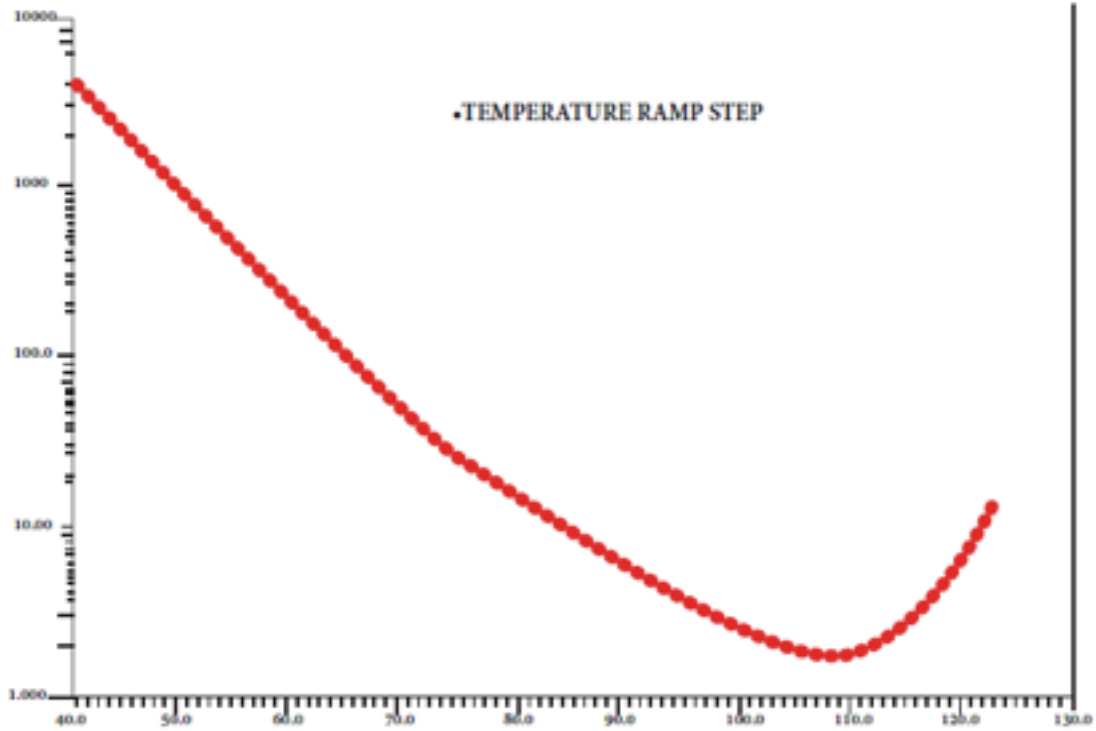
Minimum cure requirements

Property	Result	Test Method
Minimum cure temperature (°C)	80	DSC
Cure time (hours:mins) at min temperature	12:00	DSC
Glass transition temp, Tg (°C)	102	DSC

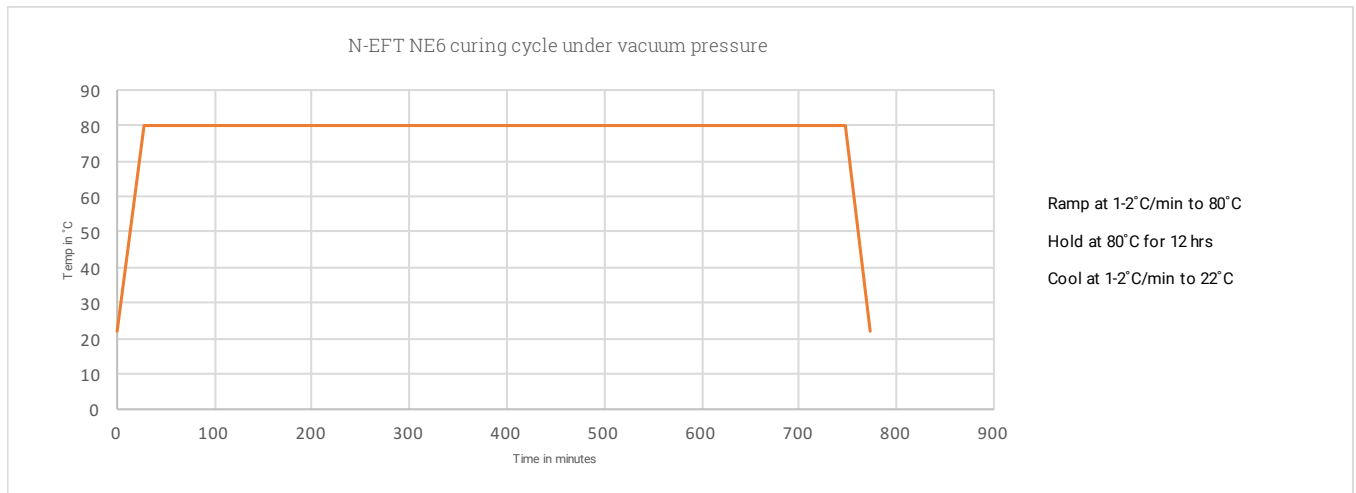


## RHEOLOGY

Rheology profile for N-EFT film with NE6 resin system  
Rheology profile for NE6 prepreg system



Typical vacuum curing schedule for N-EFT film with NE6 resin system





#### Alternative cure cycles

Laminate Temp. (°C)	Dwell Time (Hours)	Tg by DSC (°C)	Test Method
80	12	102.5	DSC
80	5	80	DSC
85	10	100.1	DSC
85	4	87.2	DSC
90	6	105	DSC
100	3	115	DSC
120	0.75	98	DSC

#### CURED MATRIX PROPERTIES

(12hrs at 80°C)

Property	Result	Test Method
Tensile Strength (MPa)	80 ± 2	ISO R527
Tensile Modulus (GPa)	3.1 ± 0.1	ISO R527
Strain (%)	3.57 ± 0.12	ISO R527
Flexural strength (MPa)	125 ± 5	ISO R178
Flexural modulus (GPa)	3 ± 0.1	ISO R178
Compression strength (MPa)	107 ± 2	ASTM D695
Compression modulus (GPa)	3.1 ± 0.1	ASTM D695
Fracture toughness K1C (MPa√m)	0.82 ± 0.05	ISO 13586
Fracture energy G1C (J/m <sup>2</sup> )	240 ± 25	ISO 13586
Density (g/cm <sup>3</sup> )	≈ 1.162	
Glass Transition Temperature (°C)	102	DSC - 10°C/min



## LAMINATE PROPERTIES

(12hrs at 80°C – Various E-glass Reinforcements)

Property	UD-1200	UD-1600	Biax-600 (±45°)	Biax-600 (0/90)	Triax-900 (0,±45°)	Test Method
Reinforcement weight (gsm)	1200	1600	600	600	900	
Resin content by weight (%)	32	32	35	35	38	
Number of plies in test laminate	2	2	4	4	4	
Test laminate thickness (mm)	1.76	2.4	1.76	1.76	2	
Test laminate fibre volume thickness (%)	53	53	53	53	53	
Tensile strength (MPa)	1166	1170	565.22	151.2	690.5	ISO 527-4 & 5
Tensile modulus (GPa)	46.8	47.1	27.0	13.9	28.6	ISO 527-4 & 5
Flexural strength (MPa)	1220	1270	600	200	750	
Flexural modulus (GPa)	48	47.5	28	14	29	
Strain to failure (%)					2.287	ISO 527-4 & 5
Interlaminar shear strength (MPa)	62	60	42	40	45	ASTM D-2344/ ISO 14130

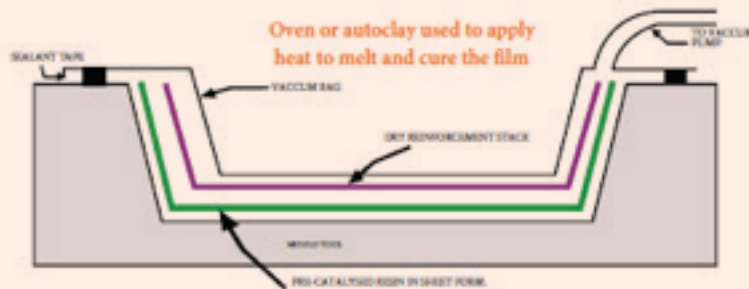
## PROCESSING METHOD

- Take the N-EFT film roll out of sealed plastic bags.
- Cut the material to the desired size on a cutting table.
- Pull off the protective polyethylene film and lay the resin film onto the mould.
- Build up the required laminate thickness using alternate layers of N-EFT resin film and dry reinforcement fabric as in the diagram below. Notus always recommends having a N-EFT film directly against the mould face
- When the desired thickness or lay-up is completed, make the vacuum bag on the mould to cover the entire laminate and apply vacuum.
- Apply full vacuum (approx. 760mm Hg) for 10 minutes before starting the heated cure cycle
- When all air is removed, place the mould in the oven or turn on heat source.
- Complete the cure cycle (as per the defined cure cycle chart for the specific Notus resin system being used). This cure schedule is available in the product TDS.
- After completing the cure cycle, turn off the heat source whilst maintaining vacuum pump pressure.
- Turn off the vacuum pump only when part temperature has dropped to 60°C or below.
- After turning of the vacuum pump, the part can be removed from the mould.

### Lay-up sequence for N-EFT resin films and dry reinforcement fabrics



### Typical Vacuum Bagging Arrangement



### TRANSPORTATION, HANDLING AND STORAGE

N-EFT resin films should be kept in the original packaging during transport and storage. Transport should be at  $-18^{\circ}\text{C}$  to maximise the life of the product. N-EFT resin films should be stored, wrapped and sealed in polythene, at  $-18^{\circ}\text{C}$  for maximum shelf life.

Temperature	Maximum Storage Time
$-18^{\circ}\text{C}$	18 months
$5^{\circ}\text{C}$	6 months
$23^{\circ}\text{C}$	60 days

The material must be fully thawed for 48 hours and allowed to reach ambient temperature before breaking the polythene seal to avoid moisture contamination.

Handling of the prepreg should be at a clean area where relative humidity is  $\leq 50\%$  and ambient temperature is  $20\text{-}23^{\circ}\text{C}$ .

Only take out the quantity required for immediate production usage, the remaining material should be wrapped up and sealed and returned to the freezer. This will extend the shelf life of the N-EFT resin films.

The backing film should be removed from the N-EFT resin film only when it is ready to be laminated or positioned in the mould. Remove the backing film from the side which is going to touch the mould surface. Remove the remaining backing film only when the next prepreg layer is ready to be placed



## HEALTH AND SAFETY PRECAUTIONS

Prepregs are low risk in terms of handling hazards. However, the usual precautions should be applied. Gloves and protective clothing should be worn and operators should avoid skin contact with the materials. Hands and contaminated skin must be cleaned properly with soap and warm water after finishing work.

To avoid eye contamination, safety glasses should be worn. In the case of any contamination, eyes must be flushed for 15 minutes with clean water and a doctor should be consulted or further medical advice should be sought. Use mechanical exhaust ventilation when heat curing the NE6 prepreg product.

## NOTICE AND DISCLAIMER

Information supplied by Notus Composites in this document is based on representative samples. As the handling conditions and methods are critical to the material performance, the company strongly recommends that customers make test panels and conduct appropriate testing of any goods or materials supplied by Notus to ensure that they are suitable for the customer's intended application. The company specifically excludes any warranty of fitness for purpose of the goods other than as provided in writing by the company.

All advice, instruction or recommendation is given in good faith but 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 which are available on the website or on request from the company. Notus Composites continuously reviews and updates its technical and marketing literature. Please ensure that you are working with the most current version which can be checked by contacting your Notus sales or technical support contacts

## CONTACT

Notus Composites FZC, P.O Box 38124, Shed 26  
Warehouse 8,9 & 10, RAK FTZ Technology Park, Ras al Khaimah, U.A.E

Tel: +971 50 531 2552  
Email: [info@notuscomposites.com](mailto:info@notuscomposites.com)  
Web: [www.notuscomposites.com](http://www.notuscomposites.com)