

# EY440

## EPOXY MATRIX

### GENERAL FEATURES

EY440 is an epoxy matrix system developed for press moulding process.

It can be used to manufacture components with a total cycle time of 3 minutes.

EY440 has a maximum service temperature of 147°C (297°F).

### MAIN CHARACTERISTICS

- Ideal for massive volume production for automotive and industrial structure;
- Allows rapid processing of composites through short cures cycle from 130°C to 150°C;
- Excellent surface finishing;
- Available on wide range of support (UD, fabrics and multi-axial - carbon, glass);
- Excellent drapability;
- Out-life over 40 days at room temperature

## OPERATIONAL INSTRUCTIONS

### CURE PROCESS RECOMMENDATIONS

#### 1. QUICK CURE PROCESS

This ideal cure cycle is 15 min at 130°C. Alternative cure cycles are described below:

Temperature (°C)	Time (min)
120	30
130	15
140	10
145	8
150	3

*Custom cure cycles can be developed in conjunction with the CIT Technical Department*

Parts can be easily removed from a hot compression mould tool without cooling.

#### 2. AUTOCLAVE PROCESS

This epoxy system can also be cured with a standard autoclave process:

Temperature (°C)	Time (min)	Pressure (bar)
135	120	6

## RESIN MATRIX

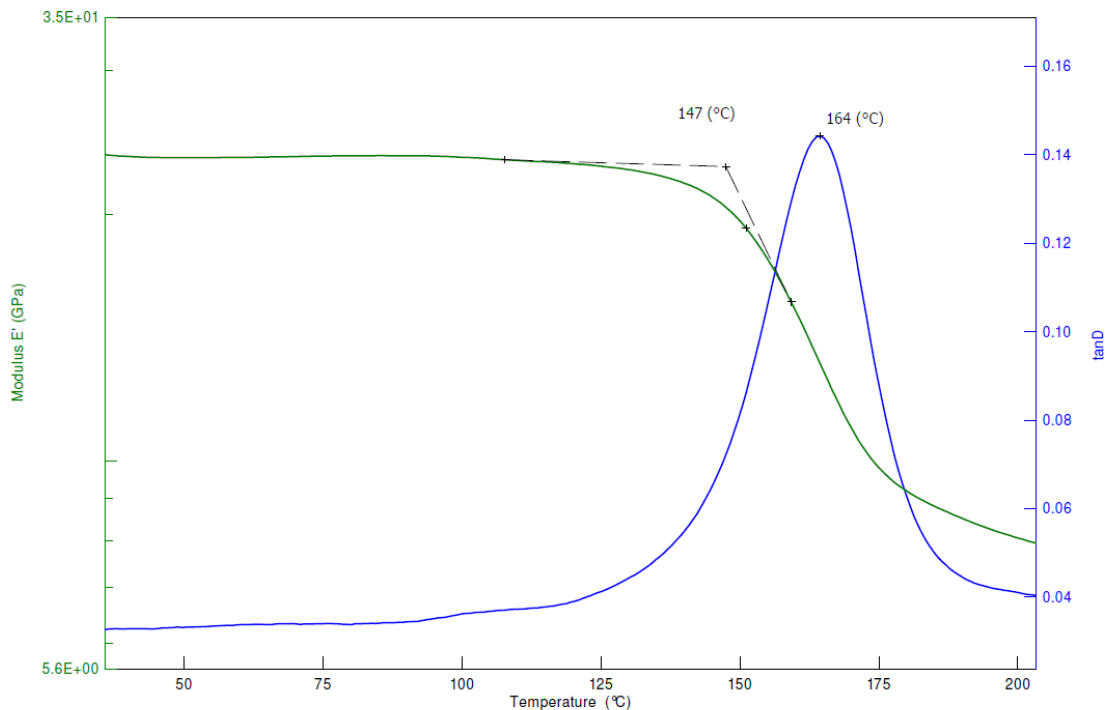
### GENERAL PROPERTIES

Property	Unit	Value	Standard
Storage life @ -18°C (0°F)	months	12	
Out life @ 23°C (73°F)	days	40	
Prepreg volatiles	%wt	<1	ASTM D3530
Cured resin density	g/cm <sup>3</sup>	1.22	ASTM D792-00
Tg E' (DMA)*	°C (°F)	147 (297)	ASTM E1640-09
Tack		Medium	

\* Laminate cured 15 min @ 130°C, hot-hot process

### THERMO-MECHANICAL DMA ANALYSIS

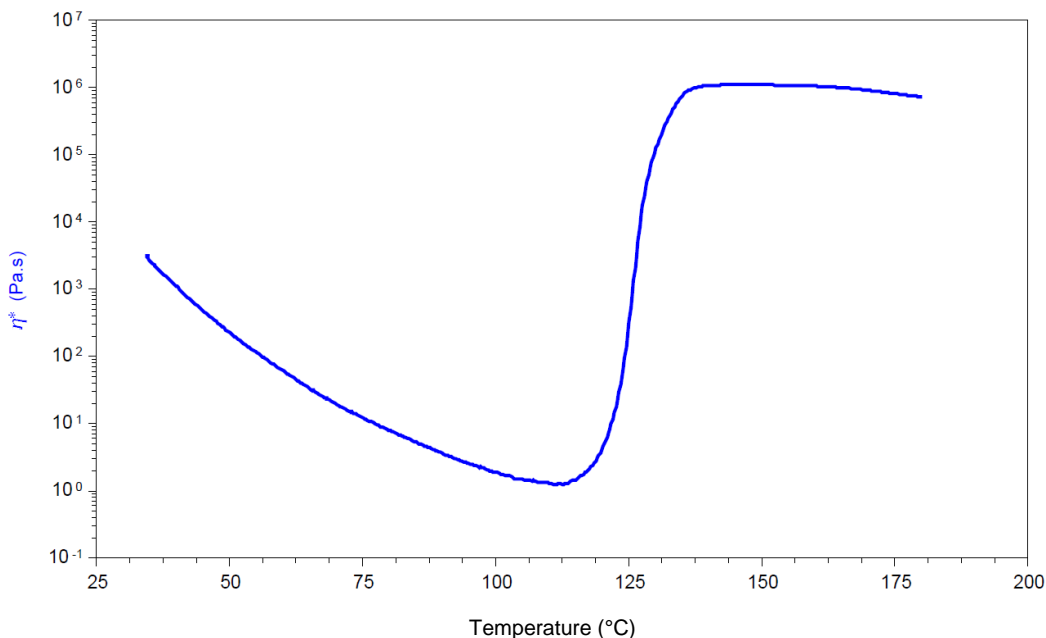
DMA trace of EY440 laminate cured for 15 min @ 130°C.



DMA Analysis: modulus E' vs Temperature

Modulus E' evaluated under 5°C/min heating rate, 1Hz oscillating frequency.

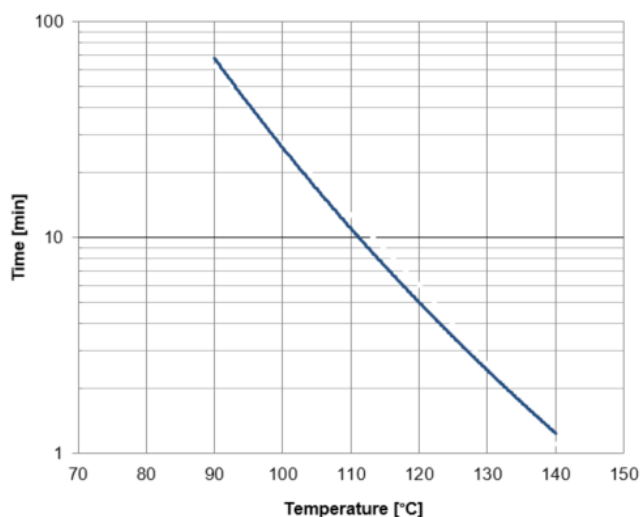
### VISCOSITY PROFILE



Viscosity profile: temperature vs complex viscosity

Resin complex viscosity is measured under 3°C/min heating rate, 1Hz oscillating frequency.

### GEL TIME



Temperature (°C)	Gel Time (min)
90	62
100	27
120	6
140	1.1

**LAMINATE**

**MECHANICAL PROPERTIES OF FABRIC PREPREG LAMINATES**

Test carried out at room temperature

Cure condition: 2 hours @135°C

Values normalized to 55% Vf except for Poisson's Ratio, IPSM, IPSS, ILSS and CPT

Cured Material Property	Test method	Units	CC384 T700 EY440 40%
0° Tensile Modulus		GPa	62.2
0° Tensile Strength	ASTM D3039	MPa	1072
Poisson's ratio		-	0.07
90° Tensile Modulus		GPa	63.4
90° Tensile Strength	ASTM D3039	MPa	1040
0° Compressive Modulus	ASTM D6641	GPa	56.0
0° Compressive Strength	SACMA SRM 1R94	MPa	727
90° Compressive Modulus	ASTM D6641	GPa	54.5
90° Compressive Strength	SACMA SRM 1R94	MPa	712
In-Plane Shear Modulus		GPa	3.65
In-Plane Shear strength at 5% strain	ASTM D3518	MPa	69.8
In-Plane Shear strength at failure		MPa	93.3
0° Inter-laminar Shear Strength	ASTM D2344	MPa	58.3
Interlaminar Fracture Toughness $G_{IC}$	ASTM D5528	J/m <sup>2</sup>	745
Cured ply thickness	-	mm	0.425

CC 384: 380gsm 2x2 Twill T700S fiber

**MECHANICAL PROPERTIES OF UNIDIRECTIONAL PREPREG LAMINATES**

Test carried out at room temperature

Cure condition: 2 hours @135°C

Values normalized to 60%Vf (except for 90° TS, ILSS, IPSS)

Cured Material Property	Test method	Units	HS T700S
0° Tensile Modulus	ASTM D3039	GPa	139
0° Tensile Strength		MPa	2790
90° Tensile Strength	ASTM D3039	MPa	46
0° Compressive Strength	SACMA SRM 1R94	MPa	1520
0° Flexural Modulus	ASTM D790	GPa	123
0° Flexural Strength		MPa	1690
Interlaminar Shear Strength	ASTM D2344	MPa	89
In-Plane Shear Strength at failure	ASTM D3518	MPa	111

## SAFETY CONSIDERATIONS

- Please consult the Material Safety Data Sheet.
- This product contains epoxy resin, and may cause allergic reaction.
- The use of latex gloves for handling is recommended.
- Waste material should be discarded following national law.

## DELIVERY FORM AND PACKAGING

Custom widths, roll size, and packaging are available on request.

**Prepreg fabrics:** Supplied on 75 mm (3") diameter cardboard cores with release paper on one side and polyethylene film separator on the other side. Rolls are sealed plastic bags and packed in cardboard boxes.

**Standard width:** 100 cm (39.4") or 127 cm (50").

**Standard length:** 50 m (54.7 In yds).

**Unidirectional Prepreg:** Supplied on 300 mm (12") diameter cardboard cores with release paper on one side and smooth polyethylene film separator on the other side. Rolls are sealed in plastic bags and packed in cardboard boxes.

**Standard width:** 60cm (23.6"), range from 30cm (11.8") up to 105cm (41.3")

**Standard length:** 100 m (109 In yds).

## HANDLING AND CONDITIONING

- Store rolls at -18 °C, sealed in original packages.
- Shop life at 23°C refers to rolls sealed in original packages.
- Before using the prepreg, remove the roll from the freezer and let it warm up to room temperature for 6 hours sealed in its original package.

## IMPORTANT NOTICE:

The data and statements supplied in this datasheet are met to provide an overview of this product and its properties. Users should perform their own verification and testing to determine suitability of this material for their specific end use applications. NO WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE IS EXPRESSED OR IMPLIED. Nothing herein is to be taken as permission to practice any patented invention without a licence.

*Copyright Composite Materials (Italy) s.r.l., April 2022, All rights reserved. RDS 17.003, Rev.06*

### Toray Group

**Composite Materials (Italy) s.r.l.** - Socio Unico

Via Quasimodo, 33 - 20025 Legnano (MI) ITALY

Capitale Sociale € 100.000 I.V. - R.E.A. MI n° 2052698

Iscrizione Registro Imprese C. F. n° 08844870967

P.IVA IT08844870967

Phone: +39 0331.467.555 • Fax: +39 0331.467.777

E-mail: info@composite-materials.it

www.composite-materials.it