

E3 MATRIX SERIES is a thermosetting epoxy matrix family with process temperatures ranging from 70°C to 140°C; designed for structural applications¹ and available in several product variants.

The viscosity of the system offers processing flexibility and a wide range of handling characteristics.

E3 matrix series exhibit high mechanical properties and, properly postcured, can be used at continuous operating temperatures up to 100°C. Higher not continuous operating temperatures can be supported.

PRODUCT VARIANTS

E3-150: Solvent version, unpigmented

E3-150N: Solvent version, light black pigmented

E3-150N2: Solvent version, heavy black pigmented

E3-122N: Solvent, light black pigmented, designed for structural applications, suitable for very large components (low exotherm)

E3-150HM: Hotmelt version, unpigmented (radiotransparency)

E3-150HN: Hotmelt version, light black pigmented

E3-150RF: Hotmelt version, heavy black pigmented (radiofrequency shielding)

SHELF LIFE



OUT LIFE²

Fabric Version: 30 days @ 21 °C
UD Version: 45 days @ 21 °C



MECHANICAL LIFE

Fabric Version: 30 days @ 21 °C
UD Version: 45days @ 21 °C



STORAGE LIFE

12 months @ -18 °C

TYPICAL APPLICATIONS



AUTOMOTIVE



MOTORSPORT



INDUSTRIAL



BIOMEDICAL



ELECTRONICS

FEATURES



GENERAL STRUCTURAL APPLICATIONS



GOOD MECHANICAL PERFORMANCES



HIGH TOUGHNESS



BIOLOGICAL COMPATIBILITY³



RADIOTRANSparency;
RADIOFREQUENCY SHIELDING

¹ The system is not designed for cosmetic application, if this application is needed please contact our Technical Department.

² Out life is the maximum time allowed before cure after a single frozen storage cycle in the original prepreg bag unopened stored at -18°C or below for a period not exceeding the above mentioned frozen storage life.

³ Complies with ISO 10993-5(2009).

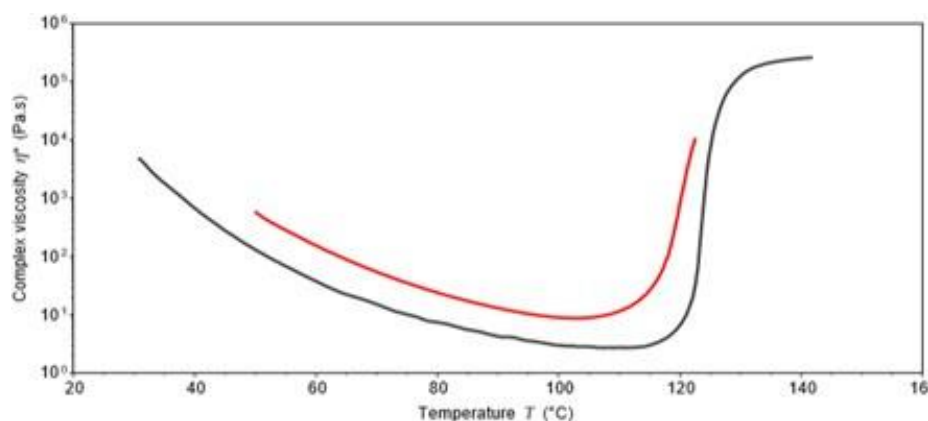
NOTE: All technical information contained in this document are given in good faith and are based on tests believed to be reliable, but their accuracy and completeness are not guaranteed. They do not constitute an offer to any person and shall not be deemed to form the basis of any contract. Accordingly, the user shall determine the suitability of the products for their intended use prior to purchase and shall assume all risk and liability in connection therewith. The information contained herein is under constant review and liable to be modified. All products are sold subject to Microtex Composites

MATRIX PROPERTIES

E3-150 Cured resin density @ RT⁴: (average value) 1.18 g/cm³.

E3-122 Cured resin density @ RT⁵: (average value) 1.20 g/cm³.

Resin viscosity: ramp rate = 2 °C/min, strain 0.1% , frequency 1.0 Hz . (**E3-150** vs **E3-122**)



Property	E3-150	E3-122
Minimum viscosity (Pa.s)	2.88	8.79
Temperature at minimum viscosity (°C)	109.86	102.29

Gel Time: (Hot Plate)

Plate Temperature	E3-150	E3-122
140 °C	3-4 min	3-4 min
130 °C	6-8 min	6-8 min
120 °C	12-16 min	14-16 min

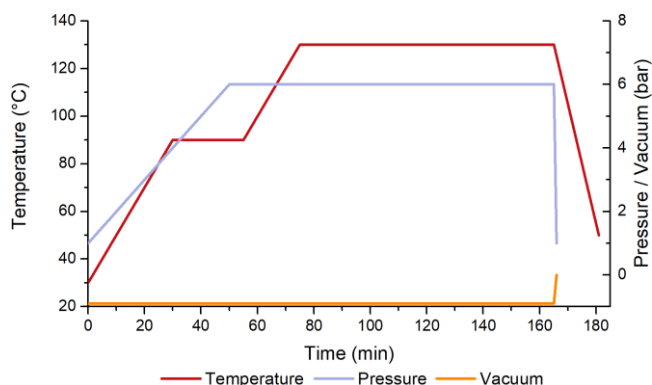
⁴ Cure cycle: 1 h @ 120 °C + 2 h @ 140 °C

⁵ Cure cycle: 1 h @ 120 °C

CURING CONDITIONS

Recommended Autoclave Cure ^{6,7}

Time (min)	Temp. (°C)	Time (min)	Pressure (bar) ⁸
0	30	0	1
30	90	10	2
55	90	30	4
75	130	50	6
165	130	165	6
181	60	166	1



ALTERNATIVE CURING CYCLES AND Tg's

GG245T 3K E3-150

Cure cycle	Tg (DMA) Onset (°C)	Tg (DMA) tanδ (°C)
8 h @ 80°C	100	120
90 min @ 135°C	134	153
Max Wet Tg⁹	81	102

GG245T 3K E3-122

Cure cycle	Tg (DMA) Onset (°C)	Tg (DMA) tanδ (°C)
90 min @ 135°C	106	126

GG630T 125 12K E3-150HM

Cure cycle	Tg (DMA) Onset (°C)	Tg (DMA) tanδ (°C)
10 h @ 90°C	125	140
4 h @ 100°C	125	140
90 min @ 135°C	140	160

⁶ Temperature must be measured by the lagging thermocouple attached to the part.

⁷ Vacuum bag pressure: 0.9 bar.

⁸ On a sandwich production, adjust the pressure on core specifications to avoid buckling and/or distortion.

⁹ Wet conditioning: 14 days immersion in water @ 70 °C.

MECHANICAL PROPERTIES

E3-150 - 90 min @ 135 °C, 6 bar		GG380T-38 ¹⁰	GG630T-37 ¹¹	UD125-36 ¹²
Property	Test Method	Values*		
0° Tensile strength [MPa]	ASTM D3039	1105	958	3507
0° Tensile modulus [GPa]		69	59	220
90° Tensile strength [MPa]		1046	920	-
90° Tensile modulus [GPa]		65	59	-
In plane shear strength (IPSS) [MPa]	ASTM D3518	100	95	-
In plane shear modulus (IPSM) [GPa]		3.3	5.5	-
0° Compressive strength [MPa]	SACMA SRM 1R-94	736	611	1653
0° Compressive modulus [GPa]		68	50	-
90° Compressive strength [MPa]		667	564	-
90° Compressive modulus [GPa]		67	50	-
0° Interlaminar shear strength (ILSS) [MPa]	ASTM D2344	61	58	90
0° Flexural strength [MPa]	ASTM D790	958	815	1488
0° Flexural modulus [GPa]		55	56	160
Mode I strain energy release rate G1c [J/m ²]	ASTM D5528 (MBT METHOD)	1250-1350	1400-1500	-

* Test conditions: room temperature, dry . Normalized values at 55% VF for fabric, 60% VF for UD.

E3-122N - 90 min @ 135 °C, 6 bar		GG630T-37 ¹¹
Property	Test Method	Value*
0° Tensile strength [MPa]	ASTM D3039	981
0° Tensile modulus [GPa]		69
0° Compressive strength [MPa]	ASTM D6641	580
90° Compressive strength [MPa]		609
0° Compressive strength [MPa]	SACMA SRM 1R-94	545
90° Compressive strength [MPa]		502
0° Interlaminar shear strength (ILSS) [MPa]	ASTM D2344	63
0° Flexural strength [MPa]	ASTM D790	866
0° Flexural modulus [GPa]		59
Mode I strain energy release rate G1c [J/m ²]	ASTM D5528 (MBT METHOD)	1479

* Test conditions: room temperature, dry . Normalized values at 55% VF .

¹⁰ HS Carbon fabric 380 gsm twill 2/2 12K T700 GRADE, RC 38%.

¹¹ HS Carbon fabric 630 gsm twill 2/2 12K PYROFIL TR50S, RC 37%.

¹² HS Carbon UD 125 gsm 12K PYROFIL MR70, RC 36%.

Further mechanical characterizations are contained in "E3 matrix series mechanical comparison table" document (contact lab@microtexcomposites.com).

OTHER PROPERTIES

Citotoxicity: ISO 10993-5 (2009): Carbon Laminate - Thickness 1.2 mm¹³

Result: test specimen did not show cytotoxicity effect (skin contact).

Fluid compatibility:

E3-150			
	Carbon Laminate ¹⁴ 1 day Absorption @ RT	Carbon Laminate ¹⁴ 28 days Absorption @ RT	Carbon Laminate ¹⁵ 28 days Absorption @ RT
Fuel Total WEC 2018	-0.199%	-0.199%	-
Oil Elf Huile HTX 860	+0.002%	+0.002%	-
Coolant Elf RF1-CO-02	+0.314%	+0.314%	-
Fuel RON 102 (E10)	-	-	+0.207%
Fuel RON 98	-	-	+0.206%

RADIOTRANSARENCY

E3-150HM			
Reinforcement	—	X Band (8-12 GHz)	
		Dk	Df
VV 296 S8 E-glass		4.55	0.023
VV190T E-glass		4.50	0.022

E
3

¹³ HS Carbon fabric 630 gsm twill 2/2 12K T700 GRADE, RC 35%; cure cycle 90'@130°C.

¹⁴ HS Carbon fabric 410 gsm twill 2/2 12K Pyrofil TR50; 5 layers; cure cycle 90'@130°C.

¹⁵ HS Carbon fabric 380 gsm twill 2/2 12K Pyrofil TR50; 2 layers; cure cycle 90'@130°C

EXOTHERM RISK

This matrix system can undergo severe exothermic heat up during the curing process if incorrect procedures are followed. Great care must be taken to ensure that safe heating rates, dwell temperatures and lay-up/bagging procedures are properly executed, especially when molding solid laminates with high thickness.

The risk of exotherm increases with lay-up thickness and increasing of temperature cure. It is strongly recommended that the user identifies a safe cure cycle through trials that are representative of all the relevant processing parameters. It is also important to recognize that the model or tool material and its thermal mass, combined with the insulating effect of breather/bagging materials can affect the risk of an exotherm. Please contact our technical department for further information on the exotherm behavior of these systems.

CHARACTERISTIC MARK

In case of areas with accumulations on the final components, a variation in colour might be observed.

AVAILABILITY

E3-Series prepregs are available in a wide range of reinforcing fabrics and UD, including carbon, aramid, glass and special fabrics.

STORAGE CONDITIONS

This prepreg should be stored as received in a cool dry place or in a refrigerator.

After removal from refrigerated storage, prepreg should be allowed to reach room temperature before opening the polyethylene bag, thus preventing condensation (a full roll in its packaging can take more than 1 day).

PRECAUTIONS FOR USE

The usual precautions when handling uncured resins and fibrous materials should be observed, and a Safety Data Sheet is available for this product.

SDS Reference Codes: E3-150: SDS-403, E3-122: SDS-428