Toray Cetex® TC1000 Premium PEI

Toray Advanced Composites

PRODUCT DATA SHEET

DESCRIPTION

Toray Cetex® TC1000 Premium is a high-end thermoplastic composite, utilizing the amorphous PEI polymer for outstanding toughness and an inherently outstanding fire, smoke, and toxicity performance (< 15/15 OSU).

With over 30 years in flight, Toray Cetex® TC1000 Premium is utilized in a consistently growing number of applications. The material has gained a wide array of qualifications at Airbus, Boeing, and many other airframe OEMs. Compared to its semi-crystalline counterparts, Toray Cetex® TC1000 Premium can be used to achieve even shorter cycle times in part production. The material exhibits a superior bondability, which makes it very suitable for hybrid assemblies consisting of different materials.

Toray Cetex® TC1000 is available as a UD tape and as a fabric prepreg with woven carbon, glass, or aramid reinforcements. It is typically supplied in pre-consolidated reinforced thermoplastic laminates (RTLs) of varying thicknesses. Laminates and prepregs are available in black, cream white, gray, and natural (amber) resin colors.

FEATURES

- **Qualified and certified to aerospace OEM specifications**
- **Excellent FST performance (OSU < 15/15)**
- **Rapid processing with cycle times < 3 minutes**
- **Very low moisture absorption**
- **Low coefficient of thermal expansion (CTE) and coefficient of moisture expansion (CME)**
- **Available in black, cream white, gray, and natural (amber) colors**
- **Good chemical resistance**
- **Indefinite shelf life at ambient temperature storage**

TYPICAL APPLICATIONS

- Secondary aircraft structures
- Aircraft interiors: seat shells, ducting channels, galleys, trolleys
- Facesheets for structural sandwich panels
- Multiple material assemblies

TYPICAL NEAT RESIN PROPERTIES

Density (specific gravity)	1.27 g/cm³ (79.2 lb/ft³)
T_g (glass transition)	217°C (423°F)
T_m (melt)	N/A (amorphous)
T_p (processing)	320–350°C (610–660°F)

PRODUCT TYPE

PEI (PolyEtherImide) Thermoplastic Resin System

MAIN QUALIFICATIONS

- ABS 5036
- ABS 5814
- ABS 5958
- ASNA 5045
- ASNA 5046

Contact us for more information:

North America/Asia/Pacific
e **explore@toraytac-usa.com**
t **+1 408 465 8500**

Europe/Middle East/Africa
e **explore@toraytac-europe.com**
t **+33 (0)548 633 933**

PRODUCT DATA SHEET

PHYSICAL PROPERTIES

Property	8 Harness Satin (EC6 Glass Woven Prepreg)	5 Harness Satin (FT300B Carbon Woven Prepreg)	Plain Weave (FT300B Carbon Woven Prepreg)	4 Harness Satin (EC9 Glass Woven Prepreg)
Fiber areal weight (FAW)	296 g/m² (8.73 oz/yd²)	280 g/m² (8.17 oz/yd²)	200 g/m² (5.90 oz/yd²)	220 g/m² (6.49 oz/yd²)
Weight per ply (PAW)	442 g/m² (13.04 oz/yd²)	484 g/m² (14.27 oz/yd²)	346 g/m² (10.20 oz/yd²)	330 g/m² (9.73 oz/yd²)
Resin content by weight (RC)	33%	42%	42%	33%
Consolidated ply thickness (CPT)	0.24 mm (0.0093")	0.32 mm (0.0127")	0.23 mm (0.0091")	0.17 mm (0.0067")
Density	1.91 g/cm³ (118.93 lb/ft³)	1.51 g/cm³ (93.95 lb/ft³)	1.51 g/cm³ (93.95 lb/ft³)	1.91 g/cm³ (118.93 lb/ft³)
Width	1270 mm (50")	1270 mm (50")	1270 mm (50")	1270 mm (50")

For the availability of other carbon, glass, or aramid reinforcements, please contact Toray Advanced Composites

MECHANICAL PROPERTIES

EC6 Glass 300gsm FAW 8HS Woven Fabric Reinforced Laminate 33% RC				
Property	**Condition**	**Test Method**	**Results**	
Tensile Strength 0°	RTD	ISO 527-4 type 3	557 MPa	81 ksi
Tensile Modulus 0°	RTD	ISO 527-4 type 3	27.9 GPa	4.1 Msi
Tensile Poisson's Ratio 0°	RTD	ISO 527-4 type 4	0.18	
Tensile Strength 90°	RTD	ISO 527-4 type 3	495 MPa	72 ksi
Tensile Modulus 90°	RTD	ISO 527-4 type 3	26.5 GPa	3.8 Msi
Compression Strength 0°	RTD	ASTM D 6641	600 MPa	87 ksi
Compression Modulus 0°	RTD	ASTM D 6641	29.4 GPa	4.3 Msi
Compression Strength 90°	RTD	ASTM D 6641	481 MPa	70 ksi
Compression Modulus 90°	RTD	ASTM D 6641	27.8 GPa	4.0 Msi
Flexural Strength 0°	RTD	ISO 178	815 MPa	118 ksi
Flexural Modulus 0°	RTD	ISO 178	26.3 GPa	3.8 Msi
Flexural Strength 90°	RTD	ISO 178	656 MPa	95 ksi
Flexural Modulus 90°	RTD	ISO 178	23.3 GPa	3.4 Msi
In Plane Shear Strength	RTD	AITM 1-0002	107 MPa	16 ksi
In Plane Shear Modulus	RTD	AITM 1-0002	5.0 GPa	0.7 Msi
Tensile Strength (0°)	ETD	ISO 527-4 type 4	467 MPa	68 ksi
Tensile Modulus (0°)	ETD	ISO 527-4 type 4	25.7 GPa	3.7 Msi
Tensile Strength (90°)	ETD	ISO 527-4 type 4	426 MPa	62 ksi
Tensile Modulus (90°)	ETD	ISO 527-4 type 4	24.6 GPa	3.6 Msi
Compression Strength (90°)	ETD	ASTM D6641	269 MPa	39 ksi
Compression Modulus (90°)	ETD	ASTM D6641	26.3 GPa	3.8 Msi
In Plane Shear Strength	ETD	AITM 1-0002	83 MPa	12 ksi
In Plane Shear Modulus	ETD	AITM 1-0002	4.1 GPa	0.6 Msi

Data generated from a limited dataset
Fabric style 7781, 50% fiber by volume (Vf), Room Temperature Dry (RTD) at 23°C (73°F), Elevated Temperature Dry (ETD) at 90°C (194°F)

PRODUCT DATA SHEET

MECHANICAL PROPERTIES

Standard Modulus FT300B 3K Carbon 280gsm FAW 5HS Woven Fabric Reinforced Laminate 42% RC				
Property	**Condition**	**Test Method**	**Results**	
Tensile Strength 90°	RTD	EN 2561	740 MPa	107 ksi
Tensile Modulus 90°	RTD	EN 2561	57.1 GPa	8.3 Msi
Compression Strength 90°	RTD	ASTM D 6641	705 MPa	102 ksi
Compression Modulus 90°	RTD		-	-
Flexural Strength 0°	RTD	ISO 178	908 MPa	132 ksi
Flexural Modulus 0°	RTD	ISO 178	49.9 GPa	7.2 Msi
Flexural Strength 90°	RTD	ISO 178	876 MPa	127 ksi
Flexural Modulus (90°)	RTD	ISO 178	48.9 GPa	7.1 Msi
50% fiber by volume (Vf) Room Temperature Dry (RTD)				

MECHANICAL PROPERTIES

Standard Modulus FT300B 3K Carbon 200gsm FAW PW Woven Fabric Reinforced Laminate 42% RC				
Property	**Condition**	**Test Method**	**Results**	
Tensile Strength 90°	RTD	EN 2561	662 MPa	96 ksi
Tensile Modulus 90°	RTD	EN 2561	55.1 GPa	8.0 Msi
Compression Strength 90°	RTD	ASTM D 6641	674 MPa	98 ksi
Compression Modulus 90°	RTD		-	-
Flexural Strength 0°	RTD	ISO 178	855 MPa	124 ksi
Flexural Modulus 0°	RTD	ISO 178	46.4 GPa	6.7 Msi
Flexural Strength 90°	RTD	ISO 178	820 MPa	119 ksi
Flexural Modulus 90°	RTD	ISO 178	46.2 GPa	6.7 Msi
50% fiber by volume (Vf) Room Temperature Dry (RTD)				

PRODUCT DATA SHEET

MECHANICAL PROPERTIES

EC9 Glass 220gsm FAW 4HS Woven Fabric Reinforced Laminate 33% RC				
Property	**Condition**	**Test Method**	**Results**	
Tensile Strength 0°	RTD	ISO 527-4 type 3	510 MPa	74 ksi
Tensile Modulus 0°	RTD	ISO 527-4 type 3	28.3 GPa	4.1 Msi
Tensile Strength 90°	RTD	ISO 527-4 type 3	496 MPa	72 ksi
Tensile Modulus 90°	RTD	ISO 527-4 type 3	27.6 GPa	4.0 Msi
Compression Strength 0°	RTD	BSS 7260	688 MPa	100 ksi
Compression Modulus 0°	RTD		-	-
Compression Strength 90°	RTD	BSS 7260	492 MPa	71 ksi
Compression Modulus 90°	RTD		-	-
Flexural Strength 0°	RTD	ISO 178	795 MPa	115 ksi
Flexural Modulus 0°	RTD	ISO 178	26.9 GPa	3.9 Msi
Flexural Strength 90°	RTD	ISO 178	751 MPa	109 ksi
Flexural Modulus 90°	RTD	ISO 178	26.2 GPa	3.8 Msi
Fabric style 1034 50% fiber by volume (Vf) Room Temperature Dry (RTD)				

FLAMMABILITY PROPERTIES

Test	Specification	Criteria	2 Plies of 7781 PEI Resin	5 Plies of 7781 PEI Resin	5 Plies of 7581 PEI White Resin
Flammability	60-second vertical burn FAR 25.853 (a)	152 mm	PASS	PASS	PASS
Smoke Emission	ABD0031 (F)	150/200	PASS	PASS	PASS
Toxicity	ABD0031 (F)	Ds Max 4 min (Flaming/Non-Flaming) = 150	PASS	PASS	PASS
Heat Release	FAR 25.853 (d)	2-min Total HR (kW min/m²) = 65	10.0	0	3.5
		Peak HR (kW/m²) = 65	12.0	13.0	14.1

HANDLING SAFETY

Health and safety information on handling and processing Toray composite materials is described in the Safety Data Sheet available from Toray Advanced Composites. To obtain this or any other information about Toray Cetex® PEI thermoplastic composite materials, contact Toray Advanced Composites.

Toray Advanced Composites

Cetex®

18255 Sutter Blvd.
Morgan Hill, CA 95037, USA
t +1 408 465 8500

2450 Cordelia Road
Fairfield, CA 94534, USA
t +1 707 359 3400

G. van der Muelenweg 2
7443 RE Nijverdal, NL
t +33 (0)548 633 933

www.toraytac.com
explore@toraytac-usa.com (North America/Asia/Pacific)
explore@toraytac-europe.com (Europe/Middle East/Africa)