

AIRCRAFT INTERIORS

Advanced Composite Materials Selector Guide



BEAUTY IS ON THE INSIDE

'TORAY'

Toray Advanced Composites

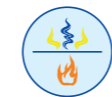









SHAPING THE FUTURE OF COMMERCIAL AND CORPORATE AIRCRAFT INTERIOR COMPOSITES

Toray Advanced Composites offers market-leading fire-retardant advanced composites for the aircraft interiors industry. Across the industry, experts use Toray lightweight composite materials in a wide variety of aerospace interior applications to maximize mechanical durability, eliminate secondary operations, and deliver optimal FST safety.

The Toray Cetex[®] brand of differentiated reinforced thermoplastic laminates (RTL) and uni-directional (UD) tapes are used in a wide variety of aircraft interior applications, ranging from flooring and cabin seating, to stowage bins and galleys. Thermoplastic composites, reinforced with glass or carbon fibers provide:

- ▶ Extremely low FST and OSU properties (OSU < 25/25)
- ▶ High-quality surface finishes, substantially reducing the need for filling and sanding before application of decorative trims or sublimation printing
- ▶ Excellent moisture resistance leading to improved durability
- ▶ Very tough surfaces for improved impact and wear performance, enabling long-term durability
- ▶ Fast manufacturing cycles, providing press forming in minutes
- ▶ Part count reduction: Overmolding thermoplastics enables consolidation of parts and integration of mechanical fixtures
- ▶ Component coloring: An option to deliver "base color" for applications

 LOW FST VALUE	 SMOOTH SURFACE	 MOISTURE RESISTANT	 IMPACT RESISTANT
 DURABLE	 THERMOFORMABLE	 OVERMOLDABLE	 COLORFAST

Toray Cetex[®] TC1000 and TC1005 – Polyetherimide (PEI) resins provide optimum FST and OSU performance, coupled with superior chemical resistance and ideal secondary operation compatibility (welding, jointing, and painting).

Toray Cetex[®] TC1100 – Polyphenylene Sulfide (PPS) provides outstanding solvent resistance for structural applications and ideal FST performance.


Toray Cetex[®] TC1130 – PolyEtherSulphone (PESU) provides outstanding toughness and FST performance, and can be used to create monomaterial fully recyclable sandwich panels.

Toray Cetex[®] TC1225 – Low-Melt Polyaryletherketone (LMPAEK[™]) resin, (part of PEEK family) offers outstanding structural and thermal performance and compatibility to PEEK for injection overmolding and welding.





Materials can be provided as prepreg rolls or consolidated laminates (RTL) with a format of 3.66 m x 1.22 m (12' x 4')

For more product information such as product data sheets, case studies, or technical papers, please use the following resources:

 Search for the Toray TAC Product Selector
 

 www.toraytac.com/interiors
Go to our online resource center for product data sheets and technical resources.

OUR OBJECTIVES

- | | | | |
|---|---|---|--|
|  Reduce weight |  Good durability |  Excellent FST performance |  Improve cost-effectiveness |
|---|---|---|--|

“ ...it’s an important seat – because you’re in it. ”

Donald Burr

AIRCRAFT INTERIORS

Product Applications

STORAGE BINS In an industry where weight and impact performance is paramount, Toray Cetex® is the ultimate solution. Exceptionally durable and lightweight for hardwearing bin surfaces and linings, we also offer an embedded color, eliminating secondary painting and finishing requirements.



CABIN LININGS Offering high impact resistance and exceptional durability, Toray Cetex® offers near perfect demold performance, maximizing efficiency for trim by minimizing post-processing (sand/sweep) operations.



CARGO LININGS With excellent FST performance and exceptional durability, Toray Cetex® thermoplastics offer near-perfect demold performance, maximizing efficiency for large surfaces by minimizing post-processing (sand/sweep) operations.



SERVICE CARTS Toray Cetex® thermoplastics are the ultimate solution in an industry where weight and impact performance are paramount. Exceptionally durable and lightweight for hard-wearing cart surfaces, graphics can also be sublimated into the surface, eliminating secondary painting and finishing requirements.



DUCTING For ultimate flow rate performance, Toray Cetex® thermoplastics offer the lowest porosity levels in the lightest materials available. Used in low-pressure systems across the world, our laminates are rolled and seam welded for maximum efficiency.



CEILING LININGS Lightweight and stiff, Toray Cetex® thermoplastics offer near-perfect demold performance, maximizing efficiency for large surfaces by minimizing post-processing (sand/sweep) operations.



GALLEYS High-volume and wear applications such as galleys and dividers demand resilient low-maintenance performance. With Toray Cetex® thermoplastics in-color and high moisture barrier technology, your workspace now has new possibilities.



SEAT STRUCTURES Capable of fast manufacturing cycles, Toray Cetex® thermoplastics are ideal for high-volume parts such as seat pans, back panels, and arm rests. Materials can also be overmolded with features for process improvement and design integrity. Braided thermoplastic slit tapes are ideal for seat frames and tubular structures.



FLOORING Manufactured in high volumes and prone to abuse, aircraft flooring demands exceptional resilience. Lightweight Toray Cetex® thermoplastics deliver exceptional durability and longer service life, withstanding carpet changes without surface degradation.



AIRCRAFT INTERIORS

Product Overview

THERMOSET

	RESIN MATRIX	DRY T _g ONSET	CURE TIME AND TEMPERATURE	KEY PRODUCT CHARACTERISTICS	OOA/WBO	DURABILITY/ TOUGHNESS	CHEMICAL RESISTANT	OEM QUALIFICATION
E721-FR	Epoxy	120°C (248°F)	60 minutes at 120°C (248°F)	<ul style="list-style-type: none"> Fire retardant under FAR 25.853 Appendix F - vertical burn material test criteria (ii) Core bondable 	○		○	
TC264-1	Epoxy	124°C (255°F)	90 minutes at 118-127°C (245-260°F)	<ul style="list-style-type: none"> Flame retardancy applications e.g., ducting, decorative enclosures, and composite panel assemblies 	○	○	○	
BT250E-1FR	Epoxy	125°C (257°F)	60 minutes at 121°C (250°F)	<ul style="list-style-type: none"> Self-adhesive to honeycomb and foam core Outstanding surface finish with OOA 	○	○		MIL-R-9300 (BT250E-1)
TC250	Epoxy	140°C (285°F) 180°C (356°F) with post cure	130°C (265°F) 2 hours post cure 180°C (356°F) 2 hours	<ul style="list-style-type: none"> Aerospace flight qualified Toughened system Post curable for higher T_g Flame-retardant version available NCAMP database on fabric version 	○	○	○	

TORAY MICROPLY™ FILM ADHESIVES

	RESIN MATRIX	DRY T _g ONSET	CURE TIME AND TEMPERATURE	KEY PRODUCT CHARACTERISTICS	OOA/WBO	DURABILITY/ TOUGHNESS	CHEMICAL RESISTANT	OEM QUALIFICATION
TC263	Epoxy	110°C (230°F)	2 hours at 121°C (250°F)	<ul style="list-style-type: none"> High peel strength Ideal for metal or composite bonding 	○	○	○	

TORAY CETEX® THERMOPLASTIC

	RESIN MATRIX	PEAK T _g	PROCESSING TEMPERATURE	KEY PRODUCT CHARACTERISTICS	SECONDARY OPERATIONS	DURABILITY/ TOUGHNESS	CHEMICAL RESISTANT	OEM QUALIFICATION
TC1000	PEI	215°C (419°F)	315°C (600°F)	<ul style="list-style-type: none"> Excellent FST performance, OSU (< 15/15) Qualified to OEM specifications 	○	+	+	ABS 5036 ABS 5814
TC1005	PEI	215°C (419°F)	315°C (600°F)	<ul style="list-style-type: none"> Excellent FST performance, OSU (< 15/15) Ideal for customer qualified design programs Broader color palette and range of textures 	○	+	+	
TC1100	PPS	90°C (194°F) T _m 280°C (536°F)	320°C (608°F)	<ul style="list-style-type: none"> Achieves 35/35 for OSU performance Outstanding solvent resistance for structural applications High impact resistance Ideal for beams and floor panels 		+	+	ABS 5045 ABS 5222 MEP 15-052
TC1130	PESU	225°C (437°F)	320-350°C (610-660°F)	<ul style="list-style-type: none"> Recyclable, also as monomaterial sandwich structure Excellent FST performance (OSU < 15/15) Achieves high surface finish Rapid processing with cycle times < 3 minutes 	○	+	+	
TC1225	LMPAEK™	147°C (297°F) T _m 305°C (581°F)	325-350°C (615-662°F)	<ul style="list-style-type: none"> Outstanding structural and thermal performance Compatibility to PEEK for injection overmolding and welding 	○	+	+	

Notes

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LOCATIONS AND CAPABILITIES

SOLUTIONS

- Thermoplastic composites
- Thermoplastic laminates

- Thermoset composites
- Carbon-free manufacturing

- Parts manufacture
- Sales office

CERTIFICATIONS

- ISO 9001:2015
- AS9100D

- ISO 14001:2015
- ISO 45001:2018

Fairfield - California, United States

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Morgan Hill - California, United States

- ● ● ● ● ■ ■ ■ ■ ■

Camarillo - California, United States

- ● ● ● ● ■ ■ ■ ■ ■

Nottingham, United Kingdom

- ● ● ● ● ■ ■ ■ ■ ■

Nijverdal, The Netherlands

- ● ● ● ● ■ ■ ■ ■ ■

Toulouse, France

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Guangzhou, China

- ● ● ■ ■ ■ ■ ■

Taichung, Taiwan

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