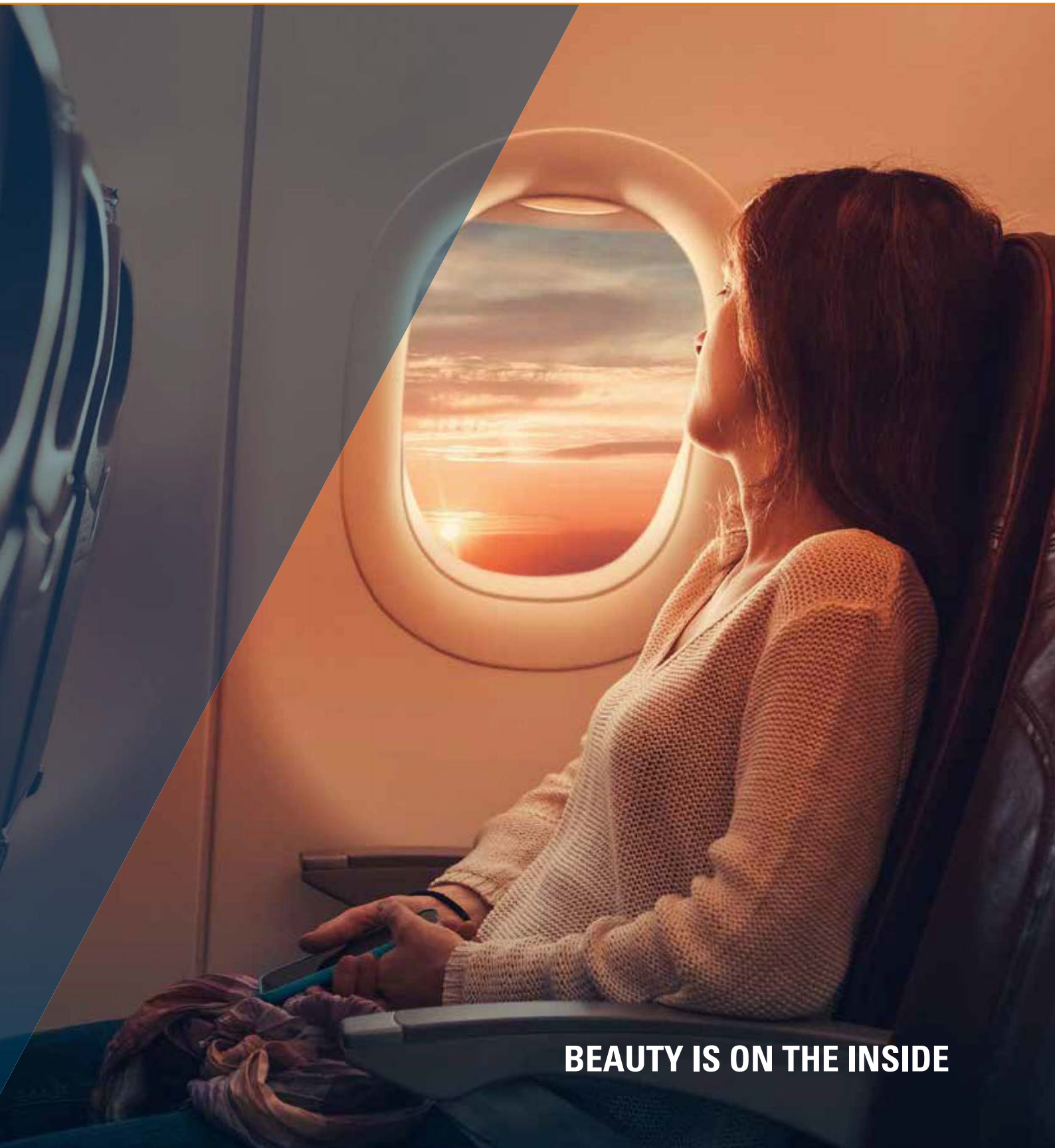


# AIRCRAFT INTERIORS

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® TC925 FST** – Polycarbonate (PC) resins provide a cost-effective solution that combines strong FST and OSU results with excellent impact performance.

**Toray Cetex® TC1000** – 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® TC1225** – Polyaryletherketone (PAEK) 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](http://www.toraytac.com/interiors)

Go to our online resource center for product data sheets and technical resources.

Tailored to your application needs, Toray Cetex® laminates are consolidated as a single or multi-ply construction to maximize functionality. The RTL semi-finished product incorporates tailored fiber lay-ups, color, and a surface finish ready for service.

“

...it's an important seat – because you're in it.

”

Donald Burr

OUR OBJECTIVES

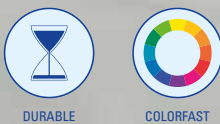
▼ Reduce weight	▲ Good durability	▲ Excellent FST performance	▲ Improve cost-effectiveness
--------------------	----------------------	--------------------------------	---------------------------------



# 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. Our hybrid system combines the best of lightweight thermoplastic and thermoset technology to deliver exceptional durability and longer service life, withstanding carpet changes without surface degradation.



THERMOSET

	RESIN MATRIX	DRY T <sub>g</sub> ONSET	CURE TIME AND TEMPERATURE	KEY PRODUCT CHARACTERISTICS	00A/VB0	DURABILITY/ TOUGHNESS	CHEMICAL RESISTANT	OEM QUALIFICATION
E721-FR	Epoxy	120°C (248°F)	60 minutes at 120°C (248°F)	► 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)	► 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)	► Self-adhesive to honeycomb and foam core ► Outstanding surface finish with 00A	○	○		MIL-R-9300 (BT250E-1)

TORAY CETEX® THERMOPLASTIC

	RESIN MATRIX	PEAK T <sub>g</sub>	PROCESSING TEMPERATURE	KEY PRODUCT CHARACTERISTICS	SECONDARY OPERATIONS	DURABILITY/ TOUGHNESS	CHEMICAL RESISTANT	OEM QUALIFICATION
TC925 FST	PC	153°C (307°F)	260°C (500°F)	► Good FST performance, OSU (< 25/25) ► White color option for visual aspect ► Value based solution	○	+	+	
TC1000 Premium	PEI	215°C (419°F)	315°C (600°F)	► Excellent FST performance, OSU (< 15/15) ► Qualified to OEM specifications	○	+	+	ABS 5036 ABS 5814
TC1000 Design	PEI	215°C (419°F)	315°C (600°F)	► 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 <sub>m</sub> 280°C (536°F)	320°C (608°F)	► 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
TC1225	PAEK	147°C (297°F) T <sub>m</sub> 305°C (581°F)	325-350°C (615-662°F)	► Outstanding structural and thermal performance ► Compatibility to PEEK for injection overmolding and welding	○	+	+	

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



www.toraytac.com/interiors
Go to our online resource center for case studies and technical papers

TORAY MICROPLY™ FILM ADHESIVES

	RESIN MATRIX	DRY T <sub>g</sub> ONSET	CURE TIME AND TEMPERATURE	KEY PRODUCT CHARACTERISTICS	00A/VB0	DURABILITY/ TOUGHNESS	CHEMICAL RESISTANT	OEM QUALIFICATION
TC263	Epoxy	110°C (230°F)	2 hours at 121°C (250°F)	► High peel strength ► Ideal for metal or composite bonding	○	○	○	

NOMEX® HONEYCOMB\* AEROSPACE GRADE

	CONFIGURATIONS CELL SIZE & DENSITY	SHEET SIZE	KEY PRODUCT CHARACTERISTICS
ANA-3.2-29	3.2 mm 29 kg/m³	1250 x 2500 mm	► Fire resistant and self-extinguishing to FAR 25.853 ► High-temperature strength up to 180°C (356°F) ► High strength-to-weight ratio and easily formable to shape ► Nomex® paper sheets are coated and bonded together with a high-modulus phenolic resin
ANA-3.2-48	3.2 mm 48 kg/m³	1250 x 2500 mm	
ANA-3.2-64	3.2 mm 64 kg/m³	1220 x 2440 mm	
ANA-4.8-48(OX)	4.8 mm 48 kg/m³	1250 x 2500 mm	

Nomex® is a registered trademark of E.I du Pont de Nemours and Company.

\* Cut to customer thickness specifications +/- 0.125 mm.
Offered from Langley Mill, UK. Additional grades can be sourced upon request, subject to minimum order quantities.

For additional honeycomb core grades please refer to our core materials on page 53 of our Aerospace Advanced Composite Materials Selector Guide.

HYBRID PANEL SOLUTION

Toray Cetex® TC1000 can also be supplied as part of a patented hybrid panel solution, benefiting from the surface properties of the Reinforced Thermoplastic Laminate (RTL) capping a traditional Toray thermoset epoxy prepreg/Nomex® honeycomb core structure.



[www.toraytac.com/interiors](http://www.toraytac.com/interiors)