

Advanced Composite Material Portfolio

Selector Guide



- ▶ Thermoset
- ▶ Thermoplastic
- ▶ Ancillaries
- ▶ RTM & BMC

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Introduction to Toray Advanced Composites

Materials Technology and Capabilities

Market-Leading Technology and Capabilities

Toray Advanced Composites is a global leader in the development and manufacture of a wide range of advanced composite material solutions for aerospace, satellite, communications, and high performance industrial markets. Our goal is to increase our customers' advantage with our market-leading product portfolio, a world-class technical support team, and award-winning customer service.

Toray Advanced Composites operates five prepreg manufacturing sites globally, with three facilities in North America and two in Europe. Three of our facilities offer true carbon-free areas to serve the sensitive radome and communication industries with low dielectric constant and low-loss materials. Our major production sites operate aerospace-quality systems and are certified to ISO9001:2015 and/or AS9100D.

Toray Advanced Composites is unique in the industry, offering a broad spectrum of thermoplastic and thermoset prepreg systems, with particular expertise in high performance thermoplastic composites (under the brand name Toray Cetex®). Our broad product portfolio supports programs from prototyping through to high-volume manufacture of parts.

Your Global Partner

Our state-of-the-art manufacturing facilities around the world allow Toray to efficiently supply composite materials to global customers. Ongoing investments in facilities and personnel ensure production excellence to meet today's requirements and tomorrow's demand. Stop by and see for yourself. We welcome customer visits and look forward to the opportunity to work with you on your next project.

Innovation

Investing in innovation for over 45 years, our strong customer focus on tailored systems, combined with our comprehensive laboratory and testing capabilities, allows for rapid development, customization, and database development. Our experience in thermoset and thermoplastic resins, various composite fibers, and part design allows us to rapidly innovate to customer needs. Recognized in the industry for providing optimized fiber and resin solutions, we deliver advanced customer-oriented products to the market.


AmberTool®

Cetex®

MicroPly™

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**
Available on the  App Store and  Google Play

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



	POLYMER	MELTING TEMPERATURE T _m	PROCESSING TEMPERATURE T _p	KEY PRODUCT CHARACTERISTICS	PRODUCT FORMATS			PROCESSING			PRODUCT ATTRIBUTES							MARKET SEGMENTS								
					UDTAPE	WOVEN PREPREG	RTL LAMINATE	WELDABLE/JOINTING	AUTOCLAVE	PRESS FORMING	AFP/ATL	DURABILITY/TOUGHNESS	FLAME RETARDANT	CHEMICAL RESISTANT	CORROSION RESISTANT	IMPACT RESISTANT	HIGH TEMPERATURE PERFORMANCE	LOW MOISTURE ABSORPTION	MECHANICAL PERFORMANCE	AEROSPACE						
																				AEROSTRUCTURES	SPACE AND SATELLITE	LAUNCH	RADOMES	AIRCRAFT INTERIORS	AERO ENGINES	INDUSTRIAL
TC910	PA6 Nylon 6	220°C (428°F)	249–271°C (480–520°F)	<ul style="list-style-type: none"> Temperature and solvent resistant Use as a preform insert for compression and overmolding to improve part performance 	○			○	○	○	○	○	○	○	○	○	○								○	
TC925 FST	PC Polycarbonate	153°C (307°F)	260–320°C (500–608°F)	<ul style="list-style-type: none"> Designed for interior applications with good FST properties (OSU < 25/25) Value-oriented solution Good surface qualities, impact toughness 		○	○	○	○	○		○	○	○	○	○	○						○		○	
TC930	HDPE High Density Polyethylene	120°C (248°F)	182–199°C (360–390°F)	<ul style="list-style-type: none"> Strong and tough Oil and gas applications such as pipe overwrapping 	○			○	○	○	○	○	○	○	○	○									○	
TC940	PET Polyethylene-Terephthalate	254°C (489°F)	254–277°C (489–531°F)	<ul style="list-style-type: none"> Good impact resistance for recreational and low cost applications 	○			○	○	○	○	○	○	○	○	○									○	
TC960	PP Polypropylene	160°C (320°F)	199–216°C (390–421°F)	<ul style="list-style-type: none"> High toughness for vehicle and low cost applications 	○			○	○	○	○	○	○	○	○	○									○	
TC1000 Design	PEI Polyetherimide	Amorphous	320–350°C (608–662°F)	<ul style="list-style-type: none"> Laminates are available to customer specifications Excellent FST performance Lower cost option than Premium where OEM specifications are not required 		○	○	○	○	○		○	○	○	○	○	○						○		○	
TC1000 Premium	PEI Polyetherimide	Amorphous	320–350°C (608–662°F)	<ul style="list-style-type: none"> Excellent FST performance (OSU < 15/15) Moderate solvent resistance Widely used in aircraft interiors, qualified to OEM specifications 		○	○	○	○	○		○	○	○	○	○	○	○					○	○	○	
TC1100	PPS Polyphenylenesulfide	280°C (536°F)	300–330°C (572–626°F)	<ul style="list-style-type: none"> Microcrack free Low flammability, achieves 35/35 for OSU performance Good CAI properties 229 MPa (33.2 ksi) Ideal for leading edges, beams, clips, and floor panels 	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○					○	○	○
TC1200	PEEK Polyetheretherketone	343°C (649°F)	370–400°C (698–752°F)	<ul style="list-style-type: none"> Good high temperature properties Very good CAI properties 265 MPa (38.4 ksi) Ideal for structural applications 	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○					○	○	○
TC1225	LMPAEK Low-Melt Polyaryletherketone	305°C (581°F)	340–385°C (644–725°F)	<ul style="list-style-type: none"> Lower processing temperature with good high temperature performance May be overmolded with PEEK for final part Very good CAI properties 282 MPa (40.9 ksi) Ideal for structural applications 	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○					○	○	○
TC1320	PEKK Polyetherketoneketone	337°C (639°F)	370–400°C (698–752°F)	<ul style="list-style-type: none"> Outstanding solvent and impact resistance Very high CAI properties 337 MPa (48.9 ksi) Ideal for structural applications Lower processing temperature material 	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○					○		

Thermoplastic

Thermoplastic

Toray MicroPly™ Surfacing Films Epoxy

	RESIN MATRIX	NEAT RESIN DRY T _g ONSET	CURE TEMPERATURE AND TIME	KEY PRODUCT CHARACTERISTICS	TACK LIFE # DAYS	FREEZER LIFE # MONTHS	PROCESSING					PRODUCT ATTRIBUTES							MARKET SEGMENTS							
							OOA / VBO	AUTOCLAVE	PRESS FORMING	APP/ATL	POST CURABLE	TOUGHENED	FLAME RETARDANT	CHEMICAL RESISTANT	CORROSION RESISTANT	IMPACT RESISTANT	HIGH TEMPERATURE PERFORMANCE	LOW MOISTURE ABSORPTION	LIGHTNING STRIKE PROTECTION	AEROSPACE						INDUSTRIAL
																				AEROSTRUCTURES	SPACE AND SATELLITE	LAUNCH	RADOMES	AIRCRAFT INTERIORS	ENGINES/HIGH TEMP	
TC235SF-1	Epoxy Surfacing Film	119°C (246°F)	121°C (250°F) 60 minutes	<ul style="list-style-type: none"> ▶ Excellent protective surface finish ▶ Available with embedded lightning strike foils ▶ Reduces shop floor finishing for productivity savings ▶ Generally compatible with 120°C and 177°C curing epoxy resin prepreg systems 	30	12	○	○	○			○		○				○								

Toray MicroPly™ Syntactics Epoxy

	RESIN MATRIX	NEAT RESIN DRY T _g ONSET	CURE TEMPERATURE AND TIME	KEY PRODUCT CHARACTERISTICS	OUT LIFE # DAYS	FREEZER LIFE # MONTHS	PRODUCT FORMATS			PROCESSING					PRODUCT ATTRIBUTES							MARKET SEGMENTS							
							FILM	PASTE	EXPANDING	OOA / VBO	AUTOCLAVE	PRESS FORMING	APP/ATL	POST CURABLE	TOUGHENED	FLAME RETARDANT	CHEMICAL RESISTANT	CORROSION RESISTANT	IMPACT RESISTANT	HIGH TEMPERATURE PERFORMANCE	LOW MOISTURE ABSORPTION	LOW TEMPERATURE CURE	AEROSPACE						INDUSTRIAL
																							AEROSTRUCTURES	SPACE AND SATELLITE	LAUNCH	RADOMES	AIRCRAFT INTERIORS	ENGINES/HIGH TEMP	
EM-3	Epoxy	116°C (240°F) ¹	121°C (250°F) 60 minutes	▶ High expansion (8–10 x) 0.64 g/cc (40 pcf) density	14	12	○		○																				
ES72A-2	Epoxy	114°C (237°F)	Minimum 125°C (257°F) 60 minutes	▶ Density/strength tailored by changing cure pressure/limiting volume available for expansion	30	12	○		○	○																	○		
SC72A	Epoxy	106°C (222°F)	120°C (248°F) 60 minutes	<ul style="list-style-type: none"> ▶ Low density ▶ Easily contoured and shaped 	30	12	○			○	○																○		
SC8020A	Epoxy	106°C (222°F)	80°C (176°F) – 5.5 hours Alternate cures are available	<ul style="list-style-type: none"> ▶ Low density ▶ Flexible cure schedules 70–130°C (158–266°F) 	30	12	○			○	○																○		
TCF4035	Epoxy	140°C (284°F)	130°C (265°F) 2 hours	<ul style="list-style-type: none"> ▶ Low density 0.64 g/cc (40 pcf) ▶ Compatible with 121–135°C (250–275°F) curing materials e.g., TC250 ▶ Post curable for higher T_g 	21	12	○			○	○																		
TCF4045	Modified Epoxy	180°C (356°F)	179°C (355°F) 3 hours	<ul style="list-style-type: none"> ▶ Excellent low dielectric loss and constant ▶ Density of 0.61 g/cc (38.5 pcf) 	14	6	○			○	○																		

1 - T_g estimated from base resin data

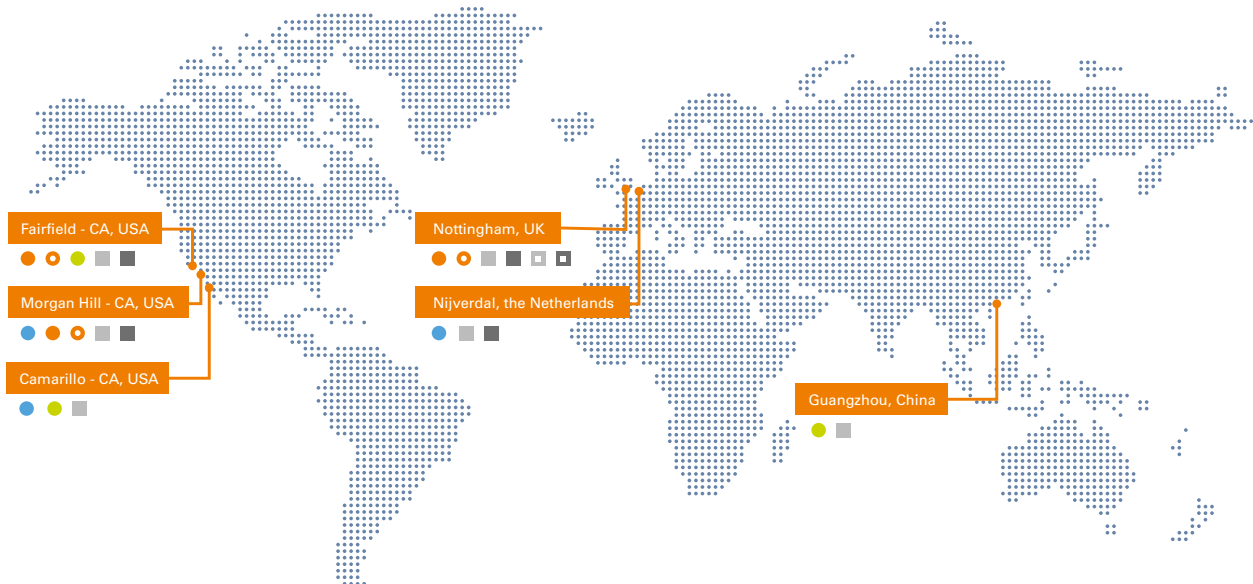
Locations and Capabilities

SOLUTIONS

- Thermoplastic composites
- Carbon-free manufacturing
- Thermoset composites
- Parts manufacture

CERTIFICATIONS

- ISO 9001:2015
- ISO 14001:2015
- AS9100D
- ISO 45001:2018



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