Ensinger

Aircraft Interior Applications

Thermoplastics & Thermoplastic Composites

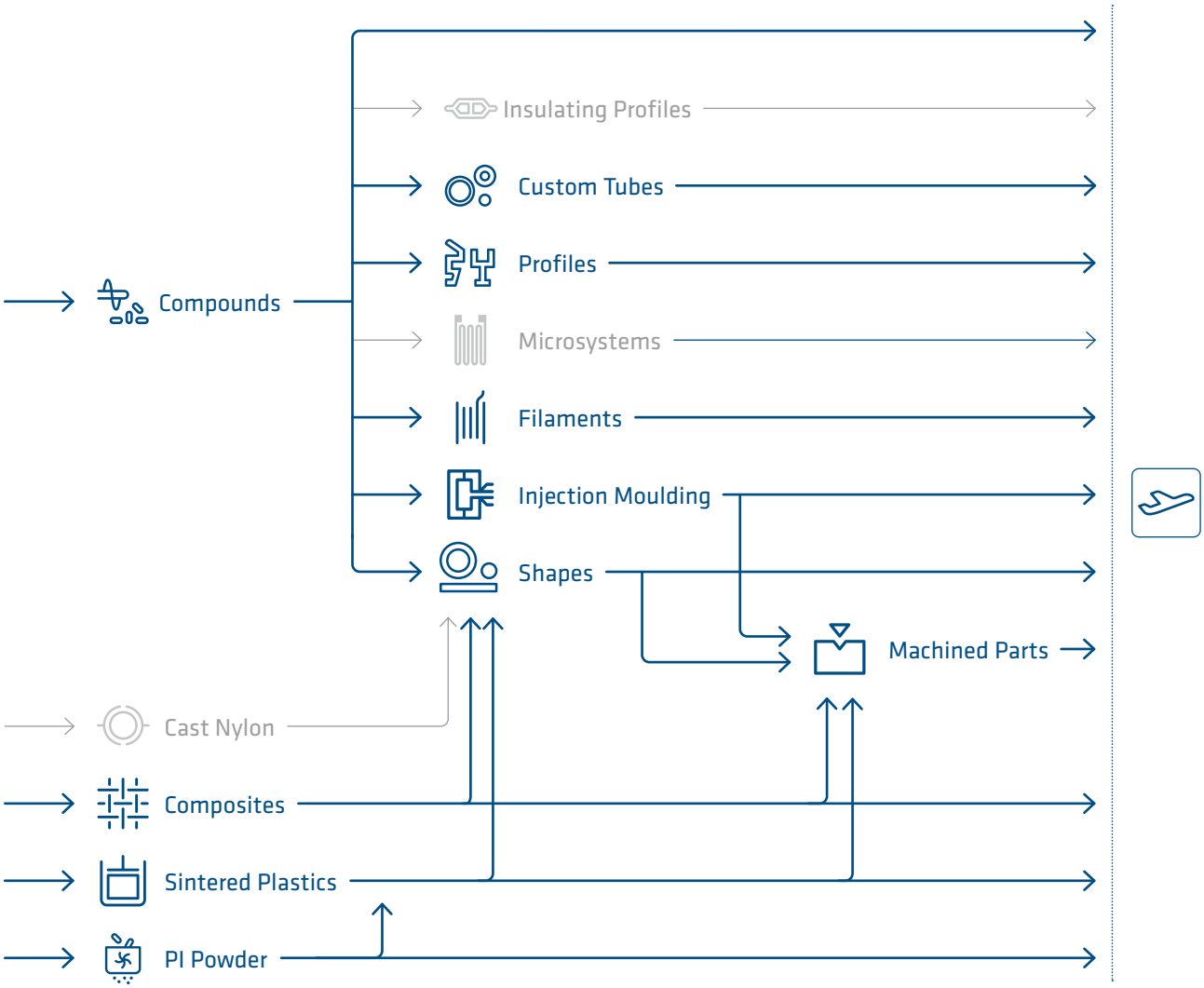


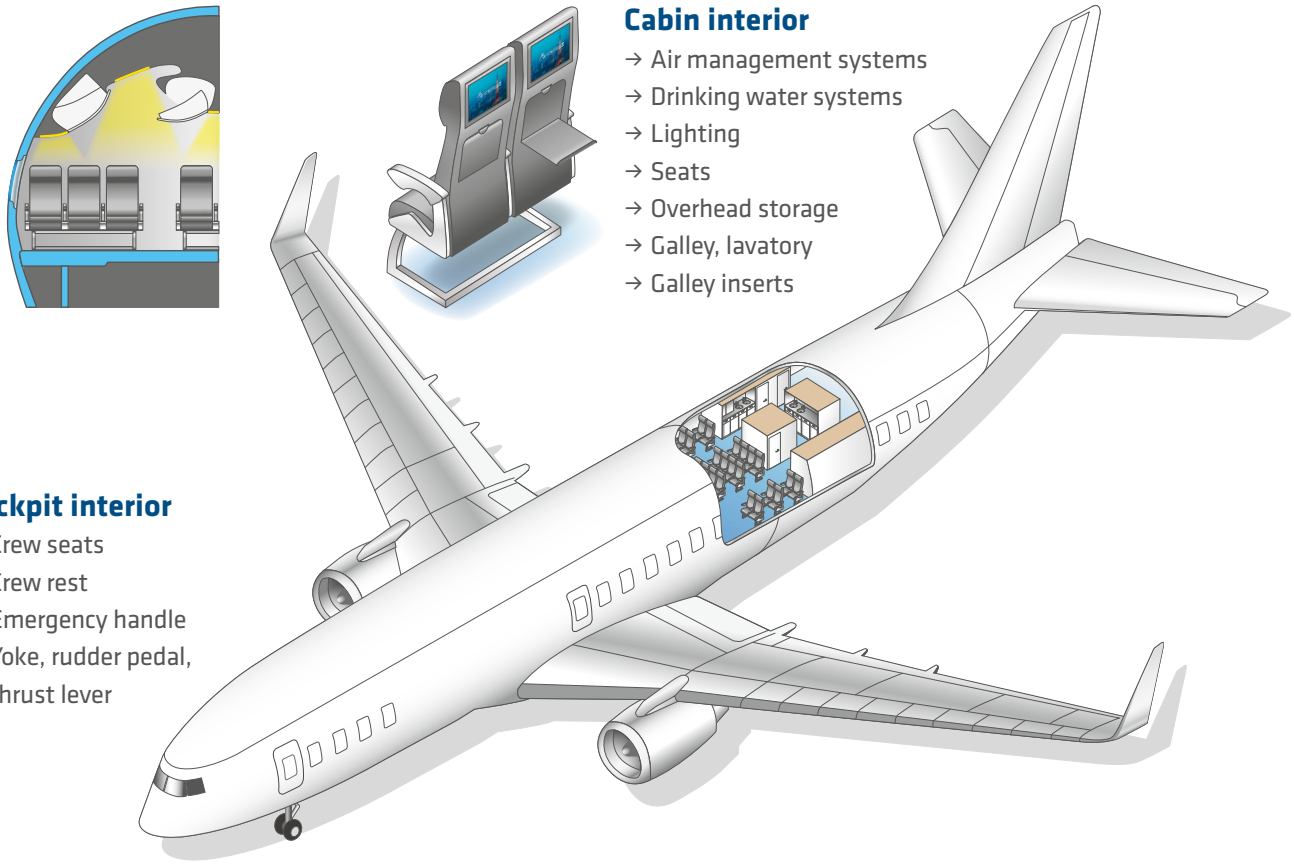
Lightweight Construction, Safety, Suitability for Series Production – All from a Single Source

Ensinger supports the aircraft industry with a comprehensive portfolio of engineering and high-performance thermoplastics, as well as thermoplastic fibre composites. Our materials create new freedom in construction and design – from established cabin components to lightweight structural concepts such as sandwich panels. Throughout, we combine reliable compliance with relevant standards, dependable processing and cost-effective series production.

Ready for Demanding Aircraft Interior Applications

Materials used in aircraft cabins must meet stringent requirements for flammability, smoke density, combustion emissions and toxicity in accordance with FAR 25.853. Ensinger provides documented materials tested to 60-second or 12-second vertical burn requirements, with additional smoke, toxicity and heat-release testing available where required. This gives manufacturers dependable, ready-to-use solutions for applications including seating, lighting, galleys and cockpit equipment – helping to turn ambitious interior designs into series-ready aircraft components.





Cabin interior

→ Air management systems
→ Drinking water systems
→ Lighting
→ Seats
→ Overhead storage
→ Galley, lavatory
→ Galley inserts

Cockpit interior

→ Crew seats
→ Crew rest
→ Emergency handle
→ Yoke, rudder pedal, thrust lever

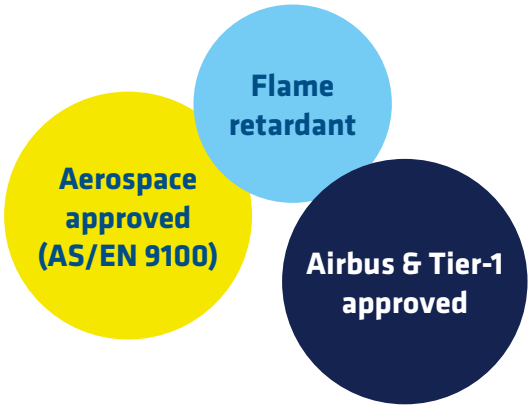
What Aircraft Interiors Demand. What Ensinger Materials Deliver.

Lower material density for weight-optimised designs

→ Selected Ensinger thermoplastics have a lower density than aluminium, supporting weight-optimised component design

Reduce cost

Replacing metal with high-performance thermoplastics
→ Fewer secondary processes
→ Lower Total Cost of Ownership



More benefits

→ High rate capability materials due to standardisation processes with thermoplastics
→ Functional integration of complex, structurally relevant components
→ Mechanical performance & long-term durability
→ Process efficiency in material selection and manufacturing
→ Thermoplastics can support recycling strategies depending on the material and the design

Thermoplastic Composites Set the New Standards

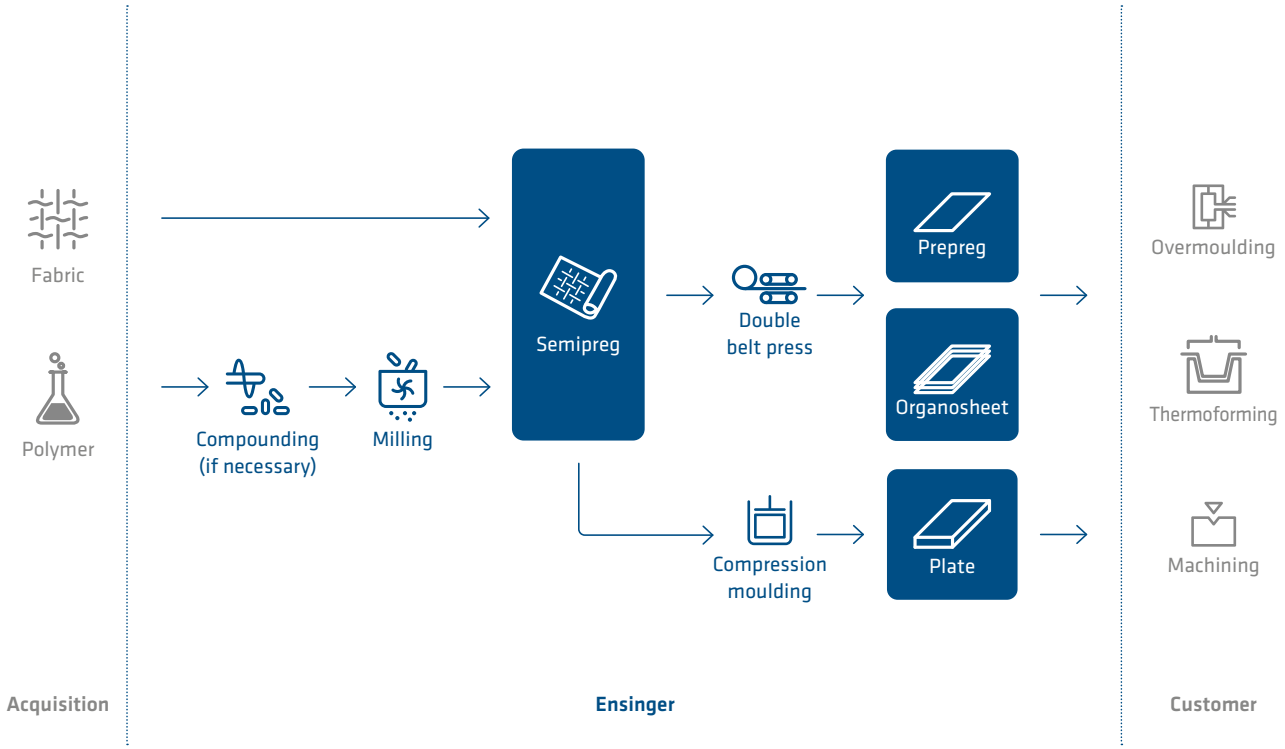
What are thermoplastic composites – and why are they suitable for the aerospace industry?

Thermoplastic composites combine continuous-fibre-reinforced fabrics (e.g. carbon or glass fibre) with a thermoplastic matrix. This offers advantages for aircraft applications, particularly where stiffness, lightweight construction and robust, industrial-scale processing are required. The main advantage of thermoplastic composites lies in their better strength-to-weight ratio compared with conventional thermoplastic materials and aluminium.

Ensinger offers thermoplastic fibre-reinforced composites in various semi-finished forms: semipregs and prepregs, organosheets, or composite panels (moulded sheets made from various material combinations).

These semi-finished products serve as the starting point for prototypes, small-batch production and mass production. From material to component: process chain & manufacturing options.

A key added value is the comprehensive support throughout the process chain – from the suitable composite semi-finished product right through to component-specific design and manufacture.



Combined Benefits: Thermoplastics and Composites for Interior Concepts







By combining flame-retardant thermoplastics with conventional fibre fabrics, we are creating composites for traditional interior components, functional elements and structural parts. With components which are designed for rigidity and lightweight construction, it is possible to create solutions that:

→ Support lightweight component concepts while meeting defined mechanical and functional requirements
→ Enable conventional designs with added functionality through further processing steps such as overmoulding and thermoforming
→ Enable a rapid transition from semi-finished products to validatable components during development phases

Correspondence of testing methods between FAR 25.853, AITM and BSS

Test description	FAR Standard	Airbus Standard	Boeing Standard
Flammability Vertical - 60 Seconds	FAR/CS25.853 (a) App. F Part I (a)(1)(i)	AITM 2.0002A	BSS 7230 F1
Flammability Vertical - 12 Seconds	FAR/CS25.853 (a) App. F Part I (a)(1)(ii)	AITM 2.0002B	BSS 7230 F2
Flammability Horizontal - 15s - 2.5 inch/min	FAR/CS25.853 (a) App. F Part I (a)(1)(iv)	AITM 2.0003A	BSS 7230 F3
Flammability Horizontal - 15s - 4.0 inch/min	FAR/CS25.853 (a) App. F Part I (a)(1)(v)	AITM 2.0003B	BSS 7230 F4
Smoke Density (NBS)	FAR/CS25.853 (d) App. F Part V	AITM 2.0007A & B	BSS 7238
Smoke Toxicity	N/A	AITM 3.0005	BSS 7239

Certified Flame-Retardant High-Performance Plastics



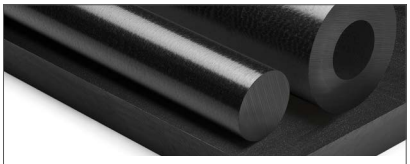
TECAPEEK natural	Tested thickness:
Flamm. Vert. 12 seconds:	1 mm & 3 mm
Flamm. Vert. 60 seconds:	1 mm & 3 mm
Smoke Density (NBS):	3 mm
Smoke Toxicity:	3 mm



TECAPEEK CF30 black	Tested thickness:
Flamm. Vert. 60 seconds:	1 mm



TECAPEEK GF30 natural	Tested thickness:
Flamm. Vert. 60 seconds:	1 mm



TECAPEEK PVX black	Tested thickness:
Flamm. Vert. 12 seconds:	1 mm



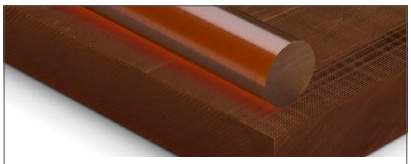
TECATRON natural	Tested thickness:
Flamm. Vert. 12 seconds:	3 mm
Flamm. Vert. 60 seconds:	3 mm
Smoke Density (NBS):	3 mm
Smoke Toxicity:	3 mm



TECATRON GF40 black	Tested thickness:
Flamm. Vert. 12 seconds:	1 mm

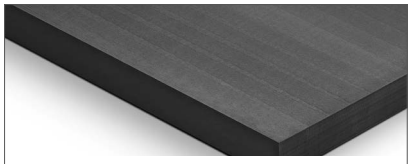


TECATRON PVX black	Tested thickness:
Flamm. Vert. 12 seconds:	1 mm
Flamm. Vert. 60 seconds:	1 mm



TECAPEI natural	Tested thickness:
Flamm. Vert. 12 seconds:	3 mm
Flamm. Vert. 60 seconds:	1 mm & 3 mm
Flamm. Horiz. 15s - 2.5 "/min:	1.6 mm
Smoke Density (NBS):	3 mm
Smoke Toxicity:	3 mm

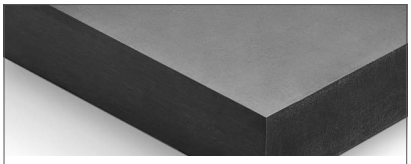
The flammability has been tested according to FAR 25.853 (a) and Appendix F Part I, para. (a)(1)(i) or (ii):
respectively 60s or 12s vertical Bunsen burner test. Smoke emission, toxicity and heat release as per aircraft manufacturer standards.



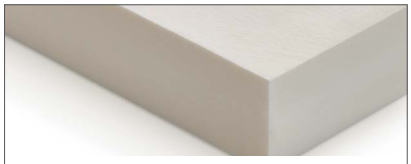
TECANYL VH2 black	Tested thickness:
Flamm. Vert. 12 seconds:	3 mm
Flamm. Vert. 60 seconds:	3 mm
Smoke Density (NBS):	3 mm
Smoke Toxicity:	3 mm



TECANYL VH2 grey	Tested thickness:
Flamm. Vert. 60 seconds:	3 mm



TECAMID 66 GF15 FR black	Tested thickness:
Flamm. Vert. 12 seconds:	3 mm
Flamm. Vert. 60 seconds:	3 mm
Flamm. Horiz. 15s - 2.5 "/min:	3 mm
Flamm. Horiz. 15s - 4.0 "/min:	3 mm
Smoke Density (NBS):	3 mm (Failed)
Smoke Toxicity:	3 mm



TECAMID 6 FRT natural	Tested thickness:
Flamm. Vert. 12 seconds:	4 mm
Flamm. Vert. 60 seconds:	4 mm
Flamm. Horiz. 15s - 2.5 "/min:	4 mm
Flamm. Horiz. 15s - 4.0 "/min:	4 mm
Heat Release (OSU):	4 mm
Smoke Density (NBS):	4 mm
Smoke Toxicity:	4 mm



TECAMID 6 FRT black	Tested thickness:
Flamm. Vert. 12 seconds:	4 mm
Flamm. Vert. 60 seconds:	4 mm
Heat Release (OSU):	4 mm
Smoke Density (NBS):	4 mm
Smoke Toxicity:	4 mm



TECATEC PC CF50 T200 FR CP/IP/OS natural	Tested thickness:
Heat Release (OSU):	2, 3 & 4 layers
Smoke Density (NBS):	2, 3 & 4 layers
Smoke Toxicity:	2, 3 & 4 layers
	1 Layer = 0.227mm



TECATEC PC CF45 T245 FR CP/IP/OS natural	Tested thickness:
Flamm. Vert. 12 seconds:	2 & 3 layers
Flamm. Vert. 60 seconds:	2 & 3 layers
Heat Release (OSU):	2 & 3 layers
Smoke Density (NBS):	2 & 3 layers
Smoke Toxicity:	2 & 3 layers
	1 Layer = 0.324mm



TECATEC PC GF50 S296 FR CP/IP/OS natural	Tested thickness:
Heat Release (OSU):	2 & 3 layers
Smoke Density (NBS):	2 & 3 layers
Smoke Toxicity:	2 & 3 layers
	1 Layer = 0.233mm



TECATEC PES GF50 S296 CP/IP/OS natural	Tested thickness:
Heat Release (OSU):	2 & 3 layers
Smoke Density (NBS):	2 & 3 layers
Smoke Toxicity:	2 & 3 layers
	1 Layer = 0.233mm



TECATEC PEI GF50 S296 CP/IP/OS natural	Tested thickness:
Heat Release (OSU):	1 layer
Smoke Density (NBS):	1 layer
Smoke Toxicity:	1 layer
	1 Layer = 0.233mm



TECATEC PEI GF50 S296 CP/IP/OS black	Tested thickness:
Heat Release (OSU):	1 layer
Smoke Density (NBS):	1 layer
Smoke Toxicity:	1 layer
	1 Layer = 0.233mm

Contact
aerospace@ensingerplastics.com

Ensinger GmbH
Rudolf-Diesel-Straße 8
71154 Nufringen
Germany
Phone +49 7032 819 0
ensingerplastics.com

Ensinger Website

The Ensinger Group is engaged in the development, manufacture and sale of compounds, semi-finished materials, composites, technical parts and profiles made of engineering and high-performance plastics. To process the thermoplastic polymers, Ensinger uses a wide range of production techniques, such as extrusion, machining, injection moulding, casting, sintering and pressing. With a total of more than 2,500 employees at over 30 locations, the family-owned enterprise is represented worldwide in all major industrial regions with manufacturing facilities or sales offices.

19-EN-10|26