Baydur® PUL

Innovative polyurethane resins for pultrusion enable high productivity of composite parts

covestro

Polyurethane pultrusion systems: excellent mechanical properties with a boost in productivity

As one of the world's leading suppliers of polymers and polymer raw materials, Covestro has developed a range of tailored polyurethane (PU) systems for glass and carbon fiber pultrusion that combine cutting-edge mechanical properties with fast processing for a wide variety of applications.

Baydur® PUL systems are tailored for high productivity in pultrusion applications, offering outstanding material properties that meet application-specific requirements including: high stiffness and impact strength, excellent thermal insulation, corrosion resistance and low creepage. These properties make polyurethane composites a cost-competitive alternative to traditional plastics, wood and metals for demanding applications such as wind blade spar caps, window profiles, electric vehicle battery packs (EVBP), railway sleepers and utility poles.

Our innovative PU resins offer significant advantages for the pultrusion process, including low viscosity and high reactivity, which result in high line speed, improving productivity and reducing manufacturing costs. In fact, polyurethane pultrusion technology reduces production costs by as much as 20% compared to vinyl ester and epoxy systems.

Typical mechanical properties of PU pultruded profiles

Glass reinforcement: unidirectional rovings (4,800 tex) / carbon reinforcement: unidirectional rovings (50k)

Property	Unit	Acc. to test standard	Direction	Baydur® PUL	
				Glass fibers	Carbon fibers
Fiber volume fraction	[%]	DIN EN ISO 1172 / TM 900069	–	65	67
Tensile strength	[MPa]	DIN EN ISO 527	0°	1000	n.a.
			90°	40	42
Tensile modulus	[GPa]	DIN EN ISO 527	0°	55	n.a.
			90°	12	9
Flexural strength	[MPa]	DIN EN ISO 14125	0°	1300	1190
			90°	70	140
Flexural modulus	[GPa]	DIN EN ISO 14125	0°	52	130
			90°	15	9
Interlaminar shear strength	[MPa]	DIN EN ISO 14130	0°	65	80
			90°	10	14

Technical processing information

Components	Baydur® PUL
Processing equipment	• 2k dosing and mixing machine • Injection box for fiber impregnation • Standard pultrusion line
Proposed pultrusion die	1-meter-long with 3-6 heating zones (up to 230°C)
Line speed (after start-up phase)	Up to 3 m/min with 3 mm wall thickness of the pultrudate

Our polyurethane resin systems help pultruders increase productivity, reducing the time and energy required to produce high-quality composite parts

Fast processing:
PU resins offer low viscosity and high reactivity for an efficient impregnation of glass and carbon fibers, fast pultrusion line speed and high productivity

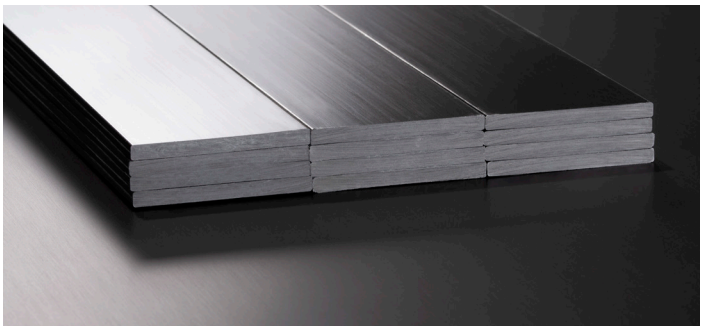
Cost-saving:
PU pultrusion technology helps pultruders saving by as much as 20% on production costs compared to alternative materials

Outstanding performance:
PU pultruded parts have excellent longitudinal and transversal mechanical properties, offering outstanding strength and stiffness combined with a low weight

Design flexibility:
With PU pultrusion, designers, engineers and architects can create simple or complex composite profiles with variable wall thicknesses that match their application targets

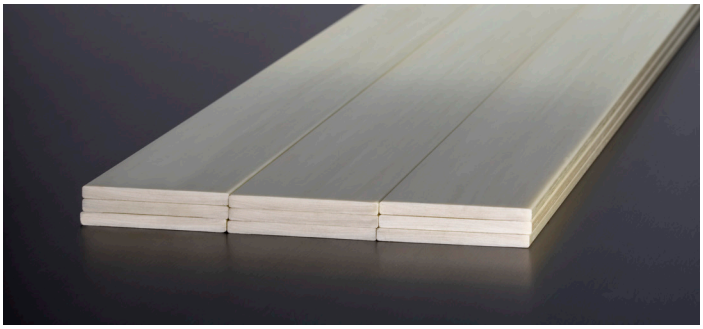
Go-to partner:
We support our PU pultrusion customers in qualification, development and technology implementation

Overview of applications:



Pultruded polyurethane carbon-fiber profiles for wind blade spar caps

Lightweight polyurethane carbon-fiber beam for light commercial vehicles (Carbon Truck & Trailer GmbH)



Pultruded polyurethane glass-fiber profiles for wind blade spar caps

High-strength and energy-efficient polyurethane glass-fiber pultruded window profile

Click here

for more information

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