F1 COMPOSITE

Pultruded FRP Profiles · Engineered for Fenestration

Pultruded FRP Window & Door Catalog

Engineered glass-fibre composite frame systems for residential, commercial and passive-house fenestration projects.

Edition 2026 · F1-CAT-WIN-001

F1 Composite
sales@f1composite.com · www.f1composite.com

About F1 Composite

Pultruded composite profiles for global fenestration

F1 Composite supplies pultruded fibre-reinforced polymer (FRP) window and door frame profiles to specifiers, fabricators and developers in more than 30 countries. Our fenestration range — 70, 80, 90 and 140 series frames — covers the full performance envelope from value-class casement to passive-house-certified ultra-low-energy systems, with matching sliding-door profiles for large patio openings up to 3.0 m tall.

Every profile is continuously pultruded with high-content E-glass roving in a polyurethane or polyester resin matrix, finished with weather-resistant powder coating, and supplied with full third-party test documentation against EN 14351-1, AS 2047, PHI passive-house, and project-specific national codes.

Why specifiers choose F1 Composite

Engineering depth. Every series ships with documented thermal (U_f), structural (EN 12210 wind load), water (EN 12208) and air (EN 12207) performance — not catalogue claims.

One material across climates. The same FRP profile system performs at -40 °C / 180 °F service temperatures, hot-humid coastal, and high-UV high-altitude environments, simplifying multi-region specification.

Independent qualification. AS 2047 reports issued at IAS-accredited Intertek Shanghai Fengxian; passive-house certification from PHI Darmstadt; supplementary national-code packages on request.

The Pultrusion Advantage for Fenestration

Pultrusion is a continuous composite manufacturing process: glass fibre roving is pulled through a thermosetting resin bath and a heated forming die, emerging as a long, dimensionally stable composite section. For window and door frames the process delivers four structural characteristics that competing materials cannot match in combination.

1. Dimensional stability across temperature

Linear thermal expansion coefficient of pultruded GFRP is ≈ 5.5 – 6.5 × 10^{-6} /°C, an order of magnitude lower than aluminium (22 – 24 × 10^{-6}) and PVC-U (60 – 80 × 10^{-6}). The frame stays dimensionally true across the 220 °C service window (-40 to +180 °F), eliminating the seal-fatigue failure modes that shorten the service life of metal and polymer frames.

2. Thermal performance comparable to wood

Thermal conductivity of GFRP composite is ≈ 0.28 W/(m·K), close to softwood (0.13 – 0.18) and approximately 570× lower than aluminium (160). The frame itself does not need a thermal-break insert; the composite is the thermal break. This single property is what makes GFRP the natural specification for passive-house and ultra-low-energy buildings.

3. Strength-to-weight ratio above metals

GFRP tensile strength of 950 – 1350 MPa at a density of 2.1 g/cm³ gives a specific strength near 580 — well above aluminium (74 – 111) and PVC-U (25 – 37). Larger leaves are supported on slimmer sections with no need for steel stiffening inserts.

4. Corrosion-immune and dimensionally permanent

Glass-fibre composite does not rust, rot, warp or galvanically corrode. Coastal, marine and chemically aggressive environments — the failure modes that drive aluminium and timber replacement cycles — leave GFRP frames unchanged across the building lifespan.

Material Performance Comparison

Pultruded GFRP vs. aluminium, PVC-U and softwood

The table below summarises the key engineering properties that drive frame-system selection. Values are industry-typical ranges for fenestration-grade material; F1 Composite series-specific values are given in the individual product pages.

Property	GFRP (F1)	Aluminium	PVC-U	Pine
Density (g/cm^3)	**2.12**	2.69	1.35 – 1.55	0.40 – 0.75
Thermal conductivity W/(m·K)	**0.28**	160	0.17	0.13 – 0.18
Tensile strength (MPa)	**950 – 1350**	160 – 200	35 – 52	80 – 120
Flexural strength (MPa)	**1150 – 1480**	170 – 230	70 – 110	118 – 142
Flexural modulus (GPa)	**37 – 45**	60 – 71	2.2 – 5.0	13.3 – 16.2
Poisson's ratio	**0.30 – 0.38**	0.33 – 0.35	0.32 – 0.36	0.30 – 0.49
CTE ×10^{-6} /°C	**5.5 – 6.5**	22 – 24	60 – 80	8.5 – 11.6
Specific strength (str/density)	**≈ 580**	74 – 111	25 – 37	90 – 110
Service / softening (°C)	**1360 melt**	580 – 660	160 – 220	200 – 290

Carbon footprint

Cradle-to-gate CO_2 equivalent for a typical 1.5 × 1.5 m residential window frame (frame material only, four glazing performance points from U_w 1.8 to 0.8):

U-value class	GFRP frame (kg CO_2e)	Aluminium frame (kg CO_2e)
U_w 1.8	**91**	451
U_w 1.4	**91**	465
U_w 1.1	**91**	480
U_w 0.8	**101**	537

GFRP frame embodied carbon is roughly one-fifth that of an equivalent aluminium frame across the residential U_w performance range. The gap widens at high-performance specifications because aluminium systems require additional thermal-break complexity to reach the same U_w.

Frame Series at a Glance

Five system widths to match application class

Series	Frame width	Opening modes	Best U_w (W/m²K)	Max leaf load
70-Series Casement	70 mm	Inward / outward / tilt-turn	**1.23**	120 kg
80-Series Tilt-Turn	80 mm	Inward / tilt-turn	**1.07**	130 kg
90-Series Casement	90 mm	Inward / tilt-turn / French	**0.82**	130 kg
90-Series Sliding	90 mm	Horizontal slide	**1.70**	120 kg
140-Series Sliding Door	140 mm	Lift-slide / horizontal slide	**1.02**	200 kg

Series selection guide. 70-Series is the practical entry point for residential and light-commercial work where $U_w \le 1.5$ W/m²K and standard glazing builds (5LowE+12A+5) deliver the specification. 80-Series serves cold-climate residential and Passive-House-aligned commercial projects where $U_w \le 1.1$ is required. 90-Series is the premium specification: passive-house certified, certified to PHI phA arctic climate class, and the natural choice for Net-Zero and ultra-low-energy projects. 140-Series sliding doors handle 3 × 2.4 m patio openings without aluminium support stiffeners and meet AS 2047-2014 / AS/NZS 4420.1-2016 for the Australian premium market.

Performance basis

All performance classes are reported per the European fenestration framework: water tightness per **EN 12208**, air permeability per **EN 12207**, wind load resistance per **EN 12210**, U-value per **EN ISO 10077-1**, acoustic R_w per **EN ISO 717-1**. AS 2047 / AS/NZS 4420.1 test reports are issued at IAS-accredited Intertek Shanghai Fengxian on project request. NFRC and PHI passive-house component certifications are issued by the respective bodies.

70-Series Casement

Mid-performance frame for residential and light commercial

System overview. 70 mm frame width with 3.0 mm load-bearing wall thickness. Supports outward, inward, tilt-turn and awning configurations from a single profile family. Standard powder-coat finish, weather-resistant top coat compatible with EN 12206 / AAMA 2604 finishes.

Specifications

Frame thickness	70 mm
Load-bearing wall	3.0 mm
Max leaf load	120 kg
Opening modes	Inward, outward, tilt-turn, awning
Performance class	Thermal 8 · Sound 4 · Watertight 6 · Airtight 8 · Wind 9
Reference standard	EN 14351-1; AS 2047 on request

Recommended glazing configurations

Glass build	U_g (W/m²K)	U_f (W/m²K)	U_w (W/m²K)	Hardware
5 Low-E + 12Ar + 5 Low-E + 12Ar + 5	0.81	1.16	**1.23**	Universal
5 Low-E + 12A + 5 + 12A + 5	1.34	1.16	**1.50**	Universal
5 Double-Silver Low-E + 12A + 5	1.76	1.16	**1.79**	Universal

80-Series Casement

Premium thermal performance for cold-climate residential

System overview. 80 mm frame width with 3.0 mm load-bearing wall thickness. Engineered for tilt-turn operation with reinforced corner geometry; standard configuration for cold-climate residential where $U_w \leq 1.1$ W/m²K is required.

Specifications

Frame thickness	80 mm
Load-bearing wall	3.0 mm
Max leaf load	130 kg
Opening modes	Inward, tilt-turn
Performance class	Thermal 9 · Sound 4 · Watertight 6 · Airtight 8 · Wind 9
Reference standard	EN 14351-1; suitable for Green Building 3-star

Recommended glazing configurations

Glass build	U_g (W/m²K)	U_f (W/m²K)	U_w (W/m²K)	Hardware
5 + 12Ar + 5 Low-E + 12Ar + 5 Low-E	0.81	0.92	**1.07**	Universal
5 + 12Ar + 5 + 12Ar + 5 Low-E	1.12	0.92	**1.28**	Universal
5 Low-E + 12A + 5 + 12A + 5	1.34	0.92	**1.42**	Universal

90-Series Casement

Passive-house certified · PHI phA arctic class

System overview. 90 mm frame width with 3.0 mm load-bearing wall thickness and high-performance triple-glazing channel. The 90-Series carries PHI passive-house component certification (Component-ID 2491wi03, phA arctic climate class) and is the natural choice for Net-Zero, passive-house and ultra-low-energy projects.

Specifications

Frame thickness	90 mm
Load-bearing wall	3.0 mm
Max leaf load	130 kg
Opening modes	Inward, tilt-turn, French
Performance class	Thermal 10 · Sound 5 · Watertight 6 · Airtight 8 · Wind 9
Certification	PHI passive-house phA arctic; EN 14351-1; AS 2047 on request

Recommended glazing configurations

Glass build	U_g (W/m²K)	U_f (W/m²K)	U_w (W/m²K)	Hardware
5 + 16Ar + 5 Low-E + 16Ar + 5 Low-E	0.79	0.83	**0.82**	Universal
5 + 12Ar + 5 Low-E + 12Ar + 5 Low-E	0.81	0.83	**1.01**	Universal
5 + 12Ar + 5 + 12Ar + 5 Low-E	1.12	0.83	**1.14**	Universal

140-Series Sliding Door

Large-format lift-slide patio doors to 3 × 2.4 m

System overview. 140 mm frame width sliding-door system, engineered to handle 3000 × 2400 mm patio openings without aluminium stiffening. AS 2047-2014 / AS/NZS 4420.1-2016 tested at IAS-accredited Intertek Shanghai Fengxian under Intertek Report 240821010SHF-002 — air infiltration, water penetration at 600 Pa, structural integrity at 3000 Pa.

Specifications

Frame thickness	140 mm
Load-bearing wall	3.0 mm
Max leaf load	200 kg
Opening modes	Lift-slide, horizontal slide
Performance class	Thermal 10 · Sound 4 · Watertight 6 · Airtight 8 · Wind 9
Certification	AS 2047 / AS/NZS 4420.1; EN 14351-1; AAMA 2604 finish

Recommended glazing configurations

Glass build	U_g (W/m²K)	U_f (W/m²K)	U_w (W/m²K)	Hardware
5 + 16Ar + 5 Low-E + 16Ar + 5 Low-E	0.79	0.90	**1.02**	Universal
5 + 12Ar + 5 Low-E + 12Ar + 5 Low-E	0.81	0.90	**1.04**	Universal
5 + 12Ar + 5 + 12Ar + 5 Low-E	1.12	0.90	**1.25**	Universal

Matching Frame Series to Building Energy Code

Use the table below to map each series to the energy-performance level that your project's national building code, voluntary certification scheme, or developer specification requires. F1 Composite engineering can issue project-specific calculation packs for any of these schemes on request.

Scheme	70-Series	80-Series	90-Series	140-Series
EU EN 14351-1 / nZEB	✓	✓	✓	✓
PHI Passive House (phA arctic)	—	—	✓	—
AS 2047 / AS/NZS 4420.1 (Australia)	✓	✓	✓	✓
NFRC ENERGY STAR (US)	✓	✓	✓	✓
China GB 50189 Green Building	✓	✓	✓	✓
Ultra-low-energy / Net-Zero	—	✓	✓	✓

Climate zone guidance. Hot-dry and hot-humid coastal: 70-Series or 80-Series with double-silver Low-E glass build. Temperate / mixed-humid: 80-Series tilt-turn with triple glazing. Cold and severe-cold (including PHI passive house): 90-Series with argon-filled triple Low-E. Marine and coastal: any series with AAMA 2604 powder-coat finish; FRP is corrosion-immune.

Acoustic performance

All F1 Composite series achieve EN ISO 717-1 sound reduction class 4 minimum ($R_w \geq 35$ dB); the 90-Series with asymmetric laminated glazing reaches class 5 ($R_w \geq 40$ dB) suitable for airport-adjacent and high-traffic urban developments.

Sub-Frame Profiles and Customisation

F1 Composite supplies five standard pultruded GFRP sub-frame profiles for wall integration, structurally rated to support the full leaf load of any window or door series in the catalog.

Sub-frame profile	Section (mm × mm)	Use case
F1-SF-65×24	65 × 24	Lightweight residential, retrofit installation
F1-SF-75×25	75 × 25	Standard residential casement and tilt-turn
F1-SF-75×50	75 × 50	Heavy casement and prefabricated modular wall
F1-SF-90×25	90 × 25	90-Series passive-house casement
F1-SF-90×50	90 × 50	Sliding-door perimeter and large-format leaves

Custom pultruded profiles

Beyond the standard catalog, F1 Composite designs and pultrudes project-specific profiles. Typical custom-engineering requests:

Specialised mechanical performance — higher fibre volume, biaxial reinforcement, or hybrid carbon-fibre sections for tall openings and curtain-wall integration.

Environmental enhancement — marine-grade resin systems for coastal exposure, UV-stabilised matrix for high-altitude and tropical service, fire-retardant formulations meeting national class B1 / B2 ratings.

Architectural geometry — historic-replication profiles for heritage replacement work, slim sight-line profiles for curtain-wall integration, and curved pultrusion for arched openings.

Sustainability and Lifecycle

Embodied carbon

Pultruded GFRP frames carry roughly 1/5 the cradle-to-gate CO■ of equivalent aluminium frames and 1/3 of equivalent PVC-U frames at matched U-value. EN 15804 Environmental Product Declarations are available on request for project-specific lifecycle assessment.

Service life

Service life of pultruded GFRP frames matches the building lifespan (50 – 100 years) under normal exposure. There is no rust, no rot, no warpage; the seal-fatigue failure mode driven by thermal expansion is suppressed by the low CTE. Replacement-cycle costs across a 50-year building life favour GFRP over aluminium and PVC-U by a factor of 2 – 4× in lifecycle cost analysis.

End-of-life

End-of-life FRP frames can be mechanically shredded and used as filler in construction concrete or as raw feed for secondary FRP products. F1 Composite participates in industry-wide composite recycling pilots and can provide project-specific end-of-life pathway documentation.

Low-VOC manufacturing

Our pultrusion lines use low-VOC resin and release-agent chemistry; powder-coat finishes carry no solvent emissions. The finished frame meets IAQ requirements for sensitive occupancies including hospitals and schools.

Ordering and Engineering Support

Step 1 — Specification

Send your project drawings, target U-value, performance grades, and any national-code requirements to sales@f1composite.com. The F1 Composite engineering team will return a system recommendation and preliminary U-value pack within two business days.

Step 2 — Sample and qualification

Profile samples are available within one week of request. Project-specific qualification testing — AS 2047, NFRC, PHI re-certification — is coordinated through the relevant certification body; F1 Composite manages the lab booking and documentation pack.

Step 3 — Order and lead time

Standard catalog profiles ship in 4 – 6 weeks from confirmed order, FOB Chinese seaports. Custom-engineered profiles ship in 8 – 12 weeks depending on die fabrication time. CIF and DDP Incoterms available; consolidation with sub-frames and hardware can be coordinated through the F1 Composite logistics desk.

Step 4 — Material Test Certificate

Every shipment includes a project-stamped Material Test Certificate (MTC) tied to the production batch, with traceable fibre and resin lot numbers, profile dimensional QC, and full mechanical-performance results against the EN 13706 grade.

Engineering and sales contact

Email	sales@f1composite.com
Website	https://www.f1composite.com
AI advisor	https://www.f1composite.com/ask
Downloads	https://www.f1composite.com/resources/downloads
Calculator	https://www.f1composite.com/frp-profile-calculator

This catalog is published by F1 Composite as engineering reference for specifiers and fabricators. Values are typical for the standard production run; project-specific U-values, structural performance classes, and certification documentation are issued at point of order. F1 Composite reserves the right to revise specifications without prior notice to support continuous product improvement.