

— TECHNICAL CATALOGUE

GRP profiles for the transport sector



SINCE 1998

INNOVATION IN COMPOSITES



Specialists in GFRP Profiles, Since 1998

Tecnipul is a specialized company focused on the design and manufacturing of GFRP (Glass Fiber Reinforced Polymer) profiles through an automated pultrusion process. This technology enables the production of continuous profiles with complex geometries, high dimensional accuracy, excellent mechanical properties, and a high-quality surface finish.

From our facilities in Els Prats de Rei (Barcelona), we supply GFRP profiles—such as roof fairings, floor decking profiles, ventilation ducts, ceiling panels, and corner covers—for tramways, trains, buses, and truck bodies.

Our turnkey value proposition integrates engineering & design, manufacturing, CNC machining, insert adhesive bonding, and painting, offering a comprehensive end-to-end service while ensuring total traceability, consistent quality, and batch repeatability.

+25
YEARS OF
EXPERIENCE

10.000 m²
INDUSTRIAL
FACILITIES

23
PULTRUSION
LINES

3
CNC MACHINING
CENTERS

1 Roving Feeding

Rovings consist of continuous glass fiber filaments grouped into strands, serving as the core structural foundation of the profile.

2 Fabric Reinforcement

Continuous filament mats (CFM) or woven glass fiber fabrics are integrated to enhance the mechanical properties of the profile.

3 Forming and Impregnation

The fibers are thoroughly impregnated inside the mold via a resin injection process.

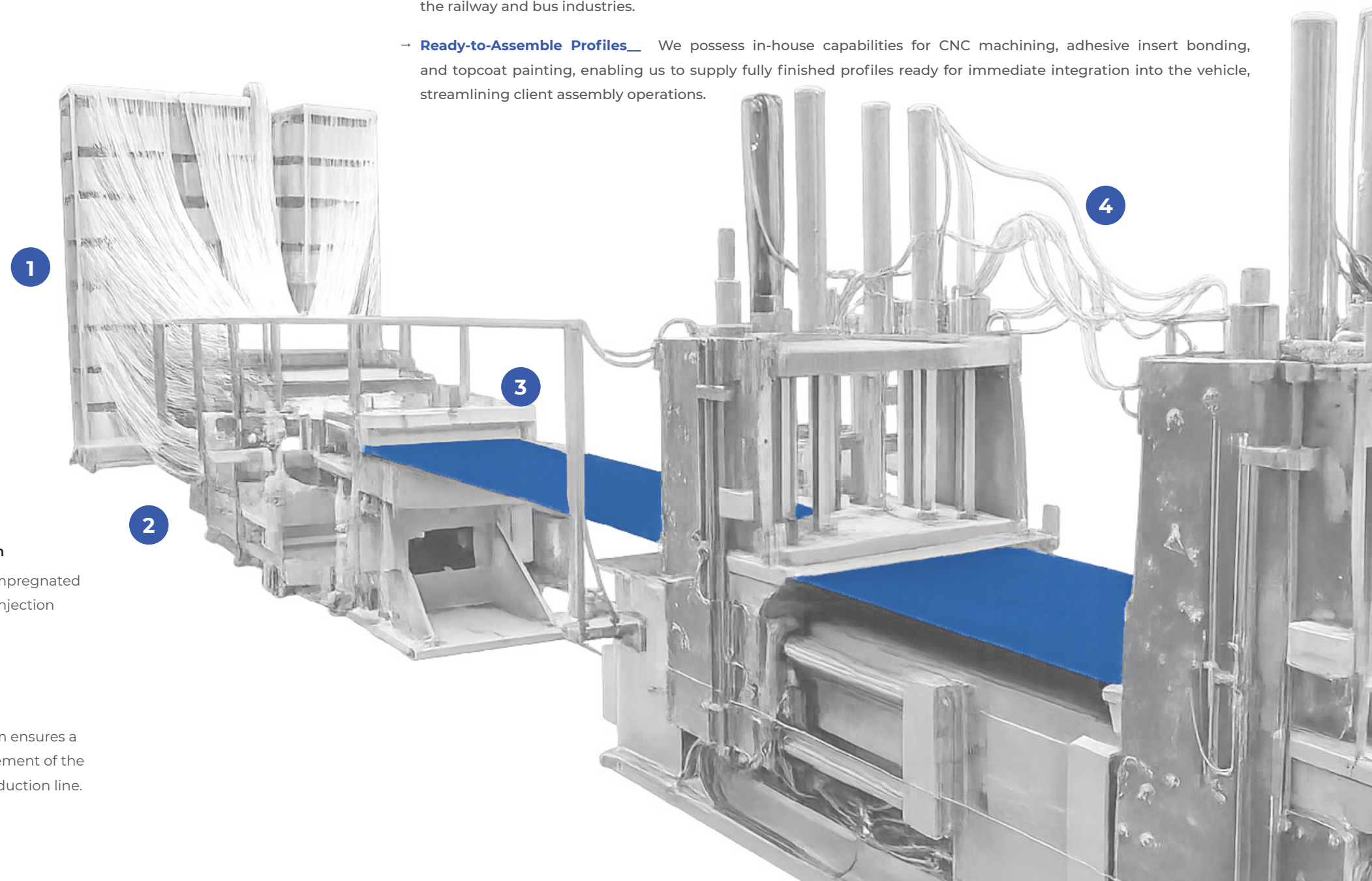
4 Pulling System

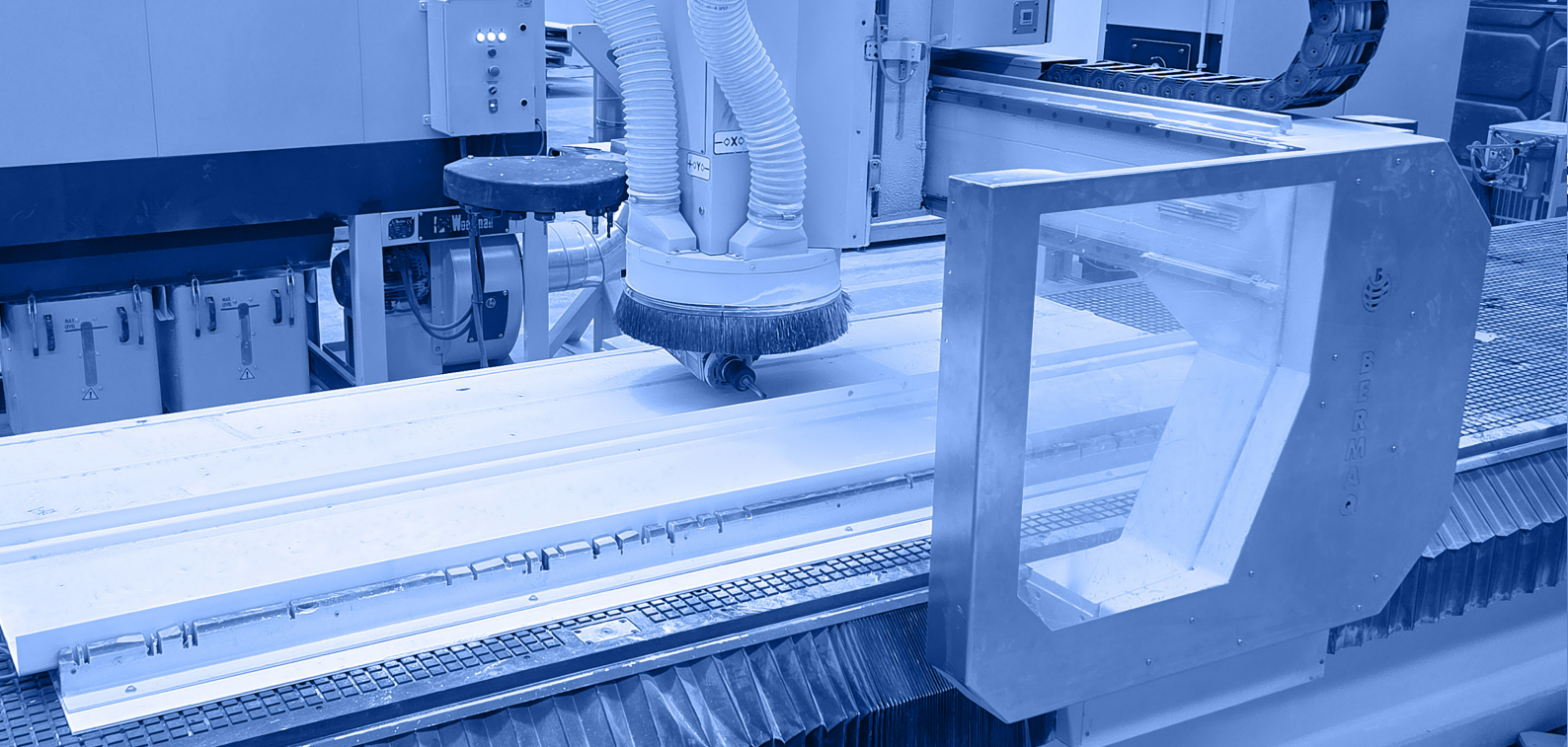
A continuous pulling system ensures a steady, uninterrupted movement of the profile along the entire production line.

Tailor-Made Pultrusion

With over 25 years of experience working alongside rolling stock manufacturers, engineering firms, bodybuilders, and transport operators, we develop custom profiles tailored to the technical, functional, and regulatory requirements of each project.

- **Complex Geometries__** Pultrusion technology allows us to develop profiles with cross-sections adapted to specific application requirements, integrating multiple functions into a single profile.
- **Fire Performance & Safety__** We have developed custom resin formulations to comply with the strict fire safety requirements of the railway sector (EN 45545 standard, HL2 hazard level classification).
- **Integrated Functions__** We integrate features that traditionally require multiple separate parts—such as guides, stiffeners, or fastening systems—into a single profile cross-section, reducing total component count and simplifying installation.
- **Physical & Mechanical Properties__** Featuring a density of approximately 1.7–1.9 g/cm³ and an exceptional strength-to-weight ratio, our GFRP profiles offer a combination of lightness, structural strength, and durability—key factors for the railway and bus industries.
- **Ready-to-Assemble Profiles__** We possess in-house capabilities for CNC machining, adhesive insert bonding, and topcoat painting, enabling us to supply fully finished profiles ready for immediate integration into the vehicle, streamlining client assembly operations.





Precision Machining & Fabrication

Equipped with three 5-axis CNC machining centers, we supply fully fabricated GFRP profiles ready for final assembly. We perform precision cutting, drilling, milling, routing, chamfering, and other custom machining operations with high precision and repeatability tailored to each project's specifications.

Ready-to-Assemble Profiles

Once the pultrusion process is completed, the profiles move to our machining division, where each part is tailored to the customer's exact assembly specifications.

Our machining capabilities range from simple operations to complex geometries requiring tight dimensional tolerances and high repeatability in large production series. We combine 5-axis CNC centers with conventional machinery to offer a flexible solution suited to every component.

This integrated service delivers fully finished profiles ready for vehicle installation, eliminating intermediate processing for the customer, shortening assembly lead times, and guaranteeing controlled tolerances and complete product traceability.

Structural Adhesive Bonding

Tecnipul is certified under the EN 17460 standard (Railway applications — Adhesive bonding of railway vehicles and components) in Category A3, featuring qualified, specialized personnel for executing structural adhesive joints.

We feature a dedicated bonding clean area equipped with temperature and humidity environmental controls. Every adhesive joint follows defined and validated procedures for surface preparation, adhesive application, and curing, guaranteeing quality, process repeatability, and traceability.

Our expertise includes the installation of threaded inserts and mechanical fasteners in GFRP profiles, particularly for applications such as fairings, floor decking, and other components for the railway and transport sectors.

Kitting & Project Supply Chain

Deliveries for these sectors are managed using project- or vehicle-specific kits, containing the complete set of profiles required for final assembly. Each kit is delivered referenced, labeled, and ready for installation, optimizing customer logistics and reducing line preparation time.

→ **Assembly of threaded inserts** and fastening elements.

→ **Project-specific kits**, referenced and labeled.

→ **Just-In-Time (JIT) delivery**, aligned with customer manufacturing schedules.

→ **Complete traceability** across batch, process, and sub-component levels

Coating & Surface Finishing

Tecnipul has extensive expertise in topcoat painting and surface finishing of pultruded profiles, particularly for fairing components used in railway and transport applications.

We feature two certified paint systems, engineered to satisfy the strict requirements for fire performance, smoke emission, and toxicity established by the EN 45545 standard.

Integrating all manufacturing phases—pultrusion, machining, bonding, and painting—combined with over 15 years of experience supplying components to the rail and bus sectors, enables us to provide a complete turnkey solution and serve as a reliable partner for transport projects.



Different Profiles, Tailored Requirements

Each vehicle zone demands specific technical design and performance criteria for GFRP profiles. While exterior fairings, floor profiles, and ventilation ducts share pultrusion technology, each requires dedicated developments suited to its function and operating environment.



Roof Fairings

Installed on the top section of the vehicle to protect and conceal rooftop equipment, providing aerodynamic continuity and visual alignment with the overall bodywork.

The design of these components must meet various technical requirements:

- **Surface Finish__** Form part of the exterior envelope, requiring high surface quality to ensure visual continuity with the coachwork.
- **Mechanical Strength__** Engineered to withstand aerodynamic loads during train operation..
- **Fire & Smoke Requirements__** Compliant with EN 45545 fire safety standards for passenger transport.

Floor Profiles

The primary advantage of using GFRP profiles in railway flooring is the significant reduction in lifecycle maintenance costs compared to traditional solutions like plywood. GFRP profiles provide superior durability, moisture resistance, and dimensional stability, drastically reducing replacements and repairs.

Unlike conventional sandwich panels, GFRP pultrusion offers exceptional design flexibility. The same profile design can be adapted to different projects simply by adjusting the CNC machining program, allowing fast, cost-effective adaptations for new vehicle configurations.



- **Mechanical Strength__** Engineered to support structural floor loads.
- **Extended Service Life__** High durability lowers maintenance interventions and optimizes overall vehicle lifecycle costs.
- **Machining Versatility__** A single profile cross-section adapts to multiple project designs via machining tweaks, avoiding the need for new molds or custom panel tooling.
- **Fire & Smoke Requirements__** Compliant with EN 45545 fire safety standards for passenger transport.

Key factors considered during design include structural strength, fire behavior, water absorption, dimensional stability, and surface finish to ensure seamless vehicle integration.



Side Fairings (Upper, Between-Windows & Waistline)

GFRP side fairings are increasingly used in exterior cladding for railway cars and buses, primarily due to their low density (1.7 g/cm³ vs 2.7 g/cm³ for aluminum) and the ability of pultrusion to integrate complex geometries, fastening channels, and functional features directly into the profile.

Like the roof fairing, these components must meet specific design and performance requirements:

- **Surface Finish__** Delivers aesthetic continuity with high surface quality for the exterior envelope.
- **Mechanical Strength__** Designed to endure aerodynamic pressure waves and operational mechanical stresses.
- **Fire & Smoke Requirements__** Compliant with EN 45545 fire safety standards for passenger vehicles.

Ventilation Ducts & HVAC Profiles

The capability to manufacture GFRP profiles with custom cross-sections allows for ducting designs tailored to tight space constraints and specific vehicle layouts.

Combining low density, corrosion resistance, low water absorption, and excellent fire/smoke performance makes pultruded GFRP profiles an ideal solution for train and bus ventilation systems.



Principales requerimientos:

- **Complex Geometries__** Cross-sections adapted to space limitations and structural requirements.
- **Low Water Absorption__** Ensures dimensional stability and long-term durability in humid airflow environments.
- **Low Density__** Reduces total weight of the HVAC network compared to metallic or higher-density materials.
- **Corrosion Resistance__** Immune to metallic oxidation and corrosion, guaranteeing extended lifespan.
- **Fire & Smoke Requirements__** Compliant with EN 45545 fire safety standards for railway air handling.



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