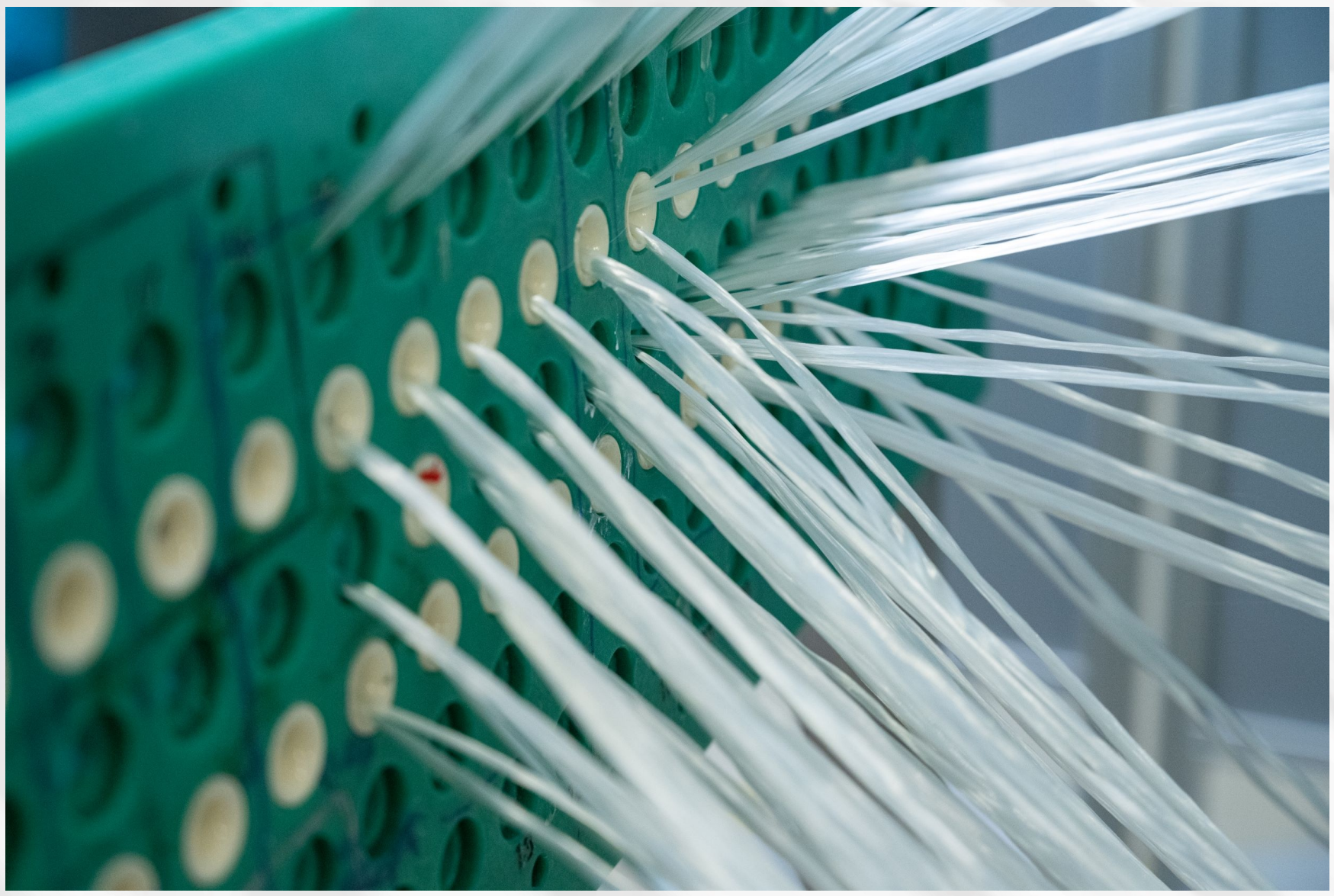
WELCOME TO THE WORLD OF PULTRUSION



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PULTRUSION TECHNOLOGY
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ABOUT EPTA

EPTA is the the European Pultrusion Technology Association. It was created in 1989 by the leading Pultruders in Europe. With today 40 member companies/institutions EPTA is the largest pultrusion network in Europe. The mission is to support the growth of the composite profiles industry by maximizing external communication efforts and having an actively contributing membership. EPTA is open for membership to all companies and organizations, wishing to participate promoting the responsible use of Fiber Reinforced Composite Materials, and in the exchange of knowledge between members.

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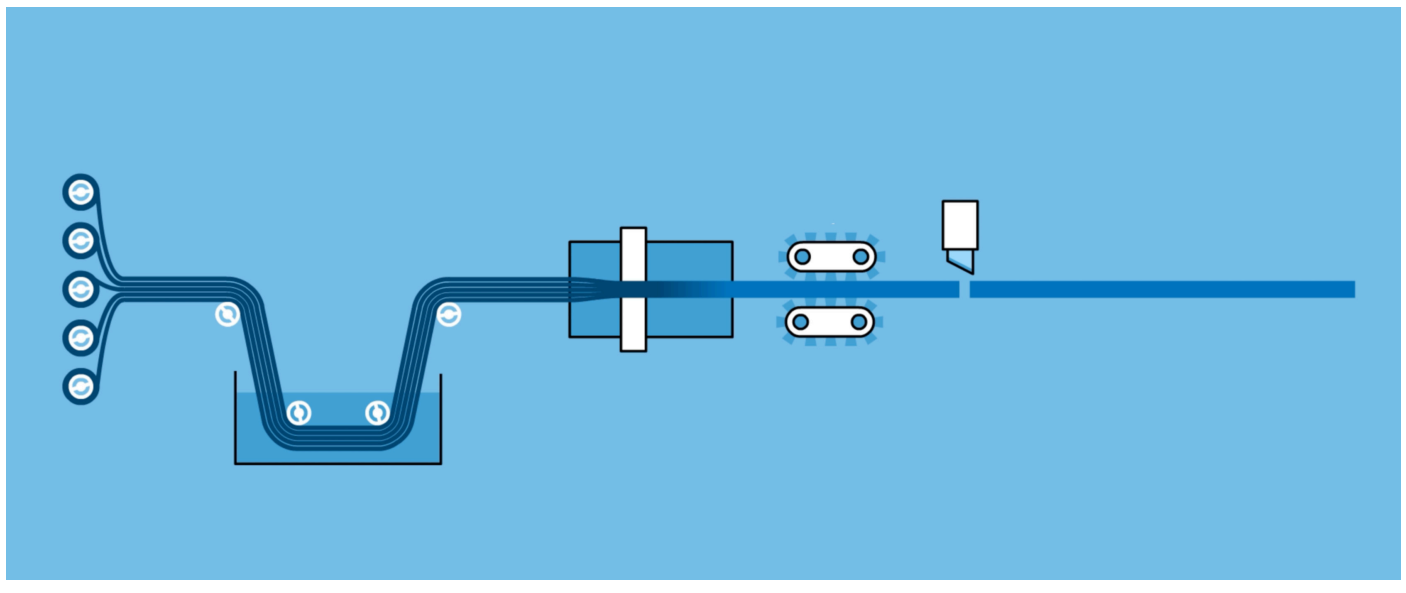
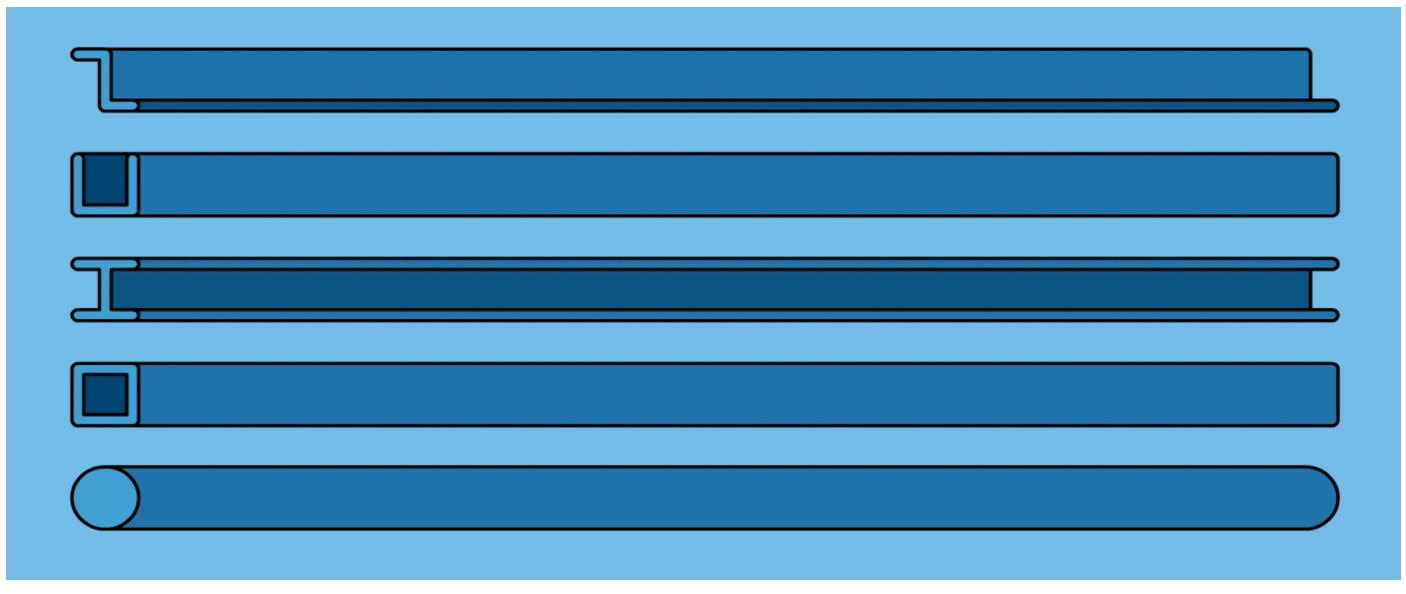
WHAT IS PULTRUSION?

Pultrusion is an automated process for the continuous production of FRP (Fiber Reinforced Plastics) profiles with a constant cross section.

The process is very well established with nearly unlimited possibilities. In the process, the use of various materials/semi-finished products is possible.

The pultrusion process starts with the reinforcing material. This is guided in front of the mould. The material is than pulled, by caterpillar take-off units or hydraulic clamps, into the impregnation area. In the next step the wet/impregnated fibres are pulled through the heated die, where the material is getting its final shape and is cured. The finished profile is then cut to the required length by a saw.





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Why using FRP?

FRP stands for Fibre Reinforced Plastics. These materials have some outstanding advantages in comparison to other construction materials (e.g.):

- Corrosion and wheather resistance
- High lightweight potential (low density)
- Excellent chemical and biological resistance
- It does not rust nor rot
- Minimal maintenance during use
- No electrical conductivity (GFRP*)
- Transparent to electromagnetic waves

*GFRP (Glassfibre Reinforced Plastics)

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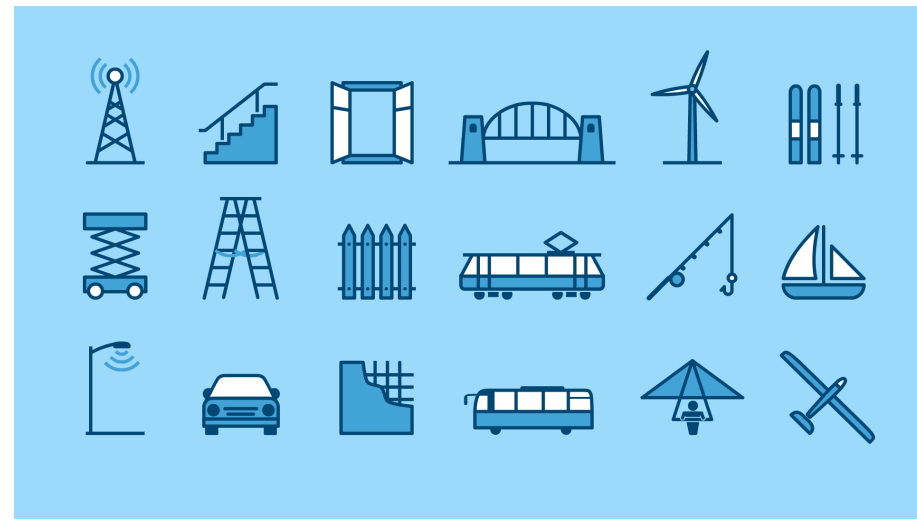
ADVANTAGES OF PULTRUSION?



FRP-Profiles are perfect materials for the construction of structural elements.
There are several advantages (e.g.):

- Load- & application-oriented design possible
- Length of pultruded profiles is completely unrestricted – only limited by the conditions of transportation
- Production at a constantly high level of quality
- Profiles are easy to transport and to install
- Nearly no limitation in shape of the profiles
- Excellent mechanical properties
- Very high tensile strength
- Use of various materials/semi-finished products possible

COMPARISON OF COMPOSITES, STEEL AND ALUMINIUM

		Glass fiber composites		Carbon fiber composites			
Property	**Unit**	**UD pultrusion**	**E23 pultrusion**	**UD standard**	**Quasi isotropic**	**Aluminium**	**Steel**
Density p	g/cm³	2	1,8	1,6	1,55	2,7	7,85
Tensile elastic modulus E	GPa	40	23	135	50	70	210
Tensile strength σ	MPa	1000	240	1500	250	240	250
Specific modulus E/p	MNm/kg	20	13	84	32	26	27
Specific strenqth σ/p	kNm/kg	500	133	938	161	89	32

For each property a „typical“ value is chosen for an easy comparison and understanding. Properties can vary depending on the grade or type of material.
The listed properties for the pultruded profiles corresponds to the requirements of EN 13706. Properties can be customized and hybrid fiber compositions are possible for optimized mechanical performance.

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WHAT ABOUT SUSTAINABILITY?

Composites have great advantages when it comes to sustainability! In general, the materials are durable, engineered materials, providing longevity, strength, excellent chemical and heat resistance, and freedom of design.

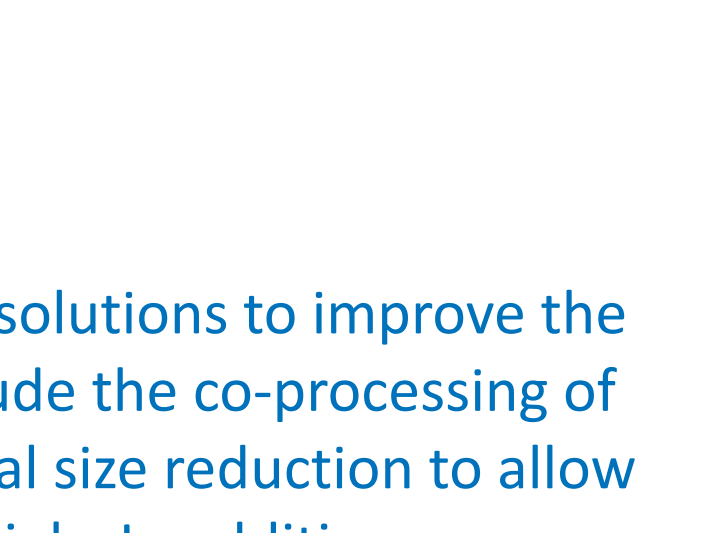
The Composites market is growing consistently over the last decades. This trend will accelerate with the implementation of new policy measures in Europe promoting renewable energy, reduced energy use, and lightweight, durable solutions for transportation, buildings and infrastructure.

CURRENT SITUATION

Composites cannot be easily separated into their fibre and matrix components, which is the basis for the success of these versatile materials but also means they are inherently difficult to recycle. The EuCIA (European Composites Industry Association) estimates that 40-70% of the composites waste today is still ending in landfill or is incinerated without energy recovery.

CIRCULAR SOLUTIONS FOR TODAY AND TOMORROW

Over the last decade, the industry has been working on solutions to improve the circularity of composites. These emerging solutions include the co-processing of composites in cement clinker production, and mechanical size reduction to allow reuse in new composite products, replacing virgin materials. In addition, many other solutions to preserve intrinsic material properties are currently researched, developed or tested by, or with the support of, the industry, such as product design and strategies to maximise the service life of products, to fostering the re-use of composites in other applications, as well as develop new recycling processes aiming at increasing the value retention of composites.



Source: EuCIA - POSITION PAPER: CIRCULARITY OF COMPOSITE MATERIALS

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PULTRUDED PROFILES – A STANDARD MATERIAL?

STANDARDISATION

FRP-Profiles are commonly used in the construction industry and several other applications. The following standards are available regarding the manufacture, quality determination, and quality assurance:

- EN 13706 General European specifications for pultruded profiles
- DIN 18820 Reinforced laminates for load-bearing building components
- DIN 2768 Free dimensional tolerances
- ISO 178 / ISO 527 / ISO 604 / ISO 1183 / ISO R62
- IEC 93 & 112 Formal test specifications for material testing

EUROCODES

The EN Eurocodes are a series of 10 European Standards, EN 1990 - EN 1999, providing a common approach for the design of buildings and other civil engineering works and construction products.

The publication of the Eurocodes by the European Committee for Standardization (CEN) in May 2007 marked a major milestone in the European standardisation for construction, since they introduced common technical rules for calculation of the mechanical and fire resistance, and the stability of constructions and construction products.

There is also a new Eurocode for composites developed: CEN/TS 19101

It applies to the design of buildings, bridges and other civil engineering structures in fibre-polymer composite materials, including permanent and temporary structures.

Sources: https://eurocodes.jrc.ec.europa.eu/en-eurocodes; https://standards.iteh.ai/catalog/standards/cen/bebb5d0f-108f-4472-b688-f904ca7e91ce/cen-ts-19101-2022

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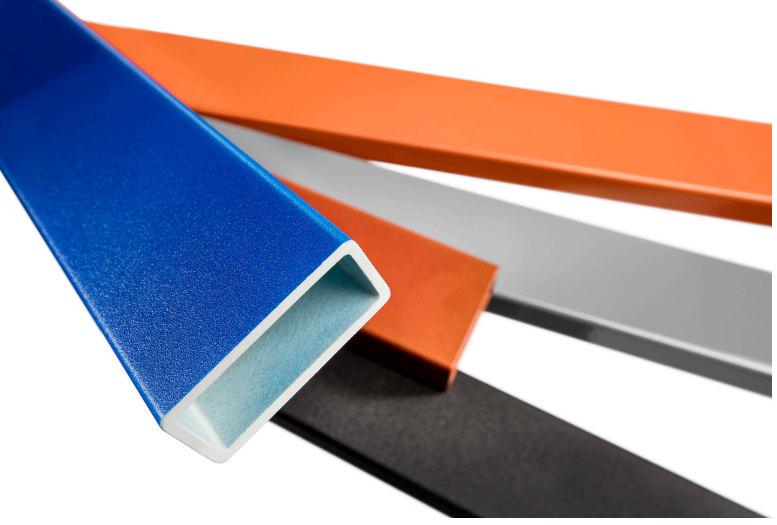
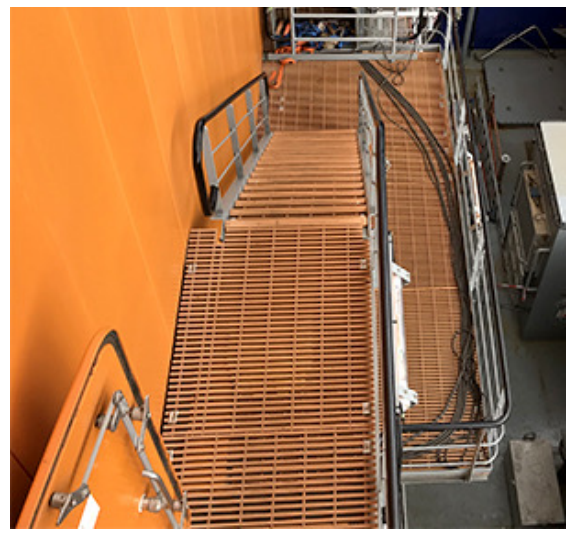


TYPICAL APPLICATIONS

FRP profiles are predestined for use in a challenging environment. The high-performance potential and outstanding properties have made FRP profiles the material of choice in many applications & industries. Today you will find profiles in building- and infrastructure sector, sports- and leisure, mobility, wind-industry and many more.

HANDRAIL/DECKING

SCAFFOLDING / STAIR ELEMENTS



WINDOW FRAME

CONSTRUCTION ELEMENTS

BRIDGE ELEMENTS

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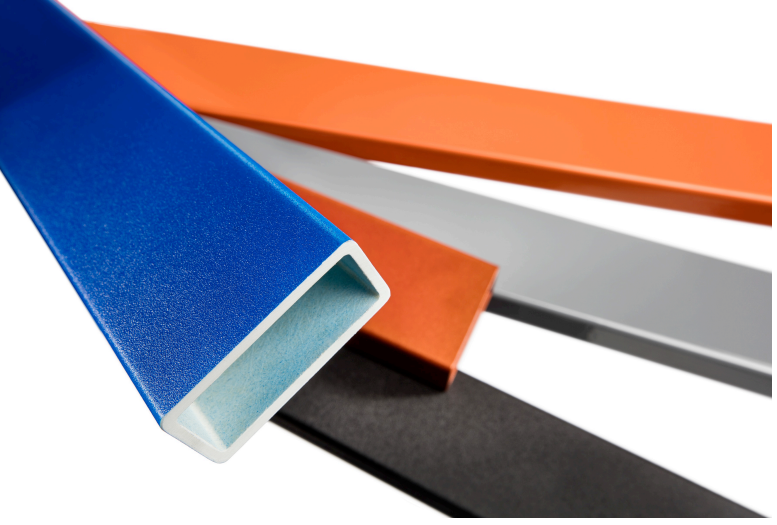

TYPICAL APPLICATIONS

FASTBUILD TRACK ELEMENTS

STRUCTURAL PROFILES

REFRIGERATED VEHICLES

PANELING

CABLE TRAY

PROFILES FOR WASTE WATER PLANTS

SMALL WIND TURBINES

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ADDITIONAL INFORMATION

You want to know more about pultrusion, technical specifications or our members?

Please visit our website www.pultruders.com
Find news articles, background documents and the largest pultrusion network in Europe.

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