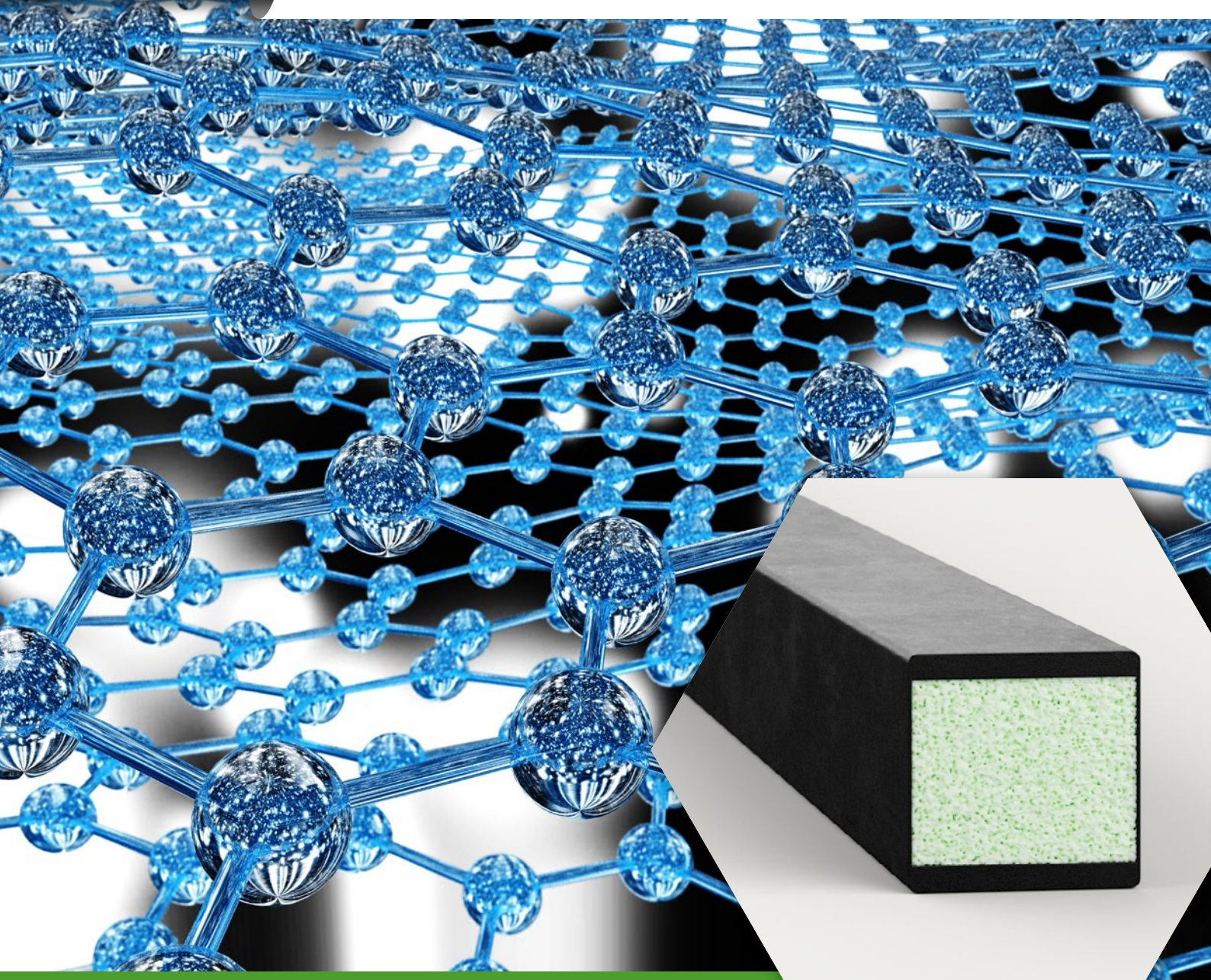


hochuli advanced

Composite Extrusion



Composite profiles

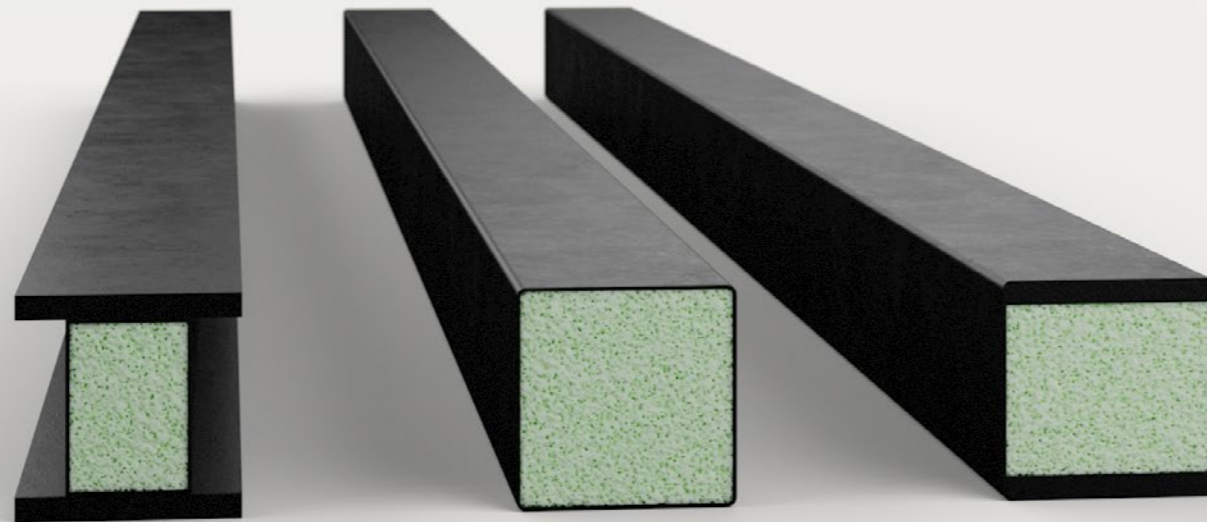
Made from recycled PET bottles at the core

- THE revolutionised method in construction
- For industry, electrical engineering, construction, logistics and design
- Ecologically sustainable with PET
- Enormous mechanical strength
- Lightweight

engineering
by **hochuli + Empa**

Hochuli Advanced AG - Progress thanks to technology

Hochuli Advanced AG is a spin-off from Hochuli Metallbau AG. Our specialists develop advanced, novel high-performance composites for the window, door, and facade industry as well as structural profiles for lightweight construction. The possibilities are unlimited. Together with your specialists we design solutions for individual applications.



We contribute to progress

Our insulation solution is made from 100% recycled old drink bottles that are reused.



Our composite profile with optimum load-bearing value

The innovative profile expands the dimensional range of profiles and enables greater design complexity. From this, more individual lightweight elements, structural measures and components for systems and machines can be produced.

The choice of materials used is revolutionising the market because it is ecologically sustainable. In the wrapping process, we combine the core material made of PET with the cover layer.

In the core, we achieve thermal insulation with the best insulation values thanks to ALPET® technology. Meanwhile, the thin, outer membrane layer optimises the load-bearing value of the profile.

From old to new: "Upcycling" of drink bottles

In close cooperation with scientists from the Swiss Federal Laboratories for Materials Science and Technology (Empa), we at Hochuli Advanced AG developed the innovative ALPET® insulating web for aluminium-glass facades. Innosuisse also supported this project.

The idea of individual "composite profiles" was derived from this. The foam core of these revolutionary profiles is made of 100% recycled PET. They are encased in glass-fibre reinforced thermoplastic. The usage time of the revolutionary material has been scientifically tested and its long-term stability confirmed (stepped isostress tests).

Expert advice from Hochuli Advanced AG

Our specialists develop the composite profiles customer specific. Geometry, width, depth, grooves and bars are adapted to the structural requirements. We support you through the entire process. Together with you, we plan the optimum cross-section for your application and implement it by means of composite construction. Through this process the construction meets the mechanical and physical requirements.

Customer discussions show that extruded composite profiles are in demand in industry and can also be used extensively. In addition to supporting projects in industry and design, we are further developing the product scientifically, with a focus on application and processing possibilities.

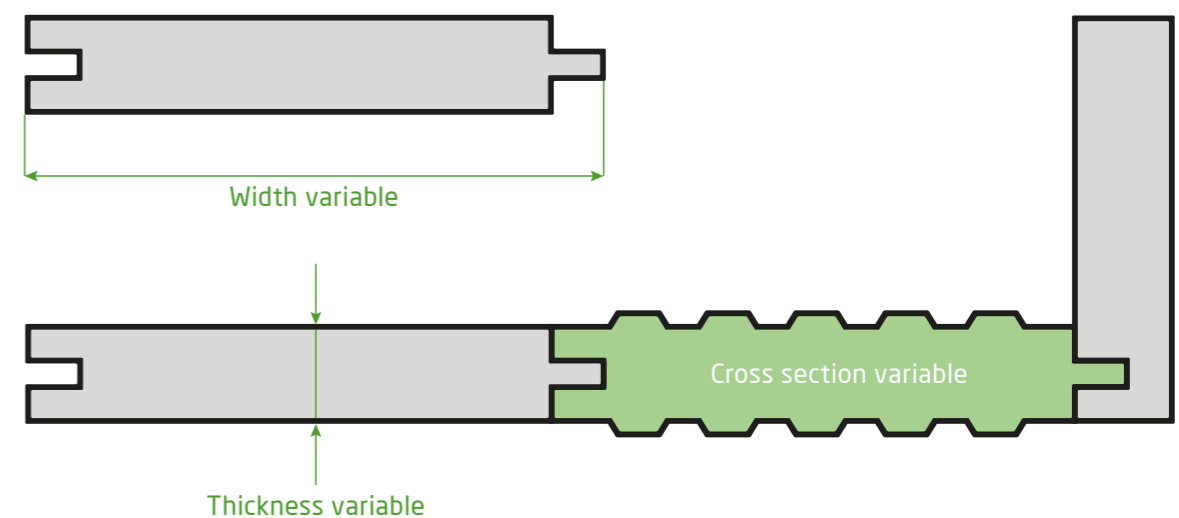
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Individual design possibilities

The new composite profile impresses with its high design flexibility for all requirements in lightweight construction and the significantly higher stability than the standard (tested with a scientific long-term study).

Our composite profiles offer significant advantages over conventional solutions.

- Almost unrestricted design of the cross-section
- Combination of conventional construction and lightweight systems
- Any profile length up to 7 metres





Composite profiles open new possibilities

With the sandwich construction method, the two materials are combined to form a composite material.

In our composite profiles, the insulating foam core made from recycled PET is wrapped with glass-fibre reinforced thermoplastic. The wrapping is done in a continuous manufacturing process and is therefore economically attractive.

Our composite profile opens new, uncharted perspectives. From our customers we are constantly discovering new possibilities for use and processing.

- Frame widening in window and door construction
- Weather-resistant substructures
- Profiles with groove and comb
- Etc.

The profiles are processed with standard wood, plastic, or metal construction tools.

Substructure for rear-ventilated facades



Fig. 3: Rotting-resistant substructure for rear-ventilated facades made of timber boarding or lamellae, natural stone, artificial stone or ceramic slabs, clinker brick slips, metal sheeting, glass

Frame extensions with sheet metal

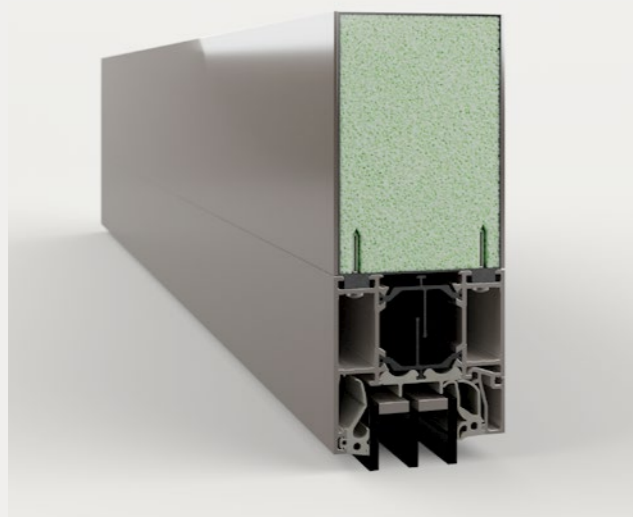


Fig. 1: Frame extensions adapted to the geometry of the profiles with a U-value $0.60 \text{ W/m}^2\text{K}$ at a thickness of 70mm

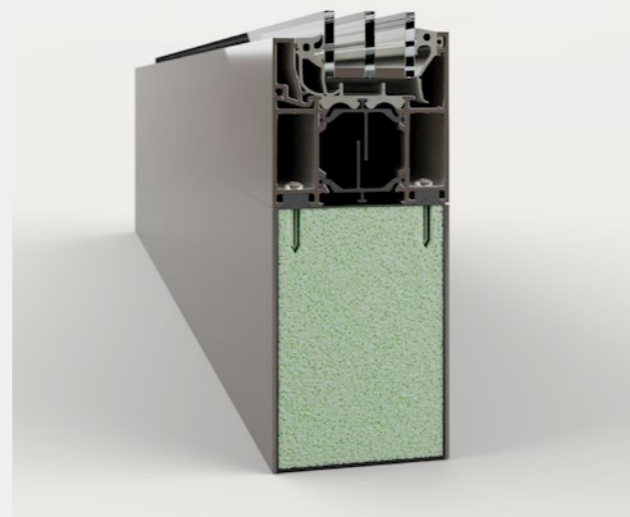


Fig. 2: Can also be used as a rot-resistant finish in the in the plinth area

Profiles with groove for screw lightweight constructions

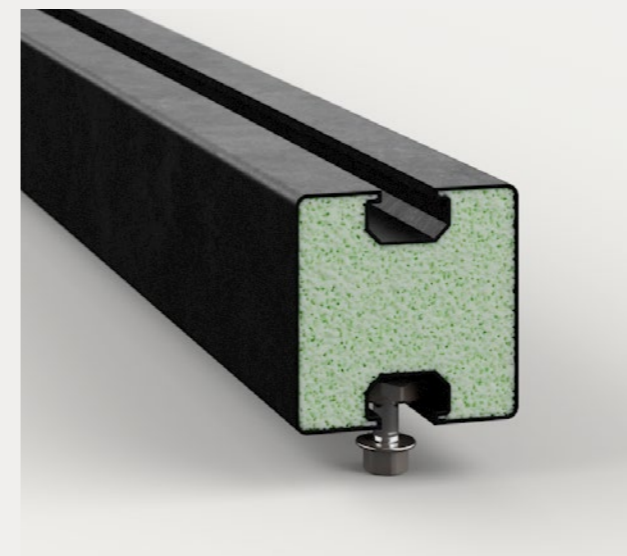


Fig. 3: Groove profile to accommodate commercially available hammer nuts or threaded plates

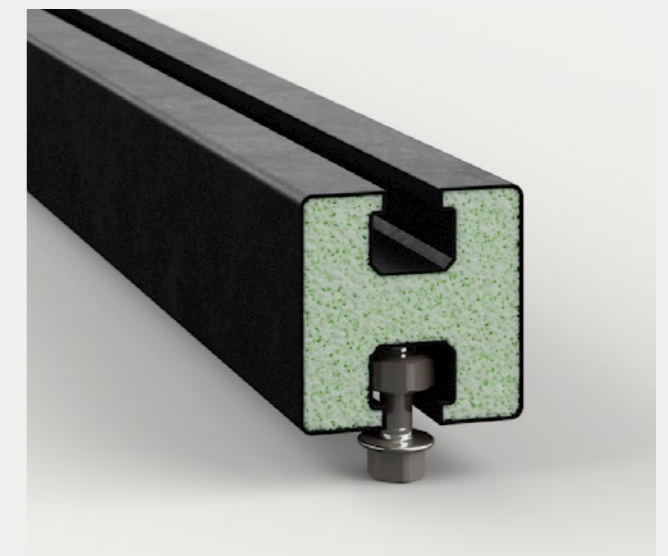


Fig. 4: Groove profile to accommodate commercially available hammer nuts or threaded plates



Profile selection as a base for welded constructions

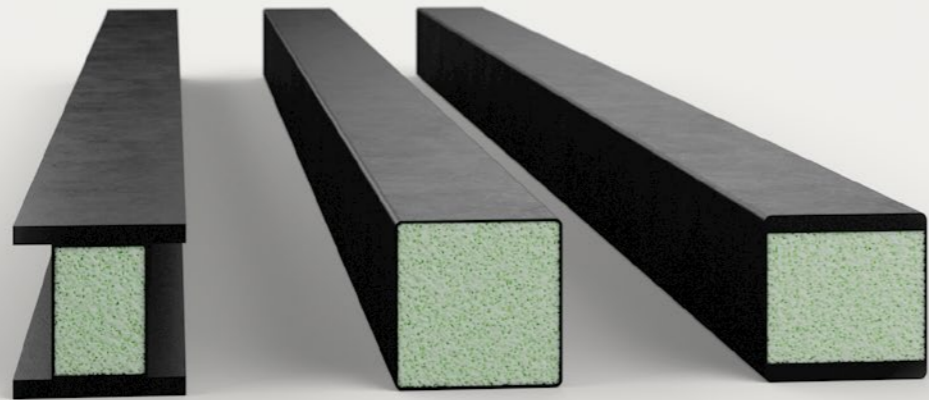


Fig. 6: We adapt shapes and cross-sections to the needs of your application.

Versatile constructions



Fig. 7: Trusses made of our composite profiles for supporting larger loads such as stage lighting

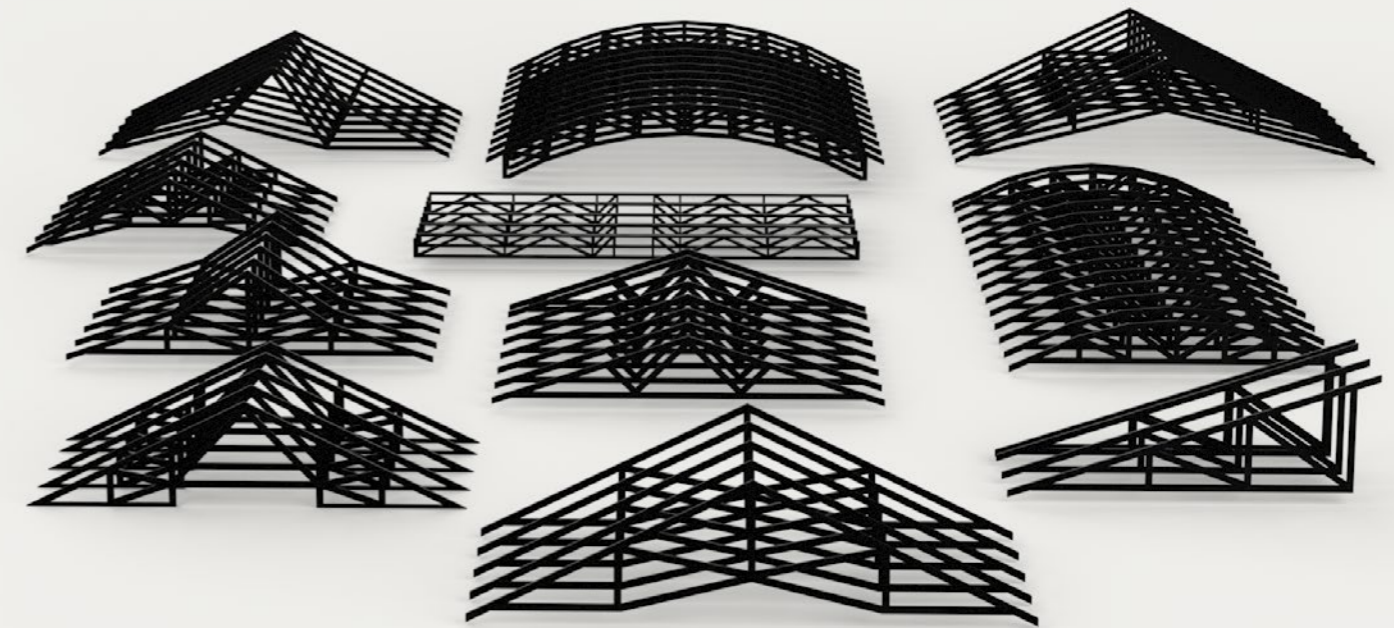


Fig. 8: Lattice girders for carrying larger loads such as roof structures



Fig. 9: Lattice girder for bearing larger loads such as small passerelles



Innovative applications

hochuli advanced
Composite Extrusion

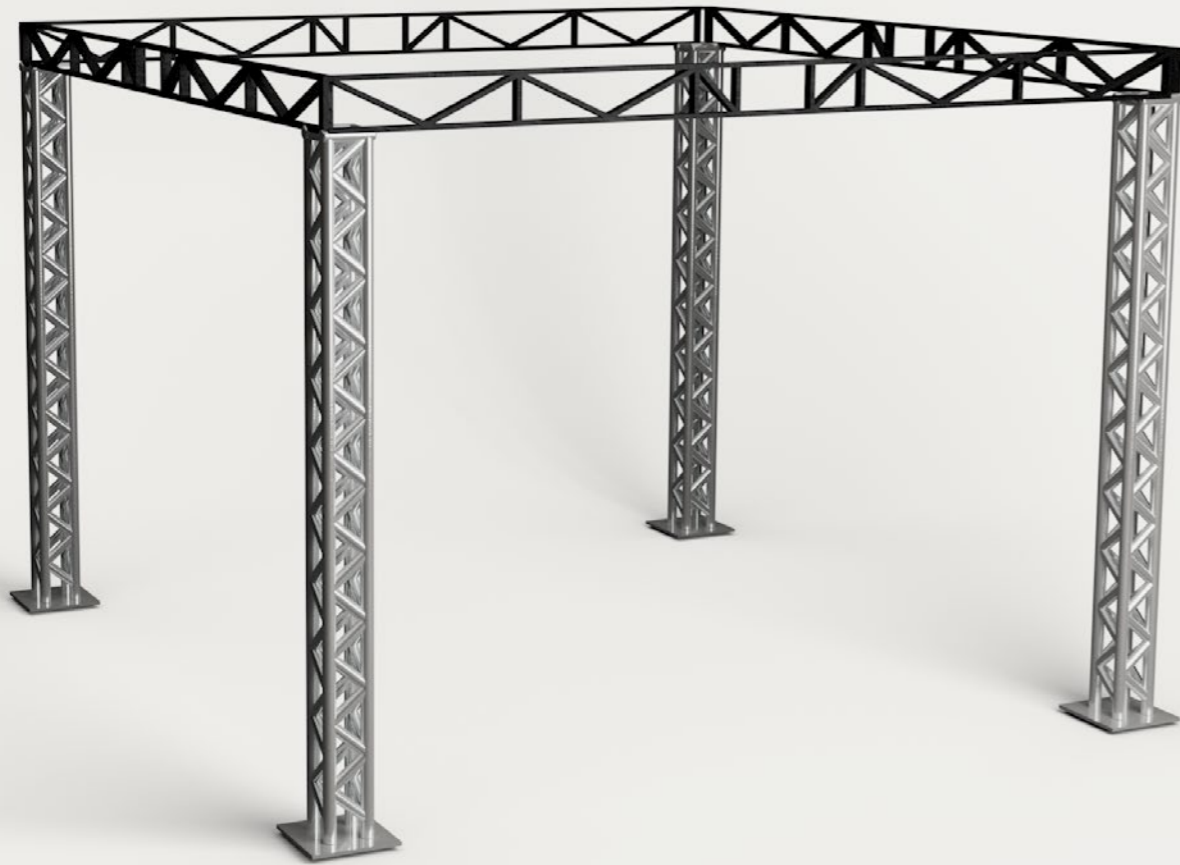


Fig. 10: Lightweight construction as a shelter for trade fairs or at home in the garden

Profiles with tongue and groove as a basis for plug-in constructions



Fig. 11: Plug-in system e.g. for floors or transport boxes with very good insulation values

Wide range of advantages

Industry, electrical, construction, logistics and design - several sectors benefit from the considerable variety of applications of our revolutionary solution. Our new, innovative material offers unique design freedom for complex geometries.

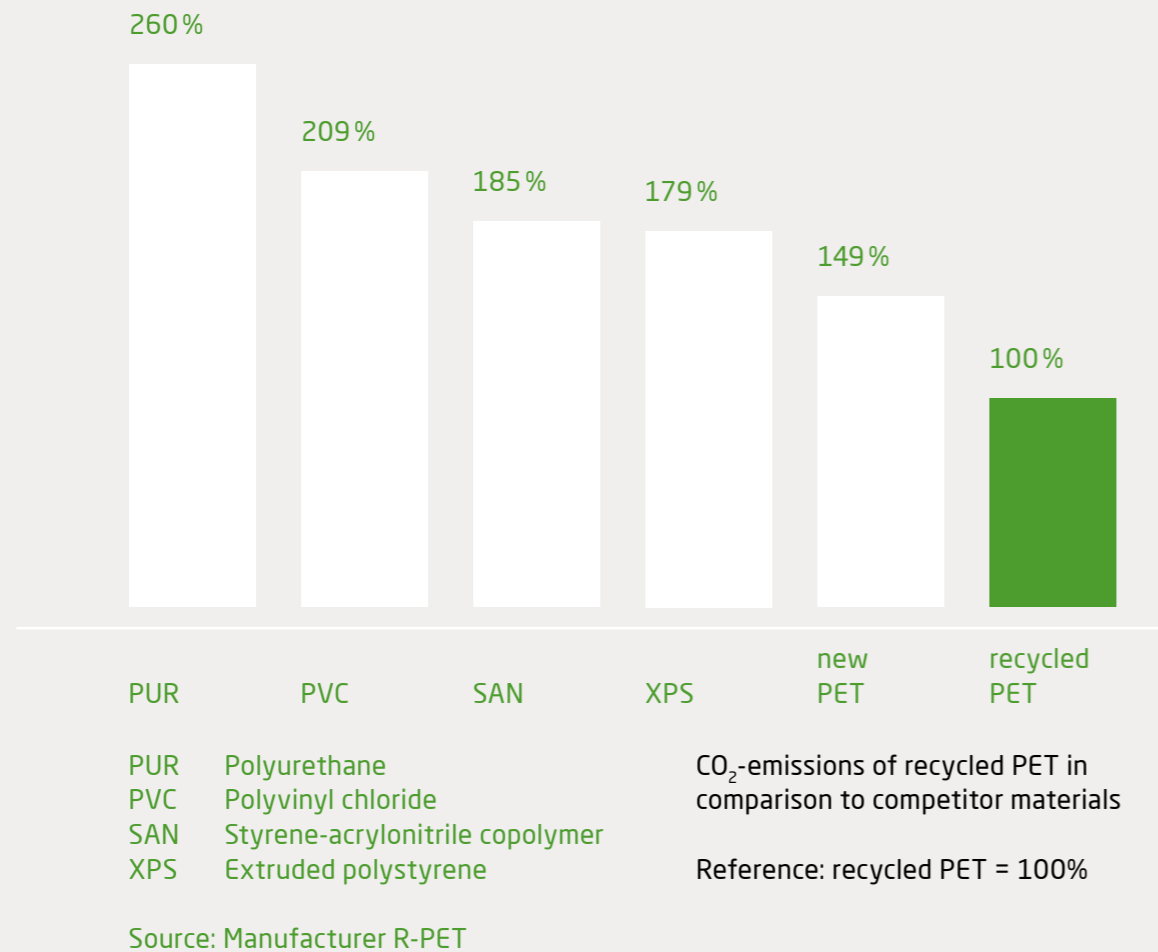
Our composite profiles offer a wide range of advantages over conventional materials:

- High load-bearing capacity with lowest net weight
- Electrical and thermal insulation (up to 3x lower thermal conductivity values)
- Weatherproof
- Resistant to aggressive chemicals and corrosion
- Good price-performance ratio due to continuous manufacturing process
- Local raw material sourcing and short transport routes for a healthy environment



Recycling

Recycled PET comes out on top in terms of CO₂-emissions



Patent process technology with lowest CO₂-emissions

The use of 100% recycled PET as the raw material base for our foam core results in significant savings in CO₂-emissions.

Sustainable values and philosophy

Upcycling (recycling with a material upgrade) or urban mining (our region as a raw material mine) are not just great buzzwords for us, but we consistently implement the concepts behind them. We are in the process of obtaining Cradle to Cradle certification. Because it is not only the first use of the raw material is in the foreground, but also the application afterwards.

For the day after tomorrow

The shell and core material can be 100% recycled or reprocessed together.

The insulating foam core is made from 100% recycled PET as the starting raw material.





Properties

Unique physical properties

- Unrivalled low thermal conductivity
- Electrical insulation properties
- Very light with high stiffness and stability
- Temperature resistant up to 200°C for several minutes

Resistant to chemicals and cleaning agents

- Prepas 130-720 Prelitin 750-200
- Singoli Citrus Power Cleaner
- KABE Paints Universal Thinner 5119
- KABE Colours Turpentine Substitute
- White GOSMO HD-100.411/412
- IBZ S-150 Isopropyl alcohol (substrate cleaner)
- Bider Hauser Microdosing Spray Oil
- Wieds Demysol 2012
- Ateco Tobler (diluted sulphuric acid)
- Ateco Tobler descaling aluminium
- Ateco Tobler pickling bath (diluted nitric acid and aluminium)
- Precap 950-006
- Esco 2-component aluminium adhesive

Versatile bonding options

- Good adhesive properties
- Very well suited for welding
- Screw connection
- Tongue and groove joint

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Welding



Unproblematic surface treatment

When our composite profiles are installed as a fixed component in an aluminium construction, the whole composition can be powder coated or anodised.

The effects of these coating methods on the material have been scientifically tested and are unproblematic. Compatibility and resistance to chemicals are also given.

For constructions made of pure composite profiles, colouring by wet paint is possible.

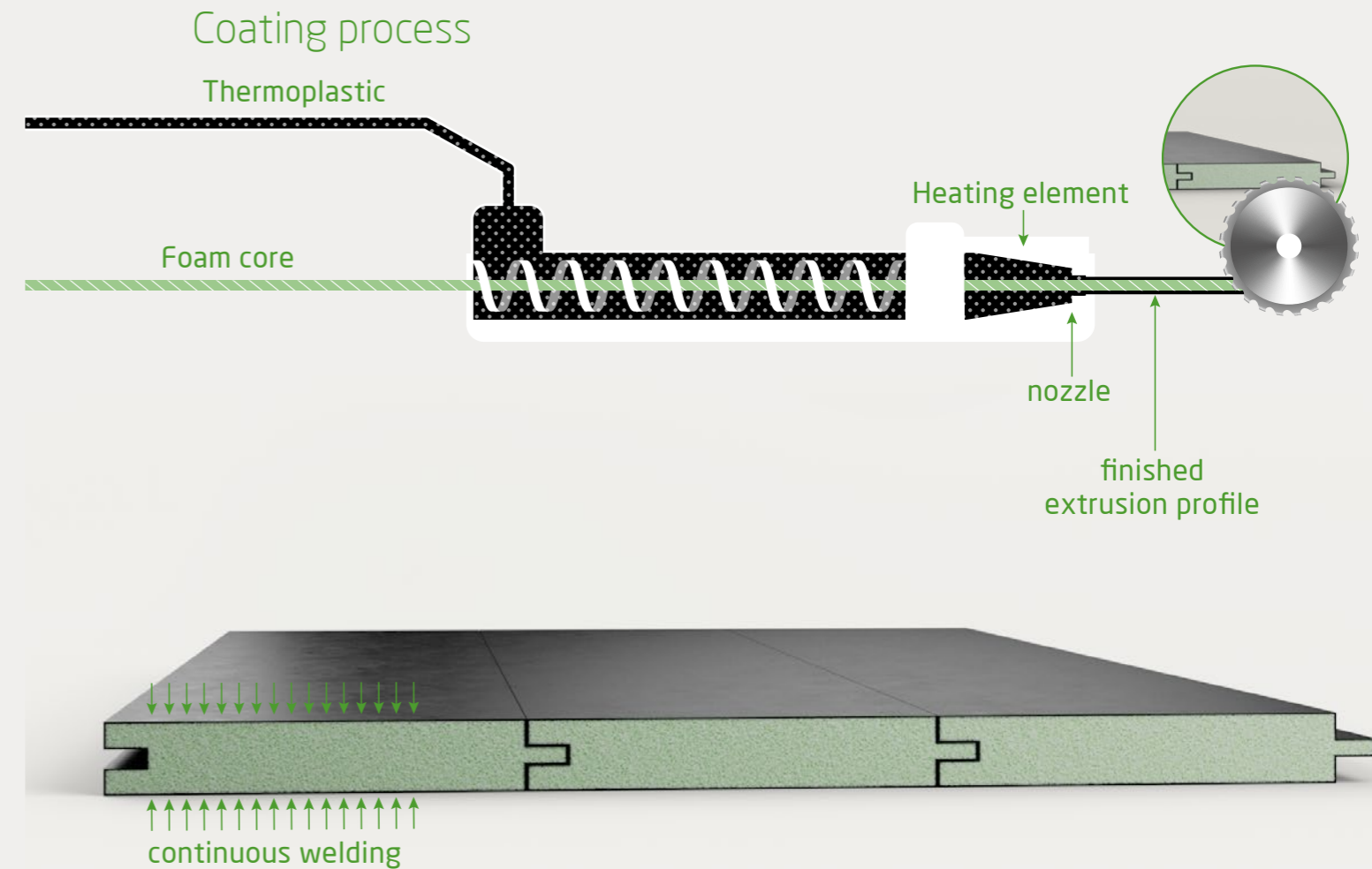
Easily weldable ...

The composite profiles can be welded together very well and permanently by bead welding or heating mirror welding.

... and load-tested

The technique of welding can be used to implement various lightweight constructions or frames for different areas of application. The welded joints withstand large loads without a problem.

- Product development with the support of material scientists, engineers, physicists, selected industrial partners and the scientific project partner Empa
- Engineering from conception to development
- Specialised personnel with many years of experience
- Innovative production of prototypes and series in own production
- Your competent partner



We continue to develop!

- New sandwich construction method, protected by three patents
- Further development of composite profiles in different cross-sections
- Coextrusion of new profiles
- Cradle-to-Cradle certification of the composite profiles
- Composite profiles with very high stiffness, e.g. as static insertion blanks
- Optimise welding processes to increase economic efficiency
- Further development of composite profiles for lightweight constructions



Upcycling and upgrading

The composite profiles can be easily recycled and returned to the cycle (urban mining).

Production and development

Scan the QR code. In a short video you will find an insight into the production process and individual development steps of ALPET®.

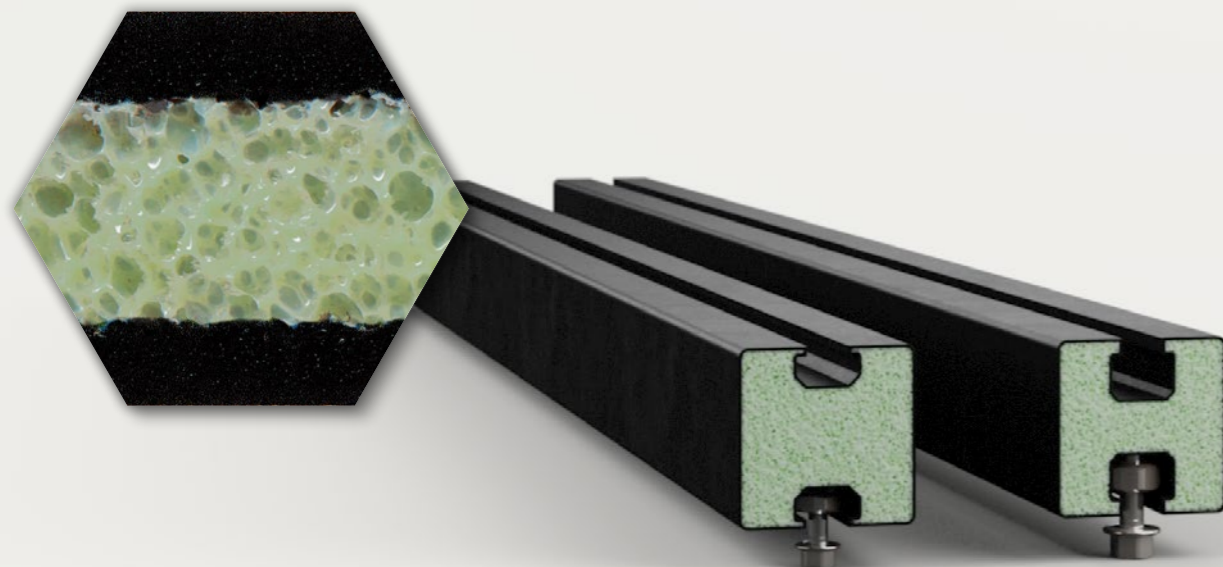


engineering

The structure of the composite profiles

In sandwich construction, we process the insulating structural foam core based on PET and encase it in glass-fibre reinforced, semi-crystalline thermoplastic.

Empty spaces are replaced by a foam with microscopically small air chambers.



Worth knowing

Fire behaviour

DIN EN 13505-1, Class E

Ageing behaviour tested

The ageing behaviour was extrapolated according to advanced scientific methods. (stepped isostress tests)

Partner

Innovation project supported by:



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Innosuisse – Schweizerische Agentur
für Innovationsförderung

Basic research and development by materials scientists at Empa:



Empa

Materials Science and Technology

Engineering, development and innovation from one partner.



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Innovative applications



Recycling



Properties



Surface treatment



Welding



Prospects



Upcycling

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