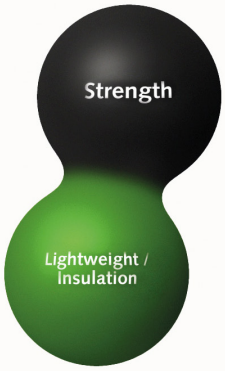
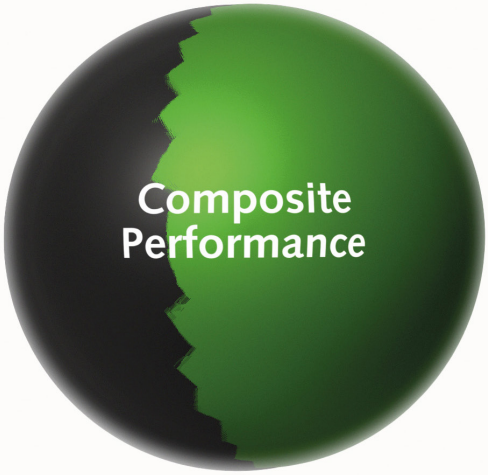
Composite

From Core to Surface: Physically Perfect

Composite technology deliberately combines materials to create a system whose performance exceeds that of the individual materials. By combining materials in a structured way, we can achieve properties that are unattainable with a single material.

Unmatched Performance Metrics





The Insulating Core

The core consists of a thermal-insulating foam made from recycled PET. It slows down heat flows, stabilizes the isothermal field, and minimizes thermal bridges. At the same time, it shows only marginal creep under load. Even under continuous load, its geometry remains stable.

The Stable Outer Layer

The outer layer provides stability. It is high-strength, chemically resistant, and absorbs loads. Due to its water-repellent properties, it prevents moisture uptake and keeps the core permanently dimensionally stable.

In Interaction

In combination, an insulating bar is created that achieves superior performance values: high, tunable strength for various applications, reliable chemical resistance, absolute dimensional accuracy without water absorption, minimal creep tendency, and optimized heat flow. Thus, insulation, stability, and durability are united in a single component. Together, they achieve more than they ever could individually.

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Composite Extrusion

engineering
by hochuli + Empa

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Everything Remains — Just Improved

Full Process Compatibility. No Retooling. More Performance.

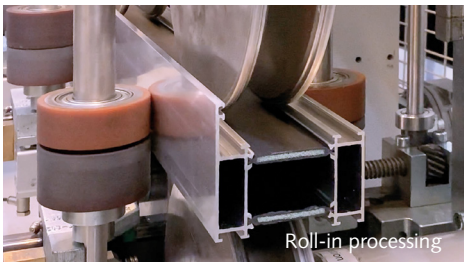
Maintain Processes

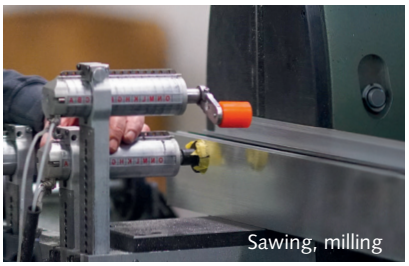
The insulating bar is designed to integrate seamlessly into existing processes. ALPET® was developed so that no new aluminum shells are required. Existing extrusion tools remain in use, and processing is carried out with the usual roll-in head. Even edge milling and adhesive cords remain unchanged. By eliminating inserts and the gluing process, you save additional costs.

Weldable

ALPET®'s weldability unlocks both technical freedom and economic value:

- Fewer components, less inventory
- Streamlined assemblies
- Material only where it matters


Roll-in processing

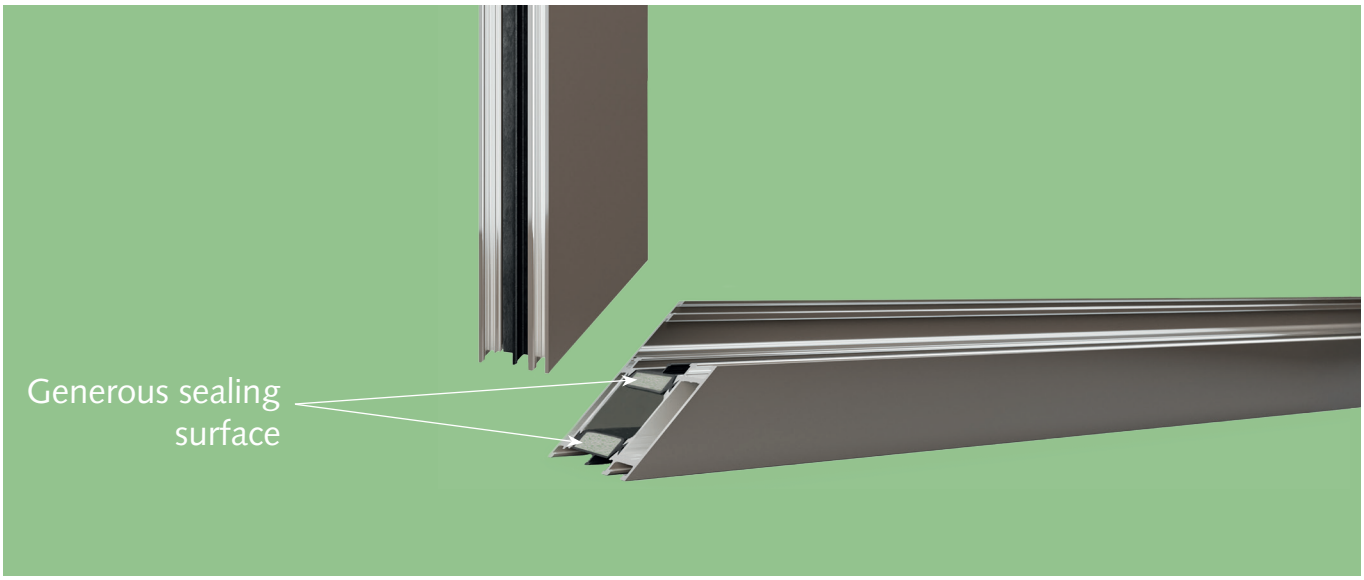

Sawing, milling


Drilling


Punching


Wet coating


Powder coating



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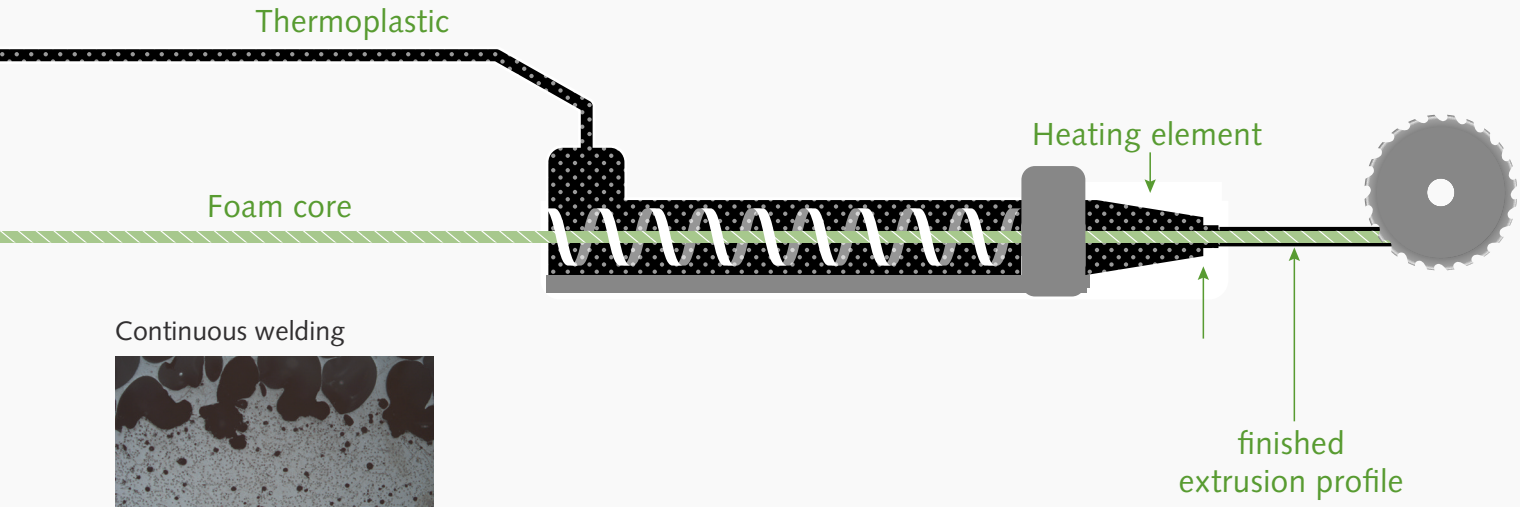
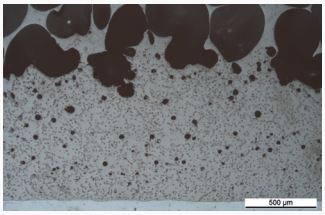
Endless **Extrusion**

Core and Membrane: Molecularly Welded in One Step

Hochuli Advanced has developed a process in which two composite materials are joined in a single step. As a result, the two materials are continuously molecularly welded together.



Continuous welding



Function

In the extruder, thermoplastics are heated, plasticized, and conveyed under defined pressure. The foam core is created via a controlled foaming process, optionally using physical or chemical blowing agents. The membrane layer separately reaches melting temperature.

In a specially developed tool, both material streams meet. Temperature, pressure, and compression control the molecular welding of the surfaces, eliminating the need for adhesives or additional post-processing. The bond is so permanent that it remains stable even under thermal and mechanical loads.

The Difference

Seamless connection:
Molecular welding in a single step.

Endlessly strong:
High stability at low weight.

Efficient:
No gluing, no welding, no rework.

Reliable:
Void-free structure, permanently load-bearing.

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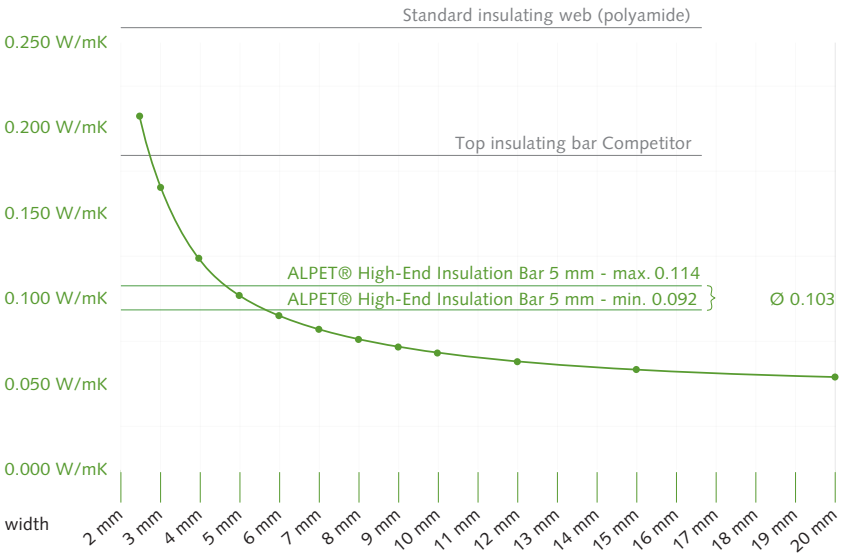
Performance Through Physics

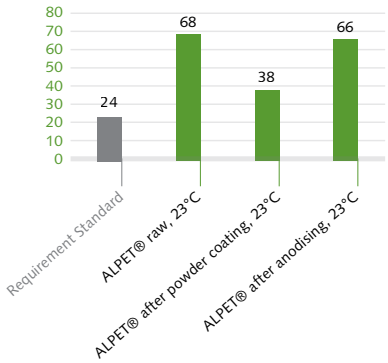
Thermal conductivity of insulating bar



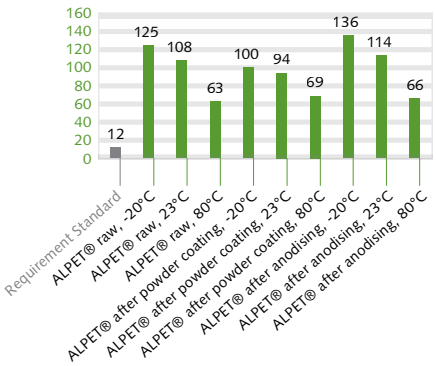
Reference values: ALPET® bar width 5 mm - 0.105 W/mK
ALPET® bar width 8 mm - 0.080 W/mK

Strength comparison

Shear strength ALPET®



Transverse tensile strength ALPET®



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Acoustic measurement

ALPET®
Reference installation depth 80 mm
Reference frame depth 70 mm

Rw (C; C tr) = 46 (-2; -6) dB
Rw (C; C tr) = 46 (-2; -6) dB (Noryl bar)
Rw (C; C tr) = 47 (-2; -6) dB (Polyamide bar)

Fire behavior

DIN EN 13505-1, Class E
(Approval for insulating bars in aluminum profiles)

Mechanical performance characteristics

DIN EN 14024
(Possible failure modes have been scientifically investigated.)

Aging behavior

Empa (Swiss Federal Laboratories for Materials Science and Technology):

The ageing behaviour was extrapolated using advanced scientific methods (Stepped Isostress Tests).

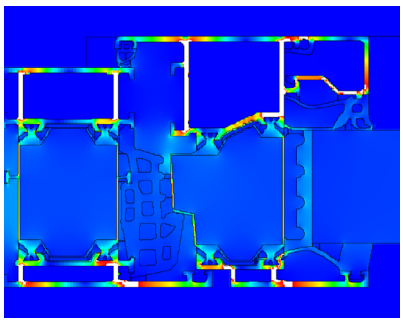
Verification of the composite performance characteristics with respect to mechanical behaviour – Section 4.3 EN 14024

(ift Rosenheim).

Heat flows

Standard window **without ALPET®**

Standard window **with ALPET®**



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True **Circular Economy**

Recycled, Proven, Effective — For Decades to Come

Upcycling rPET

ALPET® is produced from recycled PET, transforming what would otherwise be waste into a high-performance composite profile. A single cubic meter of rPET foam contains the equivalent of roughly 3,600 used PET bottles. The insulating bar can be manufactured not only from standard drink bottles but also from ocean-recovered PET.

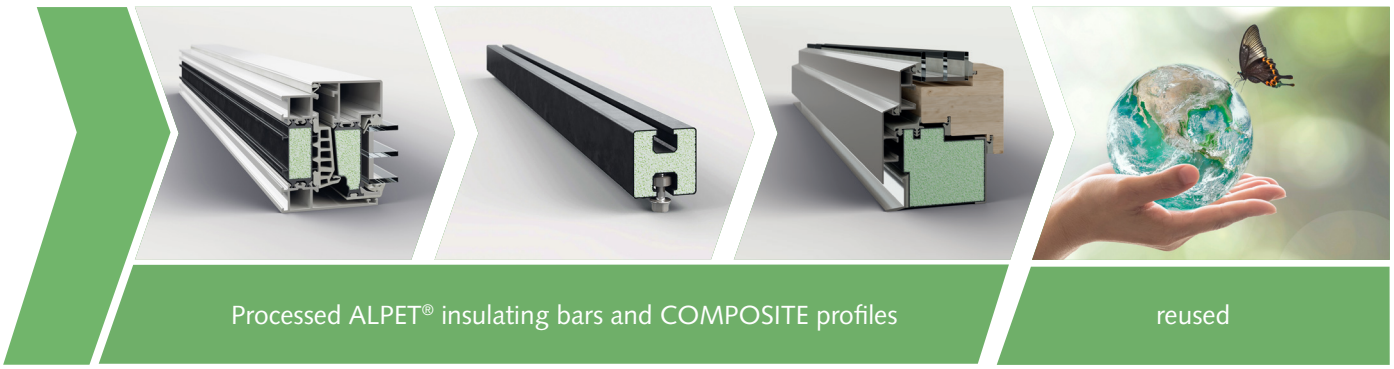
More Energy-Efficient Windows

The use of ALPET® not only contributes to the circular economy, but also helps reduce the energy consumption of window frames. The thermal insulation of the frames matches the performance of the glazing itself. Costly fill gases such as krypton or xenon are no longer required, and the risk of these gases leaking over time is eliminated.

Certified Sustainability

The chosen materials and production methods enable certification under leading international standards, including:

LEED, Cradle to Cradle, BREEAM, ISO 14001, Carbon Trust Standard, Product Carbon Footprint, Environmental Product Declaration, PAS 2050



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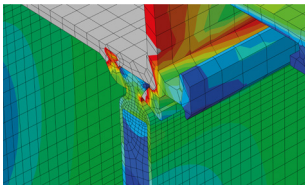
Where Forces **Complement Each Other**

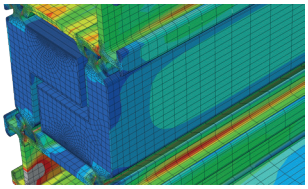
Composite Expertise Enhances Your Development in Building Physics and Structural Engineering.

You already possess development and system expertise. We provide the additional freedom: composite profiles, precisely tailored to your projects, unlock new structural possibilities.

Depending on your needs, we either operate discreetly in the background or collaborate actively with you – leveraging experience from diverse projects, an external perspective, and the decisive impetus for the optimal solution.

Visualization of the FEM calculation





What We Offer

- Engineering & design consulting
- Cross-section optimization & simplification
- Structural analysis and verification (static, dynamic, linear, or viscoelastic; 2D/3D)
- Unlocking hidden material potential with FEM simulations

Enabling New Structural Solutions

- Freely configurable cross-sections: shoulders, ribs, tabs, channels, and more
- Preventing thermal bridges with intelligent geometry
- Fewer parts, greater flexibility: weldable, bondable, and ready for direct use

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Trust That **Delivers**

Scientifically Proven, Industry-Tested, Reliably Supplied

Scalable Volumes

Production is carried out with predictable lead times, comparable to conventional PA insulating bars. Whether small series or large-scale orders with hundreds of thousands of meters per year. More than 30 extruders control the production capacity.

Established Production Partner

An experienced profile manufacturer ensures industrial processes, supply-chain management, and quality. All industry-standard certifications are available, every batch is fully traceable, and a stable supply is guaranteed by multiple raw material sources.

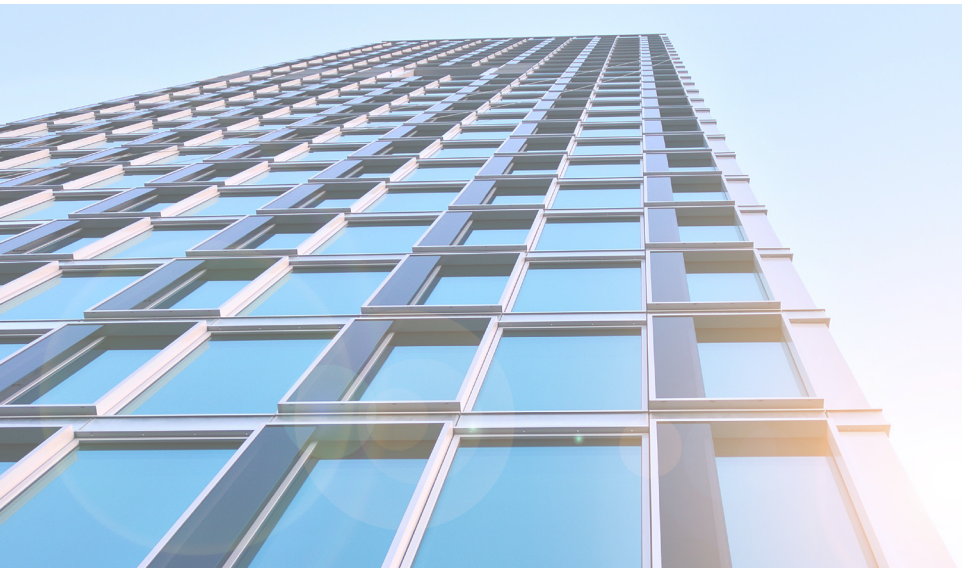
Seamlessly Integrable

The insulating bar integrates into existing production lines without process changes. Standardized packaging and labeling simplify logistics. You can focus on planning and executing your projects while quality, material, and availability are assured.

Tested. Validated. Superior. Far Above Standard

ALPET® profiles comply with international approval standards and exceed the requirements for aluminum profiles. ift Rosenheim has tested all approval and failure scenarios: mechanical overload, material fatigue and aging processes. Using the Stepped-Isostress method, service life has been empirically determined and scientifically extrapolated. The results confirm long-term functional reliability over decades.

ALPET® is not a theoretical concept, but a proven product: developed in cooperation with Empa, funded by Innosuisse, and independently tested by ift Rosenheim.



Trust You Can **Build On**

Inspected & Approved
Because Safety Matters

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