

AST® TECHNOLOGY

Advanced Structural Technology in panels

PRODUCT INFO





The tensile strength of an A4 size piece of Paroc Panel System panel is good enough to withstand the load of one Beetle.

Strength

“Sandwich panels are based on interaction between the different materials, providing optimal strength properties. That is why the bonding between the core and the facings is the most critical part in a sandwich panel.”

Paroc Panel System masters the sandwich panel technology. In Paroc Panel System panels the fully bonded facings together with the lamella orientation and pattern guarantee equal strength properties in each cross-section. The adhesive used in Paroc Panel System panels is specially developed to fulfil the high strength demands on the structural bonding between the core and the facings. The reverse side of the steel sheets has a multi-layer primer system. The adhesive and the reverse side primer system are selected to interact and maximise the strength properties.

Tensile strength of a sandwich panel

To guarantee reliable and uniform strength of a sandwich panel, the tensile strength of the bonding between the face and the core shall always exceed the tensile strength of the core material itself i.e. in the tensile strength test the failure always has to occur in the core. The tensile strength threshold value for AST quality panels is 100 kN/m².

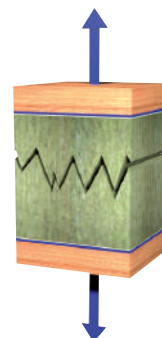
Tensile strength of different Paroc Panel System panel types

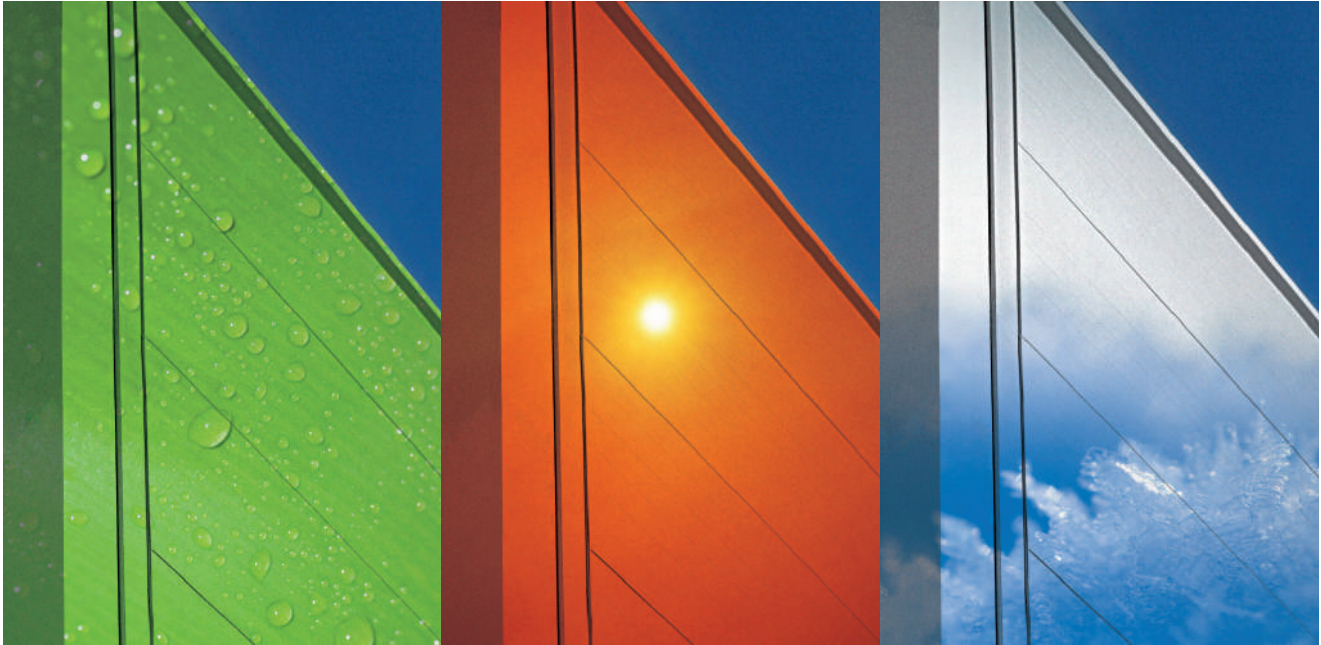
AST® L	AST® S	AST® F	AST® E
110 kN/m ²	130 kN/m ²	180 kN/m ²	230 kN/m ²

Characteristic values for the tensile strength of different Paroc Panel System panel types.

AST® Quality for Strength

- Equal strength properties in each cross-section of a panel
- Tensile failure of a panel always in the core
- Tensile strength of panel ≥ 100 kN/m²
- Shear strength of panel > Shear strength of core





For lightweight sandwich panels, moisture and temperature variations are the most critical factors influencing degradation.

Durability

“Durability in sandwich panels is its long-term performance as a structural building component. Cladding products have to maintain their strength and insulating properties, and to remain weather resistant over their expected service life. For industrial buildings a lifetime of 25 years can be sufficient but in other cases, requirements can be 50 years or more.”

In Paroc Panel System panels various primer and coating layers of steel sheets, eliminate the potential risk of corrosion inside the panel and ensure the bonding between the adhesive and the steel sheet. To secure colour and gloss retention in the panel surface PVDF is the standard coating in external use. The adhesive is developed to fulfil high durability demands in all environmental conditions during the lifetime of a building. The PAROC structural stone wool is treated to be water-repellent, non-hygroscopic and non-capillary, which means that no water can penetrate. In addition, moisture has no effect on the stability of the core and the binder.

Tensile strength of a sandwich panel

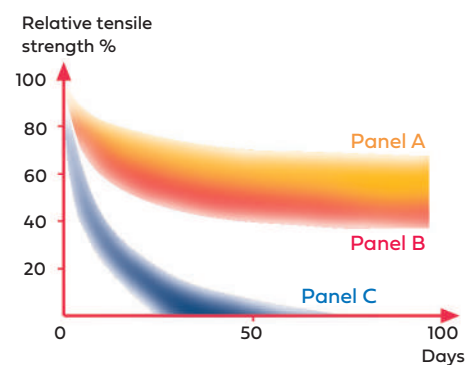
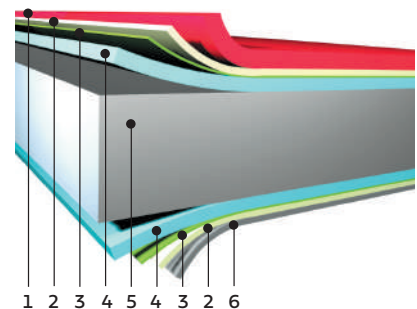
The durability of a sandwich panel is tested with an accelerated ageing method according to the European product standard EN 14509 for sandwich panels. In the test the decrease of tensile strength is measured. To guarantee reliable quality through the years, it is of importance that the ageing process stops during test period.

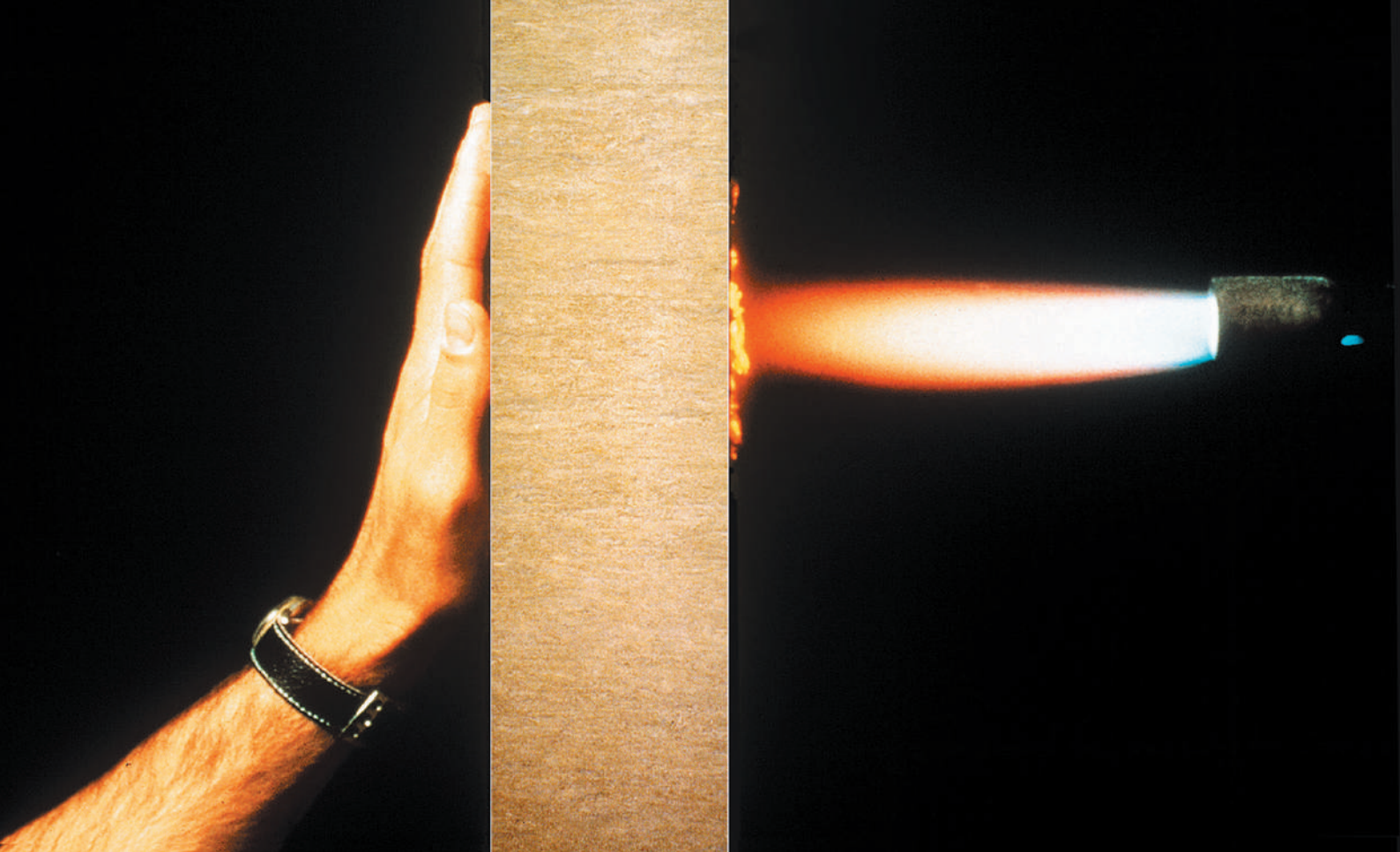
AST® Quality for Durability

The durability of the AST quality panel and its basic materials shall be tested and fulfil the highest class according to the method presented in ECCS/CIB recommendations and the European product standard EN 14509 for sandwich panels.

Surface structure of Paroc Panel System panels

- 1 Substrate coating
- 2 Priming paint
- 3 Passivation layer
- 4 Zinc
- 5 Steel
- 6 Epoxy coating





Euroclass A2-s1,d0 /According to AST® quality fire safety is composed of non-combustible panels and fire safe structures.

Fire Safety

“The objectives of global fire safety design are to protect the life of people in the buildings and of fire fighters, to prevent losses in terms of damaged buildings, facilities and moveable property as well as interruption of business activities and to protect the environment from hazardous emissions.”

Paroc Panel System panels have been classified in Euroclass A2-s1,d0 which means that they are impossible to ignite and will not contribute heat to the fire. They are non-combustible (A2) and they generate very little smoke and toxic products (s1) and do not form flaming molten droplets (d0).

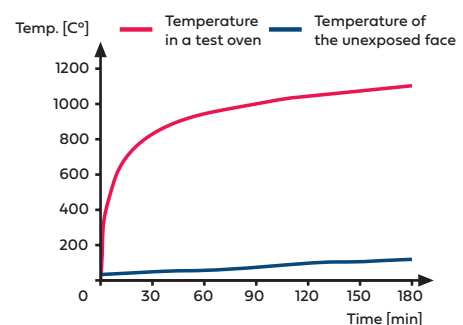
The fire resistance of Paroc Panel System structures is classified up to EI 240 as walls and EI 120 as ceilings. The Paroc Panel System structural stone wool core has good thermal insulation also at extreme temperatures and it will not shrink. Shrinkage could cause loss of both insulation and integrity. The specially developed adhesive for Paroc Panel System panels has high temperature resistance keeping the core bonded to the unexposed face during a fire. The panel joint in Paroc Panel System panels is also specially designed to be tight without sealant and extra fixings in the joint, thus preventing the penetration of hot gases and flames.

In case of fire, Paroc Panel System panels function as a catenary structure. Therefore, when designing fire-resistant structures it is of utmost importance to execute the detail

solutions so that the whole structure meets the requirements on stability, insulation and integrity.

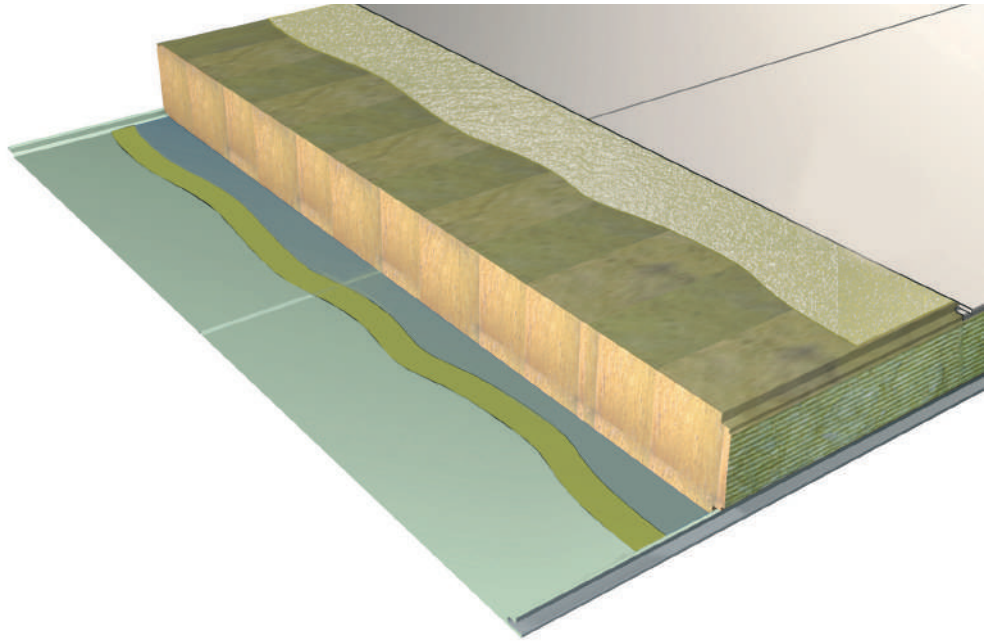
Fire test on a 150 mm Paroc Panel Systemv panel

In fire resistance classification of structures integrity (E) is a structure's possibility to resist penetration of flames and hot gases, insulation (I) is the ability to keep the unexposed side cool enough thus preventing materials that come in contact with it from ignition.



AST® Quality for Fire Safety

- Non-combustible panels, Euroclass A2-s1, d0
- Fire safe structures – panels and details



AST® quality is fully implemented in Paroc Panel System panels.

AST® Quality — Strength, Durability and Fire Safety

“AST® quality is a profile of selected properties, significantly important to structural sandwich constructions, with reference to objective quality measures.”

Advanced Structural Technology results in secure strength properties, reliable long-term durability and fire safety in sandwich panels. The essential characteristics cannot be visually identified, but can still be measured and controlled in the manufacturing process. The quality assurance procedure includes internal testing according to the European product standard

EN 14509 for sandwich panels, and third party control by authorised institutes.

AST® Quality

- Four-stage quality system
 - Supplier quality control
 - Reception control
 - Control of manufacturing quality
 - Control of finished panels with full-scale strength tests
- Third party quality control by authorised institutes
- ISO 9001 Quality Certificate

Components of Paroc Panel System® panels

- 1 Zinc-coated steel sheets with top coating according to environmental demands.
- 2 Specially developed adhesive that fulfils the AST® quality demands on strength and durability as well as the requirements for European non-combustible products A2-s1,d0 covers the whole surface area.
- 3 Non-combustible core of Paroc Panel System structural stone wool lamellas give equal strength properties in each cross section of the panel.
- 4 Multi-layer primer to ensure the bonding between the adhesive and the zinc layered steel sheet.
- 5 Fire safe joint design that makes the panel tight for hot gases and flames and gives up to 4 hours (EI240) fire resistance properties.





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