

Advanced Structural Technology

AST[®] quality in panels



Strength



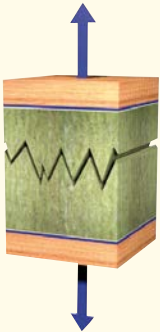
“Sandwich panels are based on interaction between the different materials, providing optimal strength properties. That is why the bonding between the core and the facings is the most critical part in a sandwich panel.”

Paroc Panel System masters the sandwich panel technology. In PAROC 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 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.

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

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 types

AST® T	AST® S	AST® F	AST® E
100 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 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 \geq 100 kN/m²
- Shear strength of panel > Shear strength of core

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.”

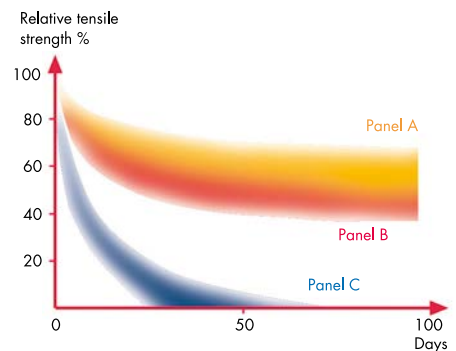
In PAROC panels various primer and coating layers of steel sheets, eliminate the potential risk of corrosion inside the panel and ensure the bonding between the adhesive and the steel sheet. To secure colour and gloss retention in the panel surface PVDF is the standard coating in external use.

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.

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

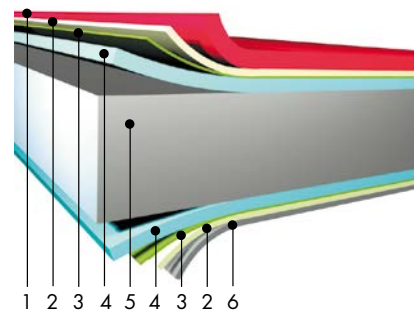
Relative tensile strength of panels with different core materials

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.



Surface structure of PAROC® panels

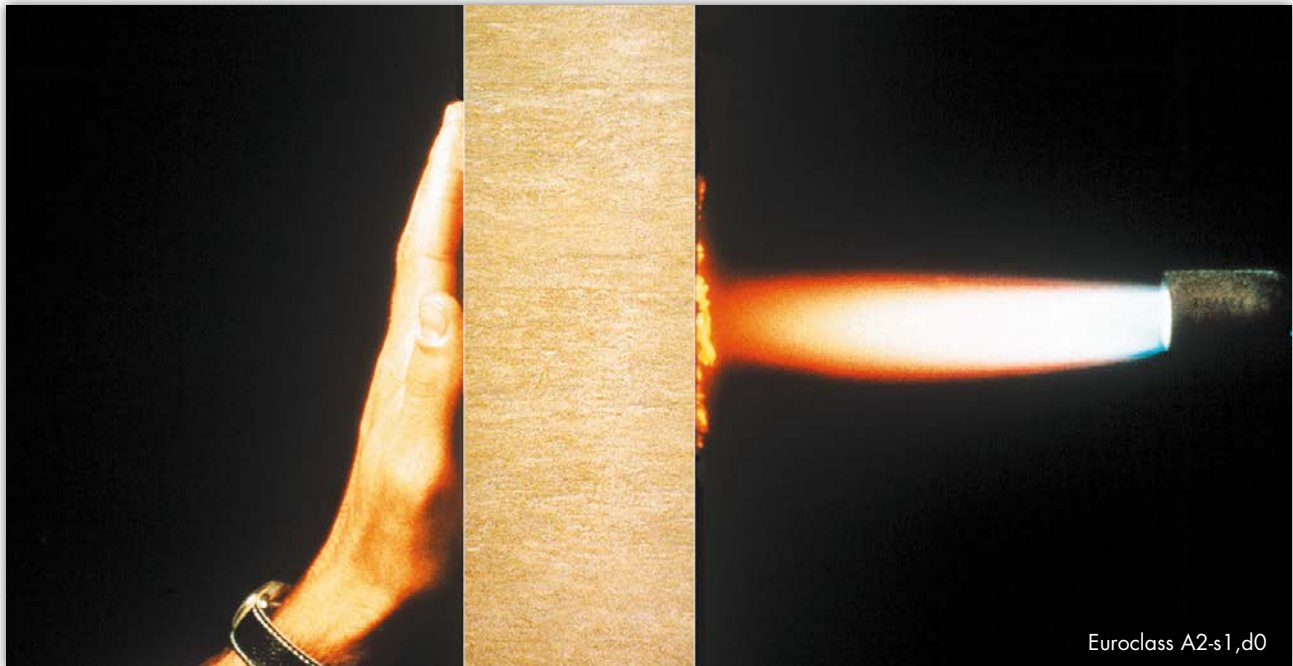
- 1 Substrate coating
- 2 Priming paint
- 3 Passivation layer
- 4 Zinc
- 5 Steel
- 6 Epoxy coating



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.

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 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 structures is classified up to EI 240 as walls and EI 60 as ceilings. The PAROC 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 panels has high temperature resistance keeping the core bonded to the unexposed face during a fire. The panel joint in PAROC panels is also specially designed to be tight

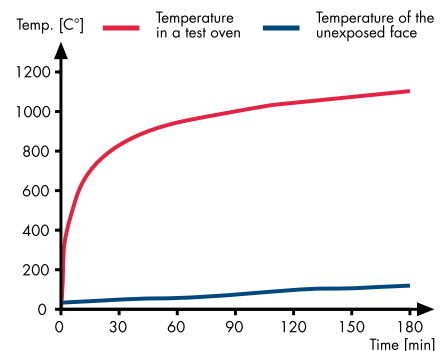
According to AST® quality fire safety is composed of non-combustible panels and fire safe structures.

without sealant and extra fixings in the joint, thus preventing the penetration of hot gases and flames.

In case of fire, PAROC 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

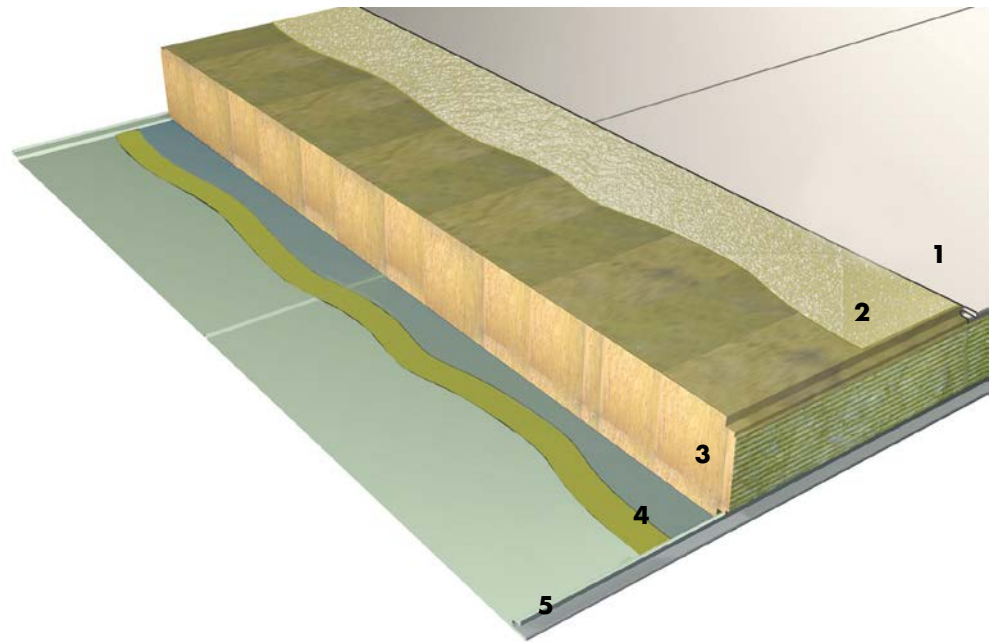
In fire resistance classification of structures integrity (E) is a structure's possibility to resist penetration of flames and hot gases, insulation (I) is the ability to keep the unexposed side cool enough thus preventing materials that come in contact with it from ignition.



AST® Quality for Fire Safety

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

AST® Quality — 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 is fully implemented in PAROC panels.

Components of PAROC® 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 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.

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



PAROC PANEL SYSTEM – EXPERIENCE SINCE 1986

PAROC sandwich panels are steel-faced light-weight panels with a stone wool core used in public, commercial and industrial construction.

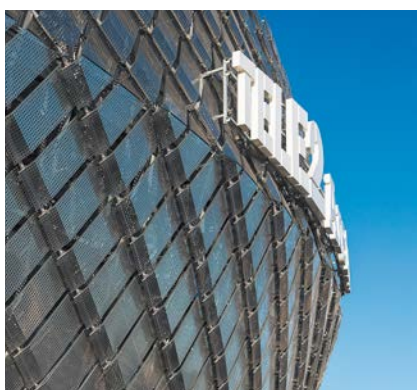


PRODUCTS

Paroc Panel System manufactures steel-faced, stone wool sandwich panels for façades, partition walls and ceilings. The panels are safe, light-weight and easy to install, as well as aesthetically pleasing. They help refinish façades in no time. PAROC panels have many exceptional properties: they are non-combustible, strong, heat-insulating and airtight.

COMPETENCE

The high quality of our products is made possible by our knowledgeable and committed staff. We offer customer-focused solutions that are safe, functional and stylish. We provide added value to our partners by maintaining a successful and inspiring atmosphere where people are focused on development and professional knowledge. Our goal is to remain the number 1 supplier of stone wool core sandwich panels.



SALES AND PRODUCTION

Our international sales and distribution network covers most of Europe and the Middle East. Northern Europe is our main market. Our extensive experience and reliability as a partner have secured us the position of number 1 supplier in Nordic countries. PAROC panels are manufactured in Parainen, Finland.



The information in this brochure is an exclusive and full description of the product properties. The description is valid from the time this brochure is drafted until it is replaced by a new electronic or printed description. The latest version of the description will always be accessible on the Paroc website. The brochure material is intended to present product solutions and applications that are within the scope of the functionality and the technical properties of the products. The contents of this brochure do not constitute a warranty of any kind. We will not be liable for any use of our products in conjunction with the use or installation of third party products or solutions. We will not be liable for any use of the product for purposes other than those defined in this brochure. We reserve the right to modify or change our brochures.

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