Building with conscience.

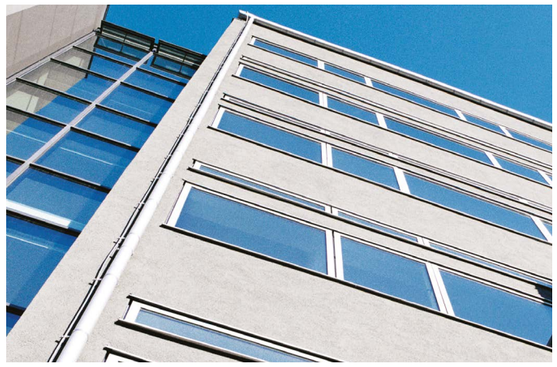
Solutions for recladding buildings safely

External wall insulation and rainscreen systems

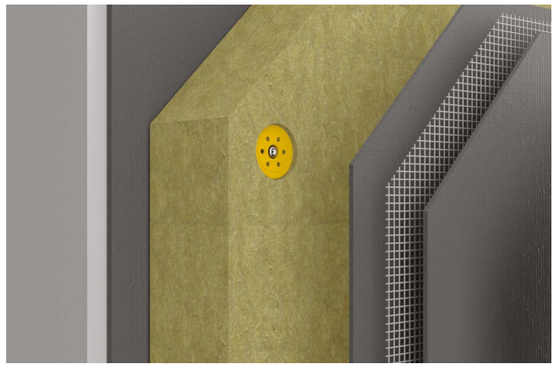
Facade

We have been developing, manufacturing and selling external wall insulation systems for over 55 years. These systems are in demand more than ever before for both new-build and refurbishment projects to ensure compliance with national building codes.

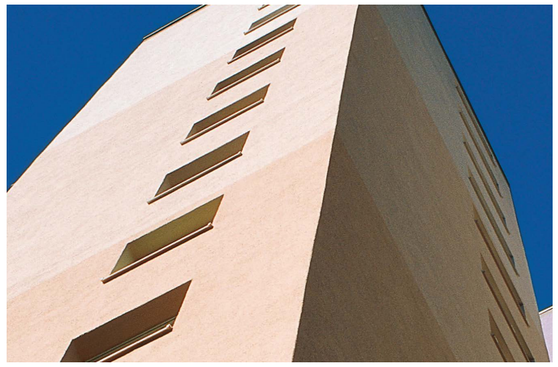
Contents



Building with conscience



Background to fire safety



Recladding with Sto

Sto systems

Building with conscience

Sto adopted the motto "Building with Conscience" in the 1980s. This attitude permeates our business approach and offerings from start to finish.

Our products and systems have been developed since the 1950s with the customer in mind, whether you are a building owner, designer, contractor or occupant. Selecting the right facade material and a suitable facade construction plays a major role – not only in light of the huge consumption of raw materials, but in terms of CO_2 emissions, durability and human and environmental health and safety. Furthermore, aesthetic requirements also play a key part in the well-being of people, so the ability to offer a broad choice of finishes with a variety in shape, colour and texture is essential.

More recently, behaviour of structures when subjected to fire has become the major factor in the selection of facade solutions. It is the responsibility of everyone in the construction process to build responsibly and make the correct choices. With a variety of components at our disposal, Sto have always tested systems with rigour and ensured compliance with national building codes wherever we operate. Now, more than ever, Building with Conscience is essential.

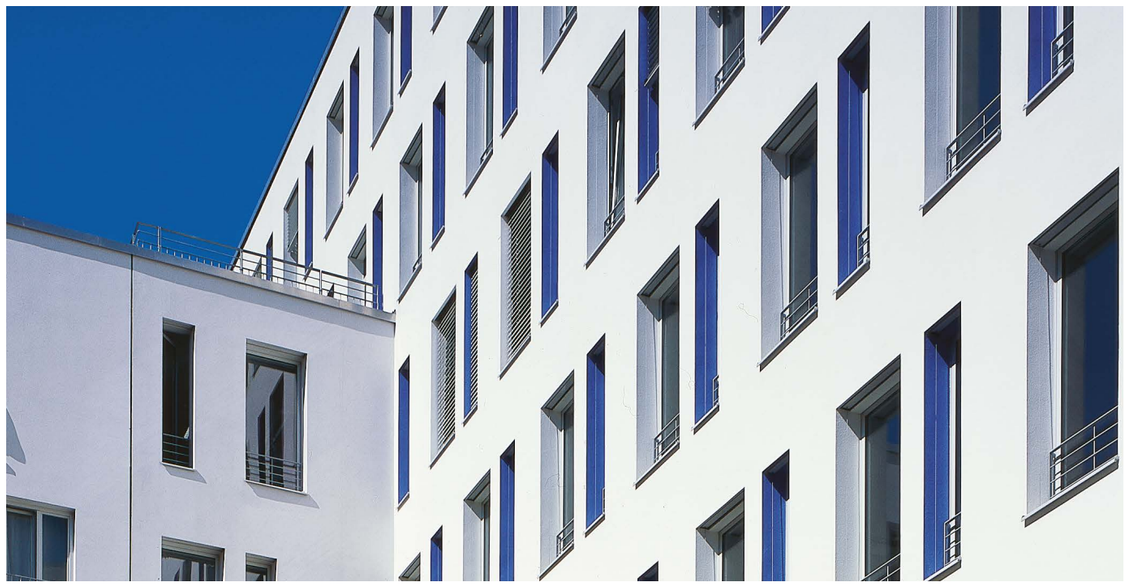
Building safety - who is responsible?

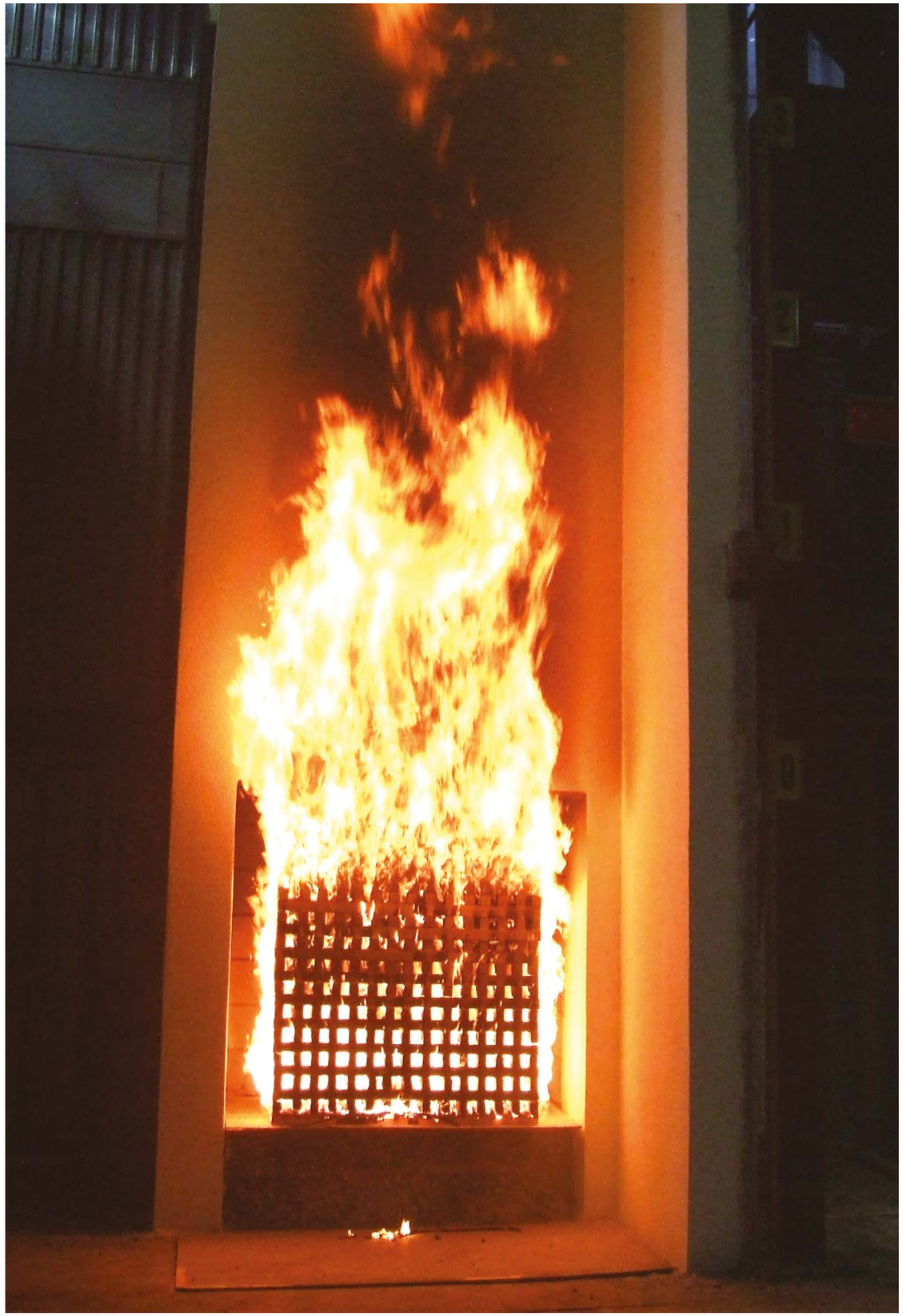
Now, more than ever, we must all take ownership of our responsibilities to ensure any person using a public or private building is safe.

Everyone involved in the construction process is responsible for the design, construction and occupation of buildings. This includes the building owner, designer, contractor, sub-contractor, facilities maintenance, the occupier, and the external wall cladding supplier and any associated approvals or certification bodies.

Each of these people has their part to play for a responsible and realistic attitude to budgets, build schedules and pricing, and the ability to install correctly and all the steps in between.

Ultimately this group also expands sideways into specialist consultants, building regulations, enforcement bodies and building warranty providers and insurers.





Background to fire safety

For product manufacturers of facade systems, fire safety is assured by testing and classifying products to a reaction to fire standard. This requirement is embedded in the Building Regulations of the various countries of the United Kingdom and Ireland.

Building Regulations

The requirement B4 of the Building Regulations* for England states that:

> "The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building."

Further to this, Regulation 7, paragraph 2* goes on to state:

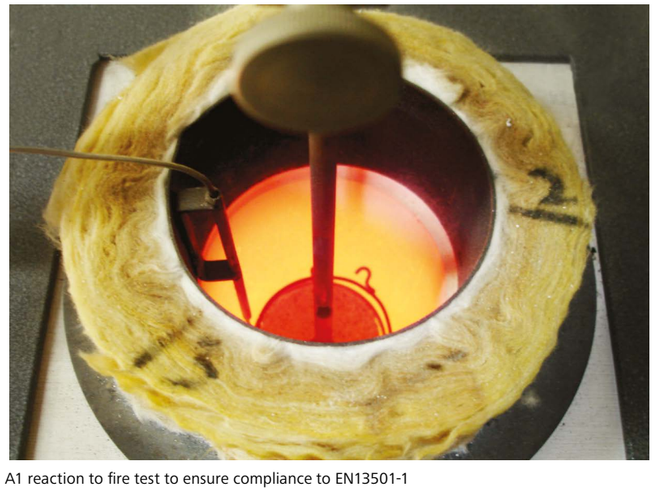
> "Subject to paragraph (3), building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or Class A1, classified in accordance with BS EN 13501- 1:2007+A1:2009 entitled "Fire classification of construction products and building elements. Classification using test data from reaction to fire tests" (ISBN 978 0 580 59861 6) published by the British Standards Institution on 30th March 2007 and amended in November 2009."

The regulations also list components that may be excluded from this Regulation and also to which types of buildings and from which height the Regulation applies. Other regions of the UK and Ireland will have similar requirements.

* Source: The Building Regulations 2010, Approved Document B, Volume 1 and 2, Fire Safety.

The EN13501-1 standard for reaction to fire

This standard was introduced by the European Union in 2000 to remove trade barriers between member states and implement one standard approach to defining the reaction to fire of building products. It evaluates multiple aspects of reaction to fire such as ignitability, flame spread and heat emission.



A1 reaction to fire test to ensure compliance to EN13501-1

Understanding reaction to fire classifications - the Euroclass system, defined by EN13501-1, classifies products or systems according to combustibility, smoke and droplet production. Four separate standards are defined in order to reach this classification.

Class	EN 11925 (Ignitability test)	EN 13823 (SBI-test)	EN ISO 1716 (Gross calorific test)	EN ISO 1182 (Non-combustibility test)
A1			■	■
A2		■	■	
B	■	■		
C	■	■		
D	■	■		
E	■			

Compliance with the non-combustibility test (EN ISO 1182) and below the required value in the gross calorific potential test (EN ISO 1716) result in an A1 classification.

Products with Euroclasses A2 to D then also undergo the Single Burning Item test (EN 13823) to determine characteristics such as flame spread, ignitability, smoke and flaming droplet production.

This then results in the classification A2 to D as well as a result for smoke and flaming droplet production:

s1 – Little or no smoke

s2 – Visible smoke

s3 – Substantial smoke

d0 – No flaming droplets/particles

d1 – Some flaming droplets/particles

d2 – Significant flaming droplets/particles

For systems compliant with the latest building regulations requirements, for dwellings >18m in height (11m in Scotland), you will need to see a classification of either A1 or A2-s1, d0.

Products or systems that do not reach the A1 or A2 classification also have to undergo the ignitability test (EN ISO 11925-2).

In real life, there is little practical difference regarding reaction to fire performance between A1 and A2. EWI systems rated A2 use newer render technology that can give additional benefits such as better impact resistance, longer protection against algae growth and staining, as well as better water resistance.

Sto external wall insulation and rainscreen systems

Before a facade finish is selected, a decision must first be made about the underlying system. This comes down to choosing between an external wall insulation system or a ventilated rainscreen system.

External wall insulation systems
These systems fix the insulation either directly to the substructure or may form a narrow cavity which is drained but not ventilated. They offer significant advantages over traditional construction methods, as the insulation is on the outside, therefore the inner wall is kept warm, reducing peaks and troughs of warm/cold cycles and also reducing the chance of moisture forming in the wall. They typically offer a more economical solution than ventilated rainscreens, but it is harder to achieve a perfectly flat surface – this may become apparent on large expanses of facade, unbroken by windows or other surface features.

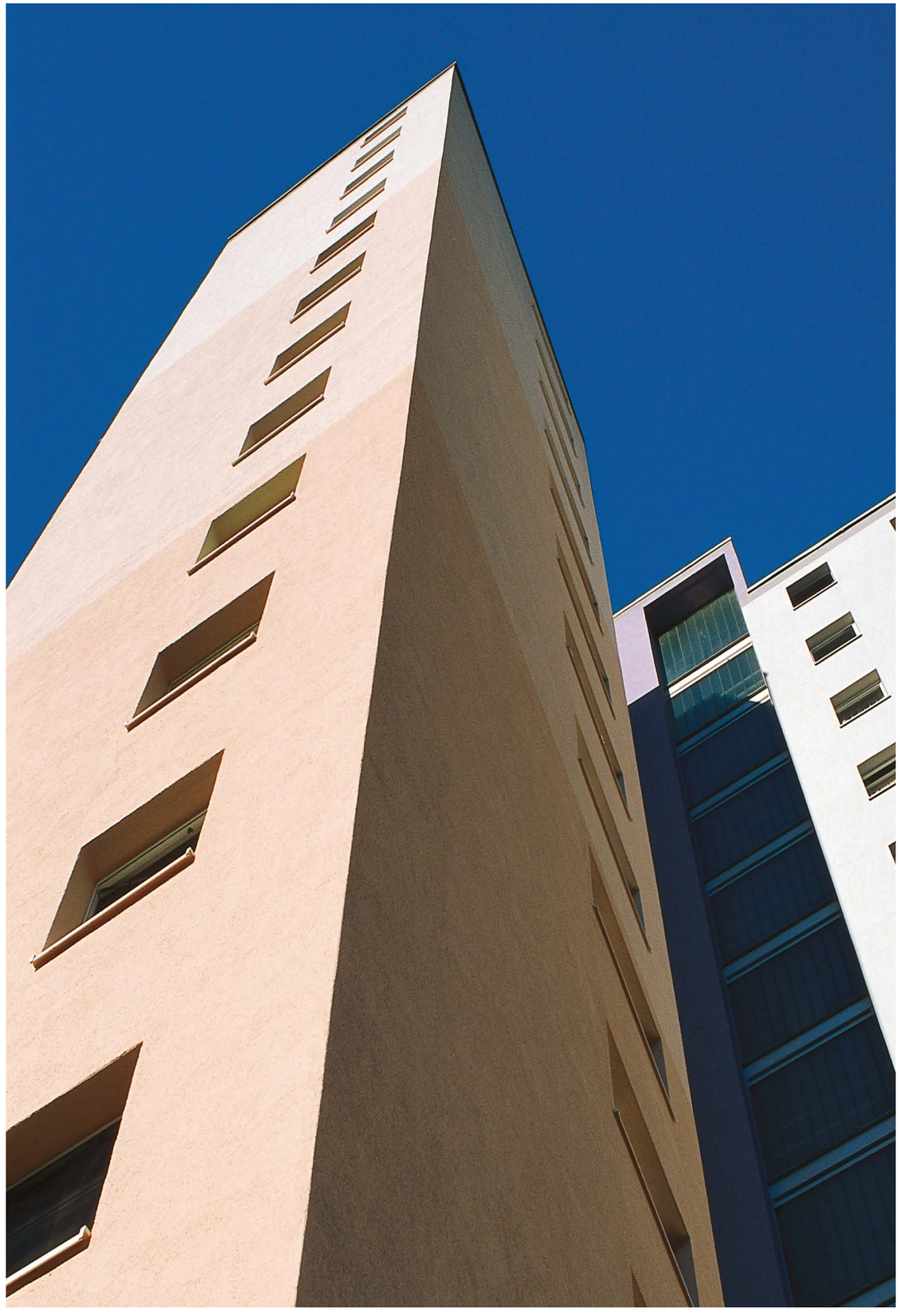
Rainscreen cladding systems
Offer similar benefits over traditional construction to external wall insulation systems, but as they form a drained and ventilated cavity, very close to the outer skin, they perform even better regarding trapped moisture and tend to offer a higher quality finished appearance.

Fire design strategies
The responsibility for a building's fire strategy usually lies with a fire consultant and is a holistic design drawn up to comply with or exceed building regulation requirements. We have partnerships with fire barrier specialists and work hand-in-hand with them to ensure that not only is the cladding safe, but also any concealed cavities are also treated in accordance with prevailing regulations.

StoTherm Mineral external wall insulation systems
StoTherm Mineral EWI systems can be applied to virtually any type of substructure and offer a wide variety of finishes, including render and brick slips. The majority of our systems have a BBA certificate and are NHBC compliant. Fire classification to EN13501-1 is A2-s1, d0, in the most part.

StoVentec R ventilated rainscreen system
StoVentec R is a system for the perfect finish. Able to cover large areas seamlessly with minimal joints, with either render or brick slip finishes. StoVentec R can easily form curved surfaces and extra-sharp arisses and corners. Covered by a BBA certificate and accepted by the NHBC, fire classification is also A2-s1, d0 when using our carrier board A and non-combustible mineral fibre insulation behind the board.

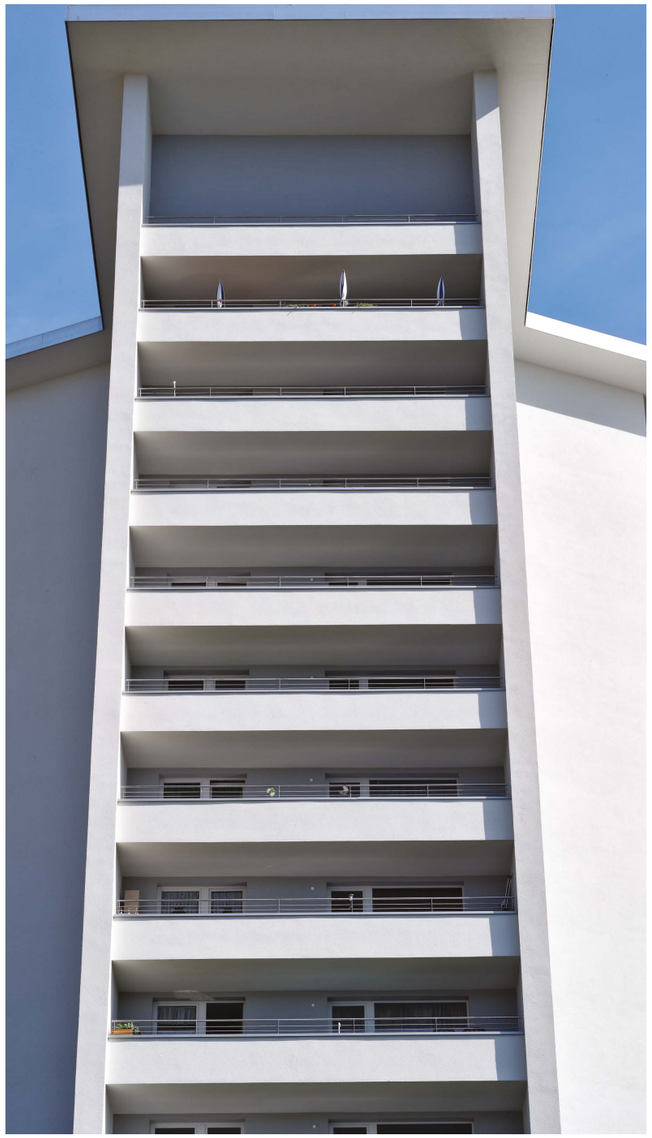
Fire barriers
Fire barriers may be required under certain circumstances to arrest or limit fire spread in cavities. They may fill the cavity fully or activate and expand under high temperature. Fire barriers are not part of the cladding design or system but supplementary and exact guidance can be found in the Building Regulations.



StoTherm Mineral

External wall insulation system featuring non-combustible insulation and a wide range of finishes

External wall insulation systems need to meet more stringent fire protection requirements, especially high-rise and public buildings. StoTherm Mineral meets these requirements thanks to its insulation material made of mineral or stone wool. In addition to being particularly cost-effective, the system, with a mineral base coat or limited combustibility polymer base coat, offers complete freedom when it comes to selecting the facade material.



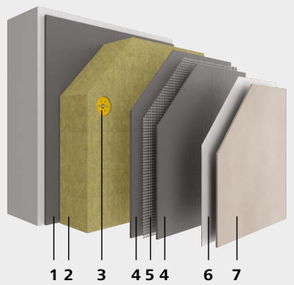
System advantages
- A1 or A2-s1, d0 rated system
- Facade design options Sto Render, StoBrick, Sto Resin Brick Slips
- Three-dimensional facade design profiles are available with the use of StoDeco (StoDeco components classified as A2-s1, d0)
- Purely mineral coating build-up is possible
- High resistance to microorganisms (algae and fungi), especially with an additional paint build-up (including priming coat)

Real world performance of A2-s1, d0 and A1 EWI systems
The legal requirement for the reaction to fire of facades on relevant buildings is A2-s1, d0. Sometimes, however, A1 will be specified and it is important to recognise the wider implications of this. Whilst A1 may feel like a superior classification to A2-s1, d0, in fire performance terms there is very little difference.

In terms of the materials, A1 systems use technology that is largely mineral-based. Since the 1950s, this technology has advanced, using different materials to improve water resistance and prolong a clean appearance. This newer render technology cannot be rated A1 due to its composition, but achieves the A2-s1, d0 classification required as well as having superior water resistance, water shedding capability and will appear cleaner for longer.

The system

StoTherm Mineral build-up - available in A1 and A2-s1, d0



Insulation layer
1 — Bonding
2 — Mineral fibre board
3 — Fixing

Reinforcing layer
4 — Base coat
5 — Reinforcement

Material layer
6 — Intermediate coat
7 — Finish
8 — Cladding*

* Alternative material layer, see material finish options

Material finish options

Sto Render | StoEcoshape | StoDeco | StoBrick | StoStone | StoGlass Mosaic

Finish (7)
- Sto rendered surfaces

Cladding (8)
- StoEcoshapes (prefabricated render elements)
- StoDeco (three-dimensional facade elements), full-surface/partial
- StoBrick (brick slips)
- StoStone (natural stone tiles)
- StoGlass Mosaic (glass mosaic tiles)

Properties

Substrate
Masonry or lightweight steel frame

Insulating layer
- Insulating material: mineral wool
- Thermal conductivity level: 035–041
- Fixing: bonded or bonded and anchor-fixed

Reinforcing layer
- Base coat: mineral, for maximum freedom when selecting a material

Material layer
- Rendered surfaces and StoEcoshapes (prefabricated render elements) in colour shades with a light reflectance value of ≥20 %
- StoDeco (three-dimensional facade elements), no light reflectance value limit with coating build-up using X-black Technology
- StoBrick, StoStone, and StoGlass Mosaic without light reflectance value limit

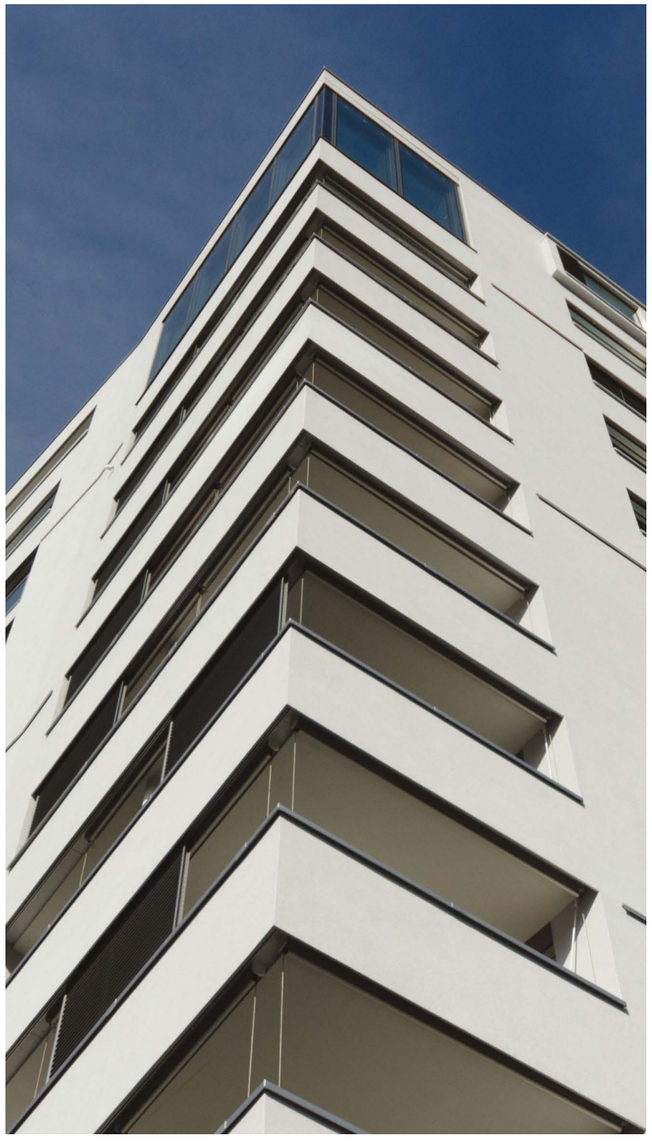
System
- Reaction to fire: class A1 or A2-s1, d0 (in accordance with EN 13501-1)
- Impact resistance with rendered surface:
  - In the appropriate system build-up – hail resistance class 3

StoVentec R

StoVentec is a diverse and complete system for ventilated rainscreen cladding facades. The wide range of materials, the flexible sub-construction, and the StoVentec Carrier Board open up plenty of design possibilities.

Almost no other system offers as many different options for designing ventilated facades as StoVentec. You can choose to have a smooth or coarse render texture, matt or gloss surfaces, as well as individual colours, brick, stone or glass mosaic.

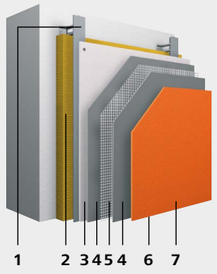
StoVentec has yet another strength: with its flexible StoVentec Carrier Board, it is suitable for designs involving curved or folding shapes. As it is a limited combustible facade system, StoVentec R makes it possible to use ventilated facades with rendered surfaces on high-rise buildings.



System advantages
- Level render surface over undulating or uneven substrates with high aesthetic value
- Also compatible with Sto Resin Brick, StoBrick, StoStone, StoGlass Mosaic, StoEcoshape and StoDeco Profiles
- Huge range of Sto Renders with over 800 colours and different textures with self cleaning, fast drying or pollution-absorbing options
- Excellent interstitial condensation control
- A2-s1, d0 rated system
- Class-leading resistance to cracking and mechanical stress resistance
- Seamless facades up to 200m² (joints in substrate must be expressed)
- BBA approval for any substrate

The system

StoVentec R build-up



Insulation layer
1 — Sub-construction
2 — Mineral fibre board
3 — StoVentec carrier board A

Reinforcing layer
4 — Base coat
5 — Reinforcement

Material layer
6 — Intermediate coat
(depending on system build-up)
7 — Finish
8 — Cladding*

* Alternative material layer, see material finish options

Material finish options

Sto Render | StoEcoshape | StoDeco | StoBrick | StoStone | StoGlass Mosaic

Finish (7)
- Sto rendered surfaces

Cladding (8)
- StoEcoshapes (prefabricated render elements)
- StoDeco (three-dimensional facade elements), full-surface/partial
- StoBrick (brick slips)
- StoStone (natural stone tiles)
- StoGlass Mosaic (glass mosaic tiles)

Properties

Substrate
All substrates

Insulating layer
- Insulating material: mineral wool
- Thermal conductivity level: 035–041
- Fixing: bonded or bonded and anchor-fixed

Reinforcing layer
- Base coat: mineral, for maximum freedom when selecting a material

Material layer
- Rendered surfaces and StoEcoshapes (prefabricated render elements) in colour shades with a light reflectance value of ≥20 %
- StoDeco (three-dimensional facade elements), no light reflectance value limit with coating build-up using X-black Technology
- StoBrick, StoStone, and StoGlass Mosaic without light reflectance value limit

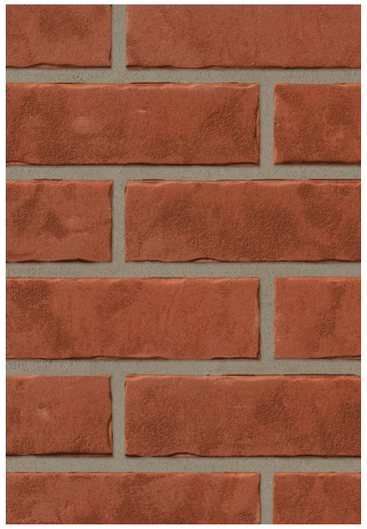
System
- Reaction to fire: class A2-s1, d0 with Ventec A board (in accordance with EN13501-1)
- Impact resistance with rendered surface:
  - In the appropriate system build-up – hail resistance class 3

Because material diversity is the best tool to have

Aesthetic appeal is the most important string to our bow. Our range of surface materials allow for creative facade designs: renders, prefabricated render elements, three-dimensional facade profiles and hard claddings including brick, stone, and glass mosaic.

Render

Render offers a range of fascinating options for facade design in terms of form, colour, and structure. It can be used in individual designs and applied manually using a wide variety of tools and application techniques. Of course, there is more than one type of render. We provide organic and silicone resin renders, render with Lotus-Effect® Technology, and mineral and silicate renders. Surfaces ranging from smooth to very coarse can be created using different types of render (stippled, rilled, and free-style textured render) with various grain sizes. You can also decide whether the appearance should be smooth or matt and you can choose from a whole rainbow of colour shades.



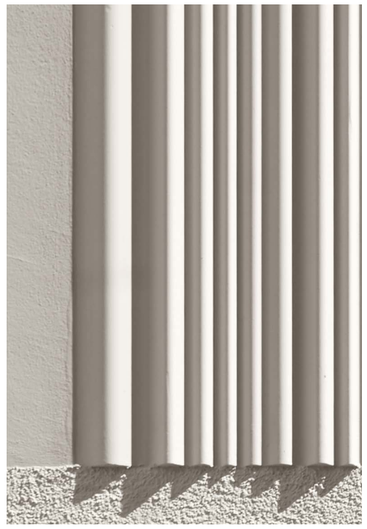
StoBrick

We have a wide range of brick slips in various surfaces and formats. If you wish, you can also pick out your own ceramics and we will test them for feasibility with the system. Ceramics provide a hard-wearing surface that offers many design possibilities, including three-dimensional facade design. At Sto, you can choose from smooth, coarse, and three-dimensional surfaces, as well as matt and gloss finishes – and you can decide on the colour shade as well.

Resin Brick Slips

Bonding brick slips to an insulation system provides a cost-effective and structurally straightforward alternative to double-leaf construction types. Our resin brick slips are extremely lightweight using a flexible material, 90% of which is made up from mineral components, and can be used not only on all our external wall insulation systems (StoTherm) but also on StoVentec R rainscreen facades.

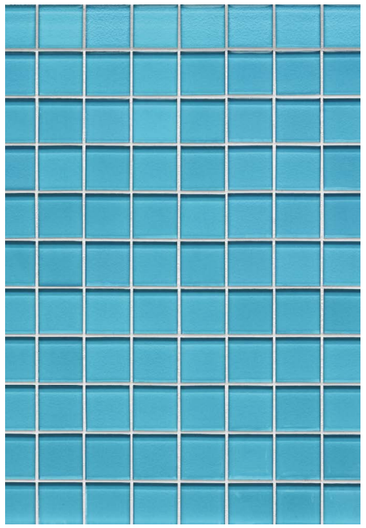
Using the same material, we can also achieve timber effects on StoTherm or StoVentec R systems. Typically used for accentuating building features or adding interest to a facade, this solution has the same A2-s1, d0 reaction to fire classification.



StoDeco

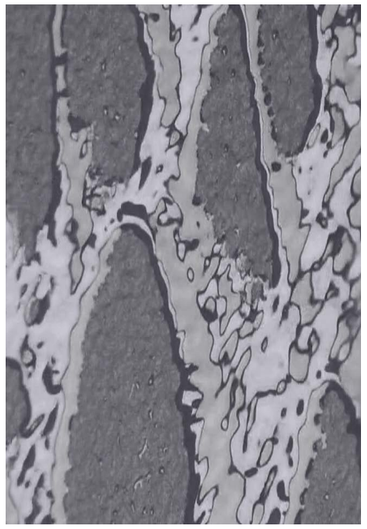
Three-dimensional facade elements, from standard sills, sill supports or keystones, to bespoke architectural designs. Manufactured from the lightweight, weather resistant and easy to shape material, Verolith®, any StoDeco profile or panel can be precisely produced using our state-of-the-art CNC milling machines.

If you are looking to recreate a facade that's inspired by Art Deco or Bauhaus influences or to add detailing, these facade panels and profiles can provide an individual touch.



Glass Mosaic

Glass mosaic owes its dazzling effect to the interplay of light and colour and produces spectacular results on curved shapes. It also provides unparalleled lustre, a reflective surface, and an impressive depth effect. At Sto, you can combine various colours and formats. Our extensive range also features a variety of standard colour shades and joint material that can be tinted to match.



Innovative Coatings

Sto's innovative renders and facade paints can provide the optimum protection, colour stability and durability when applied to an EWI or rainscreen system. Our superhydrophobic Lotus-Effect® render ensures dirt runs off with rain, whilst StoColor Dryonic facade paints, in 800 colour shades, protect the facade from weathering due to water, UV radiation, or heat, as well as algae or fungal attack.

With you every step of the way: from design to completion

Sto specification managers and the technical service team support architects, planners and applicators from the design to the last detail of the finished facade.

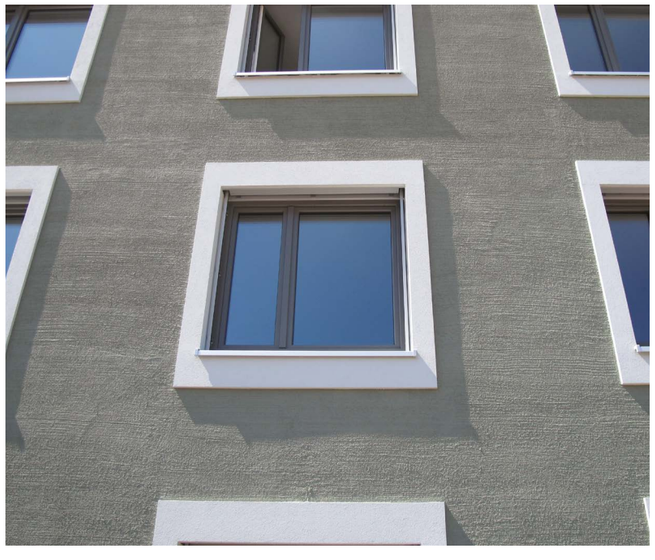
Our services
- Planning and applicator consultation, particularly for custom solutions
- 2D or 3D design visuals to help select the correct facade finish
- Visits to existing sites
- Communication of project-based structural analyses
- Determination of wind loads (simplified method)

Advice for every project phase
Comprehensive advice is a key component of our services. Sto offers expert advice quickly during every stage of the project – how to apply Sto products correctly, right through to the most detailed questions about the external wall insulation or rainscreen system.

StoDesign
Our StoDesign team offers you more than just design with colour. Individual and project-related material and colour concepts can be designed to inspire you. We can showcase design options in digital, virtual visualisations that allow decisions on architecture, design and engineering.

Render, brick slips; rough or smooth, matt or glossy: the surface aesthetics of these different materials influences the overall facade effect. Suitable for new builds or refurbishments, where you need to remove old or non-compliant facade materials.

Support for applicators
The Sto Technical Team provides professional, assistance. As qualified, technical contact people, they support applicators with practical explanations on all materials and application techniques.



Case Study - Residential building
Advice | Study – Design – Visualisation

Concept A, top image: option to create a direct connection to the neighbouring buildings with render and accentuated red coloured balcony areas.

Concept B, second image from top: render and brick are the main design features with colours ranging from red to brown and anthracite.

Image bottom right: completed buildings with the chosen concept B StoDesign of Sto render and Sto resin brick slips.

Headquarters

Sto Ltd
Unit 700, Catesby Park
Kings Norton
Birmingham
B38 8SE

Phone +44 (0)141 892 8000
info.uk@sto.com
www.sto.co.uk

01/07.21 Printed in the U.K.