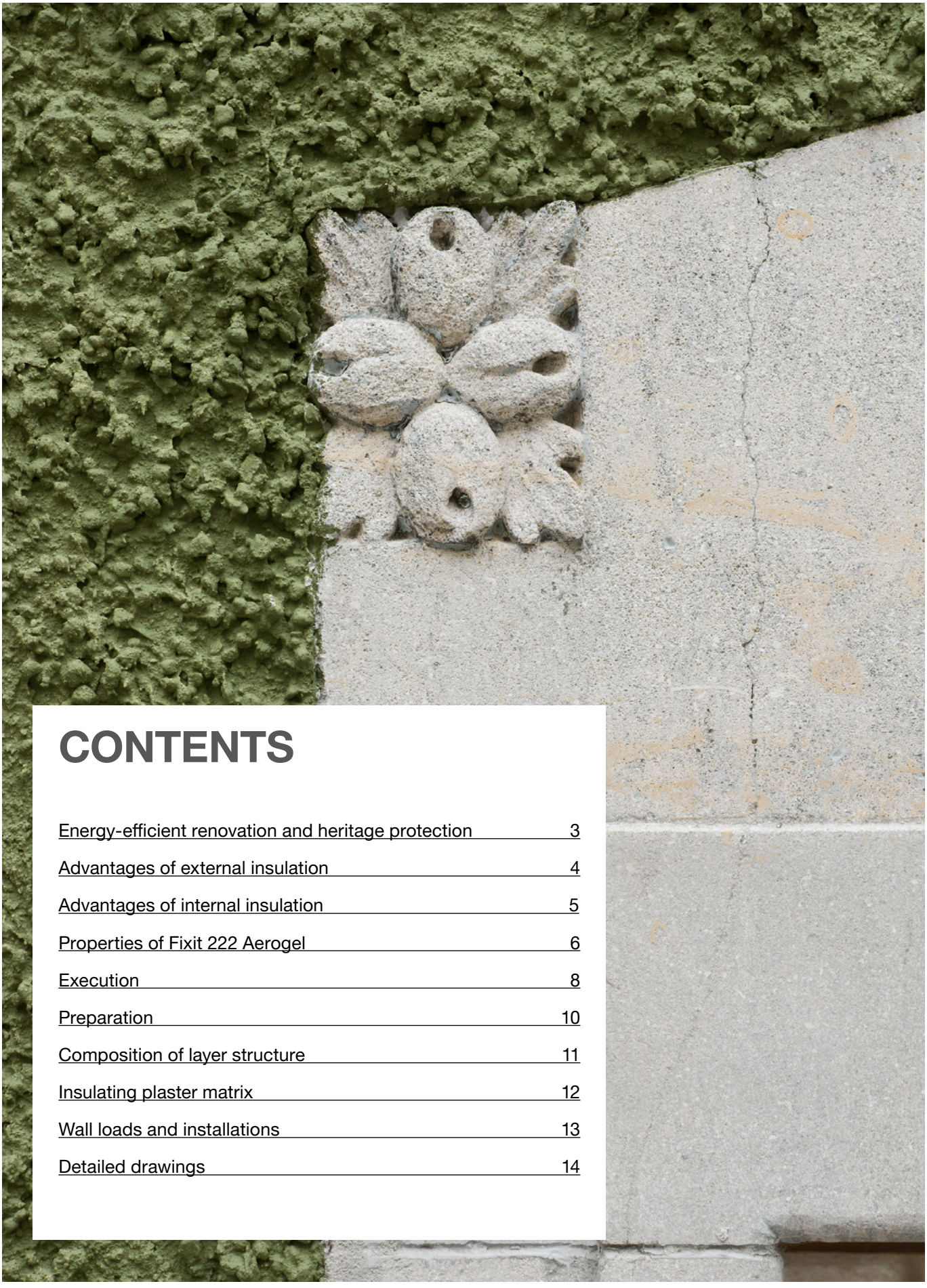
FIXIT
Schweiz. Suisse. Svizzera.

Fixit 222 Aerogel
High-performance insulating plaster

Expertise & Application guidelines



CONTENTS

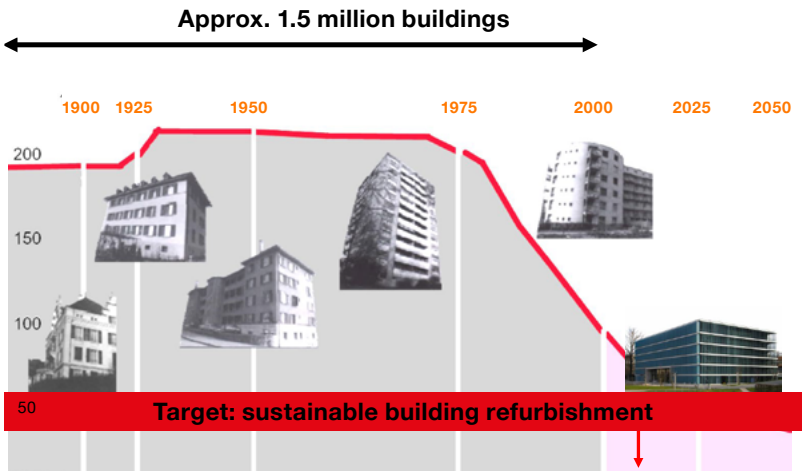
FOR INDOOR AND OUTDOOR USE

ENERGY-EFFICIENT RENOVATION AND LOCAL HERITAGE PROTECTION

Around two-thirds of the buildings currently standing in Switzerland were built between 1940 and 1970. Many of these older buildings have no insulation at all, or only inadequate insulation. To reduce energy consumption and CO_2 emissions, they therefore need to undergo an energy-efficiency refurbishment.

Although many of these buildings are not yet officially listed, they play a key role in shaping the townscape – and are increasingly coming to attention of heritage conservation authorities. However, conventional external insulation poses a challenge. Its thick insulation layers create deep window reveals, altering the building's proportions and causing the characteristic appearance of the old buildings to be lost.

The result: energy-efficient façade renovations and the preservation of the historic townscape appear to be in conflict.



Facades can be renovated to improve energy efficiency without compromising their appearance.

If all stakeholders – clients, heritage conservation authorities, townscape conservation bodies and planners – are involved at an early stage, holistic solutions are possible even for buildings that are not listed.

This brochure helps all stakeholders to plan energy-efficient façade renovations effectively and implement them smoothly – resulting in a project that is both technically sound and aesthetically pleasing.

ADVANTAGES

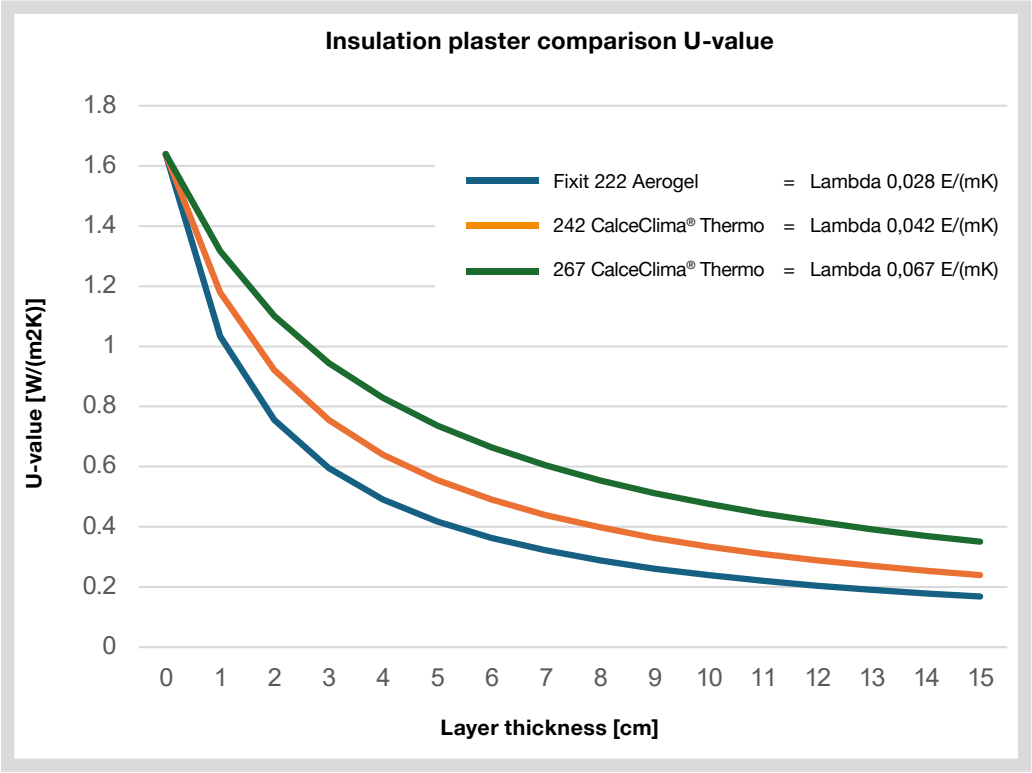
EXTERNAL INSULATION

Fixit 222 Aerogel high-performance insulating plaster was developed in close collaboration with Empa (Swiss Federal Laboratories for Materials Science and Technology) – as a premium solution for all situations where conventional external insulation would unduly detract from a building's appearance.

It enables efficient energy-efficient refurbishment – without compromising on the architecture.

Thanks to its **exceptionally high thermal insulation performance of 0.028 W/(mK)**, Fixit 222 Aerogel reduces the energy consumption of the external wall by half with a layer thickness of just 3 cm – the thickness of a standard layer of plaster that has been removed.

This makes energy-efficient façade renovation possible whilst fully preserving the original appearance. Heritage conservation and energy-efficient renovation are no longer at odds – they benefit from each other.



Evaluation by the Fraunhofer Institute

Calculation Frongartenstreet, St. Gallen

- Lower heating costs whilst maintaining the same façade appearance
- Insulation thicknesses that can be tailored to individual requirements
- Non-combustible and therefore safe for buildings constructed close together, such as in old town centres

ADVANTAGES

INTERNAL INSULATION

Many buildings constructed before 1970 have inadequate thermal insulation. If external thermal insulation with plaster is not feasible for technical or aesthetic reasons, internal insulation offers an ideal alternative. It significantly improves thermal insulation and noticeably enhances comfort for occupants.

Just 3 cm of insulation reduces heating costs by around 50%. Although the insulating effect does not increase in direct proportion to the thickness of the insulation, even with just 8 cm, energy savings of around two-thirds can be achieved.

As adjacent, uninsulated building elements can become colder when internal insulation is installed, the guiding principle is: **as much internal insulation as necessary – but as little as possible.**

- As the insulation is installed on the inside, there is no cold air settling on the external walls and therefore no draughts inside the building.
- The insulation reduces moisture on the walls, thereby preventing mould growth.
- Rooms with internal insulation can be heated up completely in a very short time. This is of particular interest for buildings used only occasionally, such as holiday homes, holiday lodges or common rooms, etc.
- No scaffolding is required to apply the insulating plaster and the work can be carried out very quickly.
- The cost of energy-efficient refurbishment of old buildings is lower with internal insulation.
- Depending on requirements, custom insulation thicknesses are possible without causing visible unevenness.
- All cavities are filled easily and automatically by the spraying process.
- Neither vapour barriers nor vapour retards are required.
- Fixit 222 Aerogel is capillary-active and vapour-permeable due to the natural binder, lime.
- Fixit 222 Aerogel belongs to building material class A2 and is non-combustible.

Water absorbency

The lime-based Fixit 222 Aerogel really comes into its own as an internal insulation:
It is highly **vapour-permeable**, has very **high capillary absorbency** and offers ideal conditions for reliably absorbing and releasing moisture.

The Fixit 222 Aerogel high-performance insulating plaster also impresses in terms of its **resistance to condensation** and **drying behaviour**. This makes it ideal for the internal insulation of challenging existing buildings.

OUTSIDE INSIDE

PROPERTIES

Properties	Mean measured value
Dry bulk density	220 kg/m³
Porosity	90
Diffusion resistance coefficient μ	4 – 5
Water absorption coefficient	12.6 kg/m²√h
Thickness	49.4 mm
Moisture content at 23°C and 80% RH	0.83 Vol.-%
Free water saturation	46.2 Vol.-%

OUTSIDE INSIDE

FURTHER INFORMATION

Lambda value
Maintaining the lambda values of insulating materials is of extreme importance. Independently monitored products guarantee that these values are correct. Fixit AG maintains such independent monitoring, confirmed by the responsible department of the SIA.

Mineral insulation

Thanks to its lime binder, Fixit 222 Aerogel is a mineral-based building material that can be applied without leaving any voids. It is therefore also ideal for internal insulation.

Nanoparticles

The structure of the aerogel particles continues to raise health concerns. The potential for harm has been independently investigated, and no toxicological risks were found. Furthermore, dust emissions during processing remain below the legal limits.
The material can therefore be used indoors without hesitation, particularly as the capillary action of the base binder, lime, and the insulating properties of the aerogel particles significantly improve the quality of living.

EMPA VOC Test Report (DE)

Non-flammable
Fixit 222 Aerogel High Performance Insulating Plaster is a Class A2 building material and so is non-flammable.

MPA Report on Flammability Characteristics (DE)

Capillary-active and vapour-permeable

Further advantages of Fixit 222 Aerogel high-performance insulating plaster include its capillary activity and breathability. This means there is no risk of algae or fungal growth on the exterior, and this saving can be factored into maintenance costs. The paint finish can be applied without the use of biocides, and no special measures need to be taken during the renovation. There are no additional costs involved.

Video showing diffusion properties

SUBSTRATE

EXECUTION

The first step is to check what layer thickness is possible with the insulating plaster.
In addition, various pre-treatments may be required depending on the substrate:

Substrate	Fixit 211	CC Pre-injection	Fixit 670	Fixit 462	Fixit 210	Welnet
Brickwork	✓	✓	✓			
Concrete	✓			✓		✓
Quarry stone	✓	✓	✓			
Tamped concrete	✓					✓
Sandstone		✓				
Half-timbered work						✓**
Lime plaster		✓*		✓		✓
Cement plaster	✓*			✓		✓
Synthetic plaster	Substrate not suitable and must be removed!					
Gypsum plaster	Substrate not suitable and must be removed!					
Efflorescence					✓***	

Inventory checklist

✓* = If the surface cannot be removed, apply to adequately stable
✓** = Cover wooden beams with roofing paper, fix Welnet to masonry only.
✓*** = Reconstruction following removal of the substrate.

Any deposits on the surface, such as mould, soot, nicotine or old wallpaper, must always be removed.

Before installing internal insulation, the first step is to carry out a survey of the rooms to be insulated.

Once the survey has been completed, the details must be discussed in detail with the building physics consultant, who will then carry out the necessary calculations. Close coordination between the planners and the specialist contractors is essential.

The following points are very important:

- WUFI calculations (a simulation program for calculating coupled heat and moisture transport processes in building components).
- Details of interfaces such as windows, partition walls, wooden beams, cable conduits and pipework.
- Airtight connections must be decoupled using a grooved tape.
- Fixit 222 Aerogel is used above ground level and in vapour-permeable structures.
- When applying to wooden walls or above wooden floors, it is recommended that corners and edges be opened and filled with insulating plaster to minimize thermal bridges.
- Wooden components (e.g. with half-timbered work) must be covered with roofing paper, and a plaster-bearing substrate such as Welnet attached to the masonry. It is possible to achieve an airtight bond with half-timbered walls using Fixit 222 Aerogel.
- Wooden beams within masonry structures are in no way endangered by Fixit 222 Aerogel High Performance Insulating Plaster.

FINISHING PLASTER

EXECUTION

Fixit 222 Aerogel high-performance insulating plaster is applied using a plastering machine designed for thermal insulation plasters (double-speed auger housing, plastering spiral for thermal insulation plasters).

To prevent the Fixit 222 Aerogel high-performance insulating plaster from drying out too quickly and developing **shrinkage cracks**, it must be **kept moist for at least one week.**

Preparation for further coating

1. **Roughen the surface**

   Before applying the next coat, the surface of the insulating plaster is scraped to ensure adequate adhesion.

2. **Remove dust**

   The **dust residue** must then be thoroughly vacuumed up.

3. **Stabilise the subgrade**

   Fixit 493 Mineral Substrate Stabiliser is then applied – **ideally 24 hours before embedding the tissue.**

4. **Tissue embedding**

   Fixit 223 Special Embedding Mortar is applied together with the **reinforcement mesh.** The application method depends on the desired finish coat:
   Mineral finish coats: broom-finished
   Silicate finishes: trowelled smooth

   At the base, the perimeter insulation board must be **roughened** before application. The **drying** time is **10 days**.

5. **Finishing coat**

   The finishing coat for the aerogel insulation plaster system must be applied exclusively using the finishing plasters and paints approved by Fixit.

   Hard finishing coats such as washable or textured plasters are **not suitable**, as their high surface tension does not ensure reliable adhesion.

OUTSIDE

INSIDE

PREPARATION

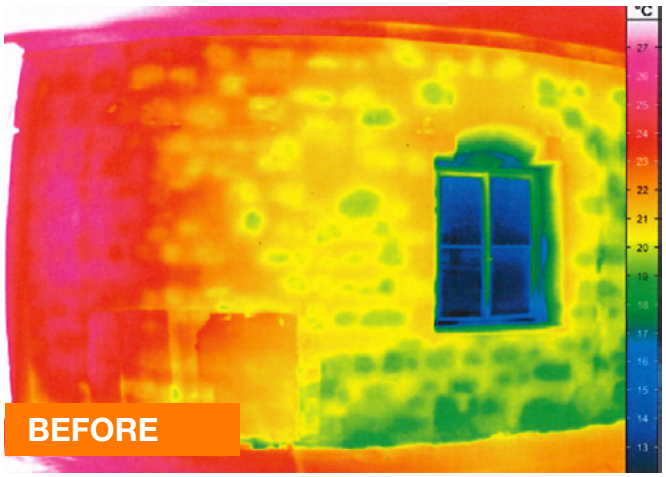
Outside, the scaffolding must be equipped with a **net/cover** to protect against **wind** and **direct sunlight**.

For skirting, balcony and floor connections, or in situations where water may accumulate, skirting insulation boards must first be glued down and aligned to a height of at least 10 cm and no more than 25 cm above ground level.

The connections in the plinth area must be carried out in accordance with the **detailed drawings** for Fixit 222 Aerogel high-performance insulating plaster.

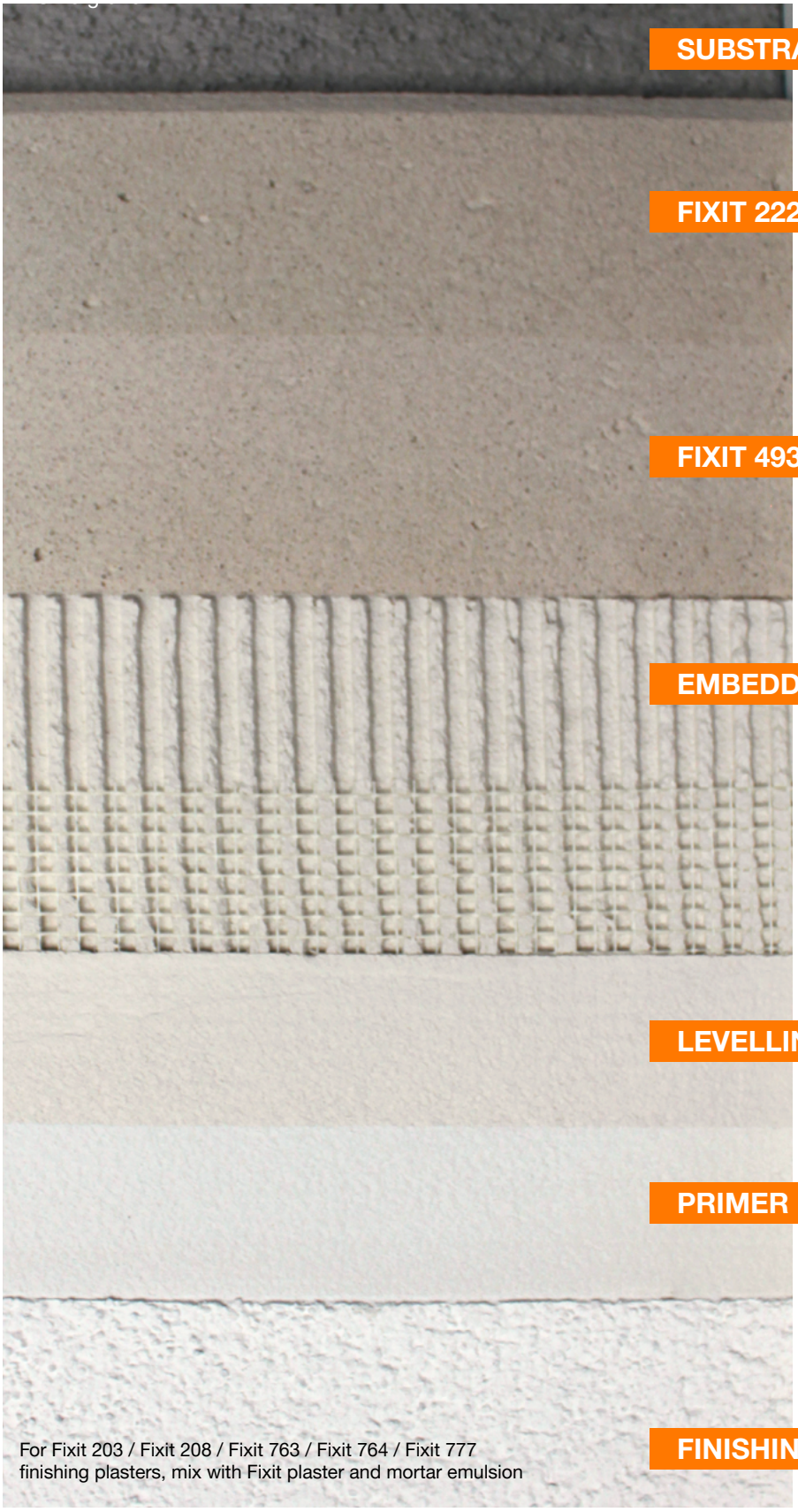
The following coatings or surfaces may be applied over Fixit 222 Aerogel High Performance Insulating Plaster (in conjunction with Fixit 223 and embedded reinforcement mesh):

- Scandatex Wall paper (Fixit 145 Planofix Fine Truing Coating, max. 3 mm layer thickness)
- Ceramic wall tiles (max size 1600 cm^2, with anchor bolts through the mesh reinforcing on 40cm grid layout) up to a maximum of 1 m x 1.6 m as rear wall.
- Magnetic panels or magnetic plaster (with anchor bolts through the mesh reinforcing on 40cm grid layout)
- Other standard mineral-based final coats prepared and applied as per Fixit guidelines.



AEROGEL HIGH-PERFORMANCE INSULATING PLASTER

COMPOSITION OF LAYER STRUCTURE



SUBSTRATE

FIXIT 222 AEROGEL

high-performance
insulating plaster

FIXIT 493

mineral-based
undercoat stabilizer

EMBEDDING FABRIC

LEVELLING LAYER

PRIMER

FINISHING PLASTER

For Fixit 203 / Fixit 208 / Fixit 763 / Fixit 764 / Fixit 777
finishing plasters, mix with Fixit plaster and mortar emulsion

FOR PLANNING

INSULATING PLASTER MATRIX

Stand times

		Brickwork	Concrete	Quarry stone	Sand-stone	Tamped concrete	Lime plaster	Cement plaster
Stand times	Product	Fixit 222 Aerogel high-performance insulating plaster						
5 days	Fixit 211	✓	✓	✓		✓		✓
1 – 3 days	CC Anwurf	✓		✓	✓	✓	✓	✓
3 weeks	Fixit 670	✓		✓		✓		✓
1 day/mm	Fixit 462		✓			✓	✓	✓
10 days	Fixit 210	✓		✓	✓	✓		
immediately	Welnet	✓	✓	✓	✓	✓	✓	✓

*Covering wood with roofing felt

Grid integration

Stand times for grid integration		
10 days	Fixit 223	Coarse mesh reinforcement 8x8 Mesh of glass fibre

Drying times

Insulation thickness	days
3 cm	21
4 cm	21
5 cm	21
6 cm	21
7 cm	23
8 cm	26
9 cm	30
10 cm	33
11 cm	36
12 cm	40
13 cm	43
14 cm	46
15 cm	50

INNEN

WALL LOADS AND INSTALLATIONS

If it is intended to attach loads to the walls after the insulating plaster has been applied, this must be taken into consideration during the planning phase. It is important to know in advance what these loads are.

LIGHT LOADS

Mounting discs with transverse load max 5 kg

- Motion sensors
- Light signage
- Temperature sensors
- Light framed pictures

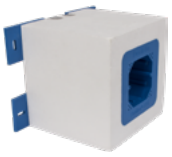
Mounting cylinders with transverse load max 15 kg and tensile load 30 kg

- Light lamps
- Light framed pictures

ELECTRICAL FITTINGS

Thermal bridge-free montage of electrical switches and power outlets for indoor insulated rooms

- Electrical switchboxes
- Power sockets
- Motion sensors
- Temperature sensors



SUPPORT BLOCKS

Quadroline® PU-support blocks

- Kitchen cupboards (free hanging)
- Heavy framed pictures
- Cupboards
- Shelving, free hanging

MEDIUM LOADS

Supporting brackets with transverse load max 100 kg and tensile load 160 kg (fixed into masonry)

- Heavy pictures
- Heavy lamps
- Hand rails
- Light radiators

HEAVY LOADS

Heavy duty brackets with transverse load max 600 kg (depending on mounting surface)

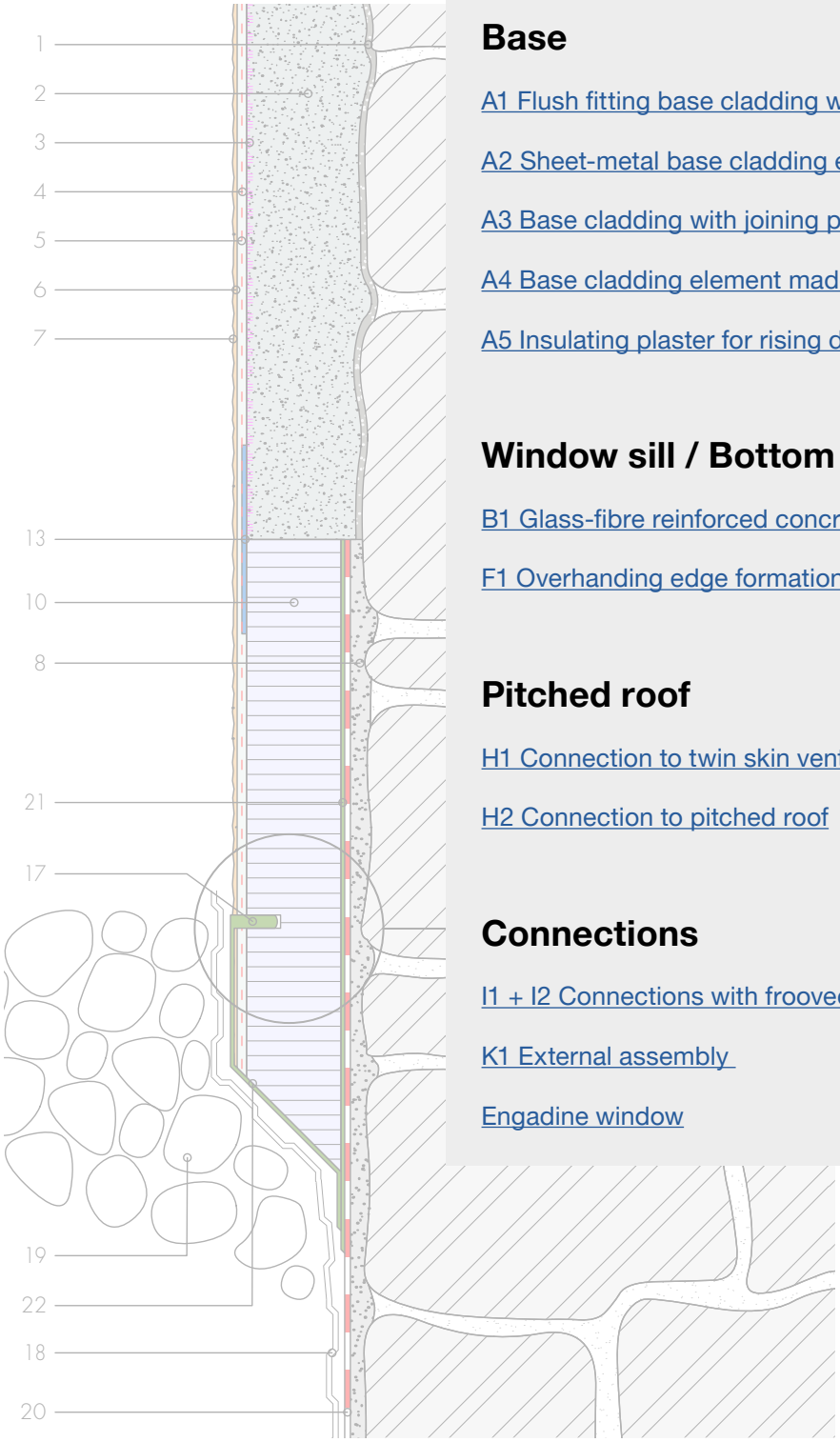
- Kitchen components, free hanging
- Mirrored cabinets
- Heavy radiators
- Coat racks, free hanging

If details of the required loads only become known after the application of the insulating plaster, please follow the link given to access information on available fixing components. The fixing components must if possible be attached in advance to the substrate. Adhesive should be applied over the entire contact surface. Afterwards, if necessary, reinforce by using anchor bolts.

Link Hilti fixing components

OUTSIDE

DETAILED DRAWINGS



Base

A1 Flush fitting base cladding with perimeter insulation

A2 Sheet-metal base cladding element mounted

A3 Base cladding with joining profile

A4 Base cladding element made of glass-fibre

A5 Insulating plaster for rising damp

Window sill / Bottom view

B1 Glass-fibre reinforced concrete window sill

F1 Overhanding edge formation with drip profile

Pitched roof

H1 Connection to twin skin ventilated roof

H2 Connection to pitched roof

Connections

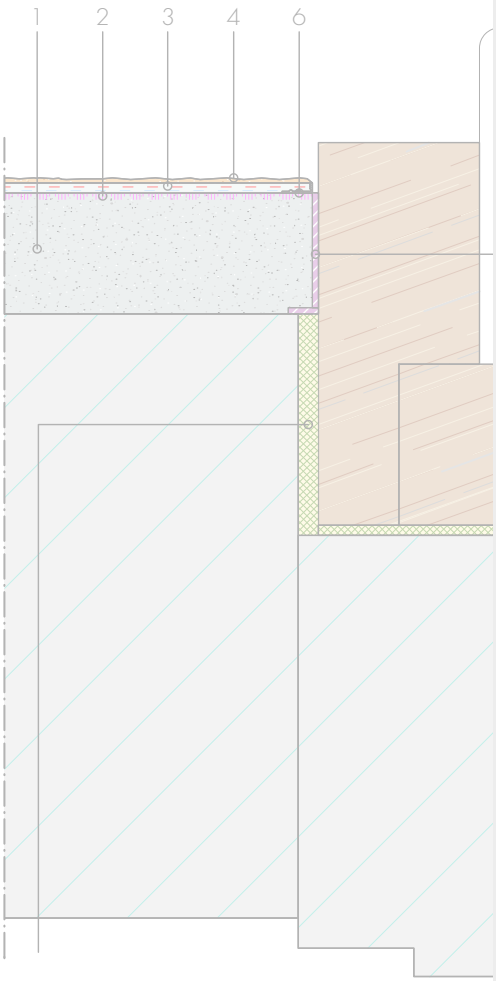
I1 + I2 Connections with frooved tape and joint de metal frame BG1

K1 External assembly

Engadine window

INSIDE

DETAILED DRAWINGS



Window / Door

Interface to window opening and door jamb

Interface to solid masonry window sill

Interface to window frame, in solid masonry Variant 1

Interface to window frame, in solid masonry Variant 2

Floor / Ceiling

Interface to concrete floor

Interface to wooden floor / ceiling

Interface to wooden beam ceiling

Partition wall / Magnetic wall / Sound insulation

Bond to partition wall

Magnetic wall

Enhanced noise reduction

Various connections

Bearing fitted cupboard

Bearing sink backboard max 1 x 1,6 m

Electrical fittings

Fixit AG

Schachen 416
CH – 5113 Holderbank AG

Tel. +41 (0)62 887 53 00
info@fixit.ch

fixit.ch/en/trends-solutions/fixit-222-aerogel