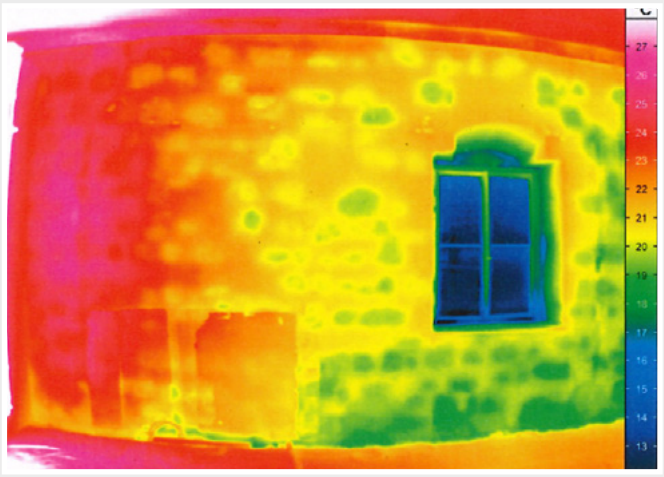
FIXIT
Schweiz. Suisse. Svizzera.

Indoor insulating plasterwork

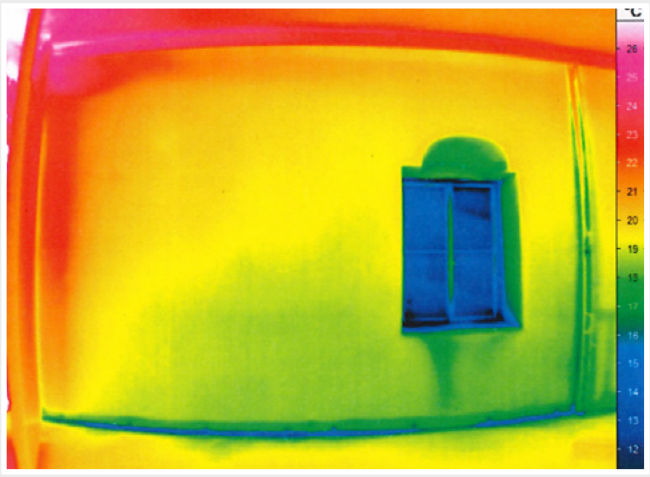
with Fixit 222 Aerogel High Performance Insulating Plaster

Specialist information and detailed drawings

Contents



Pre-treatment



Post-treatment

The advantages of indoor insulation

Buildings constructed prior to 1970 often suffer from poor thermal insulation. If, for aesthetic or technical reasons, the use of an insulating render on the external façade of a building is not possible, then frequently the only solution remaining is to apply thermally insulating plaster to the indoor walls. The aim of both methods is the same – namely, to increase the level of thermal insulation and thereby enhance the comfort of the occupiers.

Relevant in this context are the U-values as defined in the SIA Standard 180. Here U-values of a maximum of 0,4 W/(m^{2}K) are required – poorer values for indoor insulating layers are extremely problematic due to the presence of a large number of thermal bridges and will not deliver the expected results.

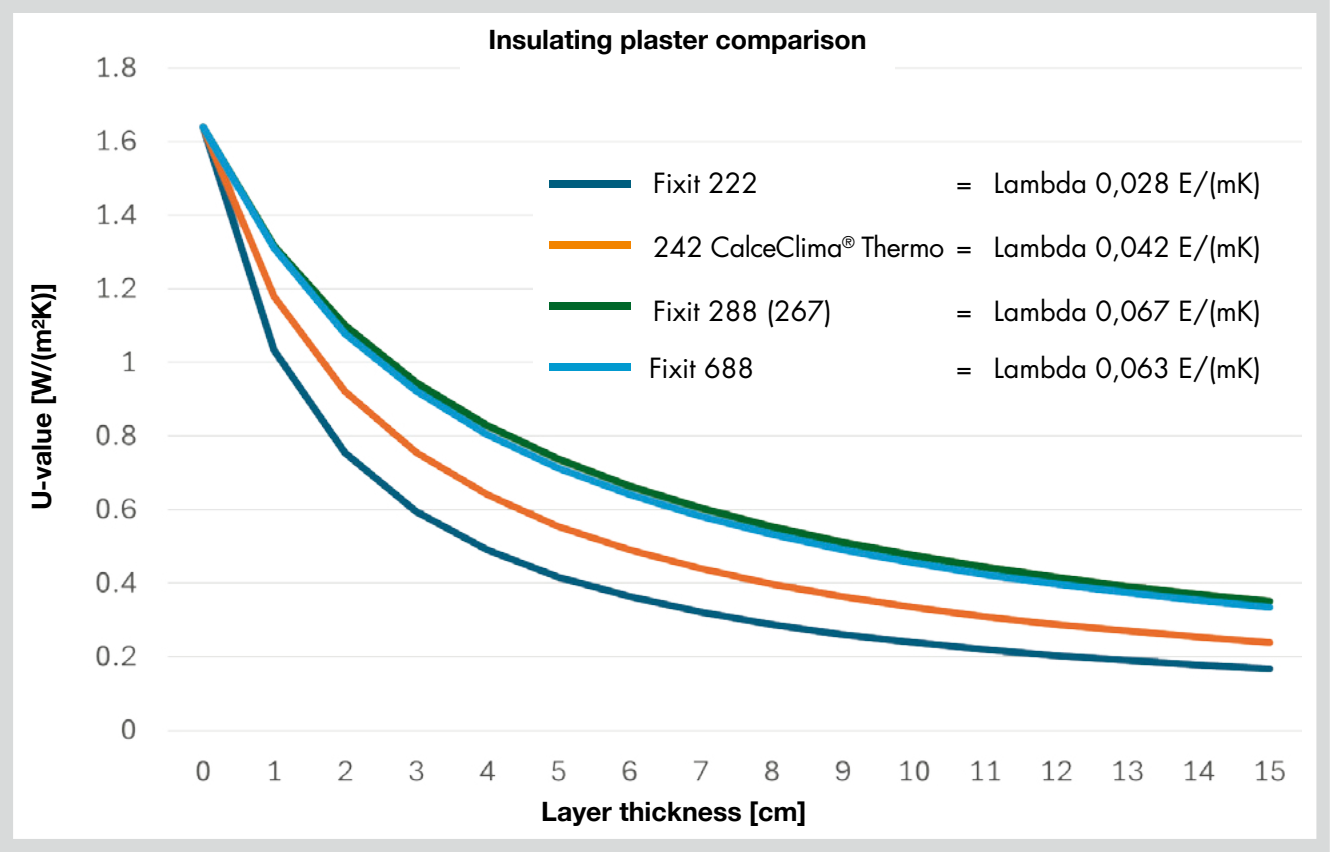
Indoor insulation offers a range of advantages:

- Because the insulating layer is on the inner wall surface, cold air downflows down the façade are avoided, as are draughts in indoor rooms.
- The insulation reduces wall humidity, thereby preventing mould and mildew attack.
- Rooms with indoor insulation warm rapidly to a comfortable temperature when heated, an important factor for premises which are used only part-time, such as holiday homes, churches and party or recreation rooms, etc.
- No scaffolding is needed to apply the indoor insulating layers, and the work can be executed rapidly.
- Less effort is involved in the energy-efficient renovation of old buildings when indoor insulation is used.
- Depending on local requirements, different layer thicknesses can be applied without visible dimensional changes occurring.

When indoor insulation is used, it must not be forgotten that neighbouring, uninsulated building areas will become colder than they were prior to renovation. The motto here is: as much indoor insulation as required, but no more than necessary!

Aerogel High Performance Insulating Plaster as indoor thermal insulation

The primary advantage of Fixit 222 Aerogel High Performance Insulating Plaster for indoor insulation work is its very high thermal insulating capability, which permits the use of thin layers on walls. Applying a coat just 3 cm thick reduces heating costs by one half. Insulation performance does not increase linearly with layer thickness, but even so the energy saving with only 8 cm of plaster is around two-thirds of the original value!



Fixit 222 is perfectly suited to indoor insulation work, because application leaves no cavities behind. Problematic wall details can be resolved very simply using spray-on techniques.

Aerogel High Performance Insulating Plaster Fixit 222 speaks for itself:

- Excellent insulating properties: a Lambda_D value of 0,028 W/(mK) – guaranteed by independent monitoring and SIA certified.
- All hollow spaces are simply and automatically filled during the spray-on application process.
- Neither humidity retarders nor barriers are necessary.
- Uneven substrates or small surface irregularities can be easily corrected.
- Fixit 222 is a capillary-active and breathable material based on limestone, a natural binding agent.
- Spray-on application obviates the necessity to cut insulating panels to size to accommodate electrical conduits or pipework.
- Several different methods are possible for hanging pictures or supporting loads etc. on walls. See page 9.
- Fixit 222 is a Class A2 building material and is non-flammable.

Properties of Fixit 222

Mineral-based insulation

Evaluation by the Fraunhofer Institute

Aerogel High Performance Insulating Plaster is a mineral-based building material which uses limestone as a binding agent. As a result it is capillary-active and water vapour-permeable, and in addition it leaves no cavities or voids after application. This makes it ideally suited for interior wall insulation purposes. Fixit 222 was specially developed for historic buildings under conservation orders and heritage site houses. These older, uninsulated structures can be renovated to a more energy efficient state by the application of just a thin layer of Fixit 222 insulating plaster to both interior and exterior surfaces, without compromising their valuable historic appearance or aesthetics.

Nanoparticles

Independent safety evaluation

EMPA Test Report on VOCs

The structure of aerogel particles has on occasion given rise to fears of negative health effects, for which reason a potential risk evaluation has been carried out by an independent external agency. No toxicological risks were identified, and dust emission during the application phase lay below the legal limiting values. The plaster material can therefore be used without hesitation in an indoor setting, all the more so as the capillary-active nature of the binding agent (limestone) and the excellent insulating value of the aerogel particles lend a high level of living quality and comfort to finished rooms.

Water vapour-permeable

Film showing diffusion properties

Fixit 222 Aerogel High Performance Insulating plaster is a condensate-tolerant interior insulation. It must be used above ground level and in diffusion-open constructions.

Diffusion characteristics

With its very low diffusion-resistance coefficient, Fixit 222 Aerogel High Performance Insulating Plaster is ideally suited for use in old buildings where its diffusion properties are excellent for water vapour regulation. Its permeability is, in fact, better than that of conventional lime mortar.

Non-flammable

MPA Report on Flammability Characteristics

Fixit 222 is a Class A2 building material and is non-flammable. It is therefore particularly suitable for indoor applications.

Water absorption capability

Use as interior insulating plaster has demonstrated that limestone-based Fixit 222 offers great advantages in terms of its excellent vapour-diffusion and capillary absorption properties. In addition, its freedom from condensation and its drying characteristics make the Aerogel insulating plaster outstandingly suitable for indoor application.

Property	Unit	Mean measured value
Thickness	mm	49,4
Dry bulk density	kg/m³	220
Porosity	%	90
Diffusion resistance coefficient μ	-	4 – 5
Water absorption coefficient	kg/(m²√h)	12,6
Moisture content at 23°C and 80% RH	Vol.-%	0,83
Free water saturation	Vol.-%	46,2

Execution

All steps involving the application of indoor insulation must be planned before execution. Cooperation and understanding between the planner and the specialist company carrying out the work is extremely important, and planning must be undertaken systematically.

Before any insulation work is done, the first step is to evaluate the existing condition of the room to be insulated.

Inventory checklist

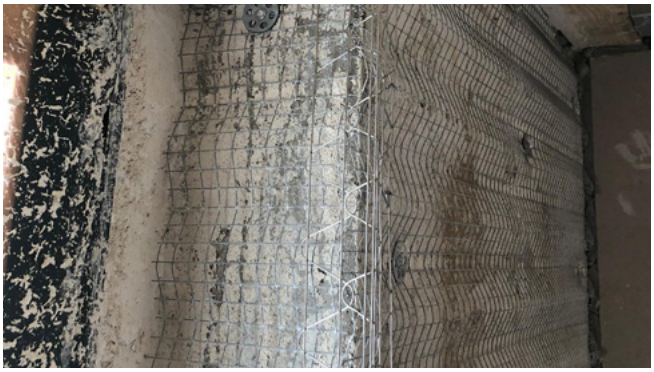
After the initial evaluation is completed, exact details must be discussed with the lead building physicist or civil engineer, and latter must perform all necessary calculations. The following points are extremely important in this context:

- Thermal bridge calculations involving non-insulated building components
- 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 sealing
- Compliance with thermal and dampness protection standards as per SIA 180
- During application, the indoor insulating plaster layer must continue down to the concrete flooring. The floor covering must be cut back by the thickness of the plaster layer to allow this.
- Fixit 222 is applied above the soil layer and onto porous surfaces with good diffusion characteristics.
- 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.
- Decouple interfaces and seals using grooved tape.
- 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.
- Wooden beams within masonry structures are in no way endangered by Aerogel High Performance Insulating Plaster.
- If noise reduction measures must be used, bond interfaces at walls, ceilings and flooring must be decoupled by applying glass-fibre tape over the joints.

BFE Thermal Bridge Catalog

IABP Final Report

The most suitable substrates are lime-cement and cement-lime plasters. Gypsum and loam plaster-work, wall-paper, tiles or paint coatings must be removed. Since the dew point shifts inwards after indoor insulation is applied, these surfaces would negatively affect the insulating properties of the Aerogel plaster.



Composition of layer structure

After the substrate has been examined and found usable, it must be prepared as follows:

Substrate	Fixit 211	Fixit 281	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					✓**	
Mildew	Must be removed					
Soot deposits	Must be removed					
Nicotine stains	Must be removed					
Wallpaper	Must be removed					

✓*= cover wooden beams with roofing paper, fix Welnet to masonry only

✓**= apply after removing substrate

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.

Limitations

MLV Aerogel insulating plaster

For high-humidity rooms such as kitchens, bathrooms, toilets etc. Fixit 222 Aerogel High Performance Insulating Plaster may only be used after consultation with Fixit AG.

After the plaster has been applied, it is important to ensure that there is adequate ventilation in the room. This can be achieved by using a mechanical ventilation system, or manually (by cross-draught ventilation for 5 to 10 minutes at least twice daily). Leaving a window open at a slight angle is not effective as it merely allows warm air to escape whilst the humidity remains in the room.

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.

Mounting discs with transverse load max 5 kg

Light loads

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

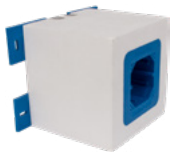
Mounting cylinders with transverse load max 15 kg and tensile load 30 kg

- 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

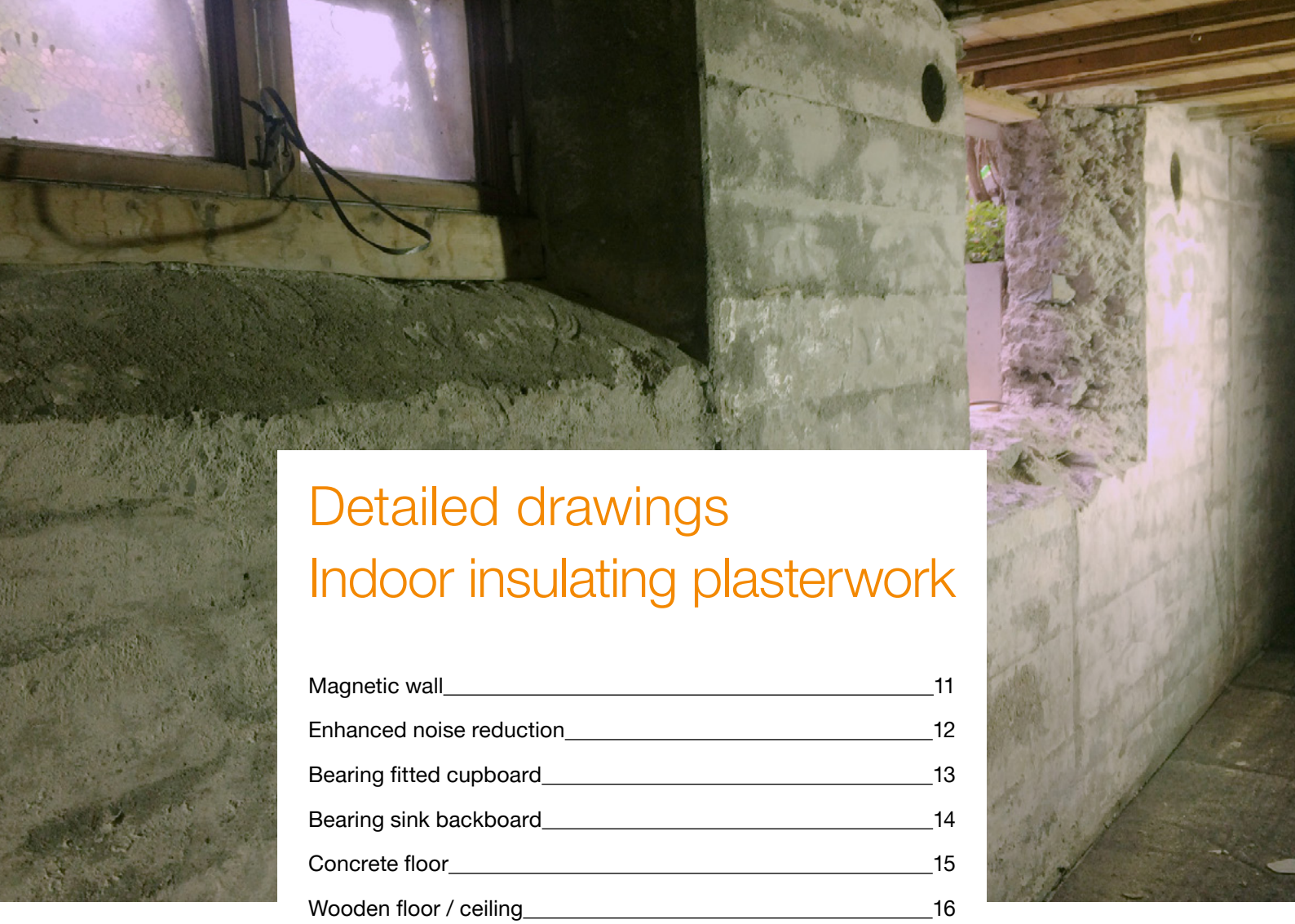
Heavy loads

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

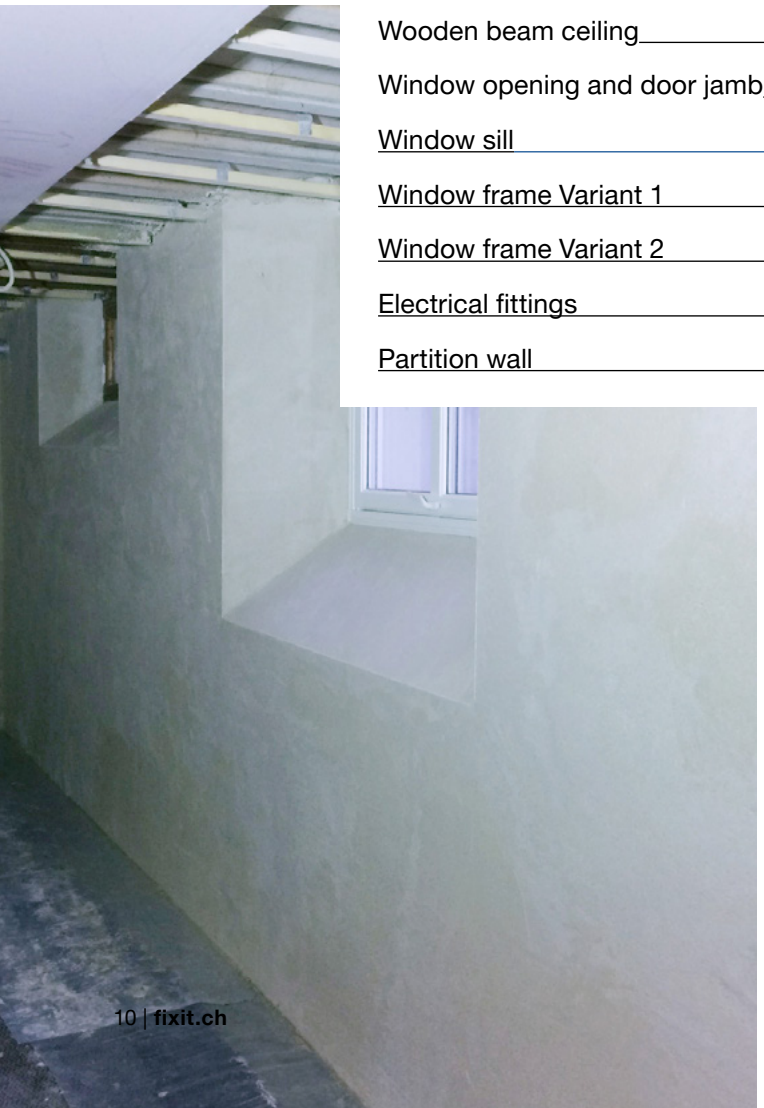
- Kitchen components, free hanging
- Mirrored cabinets
- Heavy radiators
- Coat racks, free hanging

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

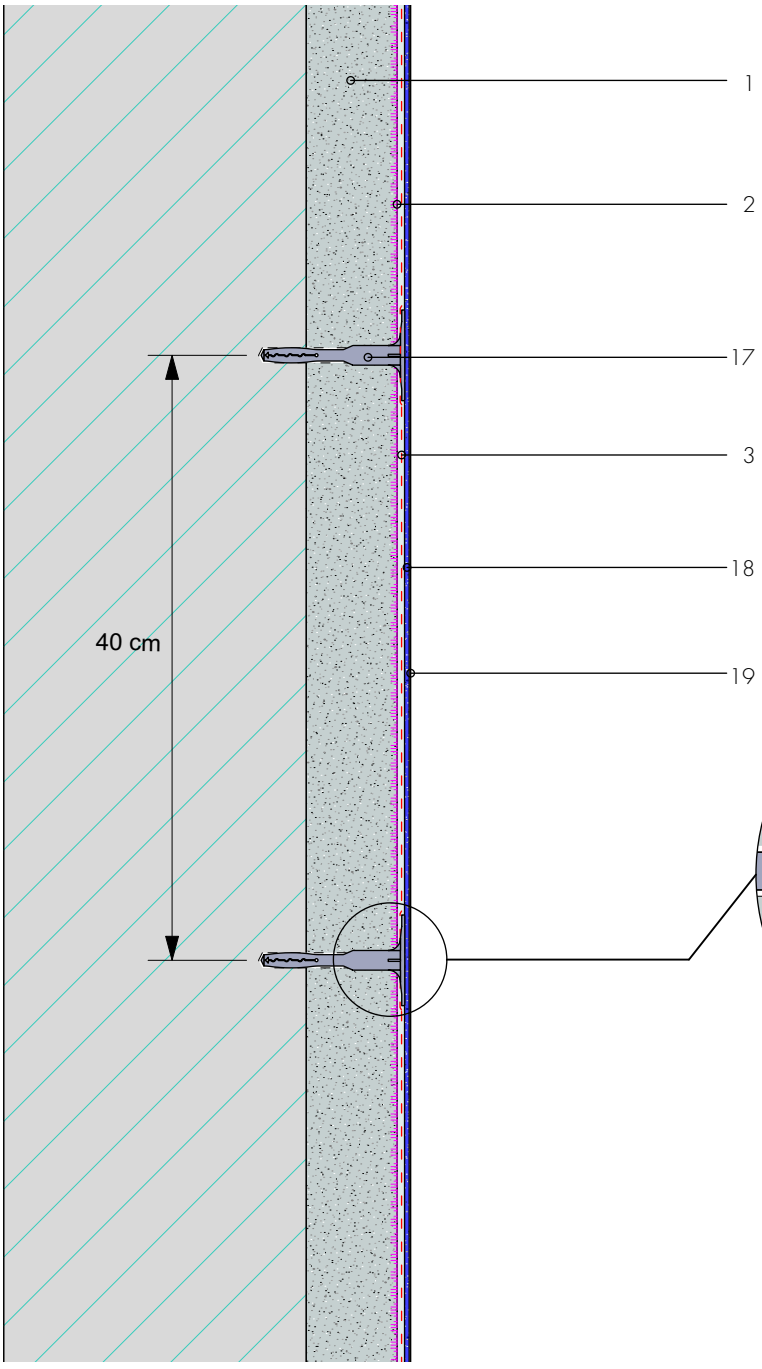


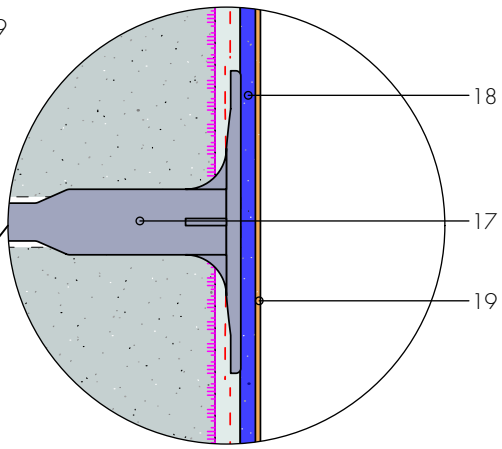
Detailed drawings
Indoor insulating plasterwork



Magnetic wall

Indoor insulating plaster as a magnetic wall



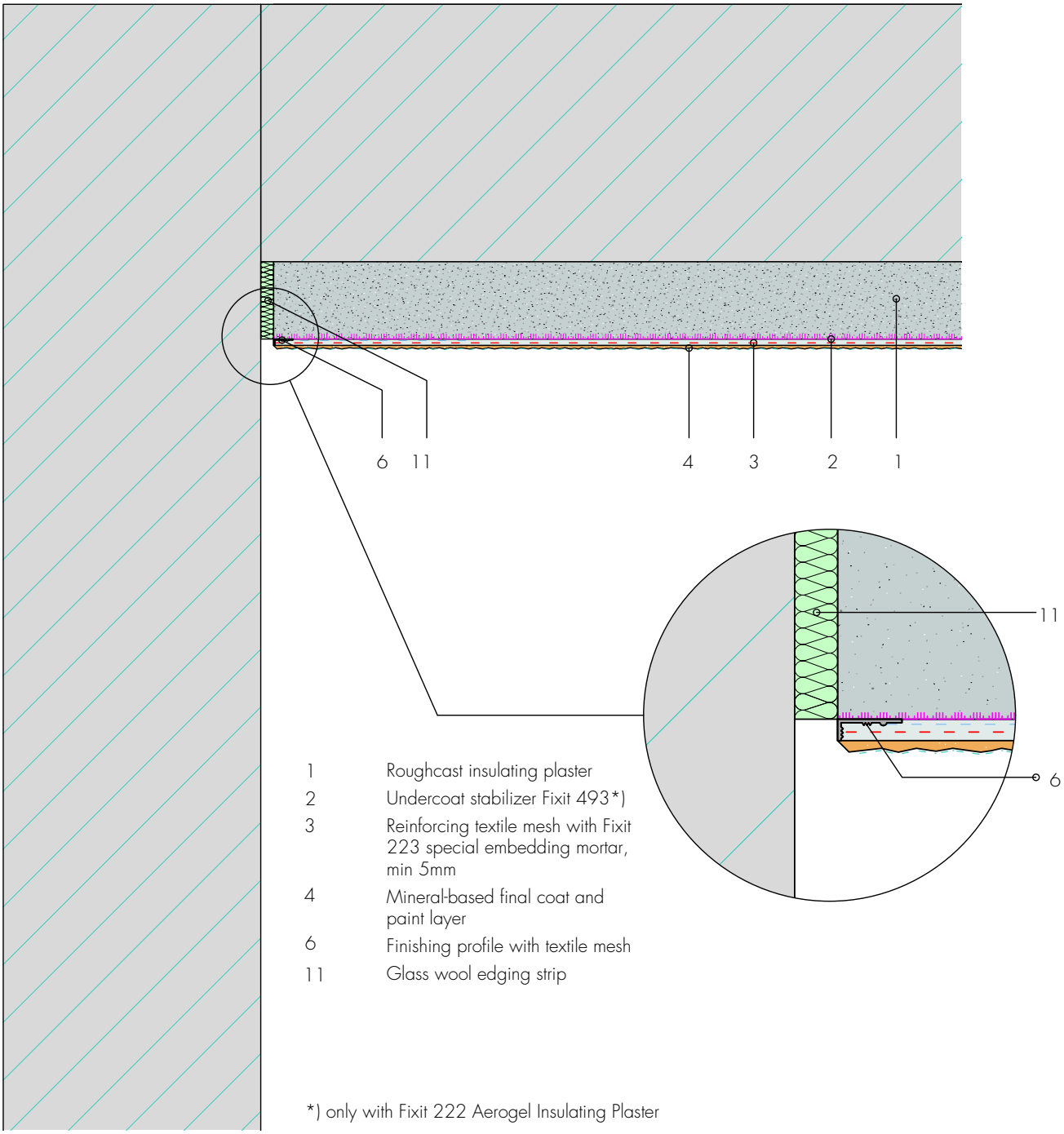


1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
17	Impact anchor bolt H1 eco through textile mesh
18	Magnetic plaster, or magnetic panels attached with adhesive
19	Final coat 0.5mm (for adhesive magnetic panels)

*) only with Fixit 222 Aerogel Insulating Plaster

Enhanced noise reduction

Indoor insulating plaster with enhanced noise reduction

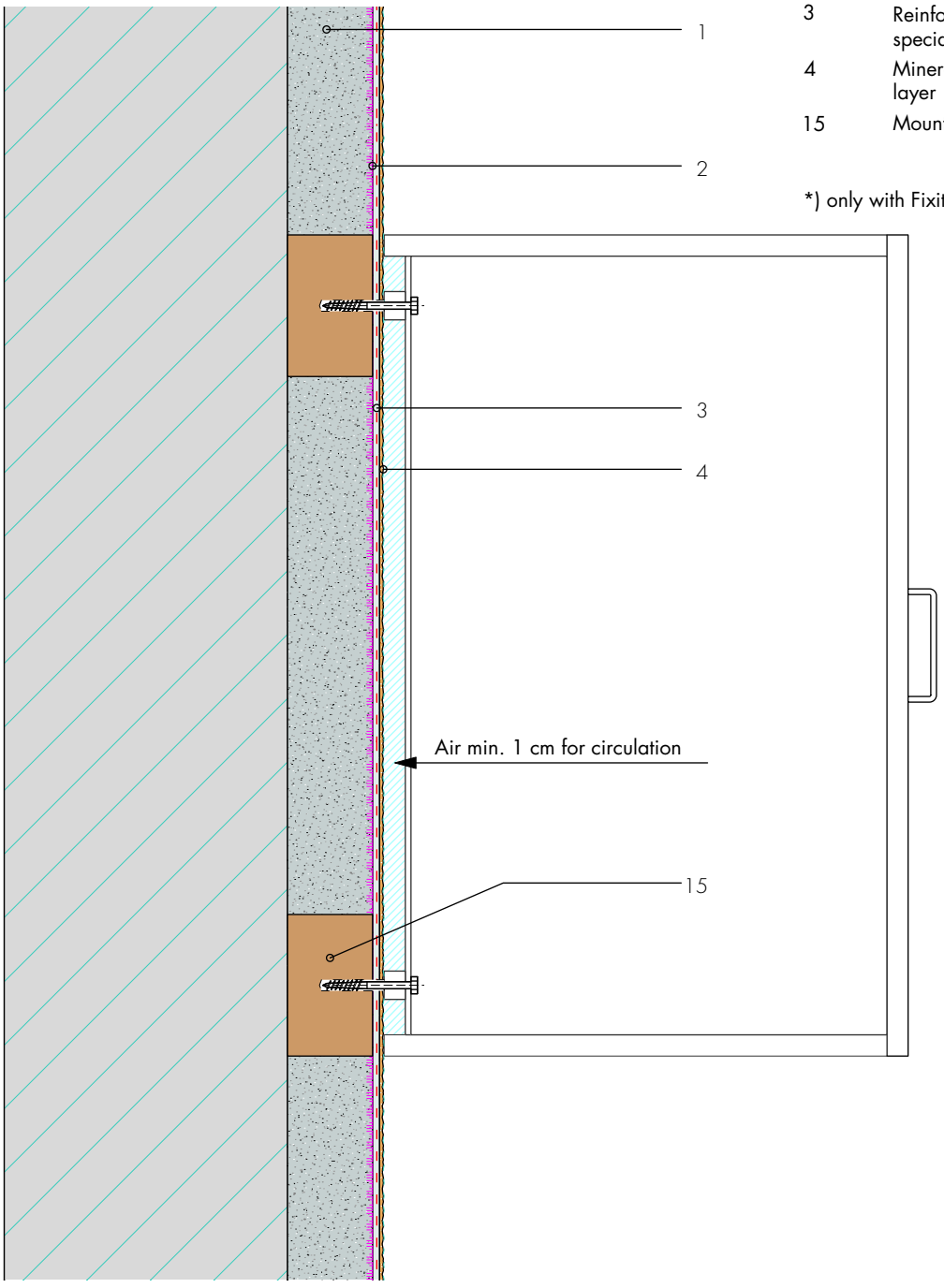


1 Roughcast insulating plaster
2 Undercoat stabilizer Fixit 493*)
3 Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4 Mineral-based final coat and paint layer
6 Finishing profile with textile mesh
11 Glass wool edging strip

*) only with Fixit 222 Aerogel Insulating Plaster

Bearing fitted cupboard

Indoor insulating plaster bearing fitted cupboard

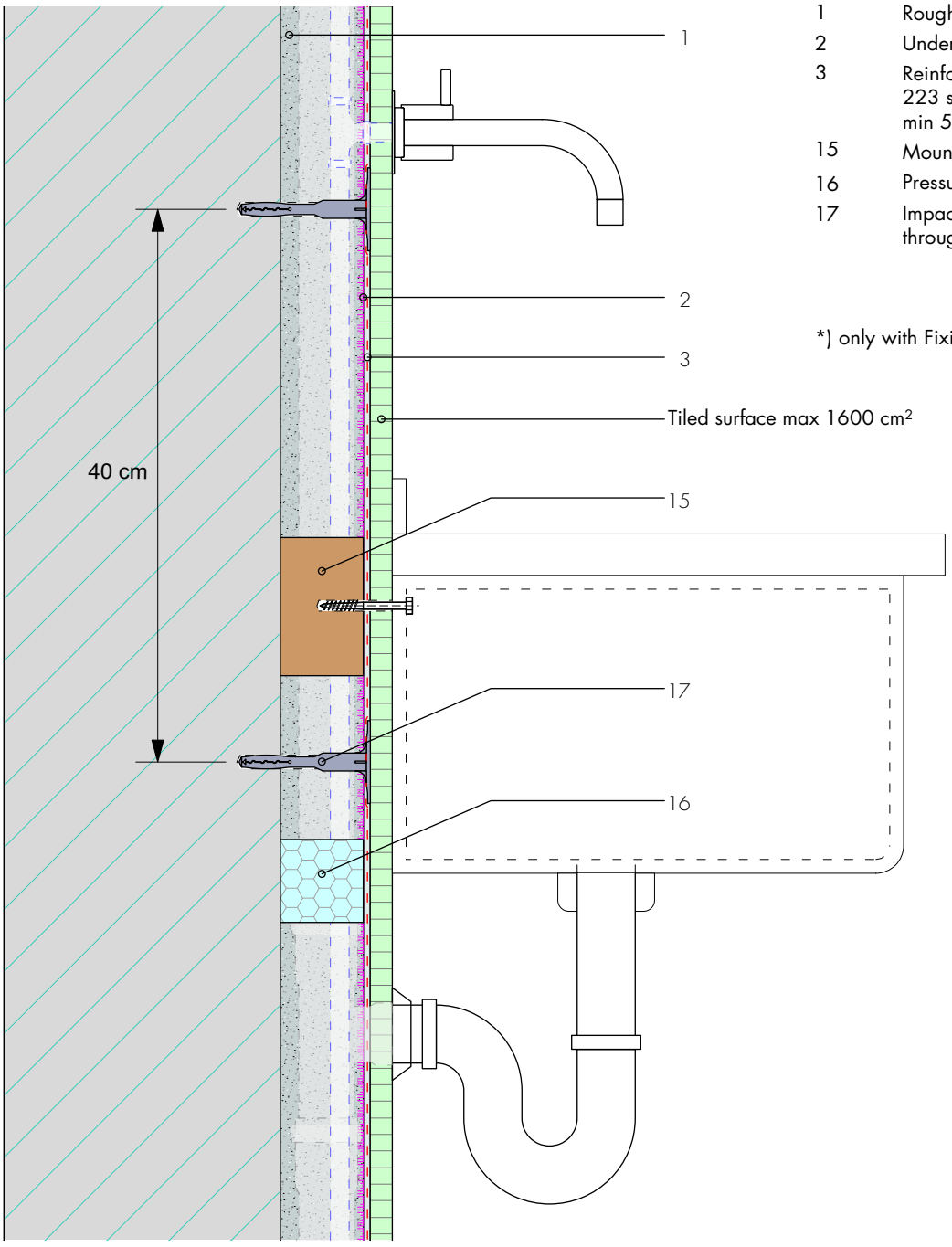


1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*)
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4	Mineral-based final coat and paint layer
15	Mounting cubes

*) only with Fixit 222 Aerogel Insulating Plaster

Bearing sink backboard

Indoor insulating plaster bearing sink backboard max 1 x 1,6 m

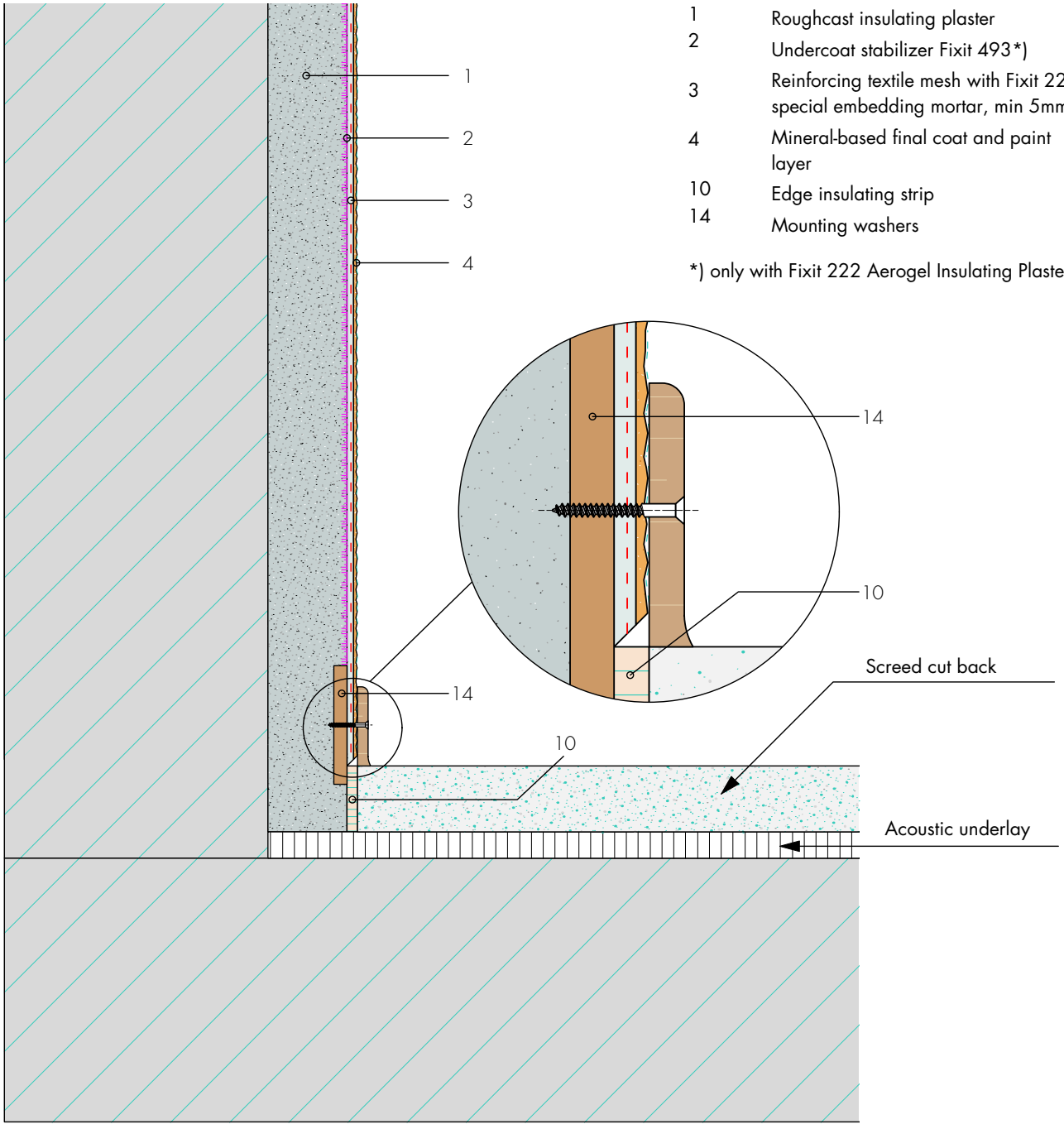


1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*)
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
15	Mounting cubes
16	Pressure plate
17	Impact anchor bolt H1 eco through textile mesh

*) only with Fixit 222 Aerogel Insulating Plaster

Concrete floor

Indoor insulating plaster with interface to concrete floor

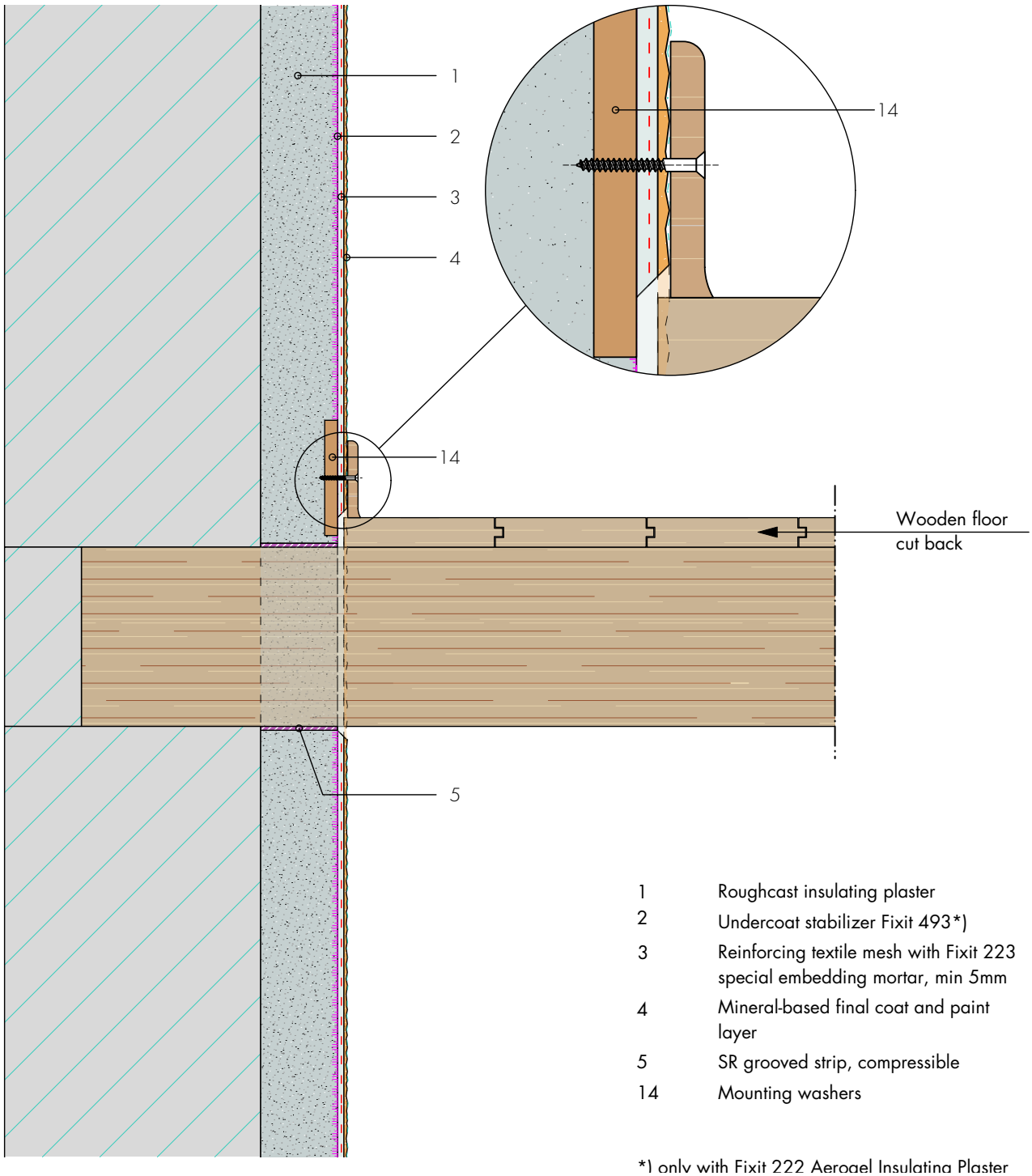


1 Roughcast insulating plaster
2 Undercoat stabilizer Fixit 493*)
3 Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4 Mineral-based final coat and paint layer
10 Edge insulating strip
14 Mounting washers

*) only with Fixit 222 Aerogel Insulating Plaster

Wooden floor / ceiling

Indoor insulating plaster with interface to wooden floor / ceiling

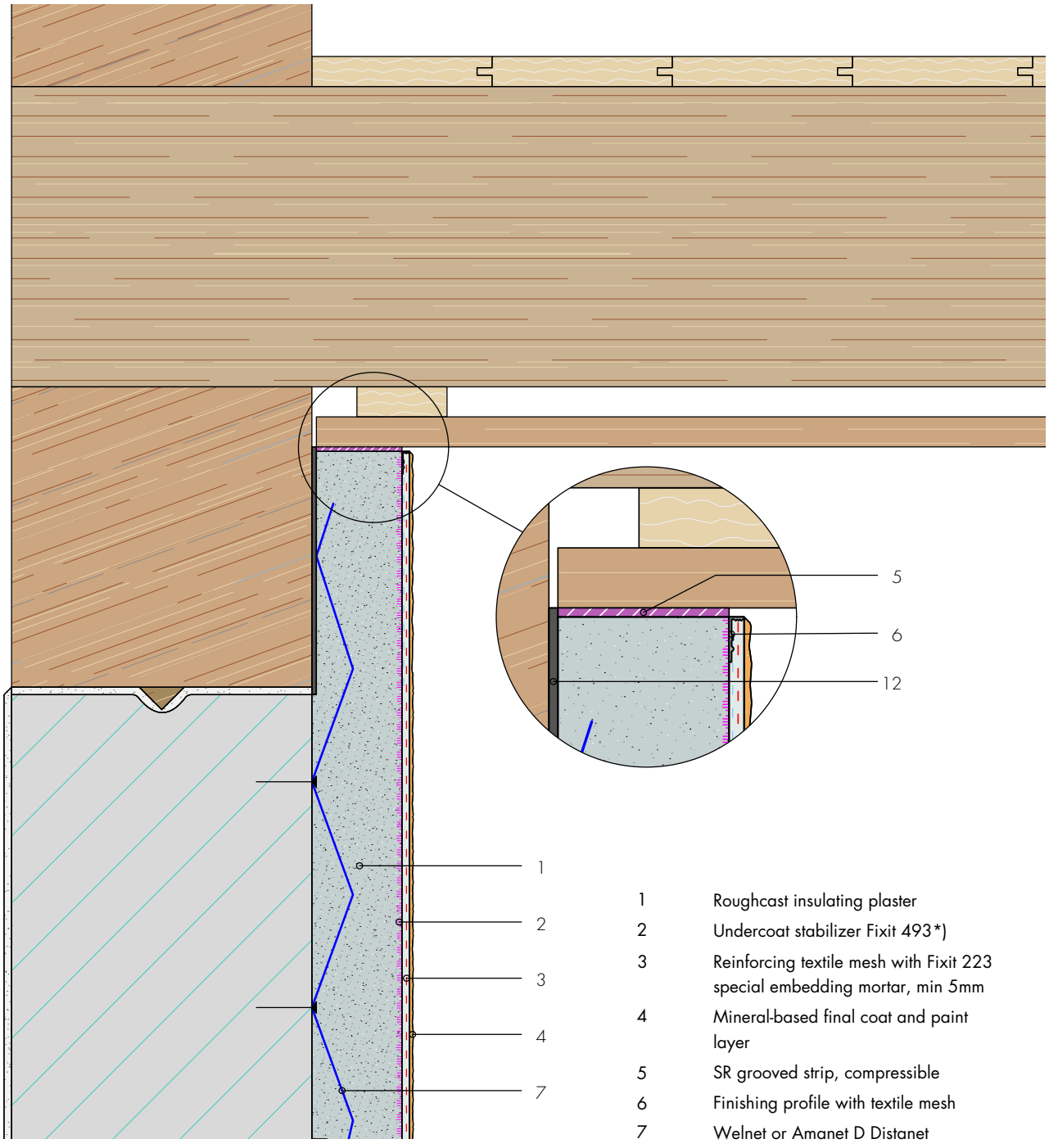


1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*)
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4	Mineral-based final coat and paint layer
5	SR grooved strip, compressible
14	Mounting washers

*1 only with Fixit 222 Aerogel Insulating Plaster

Wooden beam ceiling

Indoor insulating plaster with interface to wooden beam ceiling

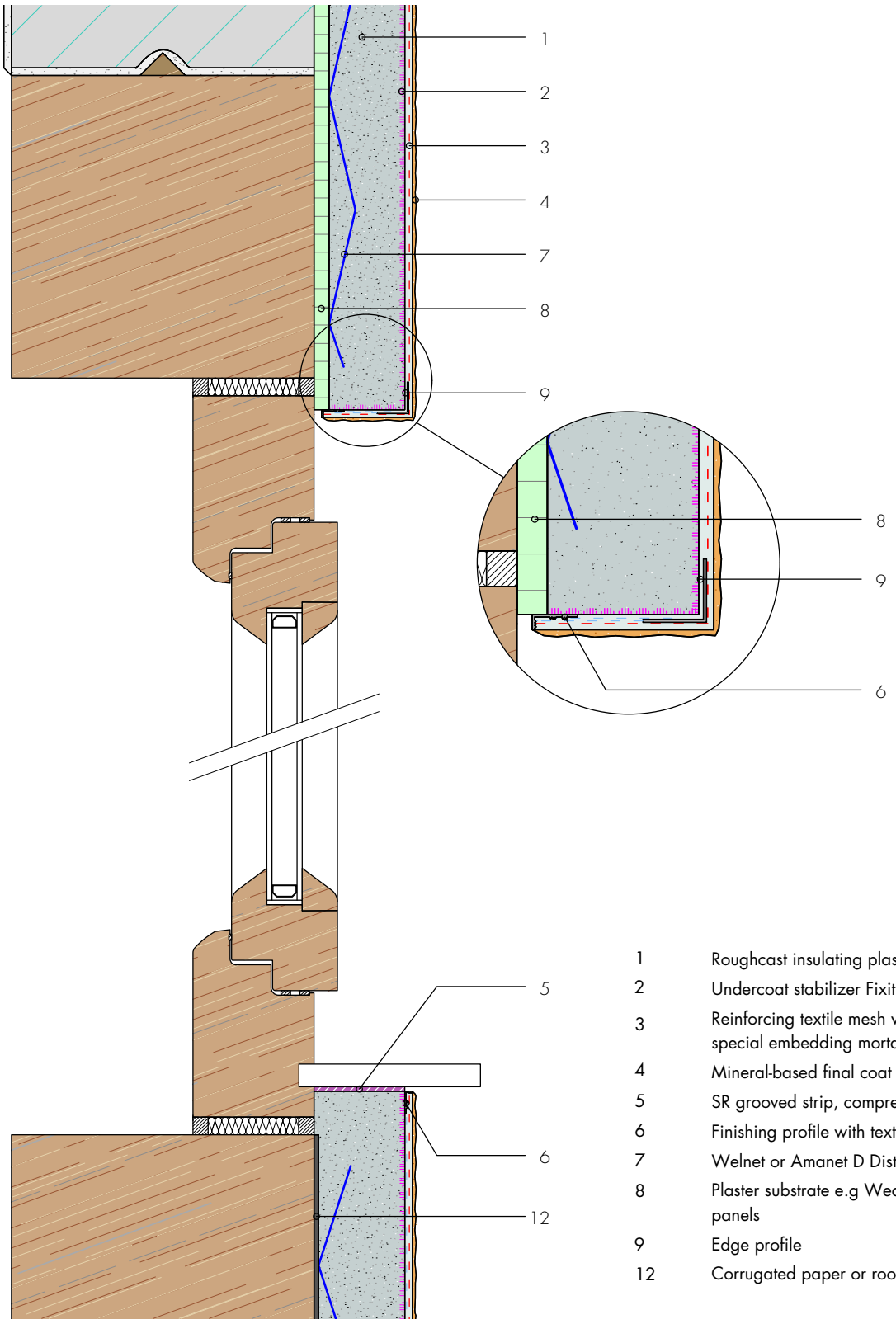


1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*)
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4	Mineral-based final coat and paint layer
5	SR grooved strip, compressible
6	Finishing profile with textile mesh
7	Welnet or Amanet D Distanet
12	Corrugated paper or roofing paper

*) only with Fixit 222 Aerogel Insulating Plaster

Window opening and door jamb

Indoor insulating plaster with interface to window opening and door jamb

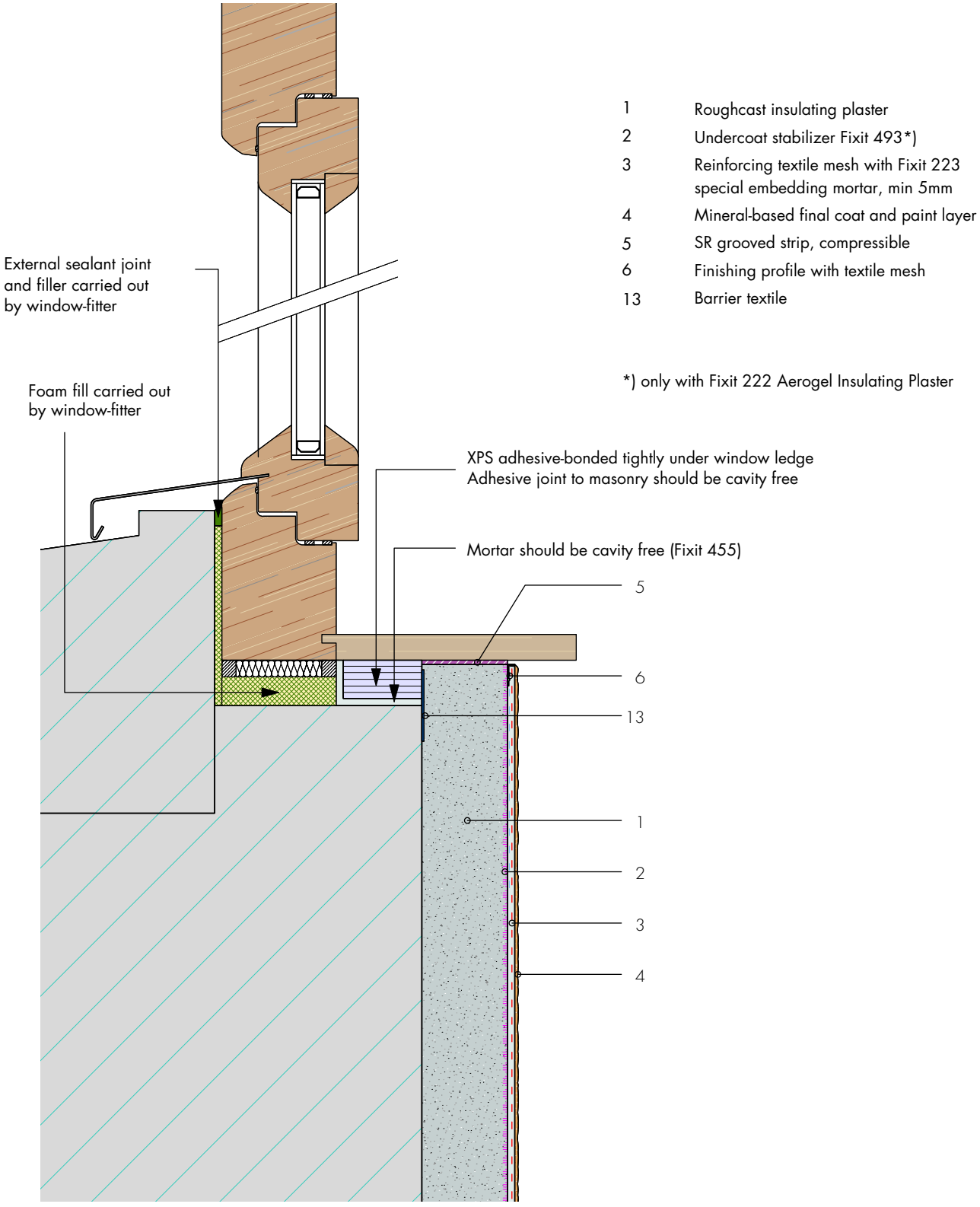


1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4	Mineral-based final coat and paint layer
5	SR grooved strip, compressible
6	Finishing profile with textile mesh
7	Welnet or Amanet D Distanet
8	Plaster substrate e.g Wedi® construction panels
9	Edge profile
12	Corrugated paper or roofing paper

*) only with Fixit 222 Aerogel Insulating Plaster

Window sill

Indoor insulating plaster with interface to solid masonry window sill



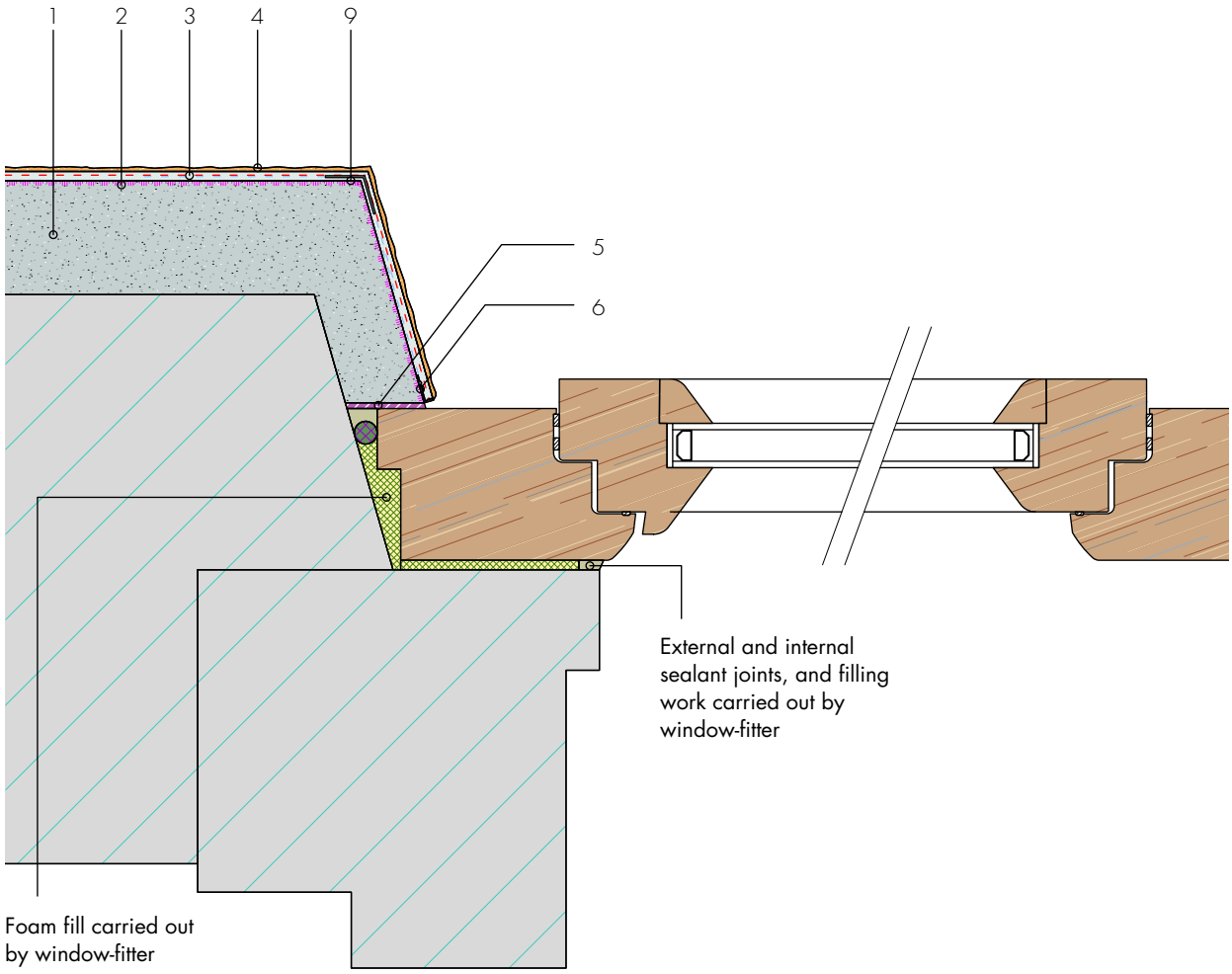
1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*)
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4	Mineral-based final coat and paint layer
5	SR grooved strip, compressible
6	Finishing profile with textile mesh
13	Barrier textile

*) only with Fixit 222 Aerogel Insulating Plaster

Window frame

Indoor insulating plaster with interface to window frame, in solid masonry

Variant 1



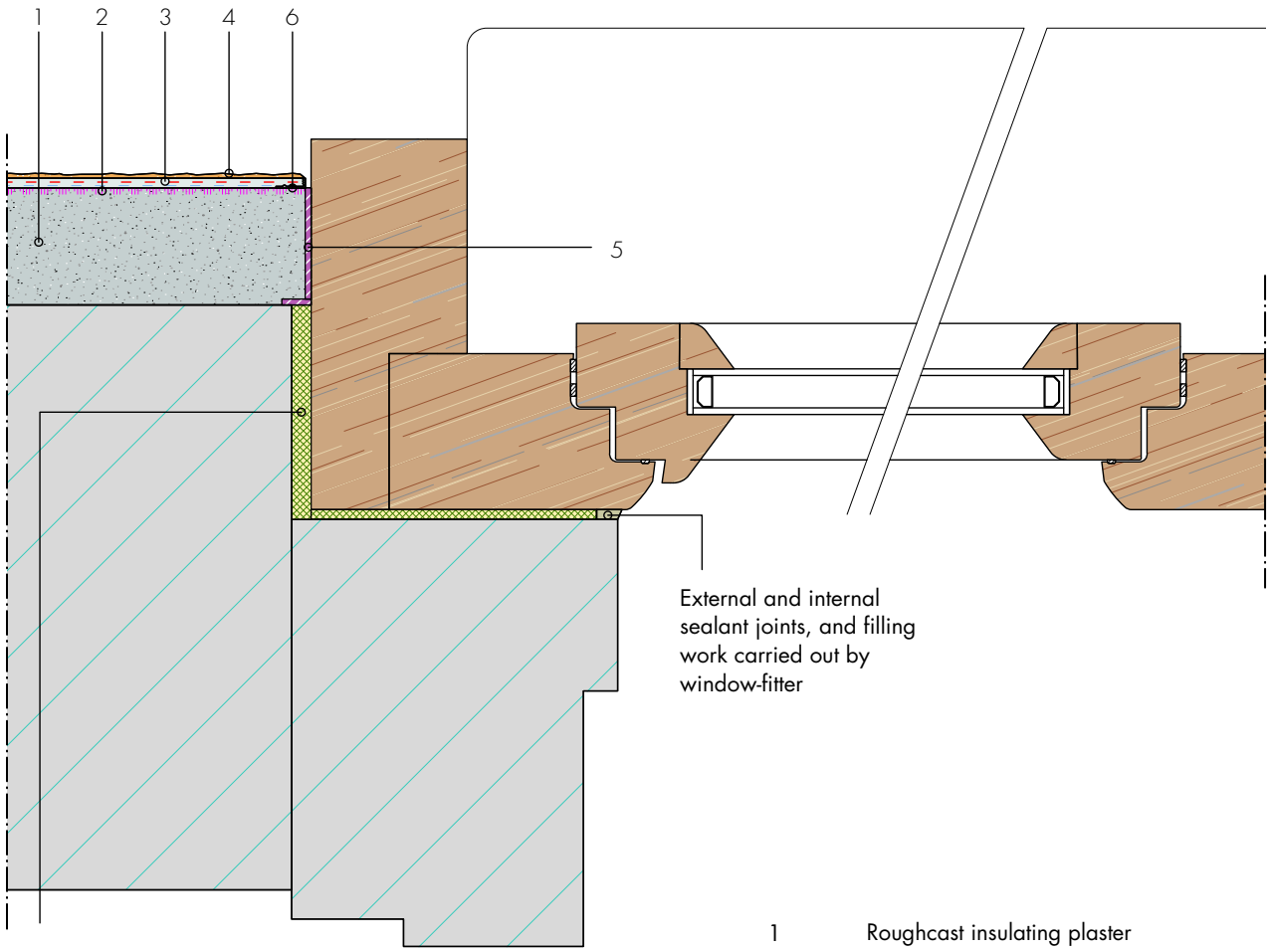
1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*)
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4	Mineral-based final coat and paint layer
5	SR grooved strip, compressible
6	Finishing profile with textile mesh
9	Edge profile

*) only with Fixit 222 Aerogel Insulating Plaster

Window frame

Indoor insulating plaster with interface to window frame, in solid masonry

Variant 2



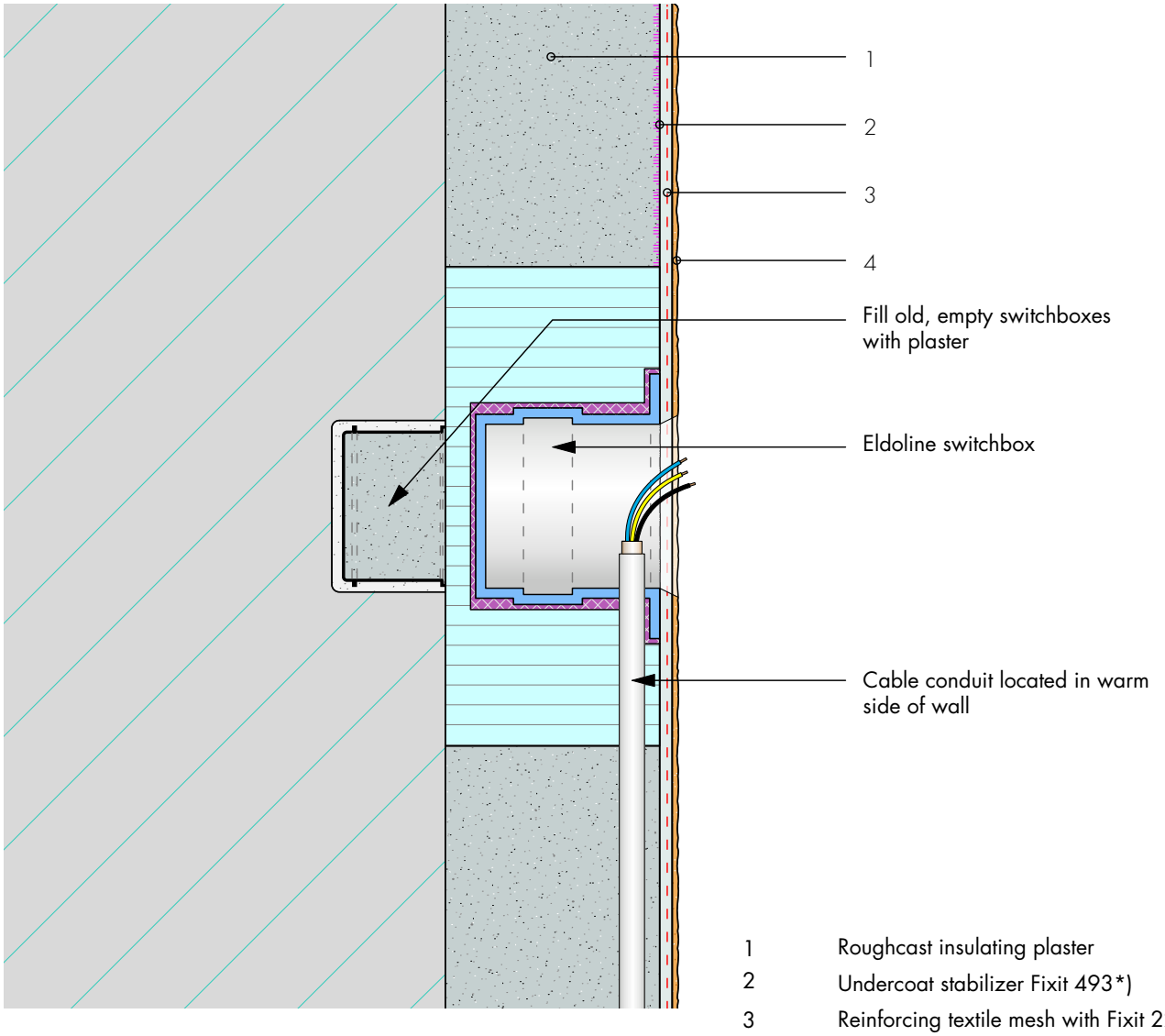
1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4	Mineral-based final coat and paint layer
5	SR grooved strip, compressible
6	Finishing profile with textile mesh

*) Seulement pour l'enduit Aerogel Fixit 222

Electrical fittings

Indoor insulating plaster electrical fittings

Outdoor side **Indoor side**

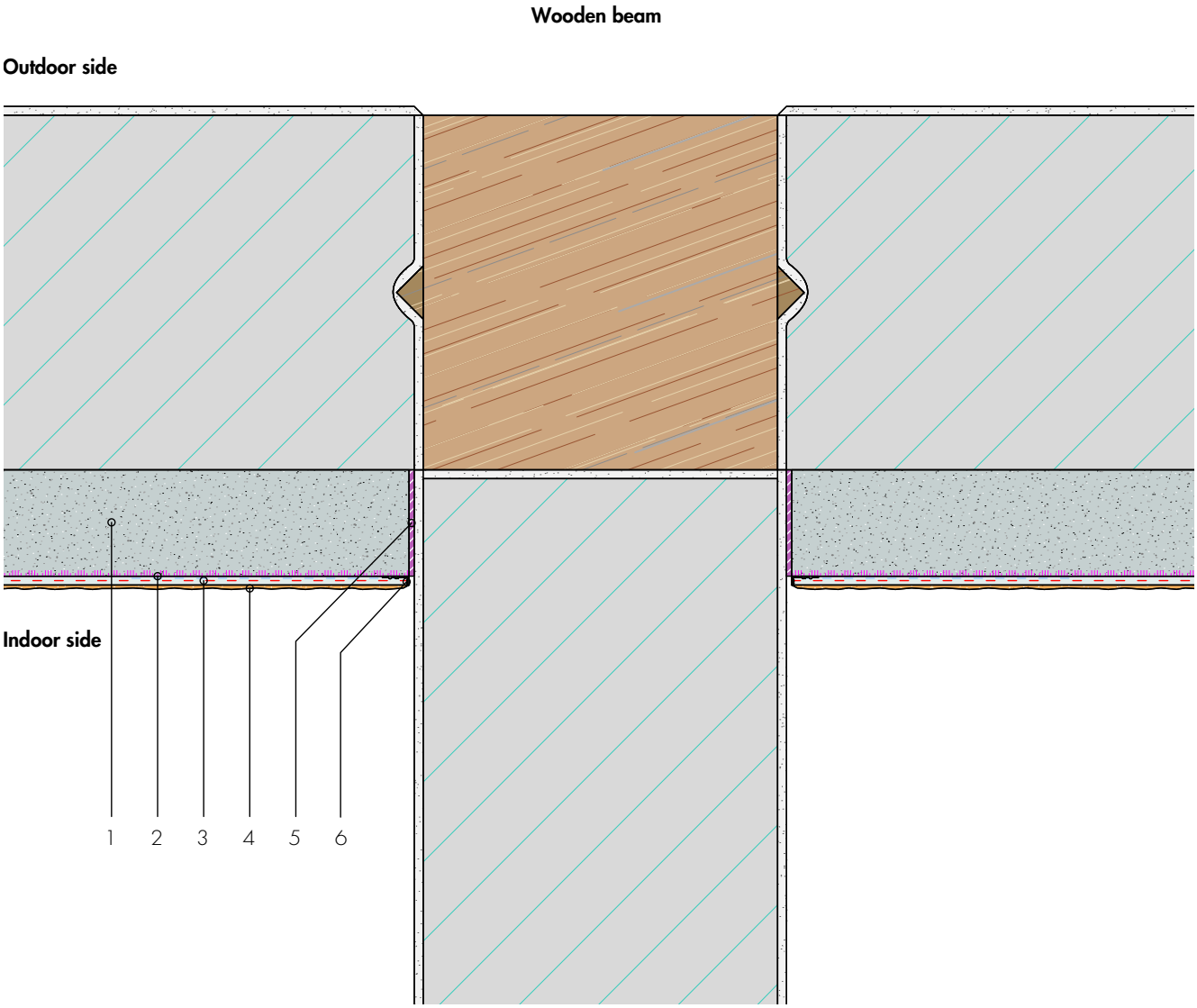


1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*)
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4	Mineral-based final coat and paint layer

*) only with Fixit 222 Aerogel Insulating Plaster

Partition wall

Indoor insulating plaster with bond to partition wall



1	Roughcast insulating plaster
2	Undercoat stabilizer Fixit 493*
3	Reinforcing textile mesh with Fixit 223 special embedding mortar, min 5mm
4	Mineral-based final coat and paint layer
5	SR grooved strip, compressible
6	Finishing profile with textile mesh

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