BBV21:1 replaces BBV15:1

BBV

Trade Rules of the Swedish Ceramic Tile Council for Wet Rooms

Trade rules for ceramic tiles in wet rooms.
The rules have been produced by the Swedish Ceramic Tile Council taking into account the regulatory requirements in Boverket's building regulations, BFS 2011:6 with amendments up to and including BFS 2020:4, BBR

bygg keramik rådet

Reading instructions

BBV, which was previously divided into rules and other information in separate sections, has been merged. The use of language indicates the difference between requirement text and other information.

The images are illustrative, and not governing as rule texts. The captions explain the component that the image should illustrate.

The Swedish Ceramic Tile Council has preferential right of interpretation over these rules.

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BBV, Trade Rules of the Swedish Ceramic Tile Council for Wet Rooms

January 2021, first edition

Important changes in this edition:
- Revised structure for better clarity and flow
- Requirement that thresholds and door frames shall be flush with walls
- Amended rules for floor slope around floor drains
- Distance between incoming pipes increased to 60 mm cc
- Clearer requirements for penetrations with electricity

Editing: Swedish Ceramic Tile Council
Graphic design, production and Illustration: AB Typoform
Printers: Arkitektkopia

Content

Foreword

When SBN (Swedish Building Norm) was replaced by functional requirements in Boverket's (Swedish Board of Housing, Building and Planning) new building regulations in 1988, known as BBR (Boverket's Building Regulations) since 1994, a need arose for trade rules, including for floor and wall structures in wet rooms.

In 1988, the trade organisation for the tile trade, Plattsättningsentreprenörers Riksförening, PER, produced rules for ceramic wall structures in cooperation with leading manufacturers and suppliers: "PER's trade rules".

When contractors and suppliers subsequently formed the Swedish Ceramic Tile Council, BKR in 1989, responsibility for the trade rules passed to the Swedish Ceramic Tile Council.

From edition 07:1 of June 2007, the rules have been called the "Trade rules of the Swedish Ceramic Tile Council for wet rooms, BBV". As before, both contractors and suppliers support the trade rules through Plattsättningsentreprenörers Riksförening, PER, and Kakelföreningen, KAF.

This version of BBV, 21:1, applies from 1 January 2021 and replaces BBV15:1.

Coordination

The requirements in BBV21:1 are harmonised with the trade rules from Golvbranschens Våtrumskontroll (GVK), Säker Vatten and Måleribranschens Våtrumskontroll (MVK).

Transitional rules

Design and installation work which commences from 1 January 2021 shall be performed in accordance with BBV21:1. Works starting from 1 January 2021 may be carried out according to BBV15:1, provided planning permission was granted before 1 January 2021, even when design and installation work starts from 1 January 2021, or when design or construction documents according to BBV15:1 were started before 1 January 2021.

BBV15:1 is replaced by BBV21:1

1. Application of the rules

The rules apply to the function and application of watertight covering kits on various substrates where tiles or mosaics will form the surface layer on floors and walls in site-built wet rooms in residentials or areas with equivalent water load.

Wet rooms are considered to be areas where floors and wall surfaces might be exposed, fully or partly, to recurrent water spray, such as areas where showers or bathtubs are installed.

The rules can be applied, fully or partly, when natural stone, glass or similar products are used as a surface layer.

The rules apply to ceramic tiles that are fitted using thin-layer technology. Thin-layer technology means that tiles are placed on an adhesive that has been combed with a notched trowel, applied on top of the watertight membrane. These rules do not apply to other types of execution, such as thick grout or when the surface layer will consist of other materials, such as coloured cement products.

The rules apply to both new construction and renovation.

Rules concerning water and sewage installations are not included in BBV. For these, please refer to the Säker Vatteninstallation (Safe Water Installation) Trade Rules. See www.sakervatten.se.

Rules for electrical installations are not included in BBV. For these, please refer to applicable Swedish standards. See www.elsakerhetsverket.se.

Rules for painting work are not included in BBV. For these, please refer to Måleribranschens Våtrumskontroll (MVK) trade rules for wet rooms.

1.1 Application of the rules in other areas

The rules apply, where appropriate, to ceramic floors in areas where there is a risk of leaking water or water spillage (BBR 6:5331). Residential areas where the following regulations can be applied include laundry rooms, toilets and areas with water heaters, heat pumps, boilers or similar. The rules can also be applied for other areas if there is a risk that the floor could be subjected to leaking water or water spills. Residential kitchens are not subject to requirements for watertight membranes on floors.

The rules apply in their entirety to other areas, except in the following chapters:

Quality documents according to section 2.5 in other areas

Appendix A to BBV, Quality Document, does not need to be issued for contracts in other residential spaces. However, quality documents can be issued for the areas described above, if agreed with the client/purchaser. In such cases, it shall be clear that the Quality Document applies solely to floors.

Requirements for watertightness according to section 3 in other areas

In other areas with requirements for watertight flooring, the entire floor must be provided with a watertight membrane. The watertight membrane shall also be extended up the wall by at least 50 mm.

Wet zones according to section 3.2 in other areas

The other areas are not divided into wet zones. The floor in the other areas must be provided with an approved watertight covering kit of optional type, VTg or VTgF, regardless of the substrate. If the floor is connected to floors in wet area with no interruption in the watertight membrane, VTgF systems must be used at wooden constructions.

Floor gradient according to section 4.2 in other areas

If a floor drain is installed in these areas, the floor gradient can be restricted to a local area at the drain, provided that the appliances connected to water that could leak are installed next to the floor drain. If the appliances are not installed next to the floor drain, the floor must slope the entire way from the appliance to the floor drain. The floor gradient shall be at least 1:200 (5 mm/m).

Other surfaces can be executed without incline. **However, there must be no slope away from the drain in any part of the area.**

Floor structures of boards according to section 4.7.2 in other areas

On sloping floors in other spaces, the watertight membrane must not be applied directly on the substrate boards. However, suitable board material can be used as substrate for watertight membranes on floors in other areas without a slope (without floor drain), for example toilets.

Pipes (Penetrations in floors) according to section 5.1.3 in other areas

In laundry rooms with water heaters, heat pumps, water meters or similar appliances, pipe penetrations in the floor for tap water, or connections to appliances and distributor pipes, shall be executed with pipe penetrations sleeves.

In WC, tap water pipes are also permitted in the floor, provided that the pipe has a smooth surface and the correct distance between pipes, allowing the cuff to be correctly fitted.

Watertight membrane in connection with the toilet bowl with built-in flush tank according to section 6.6 in other areas

Even in toilet areas where there are otherwise no requirements for watertight membrane on walls, the walls and floor behind, on the sides and beneath the built-in cistern must be provided with a watertight covering kit of optional system type. In this respect, it may be possible to use different types of watertight covering kit than those intended for ceramics, or to use a specific product to divert leaks according to the supplier's description.

1.2 Professional conduct according to BBV

The general regulations of the building trade (AB/ABT) and the Consumer Services Act 1985:716 specify that firms must carry out the work professionally. Professional conduct includes the contractor being responsible that the service is performed in a manner that can be expected of a skilled professional with a normal level of knowledge, and that all installations are in accordance with the supplier's instructions.

BBV has long been recognized as a guide for professional conduct in the field of ceramic floor and wall structures in wet rooms.

To achieve professional expertise according to BBV, it is necessary

- that the work is carried out according to BBV
- that an approved watertight covering kit according to BBV is used on at least one surface in the area and that the work has been executed in accordance with approved installation instructions
- that the works are carried out by a company that is certified according to section 2 BBV
- that the watertight membrane is carried out by tilers who are certified according to section 2.2 BBV, are employed by a certified company and can present a valid photo ID issued by the Swedish Ceramic Tile Council
- that the Quality Document, BBV's Appendix A, is completed and submitted to the client and user/resident, together with the installation instructions for the approved watertight covering kit in accordance with section 2.5 BBV.

1.3 The rules are general

The rules are based on the knowledge and experience present in the Swedish ceramic tile industry in 2020. The trade rules concern detailed execution taking into account the regulatory requirements in Boverket's building regulations, BFS 2011:6 with amendments up to and including BFS 2020:4, BBR. The rules are general and are based on works with approved watertight membranes on entire floor and wall surfaces that are to be fitted with ceramic tiles.

Contracts do occur where ceramic surfaces are to be mixed with other surface materials in a wet room. In these cases, the watertight membrane must overlap the different surface materials, with the rules only applying for the surfaces that are covered with ceramic. Demarcation must be clearly stated in the Quality Document.

1.3.1 Deviations

In some cases, situations can arise where the general rules cannot always be applied to their full extent. Instead, special solutions must be created taking into consideration the circumstances on site. Such solutions shall be implemented only after agreement between contractor and client and after consultation with the material manufacturers concerned. Deviations shall always be executed professionally with a guarantee for the work issued as usual. If the tradesperson considers that the work cannot be carried out professionally, he or she should advise against the solution.

A description of the solution and agreement with the client/material manufacturer shall be documented in a deviation report and in the Quality Document, Appendix A to BBV.

1.4 Partial repairs

The rules cannot normally be applied to work on parts of surfaces during repairs, rectification of incorrect execution, damage and similar.

However, such measures can be executed professionally based on BBV. The contractor takes responsibility for the work and can provide a guarantee as agreed between the parties. The contractor should contact the manufacturer of the watertight covering kit and obtain approval for

repairs in the specific case. The manufacturer of the watertight covering kit shall provide the contractor with an instruction concerning the repair. The contractor must document the work on a continuous basis and provide the client with images, a description of the work and the instruction from the manufacturer of the watertight covering kit. The Quality Document, Appendix A, cannot be issued solely for partial repair work carried out after the end of the contract.

1.5 Do-it-yourself work – DIY

The insurance companies usually accept ceramic tile work performed by private persons on their property, as long as they follow the appropriate trade rules and accords with the manufacturer of the watertight covering kits' approved installation instructions. However, the Swedish Ceramic Tile Council advises against DIY in wet rooms , unless the person concerned is experienced and knowledgeable in the field. **Quality documents cannot be issued for these works.**

2. Wet room certification

2.1 Certified company

The Swedish Ceramic Tile Council's logo "Behörig våtrum" ("Certified Wet Room")

Companies can be certified following application to the Swedish Ceramic Tile Council.

The companies must have tiling contracts as their established and regular business and employ their own tilers, at least one of whom is certified with a professional certificate or equivalent tiling experience (three years with 100% tiling work). If no tiler with a Swedish professional certificate can be specified, tiling experience must be verified with an approved result from at least one qualified tiler.

A list of certified companies is available in Appendix D to the Trade Rules, BBV, at www.bkr.se/medlemsforetag.

Unless agreed otherwise, certified companies shall execute wet room contracts according to BBV.

Certified companies shall issue Quality Documents in accordance with section 2.5 for wet roomcontracts.

Certified companies must have orderly accounts, be registered for corporation tax, have liability insurance and be VAT registered.

Certified companies shall comply with PER's ethical rules.

Only companies that have been granted wet room certification are entitled to use the Swedish Ceramic Tile Council's "Behörig våtrum" ("Certified Wet Room") logo.

2.2 The certified company's personnel

Certified companies must always have:

- at least one wet room supervisor responsible for the company's certification, also known as a certification holder.
- at least one tiler among the full-time employees who holds a professional certificate as a tiler or who has had his or her tiling skills verified.

Certification for tilers, in the form of photo identification issued by the Swedish Ceramic Tile Council, shall be presented on request and should be worn on work clothes. The photo ID can also be linked to ID06. The certification is valid for 5 years, provided the employer's certification applies.

Subcontractors engaged for work with watertight membranes must also be certified. A company's certification applies solely to its own personnel.

A person cannot be a certification holder or supervisor in two different companies at the same time.

A certified tiler cannot be employed by two different certified companies at the same time.

2.2.1 Apprenticeships

Companies that employ apprentices and which are actively involved in this type of training, may allow apprentices to perform waterproofing work when the instructor deems it appropriate. This is conditional on it being performed under the continuous supervision of an instructor who is a certified tiler employed by the company.

2.3 Certification training

At least one wet room supervisor at the company must have completed the Swedish Ceramic Tile Council's courses 1 and 2. If the certified company has its registered office in several locations, a wet room supervisor, who has completed courses 1 and 2, shall be present at each location.

Tilers who carry out waterproofing work in accordance with the trade rules must have completed the Swedish Ceramic Tile Council's courses 1 and 3 and be employed by a certified company.

Sole proprietors complete courses 1, 2 and 3 for the company's and their own certification.

Courses 1, 2 and maintenance of wet room certification are arranged and conducted by the Swedish Ceramic Tile Council. Course 3 is arranged and conducted by the supplier of the watertight covering kit.

Course 1

Two-day course for tilers and supervisors/company managers. The course includes a detailed review of the trade rules, as well as requirements for documentation, construction and implementation. Knowledge of materials and review of guidelines for completed work are also included. The course ends with a written test.

Course 2

A one-day course for supervisors/company management who are responsible for wet room work in the company. The course includes a large proportion of contract law, an overview of Swedish construction legislation and information about the legal requirements and consequences of certified and professional work according to the trade rules. The course ends with a written test.

Course 3

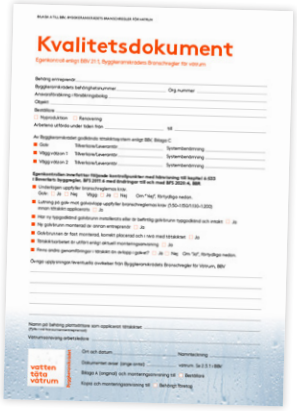
Course in practical application of approved watertight covering kits, which is delivered by manufacturers/suppliers of approved watertight membranes. Course content according to agreement with the Swedish Ceramic Tile Council. Course participants shall contact optional supplier themselves in accordance with Appendix C of the trade rules.

Tilers performing waterproofing work shall complete course 3 for all watertight membranes they work with.

2.4 Maintenance of wet room certification

To maintain the certification, both tilers and supervisors shall attend a follow-up course every five years. The course is arranged and conducted by the Swedish Building Ceramics Council.

2.5 Quality Document



Quality Document, Appendix A to BBV

Certified companies shall issue a Quality Document, Appendix A to BBV, after each wet room contract. The Quality Document shall be issued by the certified company whose personnel performed the watertight membrane and shall be submitted to the purchaser and user/resident on completion of the work. Quality documents are part of the contractor's undertaking for wet room contracts pursuant to BBV and shall therefore be provided without delay. The Quality Document shall be available in connection with final inspection.

The certified tiler who performed the work conducts a self-inspection to verify that the work has been carried out in accordance with BBV and according to the relevant installation instructions. The quality documentation is completed by the company's wet room supervisor or certified tiler in one of the digital media provided by the Swedish Ceramic Tile Council for certified companies. The tiler's self-inspection can also be conducted directly in the mobile application.

The Quality Document is then signed electronically by the wet room supervisor and the certified tiler who performed the watertight membrane must be named. If more than one certified tiler has carried out work in a wet room, their names are recorded under other information.

The Quality Document is sent to the client/resident by e-mail together with a link to the relevant installation instructions for the approved watertight covering kit or, alternatively, in paper form. A copy of the Quality Document and a link to installation instructions are archived digitally and kept available at the certified company for their own documentation and also so that they can be presented in connection with quality audits in accordance with section 2.6.

2.5.1 Common Quality Document

For large contracts that concern tenancies, hotels and suchlike, a common quality document for all the wet rooms can be prepared, if this is agreed with the client. For contracts concerning leaseholds, where the resident personally takes out insurance, a Quality Document must be issued for each apartment.

2.6 Quality Audit

Certified companies shall be available for quality audits conducted by the Swedish Ceramic Tile Council's quality consultants. Audits entail review of documentation from completed wet room works as well as examination of work in progress.

2.7 Termination of certification

Companies that have failed quality audits, or have not been available for quality audits, can have their certification revoked.

The certification can also be revoked if the contractor is guilty of performing the work incorrectly or other deviations from BBV.

Misuse of the Trade Rules' Appendix A, Quality Document, entails immediate withdrawal of certification.

Companies that do not meet the requirements in section 2.1–2.6 or the Swedish Ceramic Tile Council's provisions for certification may have their certification revoked. The rights that the company are accorded by the certification expire.

Companies may voluntarily waive their certification.

3. Requirements for watertightness

3.1 All ceramic surfaces

All floor and wall surfaces with ceramic coating/cladding in a wet room shall be provided with an approved watertight covering kit, see Figure 1. The watertight covering kit shall be of the same make throughout the entire area.

FIGURE 1. Schematic diagram

3.1.1. Exceptions in solid constuctions on the ground

The rules allow exceptions to the above requirements in section 3.1 when floor and wall surfaces without underlying/external insulation and capillary-breaking layers are in direct contact with the ground and where ingress of water/moisture in the vapour phase may occur, see Figures 2 and 3.

This is a common issue when renovating split-level houses and older houses with basements.

In these cases, the watertight covering kit can be limited to floor and wall surfaces with a substantial water load, showers for example. Any moisture in the form of diffusion can then be transported through the construction via other surfaces without obstruction. **The distribution of surfaces with, or without, a watertight covering kit is assessed from case to case depending on the design of the structure, together with the selected supplier of the watertight membrane.** If exceptions are made, and watertight membrane(s) are applied solely to parts of surfaces, this presumes that these surfaces consist solely of mineral materials that can withstand moisture. An approved watertight covering kit shall be applied on surfaces in the room without any risk of additional moisture in accordance with section 3.1.

It may also be possible to use a cement-based, so-called diffusion-open, watertight membrane. These products are normally developed for use in applications other than residential wet rooms and thus do not meet the requirements for approved watertight membrane according to section 6. In accordance with BBV, these products may only be used after the manufacturer of the product has issued project-specific approval and instructions. The watertight covering kit shall be the same brand as other watertight membranes in the area. A description of the solution and the manufacturer's approval shall be recorded in the Quality Document.

FIGURE 2. Basement with ground moisture penetration

Requirements for watertight membrane on floors and exterior walls are excluded where there is a risk of moisture penetration.

FIGURE 3. Basement without ground moisture penetration

A watertight membrane shall be applied for insulated and drained basements according to the trade rules for all surfaces in the wet room.

3.2 Wet Zones

The wet room is divided into wet zones, with varying requirements based on the expected water load, see Figure 4.

Space for bathtub or shower = floor in shower or beneath bathtub and walls up to 2.0 m above the finished floor behind the bathtub or shower area.

When the bathtub or shower area is surrounded on one or more sides by a screen wall right up to the ceiling, which is to be tiled, the end is included in wet zone 1 and the rear of the screen wall is included in wet zone 2.

Wet zone 1 = Floor-to-ceiling walls for bathtub or shower and wall surfaces for at least one metre outside of them, as well as the entire floor area of the wet room. A one-metre area outside the space for bathtub or shower, the opposite wall surface, including end, are in wet zone 1.

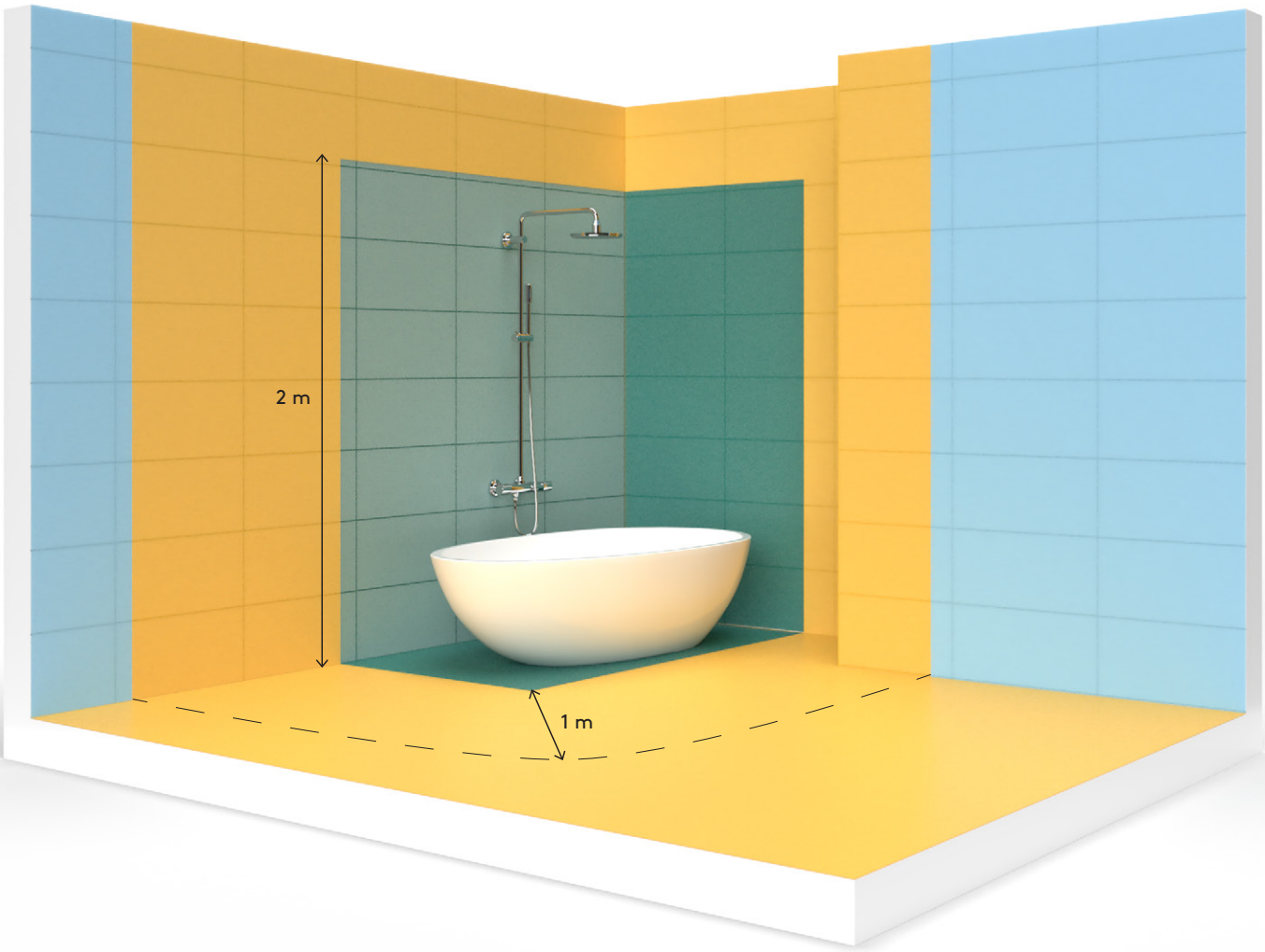
If part of an outer wall is included in wet zone 1, the entire wall shall be treated as belonging to wet zone 1. The reason for this is that the major driving force for moisture is in the outer wall of the wet room due to the large differences between outdoor and indoor temperature, especially during the winter months.

Take the dimensions of the shower walls into account as well as the size and location of the bathtub when assessing the extent of wet zone 1. Client and contractor should communicate this.

Wet zone 2 = Other wall surfaces.

FIGURE 4. Wet Zones

- Wet Zone 1
- Wet Zone 2
- Space for bathtub or shower



3.3 Types of watertight covering kit

VTgF = Watertight flooring systems of foil sheet type or board with watertight membrane

VTvF = Watertight wall systems of foil sheet type or board with watertight membrane

The watertight membrane consists of factory-made foil sheets that are applied with sealed seams on the wall and floor surfaces.

VTg = Other approved floor watertight covering kits

VTv = Other approved wall watertight covering kits

Liquid-based systems are designated VTg for floors and VTv for walls.

The liquid-based systems require the correct amount to be applied per unit of surface, otherwise they can be too thin and consequently not sufficiently watertight. Always follow the installation instructions.

3.4 Choice of watertight covering kit

Wet zone 1, walls

Board structures – VTvF

Solid structures – VTvF or VTv

Wet zone 1, floor

Board structures – VTgF

Solid structures – VTgF or VTg

Wet zone 2, walls

Board structures – VTvF or VTv

Solid structures – VTvF or VTv

Solid structures refer to concrete, plaster and/or different types of masonry.

Appendix C to the trade rules (the list of approved systems available at www.bkr.se/godkanda-system) shows the properties of the system in terms of type of watertight membrane and location on the floor or wall.

TABLE 1.
Choice of watertight covering kit

Choice depending on substrate and wet zone

		Types of watertight covering kit		
Substrate	**Zone**	**Foil**	**Boards with watertight membrane**	**Liquid-based**
Board structure	Wet Zone 1	✔	✔	✘
	Wet Zone 2	✔	✔	✔
Solid structure	Wet Zone 1	✔	✔	✔
	Wet Zone 2	✔	✔	✔

4. Substrate

4.1 General requirements

Substrates must be capable of sustaining weight, dry, cleaned and free from loose particles. Cavities and uneven surfaces must be filled or sanded before commencing the waterproofing work. Filler residues, paint splashes, pure lime plaster, gypsum plaster and similar must be removed. Wall and floor surfaces in wet rooms must be documented or of proven suitability as substrate for watertight membrane and tiling. If this is not the case, the substrate shall be replaced or supplemented with suitable material.

4.1.1. Inspection of the substrate

The substrate must be inspected before commencing application of the watertight membrane. The substrate requirements in AMA Hus, Table 43.DC/-1 for floors and Table 43.B/HSD-1 for walls shall generally be applied.

The tiling contractor shall take the client's wishes into consideration regarding the size and format of the ceramic tile. When installing large-format tiles on walls, stricter tolerances are required than those specified in AMA Hus.

For further information, see the Swedish Ceramic Tile Council's Guidelines for Large-format tiles at www.bkr.se.

4.1.2 Moisture and temperature

The temperature of the substrate must not be lower than 10°C, unless stated otherwise in the installation instructions from the manufacturer of the watertight covering kit.

The moisture content of the substrate must be kept at the lowest possible level. The substrate's residual moisture shall be given the opportunity to dry out. The substrate must as a minimum be surface dry when the waterproofing work is carried out. The instructions from the watertight covering kit manufacturer regarding moisture content must be followed.

4.1.3. Existing surface layers when renovating

The basic rule is that existing finishes shall be removed. For surfaces applied to sand filler, both the existing surface layer and the sand filler layer must be removed. Existing surfaces in the form of lime plaster, asphalt products, plastic mats, wet room wallpaper, adhesives or painting treatments including fabrics and suchlike, must be removed. Always consult the supplier of the watertight covering kit if existing surfaces cannot be removed in their entirety. If a watertight membrane is applied to the existing surface layer, this shall be noted in the Quality Document.

4.2 Floor gradient

Floors shall be sloped towards floor drains in both the substrate for watertight membrane and the surface layer. There must be no negative slope away from the drain in any part of the area.

The gradient of floor surfaces in the space for bathtub or shower adjacent to the floor drain that are regularly exposed to water spray shall be in the range 1:50 to 1:150 (20 mm/m–7 mm/m).

However, parts of floors that are not normally accessed, see green field in Figure 5, for example between the floor drain and the nearest wall surfaces, can have a maximum gradient of 1:25 (40 mm/m).

On other floor surfaces which can be exposed to water spray or water spillage, the floor gradient should be executed in the range 1:100–1:200 (10 mm/m–5 mm/m).

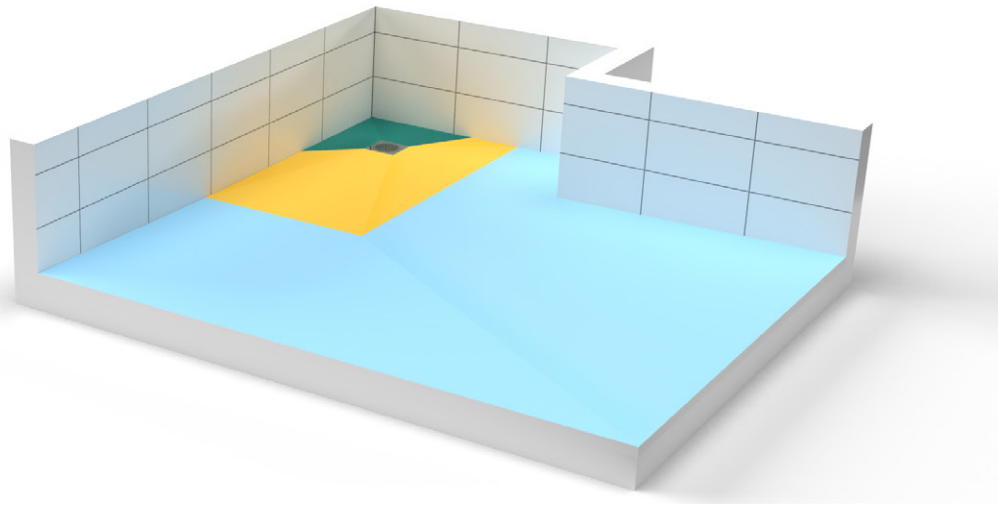
Where a toilet, bidet or similar is to be installed on the floor, a level installation area of at least 300×400 mm is required. The gradient of the installation area shall not exceed 1:100 (10 mm/m).

All gradient specifications are measured in the direction of the floor drain. Alternative floor gradient for fixed installations, large-format tiles, disability access, more than one floor drain or similar shall be agreed before execution. Agreement on alternative floor gradient shall always be documented in the Quality Document, Appendix A to BBV.

FIGURE 5. Gradient tolerances

Space for bathtub and shower:
- 1:25-1:150
  7-40 mm/m
- 1:50–1:150
  7–20 mm/m

Other floor areas:
- 1:100–1:200
  5–10 mm/m



4.3 Concrete

The concrete's deformation due to shrinkage shall be taken into consideration. Unless stated otherwise, the concrete must have hardened for at least 3 months under normal temperature and humidity conditions for indoor environments. Instructions from the supplier of the watertight covering kit regarding relative humidity shall be followed.

Concrete shall have a surface structure suitable for applying the watertight membrane. Concrete cast against steel moulds, e.g. prefabricated concrete elements, or vacuum-suctioned floors, can have a highly dense/shiny surface that may need to be treated in order to attain adequate adhesion to the watertight membrane. Any cement film or mould oil must be removed. Cracks, peaks, burrs and other irregularities shall be filled with filler/screed according to section 4.6 and/or ground. See section 4.1.3.

4.4 Lightweight concrete

Floor and wall surfaces made of lightweight concrete (aerated concrete or lightweight aggregate concrete) shall be treated according to the instructions from the filler, plaster and watertight covering kit manufacturer.

4.5 Plaster

Plaster can be lime plaster or cement plaster. Alternatively, products with equivalent properties may form the substrate for the watertight membrane, if the plaster manufacturer provides instructions for this.

Lime plaster must not constitute the substrate for watertight membrane and ceramic cladding.

Water and fine materials that have worked their way up to the surface must be removed.

4.6 Filler and levelling compounds

Filler and levelling compounds must be mineral-bound and meet the requirements according to the current standard. They must be recommended by the manufacturer as substrate for watertight membranes and ceramic tiles in wet rooms.

4.7 Boards

Wood-based boards should generally not be used as a substrate for watertight membranes and tiling. However, they can be present as underlying boards.

4.7.1 Board wall structures

With regard to adhesive properties and shapestability, boards on the walls of wet rooms shall be suitable as a substrate for ceramic cladding and watertight membrane and shall be installed according to the board manufacturer's instructions, or specified in some other way. The dimensions and number of boards shall be adapted to the relevant centre–centre spacing between studs to provide sufficient flexural rigidity. Cardboard-covered plasterboard can be used under watertight sheets in wet rooms, however, it is recommended that special wet room boards be used throughout the area.

4.7.2 Board floor structures

Watertight membranes shall not be applied directly to board substrates on wet room floors. Exceptions can be made when using drop panels, with or without pre-assembled watertight membrane, that are specified by the manufacturer for cladding with watertight membranes and/or tiles.

The centre–centre distance between joists in the floor structure shall not exceed 600 mm. The joists shall be reinforced in order to adapt the flexural rigidity between joists to ceramic cladding and to prevent the transfer of moisture or temperature-conditioned movements to the ceramic layer. When using self leveling compound on board structures, the thickness shall be at least 12 mm or according to the supplier's instructions.

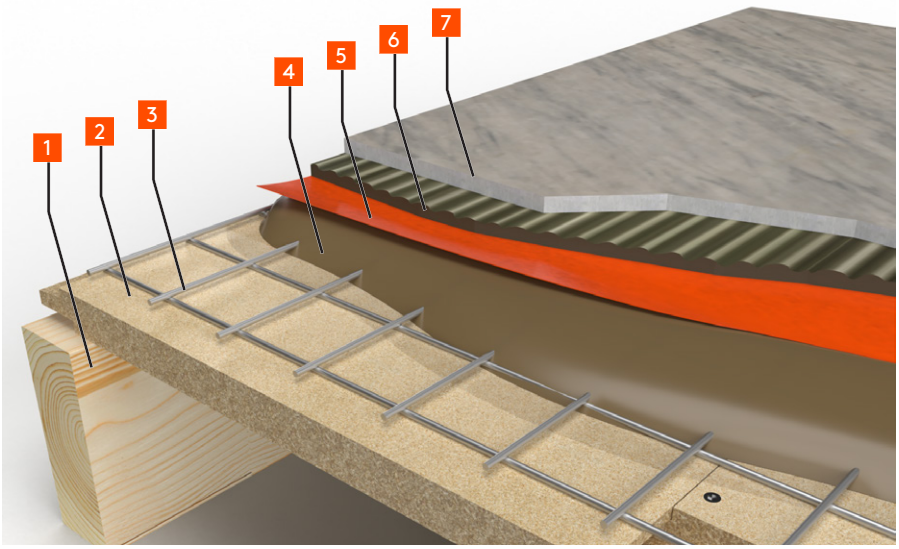


FIGURE 6.
Examples of floor structure (GF3)

1. Floor joists with c-c distance 300–600 mm
2. Chipboard glued and screwed
3. Spot-welded steel or fibreglass mesh
4. Screed, minimum 12 mm
5. Watertight membrane
6. Adhesive
7. Tiles

The GF3 structure, see the Ceramic Tile Manual (Byggkeramikhandboken) at www.bkr.se, is a proven solution that meets the above criteria.

Other floor and wall structures can be used if a architect/constructor/planner has provided a drawing with material specifications unique to the project, or a drawing with structural design and material specification provided by a supplier.

5. Penetrations in watertight membranes

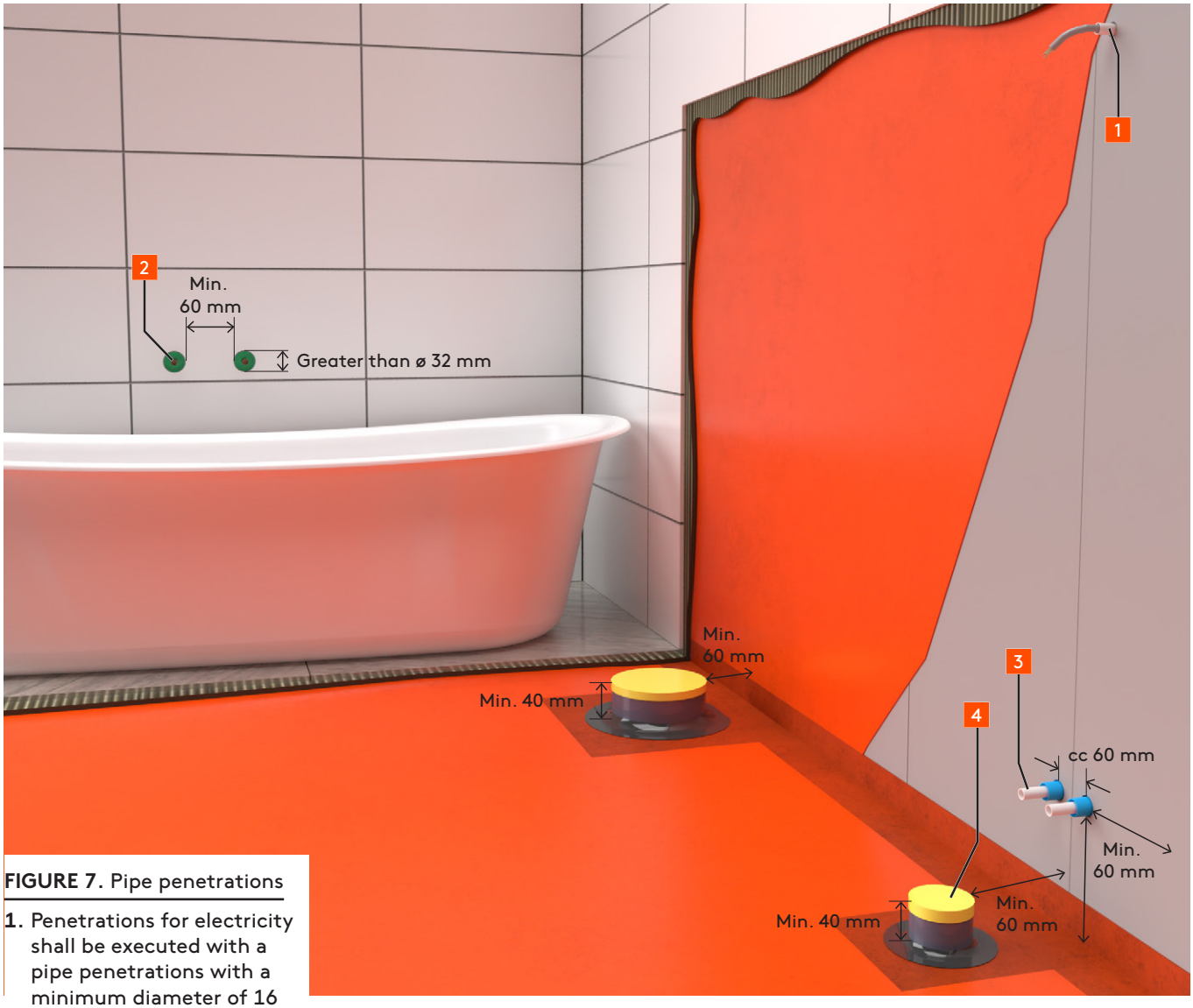


FIGURE 7. Pipe penetrations

1. Penetrations for electricity shall be executed with a pipe penetrations with a minimum diameter of 16 mm, see 5.2.2.
2. Pipes with diameters greater than 32 mm shall have a distance of at least 60 mm between the edges, see 5.2.1.
3. Pipes with diameters less than or equal to 32 mm shall have a c–c distance of at least 60 mm, see Figure 9.
4. Wastewater and pipe penetrations in floors, see 5.1.3.

5.1 Penetrations in floors

5.1.1 Floor drains

Floor drains and any associated elevation rings shall be type-approved according to the relevant standard. Floor drains made before 1990 shall always be replaced. if in doubt about the make, age, damage or function of an existing floor drain, it shall be replaced by a new type-approved drain.

Drains shall be securely installed in accordance with the floor drain manufacturer's instructions in order to prevent movements between drain, substrate, watertight membrane and floor covering.

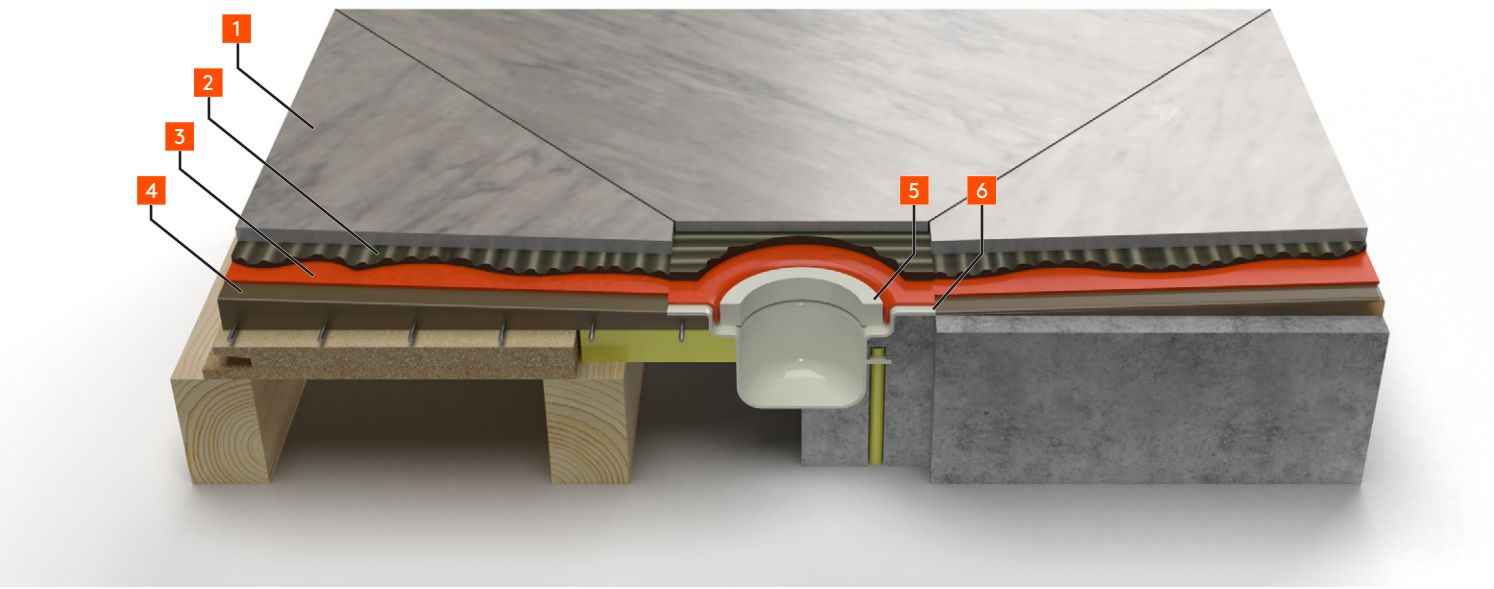


FIGURE 8. Floor drain

1. Tiles
2. Adhesive
3. Watertight membrane
4. Screed
5. Clamping ring
6. Drain flange

The floor drain shall be installed horizontally (tolerance: ±2 mm, measured from the centre of the drain to the outer edge of the flange).

The floor drain's flange shall be flush with the plaster surface, allowing the watertight membrane and seal to be connected to the drain as instructed with no difference in level. The floor drain manufacturer's special tool for making holes in the drain cuff and foil sheet shall be used.

Tile frames shall have a complete mortar substrate, with the exception of the clamping ring and the part of the watertight membrane that is to allow inspection around the clamping ring. In addition, the mortar shall be approved.

5.1.2 Drains close to walls

So-called 'drains close to walls' shall be industry approved in combination with the watertight covering kit.

List and procedures for approval can be found at www.bkr.se.

5.1.3 Pipes

No pipe penetrations are permitted through floors in wet rooms other than for drains and floor drains. The distance between drain pipes and the wall's watertight membrane shall be at least 60 mm. Drain pipes are not permitted in spaces for baths or showers. The distance between the substrate for the floor's watertight membrane and the upper edge of the wastewater pipe shall not be less than 40 mm when installing the watertight membrane. Wastewater pipes or connection sleeves for toilets shall have a smooth surface.

Pipes shall be fixed at penetrations. The maximum permitted cavity between pipe and substrate (adjoining board/filler etc.) is 2 mm, larger holes shall be filled with a product recommended by the supplier of the watertight covering kit.

There can be exceptions to the above in bathrooms or shower rooms with water heater, heat pump or water meter. Pipe penetrations for this can be executed in floors for such appliances with a pipe penetration sleeve. Pipe penetration sleeves are not permitted in spaces for bathtubs or showers.

TABLE 2. Pipe penetrations in floors

The table below presents the types of pipe penetrations that are approved for breaking the floor's watertight membrane depending on the type of pipe and area.

		Wet room			Other areas	
		In space for bath-tub or shower	With hot water heater, heat pump or water meter	Without hot water heater, heat pump or water meter	Laundry rooms, areas with hot water heater, heat pump, water meter	In toilets
Drain	Floor drain	✔	✔	✔	✔	✔
	Wastewater	✘	✔	✔	✔	✔
Pipes to hot water heater, heat pump or water meter	with pipe penetration sleeve	✘	✔	not applicable	✔	not applicable
	without pipe penetration sleeve	✘	✘	not applicable	✘	not applicable
Tap water and/or heat-ing pipes	with or with-out pipe pene-tration sleeve	✘	✘	✘	✘	✔

5.2 Penetrations in walls

5.2.1. Tap water and heating pipes

No water penetrations are permitted through walls in the space for bathtubs or showers other than for water pipes directly to the mixer tap.

Pipes shall be fixed at penetrations. The maximum permitted cavity between pipe and substrate (adjoining board/filler etc.) is 2 mm, larger holes shall be filled with a product recommended by the supplier of the watertight covering kit.

The distance between pipes and the floor's/wall's watertight membrane shall be at least 60 mm.

The centre-centre distance between pipes with a diameter of 32 mm or less shall be at least 60 ± 2 mm, see Figure 9. For diameters greater than 32 mm, there must be a distance of 60 mm or more between pipe edges, see Figure 7.

The pipe's diameter in this context is measured on the surface to be sealed. Check with the manufacturer of the pipe system.

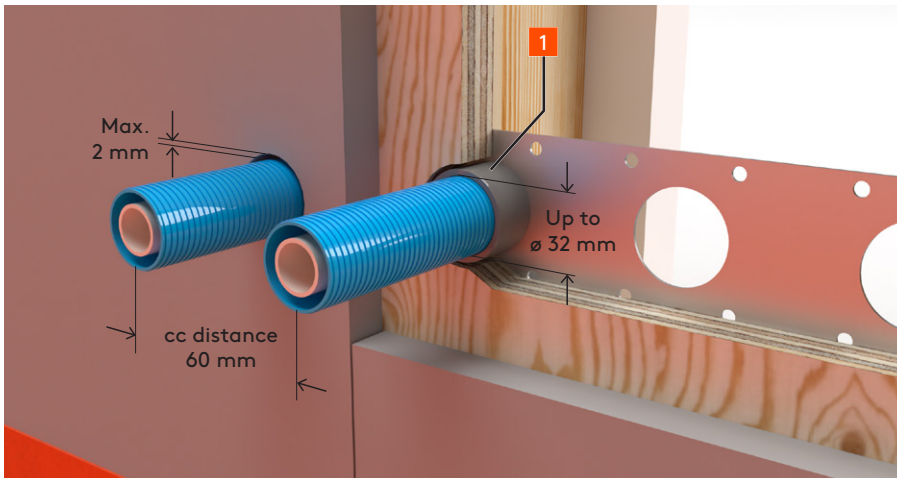


FIGURE 9. Penetrations in walls

Example of fixed pipe penetrations with pipe-in-pipe system
1. Fixing

5.2.2 Electricity

Electrical installations in wet rooms shall be executed with fixed penetrations with a minimum diameter of 16 mm or with another product designated by the supplier, which can be sealed with a suitable seal from the approved watertight covering kit.

Only penetrations necessary for appliances are permitted through walls in the space for bathtubs or showers.

These may only be executed with fixed pipe penetrations with a minimum diameter of 16 mm. The pipe penetrations should be executed with pipe bend VPS or equivalent. Flexible pipes in pipe penetrations are to be avoided.

Recessed boxes for switches by the doors in wet zone 2 do not require sealing.

5.2.3 Other penetrations in walls

Prefabricated constructions, such as distributor cabinets, service hatch frames, built-in mixer tap boxes, prefabricated watertight constructions for toilets with built-in cistern or other products that will be connected to watertight membrane shall be tested and approved according to trade rules.

There shall not be any ventilation penetrations in spaces for showers and bathtubs, see Figure 4, but they can be situated at a height of more than two metres above the finished floor in wet zones 1 and 2.

vatten täta våtrum
Byggkeramikrådet

The Swedish Ceramic Tile Council's logo "Vattentäta våtrum" ("Watertight Wet Room")

6. Watertight membrane

Waterproofing work shall be executed with an approved watertight covering kit that is listed at www.bkr.se.

6.1 Components included in the watertight covering kit

All components included in the system (watertight membrane, seals and adhesives) shall be tested together in accordance with Appendix B of the Industry Rules in order to be approved. It is the complete system that is approved, not the separate components.

6.1.1. The watertight covering kits' resistance to water vapour permeability

The watertight membrane shall have a resistance to water vapour permeability greater than 1,000,000 s/m. Alternatively, moisture-proofing must be done. At outer walls where plastic sheets are installed as a vapour barrier for board structures, or where there is uncertainty about the walls' construction, a minimum resistance to water vapour permeability of 2,500,000 s/m is recommended, unless moisture-proofing has been done.

Resistance to water vapour permeability is a measure of how well the watertight membrane functions as a vapour barrier. The watertight membrane's resistance to water in the vapour phase is given by a value expressed as s/m (seconds per meter). E.g.: 1,000,000 s/m = one million seconds per meter.

BBR, Boverket's Building Regulations, set out that a watertight membrane should have a minimum resistance to water vapour permeability of 1 million s/m, unless a moisture-proofing design can prove that another resistance is sufficient.

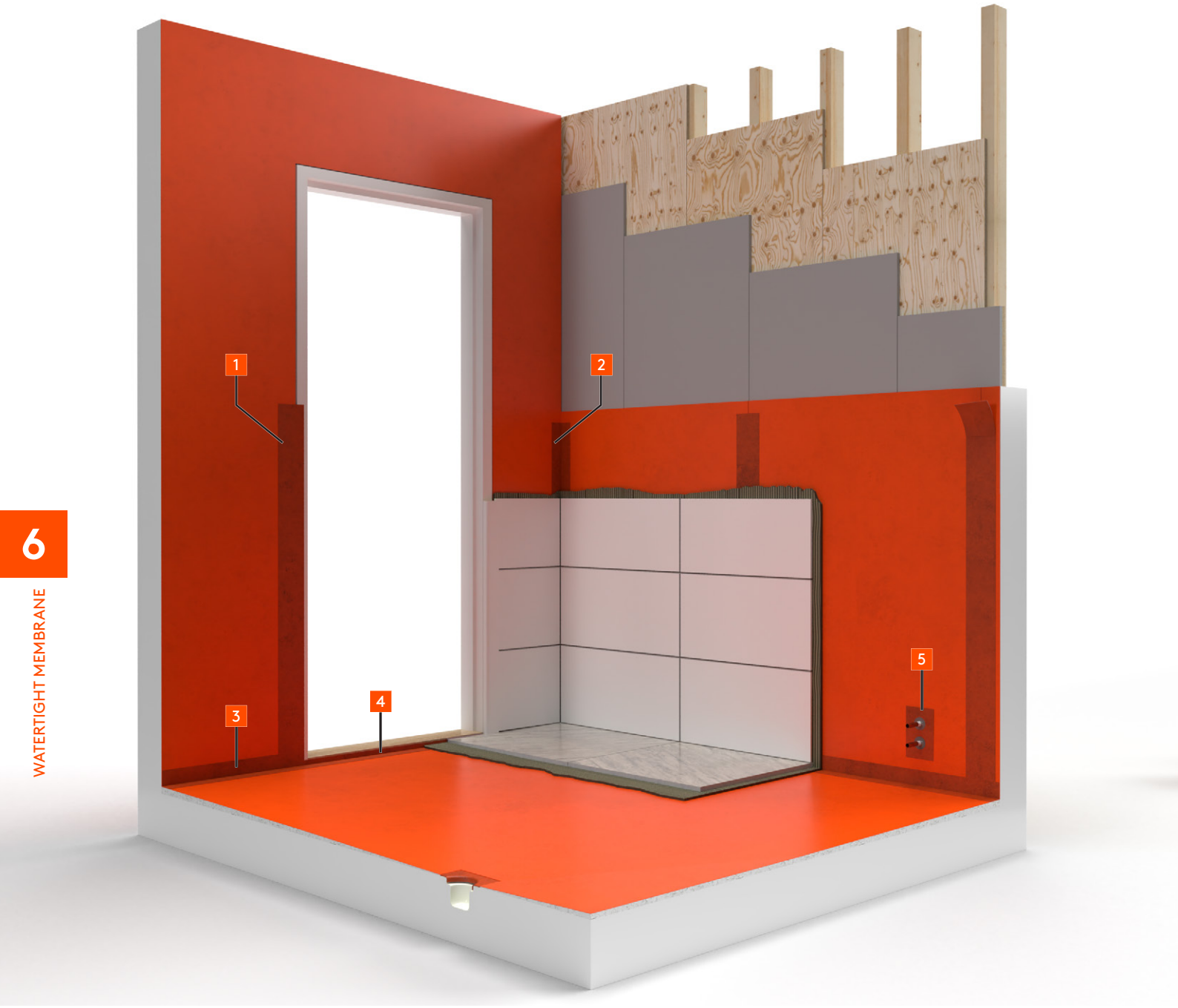


FIGURE 10. Sealing

1. Sealing on doors and windows in wet zone 1, see Figure 12.
2. Sealing in joints, see 6.3.1.
3. Sealing in floor-wall angles, see Figure 11.
4. Sealing against the door's threshold, see Figure 13.
5. Sealing against pipe penetrations, see Figures 14, 15 and 16.

The watertight covering kit for the relevant floor/wall structure should be selected in consultation with the manufacturer of the watertight covering kit or, where appropriate, according to the moisture-proofing design presented by the developer/purchaser.

6.2 Application of the watertight covering kit

The watertight covering kit shall be intended/recommended for the relevant substrate and applied according to the manufacturer's approved installation instructions. Approved installation instructions bear the Swedish Ceramic Tile Council's logo "Vattentäta våtrum" ("Watertight Wet Room"). The watertight covering kit shall be installed with the products, methods and quantities specified in the installation instructions.

6.3 Sealing

Sealing is a collective word for strips, cuffs and components included in the watertight covering kit. Sealing provides reinforcement of the watertight membrane where necessary due to an increased risk of movement, e.g. at angles, corners, material transitions or penetrations.

Sheet type watertight membrane can have the same ability to bridge movements. Sealing materials can be waterproof in themselves or embedded in several layers of viscous waterproofing.

For board structures, all seals except board joints in wet zone 2 shall be intrinsically watertight.

Always follow the approved installation instructions from the manufacturer of the watertight covering kit regarding the use of sealing materials, which set out how and where the various sealing components shall be used.

Sealing materials shall be labelled and identifiable as belonging to the relevant system when applying watertight membrane. Sealing materials shall be marked directly on the material.

6.3.1 Walls

Seals shall be executed at:

Solid walls
In corners, transitions between different materials, or joints between elements and transitions between watertight membrane on floors and walls.

Board walls
Wall angles, corners and board joints.

6.3.2 Doorways and windows

Door frames/thresholds shall be flush with the substrate for the watertight membrane. See Figure 11. Thresholds or hidden thresholds and frames shall be installed before applying the watertight membrane. If this is not the case, this shall be noted as a deviation in the Quality Document.

Thresholds or hidden thresholds shall be sealed by folding up the watertight membrane and associated sealing against the threshold to at least the level of the finished floor, see Figure 13.

FIGURE 11. Threshold flush with wall

Sealing shall be continuous between the threshold, frame and wall.

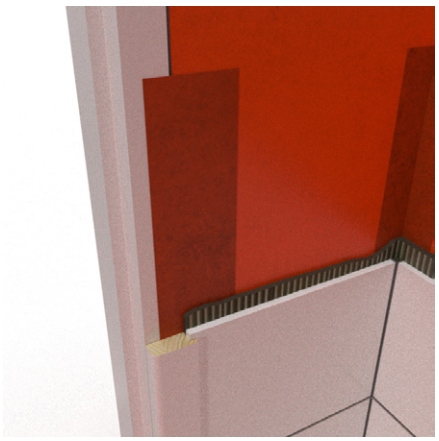


FIGURE 12. Sealing on frame

Sealing out on to the frame protects the wall's internal structure.

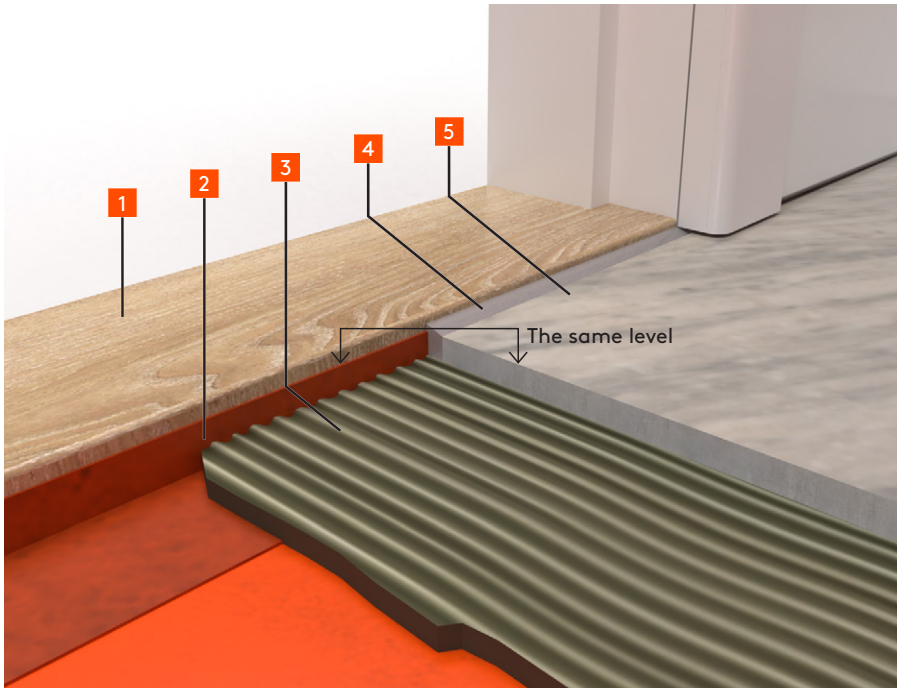


FIGURE 13. Turn-up against threshold

1. Threshold
2. Watertight sealing
3. Adhesive
4. Flexible sealant
5. Tiles

The upper edge of the turn-up at doorway shall be at least 20 mm above the horizontal level of the watertight membrane around the floor drain flange.

If doors and windows are situated in wet zone 1, the watertight membrane shall be extended to the frame so as to protect the edge of the wall board, see Figure 12.

Open gaps can be sealed without filling. This assumes that the seal can bridge the gap without rear attachment. See the material supplier's installation instructions.

The extent of seal on the frame is determined in the specific case by the contractor/material supplier.

Floor/wall angles must always be sealed without a break between the threshold, frame and wall regardless of the location within the room.

6.3.3 Pipes

All pipe penetrations are to be sealed throughout the wet room. Always check the installation instructions for the piping system for how to perform the sealing.

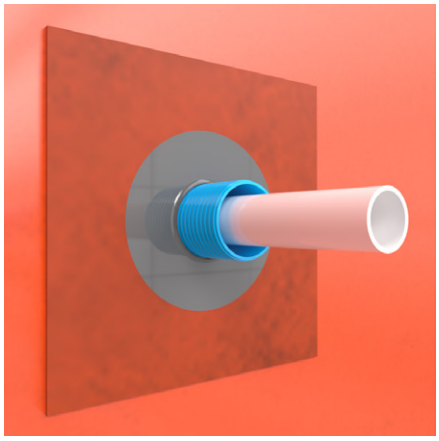


FIGURE 14.
Sealing against protective pipe

Seals around pipe-in-pipe are made against the protective pipe.

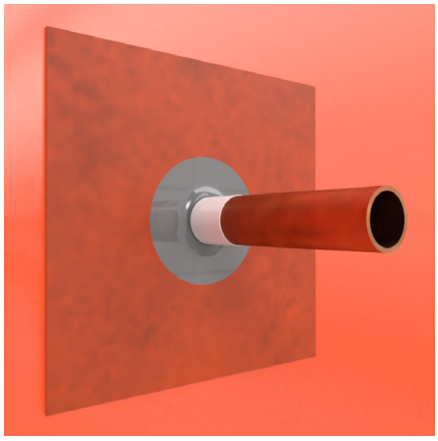


FIGURE 15.
Sealing against plastic sleeve

For pipes without protective pipe, the seal is made directly on the pipe's plastic sleeve.

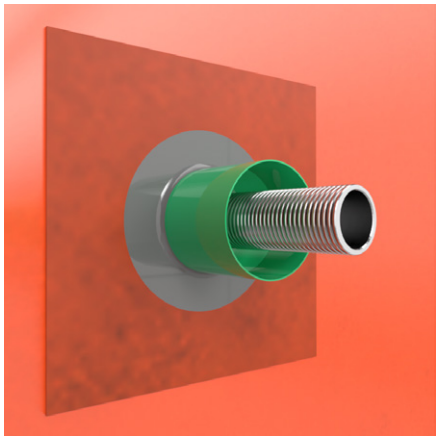


FIGURE 16. Sealing against fittings

When using fittings, the seal is made directly against the box.

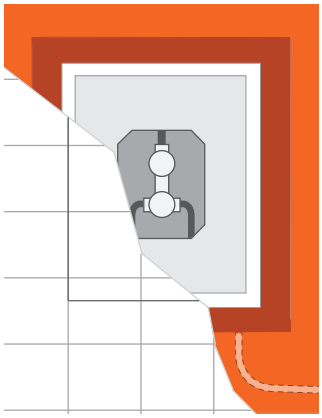


FIGURE 17. Built-in box

6.3.4 Connections to coupling/distributor cabinets, boxes for built-in tap mixers and built-in mixer taps

The selected manufacturer/supplier shall provide installation instructions for connection to coupling/distributor cabinets, the built-in mixer taps and similar. The supplier of the watertight covering kit shall provide approved watertight covering kits and sealing materials compatible with the relevant component.

6.4 Transitions between different watertight covering kits

At transitions from VTvF watertight covering kits on walls in wet zone 1 to VTv in wet zone 2, both systems shall be of the same make. Overlap/transition between the systems shall be executed in accordance with the installation instructions provided by the manufacturer of the watertight covering kit.

6.5 Transition to watertight membrane intended for other surface materials

The transition between different types of watertight membrane shall be executed in such a way that leakage cannot occur in the overlap between the watertight membranes.

The surface that is not clad or coated with ceramics is not subject to these trade rules. Coordination responsibilities are governed by agreements and not by trade rules.

6.5.1 Connection between plastic flooring and ceramics on walls

The plastic flooring's turn-up shall be sealed according to the system's installation instructions. The upper edge of the plastic flooring's turn-up shall be filled with plaster to at least 350 mm, to ensure that

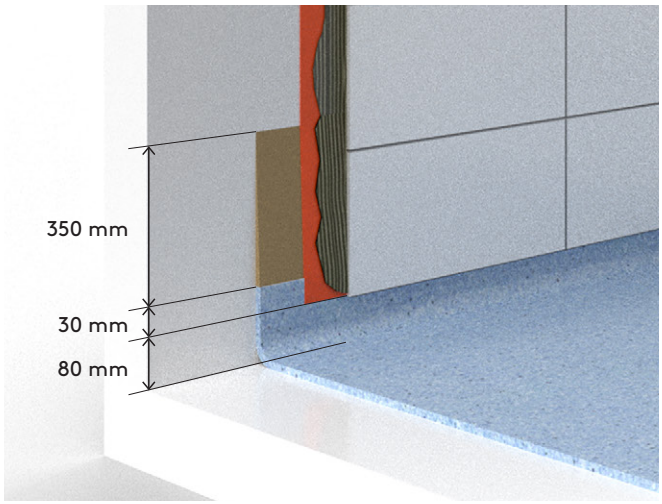


FIGURE 18. Connection to plastic flooring

The connection shall be made with an overlap of at least 30 mm watertight membrane out on to the plastic flooring behind the ceramic tiles. From the floor up to the lower edge of the ceramic, there shall be at least 80 mm of visible plastic flooring.

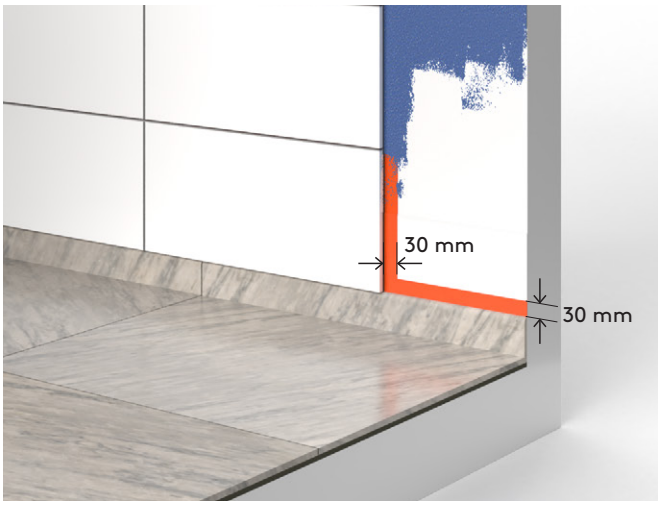


FIGURE 19. Connection to painted watertight covering kits

The connection to the painted VT system shall be made with the watertight membrane overlapping the ceramic by at least 30 mm.

FIGURE 20. Ceiling painted before tiling

When the ceiling is painted down onto the wall, the watertight membrane can be finished 50 mm from the ceiling, to avoid making the ceiling dirty.

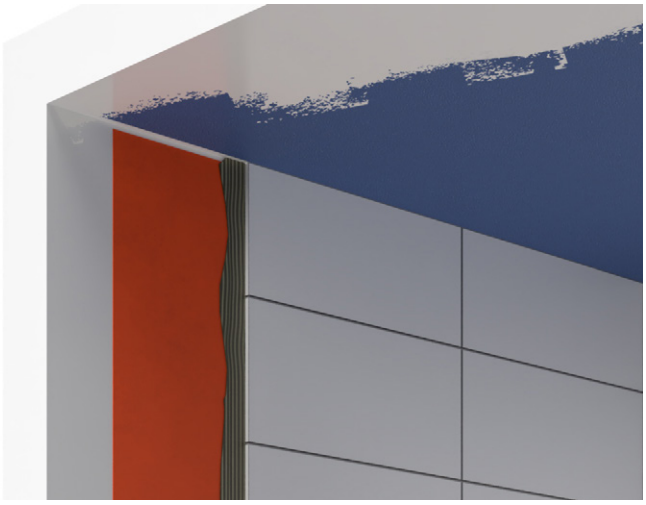


FIGURE 21. Ceiling painted after tiling

When the ceiling is not painted before tiling, the watertight membrane should be finished as close to the ceiling as possible, but can be finished max 50 mm from the ceiling.

the substrate for the ceramic's watertight membrane is even. Overlap between plastic flooring and ceramic watertight membrane shall be at least 30 mm.

6.5.2 Connection between ceramic and painted surfaces

Overlaps between painted watertight membranes and watertight membrane for ceramics are executed by overlapping the different watertight membranes by at least 30 mm. Both horizontally and vertically.

6.6 Watertight membrane in connection with toilet bowls with built-in flush tank

Watertight membranes shall be unbroken behind and beneath toilet enclosures, see Figures 22 and 23. The hidden bottom surface shall have a leakage indication outlet at the lowest point, so that any leaking water is visible. For installation in the wall, the hidden bottom surface shall have an incline towards the wet room.

Alternatively, a specific leakage drainage device can be used as specified by the supplier.

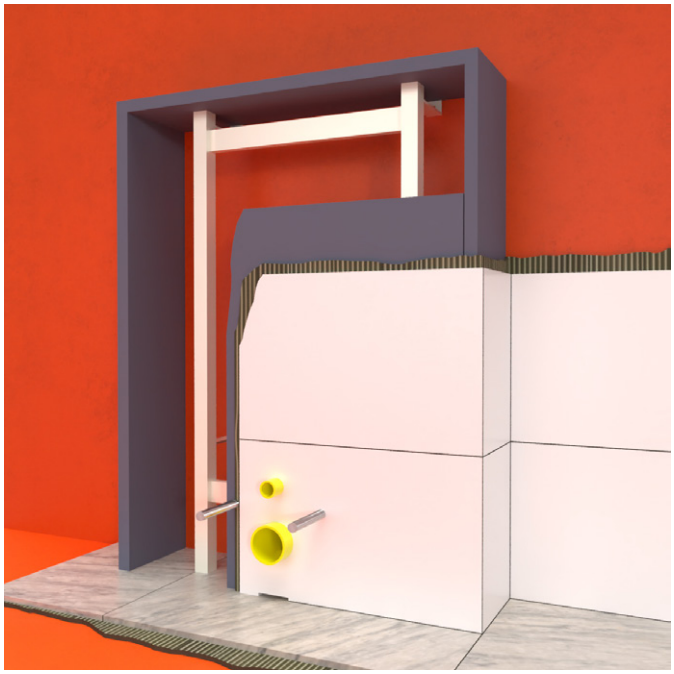


FIGURE 22. Watertight membrane behind built-in WC

There shall be a watertight membrane on the floor and wall behind the built-in flush tank. There shall be tiles on floors under the enclosure. Check with the supplier of the watertight membrane about any ceramics behind the flush tank.

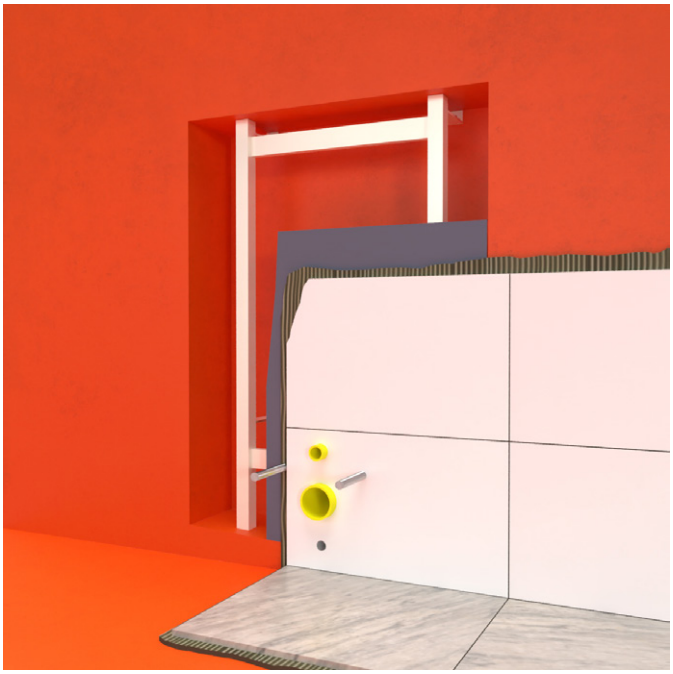


FIGURE 23. Watertight membrane behind built-in WC in wall

There shall be a watertight membrane beneath and behind the built-in flush tank. Any leakage at the fitting shall flow out into the wet room.

7. Installation instructions

The watertight covering kit shall be installed according to the manufacturer's approved installation instructions. Watertight covering kits and installation instructions shall be approved by the Swedish Ceramic Tile Council. The installation instructions shall bear the logo "Vattentäta våtrum", indicating that the watertight covering kits and its associated installation instructions are approved by the Swedish Ceramic Tile Council. The installation instructions shall be updated and relevant in accordance with the requirements in BBV. The approved systems' installation instructions are available for download at www.bkr.se/godkandasystem.

8. Other materials

8.1 Adhesive

Adhesive(s) in watertight covering kits shall comply with the requirements in the applicable standard, be tested according to the requirements in the trade rules, be included in the approved system of the manufacturer of the watertight covering kit, be recommended for the purpose and be specified in the installation instructions.

The adhesive shall be selected taking into consideration the selected tile and the substrate, according to the instructions of the ceramic supplier and manufacturer of the watertight covering kit. The adhesive shall be applied in such a quantity and in such a way as is required to achieve full adhesion.

To ensure the ceramic tiles' adhesion even under pressure and shear loads that occur during shrinkage and other movements, sufficient quantities of adhesive must be applied, both in respect to thickness and coverage.

Always follow the manufacturer's instructions.

8.2 Ceramic tiles

Wall and floor tiles shall be of first sorting and meet the requirements according to the applicable standard. If underfloor heating is installed, the ceramic tiles shall have a maximum water absorption of 6%.

8.3 Grouts

Grouts are not included in the approved watertight covering kit.

Grouts shall be intended for the selected tile and comply with the requirements of the applicable standard.

Cement-bound grouts can be given different technical properties by means of polymer modification. Consult the supplier about the appropriate grout for the relevant conditions. When working with mosaics, especially glass mosaics or other transparent materials, special consideration must be given to choice of grout. Always follow instructions from the manufacturer/supplier.

8.4 Flexible sealants

Construction joints are normally executed in the surface layer at material transitions in the substrate and in new construction where there is a risk of movement.

To handle movement in the surface layer, flexible grouts intended for wet rooms shall be used.

Flexible sealants should be used, for example, in:

- corners and angles where the substrate on both sides is concrete, cast less than one year prior to tiling
- in new construction, when risks of movements in the substrate can be expected. For example, at wall angles where board structures meet concrete walls, or board structures meet board structures.
- at transitions to other materials in walls, such as door frames/jambs, window frame/jambs and thresholds. A paintable, flexible sealant shall be used in these cases.
- in ceiling/wall angles. A paintable, flexible sealant shall be used in ceiling angles. Silicone should not be used as it makes painting more difficult.

Flexible sealants are not to be used:

- at the lower edge of ceramic wall coverings that overlap the turn-up on plastic flooring
- in joints between ceramic floor tiles and the tile frame of floor drains

9. Subsequent installations

Where holes have to be drilled through watertight membranes, sealing must be executed at the level of the watertight membrane. Screw fixings with plugs shall be sealed according to the manufacturer of the watertight covering kit's installation instructions. Screw fixings shall only be executed in solid structures, such as concrete, masonry, wooden battens, nogging pieces or other described constructions.

The most common procedure is to fill the hole with sealing compound before the plug/screw, so that the compound seals against the watertight membrane behind the tiles, as shown in Figures 24 and 25.

Other special design features:

- Nowaday it's possible to replace all screw fixings with adhesive systems.
- Special plugs that are tested according to international testing methods can provide an efficient sealing.
- The so-called "Våtrumsinnerväggen" is a projected construction that is available on the websites of various trade associations. Provided that the installation instructions are carefully followed, heavier objects can be installed without leakage problems.

There can also be other solutions.

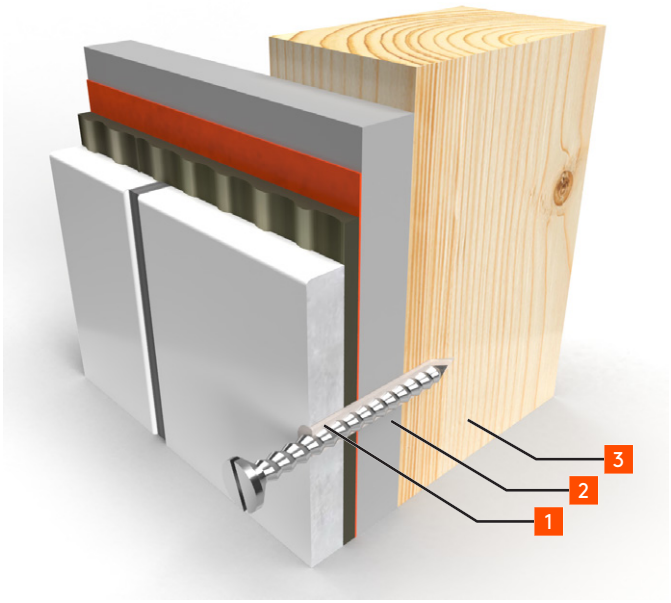


FIGURE 24. Fixing in wooden joist

The screws shall be fixed in the joist

1. Sealant (and optional plug)

2. Board material

3. Joist

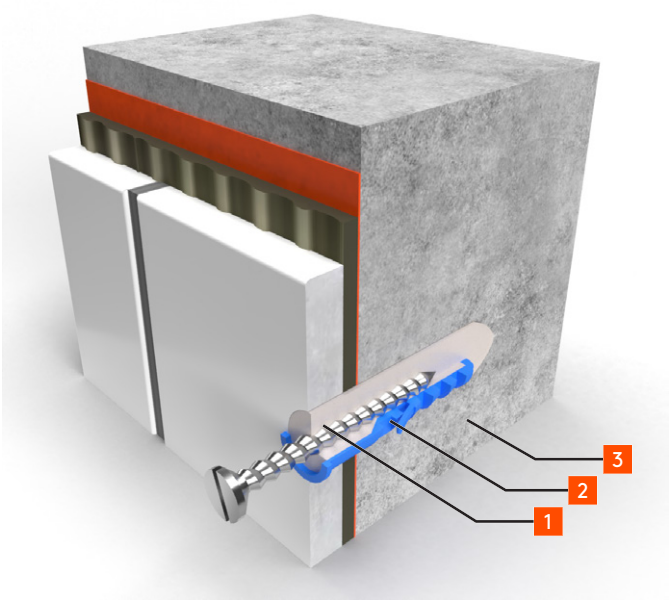


FIGURE 25. Fixing to concrete wall

The screws shall be fixed in the concrete

1. Sealant

2. Plug and sealant

3. Concrete wall

10. Applicable standards and norms

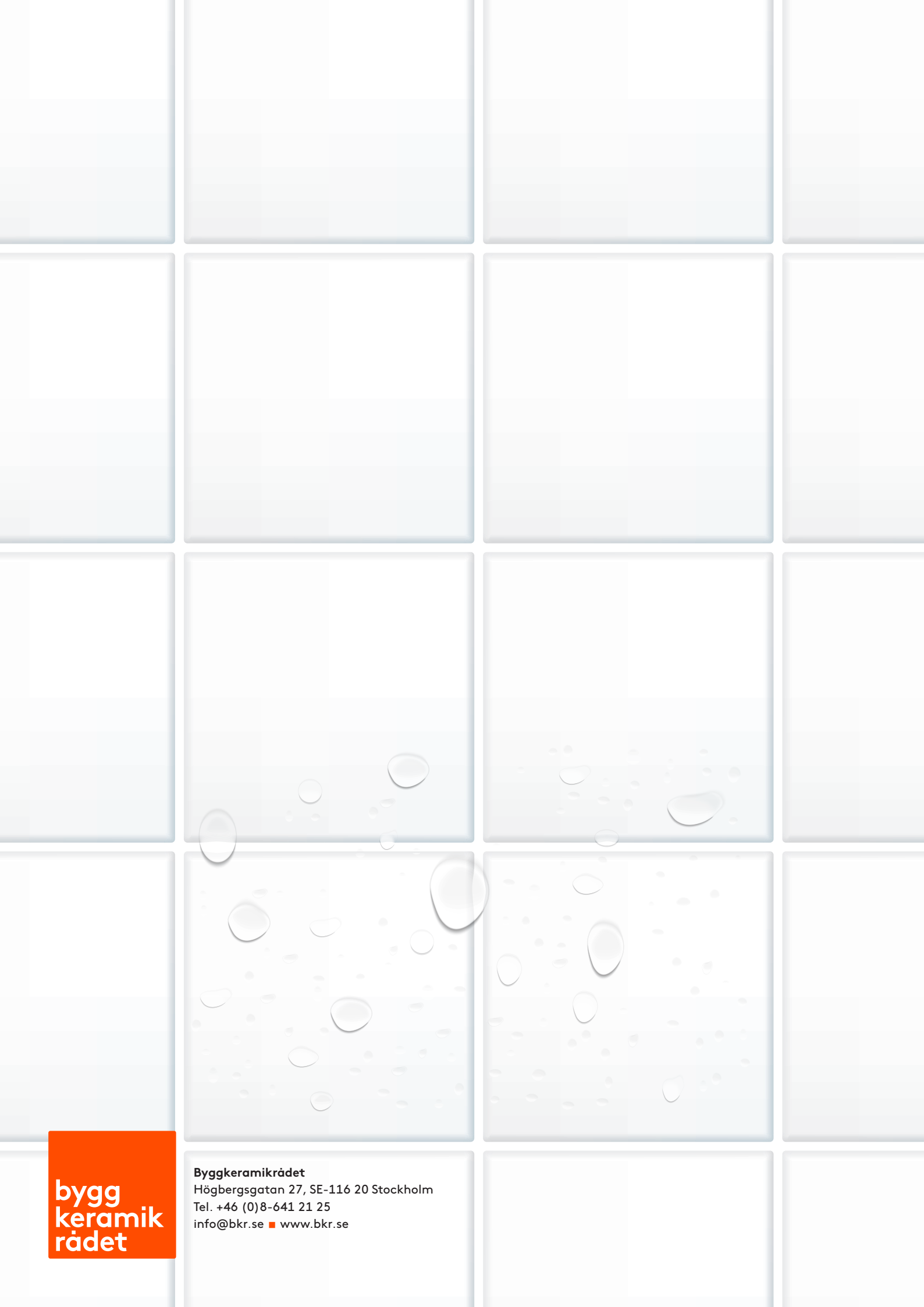
Here is a list of the standards that are referred to in the rules. They give the minimum requirements set for the individual materials within Europe. The versions of the standards are those in force at the time of publication of these trade rules. Following revision of a standard, the latest issue of the standard applies. All standards can be ordered from www.sis.se.

Adhesives for ceramic tiles. Requirements, evaluation of conformity, classification and labelling.	SWEDISH STANDARD SS-EN 12004-1:2017
Adhesives for ceramic tiles. Test methods.	SWEDISH STANDARD 12004-2:2017
Grout for tiles – Requirements, evaluation of conformity, classification and designation.	SWEDISH STANDARD SS-EN 13888:2009
Ceramic tiles — Definitions, classification, characteristics, assessment and verification of conformity and labelling.	SWEDISH STANDARD SS-EN 14411:2016
Floor material – Screed material and floor screeds based on cement, plaster, magnesite, bitumen or hardened plastics – Screed material and floor screeds – Properties and requirements.	SWEDISH STANDARD SS-EN 13813
Outflow - Drains for buildings. Part 1: Floor drains with water traps with a depth of at least 50 mm.	SWEDISH STANDARD SS-EN 1253-1:2015
Outflow - Drains for buildings. Part 2: Roof drains and floor drains without odour trap.	SWEDISH STANDARD SS-EN 1253-2:2015
Gypsum binders and gypsum plasters – Part 1: Definitions and requirements.	SWEDISH STANDARD SS-EN 13279-1:2008
Particleboards - Specifications.	SWEDISH STANDARD SS-EN 312:2010

Resistance to water vapour permeability

The value for water vapour permeability is calculated according to the standard SS-EN ISO 12572:2016. In Sweden, the value for resistance to water vapour permeability is traditionally expressed in s/m (seconds per meter).

Notes



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