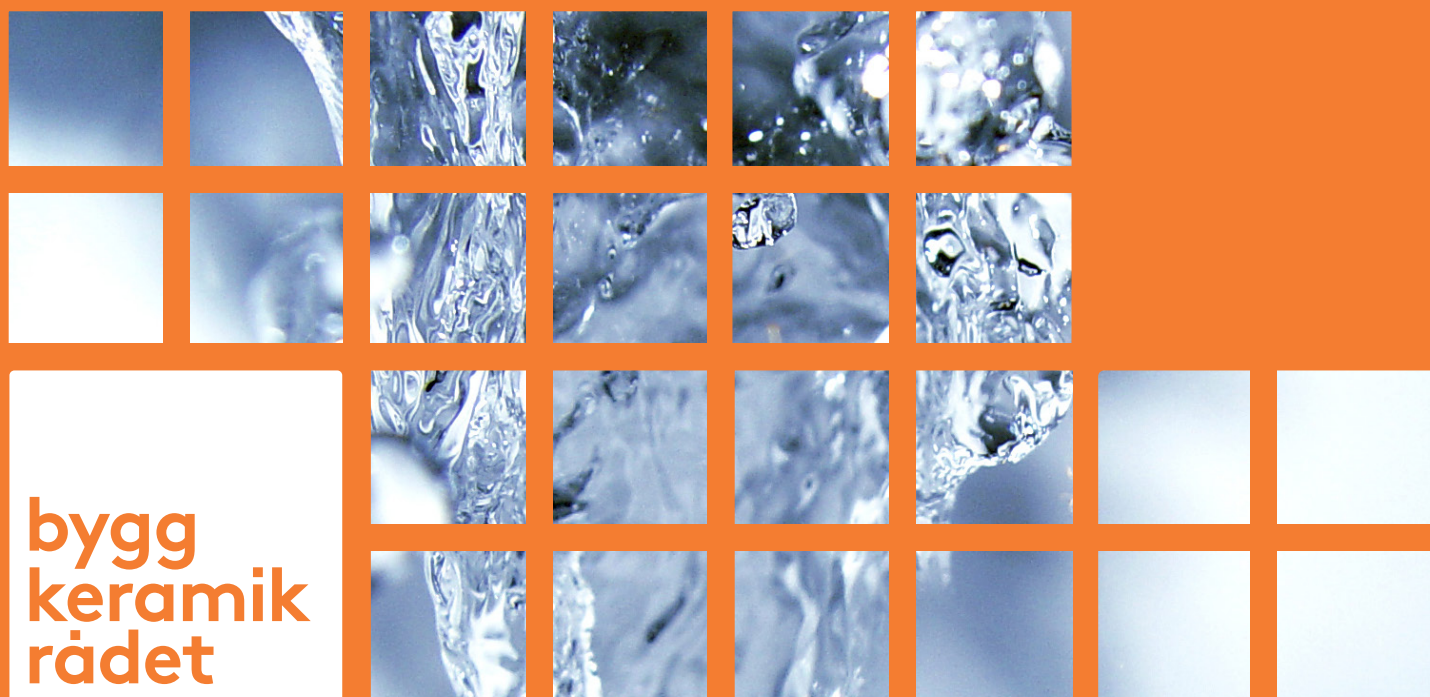




BBV

Trade Rules of the Swedish Ceramic Tile Council for Wet Areas

Trade rules for ceramic tiles in wet areas. The rules have been compiled by the Swedish Ceramic Tile Council with consideration given to the regulatory requirements in Boverkets Building Rules BFS 2011:6 with changes until BFS 2015:3, BBR.



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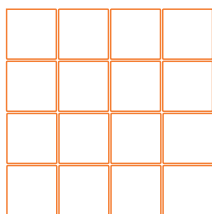
Reading

These Trade Rules have been divided into two parts. The first part contains the actual trade rules, whereas the second part contains clarifications, explanations, advice and general information.

The two parts have been harmonized, as far as possible, regarding division into chapters, making it easy for the reader to find any relevant supplementary information.

Changes since the previous edition:

Page 9 paragraph 3.6, the text “In wet zone one the boards must be resistant to microbial growth. Cardboard covered plasterboards must not be used in wet zone 1 either as substrates for watertight membranes or as backing boards” has been removed.



Foreword

The Swedish Board of Housing, Building and Planning (Boverket) issued new building regulations in 1988, replacing the SBN (Swedish Building Norm). The detailed requirements on wetroom wall and floor constructions were replaced with requirements only on their function.

In 1988 the trade organization for the tile trade, Plattsättningsentreprenörers Riksförening, PER, created rules for ceramic wall construction in co-operation with leading manufacturers and suppliers, called 'PER:s trade rules'.

When contractors and suppliers formed the Swedish Ceramic Tile Council, BKR, in 1989, the responsibility for the trade rules passed on to the Swedish Ceramic Tile Council. Since June 2007, the regulations have been called 'Trade rules of the Swedish Ceramic Tile Council for wet areas, BBV'. As before, contractors and suppliers both support the trade rules through Plattsättningsentreprenörers Riksförening, PER, and Kakelföreningen, KAF.

The current edition of BBV, BBV 15:1 applies from 1 June 2015 and replaces BBV 14:1.

Traderules apply to entire floor or wall surfaces

These trade rules are based on knowledge and experience from the Swedish ceramics tile trade up to 2015.

The rules are general and presuppose work in bathrooms or areas with similar moisture impact, in residences or similar. They presuppose work using approved watertight covering kits on entire wall- or floor surfaces which are to be clad with ceramic tiles. Especially during renovations situations may arise, however, when general rules cannot be applied to their full extent, and when special solutions taking into account the on-site circumstances must be applied. Such solutions should only be implemented once an agreement between the contractor and the customer has been reached, and after consultation with pertinent watertight covering kit manufacturers. They shall be documented in the Quality Document, Appendix A to BBV.

Normally, the regulations cannot be applied to work performed on parts of surfaces during repairs, correction of mistakes, damage, etc. On the other hand, such measures may be carried out professionally, following the principles of the Trade rules of the Swedish Ceramic Tile Council for wet areas, BBV. The contractor takes responsibility for the work and can provide a guarantee in accordance with an agreement between the parties.

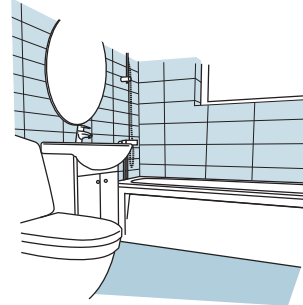
Professionalism – performance by a qualified contractor

The general regulations of the building trade (AB/ABT) and the Consumer Services Act (1985:716) provide that an entrepreneur must carry out his work professionally. Professionalism means, among other things, that the contractor is responsible for a service being performed in a manner expected of a normally knowledgeable and skillful professional, and that all materials are installed in accordance with the suppliers mounting instructions.

The Trade rules of the Swedish Ceramic Tile Council for wet areas, BBV, are recognized across the building sector as guidelines for professionalism within wet area ceramic constructions.

To satisfy the trade rules' definition of professionalism the following is required:

- that work is carried out in accordance with BBV
- that a watertight covering kit which is approved by the Swedish Ceramic Tile Council is used in accordance with approved mounting instructions
- that work is carried out by a company that is qualified in accordance with BBV
- that watertight membrane work is carried out by a tiler who is certified in accordance with BBV, employed by a certified company, and who can show a valid photo ID issued by the Swedish Ceramic Tile Council
- that the Quality Document BBV, Appendix A, is filled in and handed with a copy of the mounting instructions for the approved watertight covering kit to the customer. In larger projects, after an agreement with the purchaser, the mounting instructions may be delivered in a different way, for example, by referring the parties concerned to the website of the supplier of the watertight covering kit



DIY - Do it yourself

For private persons who intend to carry out work with ceramic tiles on their own, insurance companies usually accept this kind of work, on the condition that it is carried out following current trade rules and in accordance with the watertight covering kit manufacturer's approved mounting instructions. However, the Swedish Ceramic Tile Council does not advise DIY in wet areas, unless the person concerned is well experienced and knowledgeable in the field.

1. Application of the trade rules

The rules are applicable when using watertight covering kits on different substrates and when tiles or mosaic are to make up the surface layer on floors and walls in wet areas, such as bathrooms and shower areas in residences, or areas with an equivalent water load. The trade rules can be applied, fully or partly, when natural stone, glass or similar products are used as a surface layer. The rules are also applicable for floors in toilets and in laundry rooms as well as for areas with hot water boilers (BBR 6:5331).

The rules apply to both new constructions and renovation where ceramic tiles are mounted using the thin-layer technique.

Rules concerning water- and sewage installations are not covered by BBV. For these installations the reader should refer to trade rules for heating, ventilation and sanitation engineering (VVS) companies 'Säker Vatteninstallation' at www.sakervatten.se

2. Requirements for water tightness

All floor and wall surfaces with ceramic tiling in a wet area must be fitted with approved watertight covering kits (see Figures 1 and 2).

A wet area is an area where floor- and wall surfaces wholly or partially may be regularly exposed to water.

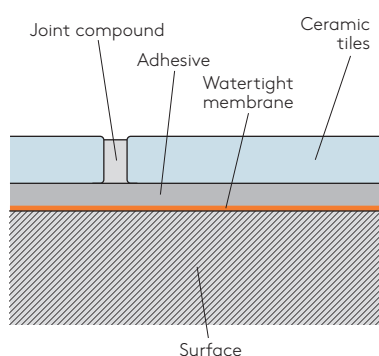


Figure 1. Schematic representation - floor

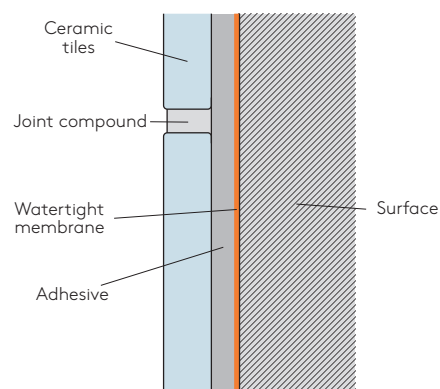


Figure 2. Schematic representation - wall

2.1 Exceptions in solid constructions on the ground

When floor- and wall surfaces without underlying/external insulation are in direct contact with the ground, and where penetration of water/moisture can occur, the regulations allow for exceptions from the requirements above, see Figures 3 and 4. This issue is common when renovating old houses. Here, the extent of the watertight membrane can be limited to floor- and wall areas with a heavy water load, for example, a shower area. The distribution of surfaces with or without watertight membranes is judged case by case, depending on the construction design. Evaluation by a professional building expert may be necessary

2.2 Wet areas are divided into wet zones

Wet zone 1 = Walls around the bathtub/shower and wall surfaces at least one metre outside these, as well as the whole floor surface, see Figure 5. When the bathtub/shower area on any side is enclosed by a screen wall which is to be covered in tiles, the wall surface facing the bath/shower, including the gable, is included in wet zone 1. If any part of the exterior wall is part of wet zone 1, the whole wall shall be treated as a part of wet zone 1.

Wet zone 2 = All other wall surfaces.

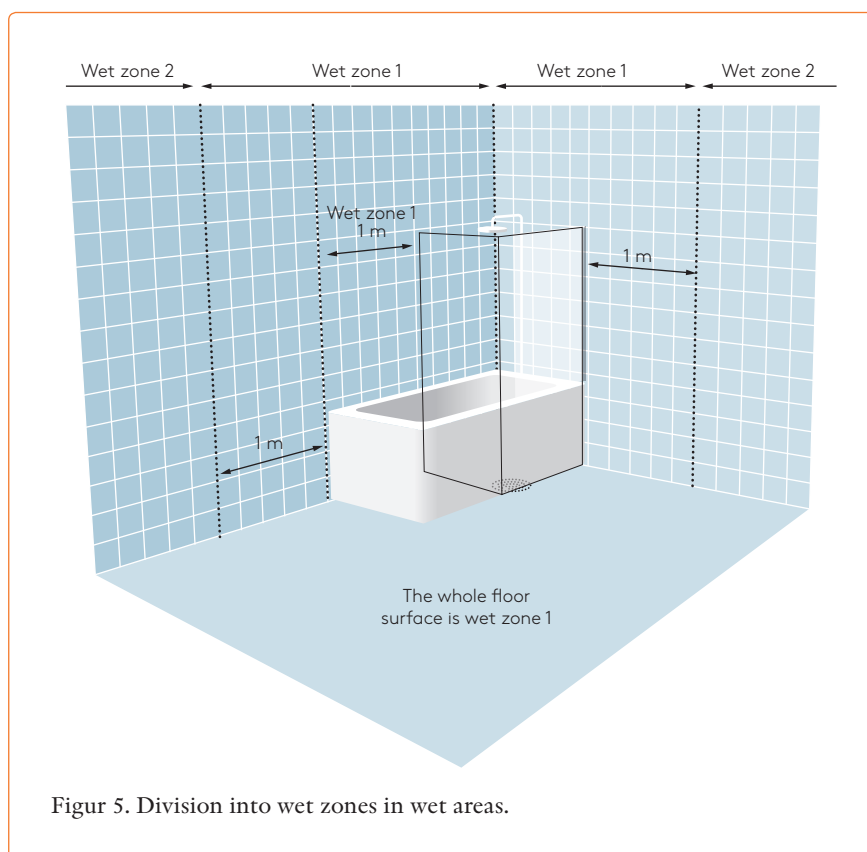


Figure 5. Division into wet zones in wet areas.

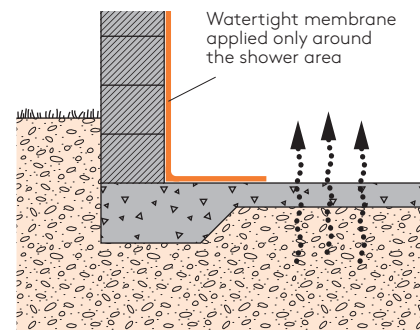


Figure 3.

If floors and walls in direct ground contact lack underlying/external insulation (capillary barrier and/or heat insulation) and consist entirely of mineral material, a watertight membrane may be excluded. Any moisture, as diffusion, can then be transported through the construction without being stopped. Watertight membrane should be, however, applied locally around the shower area or similar to avoid local humidification of the construction.

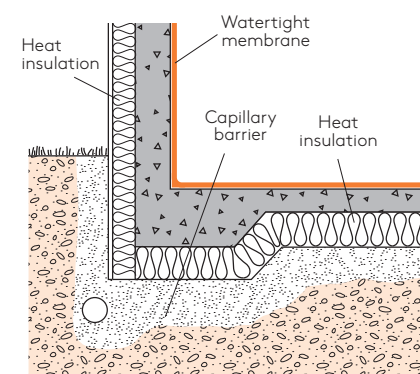


Figure 4.

When floors and walls have underlying/external insulation (capillary barrier and/or thermal insulation), watertight membrane must be applied on all surfaces in wet areas.

2.3 Sealing classes

VTgF	=	Watertight covering kits for floors, flexible sheets type
VTvF	=	Watertight covering kits for walls, flexible sheets type
VTg	=	Other approved watertight covering kits for floors
VTv	=	Other approved watertight covering kits for walls

2.4 Selecting watertight covering kits

Wet zone 1, walls

Board constructions	=	VTvF
Solid constructions	=	VTvF or VTv

Wet zone 1, floor

Board constructions	=	VTgF
Solid constructions	=	VTgF or VTg

Wet zone 2, walls

Board constructions	=	VTvF or VTv
Solid constructions	=	VTvF or VTv

Concrete, bricking and/or plaster are considered solid constructions.

2.5 Combining different waterproofing systems

When changing over from VTvF watertight covering kit on walls in zone 1 to VTv in wet zone 2, both kits must be from the same manufacturer. Execution of the overlap between the systems must be in accordance with the mounting instructions of the watertight membrane manufacturer.

2.6 Other areas

In toilets, laundry rooms and areas with hot-water heaters the floor must be fitted with approved watertight covering kit. If the floor in one of these areas is contiguous with the floor in a wet area, a VTgF kit shall be used where the floor is a board construction. If a floor drain has been installed in these areas, the floor fall can be limited to local fall around the floor drain. The remaining surface may be level. Fall away from the drain must not occur in any part of the area.

The watertight membrane on the floor shall be extended by at least 50 mm onto the wall. If there is a cast step around the water main coming out from the floor, all surfaces of the step shall be covered with the watertight covering membrane.

Kitchen floors are not required to follow the rules concerning watertight covering kits.

2.7 Mounting instructions

Watertight membrane work must be carried out with an approved watertight covering kit and in accordance with the mounting instructions of the manufacturer.

3. Substrates/preparations

3.1 General requirements

3.1.1 Existing surface layers when renovating

The fundamental rule is that existing surface layers must be removed. For surface layers which have been applied on sand filler it is important that the existing surface layer and sand filler layer are removed.

Applying onto an existing surface layer is a deviation from the fundamental rules and must be noted in the Quality Document.

The substrate must be sound, dry, clean and free from loose particles. Any cavities and uneven surfaces shall be filled with a filler or sand-papered before the watertight membrane work can begin. Any filling residue or residue of paint, lime plaster or similar shall be removed.

In general, the moisture content of the substrate shall always be kept as low as possible.

Generally, the substrate must have a dry surface and there must be a possibility for drying out any remaining moisture.

The supplier's mounting instructions shall be followed with respect to the substrate. Materials and substrates must not have a temperature lower than +10°C, unless the mounting instructions of the watertight membrane supplier stipulate otherwise.

Generally, the relevant parts of substrate requirements specified in AMA Hus shall be applied when applying watertight membranes and tiling.

Wall and floor substrates in wet areas shall be suitable as substrates for watertight covering kits and tiling.

3.1.2 Floor fall

The floor must be prepared so that there is fall toward the floor drain in both the watertight membrane substrate and in the surface layer. Fall away from the drain must not occur in any part of the area.

On floor surfaces which are regularly exposed to water, in connection to the floor drain, the shower area and under the bathtub, the floor fall must be within the interval 1:50–1:150 (20 mm/m–7 mm/m).

The fall must be within the interval 1:100–1:200 (10 mm/m–5 mm/m) on the parts of the area that are partially exposed to water or water spillage.

Alternative floor falls can be agreed upon. An agreement on an alternative floor fall shall be always documented in the Quality Document, BBV, Appendix A.

Please note that the maximum fall allowed in accordance with the building regulations of Boverkets byggregler, BBR, 6:5335, is 1:50 (20 mm/m) in the surface substrate. A greater fall may pose a risk for slipping.

Where the toilet or bidet is to be placed, a rectangular, flat assembly area of at least 300x400 mm is required. The assembly area must be free from underfloor heating. Water, sewage and electrical installations may be placed deeper than 60 mm under finished floor.

3.2 Concrete

Deformation of concrete due to shrinking shall be considered. Any form oil shall be removed.

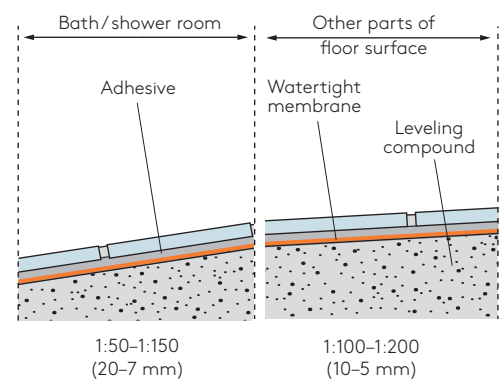


Figure 6. Floor fall in wet areas.

Watertight covering kits and tiling shall be carried out in accordance with the mounting instructions of the kit manufacturer. Unless stated otherwise the concrete substrate must harden for at least two months under normal temperature and moisture conditions before tiling is done.

3.3 Light concrete

Floor and wall surfaces made of lightweight concrete (aerated concrete and lightweight aggregate concrete) shall be treated in accordance with the instructions of the supplier of the watertight covering kit and filler.

3.4 Plaster

Plaster can be lime plaster or cement plaster. Alternatively, gypsum-bound plaster which fulfills the fundamental requirements of the current standard* for gypsum plaster may be used. Lime plaster shall not constitute a substrate for watertight membranes clad with tiles.

3.5 Filler/levelling compounds

SFillers and levelling compounds intended for floors and walls must be mineral-bound, and fulfil the requirements in accordance with the current standard.*

3.6 Board constructions

Boards/board constructions in wet areas must, in accordance with the manufacturer's instructions, be documented suitable/intended as substrates for ceramic watertight covering kits in wet areas and be mounted in accordance with the board manufacturer's instructions. Wood-based boards shall not be used as substrates for watertight membranes or tiles.

3.6.1 Walls

The number and dimensions of the boards shall be adapted to stud spacing to achieve sufficient bending rigidity in accordance with the board-manufacturer's instructions.

3.6.2 Floor

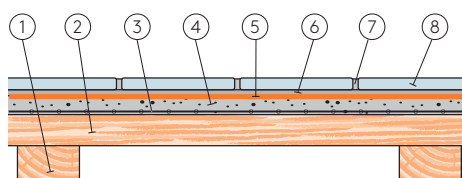
On floors with fall a watertight membrane shall not be applied directly to the substrate made of boards. An exception can be made when using fall boards manufactured specifically for ceramic cladding.

Measures must be taken to increase the bending rigidity between the floor joists (regardless of joist spacing), and to prevent transfer of movement in the subfloor to the ceramic cladding. Joist spacing shall not exceed 600mm (centre-centre).

The subfloor can be strengthened using leveling compound in accordance with the example in 'Explanations and clarifications to BBV'. Please refer also to Fig. 7.

Alternative solutions

Other solutions may arise and, if so, must be described in the structural design and/or mounting instructions of the responsible engineer/manufacturer.



- | | |
|-------------------------------------|------------------------|
| 1. Joists | 5. Watertight membrane |
| 2. Wooden substrate | 6. Adhesive |
| 3. Spot-welded steel mesh | 7. Joints |
| 4. Levelling compound minimum 12 mm | 8. Ceramic tiles |

Figure 7. Example of floor construction GF3. See also Ceramic Tile Book (Byggkeramik-handboken).

* All standards and norms which are made reference to in the Trade Rules can be found in chapter 10.

4. Floor drains

Floor drains and elevation rings must be type-approved in accordance with current standard*. All drains must be secured in accordance with the specifications of the floor drain manufacturer, so that internal movement cannot arise between the drain, substrate, watertight membrane and floor cladding.

The floor drain must be assembled horizontally (tolerance: ± 2 mm, measured from the centre of the drain to the outer ring of the flange) and in such a manner that the connection between the watertight membrane around the floor drain can be made flush to the watertight membrane substrate.

Floor drains manufactured before 1990 must always be replaced. If in doubt about the make of a floor drain, age or function, it should be replaced by a new type-approved* drain.

4.1 Drains close to walls

So called 'drains close to walls' must be tested and type-approved in accordance with 'Branschgodkännande avsedda för väggnära placering...'. See www.bkr.se

5. Watertight membranes

5.1 Watertight covering kits

All components which are included in the system (watertight membrane, sealings and adhesive) must have been tested together in accordance with the requirements and methods specified in Appendix B to the trade rules. Refer also to www.bkr.se

The watertight membrane must be intended/recommended for the substrate in question and be applied in accordance with the approved mounting instructions of the manufacturer. The watertight membrane must be applied using the methods and the amount which are stated in the mounting instructions.

5.1.1 Watertight membranes around a wall-mounted toilet

The watertight membrane must be intact behind and under the toilet lining and installation walls, see Figure 9.

The hidden bottom surface must have a fall and an outlet allowing any leaking water to become visible.

Even in lavatories where there are otherwise no requirements for watertight membranes on the walls, the wall and floor behind and under a built-in cistern must be fitted with a watertight membrane of optional class. Other types of watertight membranes than those intended for tiles may also be used here.

5.1.2 Gaps between wall and door frame

If a door or window is placed in wet zone 1 on any of the walls where a shower or bathtub is mounted, the watertight membrane shall be applied onto the door frame (see Figure 10). Alternatively, if there is no door frame, the watertight membrane can be folded around the wall corner in order to protect it (see Figure 11). Other solutions may also be applicable.

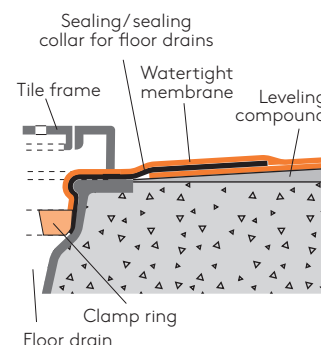


Figure 8. Connecting watertight membrane with floor drain with a clamp ring.

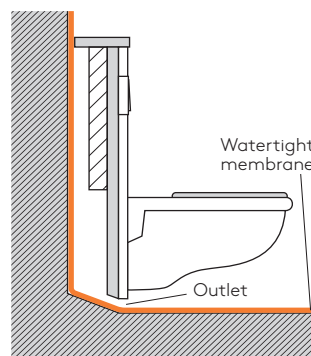


Figure 9. Watertight membrane under and behind wall-mounted toilet.

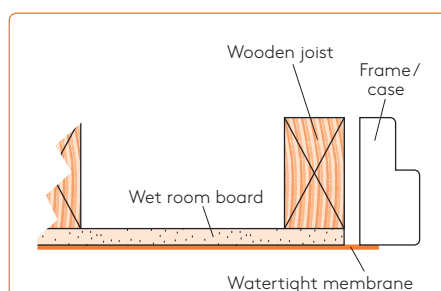


Figure 10. Watertight membrane spread onto the door frame.

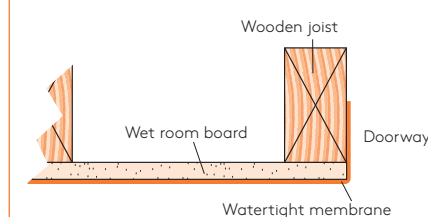


Figure 11. Watertight membrane around the wall's corners.

* All standards and norms which are made reference to in the Trade Rules can be found in chapter 10.

When there is a gap between a wall and a door frame in the floor/wall angle, sealing shall always be carried out in a continuous manner between the threshold, door frame and wall, irrespective of their location in the room

5.2 Sealing

The objective of sealing is to strengthen the watertight membrane due to an increased risk of movement in, e.g. corners, along wall joints, connection joints between different materials and around pipe penetrations.

Sealing material may be inherently watertight or imbedded in several layers of viscous watertight compound.

When using board constructions all sealings must be inherently watertight with the exception of board joints in wet zone 2. Sealing material together with all other components must be used in accordance with the manufacturer's mounting instructions.

The sealing material must be marked and identifiable as part of the watertight kit in question.

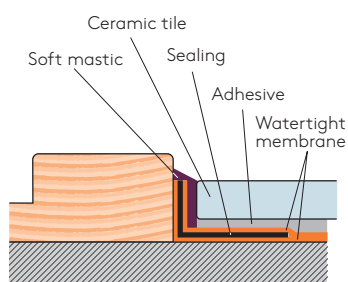


Figure 12. Connection with threshold. (Watertight membrane extended to the upper edge of the ceramic tile).

5.2.1 Walls

Sealing must be carried out along:

Solid walls

The connection between different materials, or joints between prefabricated elements, as well as connections between watertight membrane kits on floors and walls.

Board walls

Wall angles, corners and board joints (see Figures 13 och 15).

5.2.2 Sealing in connection with floor drains, thresholds and in the floor/wall angle

Sealing against a threshold or similar must be performed by folding up the watertight membrane and the sealing tape against the threshold to the level of finished floor (see Fig.12). The upper edge of the fold-up at the door shall be at least 20 mm over the horizontal level of the watertight membrane around the upper edge of the floor drain.

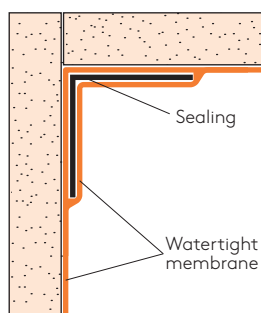


Figure 13. Corner in a board wall VTv.

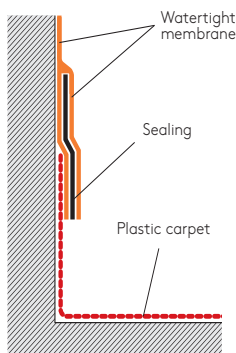


Figure 14. Connection with plastic flooring.

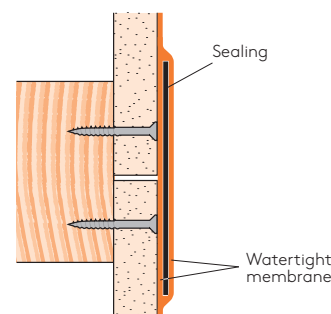


Figure 15. Joint in a boardwall VTv.

5.2.3 Sealing around pipe penetrations

All penetrations shall be sealed within the whole wet area.

On wet area floors no other penetrations are allowed except for floor drains and other drains. On walls adjacent to the bathtub/shower only lead-throughs for mixers are allowed.

Pipes must be secured around the penetrations. Spacing larger than 2 mm between the wall/floorboard and pipes are not allowed. Larger cavities must be filled with soft sealant, and not with silicone, (which normally does not adhere to pipe collars).

The minimum centre distance between the pipes should be 40 mm. The minimum distance between the pipe and the floor/wall should be 60 mm.

When carrying out penetrations of 'pipe-in-pipe system', sealing must be carried out against the protection pipe, or against an assembly detail with a similar function, which shall protrude perpendicularly from the wall far enough to enable fitting a pipe collar. Always check in the mounting instructions for the pipe system how sealing should be performed (see Figures 16 och 17).

Electrical installations shall be carried out in accordance with Elektriska installationsorganisationen's (EIO) recommendations by an authorised electrician.

6. Mounting instructions

Installation of the watertight membrane shall be carried out using an approved watertight covering kit and in accordance with the manufacturer's mounting instructions. The watertight covering kit and the mounting instructions shall be approved by the Swedish Ceramic Tile Council. Approved systems and links to the mounting instructions are listed at www.bkr.se and constitute Appendix C to the BBV.

7. Other materials

7.1 Adhesives

Adhesives in watertight covering kits must fulfil the requirements of the current standards*, be tested in accordance with the trade rule requirements, be part of the approved kit of the watertight membrane manufacturer and recommended for the purpose in question, as well as specified in the mounting instructions.

When fixing ceramic tiles, adhesives should be applied to the floor or wall in such an amount that the back of the tile is completely covered.

7.2 Grout

The grout to be used must be intended for the type of ceramic tiles used, and of each manufacturer respectively recommended for the watertight kit in question, as well as fulfil the requirements of the current standard.*

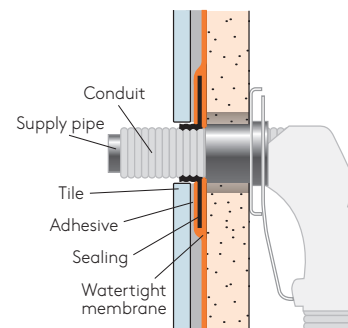


Figure 16. Wall lead-through with pipe in the piping system.

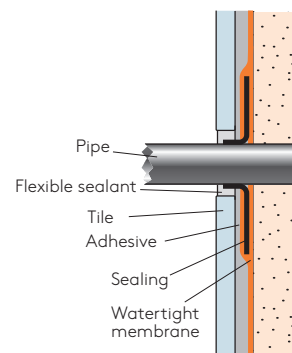


Figure 17. Wall lead-through, pipe without a protection pipe.

* All standards and norms which are made reference to in the Trade Rules can be found in chapter 10

Structural movement joints are normally applied in the surface layer in the joint between different substrate materials, and in new buildings, where there is a risk of the substrate moving.

7.3 Ceramic tiles

7.3.1 Product standards

Ceramic tiles shall be of first quality and fulfil the requirements in accordance with the current Swedish Standard/European Norm*.

7.3.2

Ceramic tiles for floors with under-floor heating must have water absorption $E \leq 6\%$.

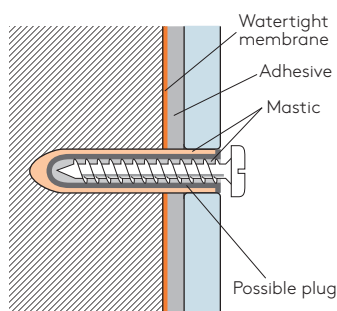


Figure 18. Attachment in the wall

8. Subsequent installations

Screw attachments must be sealed in accordance with the mounting instructions of the watertight membrane manufacturer. Screw attachments in wet zone 1 must only be carried out in solid constructions, such as concrete, masonry, joists, nogging piece or another special construction detail described by the constructor (see Figure 18).

9. Trade rule requirements

A watertight floor or wall cladding is carried out in accordance with the Trade Rules of the Swedish Ceramic Tile Council for Wet Areas, BBV, on the condition that the requirements conforming with the following specifications below are fulfilled.

9.1 Watertight covering kits

An approved watertight covering kit for floors or walls must be tested in accordance with the methods and rules specified in Appendix B. The instructions of the watertight membrane manufacturer must be examined and approved by the Swedish Ceramic Tile Council before an approval of the kit can be given.

Approved kits can be found in the Trade Rules, Appendix C. Manufacturers of approved kits have the right to use the symbol 'Vattentäta våtrum' on printed matter and product packaging.



The symbol Vattentäta våtrum.

9.2 Carrying out work

For building works performed in accordance with the BBV Trade Rules that the company is certified by the Swedish Ceramic Tile Council and that the tilers who carry out watertight membrane work are employed by the certified company and have undergone courses in accordance with 9.2 in Explanations, and that they are able to show a certification ID issued by the above Council.

* All standards and norms which are made reference to in the Trade Rules can be found in chapter 10

Bilaga A till BBV, Bygggeramikrådets Branschregler för våtrum

Kvalitetsdokument

Egenkontroll enligt BBV, Bygggeramikrådets Branschregler för våtrum

Behörig entreprenör _____

Bygggeramikrådets behörighetsnummer _____ Org.nummer _____

Ansvarsförsäkring i försäkringsbolag _____

Objekt _____

Beställare _____

☐ Nyproduktion ☐ Renovering

Arbetena utförda under tiden från _____ till _____

Av Bygggeramikrådet godkända tätskiktssystem enligt BBV, Bilaga C

■ *Golv* Tillverkare/Leverantör _____ Systembenämning _____■ *Vägg våtzon 1* Tillverkare/Leverantör _____ Systembenämning _____■ *Vägg våtzon 2* Tillverkare/Leverantör _____ Systembenämning _____

Egenkontrollen innefattar följande kontrollpunkter med hänvisning till kapitel 6:533 i Boverkets byggregler, BFS 2011:8 och BBR 2011:26, BBR

- Underlagen uppfyller branschreglernas krav. Golv: ☐ Ja ☐ Nej Vägg: ☐ Ja ☐ Nej Om "Nej", förtydliga nedan.
- Lutning på golv mot golvavlopp uppfyller branschreglernas krav (1:50–1:150/1:100–1:200) innan tätskikt applicerats. ☐ Ja
- Har ny typgodkänd golvbrunn installerats ☐ Ja Eller är befintlig golvbrunn typgodkänd och intakt ☐ Ja
- Golvbrunnen är fast monterad, korrekt placerad och i nivå med tätskiktet ☐ Ja
- Tätskiktsarbetet är utfört enligt aktuell monteringsanvisning ☐ Ja
- Finns andra genomföringar i tätskikt än avlopp i golv? ☐ Ja ☐ Nej Om "Ja", förtydliga nedan.

Övriga upplysningar/eventuella avvikelser från Bygggeramikrådets Branschregler för Våtrum, BBV

Namn på behörig platsättare som applicerat tätskiktet _____

(Fylls i vid konsumententreprenad)

Våtrumsansvarig arbetsledare _____



Ort och datum _____ Namnteckning _____

Dokumentet avser (ange antal) _____ våtrum. Se 9.3.1 i BBV.

Bilaga A (original) och monteringsanvisning till ☐ BeställareKopia och monteringsanvisning till ☐ Nyttjare/Boende ☐ Behörigt företag

10. Applicable standards and norms

In various places in the trade rules there are references made to current standards and norms, which are marked with an asterisk *. Below is a list of the standards which have been referred to in the rules. These standards provide the minimum requirements which are placed on the separate qualities of the material in Europe. Standards valid at the time of the publication of the current trade rules are applicable. After a revision of a standard the latest version will apply. All the standards can be ordered from SIS Förlag AB.

Adhesives for ceramic tiles assessment of conformity Classification and designation	SWEDISH STANDARD SS-EN 12004:2007, A1:2012
Adhesives for ceramic tiles determination of cross-deformation Cement-bound adhesives and grouts	SWEDISH STANDARD SS-EN 12002:2008
Ceramic tiles grouts Definitions and requirements	SWEDISH STANDARD SS-EN 13888:2009
Ceramic tiles - definitions, classification, qualities, determination of conformance and marking	SWEDISH STANDARD SS-EN 14411:2012
Floor materials – Levelling compounds and covering fillers basen on cement gypsum, magnesite, bitumen or thermo- set plastic – Qualities and requirements	SWEDISH STANDARD SS-EN 13813
Sewage – floor drains for buildings Part 1: Requirements	SWEDISH STANDARD SS-EN 1253-1
Gypsum binding agent and gypsum- bound plaster Part 1: Definitions and requirements	SWEDISH STANDARD SS-EN 13279-1:2008
Chipboards – specifications	SWEDISH STANDARD SS-EN 312:2010

Resistance to water vapour permeability

The resistance value for water vapour permeability is calculated in accordance with the SS-EN ISO 12572 standard. However, in Sweden, by tradition, the resistance value for water vapour permeability is expressed in s/m (seconds per meter).



Explanations and
clarifications for BBV

1. Applicability of the trade rules

- A wet area is an area where floor and wall surfaces wholly or partially may be regularly exposed to water, such as, showers and bathrooms.
- In toilets, laundry rooms and areas with hot-water heaters which are not to be regarded as wet areas in accordance with the above, the floor shall nevertheless be provided with a watertight membrane. The membrane shall be extended from the floor 50 mm onto the wall. The walls do not need to be covered with a watertight membrane in this case.
- A thin-layer technique means that on top of the watertight membrane tiles are placed on an adhesive which has been combed with a notched trowel. These rules do not apply to so called thick grout.

All earlier trade rules can be found at www.bkr.se

Rules for water and sewage installations are not included in BBV. Regarding those the reader should consult trade rules for heating, ventilation and sanitation of engineering companies Säker Vatteninstallation. See: www.sakervatten.se.

2. Requirements for watertightness

2.1 Exceptions for solid constructions on the ground

In order to make an exception from the above BBV rules and not apply the watertight on all surfaces, , for example in a cellar, one should check whether there is a risk for penetration by ground moisture. This may be carried out in the following way. If one has access to the structural design of the area, one can determine with its help whether there is a risk for penetration by ground moisture, or whether there is any underlying capillary barrier or thermal insulation. If no structural design is available, when changing the floor drain one can perhaps check the underlying construction to be able to assess this way whether there is a risk for penetration by ground moisture.

If an exception is made and watertight membrane is applied on a part of the area only, the area in question must consist of mineral materials which tolerate humidification. It may also be possible to use a semi-permeable watertight membrane. Since the latter is not an approved watertight membrane in comparison with a 'normal' water vapour resistant membranes, this must always be done in close consultation with the supplier of watertight covering kits.

It is important to note and give reasons in Appendix A of the Quality Document whether the watertight membrane has been only partially applied, or whether one has not used the possibility of an exception from the rules and has applied the watertight membrane on all the surfaces.

2.2 Wet areas are divided into wet zones

The greatest driving force for moisture transfer is the wet area's outer wall. This is due to big differences between outdoor and indoor temperature, especially during winter. This is why if any part of the outside wall has been part of wet zone 1 to start with, the whole of the outside wall shall be regarded as wet zone 1.

Measure the shower walls and the bath tub and consider their placement when determining the extent of wet zone 1. The purchaser and the contractor should come to an agreement regarding this matter.

2.3 Types of watertight covering kits

There are three types of watertight covering kits for ceramic constructions:

- Liquid-based systems for floors and walls. These are labeled VTg (for floors) and VTv (for walls) respectively. These systems often consist of a thin membrane of a low-viscosity dispersion, followed by a thicker, more viscous dispersion often called "rubber". The products shall be, as a rule, used in combination with each other, but the supplier's mounting instructions must be always followed.

The liquid-based systems require that the correct amount per surface unit is applied, as otherwise the membrane may be too thin and therefore not watertight.

- Watertight membranes of flexible sheets for floors and walls are labeled VTgF and VvF respectively.

Watertight membranes consist of factory-produced flexible sheets that are applied with joint sealing on wall and floor surfaces.

- These watertight boards with joint sealing only. These are labeled VTvF like flexible sheets.

Both flexible sheets and watertight boards are made watertight in the factory. This ensures that they have the same thickness and density over the whole surface.

3. Substrates/preparations

3.1. General requirements

3.1.1 Existing surface layers when renovating

Existing surface layers in the form of lime plaster, asphalt products, plastic flooring, wet area wallpaper, glue or paint treatments, including sticking fabric and similar, must be removed. On surfaces where the existing surface layer cannot be removed without great difficulty, mounting can nevertheless be carried out after consultation with the purchaser and the watertight membrane manufacturer. Deviations from the fundamental rules shall be noted in the Quality Document BBV, Appendix A.

Moisture content of the substrate material shall be generally kept at the lowest possible level. Regarding the application of watertight membranes the BBV trade rules do not place, however, any specific requirements on the substrate material's relative humidity. Always follow the instructions of the watertight covering kit's manufacturer for the substrate in question.

3.1.2 Floor fall

An alternative floor fall can be agreed upon for fixed installations, e.g. a shower walls, cladding with large tiles or where adjustments for accessibility requirement are necessary.

When using an alternative floor fall some water may remain on the surface layer. It can be difficult to lay a wet area floor with large tiles (250 x 250 mm and larger) and achieve an acceptable result with regard to fall, lipping and other irregularities. When using large tiles, switching to a small format nearest the floor drain should therefore be considered.

Where the watertight membrane connects to the floor drain, a 2-3 mm thickening must be taken into account when carrying out the floor fall to avoid depressions in the tiling. This is especially important when using small tiles (mosaic). When using large

tiles the watertight membrane's substrate material can be given a correct fall and tiling be done with a somewhat lower fall. This must be agreed upon with the customer. Please consult with the adhesive manufacturer regarding an adhesive suitable for thicker application. The same method can be used if the distance between the door and the floor drain is short. To prevent the fall being too steep, which entails a risk for slipping, more adhesive can be placed under the tiles, which reduce the slope on the surface layer.

3.2 Concrete

Concrete must be worked upon to obtain a roughened surface layer. Concrete cast in a steel mould, such as e.g. precast concrete blocks or vacuumed floors, can have a very smooth surface of high density which may need roughening to obtain good bonding with the watertight membrane/adhesive.

Any cement which has been worked up to the surface when steel trowelling or applying another treatment shall be removed. Cracks and other surface irregularities shall be filled with a filler/leveling compound and/or polished.

3.4 Plaster

Water and fines which have been worked up to the surface shall be removed.

The instructions of the plaster manufacturer regarding drying time, a suitable surface structure for watertight membrane substrates, and permanent moisture stability shall be taken into consideration.

3.5 Filler/leveling compound

These products must be mineral-bound, i.e. either cement-bound or gypsum/anhydrite-bound. The products shall be recommended by the manufacturer as suitable substrate materials for watertight membranes and tiles in wet areas, and must satisfy the requirements in accordance with current standards.*

When using a filler on wood substrates, it is important that the supplier is consulted about the correct method for priming wooden surfaces and the right filler.

3.6 Board constructions

Boards made of wood must not be used as substrate for watertight membranes and tiles. They can be used, however, as backing boards.

3.6.2 Floor

Increasing the bending rigidity of wooden joists is required to counteract too much deflection between the floor joists. Also the wooden material's natural movement due to changes in humidity and temperature must be taken into account. The relatively short distance between the joists has a great effect on the ceramic layer, primarily by the changing of angles in the joints (especially when using large tiles). Deflection in the main direction in the joists is normally not of importance for the ceramic layer, and not decisive for strengthening requirements. Long experience shows that the following design works well and can be regarded as a reliable solution:

- Centre distance between the joists – maximum 600 mm
- 22 mm floor chipboard
- Steel wire mesh
- Levelling compound, minimum 12 mm around the floor drain or according to filler manufacturer's instructions

Refer also to Figure 7 under the General requirements.

* All standards and norms which are made reference to in the Trade Rules can be found in chapter 10

Other alternative constructions

- An extra wet area board can be glued on top of the chipboard before using a filler
- A corrugated sheet and leveling compound
- A gap between the joists downward is used for the casting of some sort of reinforced levelling compound

When using alternative solutions, there should always be a structural design prepared by a design engineer, which is unique for the project, in which all the materials to be used are specified. Alternatively, printed instructions should be provided by a supplier as to the structural design and specification of materials. This is important for safeguarding the design and making clear who is responsible for it.

4. Floor drain

The drain's flange shall be flush with the filler surface, so that the watertight membrane and collar can be connected and folded down to the indicated level in the drain. Any hole in the drain collar shall be made with the drain manufacturer's recommended tool.

The floor drain grate shall be preferably positioned centrally over the floor drain so that the water lock can be cleaned. The underside of the grate shall be completely covered by adhesive. In addition, mortar shall not be applied in such a manner that either the floor drain collar or the clamping ring is concealed.

Please read the mounting instructions of the floor drain manufacturer and the watertight covering kit manufacturer.

5. Watertight membranes

5.1 Watertight covering kits

Vapour permeability is a measure of how well the membrane works as a vapour barrier. The value of the watertight membrane's resistance to water vapour is given as s/m (seconds per meter). For example, 1.000.000 s/m = one million seconds per meter. This is a factor that a moisture technician/engineer has to know about in order to carry out moisture safety planning.

The Swedish Board for Building, Housing and Planning Regulations, BBR, provide that a watertight membrane's lowest resistance to water vapour permeability should be one miljon s/m, unless a moisture safety planning project can prove that another water vapour permeability resistance is sufficient.

Choosing a watertight covering kit for the relevant floor/wall construction should be carried out in consultation with the watertight membrane manufacturer, or, where appropriate, in accordance with moisture safety planning which has been submitted by the client/purchaser.

The value for a watertight covering kit's vapour permeability shall be given in the manufacturer's mounting instructions. Manufacturers of watertight covering kits can usually give examples of structural designs with specified water vapour permeability resistance for their approved kits.

Watertight membrane's connection to the ceiling

Normally, a watertight membrane may end approximately 50 mm under the ceiling/wall joint.

5.1.2 Gap between wall and door frame

Open gaps can sometimes be sealed without being filled first. This presupposes that the seal can bridge over the gap without being secured at the back. Please refer to the mounting instructions of the material supplier. The extent of the seal on the door frame should be decided separately in each case by the person carrying out the job/material supplier.

5.2 Sealing

Sealing is a word covering a variety of components which are part of the watertight covering kits, such as strips, collars, etc. Sealing materials shall carry labels directly on the material. In case of problems with labelling the Swedish Ceramic Tile Council should be informed.

The purpose of sealing is to overbridge movements in the substrate which are greater than what the watertight membrane can tolerate by itself, for example, around frames, thresholds, pipes etc. Flexible sheets for waterproofing can often possess this capacity. Follow the watertight covering kit manufacturer's approved mounting instructions on how to use sealing materials.

7. Other materials

7.1 Adhesives

Adhesives can be provided with different technical characteristics by blending different plastic types, so called polymer-modified adhesives.

The manufacturer of the watertight covering kit can inform you about the type of watertight membrane/adhesive which will be suitable for given conditions and about reliable adhesives that constitute a part of the watertight covering kit. When working with mosaic, especially glass mosaic or another transparent material, light/white adhesive should be selected. Please check with the manufacturer.

In order to achieve the full value of bonding of 0.5 N/mm which is required to withstand compression- and shear load which arise in the event of shrinking or other movements, a sufficient amount of adhesive must be applied as regards both its thickness and covering ratio.

- On tiled walls approximately 3-4 mm thickness is required with a high covering ratio
- On tiled floors approximately 4-6 mm, sometimes more, is required for full coverage.

7.2 Grouts

Grouts are not part of the tested and approved watertight covering kit, but must satisfy the requirements in accordance with applicable standard.

Cement-bound grouts may be provided with a variety of technical characteristics by polymer modification. Please consult the supplier regarding a suitable grout for the conditions applicable in your particular case.

When working with mosaic, especially glass mosaic or other transparent material, special attention should be paid when choosing a grout.

Please follow the instructions of the manufacturer/supplier for more information.

Flexible sealant

Flexible sealants should only be used where they are justified from a structural point of view. The purpose of a Flexible sealant is to absorb expected movements in the substrate layer, so that they are not transferred to the surface layer which can then be damaged.

Flexible sealants have a shorter life span than other products forming a part of a ceramic construction, since fungicides which prevent mold growth in the product lose their effect after a number of years.

Flexible sealants *should normally be used*:

- In corners and angles where the substrate on both sides is concrete cast less than one year before tiling.
- In the production of new buildings when there is a risk of movement in the substrate. For example, in wall joints where a board construction meets a concrete wall, or a board construction meets another board construction.
- At connection with other materials in walls such as door and window trim, door frames, window frames and thresholds.
- In ceiling/wall joints. Silicone joints may not be used in ceiling joints, as this makes the painting work more difficult.
- In floor/wall joints on floors with underfloor heating.

Flexible sealants *shall not be applied*:

- Along the lower edge of ceramic wall cladding which overlaps the fold-up of a plastic floor.
- In the joint between the floor tiles and the drain frame.
- In the floor/wall joint where underfloor heating has not been installed and no movement is expected.

It is preferable if the contractor and purchaser consult together and agree upon as to where Flexible sealants should be used before the work is started.

7.3 Ceramic tiles

7.3.1 Product standard SS-EN 14411:2012

In section 2 of the Ceramic Tile Manual (Byggkeramikhandboken) a matrix can be found providing descriptions of the twelve groups of tiles.

The standard SS-EN 14411:2012 describes each group's allowed deviations regarding edge straightness, squareness, thickness, skew, deviation in size in relation to the manufacturing size, etc.

7.3.3 Permitted lipping

Lipping, i.e. differences in level between floor or wall tiles in a joint, may arise due to natural manufacturing deviations of the tiles. Also during the manual fixing work certain differences in level may arise.

The Swedish building ceramic trade applies the following permitted lipping deviation (this can also be found in AMA hus:11, Table MBE/1).

- | | |
|--|--|
| ■ For tiles with a side dimension not greater than 100 mm | 0,7 mm |
| ■ För plattor med största kantmått 150 mm | 1,0 mm |
| ■ Plattor med största kantmått över 150 mm enligt formeln | $\frac{\text{Length} + \text{width}}{1000} + 1 \text{ mm}$ |
| ■ Största tillåtna fogsprång: 2,0 mm (a lower calculated value counts as the greatest allowed) | |

So-called rustic tiles ('Natural' in accordance with the SS-EN 14411 standard) and mosaic delivered/ assembled on mesh or otherwise, are not included.

Lipping can be measured using a thickness gauge and ruler or with a graded wedge gauge and ruler. A dial gauge can also be used.

8. Subsequent installations

When mounting, hangers, and similar attachments where holes must be drilled through the watertight membrane, sealing must be carried out at the level of the watertight membrane. The most common procedure is that the hole is filled with a sealing compound before a plug/screw is mounted, so that the compound forms a seal against the membrane behind the tiles.

Also special wall plugs can be obtained, which have been tested in accordance with international testing methods for effective waterproofing.

The heating, ventilation and sanitation sector provides recommendations for a special wall for heavy attachments called 'säker vattenväggen'. Under the condition that the mounting instructions are carefully followed, heavier things can be mounted (as well as smaller things) without any leakage problems.

There is a number of gluing systems on the market where one does not need to drill holes and puncture the underlying watertight membrane. Instead, attachments can be glued onto the wall.

9. Trade rule requirements

9.2 Carrying out work

Certification for watertight membrane work

Certifications can be awarded to companies after passing courses and tests. The companies must have tiling work as an established and on-going business. For certification in accordance with trade rules three different courses are arranged:

Course 1

Watertight covering kits, theory course. Two days.

Arranged and carried out by the Swedish Ceramic Tile Council. Ends with a written test.

Course 2

Certification course for companies with a focus on building contracts law and contract law. One day. Arranged and carried out by the Swedish Ceramic Tile Council. Ends with a written test.

Course 3

Practical application of approved waterproofing systems. Usually 2-3 hours.

Carried out by manufacturers/suppliers of approved watertight covering kits. Course content in accordance with an agreement with the Swedish Ceramic Tile Council. Tilers who carry out watertight membrane work must attend Course 3 for all the kits they use in their work.

Follow-up course

All certified tillers and foremen must attend a follow-up course five years after the completion of course 1 and every five years thereafter. One day.

Who must attend which course?

- Tilers who carry out watertight membrane work attend courses 1 and 3 for certification
- Foremen and/or company management attend courses 1 and 2 for the company's certification

- One-man company owners attend courses 1, 2 and 3 for the company's and their own certification
- Courses 1 and 2 contain written exams. For certification for companies and tilers satisfactory test results are required.

A list of certified companies can be found in Appendix D of the Trade Rules, at www.bkr.se.

At least one company foreman in charge of wet area work must have passed courses 1 and 2 of the Swedish Ceramic Tile Council. If the certified company operates in several locations, there must be a foreman who has passed courses 1 and 2 in charge of wet area work on every location. Tilers who carry out watertight membrane work in accordance with the Trade Rules must have passed courses 1 and 3 of the Swedish Ceramic Tile Council, and be employed by a certified company.

Proof of certification for tilers, a photo ID, issued by the Swedish Ceramic Tile Council must be shown upon request and should be worn on working clothes.

The certification is valid for 5 years, provided that a certification fee has been paid.

To extend the validity of existing certification both tilers and foremen must attend a follow-up course every five years (one day).

Certification can be revoked in the event of obvious failure to comply with the Trade Rules

9.2.1 Lärlingsutbildning

Companies employing apprentices who perform active work may allow them to carry out watertight membrane work if their supervisor so decides. This is under the condition that work is carried out under the eye of a supervisor who inspects their work before tiling begins.

11. Environment

11.1 Asbestos

Until the introduction of a ban on the import and use of asbestos in 1976, asbestos was commonly used in grouts and adhesives. One could find asbestos-containing adhesives behind tiling mounted as late as during the the second half of the 1980s.

The Swedish Ceramic Tile Council always recommends therefore that an asbestos test be performed if there is any doubt about the age of a given product in any demolition project.

Summary of AFS 2006:1 Asbestos

- Anyone who may come into contact with asbestos or asbestos-containing materials shall have been given information about health hazards connected with it
- Special training is required by all who handle asbestos-containing materials as well as by their supervisors
- Those performing demolition work need to attend a four-day course
- A permit is required from the Swedish Work Environment Authority
- Violating these provisions is a criminal offence which may result in high fines or sanction fees. (Work Environment Act, 2006:1, Chapter 3, Section 3)

Hazardous waste transportation.

Contractors have an obligation to obtain a transport permit for hazardous waste. This is important to know when carrying out demolition work and transporting debris.

Notes

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Production: Byggheramikrådet

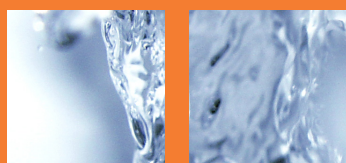
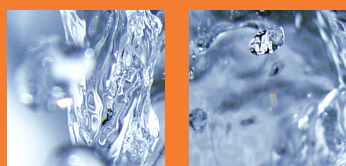
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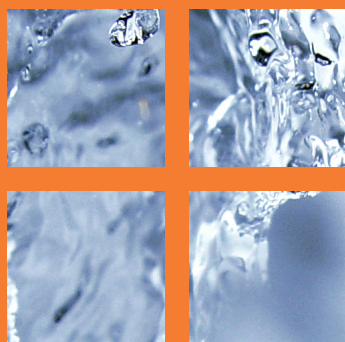
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