

Marmox board

is approved by SINTEF Building and Infrastructure with properties, fields of application and conditions as stated in this document

1. Holder of the approval

BAC AS

Karenslyst Alle 16

NO-0214 Oslo

Norway

Tel.: + 47 22 88 56 88 Fax: + 47 22 88 56 89

www.bac-as.no

2. Manufacturer

Marmox SAE, 43 El Haram St. Giza; Egypt

3. Product description

Marmox board is a wetroom board based on a core of extruded polystyrene (XPS). The board is faced on both sides with a fibreglass mesh embedded into a cement polymer mortar, see fig. 1.

The product is also marked as BACboard.

The thickness and dimensions are shown in table 1. The boards have straight edges. The colour of the surface is grey, and the core material is light grey.

Table 1
Standard dimensions and weight

Standard thickness mm	Weight kg/m ²	Standard dimension mm x mm
6	2,7	1250 x 600
10	2,9	2500 x 600
12,5	3,0	2500 x 600
20	3,1	2500 x 600
30	3,3	2500 x 600
40	3,7	2500 x 600
50	4,2	2500 x 600

The boards have the following tolerances:

- thickness: ± 2 mm
- length ± 5 mm
- width ± 2 mm.

Fittings, screws and washers are a part of the system.

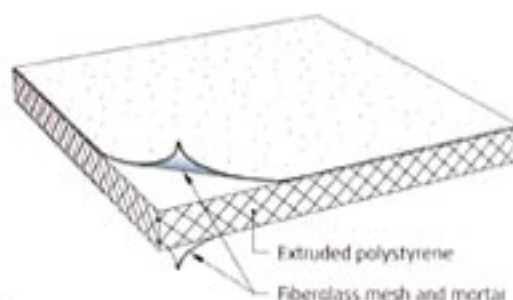


Fig. 1

Marmox board. The boards are symmetrical with reinforced mortar on each side.

4. Fields of application

Marmox board can be used as a watertight layer on walls in bathrooms and washrooms in houses, hotels and in rooms with equivalent conditions. The application as a watertight layer requires the use of reinforcement strips and a membrane over joints and fixing points (eg. screws). Clause 6 gives additional requirements for use.

The boards may be installed directly on a wall framework or other substrate such as brickwork or concrete, including walls below ground level. The boards shall always be covered by ceramic tiles or equivalent non combustible lining.

5. Properties

Material properties

The material properties of the core material are given in Table 2, and Table 3 shows the properties for the Marmox board.

Watertightness

Installed as specified in clause 6 the performance of Marmox board proved satisfactory when tested according to "Guideline for European Technical Approval of watertight covering kits for wet room floors and or walls"

(ETAG 022), Annex E "Watertightness of details in wetroom walls including penetrations for pipes".

Table 2
Material properties for the core material

Property	Value	Test method
Thermal conductivity	0.035 W/(mK)	DIN 52612
Water absorption, immersion	< 0,2 vol %	ASTM D-2842 & ISO 2896
Compressive strength	371 kN/m ²	ASTM C-165

Table 3
Properties for Marmox board

Property	Value	Test method
Bending moment capacity: 20 mm board 30 mm board	207 Nmm/mm 124 Nmm/mm	EN 12089
Bending stiffness, EI: 20 mm 30 mm	601 kNmm ² /mm 1285 kNmm ² /mm	EN 12089
Resistance to soft body impact load	3 x 120 Nm ¹⁾	ETAG 003
Water vapour permeability, 30 mm board, S _d	3,2 m	EN 12086
Bond strength	0,3 N/mm ²	EN 1348

¹⁾ Installed with a stud spacing of c/c 600 mm the boards resists a soft body impact of 120 Nm 3 times

Reaction to fire

The boards are classified as class E according to EN 13501-1. When the boards are covered with tiles the surface complies with the classification In1 according to the norwegian standard NS 3919.

Effect on indoor environment

Marmox board has been assessed as not emitting any particles, gases or radiation that may have a negative effect on the indoor climate or to have any significant effect on health.

Environmental declaration

The product does not contain any substances on the observation list of dangerous substances published by the national environmental authorities.

Waste treatment/recycling

The product can be delivered to ordinary public waste-disposal sites at the end of the working life.

6. Special conditions for use and installation

Storage and conditioning

The boards should be covered during storage and transport to avoid dust or dirt that may reduce the adhesive bond properties of the board surface. The boards must not be exposed to flames, other ignition sources or organic solvents. The product should be protected from UV radiation during long-term storage.

Underlay

The underlay for installation of Marmox board shall fulfil the requirements for directional- and surface tolerances given in the norwegian standard NS 3420-N4, tolerance class B.

Water vapour control layer

External walls, and walls towards rooms with no or limited heating, must have a water vapour resistance $s_d \geq 10$ m on the inside. Otherwise the moisture control performance of the construction must be verified in each individual case.

Marmox board has a vapour resistance less than this limit. For the applications given above the Marmox boards must therefore be supplemented with a membrane, e.g. a liquid applied membrane or primer with a documented vapour resistance, which gives a total combined vapour resistance of $s_d \geq 10$ m. In such cases an ordinary plastic sheet water vapour control barrier is removed behind the boards.

Watertightness at pipe penetrations and joints

In the wet zone, all joints, connections between floor and wall, corners, penetrations and screw fixings must be locally covered by a membrane with reinforcement strips. The membrane shall have a Technical Approval or an equivalent documentation. Each layer of reinforcement strips must be coated with a membrane wider than the width of the strips.

The membrane shall be applied with a total thickness of minimum 1 mm. Prefabricated collars shall be used around pipe penetrations, fig. 2. Figure 3 shows the connection between wall and floor where the membrane is placed at the top of the floor.

Installation on framework

Boards with a thickness of min. 20 mm may be installed directly on studs spaced max. c/c 600 mm. Thinner boards require a continuous underlay of panels or boards.

Extra noggings must be used for installation of heavy objects like washstands, cabinets etc.

The boards shall be fixed along the edges with screws and washers intended for use with the board system. Recommended spacing between screws is max. 400 mm. For boards fixed to a continuous underlay it is recommended to also use 3 screws with washers evenly spaced along the center of the board. All screws shall be at least 20 mm longer than the board thickness.

Installation on masonry or concrete

Fixing to masonry or concrete substrates is done with cement-based tile adhesive applied with a spreader with least 6 mm deep grooves, depending on the roughness of the substrate surface. Alternatively the boards may be fixed with expansion anchors at least 20 mm longer than the boards thickness, see fig. 4.

All loose wallpaper, plaster, paint and dust must be removed before fixing the boards, and the surface sorption ability controlled.

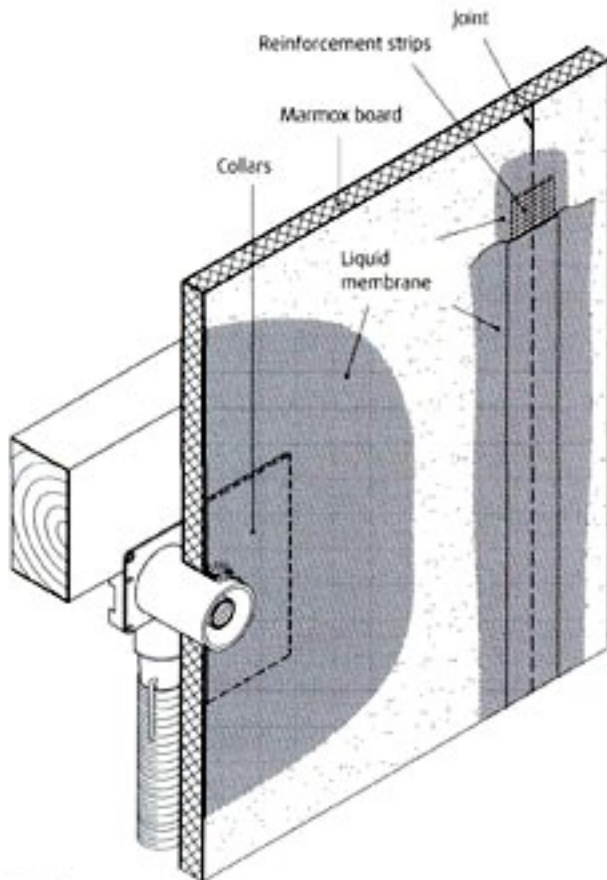


Fig. 2 Principle for the use of collars at pipe penetrations and joints.

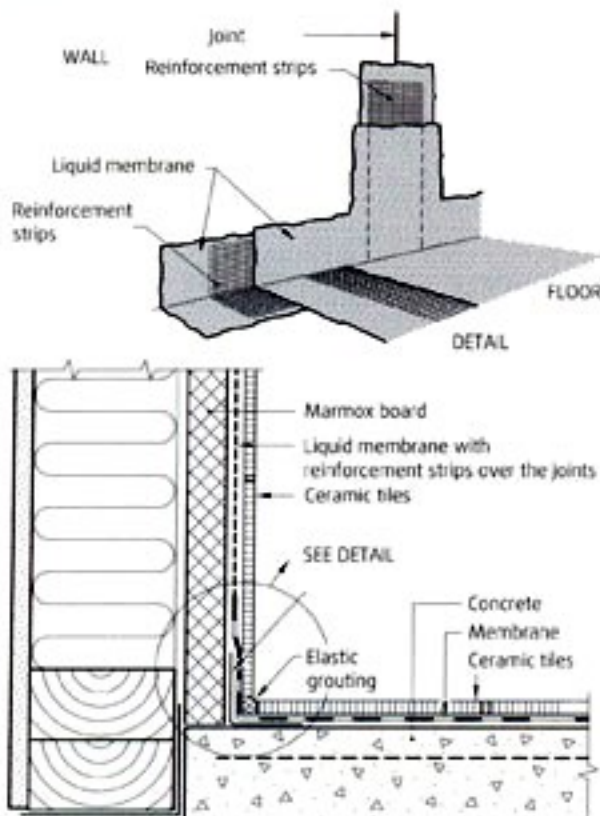


Fig. 3 Example of connection between wall and a tiled floor with a membrane on the top of the floor.

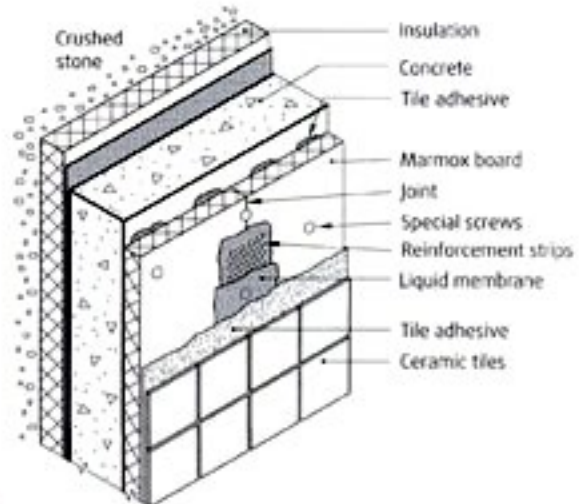


Fig. 4 Example of Marmox board installation on wall below ground level.

7. Factory production control

Marmox board is subject to supervisory product and factory production control according to contract with SINTEF regarding SINTEF Technical Approval. The manufacturer has a quality system which is certified by SGS United Kingdom Ltd. Systems & Service Certification according to ISO 9001:2000, reg. nr. EG06/00732QA.

8. Basis for the approval

The approval is based on properties verified in the following reports:

- SINTEF Building and Infrastructure. Testing of watertightness for BACboard used on wall. Report no. O 9999-99 dated 11.10.2007
- SINTEF Building and Infrastructure: Testing of Bending moment capacity and testing of soft body impact (ETAG 003). Report no. O 22199 dated 23.10.2007
- Baustoffberatungszentrum-Rheinland. Prüfung der Haftfestigkeit von Steinszugfliesen von Marmox Board Bauplatten. Report no. 37-2701/04 CPH-6682 dated 24.03.2004
- Baustoffberatungszentrum-Rheinland. Bestimmung der Wasserdampfdurchlässigkeit von Marmox Board. Report no. 38-2108/07 CPH-9020-1 dated: 27.09.2007
- Housing and Building National Research Center, Thermal conductivity, delivery no. 433068 dated 14.06.2006
- Housing and Building National Research Center, Water absorption, delivery no. 433068 dated: 14.06.2006
- Housing and Building National Research Center, Water absorption, % by volum after 96 hour, delivery no. 433068 dated: 14.06.2006

9. Marking

The board shall be marked with the manufacturer's name, product name and time of production. The marking may be fixed directly on the boards or on the packaging. The approval mark for Technical Approval TG 2426 may also be used.



Approval mark

10. Liability

The holder/manufacturer has sole product responsibility according to existing law. Claims resulting from the use of the product cannot be brought against the SINTEF beyond the provisions of Norwegian Standard NS 8402.

11. Technical management

Project manager for this approval is Mr. Morten Lian, SINTEF Building and Infrastructure, dep. Building Materials and Constructions, Oslo.