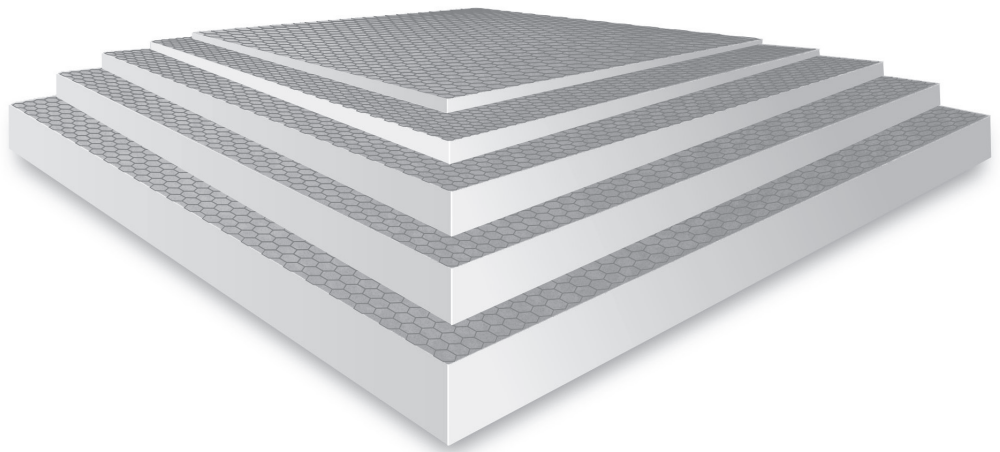




BRANZ Appraised
Appraisal No. 895 [2018]

MARMOX BUILDING PRODUCTS



Appraisal No. 895 (2018)

Amended 18 November 2020

BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

- 1.1 Marmox Building Products are a range of extruded polystyrene foam boards finished on both sides with a polymer-modified mortar facing reinforced with a glassfibre mesh. The boards are for use as an intermediate substrate to ceramic and natural stone tiling on internal floors.
- 1.2 Marmox Building Products are also available pre-fabricated into shower bases, shower niches, footrests and hobs.

Scope

- 2.1 Marmox Building Products have been appraised for use as an intermediate substrate to tiling for interior areas when applied to timber, plywood, fibre cement or concrete floors.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Marmox Building Products, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.2. Marmox Building Products meet these requirements. See Paragraph 9.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.3. Marmox Building Products contribute to meeting this requirement. See Paragraphs 12.1-12.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Marmox Building Products meet this requirement.

Technical Specification

- 4.1 Marmox Building Products are made from extruded polystyrene, each side faced with a nominal 0.75 mm thick polymer-modified cement mortar reinforced with a glassfibre mesh.
- 4.2 The boards are available in the sizes given in Table 1.

Table 1: Nominal dimensions and weights

Thickness [mm]*	Board dimensions [mm]	Weight per board [kg]	kg/m ²
6	600 x 1,250	2.0	2.7
10	600 x 1,250	2.2	2.9

* Insulation boards of thicknesses 20 mm, 30 mm and 50 mm are also available but have longer lead times.

- 4.3 Marmox Building Products are also available as pre-formed shower bases [Table 2], shower niches [Table 3], footrests and hobs [Table 4]. See Tables 2, 3 and 4 for profiles and sizes.
- 4.4 Accessories used with Marmox Building Products which are supplied by the building contractor, and outside the scope of this Appraisal are:
- **Cement based tile adhesive** - for fixing Marmox Building Products to the substrate.
 - **Marmox fixings washers** - 38 mm diameter metal washers or 40 mm diameter plastic washers and screws, for fixing the boards to the substrate. Screws used must be at least 20 mm longer than the board thickness to be fixed.
 - **Glassfibre mesh tape** - for application over joints between boards.
 - **Waterproof membrane** - a BRANZ Appraised waterproofing membrane appraised for use in wet areas.
 - **Tile adhesive** - a flexible waterproof tile adhesive for bonding the stone or ceramic tiles to the Marmox Building Products.

Details of these accessories for use with Marmox Building Products must be obtained from Marmox New Zealand Ltd.

Table 2: Shower Bases

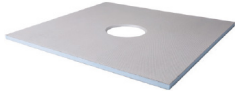




Centre Drains	Offset Drains	Channel Drains	Wedge Trays
			
Sizes	Sizes	Sizes	Sizes
900 x 900 x 25 mm	900 x 900 x 25 mm	Traverse Drains	1,000 x 1,000 x 25 mm
1,000 x 1,000 x 25 mm	1,000 x 1,000 x 25 mm	1,000 x 1,000 x 25 mm	1,200 x 1,200 x 22 mm
1,200 x 1,200 x 25 mm	1,200 x 1,200 x 25 mm	1,200 x 1,200 x 25 mm	1,200 x 1,600 x 26 mm
1,000 x 1,500 x 25 mm	1,000 x 1,500 x 25 mm	1,000 x 1,500 x 25 mm	
1,000 x 2,000 x 25 mm	1,000 x 2,000 x 25 mm	1,000 x 2,000 x 25 mm	
		Longitudinal Drains	
		1,000 x 1,500 x 25 mm	
		1,000 x 2,000 x 25 mm	

Table 3: Shower Niches


Sizes
930 x 330 mm
630 x 330 mm
330 x 330 mm

Table 4: Shower Hobs


Sizes
65 x 65 mm - lengths 1,100, 1,600 and 2,100 mm
50 x 35 mm - lengths 1,100, 1,600 and 2,100 mm

Handling and Storage

- 5.1 Marmox Building Products are supplied in cardboard boxes. They must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and extremes of temperature. Care must be taken to avoid damage to the edges, ends and surfaces of the boards. The boards must always be carried on edge.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Marmox Building Products. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 Marmox Building Products are designed as a tile substrate fixed over new or existing floors to provide a flat, even surface for the direct adhesion of ceramic or stone floor tiles. Where a waterproofing membrane is specified for wet areas, Marmox Building Products are suitable for use as a base for the waterproofing membrane.
- 7.2 Once fixed in place, tiles may be directly adhered to the boards and grouted to provide an impervious and easily cleaned surface. Alternatively a waterproof membrane may be installed over the boards with the tiles adhered to the membrane. Marmox New Zealand Ltd should be consulted for suitable accessories.
- 7.3 If present, mould or fungal growth on the substrate should be treated prior to fixing the boards. Marmox New Zealand Ltd should be consulted for suitable anti-fungal products.

- 7.4 Movement and control joints may be required depending on the shape and size of the building or room, and the tile finish specified. Design guidelines can be found in the BRANZ Good Practice Guide – Tiling.

Wet Areas

- 7.5 Wet areas are spaces where sanitary fixtures and sanitary appliances are located such as bathrooms, toilets, laundries and kitchens. The two general categories of wet areas are as follows:
1. Water Splash – These are areas subject to intermittent splashing of water such as around baths, vanities, tubs and sinks.
 2. Shower Areas – These are areas subject to frequent and heavy water splash such as enclosed showers, unenclosed shower zones and showers over baths.
- 7.6 Marmox Building Products may be used in both wet area categories described above. Shower Areas must include a BRANZ Appraised wet area waterproofing membrane system under the tiles.

Structure

- 8.1 For best results it is essential that the floor structure is sound and not 'springy'. Any movement in the floor after tiling will cause the tile joints to move and crack, thus allowing moisture and dirt to penetrate the tile surface. Although flexible adhesives must be used to adhere the tiles to the substrate, they must not be used to accommodate deflection beyond the limits of this Appraisal.
- 8.2 Timber framing systems must comply with NZS 3604, with joist spans reduced by approximately 20% of those set out in NZS 3604, or floor framing systems to a specific engineering design complying with the NZBC.
- 8.3 All floors, new and existing, will be structurally suitable for tiling when the maximum deflection of the floor joists is $1/360^{\text{th}}$ of the span.
- 8.4 The boards are capable of resisting a uniformly distributed load of 1.5 kN/m² with minimal deflection.
- 8.5 The level of resistance to concentrated loads will depend upon the size and strength of the tiles used to cover the boards.
- 8.6 Tiling must not be carried out until the flooring and timber framing is dry enough to ensure the majority of the shrinkage has occurred. Generally this will require timber moisture content of between 12 and 14% in air-conditioned spaces, and between 16 and 18% for other spaces, when tiles are laid. For new timber-framed floors, the use of kiln-dried framing is strongly recommended.

Durability

Serviceable Life

- 9.1 Where Marmox Building Products are used as an underlay for waterproofing membranes, they will be durable for at least 15 years, provided the tiling and waterproofing systems are maintained to ensure the boards and fixings remain dry in service. Tiles, adhesives, grouts and waterproofing membranes have not been assessed and are outside the scope of this Appraisal.

Maintenance

- 10.1 No maintenance of Marmox Building Products will be required, provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiled areas to ensure they are sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiles, grout and sealant.
- 10.2 Drainage outlets must be maintained to operate effectively, and the tile finishes must be kept clean.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to Marmox Building Products from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

Internal Moisture

- 12.1 Surfaces must be finished with ceramic or stone tile finishes. A means of code compliance to NZBC Clause E3.3.3 is given in NZBC Acceptable Solution E3/AS1, Paragraph 3.1.1 b).
- 12.2 Falls in showers and shower areas must be a minimum of 1 in 50. In unenclosed showers, falls must extend a minimum of 1,500 mm out from the shower rose. Floor wastes and drainage flanges must be provided and the floor must fall to the outlet.
- 12.3 A BRANZ Appraised waterproofing membrane must be used in all shower areas. The membrane must completely cover shower bases, and for unenclosed showers it must extend a minimum of 1,500 mm out from the shower rose. Further design guidance on waterproofing wet areas, including waterproofing junctions can be obtained from AS 3740 and the BRANZ Good Practice Guide - Tiling.
- 12.4 To minimise internal condensation, adequate levels of ventilation and thermal resistance must be provided to all spaces where moisture may be generated.

Control Joints

- 13.1 Movement control joints must be provided in the following situations:
 - to coincide with any existing structural movement control joints in the floor structure; and,
 - at maximum 5 m centres in any direction; and,
 - across any doorways or openings where tiling is carried through; and,
 - to coincide with changes of direction in the floor such as will occur in 'L' shaped rooms; and,
 - around the perimeter of the tiled area where it abuts another material or surface.
- 13.2 Control joints should be spaced towards the centre of the floor if possible, so that an equal amount of floor is each side of the joint.
- 13.3 For guidance on all aspects of control joint detailing and construction refer to the BRANZ Good Practice Guide - Tiling.

Installation Information

Installation Skill Level Requirement

- 14.1 Installation of Marmox Building Products must be completed by, or under the supervision of, Licensed Building Practitioners with the relevant Licence Class, in accordance with the instructions given within the Marmox New Zealand Ltd Technical Literature and this Appraisal.

Preparation

- 15.1 Existing floor coverings must be removed before Marmox Building Products are installed, and the floor must be substantially flat. If any floorboards are cupped, misaligned or warped, the whole floor must be coarse-sanded. Loose flooring must be re-nailed, and damaged, rotten or unsound flooring or floor framing must be replaced.
- 15.2 The relative humidity of concrete substrates must be 75% or less before installation of the boards. The concrete can be checked for dryness using a hygrometer as set out in BRANZ Bulletin No. 585.
- 15.3 The floor must be free of dirt, dust and grease before installing Marmox Building Products.

System Installation

- 16.1 It is recommended that the installer dry fit the Marmox Building Products and pre-formed products before final fixing to ensure a good fit. Boards may be loosely laid out on the floor to 'mimic' the actual location of the boards and show where cuts and joints will be made. The boards are laid in a staggered pattern to ensure that four corners never meet at one point. Sheet joints are butted together.
- 16.2 Board joints must not coincide with substrate joints.
- 16.3 The boards must not bridge movement control joints. These must be carried through the board/tile bed and sealed in an appropriate manner.
- 16.4 The boards can be cut with either a hand knife or a saw. When working in enclosed areas, precautions should be taken to ensure dust levels are controlled.



Fixing to concrete and fibre cement floors

- 16.5 A suitable cementitious adhesive is applied to the prepared floor in a straight line using a notched trowel.
- 16.6 Starting in a corner, the boards are laid in a brick bond pattern, leaving a gap of about 5 mm between the board and the wall or skirting board to allow for expansion.
- 16.7 The joints between the boards are taped with a glassfibre mesh tape.

Fixing to plywood and timber floors

- 16.8 The boards are fixed in accordance with the method described for fixing the boards to concrete and other solid floors. However a 10 mm gap should be left between the boards and the wall or skirting board to allow for expansion of the floor.
- 16.9 Alternatively, provided the floor is flat, boards at least 10 mm thick can be mechanically fixed using the Marmox washers and suitable screws. At least 15 fixings per short board (600 x 1,250 mm) must be used when not using an adhesive.
- 16.10 Joints between boards are taped with a glassfibre mesh tape.

Installation in Wet Areas

- 17.1 BRANZ recommends the entire floor be covered by a waterproof membrane for bath, shower and spa rooms where timber, plywood or particleboard floors are used.
- 17.2 Shower areas must include a BRANZ Appraised wet area waterproofing membrane system under the tiles.

Tiling

- 18.1 Before tiling commences, waterproof membranes, screeds to form falls, and floor waste outlets, where required, must be installed. Waterproof membranes must be installed in accordance with the supplier's instructions and be fully cured before tiling.
- 18.2 Tiling must be carried out using a flexible tile adhesive in accordance with the tile adhesive manufacturer's instructions.
- 18.3 Tiling must be undertaken in accordance with AS 3958.1 and the BRANZ Good Practice Guide – Tiling.

Health and Safety

- 19.1 Safe use and handling procedures for Marmox Building Products are provided in the Technical Literature. The materials must be used in conjunction with the relevant Material Safety Data Sheet.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 20.1 The following testing of Marmox Building Products has been undertaken by the following organisations:
- Housing and Building National Research Centre (HBRC), Egypt – board density, compressive strength, linear coefficient of thermal expansion, water absorption and water vapour permeability.
 - British Board of Agrément (BBA), United Kingdom – impact resistance of tile covered boards (soft and hard body impact), compressive strength, flexural strength of wet and dry samples, compressive creep.
 - Sintef, Norway – bending moment, bending stiffness, resistance to soft body impacts, water vapour permeability.

Test methods and results have been reviewed by BRANZ and found to be satisfactory.



Other Investigations

- 21.1 An assessment was made of the durability of Marmox Building Products by BRANZ technical experts.
- 21.2 Site inspections were carried out by BRANZ to assess the practicability of installation.
- 21.3 The Technical Literature for Marmox Building Products has been examined by BRANZ and found to be satisfactory.

Quality

- 22.1 The manufacture of Marmox Building Products has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 22.2 The quality of supply to the market is the responsibility of Marmox New Zealand Ltd.
- 22.3 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the framing systems and substrates.
- 22.4 The quality on site is the responsibility of the Licenced Building Practitioner.
- 22.5 Building owners are responsible for the maintenance of the tile finish in accordance with the instructions of Marmox New Zealand Ltd.

Sources of Information

- AS 3740 – 2010 Waterproofing of wet areas within residential buildings.
- AS 3958.1: 2007 Guide to the installation of ceramic tiles.
- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2908.2: 2000 Cellulose-cement products – flat sheet.
- AS/NZS 2269: 2012 Plywood – Structural.
- BRANZ Bulletin No. 585. Measuring Moisture in Timber and Concrete.
- Good Practice Guide – Tiling [3rd Edition], BRANZ, 2015.
- NZS 3101: 2006 The design of concrete structures.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4229: 2013 Concrete masonry buildings not requiring specific engineering design.
- Ministry of Business, Innovation and Employment Record of amendments – Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 18 November 2020

This Appraisal has been amended to update the Technical Specifications and Appraisal Title.



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23 October 2018

MARMOX BUILDING PRODUCTS



In the opinion of BRANZ, **Marmox Building Products** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Marmox New Zealand Ltd**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Marmox New Zealand Ltd**:
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Marmox New Zealand Ltd**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Marmox New Zealand Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

23 October 2018