



BRANZ Appraised
Appraisal No. 515 [2018]

STOARMAT MIRAL RENDER SYSTEMS

Appraisal No. 515 [2018]

This Appraisal replaces BRANZ
Appraisal No. 515 [2007].



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



Stoanz Limited

72 Abel Smith Street
Wellington

Tel: 04 801 7794

Email: info@sto.co.nz

Web: www.sto.co.nz



BRANZ

1222 Moonshine Rd,
RD1, Porirua 5381

Private Bag 50 908

Porirua 5240,

New Zealand

Tel: 04 237 1170

branz.co.nz



Product

- 1.1 The StoArmat Miral Render Systems consist of the StoArmat Miral Render System and the Sto Miral Render System. The StoArmat Miral Render System is a fiberglass mesh reinforced synthetic resin solid render. This is for use over a solid backing of concrete masonry, clay brick veneer, in-situ or pre-cast concrete, autoclaved aerated concrete block and EPS block. Sto Miral Render System is a fiberglass mesh reinforced mineral solid render for use over clay brick veneer.

Scope

- 2.1 The StoArmat Miral Render Systems have been appraised as solid render systems for buildings within the following scope:
 - with substrates of concrete masonry, in-situ or pre-cast concrete, autoclaved aerated concrete block and EPS block up to 3 storeys, with a maximum height from ground to eaves of 10 m [StoArmat Miral Render System]; and,
 - with substrates of clay brick veneer designed and constructed in accordance with the scope limitations of NZBC Acceptable Solution E2/AS1, NZS 4210 and NZS 4229 [StoArmat Miral Render System and Sto Miral Render System]; and,
 - with floor plan area limited only by seismic and structural control joints; and,
 - with supporting structures designed and constructed in accordance with the NZBC; and,
 - situated in NZS 3604 Wind Zones up to, and including Extra High.
- 2.2 The StoArmat Miral Render System has also been appraised for bond, durability and weathertightness of the render system for concrete masonry, in-situ or pre-cast concrete, autoclaved aerated concrete block and EPS block buildings subject to specific design with no building height or wind exposure restriction.
- 2.3 The StoArmat Miral Render System must only be applied on vertical surfaces except for sills, concrete reinforced parapets and concrete reinforced balustrades which must have a minimum 10° slope and be waterproofed in accordance with the requirements of the Technical Literature and building designer. The Sto Miral Render System must only be applied on vertical surfaces except for sills, which must have a minimum 10° slope and be waterproofed in accordance with the requirements of the Technical Literature and building designer.
- 2.4 The StoArmat Miral Render Systems for use on buildings within the scope detailed in Paragraph 2.1 are appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. [The Appraisal of the StoArmat Miral Render Systems relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone.]
- 2.5 Installation of components and accessories supplied by Stoanz Limited and Sto registered contractors must be carried out only by Sto registered contractors.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the StoArmat Miral Render Systems 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, B2.3.1 [c], 5 years and B2.3.2. The StoArmat Miral Render Systems meet these requirements. See Paragraph 9.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The StoArmat Miral Render Systems contribute to meeting this requirement. See Paragraphs 13.1 and 13.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The StoArmat Miral Render Systems meet this requirement and will not present a health hazard to people.

Technical Specification

4.1 The StoArmat Miral Render System consists of a nominal 5-8 mm thickness of polystyrene bead saturated polymer-modified, cement-based levelling render applied to the concrete masonry, clay brick veneer, prepared in-situ or pre-cast concrete, autoclaved aerated concrete or EPS block substrate, a 2.5-3.0 mm thick coat of fibreglass mesh reinforced synthetic resin render, and an approximate 1-3 mm [as selected] thick coat of coloured finish render. The render system is finished with a Sto coating.

4.2 The Sto Miral Render System consists of a nominal 5-8 mm thickness of polystyrene bead saturated polymer-modified, cement-based levelling render applied to the clay brick veneer substrate, a sealer and an approximate 1-3 mm [as selected] thick coat of coloured finish render. The render is coated with a StoColor façade paint.

4.3 System components and accessories supplied by Stoanz Limited for the StoArmat Miral Render Systems are:

StoArmat Miral Renders

- **StoLevell Novo** is a polymer-modified, lightweight, cement based render supplied in 15 kg bags and mixed on site with clean water. It is pump or trowel applied as a base coat in a nominal 5-8 mm thick layer.
- **Levellite** is a polymer-modified, cement-based render comprising coarse sand, polypropylene fibres, polystyrene beads and adhesives, supplied in 20 kg bags and mixed on site with clean water. It is pump or trowel applied as a base coat in a nominal 5-8 mm thick layer.
- **Multiscreed** is a cement-based adhesive render comprising graded sand, white cement, lime, fibres and additives, supplied in 25 kg bags and mixed on site with clean water. It is pump or trowel applied as a base coat in a nominal 5-8 mm thick layer.
- **StoArmat Classic** is a plasticiser free, tintable, ready-to-use, polymer-modified, cement free reinforcement render comprising granulated quartz sands, calibration grain, polypropylene fibre and additives. It is supplied in 23 kg pails, and after diluting with water as necessary and mixing, is ready for use. It is trowel-applied in a 2.0 mm thick layer followed by the embedment of fibreglass mesh reinforcement in the outer surface. Once dry, a further coat of StoArmat Classic approximately 1.0 mm thick is applied to cover the mesh and leave a flat, even surface.
- **Stolit K** is a plasticiser free, tintable, ready-to-use, polymer-modified, cement free finishing render with a 1, 1.5, 2 or 3 mm grain size. It is supplied in 25 kg pails and is trowel-applied to an approximate thickness of 1 - 3 mm, gauging to the thickness of the aggregate size.
- **Stolit MP and MP Natural** are plasticiser free tintable, ready-to-use, polymer-modified, cement free finishing renders. They are supplied in 25 kg pails, are trowel-applied in two coats and are either float finished, or lightly sponged to the selected pattern.
- **Stolit Milano** is a smooth, plasticiser free tintable, ready-to-use, polymer-modified, cement free finishing render. It is supplied in 25 kg pails, is trowel-applied in two coats and is either steel troweled, floated, or lightly randomly sponged to the selected pattern.



- **Sto Flexyl** is a cementitious waterproof paste. It is mixed on site with a 1:1 ratio of fresh cement and is used as a waterproofing membrane over rendered reinforced concrete balustrades and parapets, window and door joinery sills and rebates. Sto Flexyl is supplied in 18 kg pails.

Sto Miral Renders

- **StoLevell Novo** is a polymer-modified, lightweight, cement based render supplied in 15 kg bags and mixed on site with clean water. It is pump or trowel applied as a base coat in a minimum 3 mm thick layer followed by the embedment of fibreglass mesh in the outer surface. An additional 2 mm layer is applied to fully encase the mesh.
- **Multiscreed** is a cement-based adhesive render comprising graded sand, white cement, lime, fibres and additives, supplied in 25 kg bags and mixed on site with clean water. It is used as a base coat in a minimum 3 mm thick layer, followed by the embedment of fibreglass mesh in the outer surface. An additional 2 mm layer is applied to fully encase the mesh.
- **StoPoren** is a polymer-modified, white cement-based render comprising graded sand and adhesives, supplied in 25 kg bags and mixed on site with clean water. It is pump or trowel applied as a base coat in a minimum 3 mm thick layer followed by the embedment of fibreglass mesh in the outer surface. An additional 2 mm layer is applied to fully encase the mesh.
- **Stolit K** is a plasticiser free, tintable, ready-to-use, polymer-modified, cement free finishing render with a 1, 1.5, 2 or 3 mm grain size. It is supplied in 25 kg pails and is trowel-applied to an approximate thickness of 1 - 3 mm, gauging to the thickness of the aggregate size.
- **Sto Flexyl** is a cementitious waterproof paste. It is mixed on site with a 1:1 ratio of fresh cement and is used where required as a waterproofing membrane. Sto Flexyl is supplied in 18 kg pails.

Primer

- **Stoplex W** is a yellow tinted, ready to use, acrylic-based primer available in 10 litre containers. It is used as a primer coat over the cured StoLevell Novo, Multiscreed or StoPoren render base coat in the StoMiral Render System, and the StoLevell Novo base coat in the StoArmat Miral Render System.

StoColor Paints and Clear Sealers

- **StoColor Maxicryl** is a ready-to-use, tintable, matt, acrylic exterior paint for application over finishing renders. It is supplied in 15 litre pails, and may be brush, roller or spray applied. Where the StoArmat Render System is used over EPS block, the paint colour selected must have a light reflectance value [LRV] of 25% minimum. Where the StoArmat Render System is used over concrete masonry, clay brick veneer, in-situ or pre-cast concrete or autoclaved aerated concrete blocks, the paint colour selected must have an LRV of 20% minimum. Where the StoMiral Render System is used over clay brick veneer, the paint colour selected must have an LRV of 25% minimum.
- **StoColor Lotusan** is a ready-to-use, tintable, special dirt and algae resistant mineral silicone resin exterior paint for application over finishing renders. It is supplied in 15 litre pails, and may be brush, roller or spray applied. Where the StoArmat Render System is used over EPS block, the paint colour selected must have a light reflectance value [LRV] of 25% minimum. Where the StoArmat Render System is used over concrete masonry, clay brick veneer, in-situ or pre-cast concrete or autoclaved aerated concrete blocks, the paint colour selected must have an LRV of 20% minimum. Where the StoMiral Render System is used over clay brick veneer, the paint colour selected must have an LRV of 25% minimum.
- **StoColor Lastic** is a ready-to-use, tintable, satin matt, acrylic exterior paint for application over finishing renders. It is supplied in 15 litre pails, and may be brush, roller or spray applied. Where the StoArmat Render System is used over EPS block, the paint colour selected must have a light reflectance value [LRV] of 25% minimum. Where the StoArmat Render System is used over concrete masonry, clay brick veneer, in-situ or pre-cast concrete or autoclaved aerated concrete blocks, the paint colour selected must have an LRV of 20% minimum. Where the StoMiral Render System is used over clay brick veneer, the paint colour selected must have an LRV of 25% minimum.



- **StoColor X-Black** is a ready-to-use, tintable, matt, heat reflective acrylic exterior paint for application over finishing renders. It is supplied in 15 litre pails, and may be brush, roller or spray applied. Where the StoArmat Render System is used over EPS block, the paint colour selected must have a light reflectance value [LRV] of 10% minimum. Where the StoArmat Render System is used over concrete masonry, clay brick veneer, in-situ or pre-cast concrete or autoclaved aerated concrete blocks, there is no minimum LRV. Where the StoMiral Render System is used over clay brick veneer, the paint colour selected must have an LRV of 10% minimum.
- **S-Protect SC** is an invisible, silane based, hydrophobic sealer for application over Stolit MP, MP Natural and Milano finishing renders. It is supplied in 10 and 20 litre pails, and is applied in a flood coat using a low pressure sprayer and Sto block brush.
- **StoPur WV200** is a two component PUR, water-based, matt transparent sealer for application over Stolit Milano finishing render. It is applied by brush and Sto Micro roller.

Accessories

- **Reinforcing mesh** - alkali-resistant fibreglass mesh with a nominal mesh size of approximately 7 x 7 mm or 4 x 4 mm and an approximate weight of 165 g/m².
 - **uPVC components** - drip edge and control joint flashings.
 - **Sto pre-meshed corner beads** - uPVC and fibreglass mesh corner mouldings.
 - **Sto Joint Sealing Tape 2D** - black, compressed polyurethane foam. The foam is coated on one side with a pressure sensitive adhesive, which is covered by a release paper. The tape is available 2 and 5 mm thick, expanding to maximum 6 and 12 mm thick after installation, and is supplied in rolls 15 mm wide and 18 and 9 m long respectively.
- 4.4 Accessories used with the systems which are supplied by the Sto registered contractor are:
- **Flexible sealant** - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.
- 4.5 Accessories used with the systems which are supplied by the building contractor are:
- **Window and door trim cavity air seals** - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal for use around window, door and other wall penetration openings.

Handling and Storage

- 5.1 Handling and storage of all materials supplied by Stoanz Limited or the Sto registered contractor, whether on or off site, is under the control of the Sto registered contractor. Dry storage must be provided on site for the fibreglass mesh and bags and pails of render mix. uPVC flashings and profiles must be protected from direct sunlight and physical damage, and should be stored flat and under cover. Liquid components must be stored in frost-free conditions.
- 5.2 Handling and storage of all materials supplied by the building contractor, whether on or off site, is under the control of the building contractor. Materials must be handled and stored in accordance with the relevant manufacturer's instructions.
- 5.3 Render must be used within the designated shelf life from the date of manufacture.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the StoArmat Miral Render Systems. 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

Solid Substrates

Concrete Masonry

- 7.1 Concrete masonry must be designed and constructed in accordance with NZS 4210 and either NZS 4229 or AS/NZS 1170.

In-situ and Pre-cast Reinforced Concrete

- 7.2 In-situ and pre-cast reinforced concrete walls must be specifically designed in accordance with NZS 3101 and AS/NZS 1170 using the design guidelines.

Clay Brick Veneer

- 7.3 Clay brick veneer must be designed and constructed in accordance with NZBC Acceptable Solution E2/AS1, NZS 4210 and NZS 4229. Ventilation and drainage opening requirements must be adhered to.

EPS Block

- 7.4 EPS block construction must be specifically designed in accordance with NZS 3101 and AS/NZS 1170 using the design guidelines.

Autoclaved Aerated Concrete Block

- 7.5 Autoclaved Aerated Concrete block construction must be specifically designed and constructed to meet the performance requirements of the NZBC. Autoclaved Aerated Concrete blocks must be manufactured in accordance with ASTM C 1386.

Control Joints

- 8.1 Control joints in the StoArmat Miral and Sto Miral Render Systems must be constructed in accordance with the Technical Literature, and be provided as follows:
- aligned with any control joint in the solid substrate; and,
 - where the system covers different solid substrates.

Durability

- 9.1 The StoArmat Miral Render Systems meet the performance requirements of NZBC Clause B2.3.1 [b], 15 years for the render finishes, and the performance requirements of NZBC Clause B2.3.1 [c], 5 years for the Sto coating system.

Serviceable Life

- 9.2 StoArmat Miral and Sto Miral render system installations are expected to have a serviceable life of at least 15 years provided they are maintained in accordance with this Appraisal and the NZBC external moisture and internal moisture provisions are met.

Maintenance

- 10.1 Regular maintenance is essential for the StoArmat Miral and Sto Miral Render System installations to continue to meet the NZBC durability performance provision and to maximise their serviceable life.
- 10.2 Annual inspections must be made to ensure that all aspects of the render and coating system remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately. Sealant, coatings or the render system must be repaired in accordance with the relevant manufacturer's instructions. Any damage to the substrate must be repaired and the advice of the substrate manufacturer must be sought.
- 10.3 Regular cleaning [at least annually] of the StoArmat Miral Render Systems is required to remove grime, dirt and organic growth, to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent.



- 10.4 Recoating of the paint system will be necessary throughout the life of the render system. The interval between recoats depends on the paint colour, orientation and quality of the application, and will be at approximately 8-10 yearly intervals in accordance with the instructions of Stoanz Limited. Clear sealer systems require recoating at 5-7 yearly intervals.

Control of External Fire Spread

- 11.1 The StoArmat Miral Render System exterior surface finishes have a peak heat release rate of less than 100 kw/m² and a total heat released of less than 25 MJ/m². Testing was carried out as per NZBC Acceptable Solutions C/AS1-C/AS6 Paragraph 5.8.1 and the results are limited to the exterior surface finishes detailed within this Appraisal.
- 11.2 The Sto Miral Render System has not been assessed for a peak heat release or total heat released rating.
- 11.3 Refer to NZBC Acceptable Solutions C/AS1-C/AS7 and Verification Method C/VM2 for requirements for fire rating and exterior surface finish requirements of external walls.

Prevention of Fire Occurring

- 12.1 Separation or protection must be provided to the StoArmat Miral Render Systems from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 13.1 StoArmat Miral and StoMiral Render Systems installations, when installed and maintained in accordance with this Appraisal and the Technical Literature, will contribute to the building meeting code compliance with NZBC Clause E2.3.2 by providing a weatherproof coating system to the substrate.
- 13.2 For buildings constructed in accordance with Paragraph 2.1 of this Appraisal, the ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. For buildings constructed in accordance with Paragraph 2.2 of this Appraisal, the weathertightness detailing must be specifically designed and is the responsibility of the designer. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.
- 13.3 The detailing of junctions between the StoArmat Miral Render Systems and other wall penetrations, e.g. meter boxes, and other cladding and roofing junctions are the responsibility of the designer for compliance with the NZBC. Details not included within the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Installation Information

Installation Skill Level Requirements

- 14.1 Installation and finishing of components and accessories supplied by Stoanz Limited and the Sto registered contractor must be completed by trained applicators, approved by Stoanz Limited.
- 14.2 Installation of the accessories supplied by the building contractor must be carried out in accordance with the StoArmat Miral Render Systems Technical Literature and this Appraisal by, or under the supervision of a Licensed Building Practitioner [LBP] with the relevant Licence Class.

System Installation

StoArmat Miral Render Systems

- 15.1 Components and accessories supplied by Stoanz Limited and the registered contractor must be installed in accordance with the Technical Literature by Stoanz Limited registered contractors.
- 15.2 The StoArmat Miral Render Systems must only be applied when the air and substrate temperature is within the range of +5°C to +30°C.



Inspections

- 15.3 The Technical Literature must be referred to during the inspection of the StoArmat Miral Render Systems installations.

Health and Safety

- 16.1 Safe use and handling procedures for the components that make up the StoArmat Miral Render Systems are provided in the relevant manufacturer's Technical Literature.

Basis of Appraisal

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

Tests

- 17.1 The following testing has been completed by BRANZ:
- Durability testing of the Sto Flexyl waterproofing membrane to the requirements of AS/NZS 4858, Table 8, Parts [a] – [e], except that bleach and detergent immersion set out in Appendix A was not required.
 - Tensile bond strength of the Sto LevelLite render to EPS.
 - Tensile bond strength of the StoArmat Miral Render System to autoclaved aerated concrete block.

Investigations

- 18.1 Durability and weathertightness opinions have been given by BRANZ technical experts.
- 18.2 Site inspections have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.
- 18.3 The Technical Literature for the StoArmat Miral Render Systems has been examined by BRANZ and found to be satisfactory.

Quality

- 19.1 The manufacture of the Sto renders and finishes 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. The quality management system of the manufacturer, Sto SE & Co. KGaA, has been assessed and registered as meeting the requirements of ISO 9001.
- 19.2 The environmental management system of Sto SE & Co. KGaA has been assessed and registered as meeting the requirements of ISO 14001.
- 19.3 The manufacture of the LevelLite base render has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. The quality control system of the LevelLite render manufacturer has been assessed and registered as meeting the requirements of the Telarc Q-Based Code.
- 19.4 Sto External Wall Insulation Systems are the subject of a current British Board of Agrément (BBA) Certificate No 95/3132 and the manufacture of the systems continues to be checked by the BBA during the validity period of the Certificate. Renders and paints used within the StoArmat Miral Render Systems and imported by Stoanz Limited are covered by the BBA Certificate.
- 19.5 The quality of materials, components and accessories supplied by Stoanz Limited are the responsibility of Stoanz Limited.
- 19.6 Quality on site is the responsibility of the Sto registered contractor.
- 19.7 Designers are responsible for the building design, and building contractors are responsible for the quality of construction and installation of the solid substrates, joinery, flashing tapes, airseals and joinery flashings in accordance with the instructions of the building designer.
- 19.8 Building owners are responsible for the maintenance of the StoArmat Miral Render Systems in accordance with the instructions of Stoanz Limited.



Sources of Information

- ASTM C 1386-98 Standard Specification for Precast Autoclaved Aerated Concrete (PAAC) Wall Construction Units.
- AS/NZS 1170: 2002 Structural design action – General principles.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 3101: 2006 Concrete structures standard.
- NZS 4210: 2001 Masonry construction: Materials and workmanship.
- NZS 4229: 2013 Concrete masonry buildings not requiring specific engineering design.
- NZS 4230: 2004 Design of reinforced concrete masonry structures.
- Acceptable Solutions and Verification Methods for New Zealand Building Code External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 [Amendment 7, 01 January 2017].
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



In the opinion of BRANZ, **StoArmat Miral Render Systems** 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 **Stoanz Limited**, 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. **Stoanz Limited**:
 - 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 **Stoanz Limited**.
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 **Stoanz Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

20 December 2018