BRANZ Appraised
Appraisal No. 488 [2006]

STO ARMAT PLASTER SYSTEM

Appraisal No. 488 (2006)

This Appraisal replaces Appraisal No. 488 (2005) issued 21 July 2005.

Amended 02 September 2013

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 The Sto Armat Plaster System is a jointing and exterior plaster system for use as a finishing system for Monotek® Sheet - Cavity Construction and the VentClad Ventilated Cavity System.

1.2 The system consists of a fibreglass mesh reinforced jointing plaster, followed by a 2.5 - 3.5 mm thick fibreglass mesh reinforced bond coat plaster, followed by a 1 - 3 mm thick finishing plaster. The plaster system is finished with a mineral silicone resin or acrylic exterior paint system.

Scope

2.1 The Sto Armat Plaster System has been appraised for use as a jointing and exterior plaster system for Monotek® Sheet - Cavity Construction and the VentClad Ventilated Cavity System on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 and,
- cvonstructed with timber framing complying with the NZBC; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Wind Zones up to, and including Extra High.

2.2 The Sto Armat Plaster System has also been appraised for use as a jointing and exterior plaster system for Monotek® Sheet - Cavity Construction on buildings subject to specific design up to an ultimate limit state (ULS) wind pressure of 2500 Pa; and,

- constructed with timber framing complying with the NZBC; and,
- within the scope limitations of BRANZ Appraisal No. 466 (2005) Monotek® Sheet - Cavity Construction.

2.3 Monotek® Sheet - Cavity Construction must be used, designed and installed as described in BRANZ Appraisal No. 466 (2005) and the Monotek® Sheet - Cavity Construction Technical Literature.

2.4 The VentClad Ventilated Cavity System must be used, designed and installed as described in BRANZ Appraisal No. 457 (2010) and the VentClad Ventilated Cavity System Technical Literature.

2.5 Installation of components and accessories supplied by Stoanz Limited must be carried out only by Stoanz Limited approved applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, the Sto Armat Plaster System 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 B2.3.1 (c), 5 years. The Sto Armat Plaster System meets these requirements. See Paragraphs 10.1 and 10.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Sto Armat Plaster System when used to finish Monotek® Sheet - Cavity Construction and the VentClad Ventilated Cavity System meets this requirement. See Paragraphs 8.1-8.3 and 13.1 and 13.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Sto Armat Plaster System meets this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Acceptable Solution** in terms of New Zealand Building Code compliance. The Sto Armat Plaster System meets the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.7.4. The Sto Armat Plaster System has been appraised for use as a jointing and exterior plaster system for Monotek® Sheet - Cavity Construction and the VentClad Ventilated Cavity System, which are **Alternative Solutions** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 System components and accessories supplied by Stoanz Limited for the Sto Armat Plaster System are:

Primers

- **Sto Putzgrund** is a pigmented, gritty, ready-to-use, acrylic-based primer. It is used to seal the face of the Monotek® or Eterpan sheets and sheet joints prior to plastering. Sto Putzgrund is supplied in 25 kg pails.
- **Sto Stoplex W** is a clear, ready-to-use, acrylic-based sealer. It is used to seal the face of the Monotek® or Eterpan sheets and sheet joints prior to plastering. Sto Stoplex W is supplied in 10 litre containers.

Plasters

- **Sto Armat RFP** is a plasticizer free, tintable, ready-to-use, polymer-modified, cement-free reinforcement plaster comprising granulated quartz sands, calibration grain, polypropylene fibre and additives. It is trowel applied to the joints of the Monotek® or Eterpan sheets as the bedding compound for Sto Jointing Tape. It is also trowel or pump applied as the bond coat in a 1.5 - 2.0 mm thick layer followed by the embedment of fibreglass mesh reinforcement in the outer surface. An additional 1.0 - 1.5 mm thick layer is applied to fully encase the mesh. Sto Armat Plaster System RFP is supplied in 23 kg pails.
- **Stolit MP/K** is a plasticizer free, tintable, ready-to-use, polymer-modified, cement-free finishing plaster with a 1.0, 1.5, 2.0 or 3.0 mm grain size. It is supplied in 25 kg pails and is trowel applied to an approximate thickness of 1.0 - 3.0 mm.
- **Sto Flexyl** is a cementitous waterproof paste. It is used as a waterproofing membrane over plastered balustrates and fixing blocks. Sto Flexyl is supplied in 18 kg pails.

Accessories

- **Sto Jointing Tape** - alkali-resistant fibreglass mesh with a nominal mesh size of approximately 4 x 4 mm and an approximate weight of 165 g/m^2. The mesh is supplied in rolls 65 mm wide.
- **Reinforcing mesh** - alkali-resistant fibreglass mesh with a nominal mesh size of approximately 4 x 4 mm or 6 x 6 mm and an approximate weight of 165 g/m^2. The mesh is supplied in rolls 1000 mm wide.
- **Sto pre-meshed corner beads** - uPVC and fibreglass mesh corner mouldings.
- **uPVC flashings** - flexible control joint, foot tray, vermin tray, vented window head tray, joinery flashings.

- **Sto Joint Seal Tape** - black, pre-compressed, impregnated polyurethane foam tape with an adhesive strip and release paper on one face. The tape is available 2 mm thick [expanding to 6 mm thick] in rolls 15 mm wide and 18 m long, or 5 mm thick [expanding to 12 mm thick] in rolls 15 mm wide and 9 m long.

Paint System Specification

- **StoSilco Color G** is a ready-to-use, tintable, special dirt and algae resistant mineral silicone resin exterior paint system for application over finishing plasters. It is supplied in 15 litre pails, and may be brush, roller or spray applied. The paint colour selected must have a light reflectance value [LRV] of 40% minimum regardless of gloss value.
- **Stocolor Maxicryl** is a ready-to-use, tintable, acrylic exterior paint system for application over finishing plasters. It is supplied in 15 litre pails, and may be brush, roller or spray applied. The paint colour selected must have an LRV of 40% minimum regardless of gloss value.

4.2 Accessories used with the system which are supplied by the applicator are:

- **Waterproof membrane tapes** - tapes covered by a valid BRANZ Appraisal for use as waterproofing membranes over tops of plastered balustrades, fixing blocks and the like.
- **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.

Handling and Storage

5.1 Handling and storage of all materials supplied by Stoanz Limited or the approved applicator, whether on or off site, is under the control of Stoanz Limited approved applicators. Dry storage must be provided on site for the fibreglass mesh and bags and pails of plaster mix. uPVC flashings and profiles must be protected from direct sunlight and physical damage, and should be stored flat and under cover.

5.2 Plaster 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 Monotek® Sheet - Cavity Construction, the VentClad Ventilated Cavity System and the Sto Armat Plaster System. 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

Fibre Cement Substrates

Monotek® Sheet - Cavity Construction

7.1 Monotek® Sheet - Cavity Construction must be designed and installed in accordance with BRANZ Appraisal No. 466 [2005] and the Monotek® Sheet - Cavity Construction Technical Literature.

VentClad Ventilated Cavity System

7.2 The VentClad Ventilated Cavity System must be designed and installed in accordance with BRANZ Appraisal No. 457 [2005] and the VentClad Ventilated Cavity System Technical Literature.

General

8.1 Timber wall framing and cavity battens must have a moisture content of 20% or less at the time of the commencement of the Sto Armat Plaster System.

8.2 At ground level the bottom edge of the Sto Armat Plaster System must be kept clear of paved surfaces, for example footpaths, by a minimum of 100 mm and unpaved surfaces by 175 mm in accordance with NZBC Acceptable Solution E2/AS1, Table 18. The bottom edge of the plaster system must be finished against the foot tray.

8.3 At balcony, deck or roof/wall junctions, the bottom edge of the Sto Armat Plaster System must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.

Control Joints

9.1 Control joints in the Sto Armat Plaster System must be constructed in accordance with the Technical Literature, and be provided as follows:

- Vertical control joints - at maximum 5.4 m centres; aligned with any control joint in the fibre cement substrate, or where the cladding system abuts different cladding types.
- Horizontal control joints - at maximum 5.4 m centres and at inter-storey floor levels.

Durability

10.1 The Sto Armat Plaster System meets code compliance with NZBC Clause B2.3.1 (b), 15 years for the jointing and plaster system, and code compliance with NZBC Clause B2.3.1 (c), 5 years for the exterior paint system.

Serviceable Life

10.2 Sto Armat Plaster System installations are expected to have a serviceable life of at least 15 years provided the paint finish system is maintained in accordance with this Appraisal.

Maintenance

11.1 Regular cleaning (at least annually) of the Sto Armat Plaster System is recommended 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.

11.2 Annual inspections must be made to ensure that all aspects of the plaster system remain in a sound and weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately. Sealant, paint coatings or the plaster system must be repaired in accordance with the instructions of Stoanz Limited. Any damage to the substrate must be repaired and the advice of James Hardie New Zealand Limited or Watchman Island Properties Limited must be sought.

11.3 Recoating of the paint system will be necessary throughout the life of the plaster 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.

11.4 Minimum ground clearances as set out in this Appraisal must be maintained at all times.

(Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of the Sto Armat Plaster System.)

Control of External Fire Spread

12.1 The Sto Armat Plaster System has a peak heat release rate of less than 100 kW/m^2 and a total heat released of less than 25 MJ/m^2. In accordance with NZBC Acceptable Solution C/AS1 Table 5.1 the system is suitable for use on buildings with a SH Risk Group classification, at any distance to the relevant boundary. Refer to NZBC Acceptable Solutions C/AS2 – C/AS6, Paragraph 5.8.1 for the specific exterior surface finishes requirements for other building Risk Groups.

External Moisture

13.1 The Sto Armat Plaster System, when installed and maintained in accordance with this Appraisal and the Technical Literature will meet code compliance with NZBC Clause E2.3.2.

13.2 The detailing of junctions between the Sto Armat Plaster System and external joinery, other wall penetrations, e.g. meter boxes, and other cladding and roofing junctions are the responsibility of James Hardie New Zealand Limited or Watchman Island Properties Limited for compliance with the NZBC. These details have not been assessed as part of this Appraisal but are covered by the Monotek® Sheet - Cavity Construction Appraisal and VentClad Ventilated Cavity System Appraisal respectively.

Installation Information

Installation Skill Level Requirements

14.1 Installation and finishing of the Sto Armat Plaster System must be completed by trained applicators, approved by Stoanz Limited.

System Installation

Sto Armat Plaster System Plaster System

15.1 The Sto Armat Plaster System must be installed in accordance with the Technical Literature.

15.2 The Sto Armat Plaster System must only be applied when the air and substrate temperature is greater than +5°C.

Inspections

15.3 The Technical Literature must be referred to during the inspection of Sto Armat installations by building consent authorities and territorial authorities.

Health and Safety

16.1 Safe use and handling procedures for the components that make up the Sto Armat Plaster System system 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:

- The Sto Armat Plaster System has been tested to BRANZ EM 4 over Monotek® and Eterpan sheet.
- BRANZ expert opinion on NZBC clause E2 code compliance for Monotek® Sheet - Cavity Construction was based on testing and evaluation of all details within the scope of the Monotek® Sheet - Cavity Construction Appraisal and as stated within this Appraisal. Monotek® Sheet - Cavity Construction was tested to E2/VM1 (as contained within NZBC Clause E2, Amendment 4). The testing assessed the performance of the foundation detail, window head, jamb and sill details, meter box head, jamb and sill details, vertical and horizontal control joints, internal and external corners and balustrade to wall junction with a plastered cap. In addition to the weathertightness test, the details contained within the Monotek® Sheet - Cavity Construction Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of Acceptable Solution E2/AS1 for drained cavity claddings.
- Testing of the VentClad Ventilated Cavity System has been carried out by Window Engineering Consultants to BRANZ Draft E2/VM1 testing protocol. The testing was observed by a BRANZ technical expert. The results have been reviewed by BRANZ and found to be satisfactory. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of Acceptable Solution E2/AS1 for drained cavity claddings.
- The Sto Flexyl waterproofing membrane has been tested to AS/NZS 4858, Table 8, Parts (a) to (e), except that bleach and detergent immersion set out in Appendix A1 was not required.
- Cone Calorimeter testing of the Sto Armat Plaster System. The testing was carried out in accordance with AS/NZS 3837.

Other Investigations

18.1 A durability opinion has been given by BRANZ technical experts.

18.2 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.

18.3 The Technical Literature for the Sto Armat Plaster System has been examined by BRANZ and found to be satisfactory.

Quality

19.1 The manufacture of the Sto Armat Plaster System 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.

19.2 The quality management system of the Sto Armat Plaster System manufacturer, Sto AG, has been assessed and registered as meeting the requirements of ISO 9001: 2008.

19.3 Quality of installation on site of the Sto Armat Plaster System is the responsibility of the Stoanz Limited approved applicator.

19.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, building wraps, flashing tapes, airseals, joinery head flashings, cavity battens, Monotek® sheets, Eterpan sheets etc, in accordance with the instructions of James Hardie New Zealand Limited and Watchman Island Properties Limited.

19.5 Building owners are responsible for the maintenance of the Sto Armat Plaster System in accordance with the instructions of Stoanz Limited.

Sources of Information

- AS/NZS 4858: 2004 Wet area membranes.
- NZS 3604: 2011 Timber-framed buildings.
- BRANZ Evaluation Method No. 4 (2005) Test procedure for coating and jointing systems for flush finished fibre cement sheet cladding, June 2005.
- BRANZ Appraisal No. 457 (2010) VentClad Ventilated Cavity System.
- BRANZ Appraisal No. 466 (2005) Monotek® Sheet - Cavity Construction.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (Amendment 5, 1 August 2011).
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 19 December 2008.

This Appraisal has been amended to include current cone calorimeter test results for the Sto Armat Plaster System.

Amendment No. 2, dated 31 January 2012.

This Appraisal has been amended to update clause changes as required by the introduction of NZS 3604: 2011 and NZBC Acceptable Solution E2/AS1 Third Edition, Amendment 5.

Amendment No. 3, dated 2 September 2013.

This Appraisal has been amended to update clause changes as required by the introduction of NZBC Fire Clauses C1 – C6 Protection from Fire and A3 Building Importance Levels.

BRANZ

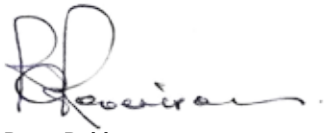
In the opinion of BRANZ, Sto Armat Plaster System is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

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



Peter Robinson
Chief Executive

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