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BUILDING PRODUCTS & SYSTEMS
Appraisals
CSIRO Appraisals, PO Box 56, Graham Road, Highett, Vic. 3190
Tel: (03) 9252 6000 Fax: (03) 9252 6244
E-mail: appraisals@dbce.csiro.au
Web: www.dbce.csiro.au/appraisals

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TECHNICAL ASSESSMENT 252

September 1999[1, 2, 3, 4, 5]

ThermaWallPlus®

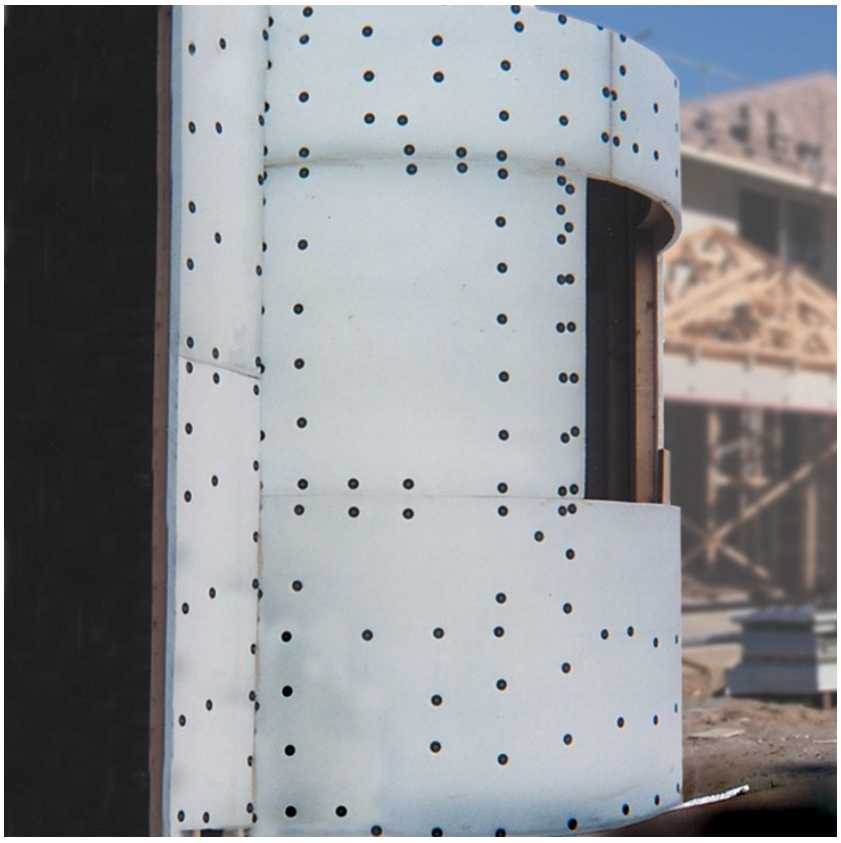
1. June 2000. Use in Terrain Category C included.
2. November 2002. Revalidated.
3. April 2004. Updated. New Technical Manual
4. November 2005. Revalidated. Updated for reprint April 2006.
5. May 2009. Revalidated until 31 December 2009. Include change of trade name – previously known as Exin Wall Panels (exinTEX™ and exinFLEX™)

PURPOSE

Insulation and weatherproof cladding of external walls of buildings

APPLICANT

RMAX A division of Huntsman Chemical Company Pty Ltd (ABN 48 004 146 338), 2-4 Mephan St, Maribyrnong 3032, (Manufacturer)



TECHNICAL OPINION

In the opinion of CSIRO Appraisals, the ThermaWallPlus® panels (40mm thick) are suitable for the insulation and weatherproof cladding of external walls for buildings up to two storeys high (maximum eaves or ridge height of 7 metres) under the following conditions:

1. The walling system is installed in compliance with the RMAX ThermaWallPlus®Technical Data Manual (July 2009, Issue 2).

Note: This manual is available from all the state sales offices of RMAX Rigid Cellular Plastics (www.rmax.com.au).

2. A wide variety of plain and textured finishes are compatible with the prefinished wall. If more than one finish is used, architectural details and specifications of the joint between the two finishes are required which will secure a waterproof joint.

3. When the building is on a concrete slab or raft foundation, the ThermaWallPlus® panel is brought down over the edge of the slab as an effective flashing.

4. Timber framing is in accordance with AS 1684.1 – 1999 'Residential timber-framed construction – Design Criteria', (Amdt 1 February 2002)

AS 1684.2-2006 'Residential timber-framed construction – Non-cyclonic areas'

AS 1684.3-2006 'Residential timber-framed construction – Cyclonic areas', and

AS 1684.4-2006 'Residential timber-framed construction, Simplified – Non-cyclonic areas'

Steel framing is in accordance with AS 3623-1993 'Domestic metal framing'.

5. Fixing of the ThermaWallPlus® panels in both sheltered urban and exposed urban for Regions A, B and C as defined in AS/NZS 1170.2 – 2002 or AS 4055 – 2006, is with fasteners to framing members with stud spacing up to 600 mm. The distance between the fasteners is between 100 mm and 300 mm depending on the level of wind pressure, as outlined in the RMAX ThermaWallPlus®Technical Data Manual (July 2009, Issue 2).

Note: This appraisal has not assessed use in Region D.

6. All penetrations through external walls are externally sealed with a durable elastic sealant that is compatible with expanded polystyrene.

7. A waterproof seal is installed around all window and door openings in external walls.

8. Where local regulations require the wall to have a fire-resistance level (FRL), the wall needs to be modified to achieve the required FRL.

9. Where termite protection is required the barrier used inhibits concealed termite access to the polystyrene core of the panel.

10. All fixtures, other than purely decorative ones, reliant on fixing to the wall are secured into the wall framing.

BUILDING CODE of AUSTRALIA

In the opinion of CSIRO Appraisals, the ThermaWallPlus® panels (40mm thick) described in this Technical Assessment and installed under the conditions listed in this Technical Assessment will satisfy the performance requirements of clauses BP1.1, CP2, FP1.4 Volume 1 (Class 2 to Class 9 buildings) and P2.1, P2.2.2, P2.3.1 Volume 2 (Class 1 and 10) of the Building Code of Australia (2009).

Notes:

(i) The inclusion of this clause with reference to the BCA is aimed at assisting those involved in the design, specifying and building approval/permit process relate the Appraisal to the relevant Performance Requirements of the BCA.

(ii) Users of this Technical Assessment must review and determine the impact of any amendments made to the BCA including referenced documents after the date of publication of this Technical Assessment.

RELATED INFORMATION

VALIDITY OF THE ASSESSMENT

Condition:
This Technical Assessment applies only to the use of the ThermaWallPlus® panels (40mm thick) as described herein.

Withdrawal:
This Technical Assessment will be withdrawn or amended if CSIRO Appraisals considers that a change in manufacturing quality renders the basis of appraisal invalid, or if reported field experience convinces CSIRO Appraisals of unsatisfactory quality or performance.

Term of Validity:
This Technical Assessment is valid until 31 December 2009. Technical Assessments may be amended during the term of validity. Users of this Technical Assessment must verify that it remains valid and is the current version by checking on the CSIRO Appraisals website: http://www.cmmt.csiro.au/services/appraisals/ or by calling CSIRO Enquiries on 1300 363 400.

RELEVANT DOCUMENTS

Standards Australia, AS/NZS 1170.2 – 2002 'Structural design actions – Wind actions',

Standards Australia, AS 1684.1-1999 'Residential timber-framed construction – Design criteria' (Amdt 1, February 2002)

Standards Australia, AS 1684.2-2006 'Residential timber-framed construction – Non-cyclonic areas'

Standards Australia, AS 1684.3-2006 'Residential timber-framed construction – Cyclonic areas', and

Standards Australia, AS 1684.4-2006 'Residential timber-framed construction, Simplified – Non-cyclonic areas'

Standards Australia, AS 3623-1993 'Domestic metal framing'

RMAX ThermaWallPlus®Technical Data Manual (July 2009, Issue 2)

APPROVED ASSESSMENT EXTRACT

The ThermaWallPlus® panels (40mm thick) manufactured by RMAX, A division of Huntsman Chemical Company Pty Ltd, 2-4 Mephan St Maribyrnong 3032 is suitable for the cladding of external walls of buildings when the conditions of CSIRO Appraisals Technical Assessment 252 are fulfilled.

APPRAISAL

DESCRIPTION

General:
The ThermaWallPlus® panels consist of an expanded polystyrene (EPS) core with a high strength alkaline resistant mesh with a cement/sand/acrylic polymer render on the external face. Panels can be fixed to timber or steel studs.

Composition:
The panel is made of expanded polystyrene (not less than Class M) coated one or two sides with mortar made from sand, cement, high strength alkaline resistant fibreglass mesh and an acrylic bonding agent. Termite resistant additive can be included where required. Standard panels are 2500 mm x 1200 mm x 40 mm. Special sizes are available on request.

Installation:
The walling system is installed in compliance with the RMAX ThermaWallPlus®Technical Data Manual (July 2009, Issue 2).

Timber frame construction. Timber framing is in accordance with;

AS 1684.1-1999 'Residential timber-framed construction – Design criteria' (Amdt 1,February 2002),

AS 1684.2-2006 'Residential timber-framed construction – Non-cyclonic areas'

AS 1684.3-2006 'Residential timber-framed construction – Cyclonic areas', and

AS 1684.4-2006 'Residential timber-framed construction, Simplified – Non-cyclonic areas'

Timber has a minimum stress grading of F5 or (H1 seasoned) in accordance with AS 2858-2004 'Timber-Softwood – Visually graded for structural purposes'. On site fixing to timber frames requires, as detailed in the RMAX ThermaWallPlus®Technical Data Manual (July 2009, Issue 2), fasteners composed of 40 mm diameter nylon washers and 10-8 x 65 mm CSK Ribbed Heads Course Thread Class 3 screws.

Steel frame construction. Steel framing should comply with AS 3623-1993 'Domestic steel framing'. On site fixing to steel frames requires, as detailed in the RMAX ThermaWallPlus®Technical Data Manual (July 2009, Issue 2), 40 mm diameter nylon washers and 10-16 x 55 mm Wing Tek Class 3 screws.

On site installation. All joints between ThermaWallPlus® panels are glued with suitable construction adhesive (polystyrene compatible). They are screwed directly on the stud/frame until the washer recesses into the surface of the panel. They are fixed at not more than 300 mm on framing members. A 150 mm wide strip of 145 g/m^2 glass fibre mesh is positioned evenly for the full length of the joint in the first base coat render or glued on prior to the first base coat render.

Services. Penetrations are sealed with a flexible sealant that is compatible with the EPS used in the panel.

Openings and edge sealing. A PVC plastic bead over a 150mm wide strip of 145g/m^2 glass fibre mesh is used to seal around openings. A PVC bead is also used at the bottom edge to aid as a termite barrier.

External finish. Base coat render is applied to a thickness of 2 – 6 mm minimum depending on texture finish required.

DESIGN INFORMATION

General:
The applicant states that theThermaWallPlus® panels consist of expanded polystyrene coated on the external face with a cement based render reinforced with a coated 'E' glass mesh.

Design:
The design of the building takes into account loads as specified in AS/NZS 1170.1 – 2002 'Structural design actions – Permanent, imposed and other actions' and AS 1684.1 – 1999 'Design Criteria', AS/NZS 1170.2 – 2002 'Structural design actions – Wind Actions'.

Durability:
In the opinion of CSIRO Appraisals, the system is designed to have a structural life compatible to that of framed construction. Durability of the external finish is dependent on the type of finish used.

BASIS OF APPRAISAL

CSIRO Appraisals has assessed the following aspects in undertaking this appraisal:

(a) the ability of the panel system to support roof loads and horizontal loads applied to walls,

(b) the ability of the panel system to prevent entry of wind driven rain, and

(c) the durability of external finishes.

The following documents and inspections were used in carrying out the appraisal.

Manufacturer's Information

1. **RMAX Rigid Cellular Plastics, 2-4 Mephan Street, Maribyrnong, Victoria 3032. Letter (4 June 2001):** This letter advises change of ownership and outlines distribution and manufacturing company details.

2. **Exin (Australia) Pty Limited, (ACN 087 175 960), 31 Hasp Street, Seventeen Mile Rocks, Qld 4073. Letter (6 August 1999):** This letter details the relationship between Exin Technology and Exin Australia. Information used in this appraisal has been provided by both divisions of Exin.

3. **Exin (Australia) Pty Ltd, 31 Hasp St, Seventeen Mile Rocks, Qld 4073. Letter (11/06/99):** This advises the applicant's change of address.

4. **Exin Australia Pty Limited, Quality Procedure Manual (Draft Issue #0) (QPR-9809):** This details the procedures taken to ensure the compliance to the quality policies as mentioned above.

5. **Nuplex Resins (Aust) Pty Ltd (ACN 000 045 572), 49-61 Stephen Road, Botany, New South Wales 2019. Information on Synthomer 29Y40:** Information supplied included a technical data sheet giving typical properties and storage details, as well as a Material Safety Data Sheet (September 1998). Installation details are contained in 'Synthomer 29Y' specification for waterproofing internal surfaces e.g. Concrete tanks' (02/1996).

6. **RMAX Rigid Cellular Plastics (ACN 004 146 338), 236 Musgrave Road, Coopers Plains, Queensland 4108. Technical Data 'Isolite® Expanded polystyrene' (RM398):** This product information includes physical properties of the Isolite® EPS used in the system.

7. **Rockcote Pty Ltd (ACN 010 988 011), Lot 9 Machinery Road, Yandina, Queensland 4561:** Several product information sheets on products used to coat the panel include 'Rockcote rendering system for expanded polystyrene, Rockcote Skimcote, Rockcote Trowel-On and Rockcote Armour'.

8. **RMAX Rigid Cellular Plastics, Maribyrnong VIC 'RMAX ThermaWallPlus®Technical Data Manual (July 2009, Issue 2):** This contains the ThermaWallPlus® panel performances, design information and installation details.

9. **NCS International Pty Limited. Certificate # 6527-17 (16 August 2007)**: **I**ssued to RMAX (Maribyrnong, VIC) for the operation of a Management system that complies with the requirements of AS/NZS ISO 9001:2000 and AS/NZS ISO 14001:2004.

10. **NCS International Pty Limited. Certificate # 8537-03 (22 May 2002):** Issued to RMAX (Coopers Plains, QLD) for the operation of a Management system that complies with the requirements of AS/NZS ISO 9001:2000.

11. **NCS International Pty Limited. Certificate # 7816-04 (18 February 2009):** Issued to RMAX (Smithfield, NSW) for the operation of a Management system that complies with the requirements of AS/NZS ISO 9001:2008.

12. **NCS International Pty Limited. Certificate # 7818-10 (7 November 2008):** **I**ssued to RMAX (Elizabeth West, SA) for the operation of a Management system that complies with the requirements of AS/NZS ISO 9001:2000.

Reports:

1. **Uniquest, Department of Civil Engineering, The University of Queensland, St Lucia, Queensland 4072. Test Report No 3035843 'Load tests on wall panels' (September 1998):** Load span testing was performed on six panels supplied by the applicant. The panels consisted of two 600 mm spans with 3 studs. Results showed satisfactory performance for strength and stiffness.

2. **Uniquest, Department of Civil Engineering, The University of Queensland, St Lucia, Queensland 4072. Project No 10920 'Load tests on wall panels' (September 1998):** Load deflection tests and fastener pullout tests were done on the composite panels. The fasteners were proprietary fasteners supplied by Exin. Three panels were tested for each type of test. The report concludes satisfactory results for use of the panel in construction in Regions A & B as defined in AS 1170.2-1989 'SAA Loading Code - Wind loads' (Amdt 1 January 1991, Amdt 2 January 1993, Amdt 3 December 1993).

3. **Uniquest, Department of Civil Engineering, The University of Queensland, St Lucia, Queensland 4072. Project No 3036299 'Static and repeated load tests on wall panels' (April 2000):**
   Load deflection tests according to AS 4040.3 – 1992, Clause 6.3. Five tests were undertaken and the conclusion states that the panel was able to be used for structural bracing in all wind load Regions except that classified as Region D as defined in AS1170.2-1989 'SAA Loading Code - Wind loads'' (Amdt 1 January 1991, Amdt 2 January 1993, Amdt 3 December 1993).

4. **AWTA Textile Testing, 26 Robertson Street, Kensington, Victoria 3051. Test Report 7-478725-CQ (September 1998) (NATA Accredited):**
   Testing for Exin Australia was conducted on composite panels coated with concrete acrylic polymer mix over a fibreglass mesh. Testing was to AS 1530.3-1989 'Methods of fire test on building materials, components and structures - Simultaneous determination of ignitability, flame propagation and heat release and smoke release' (Amdt 1-April 1992). The results indicate that there is little risk of fire being spread by the panel. The smoke developed index value of 4 is above the BCA requirement of 3 where a non-combustible material is required.

5. **CSIRO Advanced Thermal Technologies Laboratory, Highett, Victoria 3190. 'Results of measurements to determine the thermal transmission properties of an Exin wall panel for Exin Australia Pty Ltd' (September 1998):**
   This report details thermal resistance properties of the Exin panel and also comments on the effect of the various joint details possibilities on thermal performance. The panel would meet the minimum conditions in the Building Code of Australia State Variations for Victoria of R1.3 when used with an uninsulated air space and plasterboard lining.

6. **BTL Appraisal Certificate No 193A (1995), 'Rockcote insulating wall cladding system & Rockcote Plaster system for EPS Block Systems':**
   This includes an appraisal of the Rockcote external render system.
   (BTL is the Building Technology Centre, Porirua, New Zealand. This is an appraisal body similar to CSIRO Appraisals.)

7. **Uniquest, Department of Civil Engineering, The University of Queensland, St Lucia, Queensland 4072. Test Report No 3036119 'Compression tests on polystyrene foam and load tests on wall panels' (June 1999):**
   Load span testing was performed on four panels supplied by the applicant. The panels consisted of two 600 mm spans with 3 studs fastened at 120 mm centres. Results showed satisfactory performance for strength and stiffness.

8. **Diverstrand Limited, Harlow, Essex United Kingdom 'WRc Tests of effect on water quality (BS 6920)' (March 1994):**
   This is a report on potability of water which has been in contact with the Synthomer 29Y40. The product was found to pass the BS 6920 test criteria.

9. **ARUP Façade Engineering, Brisbane, Queensland 4000. Job Number 81148/008 'Racking capacity of Ecotex Wall Panels' (October 2001):**
   Different configurations of Exin Wall Panels (exinTEX™, exinFLEX™) were tested in fatigue racking. The effect of the screw spacing, the bonding between panel/stud and the contribution of the render was analysed to determine a racking capacity. exinTEX™ with the fasteners at 120 mm centres has a racking capacity of 2.5 kN/m, with fasteners at 300 mm centres and the panels bonded by glue on the timber frame has a racking capacity of 2.8 kN/m and the exinFLEX™ with fasteners at 300 mm centres has a racking capacity of 1.2 kN/m.

10. **Arup Façade Engineering, Brisbane, Queensland 4000. Job number 81148/008 'Bending capacity of Ecotex Wall Panels and Fastener Pullout – Regions A, B and C of Australia' (December 2001):**
    Exin Wall Panels were tested in static and fatigue bending (external pressure)/Fastener Pullout (internal pressure) in order to validate the use of this system in Regions A, B and C. The results showed that exinFLEX™ is suitable for use in certain parts of regions A, B and C – Terrain Categories 2, 3 and 4 – 2 storeys (up to 7.0 metres).

11. **CSIRO Manufacturing & Infrastructure Technology, Highett, Victoria 3190. 'Thermal transmission properties of six samples of polystyrene (EPS) foam' (February 2003):**
    This report details thermal resistance properties of the EPS core used in the Exin Panels.

Inspections:
A CSIRO Appraisals representative has inspected both an installation of the system and the factory and found the erection procedure and manufacturing process to be satisfactory.

Kenneth K J Lofhelm
Manager: CSIRO Appraisals

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Each Technical Assessment has been prepared by CSIRO Appraisals and then reviewed by the Technical Advisory Committee (TAC), detailed below.

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Cladding; CSIRO Appraisals; expanded polystyrene; external; panel; Render; walls

14. ABSTRACT *(CSIRO Appraisals Approved Assessment Extract)*

The ThermaWallPlus® panels (40mm thick) manufactured by RMAX, A division of Huntsman Chemical Company Pty Ltd, 2-4 Mephan St Maribyrnong 3032 is suitable for the cladding of external walls of buildings when the conditions of CSIRO Appraisals Technical Assessment 252 are fulfilled.