



BRANZ Appraised

Appraisal No.732 [2012]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 732 (2012)**

**NURAPLY
NURATHERM
INSULATING
ROOFING SYSTEM**

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Product

1.1 The Nuraply Nuratherm System is an insulating roofing system for limited access flat roofs with concrete, timber or steel structural decks. It consists of a thermal insulation layer and a roof finish of modified bitumen waterproofing membrane.



Scope

2.1 The Nuraply Nuratherm System has been appraised for use as an insulating roof on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and maximum floor plan areas; and,
- on limited access flat roofs with concrete, timber or steel structural decks subject to specific structural design; and,
- with roofs constructed to drain water to gutters and drainage outlets complying with the NZBC; and,
- with roofs constructed to suitable falls (Refer Paragraph 15.3 and 15.4); and,
- with no integral roof gardens; and,
- situated in NZS 3604 Wind Zones, up to, and including 'Extra High'.

2.2 The Nuraply Nuratherm System has also been appraised for durability and thermal performance as an insulated roofing system on buildings that are the subject of specific design with no building height restriction. Building designers are responsible for the building design and for the incorporation of the Nuraply Nuratherm System into their design in accordance with the declared properties and instructions of Nuralite Waterproofing Ltd.

2.3 The Nuraply Nuratherm System must be installed by Nuralite Waterproofing Ltd Licensed and Trained installers.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the Nuraply Nuratherm 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. The Nuraply Nuratherm System meets this requirement. See Paragraph 10.1. Performance B2.3.1 (c), 5 years. Nuracolour and Nuracoat B.A.C meet this requirement. See Paragraphs 10.1 and 10.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. The Nuraply Nuratherm System meets these requirements. See Paragraphs 15.1 – 15.9.

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

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 (a). The Nuraply Nuratherm System will contribute to meeting this requirement. See Paragraph 14.1.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 The Nuraply Nuratherm is an insulating roofing for flat roofs. The thermal layer is a polyisocyanurate board available in a number of thicknesses to suit design requirements. The insulation board is mechanically fixed on limited access flat roofs of concrete, timber and steel structural decks. The roof finish is a modified bitumen waterproofing membrane which is adhesive fixed to the insulation board.

Materials supplied by Nuralite Waterproofing Ltd are as follows:

Nuraply 3P Membrane

- 3 mm thick modified bitumen, fully heat welded cap sheet with heat welded joints waterproofing membrane with a sanded upper surface, finished in Nuracolour. Supplied in 1 m wide x 10 m long rolls.

Nuraply 3PM Membrane

- 4 mm thick modified bitumen sheet waterproofing membrane with an upper layer mineral chip. It is applied by heat welding with heat welded joints as a fully heat welded cap sheet in a double layer system over Nuraply 3PV – SA. Supplied in 1 m wide x 7.5 m long rolls.

Nuraply 3PV – SA

- 2.5 mm thick self-adhesive, modified bitumen sheet waterproofing membrane with a built in vapour pressure diffuser based on a diamond pattern. Installed as the base layer of a waterproofing membrane system. Supplied in 1 m wide x 10 m long rolls.

Nuraply ALU

- 1.2 mm thick self-adhesive SBS modified bitumen sheet membrane with a top side of polyester reinforced aluminium foil. It is used as a vapour barrier between the substrate and the insulation material when required. It is supplied in 1.08 m wide x 20 m long rolls.

IKO Enertherm ALU Insulation

- An insulation board with a core of hard polyisocyanurate foam, coated on both sides with tri-ply gas-tight aluminium. Supplied in various thickness and R Values with a board size of 1.0 m x 1.2 m.

Nurabond No. 10

- Water based adhesive for bonding Nuraply roofing systems to the insulation, plywood and concrete substrates. It is coloured black and applied by brush or roller and is supplied in 20 litre containers.

Nuracolour

- Is an acrylic coating used as a finish over Nuraply 3P to complete the system and provide long term durability. Used as a two coat system applied by airless spray or roller. It is supplied in 15 litre containers.

Nuracoat B.A.C

- Is a solvent-based, bituminous aluminium solution containing laminar aluminium flake for protecting sand finished membranes from UV attack. It is supplied in 20 litre drums.

Fastenings and Washers

- Fastenings are stainless steel CSK square self tappers 10 g x 65 mm suitable for either plywood or steel and 6.3 mm EFHD screws for concrete both are used with TRP-45-LO60 washers from Van Roji Fasteners, which are 60 mm long and 45 mm wide.

Handling and Storage

5.1 Handling and storage of all materials whether on or off site is under the control of the Nuralite Waterproofing Ltd Licensed and Trained Installers. Dry storage must be provided for all products and the rolls of membrane must be stored in an upright position.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Nuraply Nuratherm 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

General

7.1 Nuraply Nuratherm is a roof system which provides thermal insulation and waterproofing. It is for use on limited access flat roofs subject only to light foot traffic for maintenance purposes. The insulation board is mechanically fixed to concrete, timber or metal structural decks which are subject to specific structural design. The insulation board is available in several thicknesses to suit various thermal insulation designs.

7.2 The system can be used on new or existing roofs subject to the suitability of the structural deck of existing roofs. The waterproofing membrane is a fully bonded adhesive fixed two layer bitumen modified sheet with heat welded joints. The Nuraply 3PM Membrane top layer is prefinished with a mineral chip for UV protection. Where two layers of the Nuraply 3P membrane are used the top surface is finished with either Nuracolour or Nuracoat B.A.C coating.

7.3 A vapour control membrane must be used in Climate Zone 3 (as defined in NZBC Verification Method H1/VM1 and NZBC Acceptable Solution H1/AS1). The vapour control membrane, Nuraply ALU, is self adhesive and applied over the structural deck before the installation of the insulation board.

7.4 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membrane. Refer to BRANZ publication “Good Practice Guide - Membrane Roofing”.

Structure

8.1 For buildings situated in NZS 3604 Wind Zones up to and including ‘Extra High’, 10 fixings are required. The number of fixings can be decreased to 5 per sheet for ‘High’ and 8 per sheet for ‘Very High’. Refer to Nuralite Waterproofing Ltd for fixings patterns.

8.2 For buildings subject to specific design the structural design must confirm that the fixing has adequate holding into the structural decking.

Substrates

Plywood

9.1 Plywood must be treated to H3 (CCA treated). LOSP treated plywood must not be used. Plywood must be a minimum of 17 mm to comply with AS/NZS 2269, at least CD Grade Structural with the sanded C face upwards.

Concrete

9.2 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101.

Steel

9.3 The steel substrate must be G550 aluminium-zinc AZ150 to AS1397.

Existing Construction

9.4 A thorough inspection of the substrate must be made to ensure it is in fit condition.

9.5 Repairs must be undertaken, where applicable, to ensure the substrate is sound. Plywood and steel substrates must be checked for screw fixings, and if necessary refixed as for new plywood and steel.

Durability

Serviceable Life

10.1 The Nuraply Nuratherm System is expected to have a serviceable life of at least 15 years, provided it is designed, used, installed and maintained in accordance with this Appraisal and the Technical Literature.

10.2 Nuracolour and Nuracoat B.A.C are expected to have a serviceable life of at least 5 years provided they are used, installed and maintained in accordance with this Appraisal and the Technical Literature.

Chemical Resistance

10.3 Industrial air pollutants and windborne salt deposits should not significantly affect the durability of the membrane. However, the long term properties of the material may be affected by contact with petroleum-based products such as oils, greases and solvents.

Maintenance

11.1 The membrane roof system, including any areas with a UV coating applied must be regularly (at least annually) checked for damage, rubbish and debris or coating breakdown. Damage, such as small punctures and tears must be repaired and coatings reapplied as recommended by Nuralite Waterproofing Ltd.

11.2 Special care must be taken when inspecting the membrane roof system to ensure the continuing prevention of moisture ingress, and repairs must be undertaken where required.

11.3 Drainage outlets must be maintained to operate effectively.

Outbreak of Fire

12.1 Separation or protection must be provided to the combustible deck materials, insulation board and the membrane from heat sources such as flues and chimneys.

12.2 NZBC Acceptable Solution C/AS1 Part 9 and Verification Method C/MM1 provide methods for separation and protection of combustible materials from heat sources.

Spread of Fire

13.1 The Nuraply Nuratherm System may be used on roofs of buildings intended for all Purpose Groups, including SC and SD, subject to the requirements of NZBC Acceptable Solution C/AS1 Part 7, Paragraph 7.11.1.

13.2 The membrane may be used for cladding fire-rated roof construction, providing the roof construction complies with the requirements of NZBC Acceptable Solution C/AS1 Part 7.

Energy Efficiency

14.1 The thermal resistance (R-Value) of building elements may be verified by using NZS 4214. The R-Values for the IKO Enertherm ALU Insulation are given in Table 1.

Table 1: R-values

IKO Enertherm ALU Insulation - Thickness	R - Value
30 mm	1.25
40 mm	1.70
50 mm	2.10
60 mm	2.55
70 mm	2.95
80 mm	3.40
90 mm	3.80
100 mm	4.25

External Moisture

15.1 Roofs must be designed and constructed to shed precipitated moisture. They must also take account of snowfalls in snow prone areas. A means of meeting code compliance with NZBC Clause E2.3.1 is given in the Technical Literature which aligns with details in NZBC Acceptable Solution E2/AS1.

15.2 When installed in accordance with this Appraisal and the Technical Literature, the Nuraply Nuratherm System will prevent the penetration of water and will therefore meet code compliance with Clause E2.3.2. The membrane is impervious to water and will give a weathertight roof.

15.3 Roof falls must be built into the substrate.

15.4 The minimum fall to roofs is 1 in 30 and gutters are 1 in 60. All falls must slope to an outlet. Inadequate falls will allow moisture to collect and increase the risk of deterioration of the membrane.

15.5 Allowance for deflection and settlement of the substrate must be made in the design of the roof to ensure falls are maintained and no ponding of water can occur.

15.6 The Nuraply Nuratherm System is impermeable; therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with Clause E2.3.6.

15.7 Drainage flanges must be used for any outlet and must be fitted with a grate or cage to reduce potential sources of blockages. An overflow must be provided where the roof does not drain to an external gutter or spouting.

15.8 Penetrations and upstands of the membrane must be raised above the level of any possible flooding caused by the blockage of roof drainage.

15.9 The design of details not covered by the Technical Literature is subject to specific weathertightness design and is outside the scope of this Appraisal.

Condensation Control

16.1 In Climate Zone 3 as defined in NZBC H1/VM1 & AS1-Definitions, a vapour control membrane, Nuraply ALU, must be installed over the substrate prior to installing the insulation.

Water Supplies

17.1 The Nuraply Nuratherm System has not been assessed for roofs used for the collection of potable water.

Installation Information

Installation Skill Level Requirement

18.1 Installation of the Nuraply Nuratherm System must be completed by Nuralite Waterproofing Ltd Licensed and Trained Installers.

18.2 Installation of substrates must be completed by tradespersons with an understanding of roof construction, in accordance with instructions given within the Nuralite Waterproofing Ltd Technical Literature and this Appraisal.

Preparation of Substrates

19.1 Substrates must be dry, clean and stable before installation commences.

19.2 The relative humidity of concrete substrates must be 75% or less before membrane application. The concrete can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 424.

19.3 The moisture content of the plywood and timber substructure must be a maximum of 20% and the plywood sheets must be dry at time of membrane application.

System Installation

20.1 The Nuraply Nuratherm System must be installed in accordance with the Technical Literature.

20.2 Where the vapour layer is required it is installed onto the substrate followed by the insulation. The insulation is set out in a brick bond fashion and is screwed down using the screws and washers as defined in the Technical Specification.

20.3 The membrane double layer system is then installed over the insulation; generally the membrane must be unrolled without tension onto the prepared substrate and allowed to 'relax' for at least 30 minutes prior to installation.

20.4 The membrane is then installed from the lowest point and each layer is installed across the roof fall allowing a 80 mm side overlap and a 150 mm end overlap. The cap sheet layer must be offset against the base sheet layer.

Inspections

21.1 Critical areas of inspection for waterproofing systems are:

- Construction of substrates, including crack control and installation of bond breakers and movement control joints.
- Moisture content of the substrate prior to the application of the system.
- Acceptance of the substrate by the system installer prior to application of the system.
- Installation of the system to the Technical Literature.

Health and Safety

22.1 Safe use and handling procedures for the Nuraply Nuratherm System are provided in the Technical Literature. The products must be used in conjunction with the relevant Material Safety Data Sheets for each membrane.

Basis of Appraisal

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

Tests

23.1 The following is a summary of the testing and test reports on the Nuraply Nuratherm System:

- Assessment by Belgian Union for Technical Agreements in Building Systems (BUtgb) and granted "Technical Approval with Certification" under ATG certificate numbers 06/1654 and 06/2323. The testing covered tensile strength, elongation, peel resistance (joints), joint strength, low temperature flexibility, fatigue resistance, nail hold, resistance to heat aging, static load, indentation resistance and peel resistance (substrate).
- Assessment by Belgian Union for Technical Agreements in Building Systems (BUtgb) and granted "Technical Approval with Certification" under ATG certificate numbers 08/H867 and 08/2726. The testing covered thickness tolerance, flatness, delamination strength, compressive strength, dimensional stability, delamination under temperature and load, effect of temperature on dimensions, effect of humidity on dimensions and long term water absorption.

The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

24.1 A durability opinion has been provided by BRANZ technical experts.

24.2 Installation of the insulation and membrane have been assessed by BRANZ for practicability of installation and found to be satisfactory.

24.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

25.1 The manufacture of the components of the 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.

25.2 The quality of the supply of products to the New Zealand market is the responsibility of Nuralite Waterproofing Ltd.

25.3 Quality on site is the responsibility of the Nuralite Waterproofing Ltd Trained and Approved Installers.

25.4 Designers are responsible for the building design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of Nuralite Waterproofing Ltd and this Appraisal.

25.5 Building owners are responsible for the maintenance of the membrane system in accordance with the instructions of Nuralite Waterproofing Ltd and this Appraisal.

Sources of Information

- AS/NZS 1170: 2002 Structural design actions - General principles.
- AS/NZS 2269: 2008 Plywood – structural.
- NZS 3101: 2006 The design of concrete structures.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4214: 2006 Methods of Determining the Total Thermal Resistance of Parts of Buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (including Amendment 5, 1 August 2011).
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition September 2007.
- The Building Regulations 1992.
- BRANZ Good Practice Guide - Membrane Roofing reprint October 2003.



BRANZ

In the opinion of BRANZ, the **Nuraply Nuratherm 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 **Nuralite Waterproofing 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. **Nuralite Waterproofing 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 **Nuralite Waterproofing 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 **Nuralite Waterproofing Ltd** or any third party.

For BRANZ

P Burghout
Chief Executive

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