



BRANZ Appraised

Appraisal No. 678 [2022]

DANOSA TORCH-ON ROOF WATERPROOFING MEMBRANE

Appraisal No. 678 [2022]

This Appraisal replaces BRANZ
Appraisal No. 678 [2017]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 Danosa Torch-on Roof Waterproofing Membrane is a waterproofing membrane for nominally flat, pitched and curved roofs, gutters and parapets. It is installed as a multi-layer system with a mineral chip finish.
- 1.2 The product is supplied as a torch-on, reinforced, polymer-modified bitumen sheet in roll form.

Scope

- 2.1 Danosa Torch-on Roof Waterproofing Membrane has been appraised as a roof waterproofing membrane on buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with respect to building height and maximum floor plan areas; and,
 - with building structures designed and constructed to meet the requirements of the NZBC; and,
 - with roof supporting structures of timber framing with substrates of plywood; and,
 - with substrates of suspended concrete slabs; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.
- 2.2 Danosa Torch-on Roof Waterproofing Membrane has also been appraised for use as a roof waterproofing membrane on specifically designed buildings within the following scope:
 - with building structures designed and constructed to comply with the NZBC; and,
 - with roof supporting structures of timber framing with substrates of plywood; and,
 - with substrates of suspended concrete slab; and,
 - subjected to maximum wind pressures [refer to Paragraph 8.1]; and,
 - with the weathertightness design of all junctions being the subject of specific design by the designer. [Note: The design of these junctions has not been appraised by BRANZ and is outside the scope of this Appraisal].
- 2.3 Roofs waterproofed with Danosa Torch-on Roof Waterproofing Membrane must be designed and constructed in accordance with the following limitations:
 - nominally flat, curved or pitched roofs constructed to drain water to gutters and with drainage outlets complying with the NZBC; and,
 - constructed to suitable falls [refer to Paragraphs 13.3 and 13.4]; and,
 - with no integral roof gardens.
- 2.4 The design and construction of the substrate and movement and control joints is specific to each building, and therefore is the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.
- 2.5 The membrane must be installed by Equus Industries Ltd licensed and trained installers.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the Danosa Torch-on Roof Waterproofing Membrane, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 [b] 15 years. Danosa Torch-on Roof Waterproofing Membrane meets this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Danosa Torch-on Roof Waterproofing Membrane meets these requirements. See Paragraphs 13.1–13.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Danosa Torch-on Roof Waterproofing Membrane meets this requirement.

Technical Specification

4.1 Materials supplied by Equus Industries Ltd are as follows:

- **Esterdan 30 P Pol** – an APP polymer-modified bitumen sheet waterproofing membrane, reinforced with polyester felt, used as a base layer in a double layer system with polyethylene film on both sides. It is supplied as a roll 2.5 mm thick, 1 m wide and 12 m long.
- **Esterdan 50GP Pol** – an APP polymer-modified bitumen sheet waterproofing membrane used as a cap sheet in a double layer system. The lower face has a polyethylene film which is torched-off during application and the upper face is finished with slate chips. It is supplied as a roll 4 mm thick, 1 m wide and 8 m long.
- **Curidan** – a water-based bituminous emulsion for priming all substrates. It is available in 5 or 25 kg containers.
- **Impridan** – an organic-based bituminous primer for priming all substrates. It is available in 30 kg containers.

Handling and Storage

5.1 Handling and storage of all materials, whether on-site or off-site, is under the control of the Equus Industries 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 This Appraisal must be read in conjunction with:

- Equus Industries Ltd details for De Boer DuO Cold Roof on Concrete and De Boer DuO Cold Roof on Plywood, available from Equus Industries Ltd.
- WMAI Code of Practice for Reinforced Modified Bitumen Membrane (RMBM) Systems for Roofs and Decks, 4th Edition, March 2021.

6.2 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 The Danosa Torch-on Roof Waterproofing Membrane is for use on roofs, gutters and parapets where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas. The product can be used on new or existing buildings. Equus Industries Ltd should be consulted as to the suitability of any existing substrates prior to using Danosa Torch-on Roof Waterproofing Membrane.
- 7.2 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membrane. Refer to the BRANZ Good Practice Guide: Membrane Roofing.
- 7.3 The Esterdan 30 P Pol is designed for use on roofs and gutters as the first layer of a double layer system and all areas requiring detailing such as upstands, protrusions, rainwater heads and outlets. The Esterdan 50GP Pol is used as the top layer of a double layer system.

Structure

- 8.1 Danosa Torch-on Roof Waterproofing Membrane is a fully bonded double layer system suitable for use in areas subject to maximum wind pressures of 6 kPa Ultimate Limit State [ULS].

Substrates

Plywood

- 9.1 Plywood must be treated to H3 [CCA treated]. LOSP treated plywood must not be used. Plywood must comply with NZBC Acceptable Solution E2/AS1 Paragraph 8.5.3 and 8.5.5. Where specific design is used [i.e. outside the scope of E2/AS1] the plywood thickness and fixing size may increase and support centres may decrease to meet specific wind loadings. Timber framing must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases, framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and all sheet edges are fully supported.

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.

Existing Construction

- 9.3 A thorough inspection of the substrate must be made to ensure it is in fit condition and does not contain any materials that will adversely affect the performance of the membrane.
- 9.4 Repairs must be undertaken, where applicable, to ensure the substrate is sound, the joints are sealed, and the flashings are sound. Plywood substrates must be checked for screw fixings, and if necessary refixed as for new plywood.

Durability

Serviceable Life

- 10.1 Danosa Torch-on Roof Waterproofing Membrane 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.

Chemical Resistance

- 10.2 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 must be regularly [at least annually] checked for damage, rubbish, debris or coating breakdown. Damage, such as small punctures and tears must be repaired and coatings reapplied as recommended by Equus Industries 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.

Prevention of Fire Occurring

- 12.1 Separation or protection must be provided to the Danosa Torch-on Roof Waterproofing Membrane from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 13.1 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 by the Technical Literature which aligns with details in NZBC Acceptable Solution E2/AS1.
- 13.2 When installed in accordance with this Appraisal and the Technical Literature, Danosa Torch-on Roof Waterproofing Membrane will prevent the penetration of water and will therefore meet code compliance with NZBC Clause E2.3.2. The membrane is impervious to water and will give a weathertight roof.
- 13.3 Roof falls must be built into the substrate.
- 13.4 The minimum fall to roofs is 1:30 for plywood, 1:60 for concrete and gutters are 1:100. All falls must slope to an outlet. Inadequate falls will allow moisture to collect and increase the risk of deterioration of the membrane. *[Note: Where possible, a gutter fall of 1:60 is preferred.]*
- 13.5 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.
- 13.6 Danosa Torch-on Roof Waterproofing Membrane is impermeable; therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with NZBC Clause E2.3.6.
- 13.7 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.
- 13.8 Penetrations and upstands of the membrane must be raised above the level of any possible flooding caused by the blockage of roof drainage.
- 13.9 The design of details not covered by the Technical Literature is subject to specific weathertightness design and is outside the scope of this Appraisal.

Water Supplies

- 14.1 Danosa Torch-on Roof Waterproofing Membrane has not been assessed for roofs used for the collection of potable water.

Installation Information

Installation Skill Level Requirement

- 15.1 All design and building work must be carried out in accordance with the Danosa Torch-on Roof Waterproofing Membrane Technical Literature and this Appraisal. All building work must be undertaken by Equus Industries Ltd licensed and trained installers. Where the work involves Restricted Building Work, this must also be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant License Class.

Preparation of Substrates

- 16.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be smooth and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents. All surface defects must be filled to achieve an even and uniform surface.
- 16.2 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. 585.
- 16.3 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. This will generally require plywood sheets to be covered until just before the membrane is laid, to prevent rain wetting.
- 16.4 All substrates must be primed with either Curidan or Impridan and left to dry for at least 4-5 hours before the membrane is installed.

Membrane Installation

- 17.1 The membrane must be installed in accordance with the Technical Literature.
- 17.2 All roof and wall junctions must have a 20 mm x 20 mm fillet installed at the junction. Plywood substrates must use a wooden fillet and concrete substrate junctions a cement mortar fillet installed. All external edges must be chamfered to a 5 mm radius to remove sharp edges.
- 17.3 The membrane must be unrolled without tension on to the prepared substrate and allowed to 'relax' for at least 30 minutes prior to installation.
- 17.4 The membrane is installed from the lowest point and each layer is installed across the roof fall allowing a 80 mm minimum side overlap and a 100 mm minimum end overlap. The cap sheet layer must be offset against the base sheet layer.

Inspections

- 18.1 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 membrane.
 - Acceptance of the substrate by the membrane installer prior to application of the membrane.
 - Installation of the membrane to the manufacturer's instructions.

Health and Safety

- 19.1 Safe use and handling procedures for Danosa Torch-on Roof Waterproofing Membrane is 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

- 20.1 The following is a summary of the testing and test reports on Danosa Torch-on Roof Waterproofing Membrane:
- Tensile strength, elongation, watertightness, resistance to impact, resistance to static load, dimensional stability, pliability at low temperature, peel resistance, joint shear resistance, tear resistance, resistance to heat aging, resistance to elevated temperatures, UV resistance, granule adhesion, water absorption and water vapour permeability.
 - The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 21.1 A durability opinion has been provided by BRANZ technical experts.
- 21.2 Installation of the membrane has been assessed by BRANZ for practicability of installation and found to be satisfactory.
- 21.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 22.1 The manufacture of the membrane 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 manufacturer of Danosa Torch-on Roof Waterproofing Membrane has been assessed and registered as meeting the requirements of ISO 9001.
- 22.2 The quality of the supply of products to the New Zealand market is the responsibility of Equus Industries Ltd.
- 22.3 Quality on-site is the responsibility of the Equus Industries Ltd licensed and trained installers.
- 22.4 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 Equus Industries Ltd and this Appraisal.
- 22.5 Building owners are responsible for the maintenance of the membrane systems in accordance with the instructions of Equus Industries Ltd and this Appraisal.

Sources of Information

- AS/NZS 1170:2002 Structural design actions.
- AS/NZS 2269:2012 Plywood – structural.
- BRANZ Good Practice Guide: Membrane Roofing, 2nd Edition, October 2015.
- NZS 3101:2006 Concrete Structures Standard.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



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WATERPROOFING MEMBRANE



In the opinion of BRANZ, **Danosa Torch-on Roof Waterproofing Membrane** 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 **Equus Industries 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. **Equus Industries 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 **Equus Industries 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 **Equus Industries Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

22 December 2022