



BRANZ Appraised

Appraisal No. 689 [2016]

DE BOER DUO ROOF MEMBRANE SYSTEMS

Appraisal No. 689 [2016]

This Appraisal replaces BRANZ
Appraisal No. 689 [2010]

Amended 15 September 2017



BRANZ Appraisals

Technical Assessments of products
for building and construction.



de boer

De Boer Waterproofing Solutions nv

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Product

- 1.1 De Boer DuO Roof Membrane Systems are torch-on bitumen modified waterproofing membranes for roofs.

Scope

- 2.1 De Boer DuO Roof Membrane Systems have been appraised for use as roof waterproofing membranes on buildings designed within the following scope:
 - with building structures designed and constructed to comply with the BCA; 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 Paragraph 8.1]; and,
 - with the weathertightness design of all junctions being the subject of design by the designer.

Note: The design of these junctions has not been appraised by BRANZ and is outside the scope of this Appraisal.
- 2.2 Roofs waterproofed with De Boer DuO Roof Membrane Systems must be designed and constructed in accordance with the following limitations:
 - nominally flat, curved or pitched roofs constructed to drain water to gutters and drainage outlets complying with the BCA; and,
 - constructed to suitable falls [Refer Paragraph 14.3 and 14.4]; and,
 - with no integral roof gardens.
- 2.3 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.
- 2.4 The membranes must be installed by De Boer Certified Applicators. *[Note: all De Boer Certified Applicators are also Enduroflex Pty Ltd Certified Applicators.]*

Building Regulations

National Constructions Code (NCC) Building Code of Australia (BCA)

3.1 In the opinion of BRANZ, De Boer DuO Roof Membrane Systems, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the BCA:

BCA Volume 1 – Class 2 to Class 9 Buildings

Part F1 – Damp and waterproofing. Performance FP 1.4. See Paragraph 14.1 – 14.8

BCA Volume 2 – Class 1 and Class 10 Buildings

Part 2.2 – Damp and Weatherproofing. Performance P2.2.2. See Paragraph 14.1 – 14.8

Technical Specification

4.1 Materials supplied by Enduroflex Pty Ltd are as follows:

- **DeboPlast 3 mm T/F C175** - is a 3.0 mm thick, APP modified bitumen-based sheet waterproofing membrane with a mixture of talcum and sand on the upper surface and an ultra-thin Polyethylene foil on the under layer used as a base layer in multi-layer systems. It has a composite reinforcement of 175 g/m² polyester and glass and is supplied in 1 m x 10 m rolls.
- **DeboFlex 3 mm T/F C175** - is a 3.0 mm thick, SBS modified bitumen-based sheet waterproofing membrane with a mixture of talcum and sand on the upper surface and an ultra-thin Polyethylene foil on the under layer used as a base layer in multi-layer systems. It has a composite reinforcement of 175 g/m² polyester and glass and is supplied in 1 m x 10 m rolls.
- **DeboTack 2.5 mm T/F C175** - is a 2.5 mm thick, SBS modified bitumen-based sheet waterproofing membrane with a mixture of talcum and sand on the upper surface and a self-adhesive under layer used as a base layer in multi-layer systems. It has a composite reinforcement of 175 g/m² polyester and glass and is supplied in 1 m x 10 m rolls.
- **Debotack 2.5 T/F C175 Aero** - is a 2.5 mm thick, SBS modified bitumen based sheet waterproofing membrane with a mixture of talcum and sand on the upper surface and the under layer of heat resistant polypropylene fleece with self-adhesive bitumen strips of 55 mm width to create partial bonding to the substrate. It is used as a base layer in multi-layer systems. It has a composite reinforcement of 175 g/m² and is supplied in 1 m x 10 m rolls.
- **DuO HT 4 Slates/F C180** - is a nominal 4 mm thick TPO/SBS composite bitumen, torch applied sheet waterproofing membrane with a coloured slate granule upper surface finish and a polyethylene under finish used as a cap sheet in a multi-layer system. It has a composite reinforcement of polyester and glass of 180 g/m². It is supplied in 1 m x 8 m rolls.
- **DuO HT 4 Slates/F C180 Aero** - is a nominal 4 mm thick TPO/SBS composite bitumen, torch applied sheet waterproofing membrane with a coloured slate granule upper surface finish and an under layer of pure SBS strips with polyethylene foil finish to allow vapour distribution under the waterproofing, used as a cap sheet in a single-layer system. It has a composite reinforcement of polyester and glass of 180 g/m². It is supplied in 1 m x 8 m rolls.
- **DuO HT 4 Slates/F C180 Mecano** - is a nominal 4 mm thick TPO/SBS composite bitumen, sheet waterproofing membrane with a coloured slate granule upper surface finish and an under finish of polyethylene foil which is designed to be mechanically fastened to the roof, used as a single layer system on concrete, or as a capsheet in a multi-layer system. It has a composite reinforcement of polyester and glass of 180 g/m². It is supplied in 1 m x 8 m rolls.
- **DuO 4 HT Slates/PP C180 No Flame** - is a nominal 4 mm thick TPO/SBS composite bitumen, sheet waterproofing membrane with a coloured slate granule upper surface finish and an under finish of polypropylene fleece which can be fully bonded without heat, used as a cap sheet in a multi-layer system. It has a composite reinforcement of polyester and glass of 180 g/m². It is supplied in 1 m x 8 m rolls.

- **DuO B&T 5 Gran/F C250** - is a nominal 5 mm TPO/SBS composite bitumen, torch applied sheet waterproofing membrane with a grey granule upper surface finish and an under finish of polyethylene foil. It has a composite reinforcement of polyester and glass of 250 g/m² to provide a higher reinforcement level for greater heat resistance, elongation and strength used as a cap sheet under hot applied asphalt mixes. It is supplied in 1 m x 8 m rolls.
- **DuO HT 4 Slates/ F C180 Landscape** - is a nominal 4 mm TPO/SBS composite bitumen, torch applied sheet waterproofing membrane with a coloured slate upper surface finish and an under finish of polyethylene foil. It has a composite reinforcement of polyester and glass of 180 g/m². It is root resistant according to EN13948 and applicable for green roofs. It is used as a cap sheet in multi-layer systems. It is supplied in 1 m x 8 m rolls.
- **DuO HT 4 Slates/ F C180 Firecare** - is a nominal 4 mm TPO/SBS composite bitumen, torch applied sheet waterproofing membrane with a coloured slate granule upper surface finish and an under finish of polyethylene foil. It has a composite reinforcement of polyester and glass of 180 g/m². It is designed for fire resistant applications and used a cap sheet in multi-layer systems. It is supplied in 1 m x 8 m rolls.
- **DuO Primer** - is a solvent-based, bituminous vanish used to prime dry and porous surfaces. It is supplied in 25 lt containers.
- **DuO Kit** - is a bituminous adhesive/sealant used for cold bonding and sealing when necessary. It is a black paste, supplied in 310 ml cartridges.
- **DuO Cold Glue** - is a bituminous cold adhesive for adhering DuO No Flame waterproofing membranes. It is supplied in 25 kg cans.

Handling and Storage

- 5.1 Handling and storage of all materials whether on or off site is under the control of the Enduroflex Pty Ltd Certified Applicators. 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 De Boer DuO Roof Membrane 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

General

- 7.1 De Boer DuO Roof Membrane Systems are for use on roofs, gutters and parapets where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas. The products can be used on new or existing buildings. Enduroflex Pty Ltd should be consulted as to the suitability of any existing substrates prior to using De Boer DuO Roof Membrane Systems.
- 7.2 De Boer DuO Roof Membrane Systems are normally applied as double layer systems, with a base layer and cap layer. There are a number of different options available, Enduroflex Pty Ltd should be consulted for the best option depending on performance requirements.
- 7.3 The effective control of internal moisture must be considered at the design stage because of the impermeability of the membranes. Refer to BRANZ publication "Good Practice Guide - Membrane Roofing".

Structure

- 8.1 De Boer DuO Roof Membrane Systems fully bonded double layer systems are suitable for use in areas subject to maximum wind pressures of 4 kPa Ultimate Limit State.

Substrates

Plywood

- 9.1 Structural plywood must be a minimum of 17 mm thick complying with AS/NZS 2269. The structural plywood must be supported with joists at a maximum spacing as detailed in AS 1684.3, Table 7.3, fixings shall be as per "Technical Note on the Use of EWPAAs Branded Structural Plywood As Exterior Decking".

Note: LOSP treated plywood must not be used.

Concrete

- 9.2 Concrete substrates must be designed in accordance with the BCA.

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 re-fixed as for new plywood.

Durability

Serviceable Life

- 10.1 De Boer DuO Roof Membrane Systems will have a durability of at least 15 years and an expected serviceable life of over 20 years, provided they are 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 membranes. 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 or debris. Damage, such as small punctures and tears, must be repaired as recommended by Enduroflex Pty Ltd.
- 11.2 Special care must be taken when inspecting the membrane roof systems 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.

Heating Appliances, Fireplaces, Chimneys and Flues

- 12.1 De Boer DuO Roof Membrane Systems must be protected or separated from fireplaces, heating appliances, chimneys and flues in accordance with the requirements of BCA Volume 1, Part GP 2.1 and Part G2, and BCA Volume 2, Part P2.3.3 and Part 3.7.3.

Fire

- 13.1 The De Boer DuO Roof Membranes are combustible materials. Designers must take this into account when undertaking the fire design for the building.

External Moisture

- 14.1 Roofs must be designed and constructed to meet code compliance with Part F1 – Damp and waterproofing, Performance FP 1.4 and Part 2.2 – Damp and Weatherproofing, Performance P2.2.2. They must also take account of snowfalls in snow prone areas.
- 14.2 When installed in accordance with this Appraisal and the manufacturer's Technical Literature, De Boer DuO Roof Membrane Systems will prevent the penetration of water and will therefore meet code compliance with Part F1 – Damp and waterproofing, Performance FP 1.4 and Part 2.2 – Damp and Weatherproofing, Performance P2.2.2. The membrane is impervious to water and will give a weathertight deck capable of accepting minor structural movements.
- 14.3 De Boer DuO Roof Membrane Systems is impermeable, therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with Part F1 – Damp and waterproofing, Performance FP 1.4 and Part 2.2 – Damp and Weatherproofing, Performance P2.2.2.
- 14.4 BRANZ recommends a minimum fall to roofs of 1:40 and that all falls must slope to an outlet. Inadequate falls will allow moisture to collect and increase the risk of deterioration of the slate finish.
- 14.5 Roof falls must be built into the substrate and not created with mortar screeds applied over the membrane.
- 14.6 Allowance for deflection and settlement of the substrate must be made in the design of the roof.
- 14.7 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.
- 14.8 Penetrations and upstands of the membranes must be raised above the level of any possible flooding caused by the blockage of roof drainage.
- 14.9 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

- 15.1 Water is not contaminated by De Boer DuO Roof Membrane Systems.
- 15.2 The first 25 mm of rainfall from a newly installed De Boer DuO Roof Membrane Systems roof must be discarded before water collection starts. This is to remove residues which may have developed in the processes involved in the production of a De Boer DuO Roof Membrane Systems membrane roof.
- 15.3 Though De Boer DuO Roof Membrane Systems will not contaminate water, it must be noted that all water collected off roof surfaces made from any material is considered to be non-potable due to possible contamination from other sources. Water collection in this way can only be considered potable if it has been passed through a suitable sterilization system and tested. Sterilization systems such as this have not been assessed and are outside the scope of this Appraisal.

Installation Information

Installation Skill Level Requirement

- 16.1 Installation of the membranes must be completed by Enduroflex Pty Ltd Certified Applicators.
- 16.2 Installation of substrates must be completed by tradespersons with an understanding of roof construction, in accordance with instructions given within the Enduroflex Pty Ltd Technical Literature and this Appraisal.

Preparation of Substrates

- 17.1 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.
- 17.2 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.
- 17.3 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.
- 17.4 All substrates must be primed with DuO Primer and left to dry before the membrane is installed.

Membrane Installation

- 18.1 The membranes must be installed in accordance with the Technical Literature.
- 18.2 All roof and wall junctions must have a 20 mm x 20 mm wooden fillet installed at the junction. Concrete substrate junctions must have a 20 mm x 20 mm cement mortar fillet installed. All external edges must be chamfered to a 5 mm radius to remove sharp edges.
- 18.3 The membrane is installed from the lowest point and each layer is installed across the roof fall allowing a 80 mm side overlap and a 100 mm end overlap. The cap sheet layer must be offset against the base sheet layer.

Note: These are minimum overlap widths. Please refer to Manufacturer's Instructions for the specific overlap widths for the product being specified.

Inspections

- 19.1 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.

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 De Boer DuO Roof Membrane Systems:
 - Physical properties included tensile strength, elongation, tear strength, dimensional stability.
 - Service performance testing included low temperature flexibility, heat resistance, static and dynamic indentation, fatigue cycling and peel resistance.
 - Testing by SGS for dimensional stability, tear resistance, tensile strength, elongation at break, low temperature flexibility, heat resistance and tensile shear at joints.
 - British Board of Agrément No. 98/3537.

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 membranes 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 membranes 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 De Boer Duo Roof Membrane Systems has been assessed and registered as meeting the requirements of ISO 9001: 2008.
- 22.2 The quality of the supply of products to the Australian market is the responsibility of Enduroflex Pty Ltd.
- 22.3 Quality on site is the responsibility of the Enduroflex Pty Ltd Certified Applicators.
- 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 Enduroflex Pty Ltd and this Appraisal.
- 22.5 Building owners are responsible for the maintenance of the membrane systems in accordance with the instructions of Enduroflex Pty Ltd and this Appraisal.

Sources of Information

- AS 1684.3: 2010 Residential timber-framed construction - Cylonic area.
- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2269: 2012 Plywood – structural.
- BRANZ Good Practice Guide – Membrane Roofing, reprint October 2003.
- National Construction Code Series Building Code of Australia 2016 - Australian Building Codes Board.
- Technical Note on the Use of EWPA Branded Structural Plywood As Exterior Decking - PAA Engineered Wood Products Association of Australasia.

Amendments

Amendment No. 1, dated 31 August 2017.

This Appraisal has been amended to update the Technical Specification.

Amendment No. 1, dated 15 September 2017.

This Appraisal has been amended to update the Australian distributor.





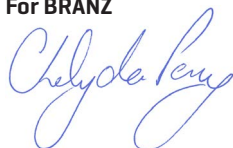
In the opinion of BRANZ, **De Boer Duo Membrane Systems** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **De Boer Waterproofing Solutions nv**, 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. **De Boer Waterproofing Solutions nv**:
 - 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 **De Boer Waterproofing Solutions nv**.
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 **De Boer Waterproofing Solutions nv** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

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27 May 2016