



BRANZ Appraised

Appraisal No.411 [2005]

BRANZ Appraisals

**Technical Assessments of products
for building and construction**

**BRANZ
APPRAISAL
No. 411 (2005)**

This Appraisal replaces BRANZ
Appraisal No. 411 (2000) issued 22

December 2000.

Amended 9 July 2008.

**DEC-K-ING PVC
WATERPROOFING
MEMBRANE**

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Waterproofing**

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Product

1.1 Dec-K-ing PVC Waterproofing Membrane is a reinforced polyvinyl chloride (PVC) sheet waterproofing membrane designed to be used on pedestrian decks and balconies.

1.2 The product is a coloured, laminated, multi layered, flexible PVC sheet in roll form. The product is installed as an adhesive fixed, single layer system.



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Scope

2.1 Dec-K-ing PVC Waterproofing Membrane has been appraised for use as a waterproofing membrane for buildings within the following scope:

- on pedestrian decks and balconies; and,
- scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with timber supporting structures designed and constructed in accordance with the NZBC; and,
- with substrates of plywood sheet and compressed fibre cement sheet; and,
- with decks that have a maximum size of 40 m².

2.2 Dec-K-ing PVC Waterproofing Membrane has also been appraised for use as a waterproofing membrane for external reinforced concrete pedestrian decks and balconies for buildings within the following scope:

- up to 3 storeys with a maximum height from ground to eaves of 10m and with a floor plan area limited only by seismic and structural control joints; and,
- with the reinforced concrete structure designed and constructed in accordance with the NZBC.

2.3 This Appraisal is limited to pedestrian decks and balconies within the following scope:

- constructed to suitable falls (Refer Paragraphs 12.1 – 12.9); and,
- with no steps within the deck level, no integral roof gardens and no down pipe discharging directly onto the deck.

2.4 The design and construction of the substrate and movement and control joints are specific to each building, and are therefore the responsibility of the building designer and building contractor, and are outside the scope of this Appraisal.

2.5 The membranes must be installed by Skellerup Roofing & Waterproofing trained and approved applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Dec-K-ing PVC 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. Dec-K-ing PVC Waterproofing Membrane meets this requirement. See Paragraph 9.1.

Clause D1 ACCESS ROUTES: Performance D1.3.3 (d). Dec-K-ing PVC Waterproofing Membrane meets this requirement. See Paragraph 7.6.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Decks and balconies incorporating Dec-K-ing PVC Waterproofing Membrane meet these requirements. See Paragraphs 12.1 – 12.8.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1 Dec-K-ing PVC Waterproofing Membrane meets this requirement and will not present a health hazard to people.

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

Technical Specification

4.1 Materials supplied by Skellerup Roofing & Waterproofing are as follows:

Dec-K-ing PVC Waterproofing Membrane

- A PVC waterproof sheet membrane reinforced with a polyester fabric mat. The product is supplied as a 1.5 mm thick sheet with a width of 1.8 m and length of 23 m or 115 m. The Dec-K-ing PVC Waterproofing Membrane is available in 6 colours.

Dec-K-ing Contact Adhesive

- A specially formulated solvent-based adhesive for all Dec-K-ing PVC Waterproofing Membrane applications. It has been designed to withstand the plasticizers in PVC sheeting. Supplied in 18.9 litre containers.

Dec-K-ing Floor Patch and Floor Patch Additive

- A two part, cement-based concrete patching compound to rapidly repair rough or damaged concrete prior to the installation of floor coverings. The floor patch is supplied in 10 kg bags and the additive is supplied in 3.7 and 18.9 litre containers.

Dec-K-ing Deck Cleaning Conditioner

- A cleaning conditioner for maintaining completed Dec-K-ing PVC Waterproofing Membrane deckings. It is supplied in 200 ml plastic containers.

Dec-K-ing Scupper Drain

- A PVC drain with baked on plastisol coating, one piece scupper drain. It is used to provide adequate drainage in Dec-K-ing PVC Waterproofing Membrane decks by way of wall or overflow drainage.

Dec-K-ing Fastening Bar

- An anodized, extruded aluminium, pre-drilled channelled bar with tape sealant installed on the back. It is used for mechanically fixing Dec-K-ing PVC Waterproofing Membrane under doorways, on wall surfaces, step risers, wheelchair ramps and deck edges.

Dec-K-ing Deck Edge Flashing

- A deck edge flashing for Dec-K-ing PVC Waterproofing Membrane to provide a formed drip edge at the deck edge.

Dec-K-ing PVC Drain

- A PVC floor-waste deck drain for Dec-K-ing PVC Waterproofing Membrane with a clamp-ring system to ensure a water-tight seal. They are available in various drain and grill sizes.

Handling and Storage

5.1 Handling and storage of all materials whether on or off site is under the control of the Skellerup Roofing & Waterproofing trained and approved applicators. Dry storage must be provided for all products.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Dec-K-ing PVC Waterproofing Membrane. 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 Dec-K-ing PVC Waterproofing Membrane is for use on pedestrian decks and balconies where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas.

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 publication "Good Practice Guide - Membrane Roofing".

7.3 Timber framing systems 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 NZS 4203. In all cases framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and that all sheet edges are fully supported.

7.4 The fully adhered membrane is suitable for use on decks and balconies of buildings within all NZS 3604 Building Wind Zones up to and including 'Very High'.

7.5 The membrane is designed for use on trafficable decks and balcony areas; however, contact with sharp objects that may damage the membrane surface must be avoided.

7.6 The membrane has a coefficient of friction (μ) of 0.6, therefore it meets the requirements of NZBC Verification Method D1/VM1 when used on pedestrian decks and balconies with slopes of up to approximately 9° (1:6 slope approximately). It may be used on ramps or pedestrian decks on access routes and accessible routes as defined by NZBC Clause D1, up to the slopes specified in Acceptable Solution D1/AS1 Table 2.

Substrates

Plywood

8.1 Plywood must be treated to H3 (CCA treated). **LOSP treated plywood must not be used.** Plywood must comply with NZBC Acceptable Solution E2/AS1 Paragraphs 8.5.3 and 8.5.5.

Fibre Cement Compressed Sheet

8.2 Fibre cement compressed sheet must be manufactured to comply with the requirements of AS 2908.2 and must be

specified by the manufacturer as being suitable for use as an external deck substrate. The fibre cement sheet must be of a thickness to meet the specific structural design requirements and must be secured to the structure to resist wind uplift and all other forces acting on the deck or balcony such as deflection from gravity and live loads.

Concrete

8.3 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101 or NZS 3109.

Durability

Serviceable Life

9.1 Dec-K-ing PVC Waterproofing Membrane when subjected to normal conditions of environment and use, is expected to have a serviceable life of at least 15 years.

Maintenance

10.1 No maintenance of the membrane is normally required provided significant substrate movement does not occur.

10.2 In the event of damage to the membrane, the membrane must be repaired by removing the damaged portion and applying a patch as for new work.

10.3 Drainage outlets must be maintained to operate effectively.

Outbreak of Fire

11.1 The membrane must be protected from heat sources such as flues and chimneys in accordance with the requirements of NZBC Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

External Moisture

12.1 Pedestrian decks and balconies must be designed and constructed to shed precipitated moisture. They must also take account of snowfalls in snow prone areas. A means of meeting the performance requirements of NZBC Clause E2.3.1 is given by the Technical Literature which is aligned with details in NZBC Acceptable Solution E2/AS1.

12.2 When installed in accordance with this Appraisal and the Technical Literature, Dec-K-ing PVC Waterproofing Membrane will prevent the penetration of water and will therefore meet the performance requirements of NZBC Clause E2.3.2. The membranes are impervious to water and will give a weathertight deck or balcony.

12.3 Dec-K-ing PVC Waterproofing Membrane is impermeable, therefore a means of dissipating construction moisture must be provided in the building design and construction to meet the performance requirements of NZBC Clause E2.3.6.

12.4 The minimum fall to decks, balconies and gutters is 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.

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

12.6 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 deck or balcony does not drain to an external gutter or spouting.

12.7 Penetrations and upstands of the membranes must be raised above the level of any possible flooding caused by blockage of deck and balcony drainage.

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

Installation Information

Installation Skill Level Requirement

13.1 Installation of the membranes must be completed by trained applicators approved by Skellerup Roofing & Waterproofing.

13.2 Installation of substrates must be completed by tradespersons with an understanding of roof, deck and balcony construction, in accordance with instructions given within the Skellerup Roofing & Waterproofing Technical Literature and this Appraisal.

Preparation of Substrates

14.1 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.

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

14.3 The moisture content of the timber substructure must be a maximum of 20% and plywood and compressed fibre cement sheet must be dry at time of membrane application. This will generally require plywood and compressed fibre cement sheets to be covered until just before the membrane is laid to prevent rain wetting.

Membrane Installation

15.1 The membrane must be installed in accordance with the Technical Literature.

15.2 The membrane should be unrolled without tension onto the prepared substrate. On plywood substrates the seams can be stapled to temporarily hold the membrane in place. These staples are removed later when the seams are welded.

15.3 Joints must be overlapped by a minimum of 20 mm at the ends and sides, with side overlapping in the direction of the fall. A minimum allowance of approximately 75 mm of membrane is required at deck edges, and 150 mm to turn up walls or upstands.

15.4 Adhesion of the membrane to the substrate is carried out by using a contact adhesive. The contact adhesive may be used in temperatures as low as 0°C

15.5 Installation of the membrane is carried out by folding back half of the sheet at a time, applying the adhesive and folding back the sheet over to adhere it to the decking. Contact adhesive is applied to both the membrane and the substrate.

15.6 After all detailing work such as internal and external corners, deck edges and flashings have been completed, the joint seams can be welded using a hot air welder.

Inspections

16.1 The Technical Literature must be referred to during the inspection of membrane installations by Building Consent Authorities and Territorial Authorities.

16.2 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

17.1 Safe use and handling procedures for the membrane system is provided in the Technical Literature. The products must be used in conjunction with the relevant Materials Safety Data Sheet.

Basis of Appraisal

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

Tests

18.1 Tests have been carried out on Dec-K-ing PVC Waterproofing Membrane in Canada by Intertek Testing Services for compliance with CAN/CGSB 37.54-95 Test Standard for Polyvinyl Chloride Roofing and Waterproofing Membrane, and from ICBO-ES Acceptance Criteria for Walking Decks (AC39).

18.2 The CAN/CGSB 37.54-95 testing covered thickness, breaking strength, elongation at break, lap joint strength, low temperature impact, resistance to heat ageing, low temperature flexibility, resistance to accelerated weathering, water vapour transmission, effect of water absorption, dimensional change and chemical resistance.

18.3 The ICBO testing covered tensile strength, elongation at break, bond strength (using both latex and contact adhesive), low temperature flexibility, accelerated ageing, weatherometer testing, effect of water absorption, percolation, concentrated load, abrasion resistance and chemical resistance.

18.4 This testing showed that the Dec-K-ing PVC Waterproofing membrane passed all of the requirements of these standards.

Other Investigations

19.1 An assessment was made of the durability of the Dec-K-ing PVC Waterproofing Membrane by BRANZ technical experts, partially based on the inspection and assessment of decks in the USA and by examination and testing of samples taken from the decks.

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

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

Quality

20.1 The manufacture of the membrane has not been examined by BRANZ, but the membrane manufacturer, Canadian General-Tower Limited is the subject of ISO/TS 16949:2002 and ISO 9001:2000 Certificates by QMI Management Systems Registration, Certificate Nos. 0002134:006308 and 0008701:006308.

20.2 The quality of supply of the product to the market is the responsibility of Skellerup Roofing & Waterproofing.

20.3 Quality on site is the responsibility of the Skellerup Roofing & Waterproofing trained and approved applicator.

20.4 Designers are responsible for the substrate design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of the substrate manufacturer, Skellerup Roofing & Waterproofing and this Appraisal.

Sources of Information

- AS 2908.2-2000 Cellulose-cement products - Flat sheet.
- AS/NZS 2269:1994 Plywood-Structural.
- NZS 3101:1995 The design of concrete structures.
- NZS 3109:1987 Specification for concrete construction.
- NZS 3604: 1999 Timber framed buildings.
- NZS 4203:1992 Code of practice for general structural design and design loadings for building.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Building Industry Authority, Third Edition 2005.
- New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, 1992.
- The Building Regulations 1992, up to, and including October 2004 Amendment.
- Good Practice Guide - Membrane Roofing, BRANZ, October 2003.



Amendment No. 1, dated 9 July 2008.

This Appraisal has been amended to update the Appraisal Holder details.



BRANZ

In the opinion of BRANZ, Dec-K-ing PVC Waterproofing 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 Skellerup Roofing & Waterproofing A division of Viking Group 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. **Skellerup Roofing & Waterproofing:**
 - 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.
3. 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.
4. 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 **Skellerup Roofing & Waterproofing**.
5. 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.
6. BRANZ provides no certification, guarantee, indemnity or warranty, to **Skellerup Roofing & Waterproofing** or any third party.

For BRANZ

A handwritten signature in black ink, appearing to read 'P Robertson'.

P Robertson
Chief Executive

Date of issue: 21 October 2005