



**BRANZ Appraised**

Appraisal No.608 [2008]

BRANZ Appraisals

Technical Assessments of products  
for building and construction

**BRANZ  
APPRAISAL  
No. 608 (2008)**

**DAVCO K10 PLUS  
EXTERNAL  
WATERPROOFING  
MEMBRANE**

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## Product

1.1 Davco K10 Plus is a liquid applied waterproofing membrane for use under ceramic or stone tile finishes on external decks and balconies.



## Scope

2.1 Davco K10 Plus has been appraised for use as a waterproofing membrane for buildings within the following scope:

- 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 and fibre cement compressed sheet; and,
- with decks that have a maximum size of 40m<sup>2</sup>.

2.2 Davco K10 Plus 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 decks and balconies within the following scope:

- constructed to suitable falls (Refer Paragraph 12.1 – 12.9); and,
- with the membranes continually protected from exposure to UV (ultra violet) light and from physical damage by ceramic or stone tile finishes; and,
- with decks and balconies designed and constructed such that deflections do not exceed 1/360<sup>th</sup> of the span; and,
- with no steps within the deck level, no integral roof gardens and no down pipe discharging directly onto the deck.

2.4 Movement and control joints in the substrate must be carried through to the tile finish. The design and construction of the substrate and movement and control joints is specific to each building, and therefore the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.

2.5 Ceramic or stone tile finishes are outside the scope of this Appraisal.

2.6 The membrane must be installed by Jacobsen Creative Surfaces Approved and Trained Applicators.

## Design Information

### General

7.1 Davco K10 Plus is for use on decks and balconies where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas.

7.2 The membrane must be protected from exposure to UV light and from physical damage by ceramic or stone tile finishes.

7.3 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 to Membrane Roofing"

7.4 Movement and control joints may be required depending on the shape and size of the deck, and the finish specified. Design guidelines for control joints for tiles can be found in the BRANZ Good Practice Guide to Tiling.

7.5 Timber floor 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. Timber framing systems supporting the substrates must be constructed such that deflections do not exceed 1/360<sup>th</sup> of the span. Where NZS 3604 is used, the allowable joist spans given in Table 7.1 shall be reduced by 20%.

### 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, 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 centres may decrease to meet specific wind loadings.

#### Fibre Cement Compressed Sheet

8.4 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 decking substrate. The fibre cement sheet must be of a thickness to meet 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. Installation must be in accordance with instructions of the manufacturer.

#### Concrete

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

### Durability

#### Serviceable Life

10.1 Davco K10 Plus, when subjected to normal conditions of environment and use, are expected to have a serviceable life of at least 15 years and be compatible with ceramic or stone tiling finishes with a design service life of 15-25 years.

## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Davco K10 plus, 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. Davco K10 Plus meets this requirement. See Paragraph 10.1.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.1 and E2.3.2. Decks and balconies incorporating Davco K10 Plus meet these requirements. See Paragraphs 12.1 – 12.9.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Davco K10 Plus meets this requirement and will not present a health hazard to people.

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

## Technical Specification

4.1 Materials supplied by Jacobsen Creative Surfaces are as follows:

#### Davco K10 Plus

- A flexible (Class III as defined in AS/NZS 4858), single pack, water based polyurethane waterproofing membrane. It is supplied as a grey paste in 20 litre pails or green paste in 4 and 20 litre pails.

#### Ultraprime

- An acrylic based multipurpose primer for all porous substrates. It is supplied as a clear liquid in 1 and 5 litre containers.

#### Ultrabond

- Is a grey, flexible, two – part primer/bond enhancer for use over difficult or non porous substrates. It is supplied as a kit made up of a 20 kg bag and a 5 litre pail.

#### Davsil

- A elastic, one component, acetox cured silicone sealant for use as an expansion joint filler. It is available in white, grey and vanilla in 300 ml cartridges.

### Handling and Storage

5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and out of freezing conditions. The materials in the original unopened packaging have a shelf life of 12 months from date of manufacture. Once opened, the materials must be used.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Davco K10 Plus. 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.

## Maintenance

11.1 No maintenance of the membrane will be required provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiling to ensure it is sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiling and any grout or sealant.

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

11.3 Drainage outlets must be maintained to operate effectively, and tile finishes must be kept clean. Cleaning materials that may affect polymer based membranes must not be used.

## External Moisture

12.1 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 code compliance with NZBC Clause E2.3.1 is given by the Technical Literature which gives details aligned with NZBC Acceptable Solution E2/AS1.

12.2 When installed in accordance with this Appraisal and the Technical Literature, Davco K10 Plus will prevent the penetration of water and will therefore meet code compliance with Clause E2.3.2. The membranes are impervious to water and will give a weathertight deck or balcony.

12.3 The minimum fall to decks, balconies and gutters must be 1 in 60 and all falls must slope to an outlet. Inadequate falls will allow moisture to collect and increase the risk of deterioration of the membrane and tiling finish.

12.4 Davco K10 Plus 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.

12.5 Deck and balcony falls must be built into the substrate and not created with mortar screeds applied over the membrane. Where a reinforced concrete substrate is used a mortar screed may be used to create the falls prior to membrane application.

12.6 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.

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

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

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

## Installation Information

### Installation Skill Level Requirement

13.1 Installation of the membrane must be completed by Jacobsen Creative Surfaces Approved and Trained applicators that have experience in the application of waterproofing membranes and understand waterproofing principles.

13.2 Installation of substrates must be completed by tradespersons with an understanding of deck and balcony construction, in accordance with instructions given within the Jacobsen Creative Surfaces 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 Concrete substrates can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 424. The relative humidity of the concrete must be 75% or less before membrane application.

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

14.4 Non-porous substrates must be primed with appropriate primer and allowed to cure before the membrane is installed.

## Membrane Installation

15.1 Installation must not be undertaken where the substrate surface temperature is below 5°C or above 35°C.

15.2 The membrane must be applied in two coats at the rates set out in the Technical Literature. The total finished system thickness of the Davco K10 Plus must be a minimum of 0.8 mm.

15.3 Application can be made by roller (medium/long nap) or brush (long bristle).

15.4 It is strongly recommended that the membrane is protected with temporary covers until it is fully cured in case of mechanical damage or rain wetting.

15.5 Clean up may be undertaken with water while the membrane is still wet.

## Tiling

16.1 The membranes must be fully cured before tiling. The cured membranes must be protected at all times to prevent mechanical damage, so may require temporary covers until the finishing is completed.

16.2 Tiling must be undertaken in accordance with AS 3958.1 and the BRANZ Good Tiling Practice Guide. The compatibility of tile adhesive must be confirmed with the adhesive manufacturer or Jacobsen Creative Surfaces.

## Inspections

17.1 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, particularly installation to the correct thickness and use of reinforcement.
- Membrane curing and integrity prior to the installation of tiles, including protection from moisture, frost and mechanical damage during curing.

## Health and Safety

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

## Basis of Appraisal

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

### Tests

19.1 The testing on Davco K10 Plus has been undertaken by various organisations:

- Testing to AS/NZS 4858: 2004 Appendix A including effect of heat aging, bleach, detergent and water on tensile and elongation, Water Vapour Transmission to ASTM E96-92 and cyclic movement
- Adhesion to various substrates and low temperature flexibility.

Test methods and results were reviewed by BRANZ and found to be satisfactory.

### Other Investigations

20.1 An assessment was made of the durability of the Davco K10 Plus by BRANZ technical experts.

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

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

### Quality

21.1 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.

21.2 The quality management system of the membranes manufacturer has been assessed by BRANZ and found to be satisfactory.

21.3 The quality of supply of the membrane system materials to the market is the responsibility of Jacobsen Creative Surfaces.

21.4 Quality on site is the responsibility of the Jacobsen Creative Surfaces Approved and Trained Applicators.

21.5 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, Jacobsen Creative Surfaces and this Appraisal.

21.6 Building owners are responsible for the maintenance of the tiling systems in accordance with the instructions of Jacobsen Creative Surfaces.

### Sources of Information

- AS 2908.2: 2000 Cellulose-cement products – Flat sheet.
- AS 3958.1 Guide to the installation of ceramic tiles.
- AS/NZS 2269: 1994 Plywood-Structural
- AS/NZS 4858: 2004 Wet area membranes.
- NZS 3101: 1995 The design of concrete structures.
- NZS 3604: 1999 Timber framed buildings.
- Approved Document for New Zealand Building Code External Moisture Clause E2, Building Industry authority, Third Edition July 2005.
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition May 2007.
- The Building Regulations 1992, up to, and including June 2007 Amendment.
- Good Practice Guide to Tiling, BRANZ, March 2004.
- Good Practice Guide to Membrane Roofing, BRANZ, October 2003



**BRANZ**

In the opinion of BRANZ, **Davco K10 Plus** 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 **Jacobsen Creative Surfaces 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. **Jacobsen Creative Surfaces 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.
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 **Jacobsen Creative Surfaces Ltd**.
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 **Jacobsen Creative Surfaces Ltd** or any third party.

For BRANZ

C Preston  
Chief Executive

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