Building Code E3/AS1 Internal Moisture
2nd edition Amendment 7
Alternative Solution Compliance Statement

Acceptable solutions for watersplash areas including kitchens, laundries, bathrooms and toilet areas where a building consent for new or refurbished work is required.
The accepted solutions for flooring finishes in these areas are slab-on-grade concrete that is steel trowel finished, ceramic, stone or an integrally waterproof sheet material (e.g. vinyl) with welded seams and edges sealed or coved. The finish must be impervious and easily cleaned. The area extends to the doorway and all walls of the room, or at least 1.5 metres from all sanitary fixtures or appliances in open plan rooms.

Timber, laminates and vinyl planks may still be used, however, these flooring finish types will now need to be specified and approved as an Alternative solution.

Alternative Solutions Compliance Statement for E3
This document provides guidance in regards to the comment under section 3.1.1 Floors (under section 3.0 Watersplash) that states "other floor finishes may also be capable of satisfying the performance for impervious and easily cleaned, if installed in a manner that prevents gaps or cracks within the finish and at any parts of its perimeter that are exposed to water splash, and/or if the surface is sealed with a suitable durable coating".

When Karndean products are installed to manufacturers installation guides, and where applicable with RLA subfloor preparation and adhesives the product and systems meet the requirements of the E3 building code under the following typical pathways of being an acceptable solution: -

- In-Service History
- Expert opinion or producer statement
- Previously accepted Alternative Solution

IMPERVIOUS SURFACE
All Karndean products are manufactured with Karndean K-Guard + Surface Protection. Our K-Guard + Surface Protection system uses polyurethane technology to provide a hygienic, durable and impervious waterproof surface – all of Karndean products are water and moisture resistant and for Karndean Hybrid ranges the joint systems used provide resistance to water penetration where water splash may occur. Neither Karndean LVT or Hybrid range boards including the 5G click system are adversely impacted by moisture during normal use or as part of the cleaning process.

Polyurethane surfaces have long been the standard for ease of cleaning and maintenance in hard flooring and our maintenance and cleaning instructions are readily available.

PERIMETERS EXPOSED TO WATERSPLASH
For Karndean LVT (Glue Down Knight Tile, Opus, Van Gogh, Art Select, LooseLay Originals & LooseLay Longboard) & Hybrid (Korlok / Van Gogh Rigid Core & Knight Tile Rigid Core) products the perimeters of the room should be installed with a bead of silicone at the floor to wall junction to all perimeters extending to the doorway, or at least 1.5 meters from any sanitary fixtures of wet rooms / watersplash areas of open plan rooms to prevent gaps and cracks in the perimeter of the finish, this to prevent water ingress and allow for easy ongoing maintenance.

For Hybrid ranges to achieve the maximum allowed floor area the main floor should be segregated from the wet room or splash zone area by use of control joints at doorways, thresholds and or architectural breaks as required. Outside of areas specified as watersplash standard installation guidelines must be applied as per Karndean Installation guides.

SERVICE HISTORY
Karndean products have been manufactured by Karndean, distributed and installed by our retail partners in New Zealand for over 25 years, with a main focus to the domestic market. When Karndean products are installed to Karndean installation guides and where applicable to system specifications as required for wet areas, Karndean products have a proven track record to performance and service history to the New Zealand market.

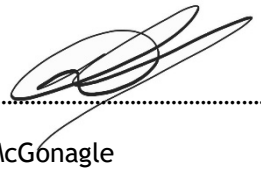
Attached to this alternative solution statement Karndean provide the following information: -

1. Previous accepted Producer statement to E3/AS1
2. RLA Polymers LVT – Wetroom installation system – Kitchen, Laundries & Toilets
3. RLA Polymers LVT – Wetroom installation system – Bathroom and Ensuites
4. Karndean installation guides
    a. LVT
    b. Looselay
    c. Korlok
5. Karndean cleaning & maintenance guides
6. Karndean warranty declaration

ADDITIONAL INFORMATION
Where the attached or above information is not followed as directed and or documented it will be the responsibility of the retailer, contractor and or installer to confirm any proposed changes to the prescribed systems are thoroughly investigated to ensure conformance to E3/AS1.

Consultation with Karndean should be sought prior to acceptance of any proposed changes outside of this statement.

Please contact your local Karndean representative or Karndean Technical Services team for further information, discussion or clarification of this statement and or supporting documentation.



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Dale McGonagle
Technical Services Manager
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PRODUCER STATEMENT

Karndean Vinyl Tile and Vinyl Wood planks tested to AS/NZ 4858 wet area membranes.

Karndean Luxury Vinyl Tiles and Vinyl Woodplanks (LVT) when installed as a system using RLA Polymer PE8000 (in AU) or RLA Polymer PE8001 (in NZ) polyurethane waterproof multi-purpose adhesive, will satisfy the performance for *impervious* and easily cleaned surfaces exposed to water-splash in wet areas of residential homes and accommodation buildings (hotels, motels etc) in accordance with…

1. Building Code of Australia, Class 1 and Class 10 buildings: Clause 3.8.1.2 and…
2. New Zealand Building Code, Internal Moisture, section E3: clauses 3.3.3, 3.3.5 and 3.3.6

…without the need for an impervious surface underlayment

Documentation enclosed with this Producer Statement.

1. AWTA Product Testing (NATA endorsed) Flemington, Victoria, Australia Commentary Letter dated 29th April 2008 on the results of testing Karndean Vinyl Flooring to AS/NZS 4858 Wet Area Membranes.

2. AWTA Test Report 7-555815-NV Appendix A – Assessment of Durability of Waterproofing Membranes pages 1 & 2 – Karndean Vinyl Flooring.

3. AWTA Test Report 7-558550-NV Appendix B – Assessment of resistance of waterproofing membranes to cyclic movement – Karndean Vinyl Flooring.

4. AWTA Test Report 7-557095-NV Appendix C – Assessment of the suitability of waterproofing membranes when used over particleboard – Karndean Vinyl Flooring.

5. RLA Polymer Engineering – Product Data – PE8000 / PE8001 2-part Waterproof Multipurpose Adhesive.

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AWTA PRODUCT TESTING

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29th April 2008

Mr Graham Caldwell
Karndean International Pty Ltd
835 Stud Road
Knoxfield Victoria 3180

Dear Graham

Re: AWTA Textile Testing Report Nos: 7-557095-NV, 7-555815-NV & 7-558550-NV

Testing was conducted to AS/NZS4858 (Wet Area Membranes), the primary purpose of which was to determine the performance and define general testing requirements for waterproof membranes to be used in residential and non residential buildings. Reference to AS/NZS4858 may be found as a pre-requisite for demonstrating that the material is waterproof in accordance with the Building Code of Australia (2007), Class 1 and Class 10 Buildings code, * Section 3.8.1.3. Testing was also undertaken with a view to determining that the product was "waterproof" as detailed in a Compliance Document for New Zealand Building Code – Internal Moisture – Clause E3 – second Edition – Clause 3.1.1.(a).

It is the intention of this correspondence to provide a broad synopsis of testing undertaken on the light grey marble vinyls tiles provided by Karndean International Pty Ltd, with a view to determining the applicability and meaning of those elements of the standard (AS4858) to which product were evaluated.

*Where applicable, the tile adhesive used was – Polymer 8000 Polyurethane Wet-area adhesive.

Testing was conducted in part on the Tile and Glue* system in addition to the Joint and Glue* system under various guises as described below, all with a view to determining if the system was waterproof as defined by AS4858 section 1.

Report Number 7-555815-NV

Appendix A – Assessment of Durability of Waterproofing Membranes

The purpose of this Appendix was to determine the deterioration in tensile strength and elasticity (Elongation) after exposure to various different environmental criteria which included the immersion in water, bleach and detergent for periods of 7 days, 28 days and 56 days as well as heat exposure for a 7 day duration @ 50°C. In all cases the elasticity (Elongation) should not have fallen to less than 50% of an original unexposed specimen.

The product complied to the above criteria demonstrating acceptable variance about the original unexposed sample (8.46 mPa – Tensile Strength @ 44.5% elongation). Result variance may have been due to inconsistencies in laminate density and orientation of tested specimens.

* Section 3.8.1.3 of the 2012 revised BCA was renumbered 3.8.1.2 with no change of intent and reads exactly the same as the previously numbered section

Testing applicability could be to demonstrate that product physical performance did not significantly alter during worst case scenario field exposure.

Table 8.1 (B) – Water Absorption

Water absorption was also tested in accordance with data provided in AS4858 Table 8.1b. The maximum amount of water absorbed by a controlled quantity of desiccant through specimen during testing was 0.1% > Whilst there is no compliance offered by the standard for the transmittance of water vapour through the product, this quantity does describe the performance of the product when exposed to an environment where significant quantities of water vapour is present, and may be used to compare this characteristic on like products that have undergone this type of testing with a view to minimising water vapour through the product which may affect surface adhesion.

Report Number 7 – 558550-NV

Table 8.1 (C) – Appendix B – Assessment of Resistance of Waterproofing Membranes to Cyclic Movement.

The above test was used to determine the affect that cyclical movement had on a glued seam of 2 tiles of fixed specimen size*. The primary purpose of this test was to ensure that the seam did not rupture after repeated unidirectional stress cycles were applied to it. The joint movement cycle used lasted for a continuous 2hr period during which a 200N force was applied and relaxed on the seam every 2.4 minutes.

After testing, the seam showed no evidence of rupture or cracking.

This test may have been designed to simulate the forces placed on tile seams by the repeated expansion and contraction of tile, glue and substrate by the application and removal of temperature.

Report Number 7-557095-NV

Table 8.1(E) – Appendix C – Assessment of the Suitability of Waterproofing Membranes when used over Particle Board.

Testing in accordance with the above reference, involved the construction of a shower base and subsequent measurement of water present in the substrate (Particle Board) to which the tiles had been adhered.

Test duration was 42 days after flooding the shower base with water to a depth of 25mm, with moisture readings taken and averaged over 6 locations at regular specified intervals on the back of the timber used to construct the shower base. Moisture readings were compared to control specimens where not more than 10% moisture increase was allowable in the particle board and the maximum difference recorded was 1.7%.

This test is specific to applications where the glued tiles are to be directly immersed in water for prolonged periods, and it may be pertinent to note that the primary resistance to water was a function of the consistency in application of the adhesive* which provided a water impermeable membrane.

Most of the testing conducted on the tile/glue* product system was specific to the ability of the system to be resistant to physical change in addition to the protection of a substrate from physical change where the tile/glue* system was applied and then placed under varying environmental circumstances.

It may be concluded that the system of glue* and tiles tested in accordance with criteria detailed above demonstrated compliance to elements of AS4858 and these data could be used in applications where AS4858 constitutes a requirement or part requirement for product selection, including references by the Building Code of Australia (2007) Class 1 and 10 Buildings sections 3.8.1.3. *

It can also be concluded that the Karndean vinyl tiles and adhesive system* evaluated in accordance to AS4858 were well within acceptable levels of water and water borne chemical permeability and prolonged physical cycle testing defined in the standard which is applicable to defining that the product and glue system* is "waterproof", which may be additionally described in New Zealand Building Code – Internal Moisture – Clause E3 – Second Edition-Section 3.1.1 (a).

It should be borne in mind that the opinions expressed in this letter are based on a limited number of observations made on a single sample and may be subject to alteration if more detailed testing were to be carried out. We recommended that you have further testing conducted if the information above is critical to your decisions on this product.

Please contact me regarding any further queries.

Yours Faithfully

David Teakle
Technologist

* Section 3.8.1.3 of the 2012 revised BCA was renumbered 3.8.1.2 with no change of intent and reads exactly the same as the previously numbered section

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TEST REPORT

CLIENT : KARNDEAN INTERNATIONAL PTY LTD
835 STUD ROAD
KNOXFIELD VIC 3180

TEST NUMBER : 7-557095-NV
DATE : 21/12/2007
ORDER NUMBER : 35991

SAMPLE DESCRIPTION Vinyl tiles
Colour: light grey marble
Q3549E

AS/NZS 4858-2004 Assessment of the Suitability of Water Proofing Membranes
CLAUSE 8E When Used over Particle Board
APPENDIX C

			Difference between Control and position's
Mean moisture content of controls		10.26%	
Mean moisture content of position	1	9.75%	0.51%
	2	9.31%	0.95%
	3	9.30%	0.96%
	4	9.95%	0.31%
	5	8.56%	1.70%
	6	8.94%	1.32%

Compliance to AS/NZS 4858:2004 C5
Requirement: to achieve a pass the moisture content at all 6 locations in the test, specimen shall not reach a moisture content 10% above the average of the 2 control measurements taken on the same day
Result: pass

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Samples, and their identifying descriptions, have been provided by the client unless otherwise stated. AWTA Ltd makes no warranty, implied or otherwise, as to the source of the tested samples. The above test results relate only to the samples or samples tested. The above test results are designed to provide the CLIENT WITH GUIDANCE INFORMATION ONLY.

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APPROVED SIGNATORY

MANAGING DIRECTOR

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TEST REPORT

CLIENT : KARNDEAN INTERNATIONAL PTY LTD
835 STUD ROAD
KNOXFIELD VIC 3180

TEST NUMBER : 7-555815-NV
DATE : 22/10/2007
ORDER NUMBER : 35991

SAMPLE DESCRIPTION Vinyl tiles
Colour: Light Grey Marble

AS/NZS 4858-2004 Wet Area Membrane
PPENDIX A Assessment of Durability of Waterproofing Membranes

	Mean tensile strength (mPa)	Mean elongation at break(%)	*	Change in appearance
As received	8.46	44.5	1	Nil
Water immersed				
7 days	9.45	40.9	3	Nil
28 days	8.44	42.6	1	Nil
56 days	8.48	44.6	1	Nil
Bleach immersion				
7 days	9.51	40.9	3	Nil
28 days	8.35	46.1	0	Nil
56 days	8.68	41.7	1	Nil
Detergent immersed				
7 days	8.67	53.3	5	Nil
28 days	8.14	43.1	1	Nil
56 days	7.88	38.8	2	Nil
Heat aged				
7 days	8.60	45.7	1	Slight gloss increase Slight yellowing

* Number of specimens than skin elongation was greater at a lower strength than backing
Dumbell used: 20mm wide
Crosshead speed: 50mm/minute
Note:Tensile strength not tested across tile joint

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(CONTINUED NEXT PAGE)

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TEST REPORT

CLIENT : KARNDEAN INTERNATIONAL PTY LTD
835 STUD ROAD
KNOXFIELD VIC 3180

TEST NUMBER : 7-555815-NV
DATE : 22/10/2007
ORDER NUMBER : 35991

Compliance to AS/NZS 4858-2004 table 8.1 property 8D-durability table A1
Requirement: As received (control) record result - tensile strength and elongation

Water immersion:	Elongation at break shall not be less than 50% of the controls	Complies
Bleach immersion:	Elongation at break shall not be less than 50% of that of the controls	Complies
Detergent immersion:	Elongation at break shall not be less than 50% of of the result recorded for the control	Complies

AS 3558.1-1999 Determination of Water Absorption Characteristics

Specimen	Mass water absorption
1	0.03 %
2	0.1
3	0.05
4	0.04
Average	0.05 %

Test conditions: 20+/-2degC and 65+/-3% Relative Humidity

All tested specimens were preconditioned in an oven at 50+/-5degC for 24 +/-0.5hours prior to testing

Compliance to AS/NZS 4858-2004 table 8.1 property 8B water absroption
Requirement Record result

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MANAGING DIRECTOR

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TEST REPORT

CLIENT : KARNDEAN INTERNATIONAL PTY LTD
835 STUD ROAD
KNOXFIELD VIC 3180

TEST NUMBER : 7-558550-NV
DATE : 20/03/2008
ORDER NUMBER : 35991

SAMPLE DESCRIPTION Vinyl tiles
Colour: Light Grey Marble

AS 4858
CLAUSE 8C
APPENDIX B

Acceptance of Cyclic Movement

	Breakage
Specimen 1	Nil
2	Nil

Test conditions: 20+/-2degC, 65+/-3% Relative Humidity

Cycled using Instron for 2 hours at a rate of 1 cycle every 2.4 min at a force of 200 Newtons tested across a glued seam using 8000 Polyurethane multipurpose adhesive

Compliance to AS 4858 clause 8C Appendix B
Requirement No breakage

Complies

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APPROVED SIGNATORY

MANAGING DIRECTOR

Polymer engineering

PRODUCT DATA

AN ADVANCED TECHNOLOGY COMPANY

8000 Polyurethane Multipurpose Adhesive

DESCRIPTION
Polymer 8000 is a 2 part polyurethane adhesive.

FOR BONDING
Polymer 8000 may be used to bond vinyl, synthetic rubber, timber and various outdoor floorings.

TO
Most common building substrates including concrete, timber & steel providing a bond highly resistant to water and most common chemicals.

PREPARATION
All surfaces should clean, dry and free of grease, oil and other contaminants. Any laitence on concrete should be removed with an acid type cleaner such as Polymer Chemclean MAS.

MIXING
Polymer 8000 has been developed for ease of handling and mixing by the floor layer. The packs are accurately weighed by the manufacturer. Contents of part B should be completely emptied into the part A container and the two parts thoroughly mixed. The difference in colour between parts A & B helps to indicate that mixing is complete.

APPLICATION
It is most important that the suitability of the adhesive for any particular flooring be checked before using.
A small practical stick test by the layer or discussion with the manufacturer is recommended.
After mixing and emptying container onto the substrate the adhesive should be spread by notched trowel. For smooth backed materials, adhesive should be spread evenly with a 'V' notched spreader with notches 1.6mm deep x 1.6mm wide x 1.6mm spacings. Use 2.4mm notches for synthetic grass or other highly textured backed materials. The material should be laid into the wet film of adhesive.
Polymer 8000 does not possess wet or dry tack properties - it relies upon the thickness of adhesive film to hold down the material - should the material not tend to lay flat e.g. corners of studded rubber tiles peaking, then assistance should be given in holding down with a weight until partial cure has been reached.
Curing time is very much related to temperature (below 7°C the cure is suspended) but generally speaking, the initial bond sets up within approx 12 hours and final cure is reached after 7 days. Over this 7 day period the bond gradually increases in strength.

USEFUL HINTS
1. Use a paint stirrer in an electric hand drill for quick and easy mixing.
2. Chemical reaction in the mix generates heat which speeds curing time and shortens the pot life of the two mixed components - if the whole of the mix is poured onto the floor and roughly spread around prior to correct trowelling this will dissipate some of the heat, make for ease of spreading and extend the pot life.

TECHNICAL DATA

PART A

Appearance	Grey paste
Solubility	Insoluble in water
S.G.	Approx 1.5
Boiling Point	>200° C
Flash Point	> 100° C

PART B

Appearance	Dark brown liquid
Solubility	Negligible
S.G.	Approx 1.2
Boiling Point	Not available
Flash Point	> 200° C

CONTAINER SIZE
10 kg unit Plastic pails
Part A = 8 .40 kgs
Part B = 1 . 86 kgs

COVERAGE
Smoothback materials (studded rubber etc) approx 2m2 per kg. Synthetic grass and carpet or other rough backed materials approx 1- 1.5m2 per kg.

SAFETY & HANDLING
Refer to safety data sheet

STORAGE
Use in well ventilated areas. Keep container closed. store away from sources of heat.

RLA 044B

All statements and technical information contained herein are based on tests we believe to be reliable but the accuracy thereof is not guaranteed. Users assume all risks and liability resulting from the use of this product and must confirm the suitability thereof by their own tests. Conditions of Sale contain a limited warranty against manufacturing defects.

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