



Operation and Maintenance Manual





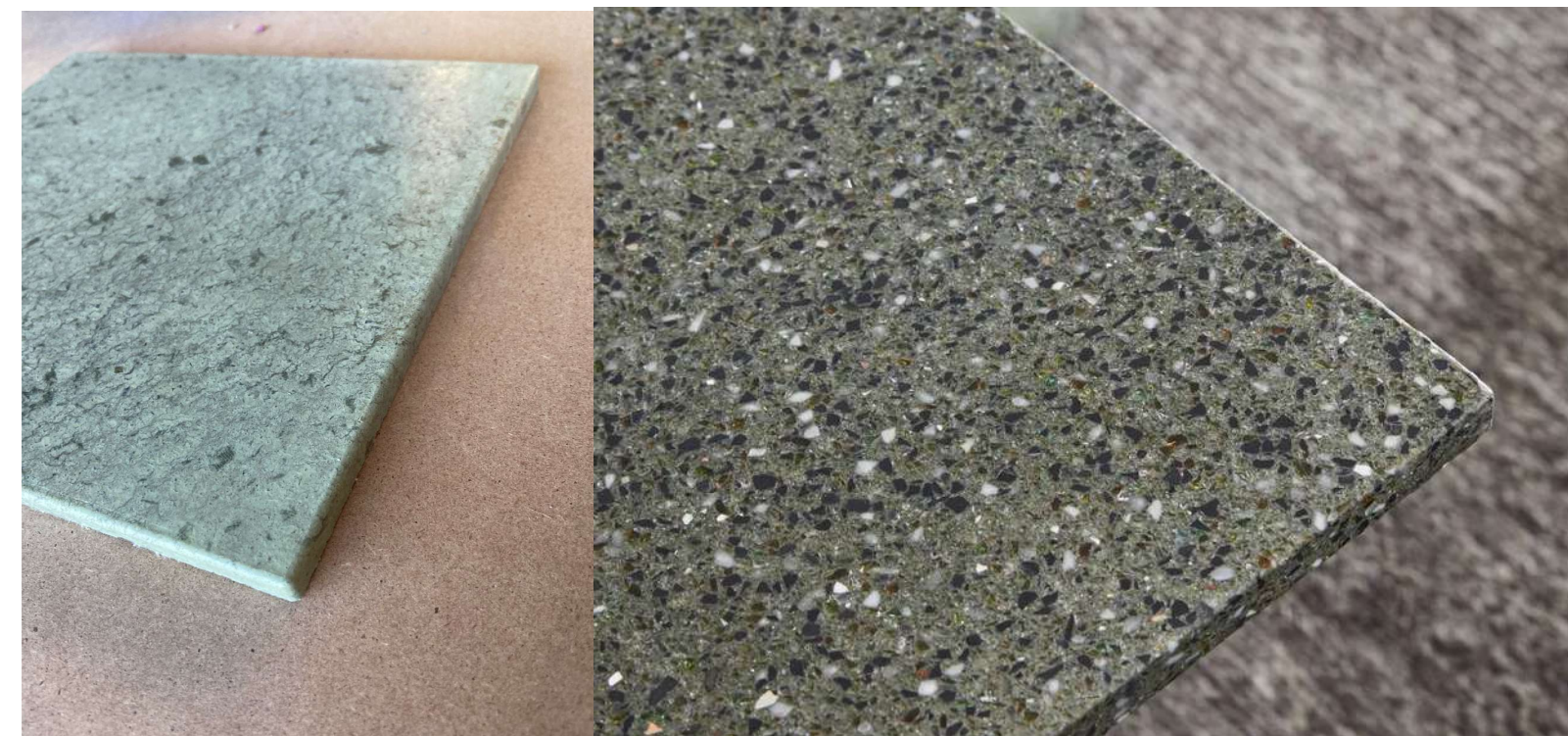
Disclaimer

Kandui makes no warranty, representation or guarantee regarding the information presented in this document. Kandui does not assume any responsibility for problems associated with defects that are not directly associated with the product itself. All recommendations for adhesion of Green Ceramic tiles have been made with reference to Australian standards. This guide aims to present suggestions regarding material selection and does not present in-depth instruction for installation using Green Ceramics. Installation steps aligning with Australian Standards should always be used when handling Green Ceramic products. Test the product in an inconspicuous area first. Green Ceramics were manufactured by Kandui in Australia. The information presented in this document is to the best of our knowledge as at the time of sharing.

Operation and Maintenance Manual

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Overview

This document presents a general guide to the proper use of Green Ceramic™ Tiles in relation to adherence to a surface. It concerns the usage of different adhesives, grouts, primers and other related materials for bonding/ adhering a Green Ceramic tile to a substrate. This substrate may be for dry or wet interior environments.

This document is a set of recommendations and does not aim to present itself as an Australian Standard. Instead, existing Standards have been referenced to provide clearer guidelines. The 2019 Australian Tile Council’s Tiles & Tiling Guide (Australian Tile Council Inc., 2019), internal testing, and past project experiences were referenced to present a comprehensive set of guidelines and recommendations.

The table below provides a schedule of references used by this guide.

Code	Description
AS 3600	2018 Concrete Structures
AS 3610	2018 Concrete Formwork Specifications
AS 3700	2018 Masonry Structures
AS 3740	2004 Waterproofing of Domestic Wet Areas
AS 3958.1	2007 Ceramic tiles Part 1: Guide to the installation of ceramic tiles
AS 4662	2003 Ceramic Tiles - Definitions, classification, characteristics and marking
AS 4992.1	2006 Ceramic tiles - Grouts and adhesives
AS/NZS 1859	2017 Reconstituted wood-based panels - Specifications Particle Board
AS/NZS 2270	2006 Plywood and blockboard for interior use
AS/NZS 2271	2004 Plywood and blockboard for exterior use
AS/NZS 2588	2018 Gypsum plasterboard
ASTM C630	Standard specification for water-resistant Gypsum backing board
ISO 13007-1	2014 Ceramic tiles – Grouts and adhesives

Substrates

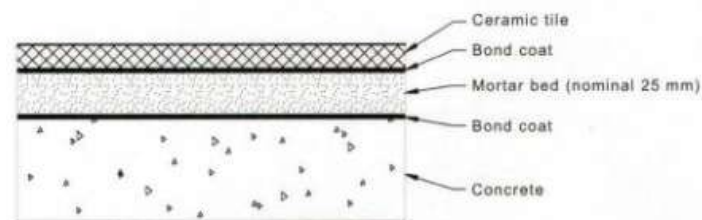
The area to be tiled must be set out in accordance with the Australian Standard AS 3958.1– 2007 Ceramic tiles Part 1: Guide to the installation of ceramic tiles or similar.

- This standard outlines the various substrates and structures for both floor and wall systems in preparation for the installation of ceramic tile systems. These floor and wall systems are suitable for the installation of Green Ceramic Tiles.
- Substrates have been defined as ‘primary or underlying materials, to which other materials are applied.’ (Australian Tile Council Inc., 2019)
- It is recommended that you don’t tile over existing tiles.
- Thin layer of fast drying levelling compound can be applied for smooth substrate.
- In every situation the substrate should be true, sound and dry before installation of the tiles takes place.
- Incorrect or inadequate surface preparation is the most common cause of failure of the bond.

Applications	Suitable Materials	Description
Wall Tiling	Gypsum Plasterboard Sheets	- Minimum thickness 10 mm. - AS/NZS 2588 compliance for dry areas. - ASTM C630 performance requirements and - AS/NZS 2588 specifications for wet areas (defined by AS3740. Includes areas of periodic wetting eg. Bathrooms)
	Fibre-Cement Sheets	- Minimum thickness 6 mm - Minimum thickness in heavy duty commercial applications 9 mm - Check with sheet manufacturer if tile is to be fixed to sheet which is fixed to building façade.
	Compressed Fibre- Cement Sheets	- Minimum thickness 9 mm
	Plywood	- Minimum thickness 10 mm - AS/NZS 2270 for dry areas - AS/NZS 2271 for wet areas
	Concrete / Masonry Walls	- AS 3600 for Concrete structures - AS 3610 for Concrete surface finish - AS 3700 for masonry

Substrates

Applications	Suitable Materials	Description
Wall Tiling	New Concrete Walls	- Continuous air-drying for 4 weeks prior to surface rendering or direct tile installation. Remove surface contaminants thoroughly.
Floor Tiling	Plywood	- Minimum thickness 10 mm - AS/NZS 2270 for dry areas - Screw sheets at 100mm centres for the edges, 200 mm centres for the rest. - Suitable flexible thin-set adhesive with a flexible additive from the same manufacturer for tile installation.
	Structural Particle Board	- AS/NZS 1859 Minimum thickness 19 mm - Recommended that minimum 6 mm thick ceramic tile underlay is used prior to tiling and waterproofing (if necessary)
	Fibre Cement Sheets	- Minimum thickness 15 mm - Used as separating layer / underlay
	Compressed Fibre Cement Sheets	- Minimum thickness 15 mm
	Concrete	- AS 3958.1 2007 for industrial, commercial and residential interior substrates. - Allow slabs to cure and dry first



To create an even surface, a 3:1 mix of fine wash sand and cement may be used to prepare the surface substrate. In this situation, two options are available for tiling. The decision is based upon the porosity of the tiles. Tiles below 6% are best used with adhesives. AS 4662 provides more details.

- Conventional adhesives can be used once new screed dries and cures.
- Tiles can be laid in the sand and cement bed as the screed is laid. A separating layer will be required if laid over existing timber substrates.

Cement render surfaces requires minimum 7 days before tiling, unless advised otherwise by adhesive manufacturer.

Bonding

A range of adhesives can be used for bonding Green Ceramics but must comply with the following.

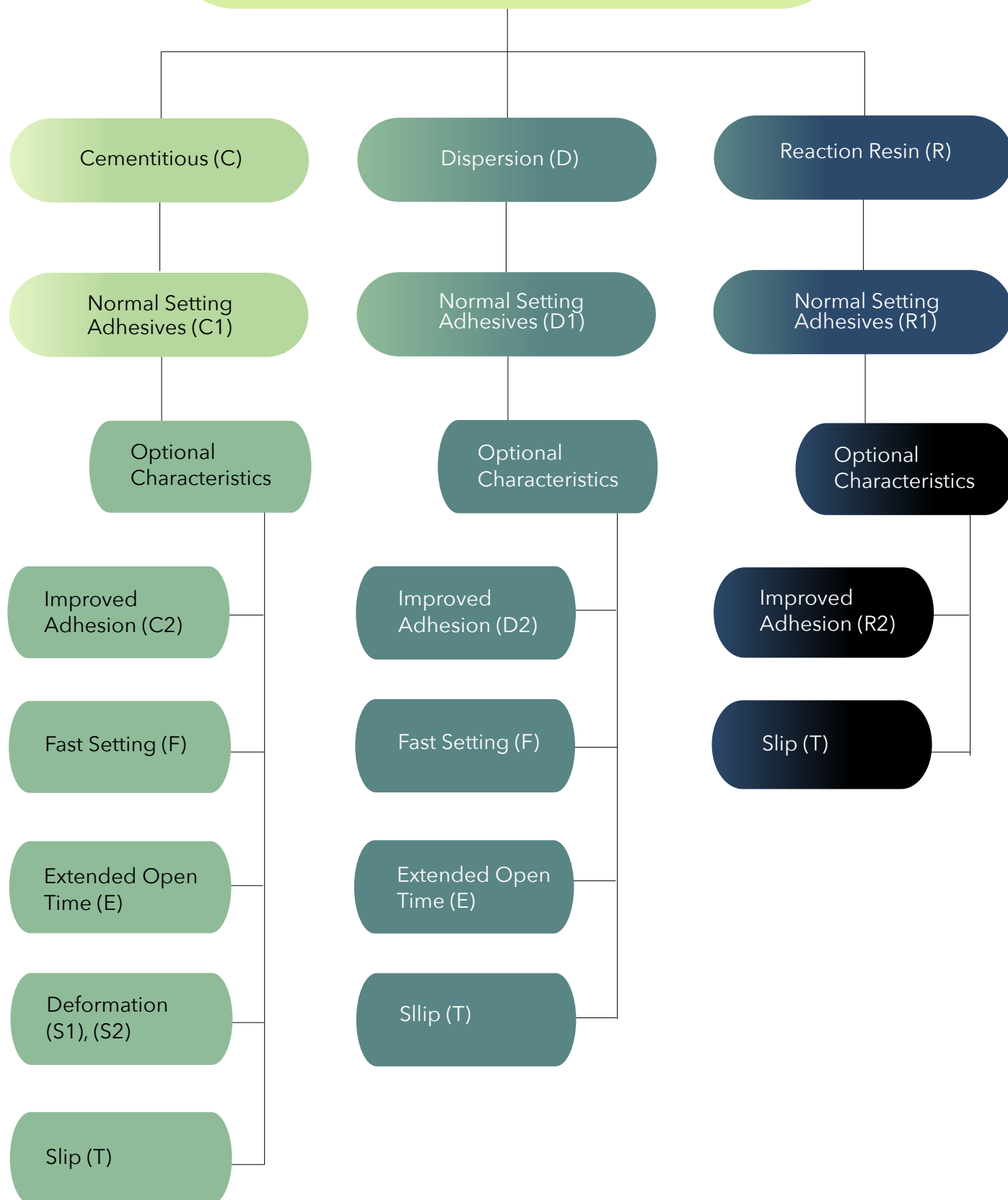
- The adhesives to be used must meet Australian Standard AS 4992.1–2006 Ceramic tiles–Grouts and adhesives or ISO 13007-1:2014 Ceramic tiles – Grouts and adhesives
- The adhesives must meet or exceed Cementitious C2S2TE and / or Dispersion D1TE classifications. A breakdown of the classification system has been included in the following diagram.
- Primers can be used to improve the characteristic of the adhesive. Follow the adhesives manufactures guidelines.
- For difficult to bond areas a product like Sikaflex 111 or 11FC can be used.
- Test the product in an inconspicuous area first.
- Do not tile if the temperatures are excessive.
- Do not apply more than the recommended amount of adhesive as it may dry and become ineffective.
- Some All-Purpose Adhesive from Dunlop¹, Davco² and similar will work in most situations with Green Ceramic Tiles.

1. <https://dunlopdij.com/product/dunlop-tile-all-plus/>

2. <https://aus.sika.com/en/46017/tile-stone-installationsystems/tile-adhesives/davco-apa-all-purposeadhesive.html>



Tile Adhesive Classification to AS 4992.1 - 2006



Grouts

Covered by ISO 13007.

- Applied in 2 mm joints (walls) or 3 mm joints (floors) following AS 3958.1. May be thinner if specified by Kandui, in response to a customer request.
- Tile fixer should decide between using AS 3958.1 standard or manufacturers suggestion based on flatness of substrate. Wider joints are recommended for uneven substrates, both vertical and horizontal.
- Tiles may be laid without grout if they are the same batch and has been discussed with Kandui.
- Standard grouting systems can be used as per Australian Standard AS 4992.1– 2006 Ceramic tiles–Grouts and adhesives or ISO 13007-1:2014 Ceramic tiles – Grouts and adhesives and inline with Australian Standard AS 3958.1–2007 Ceramic tiles Part 1: Guide to the installation of ceramic tiles.

Adhesive Types	Classes	Special Characteristics	Applications
CG (Cementitious grouts)	1 - Normal 2 - Improved	F - Fast - setting A - High Abrasion resistance W - Reduced water absorption Highly versatile, most common	Can improve by mixing additive for improved resistance to mould and staining and improved flexibility
RG (Reaction Resin/ Epoxy Grouts)		Higher Performance than improved CG	Primarily commercial environments where grout joints may encounter liquid or chemical spills.

Primers

- Improve bonding between the substrate and tile.
- Improve tile adhesive characteristics. Better water retention for longer curing, longer open time and increased ultimate strength. Longer open time allows more tiles to be laid in one period and more time to adjust.
- Should be applied to all substrates prior to tiling unless the substrate has a water proofing membrane on top.

Waterproofing Membranes

- If the tiles will be installed in wet areas, a waterproofing or water-resistant process must be applied following AS 3740 – Waterproofing of Domestic Wet Areas.
- Ensure chosen tile adhesive, grout and primer is compatible with waterproofing membrane.

Tile Preparation

- Tiles can be cut to size with a wet saw system.

Daily Care and Maintenance

For general routine cleaning, wipe SMaRT stone surfaces with a few drops of multi-purpose cleaner, a diluted sugar soap solution, lukewarm water, or a mild liquid dishwashing detergent. Use a clean soft cloth for best results. Too much cleaner or soap may leave a film and cause streaks. Rinse the surface thoroughly after washing with the soap solution and dry with a soft cloth. Do not use scouring powders or creams, these products contain abrasives that may scratch the surface. For disinfection and sterilization, use rubbing alcohol with 70%+ more alcohol content or diluted bleach solution. For stubborn stain, thoroughly scrub the surface with concentrated sugar soap or acetone. Only use rotating brush and sponge for scrubbing. Do not use steel wool to prevent scratching of tiles.

Recommended Cleaning Solution

Daily Cleaning

- Water
- Multipurpose cleaner
- Diluted sugar soap solution
- Mild liquid dishwashing detergent

Disinfection & Sterilization

- Alcohol wipe
- Diluted bleach

Stain Removal

- Concentrated sugar soap
- Acetone

Tile Damage Prevention

Scratch

To prevent scratch, do not use scouring powder and cream, steel wool, and abrasive cleaner.

Heat resistance

Green Ceramics is heat resistant, however like all stone materials, Green Ceramics can be damaged by sudden and rapid surface temperature changes. Therefore, it is recommended to place hot pots, oven trays and fry pans directly from the oven or hot plate onto a wooden chopping board or heat trivet. We also recommend that electric fry pans and slow cookers are also used on a wooden chopping board.

Stain resistance

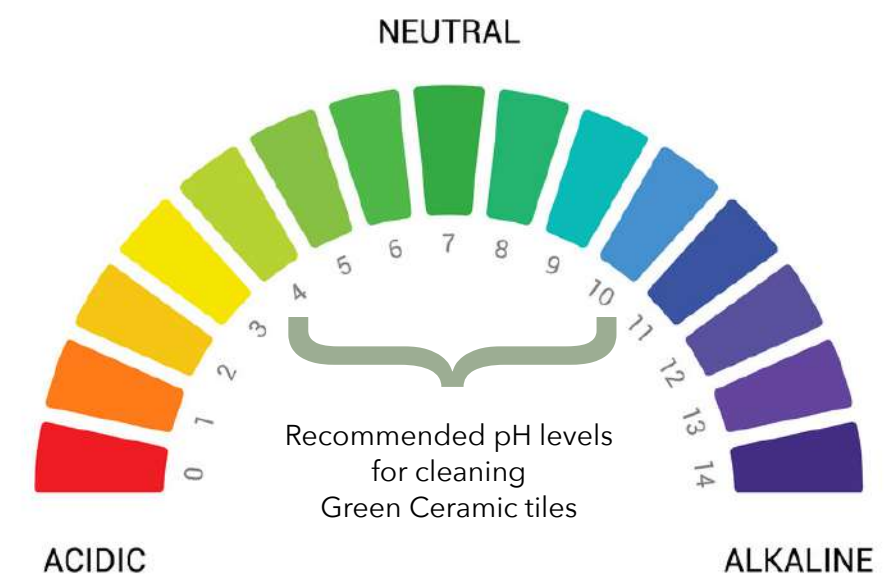
Green Ceramics is made from glass and textile. The combination of these two products offer good stain resistance to acid and alkali liquid. Green Ceramics, however, can be permanently damaged by prolonged or repetitive exposure to strong chemicals and solvents that undermine its physical properties. Do not use products that contain trichloroethane or methylene chlorides, such as paint removers or strippers. Avoid any highly aggressive cleaning agents like oven cleaner, concentrated bleach that has high alkaline levels or bathroom/grout cleaner that has high acidity. Dilution of strong alkaline/acidic chemicals to pH between 4 -10 is required to prevent dulling of tiles. Should the surface be accidentally exposed to any of these damaging products, rinse immediately with water to neutralize the effect.

Disclaimers

Always test each cleaning agent in an inconspicuous area to check for discoloration or staining.

Do not use abrasives for cleaning.

Continued use of concentrated bleach may lead to discoloration over time.



Warranty

Limited 10 year warranty

Kandui Technologies Pty Ltd (Kandui) warrants that its green ceramics tiles (Product) will remain free from defects arising from the manufacture of the Product (Defects) for a period of ten (10) years from the date of installation of the Product (Warranty Period).

If a Product is assessed to contain Defects during the Warranty Period, Kandui will replace the the Product (excluding labour) in accordance with, and subject to, the terms and conditions set out below.

This warranty applies only to the original purchaser of the Product and is not transferable to anyone else, including subsequent owners.

Except for consumer guarantees set out in the *Competition and Consumer Act 2010 (Cth) (Act)*, Kandui does not make any further warranties or representations in relation to any products.

Terms and Conditions

This warranty only applies:

1. to a Product in which Defects occur on or prior to expiry of the Warranty Period;
2. when a Product is used in accordance with any applicable published specifications and guides, and is properly installed by a qualified, licensed stonemason in accordance with any installation recommendations provided by Kandui; and
3. when the installation of the Product is inspected and approved by an authorised representative of Kandui on completion to ensure that the relevant standards have been maintained including any published installation recommendations of Kandui.

This warranty does not apply:

1. to any Defect caused to a Product by misuse, mishandling neglect, accident or ordinary wear; or
2. to any use of the Product for a purpose for which the Product was not sold or designed or used in violation of any applicable standard; or
3. to the incorrect installation or assembly of the Product or to use, installation or assembly which is not in accordance with any specified instructions for use, installation or assembly; or
4. to any damage to products sold in conjunction with a Product or to any damage resulting from the installation or assembly of any Product; or
5. to any repair, modification, tampering, subsequent fabrication or other workmanship by you or any person other than an employee of Kandui or an authorised representative of Kandui; or
6. to any Product used for flooring or in any outdoor application (including swimming pools) or any excessive exposure to sunlight, chemicals, flames or excessive heat; or
7. to any damage to the Product resulting from placing hot items, including but not limited to hot pans, electric frying pans or oven trays, on the Product;

8. to any damage to the Product resulting from the use of products which contain trichlorethane or methylene chloride (such as paint removers or strippers) or cleaning agents which have high alkaline/pH levels;

9. to any irregularity in the slab used to create the Product which existed in the material prior to fabricating and installation and were present in the final installed Product; or

10. to any material surface variations within or on the surface of the Product. These are inherent in the manufacturing process and are a characteristic of the Product; or

11. to any colour variation or discolouration of the Product due to excessive exposure to direct sunlight; or

12. to any defect in, or damage to, the Product arising from the Product not being cleaned and maintained in accordance with Kandui's Care and Maintenance Guide; or

13. to any variation in the shading, material distribution and reflectivity of the Product, including any such variations between any sample of the Product and the Product supplied. Given the Product is manufactured from natural materials, each slab is unique and variations in the shading, material distribution and reflectivity of the Product are naturally occurring; or

14. to any cracks or chips which develop in the Product after installation; or

15. to faults caused by inadequate or incorrect site preparation before installation of the Product; or

16. to Product which have been moved from their original place of installation; or

17. to Product which has been installed in or around a fireplace or heater; or

18. to Product which has been not been installed by a qualified, licensed stonemason; or

19. where a claim is not made in accordance with the procedure set out below under the heading "Making a claim" or

20. subject to the Act, to anything other than a Product assessed to contain Defects.

Making a claim

You must file a claim under this Warranty within twenty-eight (28) days after the occurrence of an event which gives rise to a claim pursuant to the Warranty Terms and Conditions. Notice should be in writing and sent to PO Box 43, Gerringong NSW 2534 or via email at accounts@kandui.com.au.

Limitation of liability

In no event shall Kandui be liable for any other loss, costs or damages, including without limitation lost profits or revenues, indirect, incidental, special or consequential damages.

Australian Consumer Law

The benefits to you given by this warranty are in addition to other rights and remedies you may have under any law in relation to the Products to which this warranty relates.

Our Products come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the Product repaired or replaced if the Product fails to be of acceptable quality and the failure does not amount to a major failure.

Privacy

In order to provide this warranty to you, Kandui collects personal information from you when you purchase the Product and when you make a warranty claim. For that purpose, it may be necessary for Kandui to share that personal information, including information which identifies you personally, to other organisations.

Governing Law

These Warranty Terms and Conditions are in accordance with the laws of the State of New South Wales, Australia.

References

Australian Tile Council Inc. (2019). The Tile & Tiling Guide. Retrieved from Australian Tile Council Inc. <https://www.austriantilecouncil.com.au/tiles-and-tiling-guide>



Product Specification

Flexural Strength

ASTM
C880/C880M

15.50 MPa

Compressive Strength

ASTM
C170/C170-16

46.10 MPa

Density

ASTM
C97/C97M

2.09 g/cm³

Slip Testing

AS 4586:2013

Slider 96
P3=35-44

Acoustic Testing

ISO 16283-
02:2018

AS ISO 717-
2:2004

ISO 3382-
2:2008

Complies with NCC
2016
Impact Sound
Insulation
requirement

Water Absorption

ASTM
C97/C97M

0.8621%

Stain

Pass

Wear

15-20 micron

Scratch

90-143 micron

Thermal Conductivity

ASTM
D7984

0.285 W/mK

Thermal Effusivity

ASTM
D7984

936.2 Ws^{1/2} /m² K

Fire Testing

ISO 9239

Mean distance:
150mm
10.2 kW/m²
97% min