



CERTIFICATE OF TEST

Ref: TSD880

Date of issue: 14/09/17

EXAMINATION OF A NATURAL OR SYNTHETIC STONE TILE

Samples of Craftstone lightweight stackstone faux stone cladding were received for examination to determine potential adhesive recommendations onto concrete/masonry walls, concrete tilt panel and fibre-cement façade systems designed to take cladding stone and tiles.

Sample Description

Pieces of matt pale grey coloured cast stackstone, composed of cement, sand and pumice/perlite like low density filler aggregate. The nominal sample size was 300x100mm x 25-60mm thick. The rear face of the tiles was coated with fine grained and glossy laitance which is a consequence of the moulding process.

Sample weights and densities

Dry weight in	0.987 / 1.074	kg	Wet weight in	x / 1.181	kg
Dry density in	≈1220	kg/m ³	Dry/wet dead	33-36 / ~39	load kg/m ²

Test method

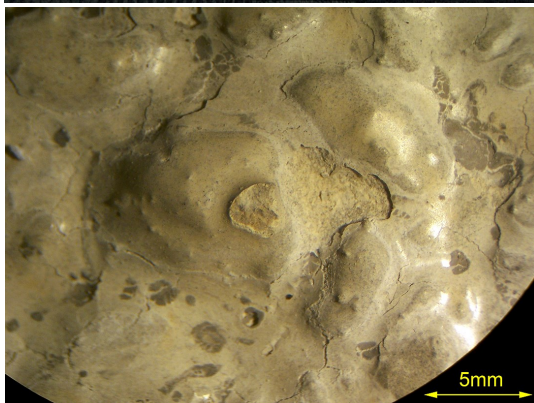
The sample was tested for moisture stability to Ardex test method TMRD45 which is derived from BS/EN 14617-12.2005.

The rear face of the sample was examined by direct illumination microscopy.

A piece of the tile was scoured on the back with steel wool to remove the laitance and then this piece and a untreated piece were bonded to a concrete block with a C Class tile adhesive. After cure the tile was sheared off to examine the strength of the rear face laitance.



Rear and front face views of the stackstone cladding. The pebbles of pumice can be seen in the cementitious matrix.



Magnified view of the stackstone rear face showing the glossy fine grained laitance covering the aggregate grains. The sandy matrix can be seen under the surface layer.

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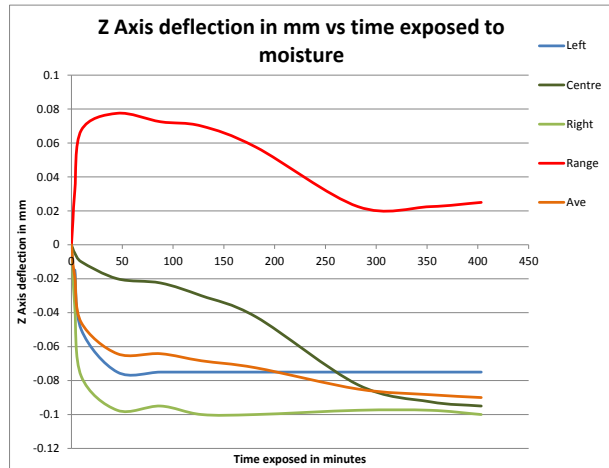
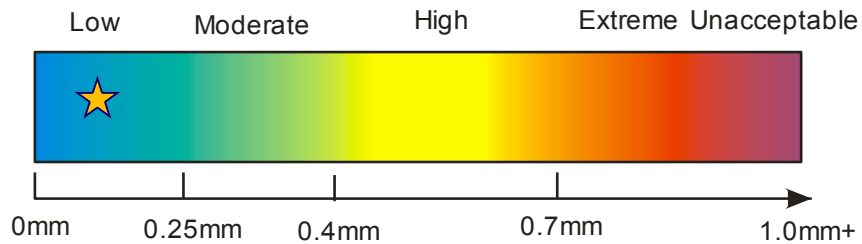


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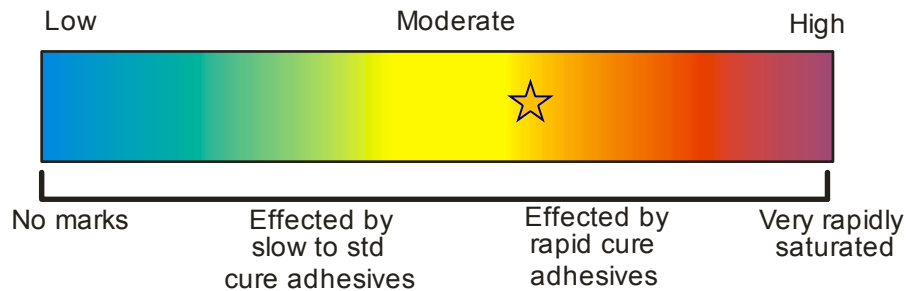
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Unrestrained movement



Moisture Sensitivity (marking potential)



Results

The tiles displayed low sensitivity to moisture deformation, however saturated relatively rapidly as can be seen in the image above. Whilst the tile adhesive will not create this effect, continuous rainfall can, and will alter the dead load.

The laitance on the rear could be easily removed by scouring, and more easily removed by wire brushing. The oblique shear impact test of the bonded samples showed that the scoured tile fracture cohesively, but the un-scoured one debonded cleanly at the laitance interface.

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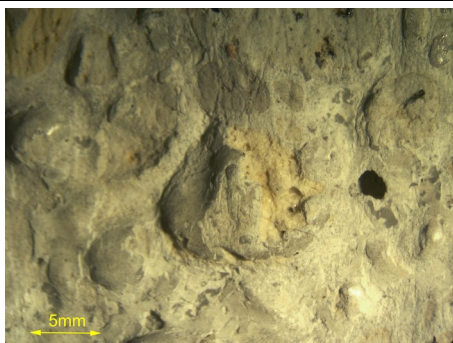
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Magnified view of the stackstone rear face showing the surface after scouring away of the glossy fine grained laitance covering the aggregate grains. The sandy matrix can be seen more clearly and the foamy pumice like structure of the lightweight aggregate.



Bonded sample where the laitance layer was scoured away. As can be seen the stackstone has fractured within itself, at an oblique angle, and not come away easily. Only half of tile has fractured.



Bonded sample where the laitance layer was un-removed. In this case the stackstone has broken away cleanly at the level of the laitance layer, which has remained bonded to the adhesive, while the main tile body came away.

This indicates an inherent surface weakness which can become important to longer term bond at high dead or live loads, or poorly achieved adhesive contact coverage.

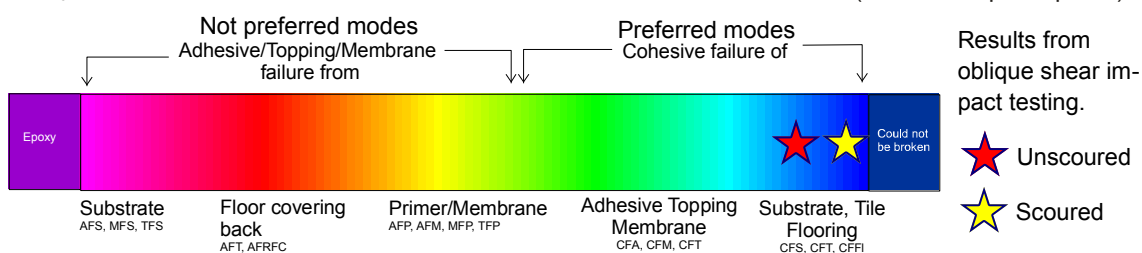
PERIOD OF VALIDITY IS 24 MONTHS FROM THE DATE OF ISSUE



Poor
(Easy - few impacts)

Moderate

Excellent
(Hard - multiple impacts)



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Recommendation

The tiles can be bonded with standard C Class cement based adhesives, or if required R Class adhesives. The application over concrete, tilt panels and rendered block or brickwork is straightforward.

Installation over fibre-cement sheet facades (comprising either James Hardie Easylap™ Panel or BGC Inno-va™ Stone Sheet™) are prescribed by standard system recommendations. In the case of Easylap™ it was created with suppliers (System recommendation SRO857).

CASE 1—CONCRETE SURFACES AND TILT PANEL (NOT WATERPROOFED)

- In all cases the surface must be mechanically prepared to open the concrete pores and remove contaminants and laitance, followed by vacuum cleaning or power washing. Acid washing is not acceptable.
- The adhesive primer applied shall be ARDEX Multiprime.
- Adhesives can any of the following types: ARDEX X77 ± ARDEX E90, ARDEX X18 ± ARDEX E90, ARDEX Quickbond ± ARDEX Abalastic (required for external), ARDEX S28N ± ARDEX E90 (internal applications only), ARDEX X17, ARDEX X10 + ARDEX E90 or Abalastic, or ARDEX WA100 (epoxy).

CASE 2—MASONRY BLOCK AND BRICKWORK (NOT WATERPROOFED)

Note that rendered surfaces nominally have a recommended deadload of 32kg/m² and where this is exceeded additional mechanical supports are recommended.

- The surface of the masonry must be clean and free from dirt, loose materials and weakly bonded adhesive residues. Mechanical preparation may be necessary
- The surface is prepared with ARDEX WR Prime in accordance with the datasheet and then rendered with ARDEX WR60, WR100 or WR120FR render.
- The adhesive primer applied shall be ARDEX Multiprime.
- Adhesives can any of the following types: ARDEX X77 ± ARDEX E90, ARDEX X18 ± ARDEX E90, ARDEX Quickbond ± ARDEX Abalastic (required for external), ARDEX S28N ± ARDEX E90 (internal applications only), ARDEX X17, ARDEX X10 + ARDEX E90 or Abalastic, or ARDEX WA100 (epoxy).

CASE 3 FIBRE-CEMENT FAÇADE SHEETS

The sheet systems are strictly constrained by the manufacturers with regards to fixing and preparation. Details for Easylap™ can be found in ARDEX System Recommendation SRO857, whilst the Stonesheet™ design manual gives equivalent recommendations.

The generalised system design is:

- The sheets are primed with ARDEX WPM265 primer
- The sheet joints are covered with ARDEX STB 15/75 tape
- The sheets are waterproofed with ARDEX WPM002 membrane
- The tiles are fixed with ARDEX Optima, ARDEX X77 + ARDEX E90, ARDEX STS8 + ARDEX E90, ARDEX X18 + ARDEX E90 or ARDEX WA100 (epoxy).

GENERAL COMMENTS

- The laitance on the rear face of the tiles should be removed by wire brushing or scouring with steel wool. This fine material is normally weaker than cement matrix of the tiles themselves.*
- All adhesives and products shall be used in accordance with the product datasheets.
- The adhesive shall be applied by both notching the adhesive onto the wall with a minimum 10mm notch trowel (with lines parallel to the ground and not fanned) and also back buttering the tile. The adhesive MUST achieve at least 90% contact coverage to minimise the risk of efflorescence.
- Special conditions apply to the use of STB15/75 tape with ARDEX WPM002 as described in Technical Bulletin TB239.
- General recommendations for placing stackstone tiles can be found in ARDEX Technical Bulletin TB148.
- Field movement joints any perimeter should be installed in the tiled surfaces in accordance with AS3958.1-2007 or any special recommendations relating to fibre-cement facades. All existing expansion and movement joints MUST be carried through the tile surface.
- Any joints requiring a flexible sealant can be filled with ARDEX ST silicone.

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- 2) All third party products tested as part of a system, shall be installed in accordance with the product manufacturers recommendations.
- 3) All constructions and installations shall comply with the relevant sections of the most recent edition of the Construction Code of Australia (formerly the 'BCA').
- 4) All ceramic tile related installations shall be made in accordance with the most recent edition of the Australian Standard AS3958 and ISO13007 (AS4992).
- 5) All waterproofing related installations or products shall comply the relevant sections of the most recent editions of the Australian Standards AS/NZS4858 (performance), AS3740 (internal) or AS4654 (external).
- 6) All flooring installations shall be performed in accordance with the relevant sections of the most recent edition of AS1884 (resilient) or AS/NZS2455 (textile).
- 7) Where Ardex Technical Bulletins and datasheets are specified, they can be sourced from the website www.ardexaustralia.com.au

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