



FAIRVIEW™

DEFINING ARCHITECTURE SINCE 1989

TECHNICAL MANUAL



smartbric®

BRICK RAINSCREEN FAÇADE SYSTEM / MANUFACTURED BY FAIRVIEW

ABOUT THIS GUIDE

This manual has been developed as an effective installation resource to inform designers, fabricators and contractors when specifying and working with the Fairview Smartbric® Rainscreen Façade System.

The guide will provide easy to follow installation information. As uncontrollable conditions of the job scope alter, this guide is a comprehensive resource for users. Fairview recommends seeking the advice of a professional where required prior to installation.

In no way does this Installation Manual replace the services of the building design professionals, nor is it an exhaustive guide of all possible scenarios. It is the responsibility of the building design professional, including the project Certifier, to ensure that the details in this Technical Manual are appropriate for the intended application.

The information and recommendations contained herein are believed to be correct at time of publishing. Fairview reserve the right to revise the contents of this manual.

For additional information and assistance with the Smartbric system, please contact Fairview on helpdesk@fv.com.au.

DISCLAIMER

The information contained in this publication and otherwise supplied to users of Smartbric products is based on Fairview's general experience, best knowledge and belief. However, due to factors which fall beyond Fairviews's knowledge and control, which can affect the use of the products, no warranty is given, express or implied with respect to fitness for particular purpose or otherwise.

It is the responsibility of the architect, designer and various engineering parties to ensure that the details in this Installation Manual are appropriate for the intended application.

Fairview reserves the right to alter specifications at any time and without notice. Products are subject to natural variation as part of the manufacturing process, colours and textures may vary according to light and weather conditions. Due to this and limitations of the printing accuracy, colours in this brochure may vary. In case of doubt, please contact your local Fairview representative.

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ENGINEERING COMPLIANCE AND STRUCTURAL SPECIFICATIONS

- Smartbric cladding system has been tested and engineer assessed to comply with:
- NCC Volume One B1.4 and Volume Two Part 3.0.4 Determination of structural resistance of materials and forms of construction, for actions determined in accordance with NCC Volume One B1.2 and NCC Volume Two 3.0.3.
 - NCC Volume One FP1.4 and Volume Two P2.2.2 Weatherproofing.

The design checks are in accordance with the following standards:

- AS/NZS 1170.1
- AS/NZS 1170.2
- AS 1562.1
- AS/NZS 4284
- AS4055

The structural frame supporting the Smartbric cladding system shall be designed and certified by others for the appropriate actions for the site and project parameters.

The following tables are the design tables for the rail and track for stud spacings of 300mm, 450mm, and 600mm. The design basis for the tables is as follows:

- Capacity of the rail and track in bending.
- Capacity of the rail and track in bearing.
- Capacity of the connection of rail/track to the specified S-section batten.
 - 1.2 mm BMT G500 ($f_y = 500$ MPa, $f_u = 520$ MPa).
- Deflection limit of L/150 under serviceability wind pressure (taken as $W_s = 0.67 \cdot W_u$).

FIRE

The demand for specification and deemed non-combustible façades have fast become the industry norm. As a vitrified clay and concrete masonry unit in combination with metal track and rail mounting system, Smartbric is deemed non-combustible under the provisions of the National Construction Code (NCC).

WEATHERPROOFING

Smartbric rainscreen facade system forms part of an engineered assembly tested to AS/NZS 4284: Testing of Building Facades to $W_s = +1,650$ Pa / -2,500Pa ; $W_u = +4,000$ Pa / -6,000Pa, and includes proprietary components specifically developed to improve performance and enhance appearance through:

- Moisture management
- Thermal/Heat management
- Movement management

TRACK AND RAIL SYSTEM - RESIDENTIAL

For residential settings, both rail and track systems have been designed in accordance with AS4055-2012, and are both acceptable for wind for wind classes up to and including N6 and C4, with maximum stud spacing at 600mm centres for general areas and within corner areas.

DESIGN TABLE FOR GENERAL AND CORNER AREAS							
Wind Class	General Areas		Corner Areas		Stud Spacing (mm)		
	Wind Load (kPa)		Wind Load (kPa)				
	W_u	W_s	W_u	W_s	300	450	600
N1	0.62	0.37	-0.94	-0.55	✓	✓	✓
N2	0.86	0.37	-1.30	-0.55	✓	✓	✓
N3	1.35	0.55	-2.03	-0.83	✓	✓	✓
N4	2.01	0.82	-3.01	-1.23	✓	✓	✓
N5	2.96	1.19	-4.44	-1.79	✓	✓	✓
N6	3.99	1.63	-5.99	-2.45	✓	✓	✓
C1	1.8	0.55	-2.70	-0.83	✓	✓	✓
C2	2.68	0.82	-4.02	-1.23	✓	✓	✓
C3	3.94	1.19	-5.91	-1.79	✓	✓	✓
C4	5.33	1.63	-7.99	-2.45	✓	✓	✓

TRACK AND RAIL SYSTEM - COMMERCIAL

TRACK AND RAIL SYSTEM - COMMERCIAL DESIGN TABLE				
Wind Load (kPa)		Stud Spacing (mm)		
W_u	W_s	300	450	600
0.5	0.34	✓	✓	✓
1.0	0.67	✓	✓	✓
1.5	1.01	✓	✓	✓
2.0	1.34	✓	✓	✓
2.5	1.68	✓	✓	✓
3.0	2.01	✓	✓	✓
3.5	2.35	✓	✓	✓
4.0	2.68	✓	✓	✓
4.5	3.02	✓	✓	✓
5.0	3.35	✓	✓	✓
5.5	3.69	✓	✓	✓
6.0	4.02	✓	✓	✓
6.5	4.36	✓	✓	✓
7.0	4.69	✓	✓	✓
7.5	5.03	✓	✓	✓
8.0	5.36	✓	✓	✓

NOTE: S-Section batten, substrate frame and their connections may govern the design specification over the track and rail system specifications in these tables.

COMMERCIAL BUILDINGS (CLASS 2 – 9)

Both Smartbric rail and Smartbric track systems have been designed and are acceptable up to and including a maximum ultimate wind load of 8.0 kPa, with vertical supports and fixings spaced at maximum span of 600 mm.

TRACK AND RAIL SYSTEM – COMMERCIAL DESIGN TABLE				
Wind Load (kPa)		Stud Spacing (mm)		
W _u	W _s	300	450	600
0.5	0.34	•	•	•
1.0	0.67	•	•	•
1.5	1.01	•	•	•
2.0	1.34	•	•	•
2.5	1.68	•	•	•
3.0	2.01	•	•	•
3.5	2.35	•	•	•
4.0	2.68	•	•	•
4.5	3.02	•	•	•
5.0	3.35	•	•	•
5.5	3.69	•	•	•
6.0	4.02	•	•	•
6.5	4.36	•	•	•
7.0	4.69	•	•	•
7.5	5.03	•	•	•
8.0	5.36	•	•	•

WEATHERPROOFING PERFORMANCE

The Smartbric System has been tested in accordance with AS/NZS4284 and assessed as meeting the performance requirements of NCC Volume 1 FP1.4 and Volume 2 P2.2.2 for weatherproofing.

AS/NZS 4284:2008 Testing of building facades involves the testing of a full-scale wall incorporating construction features including:

- Wall junctions
- Vertical and horizontal control joints
- Parapet flashings and balcony drainage
- Footer hand header installation arrangements
- Soffits
- Internal and external corner junctions
- Footer starter and header termination configurations
- Wall penetrations (windows and doors)
- Air/water/vapour barrier detailing

WEEP HOLES

To allow drainage of moisture from the cavity, horizontal weep holes (weep hole screens or similar) are required at 1200mm centres at the panels base and at the floor-slab edges (and other horizontal planes such as window sills) to ventilate the cavity space and via the flashing.

MATERIAL PROPERTIES

For the Smartbric systems, allow 48 pieces per square metre (m²) when using 230mm long x 76mm high Classic brick or 240mm long x 76mm high Rapid bricks. Product is supplied at 50 units per m².

BRICK FACINGS

All dimensions on clay and concrete brick products will vary according to the type of raw materials & firing and manufacturing techniques.

PRODUCT SPECIFICATION

SMARTBRIC RAPID – EXTRUDED CLAY

SMARTBRIC RAPID – EXTRUDED CLAY PRODUCT SPECIFICATION – TYPICAL PROPERTIES		
	Material	Natural Clay
	Size (L x H x W)	230 (+10)mm x 76mm x 25mm
	Weight	0.85 kg each
	Thickness	± 2%
	Length	± 5%
	Dimensional Stability	± 2%
	Frost Resistance	Not less than 150 cycles
	Water Absorption	< 10% (typically ~ 4%)
	Corner	Mitred only
	Combustibility	Clay masonry units are non-combustible
	AS4456.11 – Breaking Load Testing of Units	
	Breaking Load Mean	1.8kN
	Breaking Load Std Dev	0.1kN
	Breaking Load Characteristic Strength	1.1kN
	Modulus of Rupture Mean	9.8MPa
	Modulus of Rupture Std Dev	0.6Mpa
	Modulus of Rupture Characteristic Strength	6.3MPa
	Surface Indentation Test on Aluminium Rail - NCC:2019, Specification C1.8, Section 5-d & 6-e	Pass
	Surface Indentation Test on Gal. Steel Track - NCC:2019, Specification C1.8, Section 5-d & 6-e	Pass
	Durability Class AS/NZS 4456.10 Method: B - Resistance to Salt Attack – Sodium Sulphate	Resistance to Salt Attack. Met criterion (b) Exposure Grade or General Purpose or as required by the site's corrosivity category
	Total Mass Loss - All Cycles -Chloride	0.1g (mean)
	Total Mass Loss - All Cycles -Sulphate	0.1g (mean)

SMARTBRIC CLASSIC – EXTRUDED CLAY

SMARTBRIC CLASSIC – EXTRUDED CLAY PRODUCT SPECIFICATION – TYPICAL PROPERTIES		
	Material	Natural Clay (Properties typical of brown / white clay)
	Size (L x H x W)	230mm x 76mm x 25mm
	Weight	0.85 kg each
	Dimensional Tolerance	± 2mm
	Convexity and Concavity	± 1mm
	Heat Transfer Coefficient	1.1
	Water Absorption	~ 5%
	Corner	Mitred only
	Combustibility	Clay masonry units are non-combustible
	Specials	Facings Extruded 15mm – 55mm depending on brick type
AS4456.11 – Breaking Load Testing of Units		
Breaking Load Mean		1.1kN
Breaking Load Std Dev		0.3kN
Breaking Load Characteristic Strength		0.5kN
Modulus of Rupture Mean		8.8MPa
Modulus of Rupture Std Dev		2.1MPa
Modulus of Rupture Characteristic Strength		3.2MPa
Surface Indentation Test on Aluminium Rail - NCC:2019, Specification C1.8, Section 5-d & 6-e		Pass
Surface Indentation Test on Gal. Steel Track - NCC:2019, Specification C1.8, Section 5-d & 6-e		Pass
Durability Class AS/NZS 4456.10 Method: B - Resistance to Salt Attack – Sodium Sulphate		Resistance to Salt Attack. Met criterion (b) Exposure Grade or General Purpose or as required by the site's corrosivity category
Total Mass Loss - All Cycles -Chloride		0.1g (mean)
Total Mass Loss - All Cycles -Sulphate		0.1g (mean)

SMARTBRIC CLASSIC – DRY PRESSED CLAY

The information below is for general description purposes only and based on the specifications of the original full brick manufactured to AS/NZS 4455.1.

The dimensions noted below are a nominal or indicative size only. Australian bricks are manufactured to an Australian Standard DW2 and bricks of 1st quality rating are deemed to comply with this standard and are tested accordingly.

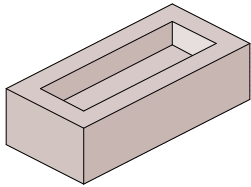
Variation on length is +/- 50mm (measured over 20 Bricks)

Variation on height is +/- 40mm (measured over 20 Bricks)

SMARTBRIC CLASSIC – DRY PRESSED CLAY PRODUCT SPECIFICATION – TYPICAL PROPERTIES		
	Material	Natural Clay
	Dimensions AS/NZS 4456.3 (L x H x W)	228mm x 76mm x 25mm
	Weight - Facings	0.85 -1.0 kg per unit (depending on brick) 40.8 - 48 kg /m² (based on 48 units/m²)
	Weight - Corners	1.15 kg per unit (average based on 3.6kg brick)
	Dimensional Tolerance (Thickness)	± 3mm
	Coefficient of expansion AS/NZS 4456.11	Less than 0.008mm/m/°C, providing a maximum service life ambient air temperature of 40°C
	Water Absorption AS/NZS 4456.14	< 10%
	Initial Rate of Absorption AS/NZS 4456.17	< 1.0 kg/m²/min (mean around 0.4 kg/m²/min)
	Breaking Load AS/NZS 4456.5	>1.0Mpa (typical)
	Corner	Cut corners available. Can be mitred
Combustibility		Clay masonry units are non-combustible
Specials		
Facings		Facings cut 15mm – 55mm depending on brick type
Corners		110mm x 25mm return – return grooved 110mm x 11mm return – with no groove
Potential to Effloresce AS4456.6		Nil
Pitting due to Lime Particles AS4456.13		Nil
Surface Indentation Test on Aluminium Rail - NCC:2019, Specification C1.8, Section 5-d & 6-e		Pass
Surface Indentation Test on Gal. Steel Track - NCC:2019, Specification C1.8, Section 5-d & 6-e		Pass
Durability Class AS/NZS 4456.10 Method: B - Resistance to Salt Attack – Sodium Sulphate		Resistance to Salt Attack. Met criterion (b) Exposure Grade or General Purpose or as required by the site's corrosivity category
Total Mass Loss - All Cycles -Chloride		0.1g (mean)
Total Mass Loss - All Cycles -Sulphate		0.1g (mean)

SMARTBRIC CLASSIC - CONCRETE MASONRY (ORIGINAL BRICK)

The information above is for general description purposes only and based on the specifications of the original full brick Manufactured to AS/NZS 4455.1 & 4455.3:2008



COLOUR:	Storm, Peppercorn, Hazelnut, Limestone, Salt, Moody Grey
FINISH	Smooth
DIMENSIONS:	76 x 110 x 230 mm (H x W x L) Category DW4 as per AS 4455.1, determined in accordance with AS/NZS 4456.3.
STRENGTH:	Characteristic Compressive Strength > 10 MPa
DURABILITY:	Exposure Grade (determined by AS/NZS 4456.10 - Resistance to Salt Attack)
WEIGHT:	3.8 Kg ±10%
NO.	Per pallet: 500 Units
NO.	Per m²: 50 Units

Refer to Smartbric Technical Data Sheet for further information.

DURABILITY

AS4312:2019 provides guidelines for the classification of atmospheric corrosivity zones in Australia and their effect on corrosion of steel and other materials. It defines six atmospheric corrosivity categories ranging from C1 (very low) to C6 (extreme) and as to how to determine the Corrosion Category of a site generally with reference to the distance from a shoreline.

Material AS 4312 Category	Corrosivity	Steel Corrosion Rate (µm/y)	Typical Environment
C1	Very low	<1.3	Dry Indoors
C2	Low (most areas of Australia at least 50km from the coast or at least 1km from sheltered bays would be in this category)	1.3-25	Arid / Urban Inland
C3	Medium (from 1km to 10-50km from breaking surf – much of metropolitan Wollongong, Sydney, Newcastle and Gold Coast are in this category)	25-50	Coastal or Industrial
C4	High (primarily coastal areas - from several hundred metres to about 1km inland from breaking surf or from the shoreline to around 50m for sheltered bays)	50-80	Sea Shore (calm)
C5	Very High (industrial or marine) – common offshore and on the beachfront in regions of rough seas and surf beaches – can extend inland for several hundred metres (in some areas of Newcastle extends around 500m)	80-200	Sea Shore (surf)
CX	Extreme	200-700	Shoreline (severe surf)

For the Sydney region, the most common environmental conditions to be encountered will be category C3, unless the site is within 1 km of a shoreline with surf or rough sea or 50m from a sheltered bay.



NCC 2022 Coastal Salt Exposure Zones

Given that track/rail and substructure framing is concealed behind the masonry façade, it cannot be readily inspected or replaced without causing significant disruption to the occupants, therefore appropriate judgment needs to be applied in track/rail material selection.

Coating Designation	Coating mass on one face	Coating thickness one face (µm)	Design Life Climate Zone C2 (years)	Design Life Climate Zone C3 (years)	Design Life Climate Zone C4 (years)
Z275	137	19.2	27 +	9 to 27	4.5 to 9
Z600*	300	42	Up to 80		

Reference: Project Remediate – Cladding Replacement Pattern Handbook

* Available on request. Lead time and minimum order quantity apply.

Smartbric material requirement for a 10 - 20 year service life.

AS 4312 Category	Cold Formed Steel Track Coatings as per AS 1397	Extruded Aluminium Rail	Screw Corrosion Resistance Class as per AS 3566.2	Mortar Class as per AS 3700
C1	Z275 - SS Grade 304, 316	6060 - T5 Aluminium	Class 1 Class 2 Class 3 SS Grade 304, 316	M2, M3, M4
C2	Z275 - SS Grade 304, 316	6060 - T5 Aluminium	Class 1 Class 2 Class 3 SS Grade 304, 316	M2, M3, M4
C3	Z275 - SS Grade 304, 316	6060 - T5 Aluminium	Class 3 SS Grade 304, 316	M3, M4
C4	SS Grade 304, 316	6060 - T5 Aluminium	Class 4 SS Grade 304, 316	M3, M4
C5	SS Grade 304, 316	6060 - T5 Aluminium	SS Grade 304, 316	M4
CX	By testing/experience – Contact Fairview			

Note: Alternate track material such as Magnaflo™, Z600 Galvanisaed and Stainless-steel options are available on request. Lead time and minimum order quantity apply.
As a rainscreen façade, the Smartbric system allows for air/vapour movement and moisture drainage and is less prone to the detrimental effects associated with a closed cavity system. Since the primary fixing system used to attach the track or rail to the building structure uses a batten (or top-hat) system there is no direct contact with mortar as with conventional brick-ties.

MORTAR MIXES

Australian Masonry Standard AS3700 or AS4773.1 set out requirements for mortar mixes.

Mortar Class	Mix Proportions					Mortar Suitability	
	Cement (GB/GP)	Masonry Cement	Builders Lime	Sand	Water Thickener	Fired Clay	Concrete
M2	1	0	2	9	No	Yes	No
M3	1	0	1	6	Optional	Yes	Yes
	1	0	0	5	Yes	Yes	Yes
	0	1	0	4	Yes	Yes	Yes
M4	1	0	0.5	4.5	Optional	Yes	Yes
	1	0	0	4	Yes	Yes	Yes
	1	0	0-0.25	3	Optional	Yes	Yes
	0	1	0	3	Yes	Yes	Yes

- NOTES:
- Type GP = General purpose Portland Cement / Type GB = General purpose Blended Cement
 - Volumes refer to materials in the dense packed state
 - Mortar mixes are designated by the proportions of their ingredients following an initial letter, the chief cementing agent being given as unity (e.g. C1:S4)

Recommended mortar types as per Australian Masonry Standard AS3700 for use with Smartbric are summarised below:

Mortar Class	Durability Class	Mix Proportion by Volume (AS3700)				Smartbric Add-Mix (additive)
		Portland (GP) or Blended Cement (GB)	Builders Lime	Sand		
M3	GP	1	0	5		Yes
M4	EXP	1	0	4		Yes

Note: For M3 and M4 mortar mixes a methyl cellulose water thickener can be used in lieu of Smartbric Add-Mix.

Recommended M4 mix quantities are:

- 4 Part ‘Brickies’ Sand - 20kg
- 1 Part Cement as specified (Grey or White Cement) – 5kg
- 20 grams (approximately 1/2 cap) of Smartbric Add-Mix
 - One cap contains about 50gms of un-compacted Smartbric Add-Mix
 - 80gms of Smartbric Add-Mix per 20kg bag of cement
 - Note: Estimated 4 shovels (5kg) per 20kg bag of cement
 - This is the theoretical additive rate, you may need more depending on atmospheric conditions.

Mix dry ingredients thoroughly before adding water using a drill with mixer attachment or similar.
Slowly add enough water to create a mix that will pass through a mortar gun/ bag without dripping – firm but fluid. NOTE: The water addition rate is sensitive to the climate.

