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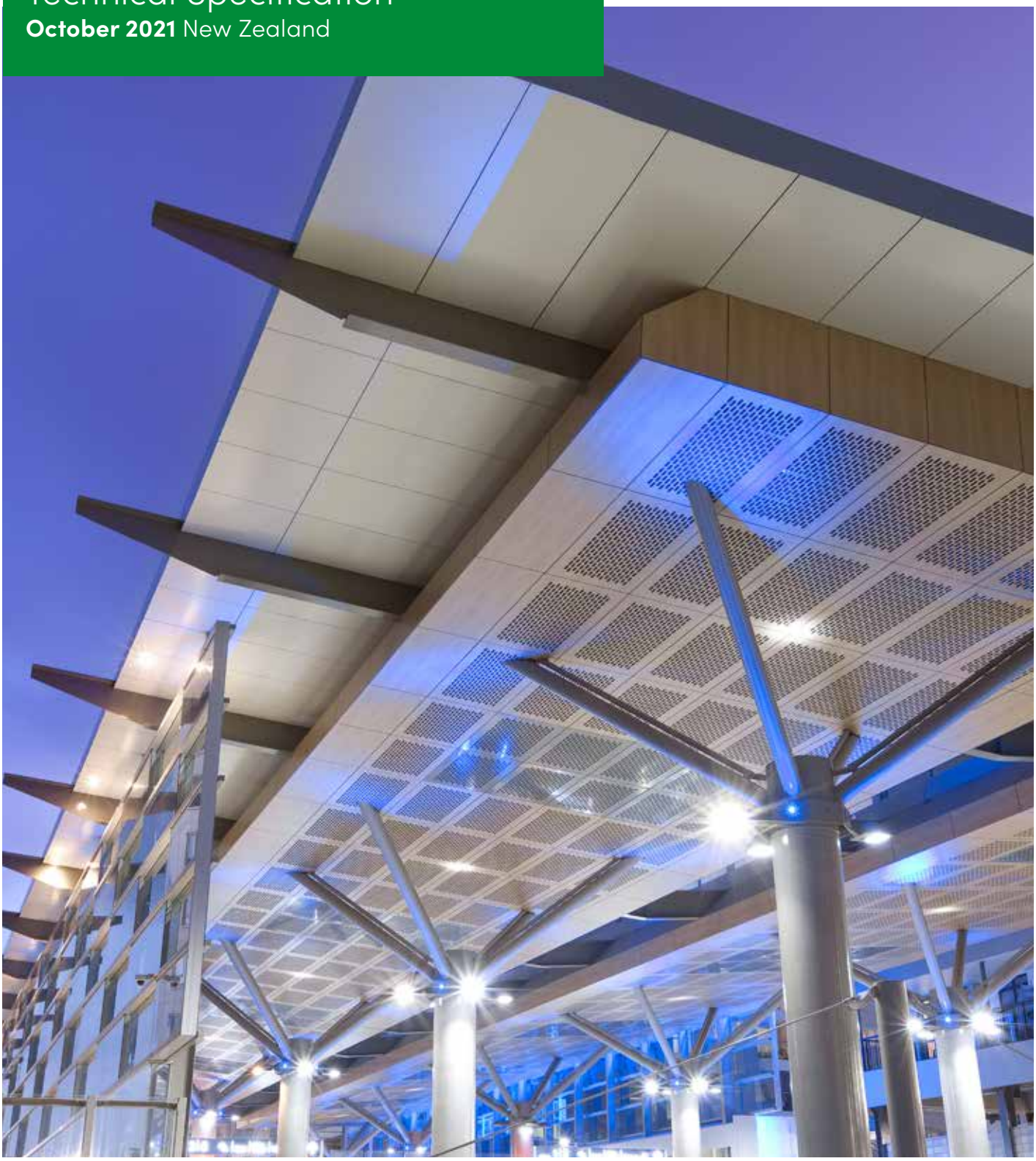
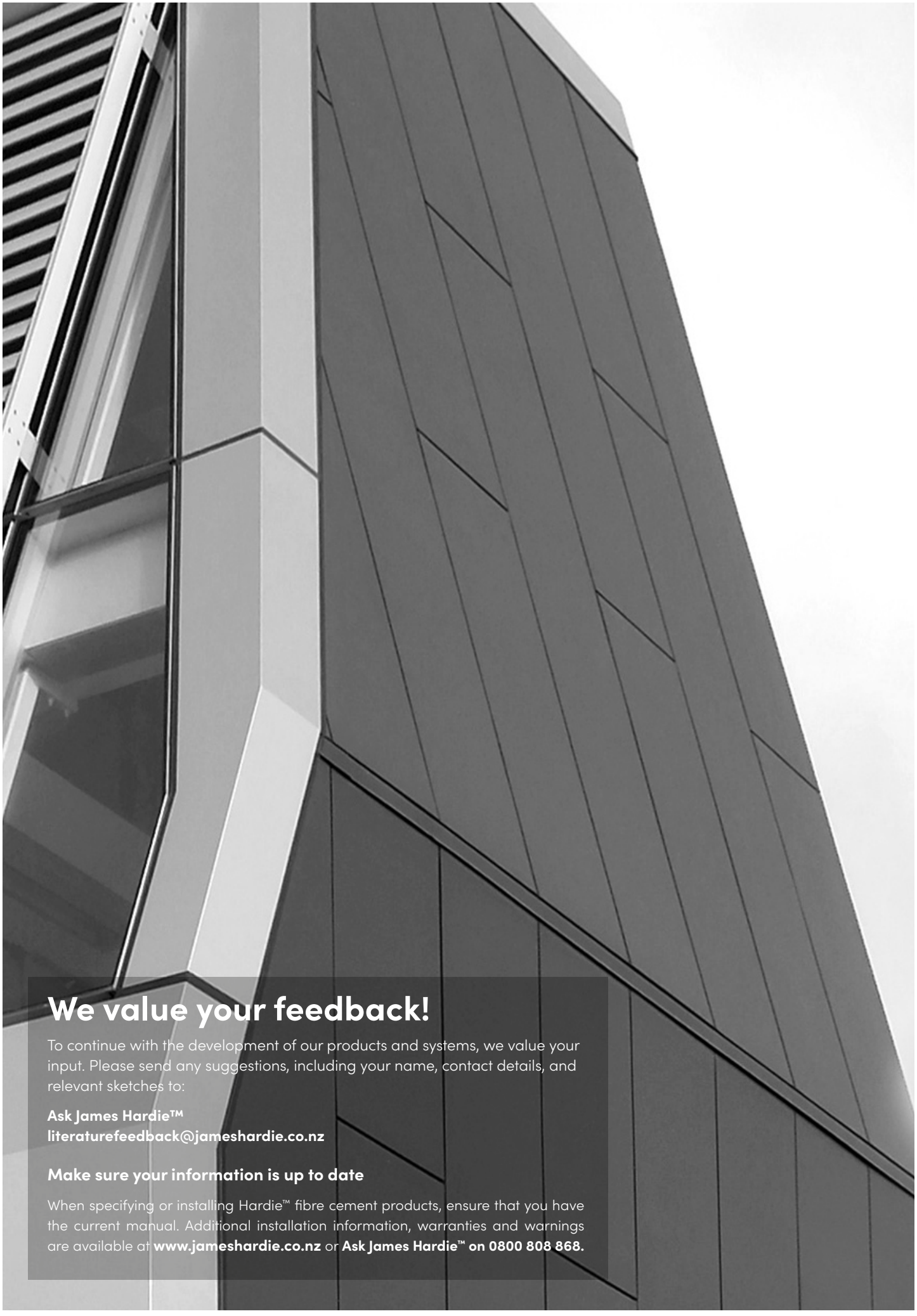
ExoTec™ Facade Panel

Top Hat Rainscreen

Technical Specification

October 2021 New Zealand





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To continue with the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

Ask James Hardie™
literaturefeedback@jameshardie.co.nz

Make sure your information is up to date

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1.1 Application

ExoTec™ Facade Panel fixed as per this technical specification provides a durable, expressed joint panelised appearance for building facades and fascias. This fixing method offers versatility to architects and builders which is demonstrated by the variety of design styles that can be achieved including curved walls, vertical/horizontal panel layout or brick pattern layout etc. A wide range of decorative finishes can be used, from site-applied to factory-applied plain/metalic colours. can also be used.

Specifier

If you are a specifier or other responsible party for a project, ensure that the information in this document is appropriate for the application you are planning and that you undertake specific design and detailing for areas which fall outside the scope of these specifications.

Installer

If you are a installer ensure that you follow the design, moisture management principles, associated details and material selection provided by the designer. All the details provided in this document must be read in conjunction with this specification manual and the project specification.

Make sure your information is up to date

When specifying or installing Hardie™ fibre cement products, ensure you have the current manual. If you are not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

1.2 Scope

This technical specification covers the installation of ExoTec Facade Panel on ExoTec Top Hats up to a wind pressure of 5kPa(ULS).

This specification covers the use of ExoTec Facade Panel and ExoTec Top Hats in commercial facade application over timber or steel frame, masonry and concrete walls. The ExoTec Facade Panel installed as per this technical specification can also be used to provide an expressed joint panel appearance in building soffits.

All the information and details within this ExoTec Top Hat Rainscreen technical specification only applies to the installation of ExoTec Facade Panel. The panels are also suitable for use curved facade applications depending on the curve radius, refer to Clause 10.1 for more information.

1.3 Details

Various ExoTec Facade Panel details are provided in the Details section of this document. These details are available in dwg, dxf, jpg and pdf file format and are available to download from our website at www.jameshardie.co.nz.

All dimensions shown are in millimetres unless noted otherwise. All New Zealand standards referenced in this manual are current edition and must be complied with.

1.4 Specific Design and Detailing

For the use of ExoTec Facade Panel and ExoTec Top Hats outside the scope of this technical specification, the designer, architect or engineer must undertake a specific engineering design. For a guidance on specific engineering designs, Ask James Hardie on 0800 808 868.

Any project specific detail not included in this literature, must be developed by the designer and included on the project drawings.

2 Design

2.1 Compliance

ExoTec Facade Panel over Top Hat Sections installed as per this technical specification have been tested /assessed and meets the compliance requirements of Clause with B1, B2 and E2 of the New Zealand Building Code (NZBC). Ask James Hardie on 0800 808 868 for any further information.

2.2 Responsibility

The specifier/designer or any party responsible for the project is responsible for ensuring that the information and details included in this specification are suitable for the intended application.

The specifier shall accommodate the appropriate provisions required by the NZBC. Careful detailing of all penetrations through the air barrier and rainscreen is required and they must be appropriately flashed and weatherproofed. The other materials and components that are used to manage moisture must be installed as per their manufacturer's instructions and comply with the requirements of relevant Standards and the NZBC.

The designer/specifier must ensure that all the reference documents and standards referred to during the design and construction process are current. The designer must identify the moisture related risks associated with the particular building design. The design and construction must effectively manage the external moisture.

The windows to be used with ExoTec Facade Panel must be specifically designed considering the design wind pressures and deflection in building facade/structure. Refer to the window manufacturer/suppliers for information regarding their specifications and installation requirements. For the latest information in relation to designing for weathertightness, refer to www.branz.co.nz and www.building.govt.nz websites.

James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets their aesthetic expectations before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation. James Hardie will only offer a replacement product if the ExoTec Facade Panel supplied is found to be out of its manufacturing specification.

2.3 Site and Foundation

The site on which the building is situated must comply with E1-'Surface Water' clause of the NZBC. The grade of adjacent finished ground must slope away from the building to avoid any possibility of water accumulation in accordance with the NZBC requirements. The foundation slab or footings of the structure must be based on 'Good Ground' as defined in the approved document of the NZBC B1 'Structure'. The foundation must be designed by a qualified structural engineer in accordance to relevant codes, regulations and standards.

2.4 Surface Clearances

ExoTec Facade Panel must always have a minimum clearance of 100mm from paved ground and 175mm from unpaved ground. On the roofs and decks a 50mm minimum clearance must be provided and this must always be maintained. ExoTec Facade Panel must overhang by 50mm minimum below the bottom plates.

Do not install external cladding such that it may remain in contact with standing water.

2.5 Moisture Management

The ExoTec Facade Panel installed over ExoTec Top Hats acts as a rainscreen. To achieve the required level of

weathertightness performance, the designer must determine the appropriate moisture managing details for the project. The designer should consider the following matters when making this decision:

- It is the responsibility of the builders and designers to identify moisture related risks associated with building design. It is the responsibility of a builder to ensure that appropriate level of moisture management is achieved by proper use of flashings, sealants and vapour permeable membranes etc. Before installing panels, all wall openings, penetrations, intersections, connections, window sills, heads and jambs must incorporate appropriate flashings for moisture management. Materials, components and the installation practices required to manage moisture must, at a minimum, comply with the requirements of the NZBC, relevant standards and the manufacturer's specifications.
- Expressed joints in ExoTec Facade Panel must be provided as detailed in this literature, see Clauses 6.2 and 6.3. For wind pressures above 4.0kPa, both vertical and horizontal joints must be filled with a suitable paintable flexible sealant. Refer to Clause 6.4 for suitable joint sealant. Refer to the sealant manufacturer for sealant durability information.
- For walls higher than 10m, a horizontal drainage joint must be provided. Refer to Figure 24.
- The installation of vermin proofing/base mould at the base of a cavity must not restrict ventilation or drainage of the cavity. Refer to Figure 4.

For information on RAB™ Board and building underlays refer to Clause 3.2 and 3.3 of this technical specification.

2.6 Framing and Top Hat Sections

ExoTec Top Hats are fixed vertically over timber, steel girt or masonry substrates. The framing to support the ExoTec Top Hat sections must be provided in accordance with specific engineering design requirements of the project and must be suitable to fix ExoTec Top Hat sections over it. The specific engineering design must be in accordance with AS/NZS 1170. The flatness of framing must comply with the expected aesthetic requirement set for the project. Straightening or packing out between the substructure and ExoTec Top Hat sections must be limited to 20mm maximum and must be done behind the ExoTec Top Hat sections. ExoTec Facade Panels must only be fixed to ExoTec Top Hats and ExoTec Intermediate Top Hats and ExoTec accessories as shown in details. Refer to Figure 3. ExoTec Top Hat and Intermediate Top Hat sections must not be installed horizontally.

ExoTec Top Hats are required at panel vertical joints and ExoTec Intermediate Top Hats in the middle of panels. Refer to Figure 5 for further information regarding the installation of top hat and intermediate sections.

The maximum spans and fixing spacing for a ExoTec Top Hats and ExoTec Intermediate Top Hats for wall and soffit applications are provided in Table 1 and 2 respectively. For wall applications, the maximum cantilever distance the ExoTec Top Hat can span up to is 1/4 of the single span given in Table 1.

2.7 Seismic Deflections

ExoTec Facade Panel installed in accordance with this technical specification is capable of withstanding deflections of the support structure (for example seismic drift) up to a magnitude of span/180 for a maximum 3m stud height as determined at the Serviceability Limit State (SLS). For higher interstorey deflections, a specific engineered deflection head should be used to fix the wall frames below the slabs.

2.8 Wind Pressure

It is a responsibility of the project engineer to determine the appropriate wind pressures for the project and select suitable spacing and fixings of the ExoTec Top Hats and ExoTec Intermediate Top Hats to the structure. The calculated wind pressure for the building facade must include the localised coefficients as defined in AS/NZS 1170.

ExoTec Facade Panel installed over ExoTec Top Hats has been tested to withstand wind pressures up to 5kPa (ULS).

Table 1 and 2 specify the spans for ExoTec Facade Panels and ExoTec Top Hat Sections depending upon the facade design wind pressures.

Table 4 specifies the fixing spacing for installing ExoTec Facade Panel to ExoTec Top Hat sections.

Table 3 specifies the design capacity required for the fasteners that should be used to fix ExoTec Top Hat sections to the framing substrates.

Table 1

Walls — maximum ExoTec Top Hat and ExoTec Intermediate Top Hat spans (mm) for (ULS) wind pressures										
Span Type	**Nominal Top Hat Spacing**	**Design Wind Pressure (kPa)**								
	(mm)	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Single Span	405 605	1750 1530	1530 1330	1390 1210	1290 1120	1210 1060	1150 1010	1100	1060	1020
2 Span Continuous	405 605	2340 2050	2050 1790	1860 1620	1720 1400	1620 1250	1470 1140	1350	1260	1160
3 Span Continuous	405 605	2160 1890	1890 1650	1710 1500	1590 1390	1500 1250	1420 1140	1350	1260	1160

Table 2

Soffits — maximum ExoTec Top Hat and ExoTec Intermediate Top Hat spans (mm) for (ULS) wind pressures									
Span Type	**Nominal Top Hat Spacing**	**Design Wind Pressure (kPa)**							
	(mm)	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0
Single Span	405 605	1660 1450	1470 1290	1350 1180	1260 1100	1190 1040	1130	1080	1010
2 Span Continuous	405 605	2220 1950	1970 1730	1810 1530	1690 1100	1550	1410	1300	1130
3 Span Continuous	405 605	2050 1800	1820 1590	1670 1460	1560 1340	1470	1400	1300	1130

Table 3

Fastener selection to fix ExoTec Top Hat section into framing										
Span Type	**Nominal Top Hat Spacing**	**Design Wind Pressure (kPa)**								
	(mm)	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Single Span	405 605	Type 1 Type 1	Type 1 Type 1	Type 1 Type 1	Type 1 Type 2	Type 1 Type 2	Type 1 Type 2	Type 1 Type 2	Type 2 Type 2	Type 2 Type 2
2 Span Continuous	405 605	Type 2 Type 2	Type 2 Type 3	Type 3 Type 3	Type 3 Type 4	Type 3 Type 4	Type 3 Type 4	Type 3 Type 4	Type 4 Type 4	Type 4 Type 4
3 Span Continuous	405 605	Type 2 Type 2	Type 2 Type 2	Type 2 Type 3	Type 2 Type 3	Type 3 Type 4	Type 3 Type 4	Type 3 Type 4	Type 3 Type 4	Type 3 Type 4

Note:

- Type 1 fastener to have a design capacity up to 1kN. Type 2 fastener to have a design capacity up to 2kN. Type 3 fastener to have a design capacity up to 3kN. Type 4 fastener to have a design capacity up to 4.2kN.
- Fastener spacing to fix Top Hat section is as per Table 1 and 2.

Table 4

Fastener spacings for wall and soffit applications			
Design Wind Pressure (Ultimate) (kPa)	**Nominal Top Hat Spacing (mm)**	**Max Fasteners Spacing at Sheet Edges (mm)**	**Max Fasteners Spacing at Intermediate Top Hats (mm)**
1.0 -1.5	605	600	600
	405	600	600
1.6 - 2.5	605	400	400
	405	600	600
2.6 - 3.0	405	450	450
3.1 - 3.5	405	400	400
3.6 - 5.0	405	300	300

Notes to Tables 1, 2, 3 and 4:
1. ExoTec Top Hat spans may be restricted to framing spans required to fix RAB™ Board, when fixing ExoTec Top Hat sections into the same framing as used to fix RAB™ Board.
2. ExoTec Top Hat system is suitable to withstand structural deflections maximum upto Span/180 (SLS) for a stud height of 3m maximum.
3. Design Wind Pressures to be in accordance with AS/NZS 1170.2 for ultimate strength design.

2.9 Fastener Spacing

Table 4 indicates the maximum fastener spacing to fix ExoTec Facade Panels into ExoTec Top Hat sections for wall and soffit applications.

2.10 Fire Rated Walls

Fire rated wall can be constructed when using rigid air barriers. A fire rating can be achieved when using RAB™ Board as rigid air barrier up to 60 minutes. The other fire rated system requirements must be included in the wall construction to achieve the required fire ratings. For more information, refer to James Hardie Fire and Acoustic Design Manual available at www.jameshardie.co.nz or Ask James Hardie on 0800 808 868 for a copy.

3 Substructure and Preparation

3.1 Substructure

The ExoTec Top Hat and ExoTec Intermediate Top Hat sections are installed vertically over steel girts or nogs. When using timber framing, the noggings between studs can be used to support ExoTec Top Hat and ExoTec Intermediate Top Hat sections. The framing to which the ExoTec Top Hat sections are fixed must be structurally adequate to withstand the facade design wind pressures. The timber framing used must be treated and have the moisture content as specified in NZS 3602.

A qualified person must design the substructure to suit the design wind pressures and loading transferred from the facade to the substructure.

For timber frame walls longer than 12m it is best practice to allow for construction joints to accommodate movements generated due to timber shrinkage or deflections generated by loadings etc.

3.2 RAB™ Board

RAB™ Board is installed over the main framing to act as a rigid air barrier to withstand high wind pressures and to manage moisture in the cavity. RAB™ Board installed as a rigid air barrier has been tested to withstand wind pressures specified in Table 1.

RAB™ Board must be used with ExoTec Facade Panel Top Hat Rainscreen where the projects are exposed to wind pressures higher than 1.5kPa(ULS). The RAB™ Board design must be installed in accordance with its installation manual to framing.

RAB™ Board comes in two thickness ie 6mm and 9mm. RAB™ Board 9mm is suitable for shear wall design or for superior acoustic performance.

Refer to the HomeRAB™ Pre-Cladding & RAB™ Board Installation Manual or Ask James Hardie on 0800 808 868 for further information.

Note: The framing requirement for fixing the RAB™ Board may restrict the ExoTec Top Hat span given in Table 1 when fixing ExoTec Top Hat sections into the same framing.

3.3 Building Underlay

Building underlay is suitable to withstand a limited wind pressure and is generally used up to a wind pressure of 1.5kPa (ULS) maximum. For those building facades that are exposed to wind pressures higher than 1.5kPa, a RAB™ Board must be used.

When considering the use of a building underlay for a specific design project, check with the building underlay manufacturer to confirm its suitability for the proposed project. The building underlay is installed between the ExoTec Top Hats and the supporting structure. Refer to Figure 5. Building underlay must be lapped when required so as to drain moisture towards the exterior of a building.

The building underlay must be installed in accordance with the AS/NZS 4200.2 'Pliable Building Membranes and Underlays – Installation' and the manufacturer's specifications.

Building underlay must comply with Table 23 of Clause E2 of the NZBC.

3.4 Flashing

All wall openings, penetrations, intersections, connections, window sills, heads and jambs must be flashed prior to ExoTec Top Hat and ExoTec Facade Panel installation. Refer to Clause 2.5 for moisture management requirements.

The building underlay or RAB™ Board must be appropriately taped around the penetrations and lapped/taped to flashings. Materials must be lapped in such a way that water tracks down to the exterior of the building. The selected flashing material must comply with the durability requirements of NZBC. For information refer to Table 20 of E2 of NZBC.

When using RAB™ Board the entire timber framing around the opening must be sealed with a flashing tape. The tape must be lapped over the face of RAB™ Board.

4 ExoTec Top Hat and Panel Layout

4.1 General

The ExoTec Facade Panel layout must be considered in conjunction with the ExoTec Top Hat spacing and substructure framing set out. ExoTec Top Hat spacing must be suitable for jointing the panels and the design wind pressures. Refer to Figure 3. Where construction joints occur in the structure, these must be carried through ExoTec Top Hats and panels. Refer to Figure 25.

4.2 Panel Orientation and Layout

ExoTec Facade Panel must be installed with distinctive white side facing to the exterior of structure whereas the clear sealed side is facing towards the cavity. Refer to Clause 11.2 for specific requirements.

Panels are generally installed with a 10mm nominal expressed vertical joint between adjacent panels, i.e. for 1200mm wide panels and a 10mm wide joint, the grid spacing is 1210mm centres. Refer to Figure 3. Vertical negative joints up to 20mm maximum wide can be formed with additional care required during installation to ensure the panel edges cover the rubber fixed on both sides of ExoTec Gasket Snap Strip. Vertical negative joint up to 6mm minimum width can also be formed with care.

The horizontal and vertical negative joints between different panels may either be aligned or offset to form a brick layout pattern.

Notes:

- Where feasible use stock panel sizes to minimise site cutting and wastage. See Section 16 for panel sizes.
- All site cut panel edges must be sealed with Dulux® Acraprime® 501/1 or a similar sealer.

5 Fixing

5.1 General

ExoTec Facade Panel is fixed to ExoTec Top Hat sections using the following fixings;

1. Countersunk screws fixed 2mm below the panel surface and flush finished using two part epoxy filler and sanded smooth. The panels are finished using a site-applied acrylic coating. Refer to Clause 5.3.
2. Exposed head screws, e.g. pan, wafer head hex screw along with ExoTec Facade washer. Exposed head fasteners can also be colour coated to match when pre-painted panels are used, refer to Clause 5.4.

5.2 Fastener Durability

Fasteners must have the appropriate level of durability required for the intended project. This is of particular importance in coastal areas, subject to salt spray and other corrosive environments.

Fasteners must be fully compatible with all other materials that they are to be in contact with to ensure the durability and integrity of the assembly.

In non-coastal areas a Class 3 coated screw and in coastal area a Class 4 coated screw must be used. Contact fastener manufacturers for more information.

See Table 4 and Figure 3 for maximum fastener spacing required for fixing panels to ExoTec Top Hats.

5.3 Countersunk Fasteners

Fastener Type: 10g x 30mm countersunk head metal screw with required Class 3 or Class 4 coating. The countersunk screw holes are flush finished with a two part epoxy filler which is sanded to a smooth finish.

Note: Panels must be pre-drilled using a 9mm Tungsten Carbide Drill Bit supplied by James Hardie. Screw head must be countersunk to a maximum depth of 2mm below the panel surface. Refer to Figure 6.

Flush Sealing Screw Holes:

- Use only proven two part epoxies for sealing holes after fixing the screws. Hilti CA273, Allnex™ Fairing Cream or a similar epoxy should be used.
- Mix correct ratio and amount of epoxy for immediate use as per the manufacturer's instructions.
- Blow dust out of holes to achieve adhesion of epoxy.
- Cover the counter sunk fasteners with two part epoxy, finish it flush with the panel surface and sand smooth.

5.4 Exposed Head Fasteners

Fastener Types: 10g x 25mm pan, wafer or hex head metal screw with required Class 3 or Class 4 coating. Refer to Figure 9.

ExoTec Facade Washers must be inserted in the pre drill screw holes before fixing the screws.

Note: Panels must be pre-drilled with a 6mm masonry titanium drill bit, which provides a 6.2 to 6.3mm diameter hole before fixing.

5.5 ExoTec Top Hat Fixing

For fixing the ExoTec Top Hat section into the framing substrate, the designer must specify the type of fastener to be used to withstand the design wind pressures. Refer to Table 3 for a guidance to check the design capacity of the fastener required.

The maximum fixing centres distance will be as per the ExoTec Top Hat spans provided in Table 1 and 2 as the sections can only be fixed at support points.

6 Joints

6.1 Panel Joints

ExoTec Facade Panels are generally installed with a nominal 10mm wide expressed joint between adjacent panels, vertically and horizontally.

6.2 Vertical Panel Joints

At vertical panel joints, prior to fixing panels, the ExoTec Gasket Snap Strip is fitted into ExoTec Top Hats by starting on one side of the top hat section and pushing it into the other side along its length. The snap strips are butted end to end to achieve the required length in ExoTec Top Hat section without any sealant.

The ExoTec Gasket Snap Strip is a hi-tensile roll-formed steel section fitted with rubber gaskets on both edges. The rubber seals get compressed under the panel edges and provides a primary weathertightness at the vertical joint. See Figure 7.

A vertical joint with a gap of 20mm maximum can be formed. It must be ensured that the panel edges cover the rubber gasket fitted on either side of ExoTec Gasket Snap Strip. The vertical joints between panels can be staggered to achieve a brick layout pattern. See Figures 1 and 2.

Note: The vertical joint must always be formed over the ExoTec Top Hat section.

6.3 Horizontal Panel Joints

Horizontal joints are formed using Aluminium 'T' socket or a 'Z' flashing. The Aluminium 'T' Socket is bonded to the rear top edge of panels using a polyurethane adhesive sealant e.g. Seal 'N' Flex-1® by Bostik®, Sikaflex® 11FC by Sika™ or similar. The lower edge of upper panel above the joint is also sealed and laps over the upstand of Aluminium 'T' Socket. Refer to Figure 19 and 20. The 'T' Socket is a 1.2mm thick extruded aluminium section.

The fixings along the horizontal panel edges must not penetrate through the Aluminium 'T' Socket.

Aluminium 'T' Socket must be sealed to the ExoTec Top Hat section at their intersection point as shown in Figures 20 and 21 to stop moisture penetration behind the 'T' Socket.

Where a vertical panel joint terminates over the horizontal joint, the 'T' Socket is also sealed to the face of ExoTec Gasket Snap Strip. Refer to Figures 22 and 23.

6.4 Jointing for High Wind Pressure

For design wind pressures including and above 4.0kPa, horizontal and vertical joints must be continuously sealed with a suitable flexible and paintable joint sealant e.g. Fosroc®, SiikaFlex® MS, Seal 'N' Flex® or similar. Refer to Figure 8.

Note: When using a horizontal 'Z' flashing, the horizontal joints must not be sealed. Seal the butt joint.
Refer to sealant manufacturer instructions for sealant application and painting.

6.5 Flashing Overlaps

When using 'Z' flashings at horizontal joints or cap flashings on top of walls etc. Refer to Table 5 for the minimum lap required over the cladding. Refer to Figure 22.

Table 5

Minimum flashing overlaps			
Maximum Design Wind Pressure (kPa ULS) up to	1.5	2.5	5.0
Minimum Flashing Cover (mm)	35	50	75

6.6 Seismic Movement Joints

Movement joints are required to limit or remove stresses transferred to panels due to the movement/deflections experienced in framing/structure.

6.6.1 Vertical Structural Joints

Where vertical structural joints are provided in a building to accommodate for seismic movement, the vertical joints in ExoTec Facade Panel must coincide with these vertical structural joints, refer to Figure 25. The project engineer is responsible for specifying the locations of vertical structural joints in a structure.

For a suitable detail of panel butting into masonry/concrete wall, refer to Figures 26 and 27.

6.6.2 Horizontal Structural Joints

Horizontal structural joints are required at floor/slab level to accommodate the interstorey seismic deflections. The extent of these deflections is specified by the project structural engineers. The framing supporting the ExoTec Top Hat can move due to creep/deflection in the slab. Refer to Figure 24 for a suitable detail for horizontal joint. See Table 5 for the flashing overlaps required.

Note: The project engineer is responsible for specifying the amount of anticipated movement/deflection.

7 Junctions

7.1 Slab Junctions

When jointing two different building materials the different expansion and contraction rates of the materials must be considered.

7.2 Head

Where ExoTec Facade Panel butts into an exposed slab, the detail must allow for sufficient creep/deflection expected in the slab. Refer to Clause 6.6.2 for further information about creep/deflection at the slab level.

Refer to Figure 27 for typical detail, suitable to cater for these deflections.

7.3 Base

ExoTec Base Mould is fitted at the rainscreen cavity base to allow for moisture drainage and ventilation required for the cavity. In a soffit application the base mould must lap under the RAB™ Board/building underlay or the base mould upstand must be taped to the RAB™ Board/building underlay to transfer the moisture to the exterior. Refer to Figure 18.

Note: It is essential that a continuous base mould flashing is provided behind the ExoTec Facade Panel at the base of the facade to allow for drainage/ventilation and to form the required vermin proofing.

7.4 Soffit Junction

There are many ways of detailing the soffit junction and it is important to ensure that 15mm minimum drip edge is formed.

A typical method to install a soffit fascia junction is shown in Figure 18. Ensure the ExoTec Base Mould is fitted at the bottom of facade cavity.

7.5 Abutments

There are different methods of finishing panels against another cladding system. A typical detail is shown in Figure 26.

8 Corners

An external/internal corner is constructed using ExoTec Top Hat Corner Flashing fitted over ExoTec Intermediate Top Hat section, refer to Figures 11, 12 and 13.

When a corner with either more or less than 90o angle is required, it can be made using a purpose made metal flashing to suit the site requirements is supplied by other manufacturers.

9 Windows

The ExoTec Facade Panel Top Hat Rainscreen system provides an opportunity to consider a wide range of alternative window opening treatments. The specifier/designer, in conjunction with the window manufacturer, must consider to achieve an effective weatherproofing of the window/door openings. Also, refer to moisture management requirements in Clause 2.5 for further information.

The typical window that have been tested in conjunction with ExoTec Facade Panel are shown in Figures 14, 15, 16 and 17.

10 Special Details

10.1 Curved Facades

ExoTec Facade Panel can be bent to suit the radius curve of more than 10m. Refer to Table 6 for maximum ExoTec Top Hat radius of spacing.

Table 6

Maximum ExoTec Top Hat spacing for curved applications	
Radii (m)	**Max ExoTec Top Hat Spacing (mm)**
10 to 15	405
>15	605 max. or to suit wind pressures as per Table 1

Notes:
1. ExoTec Facade Panel must be fixed horizontally to the ExoTec Top Hat sections.
2. The closer the spacing of ExoTec Top Hats, the less likely they will read through the panels, particularly at small radii.
3. In curved applications, always commence fixing of panels from the centre and work outwards to avoid "drumminess".

10.2 Parapet Capping

The design of metal parapet capping should aim to provide weathertightness and minimise the staining of cladding. Follow the recommendations below:

1. The flashing must overlap the cladding by a minimum distance as specified in Table 5.

2. Ensure the parapet capping has a slope towards the roof.

3. Provide a drip edge away from the cladding face.

4. In addition, cappings must be lapped at a junction as per the Table 7 below and all joints in capping should be sealed. Refer to Table 7 for the required joint overlap.

Table 7

Parapet capping joint overlap			
Max. Design Wind Pressure Up to (kPa ULS)	2.0	3.5	5.0
Min. Capping Overlap (mm)	50	100	150

Note: For permissible design wind pressure, divide ULS wind pressure by 1.5.

10.3 Inspection

After the installation of ExoTec Facade Panels but before the painting, the facade/fascia should be inspected to ensure:

1. Required number and location of fixings are correct.

2. Sealant is applied where specified.

3. The epoxy fillers is filled in the screw holes and sanded smooth to finish flush with panel surface.

4. Minor damage to panel edges can be filled with epoxy, sanded smooth and painted, see Section 11.

11 Finishes

11.1 General

To ensure the durability of ExoTec Facade Panels as per Clause 14.5 is achieved, the panels must be painted within 90 days of installation.

ExoTec Facade Panels will readily accept a wide variety of applied finishes, including site applied coatings and the factory applied special finishes.

For site-applied finishes (acrylic coatings), follow the paint manufacturer's recommendations. It is recommended that the paints with a minimum dft150 micron be used.

All site cut edges or sanded patches on panel surface must be primed after cutting or sanding. The face and edges of panels must be coated in accordance with paint manufacturer's recommendations. Also refer to Clause 5.3.

For further information, contact the customer service centre of relevant paint company.

Polyurethane paints are not suitable as a site-applied finish but can be factory coated prior to installation. Pre-finished panels are generally installed using exposed head fasteners coated in the same colour.

11.2 Panels Exposed to Direct Sunlight

The front primed or rear sealed face of the panels must not be exposed to direct sunlight for any period greater than 90 days. The face must be coated with a suitable primer as recommended by the paint manufacturer when exposed to durations more than 90 days. However, if the rear clear sealer is to be exposed to direct sunlight by its application, e.g. use in fascias, plant rooms, etc. then the clear sealer must be coated with a minimum of one coat of an exterior grade acrylic, pigmented white sealer.

12 Care and Maintenance

The extent and nature of maintenance required will depend on the geographical location and exposure of the building. It is the responsibility of the specifier to determine normal maintenance requirements to maintain the effectiveness of the cladding.

As a guide, it is recommended that the basic normal maintenance tasks shall include, but not be limited to:

- Washing down exterior surfaces every 6-12 months using low pressure water and a brush, and every 3-4 months in extreme coastal conditions or sea spray zones (such as high winds and sea sprays)
- Re-coating exterior protective finishes. Always refer to your paint manufacturer for re-coating requirements related to ongoing paint performance
- Maintaining the exterior envelope and connections including junctions, penetrations, flashings and sealants
- Cleaning out gutters, down pipes and overflow pipes as required
- Pruning back vegetation which is close to or touching the building as well as ensuring the NZBC ground clearance requirements are maintained especially where gardens are concerned
- The clearance between the bottom edge of ExoTec Facade Panel and the finished/unfinished ground must always be maintained
- Refilling the countersunk holes where the cracks start appearing in the paint film around epoxy fillers or where fastener read through becomes significant

13 Product information

13.1 Manufacturing and Classification

ExoTec Facade Panels are high quality compressed, autoclaved, cement based building panels manufactured by James Hardie.

The basic composition of these products is Portland cement, sand, cellulose fibre and water. These products are identified by the name printed at regular intervals on the back face.

James Hardie building products are manufactured to Australian/New Zealand Standard AS/NZS 2908.2 'Cellulose-Cement Products' (ISO 8336 'Fibre-Cement Flat Sheet'). James Hardie is an ISO 9001 certified manufacturer.

ExoTec Facade Panel is classified Type A, Category 3 in accordance with AS/NZS 2908.2 (ISO 8336).

13.2 Product Mass

The nominal density of ExoTec Facade Panel is 1552kg/m^3 at EMC.

For panel sizes, see Clause 13.3.

13.3 ExoTec Facade Panel

ExoTec Facade Panel is manufactured to have the nominal sizes as outlined in Table 8 below.

Table 8

ExoTec Facade Panel properties	
Properties	**Equilibrium Condition**
Width	1200mm
Length	2400mm or 3000mm
Approx. Mass	17 kg/m^2

13.4 Exotec Top Hat Section

ExoTec Top Hat sections are manufactured of steel grade 'G300' and is coated with A2150 coating. The sections are 1.15mm thick.

13.5 Durability

ExoTec Facade Panels and RAB™ Board, when installed and maintained as per this technical specification, will meet the durability requirements of 'Durability' Clause B2 of NZBC.

13.6 Resistance to Moisture/Rotting

ExoTec Facade Panel has demonstrated resistance to permanent moisture induced deterioration (rotting) and has passed the following tests in accordance with AS/NZS 2908.2

- Heat Rain (Clause 6.5)
- Water Permeability (Clause 8.2.2)
- Warm Water (Clause 8.2.4)
- Soak Dry (Clause 8.2.5)

13.7 Control of External Fire Spread

External spread of fire (clause C3.5 and C3.7) apply where:

- Building height is greater than 10m and upper floors have sleeping uses or are different property (C3.5), and
- Where the building is located within 1m of a relevant boundary (C3.7)

Refer to Table 5.1 of Section 5.4 of C/AS1 for group SH or Section 5.8 of C/AS2 to identify the external fire spread requirement applicable to the external cladding material and surface finish.

ExoTec Facade Panels and steel top hat sections are suitable use in external facade applications where 'non-combustible' materials are required for use.

13.8 Alpine Regions

In regions subject to freeze/thaw conditions, ExoTec Facade Panel must not be in direct contact with snow and/or ice build up, e.g. external walls in alpine regions subject to snowdrifts over winter.

ExoTec Facade Panel and RAB™ Board have been tested for resistance to frost in accordance with AS/NZS 2908.2 Clause 8.2.3.

14 Safe Working Practice

WARNING - DO NOT BREATHE DUST AND CUT ONLY IN WELL VENTILATED AREA

Hardie™ fibre cement products contain sand, a source of respirable crystalline silica. May cause cancer if dust from product is inhaled. Causes damage to lungs and respiratory system through prolonged or repeated inhalation of dust from product.

Intact fibre cement products are not expected to result in any adverse toxic effects. The hazard associated with fibre cement arises from the respirable crystalline silica present in dust generated by activities such as cutting, rebating, drilling, routing, sawing, crushing, or otherwise abrading fibre cement, and when cleaning up, disposing of or moving dust.

When doing any of these activities in a manner that generates dust, follow James Hardie's instructions and best practices to reduce or limit the release of dust.

If using a dust mask or respirator, use an AS/NZS 1716 P1 filter and refer to Australian/New Zealand Standard 1715:2009 Selection, Use and Maintenance of Respiratory Protective Equipment for more extensive guidance and more options for selecting respirators for workplaces. For further information, refer to our installation instructions and Safety Data Sheets available at www.jameshardie.co.nz.

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS, AND INSTALLATION INSTRUCTIONS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

Crystalline Silica is

- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard?

- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks
- The most hazardous dust is the dust you cannot see!

When is Crystalline Silica a health hazard?

- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

Avoid breathing in crystalline silica dust

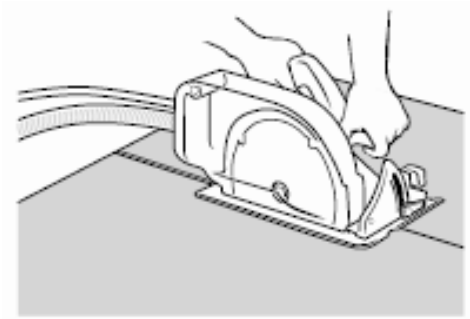
Safe working practices

- ✕ NEVER use a power saw indoors or in a poorly ventilated area
- ✕ NEVER dry sweep
- ✓ ALWAYS use M Class or higher vacuum or damp down dust before sweeping up
- ✕ NEVER use grinders
- ✓ ALWAYS use a dust reducing circular saw equipped with a sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the Hardie™ Blade name or one with at least equivalent performance – connected to an M Class or higher vacuum
- ✓ Before cutting warn others in the area to avoid dust
- ✓ ALWAYS follow tool manufacturers' safety recommendations
- ✓ ALWAYS expose only the minimum required depth of blade for the thickness of fibre cement to be cut
- ✓ ALWAYS wear a properly-fitted, approved dust mask or respirator P1 or higher in accordance with applicable government regulations and manufacturer instructions
- ✓ Consider rotating personnel across cutting tasks to further limit respirable silica exposures.

When cutting ExoTec Facade Panel:

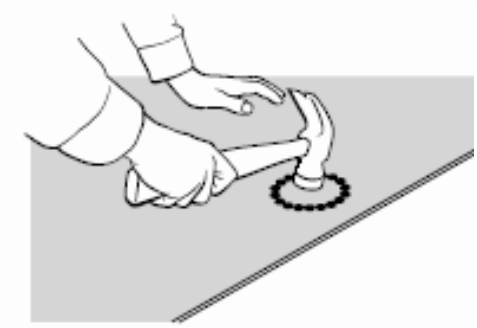
- ✓ Work outdoors only
- ✓ Make sure you work in a well ventilated area
- ✓ Position cutting station so wind will blow dust away from yourself and others in the working area
- ✓ Rotate employees across cutting task over duration of shift
- ✓ Cut products with a Hardie™ Blade Saw Blade (or equivalent) and a dust reducing circular saw connected to a M Class or higher vacuum
- ✓ When sawing, sanding, rebating, drilling or machining fibre cement products, always:
  - Wear your P1 or higher (correctly fitted in accordance with manufacturers' instructions), ask others to do the same.
  - Keep persons on site at least 2 metres and as far as practicable away from the cutting station while the saw is in operation.
  - If you are not clean shaven, then use a powered air respirator with a loose fitting head top
  - Wear safety glasses
  - Wear hearing protection
  - When others are close by, ask them to do the same
- ✓ Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class or higher vacuum

Working Instructions



Hardie™ Blade Saw Blade

The Hardie™ Blade Saw Blade used with a dust-reducing saw is ideal for fast, clean cutting of Hardie™ fibre cement products. A dust-reducing saw uses a dust collector connected to a M Class or higher vacuum. When sawing, clamp a straight edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut.



Hole-Forming

For smooth clean cut circular holes:

- Mark the centre of the hole on the sheet
- Pre-drill a 'pilot' hole
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill

For irregular holes:

- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face
- Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported

14.1 Storage and Delivery

Keeping products and people safe

Off loading

✓ Hardie™ fibre cement products should be off-loaded carefully by hand or by forklift

✓ Hardie™ fibre cement products should not be rolled or dumped off a truck during the delivery to the jobsite

Storage

Hardie™ fibre cement products should be stored:

✓ In their original packaging

✓ Under cover where possible or otherwise protected with a waterproof covering to keep products dry

✓ Off the ground – either on a pallet or adequately supported on timber or other spacers

✓ Flat so as to minimise bending

Hardie™ fibre cement products must not be stored:

✗ Directly on the ground

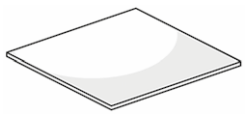
✗ In the open air exposed to the elements

James Hardie is not responsible for damage due to improper storage and handling.

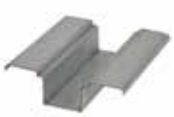
14.2 Tips for safe and easy handling of ExoTec Facade Panel

- ✓ Carry with two people
- ✓ Hold near each end and on edge
- ✓ Exercise care when handling sheet products to avoid damaging the edges/corners

15 Product and Accessories

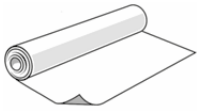
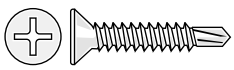
ExoTec Facade Panel information				
Product	**Description**	**Size**		
	**ExoTec Facade Panel** Dense compressed panel. Square edge. Factory sealed on all six sides. Each panel has a distinctive white face, which accepts a wide range of paint finishes. The panel must be installed with the white side facing the exterior of the structure.	**Length (mm)**	**ExoTec Facade Panel 9mm**	
			1200mm Width	**Code**
		2400	✓	**402205**
		3000	✓	**402209**

Note: All dimensions and masses provided are approximate only and are subject to manufacturing tolerances.

Accessories supplied by James Hardie		
Accessiories	**Description**	**Quantity/Size (Approx)**
	**ExoTec Top Hat** Proprietary rolled zincalum coated AZ150 steel sections 124mm wide x 35mm deep x 1.15mm thick. Designed to span vertically across the building structure to support the panels along vertical panel joints and isolate movement of the panels from those of the structure.	4800mm lengths Code: **304580**
	**ExoTec Intermediate Top Hat** Rolled zincalum coated AZ150 steel sections 50mm wide x 35mm deep x 1.15mm thick, designed to span vertically across the building support structures and to be used as intermediate support to the panels.	4800mm length Code: **304581**
	**ExoTec Gasket Snap Strip** Black sealing Neoprene Gaskets. Specially designed to clip into the ExoTec Top Hat at vertical sheet joints to cover fixings to the structure and to provide an initial weather seal and drainage.	4800mm length Code: **304582**
	**ExoTec Top Hat Corner Flashing** Pressed metal zinc alum coated Section 0.95mm thick. Used in internal and external corner details.	3000mm length Code: **304661**
	**ExoTec Top Hat J Mould** Used at butt joints with other materials like concrete or masonry.	3000mm length Code: **304662**
	**ExoTec Top Hat Base Mould** To be used to close off the cavity at the base	3000mm length Code: **304663**
	**Aluminium 'T' Socket** 1.2mm thick aluminium extruded etch primed horizontal joint flashing.	2400mm lengths Code: **304103** 3000mm lengths Code: **304105**
	**ExoTec Facade Washer** Opaque nylon washer fits beneath the appropriate exposed head fasteners and ExoTec Facade Panels. The ExoTec Facade Washers are fitted in the holes made for fixing the exposed head fasteners.	Pack of 1000 Code: **302761**
Tools		
	**Hardie™ Blade Saw Blade** Diamond tip 184mm diameter fibre cement circular saw blade. Spacers not included.	Each Code: **300660**
	**Tungsten Carbide Drill Bit** Used for drilling holes for fixing the counter sunk fasteners.	Each Code: **300567**

Accessories/tools not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with ExoTec Facade Panel System. James Hardie does not supply these products and does not provide a warranty for their use. Please contact component manufacturer for information on their warranties and further information on their products.

Product	Description
	**Building Underlay** Must comply with Table 23 of E2/AS1 of the NZBC.
	**Bond Breaker Tape** Used when filling vertical joints to prevent sealant from bonding to top hat.
	**6mm Masonry Drill** Used to pre-drill holes for exposed head fasteners.
	**Bostik® - 'Seal N Flex -1®' Adhesive or Sikaflex® 11FC Adhesive** Polyurethane adhesive required to glue the Aluminium 'T' Socket to panels. Can also be used to fill the expressed joints for wind pressures above 4.0kPa.
	**Epoxy Flush Sealing (2 Part)** Countersunk screw holes are flush sealed using Hilti CA273, Allnex Fairing Cream or similar epoxy.
	**Epoxy Applicator** A recommended method of fixing the epoxy over countersunk screw heads. This method minimises the spreading of epoxy over panel surface.
	**Flexible Tape** A flexible self-adhesive tape used in preparation of a window. Refer to the window installation section in this manual for more information.
Fasteners	
	**Countersunk Fasteners** 10g x 30mm countersunk head self drilling screws – Class 4 coating Fasteners must be fully compatible with all other material that it is in contact with to ensure the durability and integrity of assembly. Supplied by EDL Fasteners Code: **34C101630CL4**
	**Wafer Head/Pan head Fastener** 10g x 30mm wafer/pan head screw – Class 4 coating
	**Hex Head Screw** For fixing ExoTec Top Hat sections into the framing substrate. Refer Table 3 to check design capacity of the fastener required. Chose a fastener suitable to withstand wind pressures.
	**Paints and Primers** Use Dulux® AcraPrime® 501/1 primer or Dulux® Primercryl® to seal the cut edges of panels. Use quality paints only. Refer to manufacturer for further information.
	Fastener for fixing top hat setion into tilt slab and concrete blocks filled with concrete

16 Details

Various details outlined in the following table are available on Pages 17 to 31.

Figure 1: Horizontal layout brick grid pattern

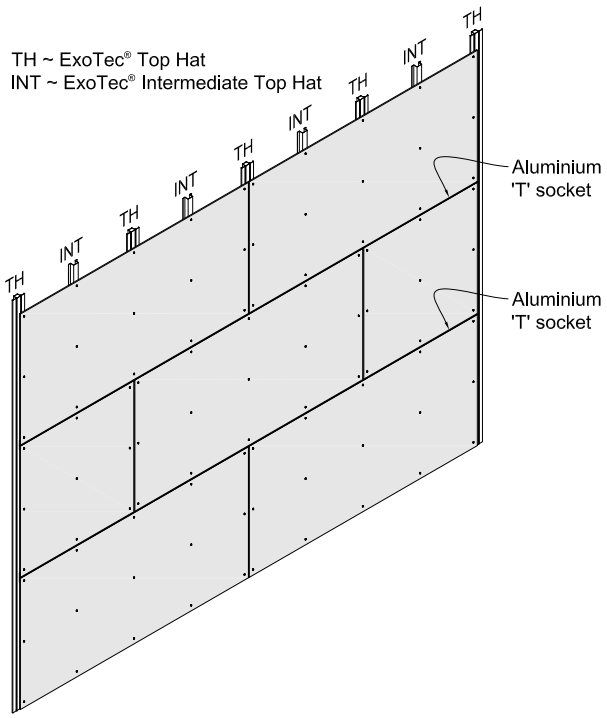


Figure 2: Vertical layout brick grid pattern

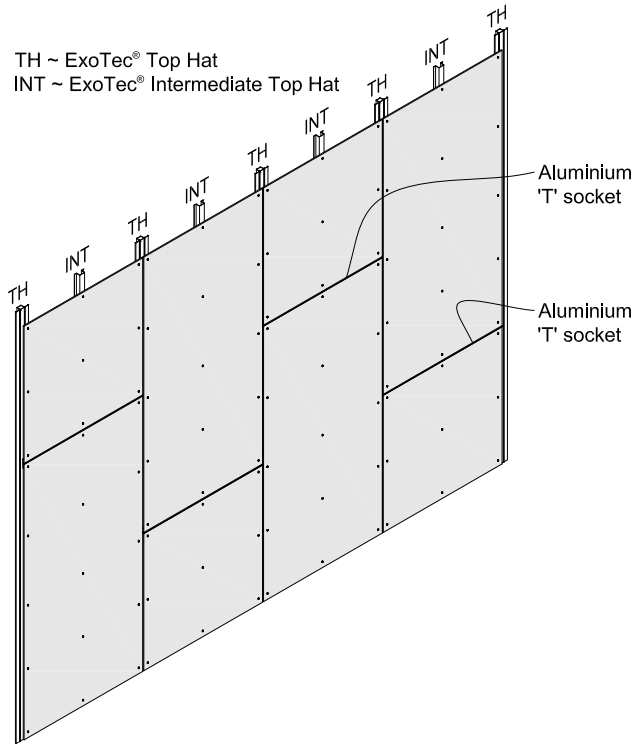


Figure 3: Typical panel and framing layout

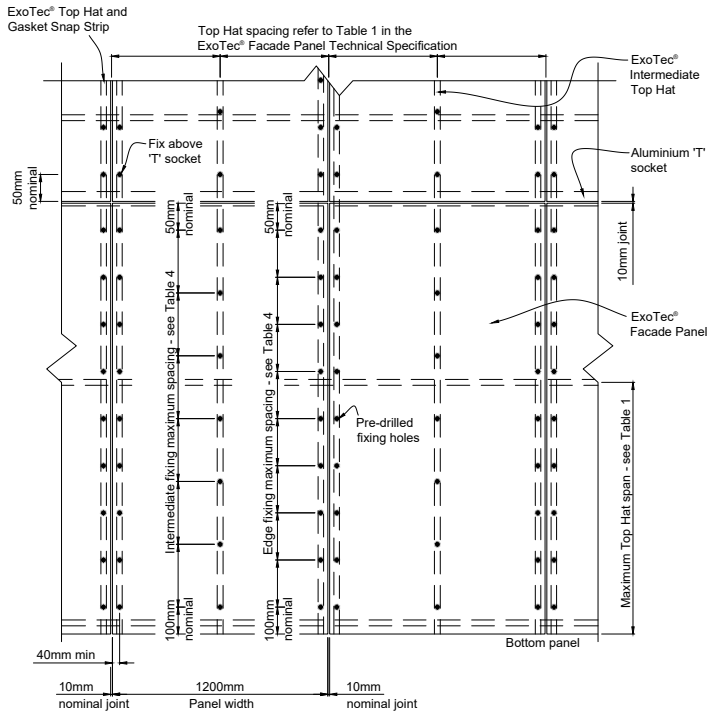


Figure 4: Wall base typical detail

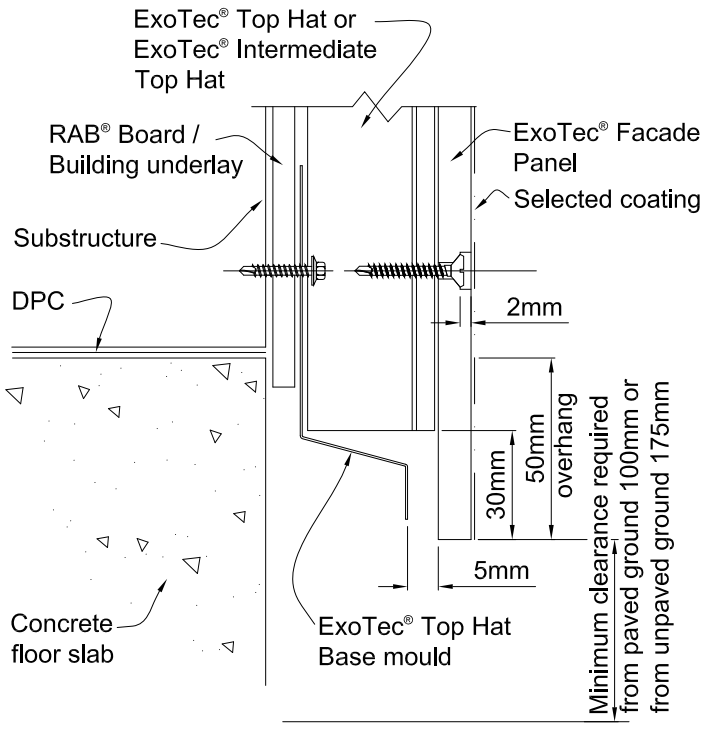


Figure 5: Top Hat and panel fixing detail

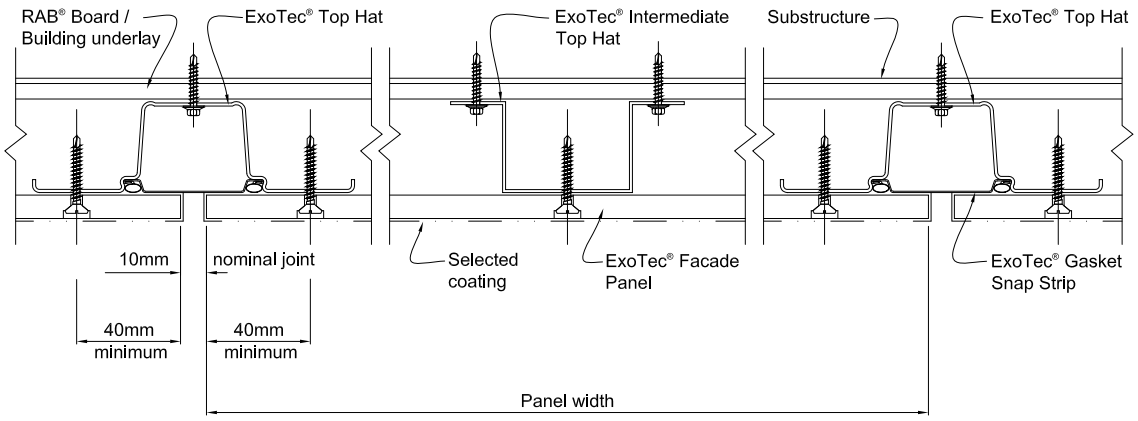


Figure 6: Countersunk fastener detail

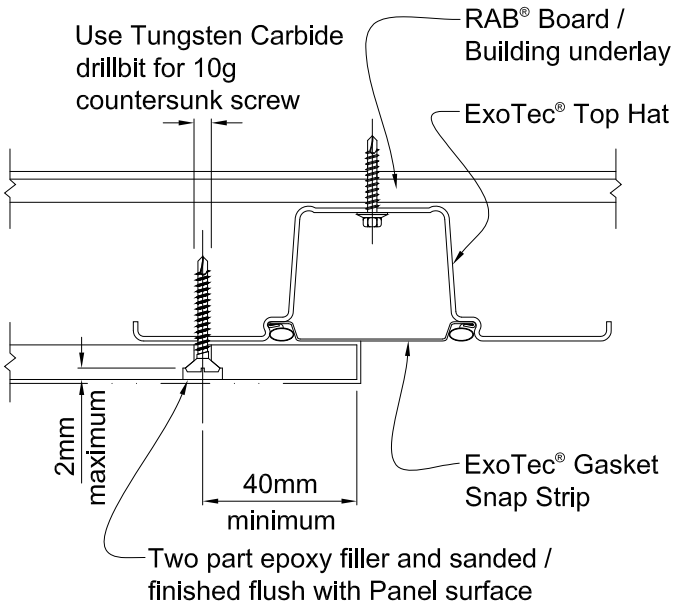


Figure 7: Vertical panel joint detail

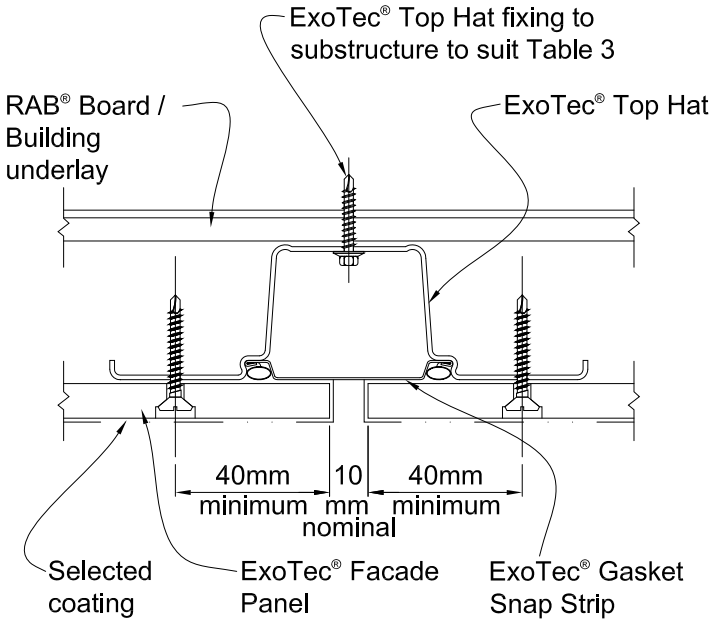


Figure 8: Panel joints in high wind pressure areas detail

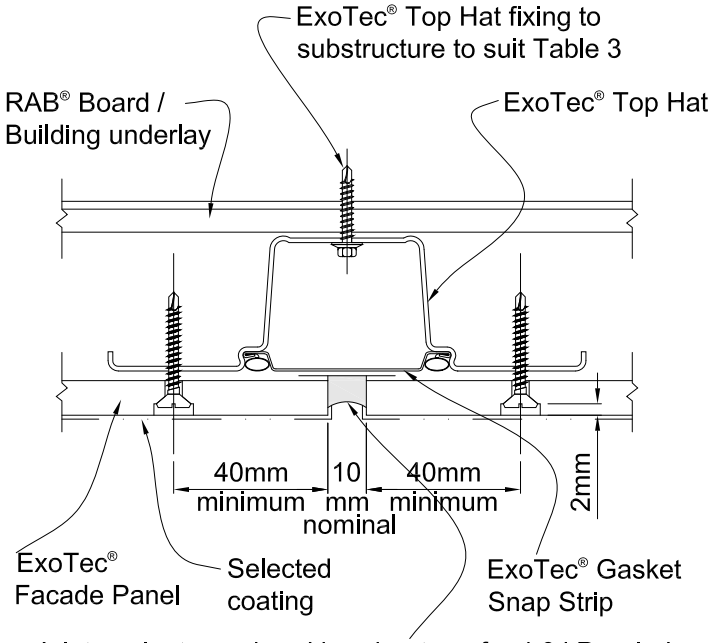


Figure 9: Exposed head fastener detail

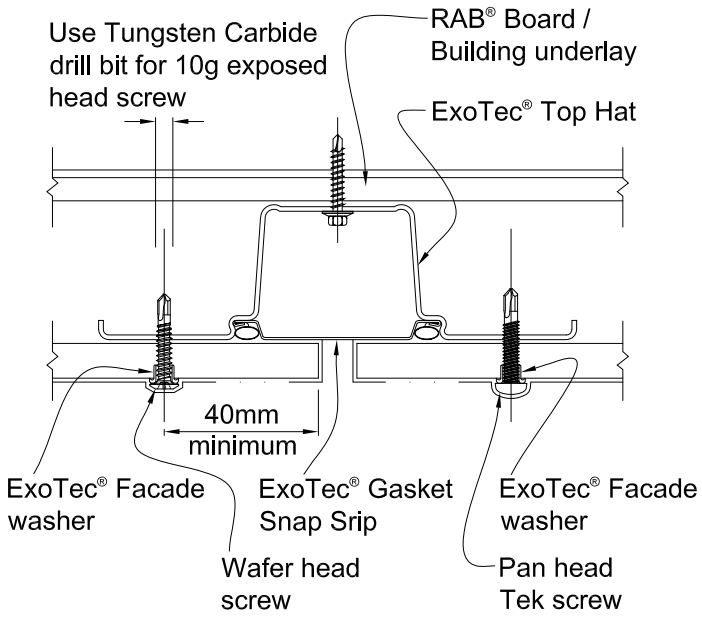


Figure 10: ExoTec Facade washer detail

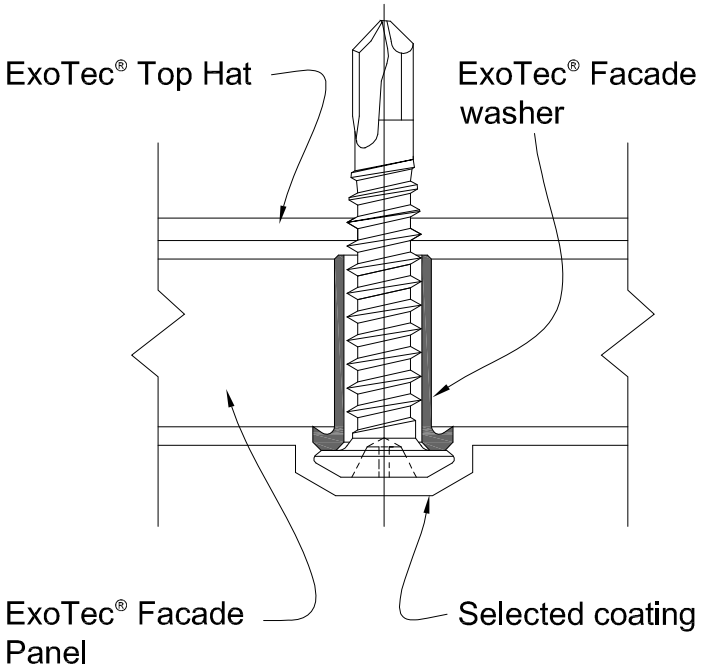


Figure 11: Internal corner detail

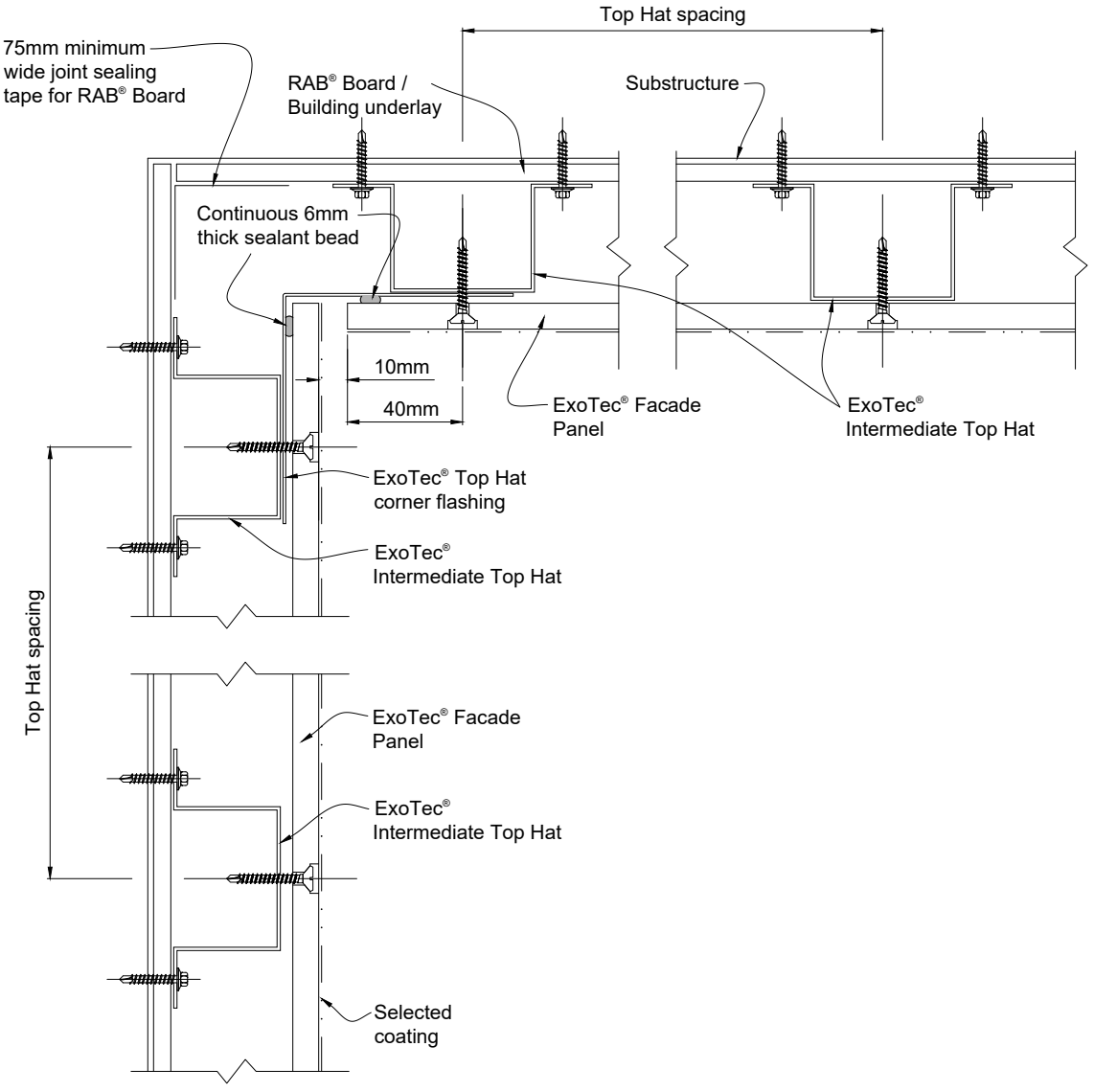


Figure 12: External corner detail

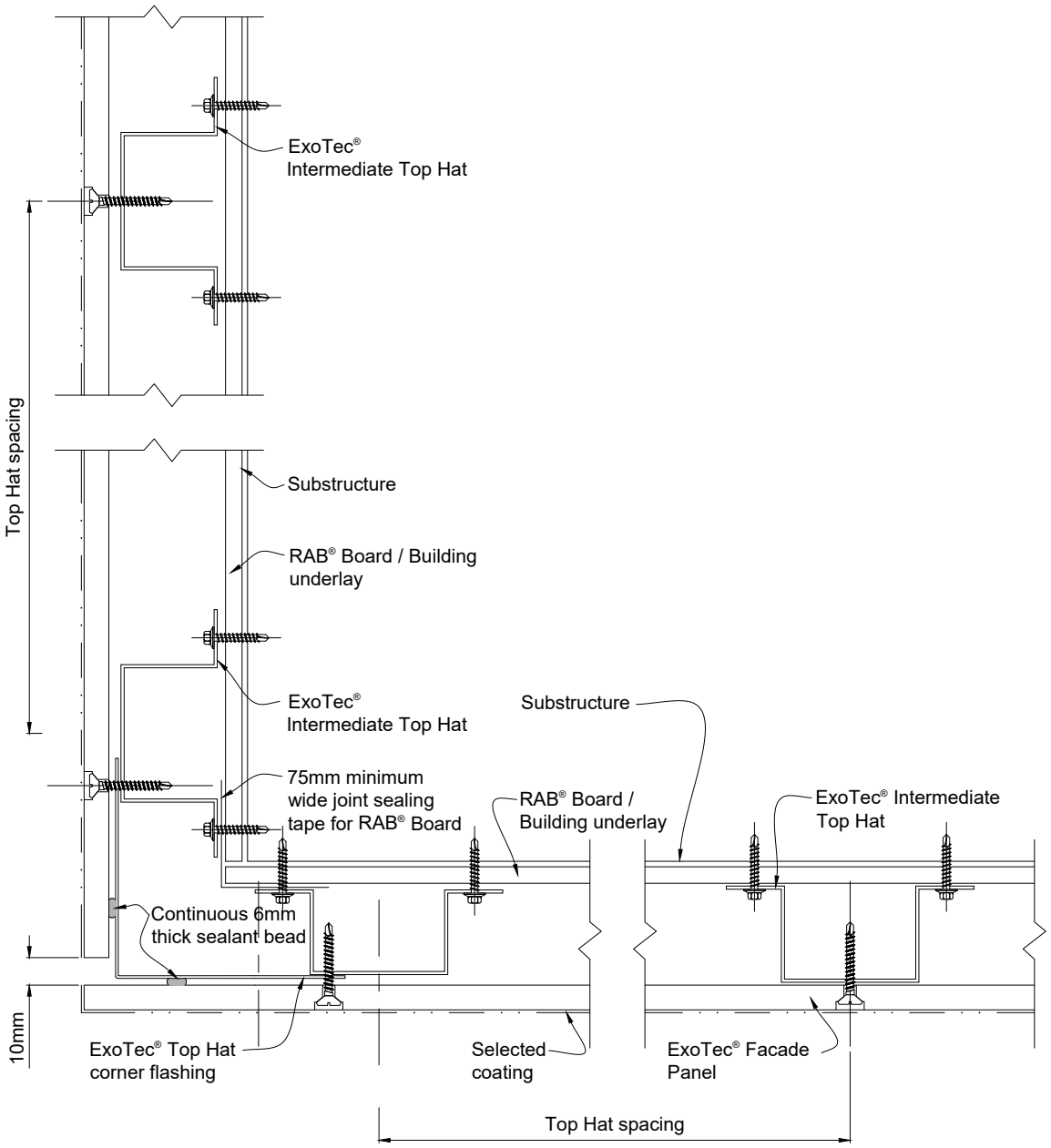


Figure 13: Angled external corner detail

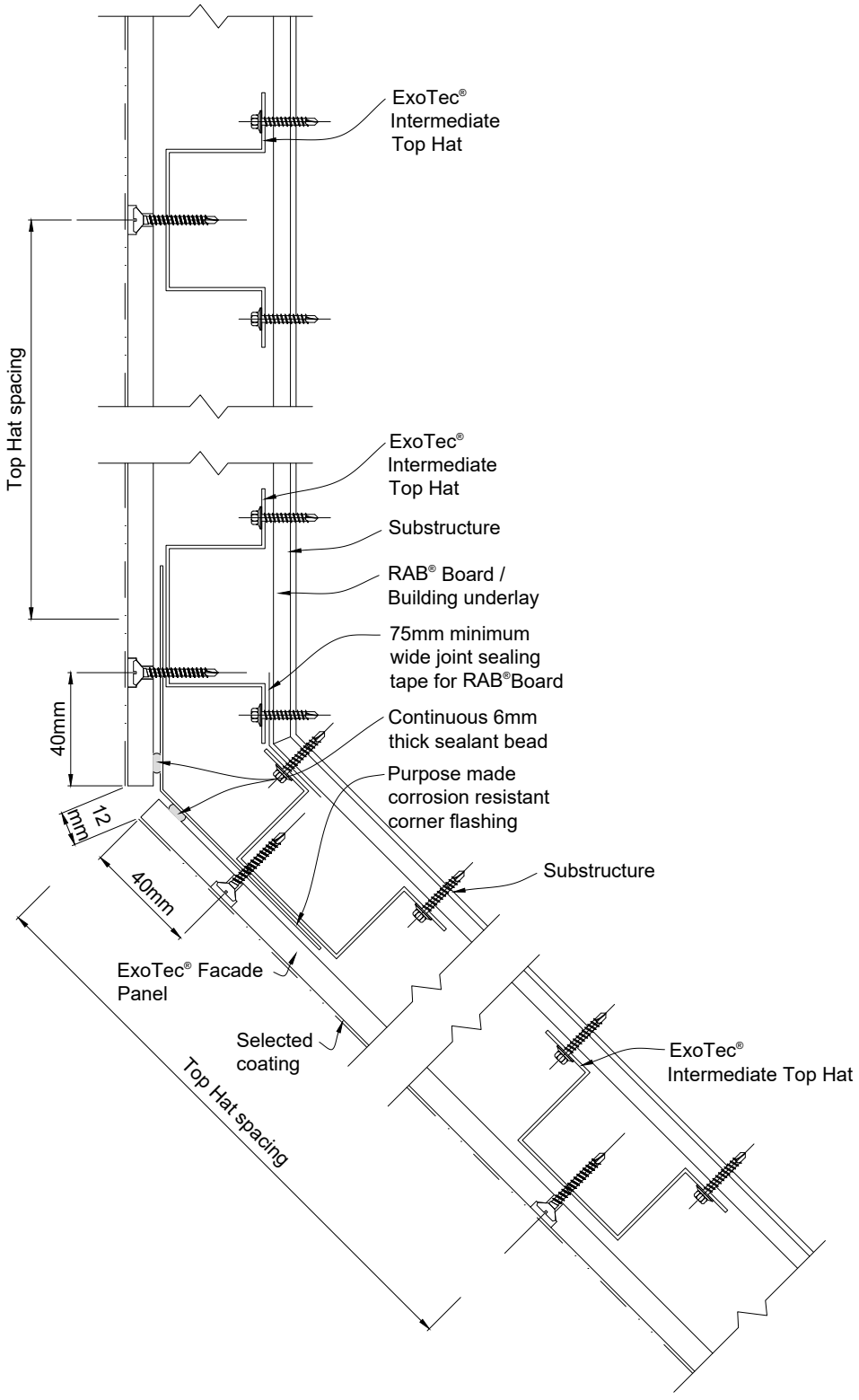
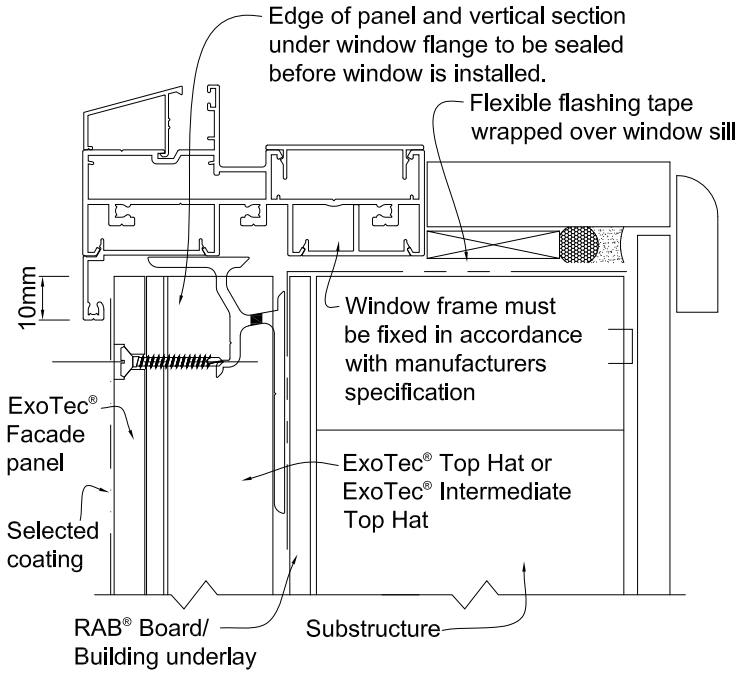
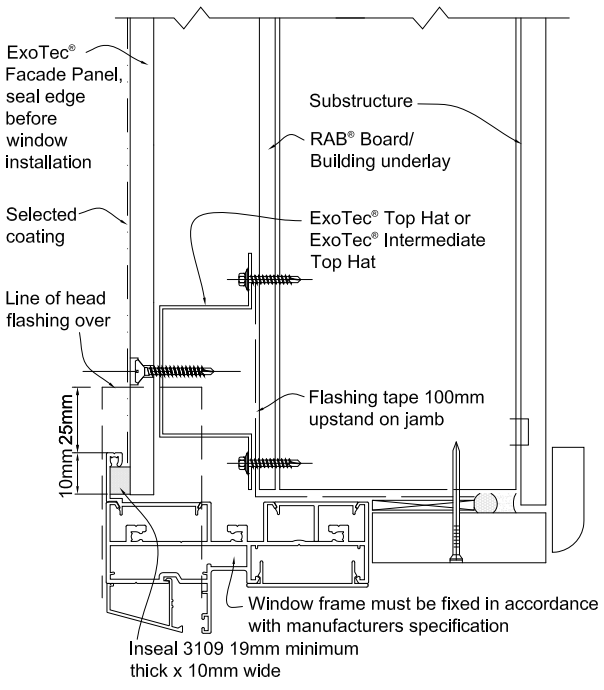


Figure 14: Commercial window sill detail



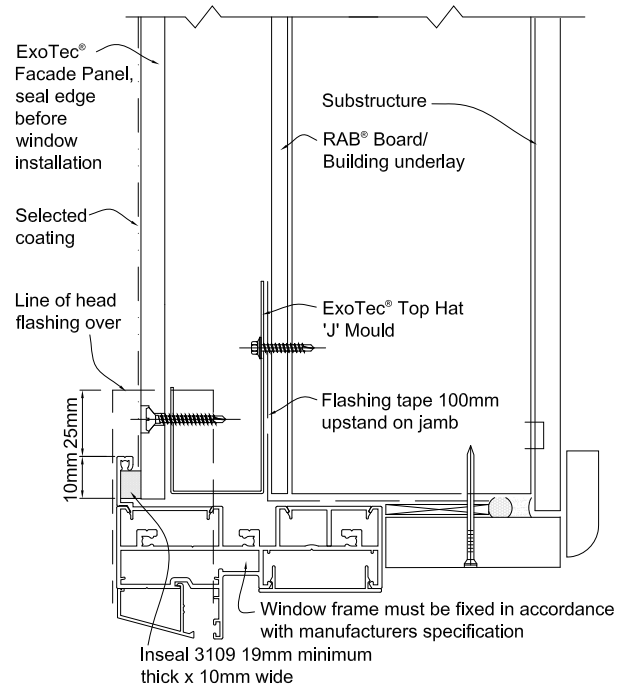
Note: When RAB® Board is used with timber frame flashing tape to be applied to the entire window opening

Figure 15: Commercial window jamb detail



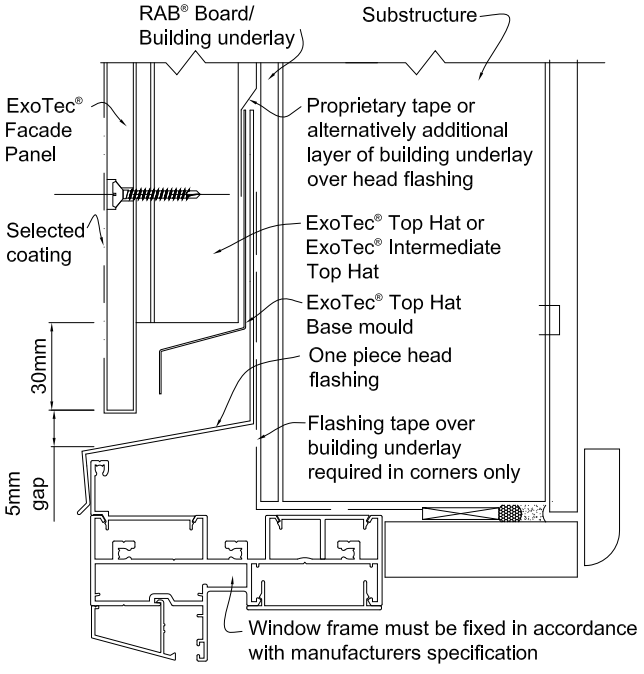
Note: When RAB® Board is used with timber frame flashing tape to be applied to the entire window opening

Figure 16: Commercial window jamb detail using 'J' mould



Note: When RAB® Board is used with timber frame flashing tape to be applied to the entire window opening

Figure 17: Commercial window head detail



Note: When RAB® Board is used with timber frame flashing tape to be applied to the entire window opening

Figure 18: Typical soffit detail

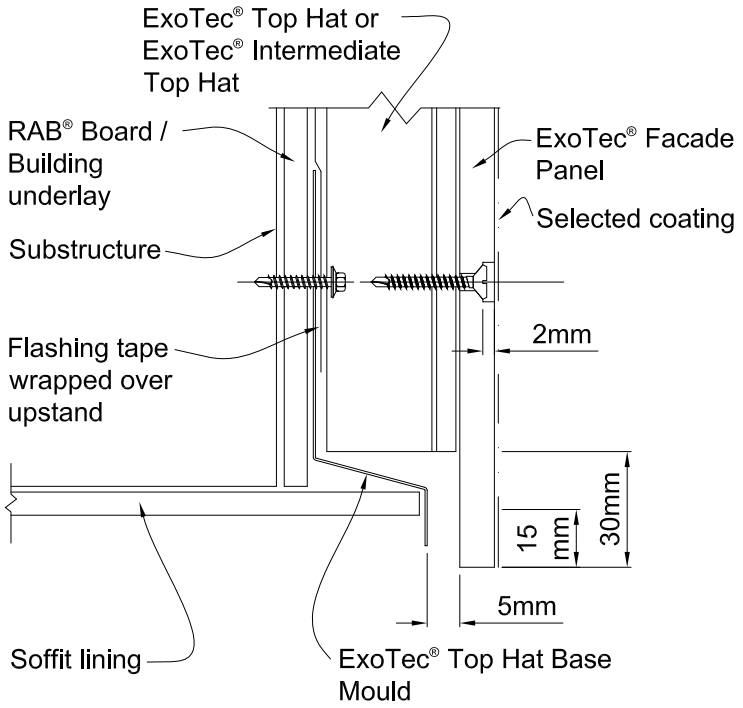


Figure 19: Horizontal panel joint detail at mid floor height

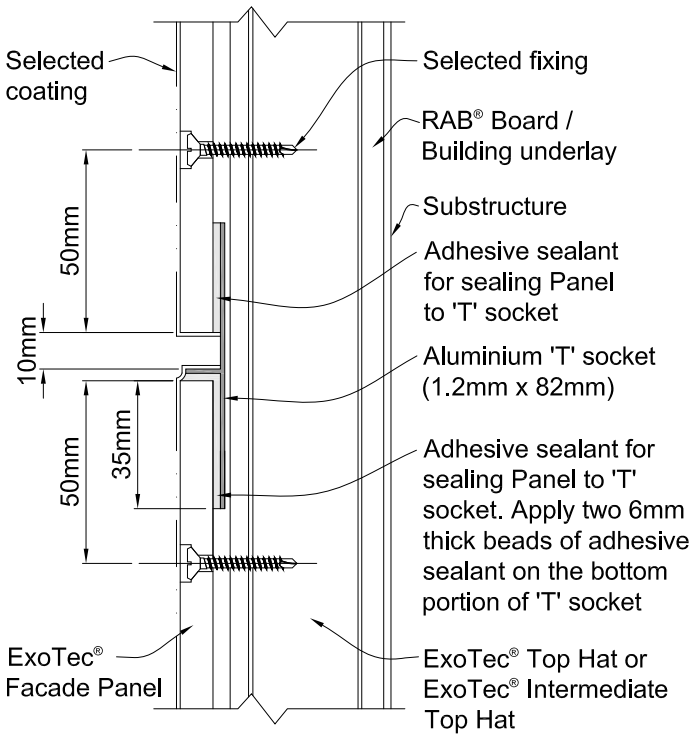


Figure 20: Installing upper panel over aluminium 'T' socket

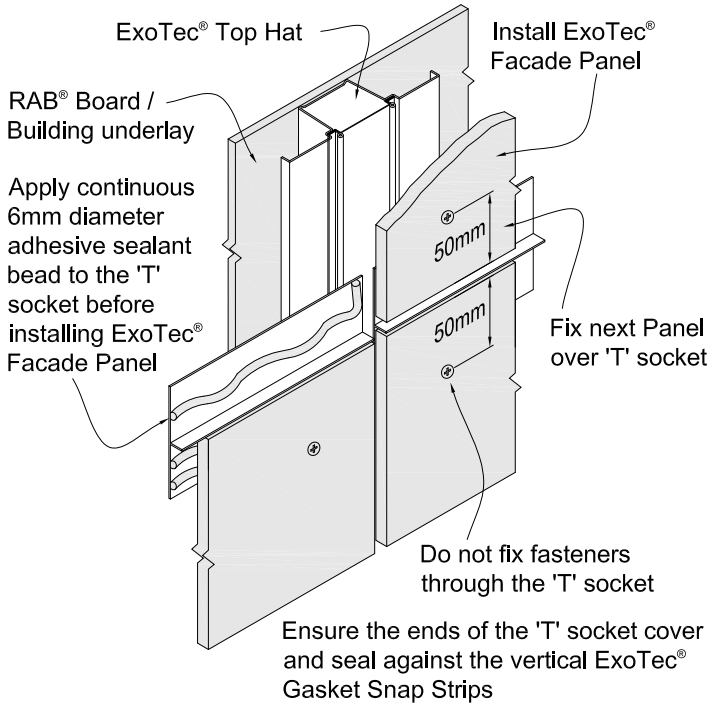
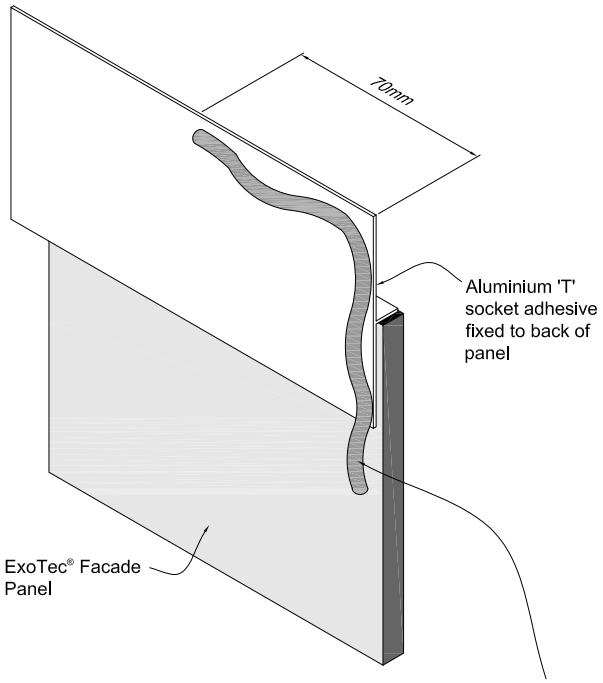


Figure 21: Sealing aluminium 'T' socket to ExoTec Top Hat section



Apply 6mm diameter adhesive sealant bead to the back of the 'T' socket before fixing over ExoTec® main Top Hat section. Continue bead onto back of Panel. Install Panel before sealant cures to ensure bond.

Figure 22: Vertical joint terminating over the horizontal joint

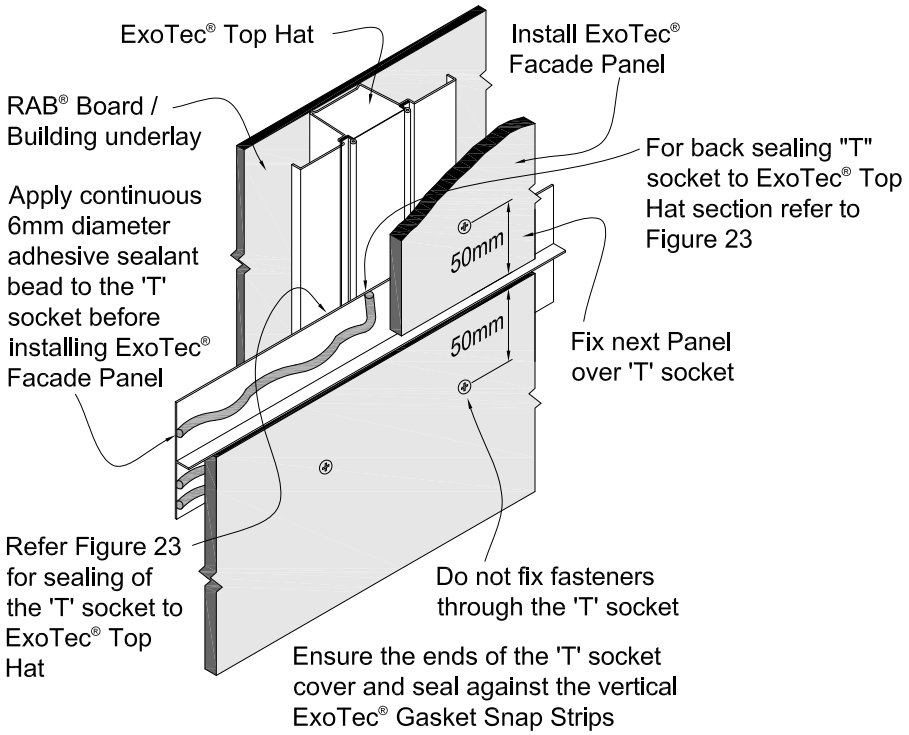


Figure 23: Sealing aluminium 'T' socket to ExoTec™ Top Hat

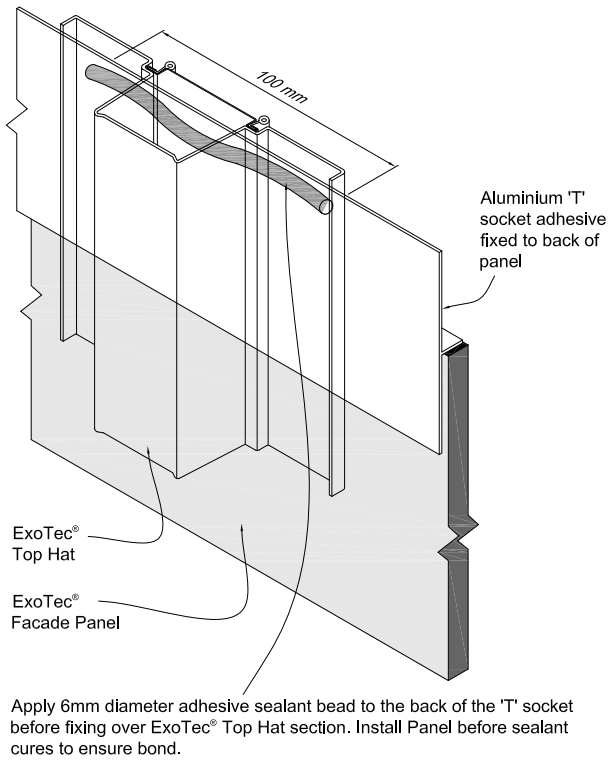


Figure 24: Horizontal structural joint detail

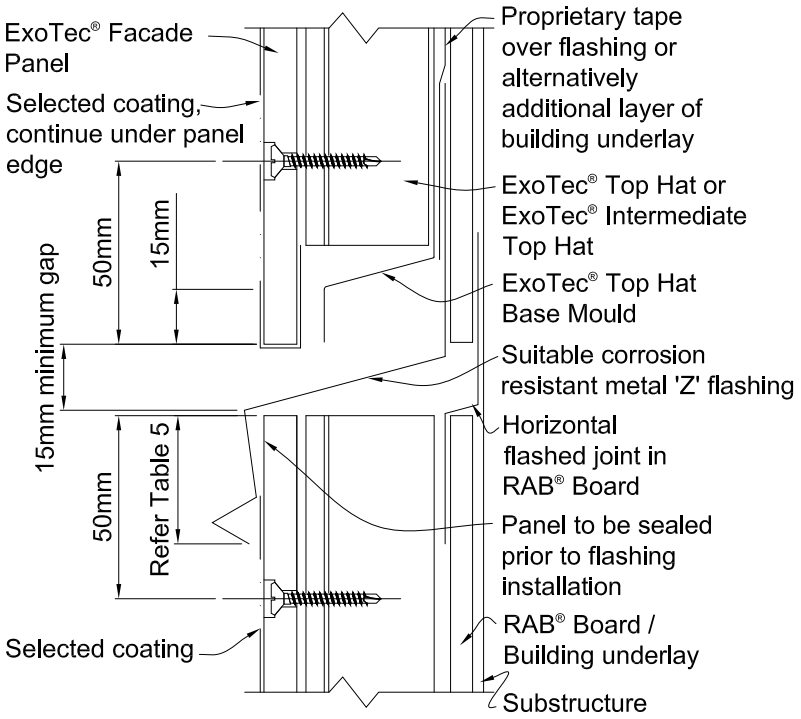


Figure 25: Vertical structural joint detail

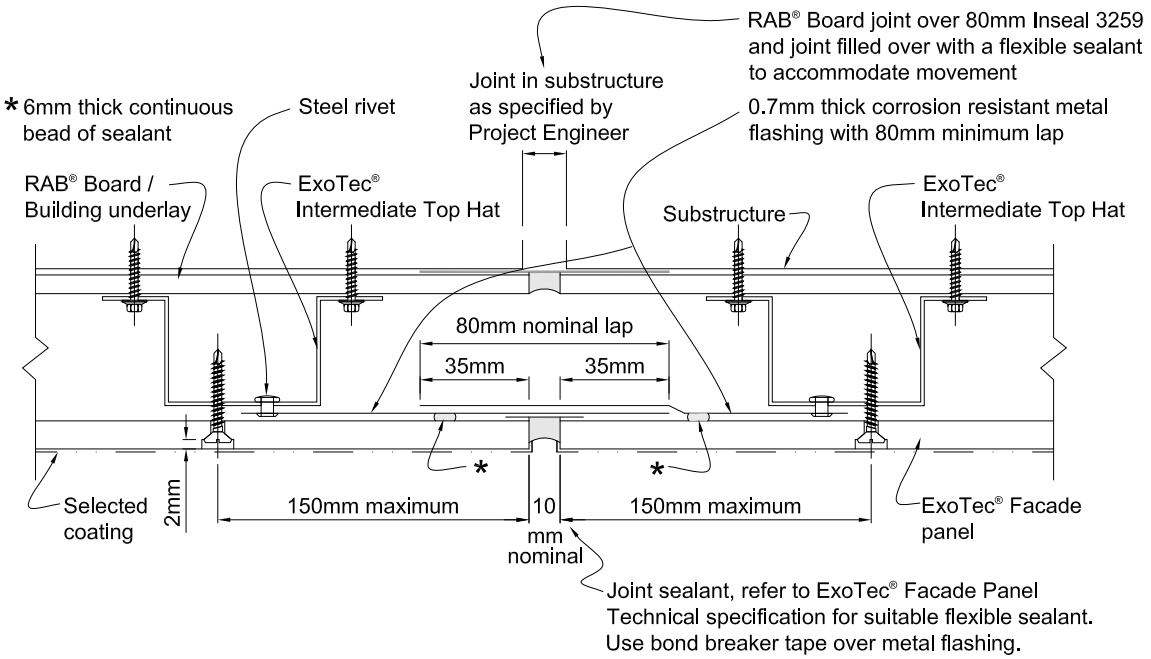


Figure 22: Vertical joint terminating over the horizontal joint

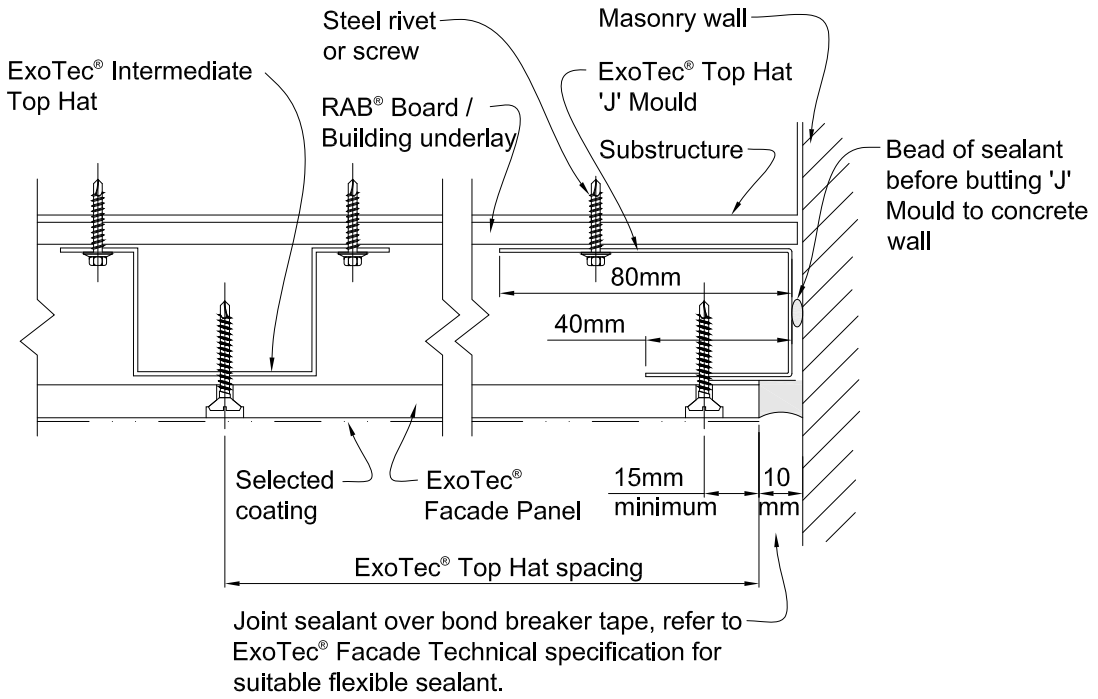
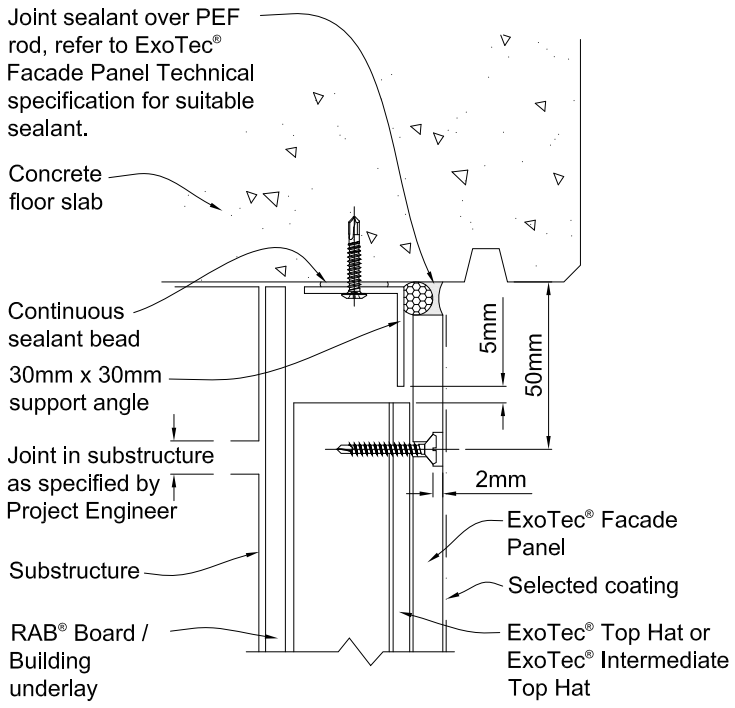


Figure 27: Wall junction under concrete slab detail



Notes

Notes

Product Warranty

James Hardie New Zealand Limited ("James Hardie") warrants for a period of 15 years from the date of purchase that the ExoTec™ Facade Panel and RAB™ Board (the "Product"), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie's relevant published literature current at the time of installation. James Hardie warrants for a period of 15 years from the date of purchase that the accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY:

The warranty is strictly subject to the following conditions:

a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation.

b) This warranty is not transferable.

c) The Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice.

d) The project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code ("NZBC"), regulations and standards.

e) The claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product.

f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces).

g) All warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law.

h) If meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

Disclaimer: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. James Hardie has tested the performance of the ExoTec™ Facade Panel and RAB™ Board when installed in accordance with the ExoTec™ Facade Panel and Top Hat Technical Specification, in accordance with the standards and verification methods required by the NZBC and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design), James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

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