Supercrete™

Sustainable Cost Effective Construction & Coating Systems

Panel Cladding Systems

Design & Installation Guide

CodeMark Australia & New Zealand

15 YEARS

NEW ZEALAND MADE

Supercoat™

100% NZ
Owned & Operated

This Design Manual has been written for building owners (including their designers and builders), Supercrete™ personnel (i.e. the Supercrete™ Panel Installers and the Supercoat™ Coating Applicators) and building consent authorities.

Supercrete™ Panel Cladding Systems

The systems described in this document incorporates the **Thermoseal™** closed cavity technology, **Steelock™** steel top hat batten mounting system, **Powercage™** a state of the art panel reinforcing technology, and **Firestop** fire rating system, hereafter referred to as the **Supercrete™ Panel Cladding System (SPC System).**

This document explains the work required to be performed by the building owner (including their designer and builder) in respect of preparing the structure for cladding.

For the purposes of providing general information and describing the SPC Systems, this document also includes details of the components supplied and the work performed by Supercrete™ registered installers and Supercoat™ coating applicators, product characteristics, system science and construction details.

The SPC Systems have been issued a Codemark by CertMark Australasia Pty Ltd. When installed in accordance with this Codemark, it has the same legal status as the Acceptable Solutions of the relevant compliance documents of the New Zealand Building Code.

Contents

		Page
1.0	**System Overview**	6
1.1	**Introduction**	6
1.1.1	Supercrete™ Panel Supply	7
1.2	**Autoclaved Aerated Concrete**	7
1.3	**System Features and Benefits**	9
1.4	**Thermal Insulation**	9
1.4.1	Overview	9
1.4.2	Thermal resistance levels	10
1.4.3	Insulation in conventionally clad walls	10
1.4.4	Thermal performance of Supercrete™Panel Cladding	11
1.4.5	Reduced thermal bridging	11
1.4.6	Construction R-Value	12
1.5	**Acoustic Insulation**	14
1.5.1	Overview	14
1.5.2	Typical wall performance	14
1.5.3	Acoustic insulation of Supercrete™ Panel Cladding	14
1.5.4	Supercrete™ Acoustic Fencing System	14
1.6	**Fire Resistance**	15
1.6.1	Fire proofing	15
1.6.2	Fire resistance of Supercrete™ Panel Cladding	15
1.7	**Additional Features**	15
1.7.1	Non toxic	15
1.7.2	Long life	15
1.7.3	Lightweight	15
1.7.4	Easily worked	15
1.7.5	Accurate	16
1.7.6	Thermal movement	16
1.7.7	Shrinkage	16
1.7.8	Versatile	16
1.7.9	Rapid assembly	16
1.7.10	Retrofitting	16
1.7.11	Stylish good looks and great performance	16
1.7.12	Guarantee	16
1.8	**System Details**	17
1.8.1	Wall heights	17
2.0	**Designing for Supercrete™ Panel**	24
2.1	**Scope**	24
2.2	**Design Considerations**	24
2.2.1	Wind, earthquake and corrosion zones	24
2.2.2	Design for movement control	24
2.2.2.1	Vertical control joints	25
2.2.2.2	Vertical control joint width	25
2.2.2.3	Vertical Control Joint with Supercoat™ Pre-meshed Control Joint Bead	25
2.2.2.4	Vertical control joint height	33
2.2.2.5	Vertical control joints above window/door heads	33
2.2.2.6	Horizontal control joints	33
2.2.2.7	Articulation joints	33
2.2.3	Timber framing treatment	33
2.2.4	Batten spacing	35
2.2.5	Batten selection	35
2.2.6	Wall bracing	35
2.2.7	Support of upper storey panels	35
2.2.8	Durability of fasteners and flashings	35
2.2.9	Specific design	35
2.2.10	Sub-floor cladding	38
2.3	**Design Detailing**	40
2.3.1	Design for panel sizes	40
2.3.2	Supercrete™ Panel base detail	40
2.3.3	Distance between floor level, or underside of Supercrete™ Panels and adjacent finished ground level	40
2.3.4	Window and door details	40
2.3.5	Window sills	42
2.3.6	Banding around openings	42
2.3.7	Penetrations (including at meter boxes)	42
2.3.8	DPC Flashings	42
2.3.9	Panel surface rebating	43
2.3.12	Roof and soffit junctions	49
2.4	**Retrofitting**	56
2.4.1	Introduction	56
2.4.2	Scope of building types for retrofitting	56
2.4.3	Base support for retrofit cladding	57
2.4.4	Openings in existing buildings	59
2.4.5	Horizontal Control Joints	59
3.0	**Additional Design Information**	61
3.1	**Scope**	61
3.2	**Architectural Detailing**	61
3.2.1	Mouldings, corbels and decorative features	61
3.2.2	Balustrades	61
3.2.3	Arches	62
3.2.4	Parapets	63
3.2.4.1	Fully framed parapets	63
3.2.4.2	Cantilevered panel parapets	65
3.2.4.3	Parapet coating considerations	65
3.2.5	Pergolas and verandas	66
3.2.6	Lightweight attachments to panels	67
3.2.7	Column and beams	68
3.2.8	Column and beam accents	68
3.2.9	Junctions with other claddings	69
3.2.10	Installation of services	70
3.2.11	Fire rated construction	70
3.3	**Summary of design requirements**	71
3.4	**Pre-installation requirements**	73
3.5	**Maintenance**	73

Page

4.0 Work Performed by Supercrete™ Personnel – Informative 74
4.1 Overview 74
4.1.1 Scope 74
4.2 Personnel Responsibilities 74
4.2.1 Supercrete™ Distributor 74
4.2.2 Supercrete™ Panel Installer 74
4.2.3 Supercoat™ Coating Applicator 74
4.3 System Components 75
4.3.1 Battens 75
4.3.2 Base angles 75
4.3.3 Fastenings into timber 75
4.3.4 Fastenings into concrete 75
4.3.5 Batten screws 75
4.3.6 Panel screws 75
4.3.7 Supercrete™ Panel 75
4.3.8 Supercoat™ AAC Superbond Adhesive 76
4.3.9 Bands and sill blocks 76
4.3.10 Corrosion Protection Paint 76
4.3.11 Skellmax Ultralon™ EVA 60 76
4.3.12 Damp proof course (DPC) 76
4.3.13 Butyl rubber flashings 76
4.3.14 Holdfast PEF backing rods for Holdfast Sealants 76
4.3.15 Supercoat™ Tanking Membranes 77
4.3.16 Sealant for control joints and around penetrations 77
4.4 Construction Details 77
4.4.1 Penetrations 77
4.4.2 Dummy control joint installation 77
4.4.3 Holdfast sealants 77
4.4.4 Panel cutting 78
4.4.5 Screw locations 78

5.0 Supercoat™ Coating Systems 79
5.1 Choosing the Right System 79
6.0 System Science 80
6.1 Overview 80
6.2 New Zealand building Code 80
6.2.1 Acceptable Solution E2/AS1 80
6.2.2 Alternative Solution 80
6.2.3 The risk matrix in Acceptable Solutions E2/AS1 80
6.3 Understanding Cladding Systems 80
6.3.1 Drained and vented cavity systems 81
6.3.2 Drained and vented cavity construction methods 81
6.4 Cladding with Supercrete™ Panels 81
6.4.1 Closed cavity construction 81
6.4.2 Interior cavity 81
6.4.3 Key differences 81
6.4.4 Low water penetration 82
6.4.5 Insulated cladding 82
6.4.6 Corrosion protection 83
6.4.7 Movement control 83
6.4.7.1 Movement cracks in solid plaster over conventional sheet backings 83

Page

6.4.7.2 Movement control in Supercrete™ Panel Cladding 84
6.4.8 Supercrete™ Panel vapour permeability 84
6.4.9 Supercoat™ coating breathability 84
6.4.10 Vapour diffusion moisture management 85
6.5 Detailing at Openings 85
6.5.1 Window flashings 85
6.5.2 Leaks at window mitre joints or joinery penetrations 86
6.5.3 Identifying and fixing leaks 86
6.5.4 Moisture content of timber framing 86
6.6 Summary 86

Appendices
Appendix A Panel Installation Checklist 87

Tables
Table 1 Supercrete™ 50 and 75mm Panel Cladding batten design 36
Table 2 Material Selection for Corrosion Zone 36
Table 3 Batten section properties 37
Table 4 Supercrete™ Panel Cladding fastenings 37
Table 5 Supercrete™ Panel physical properties 37
Table 6 60, 100 and 120mm Tophat Batten Spacing for Supercrete™ Panel Cladding Systems 56
Table 7 Number of screws per panel for backing block 60
Table 8 Holdfast Sealant Gaps 77

Drawing Index

1. General system details

		Page
SPC 1	The Supercrete™ Panel Cladding System	6
SPC 1-1	General arrangement of single storey Supercrete™ Panel Cladding System	17
SPC 1-2a	General arrangement of two storey Supercrete™ Panel Cladding System with horizontal mod-floor panels	18
SPC 1-2b	General arrangement of two Storey Supercrete™ Panel Cladding System with single horizontal control joint	19
SPC 1-3	Single storey construction details	20
SPC 1-4a	Supercrete Panel two storey construction details with horizontal mid-floor panels	21
SPC 1-4b	Supercrete Panel two storey construction details with single horizontal control joint	22
SPC 1-5	Section through single storey wall	23
SPC 1-6	Typical panel arrangement around opening	45
SPC 1-7	Panel fixing details	50
SPC 1-8	Staggered panels on tall walls	19

2. Foundation details

SPC 2-1	Typical Supercrete™ Panel foundation detail	34
SPC 2-2	Suspended floor with timber pile foundation	38
SPC 2-3	Supercrete™ Panel masonry footing detail	39
SPC 2-4	Supercrete™ Panel foundation detail with no rebate	39
SPC 2-5	Ground clearances to base rebate and floor level	41

3. Movement control joint details

SPC 3-1	Control joint detail	26
SPC 3-1a	Alternative Vertical Control Joint with Supercoat™ Pre-meshed Control Joint Bead	26
SPC 3-2	Control joint options	27
SPC 3-3	Control joint locations	28
SPC 3-4	External corner control joint details	29
SPC 3-5	Internal corner control joint details	30
SPC 3-6	Horizontal control joint with horizontal mid-floor panel	31
SPC 3-7	Horizontal control joints	32
SPC 3-8	Horizontal articulation control joint at gable end	31

4. Window and door details

SPC 4-1	Vertical section through typical window	44
SPC 4-3	Window DPC flashing details	43
SPC 4-4	Vertical section through aluminium door	46
SPC 4-5	Door jamb detail - plan view	45
SPC 4-6	Window jamb facing block option (plan view)	59
SPC 4-7	Vertical section through timber window	47
SPC 4-8	Garage door head detail	48
SPC 4-10	Fastening of narrow height panels above openings	49
SPC 4-11	Garage door base detail	48
SPC 4-12	WANZ Bar Supported Window Sill Section	42

5. Roof and parapet details

SPC 5-1	Supercrete™ Panel to typical eave/soffit junction	51
SPC 5-2	Alternative Supercrete™ Panel to typical eave/soffit junction	52
SPC 5-3	Supercrete™ Panel to outside soffit detail	52
SPC 5-4	Mono-slope roof soffit	53
SPC 5-6	Roof apron flashings	55
SPC 5-7	Sheetmetal capping to framed parapet	63
SPC 5-8	Supercoat™ Tanking Membrane capping to framed parapet	64
SPC 5-9	Isometric view of laminated overhung parapet	65
SPC 5-10	Laminated parapet details	66
SPC 5-11	Supercrete™ Panel to roof/spouting junction	53
SPC 5-12	Verge overhangs	54

6. Miscellaneous details

SPC 6-1	Supercrete™ Panel Cladding to drained and vented cavity junctions – corner details	69
SPC 6-2	Supercrete™ Panel Cladding to typical drained and vented cavity junction	70
SPC 6-3	Arch Details	62
SPC 6-4	Cladding detail for timber post	68
SPC 6-5	Cladding detail for steel column and post	68
SPC 6-6	Bracket fixing through Supercrete™ Panel	67
SPC 6-7	Pipe penetration through Supercrete™ Panel	78
SPC 6-8	Meter box detail	72
SPC 6-9	Z or W base cavity closures for use with decks/paving	71
SPC 6-10	Tophat Batten retrofit rebated foundation	57
SPC 6-11	Tophat Batten retrofit foundation with support angle	58
SPC 6-12	Tophat Batten retrofit mid-floor control joints	60

This Design Guide and all drawings are available as downloadable CAD files at

www.superbuild.co.nz

(file types .pdf, .dxf and .dwg)

1. System Overview

1.1 Introduction

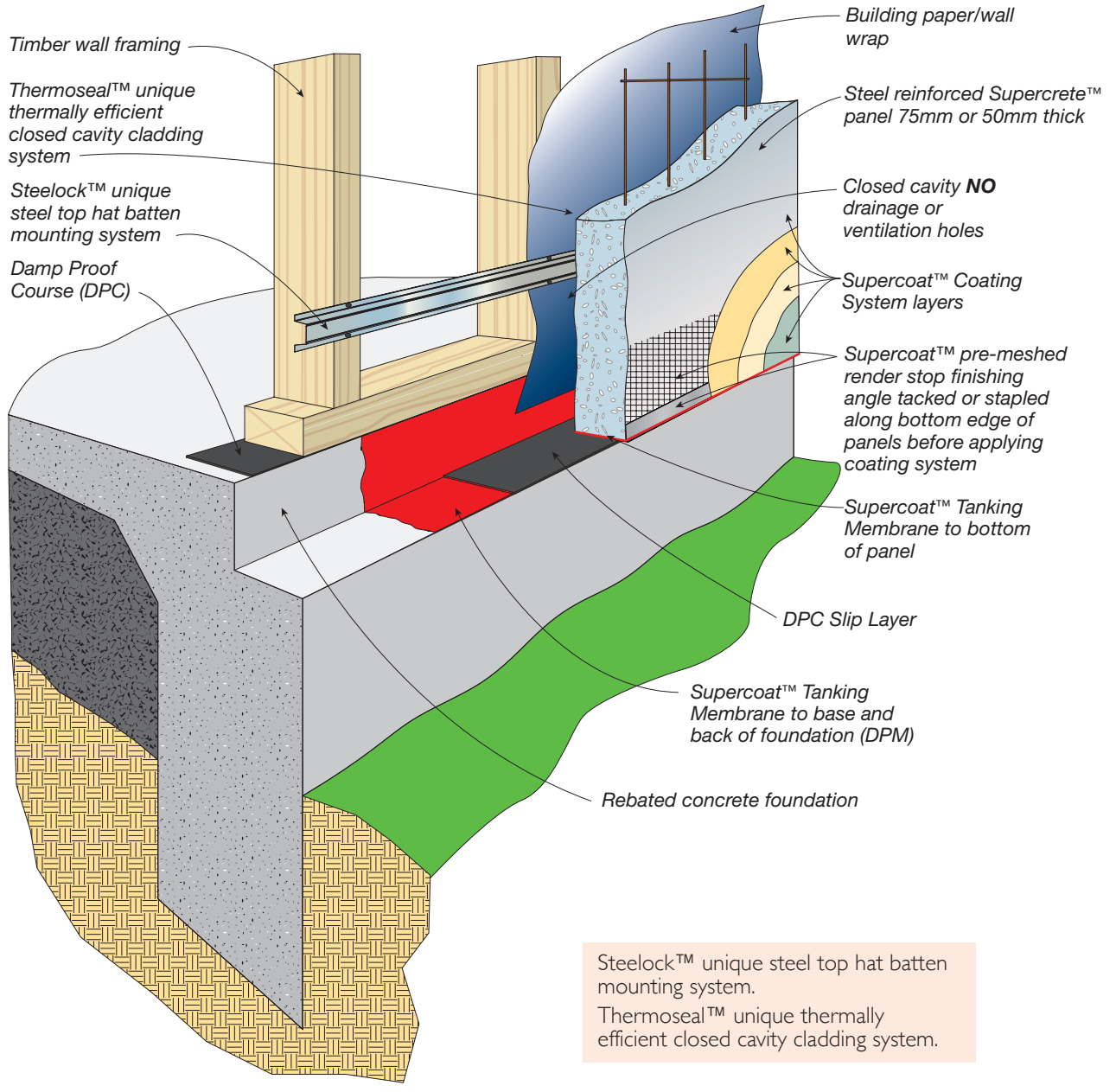
The SPC System comes as a 75mm or 50mm thick premium choice cladding for discerning builders, housing companies, designers and home owners nationwide. The Supercrete™ Panel Cladding System has been in New Zealand since 1994.

The SPC System is a closed cavity cladding, made from steel mesh reinforced Autoclaved Aerated Concrete (AAC) panels, mounted on horizontal steel battens to form the closed cavity. The cellular, aerated panels provide a rigid, insulating sheathing to a building. They offer a dimensionally stable backing to the monolithic Supercoat Coating Systems which complete the system.

Supercrete™ Panel Cladding is cost competitive with most other common claddings, such as rendered brick, polystyrene EIFS, fibre cement sheet and stucco plaster, yet it has the added benefits of being thermally and acoustically insulating, fire resistant, non-toxic, breathable, durable, lightweight, straight and accurate. The panels are cut with basic power saws with diamond tip blades and the screw fixings are easily driven with an electric drill.

One Supercrete™ Panel covers the same area as 65 bricks in a matter of a few minutes. Installed by registered Supercrete™ Panel Installers and Supercoat Coating Applicators, the Supercrete™ Panel Cladding System makes finishing your next house a breeze.

The Supercrete™ Panel Cladding System
Detail No SPC 1



Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Supercrete™ Autoclaved Aerated Concrete (AAC) has been recognised for many years as one of the best cladding solutions available on the market in New Zealand.

Housing companies, architects, developers and building owners are always looking for cladding solutions that provide great looks, low maintenance, durability and long life at an affordable price.

Supercrete™ Panel Cladding brings the luxury of an AAC exterior to even the most modest of housing budgets.

1.1.1 Supercrete™ Panel Supply

Supercrete™ Panels are supplied solely to authorised distributors throughout New Zealand.

Distributors are responsible for supplying certain components of the SPC System and ensuring that installation is in accordance with this publication. These distributors and their Supercrete™ Panel Installers and Supercoat™ Coating Applicators also undertake the installation and coating of the panels. The Supercrete™ Distributor contact details are available on the web at www.superbuild.co.nz.

1.2 Autoclaved Aerated Concrete

Supercrete™ Panels are manufactured from steel reinforced Autoclaved Aerated Concrete (AAC). The AAC material is made from finely ground silica sand, Portland cement, gypsum, water and lime. A small amount of gas forming agent, aluminium paste, is added just prior to mix placement in the moulds. This acidic paste reacts with the alkaline elements in the slurry, causing the release of millions of evenly distributed, tiny bubbles, which aerate the mix.

Corrosion protected steel reinforcing mesh is suspended in large moulds and the wet mix poured into them. The mix quickly expands to fill the mould and begins to stiffen within a few hours.

Partially cured cake being cut into panels with wires.

Supercrete™ Panel Cladding creates stunning, sharp, straight monolithic masonry walls.

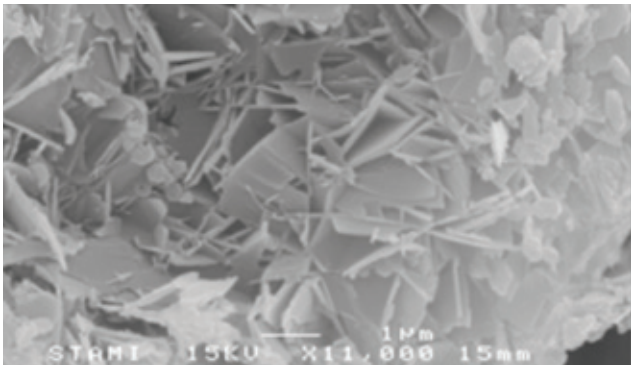
Materials being combined in mixer above and dropped as slurry into a mould car below.

When partially cured, the cake of aerated concrete is stripped from the mould and cut into panels with wires and blades.

Curing is completed in an autoclave at 185°C to 190°C and at pressures up to 1.25 MegaPascals (MPa). This fuses the ingredients into complex calcium silicate hydrate crystals, known as Tobermorite.

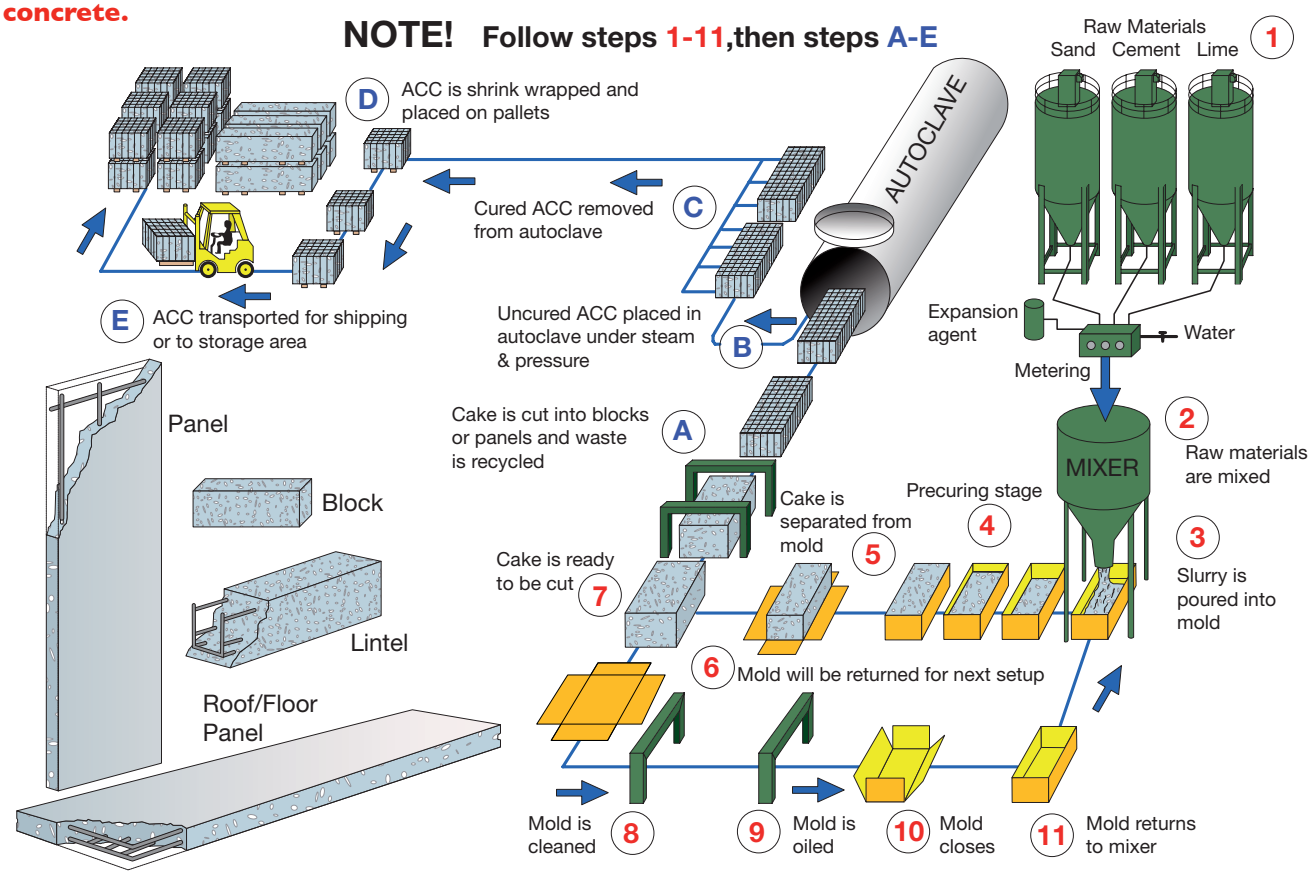
Mould car exiting an autoclave after curing.

The resulting material demonstrates good dimensional stability due to its crystalline nature, thermal and acoustic insulation due to the cellular structure. It is a low density material, only a quarter of the mass of conventional concrete, but the resulting compressive strength still makes it a strong and durable material for cladding buildings.



View of Tobermorite in Supercrete AAC.

Simplified diagram of the production process to manufacture Supercrete™ Autoclaved Aerated concrete.



1.3 System Features and Benefits

The beneficial features of the SPC System are summarised below. These features are described in more detail in the following pages.

- **Thermal Insulation** - Supercrete™ Panels have nearly twice the thermal insulation of conventional masonry veneer, due to the still air space in the closed cavity and aerated panels.

- **Acoustic Insulation** - Supercrete™ Panels have approximately twice the acoustic insulation of typical weatherboard or fibre cement clad walls.

- **Fire Resistant** - Supercrete™ Panels will not burn and are acceptable for boundary/ intertenancy level fire proofing.

- **Easily worked** - Supercrete™ Panels can be cut with power saws, sanded, shaped and cut to curves.

- **Light weight** - Conventional timber wall framing to NZS 3604:2011 will support Supercrete™ Panel Cladding. Cladding with Supercrete™ Panel Cladding is possible in areas where bricks cannot be used because of their weight. Supercrete™ Panels can be substituted because they are face fixed and don't need to rely on base support.

- **Non Toxic Materials** - Supercrete™ Panels contribute to a healthier home.

- **Rigid & Accurate** - Dimensionally stable panels do not twist or follow the bending movements of the timber frame, unlike traditional flexible backings for plaster renders. Straight panels give a clean smooth substrate, ideal for texture coating.

- **Fast installation** - A typical Supercrete™ Panel covers the same area as 65 bricks in just minutes.

- **Breathable** - Supercrete™ Panels and the Supercoat™ Coating System allow internal moisture to escape, resulting in proven reductions in timber moisture content and condensation inside the building.

- **Long Life** - Supercrete™ Panels will not rot, decay or burn and will last many times longer than timber based products.

- **Versatile** - Supercrete™ Panels allow design freedom and additional uses such as fireplace surrounds, outdoor furniture, fences, decorative bands, quoins, mouldings and many other features.

- **Great Looks** - Supercrete™ Panel clad buildings look sensational and are praised nationwide for their crisp straight lines and appealing finishes.

- **Economical** - Supercrete™ Panel cladding is competitively priced with other cladding systems and provides exceptional value for money.

- **Fully Tested and Appraised** - The SPC Systems have been Codemark Accredited by CertMark Australasia Pty Ltd.

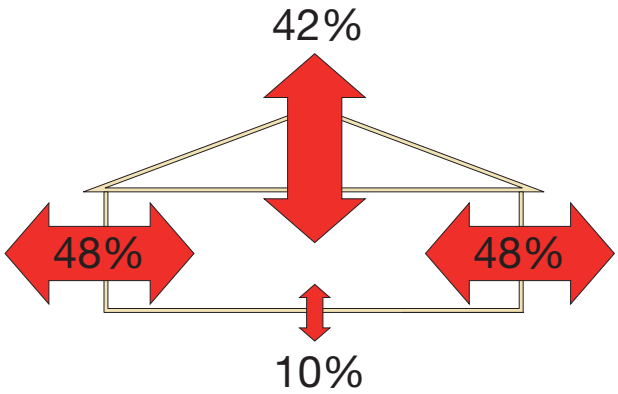
1.4 Thermal Insulation

1.4.1 Overview

Buildings must be insulated to create a stable, comfortable internal environment. In winter, heat should be prevented from escaping to the outside and in summer, the interior should be protected from the heat of the sun. Having good insulation reduces the energy costs for mechanically heating and cooling a building.

Efficient insulation must be at a level where the lifetime cost of resulting energy savings is of more benefit than the cost of increasing the insulation. Insulating materials must also practically fit within a manageable wall thickness.

Bearing in mind that approximately 42% of heat transfer will be through the roof, around 10% through the floor and the balance through walls and windows, the insulation of external walls should be considered as a part of a holistic overview of thermal resistance of all elements in the building.



Distribution of heat transfer through the envelope of a typical home.

Note: Percentages can vary depending on insulation, area and type of glazing etc.

1.4.2 Thermal Resistance Levels

The thermal insulation of a building element is measured by the amount of resistance to heat movement through it. This resistance is known as an R-value.

An R-value is calculated by measuring the heat flow between two surfaces at different temperatures and uses the units $m^2.K/W$, the higher the value, the better the thermal resistance.

In most framed walls, the bulk of the insulation is achieved with the insulation material between the frames.

The NZ Building Code requires framed buildings of less than $300m^2$ in floor area to have wall insulation values between 1.9 and 2.0 minimum, depending on the Climate Zone.

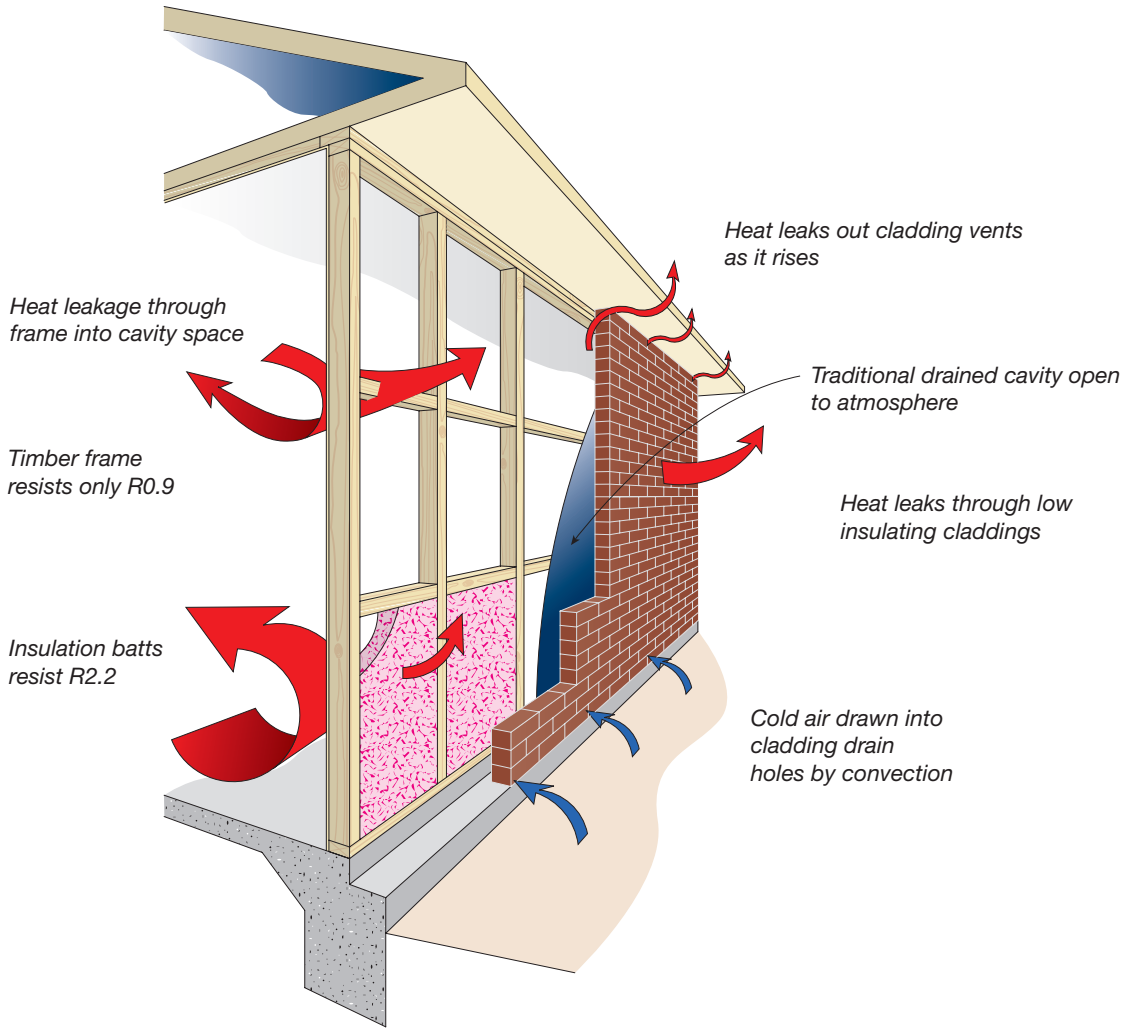
1.4.3 Insulation in Conventionally Clad Walls

a) Drained Cavities

Unlike Supercrete™ Panel Cladding, many other common cladding materials are required to have drained and ventilated cavities behind them, to control condensation and water ingress (leaks).

Opening the cavity to the outside atmosphere, by way of drain or vent holes, can create a reduction in the thermal and acoustic insulation performance of these wall systems.

The drain holes at the base of the cladding and vent holes at the top allow air movement. As heat escapes from the top vents and cold air enters at the base drain holes, a thermal convection flow is formed and the cavity spaces in these systems may have little chance of maintaining any substantial air temperature or humidity difference from the external air.



b) Thermal Bridging at the Frame

Wall insulation is usually stated as a measurement at the best case point in the wall-through the insulating batts. However, when measured at each timber stud or dwang, the R-Value of a complete wall with plasterboard lining, pine framing and exterior plaster is actually about 80% of this value.

Heat leaks through the grid of framing in the wall because the insulation is only in the rectangular sections between framing members. 90mm of Pinus Radiata framing timber only has an R-Value of 0.90 and Oregon pine only 0.83, so heat from a home can leak through the frame and into cavity spaces or in the case of face fixed claddings, almost directly to the outside air. This is why in cold conditions condensation can form in a visible framing grid on the outside of these claddings.

The framing grid varies from 15% of the wall surface area to as much as 40% where multiple openings have a large area of timber lintels and trimming studs.

Designers can use computer modelling calculation software to gain a more averaged building envelope performance, taking thermal bridging into account and the loss through windows and doors.

The calculated R-value of a wall system, taking into account the thermal bridging, is called The Construction R-value.

See graph and table on the following pages for Construction R-values of the Supercrete™ Panel Cladding System with common wall insulation.

c) Conventional Sheet Materials

Normally, plaster type claddings add very little to the wall insulation. For instance, 6 mm of fibre cement with 20mm of cement render will only add about R 0.06. A standard rendered 90mm brick adds approximately R 0.09.

The interior lining plasterboard is also a poor insulator - usually only R 0.06 for 10mm thickness.

1.4.4 Thermal Performance of Supercrete™ Panel Cladding

Supercrete™ Autoclaved Aerated Concrete is a great thermal insulator, keeping buildings cool in summer and warm in winter. The combination of Supercrete™ Panel and the closed batten space provide walls with an additional R 0.425 with a 50mm panel or R 0.58 with a 75mm panel - four to six times the insulation offered by traditional thin sheet claddings.

Using R 2.2 insulation as is usual, in combination with Supercrete™ Panel Cladding brings the overall wall insulation up to more than R 2.4, resulting in great energy savings and a comfortable environment for the occupants.

1.4.5 Reduced Thermal Bridging

Supercrete™ Panel Cladding helps to overcome the traditional problem of thermal bridging through the framing members.

Because it is an insulating sheet, which is continuous across the face of the wall and does not have air movement in the batten space, the thermal performance of a Supercrete Panel Clad building is superior to conventional cladding.

Compare the graphs and tables here and overleaf with those in the BRANZ House Insulation Guide for other types of wall cladding systems.

1.4.6 Construction R–Value

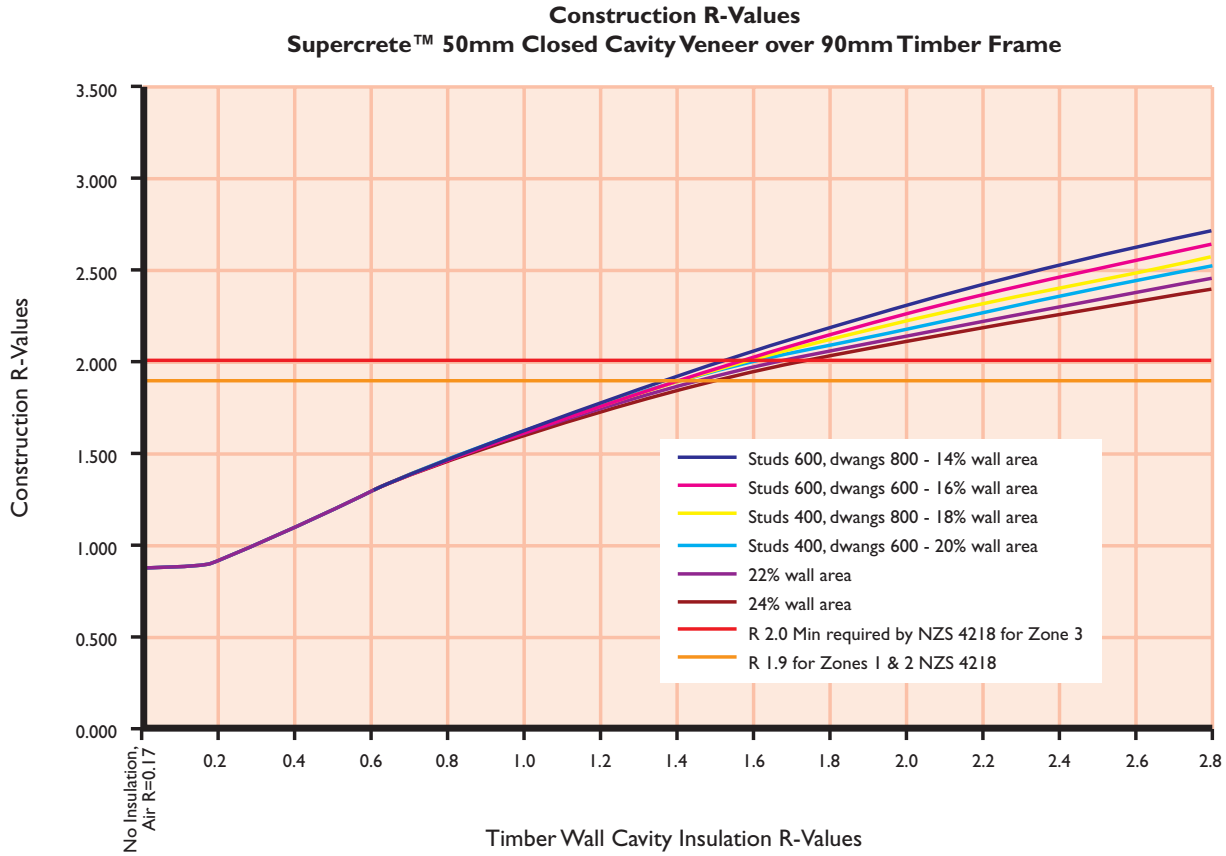
Total Construction R-Values for Supercrete™ 50mm Panel on 90mm Timber Frame

Framing Layout	Timber frame space Insulation Materials R-Value					
	1.8	2.0	2.2	2.4	2.6	2.8
Studs 600, dwangs 800 - 14% wall area	2.197	2.317	2.429	2.535	2.636	2.731
Studs 600, dwangs 600 - 16% wall area	2.165	2.276	2.380	2.477	2.569	2.656
Studs 400, dwangs 800 - 18% wall area	2.133	2.231	2.333	2.423	2.507	2.586
Studs 400, dwangs 600 - 20% wall area	2.103	2.199	2.289	2.372	2.449	2.521
22% wall area	2.074	2.164	2.2447	2.323	2.394	2.460
24% wall area	2.046	2.130	2.207	2.278	2.343	2.403

NOTE:

A 23.5 tophat batten spacing of 600mm has been taken as a convenient mean figure for the purposes of calculation. The actual spacing may not be uniform but this will not affect the Construction R-value. The difference in Cavity Construction R-value between battens spaced at 400mm and 800mm is only 0.001, therefore, the spacing of the battens is not going to have a great impact on the Construction R-value of the wall as a whole.

These figures do not take into account values for windows and doors. These can be obtained using the Window or Therm software packages. The Insulation Material R-values given are those regarded as the normal range for residential buildings. Other values below R1.8 can be obtained from the associated graph. R2.8 is the highest practicable R-value of common insulation materials that can be used with 90mm studs. The figures on this page are for ideal state materials; the actual installation conditions may reduce these figures.



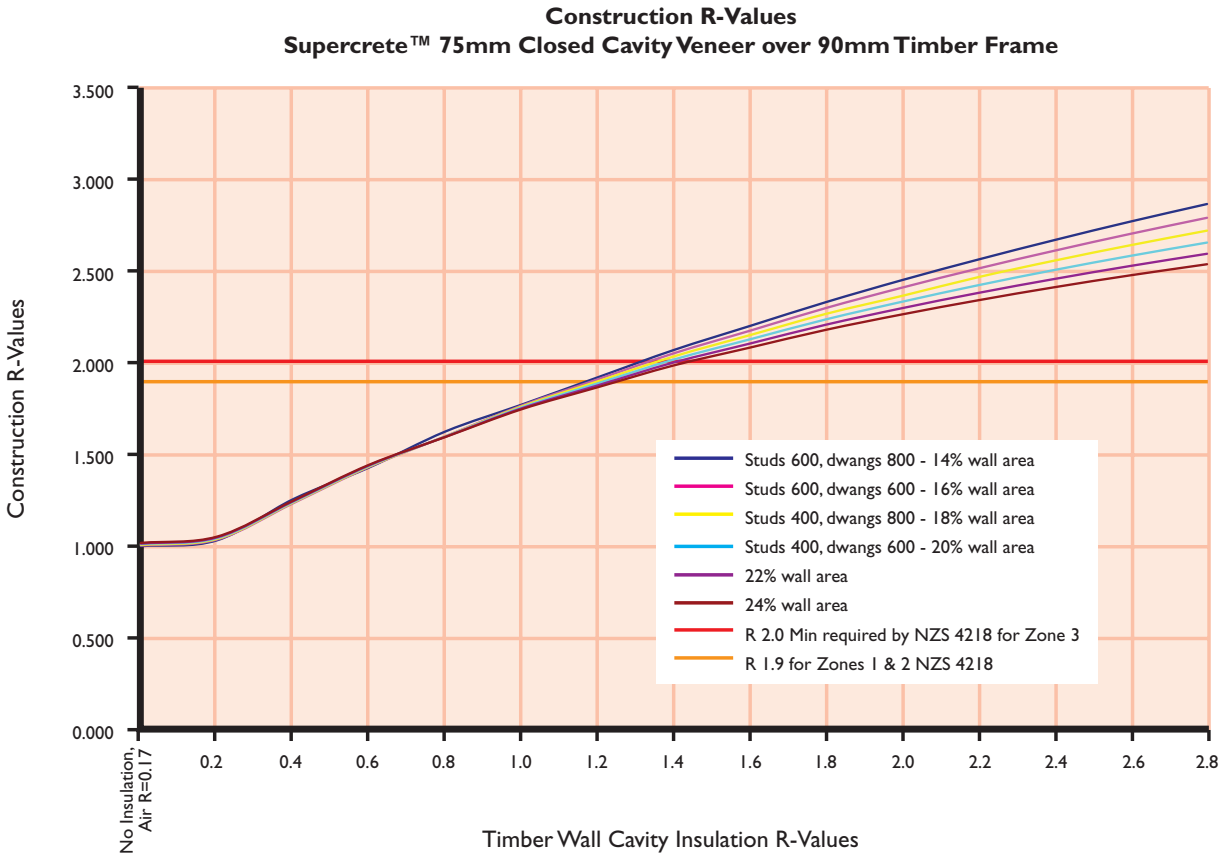
Total Construction R-Values for Supercrete™ 75mm Panel on 90mm Timber Frame

Framing Layout	Timber frame space Insulation Materials R-Value					
	1.8	2.0	2.2	2.4	2.6	2.8
Studs 600, dwangs 800 - 14% wall area	2.337	2.457	2.569	2.675	2.776	2.871
Studs 600, dwangs 600 - 16% wall area	2.305	2.416	2.520	2.617	2.709	2.796
Studs 400, dwangs 800 - 18% wall area	2.273	2.371	2.473	2.563	2.647	2.726
Studs 400, dwangs 600 - 20% wall area	2.243	2.339	2.429	2.512	2.589	2.661
22% wall area	2.214	2.304	2.387	2.463	2.534	2.560
24% wall area	2.186	2.270	2.347	2.418	2.483	2.543

NOTE:

A 23.5 tophat batten spacing of 600mm has been taken as a convenient mean figure for the purposes of calculation. The actual spacing may not be uniform but this will not affect the Construction R-value. The difference in Cavity Construction R-value between battens spaced at 400mm and 800mm is only 0.001, therefore, the spacing of the battens is not going to have a great impact on the Construction R-value of the wall as a whole.

These figures do not take into account values for windows and doors. These can be obtained using the Window or Therm software packages. The Insulation Material R-values given are those regarded as the normal range for residential buildings. Other values below R1.8 can be obtained from the associated graph. R2.8 is the highest practicable R-value of common insulation materials that can be used with 90mm studs. The figures on this page are for ideal state materials; the actual installation conditions may reduce these figures.



1.5 Acoustic Insulation

1.5.1 Overview

Preventing external noise from entering a building is important for creating a comfortable internal environment.

Airborne sound waves are blocked by building walls using a combination of reflecting, or bouncing the sound off hard surfaces and absorption, or muffling of the sound waves, by diffusing and breaking the wave pattern as it passes through the air spaces of the wall insulation.

The acoustic performance of a wall is rated using a Sound Transmission Class (STC) value. The reduction in sound (or acoustic insulation) can be tested by measuring the sound lost from an emitter of sound on one side of a wall when checked against a receiver device on the other side. Losses will vary at different frequencies and these are plotted on a graph. The graph is compared to standard curves and the best fit match is selected. The single value Sound Transmission Class is then selected using the value in decibels (dB), on the selected curve at the 500 Hertz (Hz) frequency. An example of this graph is shown in Figure A below.

1.5.2 Typical Wall Performance

Typically, timber framed buildings in New Zealand with plasterboard linings, insulation batts and weatherboard, fibre cement or brick claddings have Sound Transmission Classes of STC 19 up to STC 25. This roughly translates to blocking between 19 - 25 decibels of noise. This is what most New Zealanders accept as the amount of noise that can be kept out of their homes and workplaces. It means they expect to hear most of the 66 decibels of noise from passing traffic, much of the 80 decibels emitted by the neighbours' lawnmower and a surprising amount of the neighbours' 50 decibel children's playtime or shouting.

1.5.3 Acoustic Insulation of Supercrete™ Panel Cladding

The trapped air bubbles, which provide Supercrete™ Panels with such great thermal insulation, also give the material superior sound insulation. Supercrete™ Panel clad buildings are much quieter than conventionally clad structures, due to the amount of noise that the Supercrete™ Panels can reflect and absorb.

A bare 50mm thick Supercrete™ Panel has an STC rating of approximately 33 and when combined with a lined and insulated frame, ratings of STC 50 and greater are achieved. A bare 75mm panel has an STC rating of 35 and when lined and insulated ratings above STC 52 can be achieved.

Supercrete™ Panel clad buildings can therefore keep out approximately twice the number of decibels of noise as conventionally clad buildings. Outside sounds, which would normally be noticed, are reduced to a faint background murmur or blocked out completely.

1.5.4 Supercrete™ Acoustic Fencing System

Adding a Supercrete™ 75mm Panel Fence to problem noise areas greatly reduces sound levels in outdoor living spaces and enhances the overall performance of the acoustic design for a property. These great looking fences help to reduce noise before it reaches your Supercrete™ Panel clad building. This combination significantly reduces traffic noise for home owners on busy roads and solved plenty of noise issues between neighbours. Refer to the Supercrete Panel Fence brochure on our website www.superbuild.co.nz.

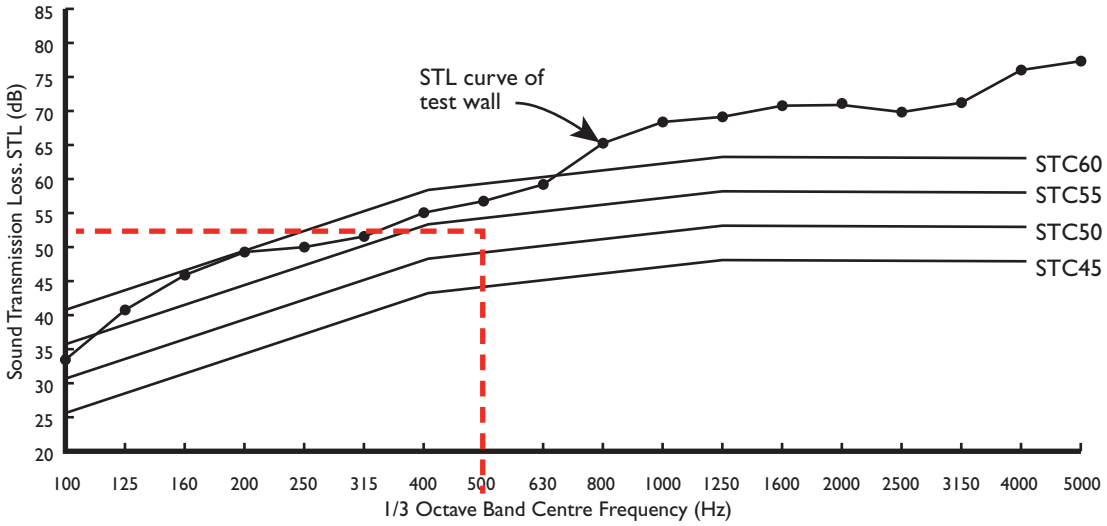


Figure A: Typical acoustic test results for a wall showing the 'best fit' of test results to standarised curves. In this example, STC 60 for the wall is derived from the highest curve fitting the test results at a frequency of 500Hz.

1.6 Fire Resistance

1.6.1 Fire Proofing

It is not a general requirement for claddings to resist fire.

In fact, most do not. There are some instances, however where this is an important feature to consider. Walls that are on, or close to a boundary are required by the NZ Building Code to have a fire rating of at least 30 minutes.

Some industrial and commercial applications need to be fire rated to protect the structure, due to higher risk uses.

Beyond the limits of NZ Building Code requirements, having a fire resistant cladding is an additional safety factor for any structure.

1.6.2 Fire Resistance of Supercrete™ Panel Cladding

As a non-combustible material, Supercrete™ Panels will not burn.

The entrained airspaces in Supercrete™ Panels, combined with the batten space between panel and frame, insulate the structure of the building. Frames are protected from heat damage where the fire source is located at the panelled face of the wall.

When a Supercrete™ Panel clad wall is required to be fire rated, the designer must specify all sealants and backing rods to meet the required fire rating.

Most fire rated walls require a 30/30/30 fire rating, or 30 minutes for structural adequacy, insulation and integrity respectively. Supercrete™ Panel Cladding System provides at least three times this protection at 90/90/90 for 50mm panel.

Supercrete™ Panels left intact after remainder of building has burnt down.

1.7 Additional Features

1.7.1 Non Toxic

Supercrete™ is made from sand, water, cement, gypsum and lime, all fused into a crystalline type material in a high pressure, high temperature autoclave. Supercrete™ does not emit any sort of gas or toxic substance. Due to its low density, it gives off lower radiation than stones, concrete or bricks. As it does not harbour vermin, mould or provide a food source for any bacteria or organisms, Supercrete™ is the healthy choice when selecting a building material.

1.7.2 Long Life

Supercrete™ does not decay over time. Whilst surface treatments may need touching up as the decades roll by, building owners can be confident that the Supercrete™ Panel substrate will still be as good as new… generation after generation.

Supercrete™ Panel Cladding has been Codemarked as meeting the building code minimum durability clauses, including "for the lifespan of the building - being not less than 50 years".

1.7.3 Light Weight

Supercrete™ Panel Cladding weighs approximately 35kg/m² for 50mm panel and 50kg/m² for 75mm panel at 30% moisture content. This makes it a comparatively light masonry product. For instance, standard 90mm bricks typically weigh over 170 kg/m² and for comparison, 50mm thick slabs of conventional dense concrete usually weigh over 150kg/m².

In terms of NZS 3604, Supercrete™ Panel Cladding is classed as a "medium weight cladding" i.e. more than 30kg but less than 80kg/m². No special considerations need to be made when designing the frame.

A 2.4 x 0.6m x 50mm panel weighs approximately 47kg at 30% moisture content and a 2.4 x 0.6m x 75mm panel approximately 57kg so they can be manhandled into position without the need for cranes or lifting machines.

1.7.4 Easily Worked

Unlike other masonry products, Supercrete™ AAC is easily shaped and worked with a variety of standard carpentry tools. Supercrete™ Panel Installers cut the panels with a standard 210mm circular saw, fitted with a segmented diamond tipped blade, or Turboblade. Small cuts and chases are easily formed with wood chisels or hand saws. Holes are simply drilled with masonry bits. No pre-drilling is necessary for panel screw fixings. Coarse sandpaper quickly smoothes any surface imperfections.

1.7.5 Accurate

The crystalline structure of Supercrete™ AAC makes it very dimensionally stable. All panels are factory cut to exacting standards. If framing is misaligned or bent before cladding, battens are normally packed by the Supercrete™ Panel Installer with DPC or similar to correct this, ensuring a straight panel surface.

1.7.6 Thermal Movement

All materials expand and contract with changes of temperature. This is due to changes in the energy stored in the molecular bonds. This energy increases with temperature rises and increases the length of the molecular bonds, which causes an overall expansion of the volume of the material.

Testing has shown that AAC Panels have a coefficient of thermal expansion of 7.12×10^{-3} mm/m/°C. For instance over a panel temperature range of -5 - 60°C, this equates to a total movement of 0.46mm per metre, or 1.84mm between control joints spaced at a maximum of 4 metres.

This is well within the 5mm expansion/contraction capacity of the Holdfast sealant used in the 10mm wide control joints.

Many cladding systems simply ignore the effects of thermal movement. The Supercrete™ Panel Cladding System recognizes that movement does take place, even though significantly less than with many other materials, and incorporates movement joints into the system to allow for this.

1.7.7 Shrinkage

Supercrete™ has approximately one third of the initial shrinkage of dense concrete due to the autoclaving process. This reduces the number of very fine ($<10 \times 10^{-6}$ mm) pores. After autoclaving, Supercrete™ has a moisture content of approximately 30% and by the time the panels are installed, this would normally have reduced to approximately 10 - 20%.

The shrinkage amount that occurs after the panels have been installed is the only important value, as this is the amount that could cause cracking of the panels. The actual shrinkage between moisture contents of 20% and 10% has been shown by test to be 0.06mm. This equates to 0.24mm over the maximum control joint spacing of 4 metres. This amount is well within the capacity of the Holdfast sealant at control joints and is less than the movement expected from diurnal temperature variations. Timber frame shrinkage is far greater than the AAC shrinkage and is more likely to govern movement at the control joints.

1.7.8 Versatile

Because it is so easily worked, so lightweight and simple to cut, Supercrete Panel is ideal for cladding awkward shapes.

1.7.9 Rapid Assembly

A typical 600mm wide by 2400mm high Supercrete™ Panel covers the equivalent wall area of about 65 standard clay bricks, yet is installed in a matter of minutes. This often results in cost savings on labour, scaffolding, machinery, etc.

1.7.10 Retrofitting

Supercrete™ Panel Cladding is an ideal material to re-clad a building where the existing cladding has deteriorated, or where it is desired to improve insulation in the building.

Where a building is in an area that has become noisy from traffic, industry, or other activities, it is an excellent option for reducing the noise infiltrating into the interior of the building. See Section 2.4, page 56 for retrofitting details.

1.7.11 Stylish Good Looks and Great Performance

Supercrete™ Panel Cladding provides clean smooth lines and a high quality finish.

The thickness of the panel gives a solid look, particularly noticeable around openings, where the depth of window setback shows off the truly substantial solidity of a Supercrete™ Panel clad building.

1.7.12 Guarantee

Superbuild International Ltd, supplies all Supercrete™ Panel Cladding with a guarantee against material defects when used in accordance with this publication. Supercrete™ Panel Installers and Supercoat™ Coating Applicators guarantee their workmanship. Ironbark Technology Ltd also guarantees the Supercoat™ Coatings against material defects when used in accordance with the relevant technical literature.

1.8 System Details

The following details describe the connection method for cladding a building compliant with NZS 3604; 2011. This cladding system is installed by registered Supercrete Panel Installers and coated with the Supercoat™ Coating System by registered Supercoat™ Coating Applicators.

1.8.1 Wall Heights

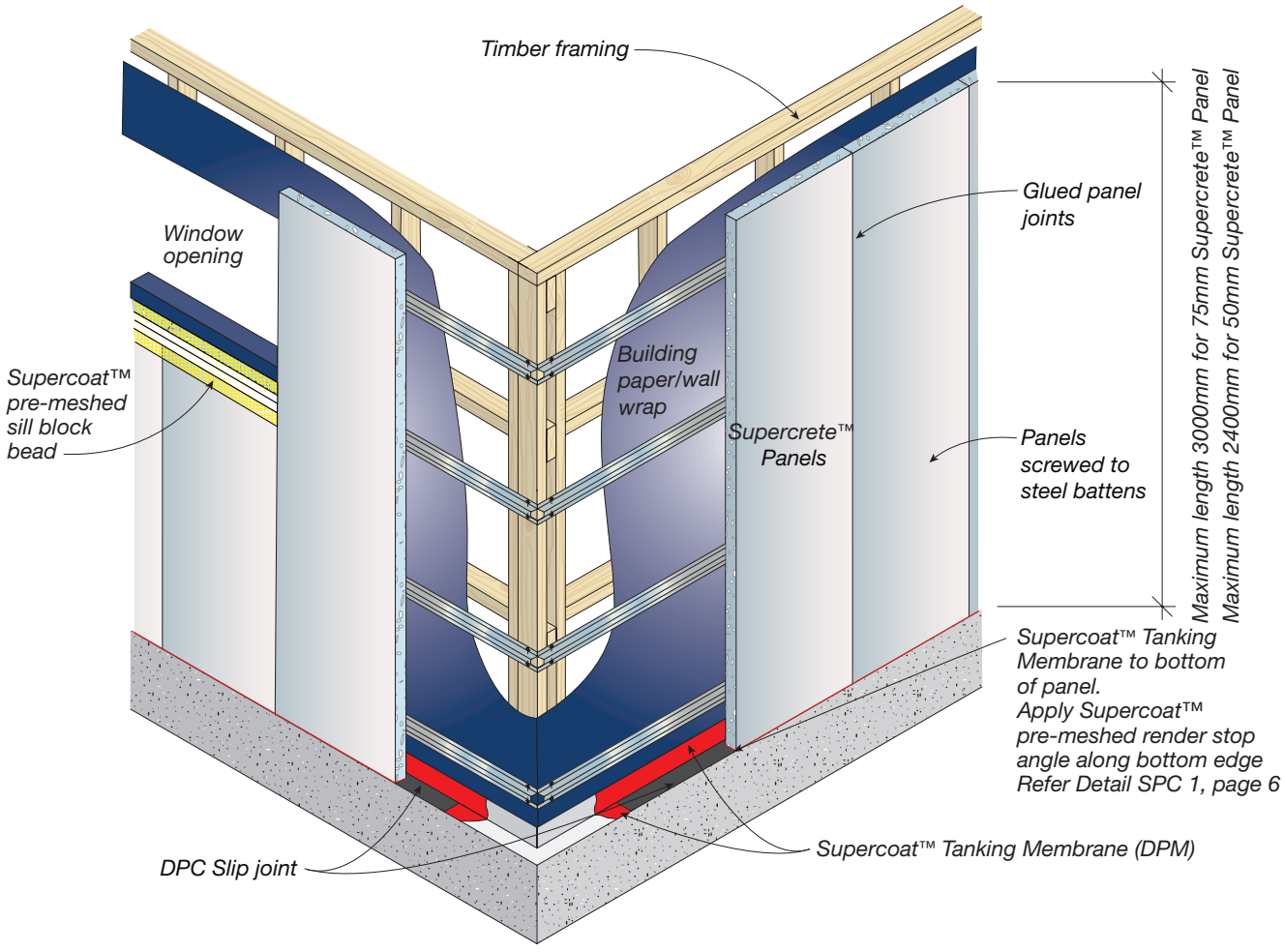
NZS 3604:2011 allows a maximum building height, measured from the lowest ground level to the highest point of the roof, of 10 metres. Maximum stud height for a single storey building or the top storey of a two storey building is 4.8 metres. Stud heights in lower storeys are limited to 3 metres.

The maximum length of the standard Supercrete Panel is 2.4 metres for 50mm panels and 3.0 metres for 75mm panel. In order to achieve up to a 4.8 metre storey height, Supercrete Panels will be butt jointed using a staggered joint arrangement or a panel may be installed horizontally to make up any additional height.

The Supercrete™ Panel Cladding System can be used for all multiple storey design covered by NZS 3604:2011 (i.e. up to 10 metres building height).

At intermediate floors a horizontal control joint as per Detail **SPC 3-6**, page 31 and **SPC 3-7**, page 32 must be installed.

General Arrangement of single storey Supercrete™ Panel Cladding System Detail No SPC 1-1

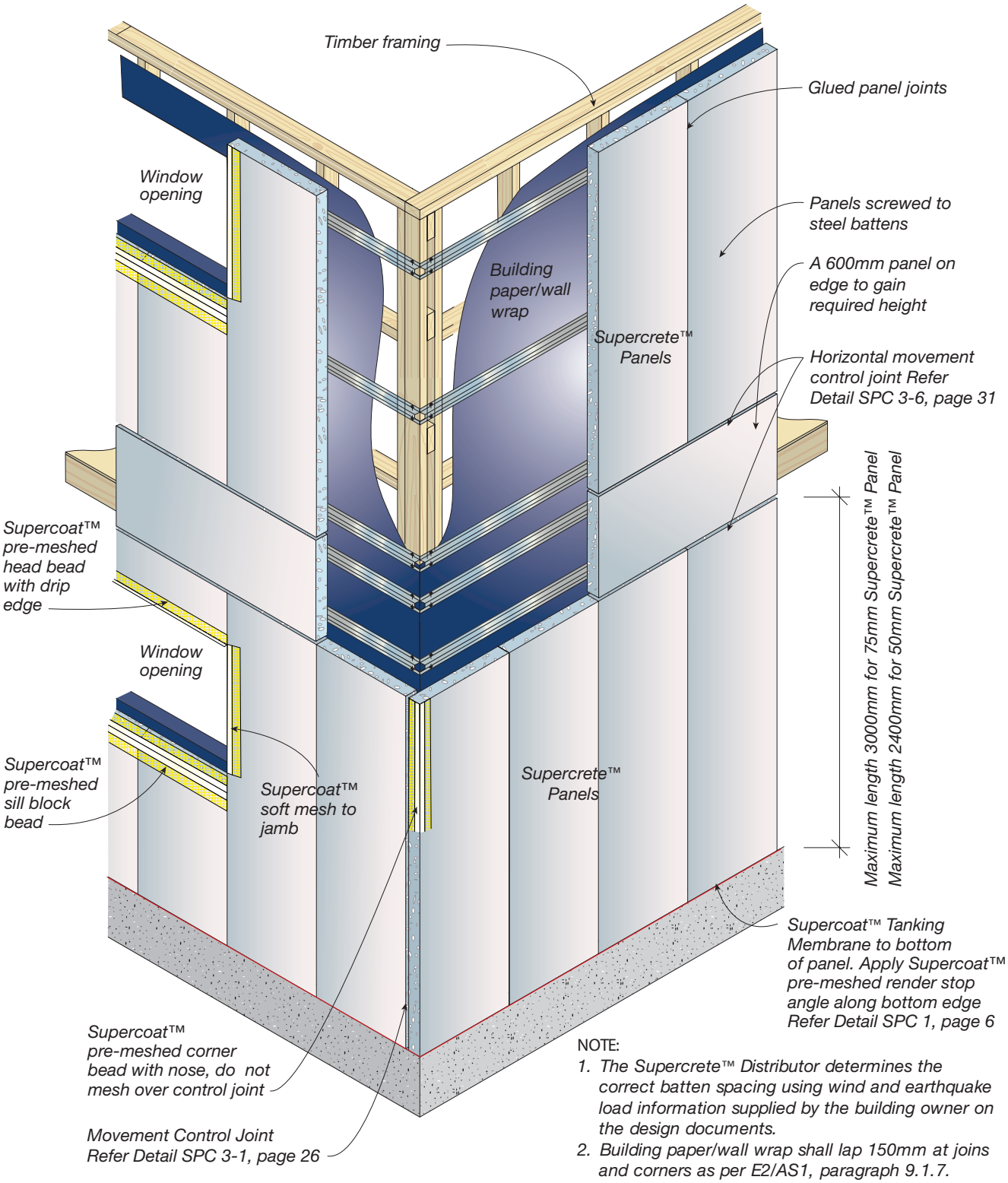


NOTE: *The Supercrete™ Distributor determines the correct batten spacing using wind and earthquake load information supplied by the building owner on the design documents.*

Steelock™ unique steel top hat batten mounting system.

Thermoseal™ unique thermally efficient closed cavity cladding system.

General Arrangement of two storey Supercrete™ Panel Cladding System with horizontal mid-floor panels
Detail No SPC 1-2a

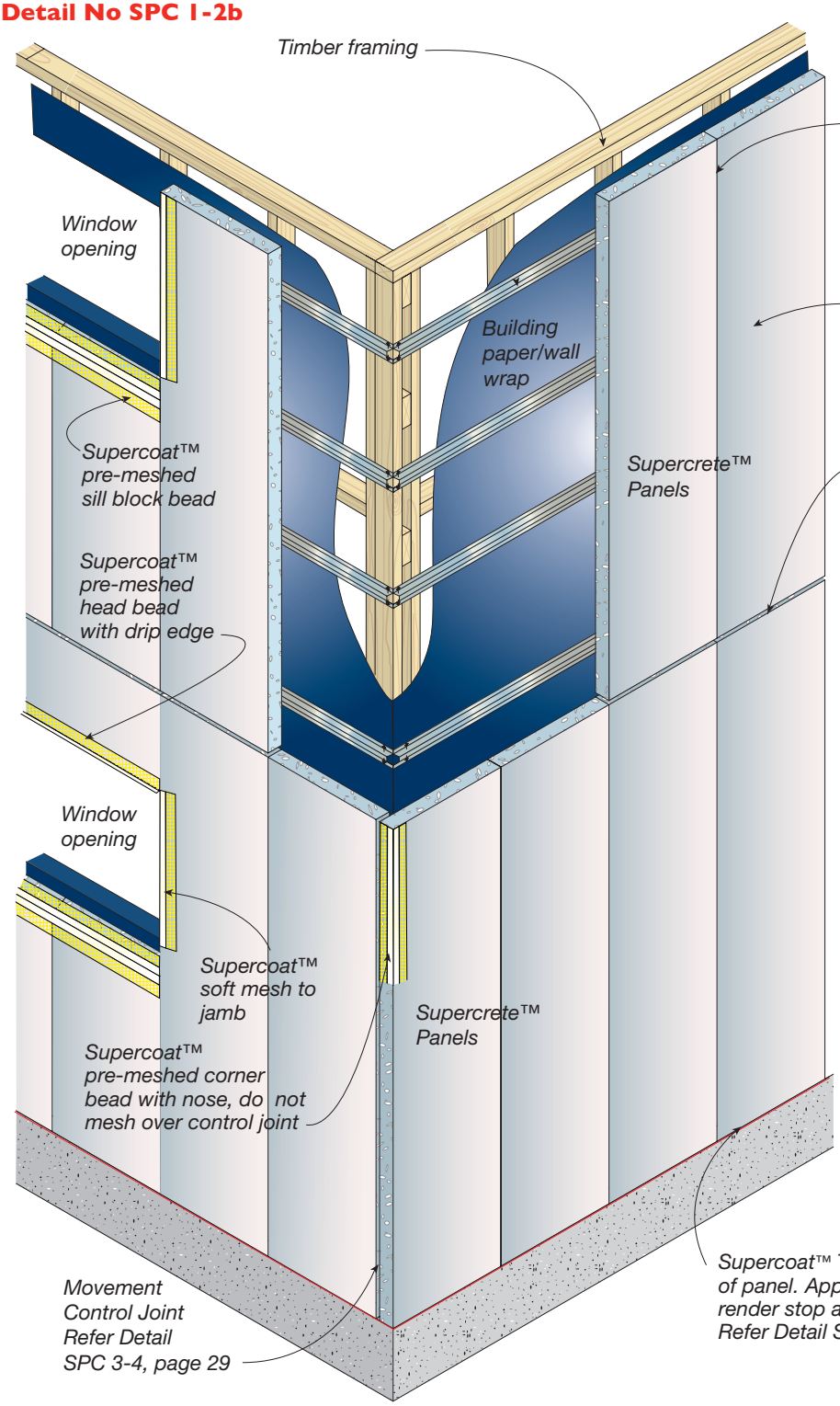


NOTE:

1. *The Supercrete™ Distributor determines the correct batten spacing using wind and earthquake load information supplied by the building owner on the design documents.*
2. *Building paper/wall wrap shall lap 150mm at joins and corners as per E2/AS1, paragraph 9.1.7.*

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

General Arrangement of two storey Supercrete™ Panel Cladding System with single horizonal control joint
Detail No SPC 1-2b



Steelock™ unique steel top hat batten mounting system.

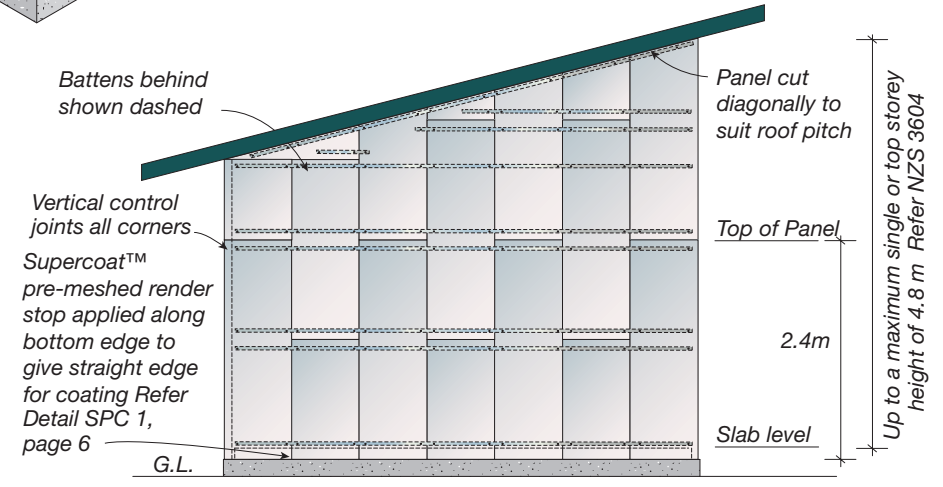
Thermoseal™ unique thermally efficient closed cavity cladding system.

NOTE: *The Supercrete™ Distributor determines the correct batten spacing using wind and earthquake load information supplied by the building owner on the design documents.*

Staggered panels on walls
Detail No SPC 1-8

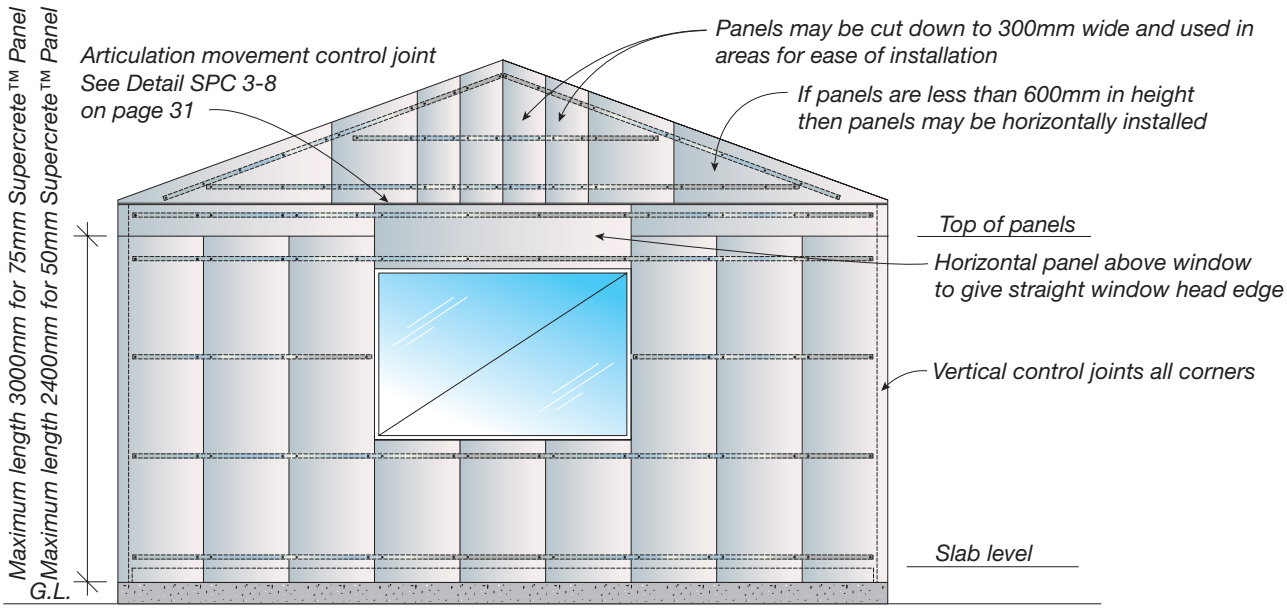
NOTES

1) *Panels will be staggered to suit wall heights greater than the maximum panel lengths shown where there is no intersecting ceiling. Staggered panelling requires additional battens to provide support at staggered panel ends. Panel ends shall be glued with Supercoat™ AAC Superbond Adhesive.*
2) *Where a ceiling intersects the wall, an articulation joint as shown in Detail SPC 3-6, page 31, shall be used*

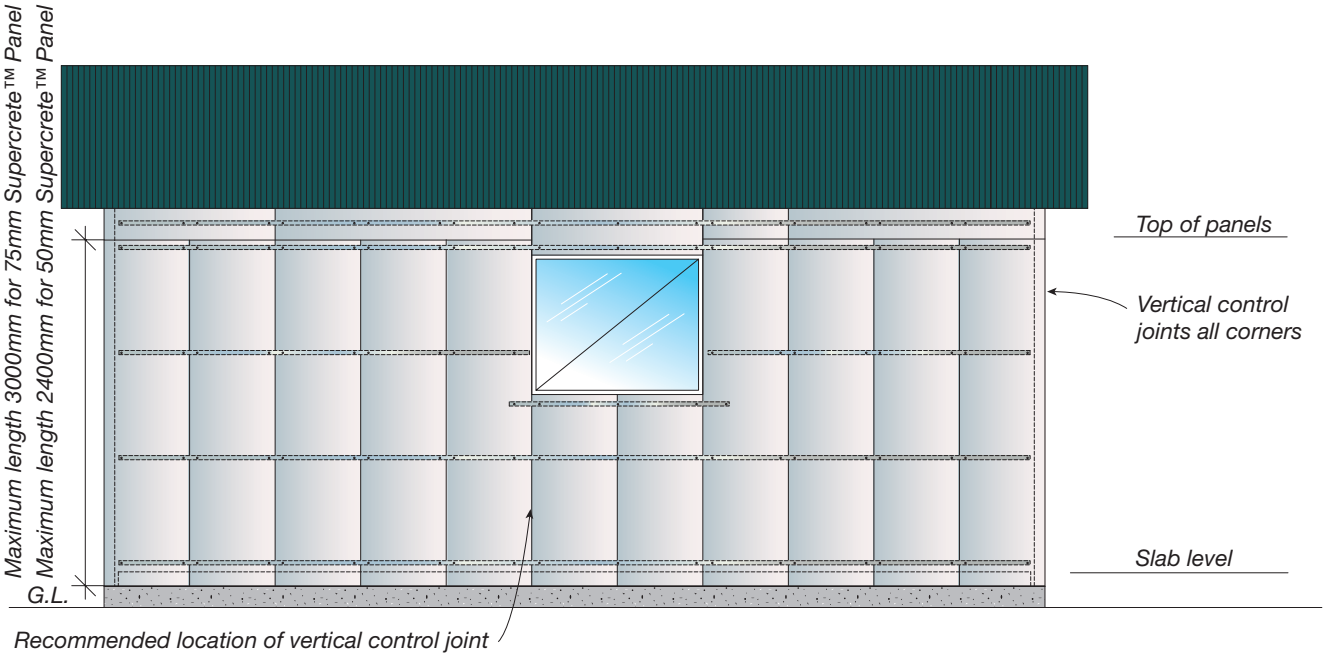


Single storey construction details
Detail No SPC 1-3

NOTE: *All battening and panel installation is performed by registered Supercrete™ Panel Installers. These details are shown for general information purposes only.*



Gable End Elevation



Side/Eaves Elevation

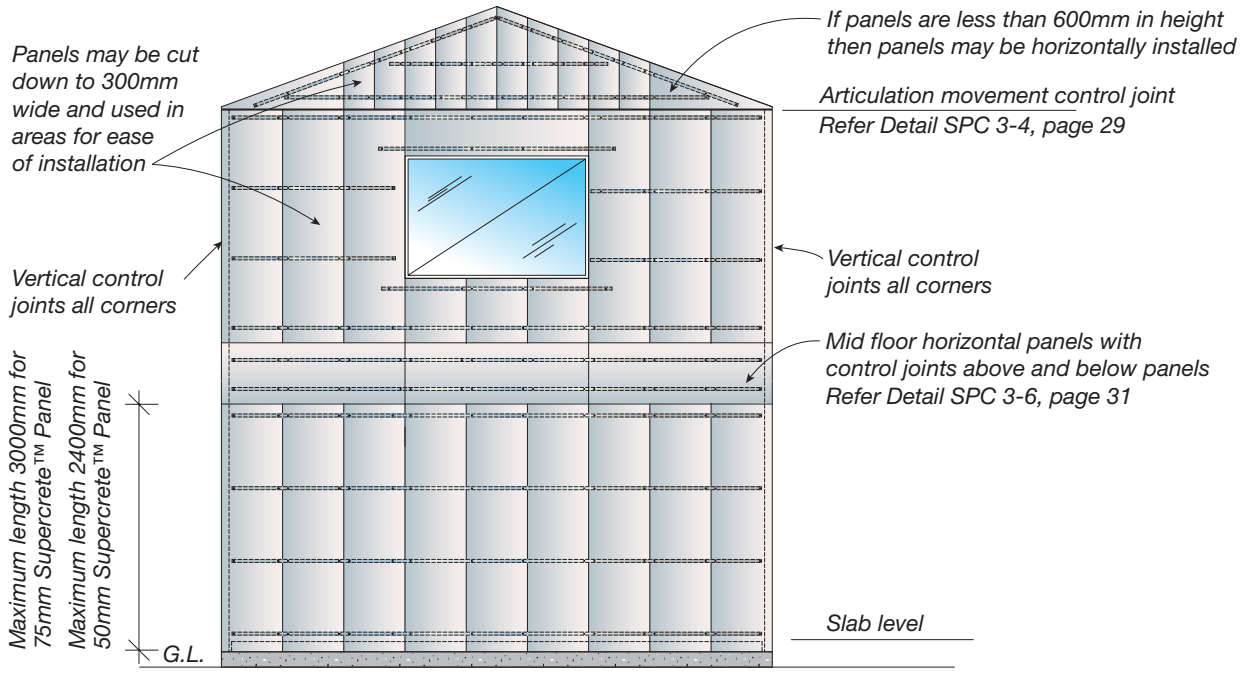
NOTE:

1. *The Supercrete™ Distributor determines the number of battens and batten spacing using wind and earthquake load information provided by the building owner.*
2. *Vertical control joints not shown on these details. Refer to Section 2.2.2.1, page 25 for control joint locations. Building owner to specify control joint locations on the project construction drawings.*

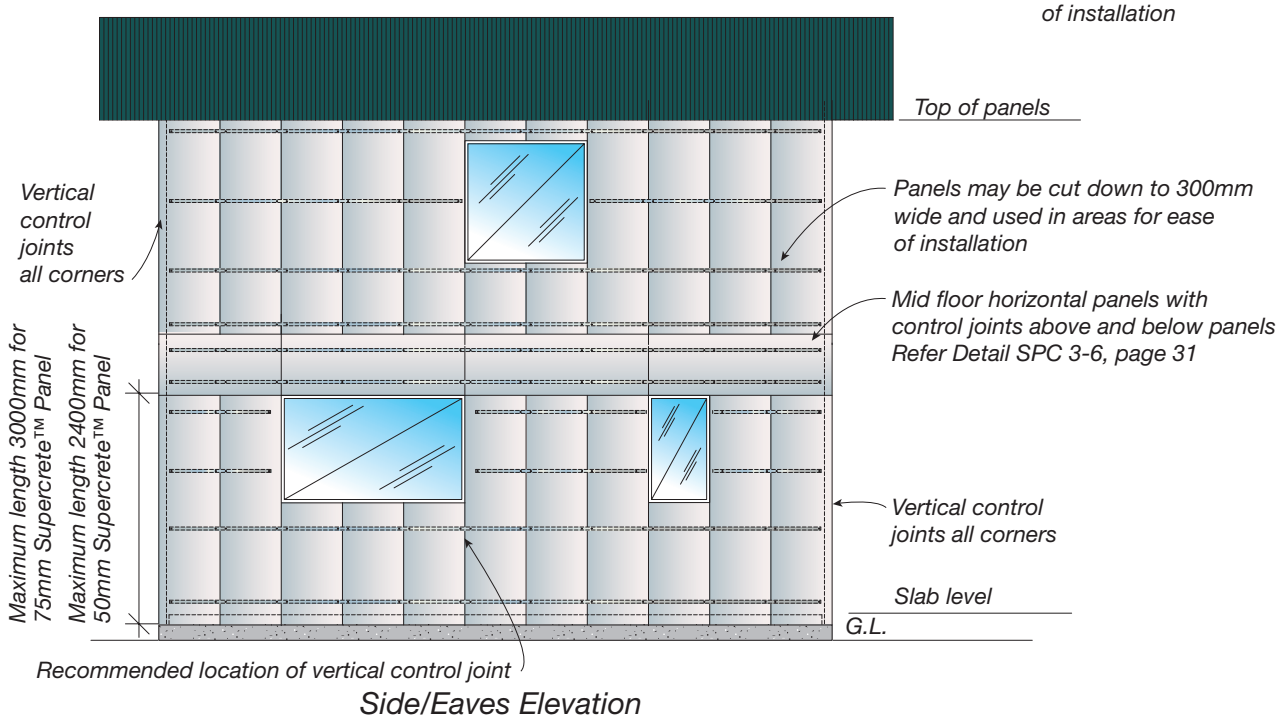
Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Supercrete™ Panel two storey construction details with horizontal mid-floor panels
Detail No SPC 1-4a

NOTE: *All battening and panel installation is performed by registered Supercrete™ Panel Installers. These details are shown for general information purposes only.*



Gable End Elevation



Side/Eaves Elevation

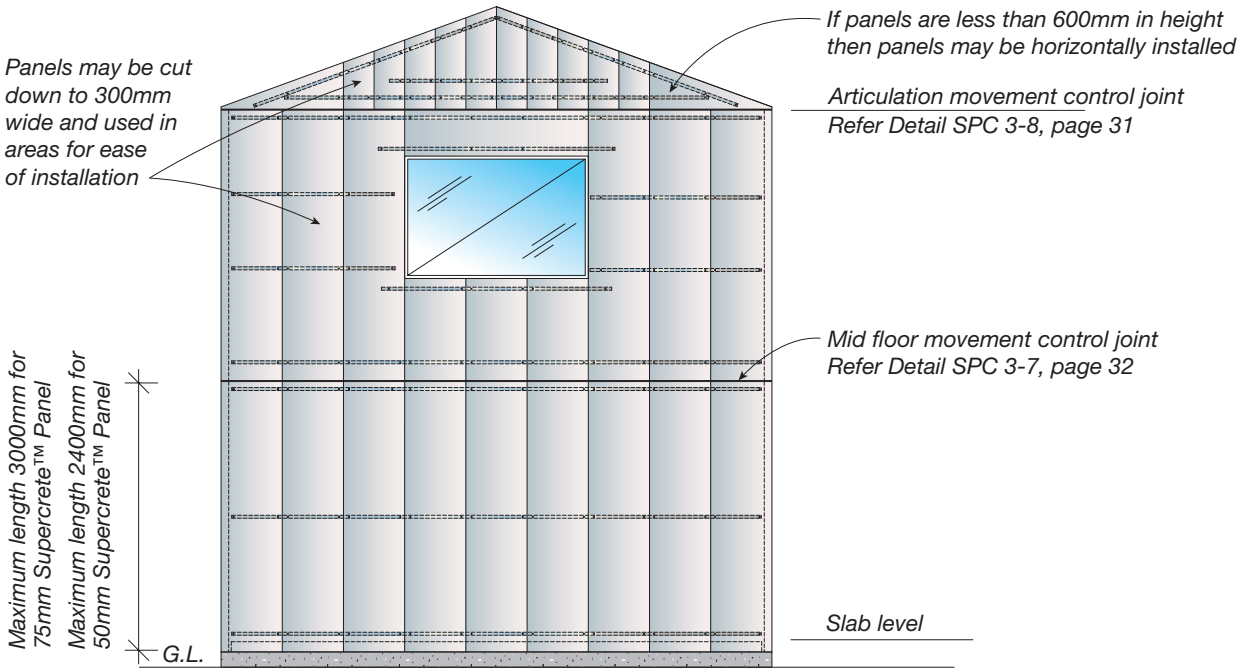
NOTE:

1. *The Supercrete™ Distributor determines the number of battens and batten spacing using wind and earthquake load information provided by the building owner.*
2. *Vertical control joints not shown on these details. Refer to Section 2.2.2.1, page 25 for control joint locations. Building owner to specify control joint locations on the project construction drawings.*

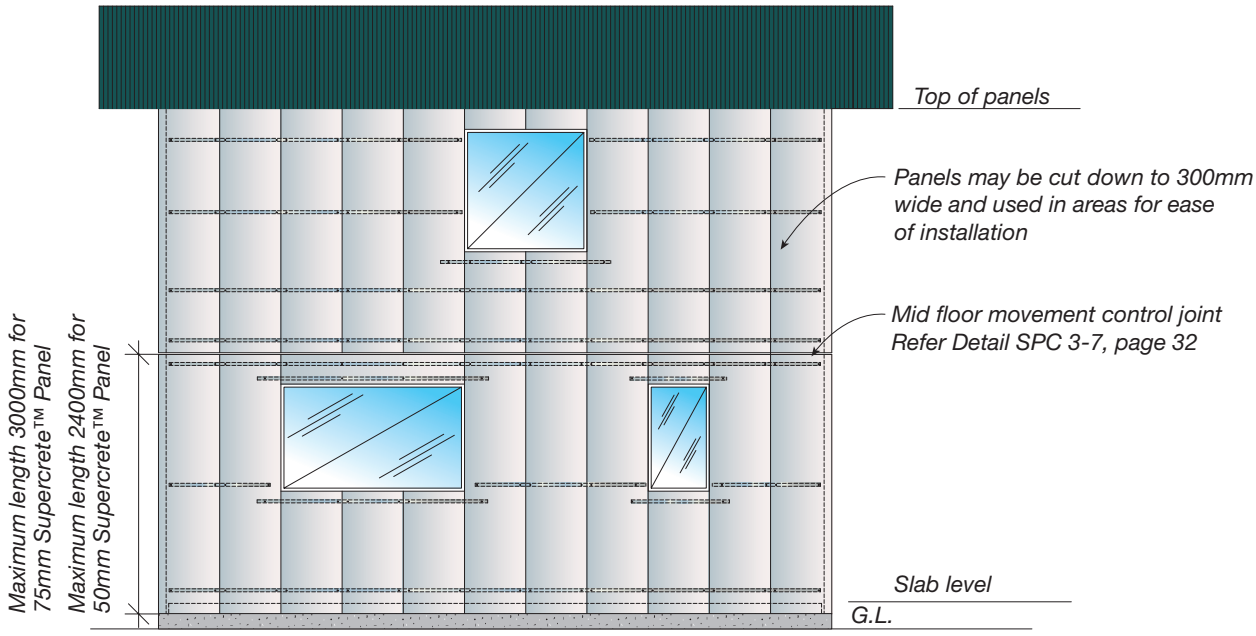
Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Supercrete™ Panel two storey construction details with single horizonal control joint
Detail No SPC 1-4b

NOTE: *All battening and panel installation is performed by registered Supercrete™ Panel Installers. These details are shown for general information purposes only.*



Gable End Elevation



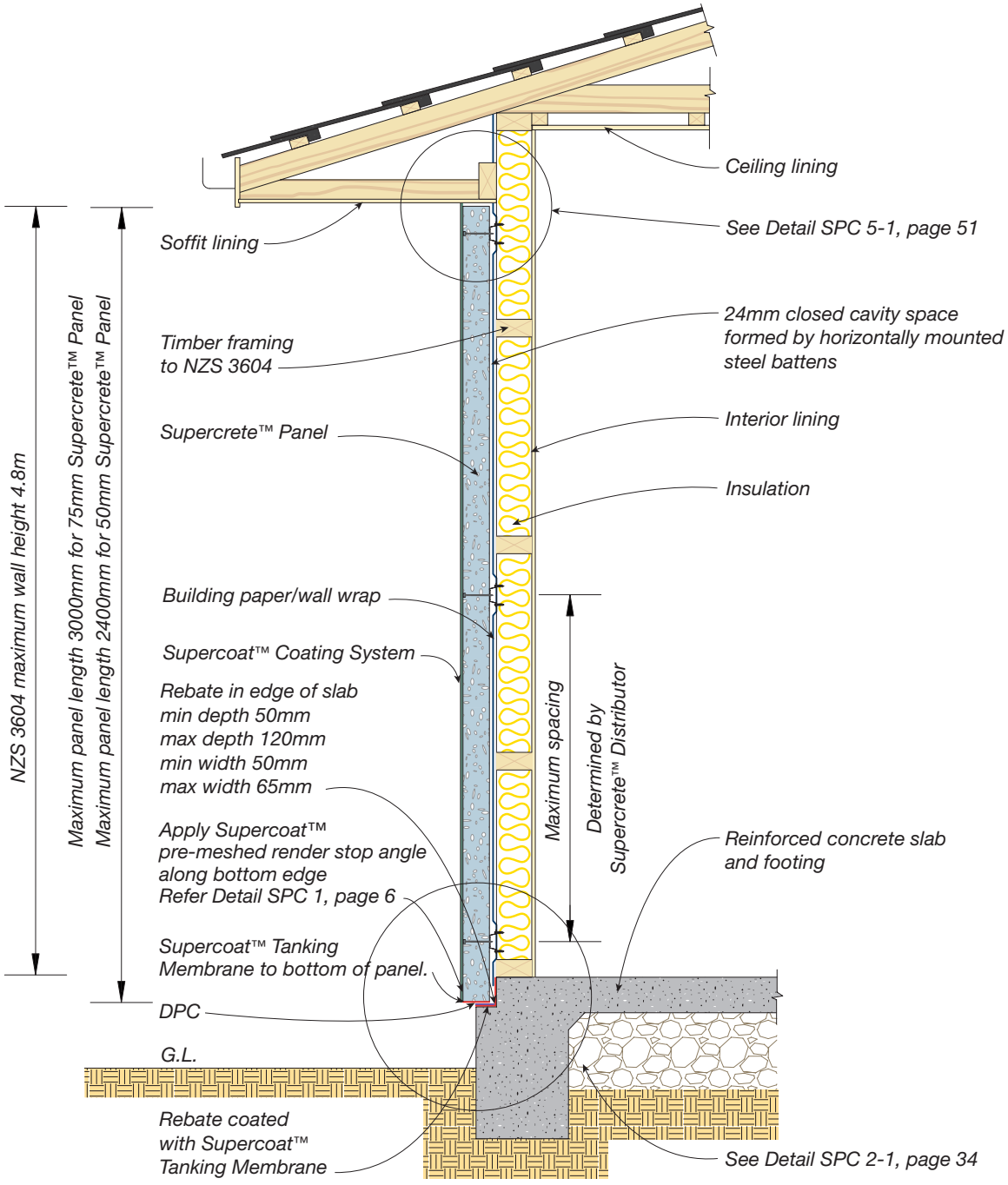
Side/Eaves Elevation

NOTE:

1. *The Supercrete™ Distributor determines the number of battens and batten spacing using wind and earthquake load information provided by the building owner.*
2. *Vertical control joints not shown on these details. Refer to Section 2.2.2.1, page 25 for control joint locations. Building owner to specify control joint locations on the project construction drawings.*

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Section through single storey wall
Detail No SPC 1-5



NOTE:

1. *The Supercrete™ Distributor determines the number of battens and batten spacing using wind and earthquake load information provided by the Building owner.*
2. *Where the wall exceeds maximum panel length panels will be butt jointed, using a staggered joint arrangement, with additional battens for panel end supports or horizontally orientated panels may be incorporated to suit height dimensions.*
3. *The building owner must determine the design panel height (bottom of foundation rebate to soffit dimension) and notate on the consent drawing documentation. Main contractor must notify the Supercrete™ Distributor of any changes in panel height as soon as possible.*

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

2. Designing for Supercrete™ Panel Cladding

2.1 Scope

This section describes:

a) the design requirements and the choices the owner must make,

b) the installation work the owner must perform prior to the Supercrete™ Panel Installer arriving on site,

c) the maintenance the owner must perform on completion of the installation of the Supercrete™ Panel Cladding System.

2.2 Design Considerations

This section specifies the requirements and details that the owner must meet to enable them to correctly specify the Supercrete™ Panel Cladding System.

Details **SPC 1, SPC 1-1, SPC 1-2, SPC 1-5** on the previous pages, show the general arrangement details of the Supercrete™ Panel Cladding System. Specific details for particular design applications are referenced in each section.

2.2.1 Wind, Earthquake and Corrosion Zones

The owner shall determine the wind and earthquake zones for the building from Section 5 'Bracing Design' of NZS 3604, and the corrosion zone from Section 4 'Durability' of NZS 3604. The owner's plans and specifications must nominate the applicable zones.

The Supercrete™ Panel Cladding System does not contribute to the bracing capacity of the building.

The bracing demand for the building must be calculated for a "medium wall" cladding as defined by NZS 3604.

Comment: *The wind, earthquake and corrosion zones in which the building is located affect the requirements of the Supercrete™ Panel Cladding System. This information is necessary to enable the Supercrete™ Distributor and the Supercrete™ Panel Installer to correctly determine and install the appropriate components. The information relating to wind and earthquake zone will be used to determine batten spacings and fixings while the information on corrosion zone to determine material and corrosion protection requirements.*

2.2.2 Design for Movement Control

Comment: *Control joints in the Supercrete™ Panel Cladding System are designed to delineate the potential crack lines which may occur due to normal building movement. They are designed in such a way that any fissure in the coating, which may be induced by movement, occurs at a point where the joint has been waterproofed with a flexible Holdfast sealant.*

The bulk of the movement experienced under normal circumstances will be that caused by timber shrinkage, although the joints also accommodate movement caused by seismic or wind loads and differential movement due to dissimilar materials.

With pre-planning, control joints can be concealed behind down pipes or next to architectural features.

Control joints must be placed where required as detailed on the following pages. The owner's plans and specifications shall detail the location of the control joints.

The stud and batten options for control joints are shown in Detail **SPC 3-2**, page 27.

2.2.2.1 Vertical Control Joints

Vertical control joints shall be placed:

a) At maximum centres of 4 metres on straight runs of walls. **Note:** This will allow paint of LRV ≥ 25% to be used. When a final paint top coat is selected which has an LRV of under 25% it is required that the Building owner sign a colour waiver form. Contact your local Supercrete™ Distributor for further details.

b) On one side of any opening that is greater than 2500mm wide but less than 3600mm wide.

c) On both sides of openings that are greater than 3600mm wide.

d) At changes in floor slab level.

e) At changes in wall height, greater than 300mm.

f) At all internal corners and external corners as shown in Detail **SPC 3-4**, page 29 and **SPC 3-4** page 30 except as follows.

- Where the wall lengths are very short (less than 300mm). For example, on a wing wall, where there is minimal fastening to the end face of the panel. In this case, the control joint shall be moved up to 600mm away and the end face panel would be fully adhered to its neighbouring panels. Refer to Detail **SPC 3-3**, page 28.
- Where panels are located above or below a faceted bay window, it is not necessary to place a control joint at every angle change where the facets are 1200mm long or less provided control joints are placed at maximum of 3.6 metre centres measured around the bay window. Control joints must be placed at each end of the bay window where it meets the main wall, regardless of the size of the facets.

Where a wall has openings greater than 600mm but less than 2500mm wide that would be within 600mm of a control joint positioned as required by the 4 metre limitation, then the control joint shall be moved to the side of the opening (while still maintaining a 4 metre maximum spacing). Also, where an opening is within 300mm of an external or internal corner the control joint shall be moved to the side of the opening as shown in photo.

The formation of a corner control joint requires one panel to cantilever past its batten supports (see Detail **SPC 3-4**, page 29). If the panel on one side of a control joint is less than 300mm wide (e.g. when a window is close to the corner), then the control joint will be positioned by the Supercrete™ Panel Installer on the shorter wall to avoid cantilevering the narrow panel.

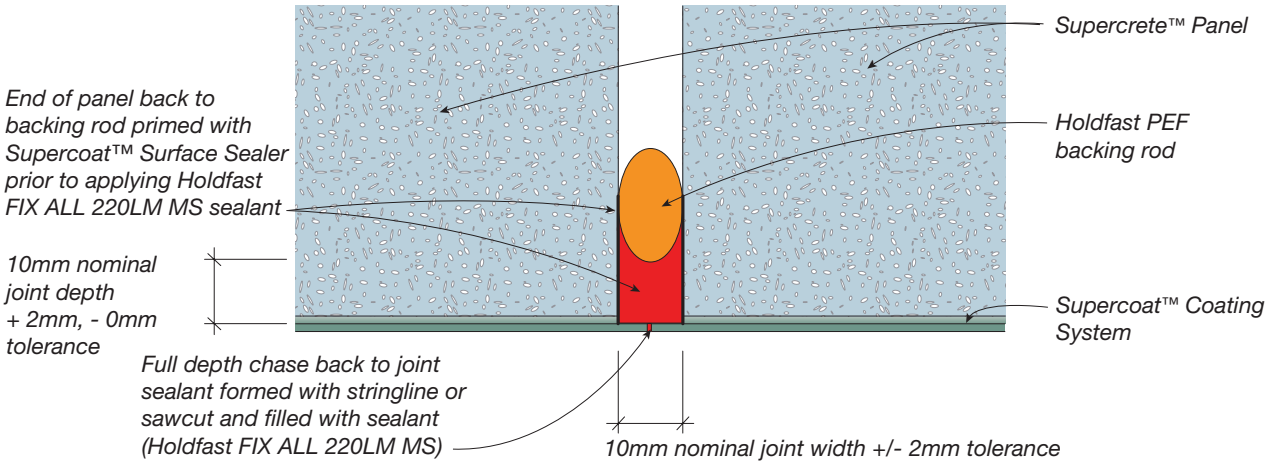
2.2.2.2 Vertical Control Joint Width

Control joints are nominally 10mm wide with tolerance to a maximum of 12mm and a minimum of 8mm.

2.2.2.3 Vertical Control Joint with Supercoat™ Pre-meshed Control Joint Bead

- The Supercoat™ Pre-meshed Control Joint Beads are to only be used for vertical and horizontal control joints where a nominal 10mm movement joint is specified.
- Holdfast Gorilla Nailpower FLEXI Expanding Foam should be inserted into the cavity prior to the Supercoat™ Pre-meshed Control Joint Bead being glued and screwed to the front face.
- All Supercoat™ Pre-meshed Control Joint Beads are to be glued in place using Holdfast FIX ALL 220LM MS and then screwed to the Supercrete™ Panel with 14-10 x 25mm long Bugle head coarse thread screws at 500mm maximum centres each side. Minimum of two screws each side.
- Supercoat™ Pre-meshed Control Joint Beads are fixed directly to the Supercrete™ panel substrate except when Supercoat™ Superadobe finish is chosen, then the Supercoat™ Pre-meshed Control Joint Bead is glued in place using Holdfast FIX ALL 220LM MS and then screwed to the Supercrete™ panel after the basecoat of Supercoat™ Superbuild Render has been applied.

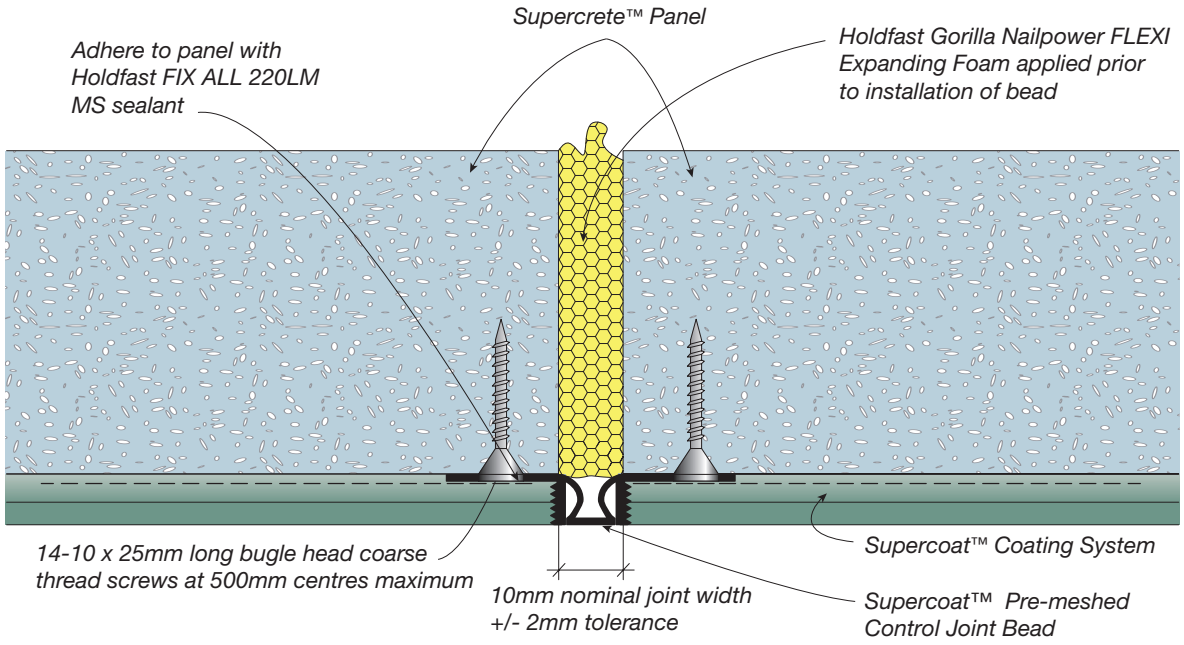
Control joint detail
Detail No SPC 3-1



Vertical Control Joint Detail
(Plan Section)

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

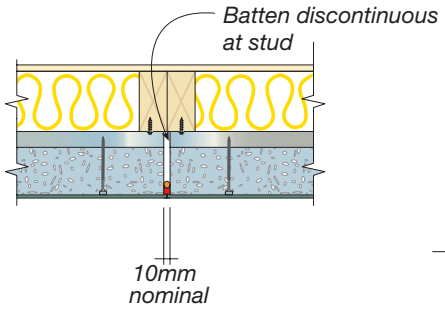
Alternative Vertical Control Joint with Supercoat™ Pre-meshed Control Joint Bead
Detail SPC 3-1a



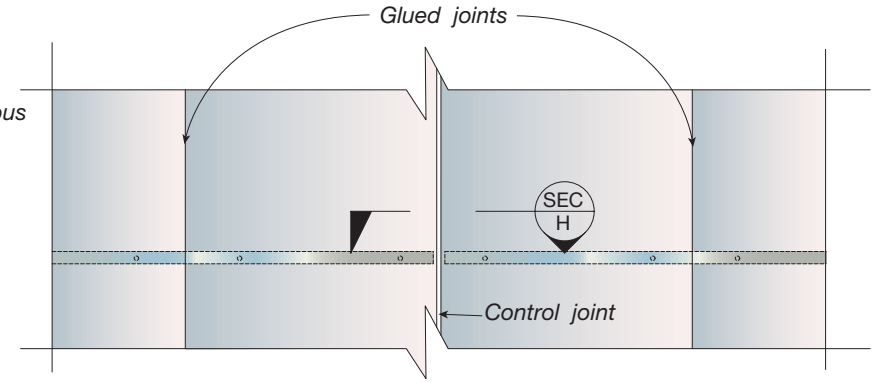
Alternative Vertical Control Joint Detail
(Plan Section)

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Control joint options
Detail No SPC 3-2



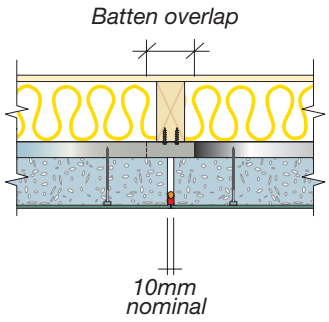
Section H



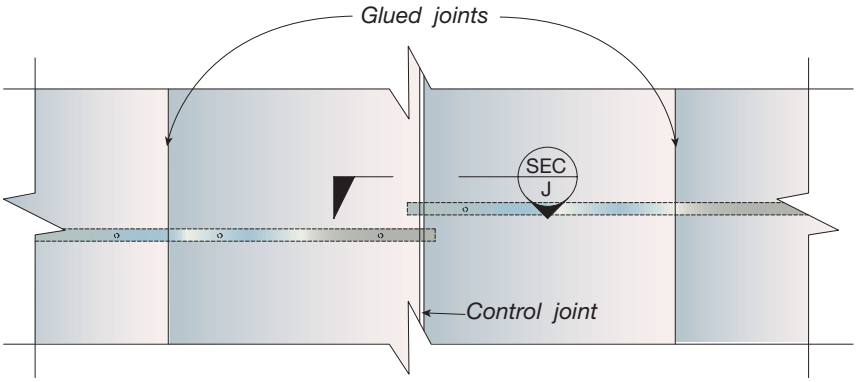
Elevation

Vertical Control Joint - Option 1

(Used where double studs are present)



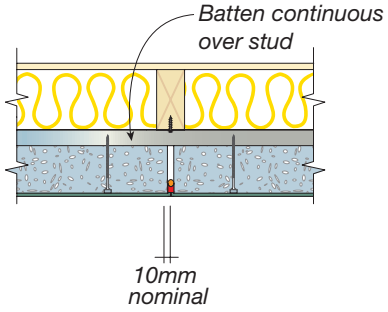
Section J



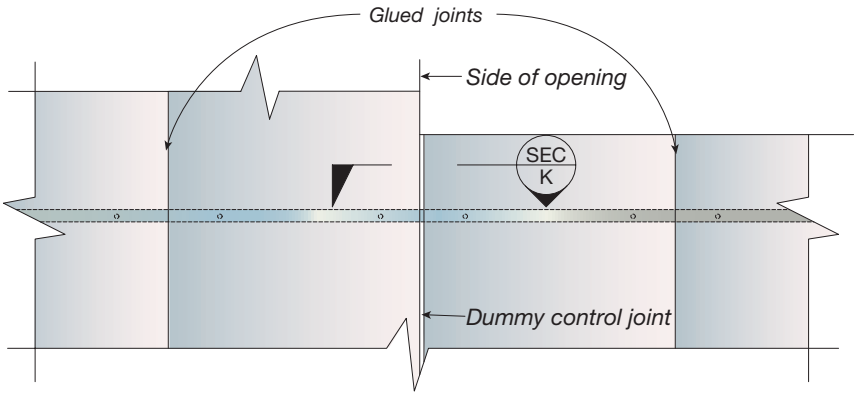
Elevation

Vertical Control Joint - Option 2

(Used at single studs)



Section K



Elevation

Dummy Vertical Control Joint

Dummy joint is not a true control joint and will be used only along window and door openings where trying to make up to 10 mm of space, thus eliminating the need to cut extra panels.

NOTE: *That at all control joints, battens will be discontinuous to allow effective movement of the building at these locations.*

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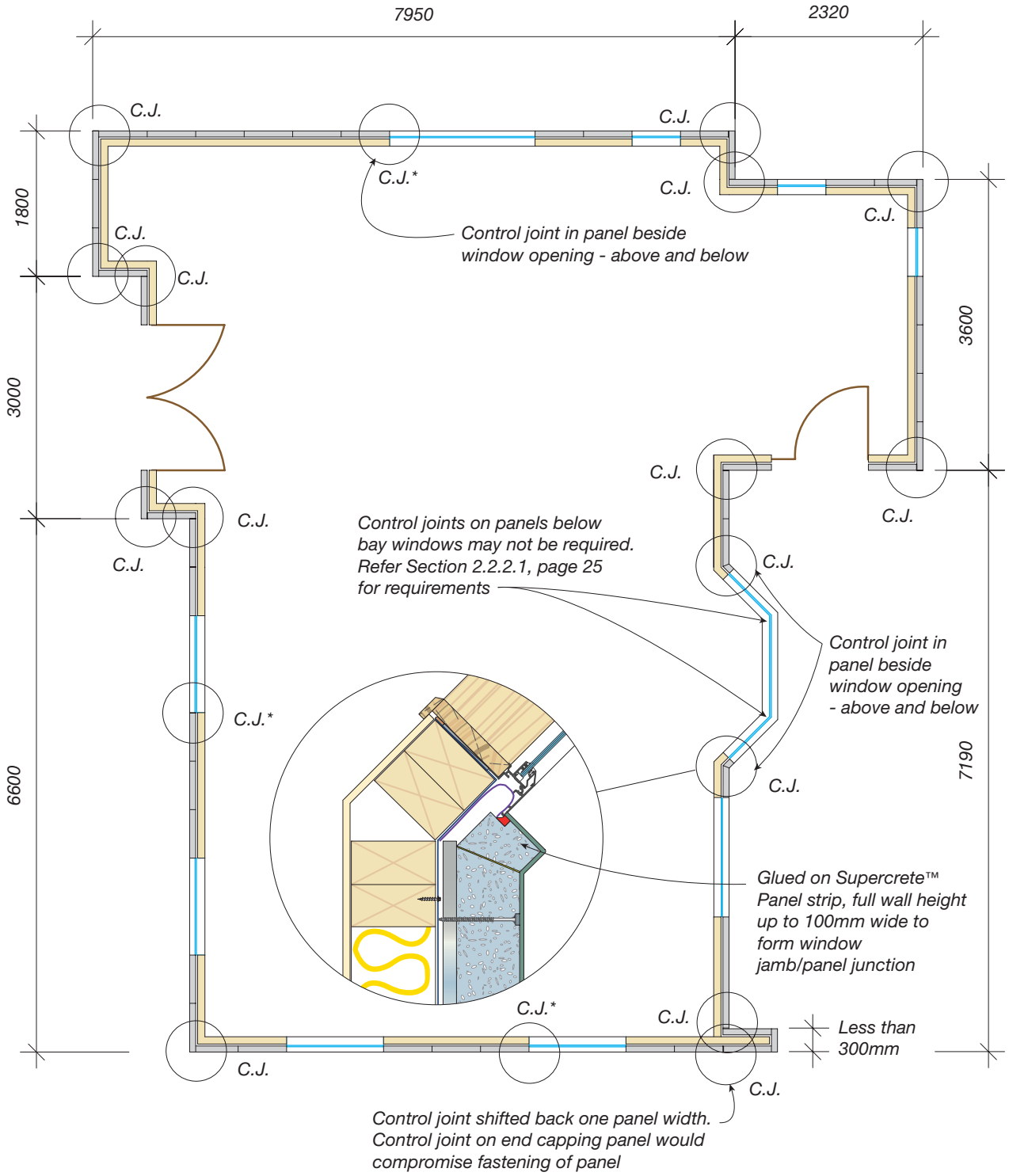
Control joint locations
Detail No SPC 3-3



NOTE:

1. This building shown as an example only, building dimensions are indicative of scale.

** These joints in midsections of walls are required if the wall length exceeds 6000mm.*

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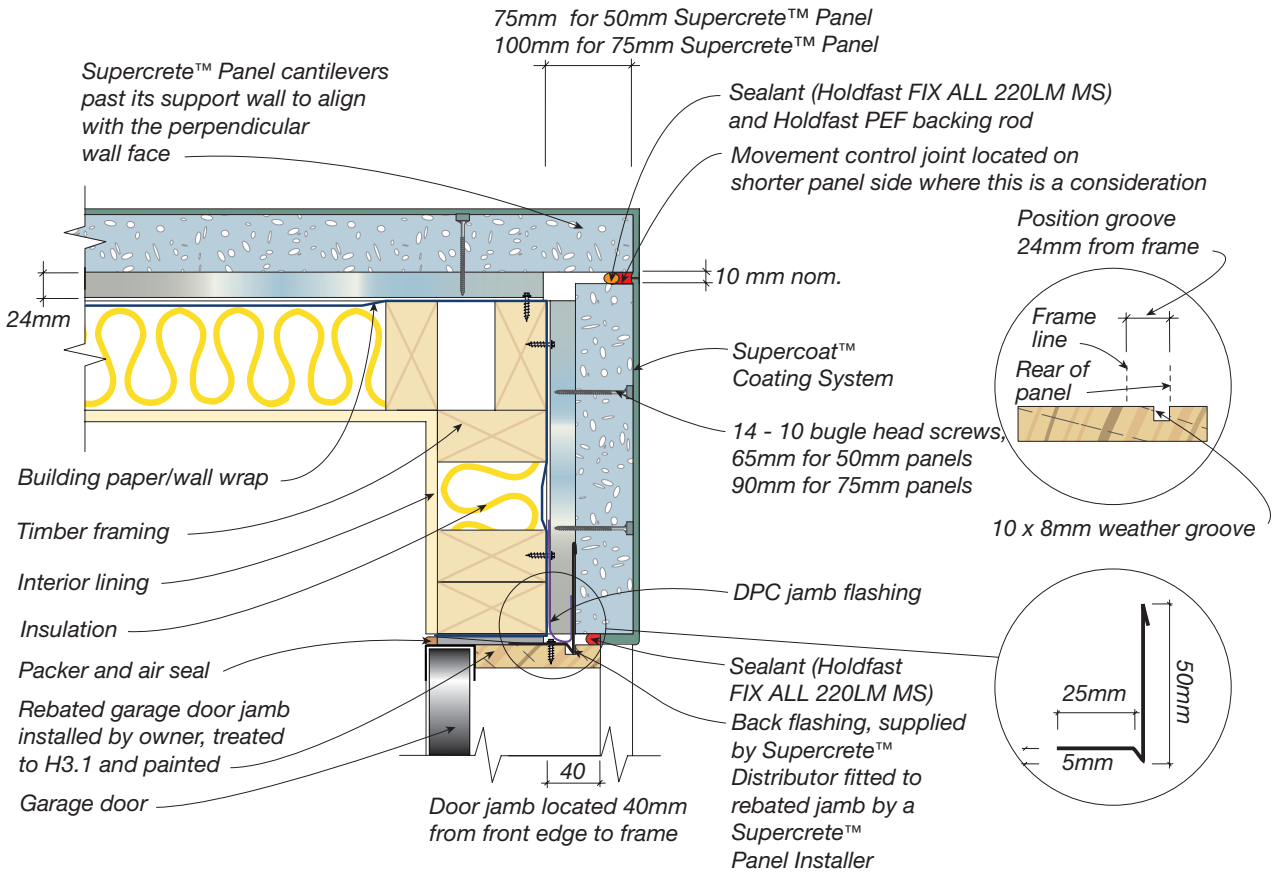
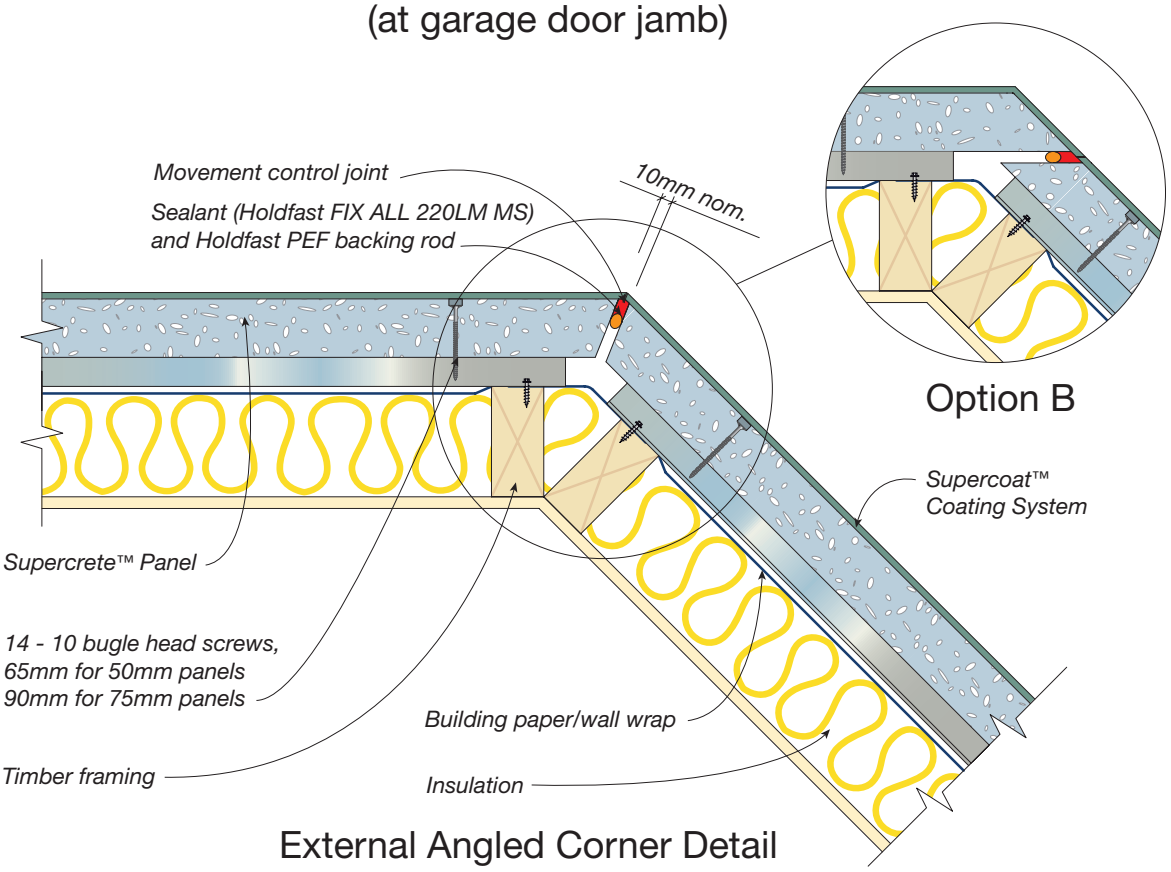
External corner control joint details
Detail No SPC 3-4



External Corner Detail
(at garage door jamb)



External Angled Corner Detail

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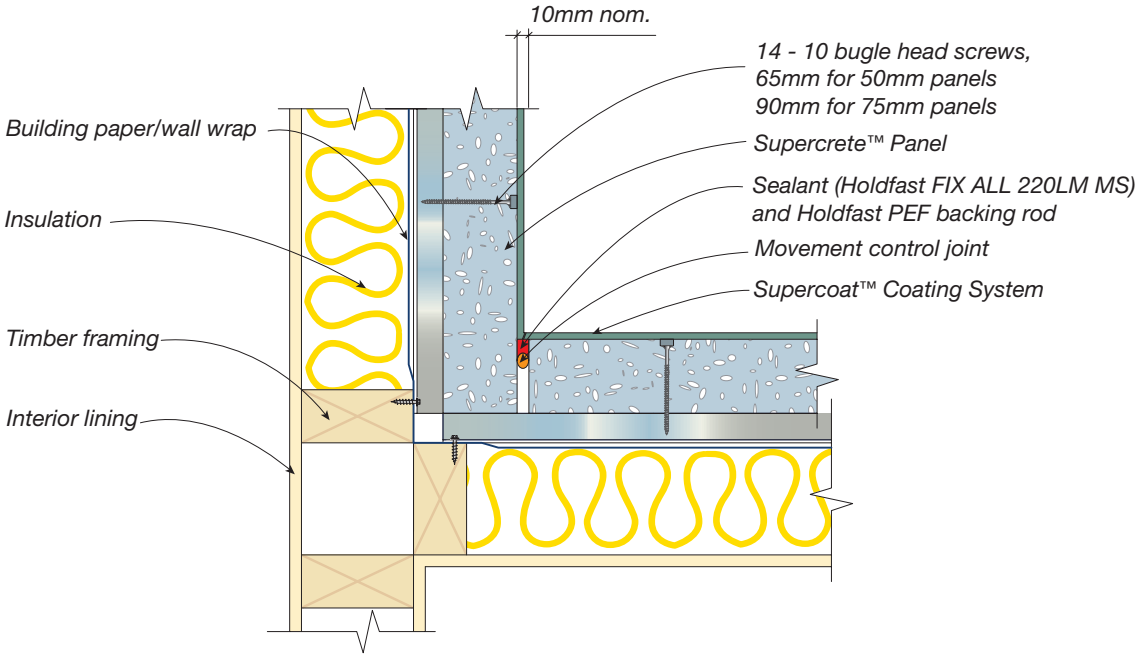
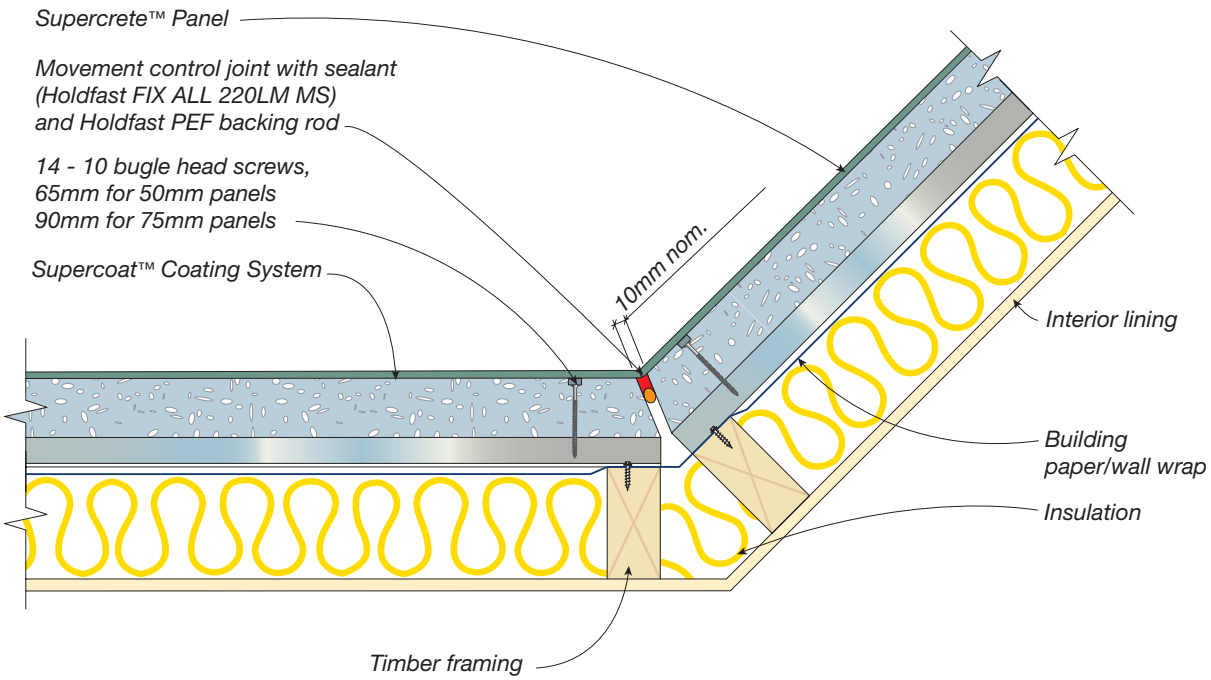
Internal corner control joint details
Detail No SPC 3-5



Internal Corner Detail



Internal Angled Corner Detail

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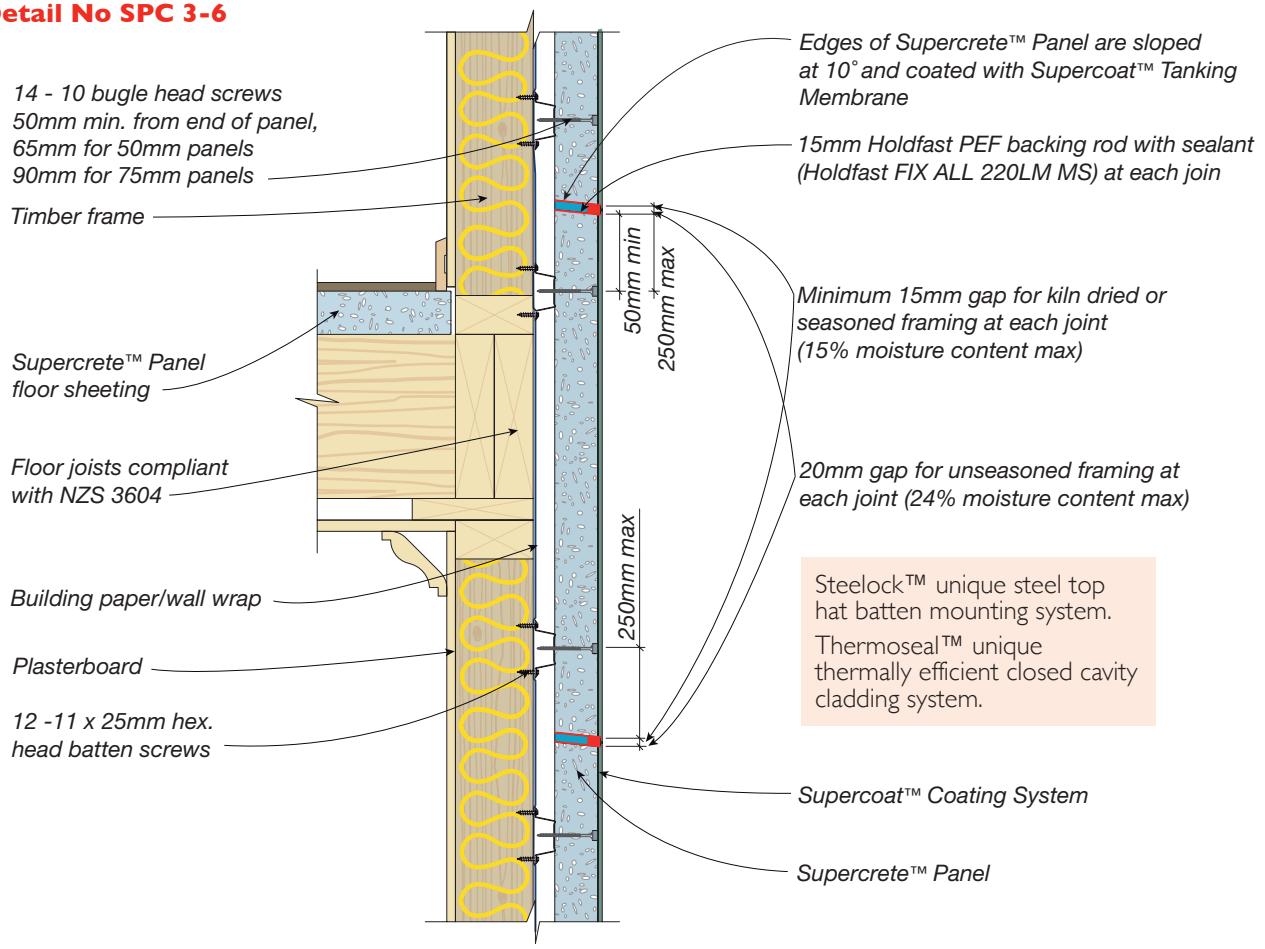
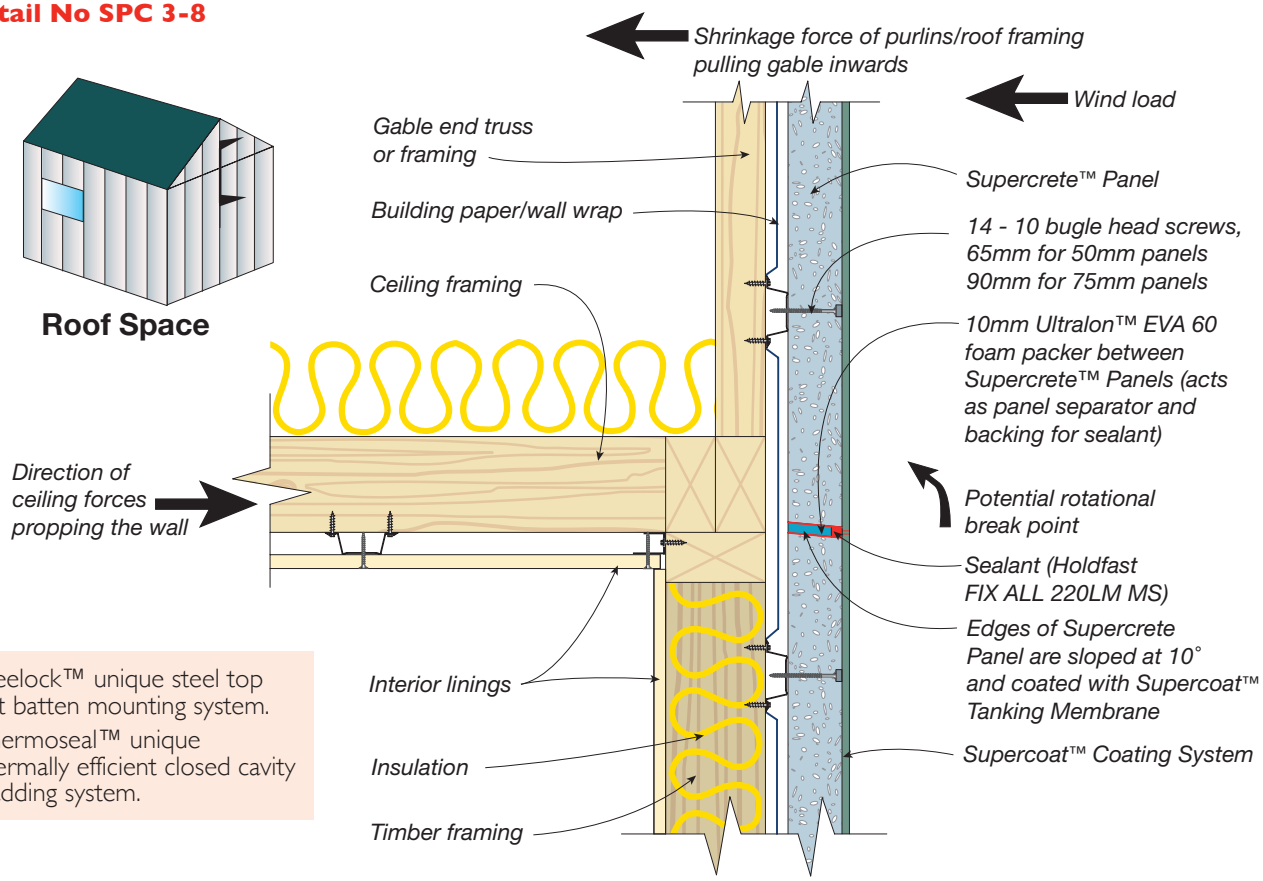
Horizontal control joint with horizontal mid-floor panel
Detail No SPC 3-6

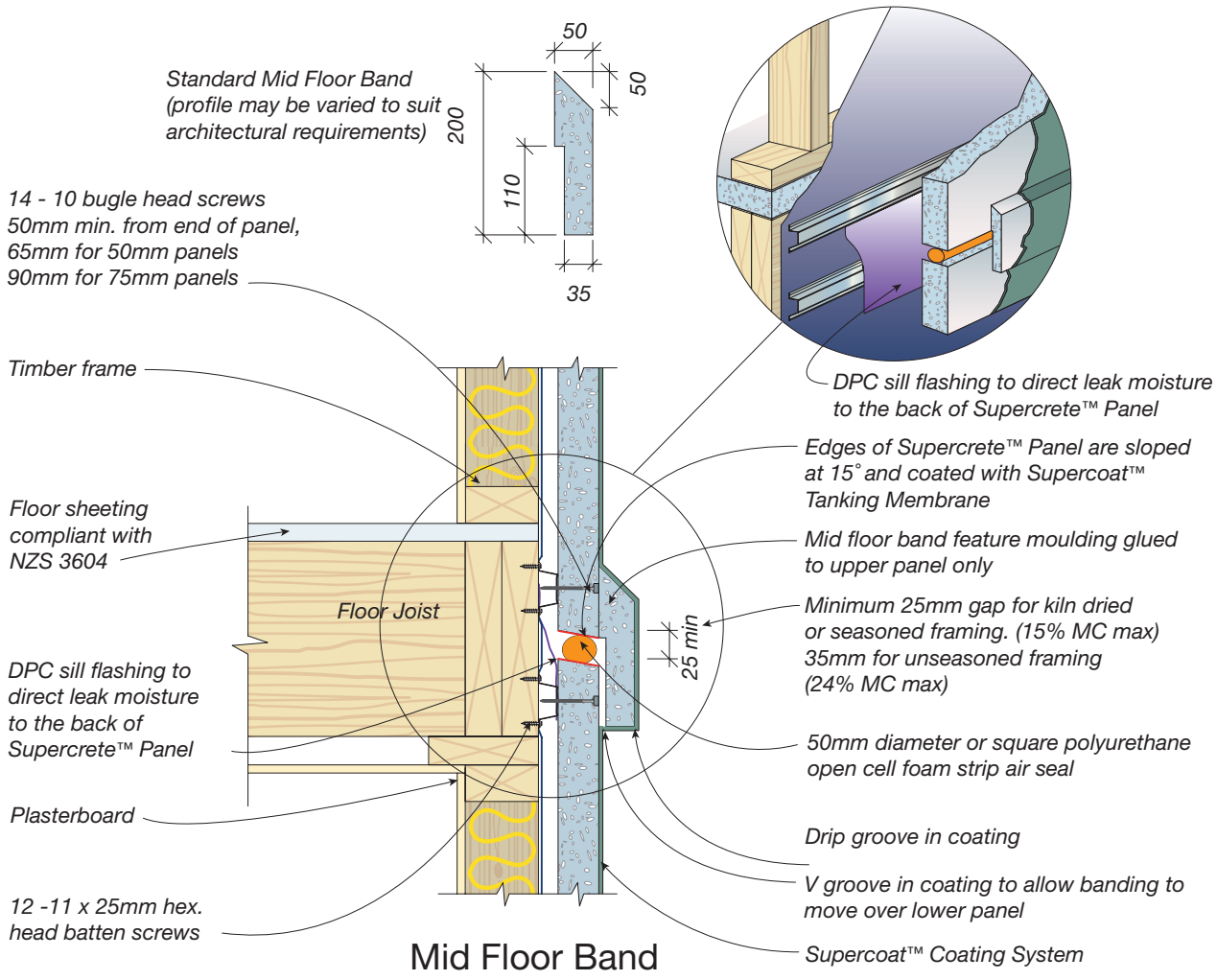


Horizontal articulation joint at gable end
Detail No SPC 3-8



NOTE: *This detail is required where a ceiling intersects the wall, except where the height from ceiling to gable apex is greater than 2000mm, or where a mid floor intersects, use Details SPC 3-6, above or SPC 3-7, page 32.*

Horizontal control joints
Detail No SPC 3-7



Mid Floor Band

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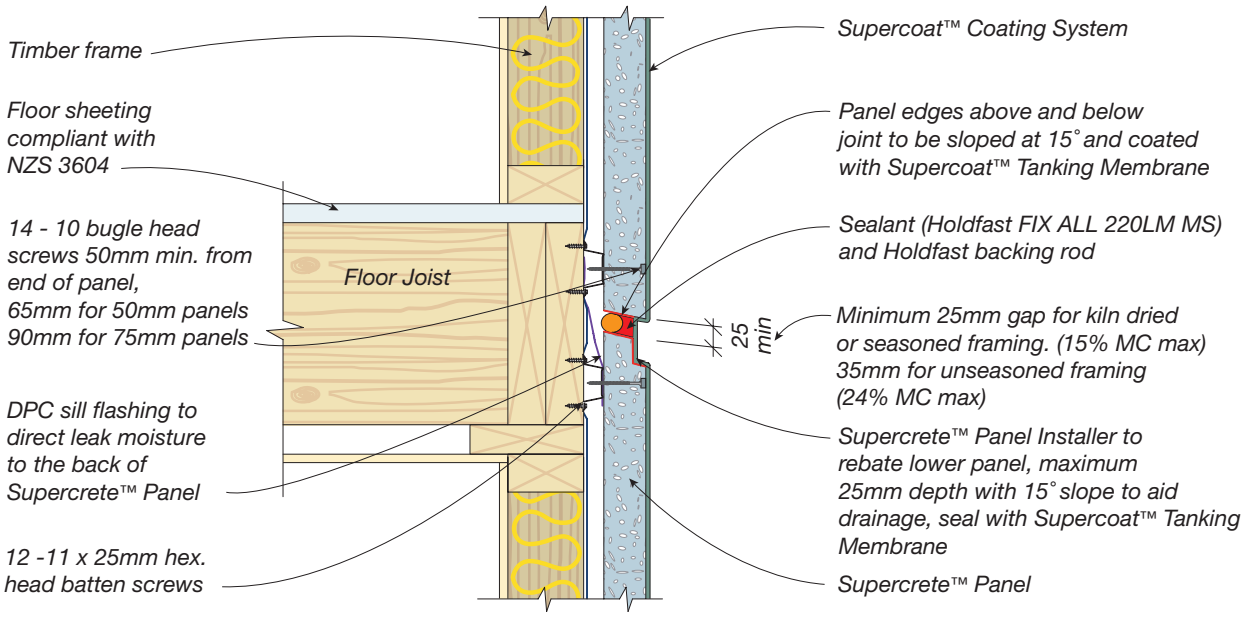


Negative Detail

NOTE:
1. *Maximum size of rebated edge cuts in panel to be 25mm square.*
2. *Panel ends will be cut to a 15˚ slope and coated with Supercoat™ Tanking Membrane prior to installation.*

2.2.2.4 Vertical Control Joint Height

Vertical control joints as required by Section 2.2.2.1, page 25 shall be full height (underside of panel to soffit) for single storey construction. On two storey construction it is preferable for the control joints to continue full height in the same line for both storeys. If window layout or wall geometry dictates, it is permissible to have the vertical joint staggered at the horizontal control joint line as long as this stagger does not exceed 1.8 metres of misalignment.

2.2.2.5 Vertical Control Joints Above Window/Door Heads

Where the small sections of panel required above a window (between window/door head and soffit), are less than 300mm high, a control joint, addition to the vertical control joints of 2.2.2.1, is required at each end of the window head panel. See Detail **SPC 4-10**, page 49.

2.2.2.6 Horizontal Control Joints

A horizontal control joint complying with the details shown in **SPC 3-6**, page 31 and **SPC 3-7**, page 32 will be provided at mid floor locations. The owner must nominate on the plans and specifications which of the options shall be installed.

2.2.2.7 Articulation Joints

Articulation joints accommodate out of plane rotational/ bending forces and will be installed at the following locations;

a) Where there is a ceiling at the base of the roof framing, as shown in Detail **SPC 3-8**, page 31.

b) Where Supercrete™ Panel is attached to the concrete foundation, as shown in Detail **SPC 2-4**, page 39, or to a timber pile foundation as shown in Detail **SPC 2-2**, page 38.

The owner's plans and specifications must nominate the position of any ceiling and detail the cladding/foundation intersection so that articulation joints can be correctly located by the Supercrete™ Panel Installer.

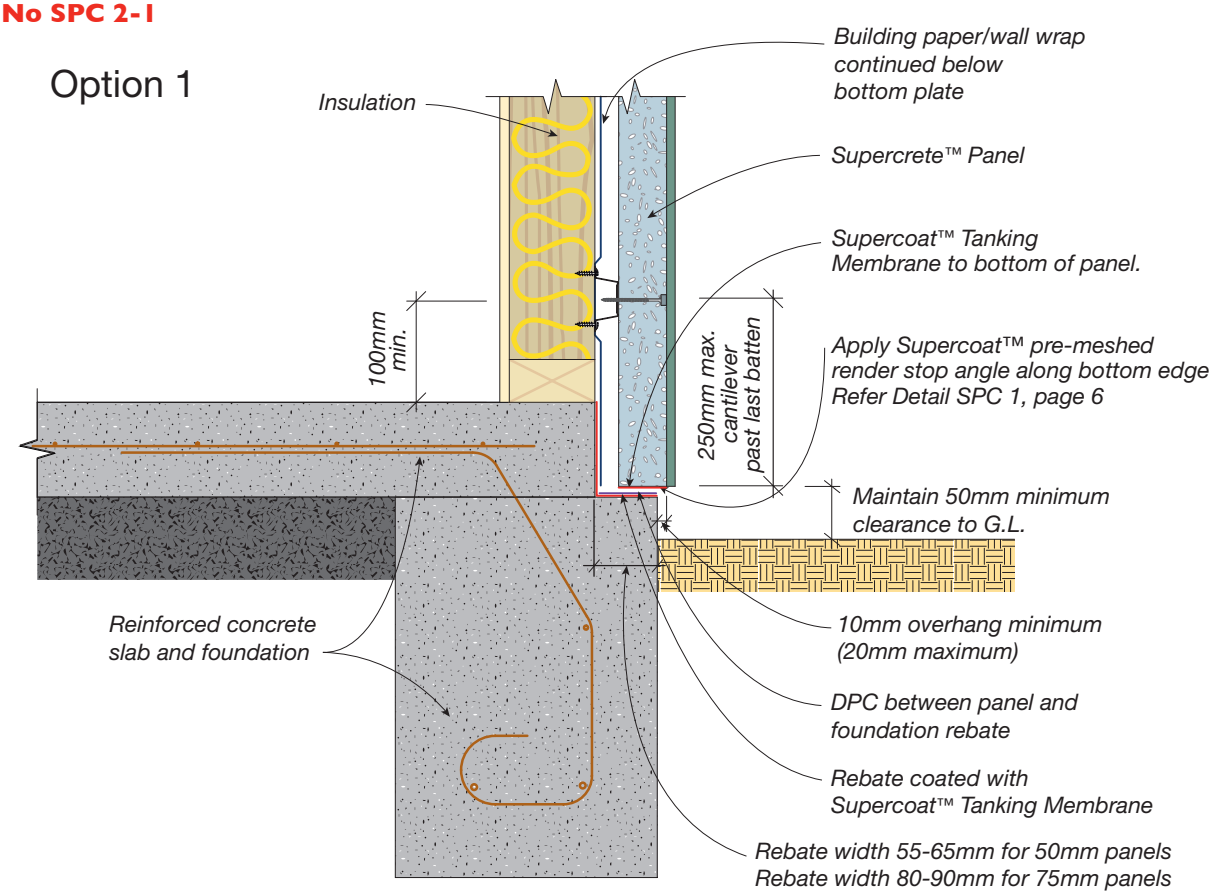
2.2.3 Timber Framing Treatment

All timber framing supporting the Supercrete™ Panel Cladding System shall have a minimum treatment to requirements of NZS3604. Treatment levels may be higher if desired. The owner's plans and specifications must clearly nominate the framing's level of treatment and the preservative used (e.g. boron, LOSP or other treatment to NZS 3640).

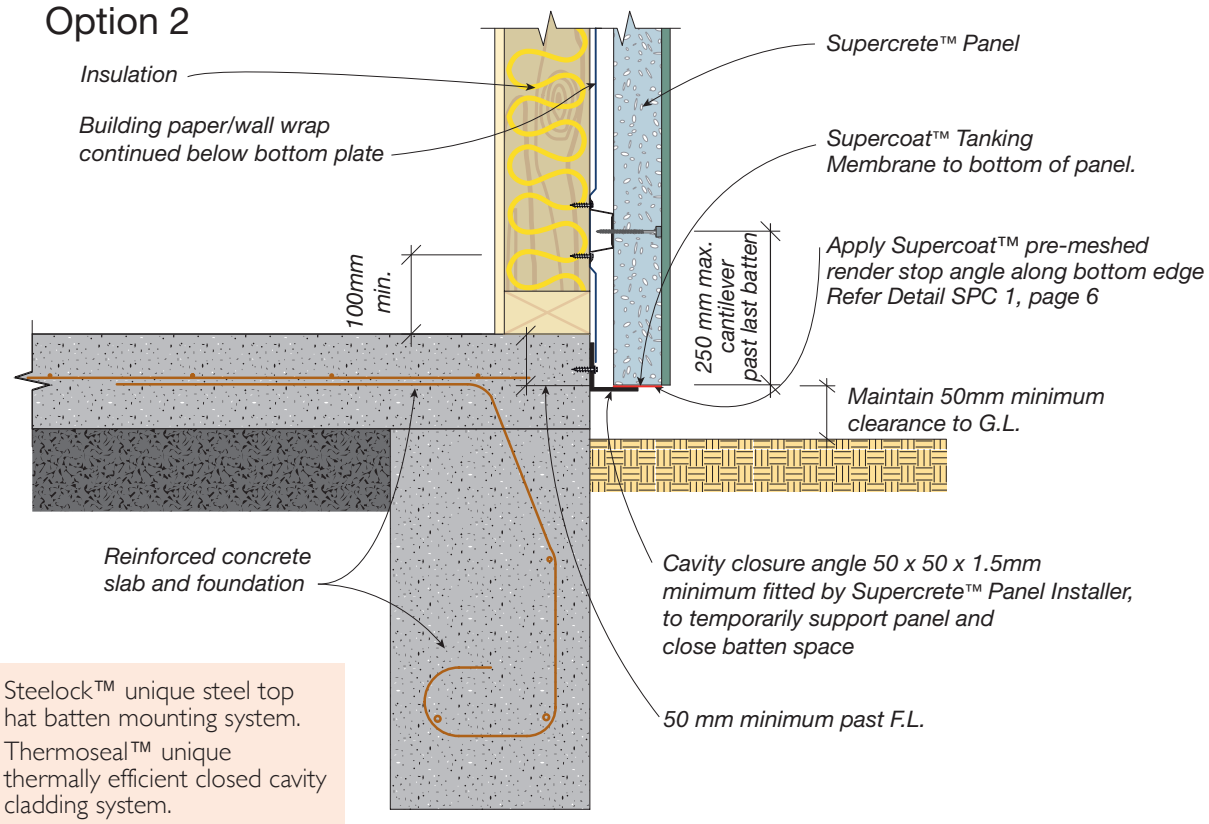
Comment: *The level of treatment and the preservative used need to be advised to the Supercrete™ Distributor and the Supercrete™ Panel Installer as these have an affect on the requirements of the Supercrete™ Panel Cladding System.*

As a recommendation, in areas subject to high internal moisture or occasional internal flooding, such as bathrooms and laundries, it is prudent to specify an H3.1 timber bottom plate.

Typical Supercrete™ Panel foundation detail
Detail No SPC 2-1



NOTE:
Rebate depth is 50mm minimum and 120mm maximum without additional fixing.
For 50mm Panel: Rebate width is 65mm maximum, 55mm minimum. Panel must have a 10mm drip edge minimum and 20mm maximum.
For 75mm Panel: Rebate width is 90mm maximum, 80mm minimum. Panel must have a 10mm drip edge minimum and 20mm maximum.



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2.2.4 Batten Spacing

Supercrete™ Panels transfers the lateral pressure and suction wind loads to the building frame via the steel battens. The spacing of battens is determined by the Supercrete™ Distributor, using Table 1, page 36.

2.2.5 Batten Selection

The Supercrete™ Distributor shall use Tables 1 and 2, page 36 to determine batten spacing and material type for metal components. The Designer shall use these tables as reference for specific design structures also.

2.2.6 Wall Bracing

The bracing capacity of Supercrete™ Panel Cladding is not included in bracing calculations.

When calculating the bracing capacity of a Supercrete Panel clad structure, the bracing capacity of interior linings or additional exterior sheet bracing must be used to achieve the required bracing demand. The bracing demand must be calculated for a "medium weight" cladding as defined by NZS 3604:2011.

2.2.7 Support of Upper Storey Panels

For upper storey panels in two or three storey construction, or where panels are only supported by the battens and/or by 50 x 50 x 1.5mm cavity closure base angles, (for example: Above a roof line, veranda decks or balconies) additional battens are required for these panels. Maximum batten spacing for panels without base foundation support are determined by the Supercrete™ Distributor, using Table 1, page 36.

2.2.8 Durability of Fasteners and Flashings

Supercrete™ Panels may be used in all environmental exposure zones as defined in NZS 3604. The base angles, panel screws, W and Z flashings are in a sheltered environment as defined in NZBC E2/AS1 Table 20. The batten and flashing fixings are in a hidden environment as defined in NZBC E2/AS1 Table 20. The designer must note the corrosion zone on the drawings and the Supercrete™ Distributor will ensure all metal components conform to the corrosion protection requirements.

2.2.9 Specific Design

For structures outside the scope of NZS 3604, Supercrete™ Panel Cladding may still be used providing the battens and fastenings are specifically designed for the applied loads, and batten spacing does not exceed those given in Table 1, page 36 for the wind zone location.

Waterproofing and cavity details must also be specifically detailed to ensure that the batten space is closed off, and that movement of the structure can be accommodated by the control joints detailed.

To assist designers with specific design, the properties of the battens are given in Table 3, screw capacities are given in Table 4 and Supercrete™ Panel properties are given in Table 5.

Table 1. Supercrete™ 50mm and 75mm Panel Cladding Batten Design

Panel height mm	Wind Zone	Panels with base support		Panels without base support	
		Numbers of battens per panel	Maximum batten spacing mm	Number of battens per panel	Maximum batten spacing mm
up to 2400 (1)	Low*	3	1050	4	700
	Medium	4	700	4	700
	High	4	700	5	525
	Very High	5	525	6	420
	Extra High	6	420	7	350
>2400 - ≤2700	Low*	3	1200	4	800
	Medium	4	800	5	600
	High	5	600	6	480
	Very High	6	480	7	400
	Extra High	7	400	8	340
>2700 - ≤3000	Low*	4	900	4	900
	Medium	4	900	5	675
	High	5	675	6	540
	Very High	6	540	7	450
	Extra High	7	450	8	385

NOTES:

(1) Maximum length of 50mm panel is 2400. This section of the table is the only one that applies to 50mm panel

(2) Wind and Seismic Zones are as specified in NZS 3604:2011

(3) This table is for framing with studs at 600mm maximum centres, therefore only two effective screws per panel

(4) All battens shall have 2 batten screws per stud

(5) Panels without base support include all panels above control joints and all panels above light gauge folded steel base angle

(6) Panels above articulation joints using Ultralon™ sheet are considered to be supported at base as long as the bottom panel is supported by the foundation rebate.

(7) Panel heights affect slenderness ratios and deflection of battens, hence variations in the maximum spacings.

(8) Wall heights to 4800mm are permitted in accordance with NZS 3604:2011. Panels are to be staggered and end butt jointed for walls taller than 3000mm maximum panel length. Use maximum batten spacing dimension for selected panel sizes used in this case.

(9) Certification available on request from Superbuild International Ltd

* Low wind shall not be used in Seismic Zones 3 & 4. There is no restriction for Seismic Zones 1 & 2

Table 2. Material Selection for Corrosion Zones

The Exposure Zones have been simplified in the new NZS 3604:2011. The zones are now Specific Engineered Design (SED), B, C and D. There is no Zone A. The provision for SED requires that all sites be examined for corrosive microclimates and if these are found the material selection is to be by Specific Engineered Design, otherwise the zones B, C & D are to be used as appropriate.

Base angles W and Z flashings (Sheltered environment)[1]	Exposure Zone in NZS 3604:2011			
	ZoneB	Zone C	Zone D	SED[4]
Type 304 or Type 316 Stainless Steel	✓	✓	✓	✓
Aluminium	✓	✓		
Galvanized steel: Z450 unpainted	✓			
Galvanized steel: Z275	Type 6	✓		
Aluminium-zinc coated steel: AZ150	Type 6	✓		
PVC	✓	✓	✓	✓
Battens[5] (Closed environment)[1]				
H23.5/303: AZ150	✓	✓	✓	
Type 304 or 316 Stainless Steel	✓	✓	✓	✓
Fixings for base angle, batten and flashing[5] (Closed environment)[1]				
Type 304 or 316 Stainless Steel	✓	✓	✓	✓
AS 3566 Class 4	✓	✓	✓	
AS 3566 Class 3	✓	✓		
Panel screws[5] (Closed environment)[2]				
Type 304 or 316 Stainless Steel	✓	✓	✓	✓
AS 3566:(Pt.2) Class 4	✓	✓	✓[3]	
AS 3566:(Pt.2) Class 3	✓	✓		
Junction Flashings (Closed environment)[1]				
Type 304 or Type 316 Stainless Steel	✓	✓	✓	✓
Aluminium	✓	✓	✓	
Galvanized steel: Z450 unpainted	✓	✓	✓	
Galvanized steel: Z275	✓	✓	✓	
Aluminium-zinc coated steel: AZ150	✓	✓	✓	
PVC	✓	✓	✓	✓

NOTES:

(1) To achieve a design life of 50 years.

(2) To achieve a design life of 15 years.

(3) Alternatively, stainless steel screws may be used in Zone D.

(4) These fixings will generally comply with most Specific Engineered Design climates. However, there will be some microclimates where they are not suitable. **All** SED microclimates **must** have suitability of the proposed materials checked specifically for the environment.

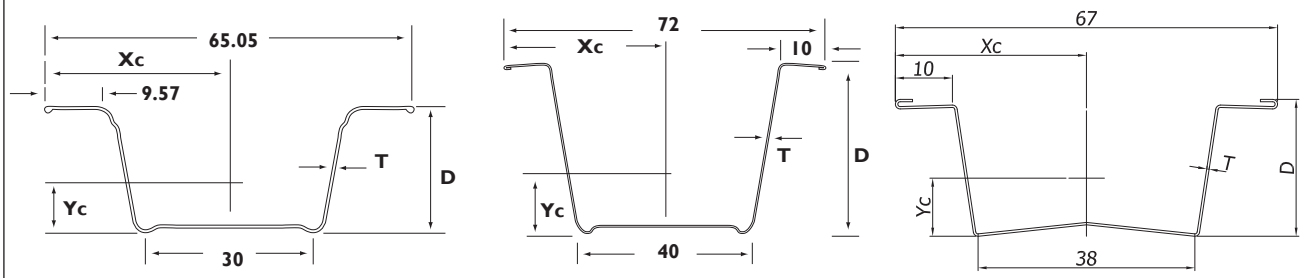
(5) Compliant batten and screw components are supplied with the Supercrete™ Panels.

(6) Powers™ Spike anchors to be type 316 stainless steel only.

(7) If fixings are to be inserted into H3.2, or higher, treated timber see NZS 3604:2011 clause 4.4.4.

Table 3. Batten Section Properties

Batten Number	HB 23.5	303	310
Area mm^2	55	45.1	66.0
D mm	23.5	23.5	35
T mm	0.50	0.42	0.55
Xc mm	35	32.52	36.0
Yc mm	10.32	11.48	15.97
Ixx (mm^4)	4.67 x 10^3	4.03 x10^3	11.90 x10^3
Iyy (mm^4)	26.68 x 10^3	16.70 x10^3	33.50 x10^3
Zxx mm^3	354	336	632
Zyy mm^3	762	516	932
Rxx mm	9.21	9.46	13.40
Ryy mm	22.03	19.2	22.5
Fy MPa	550	550	270
Mass kg/m	0.432	0.354	0.518
Coating type	Zincalume	Zincalume	Galvanised
Coating Grade	AZ-150	AZ150-150 g/m^2	Z275-275 g/m^2
Torsion Constant mm^4	4.58	2.65	5.50



303 Batten 310 Batten HB 23.5 Batten

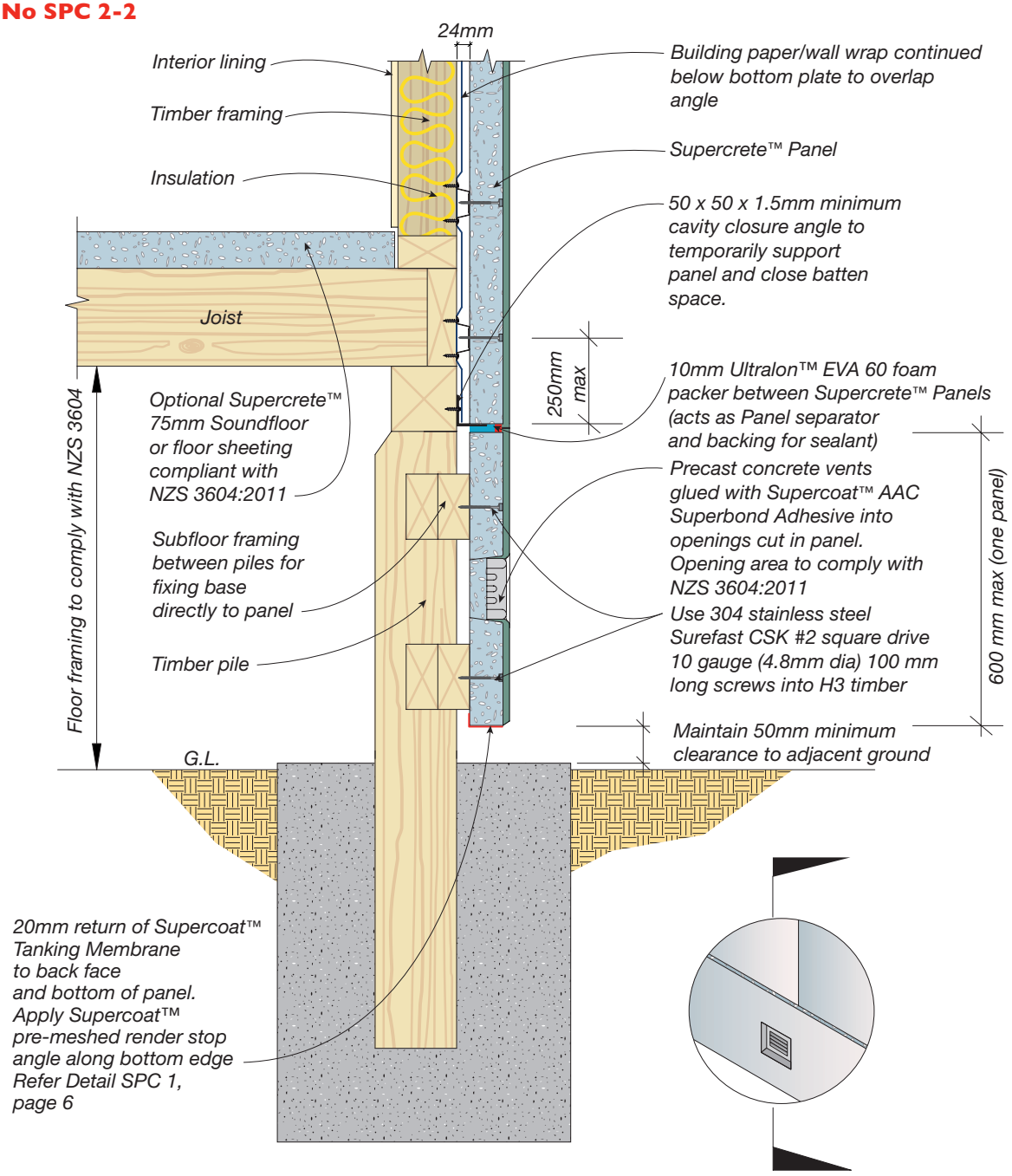
Table 4. Supercrete™ Panel Cladding Fastenings

Screw Type	Screw Type	Ultimate Design Capacity (kN)		Socket type
		Pullout	Shear	
14 - 10 x 90mm Bugle Head	Fastening 75mm Supercrete™ Panel to batten from exterior	0.24	0.24	5mm hex drive bit
14 - 10 x 65mm Bugle Head	Fastening 50mm Supercrete™ Panel to batten from interior	0.24	0.24	3/8" hex socket
12 - 11 x 25mm Hex Head	Fastening batten to timber framing	0.79	0.79	5/16" hex socket
12 - 11 x 35mm Hex Head	Fastening batten to timber framing through sheet bracing	0.79	0.79	5/16" hex socket

Table 5. Supercrete™ Panel Physical Properties

Nominal Dry Density	Density at 10% moisture content	Density at 30% moisture content	AAC Compressive Strength	AAC R-Value (panel only)	STC Value (panel only)
≤525kg/m^3	≤577.5kg/m^3	≥682.5kg/m^3	≥2.8Mpa	**50mm** 0.265m^2 °K/W **75mm** 0.49m^2 °K/W	**50mm** 33 **75mm** 35

Suspended floor with timber pile foundation
Detail No SPC 2-2



NOTE: *As the subfloor space is not a closed cavity, steel battens must not be used due to durability requirements of NZBC. Instead, fix the subfloor cover panel directly to timber framing. As this is potentially damp, H3 treated timber, stainless steel wood screws 100mm long at 600mm centres must be used.*

This is the only case where Supercrete™ Panels can be directly fixed to timber and a movement joint is vital, as there will almost certainly be differential movement experienced between the wall and the sub-floor framing.

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2.2.10 Sub-Floor Cladding

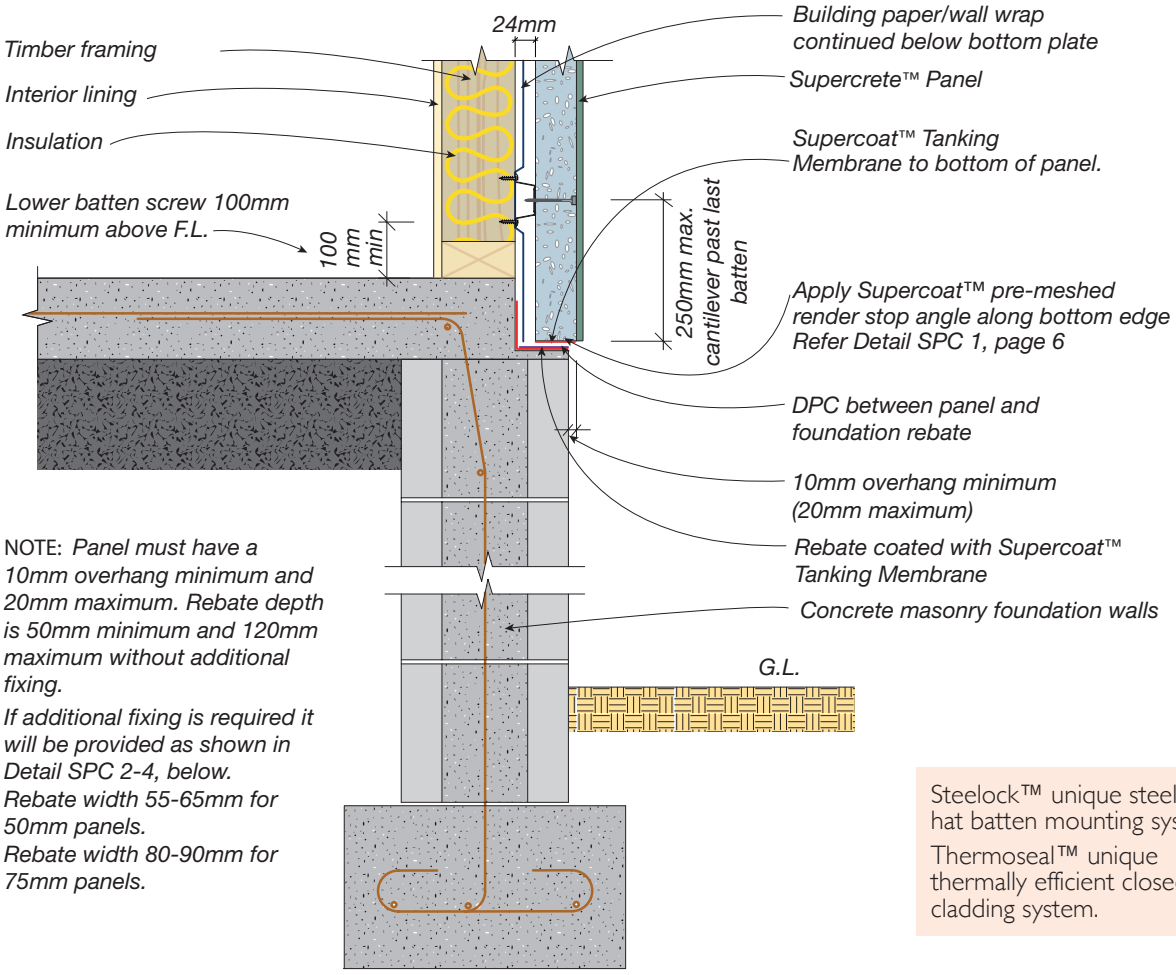
Where Supercrete™ Panel Cladding is installed on buildings with pile foundations instead of slab foundations it is permissible to clad the piles to within 50mm of the ground level to provide a consistent monolithic external appearance.

It is important that the sub-floor space is ventilated in accordance with NZS3604:2011 and concrete, plastic or steel vent boxes may be installed in these sub-floor cladding panels as shown in Detail **SPC 2-2**, above.

Additionally, as this sub-floor space is open to the atmosphere, the cladding cannot be mounted on steel battens and must be directly fixed to treated timber framing between the piles.

For these reasons the closed cavity system must stop at bearer level with a cavity closure angle and the cladding attached to the sub-floor framing is separated from the upper panels with an articulation joint as shown in Detail **SPC 2-2** above.

Supercrete™ Panel masonry footing detail
Detail No SPC 2-3



NOTE: *Panel must have a 10mm overhang minimum and 20mm maximum. Rebate depth is 50mm minimum and 120mm maximum without additional fixing.*

If additional fixing is required it will be provided as shown in Detail SPC 2-4, below.
Rebate width 55-65mm for 50mm panels.
Rebate width 80-90mm for 75mm panels.

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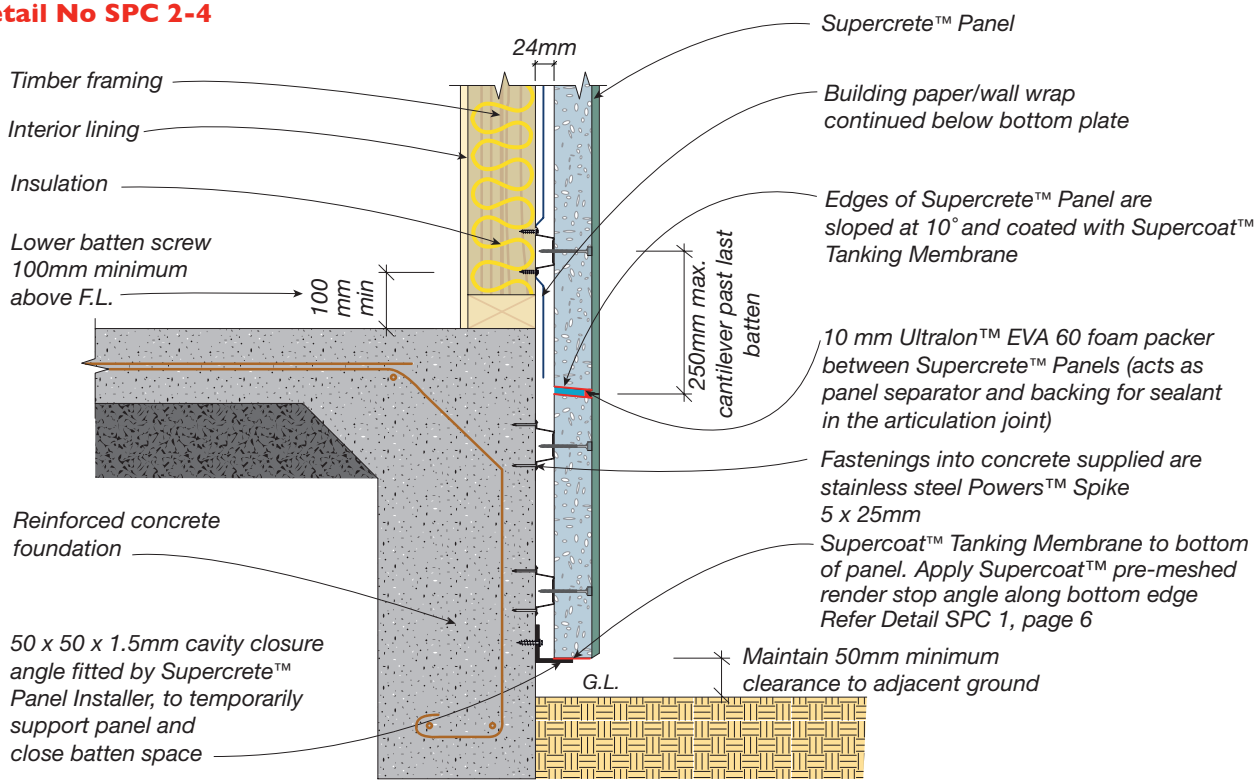
Supercrete™ Panel foundation detail with no rebate
Detail No SPC 2-4



NOTE: *Where the panels sit in a rebated foundation, with a rebate height greater than 120mm, or extend more than 120mm past the foundation, as shown in Detail SPC 2-4 above, the panel will be fixed to battens fastened to the edge of the concrete slab footing. Due to differential movement between timber frame and foundation, the panels fixed to the foundation will be separate to those fixed to the frame and have a articulation movement joint as shown in Detail SPC 2-4 above.*

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2.3 Design Detailing

2.3.1 Design for Panel Sizes

a) Panel height

The panel height must be determined taking account of the details at the slab and the soffit and noted on the owner's plans and specifications.

Comment: *The height of the wall affects panel jointing and the spacing of battens. To enable the requirements here to be determined by the Supercrete™ Distributor the owner's plans and specifications need to clearly nominate the building's wall heights.*

b) Panel width:

It is not necessary to design for panel width. Although spacing openings at multiples of 300mm will minimise wastage.

2.3.2 Supercrete™ Panel Base Detail

The Supercrete™ Panels shall either be located in a floor slab rebate or run past the edge of the concrete slab and finished on a base angle. In both cases, the Supercrete™ Panel must extend a minimum of 50mm below floor slab level. Where the panel extends more than 120mm below floor slab level, the panel will need to be fixed to the edge of the slab or rebate and an articulation joint will be provided. In the case where the panel runs past the edge of the concrete slab a base angle will be provided to temporarily support the panels during installation and close the batten space.

Where a rebate is used for 50mm Supercrete™ Panel its width must be a minimum of 55mm and a maximum of 65mm. Where a rebate is used for 75mm Supercrete™ Panel its width must be a minimum of 80mm and a maximum of 90mm.

Refer to Details **SPC 2-1** to **2-5**, pages 34 - 41.

The owner must nominate on the plans and specifications how far past the floor slab the Supercrete Panels are to extend and detail the rebate if this option is chosen.

Comment:

1. The correct rebate width is necessary to ensure that the panel drip overhang is 10mm minimum and 20mm maximum.

2. Deformation of the foundation boxing can cause up to a 10mm bulge (or more) to the exterior face of the foundation footing edge. For this reason, ***it is recommended that an actual dimension of only 60mm for 50mm panel or 85mm for 75mm panel be used for the rebate width,*** *to avoid any protruding face of the footing affecting the drip edge at the bottom of the panels.*

2.3.3 Distance Between Floor Levels, or Underside of Supercrete Panels and Adjacent Finished Ground Level

The Supercrete™ Panel Cladding System must meet the following requirements;

a) The distance between the floor slab level and the ground level shall be:
   i. 100mm minimum where the ground is paved, and
   ii. 150mm minimum where the ground is unpaved.

b) The distance between the underside of the Supercrete™ Panel and the adjoining ground shall be 50mm minimum. Refer Detail **SPC 2-5**, page 41.

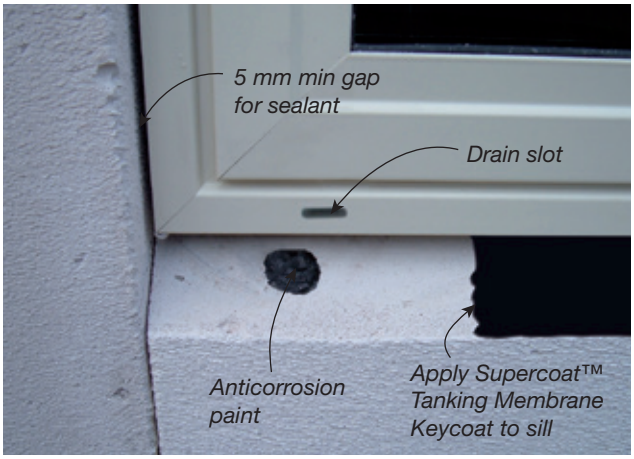
2.3.4 Window and Door Details

Joinery should be aluminium and meet the requirements of NZS 4211: 1985 (Specification for the performance of windows) for the relevant building wind zone. The maximum height or length of joinery for use with the Supercrete™ Panel Cladding System shall be 4 m. Alternatively timber can be used.

The detailing at window and door openings shall be as shown on Details **SPC 4-1, SPC 4-3, SPC 4-4** and **SPC 4-7**, pages 43-47. Aluminium joinery shall be positioned so that the face of the joinery projects 40mm beyond the face of the framing, 16mm more than the cavity space. For WANZ bar window see Detail **SPC 4-12** on page 42.

Window and door joinery must have drainage holes or slots on the front face of the extrusion that discharge to the external face of the building. Further, the manufacture of the joinery must include specific drainage provisions so that interstitial water (water seepage to cavities in the frame) is redirected to outside the cladding line. This must include provision for secondary drainage in the event of failure of primary water seals at jamb/sill mitre joints and mullion/sill connections.

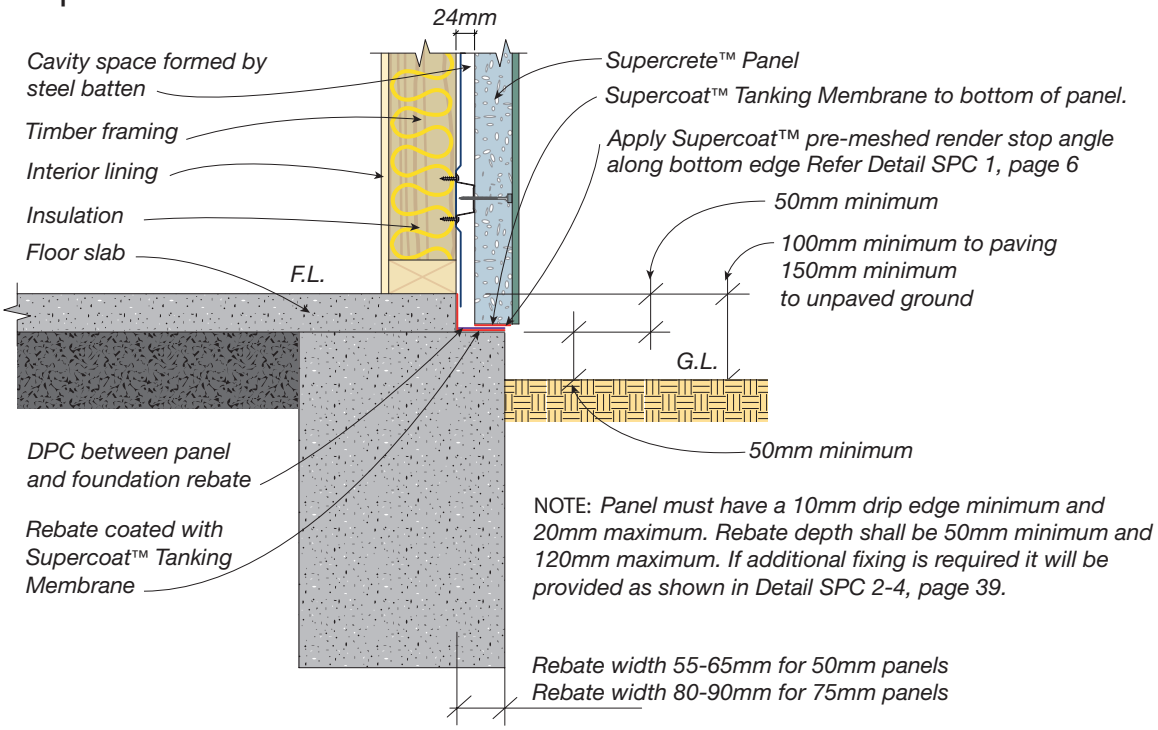
Comment: *Aluminium extrusions that have drain holes in the base, to suit drained and ventilated cavity claddings, are NOT permissible as the Supercrete™ Panel Cladding System has a closed dry cavity.*



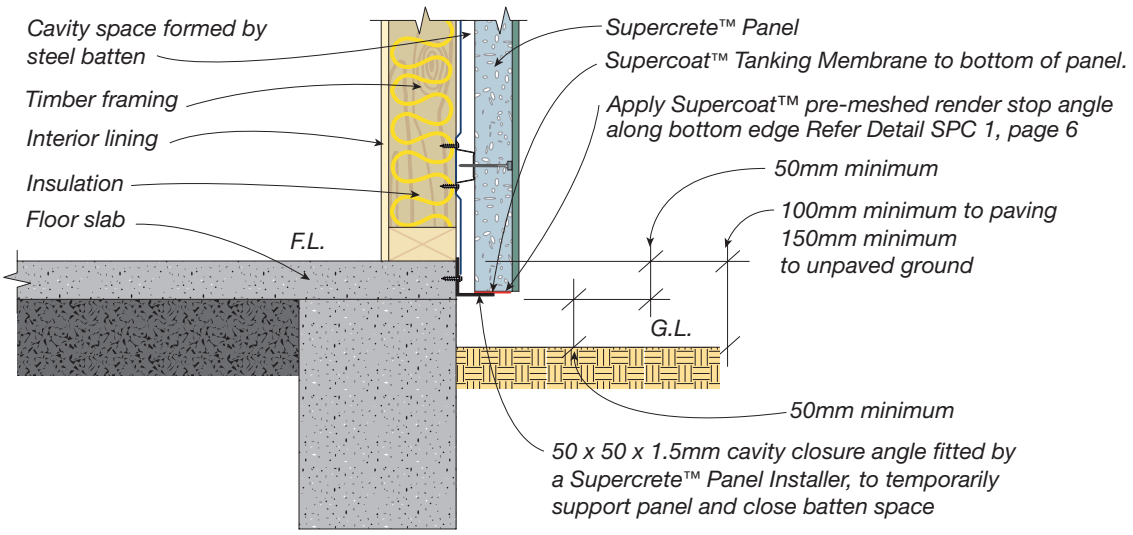
Drainage slot in aluminium window joinery.

Ground clearance to base rebate and floor level
Detail No SPC 2-5

Option 1



Option 2



Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

2.3.5 Window Sills

Sill Blocks, cut from 50mm or 75mm thick Supercrete™ Blocks or Panels, may be provided to form a drip edge at the base of windows.

Panels below windows, and sill blocks if specified, are site cut to a minimum slope angle of 10° but typically to 30°.

The top of the Supercrete™ sill will be waterproofed with Supercoat™ Tanking Membrane. See Section 4.3.15, page 77.

Sill blocks across movement control joints at the sides of openings are to have control joints cut through them

The owner's plans and specifications must show whether sill blocks are required and if so nominate the size, up to a maximum of 300mm in height and slope to top edge as above.

Comment: *Sill blocks create a drip edge for water and accumulated grime from windows to drip free of the wall face. They are recommended to prevent the front face of the panels under the window from being water stained.*

2.3.6 Banding Around Openings

To provide accents around window and door openings,

Supercrete™ bands up to a maximum of 300mm x 50mm can be glued to the face of the panel.

Banding across movement control joints at the sides of openings will have control joints cut through them.

The owner's plans and specifications must show whether bands are required and if so nominate the size.

Comment: *The minimum recommended size is 100 x 50mm. Thinner bands are possible, but are susceptible to breakage when handling.*

2.3.7 Penetrations (Including at Meter Boxes)

Penetrations through the Supercrete™ Panels must be detailed on the plans and specifications and installed with the timber framing (i.e. prior to the installation of the Supercrete™ Panels). Penetrations shall meet the following requirements:

Round penetrations shall be a maximum of 110mm outside diameter and be installed with a nominal fall to the outside. Round penetrations of larger diameter are outside of the scope the Supercrete™ Panel Cladding System.

Square edged penetrations (e.g. square or rectangular ducts, meter boxes) shall:

a) with a dimension up to a maximum of 110mm be installed with a nominal fall to outside

b) with a dimension greater than 110mm be;

   i) framed out on all four sides as required by NZS 3604:2011

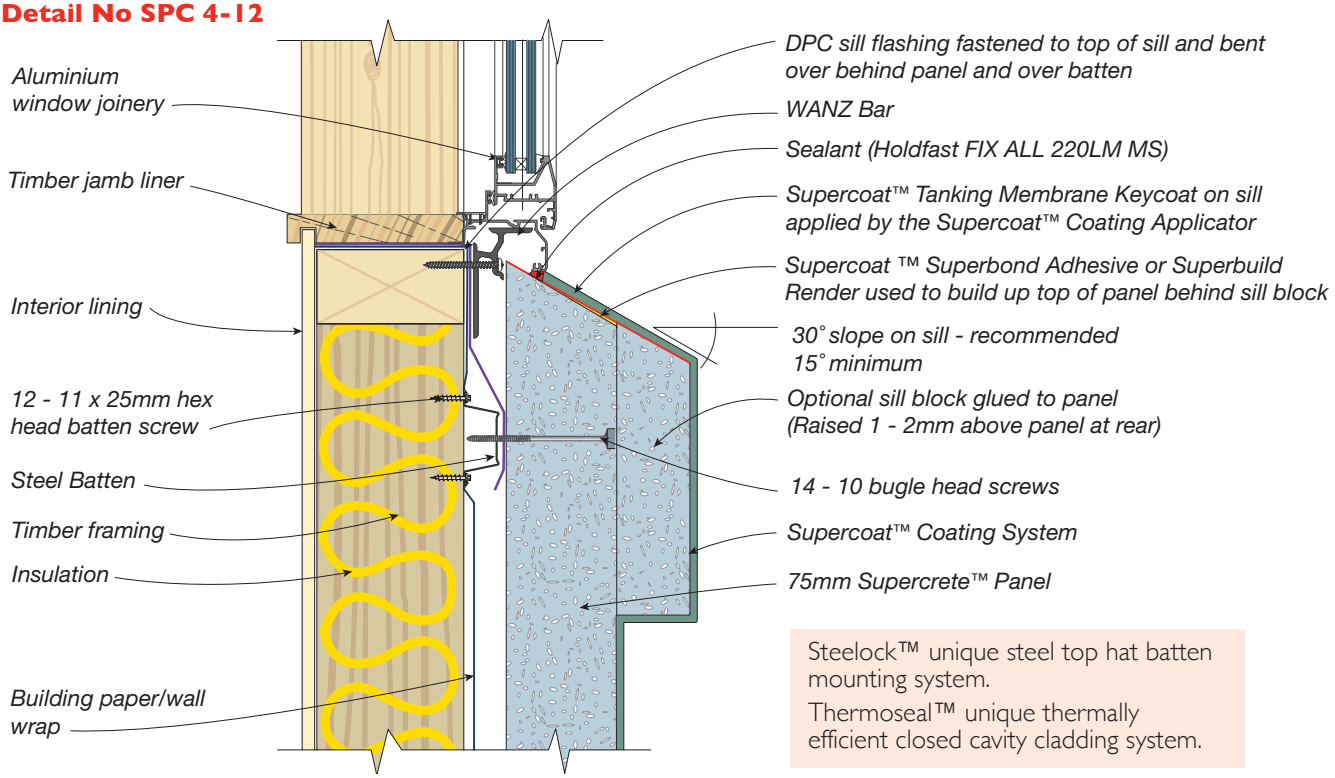
   ii) installed with a 20 x 2mm angle fixed and sealed all round to the duct (refer to Detail **S50C 6-8**, page 72).

Comment: *Ducts with a dimension greater than 110mm need to be treated in an identical fashion to meter boxes.*

2.3.8 DPC Flashings

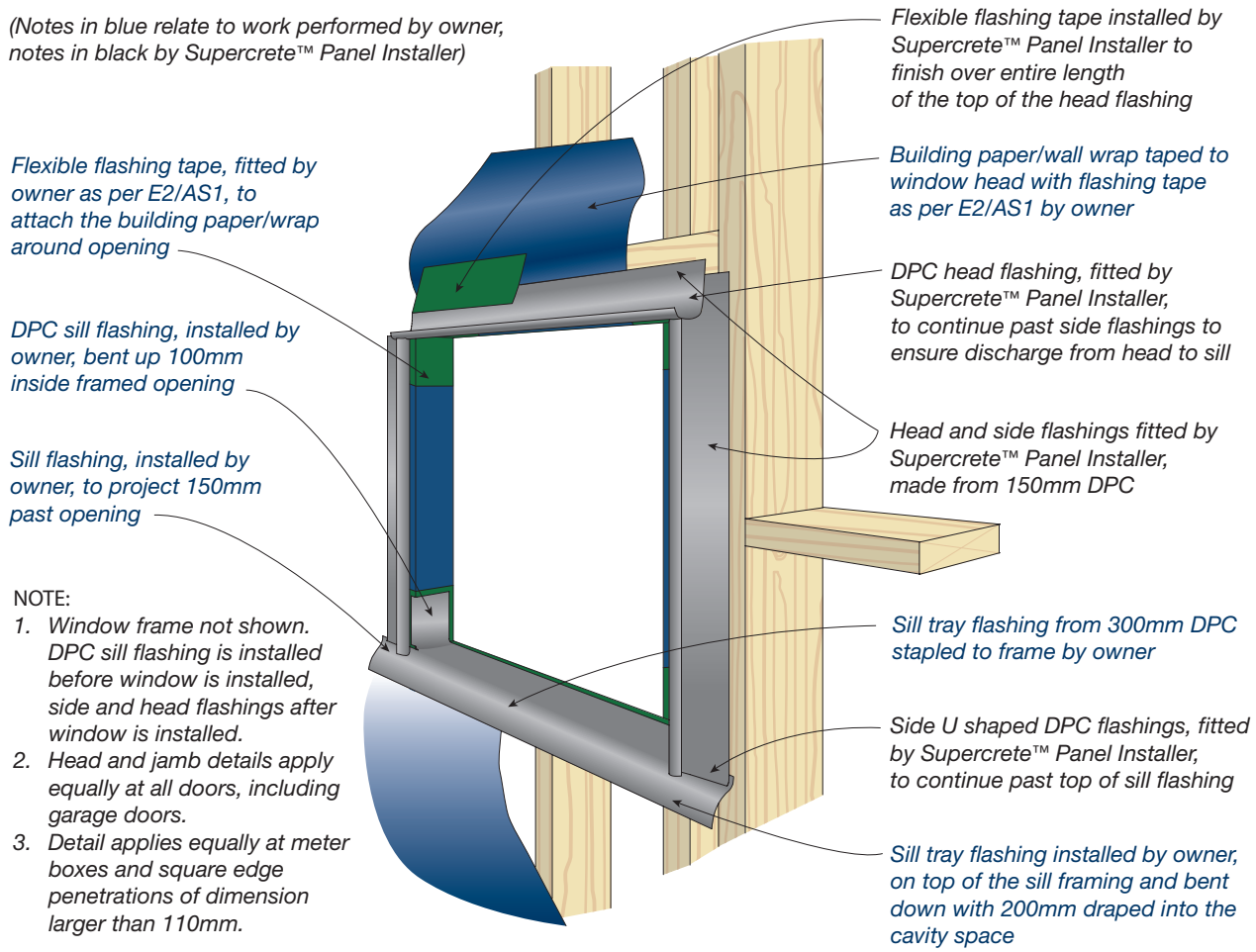
Door and window openings must have DPC flashings installed around the openings to direct any leaked water back to the rear surface of the panel, where it can escape via vapour diffusion. The flashings are as shown in Detail **SPC 4-3**, page 43 and except for the DPC sill flashing on windows are installed by the Supercrete™ Panel Installer at the time of panel installation.

WANZ Bar Supported Window Sill Section Detail No SPC 4-12



Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Window DPC flashing detail
Detail No SPC 4-3



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DPC head flashing and side flashings. Note head flashing extends past side flashings.

The window DPC sill flashing must be provided and installed by the owner prior to the window being installed. The DPC sill flashing shall be 300mm wide and extend 150mm on either side of the framing opening. It shall be cut and fixed with staples in position and left draping down for subsequent positioning over a panel batten by the Supercrete™ Panel Installer as shown on Detail **SPC 4-1**, page 44.

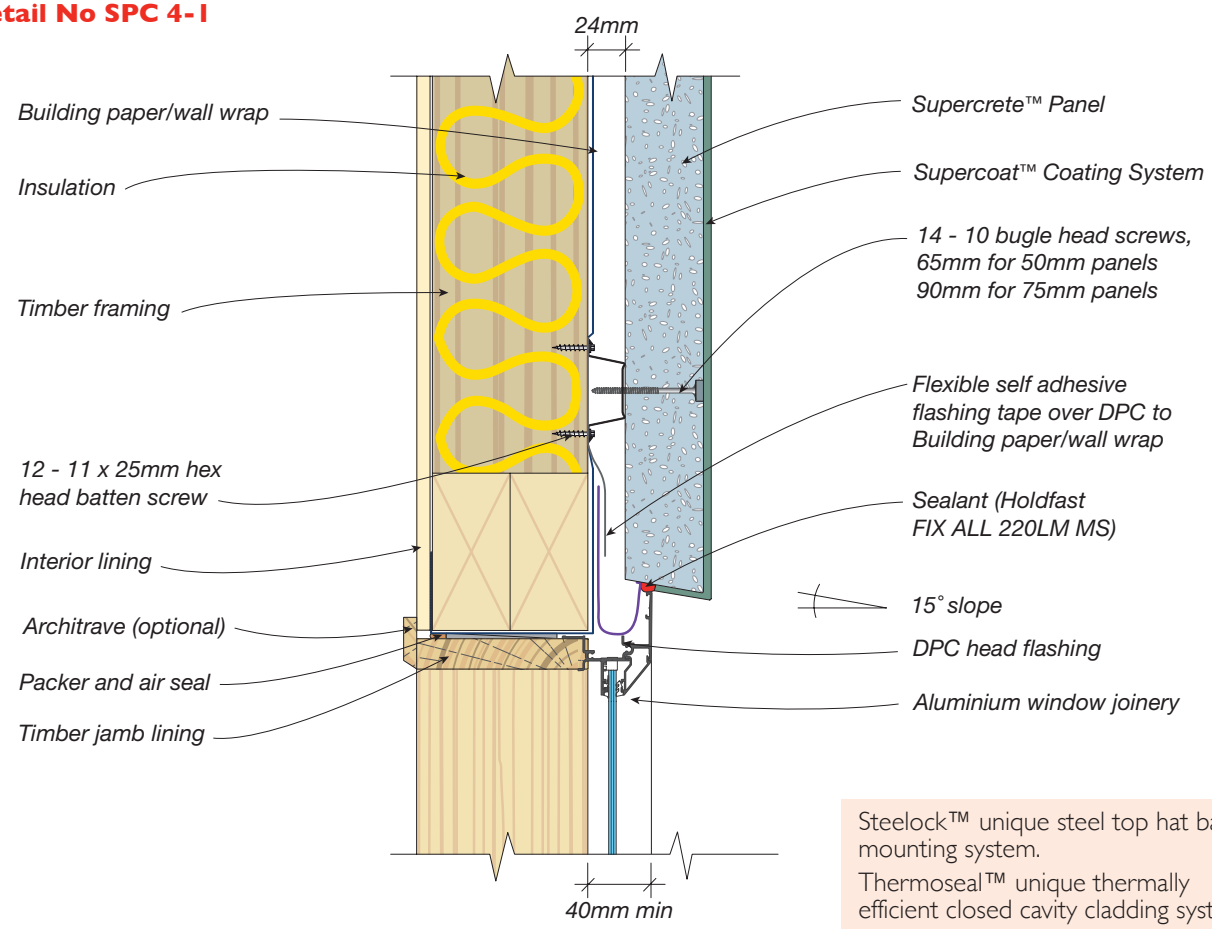
Rectangular meter boxes and ducts, with dimension greater than 110mm, shall have 20 x 20mm aluminium angles fitted as per Detail **SPC 6-8**, page 72. The owner shall provide and install DPC sill flashing before installing the meter box. The Supercrete™ Panel Installer will seal the aluminium angle to the Supercrete™ Panel.

2.3.9 Panel Surface Rebating

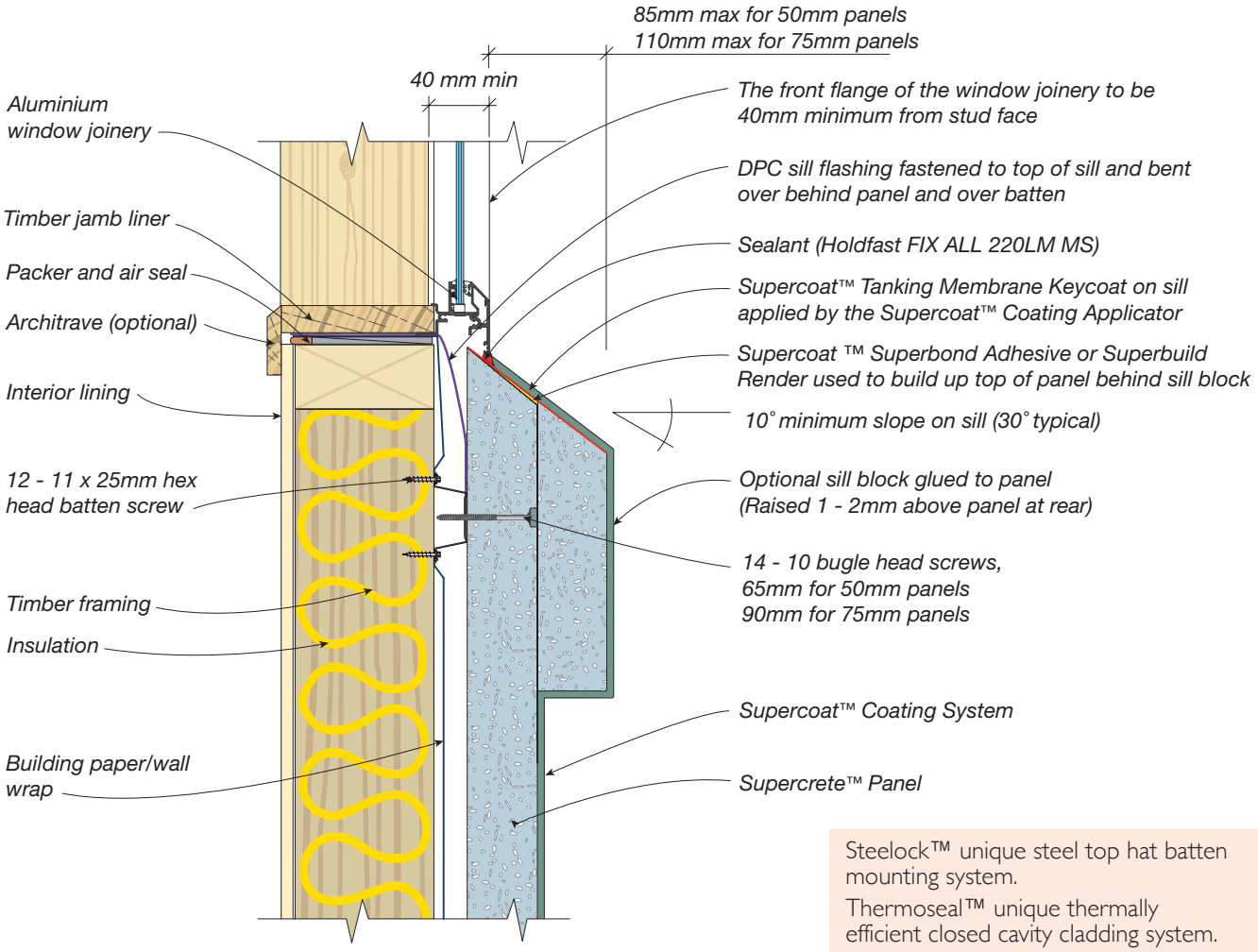
Panels will be shaped at penetrations and rebated at the horizontal control joint (if that option is chosen), at apron roof junctions and at joinery jambs, all as shown in the details in this Design & Installation Guide. No other shaping, rebating or grooving is permissible.

Comment: *Shaping, rebating or grooving of the panel face except as detailed is not permissible as the reinforcing cover and panel strength could be compromised.*

Vertical Section through typical window
Detail No SPC 4-1



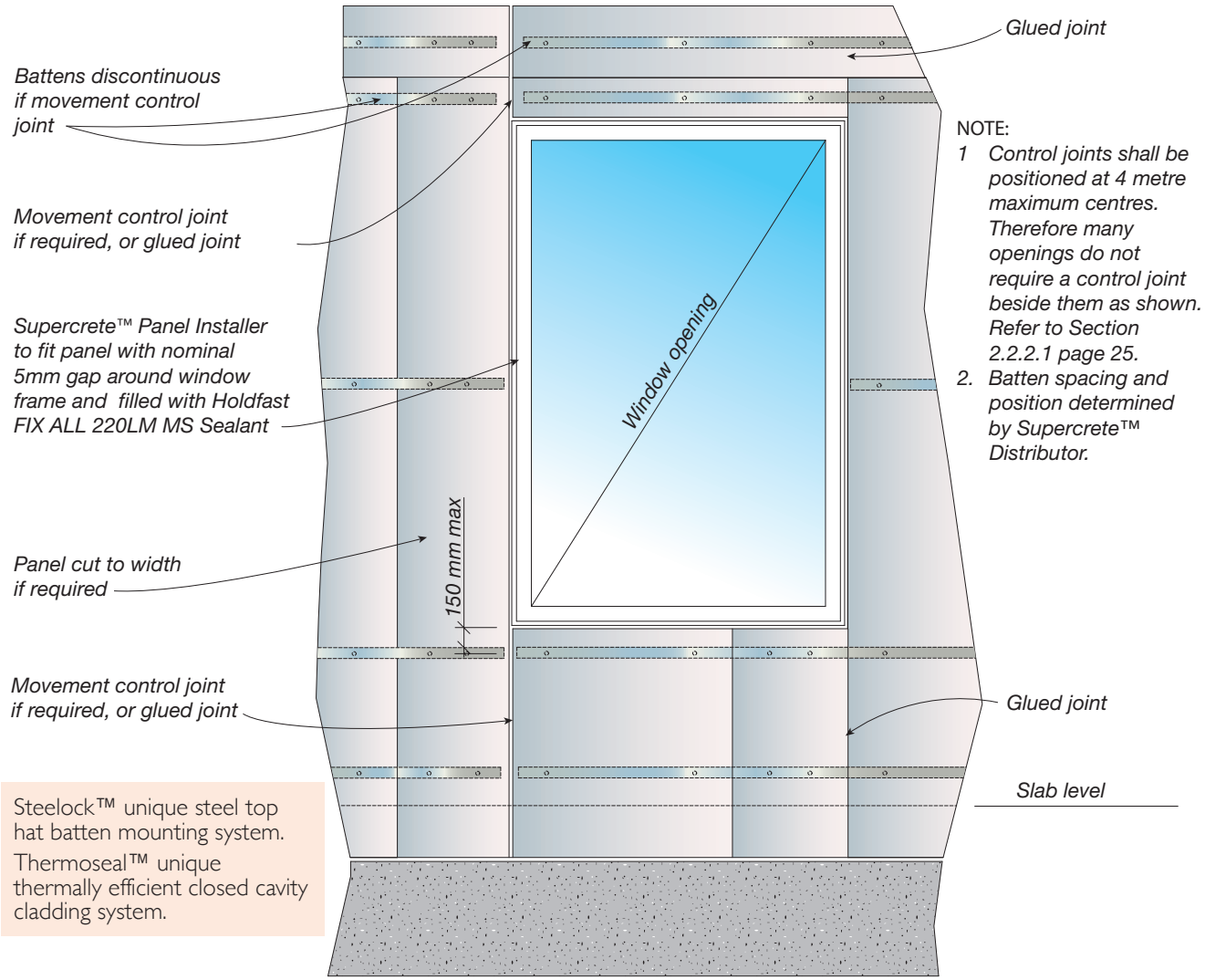
Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.



Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Window sill section

Typical panel arrangement around opening
Detail No SPC 1-6



NOTE:
1 Control joints shall be positioned at 4 metre maximum centres. Therefore many openings do not require a control joint beside them as shown. Refer to Section 2.2.2.1 page 25.
2. Batten spacing and position determined by Supercrete™ Distributor.

Steelock™ unique steel top hat batten mounting system.
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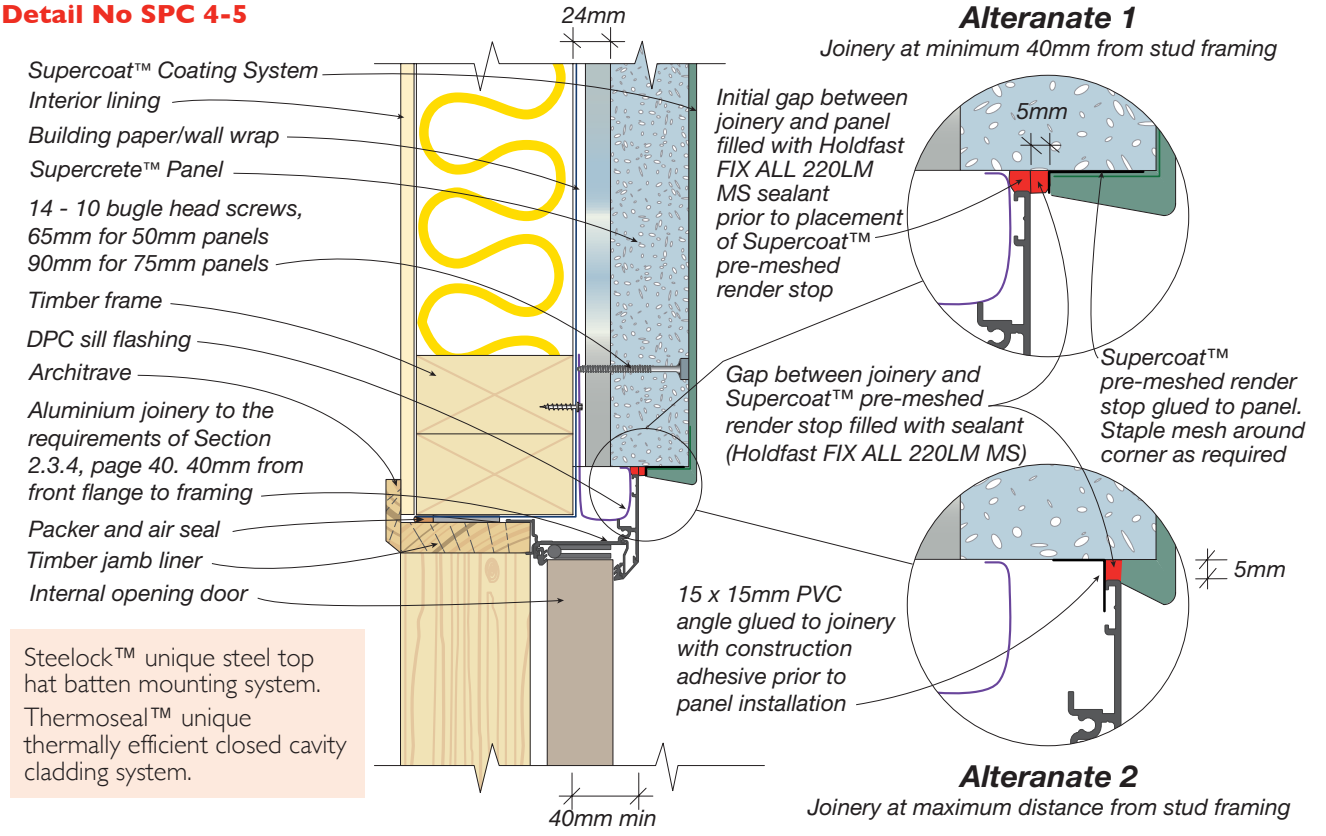
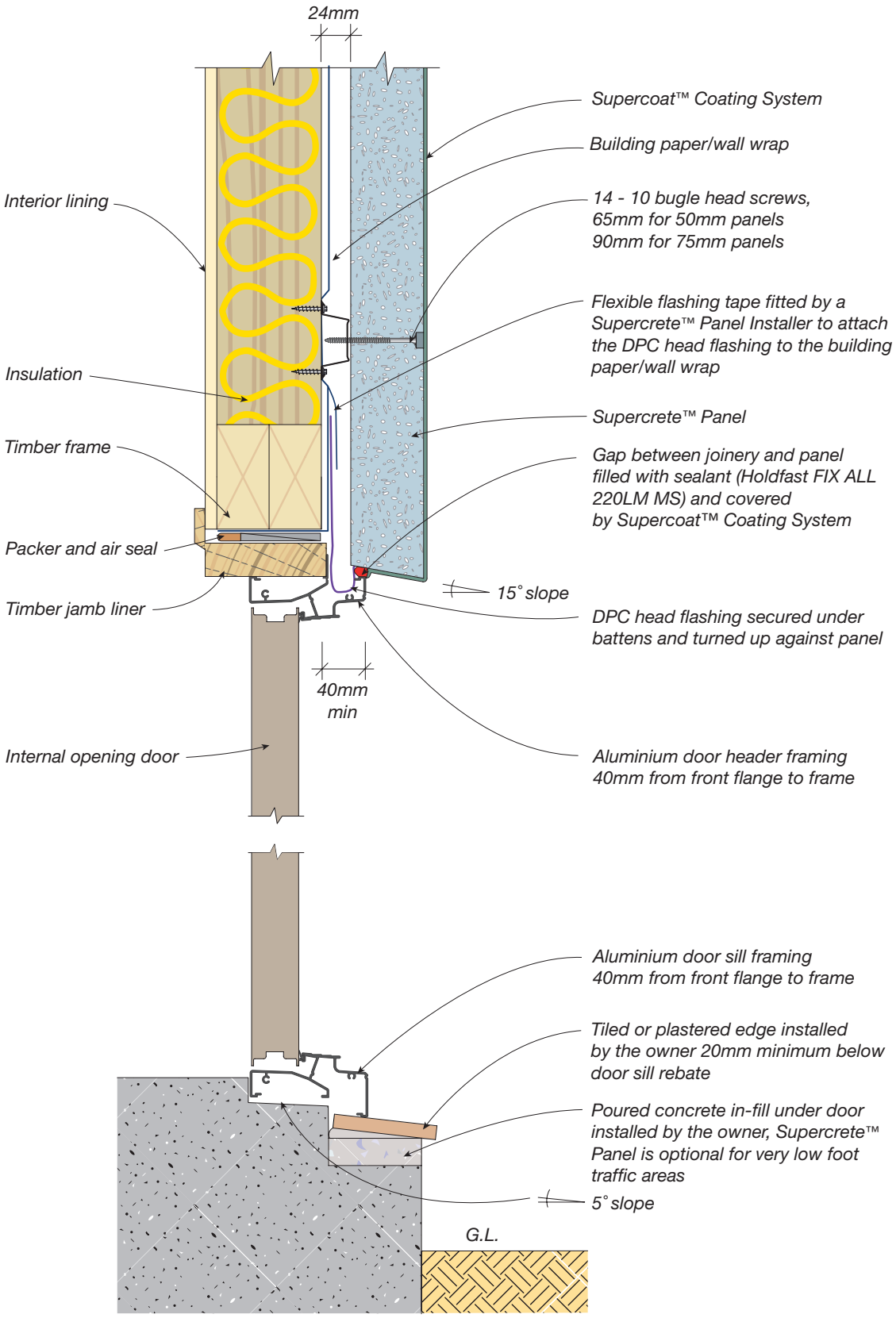
Door jamb detail- plan view (window jamb similar)
Detail No SPC 4-5



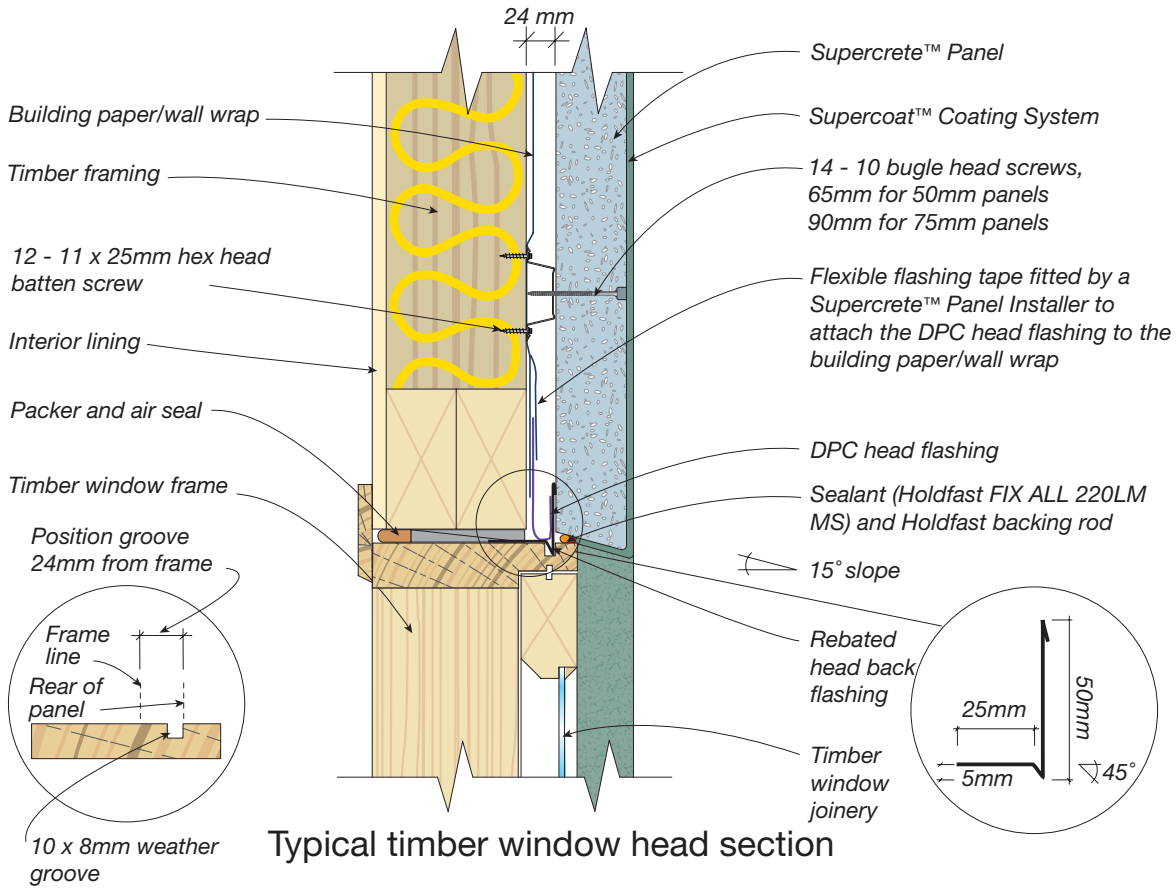
Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Vertical section through aluminium door
Detail No SPC 4-4

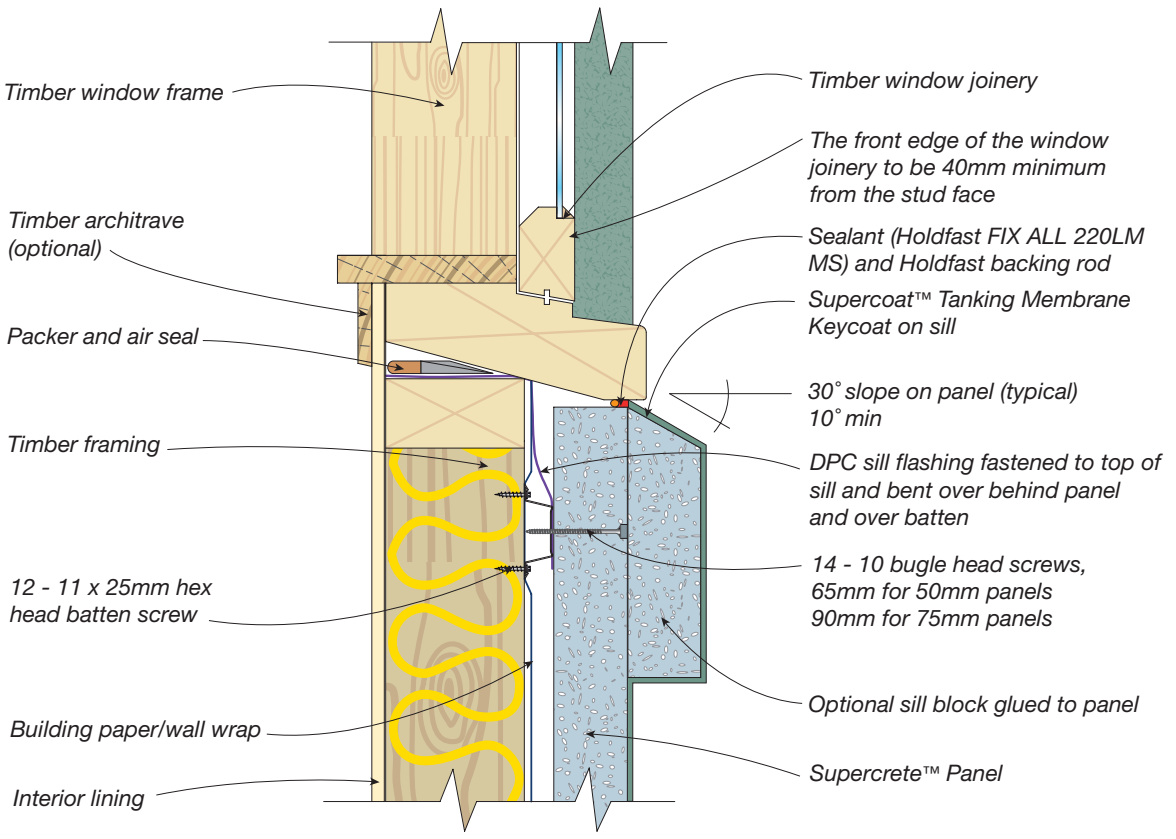


Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Vertical section through timber window
Detail No SPC 4-7



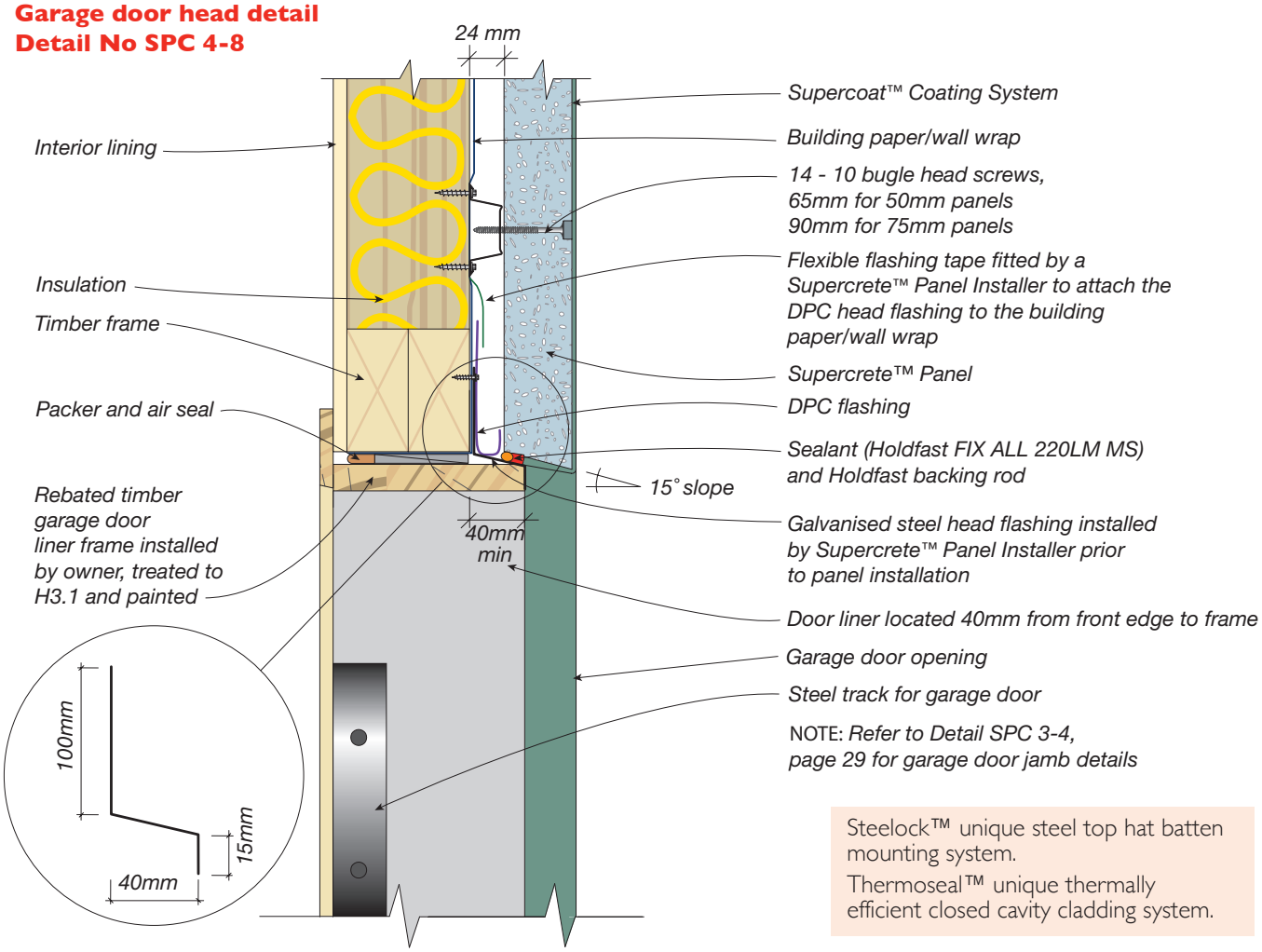
Typical timber window head section



Typical timber window sill section

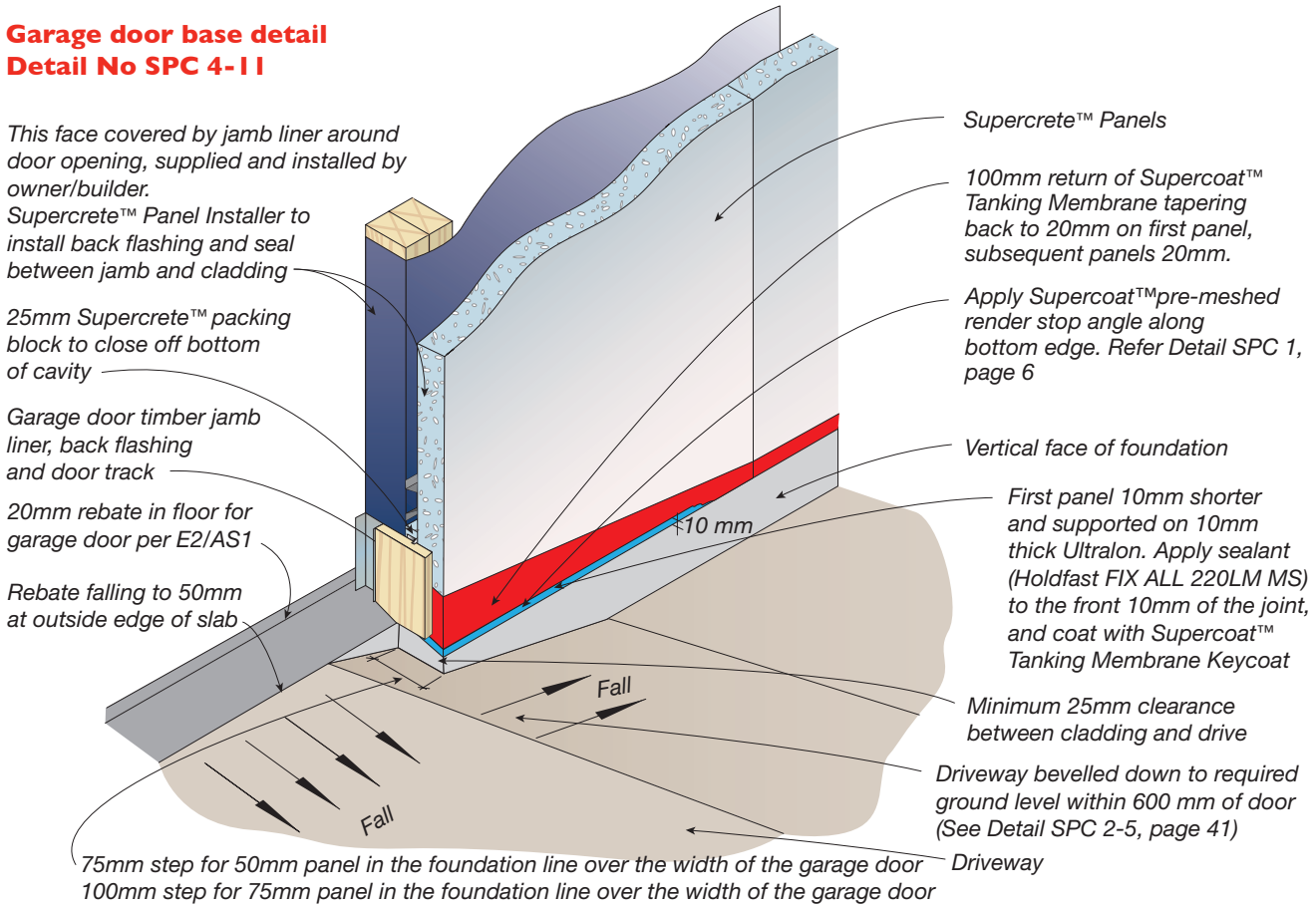
Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Garage door head detail
Detail No SPC 4-8



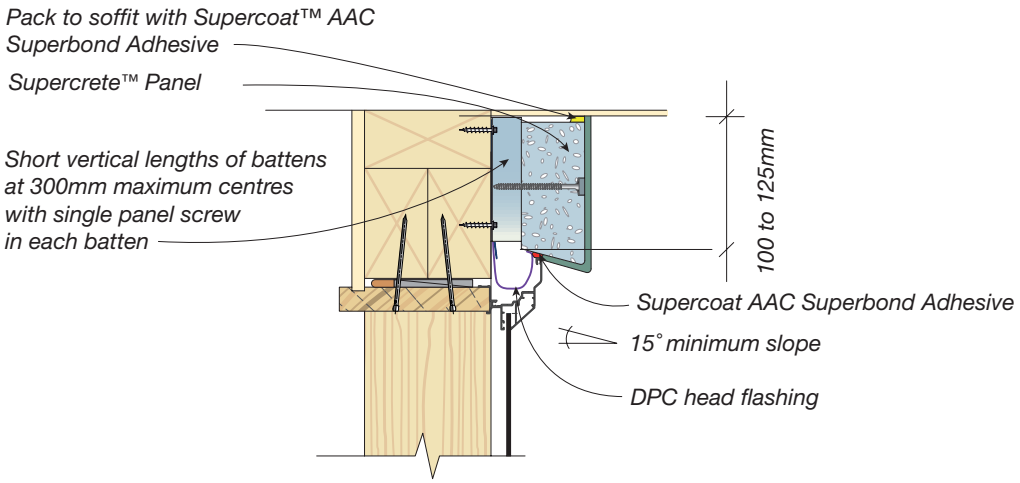
Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Garage door base detail
Detail No SPC 4-11

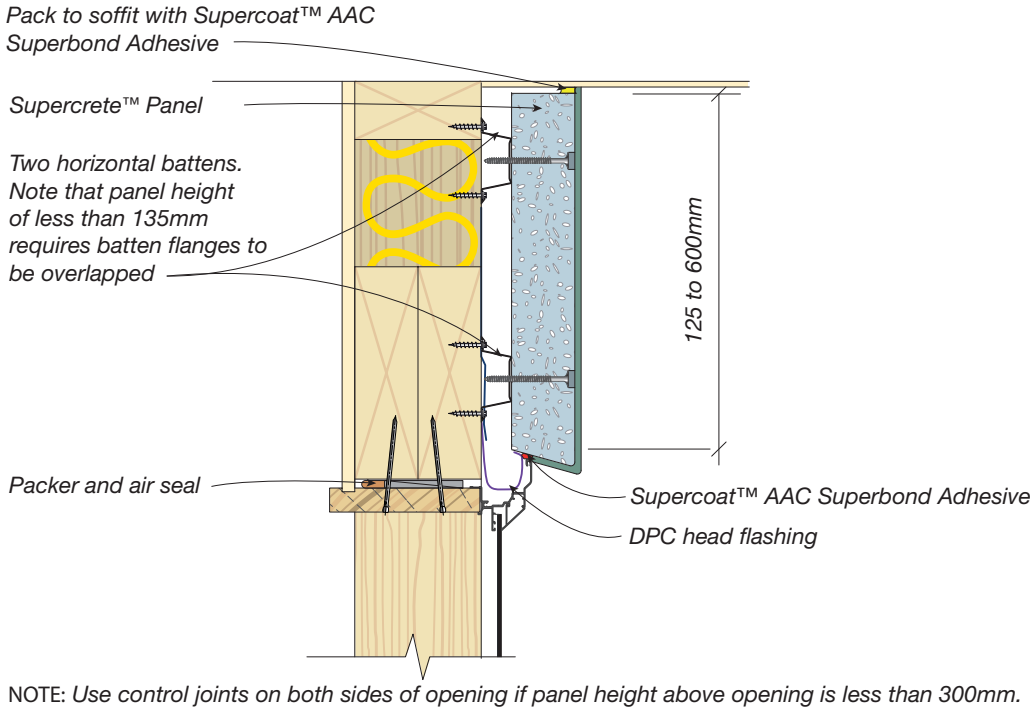


NOTE: *The requirement to have a 75mm step in the concrete along with an Ultralon™ EVA 60 backed, sealed base joint for the panel either side of the garage door, as shown above, is only for situations where the panel sits in a rebate (ie Detail SPC 2-5, page 41) and is not required where the Supercrete™ Panel runs past the slab edge and sits on a base angle (ie Detail SPC 2-4, page 39)*

Fastening of narrow height panels above openings
Detail No SPC 4-10



NOTE: *Panel heights of less than 125mm are not recommended, as they are prone to breakage. This detail is only for where the designer has been unable to avoid a small strip of panel being used. Mesh will be required in the Supercoat™ Plaster System to help maintain the integrity.*



NOTE: *Use control joints on both sides of opening if panel height above opening is less than 300mm.*

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

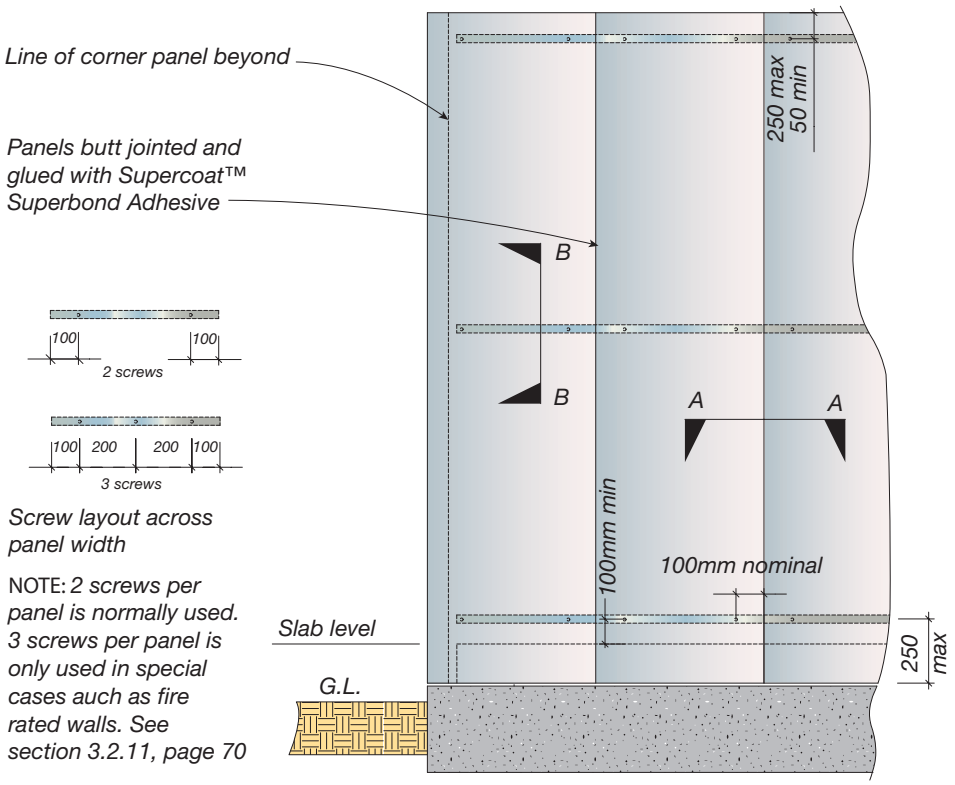
2.3.12 Roof and Soffit Junctions

The batten space must be closed off from the soffit or roof space at the top of all walls, as shown in Details **SPC 5-1** to **SPC 5-4** pages 51-53.

Where the Supercrete™ Panel finishes above a roof surface an apron flashing as detailed on **SPC 5-6**, page 55 must be provided. At these locations a base angle will be provided to close off the batten space.

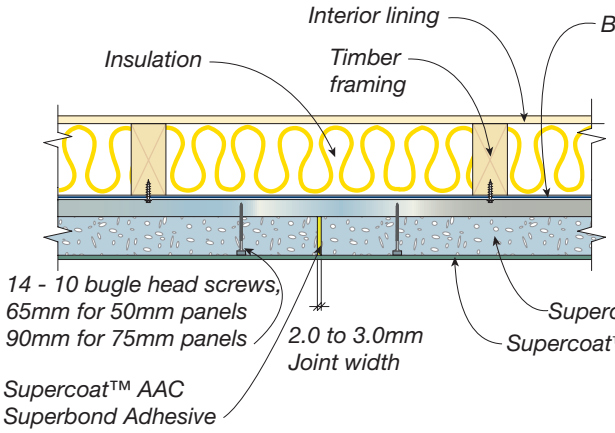
Where a spouting finishes against Supercrete™ Panel, which continues over the roof with an apron flashing, a sealed stop end shall be provided by the owner on the apron flashing as shown in Detail **SPC 5-11,** page 53 to direct water out to the spouting away from the face of the panel.

Panel fixing details
Detail No SPC 1-7

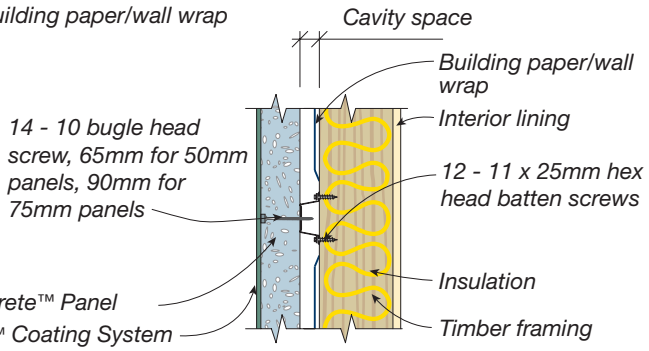


Panel Fixing Details

NOTE: *Batten spacing and screw fixing spacing is determined by the Supercrete™ Distributor.*



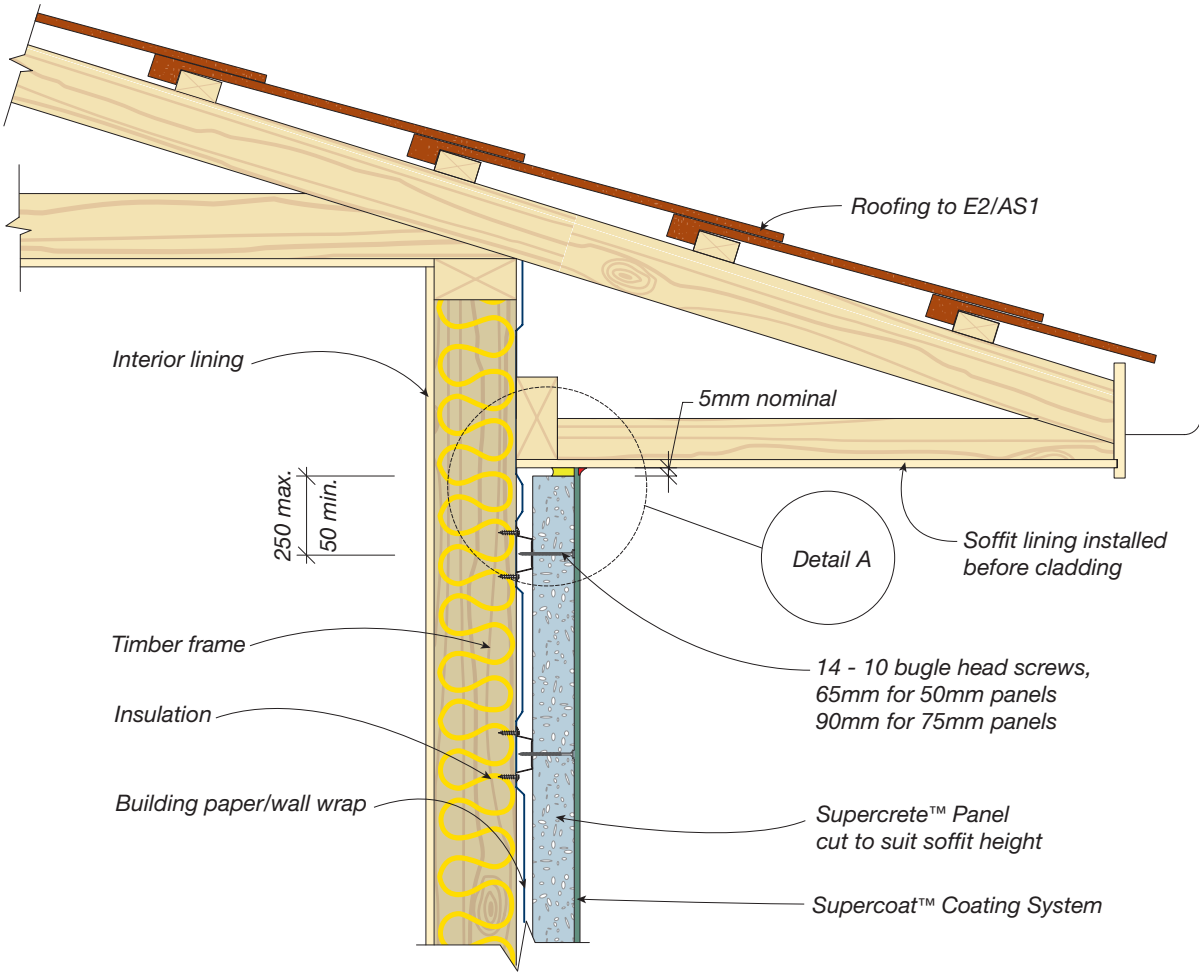
Section AA
Horizontal View of Wall



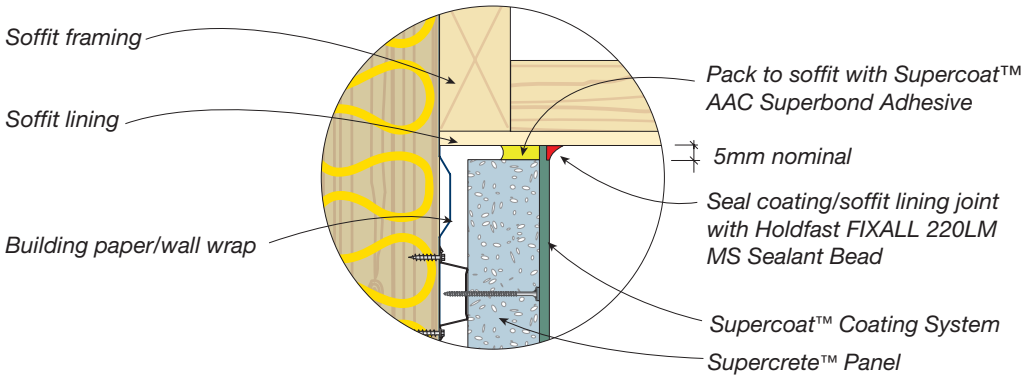
Section BB
Vertical View of Wall

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Supercrete™ panel to typical eave/soffit junction
Detail No SPC 5-1



Supercrete™ Panel to eave/soffit junction

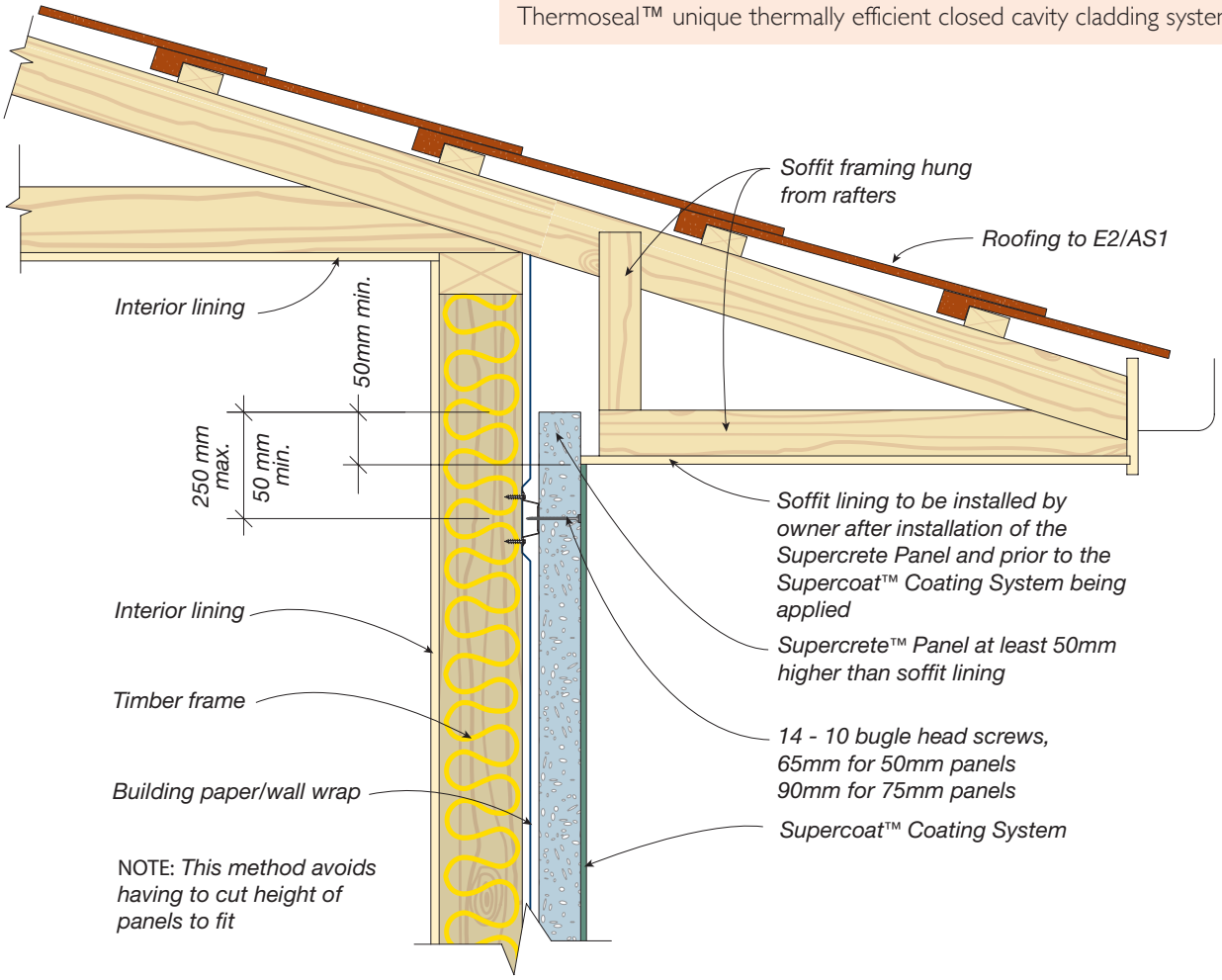


Detail A

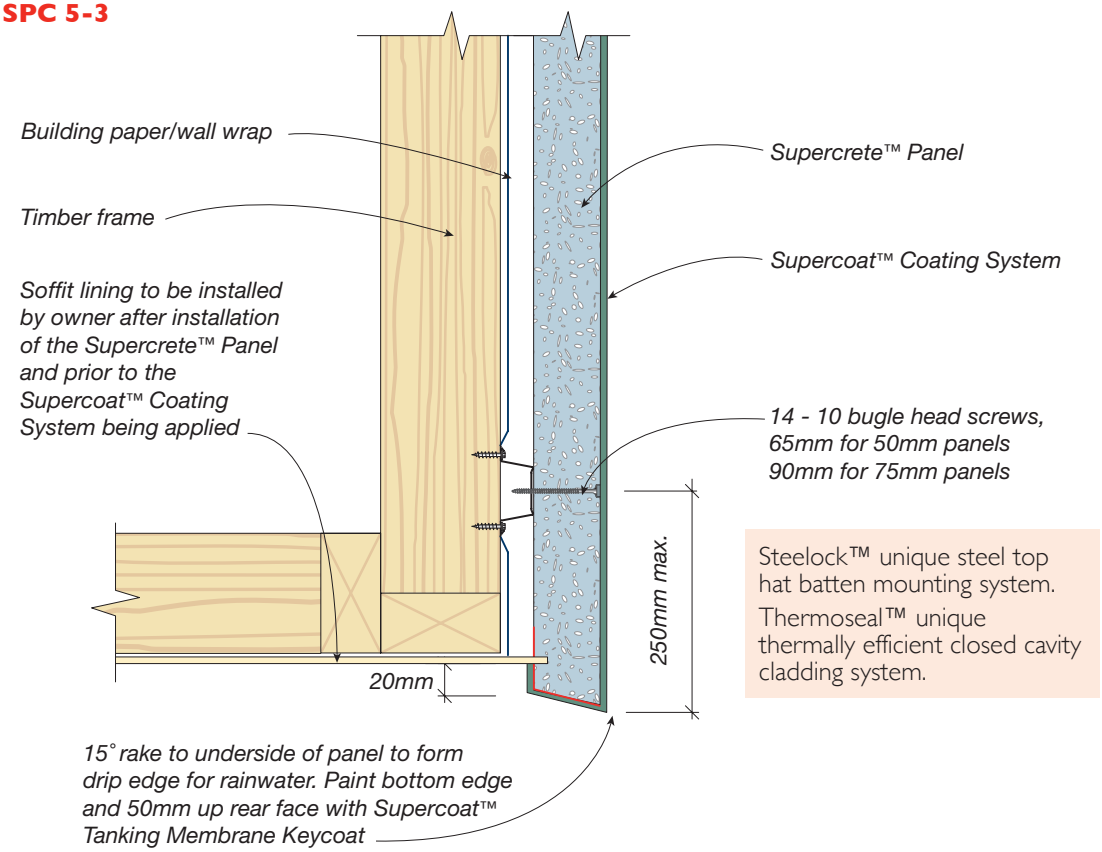
Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Alternative Supercrete™ panel to typical eave/soffit junction
Detail No SPC 5-2

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

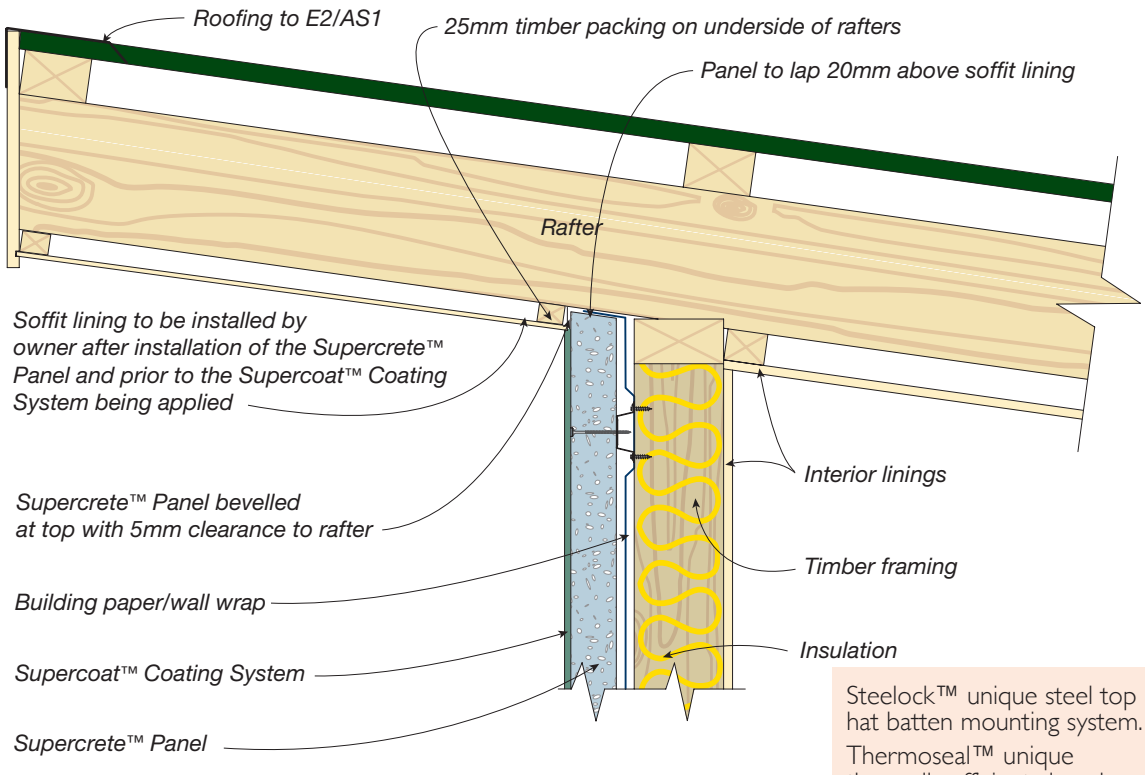


Supercrete™ panel to outside soffit detail
Detail No SPC 5-3



Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

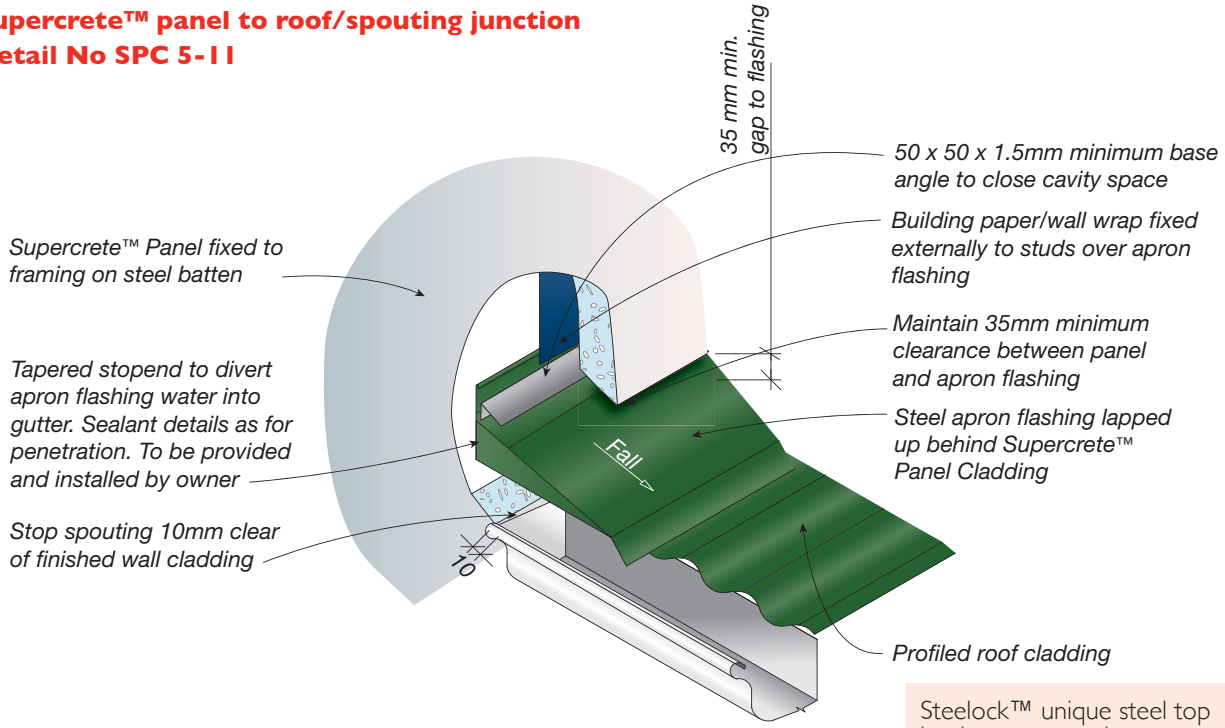
Mono-slope roof soffit
Detail No SPC 5-4



Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Panel installed first

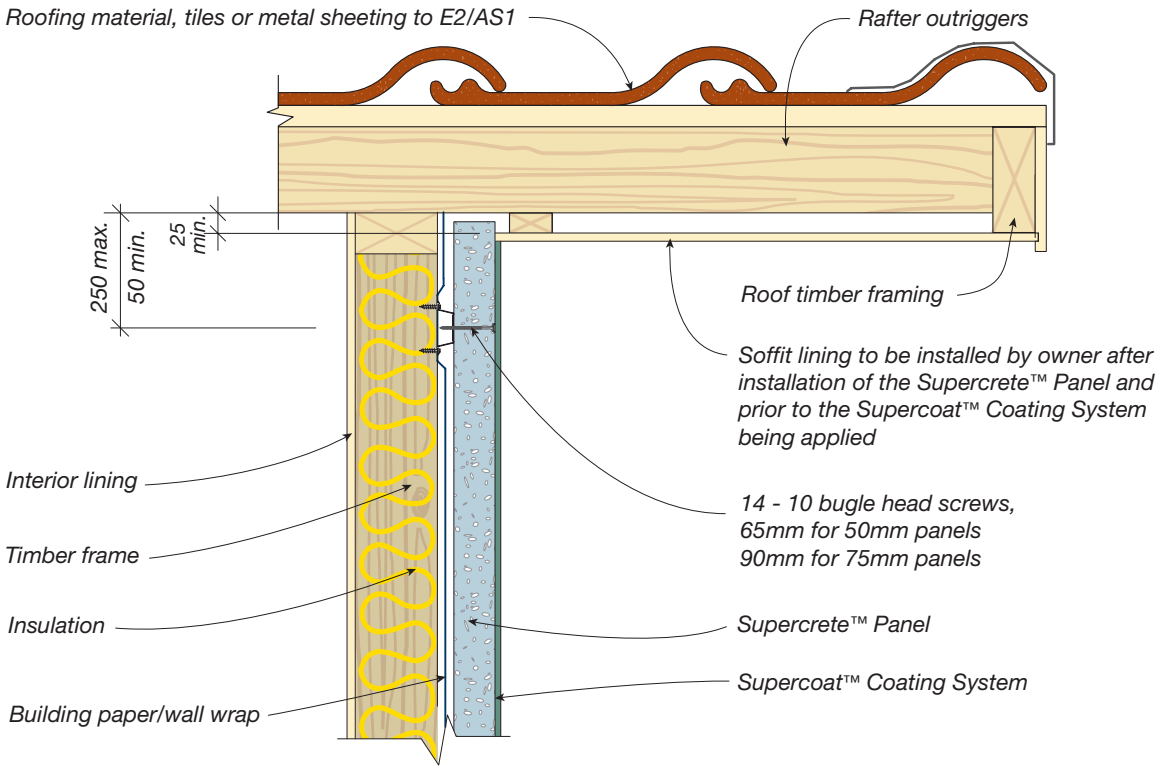
Supercrete™ panel to roof/spouting junction
Detail No SPC 5-11



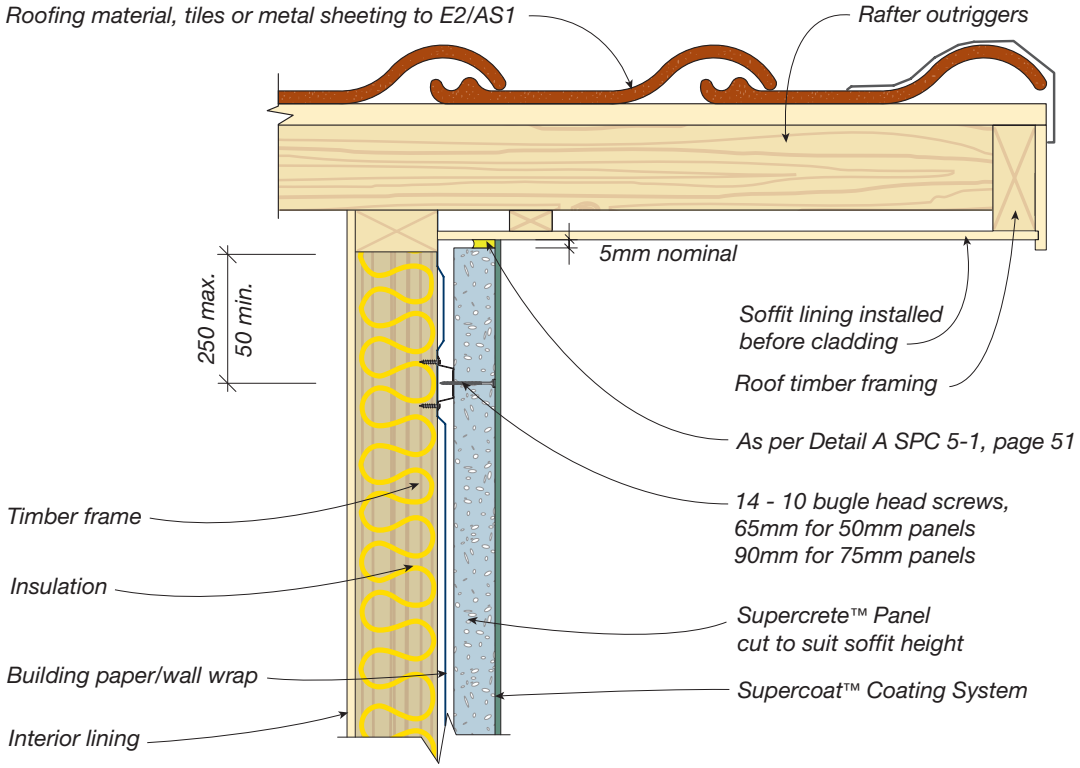
Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

NOTE: *Spouting to stop 10mm clear of the coated Supercrete™ Panel. Spouting shall be left off until the Supercrete™ Panel has been coated.*

Verge overhangs
Detail No SPC 5-12



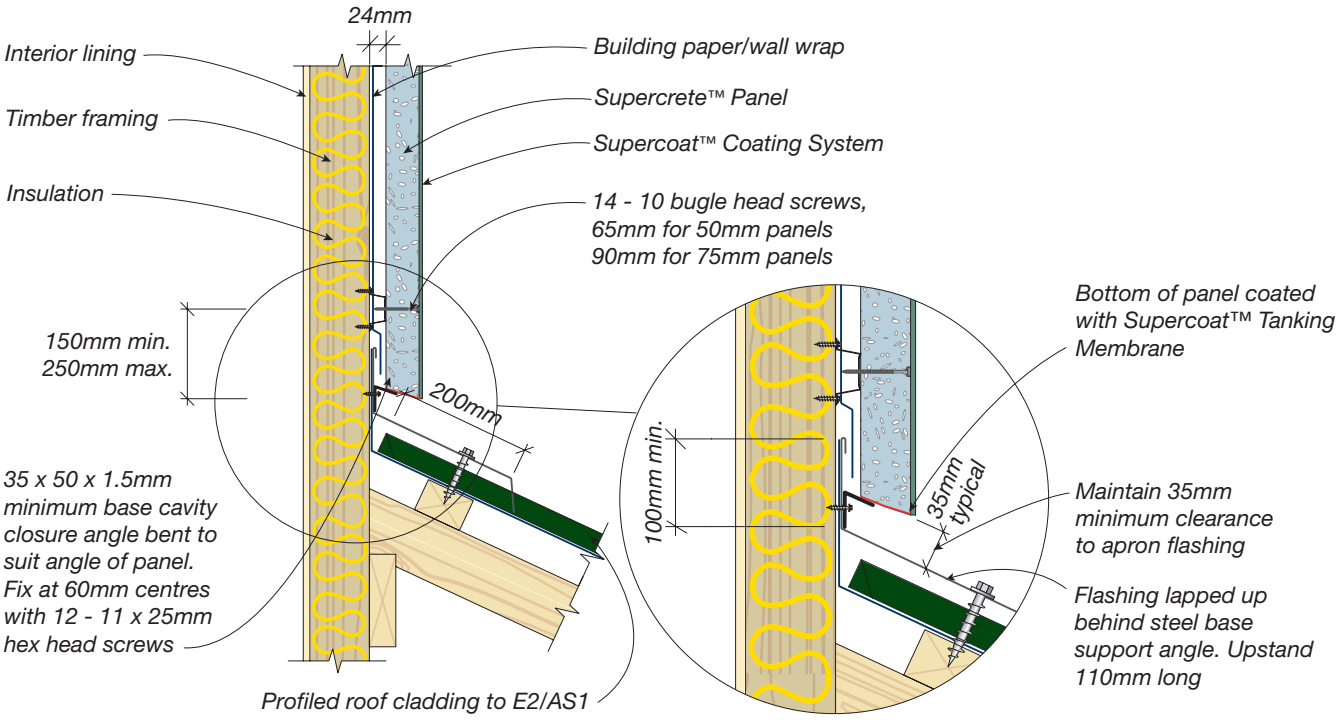
Verge Overhang - Soffit installed after panel



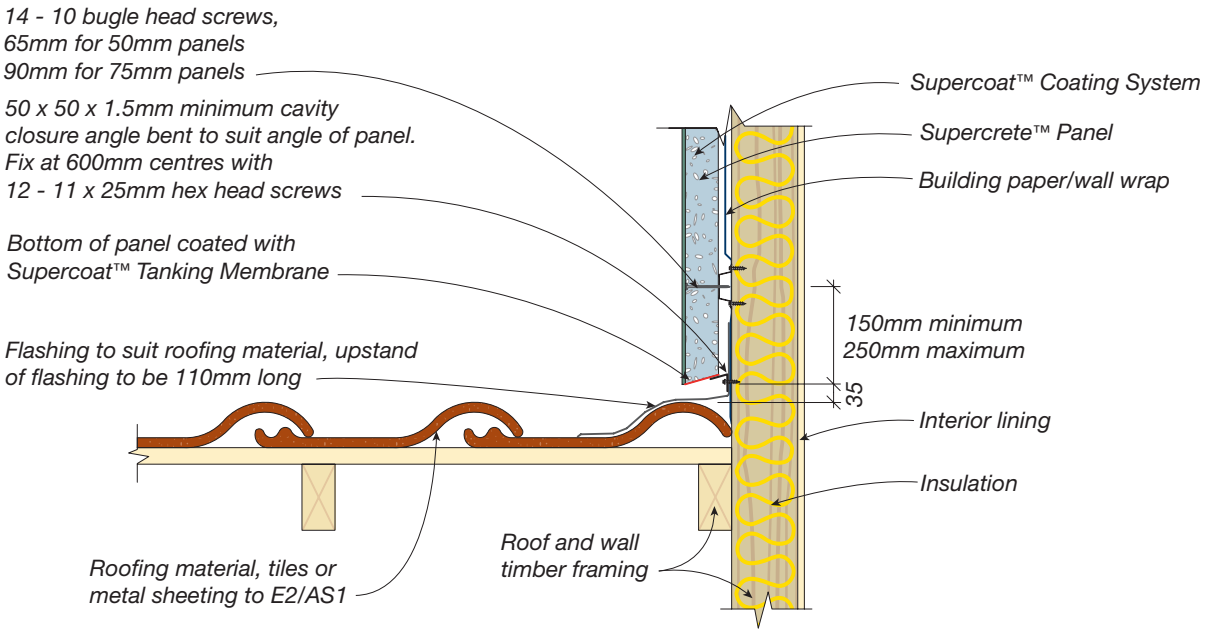
Verge Overhang - Soffit installed before panel

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Roof apron flashings
Detail No SPC 5-6



Apron panel wall to roof junction - perpendicular to roof slope



Apron panel wall to roof junction - parallel with roof slope

NOTE: *Base angle to temporarily support panel and to close batten space.*

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

2.4 Retrofitting

2.4.1 Introduction

Retrofitting, or the re-cladding of existing buildings, is a simple way of improving the exterior appearance of a building, while also improving its thermal and acoustic performance. In some cases it is not even necessary to remove the old cladding (e.g. rusticated weatherboard). If installation of insulation into a wall framing space is also carried out at the same time as re-cladding, this can be done via holes cut into the existing cladding, prior to fixing the building paper/wall wrap over the existing cladding (if no building paper/wall wrap exists then fix building paper/wall wrap over existing cladding). All buildings must have building paper/wall wrap applied prior to the battens being installed.

The panels may be supported by either the normal 23.5 or 35mm battens or by our 60, 100 or 120mm tophat battens to replicate the depth of the cladding system being replaced.

When using the normal 23.5 and 35mm battens the details contained in the previous sections of this document can generally be used. They can also be used in conjunction with the 60, 100 and 120mm tophat battens with modification to allow for the larger cavity.

2.4.2 Scope of Building Types for Retrofitting

Any timber or metal stud frame building that has a building consent can be re-clad with Supercrete™ 50 or 75mm Panel Systems. The building needs to be assessed by the Building Consent Authority as to its suitability to support a medium weight cladding. The existing framing may have to be modified to meet the requirements of the BCA.

Some older buildings may have framing installed to earlier versions of the building standards whose details differ from the current Building Code requirements.

Details such as lesser or no timber treatment and building paper not returned back into the openings will not affect the performance of our systems.

However, older structures will often require additional framing to bring them up to the current levels of bracing capacity for medium weight claddings.

Table 6. 60, 100 and 120mm Tophat batten Spacing for Supercrete™ Panel Cladding Systems (for Panels with Base Support only)

Panel Height	Wind Zone	Numbers of Battens per panel	Maximum Batten Spacing (mm)
Up to 2400mm	Low	3	1050
	Medium	4	700
	High	4	700
	Very High	5	525
	Extra High	6	420
>2400 - ≤2700	Low	3	1200
	Medium	4	800
	High	5	600
	Very High	6	480
	Extra High	7	400
>2700 - ≤3000	Low	4	900
	Medium	4	900
	High	5	675
	Very High	6	540
	Extra High	7	450

NOTES:

(1) This table is for 60, 100 and 120mm tophats only

(2) The table above can be applied to both 50mm Supercrete™ Panels and 75mm Supercrete™ Panels with base support

(3) This table does not apply to panels without base support

(4) Wind Zones are as specified in NZS 3604:2011

(5) It is assumed the battens are to be fixed to timber or metal studs at 600mm centres

(6) The first and last battens are 150mm from the ends of the Supercrete™ Panel

(7) The battens have been considered to span over a minimum of 2 continuous spans

(8) There is no restriction for Seismic Zone 1. Low wind and Medium Wind shall not be used in Seismic Zones 2 and 3. Extra High Wind shall be used in Seismic Zone 4

(9) When used in retrofitting of Supercrete™ Panel Cladding in place of existing veneer cladding the existing building frame is to be verified as complying with the NZ Building Code and, where applicable, NZS 3604:2011

2.4.3 Base Support for Retrofit Cladding

2.4.3.1 Standard 23.5mm Battens

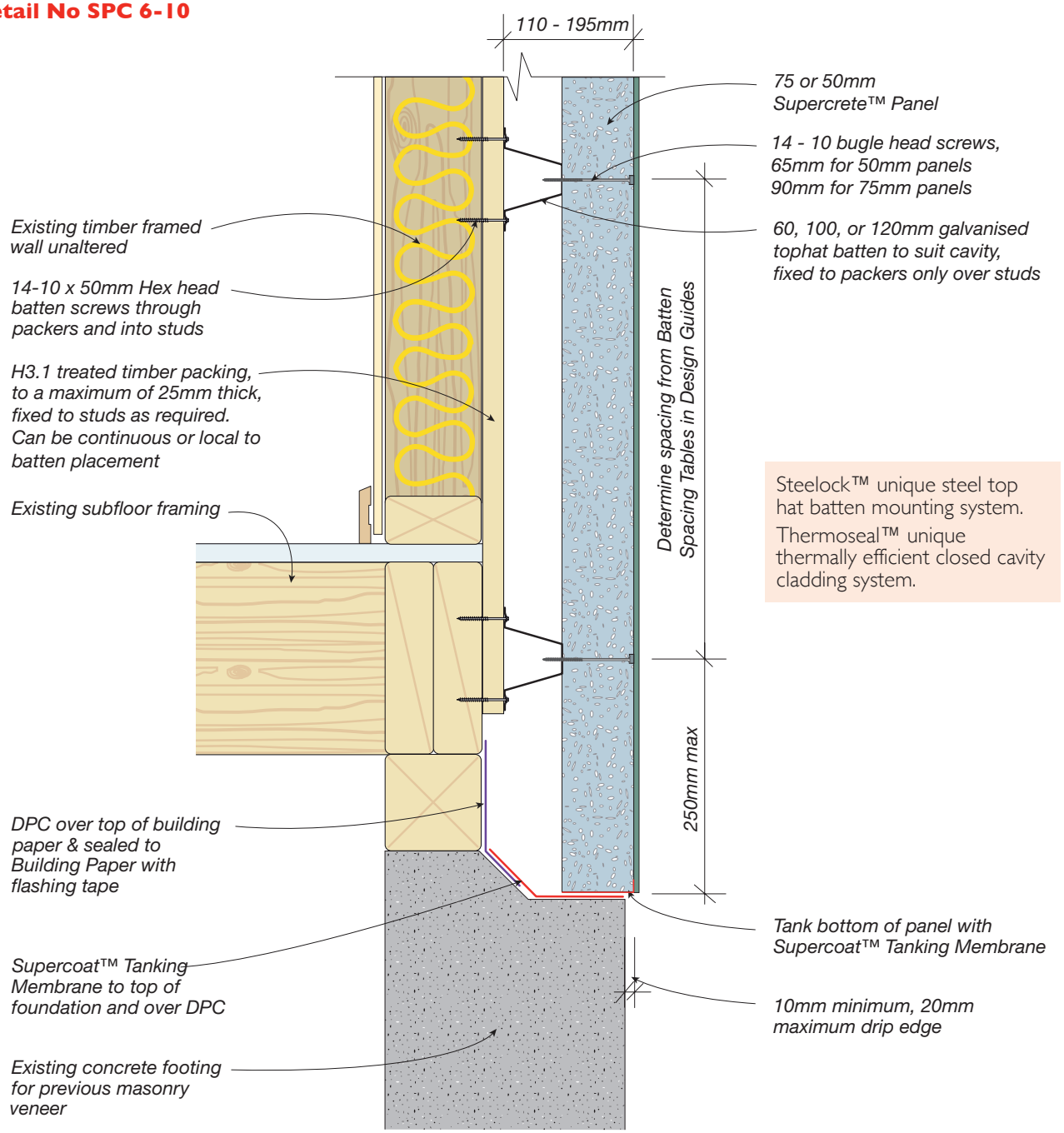
Often there will be an existing rebate in the foundation or perimeter foundation wall for the previous cladding. This may be used for the new cladding and lined with Supercoat™ Tanking Membrane and DPC as for the standard rebated foundation detail. Where there is no rebate the cavity is to be closed off at the bottom by a closure angle and the batten spacing adjusted by the Supercrete™ Distributor to suit the panels without base support.

2.4.3.2 60, 100 & 120mm Tophat Battens

When using these types of battens the bottom of the panel must be supported to take the weight of the panel. This can be either by the existing rebate in the foundation or by a galvanised angle sized by the project engineer.

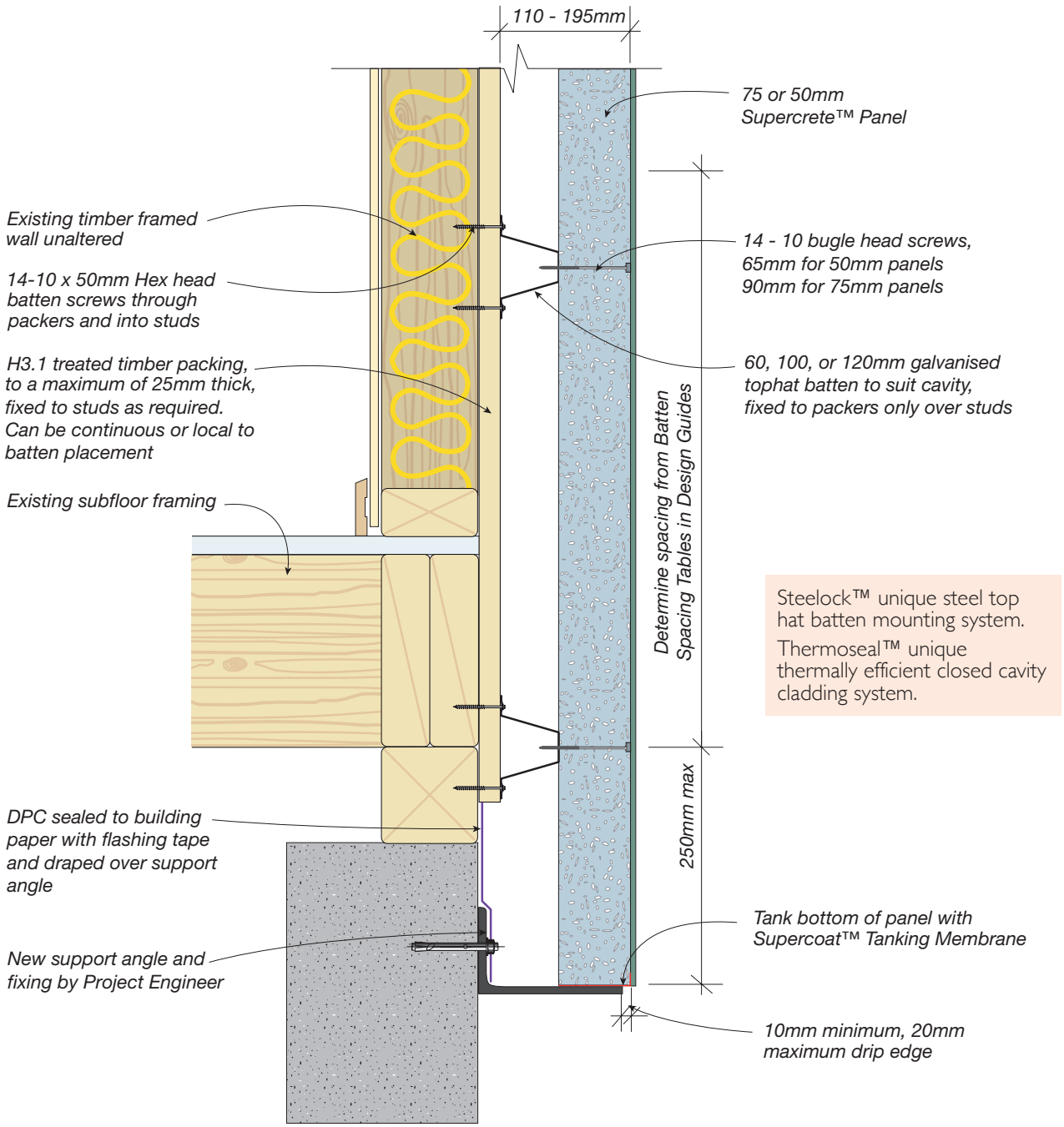
Refer Details **SPC 6-10** below or **SPC 6-11** on page 58.

Tophat Batten Retrofit Rebated Foundation
Detail No SPC 6-10



Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Tophat Batten Retrofit Foundation with Support Angle
Detail No SPC 6-11



Steelock™ unique steel top hat batten mounting system.

Thermoseal™ unique thermally efficient closed cavity cladding system.

2.4.4 Openings in existing buildings

Depending on the original cladding, the face of the joinery may not cover the new cavity sufficiently to close the cavity and give a good landing on the panel to effect a seal between the joinery and the panel. To enable a good seal to be created and to remove the need to alter or replace the windows or doors, a return segment of Supercrete™ panel can be installed around the opening.

If the existing window or door joinery will not be at least 15mm past the back face of the panel when it is installed, then it will be necessary to put a Supercrete™ Panel return around the openings to close off the cavity space and provide a surface sufficient to seal the window and door joinery to.

This is most easily done by stopping the battens and panels 60mm short of the window outer flanges and then gluing Supercrete™ 50 segment on the edges of the panel. If it is more convenient, Supercrete 75mm panel can be used and the battens stopped 85mm short.

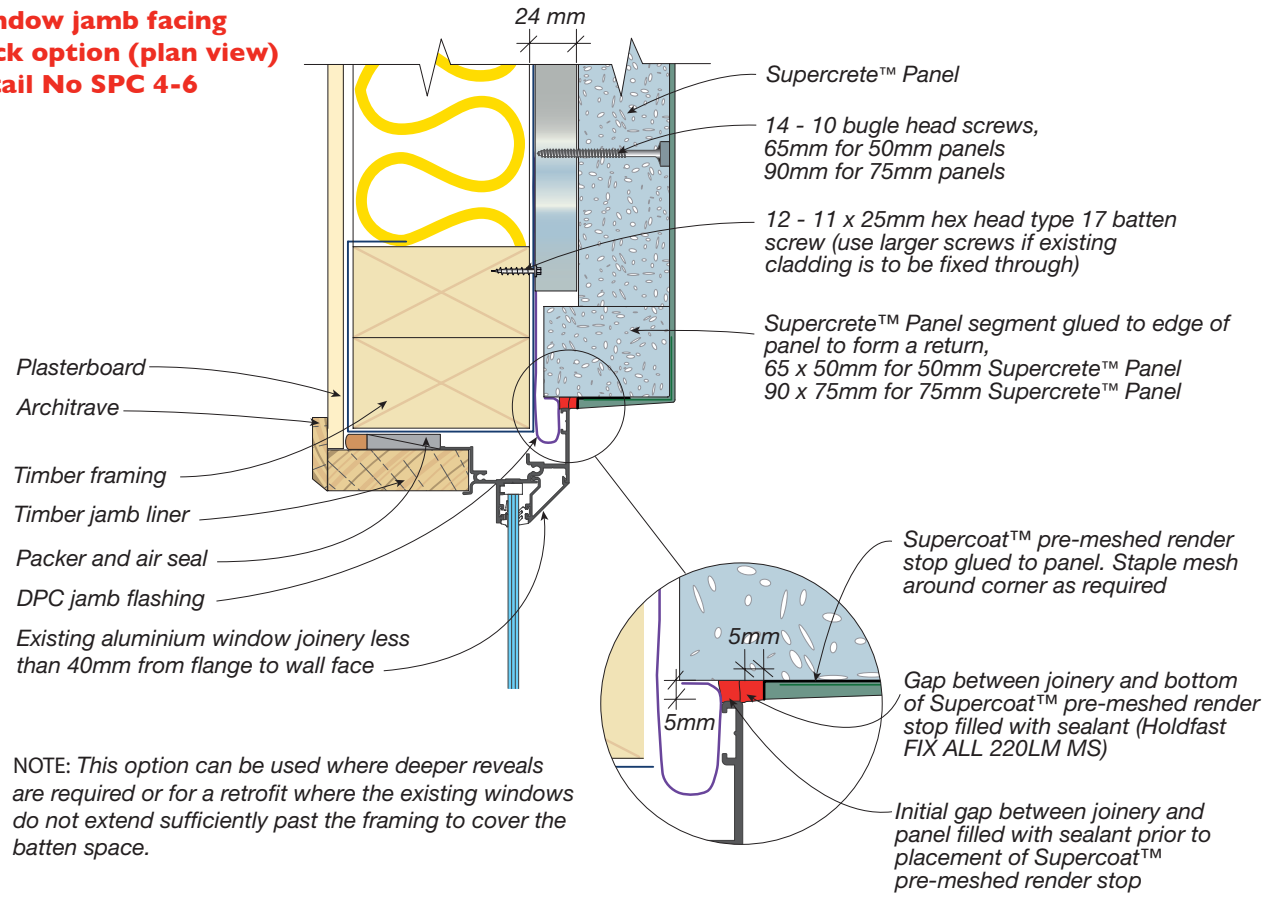
These segments can be made by cutting standard panel into strips that, when installed, will extend from the front face of the cladding surface back to a minimum of 10mm from the face of the timber framing thus closing off the batten space. See Detail SPC 4-6, below.

2.4.5 Horizontal Control Joints

Where one frame is located above another (such as an upper level wall frame over a ground floor frame) there is created a plane of differential movement between the two frames. To express this movement a flexible, horizontal control joint is installed along the line separating the two frames.

When using the 60, 100 and 120mm Tophat battens the upper panels need to be supported independent of the lower panels since the control joint does not have the strength to transfer the upper panel weights to the lower panels. Refer Detail **SPC 6-12** on page 60.

Window jamb facing block option (plan view) Detail No SPC 4-6

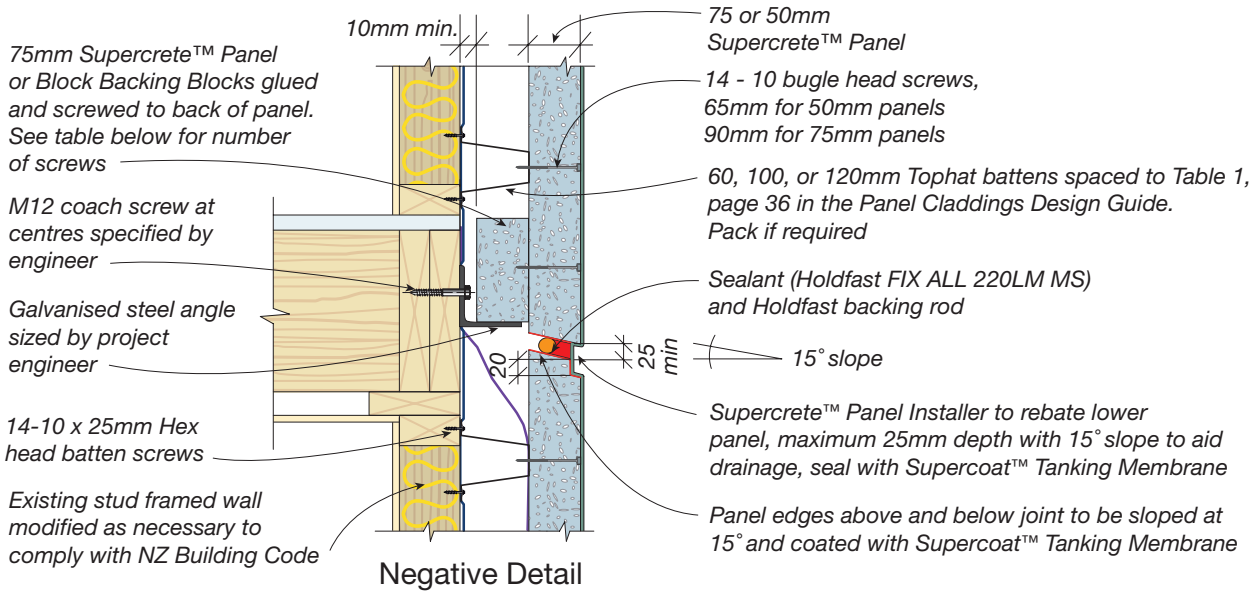


NOTE: *This option can be used where deeper reveals are required or for a retrofit where the existing windows do not extend sufficiently past the framing to cover the batten space.*

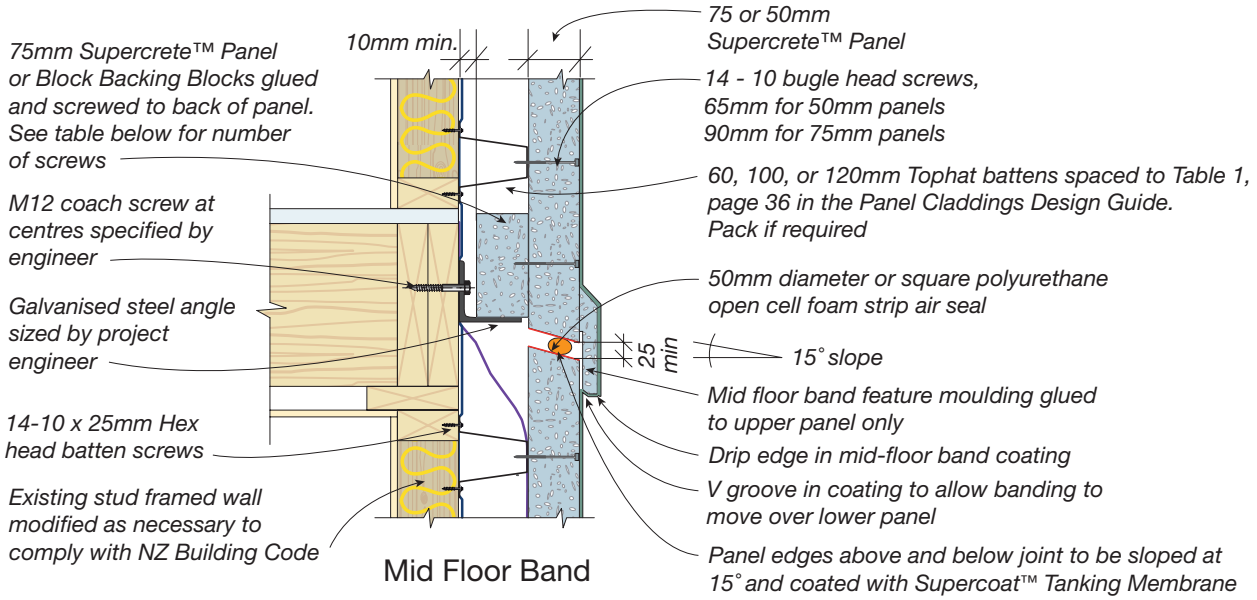
Steelock™ unique steel top hat batten mounting system.

Thermoseal™ unique thermally efficient closed cavity cladding system.

Tophat Batten Retrofit Mid-floor Control Joints
Detail No SPC 6-12



Negative Detail



Mid Floor Band

Table 7. Number of screws per panel for backing block

Length of upper panel	50mm Panel	75mm Panel
2200	2	N/A
2400	2	3
2700	N/A	4
3000	N/A	4

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

3. Additional Design Information

3.1 Scope

The following section describes system features, methodologies and surface treatments which require specific detailing or design consideration because either they fall outside the scope of NZS 3604 or they have features that may vary depending on the building components selected.

The following details or solutions offered for specific design situations are for typical application and are suggestions only. The Designer must satisfy themselves as to suitability for their specific project and what is detailed satisfies the building science of the closed cavity system to comply with relevant sections of the NZ Building Code.

3.2 Architectural Detailing

3.2.1 Mouldings, Corbels and Decorative Features

Where ornate architectural features are desired, these can be easily formed from Supercrete™ Panel or Block using any power or hand woodworking tools, ideally with tungsten tips. Blocks are non-reinforced and can therefore be shaped as desired without interference from steel reinforcing, and can be glued together to form complex shapes.

Any decorative surface treatment which has a lower vapour transmission rate than the Supercrete™ Panel must be limited in its coverage area, to ensure internal moisture vapour is not impeded as it exits the building. As a general recommendation, surface features with little or no breathability should be limited to less than 10% of the wall area, and also considered by the designer in relation to the breathable area for each room covered (e.g. do not concentrate impermeable tiling on the outside of bathrooms or wet areas which may need to vent vapour).

Artificial lightweight "stone" veneer tiles up to 30kg/m2 weight may be tiled on for 75mm Supercrete™ Panels and up to 45kg/m2 for 50mm Supercrete™ Panels to comply with the weight requirements for a medium weight cladding being 80kg as per NZS3604:2011, provided they also have solid base support and do not interfere with the action of control joints.

3.2.2 Balustrades

Panel can be used to form solid balustrades if these are timber framed. However, as with all balustrades, consideration must be given to the lateral support of the structure, and the earthquake restraint required for the panel mass. If panel is required on both sides, the overall thickness will be 250mm and the top can be capped with a 250mm wide panel. The top of all balustrades must have a minimum 5° transverse slope, if capped with a metal flashing or 10° if tanked with liquid applied Supercoat™ Tanking Membrane, see pages 63 & 64.

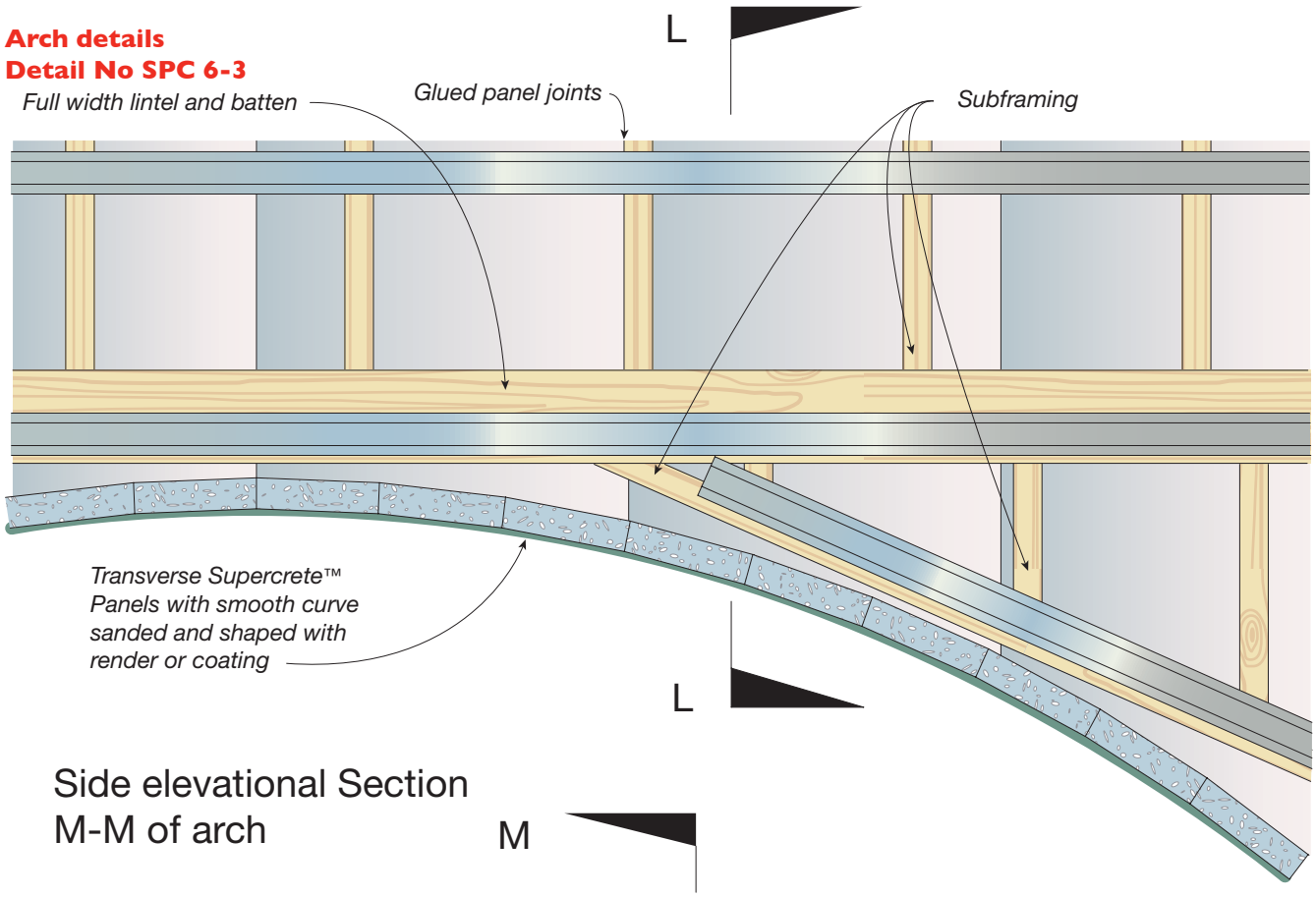
If a thinner balustrade is required, with an alternate cladding on the inside face, the designer must specify the detailing for the alternate cladding so that the Supercrete™ Panel batten space is isolated from the drained and vented cavity of the other cladding.

The top of all balustrades must be waterproofed with Supercoat™ Tanking Membrane - See parapet notes in Section 3.2.4.1 page 63.

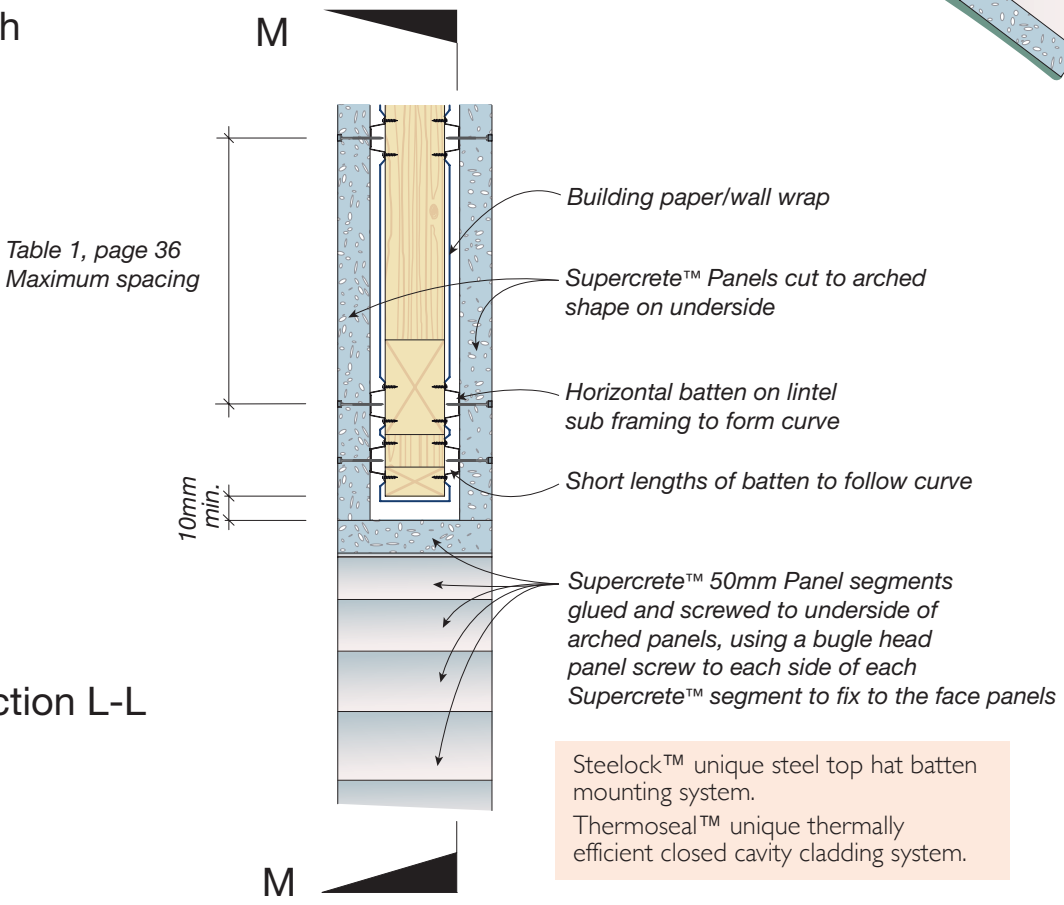
3.2.3 Arches

Arches over windows are formed by cutting the panel to shape. Where arches are required between columns, the curved underside of the arch can be formed by gluing and screwing 200 x 50mm segments of Supercrete™ Panel transversely to the underside of panels forming both sides. Refer to Detail **SPC 6-3**, below.

Arch details
Detail No SPC 6-3



Side elevational Section M-M of arch



Vertical Section L-L

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

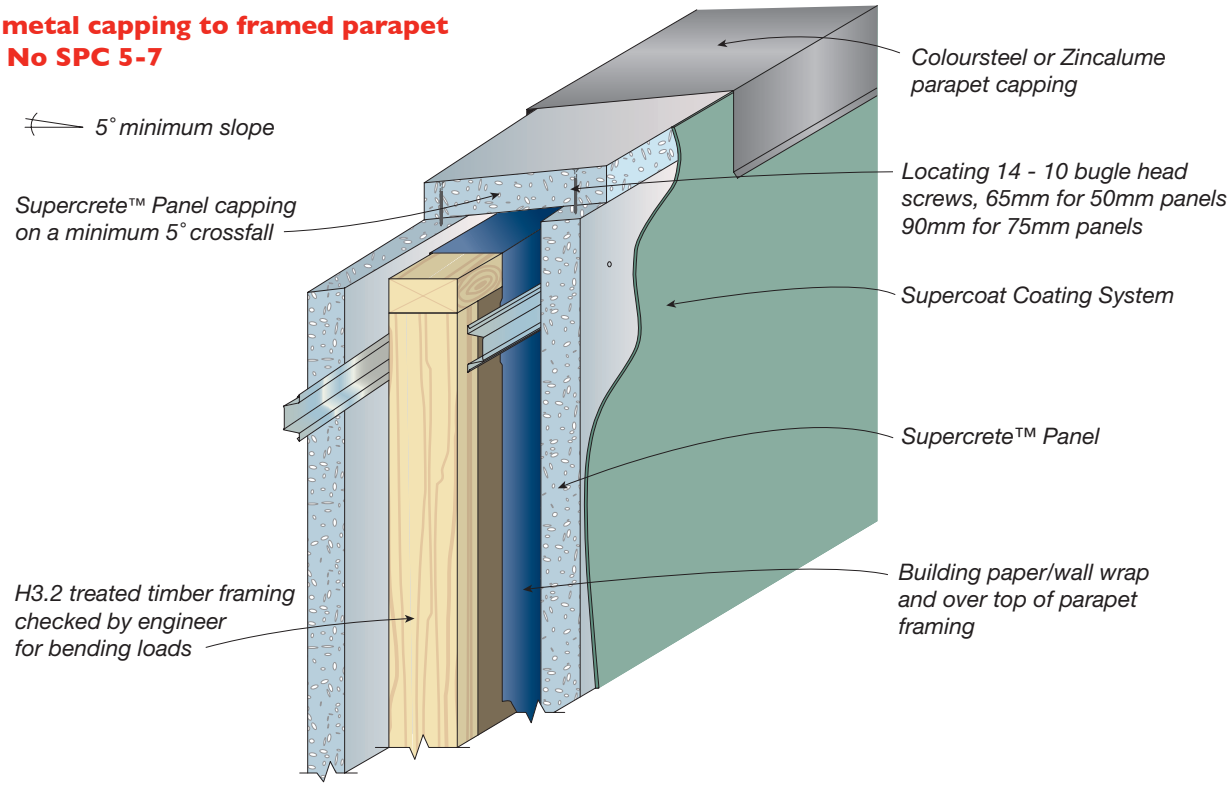
3.2.4 Parapets

3.2.4.1 Fully Framed Parapets

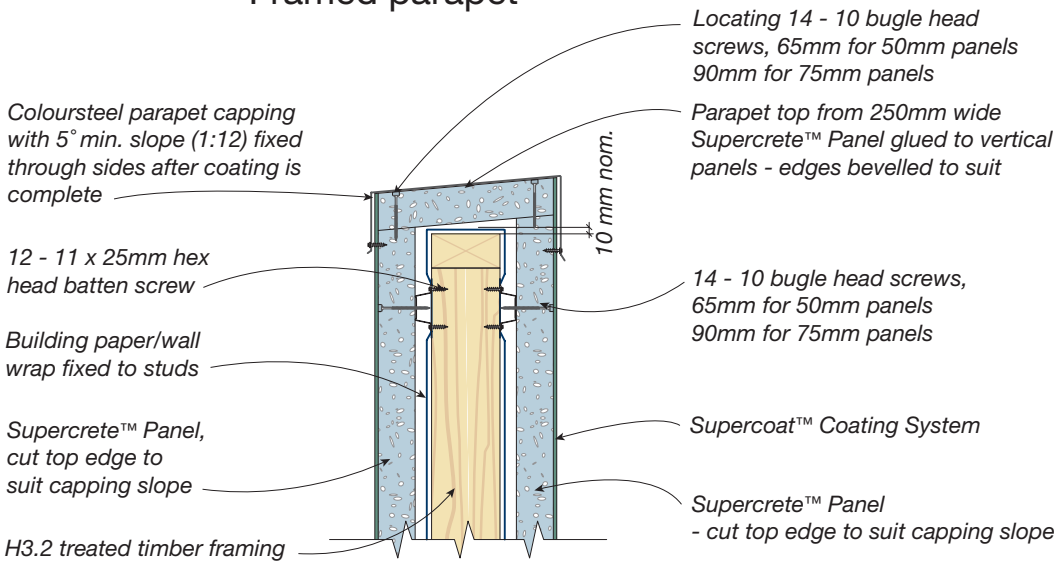
Parapets can be fully framed and panel fixed to both sides. With 100mm nominal timber framing, this will give a parapet thickness of 250mm or 300mm for 50 and 75mm panel respectively and a parapet cap can be formed by simply fixing a 250mm or 300mm wide panel on the top with Supercoat™ AAC Superbond Adhesive and locating screws. Refer to Detail **SPC 5-7**, below.

The maximum height projection of the parapet above the roof line will be governed by framing capacity. In this case, the timber frame must be checked for out of plane bending from wind and earthquake loads by a qualified design engineer and covered by a Producer Statement for the design.

Sheet metal capping to framed parapet
Detail No SPC 5-7



Framed parapet



Framed parapet - sectional view

NOTE: *Metal cap flashing may be replaced with Supercoat™ Tanking Membrane System on top and extending down sides a minimum of 100mm. See Detail SPC 5-8 on following page.*

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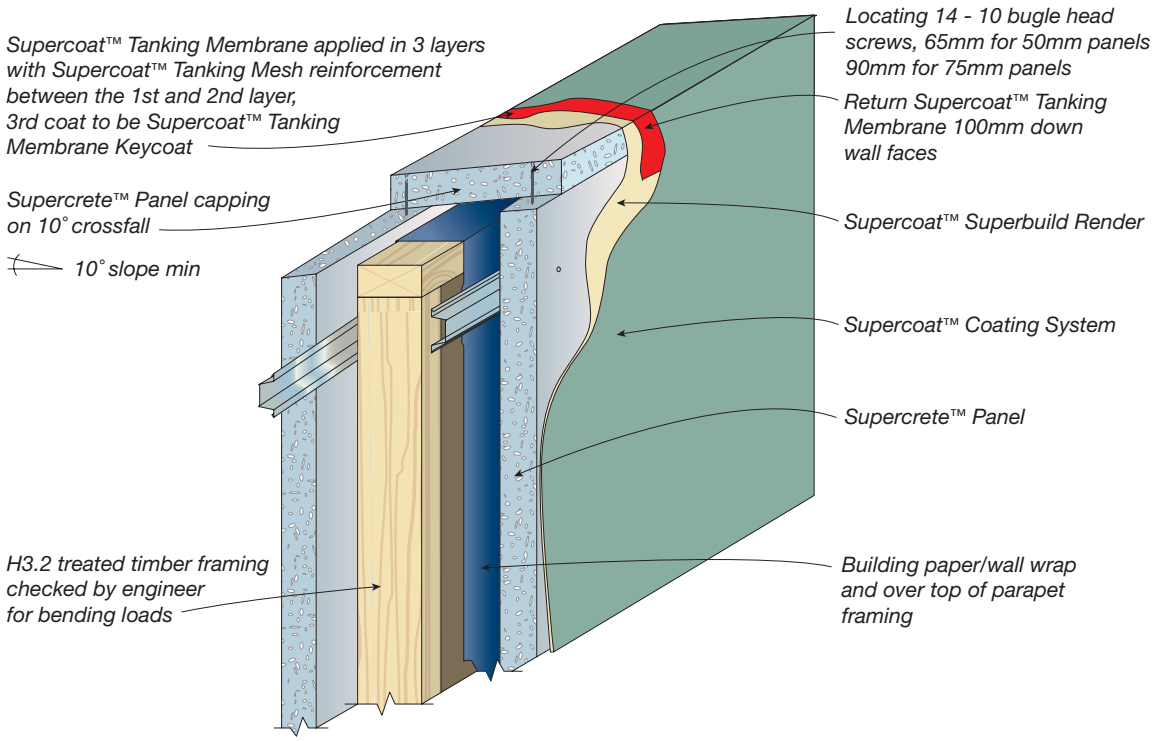
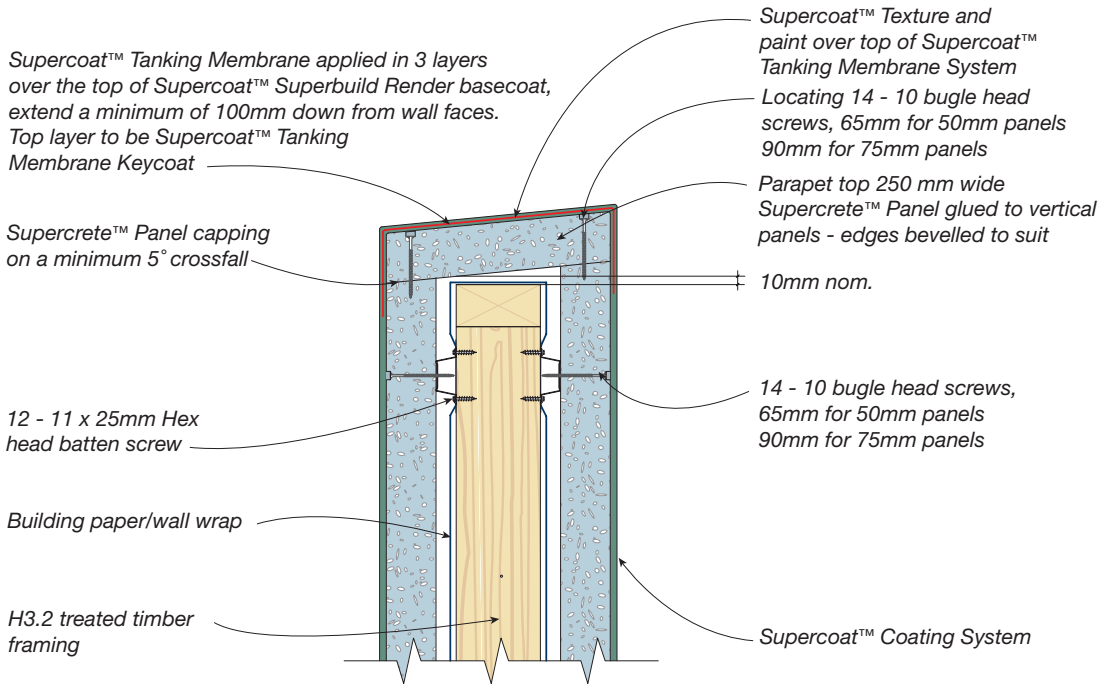
Supercoat™ Tanking Membrane capping to framed parapet
Detail No SPC 5-8



Framed parapet



Framed parapet - sectional view

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Parapets can be formed by extending the wall panels above the roof line with another panel following the roof line, glued to the rear of the projecting panels, to give a 100mm thick cantilevered parapet. Refer to Details **SPC 5-9**, below and **SPC 5-10**, page 66. This cantilever can only be a maximum of 250mm above the top batten, to avoid overstressing the cantilevered panels.

Vertical surfaces of walls must be **WATER RESISTANT-VAPOUR PERMEABLE.**

Top surfaces of parapets and window sills receive higher saturations of rain, dew, snow and frost. They must be considered as roof surfaces, not vertical walls.

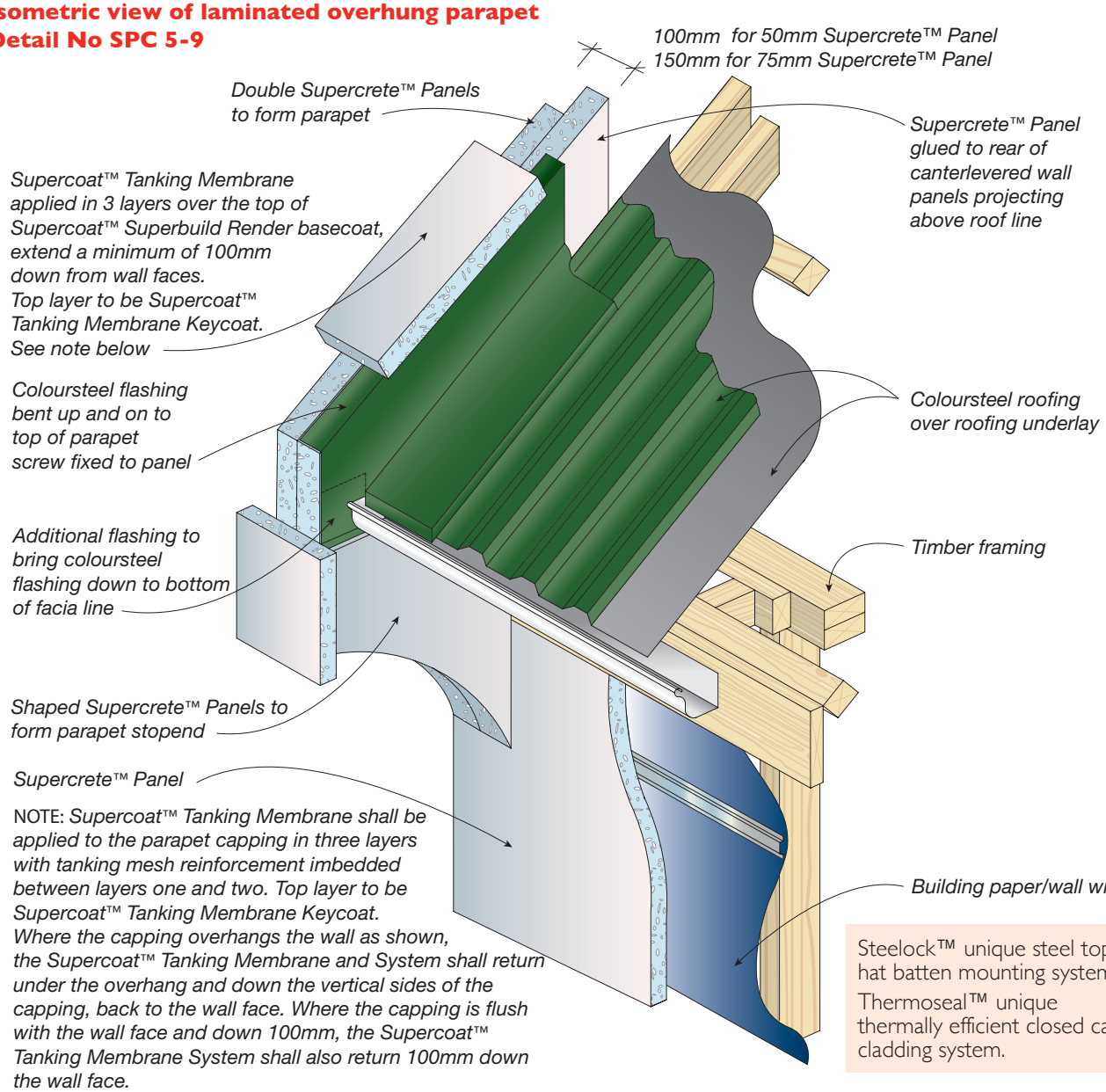
The coatings used on these top surfaces must be **WATER PROOF, NON-VAPOUR PERMEABALE** and must be tanked with Supercoat™ Tanking Membrane, prior to rexture application and painting with Supercoat Acrylic Paint, as shown in Detail **SPC 5-8**, page 64.

The only permissible reinforced tanking liquid is Supercoat™ Tanking Membrane.

Alternatively a metal cap flashing can be installed over the parapet. Refer to Detail **SPC 5-7**, page 63 .

Note: The top of all parapets must have a minimum slope of 5° either transversely or longitudinally if metal capped and 10° if tanked.

Isometric view of laminated overhung parapet Detail No SPC 5-9



NOTE: *Supercoat™ Tanking Membrane shall be applied to the parapet capping in three layers with tanking mesh reinforcement imbedded between layers one and two. Top layer to be Supercoat™ Tanking Membrane Keycoat. Where the capping overhangs the wall as shown, the Supercoat™ Tanking Membrane and System shall return under the overhang and down the vertical sides of the capping, back to the wall face. Where the capping is flush with the wall face and down 100mm, the Supercoat™ Tanking Membrane System shall also return 100mm down the wall face.*

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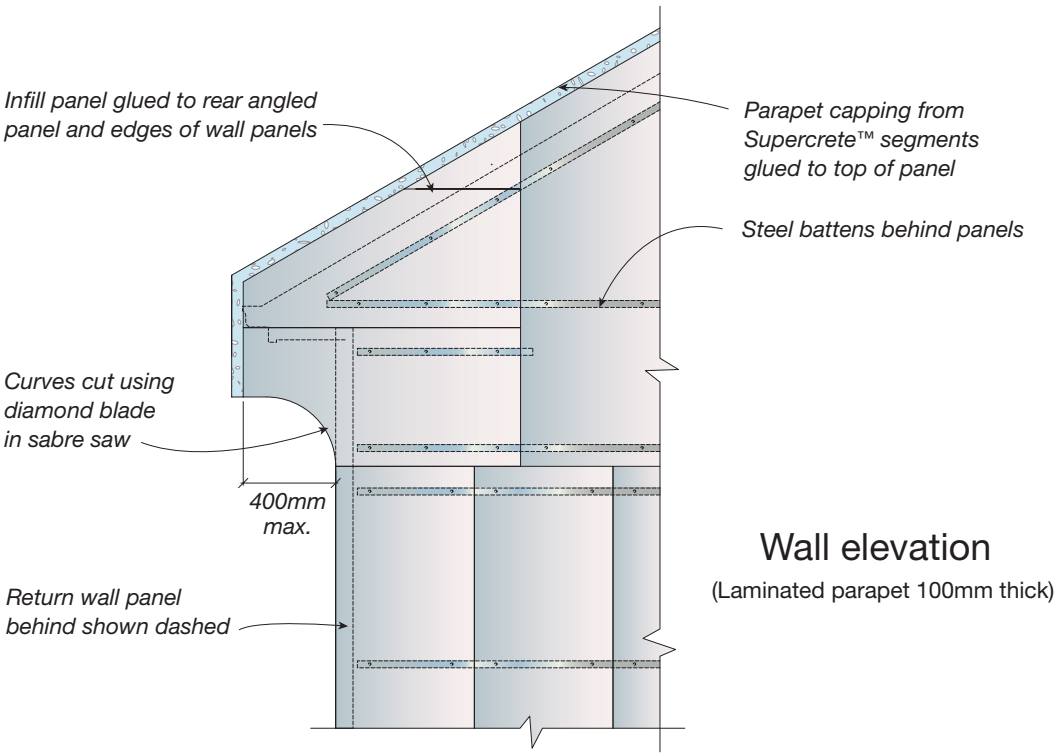
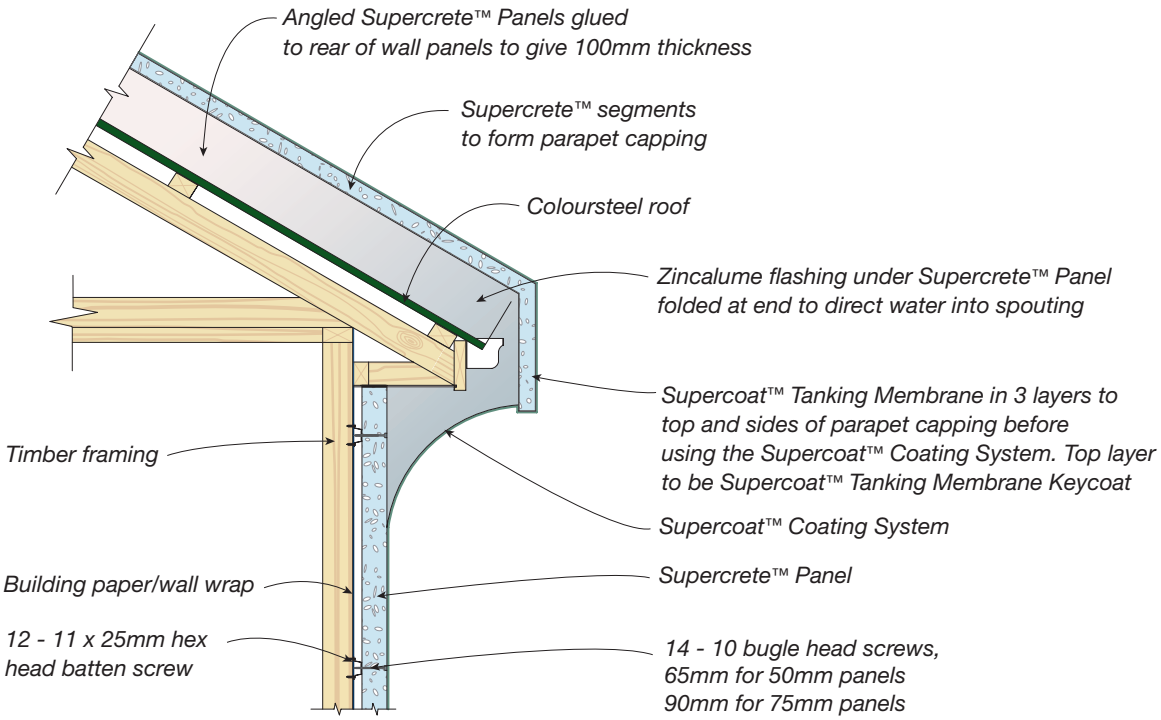
Laminated parapet details
Detail No SPC 5-10



Wall elevation

(Laminated parapet 100mm thick)



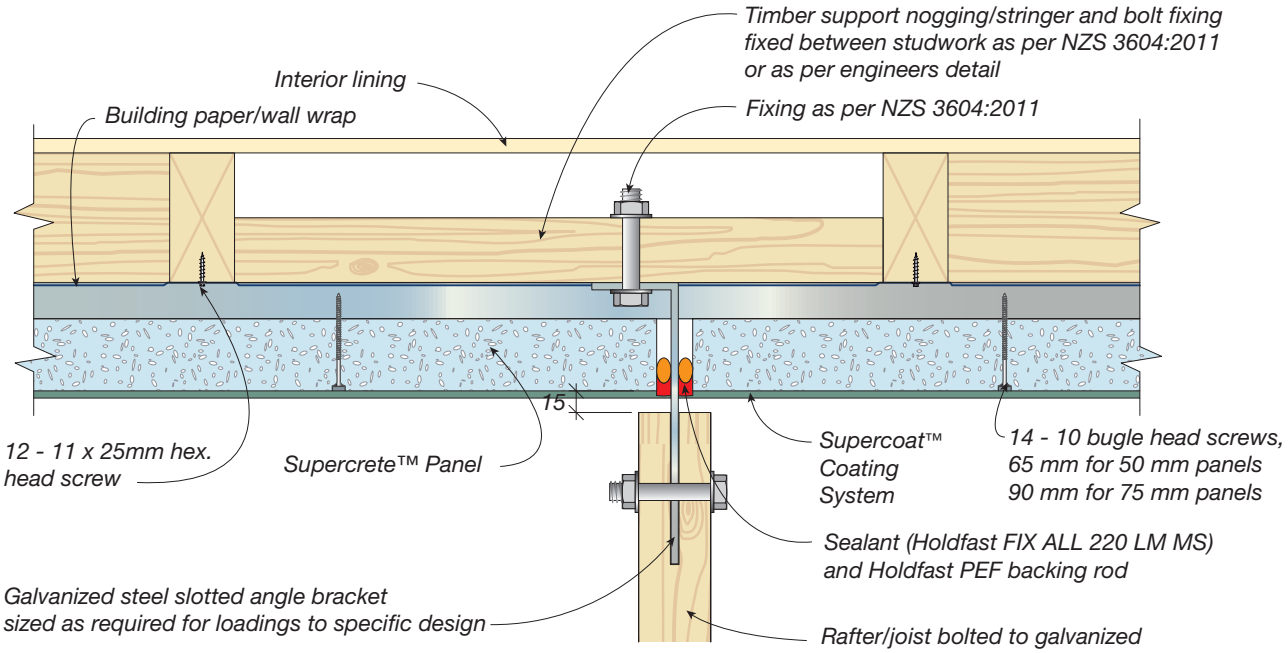
Typical parapet cross section

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

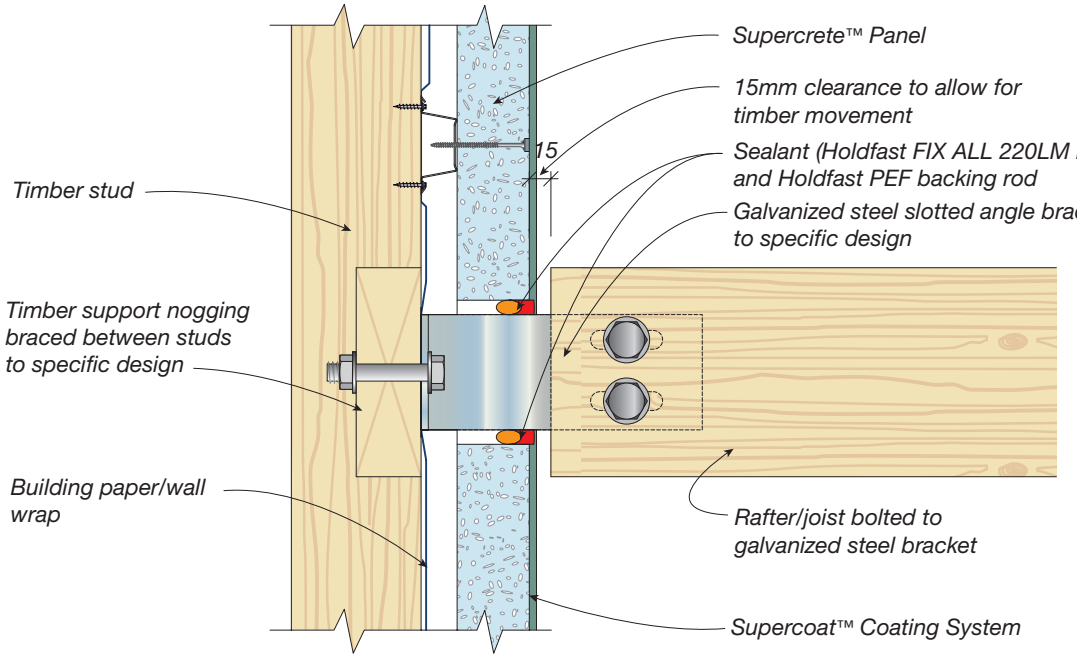
3.2.5 Pergolas and Verandas

Where pergola beams, veranda rafters or any heavy weight attachment to the structure is included in the design, these elements must be anchored to the wall framing not the cladding. Detail **SPC 6-6** on the next page shows an effective method of bracketing a pergola beam to the frame with slotted holes in the bracket and a movement gap to the beam end. This allows for timber swelling and shrinking to occur without stressing the plaster coating.

Bracket fixing through Supercrete™ Panel
(For guidance only, Structural engineer to determine bracketing)
Detail No SPC 6-6



Plan View



Sectional view

Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

3.2.6 Lightweight Attachments to Panels

As with all cladding systems, any high load or heavy external attachments to a building, such as pergolas, handrails, window shutters or clotheslines, must not be fastened directly to the cladding. Claddings are non-structural and not designed to take these loads.

Large heavy items or movement prone objects must be fixed to the wall framing behind the cladding and will require some pre-planning as to location.

Steel brackets screwed or bolted to the frame and penetrating a slot in the cladding are a common way to provide structural anchorage for large external attachments. All penetrations through the Supercrete™ Panels must have a sealed movement joint around their perimeter.

For lightweight attachments such as light fittings or signage, expansion anchors are available for use with Supercrete™ Panels but care must be taken not to compromise the waterproofing. Apply sealant at all penetrations of the coating.

3.2.7 Columns and Beams

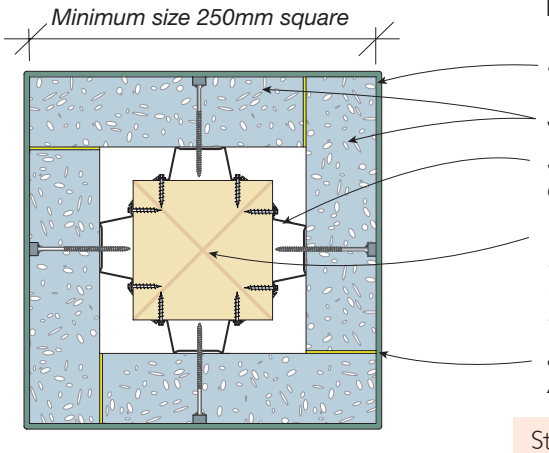
Square timber posts for verandas etc. can be clad in panel to form a column effect. The minimum size is 250mm square for 50mm panel and 300mm square for 75mm panels. Beams can also be encased in panel if a matching finish with other panel areas is desired, but the minimum width is 250mm for 50mm panel and 300mm for 75mm panel. Note that on smaller columns where a single timber post is being clad, it is not possible to fully support the panels on battens and reliance is made on gluing the panel joints and no control joints are used (see Detail **SPC 6-4**, below). This is permissible for column sizes up to 600mm in width on one face. Larger columns must have control joints at each corner.

3.2.8 Column and Beam Accents

Extra panels can be glued on the face of the cladding to provide raised column, beam and base relief panels depending on the architectural style. The fastenings for the cladding panels and battens must be checked by specific design in these cases to ensure that they can support the additional weight.

Cladding detail for timber post
Detail No SPC 6-4

Post Plan Section



NOTES:
1. *If base of column does not sit directly on concrete floor slab or foundation, the cavity space must be closed off using base angles.*
2. *Top of post cladding to be sealed to a soffit, or capped to ensure no water ingress to the batten space.*

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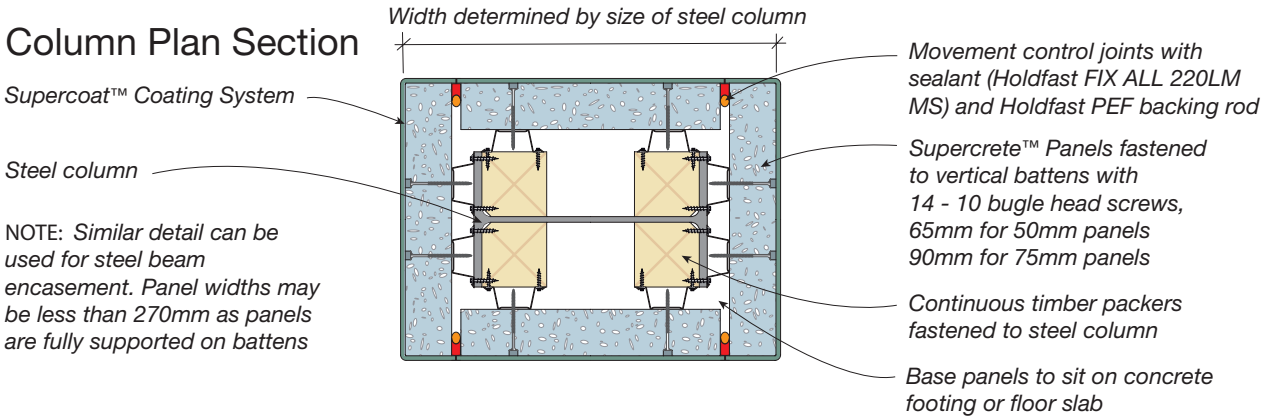
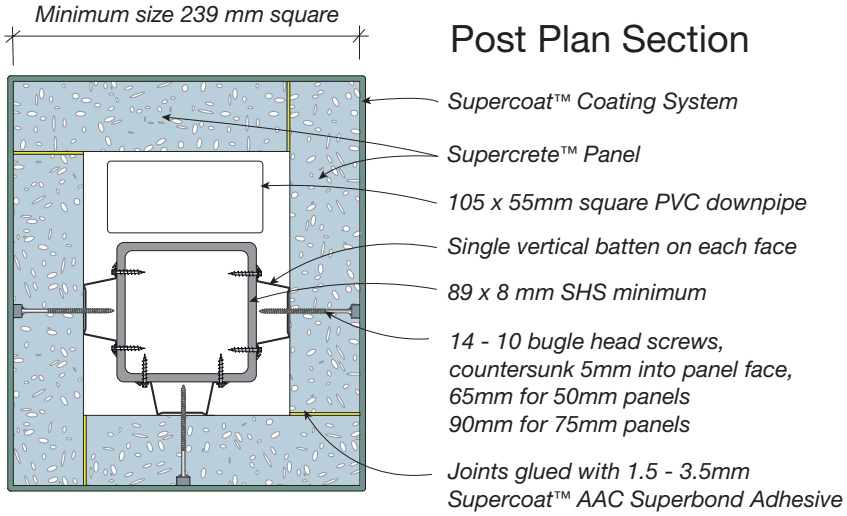
Cladding detail for steel column and post
Detail No SPC 6-5

Column Plan Section



Post Plan Section



NOTES:
1. *If base of column does not sit directly on concrete floor slab or foundation, the cavity space must be closed off using base angles.*
2. *Top of post cladding to be sealed to a soffit, or capped to ensure no water ingress to the batten space.*

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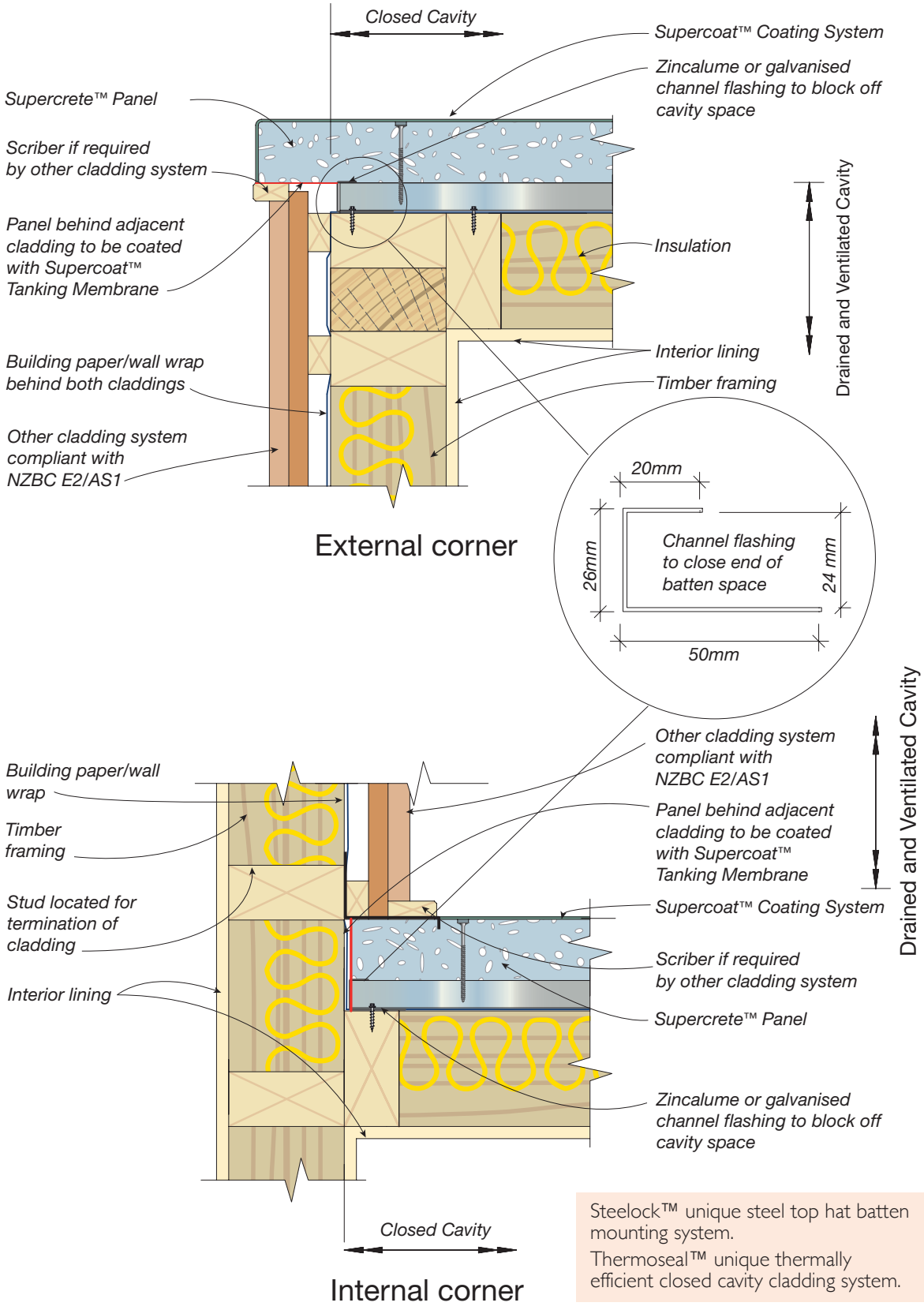
Thermoseal™ unique thermally efficient closed cavity cladding system.

3.2.9 Junctions with Other Claddings

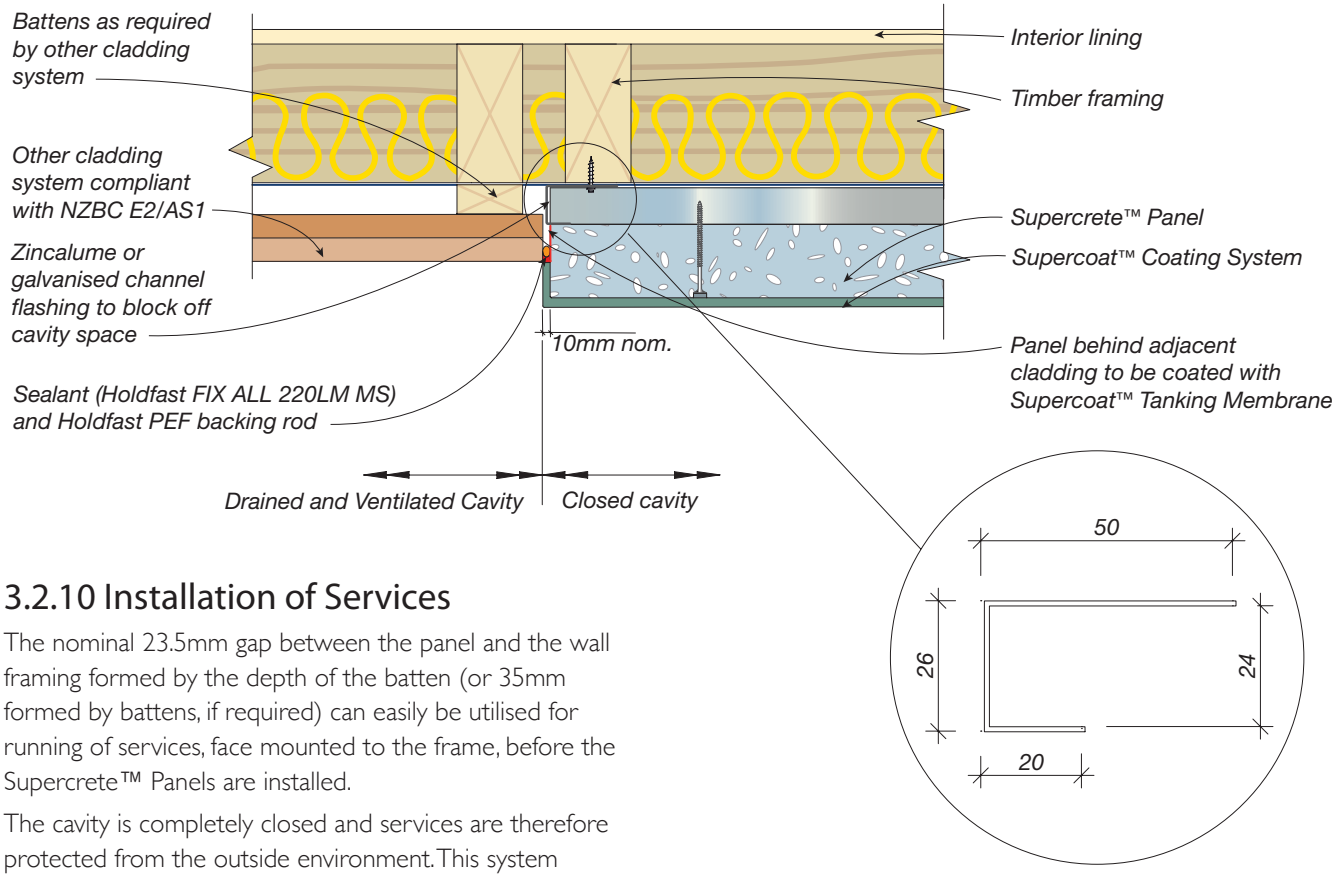
The designer must detail the junctions between Supercrete™ Panel Cladding and other cladding systems to ensure that the cavity requirements of both systems are met. This means that where drained and ventilated systems are to be installed next to Supercrete™ Panels, there must be a flashing system to completely close off the batten space behind the Supercrete™ Panels over the full height of the junction. Detailing options for these junctions are shown by Details **SPC 6-1** below and **SPC 6-2** on the next page.

Supercrete™ Panel Cladding to drained and vented cavity junction – corner detail
Detail No SPC 6-1



Steelock™ unique steel top hat batten mounting system.
Thermoseal™ unique thermally efficient closed cavity cladding system.

Supercrete™ Panel Cladding to typical drained and vented cavity junction
Detail No SPC 6-2



3.2.10 Installation of Services

The nominal 23.5mm gap between the panel and the wall framing formed by the depth of the batten (or 35mm formed by battens, if required) can easily be utilised for running of services, face mounted to the frame, before the Supercrete™ Panels are installed.

The cavity is completely closed and services are therefore protected from the outside environment. This system enables wiring and pipes to be run in continuous lengths without having to drill holes through studs, and is therefore much quicker than normal installation within the wall framing. The best time for this to be carried out is after the building paper and battens have been installed. This will require co-ordination between the panel installer and the electrical, plumbing and gas-fitting sub-trades. If externally mounted services are specified, the Supercrete™ Distributor and Supercrete™ Panel Installer must be advised at the time of quoting to allow for this coordination of sub-trades.

Steelock™ unique steel top hat batten mounting system.

Thermoseal™ unique thermally efficient closed cavity cladding system.

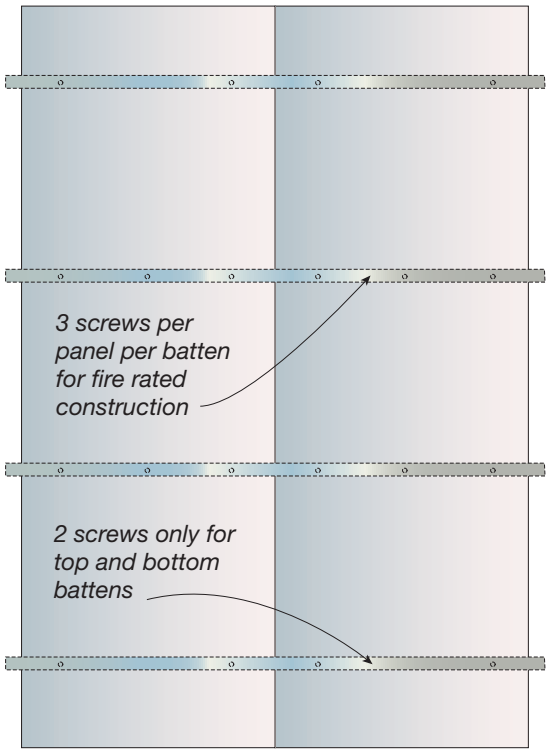
3.2.11 Fire Rated Construction

The NZ Building Code (Section C: Fire Safety) requirements for walls in close proximity to boundaries are mostly for a 30/30/30 minute Fire Resistance Rating (FRR) for Structural Adequacy, Integrity and Insulation, respectively.

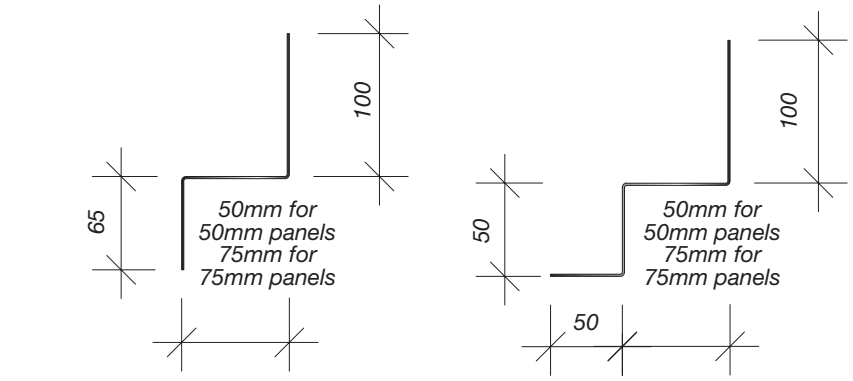
Supercrete™ Cladding can be used for external boundary walls, as it greatly exceeds this at 90/90/90 FRR for a 50mm panel.

For fire rated construction a minimum of 3 screws per middle batten(s) is required for each panel.

Supercrete™ Cladding provides walls with a Fire Resistance Rating where the fire source is from the panelled side of the wall. The overall FRR is usually only limited by the fire rating of the internal lining. The building designer must use fire rating information from interior lining manufacturers to achieve internal fire rating requirements, and may rely solely on the Supercrete™ Panel to fire rate the exterior.



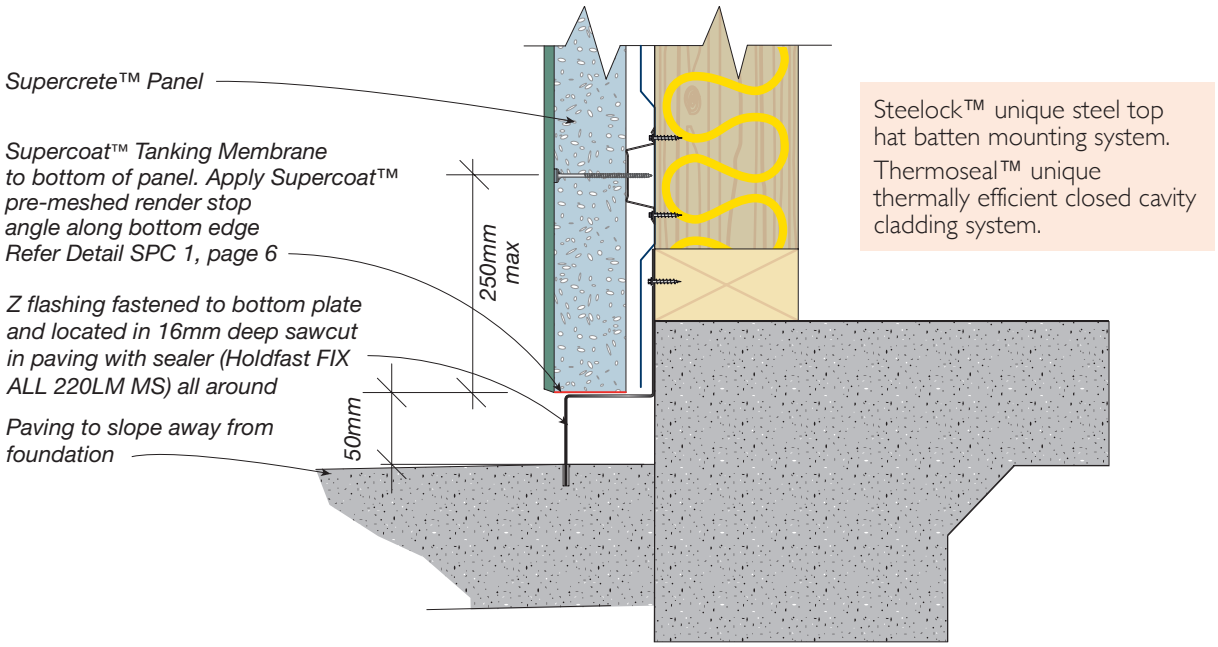
Z or W base cavity closures for use with decks/paving
Detail No SPC 6-9



Z flashing for concrete paving
All steel .55 gauge
or aluminium 1.5mm

W flashing for sheet decking
All steel .55 gauge
or aluminium 1.5mm

NOTE: *For plywood, fibre cement or Supercrete™ Panel sheet deckings, the trained Supercrete™ Panel Installer shall seal the underside of flashing to horizontal surface. The trained Supercoat™ Coating Applicator shall continue waterproofing Supercoat™ Tanking Membrane on upstand.*



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Typical detail for finishing panel above paving or solid decking

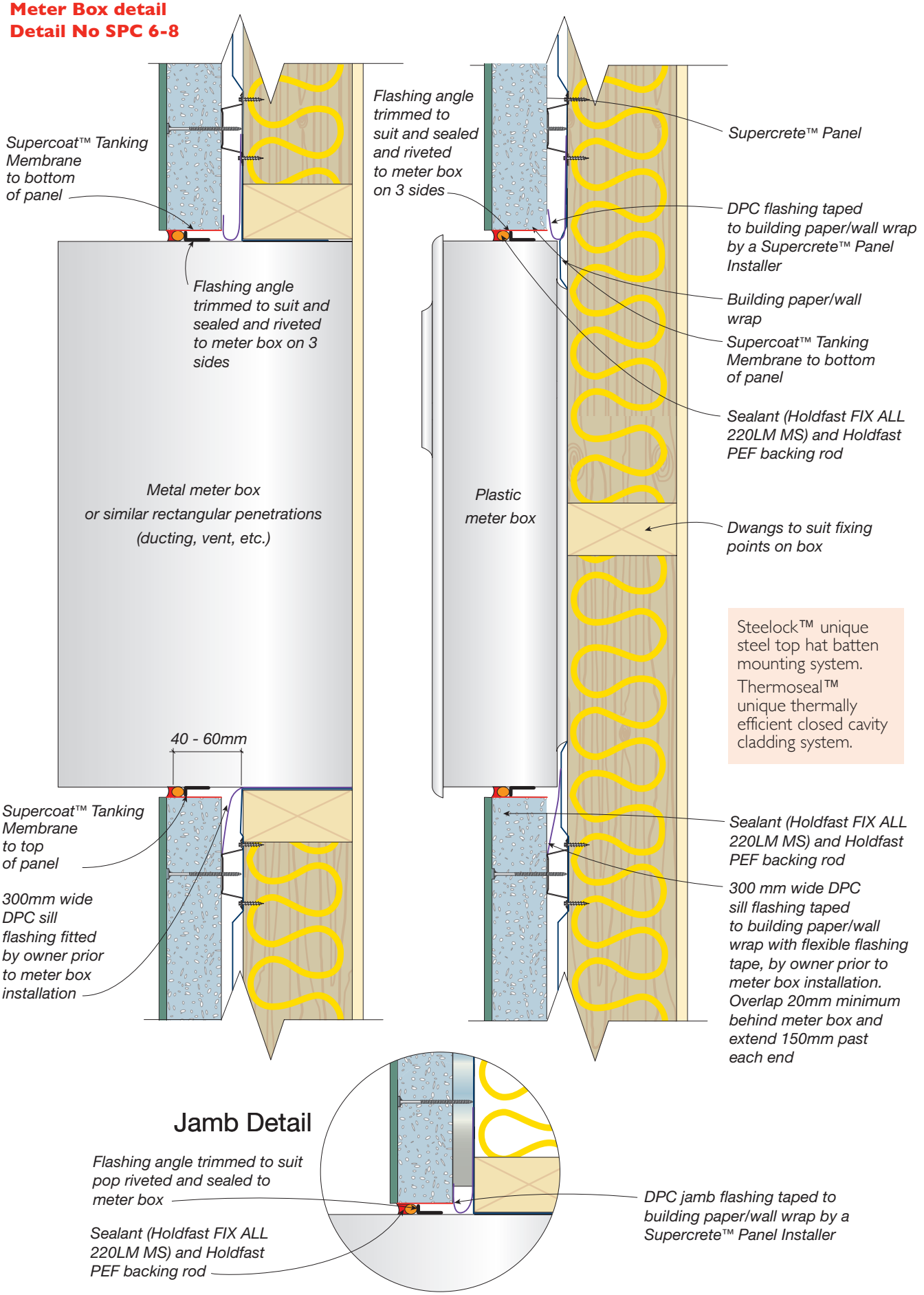
3.3 Summary of Design Requirements

In addition to detailing the building work on plans and specifications the owner shall ensure the following information in relation to the Supercrete™ Panel Cladding System is provided:

- Advise NZS 3604 building wind, earthquake and corrosion zones.
- Nominate the timber treatment and preservative.
- Locate vertical and horizontal control joints and double studs where vertical control joint (SPC 3-2 page 2) Option 1 is chosen.
- Nominate the type of horizontal and vertical control joints.
- Specify exterior joinery.
- Specify whether sill blocks and bands are required and if so nominate their size and slope to top of sill block.
- Provide details at the ground floor including dimensions of concrete slab rebate for Supercrete™ Panels (if one) and details at all doors including garage doors.
- Provide details at the base of all other Supercrete™ Panels, namely at junctions with roofs.
- Provide details at the top of the Supercrete™ Panels, namely dimension roof overhangs and nominate soffit level details.
- Specify the full Supercoat™ Coating System layers.
- Specify size and location of all penetrations, including framing requirements around penetrations larger than 110mm.

Comment: *This information is necessary so the Supercrete™ Distributor can ensure the correct design and installation of the Supercrete™ Cladding System. Some of this information may be provided by simply referencing the appropriate detail in this Design Guide.*

Meter Box detail
Detail No SPC 6-8



NOTE:

1. *The opening in the framing for the meter box or duct shall be prepared exactly as for windows and doors.* **Refer to Detail No. SPC 4-3, page 43.**
2. *The Supercrete™ Panel Installer will coat the edges of the Supercrete™ Panels to be fitted around meter boxes (or penetrations) with Supercoat™ Tanking Membrane.*

3.4 Pre-installation Requirements

The owner shall arrange for the following work in preparation for the installation of the Supercrete™ Panels by the Supercrete Panel Installer:

- Complete concrete slab and framing as detailed on the plans and specifications. Depending on the option chosen by the owner the soffit lining may need to be left until after the Supercrete™ Panels are in place.
- If the concrete slab has a rebate for housing the Supercrete™ Panels, remove any high points from the rebate and apply a cementitious render, if necessary, to provide a smooth surface.
- Install the building paper/wall wrap and supporting polypropylene tape.
- Install flexible flashing tape at openings in accordance with E2/AS1.
- Install the DPC sill tray flashing at window openings as shown in Detail **SPC 4-3**, page 43.
- Install DPC sill flashing at meter boxes and ducts with dimension greater than 110mm as shown in Detail **SPC 6-8**, page 72.
- Install joinery,
- Install rectangular penetrations larger than 110mm including the meter box, fitted with angle pop riveted and sealed as per Detail **SPC 6-8**, page 72.
- Install any round pipes less than 110mm that penetrate the Supercrete™ Panels with Butyl rubber back flashings as per Detail **SPC 6-7**, page 78.
- Install apron flashings as required.
- If the soffit option chosen is as shown in any of the Details **SPC 5-2** to **5-4**, pages 52-53, install soffit lining after installation of the Supercrete™ Panels but before application of the Supercoat™ Coating System.
- Install timber bead (minimum 15 x 15mm) fixed to the soffit to cover junction with cladding, see Detail **SPC 5-1,** page 51.
- Install garage door liner treated timber to H3.1 and painted.

3.5 Maintenance

The Supercrete™ Panel Cladding System must be kept clean by the owner in order to meet the performance requirements of the system. The owner shall wash the wall surface annually to keep the coating clean. Use water at a medium pressure and a soft brush to remove any dirt or dust. Do not use high pressure hoses or waterblasters to rinse off.

Please refer to page (2) of the Supercoat™ AAC Coating Systems Technical Manual "important owner care information" for more details.

Building paper/wall wrap.

Building tape folded around corners of openings.

Do not aim water at window vents. If fungus, oil, fuel soot, or other stubborn grime can not be cleaned with water alone, use Supercoat™ Mould, Moss and Grime Cleaner, available from the Supercrete™ Distributor. Instructions for dilution rates and application are on the container.

If the owner determines that a re-coat is required, they shall contact the supplying Supercrete™ Distributor for an on-site assessment.

Do not recoat with paint below 25% LRV.

The owner shall also annually inspect all Holdfast sealant joints to confirm weathertightness and integrity. Signs of degradation include delamination from adjacent surfaces, perishing and cracking of the surface, powdery residue or embrittlement. This must be reported to the supplying Supercrete™ Distributor and repaired immediately.

The owner must maintain minimum ground clearances throughout the lifespan of the building (refer Detail **SPC 2-5**, page 41)

Comment: It is recommended that buildings be recoated every 20 years or earlier if required.

4.0 Work Performed by Supercrete™ Registered Personnel – Informative

4.1 Overview

This section is provided for information purposes only. It describes the components supplied and the work that will be performed by Supercrete™ personnel. There are no requirements in this section on the owner.

4.1.1 Scope

This section describes the work performed by Supercrete's™ trained and certified people. It discusses the following:

- The delineation of responsibilities for the Supercrete™ Distributor, Supercrete™ Panel Installer and Supercoat™ Coating Applicator.
- The components of the Supercrete™ Panel Cladding System supplied and installed by Supercrete™ personnel.
- The method of installation of the Supercrete™ Panels and their coating application.

4.2 Personnel Responsibilities

4.2.1 Supercrete™ Distributor

The Supercrete™ Distributor is authorised by Superbuild International Ltd to supply Supercrete™ Products. It is their responsibility to;

- Transport product to site.
- Ensure the correct material type and volume is delivered to site in a condition fit for use.
- Provide training for their Supercrete™ Panel installation personnel within their territory, including direct supervision of personnel undergoing registration.
- Ensure all Supercoat™ Coating System applicators are LBP registered.
- Provide quality assurance inspections prior to the commencement of work by the Supercrete™ Panel Installer, and during and on completion of the work of both the Supercrete™ Panel Installer and the Supercoat™ Coating Applicator.
- Determine batten spacing and corrosion protection level for metal components based on information supplied by the owner.

4.2.2 Supercrete™ Panel Installer

Only personnel registered by Superbuild International Ltd or their authorised Supercrete™ Distributors, or personnel working under the direct supervision of the Supercrete™ Distributor can install the Supercrete™ Panel Cladding System.

The Supercrete™ Panel Installer is responsible for;

- Storage and handling of Supercrete™ product on site.
- Applying Supercoat™ Tanking Membrane and DPC to the base rebate.
- Installing metal back and head flashings at garage door openings.
- Applying DPC side and head flashings around window and door joinery, garage door frames, meter boxes and rectangular or square penetrations with a dimension larger than 110mm.
- Applying DPC flashings at horizontal control joints.
- Applying flashing tape and butyl rubber back flashings to pipes and rectangular or square penetrations with a dimension up to a maximum of 110mm.
- Installing the battens and packing if required up to a tolerance of 5mm.
- Installing base angles.
- Cut panels to length including shaping and rebating as necessary. Prime exposed reinforcement with Corrosion Protection Paint on all cutting edges.
- Applying Supercoat™ Tanking Membrane to panel edges where required.
- Installing the Supercrete™ Panels.
- Fitting window sill blocks, window borders and mid-floor banding.
- Filling screw countersinks and panel joints.
- Patching any surface blemishes.
- Sanding the panel surface smooth, ready for coating.
- Installing Ultralon™ EVA 60 foam packer at horizontal articulation joints and garage entries, and open cell foam strip at horizontal control joints.

4.2.3 Supercoat Coating Applicator

Only personnel trained and certified by Superbuild International Ltd, trained by their authorised Supercrete™ Distributors, or personnel working under the direct supervision of the Supercrete™ Distributor can apply the Supercoat™ Coating System.

It is a requirement that all Supercoat™ Coating Applicators be LBP registered, this ensures they are skilled tradesmen.

The Supercoat™ Coating Applicator is responsible for;

- Masking the joinery.
- Applying Supercoat™ Tanking Membrane to Supercrete™ window sills.
- Applying Holdfast sealant around joinery, garage door frame, meter boxes and penetrations.
- Applying Holdfast sealant at articulation joints and base of panels adjacent to garage openings.
- Installing Holdfast PEF Backing Rod and Holdfast sealant to movement control joints.

- Applying the layers of the Supercoat™ Coating System, including Skimbond or Renderbond additive where required.
- Ensuring a break in complete coating system back to Holdfast Fx All 220LM MS Sealant.
- Applying the Supercoat™ paints/top coats to the required coverage and thickness.
- Removing masking and clean any overspill.
- Ensuring that all pre-meshed PVC products and specified mesh products are installed in accordance with the latest version of SAACTM.

4.3 System Components

The following system components are supplied by the Supercrete™ Distributor.

4.3.1 Battens

The supporting members of the Supercrete™ Panel Cladding System are steel battens, providing a nominal 25mm batten space.

The battens supplied comply with the durability requirements of the NZ Building Code.

In some cases, to align with other, thicker claddings or ply bracing sheets, battens at 35mm may be used if requested.

4.3.2 Base Angles

Base angles are provided to close off the batten spaces in locations where the panel is not sitting on a floor slab or rebated foundation, such as above apron roofs.

Details **SPC 2-4**, page 39, and **SPC 5-6**, page 55 all require base angles. Base angle materials shall be selected by the Supercrete™ Distributor.

4.3.3 Fastenings into Timber

Screw fastening will be 12 -11 x 25mm Hex. Head screws with class 4 corrosion protection at 300mm centres maximum.

4.3.4 Fastenings into Concrete

Where Supercrete™ Panel is to extend below floor level on a concrete foundation with an articulation joint at floor level (refer to Detail **SPC 2-4,** page 39), battens fastened to the concrete foundation will be provided. Fastenings supplied for these battens are Powers™ Spike 316 stainless steel mechanical anchors which have a minimum pullout capacity of 800 N and a minimum shear capacity of 800N.

Fastening diameter is 5mm. The Powers™ Spike is 5 x 25mm with a mushroom head and is hammered through holes in the flanges of the battens into a pre-drilled 5mm diameter hole in the concrete.

4.3.5 Batten Screws

The screws used to connect the steel batten to the timber frame are 12-11 x 25mm long Hex Head self cutting screws.

The batten screws will be selected by the Supercrete™ Distributor to comply with the durability requirements of the NZBC.

4.3.6 Panel Screws

Panels are fixed from the outside using 14 -10 Bugle Head self cutting screws 65mm long for 50mm panel and 90mm long for 75mm panel.

The panel screws supplied by the Supercrete™ Distributor comply with the durability requirements of the NZBC.

Supercrete™ Panels are either 50mm thick or 75mm thick with a single layer of reinforcement.

The 50mm panels are 600mm wide and are available in 1200, 2200 and 2400mm lengths.

The 75mm panel are 600mm wide and are available in a variety of lengths as follows, 1200, 2200, 2400, 2550, 2700, 2850 and 3000mm.

Supercrete™ Panels are delivered on timber pallets for ease of handling with fork lifts or truck mounted crane.

Base angle used on foundation with no rebate.

4.3.8 Supercoat™ AAC Superbond Adhesive

Adhesive will be applied to the edges of the panels at all joints except movement control joints. Adhesive is also used for bonding Supercrete™ surface to Supercrete™ surface, such as applying Supercrete™ Sill Blocks and decorative bandings.

The Adhesive is a cement based, polymer modified adhesive supplied in dry powder form in 25kg bags.

The adhesive is mixed on site with water in accordance with the current Supercoat™ technical literature. The operating air temperature range for Adhesive is 10°C - 30°C ensuring the temperature does not drop below 10°C during the entire curing process.

4.3.9 Bands and Sill Blocks

Windows will be fitted with pre-formed 50mm thick sill blocks and border banding where required by the owner.

These are decorative elements only and are not essential to the Supercrete™ Panel Cladding Systems' performance.

4.3.10 Corrosion Protection Paint

Anytime the reinforcement is exposed where the Supercrete™ Panels are cut, it will not be protected from corrosion. Corrosion Protection Paint is supplied for this purpose. Instructions for use are on the container supplied. Corrosion Protection Paint is a black coloured liquid acrylic polymer.

4.3.11 Skellmax Ultralon™ EVA 60

This is a closed cell foam manufactured from ethyl-vinylacetate copolymers (EVA) with minimal water absorption properties and excellent chemical resistance. It is used where a horizontal articulation joint is required. These locations should not be confused with horizontal control joints required to accommodate timber shrinkage.

Skellmax Ultralon™ EVA 60 (foam with a density of 60 kg/m^3) is supplied in strips cut to your specifications.

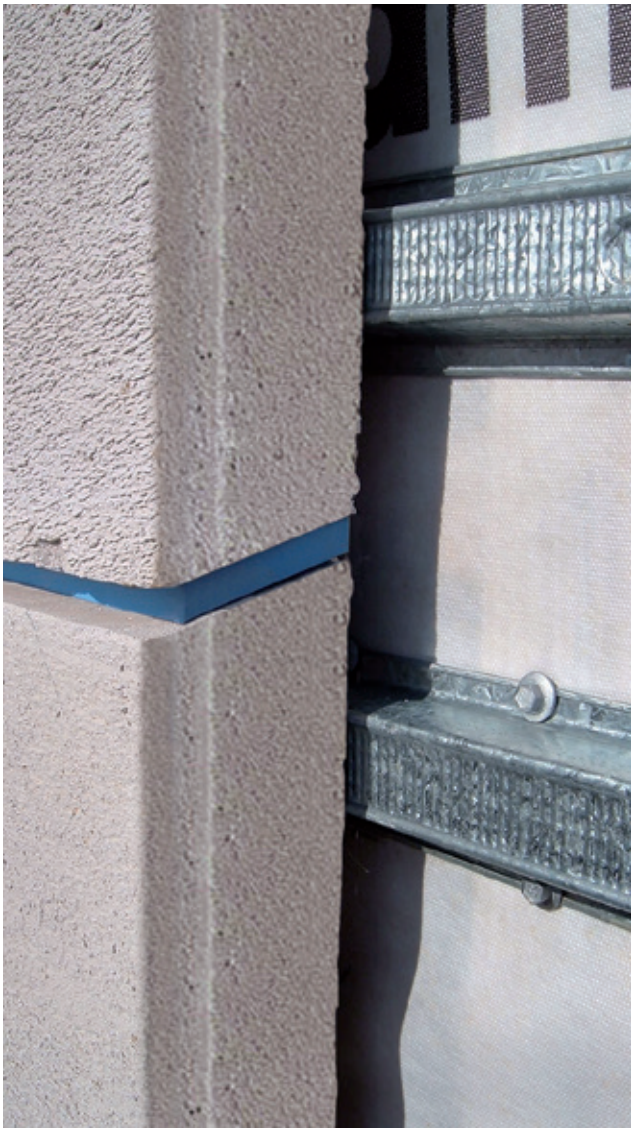
4.3.12 Damp Proof Course (DPC)

Any damp proof coarse that meets the requirements of clause 10.2.3 of E2/AS1 of the NZ Building Code may be used.

It is to be a roll-out sheet that sits on the horizontal surface of the rebate to act as a slip layer between the foundation and the cladding. This DPC is also used as a folded backflashing around openings.

4.3.13 Butyl Rubber Flashings

Penetrations through the Supercrete™ Panel with a dimension up to a maximum of 110mm that continue through the building wrap into the framing space will have Butyl synthetic rubber flashings fitted around them on the panel side of the batten space. Refer to detail **SPC 6-7**, page 78. Butyl rubber materials used must meet the requirements of E2/AS1 4.3.9.



Ultralon™ EVA 60 between Supercrete™ Panels in an articulated joint prior to Holdfast sealant application.

4.3.14 Holdfast PEF Backing Rods for Holdfast Sealants

To keep the cross sectional profile of the Holdfast sealant beads in control joints at ideal dimensions, Holdfast PEF backing rod will be inserted into the joint to the required depth of 10mm. This ensures that the right quantity of Holdfast sealant is applied without wastage, and ensures the correct joint width to depth ratio for the Holdfast sealant to flex correctly.

Holdfast PEF backing rods will be a nominal 2mm larger in diameter than the control joint width, with the exception of fire rated applications where the Backing Rod is to be double the thickness of the joint. Holdfast PEF backing rod is installed by the Supercoat™ Coating Applicator. Holdfast PEF backing rod is typically a white, closed-cell, polyethylene foam (P.E.F.) material which can compress more than the Holdfast sealant with less force. Holdfast PEF backing rods and Holdfast FIX ALL 220LM MS Sealant meet the requirements of E2/AS1 paragraph 9.2.4.1.

4.3.15 Supercoat™ Tanking Membranes

Supercoat™ Tanking Membrane is an acrylic based liquid membrane, applied using a brush or roller. Supercoat™ Tanking Membrane Keycoat, which has an aggregate in it, creates a gritty surface acting as a key for render base and top coats.

It is used wherever the Supercrete™ Panel surface is not vertical, such as window sills, to provide a waterproof layer to prevent the ingress of water, and water vapour. It is also used on the base and rear of the slab rebate and on prescribed edges of some Supercrete™ Panels.

The Supercoat™ Tanking Membrane supplied meets the requirements of 12.2.2(e) of E2/AS1.

4.3.16 Holdfast Sealant for Control Joints and around Penetrations

Control joints and junctions between panels and joinery or penetrations will be sealed to prevent moisture ingress to the closed cavity space, yet permit expected movement of the joint. Sealant used is Holdfast FIX ALL 220LM MS. Holdfast Gorilla Nailpower FLEXI Expanding Foam is used as a backing when Supercoat™ Pre-meshed UPVC control joints are used.

4.3.17 Supercoat™ Coating System

The Supercrete™ Panel Cladding System will be coated with Supercoat™ Paint over Supercoat™ Texture on a Supercoat™ skim of either Cementitious or Acrylic basecoat that has been sealed with Supercoat™ Surface Sealer, as per guidelines in Section 5.2, page 79..

4.4 Construction Details

4.4.1 Penetrations

All penetrations will be flashed at the time of panel installation in accordance with the details in this Design Guide. The maximum size of penetration through a panel without additional battens is 110mm x 110mm. Any openings larger than this will have additional battens above and below the opening and extending to the studs on either side of the opening. Holes may be placed in any panels, down to the minimum panel width of 270mm, providing that both sides have fully glued joints.

All pipe or duct penetrations through the Supercrete™ Panel with a dimension up to a maximum of 110mm (e.g. waste water, PEF gas pipes and ducts) will have Holdfast PEF backing rod and sealant as for control joints. All holes through the building paper/wall wrap will be made good with flexible flashing tape as required by the Acceptable Solution E2/AS1 paragraph 9.1.9.3. Additionally, the pipes and ducts will have a butyl rubber seal placed around them and finished up against the internal panel surface. This is to prevent any water tracking back along the pipe or duct and reaching the framing, in the event of a sealant failure. Refer to Detail **SPC 6-7**, on next page.

Round penetrations larger than 110mm are outside of the scope of the Supercrete™ Panel Cladding System. Duct penetrations larger than 110mm will be treated as for meter boxes in respect of batten support for the panel edges above and below the penetrating item. The weatherproofing of these penetrations will be as per meter boxes. Refer to Detail **SPC 6-8**, page 72. Round penetrations larger than 110mm are not covered by this Codemark accredited system, as they usually have proprietary flashing kits supplied. The distance of a penetration from a panel edge is not critical and no special considerations need to be made in this respect.

Service pipes penetrating a Supercrete™ Panel (backing and sealants yet to be applied)

Comment: *Round penetrations larger than 110mm usually have proprietary flashing kits supplied. The adequacy of these kits need to be demonstrated to and approved by the building consent authority as part of the normal building consent process.*

4.4.2 Dummy Control Joint Installation

Dummy control joints may be used to bridge a gap of up to nominal 10mm (+/- 2 mm tolerance) between Supercrete™ Panels. This gap will be sealant filled. The dummy control joint differs from a true vertical control joint as both the battens and the Supercoat™ Coating System will be continuous across the join, refer to the Detail **SPC 3-1**, page 26.

4.4.3 Holdfast Sealants

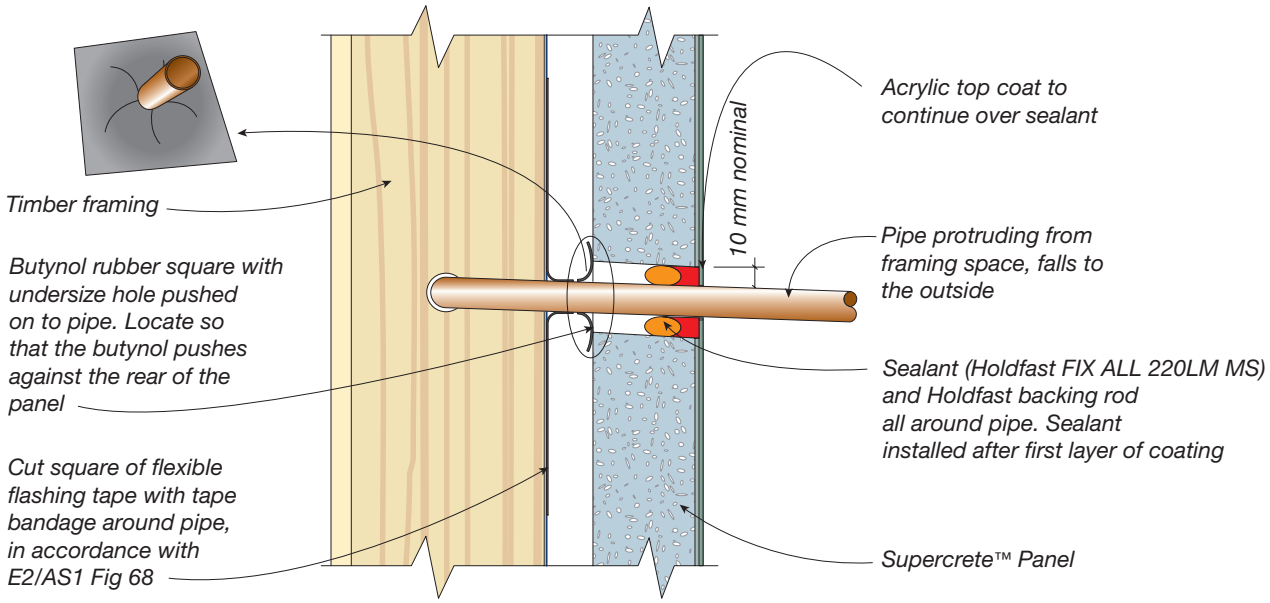
Gaps between Supercrete™ Panel and aluminium joinery extrusions will be as shown in Table 8, below.

These are based on an ambient temperature of 18°C at time of construction and will be reduced by 1mm if the temperature is over 30°C and increased by 1mm if the temperature is below 6°C.

Table 8. Holdfast Sealant Gaps

Length or Height of opening	Sealant Gaps to Aluminium Joinery
< 2.0m	5mm
2.0 to 3.0m	6mm
3.0 to 4.0m	8mm
Opening dimensions shall be a maximum of 4.0 metres	

Pipe penetration through Supercrete™ Panel
Detail No SPC 6-7



NOTE:

1. *This detail is only provided if the pipe continues into the frame space. Pipes run in the cavity are only provided with sealant and backing rod at the face of the panel.*
2. *Maximum outside diameter of pipe penetration is 110mm.*
3. *Details similar for square edged penetrations (square or rectangular ducts) with a dimension up to a maximum of 110mm.*
4. *Square edged penetrations with a dimension greater than 110mm need to be treated as for meter boxes, see Detail SPC 6-8, page 72.*

4.4.4 Panel Cutting

Supercrete™ Panels may be cut to any length or width.

However, any panel that is less than 270mm in width will be provided with full support from the steel battens fixed perpendicular to the width. Panels narrower than this will only be likely to have a single longitudinal reinforcing bar.

This requires meshing to retain structural integrity of the panel.

Where a narrow panel is required for example, between the top of a window and a soffit, it is not always possible to physically fit the two battens in. In these situations, the Supercrete™ Panel Installer will fit the battens perpendicular to the panel length, but at a maximum spacing of 300mm.

Refer Detail **SPC 4-10**, page 49.

Panel cutting.

4.4.5 Screw Locations

The location of panel screws will generally be 100mm from the side of the panel and centred over the batten behind. Panel size and configuration does not always allow this, but screws will be located a minimum of 50mm and a maximum of 120mm from the panel edge and in the centre third of the batten face. The maximum distance a panel may extend vertically beyond a batten without support is 250mm. The minimum distance a batten screw may be from the end of a stud where battens are fastened adjacent to top or bottom plates is 50mm.

Panel screwing.

5.0 Supercoat™ Coating Systems

5.1 Choosing the Right System

When choosing a finishing system for the external walls of your building we have provided you with 2 recommended coating systems as a guideline for your designer.

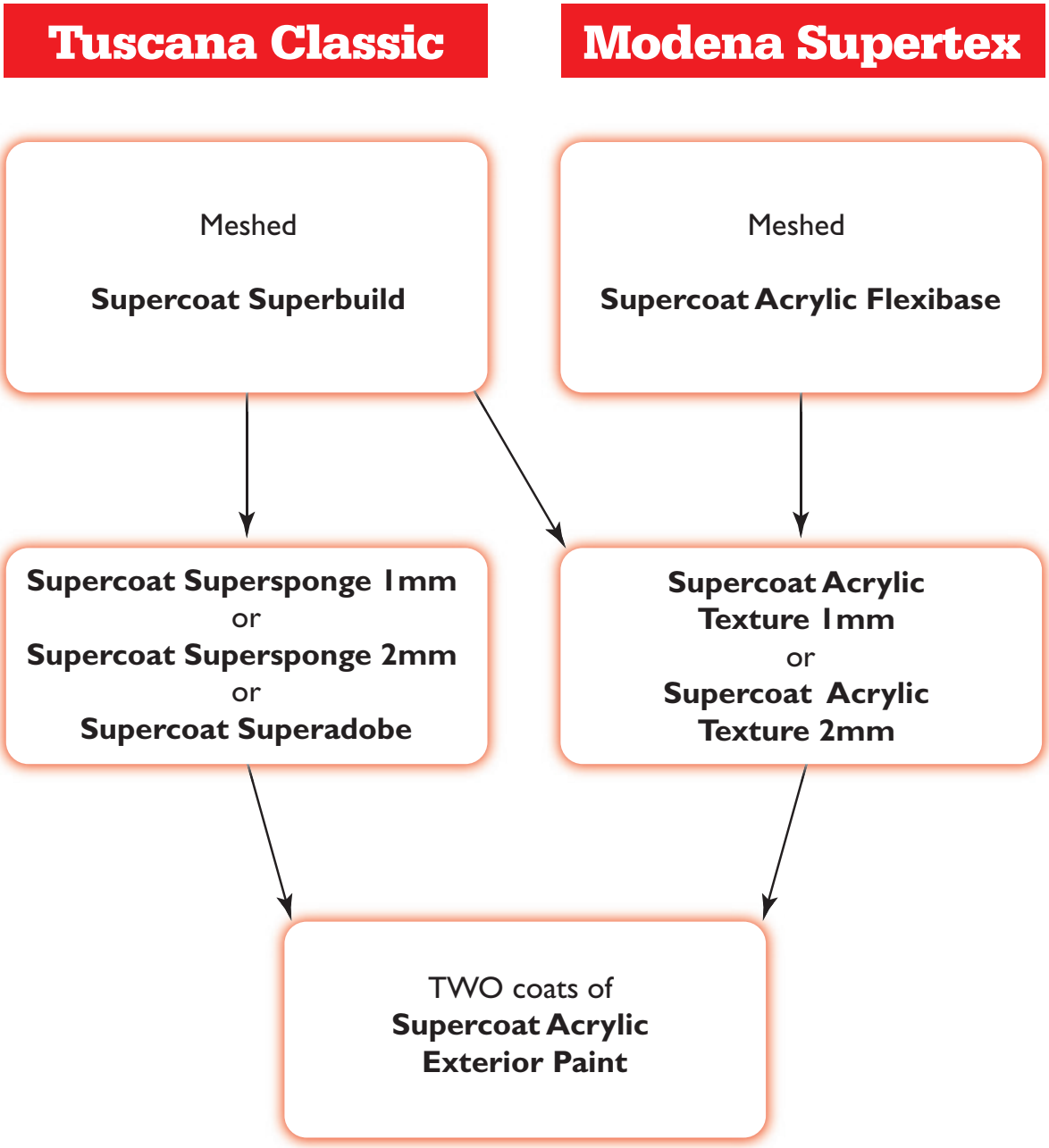
The cement base and texture option is called the "Tuscana Classic" and the full Acrylic option is called the "Modena Supertex"

The following pages summarize the specification of each system.

The owner or designer need only nominate the system type (Tuscana Classic or Modena Supertex) and the required texture. For instance, an architect may mark on the construction drawings that the coating shall be "Tuscana Classic Supercoat™ Superbase/Superadobe" and it is clear to the applicator what the whole coating system needs to be.

NOTE: All Supercoat™ Coating Systems are fully meshed. Supercoat™ Surface Sealer is to be applied over the last cementitious layer and prior to the application of any acrylic layers, please refer to the below technical manual for further system details.

For the full range of Supercoat™ Coating Systems, please refer to the Supercoat™ AAC Coating Systems Technical Manual "SAACCSTM 2013" located at ww.supercoat.co.nz



6. System Science

6.1 Overview

This section has been written to help designers, builders, building owners, certifiers and building consents authorities, understand the principles of how Supercrete™ Panel Cladding works. The relationship between this system and the New Zealand Building Code is outlined and common queries are explained.

This section sets out to explain firstly the rules governing claddings and secondly, how this autoclaved aerated concrete cladding complies with these rules.

Much of the detailing for cladding with Supercrete™ Panels is contrary to practices used on many other common cladding systems, particularly in respect of the management of external moisture and internal vapour or condensation. This section focuses on explanations of the building science regarding these different aspects.

6.2 New Zealand Building Code

6.2.1 Acceptable Solution E2/AS1

The NZ Building Code section that deals mainly with water and weather management of building facades is Clause E2: External Moisture.

To provide a method of dealing with possible leaks, condensation control, coating failure or a backstop to poor workmanship, the compliance document offers an Acceptable Solution for some claddings over timber frames.

The Acceptable Solution E2/AS1 simply accepts that water may at some point enter a cladding from a leak in the exterior, or internal moisture will condense on its interior surface, due to lack of insulation or breathability.

E2/AS1 addresses this possibility and provides one simple solution, by introducing a drained and/or ventilated cavity between the external cladding and the frame. It limits this method to the claddings listed in Acceptable Solution E2/AS1 Paragraph 3.3. They are;

a. Masonry Veneer
b. Stucco
c. Timber Weatherboards
d. Fibre Cement Weatherboards
e. Profiled Metal
f. Fibre Cement Sheet
g. Plywood Sheet
h. EIFS

The SPC System has been issued a Codemark by Certmark Australasia Pty Ltd. When installed in accordance with this Codemark, it has the same legal status as the Acceptable Solutions of the relevant compliance documents of the New Zealand Building Code.

6.2.2 Alternative Solution

The Building Act also allows for Alternative Solutions, or other ways of meeting the aims of the Building Act and the performance criteria of the NZ Building Code.

If a project has details that differ from the details in this manual then those details are regarded as Alternative Solutions in regard to the NZ Building Code.

6.2.4 The Risk Matrix in Acceptable Solution E2/AS1

The Risk Matrix is a tabulated chart which uses data about the weather exposure of a buildings' location and the number of its design features, known to be at a high risk of leaking. The Risk Matrix establishes a points based, numerical value for the comparative risk of every building - its Risk Score.

Based on the Risk Score, a building may have the listed E2/AS1 claddings directly face fixed, mounted on battens to form a cavity with drainage, ventilation, or a combination of both.

The Supercrete™ Panel Cladding System is an Alternative Solution that does not fall within the parameters of this Risk Matrix.

These drainage and ventilation features are not permissible with the Supercrete™ Panel Cladding System as opening the cavity would expose the battens to potentially corrosive moisture and this would prevent compliance with NZBC, Clauses B 1 - Structure and B 2 - Durability.

Acoustic and thermal insulation would also be lost.

There is no situation, based upon exposure risk, design features or building location, where the Supercrete™ Panel Cladding detailing changes. The same system is used for low risk sheltered buildings and highly exposed complex ones, alike.

6.3 Understanding Cladding Systems

To help designers, builders, building owners, building consent authorities and building specifiers understand how cladding with Supercrete™ Panel works, the following background information is intended to provide a basic overview of common queries about the variations between Supercrete™ Panel and other cladding materials.

6.3.1 Drained and Vented Cavity Systems

Firstly, from a building science point of view, the following issues must be kept in mind when considering why these cavities are employed in most common claddings:

1) Drained and vented cavity construction is vital in cladding systems where water is likely to enter the cladding from the outside, such as through the saturation of clay bricks or certain types of stone veneers, which can absorb water through their entire thickness in a short space of time.
2) Drained and vented cavity construction is also appropriate in cladding systems where the cladding has low vapour permeability and will have difficulty allowing internal moisture to escape.
3) Drained and vented cavity construction is also appropriate for claddings with poor insulation, where warm internal moisture vapour will condense and form water droplets upon contact with the colder internal face of the cladding.
4) Drained and vented cavity construction is a "backstop" solution for some cladding systems that have failed and leaked, due to coating and/or flashing applications allowing water ingress.
5) Drained and vented cavity construction is also appropriate for claddings with highly flexible sheet backings to monolithic coatings, where frame movement can cause flexing of the cladding, inducing cracks or tears in the coating, at the backing sheet edges, allowing a leak point to form.

6.3.2 Drained and Vented Cavity Construction Methods

Clay brick, stacked stone veneers or sheet materials, such as steel and fibre-cement, are typical examples of systems that usually employ drained cavity construction.

In most of these systems weep holes or drainage gaps at the base of the walls allow the condensate or leaked water to escape. Venting at the top of the wall cladding allows air circulation to keep the building paper dry and vent off excess vapour.

Flashings to openings are typically designed with some sort of drainage gaps to allow condensate to discharge. Building paper/wall wrap in these and most other cladding systems is considered a part of the weatherproofing of the building, in that it will allow vapour to pass through, but droplets should not soak back into the frame side.

6.4 Cladding With Supercrete™ Panels

This section describes the differences between Supercrete™ Panel Cladding methods and the Acceptable Solution methods, outlined in the previous section, for moisture management.

6.4.1 Closed Cavity Construction

The Supercrete™ Panel Cladding System is not classified as drained and vented cavity construction.

The Supercrete™ Panel Cladding System is more correctly described as a closed cavity system that is not hermetically sealed airtight, but at the same time does not allow unobstructed movement of air and water. It is "closed" in the sense that it maintains its cavity environment as an interior space within the building, rather than opened up to outside atmospheric conditions and the circulation of air.

6.4.2 Interior Cavity

In a drained and ventilated cavity cladding system, the cavity can be considered to be the exterior of the building envelope, in that it is on the outside of the insulating products and is open to the humidity and air temperature of the outside atmosphere. Building components in these drained and ventilated cavities, such as brick ties, are exposed to corrosive elements such as condensation, external moisture and airborne salts or sulphates in coastal or geothermal regions.

The Supercrete™ Panel Cladding System has a closed cavity which is not open to the outside atmosphere. It is an insulated, still airspace, on the interior side of the insulating cladding panels. The steel supporting battens within this space are isolated from external humidity and the insulating effect of the Supercrete Panels reduces condensation.

6.4.3 Key differences

The key differences that allow Supercrete™ Panel Cladding to be a closed cavity, whilst most other common claddings must be drained and ventilated are;

a) Supercrete™ has low water permeability, reducing the ingress of external liquid.
b) Supercrete™ is a good insulator, reducing condensation.
c) Supercrete™ Panel Cladding manages movement to prevent water ingress cracks.
d) Supercrete™ has good vapour permeability, to vent off internal moisture.
e) Supercoat™ Coating Systems over Supercrete™ Panels prevent moisture ingress, yet have excellent vapour permeability to help the wall breathe.
f) Supercrete™ absorbs and diffuses vapour moisture – it does not run freely in the cavity.

These key differences are outlined in detail in the following paragraphs.

6.4.4 Low Water Penetration

Testing has shown that Supercrete™ Panels have a significantly lower water penetration rate than brick. The graph below compares equal thicknesses of masonry products under British Standard water penetration test conditions to BS 4315 Pt2 1970.

Clay brick was fully saturated after only 20 hours, concrete and calcium silicate bricks by about 40 hours. At that point, uncoated Supercrete™ was only 10% saturated and it took nearly 100 hours to fully soak through. Supercrete™ coated with 3mm of Render was unaffected after seven days (168 hours) of saturation.

Even though this unpainted render resisted the ingress of moisture under these test conditions without paint, it is a system requirement that if render is used, it must be painted with Supercoat™ acrylic paint to ensure a consistent level of water resistance.

6.4.5 Insulated Cladding

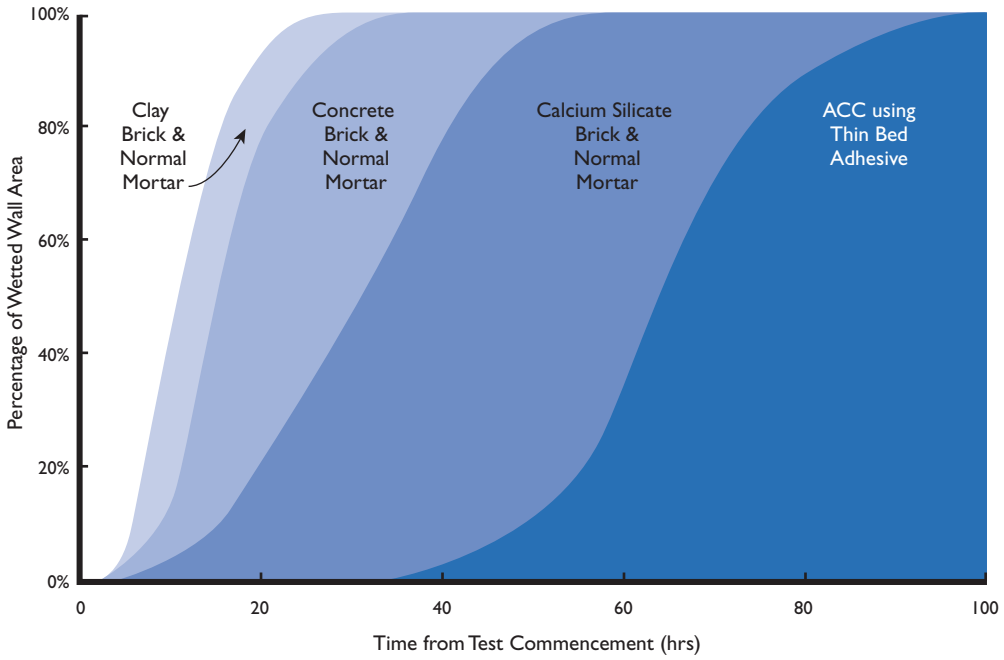
The Supercrete™ Panel Cladding System (including the batten space) adds significantly to the thermal resistivity of the whole wall (Refer to Section 1.4.4, page 11).

Importantly, from a condensation control point of view, the closed and insulated still air space of the batten cavity is not a likely dew point within the vapour path through the system.

Conventional masonry veneer (such as clay brick) or any sheeting with low insulating properties (such as fibre cement) typically employ vapour permeable building wraps and a drainage cavity to protect the frames from condensation.

As a material comparison, brick has less than half the insulation of Supercrete™ Panel. In a drained and ventilated veneer application, the system R-Value is reduced by airflow in the vented cavity. (Refer to Section 1.4.3, page 10) Fibre-cement and sheet steel have a mere fraction of the insulating properties that Supercrete™ Panel offers.

Water Penetration - Masonry Wall System
Nominal Wall Thickness 100mm



Note: Test procedure in accordance with BS 4315 Part 2 1970
"Methods of Test for Resistance to Air and Water Penetration".

6.4.6 Corrosion Protection

The durability of the battens have been tested to meet the NZ Building Code durability requirement of the lifespan of the building, being not less than 50 years. The batten has an AZ150 coating.

These have withstood and passed the AS 2331- 3.1: 2001 Neutral Salt Spray Test.

As the batten space is on the inside of the insulating Supercrete™ Panel, it is not open to the exterior environment and will not come in contact with the corrosive environment simulated by AS 2331-3.1:2001.

Zincalume AZ150 is thick enough to be "self- healing" at the cut ends. A "sacrificial rate" of galvanic corrosion requires moisture to activate the oxidation reactions. The batten space is dry, preventing detrimental corrosion.

6.4.7 Movement Control

All buildings move and must be designed to accommodate movement.

Many cladding systems make no attempt to control the movement of timber frames and the damage this can cause to surface coatings.

Building elements move for a variety of reasons. These include (but are not limited to):

a) Seismic tremors
b) Wind loads
c) Ground movement
d) Thermal expansion and contraction
e) Shrinkage through moisture loss
f) Swelling through moisture gain
g) Long term deflection under dead and live loads
h) Vibration through daily use (slamming doors, moving furniture, etc.)

Because different materials react to these movement forces at different rates and with differing degrees of elasticity, a basic principle of building is to allow for this differential movement in the design. Generally, the junctions of elements within the building are rigid, but with facility to accommodate movement by designated movement joints throughout the structure. These joints are called "Movement Joints" or "Control Joints".

6.4.7.1 Movement Cracks in Solid Plaster Over Conventional Sheet Backings

Many flexible sheet backings for plaster coatings (such as fibre cement, plywood, polystyrene, fibreboards, etc) are susceptible to damage caused by differential stud movement. That is, as the timber dries over time and shrinks, it will often warp.

As one stud bows in and another one bows out or the bottom or top plates bend, a frame can buckle or twist the wall and a tear in the coating may appear, usually corresponding with the backing sheet outline.

This "panelled effect" can sometimes be seen on rendered or plastered timber-framed buildings which incorporate flexible sheet backings.

These tears or fissures at sheet outlines may become water ingress points at places where there is no pre-waterproofing - i.e. there is normally no flexible sealant at these sheet edges, as they are not usually set up as functional control joints. Cracks like this are a common source of water damage to timber frames, especially when the sheet backing is directly fixed to the frame.

Vertical timber, polystyrene, or steel, battens do not prevent movement from causing these tears, as the studs will simply bow the battens and the tearing between sheets will still occur. The timber batten is often directly behind the crack. When water gets in, the batten can get wet, as does the building paper sandwiched between it and the stud. Potentially the stud could also get wet, even in drained cavities if attention is not paid to controlling movement cracks.

6.4.7.2 Movement Control in Supercrete Panel Cladding

Supercrete's vapour diffusion moisture management method (refer 6.4.10, page 94), allows the battens to be installed horizontally. This horizontal orientation is critical to the systems performance, as it locks the panels together and resists frame movement.

Although the cladding panels are locked rigidly together, the movement forces of the frame must be allowed space to express themselves. Relative movement between framing and the cladding is accommodated by installation of proper movement control joints, while still keeping the surface waterproofed at these joints.

In recognition that the natural frame movement needs a release point to express itself, vertical movement control joints are incorporated into the façade to delineate these potential crack lines at joints which are pre-waterproofed with Holdfast sealants. Horizontal joints at the base and mid-floor allow for slippage, articulation and frame height shrinkage.

Vertical Joints

a. In plane timber shrinkage, on a stud wall is usually limited to the potential length shrinkage in the wall plates, so this is often only a millimetre or two. Generally, this is expressed in most plastered finishes as a crack, or series of hairline fissures. To prevent these becoming uncontrolled water ingress points and unsightly cosmetic blemishes on the coating, control joints are installed to create a delineated weak point. These joints are nominally 10mm wide. In practice they end up 8 - 12mm wide and this is an acceptable range. Wider or narrower joints than this will affect the sealants' ability to cope with movement. These joints are covered by the elastomeric acrylic top layers of the Supercoat™ Coating System, or they can be visible if masked during coating and simply painted over with the final surface treatment.

Horizontal Joints

b) A common problem with any sheet material, cladding a two storey timber framed building, is peaking of the sheet ends. This occurs where height shrinkage in the frames causes the upper and lower panels to close up against each other and squeeze together. Flexible sheet material can also suffer bulging and bowing for the same reason. Height shrinkage can give startling dimension changes. For instance, if the ground floor bottom plate shrinks 3mm, the stud shrinks 2mm in length, the top plate also shrinks 3mm, the joists (if large), shrink 10mm, the upstairs bottom plate shrinks 3mm and the studs 2mm, then the total shrinkage in height of the timber framing will be 23mm. If double top plates are used, potential shrinkage increases. This is of course a worst case scenario, but it does happen, especially if frames get wet during construction. Even kiln dried timber will suffer, if saturated on site during construction. The horizontal orientation of the battens is a feature which greatly improves the rigidity and surface quality of the cladding, helping to prevent uncontrolled cracks becoming leak points. This horizontal orientation is only possible in closed cavity construction methods and is not an option.

c) For drained cavity claddings, where battens must be vertical for airflow and drainage reasons.

6.4.8 Supercrete™ Vapour Permeability

Unlike some cladding systems (which can "sweat" due to low vapour permeability) the Supercrete™ Panel is a vapour permeable product. BRANZ tests show that it will allow 33.4 grams of vapour to pass through it per square metre per 24 hours1. This is approximately the same as plasterboards so Supercrete™ Panel Cladding will not impede the passage of water vapour any more than the plasterboard lining.

By contrast, low permeability claddings, like profiled steel, have such high resistance to the passage of water vapour that it can build up to the point where it condenses on the interior face of exterior wall surfaces.

1 Water Vapour Transmission Test DC1249 carried out by BRANZ Ltd.

6.4.9 Supercoat™ Coating Breathability

It is important that the coating on a Supercrete™ Panel clad building is breathable to allow moisture from internal activities, such as washing, cooking and breathing, to vent through the walls. Allowing this moisture to escape, prevents the wall framing from becoming damp and reduces the risk of resulting decay.

There is no New Zealand minimum standard for vapour transfer rates of acrylic skins. However there are a variety of vapour transmission tests to establish an acrylic coating's permeability and suitability for use over concrete substrates.

Supercoat™ has a Water Vapour Transmission Permeability rate of approximately of 60.5g/24hour/m^2 yet the amount of liquid water (as opposed to vapour) which can pass is scarcely measurable at less than 1g/kPa/m^2 /day.

This good vapour transmission rate means that even if the cladding is dealing with a large amount of internal moisture, the acrylic skin and the Supercrete™ Panel Cladding will allow water vapour to escape to the outside of the structure.

Because Supercoat™ Coatings allow nearly twice as much vapour transmission as the substrates; it does so at rates which will not cause delaminating of the paint coating.

Comment: *Remember that water vapour is millions of times smaller than a liquid water droplet. Most vapour, such as that released from breathing, is so small it is invisible. Vapour can pass through the tiny microscopic pores within acrylic coatings, yet condensed, liquid water has a size of particle which prevents it passing through. That is why rain will shed off a painted wall, but internal vapour can still escape.*

6.4.10 Vapour Diffusion Moisture Management

The moisture management method employed by Supercrete™ Panels is best described as Vapour Diffusion.

a) Dealing with daily humidity

The combination of Supercrete™ Panels and Supercoat™ Coating System provides a breathable, water resistant skin to the building, venting and equalizing moisture vapour from daily activities such as cooking, washing and breathing, to the outside atmosphere, whilst preventing the ingress of rain water.

b) Dealing with water leaks

Due to the closed detailing of the system, leaks are unlikely.

Occasionally, poor workmanship, extreme weather events, or unexpected water pressure from hoses or water blasters may allow some water behind adjacent materials and into the closed cavity space.

It is important that the cladding system has robust moisture management facilities to deal with these events. Supercrete™ Panel Cladding has the following features to cope with this possibility;

1) Although the closed cellular structure of 50mm or 75mm thick Supercrete™ Panel means it has low permeability to liquid water, the surface has a broken bubble structure, where it has been formed by the wire cutter in the factory. This dragged concrete surface is absorbent, especially through the first 10mm of surface depth and will take on some liquid water, allowing a wet patch to form on the interior of the panel around the leak point. In this way, it does not allow the free flowing of water in the cavity space, but rather contains the moisture in the affected panels. Unless the leak is of catastrophic proportions, liquid water will not run to the base, so drainage holes would not benefit the system from a leak management point of view.
2) Unless continuously being saturated, the panels will dissipate this wet patch by vapour diffusion, through the Supercrete™ Panel and the Supercoat™ Coatings. During this process the timber frame is isolated from the wet panels by the batten space and building wrap. Tests performed on the timber frames directly behind and below known leak points on Supercrete™ Panel Clad buildings (caused by poor installation of adjacent elements) have shown that the frames maintain moisture contents in the "low" range.
3) Catastrophic leaks, such as burst water pipes, cyclone or storm damage to flashings etc, may create a big enough leak into the closed batten space to cause water to run to the bottom rebate. At the foundation rebate, where the panel sits on the DPC, there is no Holdfast sealant between the panel, DPC, and the concrete rebate. Due to irregularities in the poured concrete foundation, there will not be a watertight seal at this point and in the event of a catastrophic leak, water will drain to the space between the base of the panel and the back of the rebate and track through this joint to the outside.

A distinction must be made here between weatherproof and watertight. The system is weatherproof but not watertight, i.e. it will prevent the expected rainwater that runs down the outer face of the wall from entering, but will allow any leak water in the batten space to escape either through the panel face and coating as water vapour, or if excessive, it will soak the rear of the panel and run down to the rebate and exit under the panel. A head of pressure to raise the level of the leak water in this rebate to the height of the bottom plate, as it seeps out, could only occur with full submersion of the structure (e.g. a flood). This situation is beyond the scope of any cladding system to contain.

6.5 Detailing at Openings

Now that the unique material characteristics of Supercrete™ Autoclaved Aerated Concrete are understood, the designer, builder, installer and certifier must ensure that the correct installation method is employed to allow the system to function as intended. Critical to this is the correct detailing of openings, such as windows and doors as in any other cladding system.

6.5.1 Window Flashings

On most other cladding systems a head flashing is required over windows to discharge condensate, which may form on the building paper surface or behind the cladding, out over the window joinery. That is why in other cladding systems, head flashings have a few millimetres of open drainage gap.

The flashings are also required to direct any moisture that is wind blown up under the cladding at the window head, side or sill, back to the outside of the building.

This is not the case with Supercrete™ Panel Cladding. The head panel over windows (which has a 15 degree slope to form a drip edge) limits water tracking back to the joinery. The joinery is then fully sealed with a flexible Holdfast sealant to the panel, to prevent ingress of external moisture to the closed batten space.

In addition to the Holdfast sealant bead, a folded DPC backing is also employed as a secondary line of defence to direct any water, which may get past the Holdfast sealant, back into the panel, where it can be absorbed and vapour diffused.

Do not use drainage flashings.

If drainage discharge flashings over window and door heads are used in their traditional way (i.e. not sealed so as to allow a drainage gap over the top surface) the cavity ceases to be closed. Just as with weep holes and venting, this could raise corrosion and durability issues with the steel battens that support the cladding.

Installing flashings conventionally compromises the integrity of the system.

It is important that the moisture protection to the batten space is maintained by fully sealing around windows and doors with a Holdfast sealant (see Section 4.3.16, page 77).

Do not substitute the Holdfast sealant for a drainage type flashing. The openings must be sealed to maintain the performance of the closed cavity.

6.5.2 Leaks at Window Mitre Joints or Joinery Penetrations

Recently, focus has been placed on the mitre joints in aluminium window frames as potential ingress points for leaked water. Most reputable joinery manufacturers now ensure that all mitre joints are suitably sealed in accordance with the standards.

If a poor quality window joinery item is installed and it leaks at the joints, seals or glazing, the water must not track back to the timber frame. To assist in the unlikely event of window frame failure, the folded DPC backings will direct water from this source, away from the timber frame and into the panel, where it can be vapour diffused.

Supercrete™ Panels will sustain saturation undamaged.

The wet patch in the panel may expose itself by a visible hydrostatic blister in the coating system at the leak area. These hydrostatic blisters are caused either by the evaporation rate in hot weather exceeding the vapour diffusion rate of the coating, or in winter, freezing expansion de-bonding the coating from the substrate. This identifies the problem and a repair can be affected without having put the timber frame at risk.

6.5.3 Identifying and Fixing Leaks

Leaking is rarely a problem in the many thousands of successful Supercrete™ Cladding applications in New Zealand. In the few instances of leaks, it has been simply identified - typically by small, easily repairable hydrostatic blisters in the coating. The source of water ingress and the result can readily be remedied with the Holdfast sealants and coatings. If a leak is identified, contact the supplying Supercrete™ Distributor, who will assess the best repair solution.

6.5.4 Moisture Content of Timber Framing

Taking readings of the moisture content in the wall framing gives a good indication of the overall health of the wall.

The information can be used to assess the likelihood of fungal growth or decay in the wooden components and it shows how well the wall system is insulating to control condensation.

Invasive testing with twin probe moisture meters hammered into the timber frames of many existing Supercrete™ Panel clad buildings in both the North and South Islands of New Zealand, has shown that the timber moisture content of the framing behind Supercrete™ Panel Cladding remains in the "Very Low" or "Low" category.

The moisture content is not governed by exposure or risk criteria, or by coating integrity.

Comment: *Where other drained and ventilated claddings were installed adjacent to Supercrete™ Panel Cladding on the same wall, experiencing the same weather and internal humidity conditions, the frames behind these claddings were tested also. All comparisons showed frames behind drained and ventilated claddings had higher moisture contents than frames clad with Supercrete™ Panel Cladding.*

The closed cavity Supercrete™ Panel Cladding System is providing New Zealand building owners with excellent levels of timber frame protection.

6.6 Summary

Simply put, moisture management methods of Supercrete™ Panel Cladding do not require drained or vented cavity construction features such as weep holes, venting and drainage gaps. To apply these traditional methods to the system would introduce more problems than they could ever hope to solve.

The Supercrete™ Panel Cladding System has a proven track record in the field since 1994 in New Zealand and has been fully tested and Appraised. The system has been issued a Codemark Product Certificate by Certmark Australasia Pty Ltd.

Appendix A
Panel Installation Checklist

Supercrete™

Clients Name: Date:

Site Address

(Tick each item that has been completed. If item is not part of building write N/A beside it.)

WORKING TEMPERATURE

- [ ] Temperature was between 10°C and 35°C on each day of installation

FOUNDATION

- [ ] Foundation rebate tanked along base and up rear, or base closure angle fixed to foundation with powers spike anchors at 300mm maximum
- [ ] DPC slip joint installed

BATTENS

- [ ] First batten placed 150mm minimum & 250mm maximum from bottom of panels
- [ ] Battens have fixed at centres according to Design Guide Tables for the correct wind zone
- [ ] Battens fixed to every stud at 600mm maximum
- [ ] Battens fixed 150mm maximum below all window openings
- [ ] Battens fixed 150mm maximum above all door and window openings
- [ ] Battens have been installed straight & flat (packed if necessary to achieve this)

PANEL

- [ ] Panel screws have been placed between 50mm & 120mm from edge of panel
- [ ] Panel screw heads are below surface of panel and holes have been filled as recommended
- [ ] Exposed reinforcing steel has been coated with corrosion resistant paint

ADHESIVE JOINTS

- [ ] Surfaces to be coated brushed clean and thoroughly wetted as climate conditions require
- [ ] Supercoat™ AAC Superbond Adhesive has been applied for the full length of the joints using a toothed trowel
- [ ] Panels have been rubbed up and down against each other at the join when fitting together to ensure Supercoat™ AAC Superbond Adhesive is well spread
- [ ] Overspill has been removed flush with the face of the panel

TANKING

- [ ] Surfaces to be tanked have been brushed clean prior to applying tanking
- [ ] Bottom of panels have been tanked prior to sitting on rebate or base angle
- [ ] Window sills have been tanked
- [ ] Horizontal control joint edges have been tanked
- [ ] Articulation joint edges have been tanked

WINDOWS

- [ ] DPC flashings have been fitted to heads and jambs, and taped to building paper
- [ ] Sill flashing has been draped between batten below sill & panel
- [ ] Window joinery has been sealed continuously to panel
- [ ] Panel sill is tapered at 10° minimum (preferably 30°)

VERTICAL MOVEMENT CONTROL JOINTS

- [ ] These are to be located at positions indicated on the consented plans
- [ ] Battens stop either side of the control joint
- [ ] There is a 10mm minimum gap between panels
- [ ] The sides of the joint are sealed with Supercoat™ Surface Sealer to a minimum depth of 30mm

HORIZONTAL MOVEMENT CONTROL JOINTS

- [ ] Located at positions indicated on the consented plans
- [ ] Battens stop either side of the control joint.
- [ ] Panel edges are bevelled at 10°
- [ ] There is a 10mm minimum gap between panels.
- [ ] Sides of the joint are tanked with Supercoat ™Tanking Membrane

HORIZONTAL ARTICULATION JOINTS

- [ ] Located at positions indicated on the consented plans
- [ ] There is a 10mm minimum gap between panels
- [ ] Panel edges are bevelled at 10°
- [ ] Sides of the joint are tanked with Supercoat™ Tanking Membrane
- [ ] EVA 60 strips have been installed continuously 10mm minimum from face of panel

MOVEMENT CONTROL JOINTS TO OTHER CLADDINGS

- [ ] There is a 10mm minimum gap between panel & other claddings
- [ ] Thermoseal cavity is closed off with a closure channel
- [ ] Faces of panel outside Thermoseal cavity are tanked with Supercoat™ Tanking Membrane

I certify I have completed all the above Install stages

Signed _____ Date _____

Name _____

Supercrete™ Panel Cladding Installer Registration Number ☐☐ - ☐☐☐

Technical Support

Superbuild International Ltd and its network of Distributors offers technical assistance across New Zealand. Visit www.superbuild.co.nz for your local Distributor who will offer free estimating services; technical support to project architects, engineers, builders and owners.

Health & Safety

Information on any known health risks of our products and how to handle them safely is shown on their package and/or the documentation accompanying them.

Additional information is listed in the Material Safety Data sheet. To obtain a copy, telephone 0800 GO 4 SUPER or visit www.superbuild.co.nz

Guarantee

Supercrete™ Autoclaved Aerated Concrete products and Supercoat™ Coating System products are guaranteed to be free of defect in material and manufacture.

Installation workmanship and coating application work is guaranteed by the personnel who perform this work.

Substitution of this claddings' listed components is not permissible and if alternative brands, materials or elements are used, this will void all guarantees.

This guarantee excludes all other guarantees and liability for consequential damage or losses in connection with defective cladding, other than those imposed by legislation.

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