UNEX
ARCHITECTURAL BARRIERS

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POSTLESS BALUSTRADE

CONTENTS

THE BENEFITS OF POSTLESS BALUSTRADES

COMPLIANCE

Specifically engineered to comply with Liveload Classes A, B, E, & C3 of the NZ Building Code AS/NZS 1170.1:2002.

PRE-ENGINEERED SOLUTIONS

Full specifications available, saving cost and time designing a one-off balustrade.

AESTHETIC APPEAL

Continuous rows of thin fins gives this balustrade system a very slim profile when head-on, but has the look of a grill or comb when viewed from the side. These fins replace the need for solid posts. Concealed assembly fasteners, simple clean lines, tidy joints with no welds.

LOW MAINTENANCE

Aluminium channels do not rust. Combined with high performance powdercoat or anodized finishes make it easy to clean.

FULL BACK UP

Support from NZ's leading balustrade specialists. In-house engineering expertise provides site-specific solutions.

UNEX
ARCHITECTURAL BARRIERS

DIRECT ORDERS OR ENQUIRIES TO:
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EMAIL: orders@unex.co.nz
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INTRODUCTION

One of the advantages of Aluminium as a material is that it provides an excellent substrate for surface finishing. Aluminium is therefore the preferred choice of material where coloured coatings are required. The main coating method used is "Powdercoating". Anodizing is also available but with a much more limited choice of colour. Care and maintenance instructions for all finishes are given on Page 6. Warranties are available on extrusions for certain surface finish options. These are limited to those supplied by the supplier and/or applicator, and must be requested at the time of the order.

1. POWDERCOATING

Powdercoatings are applied as a powder, electrostatically charged to provide a uniform film thickness, followed by baking and final oven curing, resulting in a tough, smooth, and even coating. This process is performed in factory controlled conditions, and consistently gives a more uniform and superior finish compared to wet coatings. Powdercoatings also have excellent adhesion to pretreated aluminium. The use of solvents for cleaning powdercoated surfaces should be strictly avoided.

2. ANODIZING

Anodizing is an induced thickening of the natural protective oxide film on the metal's surface, and not a coating in the usual sense. The resulting film is clear, hard, extremely corrosion resistant, and capable of being coloured. Colour options are however relatively limited, with Satin (natural aluminium colour), Medium Bronze and Dark Bronze being the main colours economically available for balustrades. Some accessories, such as cast end caps, can not be anodized, and must be powdercoated in a coordinating colour. The depth of the anodized film can be varied to suit the application.

The use of abrasives for cleaning should be avoided as they can damage the anodic layer beyond repair.

CARE & MAINTENANCE OF UNEX BALUSTRADES

It is the Fabricators responsibility to ensure that a copy of these Care and Maintenance Instructions is made available to every purchaser of UNEX Balustrades. It is important that every building owner observes these recommendations to obtain the durability required in the NZ Building Code.

1. CARE AND PROTECTION

Protect the balustrades at all times from contact with:

- Wet cement or plaster, household cleaners including bleach, paint splashes, chemicals, solvents, stains and fertilisers are possibly harmful to the surface finish. If contact does occur, remove the contaminant immediately and wash as described below.
- Copper, brass, lead, mild steel, CCA treated timber, cement or concrete less than 1 month old, and water which has contacted any of these substances.

2. MAINTENANCE

Safety barriers shall be maintained in a structurally sound condition and, where applicable, self-closing gates and other components required for the protection of children shall be kept operable. Defects should be remedied immediately once they are apparent.

SURFACE FINISH

While surface finishes do not last forever, observance of these instructions will maintain their appearance and significantly extend their useful life. Observance of these instructions is also required to achieve durability performance and for surface finish warranties to be valid (where applicable). They apply to both anodized and powdercoated surfaces.

Powdercoated surfaces will lose some gloss with time. Where desired, powdercoated gloss may be enhanced with 'Dulux Gloss Up', used in accordance with the manufacturer's instructions.

CLEANING

It is recommended most residential balustrades in mild conditions or interior installations be cleaned at least once a year. In areas where pollutants are common such as industrial or geothermal areas, and for all sites within 1 km from the sea or in any sea spray zone identified by Section 4.2 of NZS 3604:1999, cleaning must be carried out more frequently as required, but not more than every three months.

a. Gently remove loose deposits with a wet sponge. Do not dry dust, or the surfaces will be scratched. Remove any moss growth, and ensure that all drain holes are unblocked, particularly those at the base of baluster fins and mounting rail.
b. Using a soft brush and a mild household detergent in warm fresh water, clean the surface to remove any dust, salt, or other deposits. Pay particular attention to any areas not washed naturally by the rain. In the instance of stubborn stains, use ONLY Isopropyl alcohol (IPA) or methylated spirits to help remove these.
c. Always rinse well after cleaning with fresh water to remove any remaining detergent.

******WARNING***: Solvents, household cleaners, bleaches, and abrasive cleaners are possibly harmful to the surface finish and must not be used.

GENERAL

The New Zealand Building Code (NZBC) provides mandatory performance criteria for balustrades. The UNEX Balustrade System has been designed to make it easy for Specifiers to ensure that balustrade compliance is achieved. The main building code clauses which affect balustrades are as below. Some areas of the code may not necessarily affect every balustrade application.

B1: STRUCTURE - Structural strength and stability
B2: DURABILITY - Durability requirements
C2: MEANS OF ESCAPE - Fire escape routes
D1: ACCESS ROUTES – Handrails
E2: WATER EGRESS – Water proofing
F2: HAZARDOUS BUILDING MATERIALS - Glazed balustrades
F4: SAFETY FROM FALLING - Barrier heights, opening sizes etc
F9: RESTRICTING ACCESS TO RESIDENTIAL POOLS

The performance criteria contained in the Building Code stipulates what is to be achieved, without prescribing how it is to be achieved. For more specific guidance, the MBIE issues 'Approved Documents' which provide detailed methods of establishing NZBC compliance, in the form of 'Verification Methods' or ' Acceptable Solutions'. While other criteria may be acceptable, the onus is on the designer to demonstrate adequate compliance with the prime requirements of the NZ Building Code. A brief summary of the Building Code clauses relevant to balustrades and handrails, is found on the following pages. A Producer Statement is available on www.unex.co.nz.

Disclaimer: Note that the information provided on the Building Code and other regulations is provided in good faith, and as applicable at the time of writing. However it is provided on a 'no liability' basis, and as these documents are up-dated from time to time, the latest documents should be consulted for full information and checked for subsequent amendments.

View The NZBC online at
www.building.govt.nz

(continued on following Page)

CLAUSE B1 - STRUCTURES

Balustrades are required to be capable of resisting certain loads. These include 'Live Loads' such as being induced by persons leaning on the balustrade. Live Loads vary with the application, eg.: Residential, Public etc. Balustrades with glass or other solid or semi-solid infill panels also need to withstand 'Wind Loads', which will vary with the location and other factors.

UNEX Balustrades have been designed to withstand the various human impact and wind loads as stipulated in the NZBC. This will be achieved if the balustrade heights and spacings between clamps or other fixing points, do not exceed the maximum given for the particular balustrade style's specification and method of fixing as given in Chapters 2 and 3. The maximum fin centres should be determined from these Chapters by the building designer and checked by the fabricator. The building designer must also ensure that an appropriate design of the substrate to adequately resist the loads imposed by the balustrade for the particular spans and fixing methods chosen is included in the drawings and specifications.

HUMAN IMPACT LOADS

These vary with the designated use of the building they are situated in, and are detailed in the loading standards cited in B1/VM1 of the NZBC: AS/NZS 1170.1:2002 Structural Design Actions. For reference, the various loadings have been designated with a "Loading Class" in the UNEX specifications. When using Chapters 2 and 3, the Loading Class must firstly be selected from the table on Page 59. Then the maximum clamp spacings can be determined for this class (along with the designated wind load if applicable), as indicated on the tables given in Chapters 2 and 3.

WIND LOADS

Balustrades with solid infill such as "glazed" styles must also withstand wind loads imposed, to the degree as stipulated in the NZBC. These loads are defined by the Design Wind Speed for the particular project.

(continued on following Page)

CLAUSE B2 - DURABILITY

The NZBC requires all balustrading to be sufficiently durable so as to remain functional for certain specified periods of time. These periods are given in the Acceptable Solution B2/AS1, which indicates a 'serviceable' durability requirement of 50 years for Balustrade Posts, Baluster-Fins, Channels and Top Rails, and 15 years for infill members. Note that this durability requirement does not apply to non-serviceable aspects such as the surface finishes (eg. powdercoating). For further information on these finishes refer to Page 5.

The durability aspect of the UNEX Balustrade system has been assessed by a Materials and Corrosion Consultant. A brief summary of this report is that in their opinion, UNEX Balustrades will meet these requirements if the balustrades are fabricated, installed and maintained in accordance with UNEX Systems' recommendations, including specific requirements relating to durability as outlined on Pages 53-54. Note that this does not cover aesthetics, but only serviceability.

Certain Care and Maintenance procedures to be followed are given on Page 6.

(continued on following Page)

CLAUSE D1 - ACCESS ROUTES

Acceptable solution D1/AS1 stipulates requirements for handrails on all stairways, and on ramps steeper than 1:20 on "accessible" routes. The top rail on a balustrade may serve as a handrail on an access route providing it meets certain requirements including; the profile, a minimum distance perimeter of the top of the profile and the height of the top rail above the ramp or pitch line of the stairs is between 900-1000mm.

The CRT and VRE rail complies with the handrail profile requirements of D1/AS1 for "Private" and "Common" stairways, but not for "Accessible Stairways or Ramps", for which LRR and LRS rails are the only compliant rails.

Where a top rail of a balustrade on a stairway does not comply with D1/AS1, a compliant auxiliary LRR round side rail can be bracketed to the side of the balustrade.

D1/AS1 also limits the projection of a balustrade or handrail on an escape route including a stairway or ramp, so that it does not reduce the minimum width by more than 100mm. Particular attention should be given to the width of the stairs and ramps on escape routes to ensure there will be the minimum permitted width inside the balustrade(s) or handrail(s). This is particularly where balustrades are "top fixed". It is advisable to coordinate with the balustrade fabricator/installer early in the design process.

In some situations, balustrades may be required to be "imperforate and non-combustible". Whilst UNEX Balustrades are not specifically designed to fulfill this requirement, they can usually be adapted to do so. UNEX Systems should be consulted if this is a requirement on any particular project.

UNEX Systems recommends that the NZBC is sighted in its entirety.

(continued on following Page)

CLAUSE E2 - WATER EGRESS

Where the balustrade attachment to the substrate incorporates water-proofing considerations, clause E2 of the NZ Building Code should be observed. Figure 19 of the Acceptable Solutions (E2/AS1 dated 1 July 2005) shows a detail which could apply to a balustrade. To sight the full details, please refer direct to the original documents in E2/AS1. There are some key points to be noted in figure 19 which must be incorporated in any application;

- The balustrade is side-mounted to a vertical surface (i.e. not top-mounted to a horizontal surface).
- The channel system is attached via a spacer which keeps the channel from directly bearing against the wall, and clears the drip edge above by a minimum of 25mm (Smaller clearances are usually accepted by Territorial Authorities).
- It shows a Neoprene or EPDM Washer between the spacer and the cladding.
- It shows the fixing which anchors into the framing, going through a batten in the cavity. It is important that any battens or packers used to transfer the compression loads within the cavity behind the cladding are vertical and extend over the full width and depth of the mounting points, bracket or spacer.
- It shows a layer of sealant between the fixing and the sides of the hole in the cladding through which the fixing passes.

(continued on following Page)

CLAUSE F2 - HAZARDOUS BUILDING MATERIALS

This clause has particular application to balustrades with glass infill panels, which are required by Acceptable Solution F2/AS1 to comply with NZS 4223.

Effective from 1st June 2016, structural glass barriers need to have an interlinking rail, unless the barrier is laminated safety glass and has features to retain panes of glass or prevent collapse, in the event of breakage. An interlinking rail must be designed to resist serviceability limit state (SLS) loads, specified in AS/NZS 1170 and B1/VM1, in the event that a glass pane of the barrier breaks.

It is the responsibility of the fabricator to ensure that the balustrade glazing design complies with NZS 4223 in all respects; including glass thickness, glass span, panel size, containment, etc. However, the UNEX Balustrade System has been designed to make this easily achievable in most situations.

All glass used in UNEX Balustrades should be safety toughened.

CLAUSE F4 - SAFETY FROM FALLING

This clause stipulates when barriers such as balustrades are required, and provides generalized requirements for barriers such as: "Barriers shall be of appropriate height". Acceptable Solution F4/AS1 provides more specific information on barriers and pool fences, and covers such things as barrier heights, opening sizes, and restrictions on toeholds.

UNEX Balustrades are entirely versatile, and can be fabricated in virtually any height or configuration. It is therefore, the responsibility of the fabricator to ensure that the finished product complies in all respects to the requirements of Clause F4, with reference to the intended use of the area as obtained from the specifier or owner.

UNEX Systems recommends that the NZBC is sighted in its entirety.

(continued on following Page)

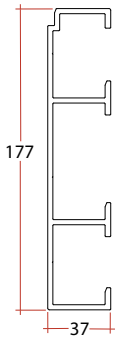
CLAUSE F9 - RESTRICTING ACCESS TO RESIDENTIAL POOLS

This clause has the requirements to prevent unsupervised access by children under five years of age to residential pools. It requires barriers around pools to restrict unsupervised access by children. Barriers can include gates and suitably constructed doors. Some small heated pools may have a removable cover rather than a surrounding barrier.

F9/AS1 provides the acceptable solution for swimming pool barriers in general. F9/AS2 provides the acceptable solution for covers which may be used on above ground small heated pools.

CHAPTER 1 - POSTLESS BALUSTRADES EXTRUSIONS & COMPONENTS

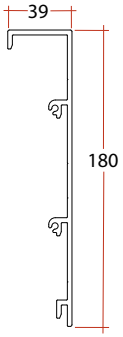
EXTRUSIONS



CBC

CHANNEL, INNER FOR FINLINE SYSTEM

Pairs with CFC Channel to form continuous bottom channel.



CFC

CHANNEL, OUTER FOR FINLINE SYSTEM

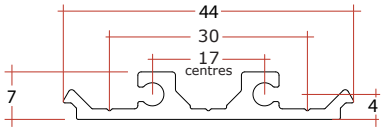
Pairs with CBC Channel to form continuous bottom channel. Accepts two 8 gauge screws for endcap attachment.

The CTL/CSL Fins are attached to this channel.

CRH

RAIL, TOP INNER FOR POSTLESS SYSTEM

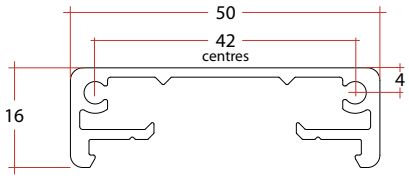
Clip fits to the CRT rail to form a continuous top rail. Accepts two 8 gauge screws for wallplates etc.



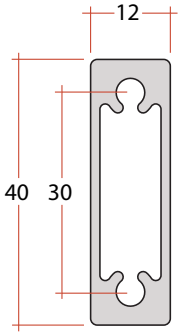
CRT

RAIL, TOP OUTER FOR POSTLESS SYSTEM

Clip fits to the CRH rail to form a continuous top rail. Accepts two 8 gauge screws for wallplates etc.



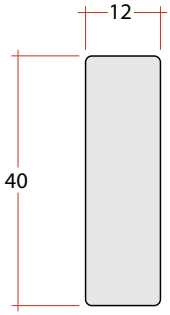
EXTRUSIONS



CTL

BALUSTER FIN, LIGHT DUTY

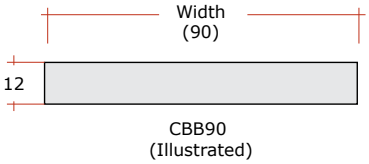
Baluster Fin for light-duty applications.
10 gauge screwpipes.



CSL

BALUSTER, SOLID FIN

Baluster Solid Fin to accompany the CTL Light Duty Fin. Used as required, see Style Specification for further detail.



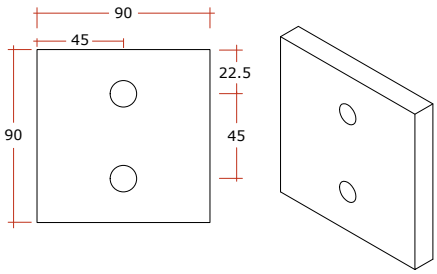
CBB75
CBB90

TOPLINE MOUNTING RAIL

Solid aluminium rail, 12mm thick. The figure after the code CBB denotes the width in millimetres.

CBB75 = 75x12mm Mounting Rail

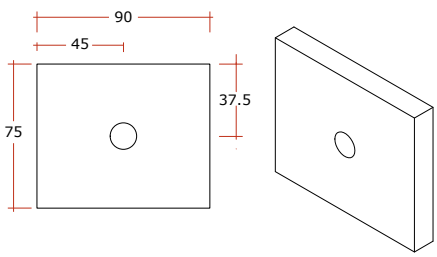
CBB90 = 90x12mm Mounting Rail (Illustrated)



PK090-090BTJ

PACKERS FOR TOPLINE WITH TIMBER

Aluminium packer for packing out and attaching Topline system to timber, with pre-drilled holes as shown. One packer is required at each pair of fixings. 10mm thick packer.

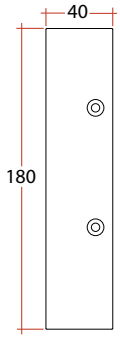


PK075-090BTW

PACKERS FOR TOPLINE WITH CONCRETE AND STEEL

Aluminium packer for packing out and attaching Topline system to concrete and steel, with pre-drilled hole as shown. One packer is required at each fixing point. Use with TSS75 tape separation between packer and steel substrates. 10mm thick packer.

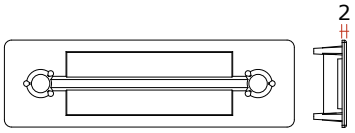
COMPONENTS



CCC

CAP, CHANNEL, FOR FINLINE SYSTEM

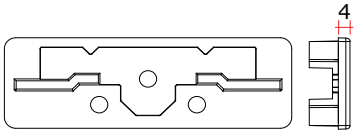
6mm thick end-cap which attaches to the Finline Postless Balustrade Channel system. Universal attachment can be screwed to either end of the CFC Channel. Commonly attached with two FV8-19 screws.



CCL

CAP, FIN FOR FINLINE SYSTEM

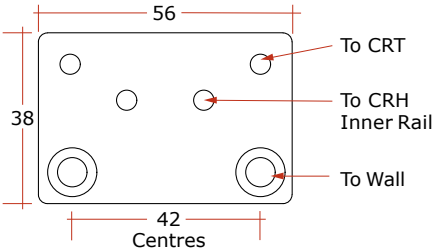
Cast aluminium cap for CTL Fin. Secure in place with TAS70-03*X* adhesive which is available in three different colours.



CCT

CAP, TOP RAIL FOR CRT

Cast aluminium cap for CRT Top Rail ends. Commonly attached with one FS4-4 rivet.



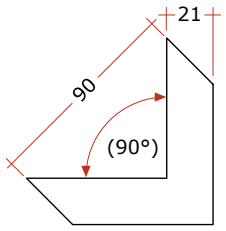
CWT

WALLPLATE, FOR CRT TOP RAIL

Flat wallplate. Screws to end of CRT and CRH Inner Rail using FV8-19, and then to wall or column (perpendicular applications only).

Ø6.5mm holes to wall.

6mm thick plate.



DNP90 (Illustrated)

DNP90
DNP135

CORNER GUSSET

Attach to the top surface of top inner rail on a suspended corner mitre. 2mm thick plate. Commonly attached to inner rail with x4 FS5-10 rivets from below the inner rail, refer to page 47.

DNP90 = 90° as illustrated

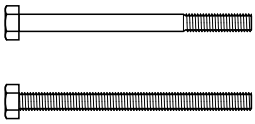
DNP135 = 135° corner angle

FASTENERS & TOOLS

The following pages give the part number key for each fastener type.

The current Price List gives actual part numbers (i.e. codes) for individual items which are available.

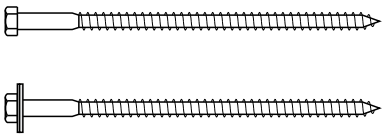
In the hypothetical, codes given for the key guides below: *0* are for digits and *X* are for letters.



FB*0*-*00*

BOLTS, HEX HEAD

1ST NUMBER	= Nominal Diameter, mm
2ND NUMBER	= Bolt Length, mm
SUFFIX: (none)	= Stainless Steel
G	= Hot Dip Galvanized



FCS*0*-*00*
FC*0*-*00*

COACH SCREWS

1ST NUMBER	= Nominal Diameter, mm
2ND NUMBER	= Screw Length, mm
SUFFIX: (none)	= Stainless Steel
G	= Hot Dip Galvanized

FCS*0*-*00* is a Coach Screw only. FC*0*-*00* is a Coach Screw and washer set. For example:

FC8-165	= FCS8-165 Coach Screw & FW8-20N Neo-Bonded Washer

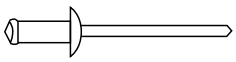
FE*0*-*00*

STUDS/RODS FOR EPOXY ANCHORING

For fastening of mounting rails/channels to concrete substrate using injected epoxy method. Grade 316 Stainless Steel.

1ST NUMBER	= Stud diameter, mm
2ND NUMBER	= Stud overall length, mm
SUFFIX: (none)	= Stud only
S	= Stud set, including Dome Nut & stud Washer
L	= Stud set, including Dome Nut & large Washer

FASTENERS & TOOLS - (CONT'D)



FR*0*-*00*

TRUSS HEAD BLIND RIVETS

1ST NUMBER: INDICATES RIVET DIAMETER

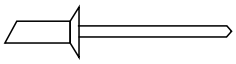
4	= 3.2mm (Drill Ø3.3)
5	= 4.0mm (Drill Ø4.1)
6	= 4.8mm (Drill Ø4.9)

2ND NUMBER: INDICATES GRIP RANGE

4	= 4.8 to 6.4mm
5	= 6.4 to 7.9mm
6	= 7.9 to 9.5mm
8	= 11.1 to 12.7mm
10	= 14.3 to 15.9mm

SUFFIX:

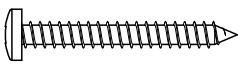
(None)	= Aluminium rivet, steel stem
B	= Black Aluminium
S	= Stainless Steel Rivet



FS*0*-*00*

CSK HEAD BLIND RIVETS

As FR series above, but with a Countersunk Head. (CSK Angle = 120°)



FT*0*-*00X*

PAN HEAD S/S SELF TAPPING SCREWS

1ST NUMBER	= Screw gauge
2ND NUMBER	= Length (mm)
SUFFIX: (none)	= Square drive
.T1	= Treated to enhance durability
H	= Self-drilling

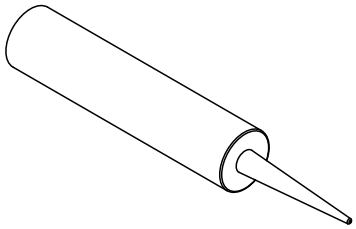
FV*0*-*00X*

CSK HEAD S/S SELF TAPPING SCREWS

As FT series above, but with a countersunk head. (CSK Angle = 90°)

SUFFIX: (none)	= Square drive
.T1	= Treated to enhance durability
TR.T1	= Truncated head (for hinges) and Treated to enhance durability

FASTENERS & TOOLS - (CONT'D)



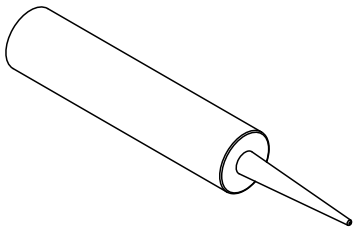
TAS70-03*X*

ADHESIVE

Elastic Simson ISR suitable for securing joints with UNEX handrails or firmly securing aesthetic end caps. 290ml cartridge.

SUFFIX:

B	= Black
G	= Grey
W	= White



TASG

ADHESIVE, FOR SUBSTRATE FASTENERS

Adhesive Sika Supergrip 2 Hour. Used to increase substrate fastener pull-out load rating, on timber decks in particular situations.

Will apply approx:
40 off FC8-165 substrate fasteners.

EPCON™ C8 EXTREME

Epcon™ C8 Extreme series epoxy is classified as a 'Dangerous Goods' and therefore has freight complications.

TEC4

Epcon™ C8 Extreme, 450ml will apply approx 33x FE10-115 Studs. Nozzles not included.

TEG4

Dispensing gun for TEC4 epoxy cartridge

TEN2

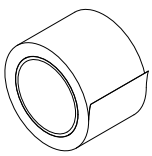
Disposable nozzle for TEC4 epoxy cartridge

TGL-05L

LANOLIN GREASE

Lanolin Grease. Used as coating to prevent corrosion and increase durability of fasteners and other products.

TGL-05L	= 0.5 Litres of Grease



TSS75
TSS90

SEPARATOR TAPE

Single-sided UV stable tape used to separate packers from steel substrates.

TSS75	= 75mm x 25m rolls
TSS90	= 90mm x 25m rolls

CHAPTER 2 - POSTLESS BALUSTRADES STYLE SPECIFICATIONS

DESIGN WIND SPEED

GENERAL OVERVIEW

For all Balustrade styles with solid infill the strength of the members and fixings must be strong enough to resist the maximum ultimate wind load that is likely to be opposed upon them. However, wind loads on balustrades with baluster or fin infills are generally small and can be neglected. The balustrades designs in this manual are compliant with wind loads up to and including 64 metres per second. Beyond 64 metres per second the balustrades will require Specific Engineering Design from a qualified Engineer.

BALUSTRADE DEFLECTION

GENERAL OVERVIEW

Balustrade deflection refers to the degree of 'movement' of the balustrade when a certain load is applied. The practical relevance of this deflection relates to the subjective feeling one may experience when asserting a force on the balustrade, as excessive movement may cause a sense of apprehension. Deflection should not be confused with safety in respect of the ultimate balustrade strength to resist failure. A guideline for the amount of balustrade deflection deemed acceptable can be derived from "Guidance on Barrier Design" March 2012, published by what was then the Department of Building and Housing. Below are several relevant excerpts from clause 3.5 of this document relating to balustrade deflection. The original document should be referred to directly for further information if required.

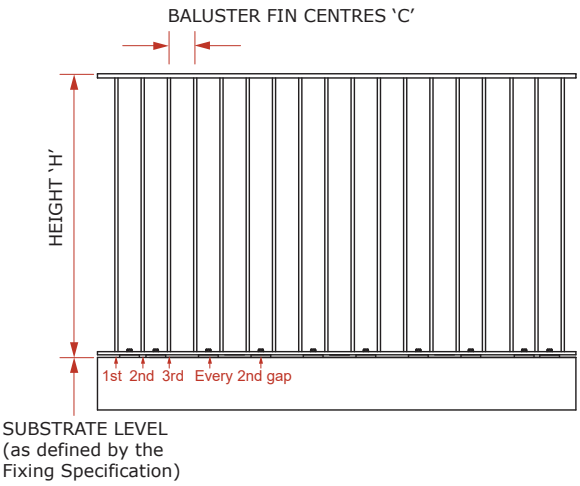
- "Beyond the NZBC requirements for barriers to be of adequate strength and stiffness to sustain the applied loads without causing loss of amenity through undue deflection, there are no further mandatory requirements for deflections."
- "The total horizontal displacement is recommended not to exceed 30mm under barrier and wind loads described in B1/VM1."
- "For serviceability, the horizontal deflection of Postless Balustrade Systems (measured at the handrail/top rail) may be considered acceptable if it does not exceed H/60 + L/240 or 30mm, whichever is smaller, where H is the height of the handrail/top rail above the top of the supporting structure (deck or slab) and L is the distance between the centres of the supporting Postless Balustrade."

APPLICATION IN THIS MANUAL

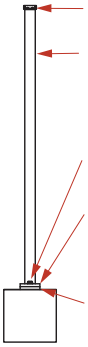
The specifications in this manual (Issue 13.0) have been calculated with a target maximum deflection not to exceed 28mm. These deflections may be exceeded by up to 10% for some "unlikely to occur" loading combinations.

'TOPLINE' (CRT TOP RAIL) - TOP FIXING

This is a Style Specification for the use of Postless Balustrade Systems, and must only be used in conjunction with a Fixing Specification, the Specification Notes, and the Assembly Specification contained in this manual. Installation must be completed in accordance with the Installation Guide in Chapter 5.



The balustrade shall be fabricated from the following items:



TOP RAIL: CRT/CRH

BALUSTER FIN: CTL
(Free ends require CSL 40x12 Solid Fins for 1.1m & 1.2m heights. Refer to table below.)

FIXINGS: Refer to fixing specification.

MOUNTING RAIL: CBB75 or CBB90 - Refer to fixing detail for correct mounting rail.

ALUMINIUM PACKER: Refer to fixing detail for sizing and type.

Balustrade supplied by Unex Systems

THIS SPECIFICATION IS BASED ON THE ATTACHMENT OF THE BALUSTRADE BEING IN ACCORDANCE WITH ONE OF THE STANDARD TOP FIXING SPECIFICATIONS CONTAINED ON PAGES 28–38. REFER TO UNEX FOR NON-STANDARD FIXING METHODS.

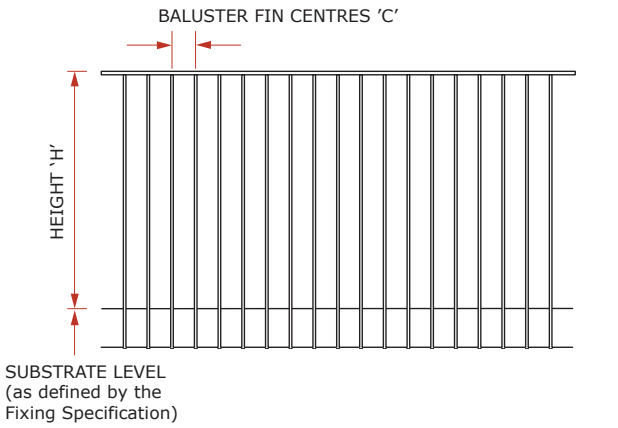
MAXIMUM HEIGHT 'H', MAXIMUM BALUSTER FIN CENTRES, SOLID FIN REQUIREMENTS AND SUBSTRATE FIXING LOCATIONS

		LOADING CLASS (1) N07C/N07R/N03R				
'H' HEIGHT(2) (metres)	Line No.	Fin CENTRES 'C'(3) (millimetres)	CSL 40X12 SOLID Fins AT EACH FREE END	SUBSTRATE FIXING LOCATIONS		
				1st row at each free end	2nd row at each free end	In-between
1.0	1	110	NONE	Centred between 1st & 2nd Fin	Centred between 2nd & 3rd Fin	Every 2nd gap between Fins
1.1	2	100	2 Fins	Centred between 1st & 2nd Fin	Centred between 2nd & 3rd Fin	Every 2nd gap between Fins
1.2	3	75	4 Fins	Centred between 1st & 2nd Fin	Centred between 2nd & 3rd Fin	Every 3rd gap between Fins

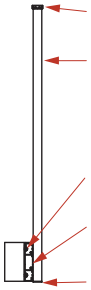
(1) LOADING CLASS: Refer to Page 59 of this Manual for the scope of the Loading Class designations.
(2) HEIGHT 'H': is the overall height of the Balustrade above the substrate level shown.
(3) Baluster Fin CENTRES: This is the maximum allowable centres for the Baluster Fins.

'FINLINE' (CRT TOP RAIL) - SIDE FIXING

This is a Style Specification for the use of Postless Balustrade Systems, and must only be used in conjunction with a Fixing Specification, the Specification Notes, and the Assembly Specification contained in this manual. Installation must be completed in accordance with the Installation Guide in Chapter 5.



The balustrade shall be fabricated from the following items:



- TOP RAIL: CRT/CRH
- BALUSTER FIN: CTL
  (Free ends require CSL 40x12 solid fins for 1.1m & 1.2m heights. Refer to table below.)
- FIXINGS: Refer to fixing specification
- CHANNEL: CBC Inner, CFC Outer
- END CAP: CCL for CTL

THIS SPECIFICATION IS BASED ON THE ATTACHMENT OF THE BALUSTRADE BEING IN ACCORDANCE WITH ONE OF THE STANDARD SIDE FIXING SPECIFICATIONS CONTAINED ON PAGES 28-38. REFER TO UNEX FOR NON-STANDARD FIXING METHODS.

MAXIMUM HEIGHT 'H', MAXIMUM BALUSTER FIN CENTRES, SOLID FIN REQUIREMENTS AND SUBSTRATE FIXING LOCATIONS

		LOADING CLASS (1) N07C/N07R/N03R				
'H' HEIGHT(2) (metres)	Line No.	Fin CENTRES 'C'(3) (millimetres)	CSL 40X12 SOLID Fins AT EACH FREE END	SUBSTRATE FIXING LOCATIONS		
				1st row at each free end	2nd row at each free end	In-between
1.0	1	110	NONE	50mm from the end	200mm from the previous row (250mm from the end)	Equal spacing up to 400mm
1.1	2	100	2 Fins	50mm from the end	200mm from the previous row (250mm from the end)	Equal spacing up to 400mm
1.2	3	75	4 Fins	50mm from the end	200mm from the previous row (250mm from the end)	Equal spacing up to 400mm

(1) LOADING CLASS: Refer to Page 59 of this Manual for the scope of the Loading Class designations.
(2) HEIGHT 'H': is the overall height of the Balustrade above the substrate level shown.
(3) Baluster Fin CENTRES: This is the maximum allowable centres for the Baluster Fins.

CHAPTER 3 - POSTLESS BALSUTRADES FIXING SPECIFICATIONS

GENERAL NOTES FOR FIXING TO TIMBER SUBSTRATES

The following general notes refer to the Timber Fixing Specifications on Pages 28-32 in this Manual.

1. GENERAL

The Postless Balustrade Style Specifications are based on the standard Fixing Specifications in this Manual.

Non-standard and site-specific specifications supplied by Unex Systems may be used in conjunction with Postless Balustrade Style Specifications and Fixing Specifications, providing any factors and/or instructions shown in the non-standard and site-specific specifications are applied.

2. LOADING CLASS

Refer to Page 59 for a description of the various Loading Class designations.

3. APPROVED FASTENERS

All fasteners shall be manufactured from 316 stainless steel and be supplied by UNEX.

Coach Screws shall be manufactured to DIN 571 and are identified in the tables by their part number. e.g.
FC8-165 : FC = Coach screw stainless steel ; 8 = 8mm diameter ; 165 = length in mm.

Bolts shall be 8mm diameter Class 70 stainless steel and be fitted with stainless steel Nyloc Nuts and Washers. Alternatively use 316 S/S threaded Rods with Nuts and Washers. Use S/S Dome Nuts in lieu of standard Nut heads where visible.

6. MOUNTING RAIL AND CHANNEL

Mounting Rail and Channels shall be attached to the Baluster Fins and fixed to structural timber framing as illustrated.

7. FABRICATION AND INSTALLATION

Fabrication and Installation are to be in accordance with the other Chapter of this Manual and where applicable, comply with the relevant requirements of the NZ Building Code.

8. SUBSTRATE DESIGN

Substrate Design including waterproofing and structural design of the timber members and their connections is beyond the scope of these specifications and must be carried out by others. Structural timber shall have a minimum thickness of 45mm.

9. TIMBER

Screw strength is based on structural timber being Pinus Radiata VSG8 or MSG8.

DRY TIMBER is timber with a maximum in-service moisture content of 18%.

WET TIMBER is timber where the in-service moisture content could be greater than 18% eg. exposed decks.

10. INSERTING COACH SCREWS

For 8mm and 10mm Coach Screws, pre-drill the entire screw embedment to the following diameters.

5.5mm diameter for 8mm Coach Screws. (TDT5.5 Drill bits available from UNEX).

8mm diameter for 10mm Coach Screws. (TDT8.0 Drill bits available from UNEX).

Where the unthreaded shaft of the screw will penetrate the structural timber, it will also be necessary to pre-drill the depth of the hole that will be occupied by the unthreaded shank to the nominal shank diameter taking great care not to extend this drilling into the threaded portion.

In some situations, the screws may penetrate beyond the structural timber. Check for suitability.

(continued on following Page)

GENERAL NOTES FOR FIXING TO TIMBER SUBSTRATES - (CONT'D)

11. DURABILITY

Instructions relating to durability issues outlined on Pages 53-54 of this Manual must be carried out in conjunction with these Fixing Specifications. These instructions cover a number of areas including; drainage slots and separation of the aluminium from the stainless steel fasteners and/or the substrate. Detailed instructions are given throughout this Manual, particularly in Chapter 5.

12. PACKING CAVITIES

For side fixed Channels the full area between the Channel and the supporting substrate must be packed solid with No 1 Pinus Radiata or similar material having an equivalent bearing strength.

13. DEFLECTION

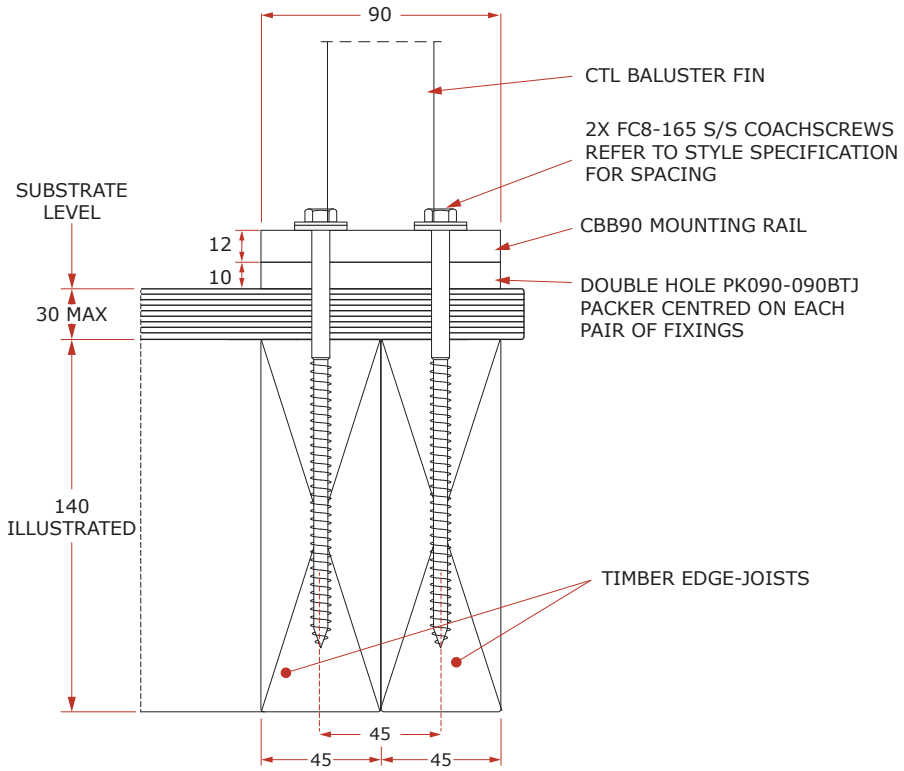
Please note that some of the following Fixing Specifications may exceed the non-mandatory recommended Balustrade deflection guide.

14. SUBSTRATE FASTENER BONDING

Where required all substrate Coach Screws, must have fully engaged threads to the structural timber and be embedded with **"Sika Supergrip 2 Hour"** Adhesive. The adhesive is available from UNEX code: TASG and must not be substituted with other adhesives. Insert some adhesive into the pre-drilled hole and liberally apply to the Coach Screws before insertion. Ensure you always follow all the manufactures safety procedures and usage instructions.

DRY TIMBER - TOP FIXING, 90MM JOIST

This is a Standard Fixing Specification for the Postless Balustrade Systems. It must only be used in conjunction with the General Notes on pages 26-27 and the relevant Style Specification in Chapter 2. Installation must be completed in accordance with the Installation Guide in Chapter 5 and all other relevant portions of this manual.



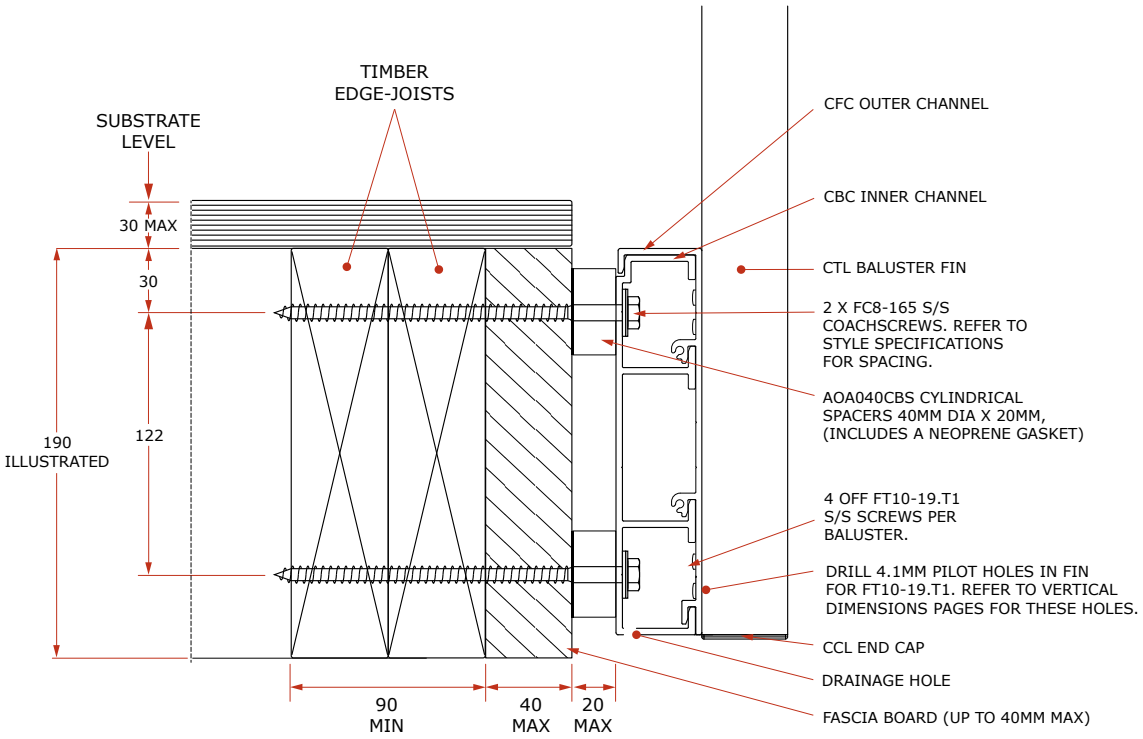
THIS STANDARD SPECIFICATION IS COMPATIBLE WITH THE STYLE SPECIFICATION ON PAGES 23. REFER TO UNEX FOR ALTERNATIVE STYLE SPECIFICATIONS AND NON-STANDARD FIXING METHODS.

NOTES RELATING TO THIS SPECIFICATION

1. Structural timber must be Pinus Radiata VSG8 or MSG8. Maximum in service moisture content of 18%.
2. All FC8-165 Coach Screws used in this specification, must be supplied by UNEX (includes Washers).
3. Important, the FC8-165 Coach Screws in this specification are to be used with the "**Sika Supergrip 2 Hour**" adhesive system (TASG).
4. Substrate design including waterproofing and structural design of the timber substrate and its connections are not included in this specification and must be carried out by others.

DRY TIMBER - SIDE FIXING, 90MM JOIST

This is a Standard Fixing Specification for the Postless Balustrade Systems. It must only be used in conjunction with the General Notes on pages 26-27 and the relevant Style Specification in Chapter 2. Installation must be completed in accordance with the Installation Guide in Chapter 5 and all other relevant portions of this manual.



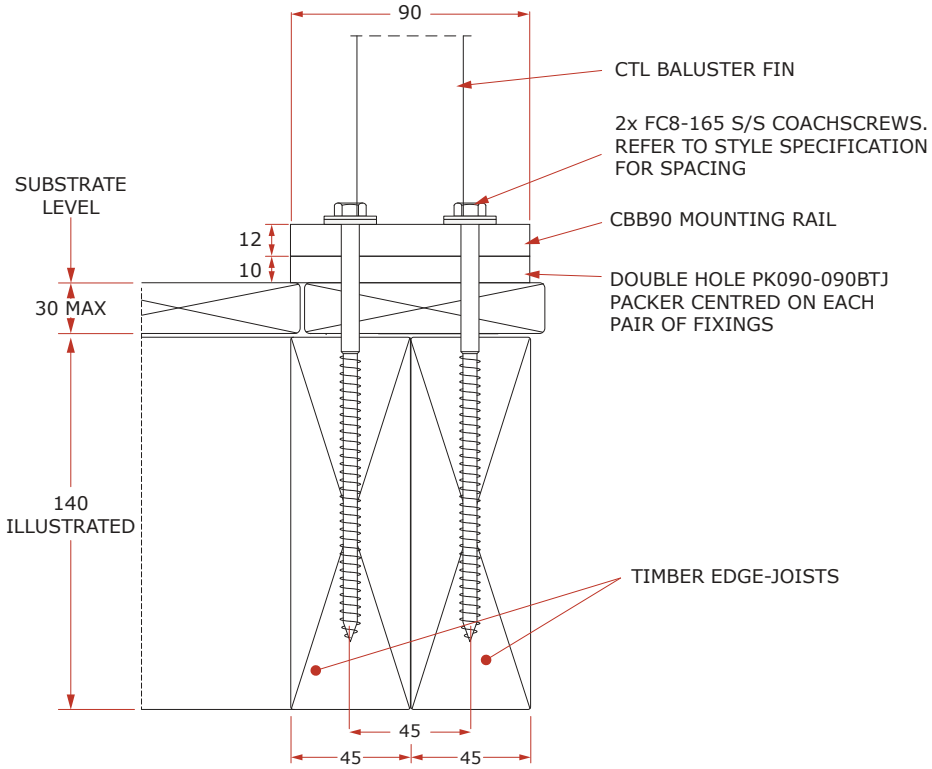
THIS STANDARD SPECIFICATION IS COMPATIBLE WITH THE STYLE SPECIFICATION ON PAGES 24. REFER TO UNEX FOR ALTERNATIVE STYLE SPECIFICATIONS AND NON-STANDARD FIXING METHODS.

NOTES RELATING TO THIS SPECIFICATION

1. Structural timber must be Pinus Radiata VSG8 or MSG8. Maximum in service moisture content of 18%.
2. Cavities between the CBC Channel back and the supporting substrate must be packed solid with No. 1 Pinus Radiata or material having an equivalent bearing strength and durability.
3. All FC8-165 Coach Screws used in this specification, must be supplied by UNEX (includes Washers).
4. Important, the FC8-165 Coach Screws in this specification are to be used with the "**Sika Supergrip 2 Hour**" adhesive system (TASG).
5. Substrate design including waterproofing and structural design of the timber substrate and its connections are not included in this specification and must be carried out by others.

WET TIMBER - TOP FIXING, 90MM JOIST

This is a Standard Fixing Specification for the Postless Balustrade Systems. It must only be used in conjunction with the General Notes on pages 26-27 and the relevant Style Specification in Chapter 2. Installation must be completed in accordance with the Installation Guide in Chapter 5 and all other relevant portions of this manual.



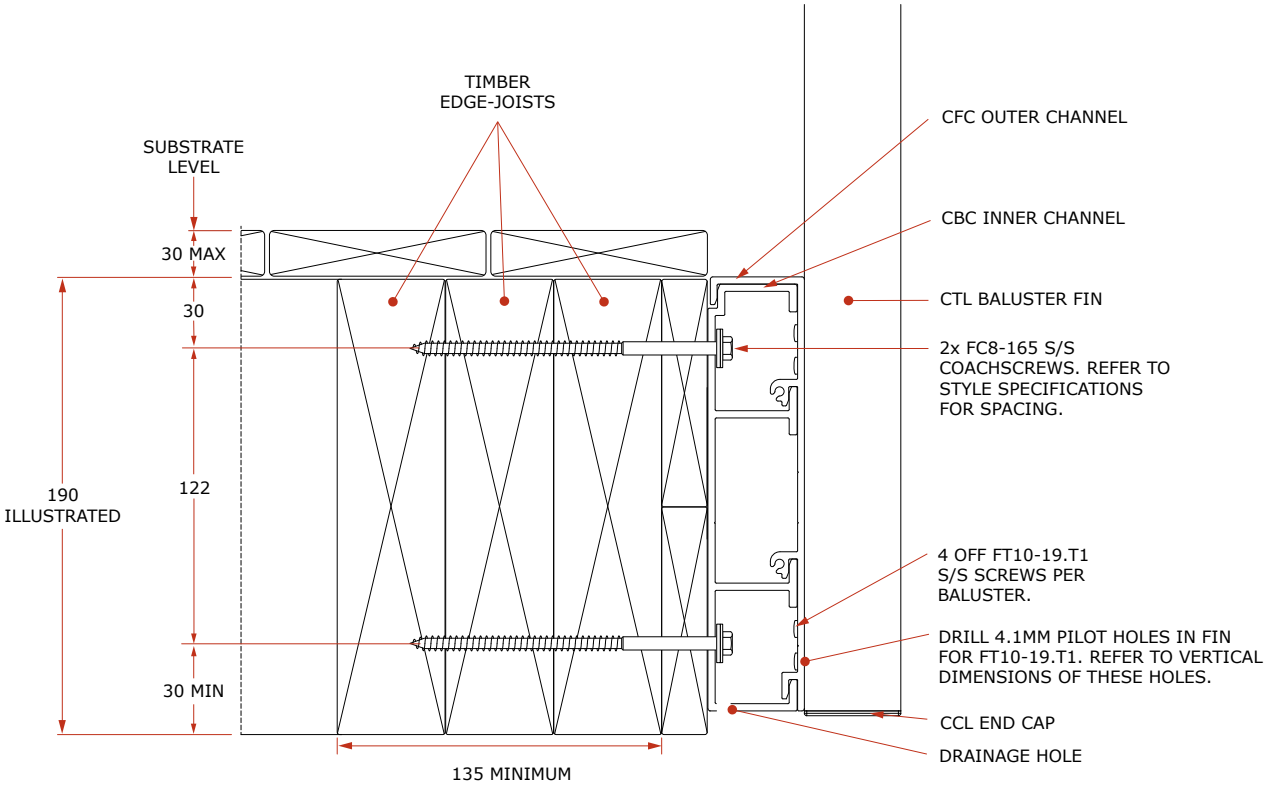
THIS STANDARD SPECIFICATION IS COMPATIBLE WITH THE STYLE SPECIFICATION ON PAGES 23. REFER TO UNEX FOR ALTERNATIVE STYLE SPECIFICATIONS AND NON-STANDARD FIXING METHODS.

NOTES RELATING TO THIS SPECIFICATION

1. Structural timber must be Pinus Radiata VSG8 or MSG8.
2. All FC8-165 Coach Screws used in this specification, must be supplied by UNEX (includes Washers).
3. Important, the FC8-165 Coach Screws in this specification are to be used with the "**Sika Supergrip 2 Hour**" adhesive system (TASG).
4. Substrate design including waterproofing and structural design of the timber substrate and its connections are not included in this specification and must be carried out by others.

WET TIMBER - SIDE FIXING, 135MM EDGE JOIST

This is a Standard Fixing Specification for the Postless Balustrade Systems. It must only be used in conjunction with the General Notes on pages 26-27 and the relevant Style Specification in Chapter 2. Installation must be completed in accordance with the Installation Guide in Chapter 5 and all other relevant portions of this manual.



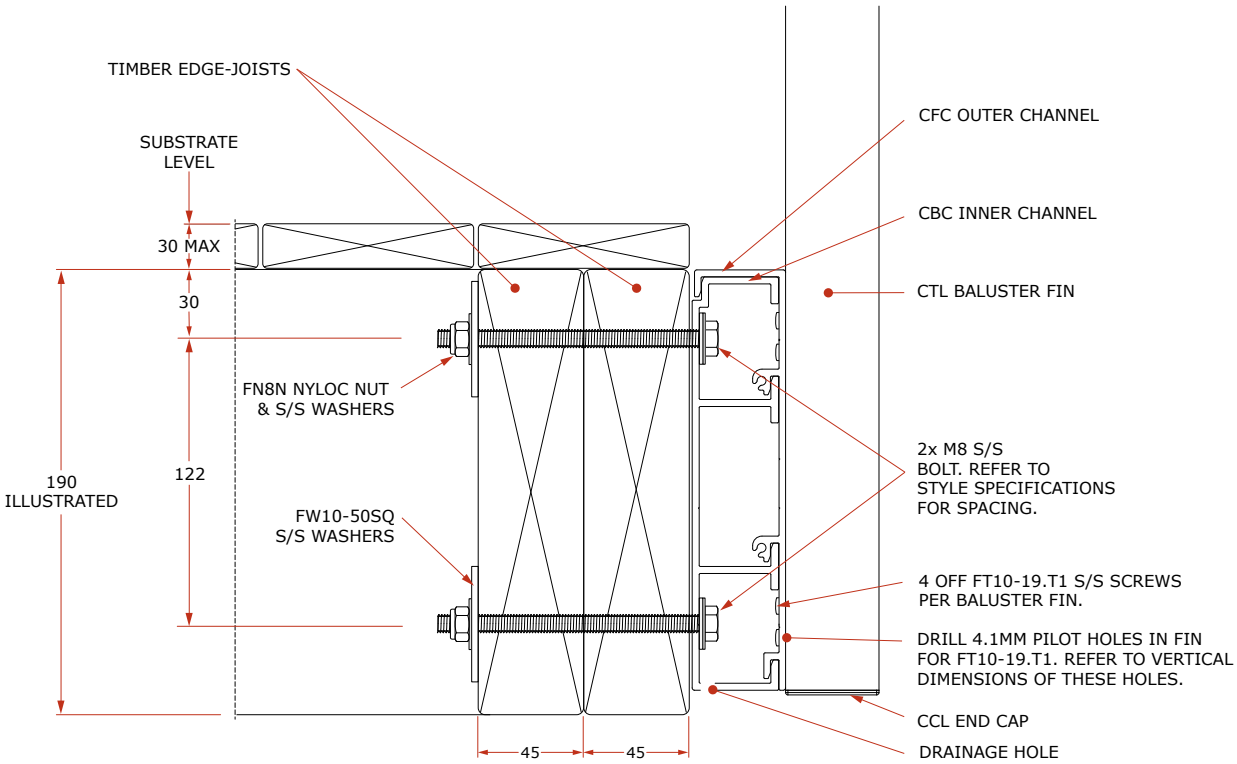
THIS STANDARD SPECIFICATION IS COMPATIBLE WITH THE STYLE SPECIFICATION ON PAGES 24. REFER TO UNEX FOR ALTERNATIVE STYLE SPECIFICATIONS AND NON-STANDARD FIXING METHODS.

NOTES RELATING TO THIS SPECIFICATION

1. Structural timber must be Pinus Radiata VSG8 or MSG8.
2. All FC8-165 Coach Screws used in this specification, must be supplied by UNEX (includes Washers).
3. Important, the FC8-165 Coach Screws in this specification are to be used with the "**Sika Supergrip 2 Hour**" adhesive system (TASG).
4. Substrate design including waterproofing and structural design of the timber substrate and its connections are not included in this specification and must be carried out by others.

WET TIMBER - SIDE FIXING, THROUGH BOLTS

This is a Standard Fixing Specification for the Postless Balustrade Systems. It must only be used in conjunction with the General Notes on pages 26-27 and the relevant Style Specification in Chapter 2. Installation must be completed in accordance with the Installation Guide in Chapter 5 and all other relevant portions of this manual.



THIS STANDARD SPECIFICATION IS COMPATIBLE WITH THE STYLE SPECIFICATION ON PAGES 24. REFER TO UNEX FOR ALTERNATIVE STYLE SPECIFICATIONS AND NON-STANDARD FIXING METHODS.

NOTES RELATING TO THIS SPECIFICATION

1. Structural timber must be Pinus Radiata VSG8 or MSG8.
2. M8 Bolts shall be Class 70 stainless steel and supplied by UNEX (M8 Bolts are UNEX code FB8-*00* where the *00* represents the length in mm).
3. Washers fitted under S/S Nyloc Nut and S/S Bolt heads shall be as follows:
   - For M8 S/S Bolt heads in the aluminium Channel, use a 22mm O.D. stainless steel washer (Part No. FW8-22) directly beneath the head of the Bolt. Then use a 22mm O.D. polymer washer (Part No. FWP8-22G) between the stainless steel washer and the aluminium Channel.
   - For the M8 S/S Nyloc Nuts bearing against timber, use a 50 x 50 x 3mm stainless steel Washers (Part No. FW10-50SQ) to bear directly against the timber. Then use a 22mm O.D. S/S washer (Part No. FW8-22) under the S/S Nyloc Nut (Part No. FN8N).
4. Substrate design including waterproofing and structural design of the timber substrate and its connections are not included in this specification and must be carried out by others.

GENERAL NOTES FOR FIXING TO CONCRETE SUBSTRATES

The following general notes refer to the concrete Fixing Specifications on Pages 34-35.

1. GENERAL

The Postless Balustrade Style Specifications are based on the standard Fixing Specifications shown in this manual.

Non-standard and site-specific specifications supplied by UNEX Systems may be used in conjunction with Postless Balustrade style and Fixing Specifications, providing any factors and/or instructions shown in the non-standard and site-specific specifications are applied.

2. LOADING CLASS

Refer to Page 59 for a description of the various Loading Class designations.

3. FASTENERS

Fasteners shall be manufactured from 316 stainless steel and be supplied by UNEX. They are identified in the tables by their UNEX Part Number. Refer to Chapter 1, eg. FE10-130: FE = Threaded Stud Stainless Steel; 10 = 10mm diameter; 130 = length in mm.

All Studs shall be threaded 316 stainless steel (S/S) with an ultimate tensile stress of not less than 560 MPa and all Bolts shall be strength Class 70 with an ultimate tensile stress of not less than 700 MPa.

4. EPOXY ANCHORING

The Postless Balustrade shall be attached to the concrete substrate, as illustrated. FE Studs as described in Note 3 above, shall be installed and anchored into concrete using the epoxy Epcon™ C8 Extreme system in accordance with the manufacturers instructions. Refer also to instructions in Chapter 5 of this manual.

5. FABRICATION AND INSTALLATION

Fabrication and Installation are to be in accordance with Chapter 5 of this manual and where applicable, comply with the relevant requirements of the NZ Building Code.

6. SUBSTRATE DESIGN

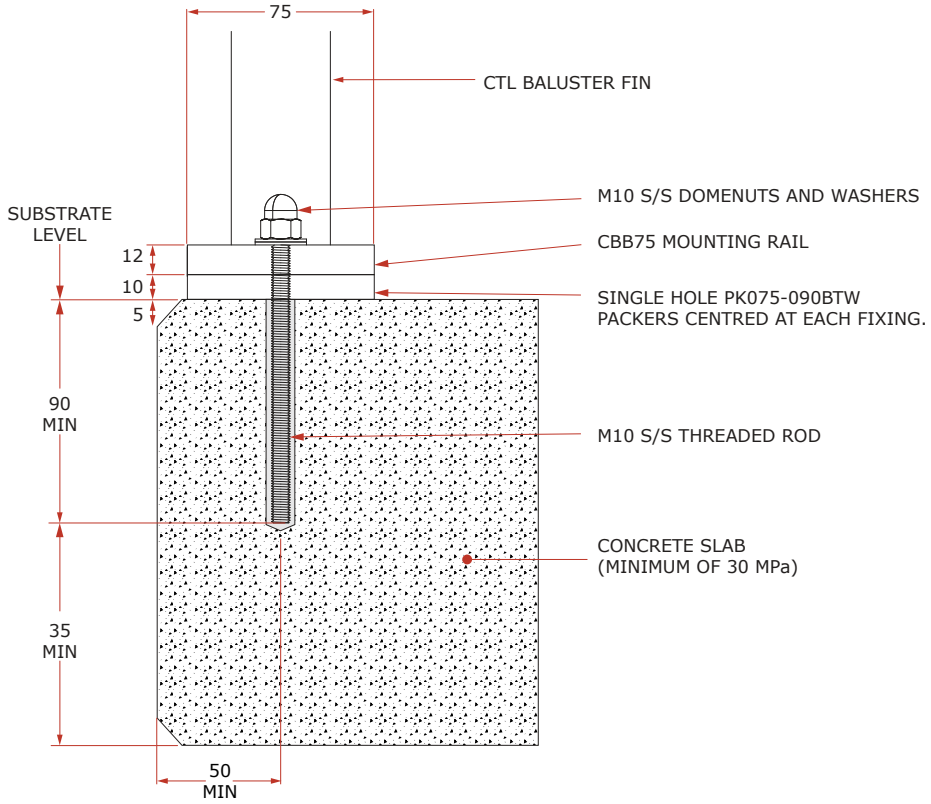
Substrate Design including waterproofing and structural design of the concrete and steel supporting substrate including reinforcement is beyond the scope of this specification and must be carried out by others.

7. CONCRETE

Concrete shall have a minimum 28 day crushing strength of 30MPa.

CONCRETE - TOP FIXING, EPOXY-SET ANCHORS

This is a Standard Fixing Specification for the Postless Balustrade Systems. It must only be used in conjunction with the General Notes on pages 26-27 and the relevant Style Specification in Chapter 2. Installation must be completed in accordance with the Installation Guide in Chapter 5 and all other relevant portions of this manual.



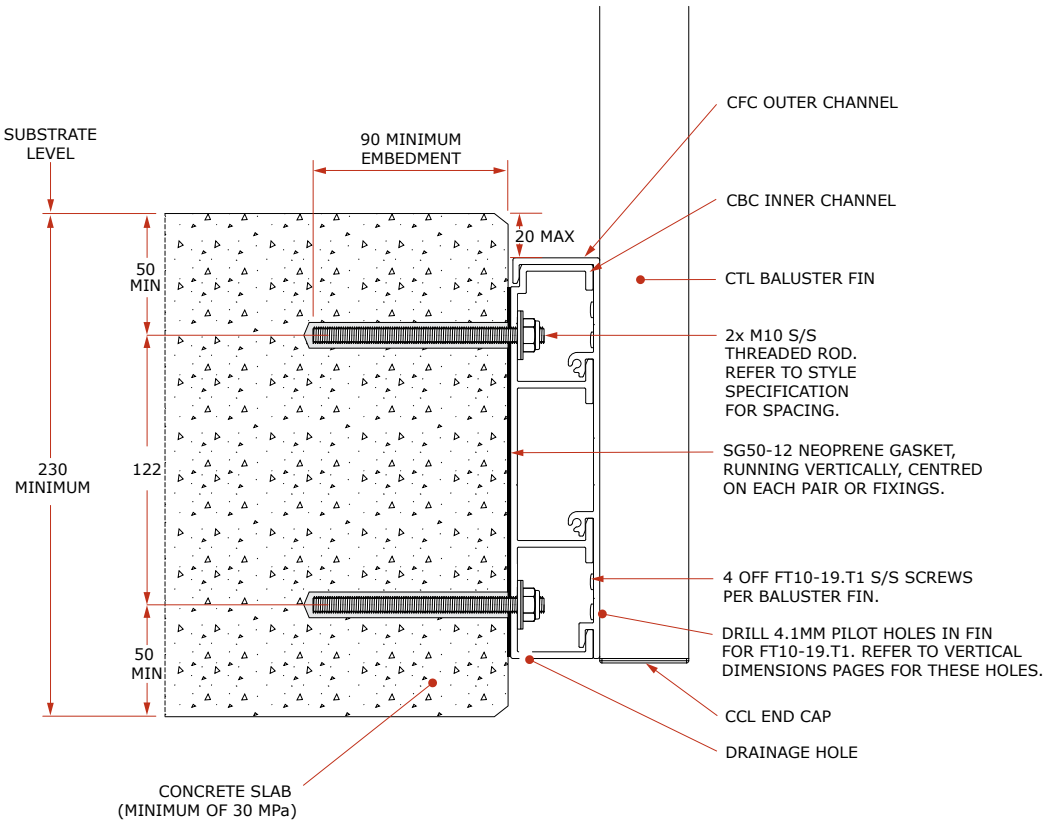
THIS STANDARD SPECIFICATION IS COMPATIBLE WITH THE STYLE SPECIFICATION ON PAGES 23. REFER TO UNEX FOR ALTERNATIVE STYLE SPECIFICATIONS AND NON-STANDARD FIXING METHODS.

NOTES RELATING TO THIS SPECIFICATION

1. M10 threaded Rods/Studs are manufactured from 316 S/S with a minimum ultimate tensile stress of 700 MPa and supplied by UNEX (M10 threaded Rods are UNEX code FE10-*00* where *00* is replaced by the length in mm of the Rod, e.g. FE10-125 is a 125mm M10 Rod, typically used). Where a plaster finish, fascia, or other such element is positioned between the Channel and the substrate, the length of the threaded rod needs to be increased by the same amount to maintain the specified embedment in the structural concrete.
2. Washers fitted under S/S Dome Nut shall be a 21mm O.D. stainless steel (Part No. FW10-21) washer directly beneath the head of the Dome Nut. Then use a 22mm O.D. polymer washer (Part No. FWP10-22G) between the stainless steel washer and the aluminium Mounting Rail.
3. FE10-*00* Studs as described above shall be installed and anchored into concrete using the epoxy Epcon™ C8 Extreme (UNEX code TEC4) in accordance with the manufacturer's instructions.
4. Substrate design, including waterproofing, is beyond the scope of this specification and shall be carried out by others. Concrete shall have a 28 day Compressive Strength of 30 MPa or more (as required for substrate design) and be adequately reinforced.

CONCRETE - SIDE FIXING, EPOXY-SET ANCHORS

This is a Standard Fixing Specification for the Postless Balustrade Systems. It must only be used in conjunction with the General Notes on pages 26-27 and the relevant Style Specification in Chapter 2. Installation must be completed in accordance with the Installation Guide in Chapter 5 and all other relevant portions of this manual.



THIS STANDARD SPECIFICATION IS COMPATIBLE WITH THE STYLE SPECIFICATION ON PAGES 24. REFER TO UNEX FOR ALTERNATIVE STYLE SPECIFICATIONS AND NON-STANDARD FIXING METHODS.

NOTES RELATING TO THIS SPECIFICATION

1. M10 threaded Rods/Studs are manufactured from 316 S/S with a minimum ultimate tensile stress of 700 MPa and supplied by UNEX (M10 threaded Rods are UNEX code FE10-*00* where *00* is replaced by the length in mm of the Rod, e.g. FE10-115 is a 115mm M10 Rod, typically used). Where a plaster finish, fascia, or other such element is positioned between the Channel and the substrate, the length of the threaded Rod needs to be increased by the same amount to maintain the specified embedment in the structural concrete.
2. Washers fitted under S/S Nyloc Nut shall be a 21mm O.D. stainless steel (Part No. FW10-21) washer directly beneath the head of the Nyloc Nut. Then use a 22mm O.D. polymer washer (Part No. FWP10-22G) between the stainless steel washer and the aluminium Channel.
3. FE10-*00* Studs as described above shall be installed and anchored into concrete using the epoxy Epcon™ C8 Extreme system (UNEX Code TEC4) in accordance with the manufacturer's instructions.
4. Substrate design, including waterproofing, is beyond the scope of this specification and shall be carried out by others. Concrete shall have a 28 day Compressive Strength of 30 MPa or more (as required for substrate design) and be adequately reinforced.

GENERAL NOTES FOR FIXING TO STEEL SUBSTRATES

The following general notes refer to the Steel Fixing Specifications on Pages 37-38.

1. GENERAL

The Postless Balustrade Style Specifications are based on the standard Fixing Specifications shown in this Manual.

Non-standard and site-specific specifications supplied by UNEX Systems may be used in conjunction with Postless Balustrade style and Fixing Specifications, providing any factors and/or instructions shown in the non-standard and site-specific specifications are applied.

2. LOADING CLASS

Refer to page 59 for a description of the various Loading Class designations.

3. FASTENERS

Fasteners shall be manufactured from 316 stainless steel and be supplied by UNEX. They are identified in the drawings by their UNEX Part Number. Refer to Chapter 1 further, eg. FB10-60
FB = Threaded Bolt Stainless Steel; 10 = 10mm diameter; 60 = length in mm.

All bolts shall be 316 stainless steel (S/S), strength Class 70, with an ultimate tensile stress of not less than 700 MPa.

4. MOUNTING RAIL AND CHANNEL

Mounting Rail and Channels shall be attached to the Baluster Fins and fixed to structural steel as illustrated.

5. FABRICATION AND INSTALLATION

Fabrication and Installation are to be in accordance with Chapter 5 of this manual and where applicable, comply with the relevant requirements of the NZ Building Code.

6. SUBSTRATE DESIGN

Substrate Design including waterproofing and structural design of the steel supporting substrate including reinforcement is beyond the scope of this specification and must be carried out by others.

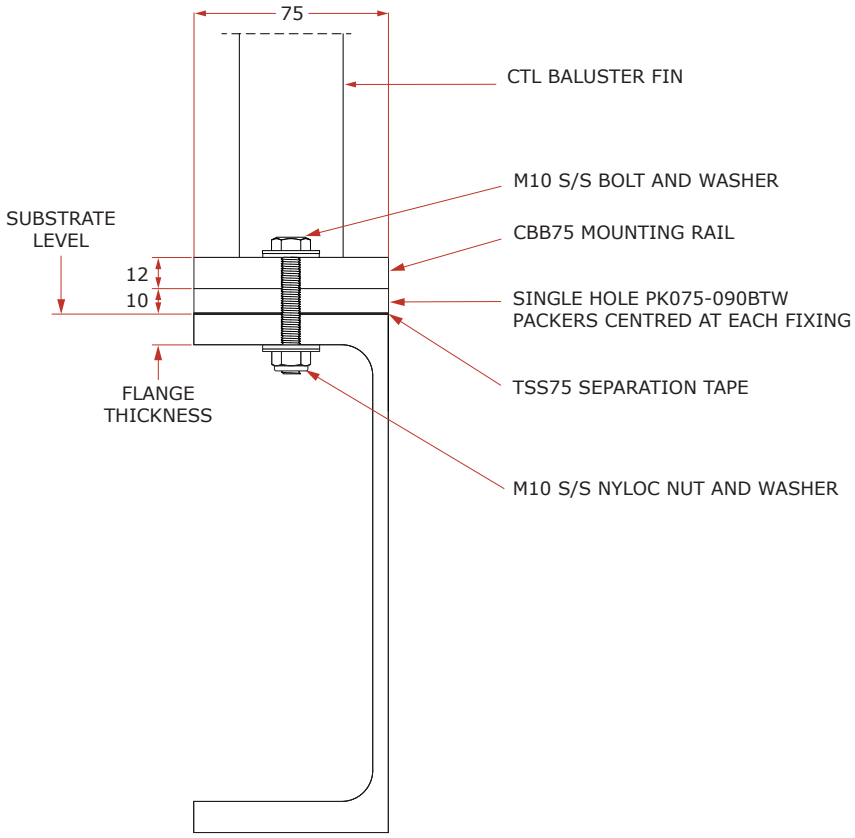
7. STEEL

Any holes drilled into steel shall have a protective coating applied to prevent corrosion. Consult a specialist for advice on the type of coating required.

Any and all aluminium shall be separated from steel using TSS90 tape, or neoprene gaskets, for the entire area in contact.

STEEL PFC - TOP FIXING, BOLTS

This is a Standard Fixing Specification for the Postless Balustrade Systems. It must only be used in conjunction with the General Notes on pages 26-27 and the relevant Style Specification in Chapter 2. Installation must be completed in accordance with the Installation Guide in Chapter 5 and all other relevant portions of this manual.



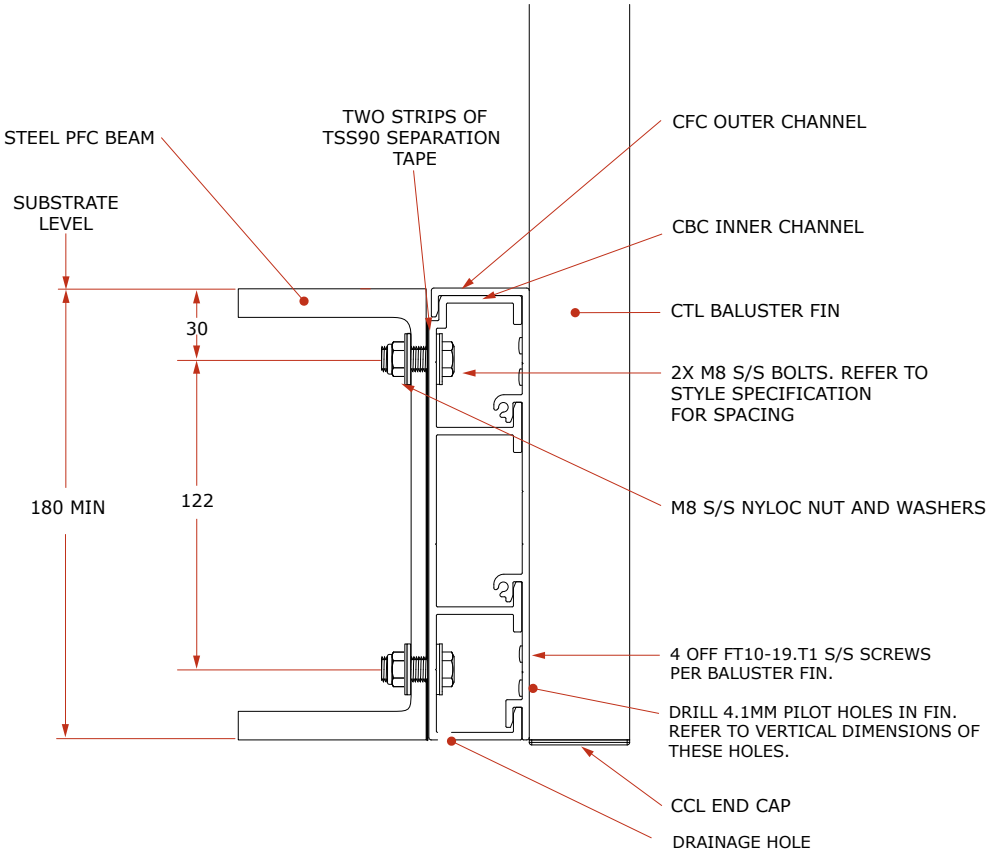
THIS STANDARD SPECIFICATION IS COMPATIBLE WITH THE STYLE SPECIFICATION ON PAGES 23. REFER TO UNEX FOR ALTERNATIVE STYLE SPECIFICATIONS AND NON-STANDARD FIXING METHODS.

NOTES RELATING TO THIS SPECIFICATION

1. M10 Bolts shall be Class 70 stainless steel and supplied by UNEX (M10 Bolts are UNEX code FB10-*00* where
   00 is replaced by the length in mm of the Bolt e.g. FB10-60 is a 60mm M10 Bolt, typically used).
2. Washers fitted under S/S Nyloc Nut and S/S Bolt Heads shall be as follows:
   - For M10 S/S Bolt heads on top of the Mounting Rail, use a 21mm O.D. stainless steel washer (Part No. FW10-21) directly beneath the head of the Bolt. Then use a 22mm O.D. polymer washer (Part No. FWP10-22G) between the stainless steel washer and the aluminium Mounting Rail.
   - For the M10 S/S Nyloc Nuts bearing against the underside of the steel flange, use a 22mm O.D. S/S washer (Part No. FW10-21) under the S/S Nyloc Nut (Part No. FN10N).
3. Substrate design, including waterproofing, is beyond the scope of this specification and shall be carried out by others.

STEEL PFC - SIDE FIXING BOLTS

This is a Standard Fixing Specification for the Postless Balustrade Systems. It must only be used in conjunction with the General Notes on pages 26-27 and the relevant Style Specification in Chapter 2. Installation must be completed in accordance with the Installation Guide in Chapter 5 and all other relevant portions of this manual.



THIS STANDARD SPECIFICATION IS COMPATIBLE WITH THE STYLE SPECIFICATION ON PAGES 24. REFER TO UNEX FOR ALTERNATIVE STYLE SPECIFICATIONS AND NON-STANDARD FIXING METHODS.

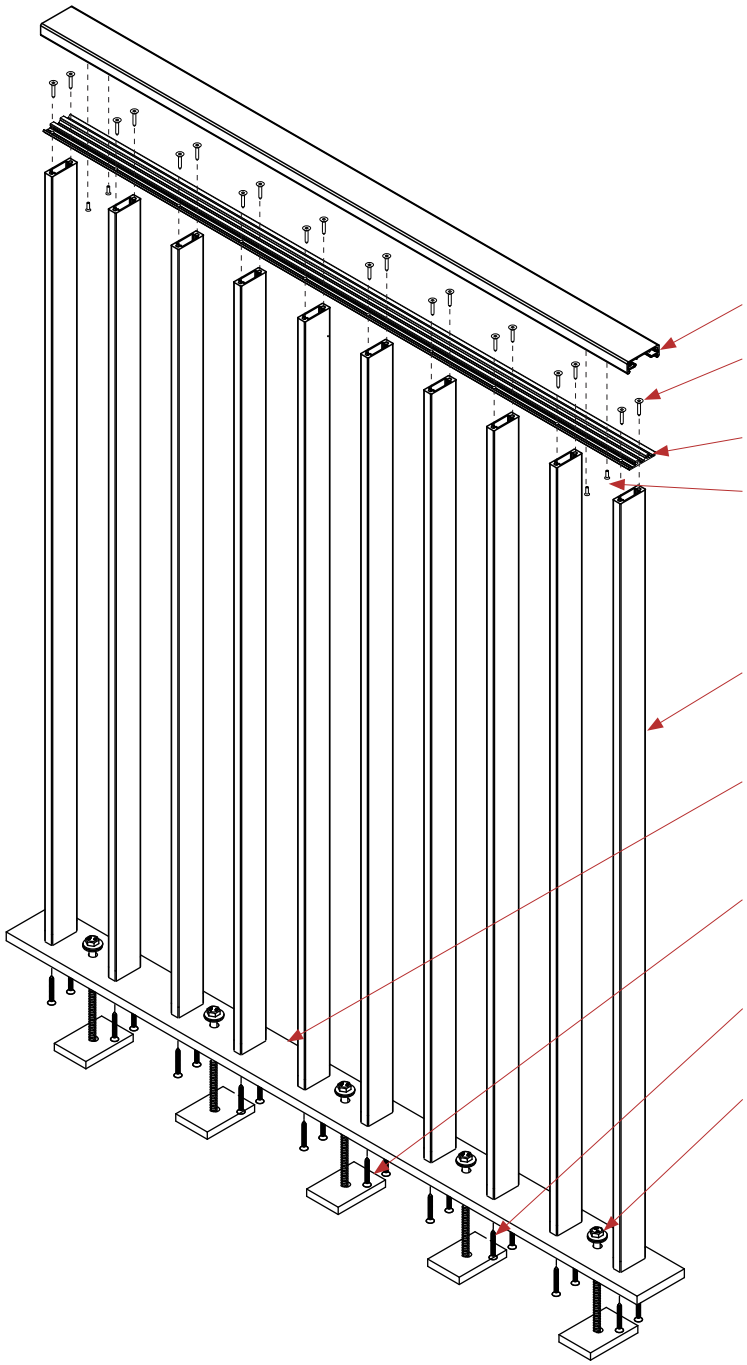
NOTES RELATING TO THIS SPECIFICATION

1. M8 Bolts shall be Class 70 stainless steel and supplied by UNEX (M8 Bolts are UNEX code FB8-*00* where *00* is replaced by the length in mm of the Bolt e.g. FB8-40 is a 40mm M8 Bolt, typically used). Where any element is positioned between the Channel and the substrate, the length of the Bolt needs to be increased by the same amount to maintain enough protrusion to attach the Nyloc Nut.
2. Washers fitted under S/S Nyloc Nut and S/S Bolt heads shall be as follows:
   - For M8 S/S Bolt heads in the aluminium Channel, use a 22mm O.D. stainless steel washer (Part No. FW8-22) directly beneath the head of the Bolt. Then use a 22mm O.D. polymer washer
     (Part No. FWP8-22G) between the stainless steel washer and the aluminium Channel.
   - For the M8 S/S Nyloc Nuts bearing against the inside of the steel web, use a 22mm O.D. S/S washer (Part No. FW8-22) under the S/S Nyloc Nut (Part No. FN8N).
3. Substrate design, including waterproofing, is beyond the scope of this specification and shall be carried out by others.

CHAPTER 4 - POSTLESS BALUSTRADES ASSEMBLY SPECIFICATIONS

'TOPLINE' (CRT TOP RAIL) - TOP FIXING

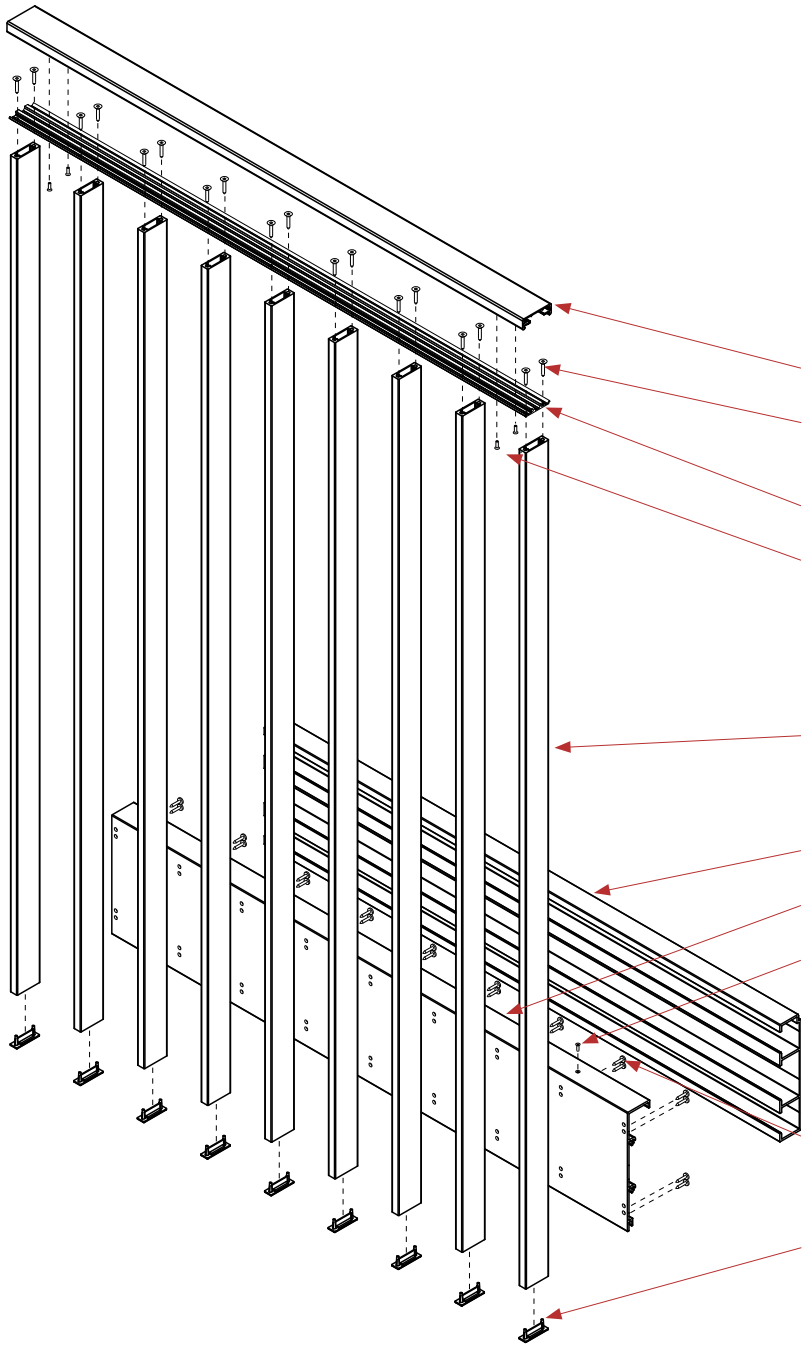
Refer elsewhere for corners, slopes and other situations not illustrated here.



- CRT TOP RAIL
- FV10-19.T1 SCREW. 2 PER CTL BALUSTER FIN. DRILL SIZE = Ø5.5MM
- CRH INNER RAIL
- FS4-4 RIVETS. 1 PAIR WITHIN 150MM FROM PANEL ENDS AND AT 1000MM MAXIMUM CENTRES BETWEEN, AND ON EITHER SIDE OF JOINTS IN OUTER TOP RAIL. DRILL SIZE = Ø3.3MM
- CTL BALUSTER FINS (ILLUSTRATED) (CSL SOLID FINS AT FREE ENDS. REFER TO STYLE SPECIFICATIONS)
- CBB75 (ILLUSTRATED) (CONCRETE/ STEEL) OR CBB90 (TIMBER) MOUNTING RAIL
- SINGLE HOLE PK075-090BTW (CONCRETE/STEEL) OR DOUBLE HOLE PK090-090BTJ (TIMBER) PACKERS
- FVHT10-50.T1 SCREWS. 2 S/S SCREWS PER CTL BALUSTER
- SUBSTRATE FASTENERS ACCORDING TO FIXING SPECIFICATIONS

'FINLINE' (CRT TOP RAIL) - SIDE FIXING

Refer elsewhere for corners, slopes and other situations not illustrated here.



- CRT TOP RAIL
- FV10-19.T1 SCREW. 2 PER CTL BALUSTER FIN. DRILL SIZE = Ø5.5MM
- CRH INNER RAIL
- FS4-4 RIVETS. 1 PAIR WITHIN 150MM FROM PANEL ENDS AND AT 1000MM MAXIMUM CENTRES BETWEEN, AND ON EITHER SIDE OF JOINTS IN OUTER TOP RAIL. DRILL SIZE = Ø3.3MM
- CTL BALUSTER FINS (ILLUSTRATED) (CSL SOLID FINS AT FREE ENDS, REFER TO STYLE SPECIFICATIONS)
- CBC INNER CHANNEL
- CFC OUTER CHANNEL
- FS6-4 RIVETS. 1X 200MM FROM RAIL ENDS, AND AT 400MM MAXIMUM CENTRES BETWEEN, AND ON EITHER SIDE OF JOINTS IN THE CFC OUTER CHANNEL. DRILL SIZE = Ø4.9MM
- FT10-19.T1 SCREWS. 4X S/S SCREWS PER FIN. IMPORTANT! DRILL Ø4.1MM PILOT HOLES IN FIN
- CCL END CAP. USE TAS70-03*X* ADHESIVE

CHAPTER 5 - POSTLESS BALUSTRADES FABRICATION & INSTALLATION

SITE MEASURING - GENERAL GUIDE

The following guide applies specifically to site measuring which should show the 4 types of information described below, plus any other relevant data.

1. PLAN DIMENSIONS

To manufacture a balustrade, the fabricator will need to accurately know the centreline length of the balustrade, and the angle between each run at all corners. Obtaining this centreline length can be achieved by two methods, i.e. "ON-SITE" METHOD, whereby the centreline length is obtained direct from measurements on site; and the "CALCULATION" METHOD, whereby the centreline length is calculated from the deck edge measurements and angles. Below are the procedures for each method. NOTE: the "CALCULATION" METHOD is recommended for all balustrades that are side fixed to the balcony.

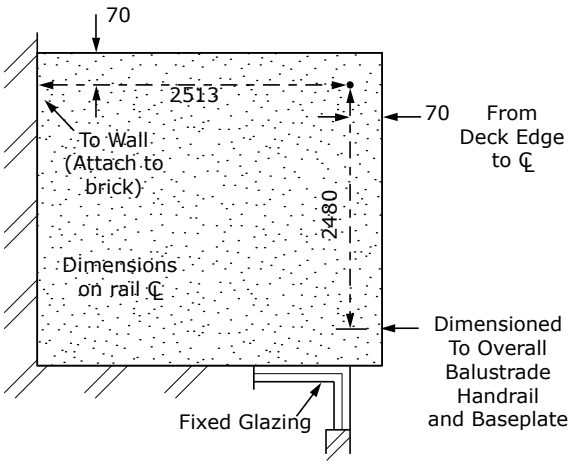


FIG. 1

(i) "ON-SITE" METHOD: It is essential when using this method that the fixing method and baseplate type etc. have been finalised. The Balustrade centreline can then be marked at an appropriate distance back from the deck edge, ensuring that the fixings will engage with structural joists and nogs on timber decks, or that the fixings will not be less than the minimum edge distance specified for concrete decks. A chalk-line can be useful for marking out the balustrade centreline on the deck. Once this is done, the balustrade centreline lengths can be measured and recorded on a layout plan, along with the angles at all intersection points.

The advantage of this method is that measurements are directly available for the balustrade manufacture, without the need of further calculations, and therefore reducing risk of error etc.

(ii) "CALCULATION" METHOD: Measure and record the length of all deck edges which require balustrades, along with substrate details.

Once the fixing method and baseplate type has been finalised, the balustrade centreline "setback" dimension can also be finalised (i.e. the distance the balustrade centreline is set back from the deck edge). Consequent to this, the balustrade centreline length can be calculated.

Where the deck angles are 90 degrees, this can be done by adding or subtracting the set-backs at each end of the run from the deck edge dimension. For other deck angles, a full size or scale drawing may be required to determine the amount to be added or subtracted to each end.
This method of site measuring will need to be used for side fixed Balustrades.

At ends, carefully record all relevant details, such as: where measurements are to, the presence of doors or windows etc. Figure 1 shows a typical layout plan and dimensions.

(continued on following Page)

SITE MEASURING - GENERAL GUIDE - (CONT'D)

2. SUBSTRATE DETAILS

These describe the building structure at all points to which the balustrade attaches. Generally the best presentation of deck structure is given by dimensioned cross-sections of the deck edges; See Figure 2 for a typical cross-section.

Where attaching to walls or columns, ensure adequate solid fixing is available. Check these surfaces for plumb, and record any discrepancy.

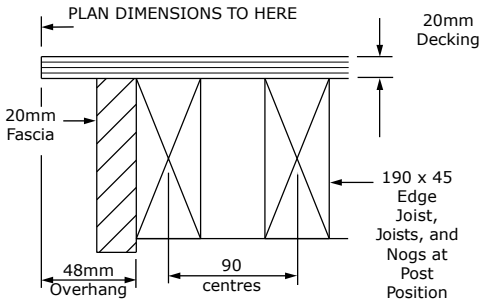


FIG. 2

3. CORNER ANGLES

On the layout plan, record the angles of all the corners. Measure these angles using an electronic protractor or similar.

If such an instrument is not available the angle can be determined by measuring a fixed amount (say 500mm) from the corner along both deck edges, marking these points and measuring the distance between them. By recording all three dimensions, the deck angle can then be accurately reproduced in the factory when fabricating the Balustrade. Figure 3 shows various methods of recording the corner angle measurements.

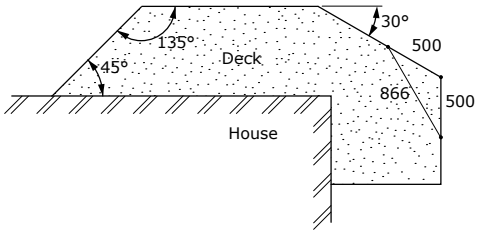
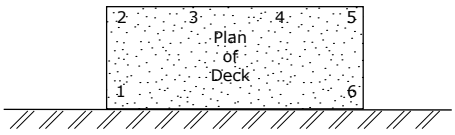


FIG. 3

4. CHANGES IN LEVEL

Note and record all changes in level.
(i) MAJOR CHANGES, e.g.-Steps or ramps.
(ii) MINOR CHANGES, e.g.-due to fall, sag in the deck or to general unevenness. These should be allowed for by varying each Baluster Fin length to obtain a straight and level top rail with the minimum specified rail height at the highest point in the deck. This generally necessitates a check on the deck level at every post position, as apparently flat decks can have significant variations in level.

The relative level of different post positions on the deck can be determined with a builders level and staff. Ensure that the zero end of the staff is on the deck. By reading on the staff the distance from the deck to the line of sight of the instrument, and recording at each position, the required length of each Baluster Fin can be determined.



Point	Staff Reading
1	1500
2	1525
3	1520
4	1517
5	1522
6	1495

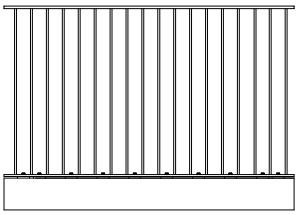
FIG. 4

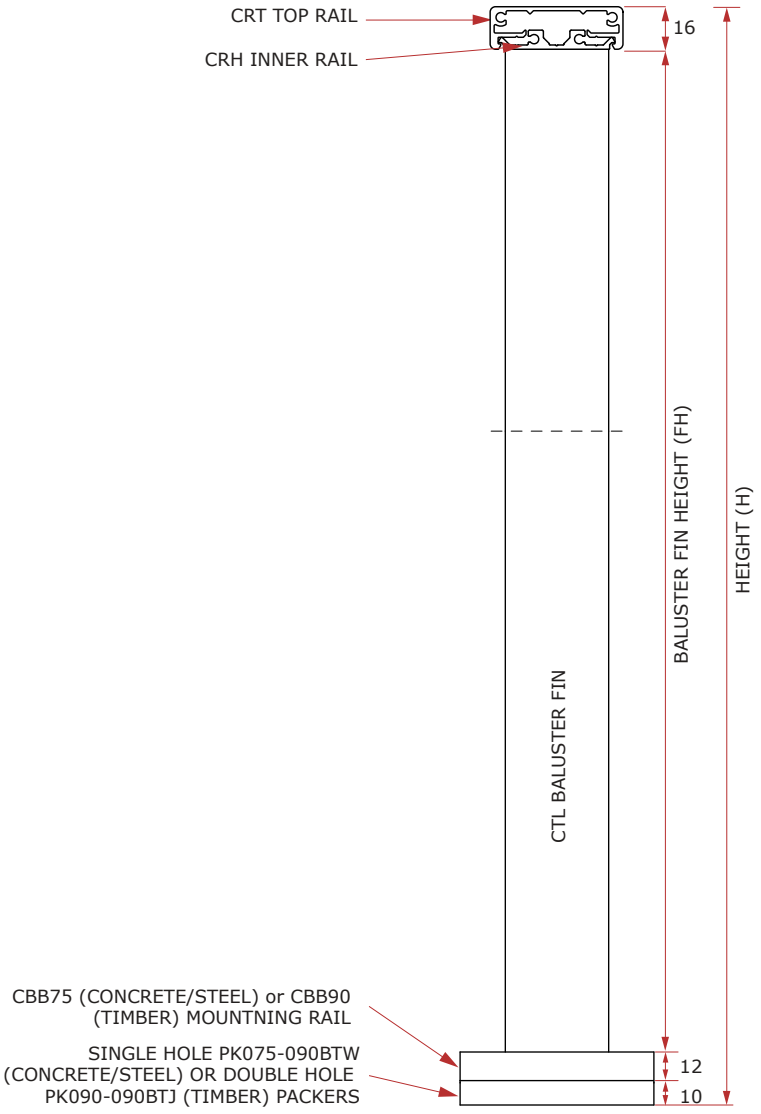
The same procedure can be carried out using a laser level to provide the horizontal line of sight.
It is convenient to identify each position on the layout plan with a number, i.e. 1, 2, 3 etc, and show the staff readings in a table adjacent to each post reference. See Figure 4. In this example, Point 6 is the highest point on the deck, and Point 2 is the lowest, with a difference of 30mm.

'TOPLINE' (CRT TOP RAIL) - TOP FIXING

'TOPLINE' (CRT TOP RAIL) - VERTICAL DIMENSIONS[1]					
DIMENSION		FORMULA	TYPICAL VALUES (MM)		
HEIGHT	(H)	As specified	1000	1100	1200
BALUSTER FIN HEIGHT	(FH)	H-38mm	962	1062	1162

1. This table applies only with the use of the parts specified below.
2. Minor dimensions on the drawings have been rounded to the nearest millimeter.

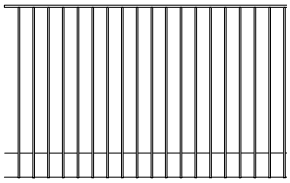


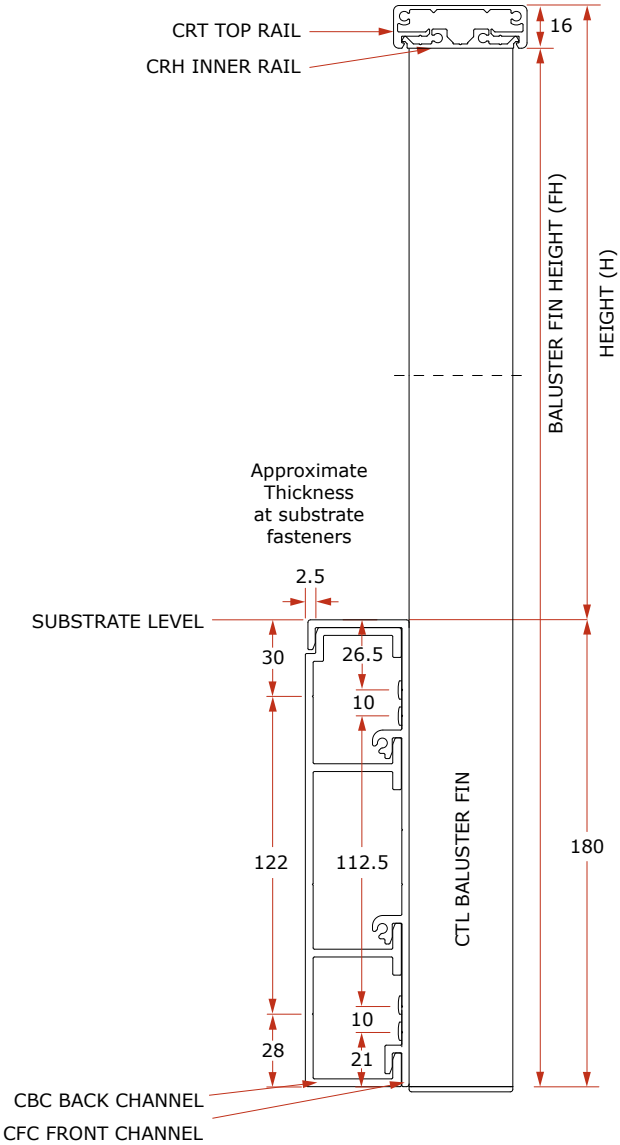


'FINLINE' (CRT TOP RAIL)

'FINLINE' (CRT TOP RAIL) - VERTICAL DIMENSIONS[1]					
DIMENSION		FORMULA	TYPICAL VALUES (MM)		
HEIGHT	(H)	As specified	1000	1100	1200
BALUSTER FIN HEIGHT	(FH)	H+180-16	1164	1264	1364

1. This table applies only with the use of the parts specified below.
2. Minor dimensions on the drawings have been rounded to the nearest millimeter.





INNER RAILS : CONNECTION TO BALUSTER FINS

This page applies to UNEX Postless two-piece Top Rails, with an Outer Top Rail i.e. CRT attached to the Inner Top Rail e.g. CRH.

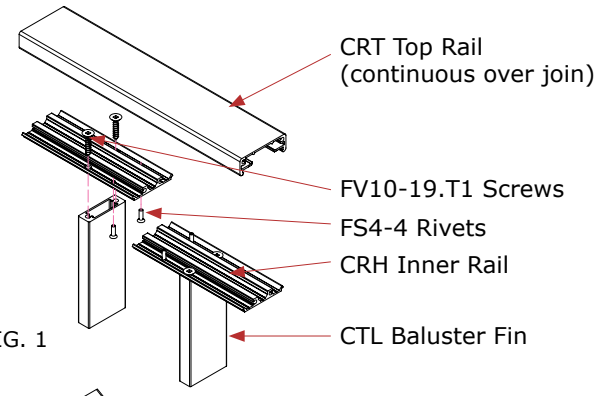


FIG. 1

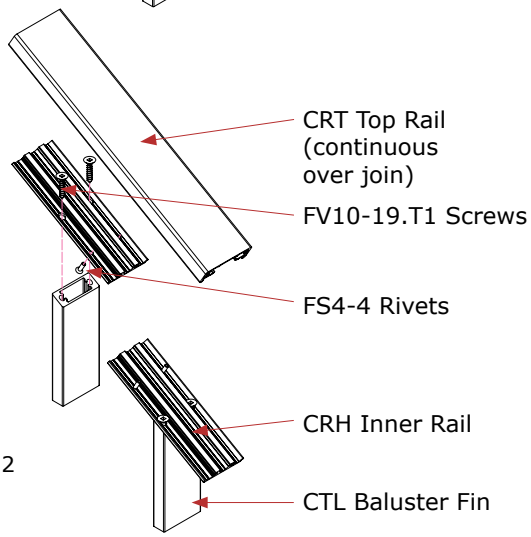


FIG. 2

1. CONNECTION IN-LINE

FV10-19.T1 screws required on the side flanges of the Inner Rail, 2 per each Baluster Fin; see Fig. 1. Ø5.5mm fixing holes.

FS4-4 rivets on either side of Inner Rail joints to the CRT Top Rail, i.e.: 2 pairs per inner rail end, Ø3.3mm rivet holes. **Note:** The Top Rail must be continuous over all Inner Rail joints, to allow for the joints to be securely riveted together.

2. CONNECTION OF SLOPING RAILS

FV10-19.T1 screws required on the side flanges of the Inner Rail, 2 per each Baluster Fin; see Fig. 2. Ø5.5mm fixing holes at the correct angle. Grind off protruding side of the screw head to allow the Top Rail to clip on.

(Note: Countersunk screws are used for this application to improve the bearing on the screw head, but the hole does not need to be countersunk).

FS4-4 rivets on either side of Inner Rail joints to the CRT Top Rail, i.e.: 2 pairs per inner rail end, Ø3.3mm rivet holes. **Note:** The Top Rail must be continuous over all Inner Rail joints, to allow for the joints to be securely riveted together.

3. CONNECTION TO 90° AND NON-90° CORNERS

FV10-19.T1 screws required on the side flanges of the Inner Rail, 2 per each Baluster Fin; see Fig. 3 and Fig. 4 Ø5.5mm fixing holes.

DNP90 corner gusset for 90° corners see Fig. 3, secured with 2 FS5-10 rivets per rail ends from underside of Inner Rail, 4 total rivets per joint. Ø4.1mm rivet holes. (Use DNP135 or similar gussets for non 90°, see Fig 4).

FS4-4 rivets on either side of Inner Rail joints to the CRT Top Rail, i.e.: 2 pairs per inner rail end, Ø3.3mm rivet holes.

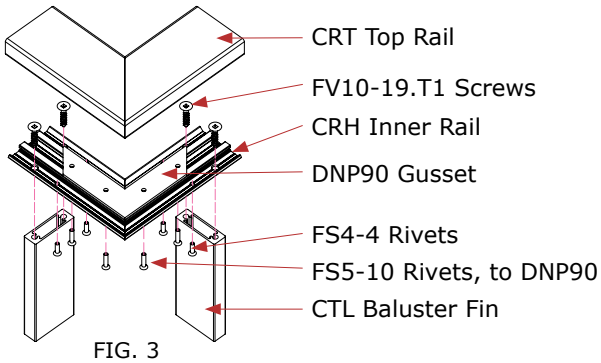


FIG. 3

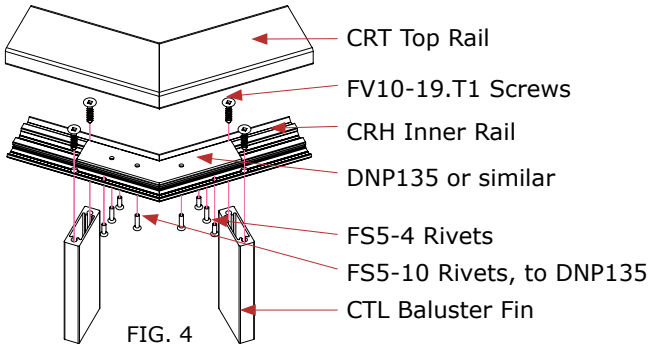
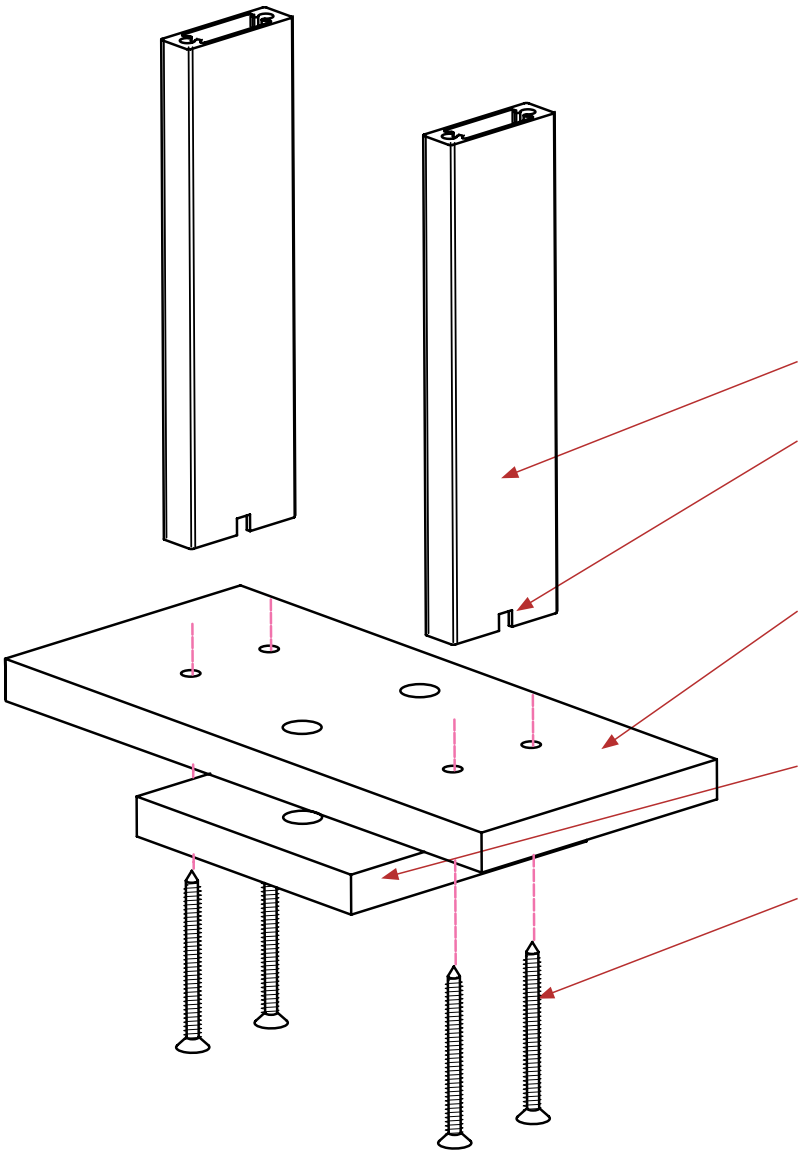


FIG. 4

TOPLINE MOUNTING RAIL ASSEMBLY

This page describes the method of connecting the Baluster Fins to the Mounting Rail. The illustrations are of typical components only.



CTL Baluster Fin (Illustrated).

DRAINAGE HOLES. Important Note: Mill out drainage slots at Mounting Rail level. Slots to be a minimum of 5mm wide x 5mm high, or a Ø6mm drill hole.

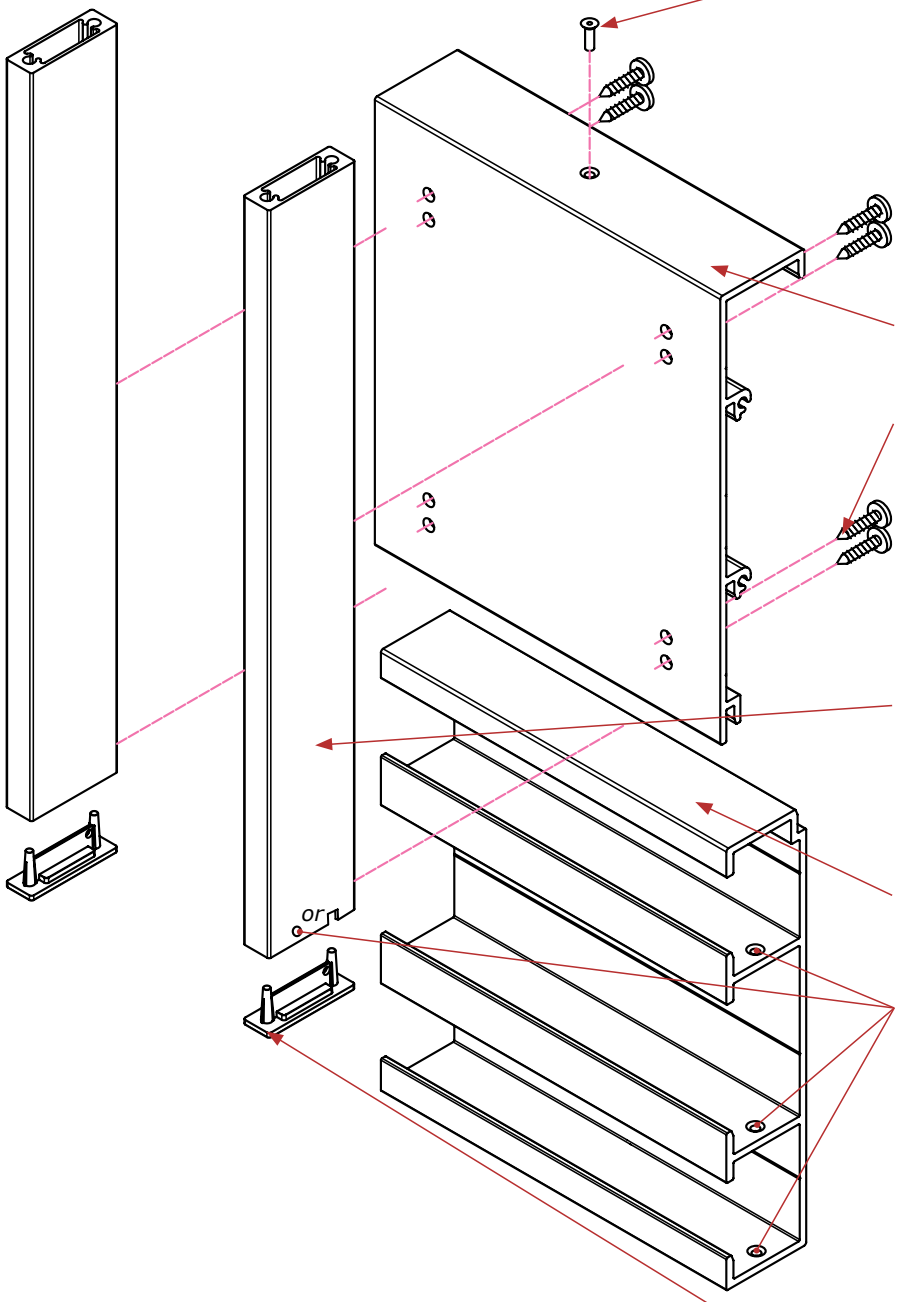
CBB90 Mounting Rail (Illustrated) Ø5.5mm clearance holes required for the Baluster Fin fixing screws.

PK090-090BTJ PACKER (Illustrated) Position centrally at fixing points.

FVHT10-50.T1 FASTENERS
Self tapping stainless steel countersunk screws supplied by UNEX. Use of other screws is strictly not permitted and invalidates all Producer Statements and Warranty. Insert screws in all available screwpipes with a power screwdriver, until tight.

FINLINE MOUNTING RAIL ASSEMBLY

This page describes the method of connecting the Baluster Fins and Channel. The illustrations are of typical components only.



FS6-4 RIVETS
Rivets required to secure the CFC to the CBC, 1x 200mm from CFC rail ends, and at 400mm maximum centres between, and on either side of joints in the CFC outer Channel. Drill size = Ø4.9mm.

CFC Channel OUTER

FT10-19.T1 FASTENERS
Self tapping stainless steel pan head screws are required to secure CFC to CTL, 4 per CTL Baluster Fin. Ø5.0mm holes required in the CFC Outer Channel.

CTL BALUSTER FIN
Important Note: Drill Ø4.1mm holes in CTL Baluster Fins.

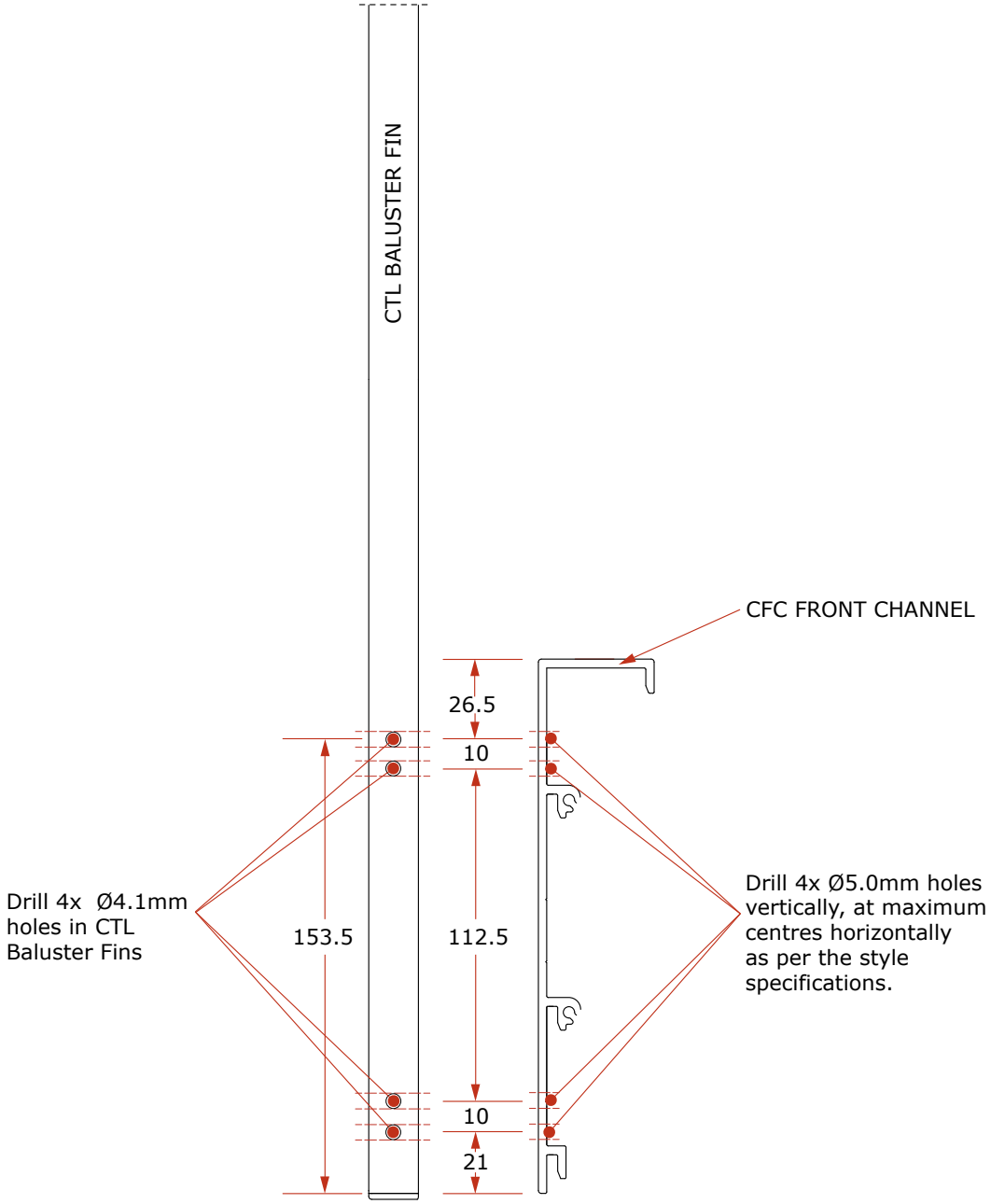
CBC Channel INNER

Drill a Ø6mm hole for drainage in all cavities.

CCL ENDCAPS
Secure with TAS70-03*X* adhesive.

CFC CHANNEL FIXING DETAILS

This page details the drilling holes required in the CFC Channel and the CTL Baluster Fins. The illustrations are of typical components only.

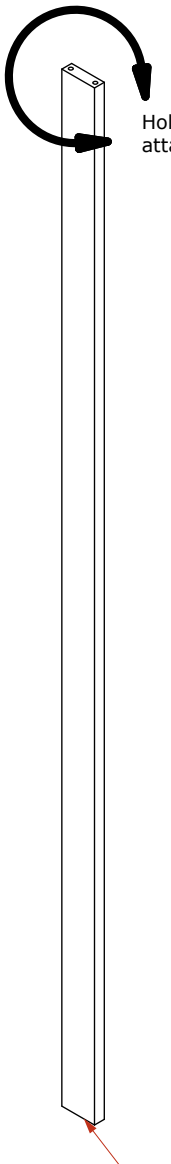


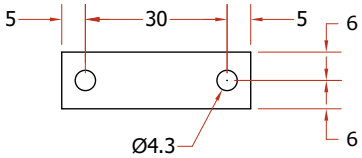
GENERAL DETAILS ON DRILLING CSL SOLID FINS, FOR THE TOPLINE STYLE

In the Topline Style Specification, it states a certain number of solid fins required at the balustrade ends (i.e. where the balustrade terminates). This is to give additional rigidity at the ends. Note these fins are not required on the corners and/or where the top rail structurally attaches to another structural element at the end. The number of solid fins required at each end varies, depending on the height. As these solid fins do not have extruded screw-ports, they require special drilling for;

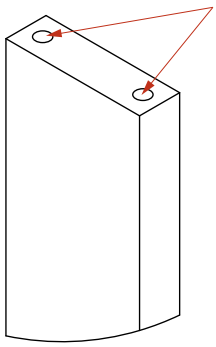
- The FV10-19.T1 screws that attach the CRH inner top rail to the fins.
- The FVHT10-50.T1 screws that attach the mounting rail to the fins.

This page illustrates some general details on the drilling hole sizes, depths and locations.

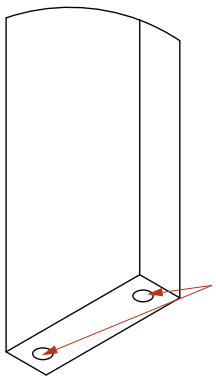




Dimensions of hole locations for FV10-19.T1 Screws and FVHT10-50.T1 Screws.



Detail of holes for FV10-19.T1 Screws to thread into. For attachment to CRH Inner Rail.



Detail of holes for FVHT10-50.T1 Screws to thread into. For attachment to Mounting Rail.

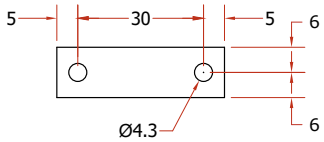
GENERAL DETAILS ON DRILLING CSL SOLID FINS, FOR THE FINLINE STYLE

In the Finline Style Specification, it states a certain number of solid fins required at the balustrade ends (i.e. where the balustrade terminates). This is to give additional rigidity at the ends. Note these fins are not required on the corners and/or where the top rail structurally attaches to another structural element at the end. The number of solid fins required at each end varies, depending on the height. As these solid fins do not have extruded screw-ports, they require special drilling for;

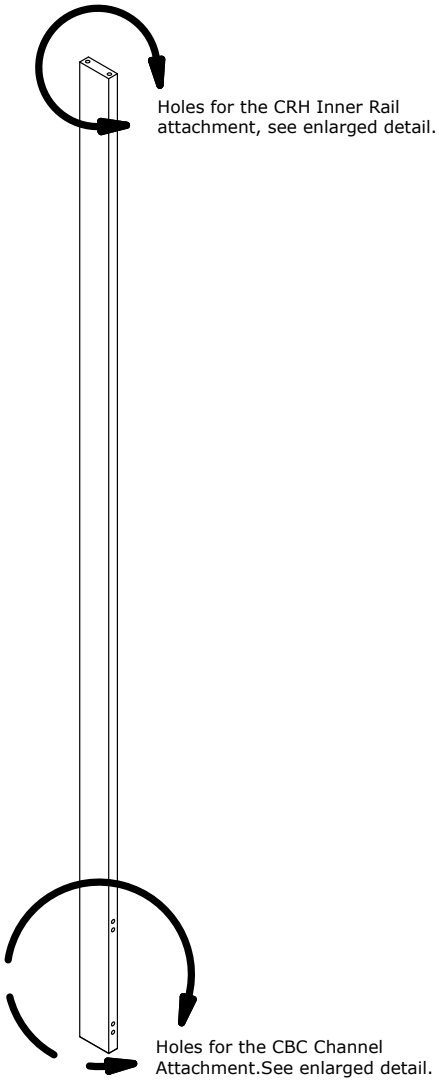
- The FV10-19.T1 screws that attach the CRH inner top rail to the fins.
- The FT10-19.T1 screws that attach the CBC channel to the fins.

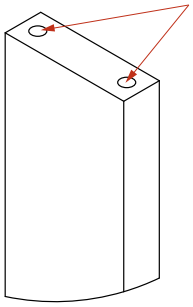
This page illustrates some general details on the drilling hole sizes, depths and locations.

Note: As the solid fins do not have a cap on the lower end, it is recommended to allow an extra 2mm of length to the solid fin (i.e. compared to the CTL fin), so as the bottom of the solid fin can align with the bottom of the adjacent CCL caps on the CTL fins. Adjust drilling height by 2mm accordingly.

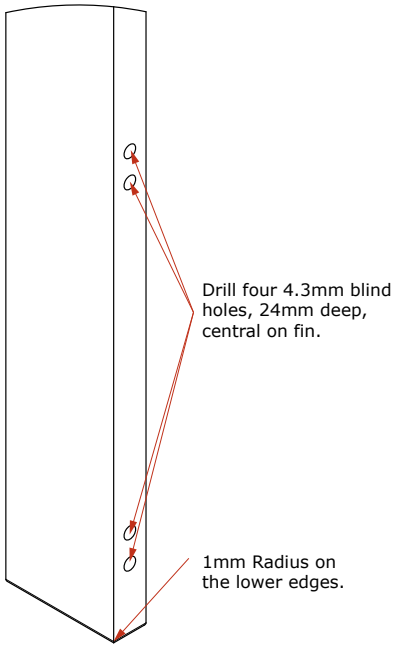


Dimensions of hole locations for FV10-19.T1





Detail of holes for FV10-19.T1 Screws to thread into. For attachment to CRH Inner Rail



Detail of holes for FT10-19.T1 Screws to thread into. For attachment to CBC Channel

DURABILITY

The NZBC requires all balustrading to be sufficiently durable so as to remain functional for certain specified periods of time. These periods are given in the Acceptable Solution B2/AS1, which indicates a 'serviceable' durability requirement of 50 years for channels, points, and top rails, and 15 years for infill members.

Whilst specific details to achieve these requirements for the common situations are given throughout this manual, it is essential that they are applied to all exterior balustrade installations regardless. These issues may be placed under two general areas as follows;

1. DRAINAGE

Water entrapped in members can potentially be detrimental to the durability of a balustrade, and provision for moisture to drain must therefore be made. Common areas where such provision is necessary, and how it can be achieved is as follows;

1.1. VERTICAL FINS
Mill a drainage slot 5mm x 5mm at the lower end of each CTL vertical fin. Alternatively drill a 6mmØ drainage hole centred 3mm above the bottom of each fin.

1.2. SIDE FIXED CFC AND CFC CHANNELS
Where the CBC and CFC channels interlock together, it forms three separate cavities. Drill a series of three x 6mmØ drainage holes, in the CBC channel, all vertically aligned, to allow drainage from all three of the cavities. The holes should be in the centre of the CBC profile, and spaced at a maximum of 1000mm centres longitudinally, and/or 500mm from the ends. Where the channel is not horizontal, drill a set 50mm from the lower end.

1.3. INNER TOP RAIL
To minimise entrance of moisture, any Inner Top Rails (e.g. CRH etc.) should be continuous wherever possible. Where joints are required, these shall have the smallest gap between rails.

2. SEPARATION OF MATERIALS

Dissimilar materials can react with each other in varying degrees if in contact with each other. This can potentially reduce the durability of a balustrade and measures must be taken to minimise this occurring. This means that aluminium members must be separated from other materials, including stainless steel fixings, as outlined below;

2.1. TOP FIXED MOUNTING RAILS
A separation washer shall be inserted between the mounting rail and the underside of all stainless steel washers used for substrate fasteners. Note for FC8-165 coach screws, the stainless steel and non-bonded washers will be adequate.

2.2. SIDE FIXED CHANNELS
(a) A separation washer shall be inserted between the CBC channel and the underside of all stainless steel washers used for substrate fasteners. Note for FC8-165 coach screws, the stainless steel and non-bonded washers will be adequate
(b) When packers are used, a strip of neoprene gasket shall be placed between the back of the aluminium packers and the adjacent substrate at each fixing point. This may also assist with waterproofing issues if required.

DURABILITY - (CONT'D)

2.3. STAINLESS STEEL ASSEMBLY SCREWS
The following stainless steel assembly fasteners must be specially treated to minimise any reaction with the aluminium members. This process is carried out by UNEX, and these screws must therefore be purchased from them.

- All screws connecting the fins to the top-mounted mounting rail.
- All screws connecting the fins to the side-mounted CBC channel.
- All screws connecting the CRH inner top rail to the fins.

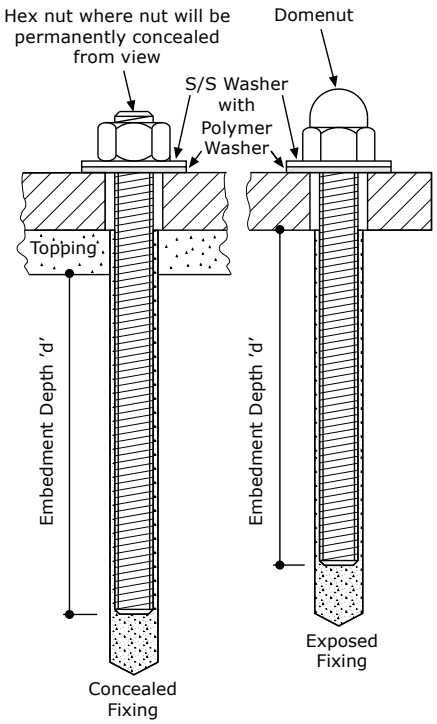
2.4. GRADES OF STAINLESS STEEL
All stainless steel fixings and substrate fasteners must be grade 316 stainless steel for maximum durability.

2.5. OTHER
For situations not covered above; EPDM or Neoprene may be a useful product to provide separation between dissimilar materials, and Lanolin grease (available from UNEX – code TGL-05L) can be a useful product to place around areas of contact between aluminium and stainless steel fasteners.

EPOXY-SET ANCHOR STUDS - INSTALLATION SPECIFICATION

1. GENERAL

This is a specification for fixing stainless steel studs into structural concrete i.e. FE8 and FE10 studs. The method used throughout this Manual utilizes the epoxy Epcon™ C8 Extreme system, and must not be substituted with other epoxies or chemset injection methods without an independent structural assessment of its adequacy to carry the design loads. Note that the epoxy Epcon™ C8 Extreme system may be sold under other names in countries other than New Zealand.



2. MATERIALS

Studs shall be threaded 316 stainless steel studs having a minimum yield stress of 400MPa and a minimum tensile stress of 700 MPa (Grade 70). Typical designations are FE10-125 = a 10mm diameter stainless steel threaded stud of 125mm overall length. Washers, nuts and dome nuts shall be stainless steel and separated from the Mounting Rail or Channel with a polymer washer.

3. FIXING MATERIALS

- Cartridges: (TEC4) Epcon™ C8 Extreme Epoxy resin. 1 x 450ml Cartridge does approx 33 FE10-125 studs.
- Disposable Nozzles: (TEN2) Allow at least 2 nozzles per cartridge.
- Dispensing Handgun: (TEG4) for TEC4 Cartridge.
- Hole Brushes: (TEB)

4. EDGE DISTANCES

Studs must not be installed closer to the edge of the structural concrete, excluding any thickness of plaster or finishing, than shown on the Fixing Specifications in Chapter 3. Where no edge distance is stipulated use the following minimum distances: FE8 - 35mm, FE10- 40mm

5. PROCEDURE

5.1. For M8 studs, drill Ø10mm holes. For M10 studs, drill Ø12mm holes. Drill all holes with a carbide tipped drill. Check slab and topping thickness when choosing stud length. Drill holes approx 10mm deeper than stud depth.

5.2. Hole cleaning: This procedure is very important for successful adhesion and must be carefully carried out.
- (a) Blow dust and debris from hole using oil free compressed air with a tube "end fitting" or the TEW hand operated blower. In either case, insert tube to bottom of hole before blowing.
- (b) Brush the hole sides thoroughly.
- (c) Blow the hole clean a second time.

5.3. Place balustrade in its final position before injecting resin, ensuring the balustrade is vertical. Ensure studs are on-hand with dome nuts and washers pre-attached, as resin may set very quickly once dispensed. Studs should initially protrude 4-5mm for M8 studs, or 5-6mm for M10 studs, into dome nuts.

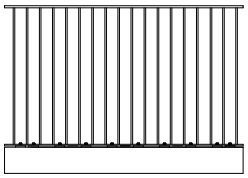
5.4. Remove cartridge cap, attach nozzle, (retain the cap). Dispense resin to waste until it is evenly mixed to correct colour (see colour sample supplied with cartridge). Insert nozzle into hole and dispense resin. Due to possibility of air pockets, the only reliable indicator of sufficient resin in hole is to insert stud and watch for some surplus resin to be forced from the hole. Wipe surplus resin off immediately.

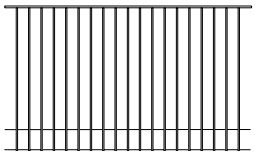
5.5. As each hole is resin injected, insert the stud with a slow twisting motion, before injecting the next hole. Do not pause more than 2 minutes during injection or a new nozzle may be required. Cap cartridge after use. Do not allow loads on Balustrade or tighten nuts, until fully cured. Refer to curing times on cartridge.

5.6. Do not install studs if temperature is less than 5°C. In all events carefully read and adhere to all instructions contained on the product packet etc.

GENERAL FABRICATION & INSTALLATION GUIDE FOR POSTLESS BALUSTRADES

APPLICATION





This Installation Guide covers the general fabrication of the Postless Top Fixed (Topline) and Side-Fixed Channel (Finline) Balustrade Styles. This guide is intended only to cover details applicable to a common and straightforward deck configuration. For any other situation, or for details not covered below, refer to UNEX.

1. BALUSTRADE DESIGN

This section covers the measuring and design of the balustrade.

1.1 SITE MEASURE
Refer to "Site Measuring - General Guide" pages 43-44 for a guide of appropriate measurements that will need to be taken from the site.

1.2 BALUSTRADE SPECIFICATIONS
Ensure that adequate information and instructions have been received from customer to ensure the balustrade is designed to New Zealand Building Code requirements. Such details could include; fixing methods, design wind speeds, building class designations, barrier heights etc.

1.3 OVERALL CENTRELINE DIMENSIONS
The Overall Centreline (OCL) is the measurement of all Balustrade runs in a continuous line, measured along the Balustrade centreline (℄) to each mitre, and to the end of each run. (See Fig. 1&2). From the site measurements, determine the OCL of the Balustrade, taking into account the Balustrade centreline position and any length adjustments necessary due to corners in the deck. Also take into account any clearances needed where the balustrade meets a wall face. **NB:** For side fixing Finline the distance from the backside of the CBC to the inside fixing points within the Channels is 2.5mm, excluding any additional packing.

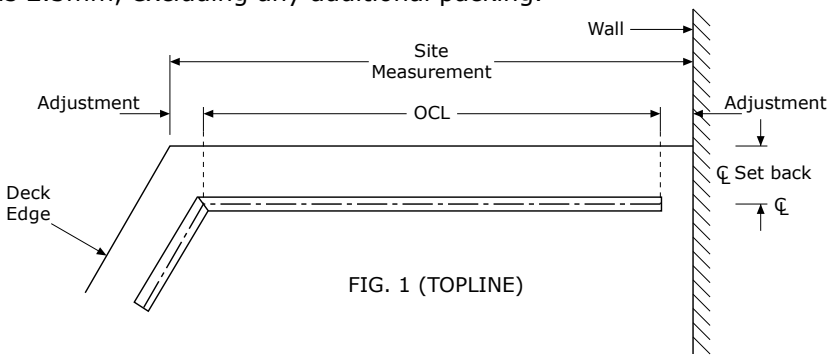


FIG. 1 (TOPLINE)

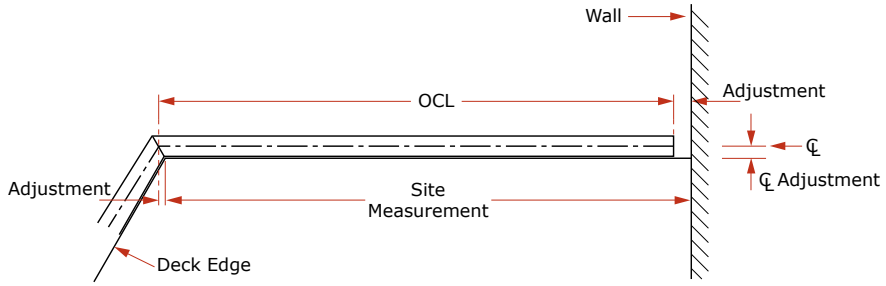


FIG. 2 (FINLINE)

1.4 VERTICAL DIMENSIONS
Calculate the balustrade heights and channel lengths to ensure the balustrade will meet all New Zealand Building Code requirements, taking into account any deck falls and changes in deck levels.

1.5 MATERIAL REQUIREMENTS
Optimise the various member types into available purchasing lengths, taking into account the additional lengths needed for mitre points, saw cuts and saw clamps etc. Any joints in the Top Outer Rail should not coincide with a joints in the Inner Rail (if applicable). Produce a summary of materials required and order from UNEX Systems.

(continued on following Page)

GENERAL FABRICATION & INSTALLATION GUIDE FOR POSTLESS BALUSTRADES

2. FABRICATION

This Section covers the cutting of the members to the required length, and the drilling of holes required. Ensure staff is provided with tools and machinery that are safe, and that they are given full instructions in how to use them. To prevent corrosion ensure all tools/drivers/screwdriver tips are suitable for stainless steel and only used on stainless steel.

2.1 CUTTING TO LENGTH
Cut all members to their required length, as calculated in step 1. Ensure all mitres are cut at the correct angle and orientation. Remove all burrs of aluminium with a light file.

2.2 DRILLING OF HOLES
Drill ø5.5mm holes in the top inner rail CRH and Mounting Rail CBB*XX* (Topline only) for attaching to the Baluster Fins. Take care on mitres. Refer to pages 47-50. Drill ø3.3mm top rail rivet holes in top inner rail at the spacing indicated on the appropriate assembly specification in Chapter 4. Countersunk carefully with a ø5.5mm drill bit from the underside. For side-mounted Finline, drill ø5.0mm holes in the CFC outer Channel, and in the CTL Baluster Fins drill ø4.1mm holes as dimensioned. Refer pages 49 & 50.

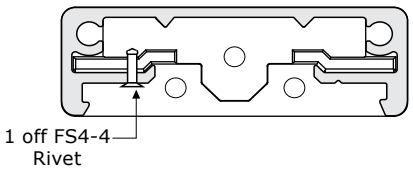
2.3 DRAINAGE HOLES
For top fixed Topline, create drainage holes at the base of the CTL Baluster Fin. This can be achieved with either a 6.0mm diameter drill, or mill a 5mm wide x 5mm high slot. (See page 48). For side fixed Finline create drainage holes in each of the cavities within the CBC Channel extrusion with a 6.0mm diameter drill 3mm above bottom of each fin (See Page 49).

3. PRE-ASSEMBLY

This part of the installation process would normally be completed in the factory, prior to site installation.

3.1 PANEL ASSEMBLY
Attach CTL Baluster Fins to inner rail CRH with two 10g x 19mm CSK (FV10-19.T1) screws. For top-mounted Topline, secure each CTL Baluster Fin to the CBB*XX* Mounting Rail with two 10g x 50mm CSK (FVHT10-50.T1) screws from UNEX. Use of other screws invalidates all warranty and Producer Statements. Refer to Page 48. For side-mounted Finline, secure each CTL Baluster Fin to the CFC outer Channel with four 10g x 19mm Pan head (FT10-19.T1) screws.

3.2 TOP RAIL ENDCAP ATTACHMENT
Attach all endcaps using a FS4-4 rivet on one side of the top rail only (using rivets on both sides will prevent the top rail clipping on). Alternatively, endcaps may be glued on or attached once the site installation is complete.



4. INSTALLATION

This section covers the installation of the balustrade extrusions and components. Prior to commencing, ensure the builder has completed all work necessary to support the balustrade. For timber decks, satisfactory performance of the balustrade will only be obtained if the decking is adequately seasoned and stable.

4.1 PREPARATION
Position extrusions and components on the deck in their approximate position in relation to the deck edge. For all substrate types, ensure the deck face where the balustrade is being mounted is straight and vertical. Note, installing the balustrade over tiles is not recommended as it may cause cracking of the tiles.

(continued on following Page)

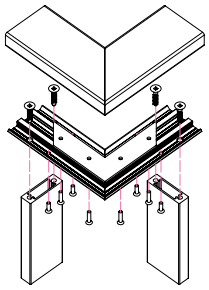
GENERAL FABRICATION & INSTALLATION GUIDE FOR POSTLESS BALUSTRADES

4.2 CBB PLACEMENT (TOPLINE, TOP-MOUNTED)
Install the CBB75 or CBB90 Mounting Rail to the surface of the deck so that the fixing will be in their correct position, along with the appropriate PK090-090BTJ (Timber) or PK075-090BTW (Concrete or Steel) packers.
CBC PLACEMENT (FINLINE - SIDE-MOUNTED)
Attach the CBC extrusion to the face of the deck at the correct height and location, taking care with regards to deck levels, the balustrade height and fixing locations. Attachment at this stage can be done using a temporary fastener.

4.3 ALIGNMENT
Using a string line, ensure the Mounting Rail/Channel is aligned perfectly straight and plumb, on both the vertical and horizontal planes. If this is not the case, pack it with solid and durable packers.

4.4 SUBSTRATE FASTENERS
It is essential that the Channel is fastened in accordance with the Fixing Specification selected. All fixings should be Stainless Steel 316 Class 70 or greater. For timber decks, fixings must be either Coach Screws or threaded Bolts right through the joists with stainless steel Nyloc Nuts and Washers beneath. Fixings shall be central on the supporting joists which shall not be less than 45mm thick. Fit 50mm square washers under all bolt heads or nuts bearing on timber, unless otherwise specified by UNEX. Seal fastener holes, as necessary. Tighten all fasteners firmly, but not over-tightened. For concrete decks, install the fixing Studs using Epcon™ C8 Extreme epoxy anchoring systems as per Page 55 of the Fabricator's Manual and insert polymer washer between the aluminium Channel and the stainless-steel washer of the substrate fastener.

4.5 PANEL PLACEMENT (FINLINE - SIDE-MOUNTED)
Install pre-assembled panels with CFC to the CBC & rivet in place with FS6-4 rivets 200mm from ends, and at 400mm maximum centres between, and either side of joints. Drill size = Ø4.9mm.



4.6 MITRES
At corners the Inner Rail ends need to form an exact mitre, and held together with aluminium gussets (e.g. DNP90) and FS5-10 rivets. Refer to Page 47.

5 FINISHING

This section covers the finishing touches of the aluminium balustrade.

5.1 ATTACH TOP RAILS
Attach the top rails, using a Ø3.3 mm (1/8") drill bit, drill up through pre-drilled holes on the underside of the Inner Top Rail. Install CSK rivets (FS4-4) to secure the Outer Top Rail. Refer to the relevant Assembly Specification page in Chapter 4. Place additional rivets on both sides of joints in the Outer Top Rail.

5.2 CLEANING
Clean the balustrade members with a soft sponge and a mild household detergent mixed in warm fresh water. Remove any debris from the deck, paying particular attention to any iron filing swarf or rivet shanks that may cause rust spots.

IMPORTANT NOTES

A. All assembly fasteners must be supplied by UNEX as they are specially treated to enhance their durability to meet the New Zealand Building Code requirements.

B. A Balustrade should not be attached to a substrate that is not adequately designed or constructed for the service loads that will be placed upon it by the balustrade. Any issue, problem or defect etc. must be remedied prior to balustrade installation.

C. Any waterproofing issues are outside the scope of this guide. Advice should be sought from waterproofing specialists in such circumstances.

D. Ensure the homeowner or purchaser is given a copy of the Care & Maintenance instructions available from UNEX.

UNEX LOADING CLASSIFICATION

Below is an extract from AS/NZS 1170:2011.1:2002, a standard which is cited in the NZBC. This table gives the minimum imposed actions on barriers for various occupancy types. To the right hand side of this table are the applicable UNEX Loading Classifications (ULC) which are stated in the specifications contained in this manual.

AS/NZS 1170.1:2002 TABLE 3.3
MINIMUM IMPOSED ACTIONS FOR BARRIERS

Type of occupancy for part of the building or structure		Specific Uses	Top Edge			Infill		ULC (UNEX Loading Classifi-cations)
			Horizontal kN/m	Vertical kN/m	Inwards, Outwards, Downwards kN	Horizontal kPa	Any Direction kN	
A	**Domestic and residential activities**	All areas within or serving exclusively one dwelling including stairs, landings, etc., but excluding external balconies and edges of roofs (see C3)	0.35	0.35	0.6	0.5	0.25	**N03R**
		Other residential (see C3)	0.75	0.75	0.6	1.0	0.5	**N07R**
B, E	**Offices and work areas not included elsewhere including storage areas**	Light access stairs and gangways not more than 600mm wide	0.22	0.22	0.6	N/A	N/A	**N02**
		Fixed platforms, walkways, stairways and ladders for access	0.35	0.35	0.6	N/A	N/A	**N03C**
		Areas not susceptible to overcrowding in office and institutional buildings also industrial and storage buildings	0.75	0.75	0.6	1.0	0.5	**N07C**
AREAS WHERE PEOPLE MAY CONGREGATE								
C1/C2	**Areas with tables or fixed seating**	Areas with fixed seating adjacent to a Balustrade, restaurants, bars. etc.	1.5	0.75	0.6	1.5	1.5	**N15**
C3	**Areas without obstacles for moving people and not susceptible to over-crowding**	Stairs, landings, external balconies, edges of roofs, etc.	0.75	0.75	0.6	1.0	0.5	**N07C**
C5	**Areas susceptible to over-crowding**	Theatres, cinemas, grandstands, discotheques, bars, clubs, auditoriums, shopping malls (see also D), assembly areas, studios, etc	3.0*	0.75	0.6	1.5	1.5	**N30** **N20(1)**
D	**Retail areas**	All retails areas including public areas of banks/building societies (see C5 for areas where over-crowding may occur)	1.5	0.75	0.6	1.5	1.5	**N15**
F/G	**Vehicular**	Pedestrian areas in car parks including stairs, landings, ramps, edges of internal floors, footways, edge of roofs	1.5	0.75	0.6	1.5	1.5	**N15**
		Horizontal loads imposed by vehicles	Requires site specific UNEX design					

(1) N20 is only applicable where 2.0kN/m horizontal top edge load is acceptable by the Building Consent Authorities.

PRODUCER STATEMENT – PS1 – DESIGN

ISSUED BY: **UNEX SYSTEMS (NZ) LTD**

TO:.....
(Owner/Developer)

TO BE SUPPLIED TO: **TO WHOM IT MAY CONCERN**

IN RESPECT OF: THE SUPPLY OF ALUMINIUM BALUSTRADE FOR THE ADDRESS BELOW

AT:.....
(Address)

Town/City:..... **LOT / DP / SO** .....
(Address)

This statement applies to the Postless Style balustrade as supplied by Unex Systems (NZ) Ltd for the owner/developer/ specifier referred to above. Construction details are to be in accordance with the **UNEX Fabricators' Manual - Postless Baustrade** for the **Finline** Style only.

The design carried out by Unex Systems (NZ) Ltd has been prepared in accordance with the requirements of clauses B1/VM1 and B1/AS1 of the Building Code for the proposed building work. The design of the load carrying members and their connections have been verified by load testing where applicable.

The proposed building work covered by this Producer Statement is described on the attached drawings. This Producer Statement must be accompanied by the **Finline Style Specification**, Fixing Specification, and Assembly Specification pages when submitted for Building Consent purposes.

I believe on reasonable grounds that subject to:

1) All proprietary products meeting their performance specification requirements.

2) The general arrangement and dimensions of the balustrade members, baluster spacing, fixing details and assembly methods being in accordance with the instructions in the current **UNEX Fabricators Manual - Postless Balustrade** and the above details.

The design of the **Finline Style** balustrade and it's fixings (excluding any supporting structure complies with clauses B1 and F4 of the New Zealand Building Code.

I, Dale Donovan am a member of Engineering New Zealand and a qualified CMEng: 1004603

UNEX Systems (NZ) Ltd holds a current policy of $200,000 Professional Indemnity Insurance.

SIGNED BY Dale Donovan (Signature)..... Date..30 August 2021

ON BEHALF OF UNEX SYSTEMS (NZ) Ltd
42 Bryant Road, Te Rapa, Hamilton 3200
PO Box 92, Hamilton 3240
Telephone: 07 850 9464

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

BUILDING CONSENT APPLICATION DOCUMENTS

Following are the 5 recommended pages for submitting a Building Consent Application.

1. Fill out a PS1 Producer Statement page
2. The relevant Style Specification page
3. The relevant Fixing Specification page
4. The relevant Assembly Specification page
5. The UNEX Loading Classifications page