

Balustrade Systems

Glass balustrades have the benefit of opening up and extending living areas, whilst ensuring safety barriers are in place for stairwells, mezzanine floors and upper storeys.

“Create large, open inner spaces that give homes a light, airy, spacious feel – without compromising on safety”.





Balustrade Systems

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AREA ICONS KEY:



PRODUCT OVERVIEW

Balustrade Systems

Frameless glass balustrades are the least obtrusive fencing option available. They allow the eye to travel further without the interruption of your view, while still meeting safety and building standards. Metro Frameless Glass balustrade systems are designed for use in external balconies and stairs - as well as for internal stairs and landings, including windbreaks and pool fences.

Various fixing options are available to comply with the specifications and requirements of the building code using hardware that makes an architectural statement in itself.

For further information, specific to Frameless Pool Fences, Gates or Windbreak applications see sections:

- ▶ Frameless Pool Fences / Gates (See section 7)
- ▶ Windbreaks (See section 7)

Balustrade Design Summary

Balustrade fixing is critical to ensure the performance of the glass as a barrier. There are a wide range of proprietary fixing systems and some standard techniques that are suitable. The designer and installer should be aware that if using a technique that is not supported by design or test data, the system may not comply with the NZBC.

There are several parts of the NZ Building Code (NZBC) that effect the design and installation of Balustrades and they are as follows;

- F2 - Hazardous Materials
- F4 - Safety from Falling
- B1 - Structure
- B2 - Durability
- D1 - Access Routes
- E2 - External Moisture

Complete guidance documents are available from Standards New Zealand, Ministry of Business, Innovation & Employment, 15 Stout Street, Wellington 6011.

P.O. Box 1473, Wellington 6140

Freephone: 0800 782 632 (New Zealand)

Phone: +64 3 943 4259

Email: enquiries@standards.govt.nz

Business hours: 8.30am – 5pm Monday to Thursday;
9am – 5pm Friday

AN OVERVIEW:

F2 – Hazardous Building Materials Provides an acceptable solution and verification method for safe guarding people, protecting them from injury or illness citing NZS ZS 4223 Part 3 2016 as means of compliance.

F4 – Safety from Falling Provides an acceptable solution and verification method to confirm buildings are constructed to reduce the likelihood of accidental fall. It requires barriers where people could fall 1 metre or more.

B1 – Structure Provides an acceptable solution and verification method to confirms buildings withstand likely loads, including wind, earthquake, live and dead loads (people and building contents).

This clause sets requirements around the combination of loads that buildings, building elements and site-work are likely to experience during construction, alteration and throughout their lives. The performance requirements outline how buildings should be stable, not degrade and withstand physical conditions to protect lives and other property. It makes due allowance for the intended use of a building, the consequence of failure and other limitations.

B2 – Durability defines minimum durability requirements for materials and fixings used in balustrades and barriers. The requirements range from 5 to 50 years depending on whether the element is structural and how difficult it is to replace. In some cases, the 50-year requirement will apply to fixings for structural elements of safety barriers, but in most cases 15 years is adequate.

D1– Access Routes defines accessible routes and how handrails are used, but they are not required if it is not an accessible route.

E2 – External Moisture deal with balustrade to wall and deck drainage, junctions and balustrade fixing to ensure the building is water tight, and it also covers compatibility of materials.

Balustrade Summary (glazing safeguarding a fall)

- Balustrades, fences and screens that safeguard the occupants from falling 1000mm or more from the floor, deck, or balcony level are defined in NZS4223.3.2016 as a barrier. Such barriers shall meet the requirements of NZBC Clause F4, and resist the barrier actions from AS/NZS 1170.1 in accordance with Verification Method B1/VM1 of Clause B1.
- The glazing shall also meet the requirements of NZS 4223.4 or AS/NZS 1170.2 as applicable.
- Pool Fences shall also meet the requirements of NZS 8500 as applicable.
- Glass design shall be in accordance with NZS 4223: Parts 1, 3, and 4, Acceptable Solution B1/AS1, F2/AS1 and F4/AS1 with engineering design loads from B1/VM1 and AS/NZS 1170.
- Engineering may require Finite Element Analysis for glass specific design.
- Product prototype testing may be required to prove compliance, if the procedures in AS/NZS 1170 are not sufficient.

Durability Requirements of Nominated Building Elements:

Interpreting B2 with respect to glazed balustrade design

Building Element	Component	Situation/Function	Not less than 50 years	Not less than 15 years
Glazed safety barrier	Attached support posts, for both infill type and structural balustrades			Y
	Embedded support posts, for both infill type and structural balustrades		Y	
	Exposed cantilevered channels or clamps			Y
	Hidden or embedded cantilevered channels or clamps		Y	
	Fixings to building/structure	Screws, bolts, anchors, or similar attaching balustrade system to building or structure	Y	
Glass fixings	Bolts, or similar attaching glass to balustrade system			Y
	Balusters, and glass panels			Y
	Gaskets, sealant, and glazing beads	Moderately difficult to access or replace		Y

Occupancy Types – Overview

There are seven core occupancy types that affect Barrier Loads:

RESIDENTIAL TYPES:

- A** areas within a domestic or residential dwelling
- A (other)** external balconies of domestic or residential dwelling
- C3** areas for moving people and not susceptible to overcrowding

COMMERCIAL TYPES:

- B, E** office not susceptible to overcrowding
- C3** areas for moving people and not susceptible to overcrowding
- C1/C2** areas with tables or fixed seating adjacent to a balustrade
- C5** areas susceptible to overcrowding
- D** areas with tables or fixed seating adjacent to a balustrade

APPENDIX D – GUIDANCE ON BARRIER LOADS

(Informative) NZS 4223.3:2016

Table D1 –Barrier imposed actions

Type of occupancy for part of the building or structure	Specific uses	Top edge and rail			Infill	
		Horizontal kN/m	Vertical kN/m	Inwards, outwards, or downwards kN	Horizontal kPa	Any direction kN
A Domestic and residential activities	All areas within or serving exclusively one dwelling including stairs, landings and so on, but excluding external balconies and edges of roofs (see C3)	0.35	0.35	0.6	0.5	0.25
	Other residential (see also C)	0.75	0.75	0.6	1.0	0.5
B,E Offices and work areas not included elsewhere including storage areas	Light access stairs and gangways not more than 600mm	0.22	0.22	0.6	N/A	N/A
	Fixed platforms, walkways, stairways and ladders for access	0.35	0.35	0.6	N/A	N/A
	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
C Areas where people may congregate						
C1/C2 Areas with tables or fixed seating	Areas with fixed seating adjacent to a balustrade, restaurants, bars and so.	1.5	0.75	0.6	1.5	1.5
C3 Areas without obstacles for moving people and not susceptible to over-crowding	Stairs, landings, external balconies, edges of roofs and so on.	0.75	0.75	0.6	1.0	0.5
C5 Areas susceptible to over-crowding	Theatres, cinemas, grandstands, discotheques, bars, auditoria, shopping malls (see also D), assembly areas, studios and so on.	3.0	0.75	0.6	1.5	1.5
D Retail areas	All retail areas including public areas of banks/ building societies, (see C5 for areas where overcrowding may occur)	1.5	0.75	0.6	1.5	1.5
F/G Vehicular	Pedestrian areas in car parks including stairs, landings, ramps, edges of internal floors, footways, edges of roofs	1.5	0.75	0.6	1.5	1.5
a Applied over a circular or square area of 2000mm, or over two adjacent vertical balusters, as appropriate.						
b This usage (under B,E) is for access to safe working at places normally used by operating, inspection, maintenance, and servicing personnel.						

As per NZS 4223.3:2016. Please refer to standards New Zealand, Ministry of Business, Innovation & employment for actual guidance documents. The information provided is an overview only.

Determining Respective Wind Zones – A Useful Guide

When wind loads are applied to glass, it causes both compression and tensile stresses. The face of the glass that has the load imposed on it is subject to compressive stresses for which the glass has a high resistance. The opposite face has the tensile stresses applied to it for which glass has a lower resistance.

The majority of loads which glass has to withstand are caused by bending and probably the most important external factor, in specifying a suitable glass thickness is the design wind load. The actual design wind load can be determined by specific engineering design using NZS 4203 or AS/NZS 1170, and on large projects the project engineer should provide this information.

Typically, the loads will vary due to building height and glazing location with much higher loads on the corners of buildings and edges or roofs. For housing and low rise projects the wind loads can be determined from NZS 3604.

Defined Wind Zones NZS 3604:2011;

- Low:** Wind speeds below 32 metres per second.
- Medium:** 37 metres per second
- High:** 44 metres per second
- Very high:** 50 metres per second
- Extra high:** 55 metres per second
- Specific design (SD):** Over 55 metres per second

There are six steps to determining wind speed in New Zealand’s building standards. These steps take into account the following factors:

- 1. Wind region:** NZ has two ‘wind regions’, known as A and W. These are national averages based on MetService data.
- 2. Lee zones:** Some parts of the country are in lee zones, which have higher wind speeds than either regions A or W.
- 3. Ground roughness:** NZ homes are either in ‘urban’ or ‘open’ spaces, based on how built-up the area is. If there are more than 10 obstructions over 3 metres high (e.g. homes and trees) in a hectare, it will be classed as urban. The opposite applies to open areas. Therefore, even forested regions are technically urban when it comes to wind zoning.
- 4. Site exposure:** Similar to roughness, exposure determines whether an area has nearby permanent shelter that is of similar size to the home being built. So, homes near beaches, open fields and similar will be classed as exposed.
- 5. Topographic class:** Topographic class determines the topography of your site. It factors local geographical features (i.e. hills or escarpments), their steepness and where the build site is in respect to them.

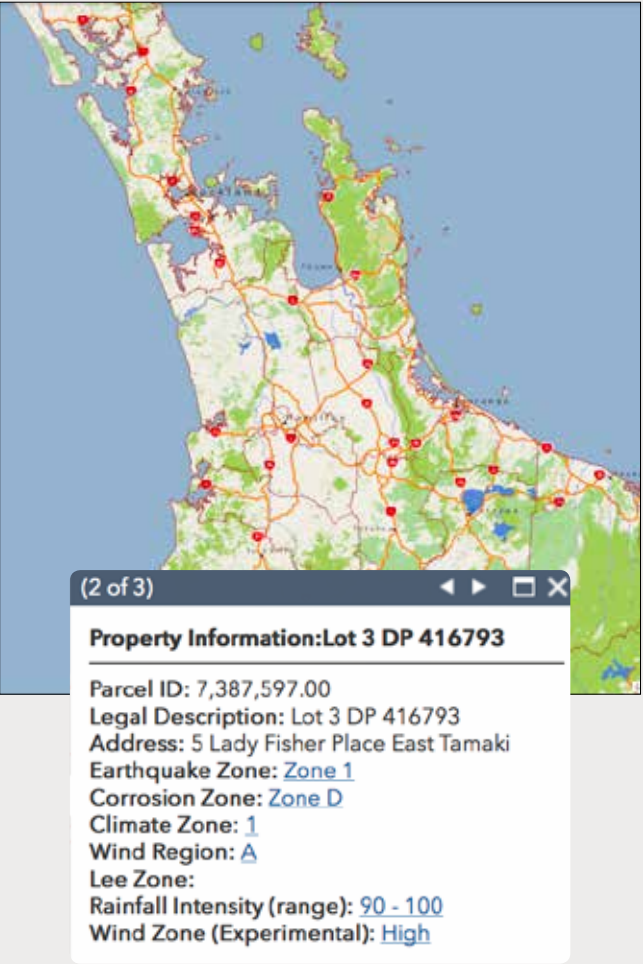
The **sixth step** would then be to calculate the final wind zone, and use these measurements to find the system requirement.

A useful tool in determining respective zones, is available on

Example

the BRANZ website valid for buildings designed to NZS3604 and NZS4229. Detailed information can be obtained and used as a guide for a given property address.

<http://branz.maps.arcgis.com/apps/webappviewer/index.html?id=1bade5ce36a9459aa0de4bd5cecd6e36>



* Only for buildings <10m high.

Earthquake zones

Four earthquakes zones - zone 1 to zone 4 - are shown on a map of the North and South Islands in Figure 5.4 of NZS 3604:2011 Timber-framed buildings.

The earthquake zones in BRANZ Maps are modified versions of those. The zones are modified so that they better align with NZS 1170.5:2004 Structural design actions - Part 5: Earthquake actions - New Zealand.

BRANZ Maps also include the changes to the zone boundaries in the Canterbury region introduced by the New Zealand Building Code clause B1 compliance document published in August 2011.

Corrosion zones

Three exposure zones - zone B, zone C and zone D - are shown on a map of the North and South Islands in Figure 4.2 of NZS 3604:2011.

The corrosion zones in BRANZ Maps are our interpretation of the exposure zones in NZS 3604:2011.

The zones relate to the severity of exposure to wind-driven salt, with B being low risk, C medium risk and D high risk.

Zone D includes:

- all offshore islands
- the area within 500 m of the coastline of New Zealand, including harbours
- the area within 100 m of tidal estuaries and sheltered inlets.

BRANZ has not attempted to define precisely what is or isn’t a tidal estuary or sheltered inlet, so our maps are technically conservative in those areas.

Building Code compliance document E2/AS1 (2011) includes an exposure zone E, which is beachfront regions subject to rough seas and surf beaches. NZS 3604:2011 contains the comment: “For the purposes of NZS 3604, the corrosion protection requirements for structural fixings in exposure zones D and E are identical...”

Microclimatic factors need to be considered in all locations.

Wind regions

Wind regions and lee zones are our interpretation of Figure 5.1 in NZS 3604:2011.

Wind Zones

Wind zones are an output from a 2014 research project at BRANZ. The project aimed to see if the calculation of wind zones (in accordance with NZS 3604:2011) could be automated using GIS (geographic information system) software. The method for calculating wind zones in NZS 3604:2011 is a simplification of the method described in AS/NZS 1170.2:2011

Structural design actions - Part 2: Wind actions.

Several approximations were made in the process of creating the map. Therefore, the wind zones must be treated as indicative and used only as a reference when calculating site-specific wind speed or only in the absence of more reliable data being available.

For example, an up-to-date council-wide wind zone map would be considered higher-resolution data, and a site-specific wind zone calculation would be higher still.

Initial user testing has shown that the wind zones in BRANZ Maps are likely to be inaccurate near escarpments or cliffs.

Climate zones

Climate zones are our interpretation of Figure B1 in NZS 4218:2004 Energy efficiency - Small building envelope.

Rainfall intensity

Rainfall intensity values are sourced from NIWA’s HIRDS calculator and correspond to a 10-minute rainfall intensity with an annual probability of exceedance of 10%. These values can be used in conjunction with clause E1 of the Building Code. For other storm durations, consult the HIRDS calculator.

Overview of Producer Statements:

The producer statement system is intended to provide Building Consent Authorities (BCA's) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

There are two categories of producer statement, **design** and **construction**.

Within the design category there are two types of statement issued; producer statement **design** and producer statement **design review**. These statements are issued by design professionals confirming that in their professional view, part, or all of the building work as described on nominated plans and specifications has been designed in accordance with the performance requirements of the NZBC. Note the design professional can be either the designer or a design reviewer.

(a) Producer statement design (PS1) these statements are issued by design professionals as confirmation that the building work as designed and documented complies with the NZBC

(b) Producer statement design review (PS2) these statements are issued by design professionals who have reviewed the work of the designer (sometimes on behalf of the Council) as confirmation that the building work that they have reviewed complies with the NZBC

Within the construction category, there are two types of statement issued; producer statement **construction** and producer statement **construction review**. These statements are issued by contractors or design professionals stating in their view that part, or all of the building work as described on the consented plans and specifications has been constructed and meets certain performance requirements of the NZBC and or conditions of building consent.

(c) Producer statement construction (PS3) this statement is issued by the contractor who has performed the building work as confirmation that the building work is in accordance with the consented plans and the NZBC and is issued when Council have had limited or no involvement with specific elements of construction, such as pile driving, application of waterproofing membranes, specialist coating and cladding systems, etc

(d) Producer statement construction review (PS4) this statement is issued by the design professional¹ who has reviewed the work of the contractor as confirmation that the building work has been carried out in accordance with the consented plans and the NZBC and is issued where the design professional or Council has requested involvement or supervision by a suitably qualified person² for building work, such as pile driving, compaction of fill, placement of steel, etc.

Producer Statements

All PS1's must be made specific to the project address with a cover sheet and relevant drawings (where required), marked up and included in the PS1.

MPG offer design tables and associated drawings to assist with sales & quoting. The documents are available for download at www.metroglass.co.nz or online from www.masterspec.co.nz.

To request a generic balustrade or pool fence PS1:

Metro Glass offer a range of "generic" balustrade system solutions.

PS1 documents for these systems can be requested from the design and technical centre within our website - www.metroglass.co.nz.

You will need to register your details and complete a balustrade or pool fence generic PS1 request (there is a guidance document within the website to assist in completing this process).

Please note: It is the responsibility of the designer to ensure that the design installation details exactly match the PS1 installation details.

Alternatively e-mail your project details to technical@metroglass.co.nz and one of our team will assist with your balustrade or pool fence PS1 request.

To request a specific engineering design (SED) PS1:

Not all PS1 requests have "generic" solutions available at this time. Metro Glass has a team of experienced engineers dedicated to providing solutions for your glass and glazing projects.

You can request SED from the design and technical centre within our website - www.metroglass.co.nz. There are a selection of RFI forms which contain the minimum required details for and most common SED projects. Please submit the completed RFI form and required drawings to technical@metroglass.co.nz

Alternatively e-mail your project details to technical@metroglass.co.nz and one of our team will assist with your SED PS1 request. SED requests may incur engineering design and documentation fees.

Please Note:

A PS1 is not required for fully framed, partly framed or infill balustrade glazing protecting a fall of 1m or more, when the scope of the work complies EXACTLY with the terms of B1 amend 15 & NZS4222.3 and 1, as per one of the tables in NZS4223.3 (table 7-12). Also ensure you comply with the 5m height above FFL requirements noted in NZS4223.1 and 1, clause 3.8.3.2 (laminated glass that is prevented from disengaging from the perimeter frame when glazing more than 5m above an occupied space).

A PS1 is not required for fully framed or partly framed windbreaks that do NOT protect a fall of 1m or more. They shall be safety glass – Thickness in accordance with NZS4223 Part 4 (check wind) & NZS4223.3 and 1, table 1 square metreage limitations apply. Point fixed wind breaks will require specific engineering design & enquiries for such should be emailed to technical@metroglass.co.nz

Ensure the proposed balustrade is in the consented documents (or seek a building consent amendment) using our site specific PS1 **before** the system is installed.

Summary:

MPG PS1: MPG do not issue PS1s retrospectively. Site specific PS1s are required to be obtained from MPG prior to commencement of installation work.

MPG PS3 & MPG Installation: A PS3 can be issued to confirm glazing complies with the Building Code. MPG does not have to issue a PS1 or a design statement for a PS3 to be issued. However, when a PS1 (or other design documentation) has been issued, the installation and hence the PS3 must be in accordance with the issued PS1 (or other design documentation).

MPG PS3 & Third Party Installation: Where MPG do not undertake installation work, MPG will not issue a PS3. The PS3 will be the responsibility of the relevant third party undertaking installation who will need to certify compliance to the relevant PS1.

BALUSTRADE PRODUCT OVERVIEW

Commercial

Below is an overview of balustrade systems when used to protect a fall over 1m. Please refer to specific section, if specifying system for use as a Frameless Pool Fence or windbreak screen, as other specific criteria will apply:

- Frameless Pool Fences / Gates (See section 7)
- Windbreaks (See section 7)

PosiGlaze System (Base and Side Fix)

PosiGlaze is the perfect choice for residential to light commercial installations where a 1.5kN frameless glass balustrade is desired. The PosiGlaze system was developed for cantilevered structural balustrades to cope with the transition from monolithic Toughened Safety Glass (TSG) to Toughened Laminated Safety Glass (TLSG).

The unique design uses a special high strength hollow core aluminium extrusion and special glass clamp kits that clamp the glass and locate into the section. This means the system can be used on 12 & 15mm TSG; 15.2 & 17.2 TLSG with SAFELITE® EVA Interlayer; and 13.52, 17.52 & 21.52 TLSG with SAFELITE® STF (Sentry), without holes in the glass.



System	Max Wind Load	Occupancy Type	Glass Capacities	Maximum Heights	Suitable substrate
PosiGlaze System (Base Fix)*	Extra High Subject to glass type and fixing method	A, B, E, C1/C2, C3 and D	12, 15, & 19mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail. 15.2, 17.2, 19.2 TLSG nominal thickness with SAFELITE® EVA Interlayer, with stiffener brackets or Interlinking rail. 13.52, 17.52 & 21.52 TLSG nominal thickness with SAFELITE® STF (Sentry), rigid interlayer. Stiffener brackets or interlinking rail not required (provided minimum panel length requirements are satisfied).	1250mm above bottom of channel (1220mm pool fence)	Steel Concrete
PosiGlaze System (Side Fix)*	Extra High Subject to glass type and fixing method	A, B, E, C1/C2, C3 and D	12, 15, & 19mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail. 15.2, 17.2, 19.2 TLSG nominal thickness with SAFELITE® EVA Interlayer, with stiffener brackets or Interlinking rail. 13.52, 17.52 & 21.52 TLSG nominal thickness with SAFELITE® STF (Sentry), rigid interlayer. Stiffener brackets or interlinking rail not required (provided minimum panel length requirements are satisfied).	1130mm above top of channel (1220mm pool fence)	Timber Steel Concrete

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

* Interlinking rails must be connected to a structural element at both ends. Interlinking rail not required for pool fence (not protecting a fall >1m).

BALUSTRADE PRODUCT OVERVIEW

Commercial

PosiGlaze MegaGrip System
(Base Fix)

PosiGlaze MegaGrip is the perfect choice for heavy commercial installations where a 3.0kN frameless glass balustrade is desired. The PosiGlaze MegaGrip System was developed for cantilevered structural balustrades and areas susceptible to overcrowding where a C5 Occupancy Type is required.

The MegaGrip system has been produced specifically for vulnerable public spaces such as; Stadiums, Shopping Centers, Public Transportation Zones, Theatres and other such areas susceptible to a high profile of people traffic. The unique design uses a special high strength hollow core aluminium extrusion and special glass clamp kits that clamp the glass and locate into the section. This means the system can be used on glass varying from 25mm up to 33mm thickness (10+10+10); without holes in the glass.

Using MegaGrip as a glass windbreak the glass panels can be up to 1800mm high for an extra high windzone and still achieve a load of 1.5kN/m for significantly taller cantilevered glass panels.



System	Max Wind Load	Occupancy Type	Glass Capacities	Maximum Heights	Suitable substrate
PosiGlaze MegaGrip (Base Fix)*	Extra High Subject to glass type and fixing method	A, B, E, C1/C2, C3, C5, D, F/G	25mm up to 33mm thickness	1800mm above top of channel	Steel Concrete

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

BALUSTRADE PRODUCT OVERVIEW

Residential

Infinity System
(Base and Side Fix)

Infinity is a cantilevered, aluminium balustrade system that utilises proprietary clamps for installation of either 12mm or 15mm nominal thick Toughened Safety Glass (TSG), with an interlinking top rail. Or Toughened Laminated Safety Glass (TLSG) with a SAFELITE® STF (Sentry)interlayer 13.52mm or 17.52mm nominal thickness without the need for an Interlinking rail (Provided minimum panel length requirements are satisfied).

Manufactured from architectural grade aluminium, the proprietary Infinity clamps fix the toughened glass or laminated panels without a requirement for holes in the glass. Drawing from the patented technology, the Infinity system is adjustable, even if the deck moves after installation. Infinity balustrade clamps are set at regular centres, with alignment via a continuous back plate. A matching continuous linear front cover plate and a 38mm x 30mm interlinking top rail (where required) finishes off the system, producing a low profile modern look.



System	Max Wind Load	Occupancy Type	Glass Capacities	Maximum Heights	Suitable substrate
Infinity (Base Fix)*	Very High or 2.0kPa Subject to glass type and fixing method (Extra High for pool fence only)	A, A Other, B, E and C3	12mm or 15mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail. 13.52, 17.52 (TLSG) nominal thickness with SAFELITE® STF (Sentry) rigid interlayer. Stiffener brackets or interlinking rail not required (provided minimum panel length requirements are satisfied).	1150mm above top of clamp (1230mm pool fence)	Timber Steel Concrete
Infinity (Side Fix)*	Very High or 2.0kPa Subject to glass type and fixing method (Extra High for pool fence only)	A, A Other, B, E and C3	12mm or 15mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail. 13.52, 17.52 (TLSG) nominal thickness with SAFELITE® STF (Sentry) rigid interlayer. Stiffener brackets or interlinking rail not required (provided minimum panel length requirements are satisfied).	1150mm above bottom of clamp including packers (1200mm pool fence)	Timber Steel Concrete

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

* Interlinking rails must be connected to a structural element at both ends. Interlinking rail not required for pool fence (not protecting a fall >1m).

50mm DoubleDisc System
(MB50 Side Fix)

The DoubleDisc MB50 system is a 50mm diameter traditional stainless steel anchor fixing offering from the Metro balustrade range - ideal for those seeking a more industrial frameless glass balustrade aesthetic.

DoubleDisc anchors are manufactured from solid 316 Marine Grade Stainless Steel. The 30mm long body sets the 12mm/15mm toughened glass panels out from the deck to assist with water draining and cleaning. The DoubleDisc anchor system is ideal for external balconies and stairs - as well as for internal stairs and landings. It can be fixed directly to either timber, steel or concrete surfaces and is finished with an interlinking top rail (where required) in a choice of stainless steel or powder coat colours to suit. The finish options are mirror polished stainless steel with a hidden fixing detail or satin stainless steel with a visible fixing detail. Adjustable options are also available.



System	Max Wind Load	Occupancy Type	Glass Capacities	Maximum Heights	Suitable substrate
50mm DoubleDisc System (MB50)*	Extra High Subject to glass type and fixing method	A, B, E, and C3	12mm or 15mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail. 15.2, 17.2 (TLSG) nominal thickness with SAFELITE® EVA interlayer, with stiffener brackets or interlinking rail. 13.52, 17.52 (TLSG) nominal thickness with SAFELITE® STF (Sentry) rigid interlayer. Stiffener brackets or interlinking rail not required (provided minimum panel length requirements are satisfied).	1250mm above centre of top disc	Timber Steel Concrete

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

* Interlinking rails must be connected to a structural element at both ends. Interlinking rail not required for pool fence (not protecting a fall >1m).

BALUSTRADE PRODUCT OVERVIEW

Residential

75mm SingleDisc
(MB75 Side Fix)

The SingleDisc MB75 was born from testing and modelling balustrade fixings to determine the optimum economical fitting for clamp fixing balustrades. The outer disc was profiled to give an attractive appearance and the single fixing point means it can be located on the edge of narrow concrete slabs or steel profiles.



System	Max Wind Load	Occupancy Type	Glass Capacities	Maximum Heights	Suitable substrate
75mm (SingleDisc MB75)*	Extra High Subject to glass type and fixing method	A, B, E and C3	12mm or 15mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail. 15.2, 17.2 (TLSG) nominal thickness with SAFELITE® EVA interlayer, with stiffener brackets or interlinking rail. 13.52, 17.52 (TLSG) nominal thickness with SAFELITE® STF (Sentry) rigid interlayer. Stiffener brackets or interlinking rail not required (provided minimum panel length requirements are satisfied).	1250mm above centre of top disc (1350mm pool fence)	Steel Concrete

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

* Interlinking rails must be connected to a structural element at both ends. Interlinking rail not required for pool fence (not protecting a fall >1m).

100mm SingleDisc
(MB100 Side Fix)

The SingleDisc MB100 was designed to provide a more solid aesthetic look to single point clamping, as an alternative option to DoubleDisc, MB50 or continuous plate systems. The outer and inner discs are simple circular profiles and the single fixing point means it can be located on the edge of narrow concrete slabs or steel profiles.



System	Max Wind Load	Occupancy Type	Glass Capacities	Maximum Heights	Suitable substrate
100mm (SingleDisc MB75)*	Very High Subject to glass type and fixing method	A, B, E and C3	12mm or 15mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail. 15.2, 17.2 (TLSG) nominal thickness with SAFELITE® EVA interlayer, with stiffener brackets or interlinking rail. 13.52, 17.52 (TLSG) nominal thickness with SAFELITE® STF (Sentry) rigid interlayer. Stiffener brackets or interlinking rail not required (provided minimum panel length requirements are satisfied).	1250mm above centre of top disc (1350mm pool fence)	Steel Concrete

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

* Interlinking rails must be connected to a structural element at both ends. Interlinking rail not required for pool fence (not protecting a fall >1m).

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

PlateFix
(PF150 Side Fix)

Designed in response to demands for maximum visibility, the PlateFix PF150 Frameless Glass Balustrade presents minimal fixings and clearer views beyond the glass panels. The PlateFix PF150 is an marine grade stainless steel clamp that fixes 12mm/17.52mm thick toughened glass panels to the external edge of balconies and stairs - as well as for internal stairs and landings. The PlateFix PF150 has a wide body which sets the glass out from the deck 20mm, assisting with water drainage and cleaning, but fixing centres are up to 50% narrower than our traditional DoubleDisc Anchors - providing a comparatively less visual and far more linear fixing detail.

The PF150 to be used with single or double fixings to the structure and it can be used vertically, horizontally, angled or a combination of the above.



System	Max Wind Load	Occupancy Type	Glass Capacities	Maximum Heights	Suitable substrate
PlateFix (PF150)*	Very High Subject to glass type and fixing method	A, B, E, and C3	12mm or 15mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail. 15.2, 17.2 (TLSG) nominal thickness with SAFELITE® EVA interlayer, with stiffener brackets or interlinking rail. 13.52, 17.52 (TLSG) nominal thickness with SAFELITE® STF (Sentry) rigid interlayer. Stiffener brackets or interlinking rail not required (provided minimum panel length requirements are satisfied).	1250mm above centre of top PF150 glass hole	Timber Steel Concrete

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

* Interlinking rails must be connected to a structural element at both ends. Interlinking rail not required for pool fence (not protecting a fall >1m).

Strut Post PL200
(Base Fix)
Strut Post PL400
(Side Fix)

The Strut Post system has a patented adjustable clamping system, designed for 12mm thick toughened glass without holes. The system is designed for heights from 1200mm for balustrades. Available as base fix or side fix, Strut Posts have crafted covers which hide the engineered stainless steel fixings. Manufactured from extruded architectural grade aluminium, Strut Posts are a popular choice for their modern, minimalist finish.



System	Max Wind Load	Occupancy Type	Glass Capacities	Maximum Heights	Suitable substrate
Strut Post PL200 (Base Fix)*	High Subject to glass type and fixing method	A, A other, B, E,	12mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail.	1200mm above deck level	Timber Steel Concrete
Strut Post PL400 8 (PL200 Gutter Bracket) (Side Fix)*	High Subject to glass type and fixing method	A, A other, B, E,	12mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail.	1200mm above deck level	Timber Steel Concrete

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

* Interlinking rails must be connected to a structural element at both ends. Interlinking rail not required for pool fence (not protecting a fall >1m).

Semi Frameless Aluminium Posts (Base and Side Fix)

- AP65 Aluminium Post
- AP78 Aluminium Post

The semi frameless system can incorporate either toughened glass in a range of styles including fully framed or semi frameless glass balustrade finishes. Further options include the addition of an intermediate rail for a split rail finish. Semi Frameless glass balustrades include a handrail which are either top or front mounted. The top rail is fashioned from one of five styles of handrails - round, rectangular, slimline interlinking rail, aerofoil or double aerofoil, all finished in a powder coat colour matching the posts. The front mounted interlinking rails are fitted to a bracket, which fixes to the balustrade post face, 100mm below the top edge. In a low height system an S25 / S40 Link Rail or an Edgetec® 220 Link Rail can be used providing it is tied back to each end of the building.

Engineered and tested to comply with the NZ Building Code, Metro's Semi Frameless balustrade has been designed to fit most NZ building scenarios including installation on modern floating or waterproof decks.



System	Max Wind Load	Occupancy Type	Glass Capacities	Maximum Heights	Suitable substrate
AP65 Aluminium Post*	2.39kPa subject to post spacing and fixing method	A, A other	10mm Toughened Safety Glass (TSG) with rail. 13.2mm SAFELITE® EVA bonded, no rail.	1800mm	Timber Steel Concrete
AP78 Aluminium Post*	2.39kPa subject to post spacing and fixing method	A, B, E, C1/C2, C3 and D	12mm - 15mm nominal thickness Toughened Safety Glass (TSG), with an interlinking top rail.	1500mm	Timber Steel Concrete

*All Subject to glass type and fixing method. Information provided is up to date but can change without further notice.

BALUSTRADE OVERVIEW

