

Frameless Commercial Doors

A number of design options are possible to suit specific onsite applications. Our established range has proven performance and offers designers options including, hinged, sliding, frameless glass with and without bottom rails, pivot and bi-fold doors.



Frameless Commercial Doors

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AREA ICONS KEY:



PRODUCT OVERVIEW

Frameless Commercial Doors, Hinged, Pivot & Sliding

Commercial contract glazing is a major part of Metro Frameless Glass's presence in the New Zealand flat glass market. Metro is able to offer various patch fittings and floor springs to suit a broad range of applications.

The Metro Commercial Door range consists of a wide array of basic types and variants, including sliding door systems enabling the conception of glass assemblies to suit a vast range of requirements. Our range of Patch Fittings not only makes the glass assemblies look visually striking but also technically sound.

Guidance Notes for Frameless Glass Doors and Assemblies

Frameless glass doors using TEMPAFLOAT® Toughened Safety Glass (TSG) with patch fittings and rails have long and successful history and they have advanced in the last decade with an ever increasing range of innovative new hardware designs.

There are some basic guidelines that limit door sizes, such as;

- ▶ Most door patch fittings and doors rails are designed for 10 and 12 mm monolithic Toughened Safety Glass.
- ▶ Some patch fittings can be modified for 15mm glass but special fittings are normally required for 15 and 19mm glass.
- ▶ Most patch fittings are NOT designed for toughened Laminated Structural Glass.
- ▶ There are a range of floor spring closers and they are limited in weight and door width, based on the maximum opening force (torque) in Nm, (normal range 15,25,35,53 Nm).
- ▶ Standard springs are limited to 100 Kg and heavyweight springs up to 300 Kg.
- ▶ Larger floor spring usually require a deeper rebate in the floor (40mm standard to 60mm max.)
- ▶ Floor springs are available in hold-open and non-hold-open types.
- ▶ Overhead closers can also be used, but are normally limited 1050 mm wide external doors and 1250 wide internal doors.
- ▶ Some doors can be fitted on hinges, but they are normally limited to internal doors up to 100 kg and 1000mm wide.
- ▶ Some modern hinges are hydraulic self-closing but most are free swinging.
- ▶ Some specialised hardware uses complex countersunk holes and fixings which allow thicker glass, but can create high localized stress around the holes.
- ▶ Frameless glass doors can have applied seals for smoke and water but they are not water or draft proof.
- ▶ Extra care is required for glass doors in high wind load zones that they do not open and close under positive and negative pressure and rotate and fracture.
- ▶ Large doors require larger clearances (gaps) as they can twist and bend during operation.
- ▶ Metro Frameless Glass doesn't recommend the use of Toughened Laminated Safety Glass (TLSG).

Door Types

Frameless glass doors are typically known in 3 Types;
See diagram on [page 368](#) for details.

Type A Doors with rails top and bottom

Type B Doors with top patch fittings and bottom rails

Type C Doors with top and bottom patch fittings

- ▶ Door locks can be fitted in the rails and or in the patch fittings. Type A, B and C doors can be used on pivot and sliding but the rails and locks are slightly different.
- ▶ Special proprietary systems like Dorma Manet, or similar which use countersunk fittings and the like must meet the manufacturers specifications.

Typically pivot doors with rails and or patch fittings are limited as follows;

| Type | Thickness mm | Width mm |
|-------|--------------|----------|
| A & B | 10 | 1100 |
| A & B | 12 | 1200 |
| A & B | 15 | 1300 |
| C | 10 | 1000 |
| C | 12 | 1100 |
| C | 15 | 1200 |

Notes:

1. These sizes are for standard pivot doors with pivot positions approximately 50 to 60mm from the edge. In some cases the pivot can be moved further in from the edge up to 300mm to make wider door panel.
2. These sizes should not exceed the limits provided by the hardware manufacturer.

- ▶ Doors are normally limited in height by the design loads which are dead weight, wind and human impact, and the fitting types and hardware capacity.
- ▶ Tall doors flex and deflect in the middle which can be disturbing to users and puts undue loads on the fittings and connection.
- ▶ Tall doors can also bend under their own weight, but this is not a problem with top hung sliders and these are often taller than ground based pivot or sliding doors.
- ▶ Glass doors can bow during toughening and the taller they are the more noticeable it is, so bow limits should be discussed with the manufacturer. In some cases, they should be toughened as LH and RH matching pairs.
- ▶ When doors are closed and locked they act like two edge supported glass and can be calculated as such using 2 edge wind load calculations.
- ▶ Central door locks can also assist in reducing deflection, but only when locked.
- ▶ Deflections are normally limited to Span/60 which can be a large deflection for a high door, for example 2500/60 = 42mm. Sometimes deflections are limited to 30mm maximum by using thicker glass.
- ▶ Door handles are normally ignored in design but long and vertical handles fixed at either end and at the centre can stiffen the door and reduce deflection, however this is complex to calculate.

Based on typical wind zones from NZS 4223 Part 4:2008 the following table provided a guide;

| Thickness | Internal 0.5 kPa | Low 0.72 kPa | Medium 0.96 kPa | High 1.36 kPa | Very High 1.76 kPa |
|-----------|---------------------|-----------------|--------------------|------------------|-----------------------|
| 10mm | 2400 | 2200 | 2000 | 1800 | NA |
| 12mm | 2800 | 2600 | 2400 | 2200 | 2000 |
| 15mm | 3600 | 3400 | 3200 | 2800 | 2400 |
| 19mm | 4000 | 4000 | 4000 | 3400 | 3200 |

Notes:

- For doors with patch fittings these sizes may exceed the hardware limits and are therefore not suitable.
- For doors with rails the span can be taken as the free span between rails, or from rail to edge, which generally increases the door opening size.
- For bottom supported sliding doors use the table, as long as the rollers and rails are suitable for the weight.
- For top hung sliding doors use the table and check with the manufacturers specification for the capacity of the door hardware.

Sliding Doors

- Sliding doors can be top hung with bottom guides or on bottom rails with rollers or with special wheel fittings. The door height shall be selected to wind pressure, and the width to manufactures specification depending on the capacity of the door hardware.

Door Assemblies

- It is important when using doors in entrance assemblies with side panels and over panel that the assembly is rigid otherwise the deflection of the door will increase. Rigidity is normally achieved by using small over panel and/or side panels or with full height or cantilevered glass fins. Cantilevered glass fins must be clamped using mechanical fixing to gain a friction grip so to resist turning moments. The fin brackets must be securely fixed to the building structure, which must be rigid.
- Cantilevered glass fins are normally 200 to 250mm wide for fins up to 1000mm long 300 to 350 mm wide for fins up to 2000mm long.
- As a guide fins are required in the following situations; 10mm glass- when the width of the side panel plus the height of the over panel exceed 1200mm and are both greater than 400mm 12mm glass- when the width of the side panel plus the height of the over panel exceed 1500mm and are both greater than 500mm.

Fins

Stabilising Fins are necessary to cope with the loads imposed on a door assembly by the action of the door and the external wind loads. The fins must be securely fixed to a suitably rigid structure at the top of the assembly, by means of back to back metal angle fin brackets clamped to the fin using gaskets and bolts.

It is important that fin fixing issues are resolved at the design stage due to the turning moments and reaction forces transferred to the support structure. In addition, the correct fasteners must be used for various substrates and should be of sufficient size to resist tensions from turning forces and shear forces at the connection interface.

Fin brackets are normally zinc plated steel if they are hidden in the ceiling, but they are available in stainless steel if they are exposed and visible. An option is to use a stainless steel cover over the steel bracket.

Frameless Glass Door Types

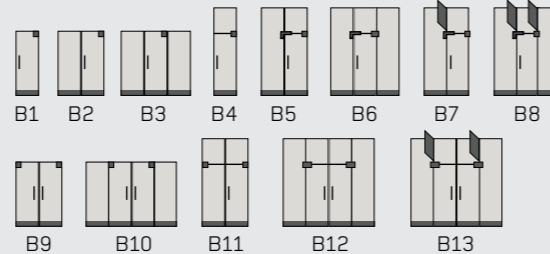
Type A

Full width rails fitted along top and bottom edges.



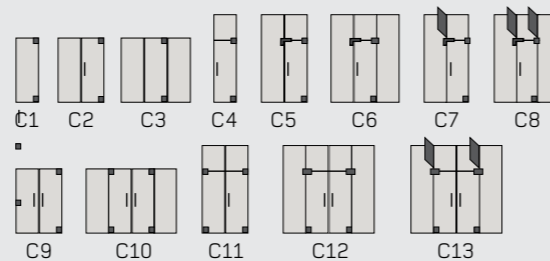
Type B

Full width rails fitted along bottom edge only, patch fitted at top corner.



Type C

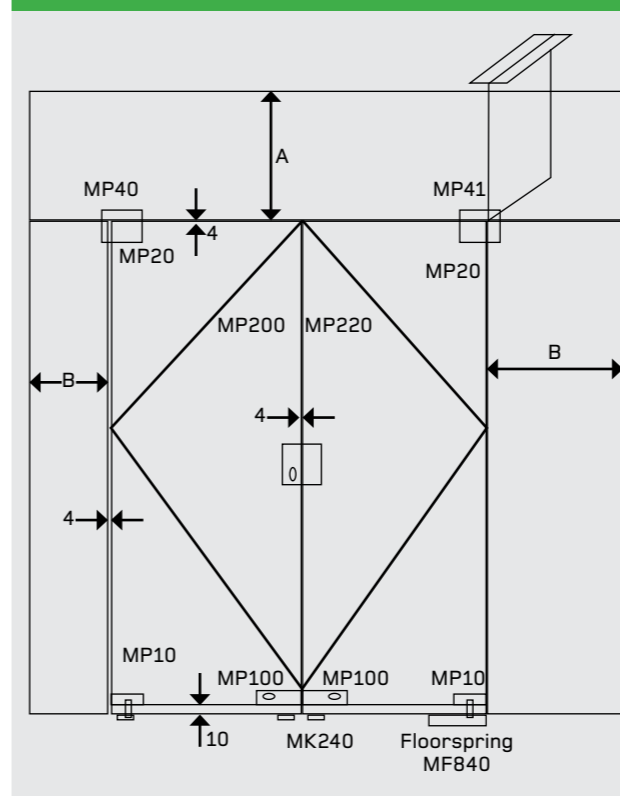
Patches fitted at top and bottom corners.



Fin Support Systems

Typical glass fin support systems are shown below but it is also possible to fix to metal mullions, trusses, space frames or other support structures for lateral support.

Fin Requirements



Fin Requirements

10mm glass When the width of the sidepanel (B) plus the height of the overpanel (A) exceeds a total of 1200mm a fin is required, but not necessary if (A) or (B) are less than 400mm.

12mm glass When the width of the sidepanel (B) plus the height of the overpanel (A) exceeds a total of 1500mm a fin is required, but not necessary if (A) or (B) are less than 500mm.