

4582 STEEL FIRE WINDOWS AND DOORS

1. GENERAL

This section relates to the manufacture, supply and installation of:

- steel fire windows
- hardware and furniture

Related work

1.1 RELATED SECTIONS

Refer to PAINTING sections for painting

Documents

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC C/AS1	Fire safety Appendix C: Test methods 8.1 Fire resisting closures and smoke control doors
NZBC E2/AS1	External moisture
AS/NZS 1170.2	Structural design actions – Wind loads
NZS 1530.4	Methods for fire tests on building materials, components and structures – Fire resistant test of elements of construction
AS/NZS 1905.1	Components for the protection of openings in fire resistant walls – Fire resistant doorsets
NZS 3604	Timber framed buildings
AS 3894.3	Site testing of protective coatings – Determination of dry film thickness
NZS 4211:1985	Performance of windows
NZS 4223.3	Glazing in buildings – Human impact safety requirements
NZS 4232.2	Performance criteria for fire resisting enclosures – Fire resisting glazing systems
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS1627.1	Preparation and pre-treatment of surfaces – Removal of oil, grease and related contamination
AS 1627.4	Preparation and pre-treatment of surfaces – Abrasive blast cleaning of steel
AS 1627.5	Preparation and pre-treatment of surfaces - Pickling
BS 3900	Methods of test for paints – Part C5 – Determination of film thickness
BS 6510	Steel – framed windows and glazed doors
ISO 2063	Thermal spraying – Metallic and other inorganic coatings – Zinc, aluminium and their alloys

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.3 ABBREVIATIONS

The following abbreviations are used throughout this part of the specification:

FRR	Fire Resistant Rating
Sm	Smoke stopping capability level
SLS	Serviceability limit state
ULS	Ultimate limit state

Warranties

- 1.4 Warrant this work under normal environmental and use conditions against failure of materials, watertightness and execution.

Installation warranty: 1 year

Product warranty: 1 year

Warrant the powder coating under normal environmental and use conditions against failure of materials and execution.

Warranty period: 1 years

Warranties to be joint warranties by both the window manufacturer and the window installer.

Refer to the general section for the required form of WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

- 1.5 **QUALIFICATIONS**
Work to be carried out by tradesmen experienced, competent and familiar with the materials and techniques specified.
- 1.6 **SECTION SAMPLES**
Submit samples of full size sections for assessment before preparing shop drawings, or half size drawings and details of all profiles offered.
- 1.7 **HARDWARE SAMPLES**
Submit for assessment samples or catalogue cuts and data sheets of all hardware, operating systems and security mechanisms before assembly commences. Provide examples of the proposed or specified hardware surface finish.
- 1.8 **FINISH SAMPLES**
Submit for assessment before fabrication, samples of the specified finish to all exposed window and door sections, in the selected colour, including a statement of the minimum film thickness. On acceptance these will be used as quality control samples.
- 1.9 **CERTIFY COATINGS**
Certify on request, compliance with this specification and support with control and sampling records. Test for film thickness and method (a) where any dispute arises as to the thickness provided.
- 1.10 **SHOP DRAWINGS AND INSTALLATION DETAILS**
Provide drawn profiles and preliminary installation details for review. Refer to the general section SHOP DRAWINGS for details of requirements.

Shop drawings to show, but not limited to:

- Design calculations
- Fully dimensioned elevations of all elements (minimum scale 1:20)
- Complete details construction, connections and all support systems (minimum scale 1:10)
- Dimensions of all typical elements and of any special sizes and shapes
- Provision for the exclusion and/or drainage of moisture
 - Jointing details and method of fixing between individual elements and between this installation and adjacent work.
 - Provisions for adjustment of fixings to ensure true alignment of windows and doors
 - Sealant types and full size sections of all sealants and backing rods
 - Provision for seismic movement and movement under wind loads
 - Sequence of installation
 - Co-ordination requirements with other work
 - A full schedule of materials, finishes, componentry, hardware and fittings

1.11 **REVISED SHOP DRAWINGS**

Provide a copy of shop drawings revised to include required modifications, before proceeding with any fabrication or erection.

Performance - weathertightness

1.12 **SPECIFIC DESIGN**

The windows, doors, their installation and all fixings to comply with NZS 4211:1985.

Refer to SELECTIONS for ULS and SLS

Refer to SELECTIONS for Air leakage level

1.13 **PERFORMANCE – STRUCTURAL/WEATHER-TIGHTNESS**

The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window manufacturer.

1.14 **CERTIFICATION, LEAKAGE**

Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows/doors offered comply with the requirements of NZS 4211 and the specified design wind pressure and air leakage level.

1.15 **VARIATIONS FROM STANDARD**

Submit before manufacture a written opinion from a registered testing laboratory, that any variation from a production model satisfies the criteria laid down in AS/NZS 1905.1.

1.16 **FIRE WINDOWS**

To NZS 4232.2. Refer to SELECTIONS for performance requirements.

1.17 **CERTIFICATION, FIRE RESISTANCE**

Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows/doors offered comply with the requirements of AS/NZS 1905.1

1.18 **EVIDENCE OF COMPLIANCE**

To AS/NZS 1905.1; clause 6.4 Evidence of compliance – New Zealand.

2. PRODUCTS

Materials

2.1 STEEL FIRE WINDOWS AND FRAME SECTIONS

To AS/NZS 1905.1, NZS 4232.2 and BS 6510

2.2 GLAZING

To NZS 4232.2 and NZS 1530.4 in the specified fire rated window, door and doorset system assembly.

Components

2.3 SUPPORTS AND ANCHORS

Supports and anchors to be built into exterior walls, to be galvanized to AS/NZS 4680.

2.4 INSERTS, BOLTS AND FASTENERS

Items to be built into exterior walls, to be hot-dip galvanized to AS/NZS 4680.

2.5 FLASHINGS GENERALLY

Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

2.6 HARDWARE AND FURNITURE

Hinges, stays, catches, fasteners, latches, locks and furniture as specified. Refer to SELECTIONS for types and finish.

Finishes

2.7 HOT-DIP GALVANIZING

Steelwork shall be pre-cleaned in accordance with the requirements of AS 1627.1 followed by acid pickling, in accordance with the requirements of AS 1627.5. Abrasive blast cleaning to Class 2 finish in accordance with the requirements of AS 1627.4 may be used.

The galvanizing coating of all steel articles shall conform to the requirements of AS/NZS 4680, The thickness of the coating shall conform with Table 1 in AS/NZS 4680.

2.8 ZINC METAL SPRAY

Steel frame to be abrasive blasted prior to application of 75 – 100 microns minimum coating thickness when measured to AS 3894.3. Refer to SELECTIONS for details.

2.9 PAINT FINISH PRIMER

Steel to be abrasive blasted prior to application of epoxy primer to suppliers recommendation. Refer to PAINT section for details.

- 2.10 PAINT FINISH
Refer PAINT Section for details
- 2.11 POWDER COAT FINISH
Refer to DULUX POWDER COATINGS for powder coating products.

3. **EXECUTION**

Conditions – generally

- 3.1 DELIVERY
Do not deliver to site any elements which cannot be immediately unloaded into suitable conditions of storage.
- 3.2 UNLOADING
Unload, handle and store elements in accordance with the window manufacturer's requirements, without distortion, avoiding prefinished surfaces rubbing together and avoiding contact with mud, plaster and cement.
- Store windows, doors and frames under cover. Place units in a vertical position with heads up, spaced by timber blocking, on minimum 100mm high timber blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. Keep paper and cardboard wrappings dry. Provide 6mm minimum space between each stacked door to permit air circulation.
- 3.3 PROPRIETARY ELEMENTS
Fix in accordance with manufacturers requirements
- 3.4 FIXINGS AND FASTENINGS
Use fixings and fastenings recommended by the manufacturer of the component being fixed.

Assembly

- 3.5 FABRICATION
Fabricate frames as detailed on the shop drawings. Install hinges, stays and running gear as scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation. Deliver welded frames with a removable spreader bars across the bottom of frames, tack welded to jambs and mullions.
- 3.6 ANCHORAGES
Install all required anchorages for the fire rated steel windows and doors, including sleeves, concrete inserts, anchor bolts and items with integral anchors that are to be embedded in concrete and/or masonry.
- 3.7 HARDWARE GENERALLY
Make provision for the scheduled fire rated hardware to be supplied and fitted either in the factory or on site. Key alike all lockable hardware able to be keyed alike. Account for all keys and deliver separately to the site manager.

Make arrangements on delivery to the site, for the installers certificate to be returned to the manufacturer.

Application – generally

- 3.8 **CHECK ALL OPENINGS**
Check all openings prior to manufacturer for size and standard of execution before installing door frames.
- 3.9 **CONFIRM PREPARATION OF EXTERIOR OPENINGS**
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.
- Required preparatory work includes the following:
- wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 Building wrap to wall openings
 - claddings neatly finished off to all sides of openings
 - installation of flashings (those which are required to be installed prior to frames)
- 3.10 **INSTALLATION**
Fix to comply with the reviewed shop drawings and installation details, including flashings, bedding compounds and sealants.
- 3.11 **TOLERANCES**
Install the finished prehung door to a dimensional accuracy of +/- 2mm

Installation – fire windows

- 3.12 **INSTALL FIRE WINDOWS**
Install and fix to comply with AS/NZS 1905.1, NZS 4232.2, the stated fire rating requirements and manufacturers installation details.
- 3.13 **INSTALL FLASHINGS**
Install flashings to heads, jambs and sills of frames as required by the window manufacturer and as detailed on the drawings. Finish head flashings to match window finish.
- Place all flashings so that the head flashing weathers the jamb flashings, Which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.
- Except where window/door frames are recessed, ensure that head flashings over-sail jamb facings by 30mm at each end. Refer to FLASHINGS section for supply and installation.
- 3.14 **GLAZING**
Install selected glazing to NZS 4232.2 and NZS 1530.4 into the specified fire rated window system assembly.
- 3.15 **MANIFESTATIONS**
To comply with NZS 4223.3, 303.1 Manifestations
- 3.16 **INSTALL FURNITURE**

Install to AS/NZS 1905.1; clause 5.6 Hardware; 5.61 Attachment. Install latches, locks and door furniture as scheduled. This becomes the full responsibility of the window supplier.

Application – jointing and sealing

- 3.17 **PREPARATION**
Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturers requirements, using required solvents and primers where necessary. Mask any adjoining surfaces which would be difficult to clean if smeared with sealant.
- 3.18 **BACKING**
Insert ceramic fibre glazing tape (typically 10x3mm) and suitable sized hardwood glazing blocks behind joints being pointed with sealant.
- 3.19 **SEALANTS**
Refer to Manufacture for selection of correct sealant to suit selected steel frame system and fire rating requirement.
- 3.20 **POINTING**
Tool sealant to form a smooth fillet, with profile and dimensions required by the sealant manufacturer.
- 3.21 **FINISHING**
Remove excess sealant from adjoining surfaces, using cleaning materials required by the sealant manufacturer and to leave frames unstained and clean.

Finishing

- 3.22 **CHECK**
Check and adjust operation of all doors and windows
- 3.23 **FINISHING, PERMANENT IDENTIFICATION MARKING AND CLEANING OF GLAZING**
All final finishing, permanent identification marking and cleaning of glazing is carried out by the door manufacturer after manufacture and installation of the specified glazing systems. Permanent identification marking to NZS 4232.2; clause 206.8 Glazing.
- 3.24 **SAFETY**
Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.

Completion

- 3.25 **PROTECTION**
Protect finishes against damage from adjacent and following work. Protect glass from damage by crossing clearly visible reinforced paper or plastic tape between jamb liners and clear of the glass.
- 3.26 **REPLACE**
Replace damage, cracked or marked elements.

- 3.27 LEAVE
Leave work to the standard required for the following procedures.
- 3.28 REMOVE
Remove safety indicators and protective coverings and wipe down all joinery thoroughly to leave it perfectly clean, using the method required by the window manufacturer. Remove debris, unused materials and elements from the site.

4. SELECTIONS

Performance – TO BE DETERMINED AT DETAILED DESIGN

- 4.1 SPECIFIC DESIGN TO NZS 1170.2
ULS:
SLS:
- 4.2 STANDARD OF PERFORMANCE
Air leakage level: Level 8 (as determined by section 11 of NZS 4211:1985)
- 4.3 WIND ZONE – DESIGN TO NZS 3604
Building wind zone (as determined from table 5.1 of NZS 3604)
- 4.4 THERMAL PERFORMANCE
R-Value as determined from NZBC H1/VM1 or H1/AS1
- 4.5 SEISMIC SUB-FRAMES
Window No:
Movement: mm

Window, doors and doorsets

- 4.6 STEEL DOORSETS

STEEL WINDOW, DOOR AND FRAME SECTIONS FIRE RATED.
Steelguard Limited Phone 09 443 2722 Jansen Steel Sections to BS 6510, coated with zinc spray 100 microns and sealed with vinyl/aluminium sealer for painting on site or proprietary ceramic coating for polyester powder coat finish to 50-80 microns.
- 4.7 FRR -/30/- = Integrity only fire rated joinery for 30 minutes
Frame: Steel Framed
Glass: 6mm clear pyroswiss or similar approved
6mm Polish Georgian Wired Glass (1000mm wide x 1500mm high
Maximum pane size)
- 4.8 FRR -/60/- = Integrity only fire rated joinery for 60 minutes
Frame: Steel Framed
Glass: 6mm clear pyroswiss or similar approved
6mm Polish Georgian Wired Glass (1000mm wide x 1500mm high
Maximum pane size)

4.9 FRR -/30/30 = Integrity and Insulating fire rated joinery for 30 minutes
Frame: Insulated Steel framing
Glass: 20mm clear insulating glass

4.10 FRR -/60/60 = Integrity and Insulating fire rated joinery for 60 minutes
Frame: Insulated Steel framing
Glass: 27mm clear insulating glass

FRR -/120/- = Integrity only fire rated joinery for 60 minutes
Frame: Steel Framed
Glass: CF Lite

Website: www.steelguard.co.nz