INTERNATIONAL FIRE CONSULTANTS LIMITED

PRIVATE & CONFIDENTIAL

IFC FIELD OF APPLICATION REPORT

Field of Application for FD30 Falcata Core Door Leaves Installed in Timber Frames

Fire Resistance Standard: BS476: Part 22: 1987

IFC Report PAR/17774/01

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1. INTRODUCTION

This report has been prepared by International Fire Consultants Ltd (IFC) to define the Field of Application for FD30 Falcata core door leaves installed in timber frames, that are required to provide 30 minutes fire resistance performance, when adjudged against BS476: Part 22: 1987.

The methodologies used in preparing this document are based upon the guidance in BS ISO/TR 12470: 1998; *'Fire resistance tests - Guidance on the application and extension of results'*.

It is proposed that variations to the tested specifications, as described in the following sections, may be accommodated into assemblies, without reducing their potential to achieve a 30 minute integrity rating, if tested in accordance with the method and criteria of BS476: Part 22: 1987. The omission of information on any components or manufacturing methods does not imply a lack of approval of those details but these would need to be the subject of a separate analysis. Only variations specifically mentioned are supported by this assessment document, and all other aspects must otherwise be as tested.

2. TEST EVIDENCE

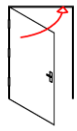
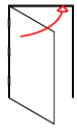
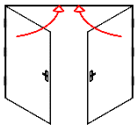
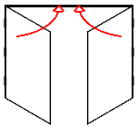
The test evidence used to support this Field of Application Report is summarised in Appendix C of this report.

3. SCOPE OF APPROVAL

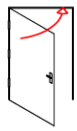
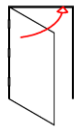
3.1 Door Assembly Configuration

The approved leaf sizes and configurations of door assemblies are outlined below:

3.1.1 Door configurations for 'standard' door construction (see Section 3.3.1)

Configuration	Envelope of Approved Leaf Size
 • **Latched** • **Single Acting** • **Single Door** • **With Optional Transommed Overpanel**	**Figure PAR/17774/01:04 in Appendix B**
 • **Unlatched** • **Single Acting** • **Single Door** • **With Optional Transommed Overpanel**	**Figure PAR/17774/01:05 in Appendix B**
 • **Latched** • **Single Acting** • **Double Door** • **With Optional Transommed Overpanel**	**Figure PAR/17774/01:06 in Appendix B**
 • **Unlatched** • **Single Acting** • **Double Door** • **With Optional Transommed Overpanel**	**Figure PAR/17774/01:07 in Appendix B**

3.1.2 Door configuration for 'enhanced' door construction (see Section 3.3.2)

Configuration	Envelope of Approved Leaf Size
 • **Latched** • **Single Acting** • **Single Door** • **With Optional Transommed Overpanel**	**Figure PAR/17774/01:08 in Appendix B**
 • **Unlatched** • **Single Acting** • **Single Door** • **With Optional Transommed Overpanel**	**Figure PAR/17774/01:09 in Appendix B**

3.2 Maximum Assessable Door Leaf Sizes

The calculated envelopes of approved leaf dimensions for each mode and configuration covered by this Field of Application Report are given in Appendix B, based upon use of the intumescent seal specification shown in Section 3.7.

Double door assemblies (only approved for the 'standard' construction) may each be of the same width, up to the maximum width indicated in Appendix B. The width of the small leaf shall not be less than 250mm smaller than that of the larger leaf (although the large leaf must still be within the limitations in Appendix B), since this will affect its vertical stability relative to that of the larger leaf.

3.3 Door Leaf and Overpanel Specification

3.3.1 Door leaf specification ('standard' construction)

A detailed constructional specification of the standard door construction is given below. Overpanels, if required, should be constructed to the same specification. This construction is based upon the test evidence detailed in Appendix C, (and is, therefore, limited to the information available from that test report), but also defines variations and tolerances, where it is considered that these will not adversely affect overall fire resistance.

Component		Species	Dimensions	Minimum Density
Core (laminated blocks, finger jointed to form lamels, and bonded together)		Falcata or Radiata pine	3no layers to give a total thickness of 38mm (centre layer at 90° to outer layers)	330kg/m^3 *Note 1*
Facings *(The same option must be used on both faces of each leaf, and on both doors of a double leaf assembly)*		MDF	2.5mm thick	700kg/m^3 *Note 1*
		Plywood		550kg/m^3 *Note 1*
		Cross grain		550kg/m^3 *Note 1*
Lippings	Square meeting stiles and other option edges	Hardwood *Note 2*	6-12mm thick	*Note 2*
	Rebated meeting stiles		18-20mm thick (to accommodate 10-12mm rebates)	
Adhesives	Laminated hardwood	PVAc	–	–
	Layers within core	Urea formaldehyde	–	–
	Lippings to core	PVAc	–	–
	Facings to core	Urea formaldehyde	–	–

Component		Species	Dimensions	Minimum Density
	Veneer to facings	Urea formaldehyde	–	–
Minimum leaf thickness (excluding decorative finishes)		–	43mm	–
Optional additional decorative finishes		Timber veneer or decorative plastic based laminate to door faces only	Maximum 2mm thick	–
		PVC or paint or lacquer to faces and edges	Maximum 0.5mm thick	

Note 1 *Nominal stated density.*

Note 2 *The following species of hardwood are acceptable for the lippings;*

American White Oak	*Nominal density 770kg/m³ (+20 - 10%)*
American Rock Maple	*nominal density 660kg/m³ (+20 - 10%)*
Black Cherry	*nominal density 580kg/m³ (+20 - 10%)*
Sapele	*nominal density 640kg/m³ (+20 - 10%)*
American Black Walnut	*nominal density 660kg/m³ (+20 - 10%)*
Merbau	*nominal density 830kg/m3 (+10 - 10%)*
Pacific Walnut	*nominal density 660kg/m³ (+20 - 10%)*
Tropical Cherry	*nominal density 580kg/m³ (+20 - 10%)*
*Dark Red Meranti**	*nominal density 640kg/m³ (+20 - 10%)* *[The density of Meranti varies considerably, hence the density of each specific batch used for production must be checked for compliance]*

Lippings are generally optional for all edges of the standard door leaf construction, but lippings MUST be applied at meeting stiles. The machining of the core/lipping, and bonding process, must be such to ensure that no gaps occur between core and lipping.

The standard door construction can be reduced in height and/or width, by any amount, whether it is lipped or unlipped; as long as lippings are applied in accordance with the specification given above.

Meeting stiles in double leaf door assemblies may either be flush (square) or include rebates 10-12mm deep and 22mm wide in both leaves.

A detailed drawing of the proposed door leaf construction is given in **Figures PAR/17774/01:01** in Appendix A.

3.3.2 Door leaf specification ('enhanced' construction)

A detailed constructional specification of the enhanced door construction is given below. This is based upon the test evidence detailed in Appendix C, (and is, therefore, limited to the information available from that test report), but also defines variations and tolerances, where it is considered that these will not adversely affect overall fire resistance.

Component		Species	Dimensions	Minimum Density
Core (laminated blocks, finger jointed to form lamels, and bonded together)		Albacia Falcata	3no layers with total minimum thickness 38mm (centre layer at 90° to outer layers)	330kg/m^3 *Note 1*
Top rail		Laminated hardwood	4no layers with total minimum height 62mm	550kg/m^3 *Note 1*
Lippings		Meranti	Minimum thickness 8mm affixed to the top and vertical edges. (Lippings to bottom edge are optional)	640kg/m^3 *Notes 1 & 2*
Facings *The same option must be used on both faces of each leaf)*		MDF	2.5mm thick on each face	700kg/m^3 *Note 1*
		Plywood		550kg/m^3 *Note 1*
		Cross grain		550kg/m^3 *Note 1*
Adhesives	Between layers in core	Urea formaldehyde	–	–
	Between vertical lippings and core	Polyvinyl acetate	–	–
	Between top rail and core	Polyvinyl acetate	–	–
	Between horizontal lipping and top rail	Polyvinyl acetate	–	–
	Between Facings and lippings/core	Urea formaldehyde	–	–
Minimum leaf thickness (excluding decorative finishes)		–	43mm	–
Optional additional decorative finishes		Timber veneer or decorative plastic based laminate to faces only	Maximum 2mm thick (veneer/laminate)	–
		PVC or paint or lacquer to faces or edges	Maximum 0.5mm thick	

Note 1 *Nominal stated density.*

Note 2 *The following species of hardwood are also acceptable for lippings and veneers;*

American Cherry	*nominal density 580kg/m³ (+20 - 10%)*
American Rock Maple	*nominal density 660kg/m³ (+20 - 10%)*
Black Cherry	*nominal density 580kg/m³ (+20 - 10%)*
Sapele	*nominal density 640kg/m³ (+20 - 10%)*
American White Oak	*nominal density 770kg/m³ (+20 - 10%)*
American Black Walnut	*nominal density 660kg/m³ (+20 - 10%)*
Merbau	*nominal density 830kg/m³ (+10 - 10%)*
Pacific Walnut	*nominal density 660kg/m³ (+20 - 10%)*
Tropical Cherry	*nominal density 580kg/m³ (+20 - 10%)*
*Dark Red Meranti**	*nominal density 640kg/m³ (+20 - 10%) [The density of Meranti varies considerably, hence the density of each specific batch used for production must be checked for compliance]*

Lippings are optional for the bottom edge of the enhanced door leaf construction, but lippings MUST be applied at the head and vertical edges. The machining of the core/lipping, and bonding process, must be such to ensure that no gaps occur between core and lipping.

The enhanced door leaf may be reduced in height by adjustment at the base ONLY. The door leaf may be reduced in width, by any amount, as long as lippings are applied in accordance with the specification given above.

A detailed drawing of the enhanced door leaf construction is given in **Figure PAR/17774/01:02** in Appendix A.

3.3.3 Overpanels (fitted above a frame transom)

Overpanels may be incorporated in the proposed door assemblies, but ONLY when fitted above a frame transom frame member. The overpanel should be manufactured using the 'standard' door construction, even if the door below the transom is an 'enhanced' leaf construction.

Intumescent seals at the overpanel/frame interface are defined in Section 3.7. Transom members shall be in accordance with Section 3.5, and installation shall be as defined in Section 3.10.

The size of overpanels is limited to the full width of the leaf/leaves contained within the door assembly and the following maximum height:

1500mm high Note 3

Note 3 *Subject to the ability of the supporting construction to provide adequate restraint/ support.*

Approval of an overpanel size by IFC does not indicate that such a size can be fabricated. This should be checked with the manufacturer.

3.4 Feature Grooves (ONLY for Standard Door Construction)

The 'standard' door leaves can include feature grooves cut into both faces, although these are optional. Each feature groove is accommodated by the inclusion of a hardwood insert *Note 4* into a recess in the face of the leaf, with the feature groove cut into the timber insert. The inserts are bonded in place with B4 type Kony Bond (boil resistant) adhesive.

Note 4 *The following species of hardwood are acceptable for the inserts;*

American White Oak	*Nominal density 770kg/m³ (+20 - 10%)*
American Rock Maple	*nominal density 660kg/m³ (+20 - 10%)*
Black Cherry	*nominal density 580kg/m³ (+20 - 10%)*
Sapele	*nominal density 640kg/m³ (+20 - 10%)*
American Black Walnut	*nominal density 660kg/m³ (+20 - 10%)*
Merbau	*nominal density 830kg/m3 (+10 - 10%)*
Pacific Walnut	*nominal density 660kg/m³ (+20 - 10%)*
Tropical Cherry	*nominal density 580kg/m³ (+20 - 10%)*
*Dark Red Meranti**	*nominal density 640kg/m³ (+20 - 10%)*
	[The density of Meranti varies considerably, hence the density of each specific batch used for production must be checked for compliance]

There are three options for the feature groove detail, as given below;

Maximum Groove Size	Hardwood Insert Size
20 x 6mm	30 x 15mm or 30 x 10mm
10 x 5mm	23 x 15mm or 23 x 10mm
8 x 4mm	10 x 8mm

The following parameters apply;

- The groove/insert details, and pattern of grooves/inserts, shall be identical in both faces of each leaf.

- The hardwood insert may alternatively be left solid, or grooved to any profile, providing that the dimensions of the grooves do not exceed those specified above; (see **Figure PAR/17774/01:01** in Appendix A).

- For the purpose of this generic approval, this report only considers doors where the overall pattern consists of a series of vertical (or horizontal) grooves that are cut to create a 'planked effect'. Alternatively, a series of vertical AND horizontal grooves may be cut to form a 'grid effect'. Two further variations are permitted within these basic designs, as described in the subsequent clauses.

- If all grooves are cut within the 'central zone' of the door leaf, such that there is a minimum 90mm wide margin (that does not contain grooves) around all 4 edges of the leaf, then the inserts/grooves may use any of the 3 options for feature grooves listed above. Individual grooves, on the same plane, should be at least 90mm apart.

- If the overall pattern is such that some, or all, grooves extend to the extreme edge of the leaf, (irrespective of the length of the groove, or whether they are horizontal or vertical), then ONLY the smallest inserts outlined above should be used; i.e. the 10mm wide by 8mm deep timber insert, with a maximum groove size of 8mm wide x 4mm deep. Individual grooves, on the same plane, should be at least 90mm apart.

- Where the grooves are truncated within the central zone of the leaf, the end of the groove may be machined with either a radiused or square profile. Equally, where horizontal and vertical grooves meet at corners, or cross at any point, the junction may be machined with either a radiused or square profile.

3.5 Frames

3.5.1 Frames with the standard door construction

Timber frames, to the specifications given below, may be used across the complete range of approved sizes and configurations for the **standard** door construction, outlined in Appendix B, utilising the intumescent seal specification outlined in Section 3.7.1.

Material	Density	Minimum Face Width	Minimum Frame Depth	Minimum Stop Depth
Softwood or hardwood	520kg/m³ *Note 5*	30mm, excluding stop *Note 7*	70mm	12mm *Note 8*
MDF	700kg/m³ *Note 6*			

Note 5 *Timber must have a minimum measured density at 12% moisture content. The timber must be straight grained and of appropriate quality in accordance with BS EN 942: 1996. The moisture content shall be 10 ± 2% for UK market, (or to suit internal joinery moisture content specification of export countries).*

Note 6 *MDF to have a minimum measured density at 12% moisture content.*

Note 7 *These dimensions assume that the rear of the frame is protected by the adjacent wall, (and firestopping), and that the frame does not project out from the wall. See Section 3.10 regarding projecting frames and shadow gaps.*

Note 8 *The doorstop is to comprise the same material as the door frame and may be either planted and pinned using 40mm steel pins, or integral with the main door frame, providing the minimum frame thickness remains as stated.*

3.5.2 Frames with the enhanced door construction

Timber frames, to the specifications given below, may be used across the complete range of approved sizes and configurations for the **enhanced** door construction, outlined in Appendix B, utilising the intumescent seal specification outlined in Section 3.7.2.

Material	Density	Minimum Face Width	Minimum Frame Depth	Minimum Stop Depth
Softwood	520kg/m³ *Note 5*	32mm, excluding stop *Note 7*	95mm	12mm *Note 8*
Hardwood	650kg/m³ *Note 5*	30mm, excluding stop *Note 7*	95mm	12mm *Note 8*

Note 5 *Timber must have a minimum measured density at 12% moisture content. The timber must be straight grained and of appropriate quality in accordance with BS EN 942: 1996. The moisture content shall be 10 ± 2% for UK market, (or to suit internal joinery moisture content specification of export countries).*

Note 6 *MDF to have a minimum measured density at 12% moisture content.*

Note 7 *These dimensions assume that the rear of the frame is protected by the adjacent wall, (and firestopping), and that the frame does not project out from the wall. See Section 3.10 regarding projecting frames and shadow gaps.*

Note 8 *The doorstop is to comprise the same material as the door frame and may be either planted and pinned using 40mm steel pins, or integral with the main door frame, providing the minimum frame thickness remains as stated.*

3.5.3 Frames - General details

The overall frame depth may be increased by the use of extension linings, but the joint between the main frame and the extension lining must not intrude into the plane of the door thickness.

Frame members shall be joined using one of the following methods;

Head/jamb: Mortice and tenon, or half-lapped joint, head twice screwed to each jamb.

Transom members: When an overpanel is required, a transom shall be used between the door and overpanel. The transom member shall be at least 38mm thick, and it shall include minimum 12mm thick door stops on both sides (i.e. making a minimum 62mm thick overall section). The transom shall be joined to the jambs with a mortice and tenon, or half-lapped joint, twice screwed to each jamb.

Architraves: Where the face of the frame, and the door, are flush with the face of the wall, loose architraves are optional, and have no fire performance requirements, and so can be freely specified; subject to adequate fire stopping. (See Section 3.10 regarding wall/frame gaps).

Where an integral architrave is used, the face of the door may project beyond the face of the wall, providing the thickness of the architrave is no greater than 10mm and the width of the architrave is such that it projects at least 15mm beyond the rear face of the door frame. (This 15mm projection shall NOT be formed by machining into the minimum width of frame section, as defined in the Tables, above, and the frame width shall be increased accordingly, to at least 47mm). This assumes that the face of the door leaf is flush with, or is set back from, the face of the architrave. (See Section 3.10 regarding wall/frame gaps).

3.6 Glazed Apertures

3.5.1 Glass types

The following glass types are approved for use in the doors considered herein, which are compatible with the identified approved glazing systems given in Section 3.6.2, although some restrictions on size may be given in subsequent sections. These glass types, and the relevant glazing systems, are approved in both standard and enhanced door constructions.

The codes used, below, for the glass types, glazing materials, and bead types, (e.g. G1, S1 and B1), are not those used by the respective manufacturers, and are attributed solely by IFC for the purpose of identification and cross-referencing within this assessment.

G1 7mm thick Pyroshield 2 (Pilkington)
G2 7mm thick Pyran S (Schott Glass)
G3 7mm thick Pyrobelite (AGC Flat Glass)
G4 7mm thick Pyrodur Plus (Pilkington)

Expansion allowance for all glass types shall be as recommended by the glass manufacturer.

3.6.2 Glazing materials and systems

The following glazing materials are approved for use in the doors considered herein, which are compatible with the identified approved glass types listed above, although some restrictions on size may be given in subsequent sections. (See also **Figure PAR/17774/01:03** in Appendix A for limitations).

S1	10 x 2mm Intumescent Seals Therm-A-Glaze 45	(G1, G2, G3, G4)
S2	13 x 3mm Sealmaster Fireglaze mastic	(G1 and G2)
S3	10 x 2mm Sealmaster G30 strip	(G1, G2, G3, G4)
S4	10 x 2mm Mann McGowan Pyroglaze 30 strip	(G1, G2)
S5	Lorient Flexible Figure 1	(G1, G2)
S6	10 x 5mm Closed cell foam	(G3 and G4)
S7	10 x 4mm Ceramic fibre tape	(G3 and G4)

3.6.3 Bead profiles and installation

The approved bead size and profile, and relevant fixing details, are shown on **Figure PAR/17774/01:03** in Appendix A, which also define any limitations upon options of interchangeability with glass types and glazing systems. These details apply for the standard and enhanced door constructions.

Beads must be hardwood[Note 9], and secured within the aperture using pins set as shown on **Figure PAR/17774/01:03** in Appendix A; although fixing centres for pins are reduced with extended height apertures (see Section 3.6.4.2).

Where the bead profile extends over the edge of the aperture (as in the upper detail on **PAR/17774/01:03** in Appendix A), an aperture lining is optional. Where the bead is flush with door face, (as in the lower detail), an aperture lining must be included. The aperture lining may be "concealed" under the decorative facings. Where aperture linings are included, they must be 8–10mm thick, and be formed from hardwood [Note 9]. Linings must be bonded in place using the adhesive approved for lippings; as defined in Section 3.3.

[Note 9] *Hardwood used for linings and beads may be one of the species listed below.*

American Cherry	*nominal density 580kg/m³ (+20 – 10%)*
American Rock Maple	*nominal density 660kg/m³ (+20 – 10%)*
Black Cherry	*nominal density 580kg/m³ (+20 – 10%)*
Sapele	*nominal density 640kg/m³ (+20 – 10%)*
American White Oak	*nominal density 770kg/m³ (+20 – 10%)*
American Black Walnut	*nominal density 660kg/m³ (+20 – 10%)*
Merbau	*nominal density 830kg/m³ (+10 – 10%)*
Pacific Walnut	*nominal density 660kg/m³ (+20 – 10%)*
Tropical Cherry	*nominal density 580kg/m³ (+20 – 10%)*
*Dark Red Meranti**	*nominal density 640kg/m³ (+20 – 10%)* *[The density of Meranti varies considerably, hence the density of each specific batch used for production must be checked for compliance]*

Timber shall be straight grained, and comply with the minimum density stated above, when measured at 12% moisture content. Timber must be of appropriate quality in accordance with BS EN 942: 1996. Moisture content shall be 10 ± 2% for UK market, (or to suit internal joinery moisture content specification of export countries).

3.6.4 Assessed aperture sizes

3.6.4.1 Aperture sizes in 'standard' door construction

Based upon the size of apertures tested, it the opinion of IFC that the following limitations apply to glazed apertures in the **standard** door construction considered herein;

Maximum area of aperture	-	0.7m²
Maximum aperture height	-	1220mm
Maximum aperture width	-	765mm
Minimum margin from leaf edge	-	110mm
Minimum distance between apertures	-	100mm

More than one aperture may be included in each leaf subject to the individual limitations above.

3.6.4.2 Extended aperture sizes in 'standard' door construction

It is the opinion of IFC that taller apertures can be approved in the **standard** door construction, but with a reduced aperture width, and subject to the following limitations;

Maximum area of aperture	-	0.35m²
Maximum aperture height	-	1490mm
Maximum aperture width	-	230mm
Minimum margin from leaf edge	-	110mm
Minimum distance between apertures	-	100mm

More than one aperture may be included in each leaf subject to the individual limitations above.

For these extended apertures sizes, beads must be secured within the aperture using pins set at **75mm** centres (instead of the 150mm centres shown on **Figure PAR/17774/01:03** in Appendix A).

3.6.5 Aperture sizes in the 'enhanced' door construction

Based upon the size of apertures tested, it the opinion of IFC that the following limitations apply to glazed apertures in the **enhanced** door construction considered herein;

Maximum area of aperture(s)	-	0.59m²
Maximum aperture height	-	1193mm
Maximum aperture width	-	496mm
Minimum margin from leaf edge	-	200mm
Minimum distance between apertures	-	150mm

More than one aperture may be included in each leaf subject to the individual limitations above.

3.7 Intumescent Seals

The following intumescent seal combinations shall be used for the door configurations covered by this report:

Intumescent Seals for Standard Door Construction

Position	Seal Specification
Frame head	1no 15 x 4mm intumescent strip fitted centrally in the frame reveal
Frame jambs	1no 15 x 4mm intumescent strip fitted centrally in the frame reveal
Flush meeting stiles	2no 10 x 4mm intumescent seals, set 5mm from each face, both seals in active leaf only
Rebated meeting stiles	2no 10 x 4mm intumescent seals, one central in the rebate and one central in the nib, both seals in active leaf only

Intumescent Seals for Enhanced Door Construction

Position	Seal Specification
Frame head	1no 20 x 4mm intumescent strip fitted centrally in the frame reveal
Frame jambs	1no 20 x 4mm intumescent strip fitted centrally in the frame reveal
Leaf head (in addition to the seal in the frame head)	1no 20 x 4mm intumescent strip fitted in the head of the leaf

All intumescent seals are to be of the graphite or Palusol type, or Lorient 617. It is recommended that all intumescent seals are manufactured or supplied by members of the Intumescent Fire Seals Association (IFSA), or that the product is included in a Third Party Certification Scheme, (such as that provided by IFC Certification); to ensure product quality and consistency.

Transommed overpanels shall include the same intumescent seal specifications as defined for the door leaf jambs, being fitted in the frame around all four edges of the overpanel.

3.8 Ambient Temperature Smoke Seals

Smoke seals, or combined intumescent/smoke seals (using the intumescent products approved in Section 3.7), that have been tested to BS476: Part 31: Section 31.1: 1983 and shown not to leak by more than $3m^3/m/hr$ at 25Pa may be used in conjunction with the proposed door assemblies to provide smoke control.

The orientation of the seals, door edge gaps, degree of building hardware interruption, and leaf configuration, will need to be as tested to BS476: Part 31: Section 31.1: 1983 to achieve the desired level of smoke control, unless these conflict with the intumescent seal widths and positions as shown in Section 3.7, in which case, the latter shall take precedence.

Test evidence to BS476: Part 22: 1987 shall also be available to demonstrate that the smoke seals will not adversely affect the overall fire resistance of timber door assemblies, when fitted in the proposed arrangements.

3.9 Hardware

Some of the various items of hardware to be used with the proposed door assemblies will have a positive contribution to the overall performance ('essential hardware') and others are classed as 'non-essential'. However, in all cases it must be ensured that choice of items, or their installation within the assemblies, does not have a detrimental effect upon their achievement of the required period of fire resistance.

All hardware beyond the scope of the general guidance given below must have been subjected to fire resistance testing, and/or assessed by a notified body, to support its use in doors of a similar construction to that proposed, or third party certification shall be available to support its use on door assemblies of the proposed type.

General guidance for all items of hardware is outlined below, based upon the range of items tested.

3.9.1 Hinges

The door assemblies have been tested utilising steel butt hinges, (3no hinges per leaf) and are thus proven to make a positive contribution to the required 30 minutes integrity performance. Other makes of hinge may be used as alternatives providing they comply with the following specification:

Hinge types	:	Fixed pin, washered butt, ball bearing butt or journal supported hinges may be used.
Number of hinges	:	3no per leaf on doors up to 2300mm tall. 4no hinges per leaf if door height is greater than 2300mm.
Positions	:	The top hinge must be positioned 150mm down from the head of the leaf to the top of the hinge and the bottom hinge positioned 225mm up from the foot of the leaf to the bottom of the hinge. The middle hinge(s) should be evenly spaced between the top and bottom hinge. (All positions ±25mm).
Fixings	:	Steel screws, as recommended by the hinge manufacturers, but in no case smaller than No 8 (3.8mm diameter) x 30mm long, and having thread for the full length. Position of screws (in relation to the door face) in blades of alternative hinge types shall be similar to hinges tested with the proposed door type.
Hinge blade sizes	:	2.0–3.5mm thick x 89–110mm high x 30–38mm width. (These dimensions refer to the blade size, i.e. the part of the hinges that are recessed into the edge of the leaves/frame).

Hinge materials	:	Brass, Phosphor Bronze, Steel or Stainless Steel. (Aluminium, Nylon or 'Mazac' are not permitted.) No combustible or thermally softening materials to be included.
Additional protection	:	Not required.

Rising butt, non-cranked butts and spring hinges (single or double action) are not suitable for use on doors approved within the scope of this generic assessment, although may be suitable to form the subject of an individual and specific evaluation.

3.9.2 Mortice latches/locks

The door design has been tested with a mortice latch fitted. The Union Y-2242-63 steel mortice latch has been tested in single leaves, and the Y-2242-66 latch was successfully tested in rebated meeting stiles. Where a latch/lock is included it should be centred at 1000mm (± 200mm), above the bottom of the door leaf. Alternative latches may be used, but they shall comply with the following specifications:

Latch/lock types	:	Mortice latches, tubular mortice latches, sashlocks, deadlocks	
Maximum dimensions	:	Forend plate:	235mm long x 20mm wide or 200mm long x 25mm wide
		Latch body:	18mm thick x 150mm high x 100mm wide
		Strikeplate:	235mm long x 20mm wide or 200mm long x 25mm wide
Materials	:	Latches must have no essential part of their structure made from polymeric or other low melting point (<800°C) materials, and should not contain any flammable materials.	
Additional protection	:	If forend or strikeplate are over 20mm wide they should be bedded on 1mm thick low pressure intumescent material, e.g. Interdens. In meeting stiles of double doors, the specifications for intumescent seals (see Section 3.7) are such that at least 5mm width of each seal is continuous alongside the forend; and this must ensured in practice.	

Over-morticing is to be avoided; mortices should be as tight as possible to the latch. If gaps either side of the case exceed 2mm, then these must be made good with intumescent mastic or sheet (rounding to the top and bottom of the mortice is permitted). Holes for spindles or cylinders should be kept as small as is compatible with the operation of the hardware.

If an alternative latch is used with rebated meeting stiles, it must be of a type that has been successfully tested in a timber door (with thickness and construction similar to that proposed); and any additional intumescent materials used in testing of the alternative latch must be employed with the proposed doors.

3.9.3 Door closers

Where required by regulatory guidance, each hinged door leaf must be fitted with a self-closing device unless they are normally kept locked shut and labelled as such with an appropriate sign which complies with BS5499: Part 1: 1990.

The specification for self-closing devices are as follows:

- Face-fixed overhead door closer (and accessories such as soffit brackets) that have been tested, assessed or otherwise approved for use on unlatched FD30 cellulosic door leaves may be used. Any accessory that is located within the door reveal must have appropriate test or assessment evidence.

- Transom mounted or concealed overhead closers must not be incorporated into any of the door assemblies within the scope of this generic scope of this report.

- It is essential that all approved closers are of the correct power rating for the width and weight of the door assemblies. They must be fitted according to the manufacturer's instructions, and be adjusted so that they are capable of fully closing the door leaf, against any friction imposed by the latch, (and smoke seals, if fitted), from any position of opening.

3.9.4 Flush bolts (Not applicable to the enhanced door construction)

Double leaf door assemblies have been tested with flush bolts fitted. Where they are included they should comply with the following specifications:

- Edge fixed flush bolts must be steel and should have a maximum length of 250mm. The intumescent seals, defined in Section 3.7 herein, are fitted in the active leaf, so that they are not interrupted by the flush bolts. In the head of the frame, a minimum 5mm width of intumescent seal must be continuous alongside the bolt/keep plate.

- Edge fixed flush bolts should be central in the leaf thickness with square meeting stiles; and offset in the rebate of the passive leaf in doors with rebated meeting stiles.

- Face fixed flush bolts require no additional measures if the intumescent seal in the head of the doorset is not interrupted, otherwise additional intumescent material local to the bolt should be provided, as described above. The maximum depth of recess should be 18mm, and the mortice should be accurately cut to suit the bolt. The recess shall be centrally positioned in the width of the door 'stile'.

3.9.5 Door selectors (Not applicable to the enhanced door construction)

Door selectors are used on double leaf door assemblies with rebated meeting stiles, to ensure that the leaves close in sequence. Door selectors fitted to the assessed door assemblies must not be recessed into the frame head to the extent that they interrupt any intumescent strips. Recesses cut to accommodate these items must be as tight as possible. Only selectors suitable for 10 – 12mm rebates should be used.

3.9.6 Non-essential hardware items

Push plates, kick plates, etc.

Plastic, pvc or metal plates may be surface-mounted to the door leaves, but, if more than 800mm in length by nominally 200mm wide, they must be attached in a way that would prevent them distorting the door leaf, e.g. glued with thermally softening adhesive or screwed with short aluminium screws and fitted in such a way so they will not be prevented from falling away by being trapped under door stops, glazing beads or handle escutcheons etc.

Pull handles

These may be fixed to the door leaves, provided that the fixing points are no greater than 500mm apart. Pull handles that are fixed through the leaf should use clearance holes as close fitting as possible to the bolt.

Dropseals

Lorient IS8010 threshold dropseals can be fitted into the bottom edge of the proposed door leaves, providing that the drop seals are encased in 1mm thick Intumescent Seals Ltd Therm-A-Strip (or an alternative 1mm thick low-pressure intumescent gasket) and are positioned centrally within the door thickness. (These are not applicable in doors with rebated meeting stiles).

3.10 Installation, Supporting Construction and Door Edge Gaps

The frames must be fixed back to the supporting construction with steel fixings at centres not exceeding 600mm; this applies to jambs and head. Screws shall be of sufficient length to penetrate the wall by at least 40mm, and shall be positioned such that they are not exploited by charring of the frame, irrespective of the direction of test exposure; (this may necessitate a twin line of screws). Packers shall be used at all fixing positions, although if combustible packers are employed, these must be protected by a layer of firestopping (see below), aligned near to each face of the door frame.

The supporting construction may be either timber or steel stud plasterboard clad partition, blockwork, brickwork or concrete walls, but shall be of a type that has been tested or assessed to provide in excess of 30 minutes fire resistance at the required size when incorporating doorset openings. If fitted into timber or steel stud partitions, the method of forming the doorset aperture must be as tested by the partition and/or doorset manufacturer.

Note 10 *Reference to steel stud partitions is in the context of permanent elements, such as those designed and proven by the plasterboard manufacturers – this report does not approve use of the proposed door assemblies in proprietary 'demountable' partitions, which must be subject to a full and independent appraisal of the particular system and door assemblies therein.*

No part of the rear of the frame section shall be exposed once installed, (except for integral architraves) and the leaf must be flush with the face of the wall. There shall be no feature rebates or shadow gaps at the junction of the frame and wall.

The fire stopping between the supporting construction and timber frames should follow the recommendations of Tables 2 and 3 in BS8214: 2016, *'Timber-based fire door assemblies – Code of practice'*; using a product proven in such timber applications, and with reference to the correct depth of seal to suit the width of gap between wall and frame. The firestopping shall be positioned on the plane of the door leaf; (unless combustible packers are employed).

The gap between the door and the frame, and at the meeting stiles, should be 2–4mm. Gaps under the door(s) should not exceed 6mm for fire performance, although, if smoke control is also required, these gaps should only be 3mm, or smoke seals should be included (see also Section 3.8 regarding suitability of smoke seals).

The door design should be such that the leaves are fully flush within the frame, when in the closed position. They may however be set back from the exposed face of the frame if required. The leaves of double doors, where approved herein, shall be flush with each at the meeting stiles.

Overpanels shall be secured into the frame using steel screws fixed through the rear of the frame members, passing at least 40mm into the centre line of the overpanel thickness. (Screws must not be fixed through the overpanel into the stops, or vice versa). Screws must be no more than 100mm from each corner of the overpanel, and at maximum 400mm centres, with a minimum of 2 screws per overpanel edge. The gap between overpanel and frame should be no greater than 1mm. The overpanel shall be on the same plane as the door below.

4. CONCLUSION

It is the opinion of International Fire Consultants Ltd that if the proposed Falcata core door assemblies installed in timber frames were manufactured and installed within the limitations of this Field of Application Report and tested for fire resistance, they would satisfy the integrity criteria of BS476: Part 22: 1987 for 30 minutes.

5. DECLARATION BY THE APPLICANT

We the undersigned, confirm that, except for that information declared to International Fire Consultants Ltd previously during the original engineering evaluation process, the components, products, and/or assemblies evaluated within IFC Field of Application Report PAR/17774/01 have not been altered in any way; and have not subsequently, to our knowledge, been included in a fire test [to the standard against which the evaluation is being carried out] in the form and/or configurations proposed.

We also confirm that we have supplied all information and assurances requested of us, for the purpose of writing this Field of Application Report, and are not aware of any other information that would adversely influence or affect the conclusions of this report.

We agree that if fire test evidence or other information subsequently becomes available, to supply this to IFC in full and seek immediate review of the continuing validity of the original report from IFC. If after review IFC conclude that the original evaluation and report is no longer appropriate, we agree to withdraw it and any references to it from circulation and advise clients and agents accordingly.

Signature: _____

Position: _____

Company: **PT Karya Cipta Unggul Nusantara**

6. LIMITATIONS

This report addresses itself solely to the ability of the proposed assemblies described to satisfy the criteria of the fire resistance test and does not imply any suitability for use with respect to other unspecified criteria.

This document only considers the door assemblies described, herein, and assumes that the surrounding construction will provide no less restraint than the tested assembly and that it will remain in place and be substantially intact for the full fire resistance period.

This report is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available, IFC reserves the right to withdraw the report unconditionally but not retrospectively.

Where the constructional information in this report is taken from details provided to International Fire Consultants Ltd (IFC) and/or from fire resistance test reports referenced herein, it is, therefore, limited to the information given in those documents. It is necessarily dependent upon the accuracy and completeness of that information. Where constructional or manufacturing details are not specified, or discussed, herein, it should not, therefore, be taken to infer approval of variation in such details from those tested or otherwise approved.

The analysis and conclusions within this report are based upon the likely fire resisting performance of a complete door assembly that is manufactured and installed in accordance with this document, and offered for fire resistance testing in 'perfect' condition. In practice, management procedures must be in place in any building where the door assemblies are installed, to ensure that no parts of the assembly are damaged or faulty. Further, the doors must open and close without the use of undue force. The edge gaps/alignment of door leaves must be in accordance with the tolerances defined, herein, when the doors are closed. Any such shortfalls in respect to the condition of the assemblies will invalidate the approval by IFC, and may seriously affect the ability of the assemblies to provide the required level of fire resistance performance. Determination of what constitutes wear or damage, and any corrective actions in order to return assemblies to the required condition, should only be carried out following consultation with the manufacturer and IFC.

This report applies to fire door assemblies that are evaluated to BS476: Part 22: 1987; which is an applicable test method currently referenced within guidance to Building Regulations in the United Kingdom, and in building codes in some other countries. However, IFC have a duty of care to advise that introduction of CE Marking may become compulsory for fire resisting doorsets marketed in the EU, during the validity period of this report; in which case, users should contact IFC for further details/advice.

Where the assessed constructions have not been subject to an on-site audit by International Fire Consultants Ltd, it is the responsibility of anyone using this report to confirm that all aspects of the assemblies fully comply with the descriptions and limitations, herein.

Any materials specified in this report have been selected and judged primarily on their fire performance. IFC do not claim expertise in areas other than fire safety. Whilst observing all possible care in the specification of solutions, we would draw the reader's attention to the fact that during the construction and procurement process, the materials used should be subjected to more general examination regarding the wider Health and Safety, and CoSHH Regulations.

This assessment considers the fire resistance performance of the door assemblies when tested with the leaves in the closed position, within the frame reveal; either retained by the latch, or self-closing device, or locked shut, as applicable. The door assemblies will only provide the assessed fire performance when in a similar configuration; and it is the responsibility of the building occupants/owner to ensure that this is the case.

This Report is provided to the sponsor on the basis that it is a professional independent engineering opinion as to what the fire performance of the construction/system would be should it to be tested to the named standard. It is IFC's experience that such an opinion is normally acceptable in support of an application for building approvals, certainly throughout the UK and in many parts of Europe and the rest of the world.

However, unless IFC have been commissioned to liaise with the Authorities that have jurisdiction for the building in question for the purpose of obtaining the necessary approvals, IFC cannot assure that the document will satisfy the requirements of the particular building regulations for any building being constructed.

It is, therefore, the responsibility of the sponsor to establish whether this evidence is appropriate for the application for which it is being supplied and IFC cannot take responsibility for any costs incurred as a result of any rejection of the document for reasons outside of our control. Early submittal of the Report to the Authorities will minimise any risks in this respect.

7. VALIDITY

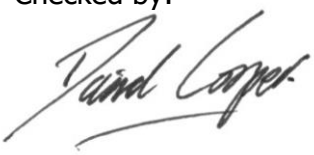
This Field of Application Report has been prepared based on International Fire Consultants Ltd's present knowledge of the products described, the stated testing regime and the submitted test evidence. For this reason, anyone using this document after July 2020 should confirm its ongoing validity.

This Field of Application Report is not valid unless it incorporates the declaration by the applicant given in Section 5 duly signed by the applicant.

Prepared by:

Mark Billingham
Senior Fire Safety Engineer
International Fire Consultants Ltd. (IFC)

Checked by:



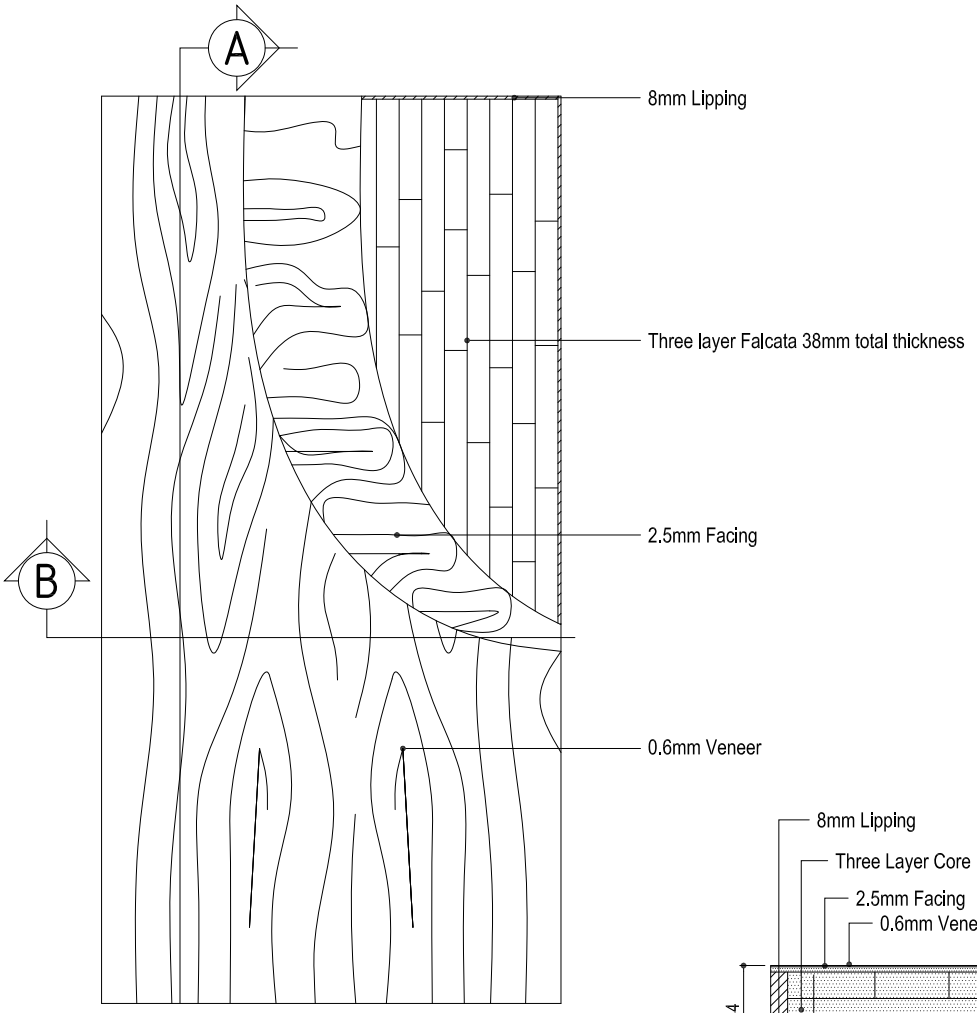
David Cooper BEng (Hons) AIMMM AIFireE
Fire Safety Engineering Manager
International Fire Consultants Ltd. (IFC)

APPENDIX A

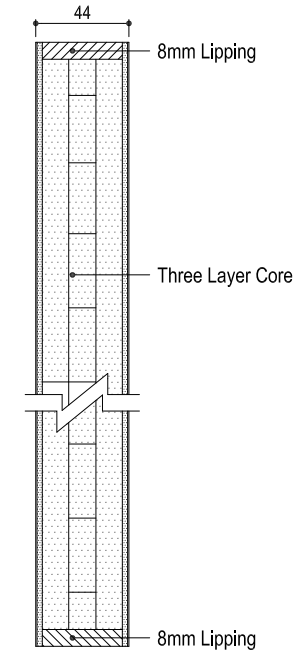
Figures PAR/17774/01:01 to 03

Examples of Door Leaf Construction and Glazing Details

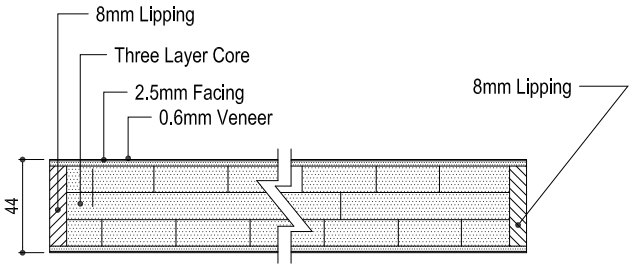
The figures in this Appendix are not included in the sequential page numbering of this report



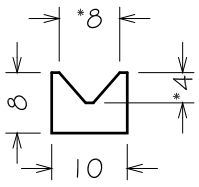
Refer to Section 3.3.1 for full details

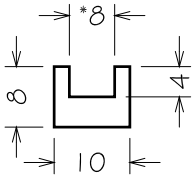


Section : A



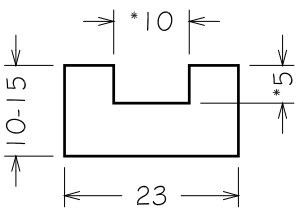
Section : B

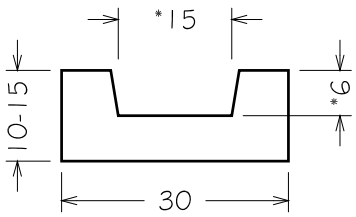




FEATURE GROOVES

* = Maximum





Note: The shape/profile of the feature groove shown here are examples, and any shape can be formed

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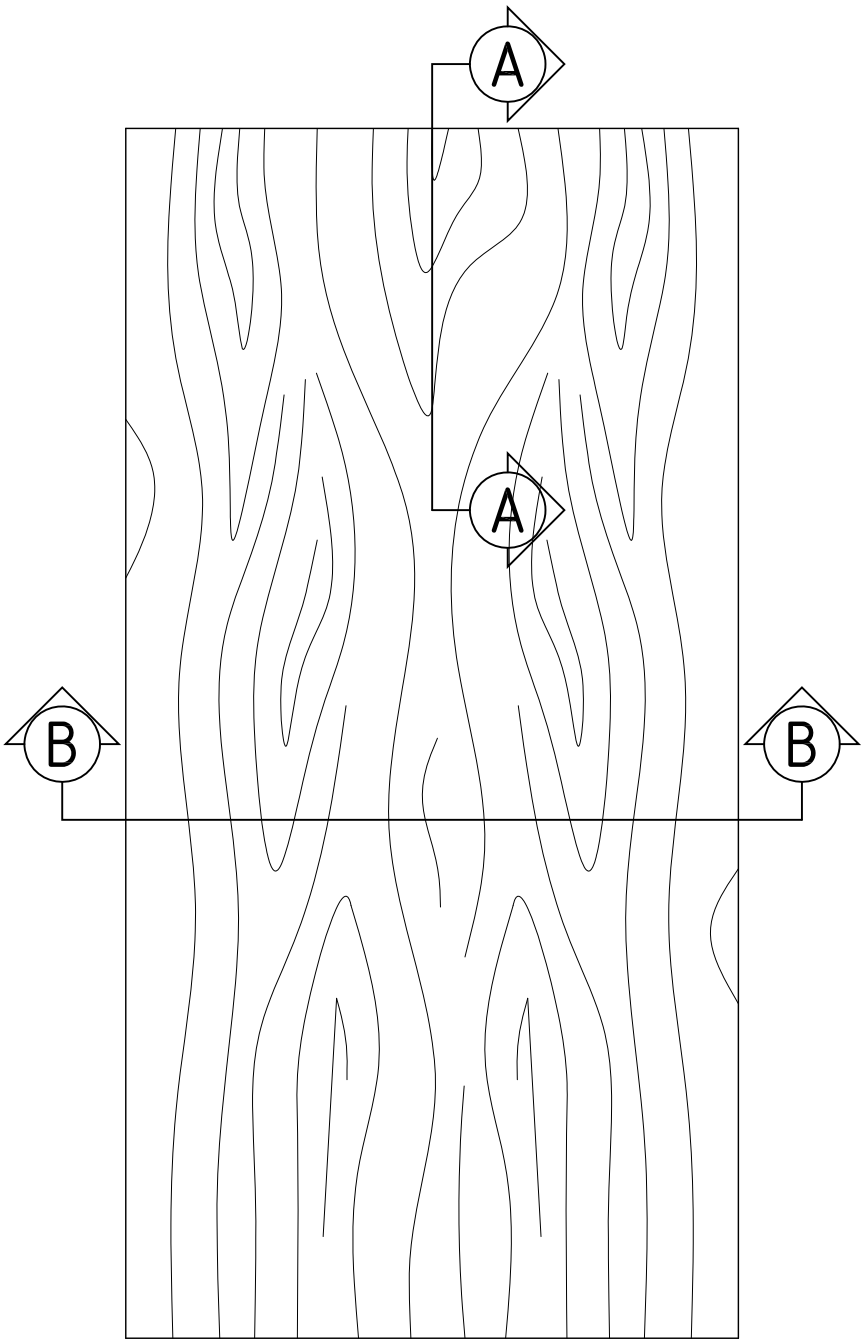
Field of Application Report
Report PAR/17774/01
PT Karya Cipta Unggul Nusantara
FD30 Falcata Core Door Leaves
Installed in Timber Frames

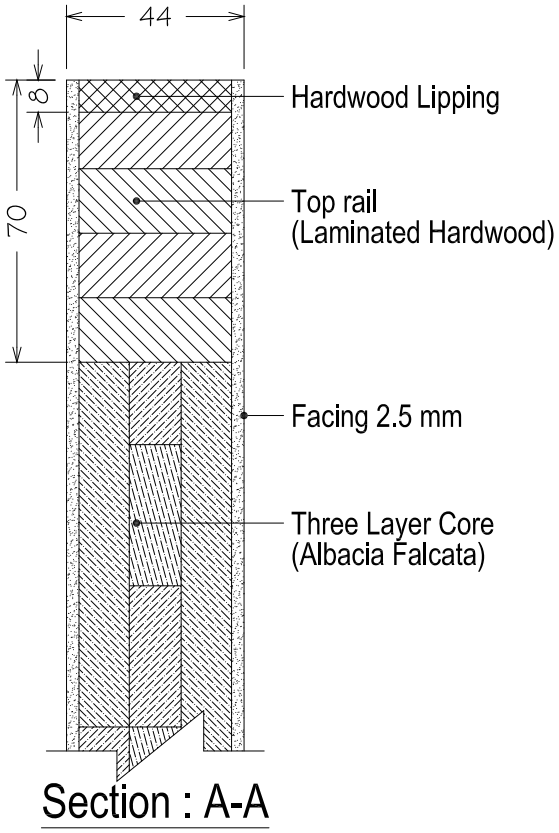
Example of Standard Door Leaf Construction

Job number: 17774	
Drawn by: CSP	Checked by: MB
Not To Scale	Drawn: Dec 2017

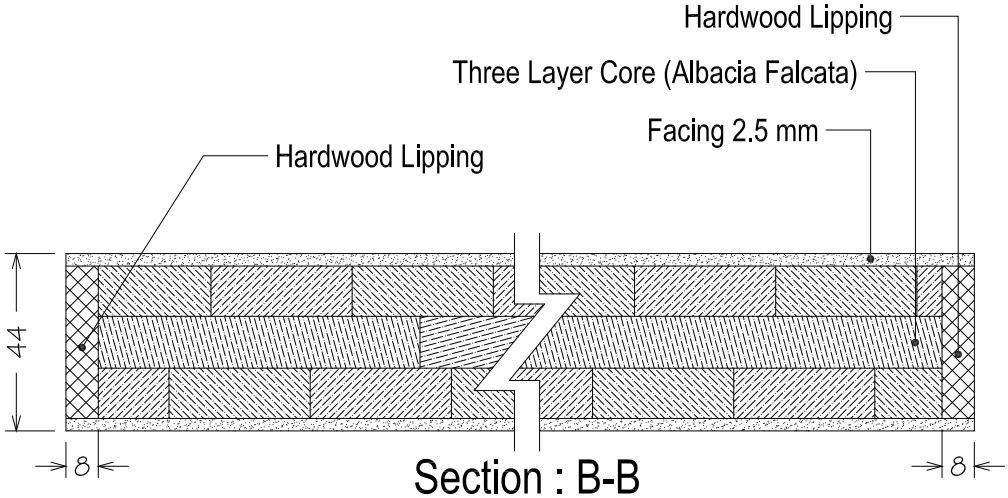
PAR/17774/01:01



Refer to Section 3.3.2 for full details



Section : A-A



Section : B-B

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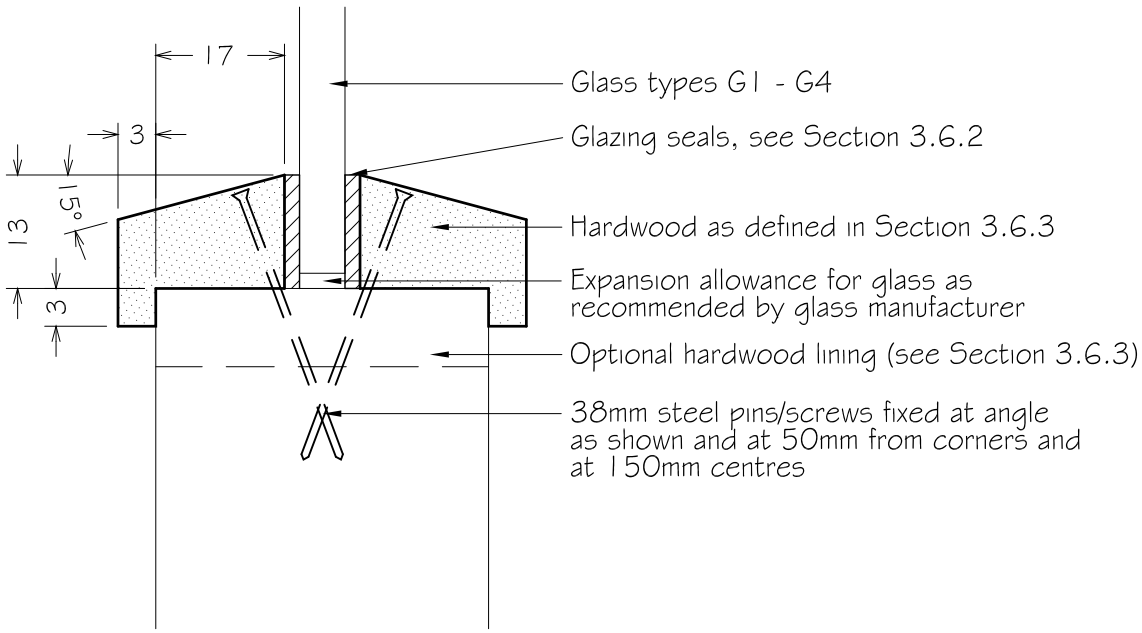
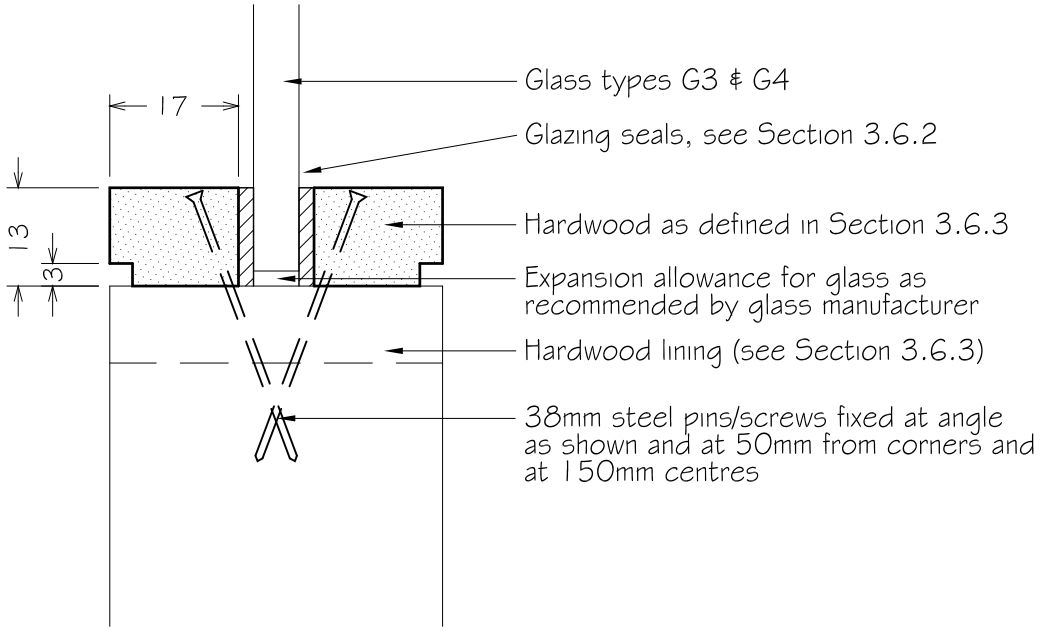
Example of Enhanced
Door Leaf Construction

Job number: 17774	
Drawn by: CSP	Checked by: MB
Not To Scale	Drawn: Dec 2017

PAR/17774/01:02





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Installed in Timber Frames

Standard
Glazing Details

Job number: 17774	
Drawn by: CSP	Checked by: MB
Not To Scale	Drawn: Dec 2017

PAR/17774/01:03

APPENDIX B

Assessed Leaf Size Envelope

Standard Door Construction – Figures PAR/17774/01:04 to 07

Enhanced Door Construction – Figures PAR/17774/01:08 and 09

The figures in this Appendix are not included in the sequential page numbering of this report

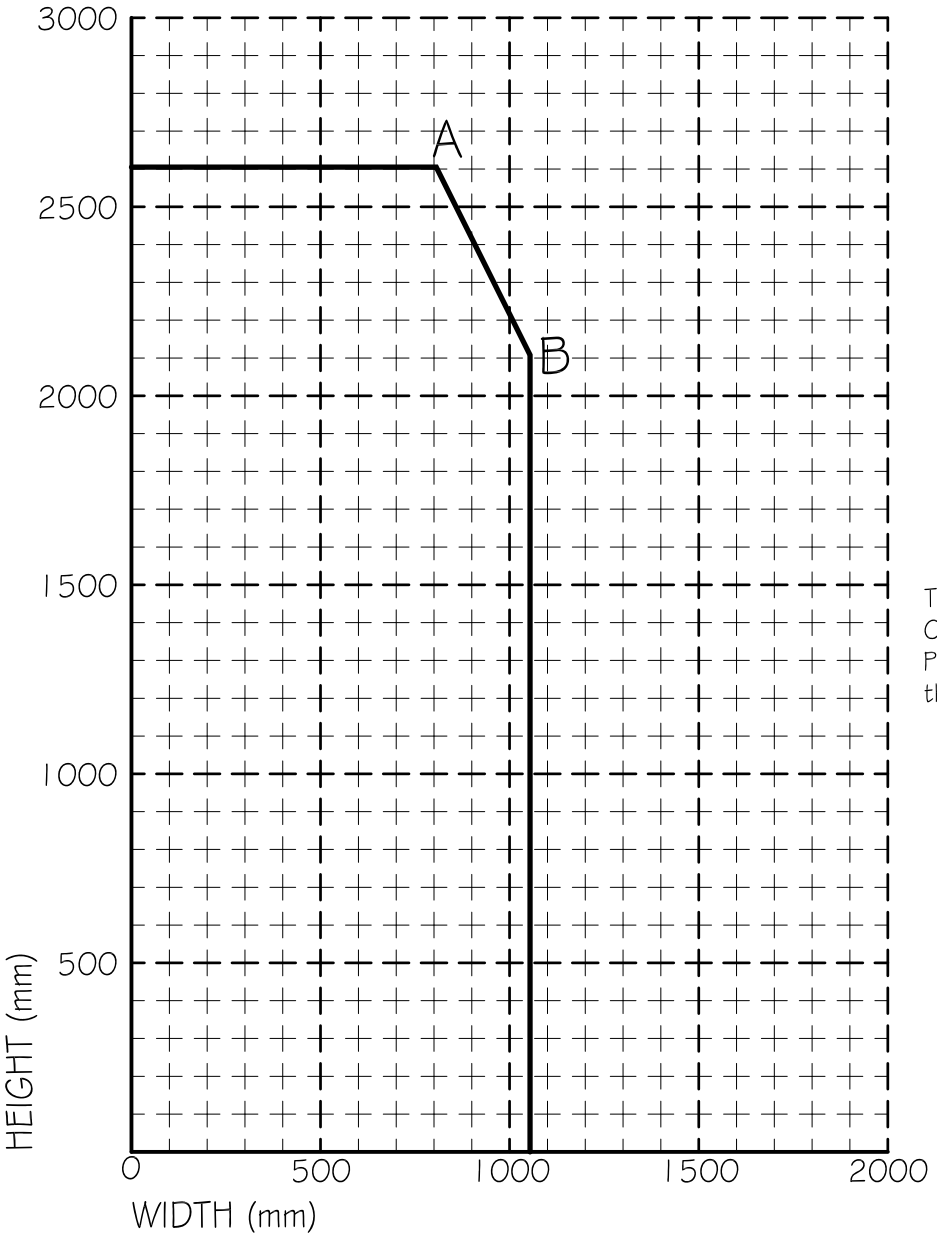
PROPOSED CONFIGURATION

LATCHED
SINGLE ACTING
SINGLE LEAF

REQUIRED INTEGRITY : 30 minutes

	A	B
Width	806	1054
Height	2605	2108

LEAF SIZE ENVELOPE POINTS



This figure forms part of International Fire Consultants Ltd's Field of Application Report PAR/17774/01, which contains full details of the assessed door construction.

ENVELOPE OF APPROVED LEAF SIZES

The above graph represents the envelope of approved leaf sizes for the proposed door leaf configuration.
Any combination of leaf width and height that falls within the graph axes and the connecting line on the graph above are approved.
POINTS A & C represent the maximum leaf height and its associated width.
POINTS B & D represent the maximum leaf width and its associated height.

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Field of Application Report
Report PAR/17774/01
PT Karya Cipta Unggul Nusantara
FD30 Falcata Core Door Leaves
Installed in Timber Frames

Envelope of Approved Sizes:
Standard Leaf Construction
LSASD

Job number: 17774	
Drawn by: CSP	Checked by: MB
Not To Scale	Drawn: Dec 2017

PAR/17774/01:04

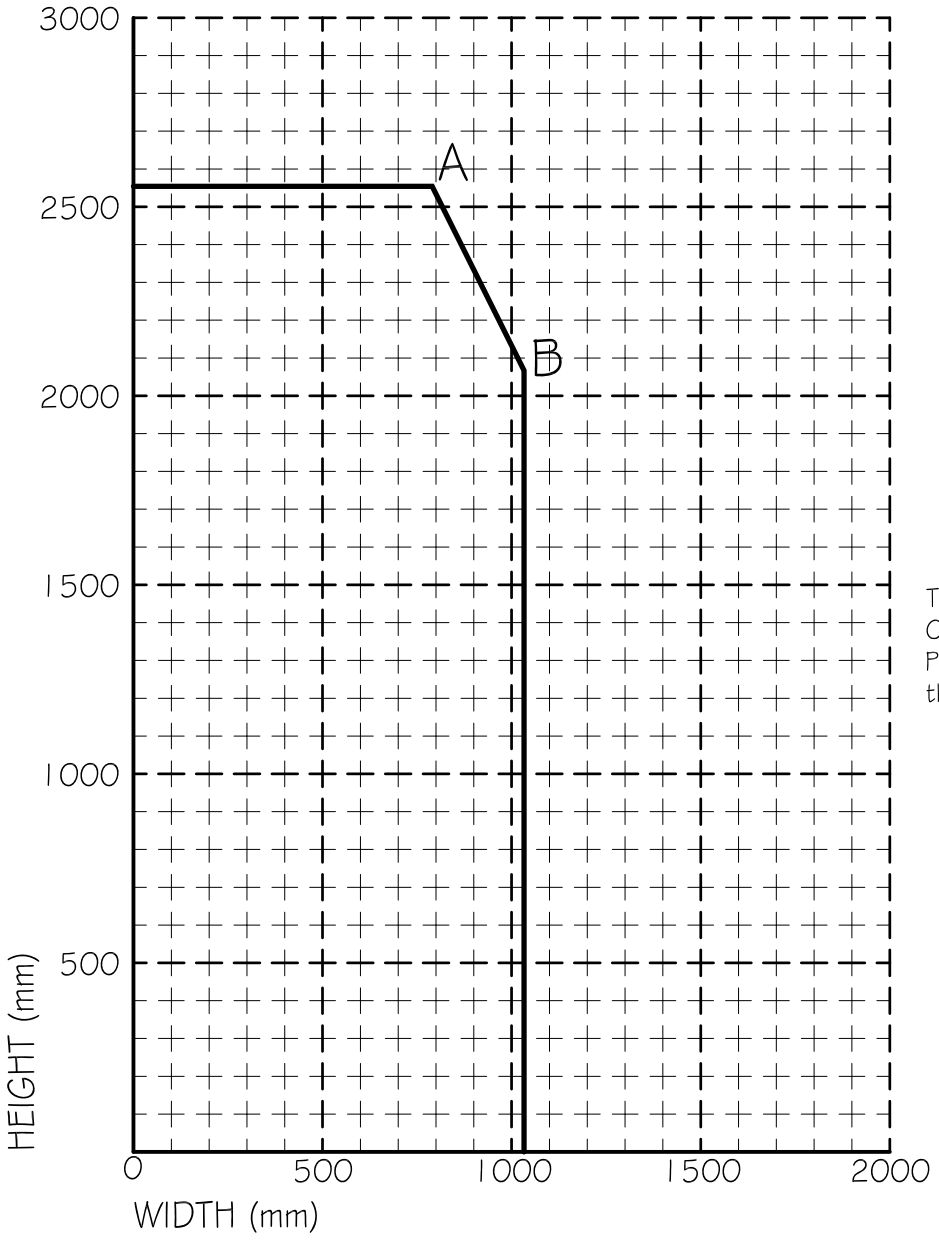
PROPOSED CONFIGURATION

UNLATCHED
SINGLE ACTING
SINGLE LEAF

REQUIRED INTEGRITY : 30 minutes

	A	B
Width	790	1033
Height	2554	2067

LEAF SIZE ENVELOPE POINTS



This figure forms part of International Fire Consultants Ltd's Field of Application Report PAR/17774/01, which contains full details of the assessed door construction.

ENVELOPE OF APPROVED LEAF SIZES

The above graph represents the envelope of approved leaf sizes for the proposed door leaf configuration.
Any combination of leaf width and height that falls within the graph axes and the connecting line on the graph above are approved.
POINTS A & C represent the maximum leaf height and its associated width.
POINTS B & D represent the maximum leaf width and its associated height.

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Field of Application Report
Report PAR/17774/01
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FD30 Falcata Core Door Leaves
Installed in Timber Frames

Envelope of Approved Sizes:
Standard Leaf Construction
ULSASD

Job number: 17774	
Drawn by: CSP	Checked by: MB
Not To Scale	Drawn: Dec 2017

PAR/17774/01:05

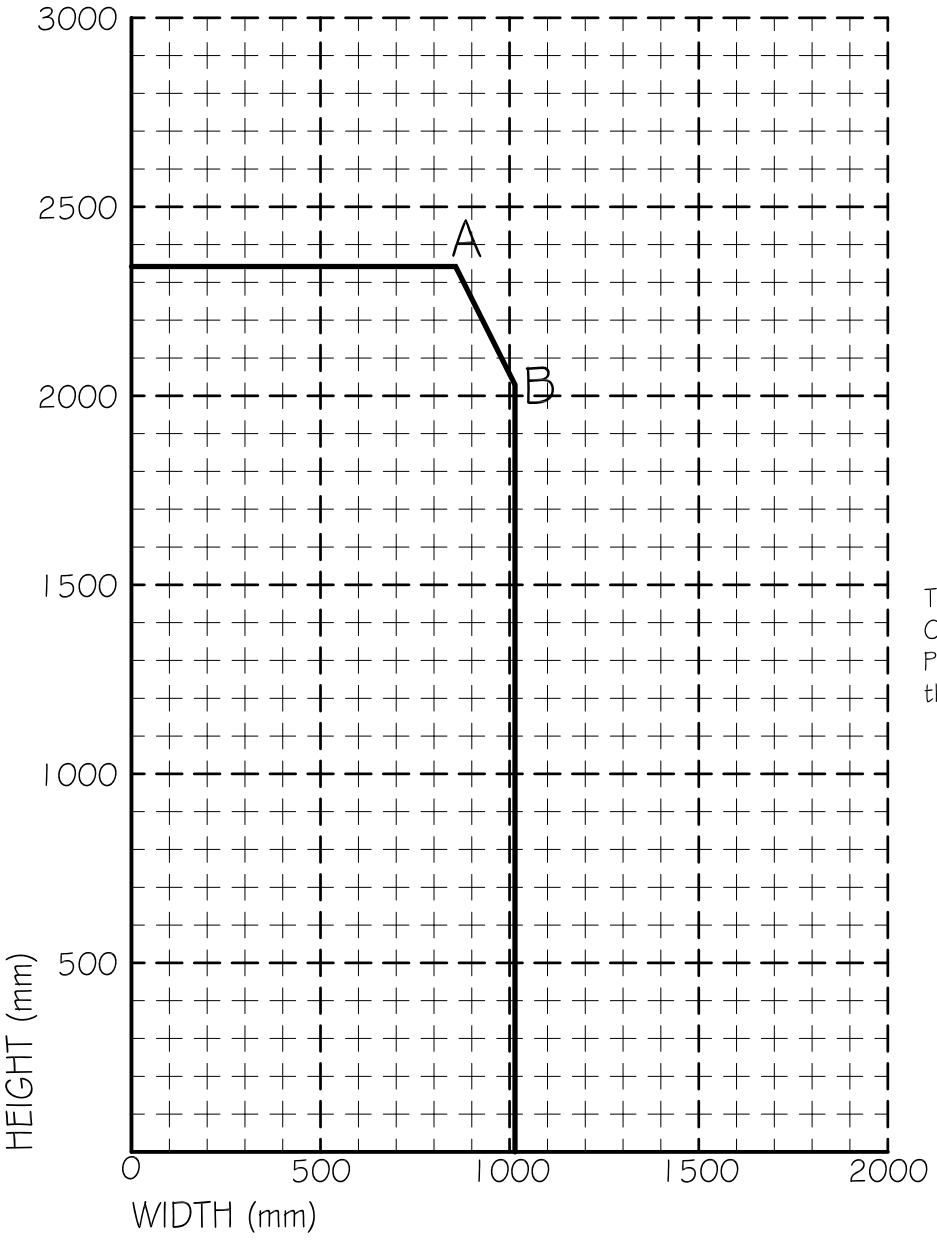
PROPOSED CONFIGURATION

LATCHED
SINGLE ACTING
DOUBLE LEAF

REQUIRED INTEGRITY : 30 minutes

	A	B
Width	857	1014
Height	2342	2029

LEAF SIZE ENVELOPE POINTS



This figure forms part of International Fire Consultants Ltd's Field of Application Report PAR/17774/01, which contains full details of the assessed door construction.

ENVELOPE OF APPROVED LEAF SIZES

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Envelope of Approved Sizes:
Standard Leaf Construction
LSADD

Job number: 17774	
Drawn by: CSP	Checked by: MB
Not To Scale	Drawn: Dec 2017

PAR/17774/01:06

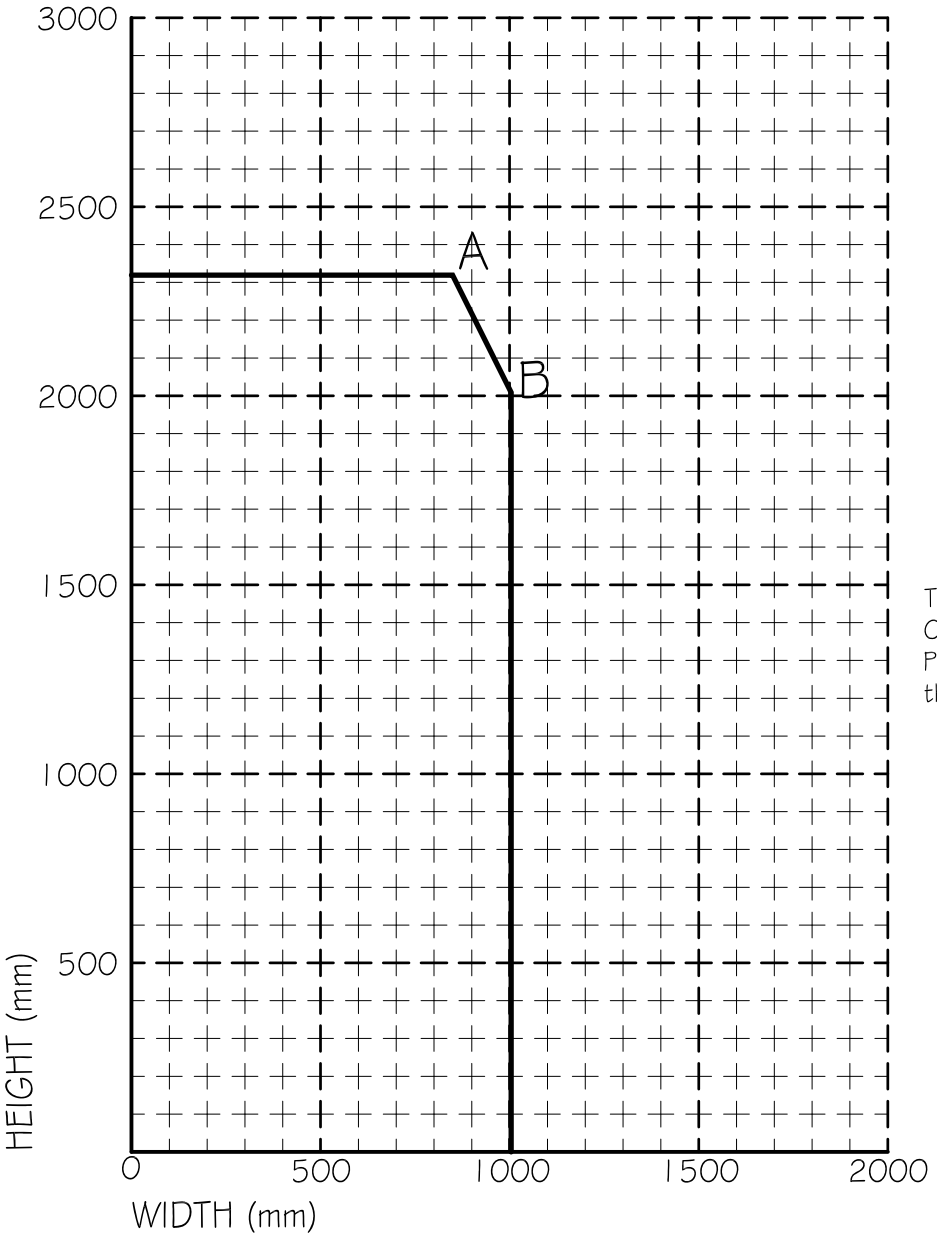
PROPOSED CONFIGURATION

UNLATCHED
SINGLE ACTING
DOUBLE LEAF

REQUIRED INTEGRITY : 30 minutes

	A	B
Width	849	1004
Height	2319	2009

LEAF SIZE ENVELOPE POINTS



This figure forms part of International Fire Consultants Ltd's Field of Application Report PAR/17774/01, which contains full details of the assessed door construction.

ENVELOPE OF APPROVED LEAF SIZES

The above graph represents the envelope of approved leaf sizes for the proposed door leaf configuration.
Any combination of leaf width and height that falls within the graph axes and the connecting line on the graph above are approved.
POINTS A & C represent the maximum leaf height and its associated width.
POINTS B & D represent the maximum leaf width and its associated height.

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Field of Application Report
Report PAR/17774/01
PT Karya Cipta Unggul Nusantara
FD30 Falcata Core Door Leaves
Installed in Timber Frames

Envelope of Approved Sizes:
Standard Leaf Construction
ULSADD

Job number: 17774	
Drawn by: CSP	Checked by: MB
Not To Scale	Drawn: Dec 2017

PAR/17774/01:07

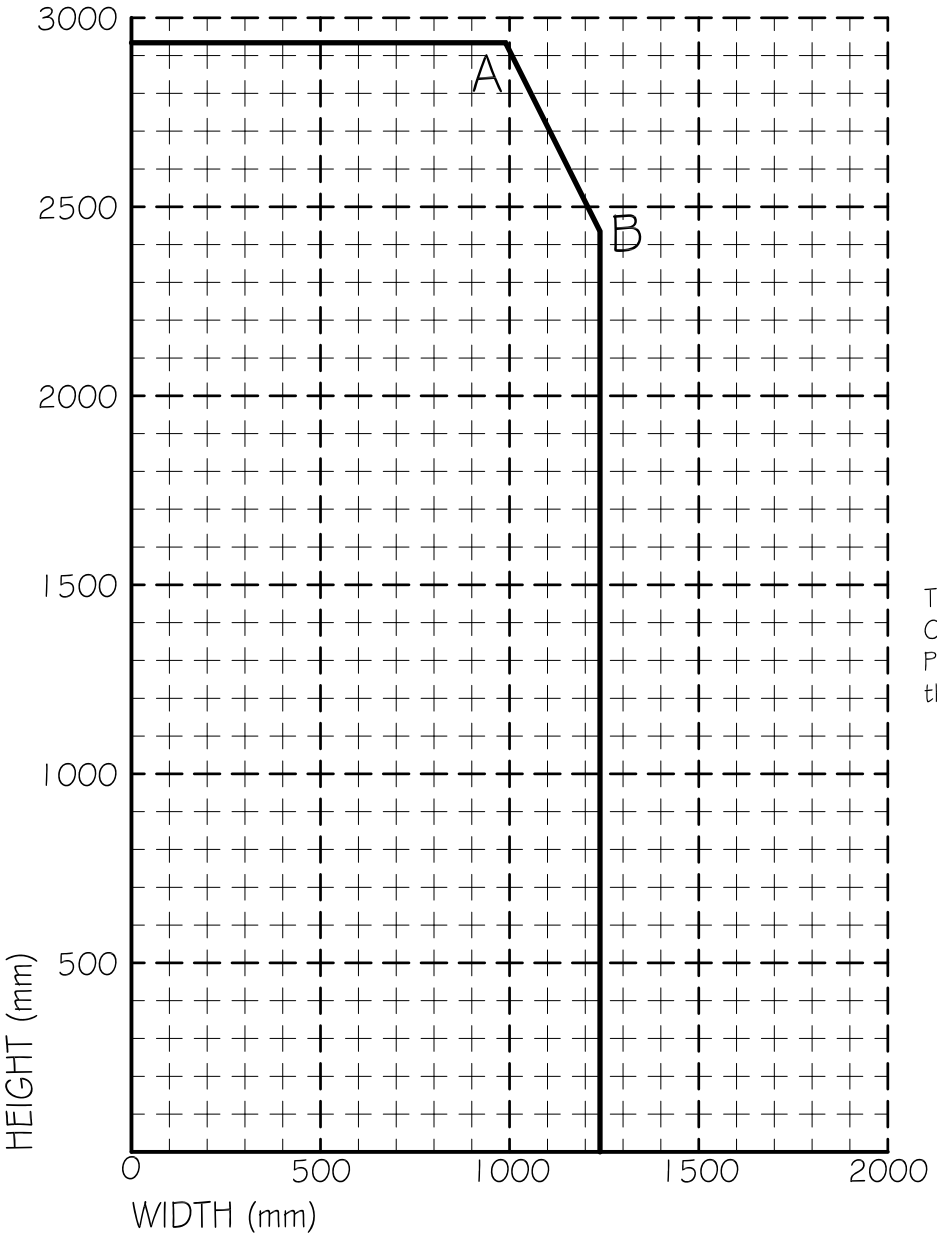
PROPOSED CONFIGURATION

LATCHED
SINGLE ACTING
SINGLE LEAF

REQUIRED INTEGRITY : 30 minutes

	A	B
Width	989	1239
Height	2934	2435

LEAF SIZE ENVELOPE POINTS



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ENVELOPE OF APPROVED LEAF SIZES

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Field of Application Report
Report PAR/17774/01
PT Karya Cipta Unggul Nusantara
FD30 Falcata Core Door Leaves
Installed in Timber Frames

Envelope of Approved Sizes:
Enhanced Leaf Construction
LSASD

Job number: 17774	
Drawn by: CSP	Checked by: MB
Not To Scale	Drawn: Dec 2017

PAR/17774/01:08

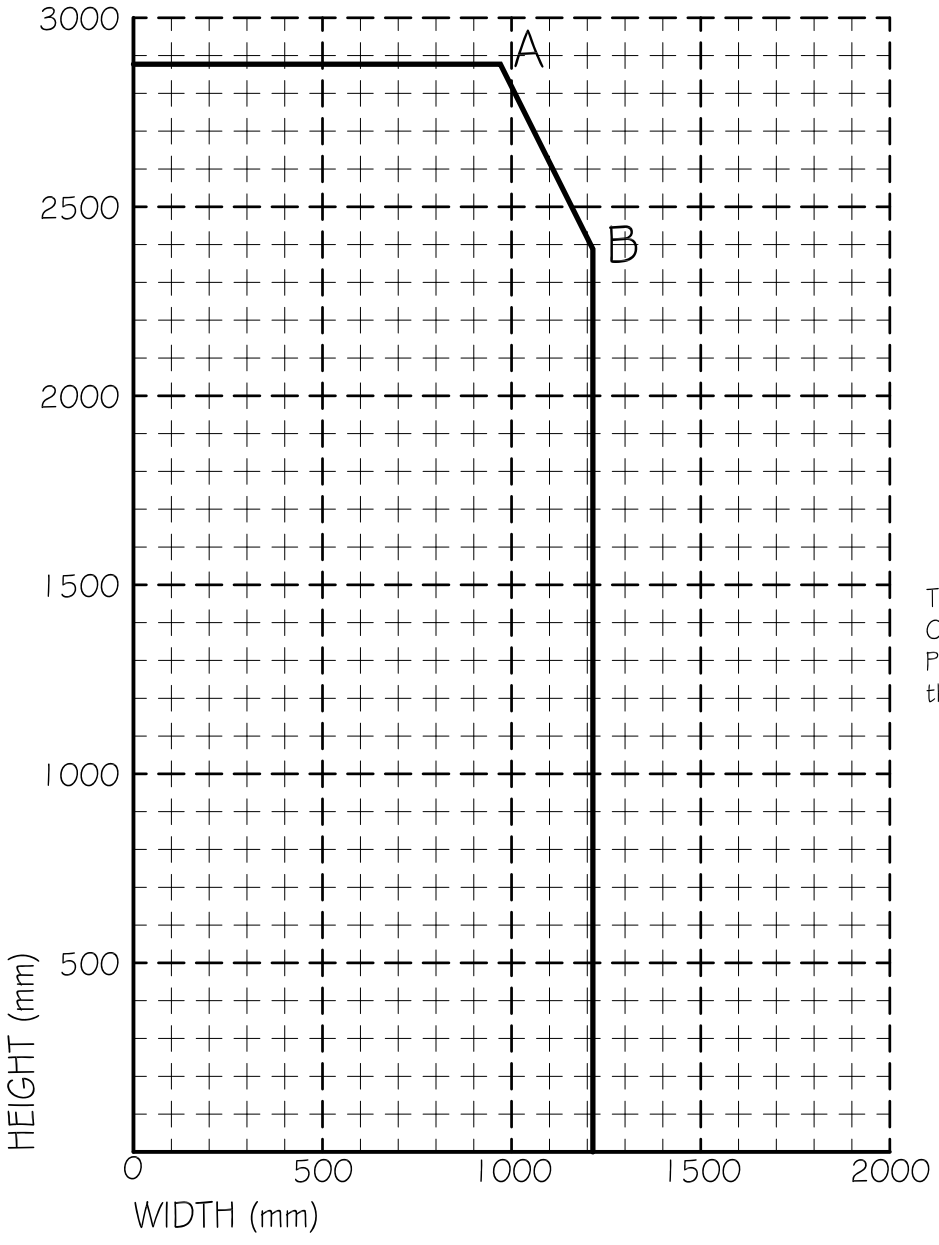
PROPOSED CONFIGURATION

UNLATCHED
SINGLE ACTING
SINGLE LEAF

REQUIRED INTEGRITY : 30 minutes

	A	B
Width	970	1215
Height	2877	2388

LEAF SIZE ENVELOPE POINTS



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ENVELOPE OF APPROVED LEAF SIZES

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Field of Application Report
Report PAR/17774/01
PT Karya Cipta Unggul Nusantara
FD30 Falcata Core Door Leaves
Installed in Timber Frames

Envelope of Approved Sizes:
Enhanced Leaf Construction
ULSASD

Job number: 17774	
Drawn by: CSP	Checked by: MB
Not To Scale	Drawn: Dec 2017

PAR/17774/01:09

APPENDIX C

Summary of Fire Test Evidence

Test Report	Configuration Tested	Leaf Size Tested	Test Standard	Integrity
WARRES No. 125457 *	ULSASD	2047 x 900 x 44mm	BS476: Part 22: 1987	37 minutes
	ULSASD	2047 x 900 x 44mm including glazing	BS476: Part 22: 1987	36 minutes
WF Report No. 199823	Review of Test Referenced WARRES No.125457			
CFR0904091	ULSADD	2040 x 826 x 44mm	BS476: Part 22: 1987	32 minutes
CFR1108251	ULSADD	2011 x 901 + 910 x 44mm (reb m.s.) including glazing	BS476: Part 22: 1987	37 minutes
CFR1301081	ULSASD	1982 x 839 x 44mm including glazing	BS476: Part 22: 1987	33 minutes
CRF1301221	ULSADD	1982 x 771 + 771 x 44mm	BS476: Part 22: 1987	38 minutes
CFR1106141	ULSASD	2388 x 1215 x 44mm	BS476: Part 22: 1987	30 minutes

ULSASD = Unlatched, Single Acting. Single leaf Door assembly
ULSADD = Unlatched, Single Acting, Double leaf Door assembly

* *The test was not sponsored by PT Karya Cipta Unggul Nusantara, but the sponsor of the test granted permission to use their test evidence in order to promote the use of their materials.*

Note: *Where appropriate, fire test evidence from glass, hardware, and intumescent seal manufacturers has also been considered when preparing this Field of Application Report.*