



INTERNATIONAL FIRE
CONSULTANTS LIMITED

PRIVATE & CONFIDENTIAL

IFC FIELD OF APPLICATION REPORT

Field of Application for Ramkor FD120 Plus Door Leaves Installed in Timber or Mild Steel Frames

Fire Resistance Standard: BS476: Part 22: 1987

IFC Report PAR/19681/01

Prepared on behalf of: Ramkor International
5 Victoria Street
Monifieth
Dundee
Scotland
DD5 4HP

NOTE: This report should not be manipulated, abridged or otherwise presented without the written consent of International Fire Consultants Ltd

Ref: #19681

Issue Date – September 2019
Valid Until – September 2024

ISSUE AND AMENDMENT RECORD

Rev	Date	Author	Review	Section	Amendments
Draft	September 2019	CPH	MB	-	-
-	September 2019	CPH	MB	-	-

CONTENTS

1. INTRODUCTION	4
2. TEST EVIDENCE	5
3. SCOPE OF APPROVAL	5
3.1 DOOR ASSEMBLY CONFIGURATION	5
3.2 MAXIMUM ASSESSABLE DOOR LEAF SIZES	6
3.3 DOOR LEAF SPECIFICATION	6
3.4 DOOR FRAMES	7
3.5 GLAZED APERTURES	9
3.6 HARDWARE	11
3.7 INSTALLATION, SUPPORTING CONSTRUCTION AND DOOR EDGE GAPS	11
3.8 INTUMESCENT SEALS	12
3.9 AMBIENT TEMPERATURE SMOKE SEALS	12
4. CONCLUSION	13
5. DECLARATION BY THE APPLICANT	15
6. LIMITATIONS	16
7. VALIDITY	18
APPENDIX A	19
FIGURES PAR/19681/01:A01 TO A03 CONSTRUCTION AND GLAZING DETAILS	
APPENDIX B	20
ASSESSED INTUMESCENT SEAL SPECIFICATIONS FOR RAMKOR FD120 PLUS DOOR LEAVES INSTALLED IN TIMBER/STEEL FRAMES	
APPENDIX C	22
FIGURES PAR/19681/01:C01 TO C02 ASSESSED LEAF SIZE ENVELOPES FOR RAMKOR FD120 PLUS DOOR LEAVES INSTALLED IN TIMBER FRAMES	
APPENDIX D	23
FIGURES PAR/19681/01:D01 ASSESSED LEAF SIZE ENVELOPES FOR RAMKOR FD120 PLUS DOOR LEAVES INSTALLED IN STEEL FRAMES	
APPENDIX E	24
GENERAL GUIDANCE ON INSTALLATION OF HARDWARE	
APPENDIX F	29
SUMMARY OF FIRE TEST EVIDENCE	

1. INTRODUCTION

This report has been prepared by International Fire Consultants Ltd (IFC), on the instruction of Ramkor International, to define the field of application for timber based door assemblies, comprising Ramkor FD120 Plus door leaves installed in timber or steel frames, that are required to provide 120 minutes fire resistance performance, when adjudged against BS476: Part 22: 1987.

This assessment has been produced using the principles outlined in the Passive Fire Protection Forum (PFPF): *'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence, 2019, Industry Standard Procedure'* -.

When establishing the variations in the construction that can achieve the required fire resistance performance, IFC complies with the principles found in the following documents:

- BS ISO/TR 12470-2: 2017 *'Fire resistance tests - Guidance on the application and extension of results from tests conducted on fire containment assemblies and products. Part 2: Non-load bearing elements.'*
- EN 15725: 2010: *'Extended application reports on the fire performance of construction products and building elements.'*

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 120 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 proven in tests summarised herein.

It is more onerous to test hinged timber-based door assemblies with the specimen installed with the leaf opening in towards the furnace. Testing in this orientation is therefore incorporated into Field of Application Reports to cover doors opening in the opposite direction. The principle is only applicable to doors in timber door frames when the door construction, and any features within the door leaf, such as glazing, are symmetrical.

Unless stated otherwise, herein, this Field of Application considers the scope of approval for door assemblies in timber frames that may be installed in either orientation, that being with either face exposed to fire conditions.

The proposed door design has only been tested in a steel frame with the leaf opening towards the furnace. Although this is more onerous, in terms of deflection characteristics of the leaf, significant increases in thermal exposure (and conduction through the frame) would occur if the assembly were tested with the leaf opening away from the furnace. In the absence of further fire test evidence to characterise the fire performance of doors fitted in steel frames, and due to the high level of fire resistance required, doors in steel frames are ONLY assessed for applications where they are fitted with the leaf opening towards the fire risk. In practice, the principle can only be applied if the direction of fire exposure can be predicted; and the principle must be agreed with the relevant Approving Authorities for each specific project.


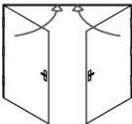
2. TEST EVIDENCE

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

3. SCOPE OF APPROVAL

3.1 Door Assembly Configuration

The approved leaf sizes and configurations of door assemblies comprising Ramkor FD120 Plus door leaves are outlined in the Table below.

Configuration	Envelope of Approved Leaf Size	
	Timber frame	Steel frame
 <ul style="list-style-type: none"> • Latched • Single Acting • Single Door • No Overpanel 	<p style="text-align: center;">Figure PAR/19681/01:C01 in Appendix C</p>	<p style="text-align: center;">Figure PAR/19681/01:D01 in Appendix D</p>
 <ul style="list-style-type: none"> • Latched • Single Acting • Double Doors <i>Note 1</i> • No Overpanel 	<p style="text-align: center;">Figure PAR/19681/01:C02 in Appendix C</p>	<p style="text-align: center;">Not Permitted</p>

Note 1 Single acting, double leaf door assemblies must have offset rebated meeting stiles (See Lipping specification in Section 3.3 and **Figure PAR/19681/01:A01** in Appendix A).

3.2 Maximum Assessable Door Leaf Sizes

The calculated envelopes of assessed leaf dimensions for each door assembly configuration covered by this field of application report are given in Appendix C (timber frames) and Appendix D (steel frames) based upon use of the intumescent seal specifications shown in Appendix B.

Double door assemblies may have leaves of the same width, up to the maximum individual leaf width indicated in Appendix C. For latched/bolted unequal pairs, there is no limit on the ratio of leaf widths, (although the large leaf must still be within the limitations outlined in Appendix C). The total width of the small leaf shall not be less than 350mm, since this will affect its vertical stability relative to that of the larger leaf.

3.3 Door Leaf Specification

The Ramkor FD120 Plus leaf construction is based upon the test evidence detailed in Appendix E, and defines variations and tolerances where it is considered that these will not adversely affect overall fire resistance. The construction details are limited to the information available from the test reports.

Component	Material	Minimum Density	Dimensions
Door blank (must be single piece. No joints allowed to increase height or width)	Ramkor FD120 Plus	550kg/m ³	78mm thick
Stiles/rails	(None fitted)	-	-
Lippings <i>Note 2 & 3</i> - fitted to all leaf edges and within the rebate at the leaf head, hanging, closing and meeting leaf edges	Hardwood (Not Beech)	710kg/m ³ <i>Note 6</i>	3-5mm thick to the main leaf edges with a 19mm x 19mm solid timber section adhered into the rebate in the leaf edges (vertical and head) prior to machining out a 14mm x 14mm rebate
Adhesive - Lippings to core	Polyurethane (Fervicol 1K PUR FR or Sudex 3022)	-	-
Minimum leaf thickness	-	-	78mm
Optional additional decorative finishes	Timber veneer or decorative plastic based laminate (to leaf faces only)	-	Maximum 2mm thick
	Paint or varnish (to faces and edges)	-	Maximum 0.5mm thick

Note 2 Lippings to be straight grained hardwood, with minimum measured density at 12% moisture content and of appropriate quality in accordance with BS EN 942: 2007. Moisture content to be $11 \pm 2\%$ for UK market (or to suit internal joinery moisture content specification of export countries).

The machining of the core/lipping, and bonding process, must be such to ensure that no gaps occur between core and lipping.

Note 3 Offset rebate detail with a 14mm wide x 14mm deep rebate in the leaf edge nearest the doorstep. **Figure PAR/19681/01:A02** in Appendix A shows the detail at the head, but detailing at stiles is identical. The rebate in the leaf head, closing and hanging edges oversails a rebated door stop.

The rebate in one of the meeting edges in double doors opposes a similar sized upstand in the opposing leaf edge. See **Figure PAR/19681/01:A01** in Appendix A.

Adjustment of door sizes –

- Door sizes must NOT be adjusted after manufacture of the leaf; i.e. after lippings have been bonded by the approved fabricator. If adjustment is required, after fabrication, new lippings must be applied, complying with details in the table above.

3.4 Door Frames

3.4.1 Timber Door Frames

Timber frames, to the specifications given below, may be used across the complete range of approved sizes and configurations outlined in Appendix C, utilising the intumescent seal specification outlined in Appendix B.

Material	Minimum Density	Minimum Face Width	Minimum Frame Depth	Minimum Stop Depth
Hardwood (Not Beech)	710kg/m ³ <i>Note 4</i>	45mm, excluding stop <i>Note 5</i>	140mm	35mm <i>Note 6</i>

Note 4 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: 2007. The moisture content shall be $11 \pm 2\%$ for UK market, (or to suit internal joinery moisture content specification of export countries).

Note 5 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 3.7 regarding projecting frames and shadow gaps.

Note 6 The door stop is to comprise the same material as the door frame and may be either planted and pinned using minimum 60mm steel pins/screws, or integral with the main door frame, providing the minimum frame thickness remains as stated. It incorporates a 14mm deep x 20mm high rebate in the corner adjacent to the leaf face - see **Figure PAR/19681/01:A02** in Appendix A. The door stop may also be in two sections, if required.

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 in the plane of the door thickness.

Head/jamb : Mortice and tenon joint, head screwed to each jamb.
joint

Architraves : Minimum 20mm thick architraves (minimum density 710kg/m³ - not Beech) must be adhered (and pin fixed) to the door frame using either PVA or Polyurethane adhesive. The architraves MUST be fitted on the 'pull' face of the assembly and cover a minimum 40mm width of the door frame finishing no further than 5mm from the frame reveal (as shown on **Figure PAR/19681/01:A02** in Appendix A). Where the door frame is flush with the face of the supporting construction, the architrave MUST be a minimum 75mm wide. If the frame is set 'within' the wall opening, the width of architrave may be reduced; but 40mm width of the frame (and the gap between frame/wall) MUST be covered by the architrave. Architraves on the 'push' face of the frame are optional; and their size is not restricted.

3.4.2 Steel Door Frames – Single door leaves only

Back-filled galvanised (mild) steel frames, to the specifications given below, may be used for latched, single acting, single door leaves only in the approved sizes outlined in Appendix D, utilising the intumescent seal specification outlined in Appendix B.

Material	Minimum Frame dimensions	Minimum Frame Depth
1.5mm thick Galvanised Steel	145mm deep x 45mm wide to the pull side and 80mm wide to the push side. The 83mm wide frame reveal incorporates a 'stepped' 35mm high doorstop interface. (see Figure PAR/19681/01:A03 in Appendix A)	The frame depth may be increased by up to 50% providing frame reveal remains as tested and the frame fixings are positioned no further than 120mm from the 'pull side' of the door assembly.

Localised frame reinforcement	Material	Minimum dimensions of localised items
Hinge positions	Galvanised steel welded onto the rear face of door frame at hinge positions (see Figure PAR/19681/01:A03 in Appendix A)	176mm x 35mm x 3mm
Door closer position	Galvanised steel (ref: QMI-M-004) welded into the rear corner of the door frame in the frame head local to the closer position	300mm x 35mm x 1.5mm

Localised frame reinforcement	Material	Minimum dimensions of localised items
Strike plate at Latch position	Galvanised steel (ref: QMI-M-004A) welded into the rear corner of the door frame at the location of the lock/ latch strike plate	38mm x 31mm x 2.5mm
Mortar Guard	Galvanised steel welded onto rear face of door frame 200mm from either end of the frame jambs and at 350-685mm centres thereafter	242mm x 40mm x 15mm
Anchor Plate	Galvanised steel (ref: QMI-M-008) welded to the inside of the frame legs of the door frame 150mm from either end of the frame jambs and at maximum 625mm centres thereafter. A further plate is fitted centrally across the width of the frame head <i>(see Figure PAR/19681/01:A03 in Appendix A)</i>	165mm x 49mm x 3mm

Door frame back-fill
The door frames are required to be fully back-filled with cementitious material in both frame jambs and the frame head

3.5 Glazed Apertures

Glazed apertures may be included in single leaf and double leaf assemblies, using the details approved in the following Sections.

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 3.5.2, although some restrictions on size may be given in subsequent sections.

The codes used, below, for the glass types, glazing materials, and bead types, (e.g. G120/1, S120/1 and B120/1), are not those used by the respective manufactures, and are attributed solely by IFC for the purpose of identification and cross-referencing within this assessment.

G120/1	5mm thick Firelite (Southern Ceramics) ^{Note 7}
G120/2	10mm thick Pyrodur EW60 (Pilkington UK Ltd)
G120/3	11mm thick Pyroguard EW60 (Pyroguard UK Ltd)

^{Note 7} *Limitations apply to the pane size of glass type G120/1, 5mm thick Firelite, as it does not satisfy the requirements of BS6206. Panes are restricted to a smaller dimension not exceeding 250mm measured between glazing beads, in accordance with the requirements of Approved Document N.*

Expansion allowances for all glass types shall be as recommended by the glass manufacturer. Edge cover to the glass perimeter shall be 20mm.

3.5.2 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. (See also **Figure PAR/19681/01:A01** in Appendix A).

S120/1 25mm x 5mm (uncompressed) 'Ramglaze tape' glazing seal in conjunction with a 78mm wide x 2mm thick 'Ramglaze' intumescent liner, both supplied by Ramkor International Ltd (details held in confidence on file by IFC).

3.5.3 Bead profiles and installation

The approved bead sizes, profiles and relevant fixing details are shown in **Figure PAR/19681/01:A01** in Appendix A.

B120/1 35mm high (providing 20mm edge cover), 25° chamfered top, with bolection moulding not less than 5mm thick.

Glazing beads formed from hardwood with a minimum measured density of 640kg/m³ at 12% moisture content (not Beech). The timber must be straight grained and of appropriate quality in accordance with BS EN 942: 2007. The moisture content shall be 11 ± 2% for UK market, (or to suit internal joinery moisture content specification of export countries).

3.5.4 Assessed aperture sizes

Apertures are created by cutting directly into the door slab with beads fitted directly to the particleboard 'blank'; overlaying the intumescent aperture liner.

Based upon the size of apertures tested, and subsequent analysis, the following limitations apply to glazed apertures in the door leaves considered herein;

Maximum area of apertures	-	0.085m ²
Maximum vertical length of aperture	-	468mm <i>Note 8</i>
Maximum horizontal length of aperture	-	246mm <i>Note 8</i>
Minimum distance from leaf edge (top)	-	400mm
Minimum distance from leaf edge (sides)	-	350mm
Minimum distance between apertures	-	300mm
Minimum distance from bottom of leaf	-	1200mm

Note 8 Refer to Section 3.5.1 for restrictions in size of apertures with specific glass panes

3.6 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.

General guidance for all items of hardware is outlined in Appendix E, based upon the range of items tested. All hardware beyond the scope of the general guidance 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 and thickness to that proposed.

3.7 Installation, Supporting Construction and Door Edge Gaps

Timber frames must be fixed back to the supporting construction with steel fixings at centres not exceeding 600mm on the vertical edges (minimum 150mm from the top and bottom), and a minimum of one fitted centrally across the width of the frame head of double doors. 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. (The detail shown on **Figure PAR/19681/01:A02** is only suitable if the door opens towards the fire exposure. If the direction of fire exposure cannot be predicted, another line of screws must be fitted through the main frame reveal opposing the door leaf edge). Packers shall be used at all fixing positions. Hardwood/combustible packers may be employed with timber frames, but these must be protected by a layer of gap sealing intumescent sealant aligned near to each face of the door frame. Steel packers/shims must be used with steel frames. Maximum gap between frame and wall is 25mm with timber frames; or 10mm with steel frames.

The backfilled steel frames must be fixed back to the supporting construction using minimum 10mm diameter steel anchor bolts (e.g. Wurth anchor bolts ref: 1418) which must penetrate the supporting construction by a minimum of 100mm through the anchor plates referenced in Section 3.4.2. Fixings shall be at centres not exceeding 625mm on the vertical edges (minimum 150mm from the top and bottom), and a minimum of one fixing fitted centrally across the width of the frame head.

The supporting construction must be blockwork, brickwork or concrete walls, but shall be of a type that has been tested or assessed to provide in excess of 120 minutes fire resistance, at the required size, when incorporating door openings.

No part of the rear of the frame section shall be exposed once installed and leaves must not project beyond the exposed face of the door frame.

There shall be no feature rebates or shadow gaps at the junction of the frame and wall. This report only applies to scenarios where the frame is fully aligned within the plane of the fire-resisting wall/partition. The approval in this report does not apply where the wall includes decorative 'cladding' on the face of the fire-resisting construction, (e.g. timber panelling on battens, or plasterboard on studs/dabs), such that any part of the frame is aligned within the plane of this decorative cladding. This detail is likely to adversely affect the fire resistance of the door assembly, and IFC should be consulted for specific advice, to determine upgrading measures that will be required in such cases.

The gap sealing between the supporting construction and timber/steel frames should be as tested, or assessed by IFC. Other Third Party Certificated solutions may also be utilised using a product proven in such applications, and with reference to the correct depth of seal to suit the width of gap between wall and frame.

The gap between the door and the frame, or between meeting stiles, should be 1.5–4mm. Gaps under the door(s) shall not exceed 6mm for fire performance, although, if smoke control is also required, these gaps shall only be 3mm, or smoke seals shall be included (see also Section 3.9 regarding suitability of smoke seals).

The door assembly design shall be such that when closed, single acting leaves are fully flush within the frame. The face of leaves in double door assemblies shall be flush with each other at meeting stiles, when closed.

3.8 Intumescent Seals

The intumescent seal specifications, widths, and positions are shown in Appendix B, based upon tested details.

It is recommended that the 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.

Intumescent protection is required for specific items of building hardware and this is detailed in Appendix E based upon details tested.

3.9 Ambient Temperature Smoke Seals

Smoke seals, or combined intumescent/smoke seals (using the specification approved in Section 3.8), that have been tested in accordance with BS EN 1634-3: 2004 (ambient temperature) or BS476: Part 31: Section 31.1: 1983 and shown not to leak by more than 3m³/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 hardware interruption, and leaf configuration, will need to be as tested in accordance with BS EN 1634-3: 2004 (ambient temperature) or 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 described in Appendix B, in which case, the latter shall take precedence and smoke sealing may not be achieved.

Test evidence to BS476: Part 22: 1987 shall 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.

4. CONCLUSION

Based upon the available test evidence, and subsequent analysis performed by International Fire Consultants Ltd, if the proposed door assemblies utilising Ramkor FD120 Plus door leaves installed in timber or steel frames were manufactured and installed in accordance with 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 120 minutes. All doors must be fitted with an engaged latch or deadbolt; see also Appendix E.

Partially insulating door assemblies are determined using the criteria given in section 7 of BS476: Part 22: 1987. These assemblies are evaluated as partially insulating door assemblies on the basis that the 'solid' part of the leaf satisfies the temperature criteria given in section 10.4 of BS 476: Part 20: 1987 and any non-insulating features, such as glazing, are less than 20% of the surface area of the leaf. The assemblies outlined, herein, are permitted to have glazed areas and so assemblies in timber frames could, therefore, be evaluated to this standard if the maximum total aperture area is less than 20% of the leaf size.

Where a door assembly includes a steel frame, the assembly can also be assessed to Section 7 of BS476: Part 22: 1987 for a 120 minute performance rating for both integrity and insulation, providing the area of the steel frame (AND any apertures, where included), is less than 20% of the surface area of the leaf.

The doors in timber frames can also be assessed to Section 6 of BS476: Part 22: 1987 for a 120 minute performance rating for both integrity and insulation, without apertures in the leaves.

This Field of Application Report considers that the door assemblies with timber frames, within the scope of approval, herein, may be installed in either orientation and so be exposed to fire conditions from either face.

In the absence of any additional fire test evidence to fully characterise the fire performance of doors in steel frames, and due to the high level of fire resistance required, doors in steel frames are ONLY assessed for applications where they are fitted with the leaf opening towards the fire risk. In practice, the principle can only be applied if the direction of fire exposure can be predicted; and the principle must be agreed with the relevant Approving Authorities for each specific project.

5. DECLARATION BY THE APPLICANT

Reference: IFC Field of Application Report **PAR/19681/01**

We the undersigned confirm that we have read and complied with the obligations placed on us by the

Passive Fire Protection Forum (PFPF)
Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence
2019
Industry Standard Procedure

We confirm that the component or element of structure, which is the subject of this assessment has not to our knowledge been subjected to a fire test to the standard against which this assessment is being made.

We confirm that the change which is the subject of this assessment has not to our knowledge been tested to the standard against which this assessment has been made.

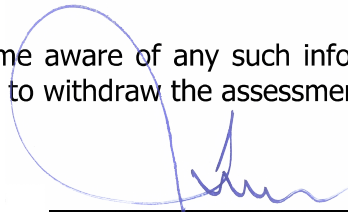
We agree to withdraw this assessment circulation should the component or element of structure be the subject of a fire test to the standard against which this assessment is being made.

We understand that this assessment is based on test evidence and will be withdrawn should evidence become available that causes the conclusion to be questioned. In that case, we accept that new test evidence may be required.

We are not aware of any information that could affect the conclusions of this assessment.

If we subsequently become aware of any such information, we agree to ask International Fire Consultants Ltd (IFC) to withdraw the assessment.

Signature



Name:

Simon Miln

Position:

Managing Director

Company:

Ramkor International

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 assessment is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available to International Fire Consultants Ltd (IFC) the assessment will be unconditionally withdrawn and the applicant will be notified in writing. Similarly, the assessment is invalidated if the assessed construction is subsequently fire tested since actual test data is deemed to take precedence.

As per the guidance outlined in the Passive Fire Protection Forum (PFPF): *'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence, 2019, Industry Standard Procedure'*, appropriate action has been taken to mitigate the risk of a conflict of interest arising during the preparation of this report. All individuals involved in the production, or subsequent review, of this assessment have declared any perceived conflicts of interest, with regards to the sponsor or subject(s) of this report, prior to working on this project.

The assessor and reviewer have been deemed suitable for involvement in the production of this assessment in accordance with the guidance outlined in the Passive Fire Protection Forum (PFPF): *'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence, 2019, Industry Standard Procedure'*.

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.

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. Designers, manufacturers and installers are reminded of their responsibilities under the CDM Regulations; but particularly with regard to installation and maintenance of heavy or inaccessible items.

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, and 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 evaluation 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 evaluation 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 September 2024 should confirm its ongoing validity.

This Field of Application Report is not valid unless it incorporates the declaration by the applicant given in Section 6 duly signed by the applicant.

Prepared by:



Chris Houchen BSc AIFireE
Associate Director
International Fire Consultants Ltd. (IFC)

Checked by:



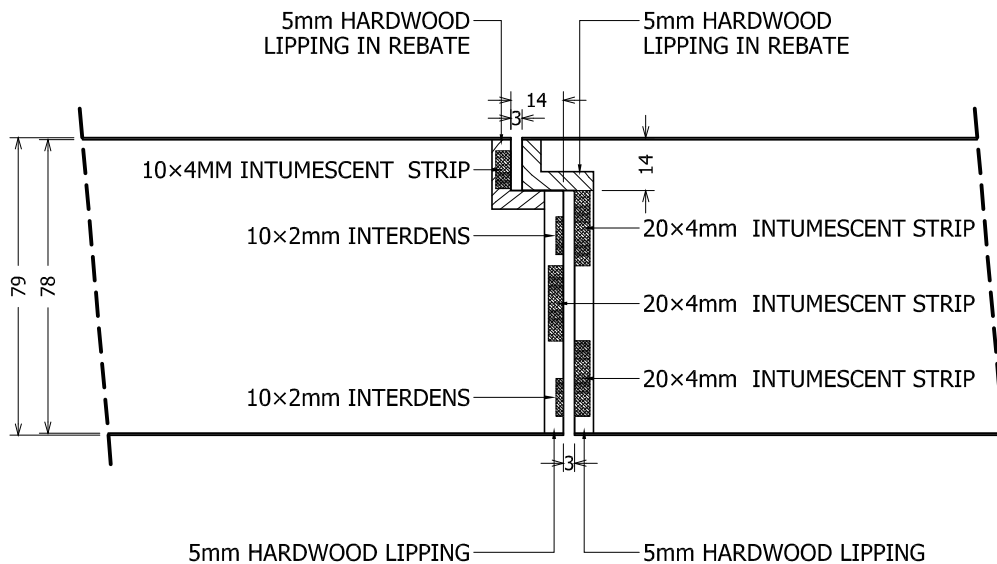
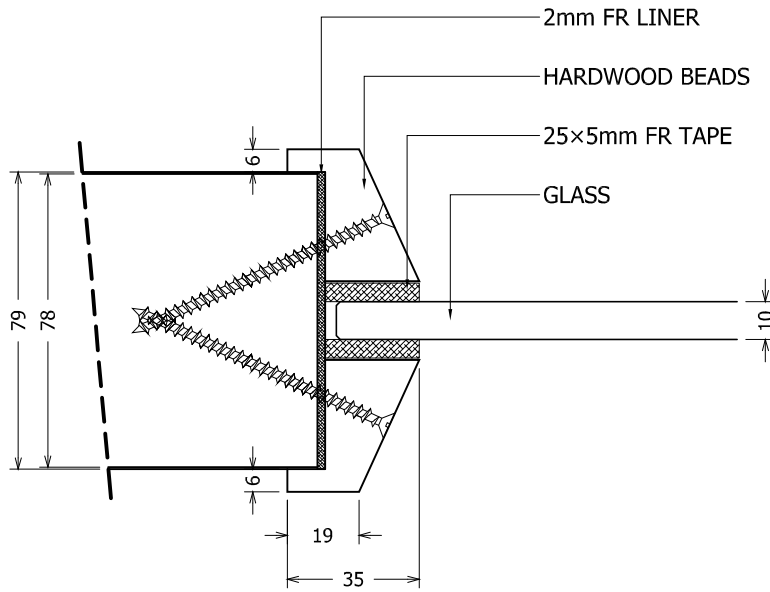
Mark Billingham
Technical Manager
International Fire Consultants Ltd (IFC)

APPENDIX A

Figures PAR/19681/01:A01 to A03

Construction and Glazing Details

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



This drawing is Copyright ©
 International Fire Consultants Limited
 Any dependencies must be reported before
 work proceeds.
 Only work to dimensions shown on drawings.

**INTERNATIONAL FIRE
 CONSULTANTS LIMITED**

20 Park Street, Princes Risborough
 Buckinghamshire, HP27 9AH, United Kingdom
 Tel: +44 (0)1844 275500 - Fax: +44 (0)1844 274002
 Email: ifc@ifcgroup.com - Web: www.ifcgroup.com

Field of Application Report
 PAR/19681/01
 Ramkor International
 Ramkor FD120 Plus Door Leaves
 Installed in Timber and Steel Frames

Glazing & Meeting Stile
 Details

Job number: 19681

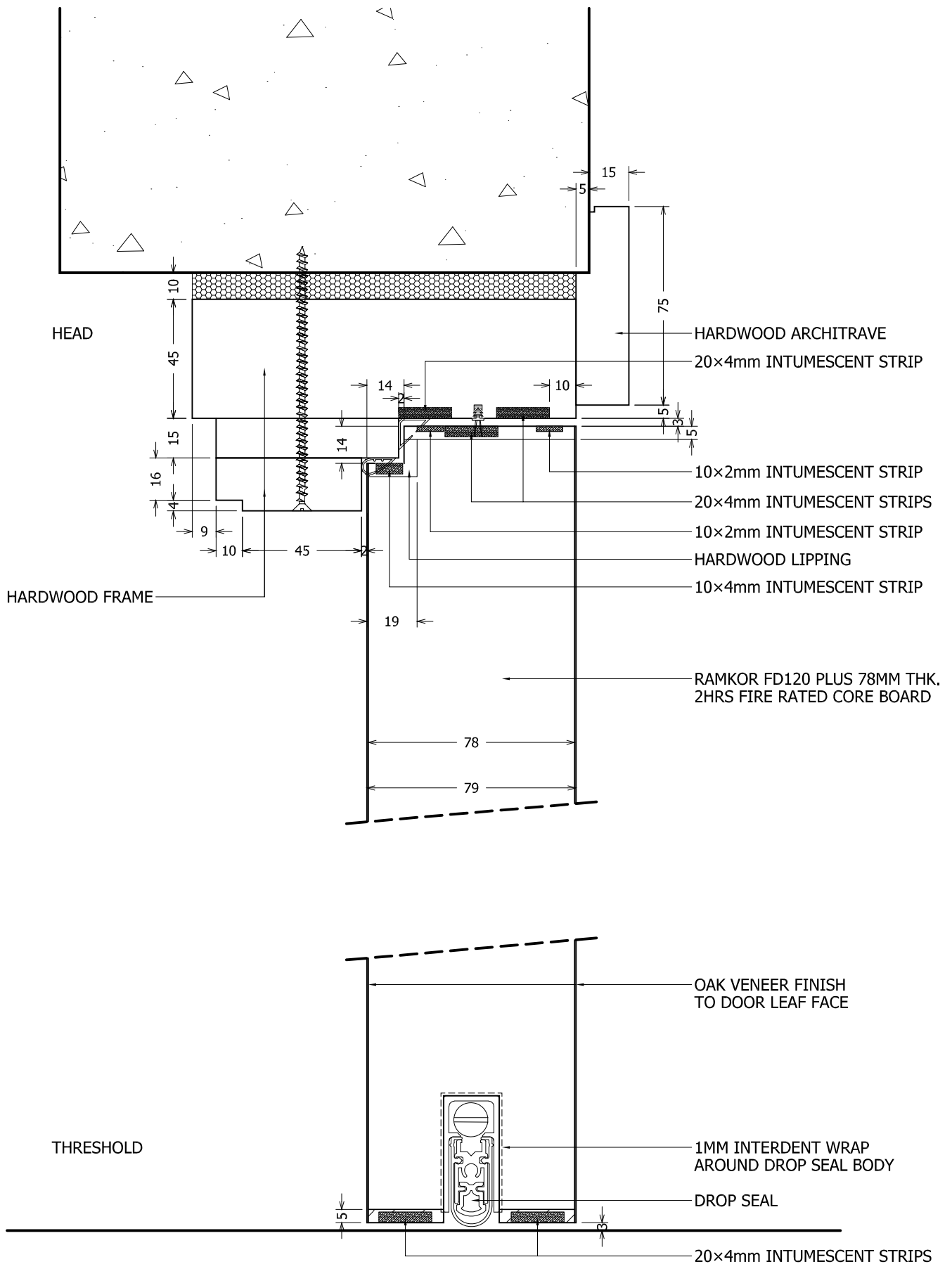
Drawn by: CSP

Checked by: CH

Not To Scale

Drawn: Aug 2019

PAR/19681/01:AO1



This drawing is Copyright ©
 International Fire Consultants Limited
 Any discrepancies must be reported before
 work proceeds.
 Only work to dimensions stated on drawing.

**INTERNATIONAL FIRE
 CONSULTANTS LIMITED**

20 Park Street, Princes Risborough
 Buckinghamshire, HP27 9AH, United Kingdom
 Tel: +44 (0)1844 275500 - Fax: +44 (0)1844 274002
 Email: ifc@ifcgroup.com - Web: www.ifcgroup.com

Field of Application Report
 PAR/19681/01
 Ramkor International
 Ramkor FD120 Plus Door Leaves
 Installed in Timber and Steel Frames

Vertical Section Showing
 Head & Threshold
 (Rotate Head Detail 90° for
 Horizontal Frame Section)

Job number: 19681

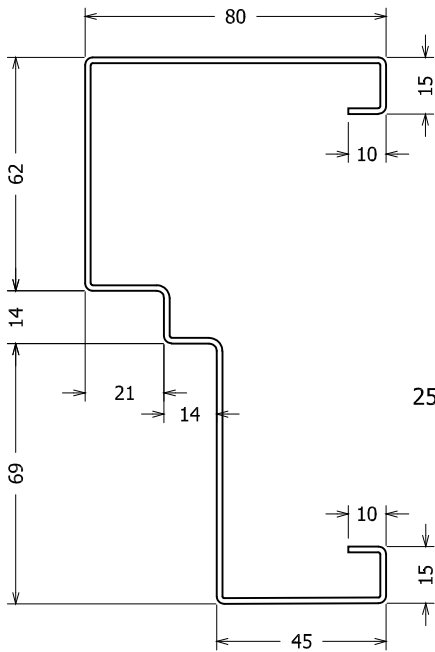
Drawn by: CSP

Checked by: CH

Not To Scale

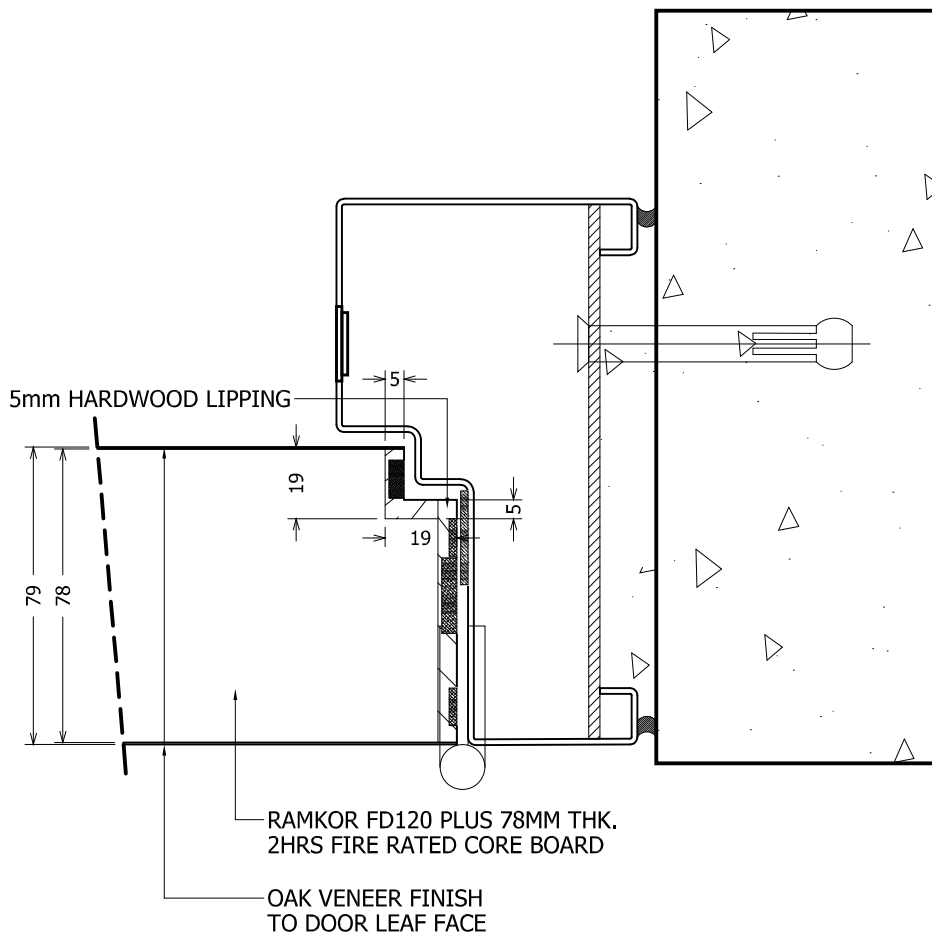
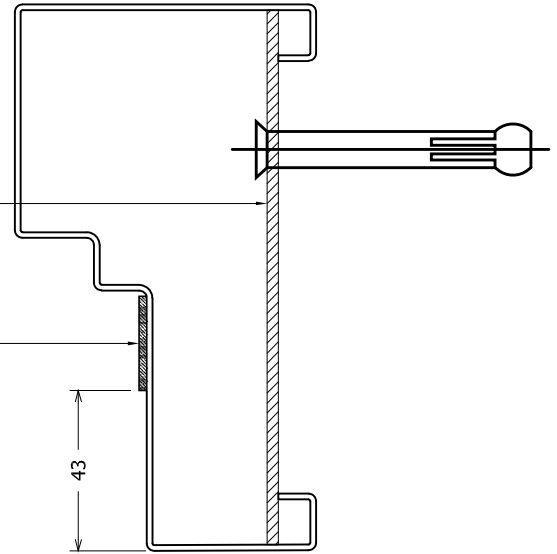
Drawn: Aug 2019

PAR/19681/01:A02



3mm THK. ANCHOR PLATE

25x2mm PYROPLEX GRAPHITE



5mm HARDWOOD LIPPING

RAMKOR FD120 PLUS 78MM THK.
2HRS FIRE RATED CORE BOARD

OAK VENEER FINISH
TO DOOR LEAF FACE

This drawing is Copyright ©
International Fire Consultants Limited
Any discrepancies must be reported before
work proceeds.
Only work to dimensions stated on drawings.

**INTERNATIONAL FIRE
CONSULTANTS LIMITED**

20 Park Street, Princes Risborough
Buckinghamshire, HP27 9AH, United Kingdom
Tel: +44 (0)1844 275500 - Fax: +44 (0)1844 274002
Email: ifc@ifcgroup.com - Web: www.ifcgroup.com

Field of Application Report
PAR/19681/01
Ramkor International
Ramkor FD120 Plus Door Leaves
Installed in Timber and Steel Frames

Steel Frame Details

Job number: 19681

Drawn by: CSP

Checked by: CH

Not To Scale

Drawn: Aug 2019

PAR/19681/01:A03

APPENDIX B

Assessed Intumescent Seal Specifications for Ramkor FD120 Plus Door Leaves Installed in Timber/Steel Frames

See Figure PAR/19681/01:A01 and A02 in Appendix A for clarification.

Location	Timber Frame Specification	Steel Frame Specification
Leaf Stiles	1no. 20 x 4mm Palusol or 617 seal fitted 27mm in from the 'pull face' + 1no. 10 x 4mm Palusol or 617 seal fitted in the rebate in the leaf edge abutting the upstand + 2no. 10 x 2mm Interdens seals, first seal fitted 7mm in from the 'pull face' and the second seal fitted 7mm in from the edge of the rebate	1no. 20 x 4mm Pyroplex graphite based intumescent strip (ref: KP2004) fitted 25mm in from the 'pull face' + 1no. 10 x 4mm Pyroplex graphite based intumescent strip (ref: KP1004) fitted in the rebate in the leaf edge abutting the upstand + 2no. 10 x 2mm Interdens seals, first seal fitted 5mm in from the 'pull face' and the second seal fitted 5mm in from the edge of the rebate
Frame Jambs	2no. 20 x 4mm Palusol or 617 seals, first seal fitted 7-10mm in from the 'pull face' and the second seal abutting the door stop	1no. 25mm x 2mm Pyroplex graphite based intumescent strip (ref: 30142) adhered within the frame reveal abutting the door stop
Leaf Head	1no. 20 x 4mm Palusol or 617 seal fitted 27mm in from the 'pull face' + 1no. 10 x 4mm Palusol or 617 seal fitted in the rebate in the leaf edge abutting the upstand + 2no. 10 x 2mm Interdens seals, first seal fitted 7mm in from the 'pull face' and the second seal fitted 7mm in from the edge of the rebate	1no. 20 x 4mm Pyroplex graphite based intumescent strip (ref: KP2004) fitted 25mm in from the 'pull face' + 1no. 10 x 4mm Pyroplex graphite based intumescent strip (ref: KP1004) fitted in the rebate in the leaf edge abutting the upstand + 2no. 10 x 2mm Interdens seals, first seal fitted 5mm in from the 'pull face' and the second seal fitted 5mm in from the edge of the rebate
Frame Head	2no. 20 x 4mm Palusol or 617 seals, first seal fitted 7mm in from the 'pull face' and the second seal abutting the door stop	1no. 25mm x 2mm Pyroplex graphite based intumescent strip (ref: 30142) adhered within the frame reveal abutting the door stop
Leaf Threshold	2no. 20 x 4mm Palusol or 617 seals, centrally fitted, spaced 20-29mm apart	2no. 20 x 4mm Pyroplex graphite based intumescent strips (ref: KP2004), centrally fitted, spaced 20-29mm apart
Unequally Rebated Meeting Stiles	<u>Active leaf (with rebate)</u> 1no. 20 x 4mm Palusol or 617 seal fitted 27mm in from the 'pull face' + 1no. 10 x 4mm Palusol or 617 seal fitted in the rebate in the leaf edge abutting the upstand + 2no. 10 x 2mm Interdens seals, first seal fitted 7mm in from the 'pull face' and the second seal fitted 7mm in from the edge of the rebate <u>Slave Leaf (with upstand)</u> 2no. 20 x 4mm Palusol or 617 seals, first seal fitted 7mm in from the 'pull face' and the second seal abutting the upstand	N/A

Note: The 4mm thick seals (in a pvc case) referenced 617 should be obtained from Lorient Polyproducts Ltd and the seals referenced 'Palusol' should be obtained from Kilargo. Combined intumescent/smoke seals may be used, maintaining the widths specified above (and subject to the conditions outlined in Section 3.9).

APPENDIX C

Figures PAR/19681/01:C01 to C02

**Assessed Leaf Size Envelopes for
Ramkor FD120 Plus Door Leaves
Installed in TIMBER Frames**

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

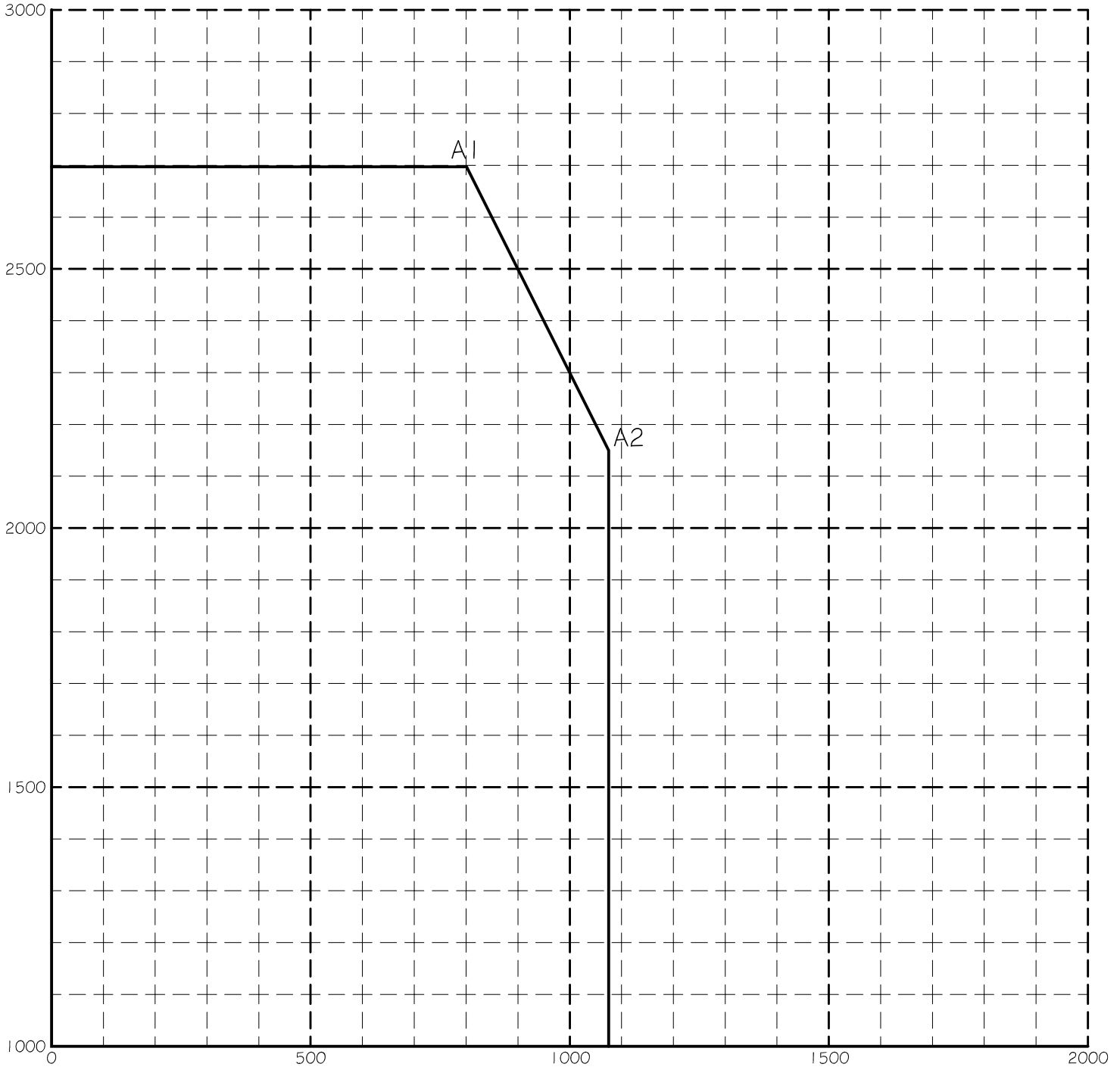
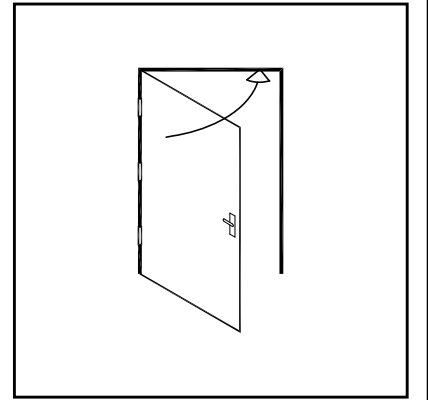
LSASD+TF		
	A1	A2
Width	801	1075
Height	2697	2150

Configuration:

TIMBER FRAMES

Latched
Single Acting
Single Leaf
Without Overpanel

Required Integrity: 120 Minutes



This drawing is Copyright ©
 Contractors must check all dimensions.
 Any discrepancies must be reported before
 only work to dimensions stated on drawing.

**INTERNATIONAL FIRE
CONSULTANTS LIMITED**

20 Park Street, Princes Risborough
 Buckinghamshire, HP27 9AH, United Kingdom
 Tel: +44 (0)1844 275500 - Fax: +44 (0)1844 274002
 Email: ifc@ifcgroup.com - Web: www.ifcgroup.com

Field of Application Report
 PAR/19681/01
 Ramkor International
 Ramkor FDI 20 Plus Door Leaves
 Installed in Timber and Steel Frames

Envelope of Approved
 Door Leaf Sizes
LSASD
 In Timber Frames

Job number: 19681	
Drawn by: CSP	Checked by: CH
Not To Scale	Drawn: Aug 2019
PAR/19681/01:CO1	

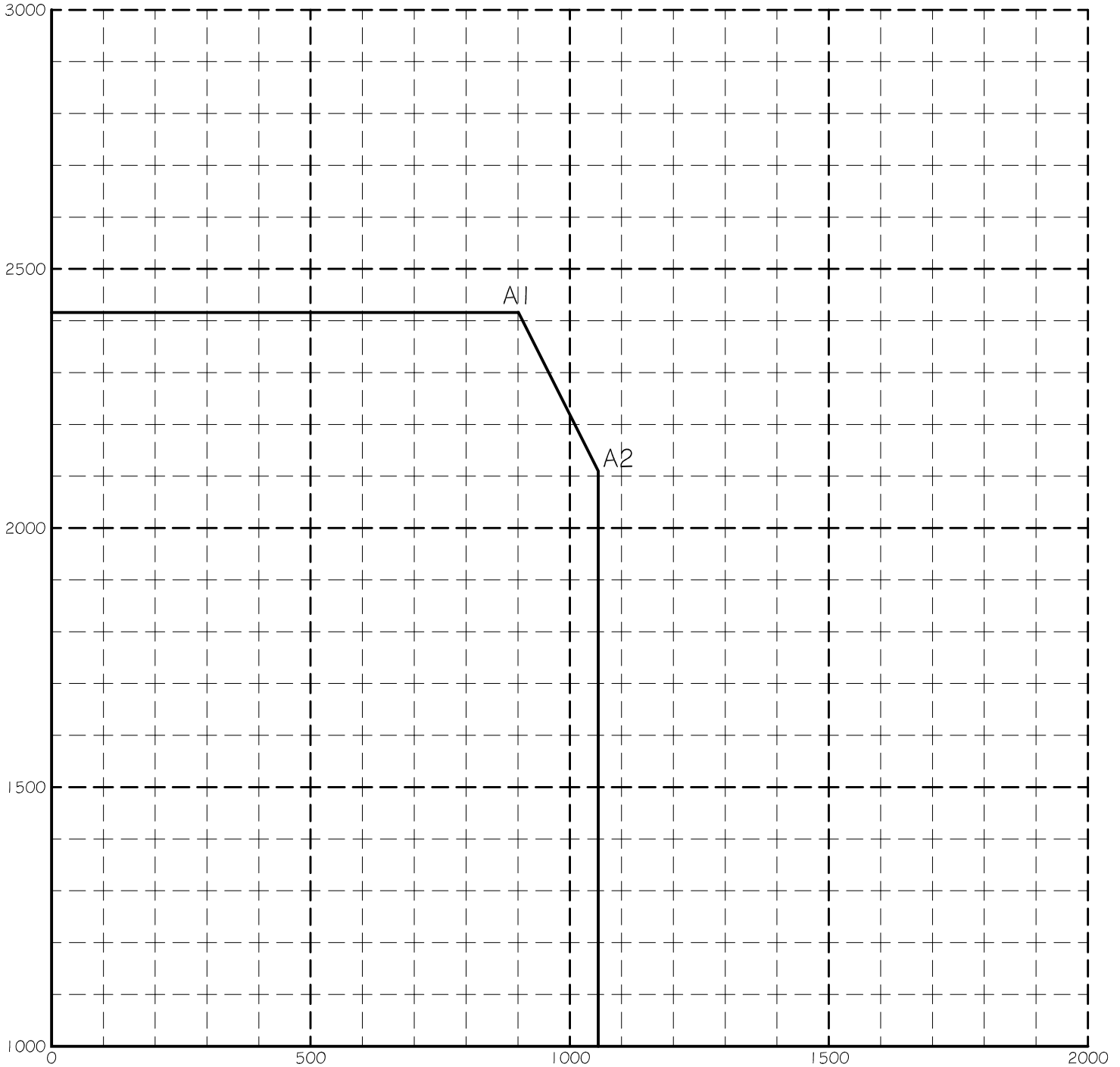
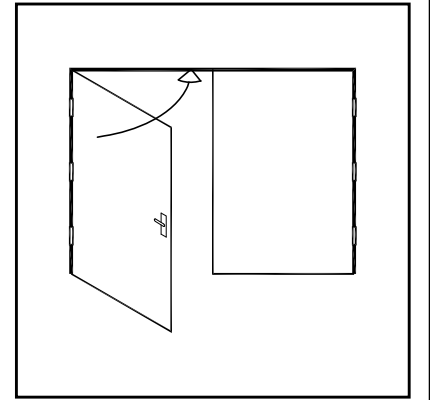
LSADD+TF		
	A1	A2
Width	901	1055
Height	2416	2110

Configuration:

TIMBER FRAMES

Latched
Single Acting
Double Leaf
Without Overpanel

Required Integrity: 120 Minutes



This drawing is Copyright ©
 Contractors must check all dimensions.
 Any discrepancies must be reported before
 only work to dimensions stated on drawing.

**INTERNATIONAL FIRE
CONSULTANTS LIMITED**

20 Park Street, Princes Risborough
 Buckinghamshire, HP27 9AH, United Kingdom
 Tel: +44 (0)1844 275500 - Fax: +44 (0)1844 274002
 Email: ifc@ifcgroup.com - Web: www.ifcgroup.com

Field of Application Report
 PAR/19681/01
 Ramkor International
 Ramkor FDI 20 Plus Door Leaves
 Installed in Timber and Steel Frames

Envelope of Approved
 Door Leaf Sizes
LSADD
 In Timber Frames

Job number: 19681

Drawn by: CSP

Checked by: CH

Not To Scale

Drawn: Aug 2019

PAR/19681/01:C02

APPENDIX D

Figures PAR/19681/01:D01

**Assessed Leaf Size Envelopes for
Ramkor FD120 Plus Door Leaves
Installed in STEEL Frames**

***The figure in this Appendix is not included
in the sequential page numbering of this report***

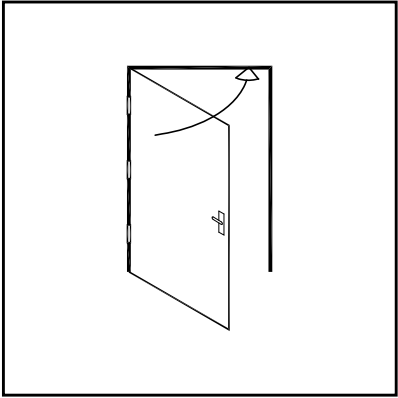
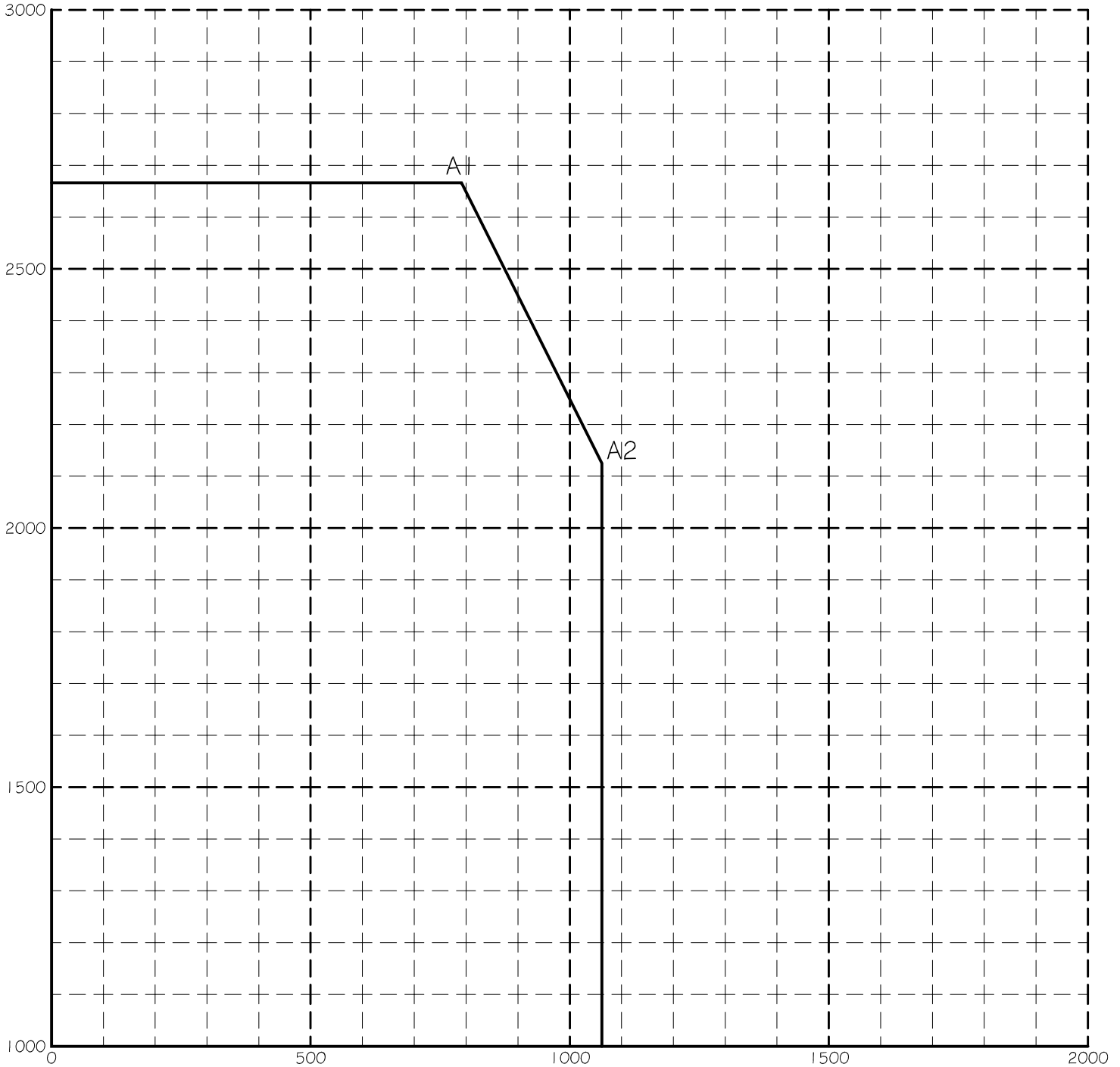
LSASD+SF		
	A1	A2
Width	791	1062
Height	2666	2125

Configuration:

STEEL FRAMES

Latched
Single Acting
Single Leaf
Without Overpanel

Required Integrity: 120 Minutes

This drawing is Copyright ©
 Contractors must check all dimensions.
 Any discrepancies must be reported before
 only work to dimensions stated on drawing.

**INTERNATIONAL FIRE
CONSULTANTS LIMITED**

20 Park Street, Princes Risborough
 Buckinghamshire, HP27 9AH, United Kingdom
 Tel: +44 (0)1844 275500 - Fax: +44 (0)1844 274002
 Email: ifc@ifcgroup.com - Web: www.ifcgroup.com

Field of Application Report
 PAR/19681/01
 Ramkor International
 Ramkor FDI 20 Plus Door Leaves
 Installed in Timber and Steel Frames

Envelope of Approved
 Door Leaf Sizes
LSASD
 In Steel Frames

Job number: 19681	
Drawn by: CSP	Checked by: CH
Not To Scale	Drawn: Aug 2019
PAR/19681/01:DOI	

APPENDIX E

General Guidance on Installation of Hardware

E.1 Hinges

The following hinge type has been successfully incorporated in the fire tests conducted on the Ramkor FD120 Plus door leaves installed in timber and steel door frames and must be used with this design of door leaf:

Element		Specification	
Hinge type		Fixed pin, ball bearing butt ref: R120H	
Blade height		102mm	
Blade width		44mm	
Blade thickness		3mm	
Material		Stainless Steel	
Fixings		Steel screws, as supplied by the hinge manufacturer	
Minimum number	Timber Frame	3no. hinges per leaf for leaves up to 2300mm high 4no. hinges per leaf for leaves greater than 2300mm high	
	Steel Frame	3no. hinges per leaf for leaves up to 2100mm high 4no. hinges per leaf for leaves greater than 2100mm high	
Positions	3no.	Top	100 - 150mm down from the leaf head to the top of the hinge
		Middle	Either equi-spaced between the top and bottom hinges or positioned 200 – 250mm below the top hinge
		Bottom	100 - 150mm up from the bottom of the leaf to the bottom of the hinge
	4no.	Top	100 - 150mm down from the leaf head to the top of the hinge
		2 nd & 3 rd	Either equi-spaced between the top and bottom hinges or 2 nd hinge positioned 200 – 250mm below the top hinge and the 3 rd hinge equi-spaced between the 2 nd and bottom hinge
		Bottom	100 - 150mm up from the bottom of the leaf to the bottom of the hinge
Intumescent protection		2mm thick Interdens to be fitted under all hinge blades	

E.2 Mortice Latches/Locks

Mortice latches or locks MUST be fitted to all single doors and to the active leaf of double leaf doors. The following lock/latch has been successfully incorporated in the fire tests on the Ramkor FD120 Plus door leaves installed in timber and steel door frames and must be used with this design of door leaf:

Element	Specification
Latch/lock type	Mortice latch/lock ref: R120L
Forend height	235mm
Strike plate height	235mm
Latch/lock body dimensions	165mm high x 90mm wide
Material	Steel based
Position	Centred at 1000mm (\pm 200mm) above the bottom of the door leaf. The lock case shall be fitted nominally central in the leaf thickness
Intumescent protection	The lock body to be encased in 1mm thick Interdens and the strikeplate and forend must be bedded on 2mm thick Interdens intumescent material. The forend may interrupt the 20mm wide intumescent strip in the door edge, but all other strips must remain continuous. The strikeplate may interrupt one of the 20mm wide intumescent strips, but all other strips must remain continuous

Over-morticing is to be avoided; mortices shall be as tight as possible to the latch/lock. If gaps occur around the case (but not exceeding 2mm), then these must be made good with intumescent mastic or sheet material. Holes for spindles or cylinders should be kept as small as is compatible with the operation of the hardware.

E.3 Door Closers

Where required by regulatory guidance or specific fire strategy, each hinged door leaf must be fitted with a self-closing device unless it is normally kept locked shut and labelled with an appropriate sign which complies with the BS5499 series of standards.

Overhead surface mounted closers are the only type approved for the proposed door type. Concealed overhead and concealed jamb mounted closers are not approved by this report.

Surface mounted overhead door closers (and accessories such as soffit brackets) may be used if they are of a type that have been tested, assessed or otherwise approved for use on minimum FD30 cellulosic door leaves in timber frames. Any accessory that is located within the door reveal must have appropriate test or assessment evidence. In addition, where areas of uninsulated glazing are adjacent to the closer, the selected closer type must have been tested on the unexposed face of an uninsulated steel door, or a fully glazed door fitted

with uninsulating glass, to demonstrate that the closer does not emit flammable fluids onto the glass face that would otherwise cause integrity failure before the required period of fire resistance.

It is essential that all closers fulfil the requirements of BS EN 1154: 1997 and are of the correct power rating for the width and weight of the doors (minimum power size 3). 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.

Screws to secure the closer must be those supplied by the closer manufacturer; but it is the responsibility of the fabricator/designer to ensure that the screws are suitable for fixing to the Ramkor FD120 Plus door leaf.

When fixing the closer arm to timber frames, screws must be of sufficient length to penetrate through the architrave and gain secure fixing into the door frame member. Alternative screws must be suitable for steel frames.

E.4 Flush Bolts

It is a condition of this approval that Ramkor R120FB edge mounted flush bolts MUST be fitted (and engaged) in all double leaf door assemblies.

The following limitations and protection also apply;

Element	Specification
Flush bolt	Ramkor ref: R120FB
Position	Flush bolts must be fitted at the top and bottom of the passive leaf positioned centrally in the leaf thickness
Flush bolt size	205mm long x 19mm wide and 19mm deep
Material	Steel based
Intumescent interruption	The width of intumescent strips in the head of the leaf and/or frame shall not be interrupted by more than 5mm, by the return edge of the bolt and/or keep plate The flush bolt body shall not interrupt the adjacent intumescent strips by more than 5mm in the meeting edge of the passive leaf
Intumescent protection	The body of the bolt should be bedded on Interdens intumescent material at least 2mm thick

E.5 Non-Essential Hardware Items

E.6.1 Push plates, kick plates, etc

Plastic, pvc or metal plates may be surface-mounted to the doors, 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. Screws must not cause detachment or delamination of lippings.

E.6.2 Pull handles

These may be fixed to doors with deadlocks, provided that the outer fixing points of handles are no greater than 800mm apart. Surface mounted pull handles may be fixed with wood screws, but handles that use bolt-through fixings should use clearance holes as close fitting as possible to the through-bolt. The through-bolt must be steel; and it must be wrapped in 2mm thick Interdens.

E.6.3 Dropseals

The following drop seal can be fitted into this design of fire resisting door leaf but it must be positioned centrally within the door thickness. The body of the drop seal must be wrapped in 1mm thick Interdens. The drop seal must not interrupt the intumescent seals in the bottom edge of the door; but may interrupt the 20 x 4mm strip at the bottom of the stiles.

If dropseals are fitted in conjunction with flush bolts then the dropseal may be stopped short of the leaf edge in order to accommodate the flush bolt as both items must be fitted central to the leaf thickness, however, this may have an adverse effect on the performance of the acoustic/smoke sealing properties of the dropseal.

E6.4 Door selectors

These may be used on double leaf door assemblies, to ensure that the leaves close in sequence. Only face fixed items are approved. Door selectors must not be recessed into the leaf or frame and must not intrude into the door edge interface or interrupt any intumescent strips. When fixing components to the face of doors, care must be taken to ensure that screws do not cause delamination of lippings and/or splitting of timber.

E.6.5 Lever Handles

Element	Specification
Material	Metal/alloy – shall not contain any flammable materials
Specific Installation Requirements	Holes through the leaf shall be as close fitting as possible to the spindles and/or fixing screws; which must be steel.
Intumescent protection	None required
Additional Notes	This generic approval only applies to traditional 'mechanical' lever handles and does not apply to electro-mechanical handlesets (e.g. with security reader functions); which must be the subject of independent fire testing, and further analysis by IFC

APPENDIX F

Summary of Fire Test Evidence

Test Laboratory and Report No	Test Date	Configuration Tested	Leaf Size Tested	Test Standard	Integrity
TBWIC SF013-6	14 th March 2019	LSASD LSADD <i>Both with timber frame</i>	2200mm x 960mm 2415mm x 984/400mm	BS476: Part 22: 1987	151 Minutes 113 # Minutes
TBWIC SF013-7B	23 rd May 2019	LSASD <i>With steel frame</i>	2201mm x 930mm	BS476: Part 22: 1987	93 #Minutes
TBWIC RF141-1D	12 th December 2017	LSASD <i>with timber frame</i>	2176mm x 930mm	BS476: Part 22: 1987	125 Minutes

Secondary evidence

Cambridge Fire Research CFR1812112	11 th December 2018	Fixed Panel of Ramkor FD120 Plus door with 6no glazing apertures <i>(only Apertures 1R, 2R and 3R used for this assessment)</i>	2210mm x 665mm	BS476: Part 22: 1987	132 Minutes
------------------------------------	--------------------------------	--	----------------	----------------------	-------------

LSASD = Latched, Single Acting, Single leaf Door assembly
LSADD = Latched, Single Acting, Double leaf Door assembly

Note # Premature failure occurred at the glazed aperture of these specimens, but no other failures were recorded before 120 minutes of test exposure. The successful glazing details proven in test CFR1812112 have been used to support the approved details, herein, in Ramkor FD120 Plus doors.

Note Some of the fire tests referenced in the table above were co-sponsored and where relevant, permission has been gained from the third party to permit use of that data.