INTERNATIONAL FIRE CONSULTANTS LIMITED

PRIVATE & CONFIDENTIAL

IFC FIELD OF APPLICATION REPORT

Field of Application for TriSound S3D FD60 timber-based multi-layer door leaves installed in timber frames

Fire Resistance Standard: BS476: Part 22: 1987

IFC Report PAR/13088/01 Revision A

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1. INTRODUCTION

This report has been prepared by International Fire Consultants Ltd (IFC) to define the field of application of TriSound S3D timber-based multi-layer door leaves installed in timber frames, that are required to provide 60 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; *'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 60 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.

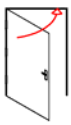
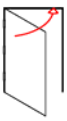
2. TEST EVIDENCE

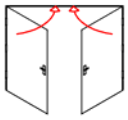
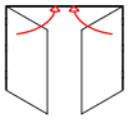
The test evidence used to support this Field of Application Report is summarised in Appendix F of this report.

3. SCOPE OF APPROVAL

3.1 Door Configuration

The following door configurations are approved within the scope of this report:

Configuration	Envelope of Approved Leaf Size
 • **Latched** • **Single Acting** • **Single Door** • **With or Without Transomed Overpanel** *Note 1*	**Figure PAR/13088/01A:D01 in Appendix D**
 • **Unlatched** • **Single Acting** • **Single Door** • **With or Without Transomed Overpanel** *Note 1*	**Figure PAR/13088/01A:D02 in Appendix D**

Configuration	Envelope of Approved Leaf Size
 • **Latched** • **Single Acting** • **Double Doors** *Note 2* • **With or Without Transomed Overpanel** *Note 1*	**Figure PAR/13088/01A:D03 in Appendix D**
 • **Unlatched** • **Single Acting** • **Double Doors** *Note 2* • **With or Without Transomed Overpanel** *Note 1*	**Figure PAR/13088/01A:D04 in Appendix D**

Note 1 *Overpanels may be fitted, provided they are separated from the door leaf by a transom member.*

Note 2 *Double leaf door assemblies within the scope of this Field of Application Report may have square edged or unequally rebated meeting stiles.*

3.2 Maximum Assessable Door Leaf Sizes

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

Double door assemblies may each be of the same width, up to the maximum width indicated in Appendix D. 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 in Appendix D). *For unlatched unequal pairs, the width of the small leaf shall not be more than 200mm smaller than that of the large leaf (although the large leaf must still be within the limitations in Appendix D).* The width of the small leaf shall not be less than 250mm, since this will affect its vertical stability relative to that of the larger leaf.

3.3 Transommed Overpanels

Transommed overpanels are permitted across the entire range of door configurations. The intumescent seal specification around the overpanel perimeter shall be as defined in Appendix C. Transom members shall be in accordance with Section 3.5, and installation shall be as defined in Section 3.8.

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

Single leaves:	2000mm high
Double leaves:	1500mm high

In all cases, the overpanel must be a single piece panel across the frame width; i.e. a "double door" overpanel shall not be used above double door leaves. Approval of an overpanel size by IFC does not indicate that such a size can be fabricated, this should be checked with the manufacturer, and will be subject to the ability of the supporting construction providing adequate restraint/support.

3.4 Door Leaf and Overpanel Specification

The FD60 TriSound S3D multi-layer door leaf and overpanel construction comprises a multi-layer chipboard/cork core surrounded by hardwood stiles/rails and faced with MDF, full details of the constructional specifications given below.

The leaf construction is based upon the test evidence detailed in Appendix F, 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.

<table>
<tr><th colspan="2">Component</th><th colspan="2">Material</th><th>Minimum Density</th><th colspan="2">Dimensions</th></tr>
<tr><td rowspan="2">Core Note 3</td><td>Central layers</td><td rowspan="2">TriSound S3D by Sauerland</td><td>Extruded Chipboard</td><td>560kg/m^3 Note 4</td><td rowspan="2">45mm</td><td>3no. layers of 13mm thick</td></tr>
<tr><td>Outer layers</td><td>Cork</td><td>220kg/m^3 Note 4</td><td>3mm thick</td></tr>
<tr><td rowspan="2">Stiles and rails Note 3</td><td>Inner</td><td colspan="2">Sapele</td><td>650kg/m^3 Note 4</td><td colspan="2">45mm thick x 38mm wide</td></tr>
<tr><td>Outer</td><td colspan="2">Sapele</td><td>650kg/m^3 Note 4</td><td colspan="2">45mm thick x 32mm wide</td></tr>
<tr><td colspan="2">Facings Note 3</td><td colspan="2">High Density MDF</td><td>850kg/m^3 Note 4</td><td colspan="2">6mm thick</td></tr>
<tr><td rowspan="2">Lippings Note 3</td><td>Vertical leaf edges (square)</td><td rowspan="2" colspan="2">Hardwood (NOT Beech)</td><td rowspan="2">630kg/m^3 Note 4</td><td colspan="2">5 – 9mm thick</td></tr>
<tr><td>Rebated meeting edges Note 5</td><td colspan="2">17 – 21 mm thick, to accommodate a 12mm deep x 39/18mm wide rebate</td></tr>
<tr><td rowspan="3">Fixings/ adhesive</td><td>Core</td><td colspan="2">Retained on confidential file by IFC Note 6</td><td>–</td><td colspan="2">–</td></tr>
<tr><td>Facing to core</td><td colspan="2">PVA D3 or Urea Formaldehyde adhesives</td><td>–</td><td colspan="2">–</td></tr>
<tr><td>Lippings</td><td colspan="2">PVA D3 adhesives</td><td>–</td><td colspan="2">–</td></tr>
<tr><td colspan="2" rowspan="2">Optional additional decorative finishes</td><td colspan="2">Timber veneer, decorative plastic based laminate, or PVC to door faces only.</td><td rowspan="2">–</td><td colspan="2">Maximum 2mm thick</td></tr>
<tr><td colspan="2">Paint or lacquer to faces and edges.</td><td colspan="2">-</td></tr>
</table>

Note 3 *Leaf construction to be in accordance the Method Statement included in Appendix A.*

Note 4 *Minimum density, based upon stated density in tests.*

Note 5 *Where rebated meeting stiles are employed they should be 12mm deep, with a 39mm wide rebate in one leaf and 18mm wide rebate in the other leaf.*

Note 6 *If required, a maximum 2mm may be trimmed from any edge, after fabrication; subject to the minimum lipping thickness being maintained. Any other adjustments to leaf width, once the door has been fabricated, will require re-lipping and remedial actions in accordance with the Method Statement included in Appendix A.*

Square and unequal width rebated meeting stile details are approved across the range of sizes covered by this Field of Application Report for double leaf door assemblies.

3.5 Frames

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

Material	Minimum Density	Minimum Face Width	Minimum Frame Depth	Minimum Stop Depth
Hardwood (NOT Beech)	650kg/m³ *Note 7*	32mm, excluding stop *Note 8*	95mm	12mm *Note 9*

Note 7 *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 ± 2% for UK market, (or to suit internal joinery moisture content specification of export countries).*

Note 8 *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 3.8 regarding projecting frames and shadow gaps.*

Note 9 *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.*

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. Where an integral architrave is used, the face of the door may protrude beyond the face of the wall, providing the thickness of the architrave is no greater than 10mm and it protrudes at least 15mm beyond the rear face of the door frame. This assumes that the face of the door leaf is flush with the face of the architrave. (See Figure 1, below)

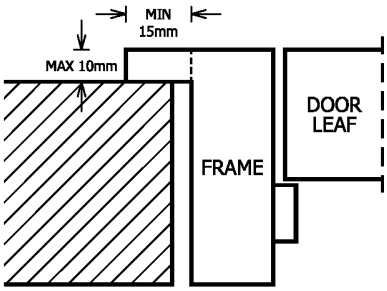


Figure 1. Frame option with integral architrave

Head/jamb joint — Mortice and tenon, or half-lapped joint, head twice screwed to each jamb **or** mitred joint which is glued with a non-thermally softening adhesive and the head twice screwed to each jamb.

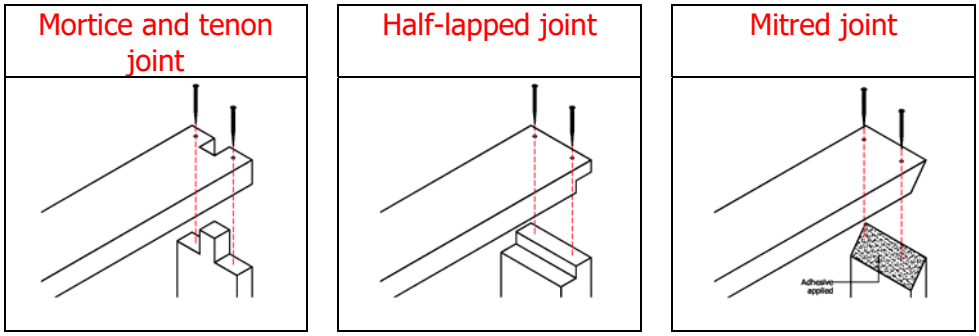


Figure 2. Head/Jamb jointing options

Other approved joints would be a 'Trench Joint' or a 'Comb Joint' which are variations on the joints shown above but they will also need to be glued with a non-thermally softening adhesive and the head twice screwed to each jamb.

Architraves — Subject to adequate sealing of gap between frame and wall, loose architraves are optional and have no fire performance requirements. (See Section 3.8 regarding sealing of wall/frame gaps).

3.6 Glazing Apertures

3.6.1 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.

- 12mm thick Pyrobelite (AGC Flat Glass)
- 23mm thick Pyrostop (Pilkington)

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

3.6.2 Glazing material

The following glazing materials are approved for use in the doors considered, herein, and are compatible with the identified approved glass types listed above. (See also **Figure PAR/13088/01A:B01** in Appendix B).

- 2no. 10 x 2mm (to create a 20 x 2mm seal) Interdens F (Various suppliers) with 54 x 2mm Norseal glazing liner (use with 12mm thick Pyrobelite)
- 10 x 2mm Kerafix 2000 (Kuhn) with 54 x 2mm Norseal glazing liner (use with 23mm thick Pyrostop)

3.6.3 Bead profile and installation

The approved bead sizes and profiles, and relevant fixing details, are shown on **Figure PAR/13088/01A:B01** in Appendix B.

Glazing beads must be formed from good quality, straight grained hardwood, (NOT Beech), with 640kg/m³ minimum density (measured at 12% moisture content). Timber should be of appropriate quality in accordance with BS EN 942: 1996 with a moisture content of 10 ±2% for UK market (or to suit internal joinery moisture content specification of export countries).

Glazed apertures must have 2no. 15 x 2.5mm Sapele inserts centrally fitted 'on edge', spaced nominally 12mm apart (see **Figure PAR/13088/01A:B01**) lining the full perimeter of the aperture.

3.6.4 Assessed aperture sizes

Apertures are created by cutting directly into the door slab with 3mm thick x 17mm deep grooves cut along the joint between core layers. Into the grooves 2.5mm thick x 15mm deep hardwood inserts are to be bonded with EPI adhesive. The glazing details are shown on **Figure PAR/13088/01A:B01** in Appendix B.

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

Maximum area of single aperture	-	0.166m² *Note 10*
Maximum vertical length of aperture	-	905mm
Maximum horizontal length of aperture	-	200mm
Minimum distance from leaf edge (top)	-	135mm
Minimum distance from leaf edge (sides)	-	140mm *Note 11*
Minimum distance from bottom of leaf	-	250mm
Minimum distance between apertures	-	200mm

More than one aperture may be included in each leaf subject to the individual limitations above, and a maximum area of apertures of 0.283m².

Note 10 *Any aperture(s) for intumescent air transfer grilles, (see Appendix E), must also be included in the total area permitted for apertures given above. Margins between apertures apply whether for glazing or grilles.*

Note 11 *Additional limitations apply regarding proximity of lock mortices. See clause E2 in Appendix E.*

3.7 Hardware

Some of the various items of hardware to be used with the proposed doorsets 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 to that proposed.

3.8 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 on the vertical edges (minimum 200mm 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; (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 timber or steel stud plasterboard partition, blockwork, brickwork or concrete walls, but shall be of a type that has been tested or assessed to provide in excess of 60 minutes fire resistance, at the required size, when incorporating openings for door assemblies. If fitted into timber or steel stud partitions, the method of forming the door aperture must be as tested by the partition and/or door assembly manufacturer.

Note 12 *Reference to steel stud partitions is in the context of permanent elements, such as those designed and proven by the plasterboard manufacturers, with plasterboard on both faces. This report does not approve use of the proposed doorsets in proprietary 'demountable' partitions, which must be subject to a full and independent appraisal of the particular system and doorsets therein.*

No part of the rear of the frame section shall be exposed once installed, (except for integral architraves, see Section 3.5) 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 with timber frames (such features could, however, be assessed on an individual basis). 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/partition 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 frames should follow the recommendations of Tables 4 and 5 in BS8214: 2016, *'Timber-based fire door assemblies – Code of practice'*, using a product proven in such timber applications; or tested, assessed or Third Party Certificated solutions may also be utilised 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 gap between the door and the frame or between meeting stiles (and between double doors and overpanel, where applicable) 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 3.10 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.

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 2no screws per overpanel edge. The gap between overpanel and frame should not exceed 3mm.

3.9 Intumescent Seals

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

3.10 Ambient Temperature Smoke/Acoustic Seals

Ambient temperature smoke/acoustic sealing was included in the fire test of the doorset design, in the form of Norseal NOR 710 at the frame reveal/stop interface and combined intumescent and smoke seals at the meeting stiles. This demonstrated that the smoke seals will not adversely affect the overall fire resistance.

This report does not consider the smoke control, but other separate, or combined intumescent, acoustic and/or smoke seals (using one of the intumescent products approved in Section 3.9), of a type 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 $3m^3/m/hr$ 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 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 C, in which case, the latter shall take precedence.

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

Note: IFC have a duty of care to advise that effective smoke control is not solely a function of seals at the leaf perimeter. Testing in accordance with BS EN 1634-3: 2004, or BS476: Part 31: Section 31.1: 1983, also evaluates the leakage through apertures for glass and hardware, and it is the responsibility of others to ensure that the TOTAL leakage is not more than $3m^3/m/hr$ at 25Pa.

4. CONCLUSION

It is the opinion of International Fire Consultants Ltd that if the proposed door assemblies utilising TriSound S3D timber-based multi-layer door leaves 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 60 minutes.

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 air transfer grilles, and so could, therefore, be evaluated to this standard if the maximum total aperture area is less than 20% of the leaf size.

The leaves may include small apertures, up to a maximum of 20% of the leaf size, and can be evaluated to Section 7 in BS 476: Part 22: 1987 as partially insulating door assemblies for 60 minutes fire resistance.

The doors can also be assessed to Section 6 of BS476: Part 22: 1987 for a 60 minute performance rating for both integrity and insulation, without apertures in the leaves; or if the glazed aperture includes 23mm Pyrostop glass.

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/13088/01 Revision A** 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: **Sauerland Spanplatte GmbH & Co KG**

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. 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, 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 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 2023** 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:

Chris Houchen BSc. AIFireE
Senior Technical Manager
International Fire Consultants Ltd. (IFC)

Checked by:

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

APPENDIX A

Construction Method Statement

The Method Statement in this Appendix is not Included in the sequential page numbering of this report

TriSound S3D by Sauerland Acoustic Blank Construction Method Statement

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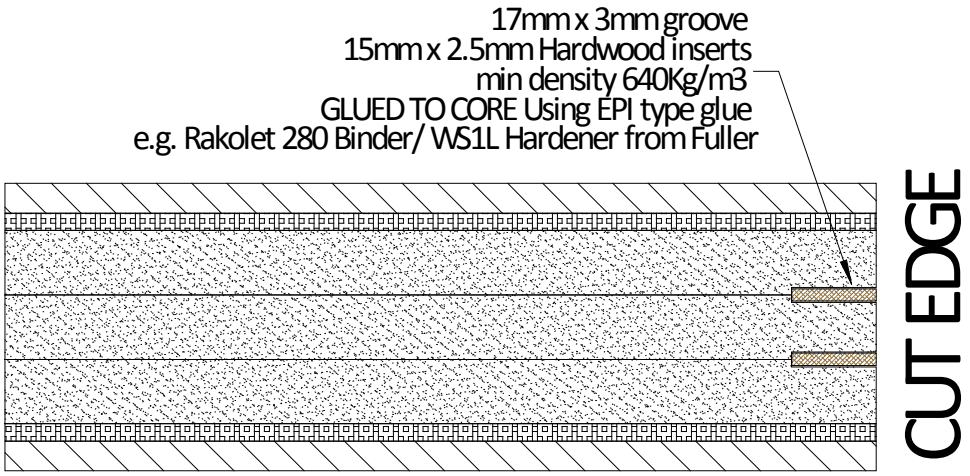
Email: kshepherd@afdsl.com

Materials

- TriSound S3D by Sauerland 45mm thick 3-Ply acoustic core with Cork outer layers (nom 2000x800mm)
- Sapele (min density 630kg/m^3 at 12% mc) 45x38mm section perimeter timber
- 2no 6mm High Density MDF (min density 850kg/m^3 at 12% mc) sheets for substrates
- Min 20x12mm steel staples
- PVA D3 or UF adhesive (and EPI adhesive if core is to be reduced in width)
- Sapele (min density 630Kg/m^3 at 12% mc) 15x2.5mm IF core is to be reduced in width

Method

1. Cut Core to internal size:
    a. Core Height: Blank Height – 152mm (see section ii below)
    b. Core Width: Blank Width – 152mm (see section iii below)
    c. Where Fire performance is required the following conditions must be adhered to:
        i. the core must only be used in the "portrait" orientation
        ii. When cutting the core to height it is imperative to ensure that the required amount is ONLY trimmed from one end of the core. The cut end MUST be located at the bottom of the leaf. If the top (non-cut) end requires squaring-up this can be achieved by trimming a maximum of 6mm before the remainder is trimmed from the opposite end.
        iii. When cutting the core to width it is imperative to ensure that the required amount is ONLY trimmed from one edge of the core. Where greater than 6mm is removed from the edge, two grooves 17mm deep by 3mm wide MUST be cut along the CUT edge positioned along the joint between core layers (see diagram below). The grooves are to be filled with 15mm x 2.5mm Sapele inserts glued to the cores using an EPI type glue (e.g. Rakolet280 Binder/WS1L hardener from Fuller).



If the non-cut edge requires squaring-up this can be achieved by trimming a maximum of 6mm before the remainder is trimmed from the opposite edge as above.

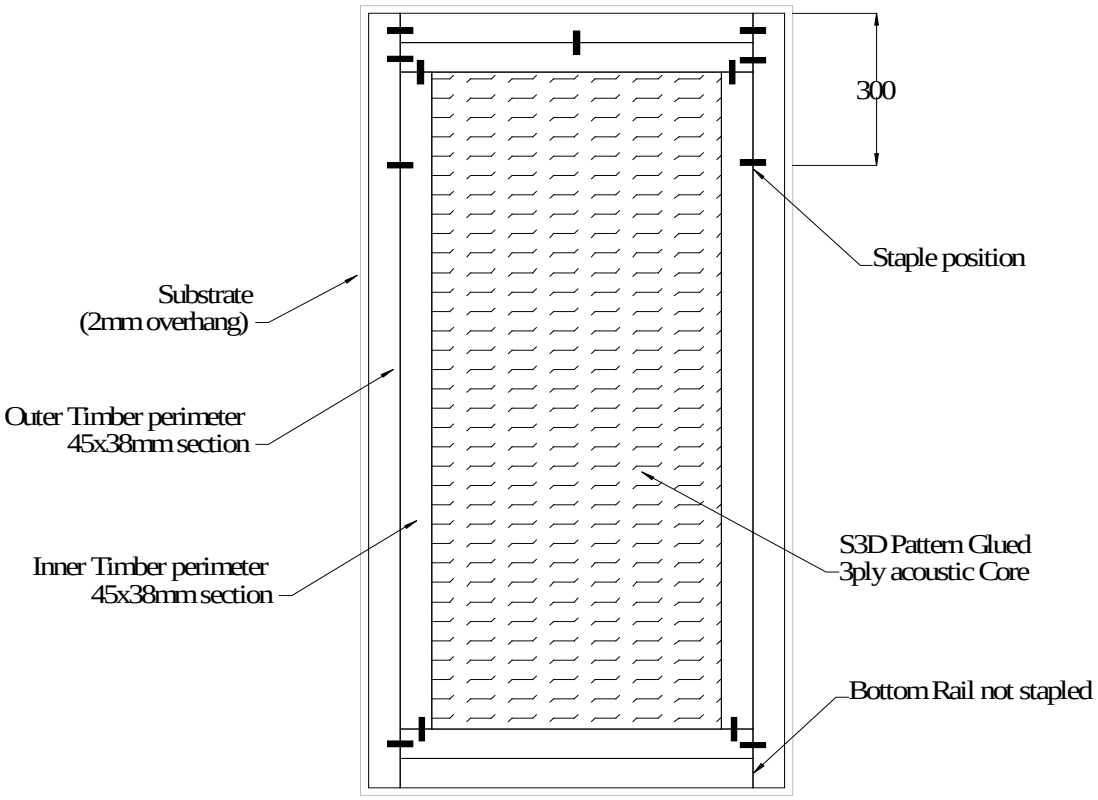
iv. The core is normally supplied at 2000x800mm dimensions. If a wider core size is required this must be custom-manufactured.

v. In any event the overall leaf sizes should be limited to the permissible envelope provided with the fire performance evidence.

2. Cut Perimeter Timber:
   a. Outer stiles: Blank Height
   b. Inner stiles: Blank Height – 152mm
   c. All rails: Blank Width – 76mm

3. Cut substrate
   (2no 6mm substrates):
   a. Height: Blank Height + 4mm
   b. Width: Blank Width + 4mm

4. Assemble Perimeter using steel staples from both faces, in locations shown below, ensuring tight fit of timber at joints and where butted up. Gaps of > 0.5mm are unacceptable. Note that the bottom rail is not stapled.



5. Coat one substrate with PVA-D3 or UF adhesive. Place (adhesive side up) on pressing platform
6. Place perimeter onto substrate with 2mm overlap all round
7. Place the bottom rail ensuring tight fit

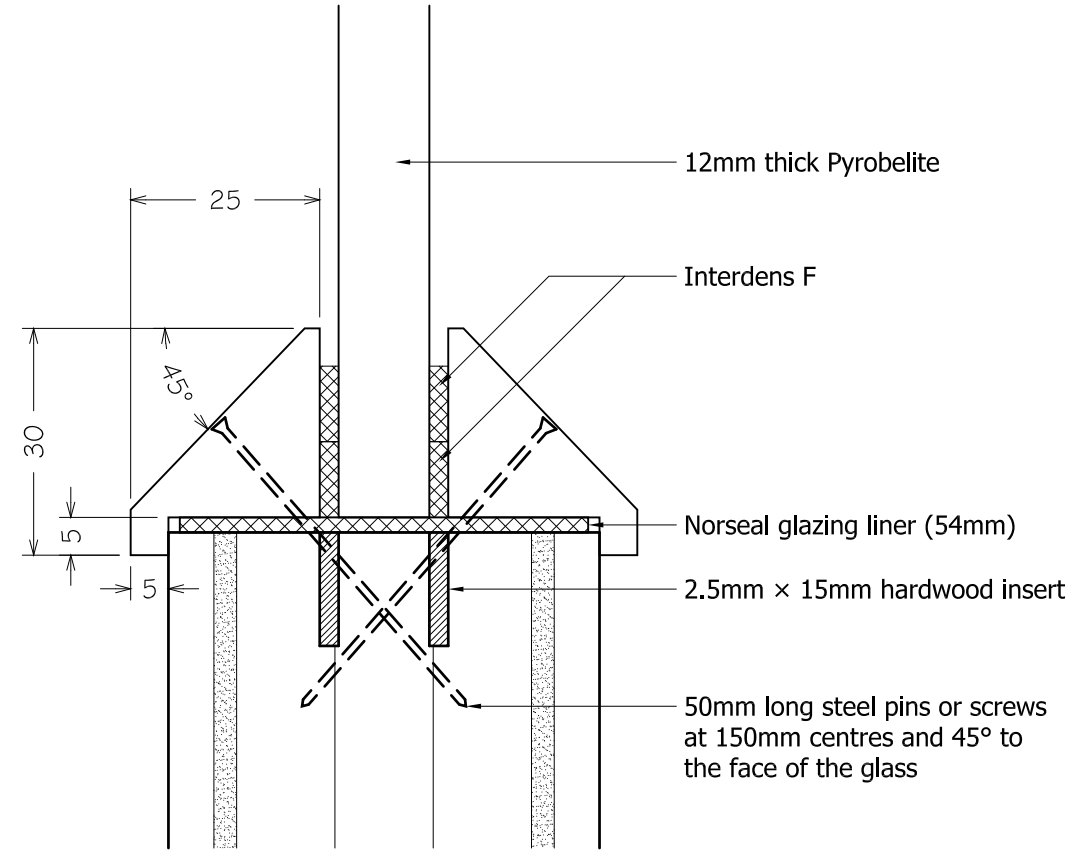
8. Place cut-to-size core material into the perimeter ensuring tight fit and that the top end of the core (see section 1-ii) is at the top end of the leaf
9. Coat second substrate with PVA-D3 or UF adhesive place on top of core/perimeter with 2mm overhang all round.
10. Press in a hot press until adhesive is cured to the handling stage. Suggested time in a hot press would normally be around 20-30 minutes but the time required will vary due to press temperature and other conditions. It is possible to use a cold press although pressing time to reach the handling stage will be significantly increased, e.g. in a 21°C environment the handling stage would normally be reached in around 75 minutes, although again this will vary due to conditions. For more information see the adhesive manufacturers Technical Data Sheet
11. Once the handling stage of curing is reached the blank can be removed from the press but handling should be kept to a minimum until full cure has been achieved. Time required to achieve full cure varies with temperature and other conditions but as a guide a blank stored in normal conditions should achieve full cure after around 24 hours.
12. Mark "Top" on the top perimeter frame.
13. Once full cure has been reached the blank can be trimmed and lipped.
14. The blank can now be veneered/trimmed/primed/painted according to requirements. See the relevant Technical Manual for more information regarding use of the blank.

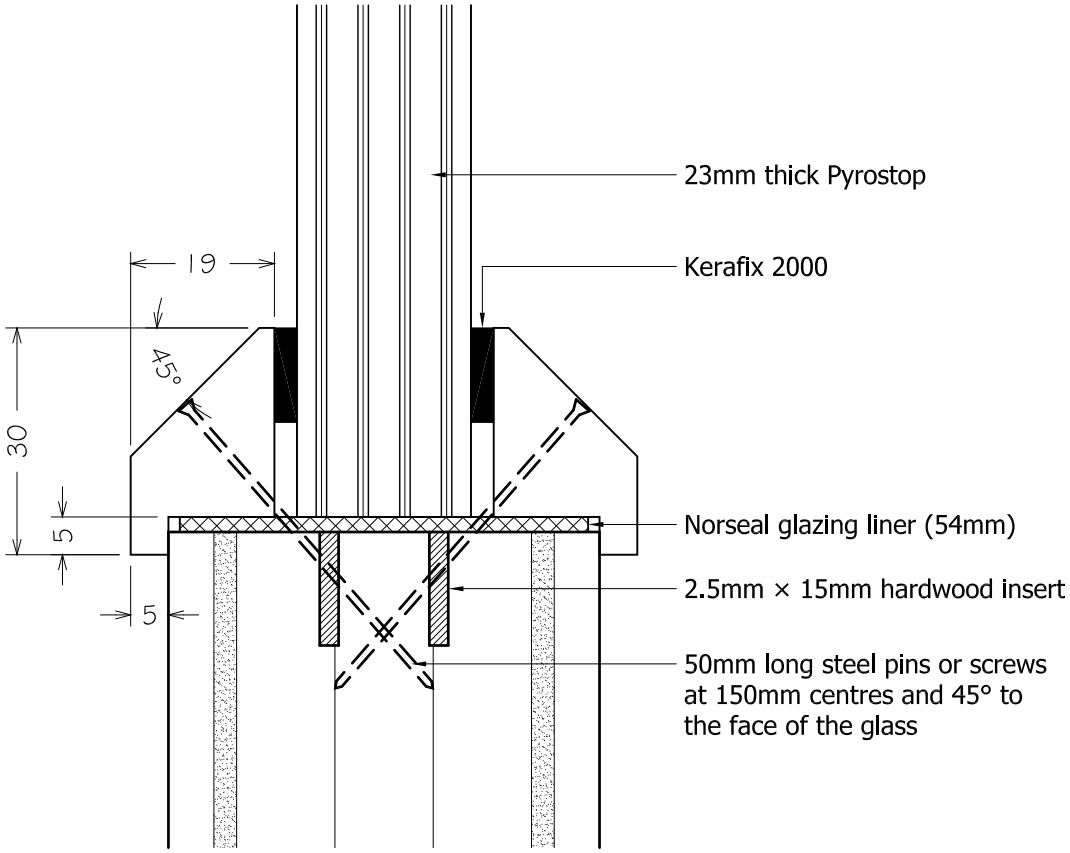
APPENDIX B

Figure PAR/13088/01A:B01

Glazing Details

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





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Field of Application Report
PAR/13088/01 Revision A
Sauerland Spanplatte GmbH & Co KG
TriSound S3D FD60 Timber-Based
Multi-Layer Door Leaves Installed
in Timber Frames

Glazing Details

Job number: 18495	
Drawn by: CSP	Checked by: CH
Not To Scale	Drawn: Jul 2018

PAR/13088/01A:B01

APPENDIX C

Assessed Intumescent Seal Specifications for TriSound S3D Timber-Based Multi-Layer Door Leaves Installed in Timber Frames

Location	Size and Position
Stile/Jamb	2no 15 x 4mm seals, centrally fitted spaced 10mm apart, in either the leaf edge, or opposing frame reveal
Head	2no 15 x 4mm seals, centrally fitted spaced 10mm apart, in either the leaf edge *(see note below),* or opposing frame reveal
Flush meeting stiles	2no 15 x 4mm seals, centrally fitted spaced 10mm apart in the active leaf
Unequally rebated meeting stiles	2no 10 x 4mm seals fitted 10mm apart, centrally, in the 39mm wide rebate and 1no. 10 x 4mm seal, fitted centrally, in the 18mm wide rebate in the opposing leaf face

Note:

The intumescent seals are to be pvc encased graphite based. All seals should be obtained from members of the Intumescent Fire Seals Association (IFSA). Combined intumescent/smoke seals may be used, maintaining the widths specified above (and subject to the conditions outlined in Section 3.9).

If intumescent seals are fitted in the head of the leaves in double doors then the seals must be graphite based.

APPENDIX D

Figures PAR/13088/01A:D01 to D04

Assessed Leaf Size Envelopes

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

	A	B
Width	831	1073
Height	2630	2146

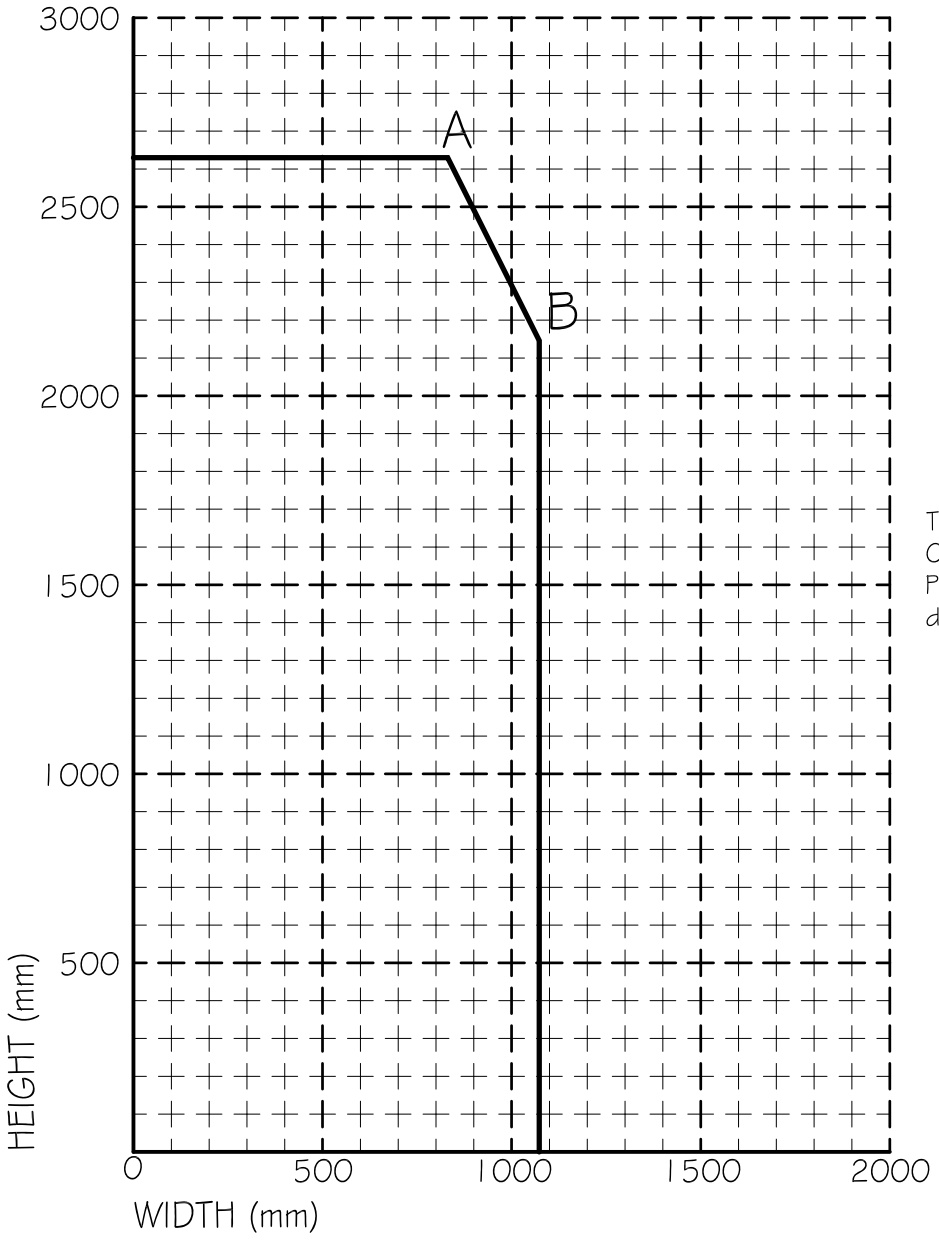
LEAF SIZE ENVELOPE POINTS

Configuration

Timber Frames

LATCHED
SINGLE ACTING
SINGLE LEAF
WITH or WITHOUT
TRANSOMED OVERPANEL

REQUIRED INTEGRITY : 60 Minutes



This figure forms part of International Fire Consultants Ltd's Field of Application Report PAR/13088/01 Revision A, which contains full details of the assessed doorset 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.
POINT A represents the maximum leaf height and its associated width.
POINT B represents the maximum leaf width and its associated height.

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Envelope of Approved
Door Leaf Sizes
LSASD
In Timber Frames

Job number: 18495	
Drawn by: CSP	Checked by: CH
Not To Scale	Drawn: Jul 2018

PAR/13088/01A:D01

	A	B
Width	814	1052
Height	2579	2104

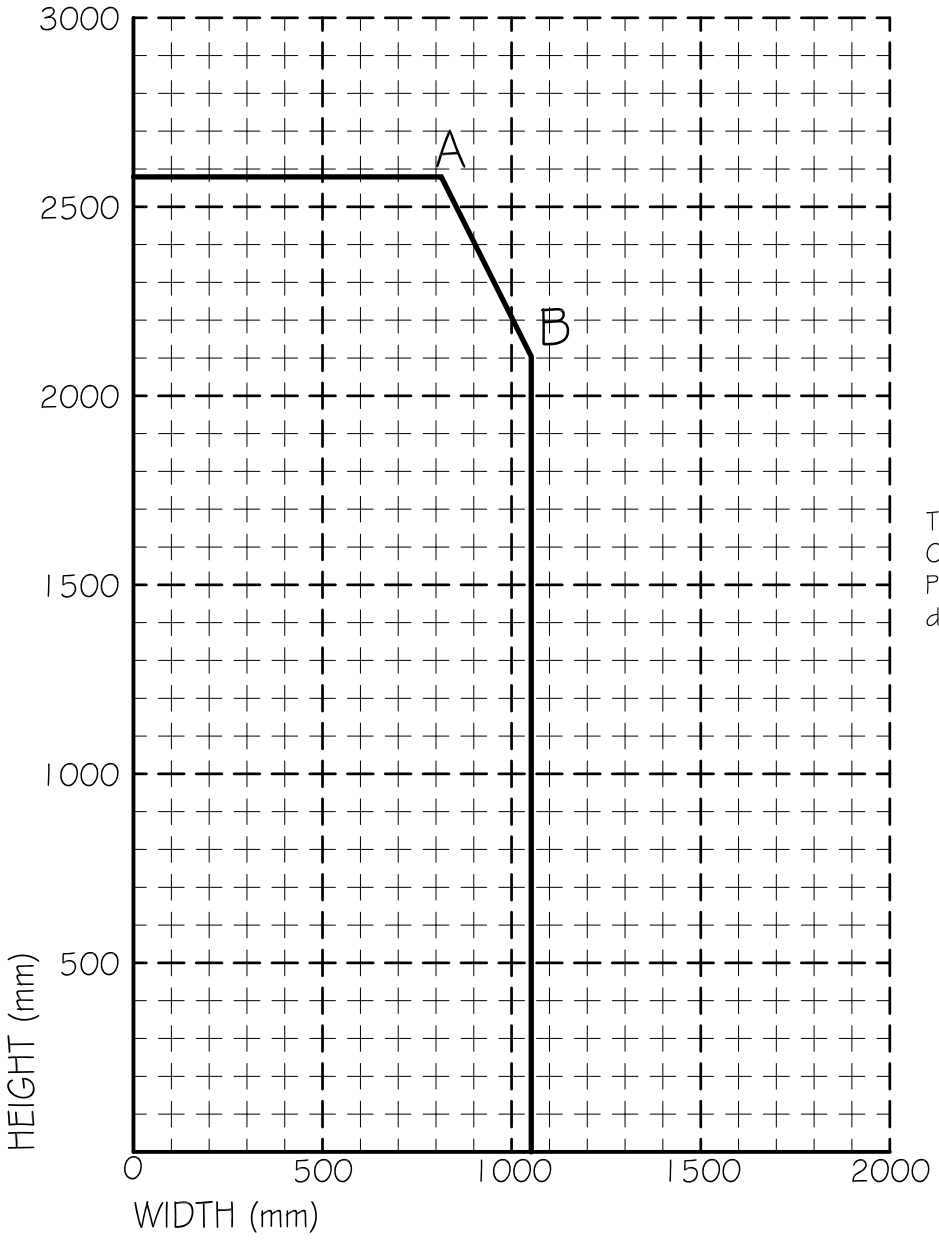
LEAF SIZE ENVELOPE POINTS

Configuration

Timber Frames

UNLATCHED
SINGLE ACTING
SINGLE LEAF
WITH or WITHOUT
TRANSOMED OVERPANEL

REQUIRED INTEGRITY : 60 Minutes



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Envelope of Approved
Door Leaf Sizes
ULSASD
In Timber Frames

Job number: 18495

Drawn by: CSP	Checked by: CH
Not To Scale	Drawn: Jul 2018

PAR/13088/01A:D02

Configuration

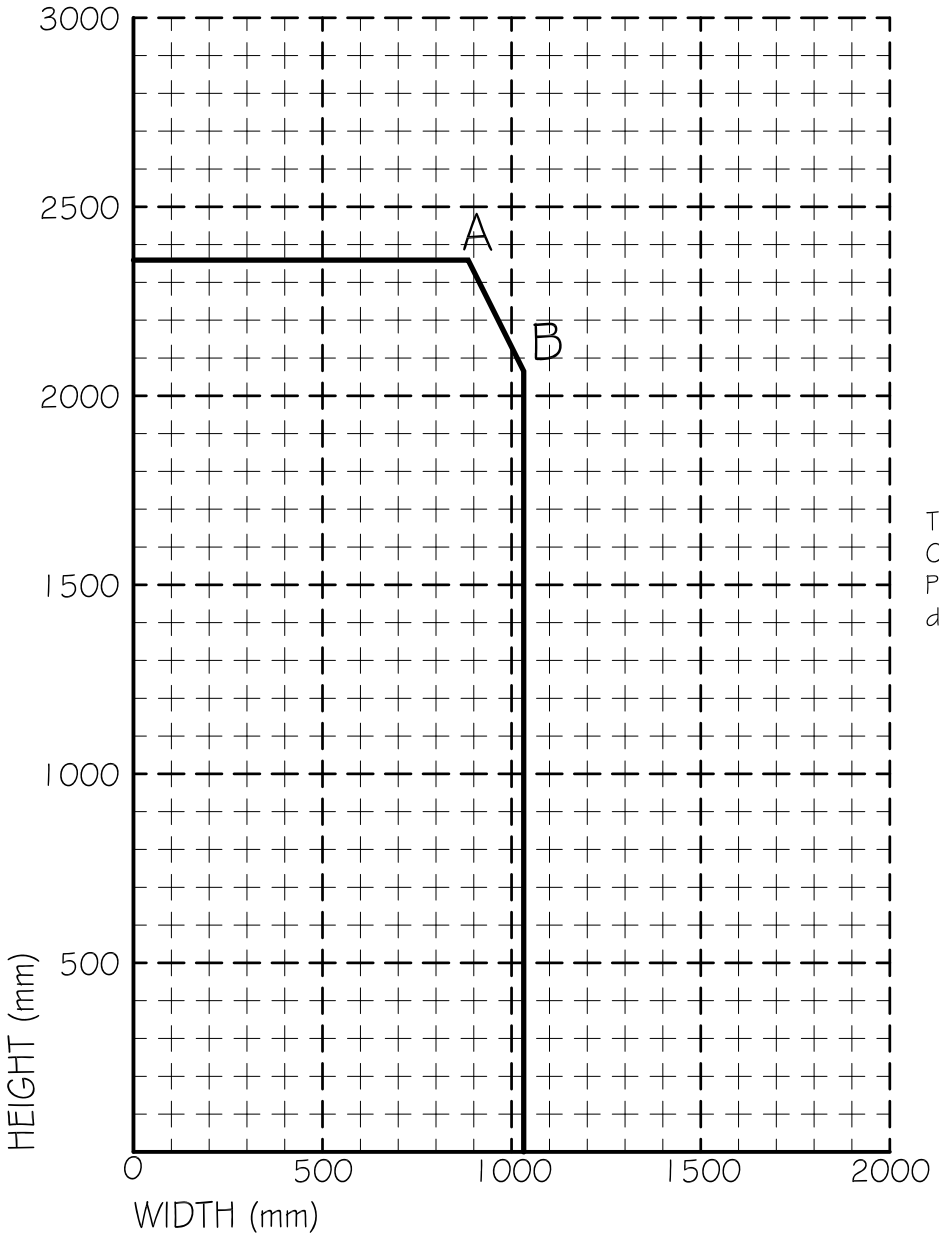
Timber Frames

LATCHED
SINGLE ACTING
DOUBLE LEAF
WITH or WITHOUT
TRANSOMED OVERPANEL

REQUIRED INTEGRITY : 60 Minutes

	A	B
Width	885	1032
Height	2359	2065

LEAF SIZE ENVELOPE POINTS



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Envelope of Approved
Door Leaf Sizes
LSADD
In Timber Frames

Job number: 18495

Drawn by: CSP	Checked by: CH
Not To Scale	Drawn: Jul 2018

PAR/13088/01A:D03

	A	B
Width	876	1022
Height	2336	2044

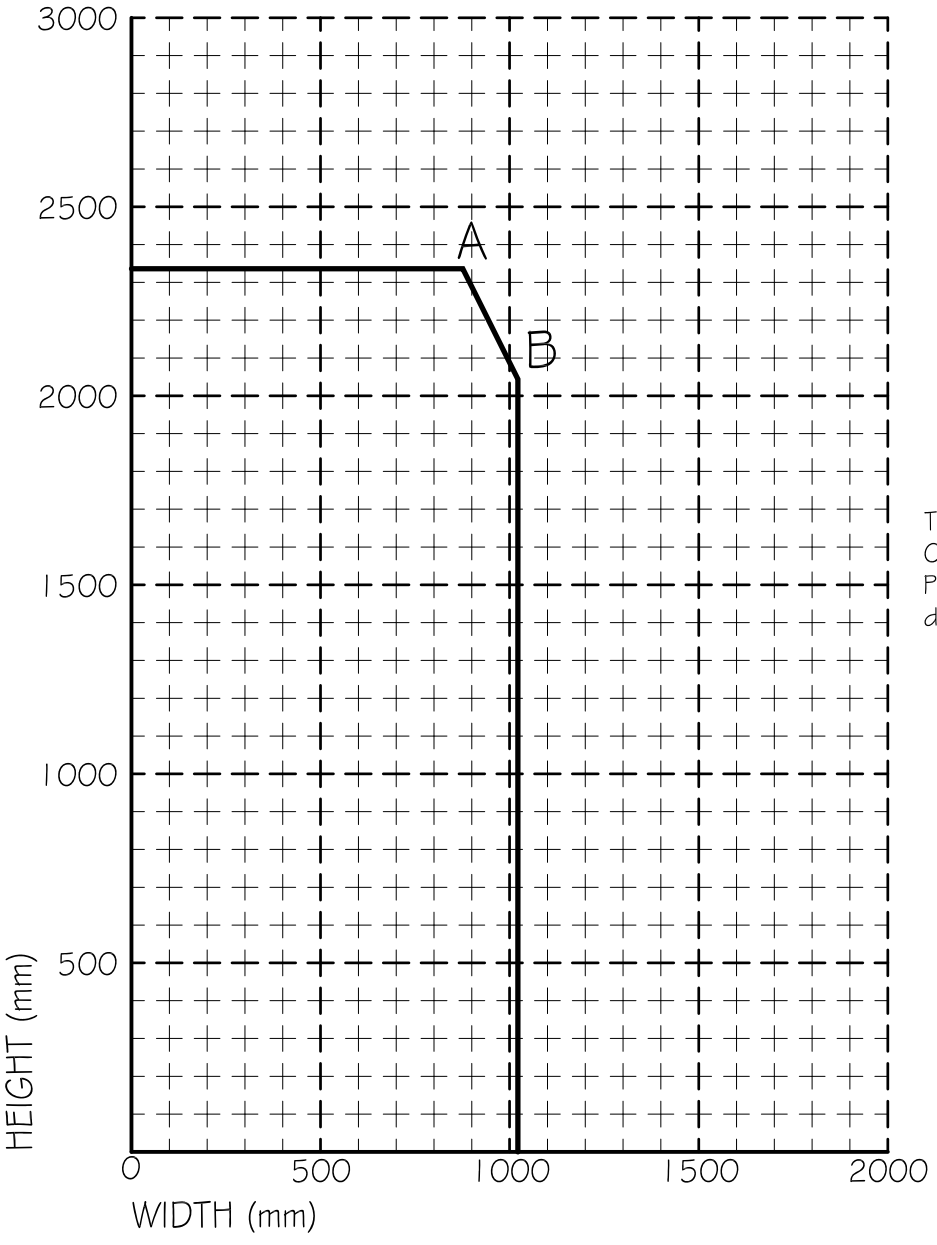
LEAF SIZE ENVELOPE POINTS

Configuration

Timber Frames

UNLATCHED
SINGLE ACTING
DOUBLE LEAF
WITH or WITHOUT
TRANSOMED OVERPANEL

REQUIRED INTEGRITY : 60 Minutes



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ULSADD
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PAR/13088/01A:D04

APPENDIX E

General Guidance on Installation of Hardware

General Guidance on Installation of Hardware

E.1 Hinges

The door design has been tested utilising Hafele SUS 304 hinges which are thus proven to make a positive contribution to the required 60 minutes integrity performance. Other makes of hinge may be used as alternatives providing they comply with the following specification:

Element		**Specification**	
Hinge type		Fixed pin, washered butt, ball bearing butt, lift-off type or journal supported.	
Blade height		89 - 110mm	
Blade width		30 - 35mm	
Blade thickness		2.5 - 3.5mm	
Material		Phosphor Bronze, Steel or Stainless Steel. (No combustible or thermally softening materials to be included).	
Fixings		Steel screws, as recommended by the hinge manufacturer, but no smaller than 30mm long x 3.8mm diameter (No.8)	
Minimum number		3no. hinges per leaf	
Positions	3no.	Top	175 - 225mm 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	200 - 250mm up from the bottom of the leaf to the bottom of the hinge blade
Intumescent protection		Hinge blades to be bedded on minimum 1mm thick low-pressure forming intumescent sheet (e.g. Interdens or Therm-A-Strip). One intumescent strip in the frame/leaf edge shall be continuous past the hinges.	

Rising butt, cranked butts and spring hinges (single or double action) are not suitable for use on doors approved within the scope of this Field of Application Report, although they may be suitable on the basis of an individual and specific fire engineering evaluation.

E.2 Mortice Latches/Locks

The door design has been tested with a Laidlaw LA60SS/R mortice lock centrally fitted in the large rebate of the unequally rebated edge meeting stiles. This mortice lock is thus proven to make a positive contribution to the required 60 minutes integrity performance; although the latch was disengaged, and so latches are not 'compulsory'. Other mortice latches/locks may be used, subject to compliance with the specifications below:

Element	Specification
Latch/lock type	Mortice latches, tubular mortice latches, sashlocks and deadlocks
Maximum forend height	235mm x 20mm wide or 200mm long x 25mm wide
Maximum strike plate height	235mm x 20mm wide or 200mm long x 25mm wide
Maximum latch/lock body dimensions	165mm high x 100mm wide x 20mm thick
Material	Steel based with no essential part of the lock/latch to comprise polymeric or other low melting point (<800°C) materials and should not contain any flammable materials
Positions	Centred at 1000mm (± 200mm) above the bottom of the door leaf. Latch to be central in the 39mm wide rebate of rebated meeting stiles; or central in leaf thickness where doors have square meeting stiles, and in single leaf doors.
Intumescent protection	Minimum 1mm thick low-pressure forming intumescent sheet material encasing the latch body, and under the strike plate and forend. In double leaf door assemblies, the cut-out 'box' for the latch keep should be lined with minimum 1mm thick pressure forming sheet (e.g. Norseal graphite sheet). In rebated meeting stiles, the intumescent strip in the rebate of the passive leaf shall be continuous past the strike plate; and 5mm width of both intumescent strips in the active leaf shall be continuous past the forend. In square meeting stiles, 5mm width of both intumescent strips in the active leaf shall be continuous past the latch/lock forend. In single leaf assemblies, 8mm width of one of the intumescent strips in the frame shall be continuous past the strike plate.

Over-morticing is to be avoided; mortices shall be as tight as possible to the latch. If gaps around the case exceed 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.

Where glazing apertures are also incorporated, and are positioned such that locks/latches are included in the margin between the aperture and door edge, care must be taken to ensure that the effective door 'stile' is not weakened by the mortice. It is a condition of this assessment that, except where tubular latches are employed, the margin must be at least 75mm wider than the lock/latch mortice. If the mortice latch/lock is fitted in line with a 'rail' between two apertures, no part of the lock mortice shall be closer than 50mm to the edge of any aperture.

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 BS5499: Part 1: 1990.

Surface mounted overhead door closers (and accessories such as soffit brackets) may be used if they have been tested, assessed or otherwise approved for use on unlatched FD60 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 partially-insulated 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.

Overhead surface mounted closers are recommended. Concealed overhead and concealed jamb mounted closers are NOT approved by this Report.

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.

E.4 Flush Bolts

The door design has been tested with Laidlaw 34 002.2 flush bolts centrally fitted in the 39mm nib of the passive leaf edge at the meeting stiles. These flush bolts are thus proven to make a positive contribution to the required 60 minutes integrity performance. Other flush bolts may be utilised subject to compliance with the specifications below:

Unless specific fire test evidence is available, all bolts shall be steel. The following limitations and protection apply;

- Maximum size of flush bolt is 250mm long x 21mm wide and 20mm deep;
- The head of the frame should contain a minimum 15mm width of intumescent strip local to the keep plate. If the keep plate is offset, this will allow one strip to be continuous. Alternatively, if the keep plate is central, then 8mm of each strip should be continuous.
- The body of the bolt should be bedded on low-pressure forming intumescent material at least 1mm thick;
- In rebated meeting stiles, edge fixed bolts shall be positioned in the 39mm nib of the passive leaf, with the single 10 x 4mm seal remaining continuous alongside it, in the 18mm rebate);
- In square meeting stiles, edge fixed bolts shall be positioned centrally in the leaf thickness (the 2no. 15 x 4mm intumescent seals defined in Appendix C shall be fitted in the active leaf opposing the flush bolt);
- Face fixed flush bolts shall be fixed so that there is a minimum of 50mm between the bolt and the door edge, and between the bolt and any glazed aperture;
- Surface mounted barrel bolts shall not exceed 400mm in length, but there is no limitation on their width. Screws for fixing bolts must be at least 25mm long, and have thread for the full screw length.

E.5 Non-Essential Hardware Items

E.5.1 Dropseals

The door design was tested with a Norsound NOR 810S dropseal, fitted 10mm from the unexposed face of the leaves; such that a 10mm wide intumescent strip was continuous alongside the drop seal, in both leaves. This dropseal is thus proven not to be detrimental to achieving the required 60 minutes integrity performance.

Norsound NOR 810S dropseals are thus approved, but the following conditions apply;

- In doors with rebated meeting stiles, the drop seal shall be positioned offset in the 39mm wide zone, (as tested), with a single 10 x 4mm seal remaining continuous alongside it, in BOTH meeting edges;
- In doors with square meeting stiles, the drop seal may either be positioned centrally in the leaf thickness (i.e. passing 'between' the 2no. 15 x 4mm intumescent seals, defined in Appendix C, in the meeting stile of the active leaf). Alternatively, if the passive leaf also includes flush bolts, the drop seal may be positioned offset, in both leaves, and it is acceptable for the drop seal to interrupt one of the 15mm wide seals in the meeting stile of the active leaf.
- In single leaf doors, the drop seal shall be central in leaf thickness.
- The drop seals shall be encased in 1mm thick low-pressure intumescent gasket if the intumescent seals (see Appendix C) are fitted in the leaf edges at hanging stiles of double/single leaves, and at the leading edge of single leaf doors; but dropseals can be utilised without this additional intumescent protection if the intumescent seals are fitted in the frame reveal at these locations.

E.5.2 Push plates, kick plates, etc.

Plastic, pvc or metal plates may be surface-mounted to the door, 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.

E.5.3 Pull handles

Pull handles may be fixed to the doors, provided that the fixing points are no greater than 1065mm apart. Pull handles that are fixed through the leaf should use clearance holes as close fitting as possible to the bolt.

E.5.4 Intumescent air transfer grilles

Intumescent air transfer grilles must be tested, assessed or otherwise approved for use with minimum 54mm thick cellulosic FD60 doors. They must be fitted fully in accordance with the manufacturer's instructions, including all intumescent liners and cloaking grilles/beads, with the aperture formed as outlined in Section 3.6.4. They must be no larger than that for which test or assessment evidence exists. See Section 3.6.4, for restrictions on maximum size and placement of any apertures; these apply to those for grilles, which must also be included in the total area permitted for apertures given in Section 3.6.4.

Note E1 *The installation of such items in a door leaf may compromise its performance as a smoke control door assembly.*

APPENDIX F

Summary of Fire Test Evidence

Summary of Fire Test Evidence

Test Report	Configuration Tested	Leaf Size Tested	Integrity
Chilt/RF13011 Revision A	ULSADD	2100 x 970 + 958 x 57mm	62 minutes

ULSADD = Unlatched, Single Acting, Double leaf Doorset

Note:

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