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Title

Field of Application for:

LAMINESSE FireSound Xtreme and

LAMINESSE FireSmoke Xtreme

For 90 & 120 minutes Fire Resistance

Report No.:

WF415740 Revision B Redacted

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WF502943

Prepared for:

Moralt AG

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Germany

The version/revision stated on the front of this Field of Application supersedes all previous versions/revisions and must be used to manufacture doorsets from the stated validity date on this front cover. Previous revisions of the Field of Application cannot be used once an updated Field of Application has been issued under a new revision.

Contents

1 Foreword

This Field of Application report has been commissioned by Moralt AG and relates to the fire resistance of 90 & 120 minute fire resisting doorset designs.

The report is for National Application and has been written in accordance with the general principles outlined in BS EN 15725:2010; *Extended application reports on the fire performance of construction products and building elements*.

This Field of Application (scope) uses established empirical methods of extrapolation and experience of fire testing similar doorsets, in order to extend the scope of application by determining the limits for the designs based on the tested constructions and performances obtained. The scope is an evaluation of the potential fire resistance performance, if the variations specified herein were to be tested in accordance BS 476 Part 22:1987.

This Field of Application has been written using appropriate test evidence generated at UKAS accredited laboratories, to the relevant test standard. The supporting test evidence has been deemed appropriate to support the manufacturers stated door design and is summarised in section 3.

The scope presented in this report relates to the behaviour of the proposed door design variations under the particular conditions of the test; they are not intended to be the sole criterion for considering the potential fire hazard of the door assembly in use.

This Field of Application has been prepared and checked by product assessors with the necessary competence, who subscribe to 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'*. The aim of the PFPF guidelines is to give confidence to end-users that assessments that exist in the UK are of a satisfactory standard to be used for building control and other purposes.

Valid CERTIFIRE and/or field of application supporting documentation has been used to increase the scope of application of this report. It is the responsibility of users to check that the cited versions of such supporting documentation remain valid at the time of use. Where new revisions or revalidations of supporting documentation have been issued they must be checked against those referenced in this report and, if their scope has changed, Warringtonfire must be consulted to review and consider the effect of these changes on the scope and conclusions of this report.

2 Proposal

It is proposed to consider the fire resistance performance of the doorset designs described in the technical specification in section 4 of this report, for 90 and 120 minutes fire resistance, if the doorsets, were to be tested to the requirements of BS 476 Part 22: 1987, *Fire tests on building materials and structures – Part 22: Method for determination of the fire resistance of non-load bearing elements of construction*.

The field of application defined in this report is based on the fire resistance test evidence for the doorset designs, which is summarised in section 3. Analysis of specific construction details that require assessment are given within this report against the relevant element of construction, as appropriate.

3 Test Data

The test evidence summarised below has been generated to support the fire resistance performance of the Laminesse doorset designs that are the subject of this report.

Note:

- Dimensions are in mm unless otherwise stated.
- Abbreviations: (h) = height; (w) = width; (t) = thickness; (d) = deep: (l) = long.
- Latches fitted but disengaged for the test, are reported as 'unlatched'.

Some/all of the test evidence used in the evaluation is over 5 years old. In accordance with industry guidance, the evidence has been reviewed to consider its suitability. Warringtonfire are satisfied that there have been no significant revisions to the relevant test standards which would render the evidence irrelevant.

The evidence has been generated to EN 1634-1. The latter is known to be more onerous than the BS 476 Part 22:1987 standard, primarily due to the use of plate thermocouples within the furnace to record the furnace temperature.

The same time temperature curve is used to control the temperature within the furnace for both test methods (the heating curve given within ISO 834-1). However, the plate thermocouple used to record the temperature within the furnace for the EN test method, requires a higher thermal inertia to read the same temperature as the probe thermocouple that is used for the BS 476 Part 22:1987 test, particularly during the early stages of the test. Furthermore, the neutral pressure regime is positioned lower relative to the specimen height in a European fire door test, therefore resulting in greater relative positive pressure conditions than those expected in a BS 476 Part 22:1987 test, which has the potential to increase hot gases and flaming on the unexposed side. These factors result in more onerous test conditions for doorsets tested to the BS EN 1634-1 test standard compared with the BS 476 Part 22:1987 test standard, which has been demonstrated by testing the same products to both standards.

It is therefore the opinion of Warringtonfire that the evidence citied in the following section, tested to both named standards referenced above can be utilised in this assessment which will conclude in terms of the fire resistance performance of the LAMINESSE FireSound Xtreme and FireSmoke Xtreme doorset designs if tested in accordance with BS 476 Part 22:1987.

3.1 Test report WF399042

This test, the essential details of which are shown below, is primary test data for the fire resistance performance of the LAMINESSE FireSound Xtreme and LAMINESSE FireSmoke Xtreme core leaves.

Date of test	2nd May 2018		
Identification of test body	Exova Warringtonfire (Now Warringtonfire Testing and Certification Ltd)		
Sponsor:	Moralt AG		
Tested Product	**Specimen A:** Latched, single acting, single leaf specimen comprised of a Moralt LAMINESSE FireSound Xtreme core leaf with vertical edges lipped with 4mm thick Sapele of nominal density 640kg/m^3 The leaf measured 2305mm (h) x 905mm (w) x 58mm (t. **Specimen B:** Latched, single acting, double leaf specimen comprised of Moralt LAMINESSE FireSmoke Xtreme core leaves with vertical edges lipped with 4mm thick Sapele of nominal density 660kg/m^3 The leaves measured 2305mm (h) x 910/325mm (w) x 58mm (t).		
Test Standard	BS EN 1634-1: 2014 and BS EN 1363-1: 2012		
Test Results (minutes) * Radiation data could not be ascertained due to an equipment malfunction.	**Integrity** **Insulation** **Radiation** (time to 15kW/M^2)	**Specimen A** 136 136 *	**Specimen B** 110 110 110
Summary of test specimen (dimensions in mm)	The tested specimens were each hung on 3No. hinges, with an overhead face fixed closer, a Glutz mortice lock with a 235mm high forend, and engaged shoot bolts on specimen B. Specimen A - 2No. 15 x 2.6 (t) Pyroplex graphite seals were fitted in the leaf edges at the head and vertical edges 2No 20 x 4 BASF Palusol seals fitted in the frame reveals at the head and jambs. The hinge blades were protected with 2mm thick Interdens intumescent gaskets. The latch body, forend and keep were protected with 1mm thick Interdens intumescent gaskets. Specimen B - 2No. 15 x 2.6 (t) Pyroplex graphite seals were fitted in the leaf edges at the head and hanging edges with 1No. 20 x 4 BASF Palusol seal fitted in one meeting edge opposite 2No 20 x 4 BASF Palusol seals in the opposite meeting edge. 2No 20 x 4 BASF Palusol seals were fitted in the frame reveals at the head and jambs. The hinge blades were protected with 2mm thick Interdens intumescent gaskets. The latch keep was protected with 1mm thick Interdens intumescent gaskets. The doorsets were oriented to open in towards the furnace for the test.		

3.2 Test report CFR1807252_2

This test, the essential details of which are shown below, is used to demonstrate the performance of Schott Technical Glass Solutions Ltd, Pyran Platinum and Pyran 'S' glass types in the LAMINESSE FireSound Xtreme core leaf.

Date of test	25th July 2015
Identification of test body	Cambridge Fire Research Ltd, Brewery Road, Pampisford, Cambridge, CB22 3HG
Sponsor	Moralt AG
Tested Product	Fixed, single leaf specimen comprised of LAMINESSE FireSound Xtreme core leaf. The leaf measured 2390mm (h) x 1220mm (w) x 58mm (t) and contained two glazed apertures.
Test Standard	Principles of BS 476 Part 22: 1987
Test Results (minutes) No failures were recorded prior to termination of the test at 132 minutes	**Integrity:** 132
	Insulation: 132
Summary of test specimen	The left glazed aperture contained Schott Technical Glass Solutions Ltd, Pyran 'S' glass, pane size 800 (w) x 200 (w) x 6 (t). The right glazed aperture contained Schott Technical Glass Solutions Ltd, Pyran Platinum glass, pane size 800 (w) x 400 (w) x 5 (t) For both apertures: Intumescent Seals Ltd ISL60 Plus tape at 25 (h) x 5 (t) was self-adhered to the glass against the beads. Beads were 1.5 (t) Z-profile Zintec steel. 6 (t) Gyproc Multiboard was used as an aperture liner to all 4 sides of the aperture, adhered in position with acrylic sealant.

3.3 Test report CFR1807241_2

This test, the essential details of which are shown below, is used to demonstrate the performance of Schott Technical Glass Solutions Ltd, Pyran Platinum and Pyran 'S' glass types in the LAMINESSE FireSmoke Xtreme core leaf.

Date of test	24th July 2015
Identification of test body	Cambridge Fire Research Ltd, Brewery Road, Pampisford, Cambridge, CB22 3HG. UKAS No. 4319.
Sponsor	Moralt AG
Tested Product	Fixed, single leaf specimen comprised of LAMINESSE FireSmoke Xtreme core leaf. The leaf measured 2390mm (h) x 1220mm (w) x 58mm (t) and contained a glazed aperture.
Test Standard	Principles of BS 476: Part 22: 1987
Test Results (minutes) No failures were recorded prior to termination of the test at 101 minutes	**Integrity:** 101
	Insulation: 101
Summary of test specimen	The glazed aperture contained Schott Technical Glass Solutions Ltd Pyran 'S' glass, pane size 800 (w) x 400 (w) x 6 (t). Intumescent Seals Ltd ISL60 Plus tape at 25 (h) x 5 (t) was self- adhered to the glass against the beads. Beads were 1.5 (t) Z-profile Zintec steel. 6 (t) Gyproc Multiboard was used as an aperture liner to all 4 sides of the aperture, adhered in position with acrylic sealant.

4 Technical Specification

4.1 General

The technical specification for the LAMINESSE FireSound Xtreme and FireSmoke Xtreme doorsets is given in the following sections, based on the test evidence summarised in section 3.

4.2 Intended use

The intended use of the LAMINESSE FireSound Xtreme and FireSmoke Xtreme doorsets is summarised below.

A pedestrian doorset including any frame, door leaf or leaves which is provided to give a fire resisting capability when used for the closing of permanent openings in fire resisting separating elements, which together with the building hardware and any seals (whether provided for the purpose of fire resistance or smoke control or for other purposes such as draught or acoustics) form the assembly.

4.3 General Description of Construction

Full details of the tested and assessed leaf construction are held on file, in confidence, at Warringtonfire.

This assessment considers the following designs:

1. Laminesse FireSound Xtreme.

Element		Species/type	Dimensions (mm)	Density (kg/m³)
Rails		None Fitted	-	-
Vertical Inserts (stiles)		Sapele	33 thick x 25 wide	640
Core		Details redacted at the request of Moralt AG, held on file in confidence at Warringtonfire.	27 thick overall from 2No. 13.5 thick boards	800
Facings	Inner		3 thick	780
	Middle		9.5 thick	-
	Outer		3 thick	780
Adhesives	Bonding the 2No. Layers core		-	-
	Bonding the Inner facings to the core		-	-
	Bonding the middle facings to the Inner facings		-	-
	Bonding the Outer facings to the Middle facings		-	-
	Lippings	PUR glue	-	-
	Inserts (stiles)		-	-
Lippings – vertical edges only		Sapele	4 thick	640

2. Laminesse FireSmoke Xtreme

Element		Species/type	Dimensions (mm)	Density (kg/m³)
Horizontal Inserts (rails) – Top and Bottom		Sapele	33 thick x 25 wide	640
Vertical Insert (stiles) – See section 10.2 for details		1. Sapele	33 thick x 25 wide	640
		2. MP-MgO (Magnesium-Oxide)	33 thick x 9.5 wide	-
Core		Laminboard	33 thick	440
Facings	Inner	Details redacted at the request of Moralt AG, held on file in confidence at Warringtonfire	9.5 thick	-
	Outer		3 thick	780
Adhesives	Bonding of the LVL to create the Laminboard		-	-
	Bonding the Inner facing to the core		-	-
	Bonding the Outer Facing to the Inner facing		-	-
	Lippings	PUR glue	-	-
	Inserts (stiles and rails)		-	-
Lippings – vertical edges only		Sapele	4 thick	640

4.4 Doorset Configurations & Maximum Leaf Sizes.

4.4.1 General

The evaluation of the leaf size for each door leaf option and doorset configuration is based on the tests listed in Section 3 and takes into account:

- the margin of over performance above 90 and 120 minutes integrity for the designs
- the characteristics exhibited during test and
- the doorset configuration tested.

The evaluation of the permitted configuration included in this field of application is based on the configuration tested. The principle is that the more components i.e. door leaves and overpanel – the harder it becomes to pass a test.

This is because the junction between two door leaves or door leaf and overpanel introduces a discontinuity into the doorset which can cause failures. This leads to the following statements:-

- A test on a double doorset is more onerous than a test on a single doorset
- A test on an unlatched doorset is more onerous than a test on a latched doorset

The leaf size for each door leaf option and configuration is linked to the intumescent specification and frame option. The following section details the maximum leaf size for each door leaf option and configuration based on the intumescent, hardware and frame details tested.

Doorsets with reduced dimensions are deemed to be less onerous. Therefore, doors with dimensions that are less than given in the door leaf envelopes (for the relevant intumescent specification) in the following sections are covered and may be manufactured.

4.4.2 Orientation

The primary fire resistance tests for these designs were conducted with the doorset hung such that the door leaf opened towards the fire, which is considered the most onerous orientation in terms of fire resistance performance. Based on this testing, assessment is made that the doorsets to this design may be hung either away from or towards the fire risk side of the doorset. This is confirmed in table 2 of clause 13.4.1 BS EN 1634-1:2014 +A1:2018.

4.4.3 Configurations

LAMINESSE FireSmoke Xtreme

For up to 90 minutes integrity requirements, based on the test evidence cited in section 3, this assessment covers the following doorset configurations for the LAMINESSE FireSmoke Xtreme door designs.

Abbreviation	Description
LSASD	Latched, single acting, single doorset
LSADD	Latched, single acting, double doorset

Unequal leaf double doorsets are covered by this assessment with no restriction on the smaller leaf dimension.

LAMINESSE FireSound Xtreme

For up to 120 minutes integrity requirements, based on the test evidence cited in section 3, this assessment covers the following doorset configurations for the LAMINESSE FireSound Xtreme door design only.

Abbreviation	Description
LSASD	Latched, single acting, single doorset

4.4.4 Laminesse FireSmoke Xtreme LSASD Configuration

4.4.4.1 Intumescent Specification

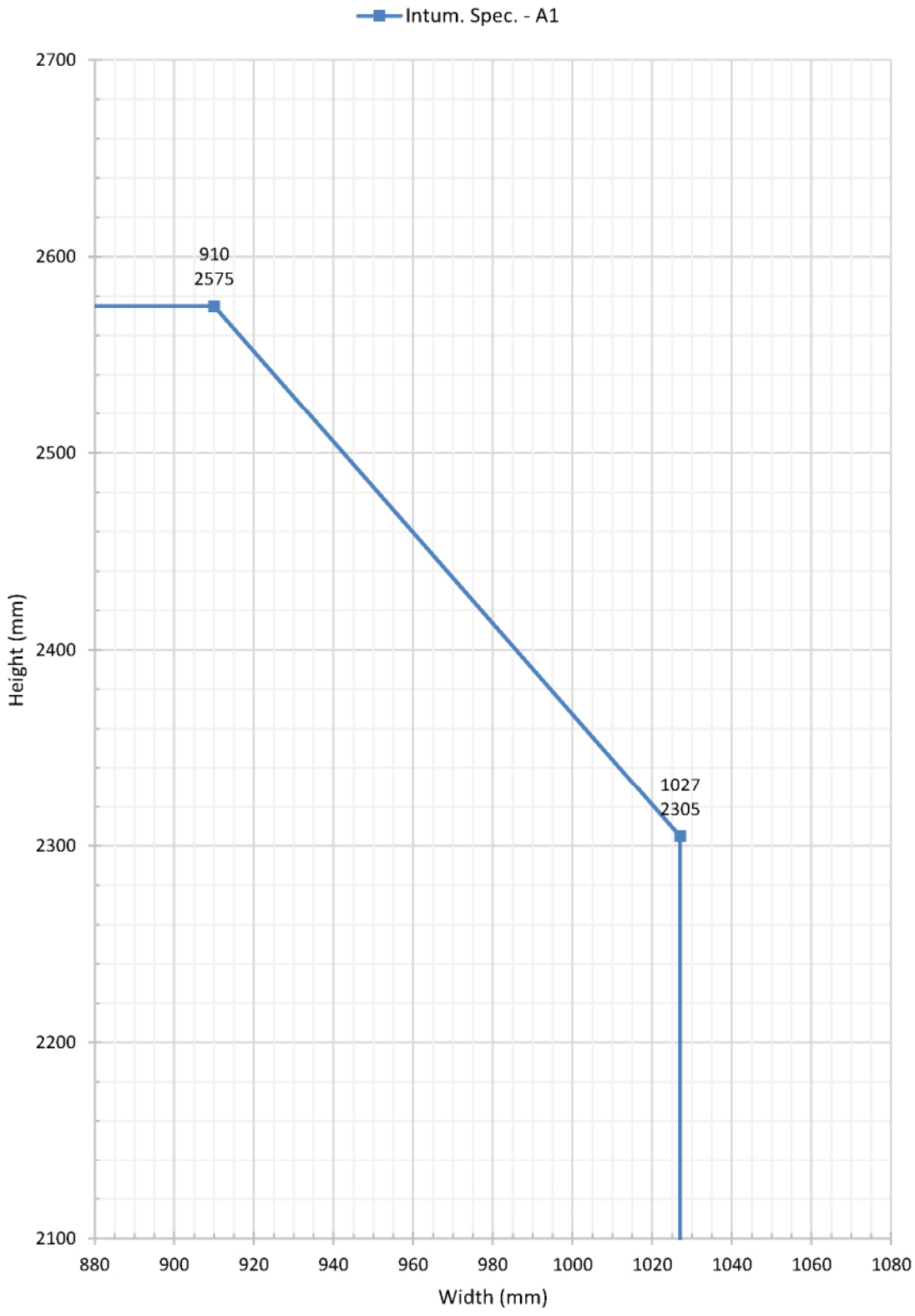
Intumescent Specification Laminesse FireSmoke Xtreme 90 Minutes - LSASD			
Intumescent Spec. Ref. (Test Ref)	**Type/Make**	**Manufacturer /Supplier**	**Location, Size & Quantity**
A1 (WF399042 Specimen B)	Rigid Box Seal and BASF Palusol SE	Pyroplex Ltd & BASF GmbH	**Door Frame – Head and Jambs:** 2No. 20mm wide x 4mm BASF Palusol SE seals exposed and fitted 10mm apart, 6mm from the exposed face in the frame reveals. **Leaf - Head & Vertical Edges:** 2No. 15mm wide x 4mm thick Pyroplex Rigid Box seals fitted side by side or 1No 30 x 4mm Pyroplex Rigid Box seal exposed and fitted centrally in the leaf edges. **Door Frame Stop:** 1No. 10mm wide x 4mm thick Pyroplex Rigid Box seal exposed and fitted to the upstand of the stop.

4.4.4.2 Essential Hardware

Hardware	Specification
1. Hinge	See section 13.2.3
2. Latch / Lock	Single Point See section 13.2.1
3. Closer	Overhead type, face fixed see section 13.2.2

4.4.4.3 Maximum Leaf Sizes

Figure 4.1: Graph Showing Maximum Leaf Size Envelope for Laminesse FireSmoke LSASD - 90 Minutes Fire Resistance



4.4.5 Laminesse FireSmoke Xtreme LSADD Configuration

4.4.5.1 Intumescent Specification

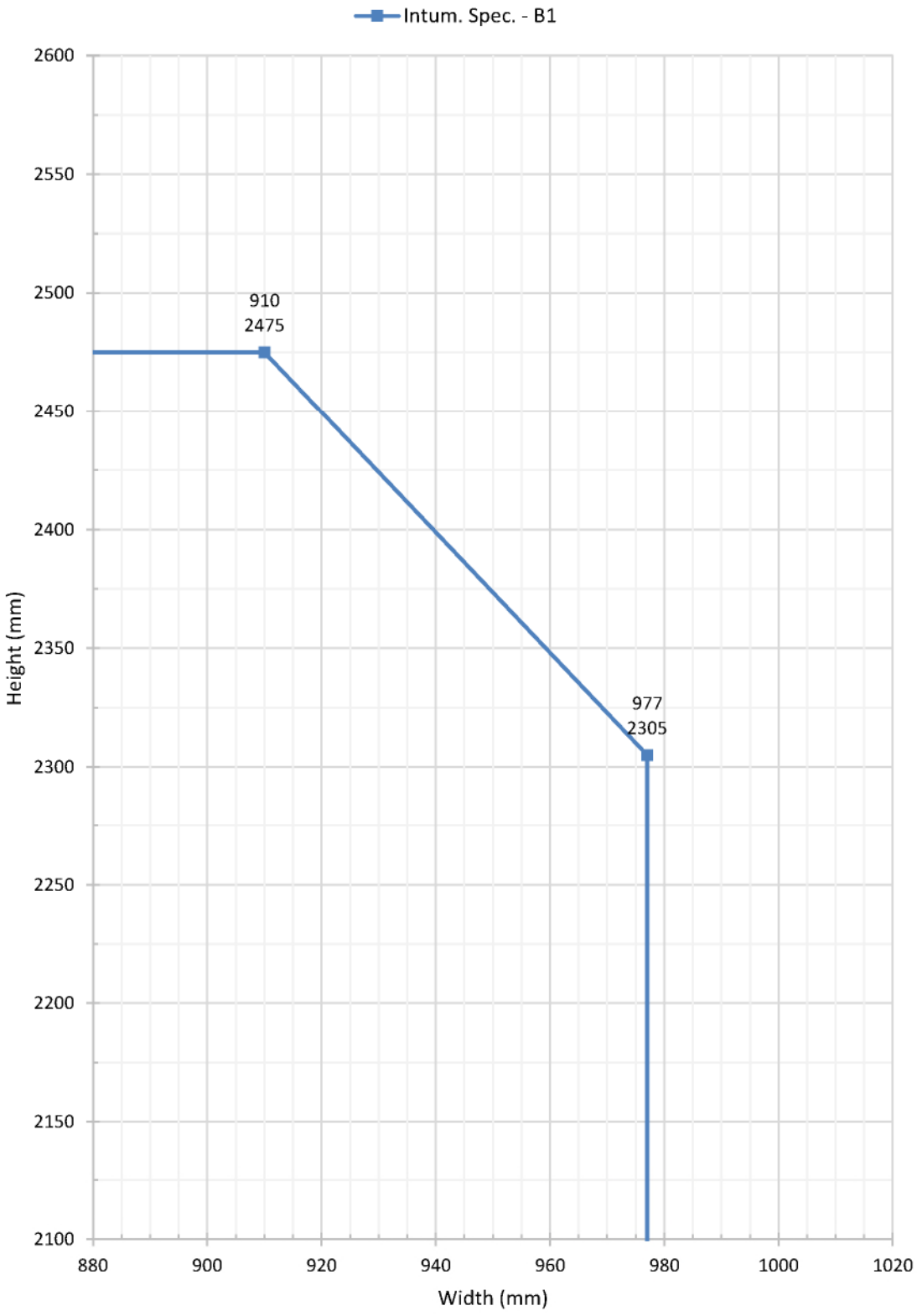
Intumescent Specification Laminesse FireSmoke Xtreme 90 Minutes - LSADD			
Intumescent Spec. Ref. (Test Ref)	**Type/Make**	**Manufacturer /Supplier**	**Location, Size & Quantity**
A1 (WF399042 Specimen B)	Rigid Box Seal and BASF Palusol SE	Pyroplex Ltd & BASF GmbH	**Door Frame – Head and Jambs:** 2No. 20mm wide x 4mm BASF Palusol SE seals exposed and fitted 10mm apart, 6mm from the exposed face in the frame reveals. **Leaf - Head & Vertical Edges:** 2No. 15mm wide x 4mm thick Pyroplex Rigid Box seals fitted side by side or 1No 30 x 4mm Pyroplex Rigid Box seal exposed and fitted centrally in the leaf edges. **Meeting Edges:** 2No. 20mm wide x 4mm BASF Palusol SE seals exposed and fitted 10mm apart 6mm from the exposed face in one leaf edge with 1No. 20mm wide x 4mm BASF Palusol SE seal exposed and fitted centrally in the leaf opposite.

4.4.5.2 Essential Hardware

Hardware	Specification
1. Hinges	See section 13.2.3
2. Latch / Lock	Single Point See section 13.2.12
3. Closer	Overhead type, face fixed see section 13.2.2

4.4.5.3 Maximum Leaf Sizes

Figure 4.2: Graph Showing Maximum Leaf Size Envelope for Laminesse FireSmoke LSADD – 90 Minutes Fire Resistance



4.4.6 Laminesse FireSound Xtreme LSASD Configuration

4.4.6.1 Intumescent Specification

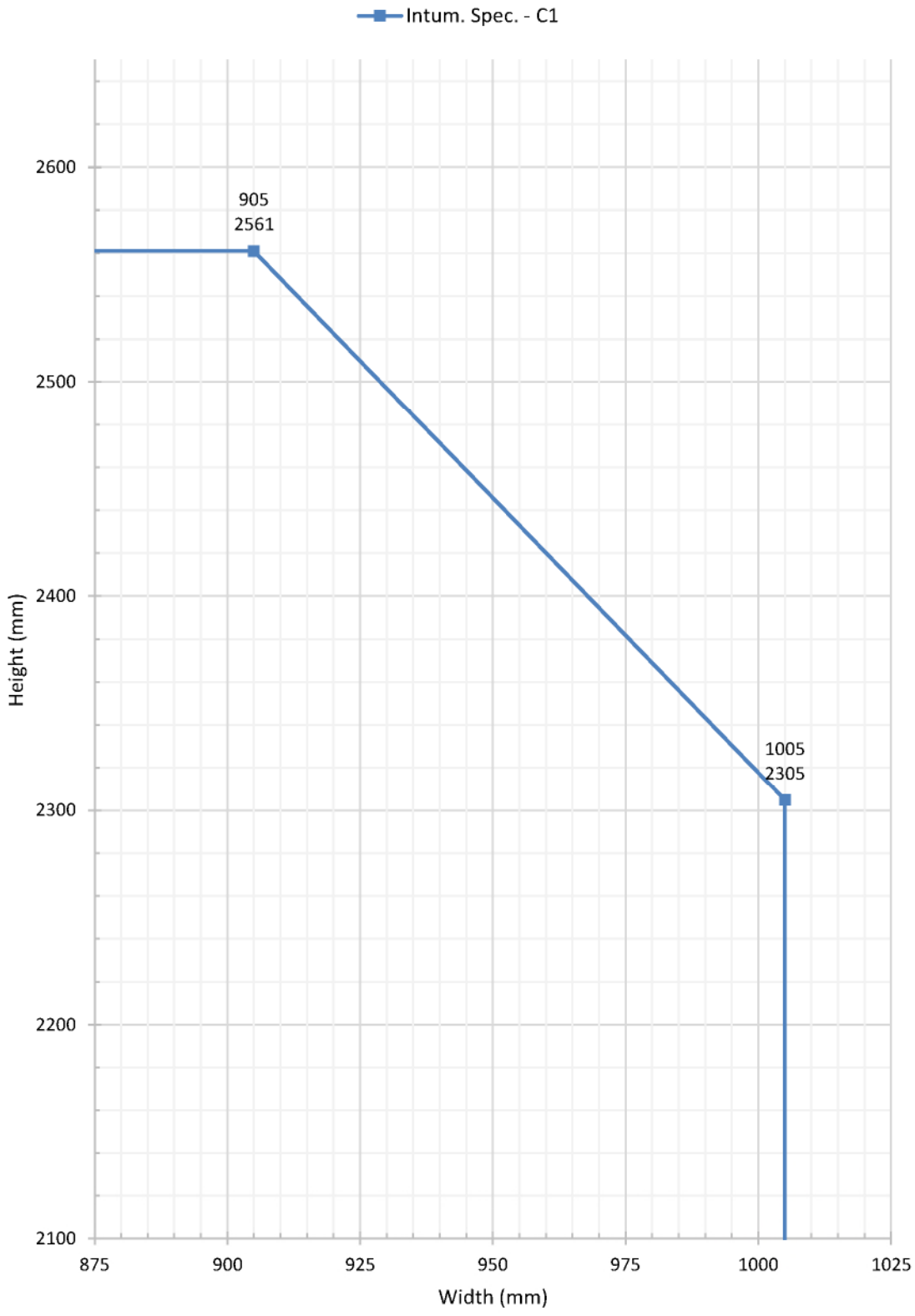
Intumescent Specification Laminesse FireSound Xtreme 90 Minutes - LSASD			
Intumescent Spec. Ref. (Test Ref)	**Type/Make**	**Manufacturer /Supplier**	**Location, Size & Quantity**
C1 (WF399042 Specimen A)	Rigid Box Seal & Palusol SE	Pyroplex Ltd & BASF	**Leaf - Head & Vertical Edges:** 2No. 15mm wide x 4mm thick Pyroplex Rigid Box seals fitted side by side or 1No 30 x 4mm Pyroplex Rigid Box seal exposed and fitted centrally in the leaf edges. **Door Frame – Head and Jambs:** 2No. 20mm wide x 4mm BASF Palusol SE seals exposed and fitted 10mm apart 6mm from the exposed face in the frame reveals. **Door Frame Stop:** 1No. 10mm wide x 4mm thick Pyroplex Rigid Box seal. **Threshold:** A drop down seal meeting the specification in section 13.3.6 must be installed.

4.4.6.2 Essential Hardware

Hardware	**Specification**
1. Hinge	See section 13.2.3
2. Latch / Lock	Single Point See section 13.2.1
3. Closer	Overhead type, face fixed see section 13.2.2

4.4.6.3 Maximum Leaf Sizes

Figure 4.3: Graph Showing Maximum Leaf Size Envelope for Laminesse FireSound LSASD – 90 Minutes Fire Resistance



4.4.7 Laminesse FireSound Xtreme LSASD Configuration

4.4.7.1 Intumescent Specification

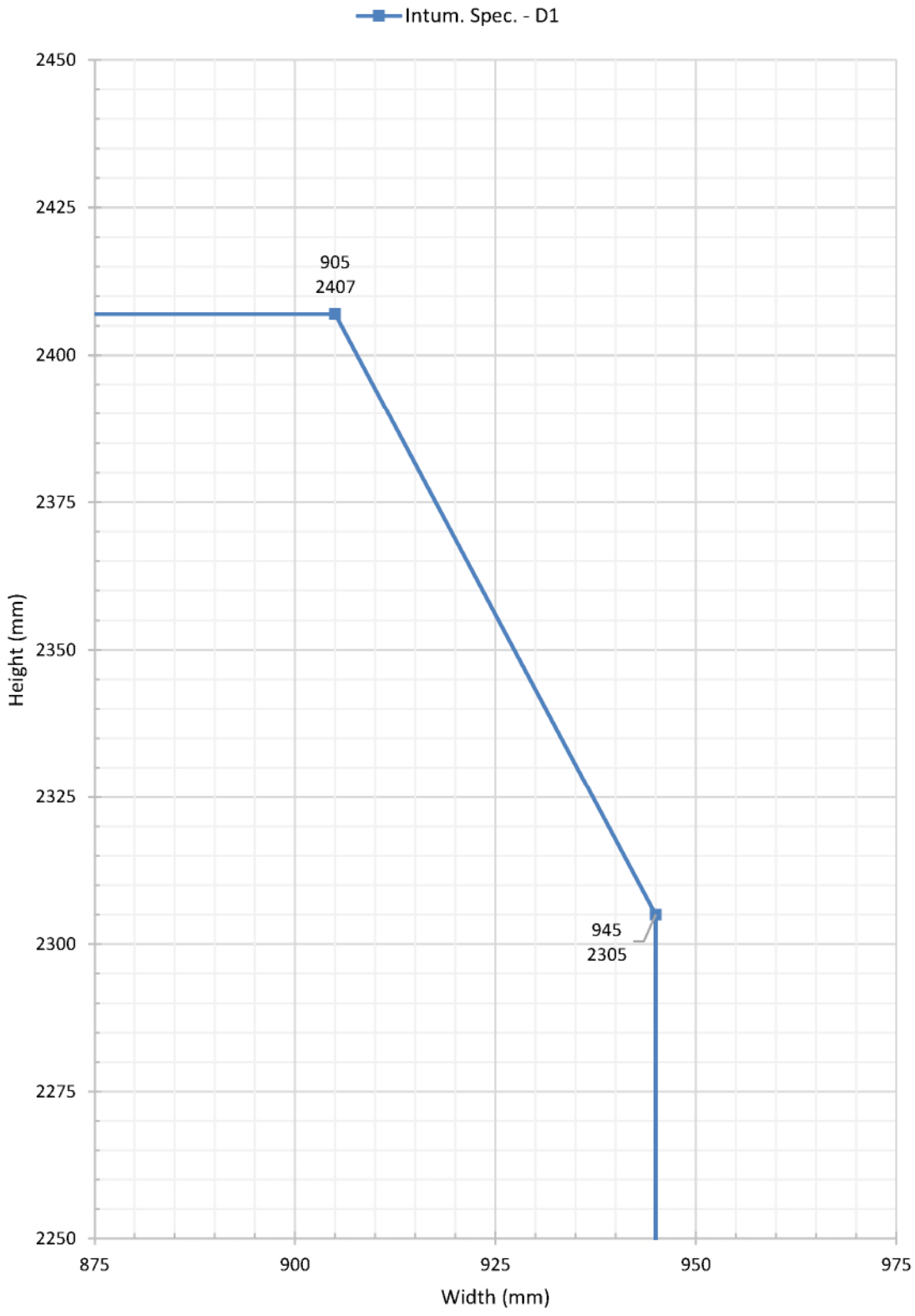
Intumescent Specification Laminesse FireSound Xtreme 120 Minutes – LSASD			
Intumescent Spec. Ref. (Test Ref)	**Type/Make**	**Manufacturer /Supplier**	**Location, Size & Quantity**
D1 (WF399042 Specimen A)	Rigid Box Seal & Palusol SE	Pyroplex Ltd & BASF	**Leaf – Head & Vertical Edges:** 2No. 15mm wide x 4mm thick Pyroplex Rigid Box seals fitted side by side or 1No 30 x 4mm Pyroplex Rigid Box seal exposed and fitted centrally in the leaf edges. **Door Frame – Head and Jambs:** 2No. 20mm wide x 4mm BASF Palusol SE seals exposed and fitted 10mm apart 6mm from the exposed face in the frame reveals. **Door Frame Stop:** 1No. 10mm wide x 4mm thick Pyroplex Rigid Box seal. **Threshold:** A drop down seal meeting the specification in section 13.3.6 must be installed.

4.4.7.2 Essential Hardware

Hardware	**Specification**
1. Hinge	See section 13.2.3
2. Latch/Lock	Single Point See section 13.2.1
3. Closer	Overhead type, face fixed see section 13.2.3

4.4.7.3 Maximum Leaf Sizes

Figure 4.4: Graph Showing Maximum Leaf Size Envelope for Laminesse FireSound LSASD - 120 Minutes Fire Resistance



5 Leaf Size Adjustment

LAMINESSE FireSound Xtreme and FireSmoke Xtreme door leaves may be altered as follows.

Element	Reduction
Leaf	Once manufactured (with inserts attached) dimensions of the leaf may not be reduced in height or width. See section 14.6 for on-site adjustment.
Lipping	The dimensions stated in section 10.1 may be reduced by 20% for fitting purposes

6 Overpanels

6.1 General

Overpanels have not been tested with the LAMINESSE FireSound Xtreme and FireSmoke Xtreme designs.

At this level of integrity performance the use of overpanels is not assessed.

7 Glazing

The testing conducted on the LAMINESSE FireSound Xtreme and FireSmoke Xtreme doorset designs has demonstrated that both designs are capable of tolerating glazed apertures, whilst providing a margin of over performance.

Glazing is acceptable within the following parameters for both 90 and 120 minutes fire resistance performance.

7.1 Approved Glazing System

The tested glazing system must be replicated in full as detailed below.

Glazing System[1]	Manufacturer	Maximum Area (m^2)
1. ISL 60Plus	Intumescent Seals	0.32

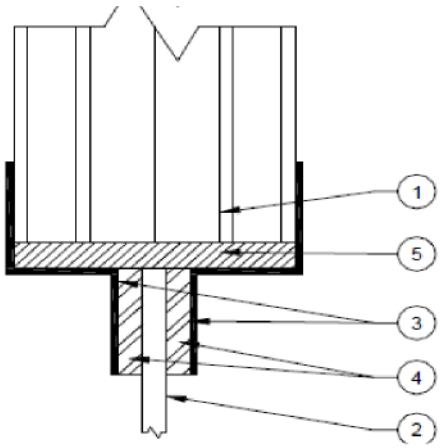
7.2 Approved Glass Products

Glass Type	Manufacturer	Thickness (mm)	Max. Area (m^2)
1. Pyran 'S'	Schott Technical Glass Solutions GmbH	6	0.32[1]
2. Pyran Platinum		5	0.32

Note: Maximum area for Pyran 'S' when used for 120 minute applications is 0.16m^2.

7.3 Glazing Beads & Installation

1. Glazing Beads for use within both the LAMINESSE FireSound Xtreme and FireSmoke Xtreme must be 1.5mm thick Z-profiled steel beads as shown below
2. Glazing beads must be retained in position with M6 steel bolts from one bead to the other through the leaf at no more than 50mm from each corner and at 150mm maximum centres
3. Glazed openings must not be less than 250mm from the top edge of the leaf and not less than 200mm from the vertical leaf edges. Multiple apertures are acceptable within the permitted glazed area, with a minimum dimension of 200mm of core between apertures
4. Glazed apertures within the LAMINESSE FireSound Xtreme and FireSmoke Xtreme must incorporate a 6mm thick aperture liner to all edges. The liner must be British Gypsum Glasroc GRG Multiboard, adhered in position with acrylic sealant
5. The aperture shape must be square or rectangular
6. The use of settings blocks and expansion gaps is not required
7. False glazing beads must not be fitted to the face of the glass.



Key:
1. LAMINESSE FireSound Xtreme or FireSmoke Xtreme door leaf
2. Pyran 'S' or Pyran Platinum glass
3. Steel Beads
4. ISL 60 Plus glazing tape
5. Glasroc GRG Multiboard

8 Door Frames

8.1 Door Frame Construction

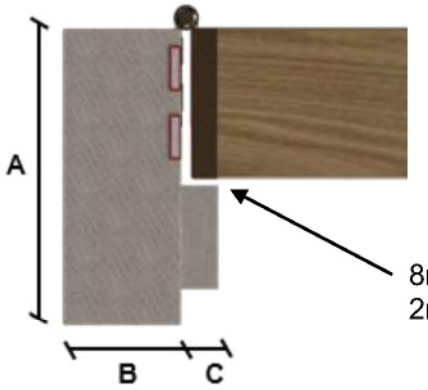
Door frames for LAMINESSE FireSound Xtreme and FireSmoke Xtreme doorsets must be constructed to meet the following specification.

Material	**Section Size** (mm)	**Min. Density** (kg/m^3)
Hardwood	100 x 38 (excluding the stop)	640

Notes:

1. The use of Beech (*Fagus sylvatica or related species*) is not permitted for 90 or 120 minute applications
2. All door frame timber must meet or exceed class J30 as specified in BS EN 942: 2007 (subject to adequate repair of any defects)
3. An 18mm deep planted or integral stop is adequate for single acting frames
4. It is not permitted to round off the edges of the door frame at the junction with the leaf edge
5. Door frame joints must be either mortice and tenon or half lapped as depicted in section 8.2. All methods require mechanical fixing with the appropriate length steel screws or ring shank nails.

The following diagram depicts the assessed frame profiles and dimensions:



Minimum frame section size:

A: Frame depth = 100mm minimum

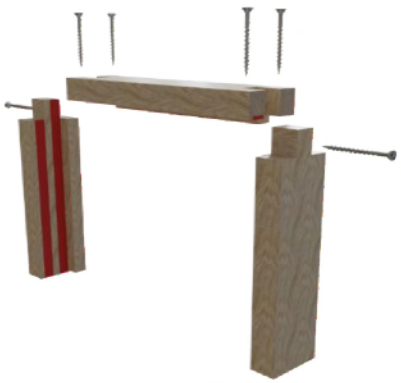
B: Frame width = 38mm minimum

C: Stop width = 18mm minimum

8mm radius max radius to create a maximum 2mm edge profiling

8.2 Door Frame Joints

Trenched or Half Lapped Joint



Mortice and Tenon Joint

Note: Drawings are representative of each type of door frame joint only; actual construction in terms of intumescent seal location and material, etc. must be as the text within this document specifies.

9 Leaf Facing Materials

9.1 General

The overall 58mm thick leaf constructions for both the LAMINESSE FireSound Xtreme and FireSmoke Xtreme must be 3mm MDF (minimum density 720kg/m^3). No alternative materials are assessed for use.

9.2 Decorative & Protective Facings

The following additional facing materials are permitted for these door designs since they would degrade rapidly under test conditions without significant effect.

Facing Material	**Maximum Permitted Thickness** (mm)
Paint	0.5
Timber veneers	2.0
PVC	2.0
Plastic laminates	2.0
Decorative paper / non-metallic foil	0.4

Notes:

1. Metallic facings are not permitted except for push plates and kick plates
2. Materials must not conceal intumescent strips
3. PVC and plastic laminates must not return around the leaf edges without specific test evidence.

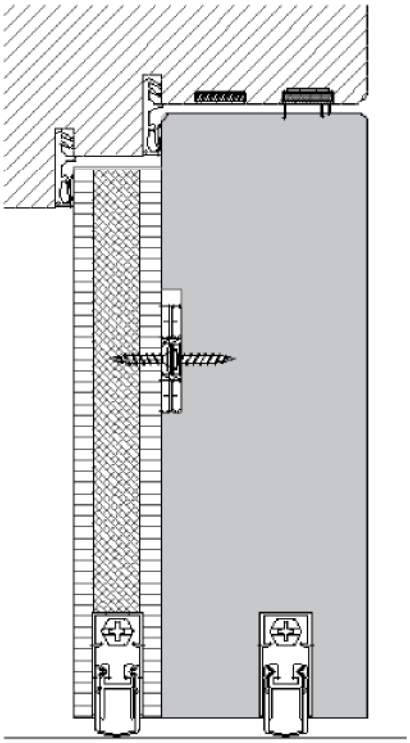
9.3 Acoustic Clad On Panels

For performance characteristics other than resistance to fire, it is proposed to add 'acoustic clad on' panels to the closing face of the Xtreme designs.

This detail is assessed as acceptable subject to the following requirements, diagram at the end of this section illustrates the principles discussed.

1. Maximum thickness of the panels must be 40mm
2. The panels must not be fitted under the frame stop, i.e. the panels may not be full width of the leaf on the closing face. However, where clad on panels are used it is permitted to extend the door frame to be double rebated where the panel would be under the second stop area as below
3. The panels must be of cellulosic or non-combustible materials, i.e. cores with MDF facings. The use of metallic materials at this thickness is not permitted
4. Since the clad on panels are not considered essential to the fire resistance performance of the leaf, it is our opinion they may be grooved to any design. The depth and/or width of any grooves in not restricted provided the grooves do not cut into the facings described in section 9.1
5. Threshold seals meeting the requirements of section 13.3.6 may be recessed into the bottom edge of clad on panels without compromising the fire resistance performance. It is beyond the remit of this assessment to comment on the smoke sealing effectiveness of a threshold seal installed in this location

6. The fitting of environmental seals as discussed in section 13.3.5 is permitted.



10 Leaf Edging Materials

10.1 Lippings

The use of Beech (*Fagus sylvatica*) is not permitted for 90 or 120 minute applications

The lipping specifications for this design of door leaf are as follows.

Material	Size (mm)		Min. Density
Hardwood	1. Square = 4 thick		640 kg/m³
	3. Rounded	Not permitted	-
	4. Rebated		

Notes:

1. A maximum of 2mm profiling is permitted at corners of lipping (see section 8.1)
2. All timber must meet or exceed class J30 as specified in BS EN 942: 2007 (subject to adequate repair of any defects)
3. Only the vertical edges of the leaves may be lipped
4. A 2.5^0 chamfer is permitted to the lipping at the leading edge of leaves providing the door gaps meet the requirements of section 14.7.

10.2 Leaf Framing Inserts

Inserts (stiles and rails) must be installed around the leaf core, as detailed below for each design.

Inserts (stiles and rails) must be fitted, where required, prior to any lippings between the facings – the inner layer of MDF must be removed – i.e. the insert will butt against the central layer. Stiles must be the full height of the core, therefore rails, where fitted, must butt up to the rear of the stiles.

Laminesse FireSound

Leaf Element	Material	Dimensions (mm)
Hanging & Lock Stiles	Hardwood[1]	33 thick x 25 wide
Top and Bottom Rails		Not required

Laminesse FireSmoke

Leaf Element	Material	Dimensions (mm)
Hanging Stile	Hardwood[1]	33 thick x 25 wide
Top and Bottom Rails		
Lock Stile – Single Leaves		
Meeting Edges – Double Leaves	Magnesium-Oxide (MgO) Board	33 thick x 9.5 wide

Note:

1. The use of Beech (*Fagus sylvatica*) is not permitted. Hardwood must meet or exceed class J30 as specified in BS EN 942: 2007 (subject to adequate repair of any defects) and be of a minimum 640kg/m^3 density.

11 Intumescent Materials for Hardware

The intumescent materials tested and assessed for this doorset design are as follows. The intumescent protection must be fitted to all relevant items of hardware as listed below. The seal specification for each doorset configuration is shown in Section 4.4.

Application	Location	Product/Manufacturer
Hinges	Under all hinge blades	1. 2mm Interdens – Dufaylite Developments Ltd. 2. 2mm Interdens 15SA - BASF
Lock/latches	Under forend & keep and encasing latch body	1. 1mm Interdens – Dufaylite Developments Ltd. 2. 1mm Interdens 15SA - BASF

12 Adhesives

See details in section 4.3.

13 Hardware

13.1 General

The following section details the permitted scope and constraints for fitting hardware to the Laminesse doorset designs. The following items of hardware must bear the CE Mark:

- Latches & locks: Test Standard EN 12209
- Single axis hinges: Test Standard EN 1935
- Controlled door closing devices: Test Standard EN 1154
- Electrically powered hold-open devices: Test Standard EN 1155
- Door co-ordinators: Test Standard EN 1158
- Emergency exit hardware: Test Standard EN 179
- Panic exit hardware: Test Standard EN 1125.

The following sections consider what tested and assessed alternative items of essential and non-essential hardware can be used on the doorset range.

Items of hardware have been considered and approved via the following means:

- The component has been successfully tested to BS 476 Part 22:1987 or BS EN 1634-1 in a suitably similar type of doorset e.g. timber leaf in timber frame
- As a result of an assessment of the appropriateness of the item of hardware, based on test evidence not commissioned by Moralt AG.
- As a result of the Certifire approval of the item of hardware
- Based on the generic guidance or CE marking but final approval will be with another approving body.

Each section will consider the named item of hardware and detail if there are any limitations associated with:

- Leaf size
- Configuration
- Intumescent seals
- Intumescent protection
- Frame configuration requirements

No item of hardware should be within 200mm of another item of hardware in the leaf edges unless there is test evidence to demonstrate they can be in closer proximity.

Hardware items should generally be fitted in accordance with the manufacturer's instructions. **However, the parameters and requirements of this assessment always take precedence, including specified protection such as hardware gaskets.** Referenced Certifire approved hardware may be incorporated subject to the design, material and dimensional limitations identified within this assessment report and identified on the relevant Certifire certificate.

13.2 Essential Hardware

13.2.1 Latches & Locks

The table below details the tested latches and locks that are approved for both single and double leaf doorsets.

Element	Manufacturer & Product Reference
Locks & latches	1. Glutz Europrofile mortice latch Ref: 4621.000.13R

Alternatively, components with the following specification are also deemed acceptable.

Element	Dimensions
Maximum forend and strike plate dimensions	235mm high by 25mm wide by 4mm thick
Maximum body dimensions	165mm high by 100mm wide by 18mm thick
Intumescent protection	See section 11
Materials	All parts essential to the locking/latching action (including the latch bolt, forend and strike) to be steel or stainless steel
Lock position	850 – 1200mm from the threshold of doors to the spindle of the operating handle

13.2.2 Automatic Closing

The table below details the tested overhead face-fixed closers that are approved.

Element	Manufacturer & Product Reference
Overhead face-fixed closers	• Rutland TS9205 (SRFB SESE)

Alternatively, components with the following specification are also deemed acceptable.

- Certifire approved overhead face-fixed closers for 90 or 120 minute fire resistance applications, as appropriate on timber based doorsets

Notes:

1. It must be ensured that the closer is of sufficient strength and power to ensure the door leaf/leaves fully engage into the frame reveal
2. Concealed overhead closers are not permitted for use with the LAMINESSE FireSound Xtreme or FireSmoke Xtreme doorset designs.

13.2.3 Butt Hinges

Leaves ≤2400mm high must be hung on a minimum of 3 hinges. Leaves >2400mm high must be hung on a minimum of 4 hinges.

The table below details the tested butt hinges that are approved.

Element	Manufacturer & Product Reference
Hinges	• Grade14 SSS concealed bearing hinge

Alternatively, components with the following specification are also deemed acceptable.

Element		Specification	
Blade height		90 - 120mm	
Blade width (excluding knuckle)		30 - 40mm	
Blade thickness		2.5 - 4mm	
Fixings		Minimum of 4No. 30mm long No. 8 or No.10 steel wood screws per blade	
Materials		Steel or stainless steel	
Hinge positions	**If 3 hinges are required**	Top	100 – 180mm from the head to top of hinge
		2nd	Minimum 200mm from top hinge or centrally fitted between top and bottom hinge
		Bottom	150 - 250mm from the foot of leaf to bottom of hinge
	If 4 hinges are required	Top	100 - 180mm from the head to top of hinge
		2nd & 3rd	Equispaced between top and bottom or 2nd hinge 200mm from top hinge and 3rd hinge equally spaced between 2nd and bottom hinge
		Bottom	150 - 250mm from the foot of the leaf to bottom of the hinge
Intumescent protection		See section 11	

13.3 Non-Essential Hardware

13.3.1 Pull Handles

These items may be surface-fixed or bolted through the door leaf provided that they are steel or stainless steel and the length is limited to 1200mm between the fixing points. No additional intumescent protection is required provided that the hole for the bolt through the leaf is tight.

13.3.2 Shoot Bolts

As discussed in section 4.4.2, the LAMINESSE FireSound Xtreme and FireSmoke Xtreme doorset designs may be installed opening in either direction with respect to fire risk, surface fixed bolts may be installed but only on the non-fire risk face of doorsets, provided their installation does not require the removal of material from the door leaf or door frame. As tested, the SCP Heavy Barrel Bolt Reference: ZAS01B is a suitable product.

Leaf edge, rebated, flush bolts are not permitted for use with the LAMINESSE FireSound Xtreme or FireSmoke Xtreme designs.

13.3.3 Push Plates/Kick Plates

Steel or stainless steel, face-fixed hardware such as push plates and kick plates may be fitted to the doorsets on both sides of the door leaf. These items of hardware are permitted up to a maximum of 20% of the door leaf area if mechanically fixed and a maximum of 30% if bonded with a contact or other thermally softening adhesive. Plates must not return around the door edges.

13.3.4 Panic Hardware

Panic hardware may be fitted, provided that its installation does not require the removal of any timber from the leaf, stop or frame reveal and it in no way interferes with the self-closing action of the door leaf.

13.3.5 Environmental Seals

Test WF399042 utilised Norsound 720 seals in the meeting edge of one leaf of specimen B and Norsound 710 seals in the upstand of the frame stop on specimen A.

On this basis, silicon based flame retardant acoustic, weather and dust seals (for example those referenced above or Lorient IS1212, IS1511, IS7025, IS7060, Norsound 710 and 720, STS ST1009, Deventer DS155a, DS112a, DS6922a and DS6955a) may be fitted to this doorset design without compromising the performance, providing their fitting does not interfere with the activation of the intumescent seals or hinder the self-closing function of the leaves.

13.3.6 Threshold Seals

Test WF399042 utilised the Planet US dropseal in the threshold of the leaf of specimen A, Therefore the following types of automatic threshold drop seals may be recessed in to the bottom rail of leaves to this design without compromising the performance:

Manufacturer	Product
Lorient Polyproducts Ltd.	IS8010Si
Raven	RP8Si
Athmer	Schall-Ex L15 range
Norsound Ltd.	810dB, 810dB+ ranges
STS	422
Planet	HS

13.3.7 Letter Boxes/Plates

It is not permitted to fit letter boxes/plates to doorsets intended for 90 or 120 minute applications.

14 Installation

14.1 General

This section considers the installation of direct types of frames and doorset. This section considers:

- the door frame and architrave installation position relative to the wall
- the fire stopping between the frame and the wall and the use of shadow gaps
- the fixing requirement including packers
- the requirements for door edge gaps
- the trimming of door edges.

14.2 Packers

Packers can be timber of equal density to the frame, or, plywood or plastic packers if fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1.

14.3 Wall types, Structural Opening and Fixity

For walls that remain rigid during fire exposure (brickwork or blockwork, for example) the opening should be square, plumb and provide a flat surface for installation of the doorset.

For flexible wall types such as steel and timber stud partitions the structural opening must be prepared in line with the test evidence provided by the wall manufacturer.

The supporting construction must provide at least the required level of fire resistance designated for the doorset design and be a suitable medium to permit adequate fixity.

It must therefore be capable of staying in place and intact for a minimum of 90 or 120 minutes, as appropriate. For single leaf doorsets, the frame jambs only are to be fixed to the supporting construction using steel fixings at 600mm maximum centres and maximum of 150mm from corner. The fixings must be of the appropriate type for the supporting construction and must penetrate to a minimum depth of 40mm. It is not necessary to fix the frame head, although packers must be inserted.

For all other configurations of doorset, the upper horizontal framing section abutting the structural opening must also be secured to the wall using steel fixings at 600mm maximum centres and maximum of 150mm from corner. The fixings must be of the appropriate type for the supporting construction and must penetrate to a minimum depth of 40mm.

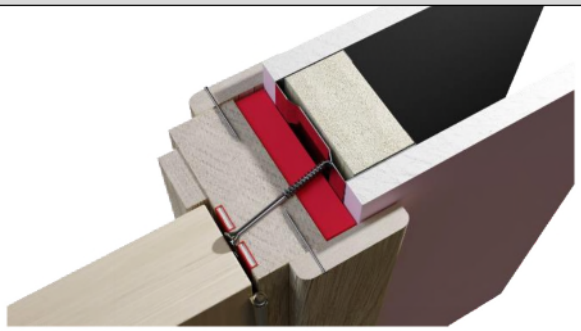
In all instances the fixing position must be such that it provides adequate restraint to the element of construction throughout the exposure to fire. This may therefore sometimes necessitate a twin line of fixings.

14.4 Door Frame Installation

The following diagrams indicate acceptable and unacceptable frame installations.

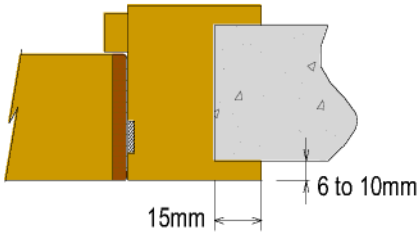
The diagrams below are representative; actual installation must be as the text within this document specifies. See section 14.5 for sealing to structural opening.

Permitted Installations



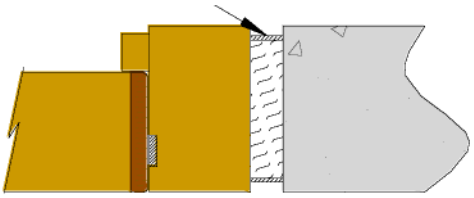
Architraves overlapping the frame to structural surround junction are mandatory.

Installation Methods Below are NOT Permitted

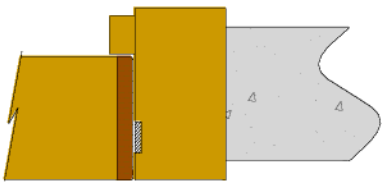


6-10mm is the maximum a frame is permitted to be proud of the structural surround when combined with a 15mm bolection return. Projecting frames outside these dimensions will require specific test evidence or assessment.

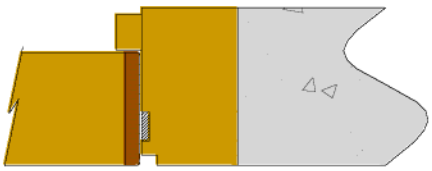
Max 10 x 10mm shadow gap with 2mm intumescent mastic capping or
10 x 4mm PVC encased intumescent seal



Shadow gaps are not permitted as shown in the above diagram providing the frame to structural surround is infilled with timber of the same density as the frame or a non-combustible material such as plasterboard. Other shadow gap dimensions will require specific test evidence or assessment.



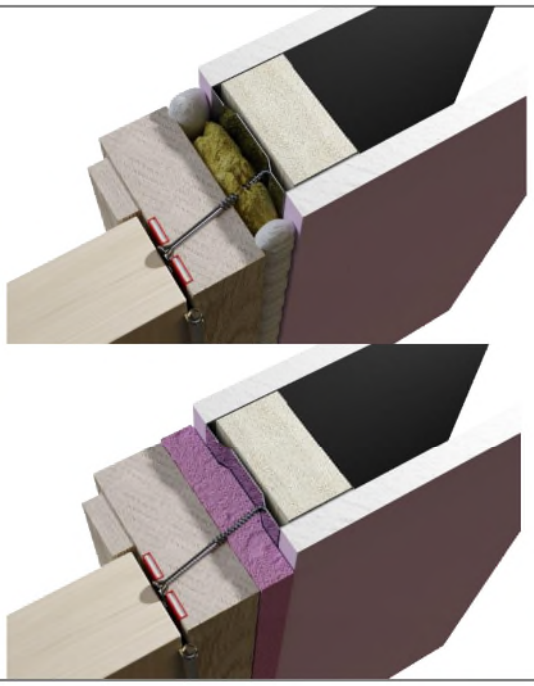
Projecting frames without bolection returns are not permitted without specific test evidence or assessment due to the potential for increased charring to the back of the frame.



Quirks between the leaf and frame are not permitted without specific test evidence or assessment due to the potential for increased charring of the leaf to frame gap.

14.5 Firestopping

The firestopping requirements between the back of frame and wall are dependent on the gap size between the substrates. The table below provides the requirements based upon the gaps size. Please note that in the 3D depictions noted below show the application where a door frame is of the same depth as the overall wall thickness.

Gap (mm)	Requirement	3D model depiction
Up to 10	Gap must be sealed on both sides with a 20mm depth of acrylic intumescent mastic, fire tested for this application to BS 476 Part 22: 1987 or BS EN 1634-1. Timber architraves of a minimum 18mm thick must be fitted to both faces, fitted with a minimum 15mm overlap to the door gap.	
10 – 20	Gap must be tightly packed with mineral fibre[1] capped on both sides with a 20mm depth of acrylic intumescent mastic, fire tested for this application to BS 476 Part 22: 1987 or BS EN 1634-1 or full depth expanding PU foam, fire tested for this application to BS 476 Part 22: 1987 or BS EN 1634-1. Timber architraves of a minimum 18mm thick must be fitted to both faces, fitted with a minimum 15mm overlap to the door gap.	

Note:

1. Proprietary gap filling product that has demonstrated 90 or 120 minutes integrity performance, as applicable, to BS476 Part 22: 1987 or BS EN 1634-1 (between masonry and timber). The frame to structural opening gap must be covered with a minimum of 18mm thick hardwood architraves overlapping at least 15mm each side.

14.6 Post Production (Onsite) Leaf Size Adjustment

The LAMINESSE FireSound Xtreme or FireSmoke Xtreme doorset designs may be altered as follows:

Element	Reduction
Lipping	The post-production lipping thickness may be reduced by 1mm for fitting purposes, providing that the door gaps and intumescent conditions remain as required by this assessment and the minimum limitation in terms of lipping thickness is still maintained

14.7 Door Gaps

Door gaps and alignment tolerances must fall within the following range.

Location	Dimensions
Door edge gaps	A minimum of 2mm and a maximum of 4mm
Alignment tolerances	Leaves must not be proud of each other or from the door frame by more than 1mm
Threshold	10mm between bottom of leaf and top of floor covering. This is the maximum tolerance for fire resistance only. Where smoke control is required refer to section 16.

15 Insulation

Insulation performance may be claimed for a doorset to these designs meeting the following.

Type	Details
Partially insulating	Doorsets incorporating up to 20% of non-insulating or partially insulating glazing
Fully insulating	Unglazed doorsets

16 Smoke Control Guidance

Fire doorsets required to provide an ambient temperature smoke control function will need to fit smoke seals, or combined intumescent/smoke seals, which have been tested in accordance with one of the following test methods:

- BS 476-31.1:1983; *Fire tests on building materials and structures, Section 31.1 Method of measurement under ambient temperature conditions*
- BS EN 1634-3: 2004; *Fire resistance tests for door and shutter assemblies — Part 3: Smoke control doors and shutters*

In order for the doorset to provide the smoke leakage performance demonstrated by the smoke leakage test evidence, the orientation and position of the smoke seals, any interruptions, door edge gaps, and the type and configuration of the doorset must be consistent with the details tested. Additionally, any other components installed where smoke leakage may occur, such as glazing, hardware, or sealing between the frame and structural surround, must also be taken into account.

The tested leakage rate will be expressed in the test reports as the volume of air leakage through the complete specimen, per linear metre of door gap, per hour (m^3/m/hr), which is measured at the pressure differences stated in the relevant standard e.g. 10Pa, 25Pa and 50Pa. The test reports will also state the tested threshold arrangement (i.e. taped or fitted with a threshold seal).

The fitting of smoke seals must not compromise the fire resistance performance of the doorset designs assessed within this field of application. Smoke seals that are fitted to fire resisting doorsets must therefore have suitable fire resistance test evidence that demonstrates the performance of the seal in fire test conditions, when tested as part of a complete doorset, to the relevant test standard (e.g. BS 476 Part 22:1987 or BS EN 1634-1). The configuration and location of the seal in the fire test evidence must align with that tested for smoke leakage.

Smoke seals can compromise the fire resistance performance of door designs by, for example, preventing the door leaf from closing fully within the frame reveal or igniting if the seal is fitted to a door design without insulation performance. It is therefore recommended that fire test evidence is sought that directly supports the use of the smoke seal with the door design assessed herein, or, where cascaded evidence is being relied upon, the smoke seal manufacturer is contacted to verify that the fire test evidence for the seal is applicable to the door design assessed herein.

Note: For doorsets tested to BS EN 1634-3:2004, the leakage rate is measured at positive and negative pressure differences of 10Pa, 25Pa, and 50Pa. The same 25Pa positive and negative pressure difference is used for the BS 476-31.1:1983 test method. Therefore, if tested to BS 476-31.1:1983, the designs would be expected to provide the same leakage rate as the results when tested to BS EN 1634-3: 2004, at 25Pa.

17 Conclusion

It is our opinion that, if the Moralt AG LAMINESSE FireSound Xtreme or FireSmoke Xtreme doorset designs constructed in accordance with the specification documented in this field of application report, were to be tested in the appropriate configuration in accordance with BS 476 Part 22: 1987, they would provide a minimum of 90 or 120 minutes integrity and insulation (subject to section 15), as appropriate.

18 Declaration by the Applicant

1) We the undersigned confirm that we have read and comply with obligations placed on us by the Passive Fire Protection Forum (PFPF) Guide to undertaking technical assessments and engineering evaluations based on fire test evidence 2021 Industry Standard Procedure
2) We confirm that any changes to a component or element of structure which are the subject of this assessment have not to our knowledge been tested to the standard against which this assessment has been made.
3) We agree to withdraw this assessment from circulation should the component or element of structure, or any of its component parts be the subject of a failed fire resistance test to the standard against which this assessment is being made.
4) 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.
5) 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 the assessing authority to withdraw the assessment.

(In accordance with the principles of FTSG Resolution No. 82: 2001).

Signed:

Name: Helmut Hahn

For and on behalf of: Moralt AG

MORALT
Moralt AG Obere Tiefenbachstr. 1 D-83734 Hausham

19 Limitations

The following limitations apply to this assessment:

1) This assessment addresses itself solely to the elements and subjects discussed and does not cover any other criteria. It is beyond the scope of this assessment to consider the potential effects of alterations to the tested specification on the acoustic performance of the doorsets herein. All other details not specifically referred to should remain as tested or assessed.

2) This field of application report is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available to Warringtonfire, the assessment will be unconditionally withdrawn, and the applicant will be notified in writing. Similarly, the assessment evaluation is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence.

3) This assessment has been carried out in accordance with Fire Test Study Group Resolution No. 82: 2001.

4) Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

5) This assessment relates only to those aspects of design, materials and construction that influence the performance of the element(s) under fire resistance test conditions. It does not purport to be a complete specification ensuring fitness for purpose and long-term serviceability. It is the responsibility of the client to ensure that the element conforms to recognised good practice in all other respects and that, with the incorporation of the guidance given in this assessment, the element is suitable for its intended purpose.

6) This assessment represents our opinion as to the performance likely to be demonstrated on a test in accordance with BS 476 Part 22:1987, on the basis of the evidence referred to herein. We express no opinion as to whether that evidence, and/or this assessment, would be regarded by any Building Control authority as sufficient for that or any other purpose. This assessment is provided to the client for its own purposes and we cannot opine on whether it will be accepted by Building Control authorities or any other third parties for any purpose.

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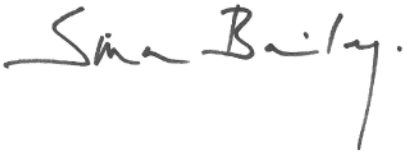
8) The version/revision stated on the front of this Field of Application supersedes all previous versions/revisions and must be used to manufacture doorsets from the stated validity date on this front cover. Previous revisions of the Field of Application cannot be used once an updated Field of Application has been issued under a new revision.

20 Validity

1) The assessment is valid for 5 years from the date of issue, after which time it must be submitted to Warringtonfire for technical review and revalidation.

2) This assessment report is not valid unless it incorporates the declaration given in Section 18, duly signed by the applicant.

Signatures:		
Name:	**A M Winning***	**S Bailey***
Title:	Senior Product Assessor	Senior Product Assessor

* For and on behalf of Warringtonfire

*

Appendix A

Revisions

Rev.	Warringtonfire Ref.	Date	Description
A	421377	12.11.19	Addition of section 12.2 to clarify insert requirements
B	502943 (WF415740 Revision B Redacted)	19.07.21	Add further details into the summary for WF399042 and clarify the leaf and door size adjustment wording. Section 12.2 as referenced above is now 10.2. Redacted copy of WF415740 Revision B Redacted issued on same date with same validity period, leaf construction details redacted at request of Moralt AG.