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Fire Resistance Assessment of:

Moralt
LAMINESSE FireSound Xtreme
and
LAMINESSE FireSmoke Xtreme

Doorsets for:

90 & 120 Minutes Fire Resistance

WF Report No:

WF415740

Prepared For:

Moralt AG
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Germany

Valid From:

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Valid Until:

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Contents

1 Foreword

This field of application report has been commissioned by Moralt AG and relates to LAMINESSE FireSound Xtreme doorsets, for 90 and 120 minute fire resisting performance; and LAMINESSE FireSmoke Xtreme doorsets for 90 minute fire resisting performance.

This field of application 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, as appropriate.

This field of application (scope) uses established empirical methods of extrapolation and experience of fire testing similar door assemblies, 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 with BS 476: Part 22: 1987 and therefore can neither be considered for a CE marking application nor can the conclusion be used to establish a formal classification against EN13501-2.

This field of application has been written using appropriate test evidence generated at a UKAS or European accredited laboratory 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) guidelines to undertaking assessments. 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.

The PFPF guidelines are produced by the UK Fire Test Study Group (FTSG) an association of the major fire testing laboratories in the UK and are published by the PFPF, the representative body for the passive fire protection industry in the UK.

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 assessment.

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 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 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.		**Specimen A**	**Specimen B**
	Integrity	136	110
	Insulation	136	110
	Radiation (time to 15kW/M^2)	*	110
Summary of test specimen (dimensions in mm)	The tested specimens were 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
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.

3.4 Comparison of Test Standards

The ISO834 time/temperature curve used in BS 476: Part 22: 1987 test is the same as within BS EN 1634-1, except for the use of Plate Thermometer device(s) for furnace control in the EN test, which test data has shown to make the EN test more onerous. This is due to the higher thermal inertia required for the plate thermocouple to read the same temperature as the probe thermocouple used for the BS 476: Part 22 test, particularly during the early stages of the test. It is therefore our assessment that the same integrity performance would be achieved in a test conducted utilizing the principles of BS 476: Part 22: 1987 and that test data generated to the requirements of the EN test may therefore be used in support of this scope of application document, written to the requirements of BS 476: Part 22: 1987.

4 Technical Specification

4.1 General

The technical specification for the LAMINESSE FireSound Xtreme and FireSmoke Xtreme doorsets is given in the following sections and is 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.**
2. **Laminesse FireSmoke Xtreme**

5 Leaf Sizes

The approval for increased leaf dimensions is based on the results of the tests shown in section 3 and takes into account the margin of over performance above 90 and 120 minutes integrity for the design(s), and the characteristics exhibited during test.

Data sheets specifying the maximum approved leaf sizes and graphs showing the permitted gradient between maximum height and width are contained in appendix B.

Doorsets with dimensions smaller than stated are deemed to be less onerous. Therefore, doors with dimensions that are less than those tested or assessed within appendix B may be manufactured.

6 Configurations

6.1 90 Minutes Integrity

For 90 minutes integrity requirements, based on the test evidence cited in section 3, this assessment covers the following doorset configurations for both the LAMINESSE FireSound Xtreme and 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.

6.2 120 Minutes Integrity

For 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

7 Leaf Size Adjustment

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

Element	Reduction
Leaf	The manufactured dimensions of the leaf may not be reduced in height or width (smaller doors may be manufactured - see section 5)
Lipping	The dimensions stated in section 12 may be reduced by 20% for fitting purposes

8 Overpanels

8.1 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.

9 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.

9.1 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

9.2 Approved Glass Products

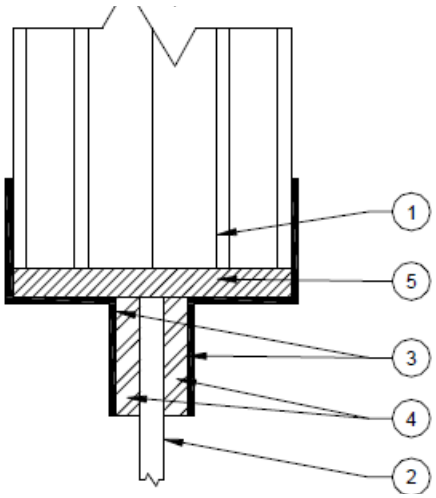
Glass Type	**Manufacturer**	**Thickness** (mm)	**Max. Area** (m^2)
1. Pyran 'S'	Schott Technical Glass Solutions GmbH	6	0.32[1]
2. Pyran Platinum		5	0.32

Note:

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

9.3 Glazing Beads & Installation

1. Glazing Beads for use within both the LAMINESSE FireSound Xtreme and FireSmoke Xtreme must be 1.5mm thick Z-profile 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 mastic
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

10 Door Frames

10.1 Door Frame Construction

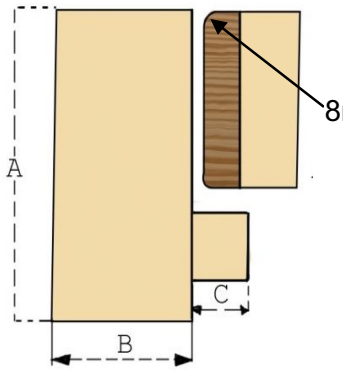
Door frames for LAMINESSE FireSound Xtreme and FireSmoke Xtreme doorsets must be constructed to meet the following specification.

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

Notes:

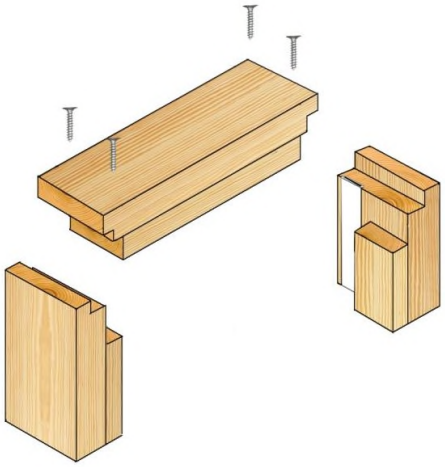
1. The use of Beech (*Fagus sylvatica or related species*) is not permitted for 90 or 120 minute applications
2. All door frame timber must meet or exceed class J30 as specified in BS EN 942: 2007 (subject to adequate repair of any defects)
3. An 18mm deep planted or integral stop is adequate for single 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 10.2. 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:

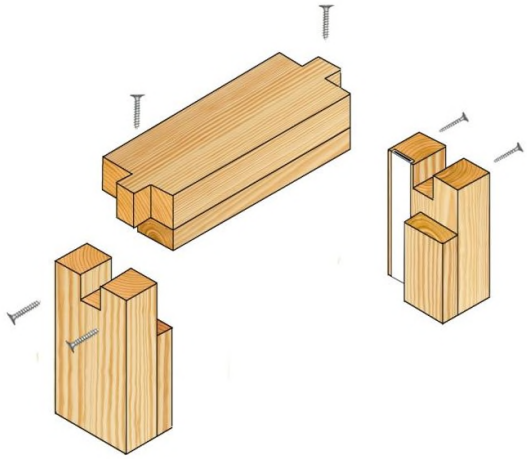


A = min. 100mm B = min. 38mm C = min. 18mm
8mm max radius to create a maximum 2mm edge profiling

10.2 Door Frame Joints



Half Lapped Joint



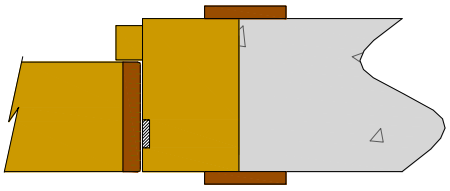
Mortice and Tenon Joint

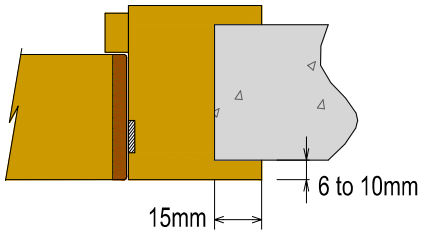
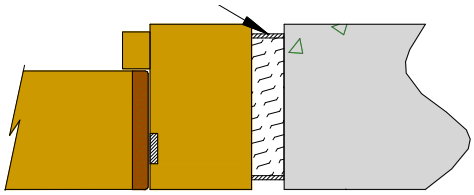
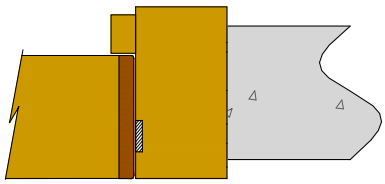
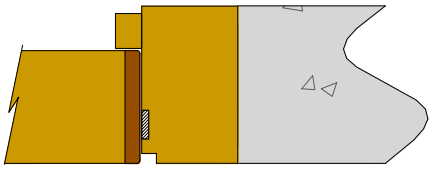
Note: Drawing is representative of each type of door frame joint only; actual construction in terms of intumescent seal location and material, etc. must be as the text within this document specifies.

10.3 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 19 for sealing to structural opening.

Permitted Installations

Architraves overlapping the frame to structural surround junction are mandatory.

Not Permitted Installations	
 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 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.

11 Leaf Facing Materials

11.1 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.

11.2 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:

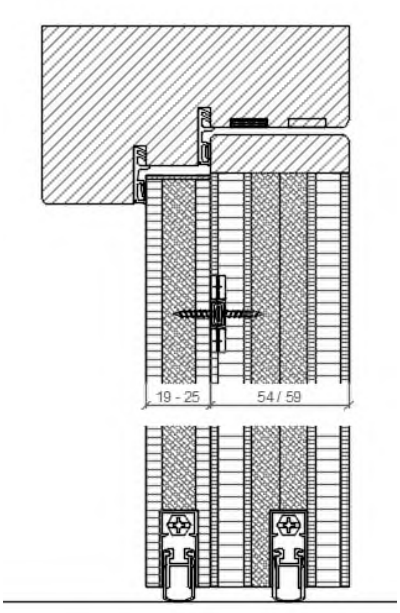
1. Metallic facings are not permitted except for push plates and kick plates
2. Materials must not conceal intumescent strips
3. PVC and plastic laminates must not return around the leaf edges without specific test evidence.

11.3 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 FireSound 54 design.

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 11.1
5. Threshold seals meeting the requirements of section 15.3.10 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 15.3.9 is permitted.



12 Lipping Materials

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 10.1)
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 16.

13 Intumescent Materials

The seal specification for each doorset configuration is contained in appendix B.

The intumescent materials tested for this doorset design are as follows:

Application	Location	Product/Manufacturer
Edge seals	Fitted in the frame jambs and leaf edges	1. Pyroplex Ltd. – Rigid Box Seal 2. BASF – SE PVC encased Palusol
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

14 Adhesives

See details in section 4.3.

15 Hardware

15.1 General

The following sections detail the scope and constraints for fitting hardware to the door designs.

15.2 Tested Hardware

The following hardware has been successfully incorporated in the tests on LAMINESSE FireSound and FireSmoke Xtreme doorsets.

Element	Product	**Size** (mm)
Hinges	Grade14 SSS concealed bearing hinge	102 x 38 (blade size)
Closers	Rutland TS9205 (SRFB SESE) overhead type	235 x 55 (footprint size)
Locks & latches	Glutz Europrofile mortice latch Ref: 4621.000.13R	235 x 25 (forend size) 170 x 25 (keep size)
Face Fixed Shoot bolts	SCP Heavy Barrel Bolt Reference: ZAS01B	200 x 35 (footprint size)
Furniture	OSLO lever type handle and lock escutcheon Ref: 5064.S Roses Ref: 5624.S.21.2 SSS PZ escutcheons Ref: 5624.3C SSS	Ø52 (rose size)

15.3 Additional & Alternative Hardware

The following section details the permitted scope and constraints for fitting hardware to these door designs.

The following items of hardware must also 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
- Panic Exit Hardware: Test Standard EN 1125
- Door Co-ordinators: Test Standard EN 1158.

15.3.1 Certifire

The Certifire third party certification scheme approves various items of hardware for different door types and different fire ratings and has its own set of requirements relating to that item of hardware.

Where the alternative hardware sections in this report allow alternatives to the tested hardware, Certifire approved hardware may be used as an alternative, subject to the following provisos:

- In all cases, the requirements of this report must take precedence
- The hardware must comply with the requirements of the relevant section e.g. hinges
- The hardware must comply with the limitations specified in terms of design, materials and dimensions.

15.3.2 Latches & Locks

Latches and locks must either be as tested, or alternatively components with the following specification are 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 13
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

15.3.3 Automatic Closing

Automatic closing devices, must either be as tested or components of equal specification that have demonstrated contribution to the required integrity performance of this type of doorset design, when tested to BS 476: Part 22: 1987 or BS EN 1634-1.

Notes:

1. The automatic closing device must be appropriate for the size and weight of the leaf required. (See appendix B for maximum leaf sizes and refer to the manufacturer's details for the maximum weight of leaf permitted with the automatic closing device.)
2. Concealed overhead closers are not permitted for use with the LAMINESSE FireSound Xtreme or FireSmoke Xtreme doorset designs.

15.3.4 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.

15.3.5 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. Hinges with the following specification are 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 13	

15.3.6 Shoot Bolts

Shoot bolts may be face fixed to the unexposed face of the LAMINESSE FireSound Xtreme and FireSmoke Xtreme doorsets, provided their installation does not require the removal of material from the door leaf or door frame.

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

15.3.7 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.

15.3.8 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.

15.3.9 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. Therefore, silicon based flame retardant acoustic, weather and dust seals (e.g. 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.

15.3.10 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

15.3.11 Letter Boxes/Plates

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

16 Door Gaps

For fire resistance performance, 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, see section 2 for smoke control

17 Structural Opening

The supporting construction must be capable of staying in place and intact for the full period of fire resistance required from the doorset.

18 Fixings

The frame jambs are to be fixed to the supporting construction using steel fixings at 600mm maximum centres. The fixings must be of the appropriate type for the supporting construction and must penetrate to a minimum depth of 50mm. It is not necessary to fix the frame head, although packers must be inserted.

19 Sealing to Structural Opening

The door frame to structural opening gap must be protected using one of the following methods:

1. Gaps up to 10mm must be sealed on both sides with a 20mm depth of acrylic intumescent mastic that has demonstrated 90 or 120 minutes integrity, as applicable, to BS 476: Part 22: 1987 or BS EN 1634-1 (between masonry and timber). Joint must be fitted with 18mm thick architraves overlapping at least 15mm each side.
2. Gaps between 10 and 20mm must be tightly packed with mineral fibre and filled on both faces with a minimum of 20mm depth of intumescent mastic that has demonstrated 90 or 120 minutes integrity, as applicable, to BS 476: 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.
3. Proprietary gap filling product that has 90 or 120 minutes integrity, as applicable, to BS 476: 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.

20 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

21 Smoke Control

21.1 General

If the doorset design is required to provide a smoke control function to comply with Building Regulations, the doorset must meet one of the following criteria:

(a) have a leakage rate not exceeding $3m^3/m/hour$ (head and jambs only) when tested at 25Pa under BS 476 *Fire tests on building materials and structures*, Section 31.1 - *Methods for measuring smoke penetration through doorsets and shutter assemblies, Method of measurement under ambient temperature conditions*; or

(b) meet the additional classification requirement of Sa when tested to BS EN 1634-3: 2004 - *Fire resistance tests for door and shutter assemblies*, Part 3 – *Smoke control doors*.

Smoke seals or combined intumescent/smoke seals that are fitted to the door to achieve the performance requirements specified above, must have been tested in accordance with the associated test method. Providing the smoke seals, any interruptions, door gaps, and the type/configuration of the doorset are consistent with the detail tested, the doorset will comply with current smoke control legislation under Approved Document B; and a suffix ‘S’ or ‘Sa’, as appropriate, may be added to the designation. Any other components installed where smoke leakage may occur must also be taken into account.

Note: The incorrect specification and fitting of smoke seals may impair the operation of a doorset and therefore compromise the fire resistance performance. Advice should be sought from the seal manufacturers regarding the correct specification and installation of smoke seals or combined smoke and intumescent seals.

21.2 Further Considerations

Note that there is other guidance available, including BS EN 9999-2017 - *Code of practice for fire safety in the design, management and use of buildings*, which may impose different or additional requirements, such as consideration of the gap between door leaf and threshold.

It is the responsibility of the relevant parties to agree the precise smoke control specification, prior to commencing manufacture and/or installation.

22 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 global assessment, 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 20), as appropriate.

23 Declaration by the Applicant

1) We the undersigned confirm that we have read and comply with obligations placed on us by FTSG Resolution No. 82: 2001.
2) We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which this assessment is being made.
3) We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.
4) We are not aware of any information that could adversely affect the conclusions of this assessment.
5) If we subsequently become aware of any such information we agree to ask the assessing authority to withdraw the assessment.

Signed: MORALT Moralt AG Obere Tiefenbachstr. 1 D-83734 Hausham i.V. 12.7.2019

Name: Helmut Hahn

For and on behalf of: Moralt AG

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

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.

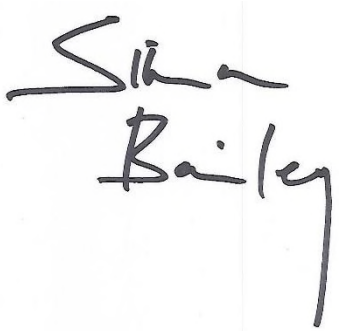
5) This assessment relates only to those aspects of design, materials and construction that influence the performance of the element(s) under fire resistance test conditions. It does not purport to be a complete specification ensuring fitness for purpose and long-term serviceability. It is the responsibility 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.

7) This report may only be reproduced in full. Extracts or abridgements of reports shall not be published without permission of Warringtonfire. All work and services carried out by Warringtonfire Testing and Certification Limited are subject to, and conducted in accordance with, the Standard Terms and Conditions of Warringtonfire Testing and Certification Limited, which are available at https://www.element.com/terms/terms-and-conditions or upon request.

25 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 23, duly signed by the applicant.

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

Appendix A

Revisions

Rev.	Warringtonfire Ref.	Date	Description

Appendix B

Data Sheets for:

Moralt AG

LAMINESSE FireSound Xtreme and FireSmoke Xtreme

90 & 120 Minutes Fire Resistance

Moralt LAMINESSE FireSmoke Xtreme Doorsets – 90 Minutes Fire Resistance

Latched, Single Acting, Single Doorsets

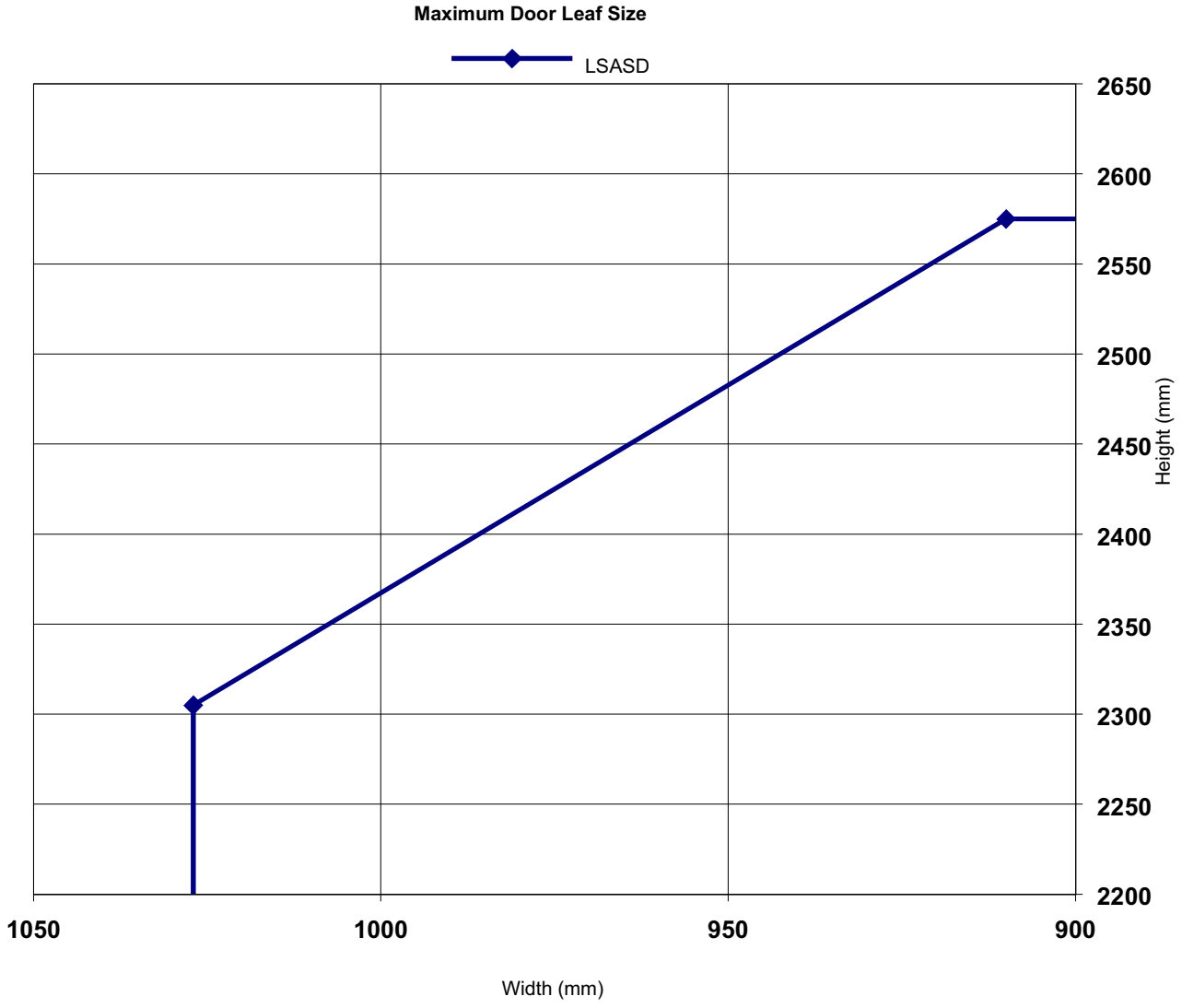
RF15073 Specimen B	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From:	2305	x	1027
		To:	2575	x	910
Maximum Overpanel Height (mm)		Not Permitted			

Intumescent Materials: Pyroplex Rigid Box Seal and BASF SE.

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 exposed and fitted to the upstand of the stop.

Hardware Protection: See section 13.



Moralt LAMINESSE FireSmoke Xtreme Doorsets – 90 Minutes Fire Resistance

Latched, Single Acting, Double Doorsets

RF15073 Specimen B	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From:	2305	x	977
		To:	2475	x	910
Maximum Overpanel Height (mm)		Not Permitted			

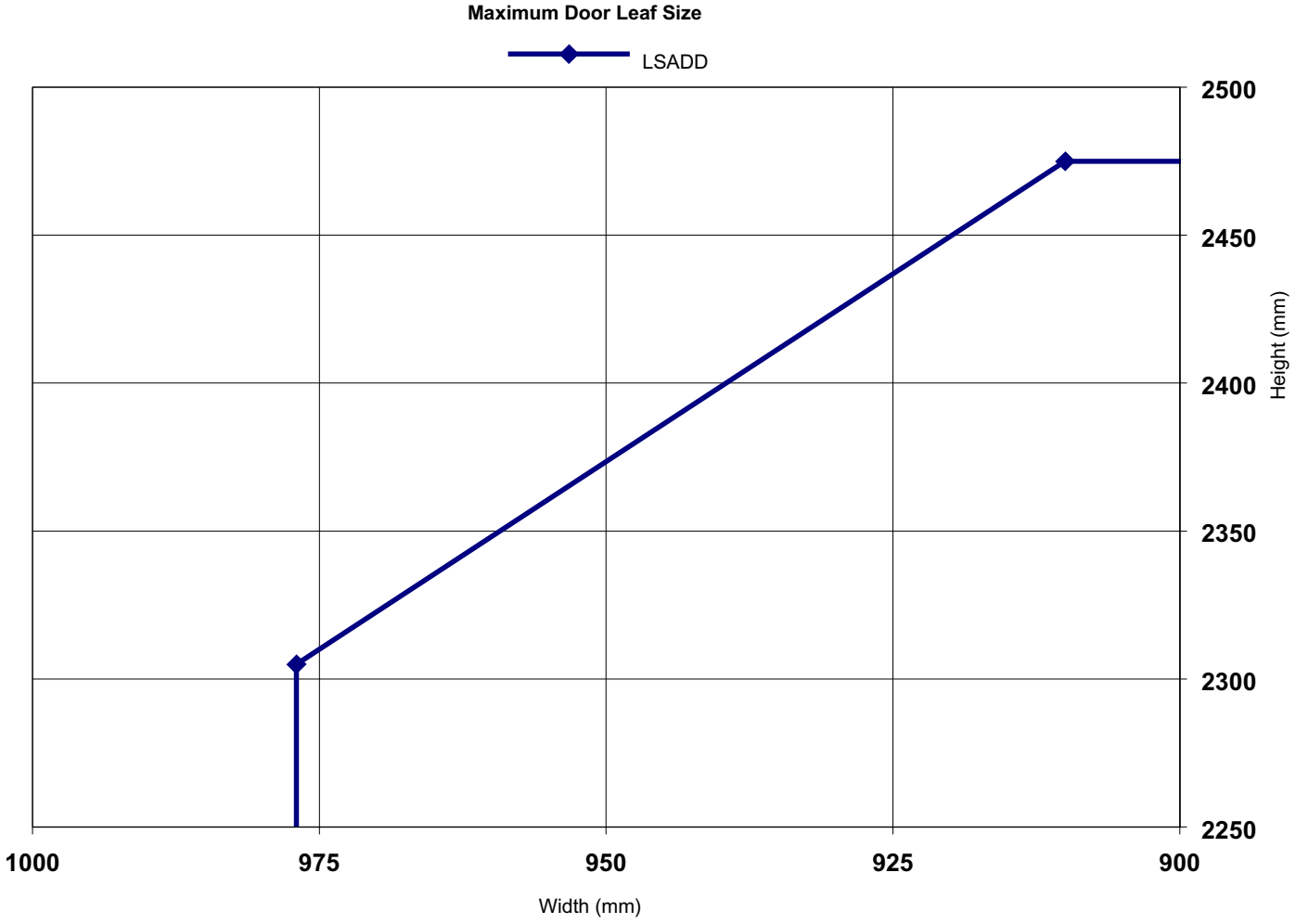
Intumescent Materials: Pyroplex Rigid Box Seal and BASF SE.

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.

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.

Hardware Protection: See section 13.



Moralt LAMINESSE FireSound Xtreme– 90 Minutes Fire Resistance

Latched, Single Acting, Single Doorsets

WF399042 Specimen A	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From:	2305	x	1005
		To:	2561	x	905
Maximum Overpanel Height (mm)		Not Permitted			

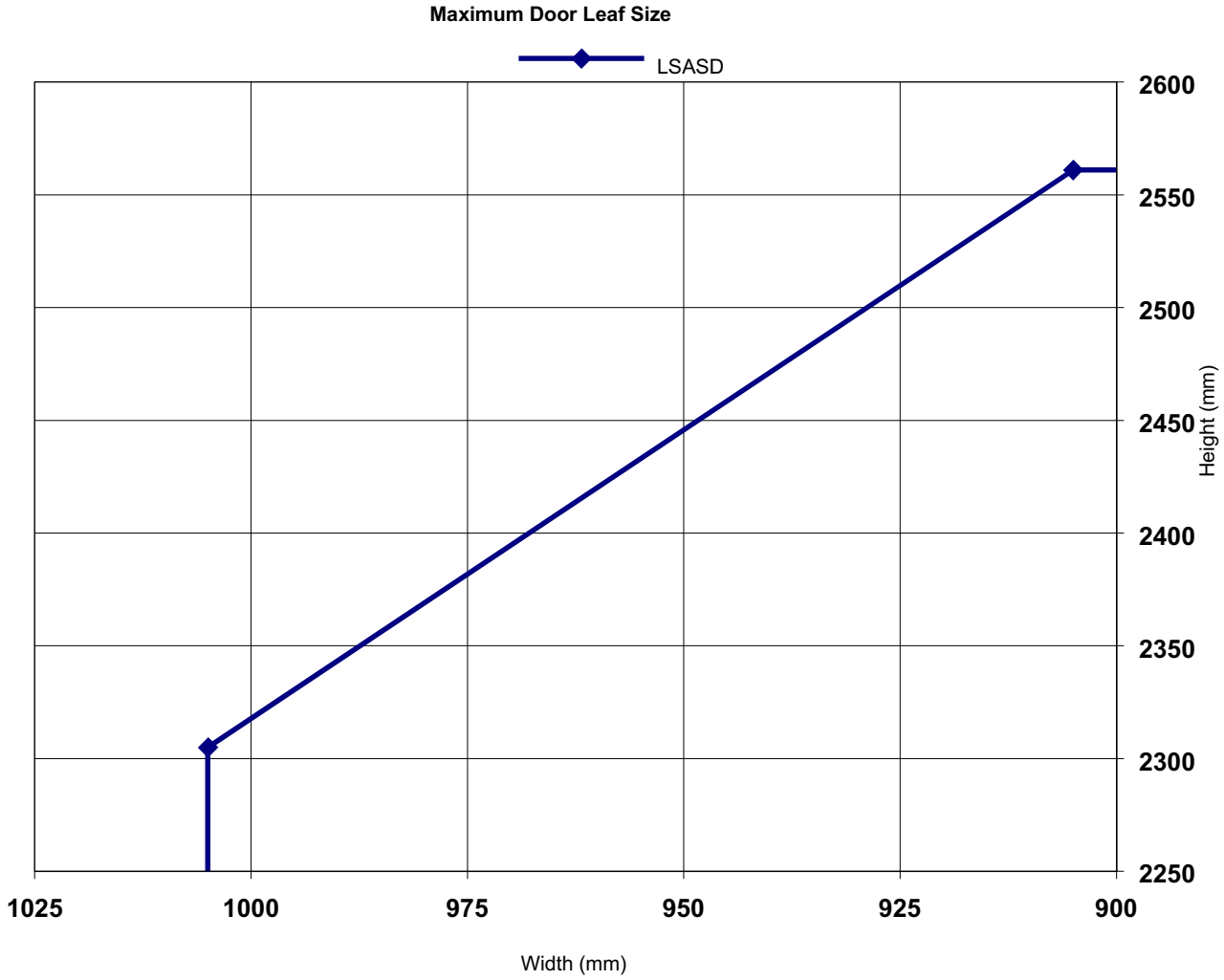
Intumescent Materials: Pyroplex Rigid Box Seal and BASF SE.

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 15.3.10 must be installed.

Hardware Protection: See section 13.



Moralt LAMINESSE FireSound Xtreme– 120 Minutes Fire Resistance

Latched, Single Acting, Single Doorsets

WF399042 Specimen A	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From:	2305	x	945
		To:	2407	x	905
Maximum Overpanel Height (mm)		Not Permitted			

Intumescent Materials: Pyroplex Rigid Box Seal and BASF SE.

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 15.3.10 must be installed.

Hardware Protection: See section 13.