

**Fire Resistance Assessment
of:**

Moralt Laminesse FireSound
54mm Doorsets for: 30 & 60
Minutes Fire Resistance

WF Report No:

WF409922

Prepared For:

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Valid From:

26th June 2019

Valid Until:

26th June 2024

Contents

	Page No.
1 Foreword	3
2 Proposal	4
3 Test Data.....	4
4 Technical Specification.....	10
5 Leaf Sizes.....	10
6 Configurations	11
7 Leaf Size Adjustment	11
8 Overpanels	11
9 Glazing	13
10 Door Frames	18
11 Leaf Facing Materials	22
12 Lipping Materials	25
13 Intumescent Materials	26
14 Adhesives.....	27
15 Hardware.....	27
16 Door Gaps	32
17 Structural Opening	32
18 Fixings	32
19 Sealing to Structural Opening	32
20 Insulation	33
21 Smoke Control.....	34
22 Conclusion.....	34
23 Declaration by the Applicant.....	35
24 Limitations	36
25 Validity.....	37
Appendix A - Supporting Performance Data	38
Appendix B - Assessed Glazing Systems	39
Appendix C - Revisions	39
Appendix D - Data Sheets.....	43

1 Foreword

This field of application report has been commissioned by Moralt AG and relates to Laminesse FireSound 54mm doorsets, for both 30 and 60 minute fire resisting performance doorset installations.

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 accredited laboratory¹ 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 and appendix A.

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 Federation (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.

¹ Test evidence from overseas laboratories has also been considered as supporting evidence for the designs in this assessment report. The test evidence is from a laboratory that has been accredited by a national accreditation body that is a signatory of the International Laboratories Accreditation Co-operation (ILAC).

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 30 and 60 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 FireSound 54mm doorset designs that are the subject of this assessment.

3.1 Test report RF10007

Date of test	1 st April 2010
Identification of test body:	Chiltern International Fire Ltd. (Now Warringtonfire Testing and Certification Ltd)
Sponsor:	Moralt AG
Tested Product:	Latched, single acting , double leaf specimen comprised of Moralt FireSound 54 core leaves with the vertical edges lipped with 8mm thick sapele of nominal density 640kg/m ³ The leaves were both was 2145mm (h) x 933mm (w) x 55mm (t) and hung in a sapele hardwood frame.
Test Standard	BSEN 1634-1: 2000 and BSEN 1363-1: 1999
Test Results (minutes): * Failure criteria was not achieved prior to termination of test at 64 minutes	<p>Integrity: Cotton Pad: 60 Continuous Flaming: 56 Gap Gauges: *</p> <p>Insulation: Discrete Area 1 (timber): * Discrete Area2 (glass): * Radiation (minutes to 15 kW/m²): *</p>
<p>Failure was attributed to undermining of the beads at the glazing perimeter. Based on the performance of the remainder of the doorset, which did not achieve failure criteria until 60 minutes, it is our assessment that the FireSound 54mm may be assessed for 60 minutes performance. Test data is used in support of assessment for double doorsets, the tested glazing system is not assessed for use at 60 minutes performance.</p>	
Summary of test specimen:	<p>The tested specimen included 3No. H207 concealed bearing butt steel hinges, an overhead face fixed closer, an Ingersoll Rand mortice lock with a 235mm high forend and engaged flush bolts.</p> <p>2No. 15 x 4 Lorient Polyproducts Ltd Type617 perimeter intumescent seals were fitted in the frame reveal of the head and jambs and also in one leaf meeting edge. The hinge blades, latch forend and keep and the flush bolts were protected with 1mm thick MAP intumescent gaskets. The installed 23mm thick Pilkington Pyrostop glass was protected with System36 gaskets fitted between the glass and sapele glazing beads on both faces; and an LX5402 Palusol glazing liner.</p> <p>The doorset was oriented to open in towards the furnace of the test.</p>

3.2 Test report P1009/14-530-1

Date of test	16 ^h April 2014
Identification of test body:	Slovenian National Building and Civil Engineering Institute, Ljubljana
Sponsor:	Information held in confidence at Warringtonfire
Tested Product:	Specimen B: Latched, single acting, single leaf specimen comprised of Moralt FireSound 54 core leaf with the vertical edges lipped with 8mm thick Mahogany of nominal density 640kg/m ³ The leaf was 2135mm (h) x 915mm (w) x 54mm (t) and hung in a sapele hardwood frame.
Test Standard	BS EN 1634-1: 2014 and BS EN 1363-1: 2012
Test Results (minutes): * Failure criteria was not achieved prior to termination of test at 84 minutes.	<p>Integrity: Cotton Pad: 65 (bottom hinge position) Continuous Flaming: * Gap Gauges: *</p> <p>Insulation: 65 – due to integrity failure. Insulation measurements continued after 65 minutes and failure criteria were not achieved (in isolation to the integrity failure) prior to termination of test at 84 minutes</p>
<p>Specimen B contained a glazed aperture. Assessment for the installation of glazed apertures into FireSound 54 is based on the performance and installation details tested in P1009/14-530.</p> <p>The ISO834 time/temperature curve used in BS 476: Part 22: 1987 test is the same as within BS EN 1634-1, but due to the use of the 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 20 test, particularly during the early stages of the test. It is therefore our assessment that the same 60 minutes integrity and insulation performance would be achieved in a test conducted utilizing the principles of BS 476: Part 22: 1987, subject to the glazing requirements within section 9.</p>	
Summary of test specimen:	<p>The tested specimen included 3No. Leaderflush Shapland bearing butt steel hinges, an overhead face fixed closer, a mortice lock with a 110mm high forend.</p> <p>2No. 15 x 4 Pyroplex Ltd Rigid Box perimeter intumescent seals were fitted in the frame reveal of the head and jambs. The hinge blades and latch body were protected with 1mm thick Interdens intumescent gaskets. The installed 23mm thick Pilkington Pyrostop 60-101 glass was protected with ISL Therm-A-Bead gaskets fitted between the glass and sapele glazing beads on both faces; and an ISL Therm-A-Line glazing liner.</p> <p>The doorset was oriented to open in towards the furnace of the test.</p>

3.3 Test report PF15041

Date of test	17 th March 2015		
Identification of test body:	BM TRADA. (Now Warringtonfire Testing and Certification Ltd)		
Sponsor:	Moralt AG		
Tested Product:	<p>A & B: Latched, single acting, double leaf specimens comprised of Moralt FireSound 54 core leaves with the vertical edges lipped with 8-14mm thick sapele of nominal density 640kg/m³</p> <p>The leaves for both specimens were 2250mm (h) x 820/260mm (w) x 54mm (t) and hung in sapele hardwood frames.</p>		
Test Standard	BSEN 1634-1: 2014 and BSEN 1363-1: 2012		
Test Results (minutes):	Integrity:	Specimen A	Specimen B
	Cotton Pad	81	81
	Continuous Flaming	77	66
	Gap Gauges	81	81
	Insulation:		
	Discrete Area 1 (timber)	77	66
	Radiation (minutes to 15 kW/m ²)	81	81
<p>Test PF15041 was designed to compare the performance of the two core types discussed in section 4.4; assessment of parity between the two core types is based on using distortion data and reference to the observations recorded up to the time of failure of doorset B.</p>			
Summary of test specimen:	<p>The tested specimen included 3No. Cooke Bros 7700CB bearing butt steel hinges, an overhead face fixed closer, a Glutz mortice lock with a 235mm high forend and disengaged flush bolts.</p> <p>For both specimens: 2No. 15 x 4 Pyroplex Ltd 8700 perimeter intumescent seals were fitted in the frame reveal of the head and jambs and 2No. 15 x 4 Pyroplex Ltd 30141 perimeter intumescent seals in one leaf meeting edge. A Norsound 810 dropseal was fitted in the threshold of the leaf.</p> <p>The hinge blades, latch forend and body, drop seal and the flush bolts were protected with 1mm thick Interdens intumescent gaskets. The doorsets were oriented to open in towards the furnace of the test.</p>		

3.4 Test report PF15288 Revision A

Date of test	9 th November 2015		
Identification of test body:	Exova Warringtonfire. (Now Warringtonfire Testing and Certification Ltd)		
Sponsor:	Information held in confidence at Warringtonfire		
Tested Products:	<p>A: Unlatched, single acting, single leaf specimen comprised of Moralt FireSound core leaves with the vertical edges lipped with 6-18mm thick sapele of nominal density 640kg/m³</p> <p>Leaf size: 2244mm (h) x 905mm (w) x 59mm (t) and hung in sapele hardwood frames.</p> <p>B: Unlatched, single acting, double leaf specimen comprised of Moralt FireSound core leaves with the vertical edges lipped with 6-18mm thick sapele of nominal density 640kg/m³</p> <p>Leaf sizes: 2250mm (h) x 905/478mm (w) x 56mm (t) and hung in sapele hardwood frames.</p>		
Test Standard	BS 476: Part 22: 1987		
Test Results (minutes):		Specimen A	Specimen B
	Integrity:	44*	83
	Insulation:	0**	83
<p>* Integrity failure was recorded behind the architrave between the door frame and supporting construction, no further failures were recorded prior to 77 minutes. The installed glazing system in specimen A is therefore assessed for use in the FireSound 54 design for 60 minutes performance, see section 9.2.2.</p> <p>** In accordance with section 8.6.1 of BS 476: Part22: 1987, specimen A has not been evaluated for insulation performance</p>			
Summary of test specimen:	<p>The tested specimens included 3No. Zoo Architectural bearing butt steel hinges, an overhead face fixed closer, a Zoo Architectural mortice lock with a 235mm high forend and, for specimen B, disengaged flush bolts.</p> <p>For both specimens: 2No. 15 x 4 Sealed Tight Solutions Ltd (STS) ST1504 perimeter intumescent seals were fitted in the frame reveal of the head and jambs and, for specimen B, 2No. Sealed Tight Solutions ST1504 perimeter intumescent seals in one leaf meeting edge.</p> <p>12mm thick Pyrobelite glass was installed in specimen A, protected with the STS ST105GT(3) and ST302 glazing system.</p> <p>The hinge blades, latch forend and keep and the flush bolts were protected with 1mm thick STS graphite intumescent gaskets.</p> <p>The doorsets were oriented to open in towards the furnace of the test.</p>		

3.5 Test report BMT/FEP/F16156 Specimen B

Date of test	23 rd June 2016
Identification of test body:	Exova Warringtonfire (Now Warringtonfire Testing and Certification Ltd)
Sponsor:	James Latham, Unit 2, Swallow Park, Fenway Road, Hemel Hempstead, Hertfordshire, HP2 7QU
Tested Product:	Specimen B: Unlatched, single acting, double leaf specimen with flush overpanel comprised of Moralt FireSound 59 core leaf with all edges lipped with 8-15mm thick Mahogany of nominal density 640kg/m ³ The leaves measured 2250mm (h) x 916/332mm (w) x 54mm (t) with a 1258mm wide x 305mm high overpanel and hung in a Mahogany hardwood frame.
Test Standard	BS 476: Part22: 1987
Test Results (minutes):	Integrity: 74 Insulation: 74
Summary of test specimen:	<p>Specimen B included 3No. Royde & Tucker H207 steel bearing butt hinges, a face fixed Arrone AR1500 closer, a Glutz mortice lock with a 235mm high forend and disengaged flush bolts in the smaller leaf.</p> <p>2No. 15 x 4mm Lorient Polyproducts Ltd, Type 617 perimeter intumescent seals were fitted in the frame reveal of the head and jambs, in the bottom edge of the overpanel and in one meeting edge, with a Lorient LAS8001si threshold seal. The hinge blades, flush bolts and latch body, forend and keep were protected with 1mm thick MAP intumescent gaskets.</p> <p>The leaf (larger) leaf contained a glazed aperture 1106mm high x 406mm wide, glazed with 23mm thick Pilkington Pyrostop utilising ISL Therm-A-Line aperture liner and Therm-A-Glaze 45 seals between the glass and beads.</p> <p>A timber astragal was fitted to the unexposed face of the overpanel.</p> <p>The doorset was oriented to open in towards the furnace of the test.</p>

4 Technical Specification

4.1 General

The technical specification for the Laminesse FireSound 54mm 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 54mm 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 design variations:

1. FireSound 54mm - 3mm MDF facings
2. FireSound 54mm - 3mm Chipboard facings.

4.4 Core Types

Tests PF15041 and RF10007 detailed in section 3 have successfully demonstrated that the core boards required for the Laminesse FireSound 54mm doorset design may be supplied by either of two manufacturers (details of the suppliers and core make-ups are held, in confidence, at Warringtonfire).

Either core type may be used in the relevant Laminesse FireSound design without restriction, unless specifically excepted in the following sections.

5 Leaf Sizes

The approval for increased leaf dimensions is based on the results of the tests data herein and takes into account the margin of over performance above 30 and 60 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 D.

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 D may be manufactured.

6 Configurations

6.1 FireSound 54mm - 30 Minutes & 60 Minutes

For both 30 & 60 minute integrity requirements, based on the test evidence cited in section 3, this assessment covers the following doorset configurations for the Laminesse FireSound 54mm door design.

Abbreviation	Description
LSASD & ULSASD	Latched, single acting, single doorset
LSASD+OP & ULSASD+OP	Latched, single acting, single doorset + overpanel
LSADD & ULSADD	Latched, single acting, double doorset
LSADD+OP & ULSASD+OP	Latched, single acting, single doorset+ overpanel

Unequal leaf double doorsets are covered by this assessment with no restriction on the smaller leaf dimension, they must be no larger than the sizes permitted in appendix D.

7 Leaf Size Adjustment

Laminesse FireSound 54mm door leaves may be altered as follows.

Element	Reduction
Leaf	The manufactured size of the leaf may be reduced in height or width without restriction, subject to the lipping requirements in section 12
Lipping	The dimensions stated in section 12 may be reduced by 20% for fitting purposes

8 Overpanels

8.1 General

Overpanels of the same construction as the door leaves may be used either flush with the leaf heads or when separated by a transom. In either case the overpanel must be fully contained within the door frame (see following diagram).

8.2 Solid Overpanels

If a transom is required to separate the leaf heads from the overpanel, it must be to the same specification as the door frame (see section 10).

The transom to door frame joint must utilise one of the following methods: mortise and tenon joints or butt joints (see section 10.2).

Either method requires frame joints to be tight, with no gaps, and require mechanical fixing with the appropriate size ring shank nails or screws. Butt joints must be additionally bonded with urea formaldehyde or equivalent.

Where flush overpanels are used an astragal must be fitted to the lower face of the overpanel overlapping the head of the leaves blow. The astragal must be hardwood of minimum density 640kg/m³ and be of minimum dimensions 45mm wide x 17mm thick. The astragal must overlap the leaf heads by a minimum of 20mm and be screwed at maximum 50mm centres to the overpanel.

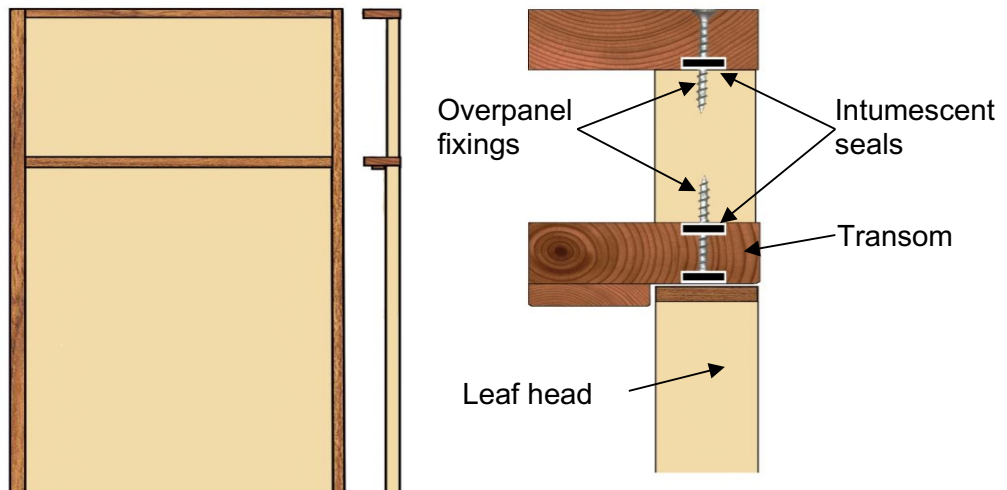
Overpanels must be fixed by screwing through the rear of the frame with steel screws passing at least 30mm into the centre line of the overpanel. Fixings must be no more than 100mm from each corner and a maximum of 250mm centres in between.

The intumescent seals specified for the jambs in appendix D, may be fitted in the overpanel edges or frame reveal, as required for the manufacturing process.

Providing the intumescent seals are fitted to all edges of the overpanel, the frame to overpanel junction is permitted to have a maximum 2mm gap tolerance.

Maximum overpanel heights are as follows.

Configuration	Max. Overpanel Height (mm)
Single doorsets	2000
Single doorsets + flush overpanel	1250
Double doorsets	1500
Double doorsets + flush overpanel	750



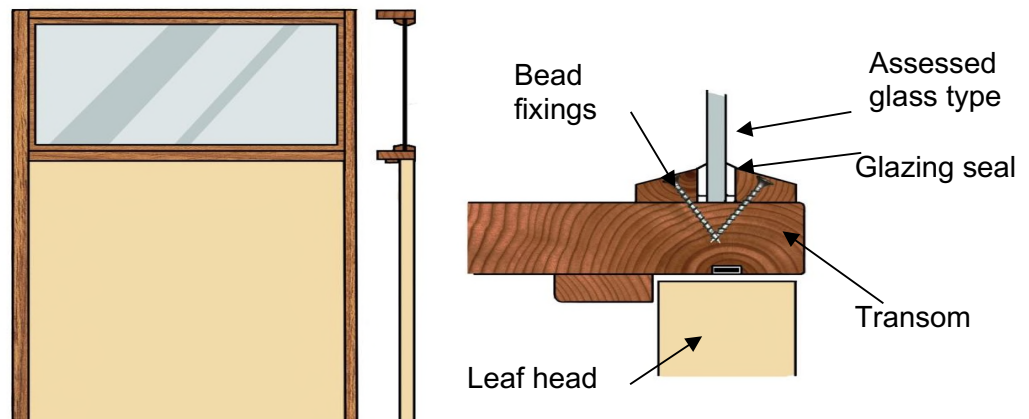
8.3 Fanlights

Timber frame doorsets including a transom may include a glazed fanlight. The timber frame and glazing beads must be joinery quality, straight grained hardwood, free from knots, splits and checks and with a minimum density of 640kg/m³ (the use of Beech is not permitted for 60 minute applications), whilst the frame section for the transom must be a minimum of 70mm x 44mm. Timber door frame and transom construction method must comply with the specification contained in section 10.

The maximum assessed fanlight dimensions are detailed in the table below, subject to the following restriction:

The glazing system and glass must be able to demonstrate adequate performance at 30 or 60 minutes when tested as a window or screen in accordance with BS 476: Part 22: 1987 or BS EN 1634-1, at the pane dimensions to be installed.

Configuration	Height (mm)	Width (mm)
Single & double doorsets	≤600	Overall door width



9 Glazing

The testing conducted on the Laminesse FireSound 54mm doorset design has demonstrated that the designs are capable of tolerating glazed apertures, whilst providing a margin of over performance.

All glazed apertures must be framed with hardwood timber a minimum of 6mm thick and with a minimum density of 640kg/m³. The use of Beech (*Fagus sylvatica*) is not permitted for 60 minute applications.

9.1 30 minutes fire resistance

Glazing is therefore acceptable within the following parameters for 30 minutes fire resistance performance.

9.1.1 Glazing Systems

Approved Glazing Systems are listed below.

Glazing System	Manufacturer	Maximum Area (m ²)
1. Therm-A-Strip ¹	Intumescent Seals Ltd.	0.51
2. System 36 Plus ¹	Lorient Polyproducts Ltd.	0.51
3. ST105GT	Sealed Tight Solutions Ltd	0.51

Notes:

- For glazing systems 1 & 2, an intumescent aperture liner must be fitted to all 4 sides of the glazing aperture:
 - For Therm-A-Strip, 2mm thick Intumescent Seals Therm-A-Line
 - For System 36 Plus, 2mm thick Lorient LX5402 Palusol
- Seals referenced ST105GT may be supplied as either 10 x 5mm or 9 x 3mm strips which must be fitted between both faces of the installed glass and the beads. The two seal sizes may be freely interchanged. It is not required to fit an additional intumescent aperture liner.

9.1.2 Assessed Glass Products

Assessed glass types are as follows.

Glass Type	Manufacturer	Thickness (mm)	Maximum Area (m ²)
1. Pyrobelite 7	AGC Flat Glass Europe	7	0.51
2. Pyrodur 30-104	Pilkington Group Ltd.	7	0.51
3. Pyrodur 60-10	Pilkington Group Ltd.	10	0.51
4. Pyroguard EW MAXI	Pyroguard UK Ltd.	11	0.51
5. Pyrobelite 12	AGC Flat Glass Europe	12	0.51
6. Pyrodur 60-20	Pilkington Group Ltd.	13	0.51
7. Pyranova 15-S3.0	Schott UK Ltd.	15	0.51
8. 15mm Pyrostop 30-10	Pilkington Group Ltd.	15	0.51
9. Pyrobel 16	AGC Flat Glass Europe	16	0.51
10. Pyrostop 60-101	Pilkington Group Ltd.	23	0.51

Note: Glass types 7 - 10 are fully insulating for 30 minutes in terms of the criteria set out in BS 476: Part 20: 1987.

9.1.3 Glazing Beads & Installation

Glazing beads must be hardwood as specified in the following table.

Material	Profile	Min. Density (kg/m ³)	Application
Hardwood	Splayed	640	All systems detailed in 9.1.1 and appendix B
	Square ¹		System 3 detailed in section 9.1.1 and appendix B

Notes:

1. See appendix B for square bead options
2. Glazing beads must be retained in position with 60mm long steel pins or 60mm long No. 8 screws, inserted at 35 - 40° to the vertical at no more than 50mm from each corner and at 150mm maximum centres.

All other installation details must meet the requirements of the approved pneumatically fired pin specification given in section 9.2.3 and the additional installation requirements in section 9.3.

9.2 60 minutes fire resistance

Glazing is acceptable within the following parameters for 60 minutes fire resistance performance.

Approved Glazing Systems are listed below.

Glazing System	Manufacturer	Maximum Area (m ²)
Therm-A-Glaze 60	Intumescent Seals Ltd.	1.0
ST105GT/ST30x2 liner	Sealed Tight Solutions Ltd	1.24

Notes:

1. See appendix B for sectional drawings of the systems.

9.2.1 Therm-A-Glaze 60 Glazing System for 60 Minutes Performance

9.2.1.1 Assessed Glass Products

Assessed glass type is as follows; this type is fully insulating for 60 minutes in terms of the criteria set out in BS 476: Part 20: 1987.

Glass Type	Manufacturer	Thickness (mm)	Max. Area (m ²)
Pyrodur 60-101	Pilkington Group Ltd.	23	1.0

9.2.1.2 Glazing Beads

Glazing Beads for use with the glass and glazing system as above fitted within the FireSound 54mm must be hardwood (the use of Beech is not permitted) of minimum density 640 kg/m³, the beads may be chamfered or square.

See sections 9.2.1.3 and 9.3 for installation requirements.

9.2.1.3 Installation

1. A square bead profile may be used as an alternative to the splayed beads required for the proprietary systems in section 9.1.1 & 9.2, subject to the provisions in section 9.2.1.2 (see appendix B for square bead profile options)
2. For the Therm-A-Glaze glazing system shown in section 9.2 glazing beads must be retained in position with 60mm long steel pins or 60mm long No. 6 - 8 screws, inserted at 35 - 40° to the plane of the glass (or perpendicular to the bead splay) at no more than 50mm from each corner and at 150mm maximum centres. Pins must meet the requirements of the approved pneumatically fired pin specification given in section 9.2.3
3. All other installation details must meet the additional installation requirements in section 9.3.

9.2.2 Sealed Tight Solutions Glazing System for 60 Minutes Performance

For the FireSound 54mm design the following STS glazing system may be utilised, subject to the requirements of this section. See appendix B for details.

Glazing System	Manufacturer	Maximum Area (m ²)
ST105GT/ST30x2 liner	Sealed Tight Solutions Ltd	1.24

Note:

The seals referenced ST105GT may be supplied as either 10 x 5mm or 9 x 3mm strips which must be fitted between both faces of the installed glass and the beads. The two seal sizes may be freely interchanged.

9.2.2.1 Assessed Glass Products

Assessed glass types for use with the STS glazing system are as follows.

Glass Type	Manufacturer	Thickness (mm)	Maximum Area (m ²)
1 Pyrobelite 12	AGC Flat Glass Europe	12	1.24
2 Pyrodur 60-20	Pilkington Group Ltd.	13	1.24
3 Pyroguard EI 30	Pyroguard UK Ltd.	15	1.24
4 Pyrostop 30-10	Pilkington Group Ltd.	15	1.24
5 Contraflam EW60	Vetrotech Saint Gobain Ltd	16	1.00
6 Pyrobel 16	AGC Flat Glass Europe	16	1.00

Notes:

1. All glass types must be fitted fully in accordance with the manufacturers' tested details/installation requirements, particularly with respect to edge cover and expansion tolerances
2. Glass types 3 – 6 are fully insulating for 30 minutes, only, in terms of the criteria set out in BS 476: Part 20: 1987.

9.2.2.2 Glazing Beads & Installation

Glazing beads must be as specified in the following table.

Material	Profile	Min. Density (kg/m ³)	Permitted Glass Type (section 9.2.2.1)
Hardwood	Splayed	640	1 - 6
Hardwood	Square	640	

Notes:

1. The use of Beech (*Fagus sylvatica*) is not permitted for 60 minute applications
2. Glazing beads must be retained in position with 50mm long steel pins or 50mm long No. 6 - 8 screws, inserted at 35 - 40° to the plane of the glass (or perpendicular to the bead splay) at no more than 50mm from each corner and at 150mm maximum centres. Pins must meet the requirements of the approved pneumatically fired pin specification given in section 9.2.3
3. A square bead profile may be used as an alternative to the splayed beads subject to the restricted glass types and glazing systems specified in the table above. See appendix B for square bead options
4. For 60 minute applications, glazed apertures within the FireSound 54mm design must incorporate hardwood timber liners, 6 - 10mm thick, glued in position using a UF, PVA or PU type adhesive, see section 12.4 for T-shaped liner option. The ST30x2 intumescent liner required for the STS glazing system must also be used, which may be recessed into the aperture liner and stop a maximum distance of 3mm from each edge
5. All other installation details must meet the additional installation requirements in section 9.3.

9.2.3 Pneumatically Fired Pins

The following minimum pin specification is permitted and is considered suitable for gun (pneumatically) fired applications for both 30 and 60 minute applications, pins with smaller dimensions than those listed below are not approved.

Option 1 – Round, Oval and Rectangular shaped pins:

- Minimum Standard Wire Gauge (SWG) 16
- Minimum cross section area of 2.03mm²
- Minimum linear dimension 1.6mm in any direction

Round pin diameter (mm) = minimum 1.6mm

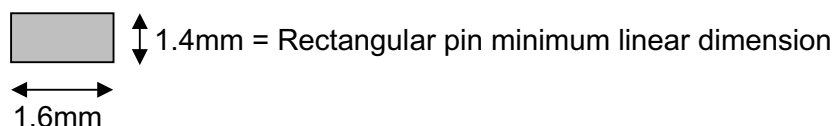


Oval/rectangular pin minimum diameter linear dimension = 1.6mm



Option 2 – Rectangular shaped pins:

- Minimum Standard Wire Gauge (SWG) 16
- Minimum cross section area of 2.24mm²
- Minimum linear dimension 1.4mm in any direction



9.3 Additional Installation Details –for both 30 and 60 minute performance

1. Glazed openings must not be less than 165mm from any door edge. Multiple apertures are acceptable within the permitted glazed area, with a minimum dimension of 135mm of core between apertures
2. Aperture shape is not restricted, providing the glazing system and beads are compatible with that shape
3. Timber for glazing beads must be straight grained joinery quality hardwood, free from knots, splits and checks
4. Gaps between glass and framing, to permit expansion, should be set at 2 - 3mm on all edges, and using non-combustible or hardwood setting blocks at the bottom edge
5. False glazing beads must not be fitted to the face of the glass
6. Sectional drawings detailing the tested glazing systems are contained in appendix B.

10 Door Frames

10.1 Door Frame Construction

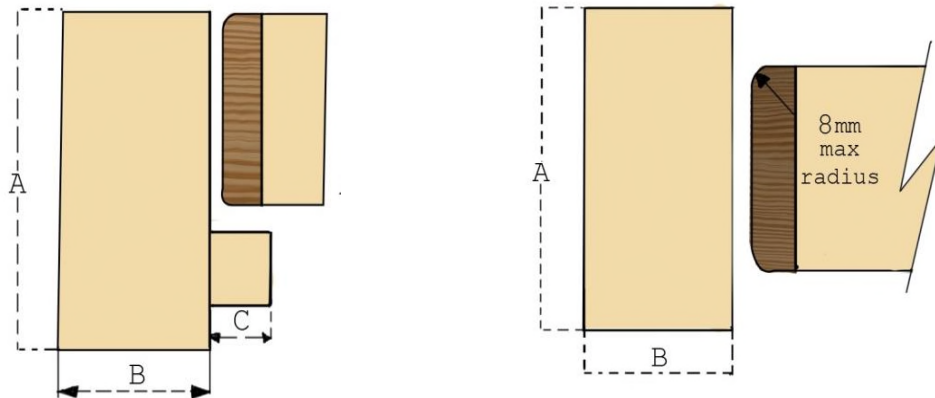
Door frames for Laminesse FireSound 54mm doorset must be constructed to meet the following specification:

Material	Section Size (mm)	Min. Density (kg/m ³)
Hardwood	70 x 32	640
WoodEx Redwood ²	70 x 32	510
Hardwood WoodEx ³	70 x 32	640

Notes:

1. The use of Beech (*Fagus sylvatica*) is not permitted for 60 minute applications
2. WoodEx Redwood may only be used for 30 minute applications
3. The various hardwood WoodEx products may be used for 30 and 60 minute applications
4. Timber for door frames must be straight grained joinery quality hardwood, free from knots, splits and checks
5. If the doorset features a transomed overpanel, the door frame must be hardwood (not WoodEx frames) with a minimum section of 70mm x 32mm and of the minimum density stated above
6. If the doorset features a flush overpanel, the door frame must be hardwood (not WoodEx frames) with a minimum section of 70mm x 32mm and of the minimum density stated above
7. A 12mm (15mm for WoodEx frames) deep planted or integral stop is adequate for single acting frames
8. It is not permitted to round off the edges of the door frame at the junction with the leaf edge
9. Door frame joints must be utilise one of the 4 methods 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:



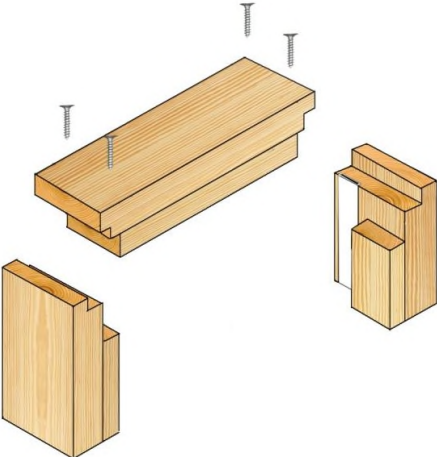
A = min. 70mm B = min. 32mm C = min. 12mm
R = radius from floor spring 8mm max radius to create a maximum 2mm edge profiling

10.1.1 CS Group Acrovyn

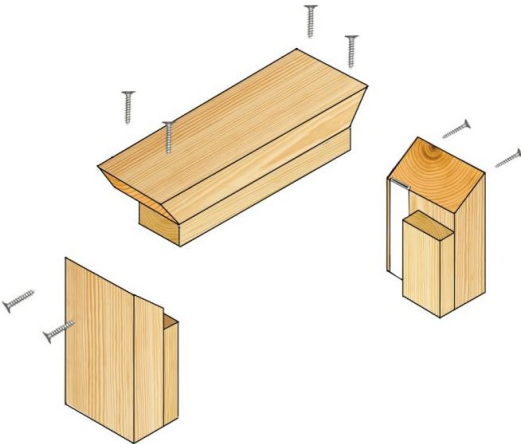
Based on the evidence generated in IF13094 and IF13095 Revision A, timber and WoodEx door frames may be encapsulated in CS Group Acrovyn meeting the following specification. All other details must remain as required in section 10.1 above, as appropriate:

1. The intumescent detail as specified in section 13 and the relevant (CS Group headed) data sheets contained in Appendix D of this assessment must be replicated
2. CS Group Acrovyn must be bonded to the door frame using 3M Scotch-Grip cement 10 contact adhesive
3. See relevant (CS Group headed) data sheets in Appendix D of this assessment for maximum permitted leaf sizes
4. The maximum thickness of CS Group Acrovyn used must be 2mm, as per test evidence.

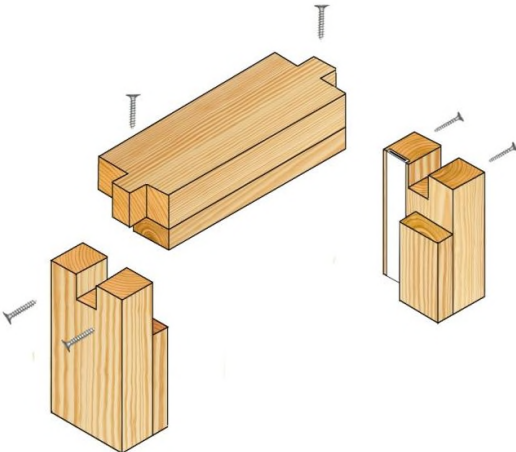
10.2 Door Frame Joints



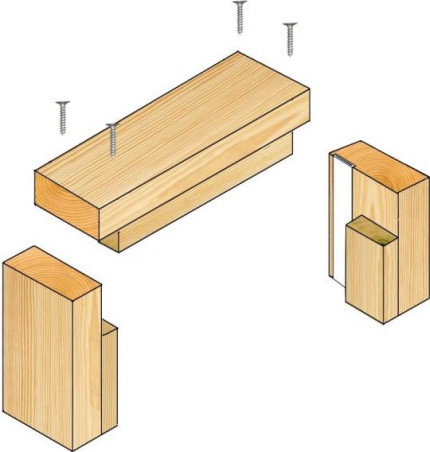
Half Lapped Joint



Mitre Joint



Mortice and Tenon Joint

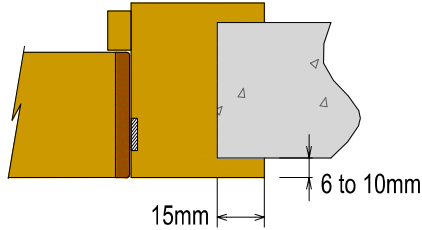
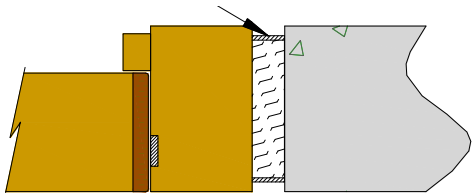
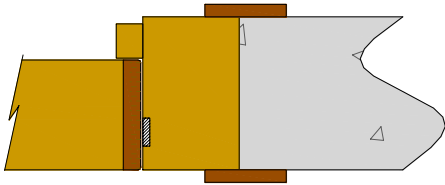
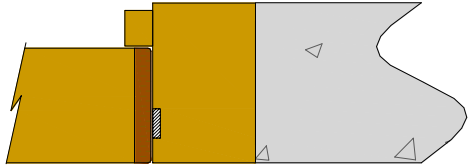
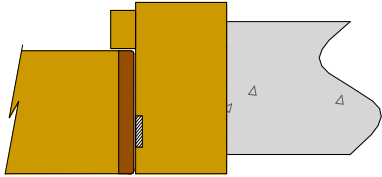
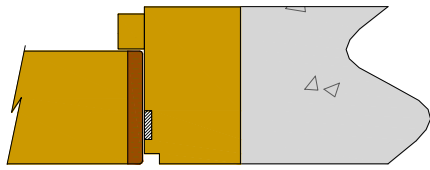


Butt Joint

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:

Permitted Installations	
 <p>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.</p>	<p>Max 10 x 10mm shadow gap with 2mm intumescent mastic capping or 10 x 4mm PVC encased intumescent seal</p>  <p>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.</p>
 <p>Architraves overlapping the frame to structural surround junction are always permitted where required but may be mandatory depending on the size of frame to surround junction gap and the fire stopping used. See section on Sealing to the Structural Surround.</p>	 <p>Depending on the size of the frame to surround junction gap and the fire stopping methods used, it may be permitted to install doorsets without architraves. See section on Sealing to the Structural Surround.</p>
Not Permitted Installations	
 <p>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.</p>	 <p>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.</p>

The diagrams above are representative; actual installation must be as the text within this document specifies. See section 19 for sealing to structural opening.

11 Leaf Facing Materials

11.1 General

The overall 54mm thick leaf construction may result in the following leaf construction variations:

1. FireSound 54mm - 3mm MDF facings (minimum density 720kg/m³)
2. FireSound 54mm - 3mm Chipboard facings (minimum density 700kg/m³).

11.2 Decorative & Protective Facings

The following additional facing materials are permitted for this door design 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.

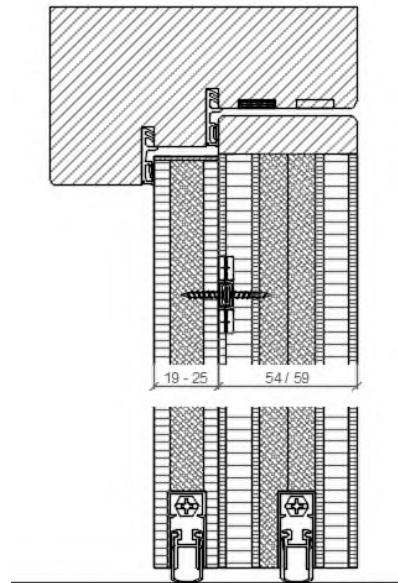
11.3 Acoustic Clad On Panels

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.

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. It is not permitted to use clad on panels in combination with PVC edge protectors or PVC leaf encapsulation (i.e. CS Group Acrovyn)
5. 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 is not restricted provided the grooves do not cut into the facings described in section 11.1
6. Threshold seals meeting the requirements of section 15.2.11 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 effectiveness of a threshold seal installed in this location

7. The fitting of environmental seals as discussed in section 15.3.10 is permitted as illustrated below.



11.4 PVC Edge Protectors & Post-Formed CS Group Acrovyn

11.4.1 General

It is possible to fit proprietary edge protectors to this doorset design providing they have suitable supporting test evidence to BS 476: Part 22: 1987 or BS EN 1634-1, when fitted to timber doorsets of similar construction to this design. The end user must satisfy themselves that the test evidence supports the proposed end use application.

11.4.2 CS Group Edge Protectors

The Moralt FireSound 54mm design has been assessed for use with CS Group edge protectors. CS Group edge protectors are supplied pre-formed with the approved intumescent material. The CS Group edge protectors must be used as part of a complete intumescent system and the required intumescent specification and leaf sizes are given in the relevant data sheets in Appendix D. CS Group must be contacted for precise installation and fixing details (www.c-sgroup.co.uk).

11.4.3 Post-Formed CS Group Acrovyn

It is possible to encapsulate the Moralt FireSound 54mm design by post-forming the leaf in CS Group Acrovyn, based on the supporting test evidence in Chilt/RF11059 for 30 minute applications and Chilt/RF11061 and IF13095 Revision A for 60 minute applications, and the following specification:

1. CS Group Acrovyn may be wrapped around the vertical edges of the leaf, or the leaf can be fully encapsulated on all four edges
2. The vertical edge detail prior to post-forming must either be lipped with 8mm thick PVC adhered to the leaf edge using WC127 PVC weld cement, or hardwood as detailed in this assessment (see sections 12.1 & 12.2). Rebated timber lippings are not permitted

3. The horizontal edge detail prior to post-forming does not require lipping but may be lipped with 8mm thick PVC adhered to the leaf edge using WC127 PVC weld cement, or hardwood as detailed in this assessment (see sections 12.1 & 12.2). Rebated timber lippings are not permitted
4. The maximum radius of the lipping at the corners of the vertical edges before post-forming must be 9mm, which provides for 11mm external radius after the CS Group Acrovyn has been applied
5. The intumescent detail as specified in section 13 and the relevant (CS Group headed) datasheets contained in Appendix D of this assessment must be replicated
6. CS Group Acrovyn must be bonded to the leaf using 3M Scotch-Grip cement 10 contact adhesive
7. See relevant (CS Group headed) datasheets in Appendix D of this assessment for maximum permitted leaf sizes
8. The maximum thickness of CS Group Acrovyn used must be 2mm, as per test evidence
9. The CS Group Acrovyn can be provided as pre-formed trays with dimensions to suit the proposed leaf sizes, as well as sheets for post-forming by the door manufacturer
10. It is permitted to hang leaves fitted with CS Group Acrovyn in timber or MDF door frames meeting the specification given in section 10.1 (not encapsulated with CS Group Acrovyn) or section 10.1.1 (encapsulated with CS Group Acrovyn).

12 Lipping Materials

12.1 General

The use of Beech (*Fagus sylvatica*) is not permitted for 60 minute applications

12.2 Laminesse FireSound 54mm

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

Material	Size (mm)	Min. Density	
Hardwood	1. Square (T-shape): 13 - 25 thick T-shape section with 5 -10mm deep x 26mm wide tongue into the core leaving 8 - 15mm exposed at the edges (see section 12.4) 2. Square = 8- 13 thick with a maximum of 2mm profiling permitted at corners of lipping (see section 10.1)	640 kg/m ³	
	2. Rounded		Not Permitted
	3. Rebated ¹		

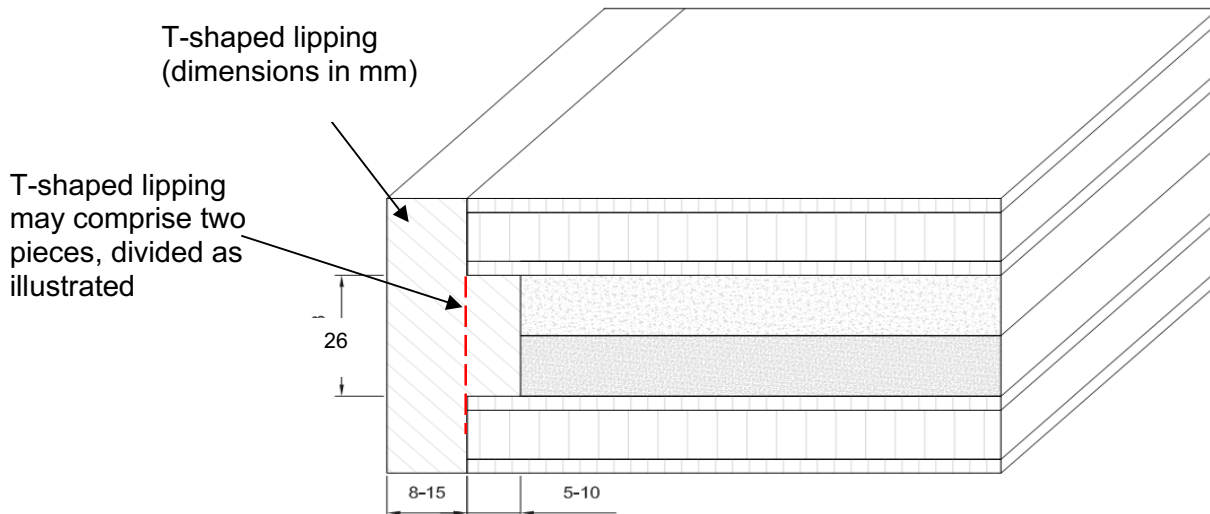
Notes:

1. Timber for lippings must be joinery quality, straight grained hardwood, free from knots, splits and checks
2. Single and double doorsets without overpanels only require lipping on the vertical edges but may be additionally lipped on the top and bottom edges if required
3. Leaves to doorsets with flush overpanels must be lipped on the vertical edges and additionally at the bottom edge of the overpanel and top edge of the doors
4. Overpanels flush with the leaf heads must be lipped all edges
5. A 2.5° chamfer is permitted to the lipping at the leading edge of leaves providing the door gaps meet the requirements of section 16.

12.3 'T'-shaped Lipping Options

In certain circumstances, a 'T' section lipping may be required which will be bonded into a groove machined in the edge of the leaf. This option is acceptable providing the tongue is a maximum of 26mm wide and otherwise meets the specification given in sections 12.2 or 12.3. The 'T' section lipping may be in two sections with the exposed lipping being within the range of 6 – 10mm thick. All glue lines must be as stated in section 14.

Where glazed apertures require timber liners as detailed in section 9, the liner may also be 'T' shaped as detailed herein (the use of Beech (*Fagus sylvatica*) is not permitted for 60 minute applications).



13 Intumescent Materials

13.1 General

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

The intumescent materials tested and assessed for this doorset design are as follows.

Application	Location	Product/Manufacturer
Edge seals	Fitted in the frame jambs and leaf edges	<ol style="list-style-type: none"> 1. Palusol 100 - Lorient Polyproducts Ltd. 2. Type 617 - Lorient Polyproducts Ltd. 3. Rigid Box Seal 8700FO – Pyroplex Ltd. 4. STS Fire – Sealed Tight Solutions Ltd. 5. 15mm wide x 1.8mm thick Flexilodice - Odice S.A.S.
Hinges	Under all hinge blades	<ol style="list-style-type: none"> 1. 1mm Interdens – Dufaylite Developments Ltd. 2. 1mm MAP paper – Lorient Polyproducts Ltd.
Lock/latches	Under forend & keep and encasing latch body	<ol style="list-style-type: none"> 3. 1mm Pyrostrip 300 – Mann McGowan Ltd. 4. 1mm Therm-A-Strip – Intumescent Seals Ltd. 5. 1mm ST60 Graphite gasket material - Sealed Tight Solutions Ltd
Flush bolts	Lining all sides of the mortice	<ol style="list-style-type: none"> 1. 2mm Interdens – Dufaylite Developments Ltd. 2. 2mm MAP paper – Lorient Polyproducts Ltd. 3. 2mm Pyrostrip 300 – Mann McGowan Ltd. 4. 2mm Therm-A-Strip – Intumescent Seals Ltd. 5. 2mm ST60 Graphite gasket material - Sealed Tight Solutions Ltd

14 Adhesives

The following adhesives must be used in the construction of Laminesse FireSound 54mm.

Element	Product
Lipping	PVAc, Polyurethane
Hardwood glazed aperture liners	Polyurethane

15 Hardware

15.1 Tested Hardware

The following hardware has been successfully incorporated in the tests on Laminesse FireSound 54mm doorsets.

Element	Product	Size (mm)
Hinges	Royde & Tucker H207 concealed steel butt hinges	101 x 29 (blade size)
	Royde & Tucker H101 lift-off type hinges	101 x 35 (blade size)
	TDSL bearing butt type hinges	100 x 31 (blade size)
Closers	Dorma TS83V overhead-type	293 x 60 (footprint size)
	Dorma TS71 overhead-type	232 x 68 (footprint size)
	Rutland TS3204 overhead-type	220 x 59 (footprint size)
	Arrone AR1500	220 x 60 (footprint size)
Locks & latches	Ingersoll Rand mortice latch	235 x 20 (forend size)
	Arrone 3 lever mortice latch	155 x 22 (forend size) 125 x 24 (keep size)
	Glutz mortice deadlock Ref:1052.7	235 x 20 (forend size) 175 x 20 (keep size)
	Glutz mortice deadlock Ref:4525	230 x 25 (forend size) 92 x 25 (keep size)
	Glutz mortice deadlock Ref:4621, 7/60	235 x 25 (forend size) 170 x 26 (keep size)
Shoot bolts	Ironmongery Direct stainless steel shoot bolts Ref. 6399674	200 x 38 (footprint size)
	Zoo Hardware Ref: ZA S03RSS	205 x 20 (footprint size)
Furniture	Aluminium lever type handles	Ø52 (rose size)

15.2 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.

15.2.1 Certifire

Providing the parameters of this assessment always take precedence, including specified protection such as hardware gaskets, where alternative hardware to that tested is permitted in the following sections, 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. This route cannot be used where only specific hardware options stated by the doorset manufacturer are permitted (i.e. where alternative hardware is not permitted).

15.2.2 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

15.2.3 Hinges

Leaves ≤2400mm high must be hung on a minimum of 3 hinges. Leaves >2400mm high must be hung on 4 hinges. Hinges with the following specification are acceptable:

Element		Specification	
Blade height		90 - 120mm	
Blade width (excluding knuckle)		30 - 35mm	
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
		2 nd	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
		2 nd & 3 rd	Equispaced between top and bottom or 2 nd hinge 200mm from top hinge and 3 rd hinge equally spaced between 2 nd and bottom hinge
		Bottom	150-250mm from the foot of the leaf to bottom of the hinge
Intumescent protection		See section 13	

15.2.4 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 D 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 assessed for use with Laminesse FireSound 54mm doorset design.

15.2.5 Pull Handles

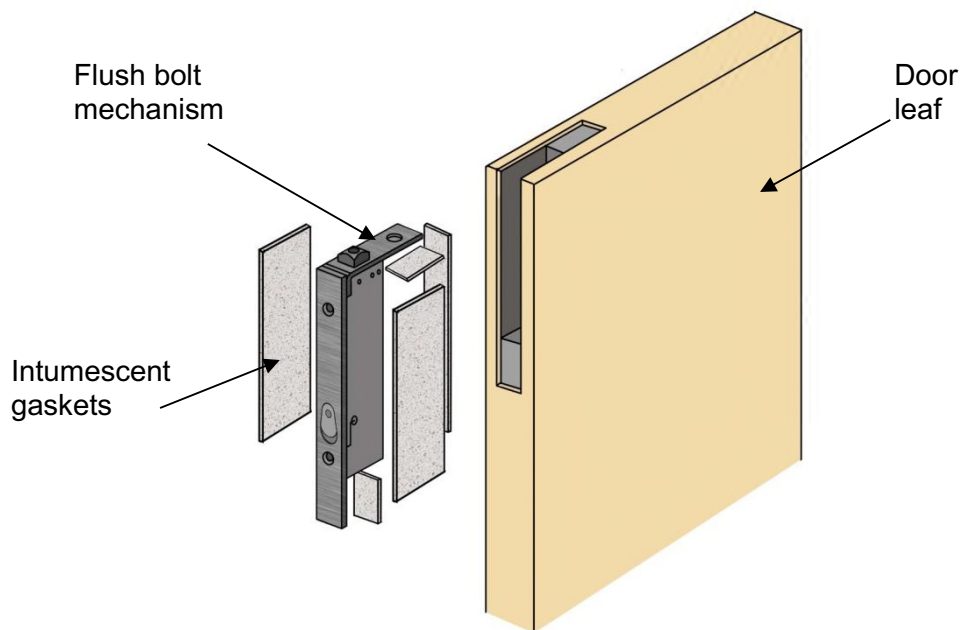
These may be surface-fixed or bolted through the door leaf provided that they are steel or brass and the length is limited to 1200mm between the fixing points. No additional intumescent protection is required provided that the hole for the bolt through the leaf is tight.

15.2.6 Flush Bolts

Flush bolts may be incorporated centrally into the top and bottom of one meeting edge, providing the following maximum dimensions are not exceeded and the components are fitted opposite the leaf edge fitted with intumescent strips.

250mm long x 20mm deep x 20mm wide.

Flush bolts must be steel and the mortice must be as tight to the mechanism as is compatible with its operation. All edges of the mortice must be protected with intumescent gaskets as specified in section 13. Alternatively, the hardware manufacturers tested gaskets may be used.



15.2.7 Push Plates/Kick Plates

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.

15.2.8 Door Security Viewers

Door security viewers with brass or steel bodies of a diameter less than or equal to 15mm may be used provided that the through-hole is bored tight to the case of the viewer (maximum tolerance +1mm). Lenses must be glass and the item must be protected with a tested acrylic intumescent mastic.

15.2.9 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.

15.2.10 Environmental Seals

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.

15.2.11 Threshold Seals

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.	LAS8001si, IS8010Si
Raven	RP8Si
Athmer	Schall-Ex Duo L-15
Norsound Ltd.	810dB, 810dB+ ranges
STS	422
Planet	HS

15.2.12 Letter Boxes/Plates

Letter boxes/plates may be fitted providing the product can demonstrate contribution to the required performance of this type of 30 or 60 minute doorset design (as appropriate), when tested to BS 476: Part 22: 1987 or BS EN 1634-1, when installed within a timber based doorset of comparable thickness. Margins to the leaf edges must remain as detailed for glazing. The position of the letter box/plate will be dictated by the pressure regime tested in the proving evidence (normally below mid-height).

15.2.13 Cable Ways

Based on the integrity performance of the doorset construction in the tests in section 3, with no burn through of the core material, we consider it acceptable to allow the provision for a concealed cable-way to facilitate electro-magnetic closing/latching mechanisms. This provision is only applicable to 30 minute door assemblies. The cable-way must be concealed in the following way:

1. A hole drilled centrally through the leaf of maximum 10mm diameter.
2. The cable for the electronic closing/latching mechanisms must be no more than 2mm smaller in diameter than the hole through the leaf.
3. The cable for the electronic closing/latching mechanism must be PVC encased
4. Cable ways are only permitted for use with latched, single leaf, single acting doorsets with maximum leaf dimensions of 2384mm (h) x 1094mm (w).
5. The hole must be located below 1000mm from the threshold and must be spaced a minimum of 90mm from any apertures within the leaf e.g. glazing, air transfer grilles or letter plates etc.

This approval is subject to the hardware manufacturer having the appropriate test evidence for the product for use with this type of 30 minute construction. Test evidence generated in steel doorsets is not acceptable. Any tested intumescent gaskets for the lockset, closing mechanism, receiver plate, cable loops etc. must be replicated.

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

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

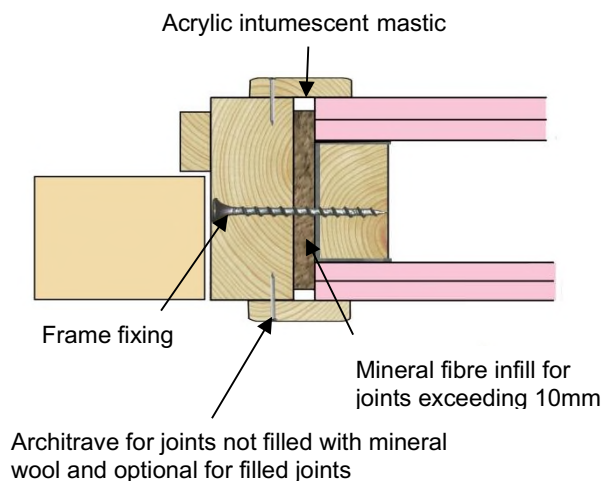
The frame jambs are to be fixed to the supporting construction using steel fixings at 600mm maximum centres. The fixings must be of the appropriate type for the supporting construction and must penetrate to a minimum depth of 50mm. It is not necessary to fix the frame head, although packers must be inserted.

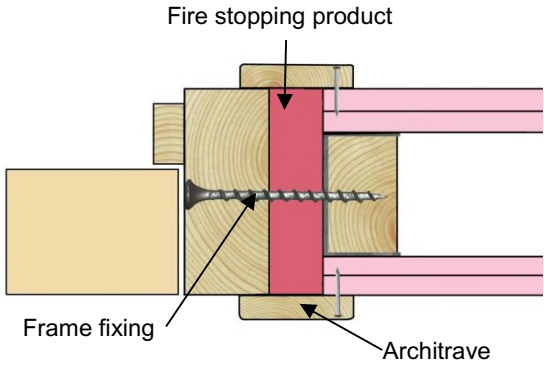
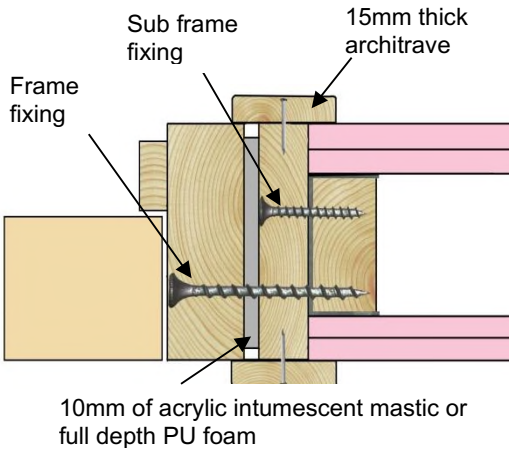
19 Sealing to Structural Opening

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 10mm depth of acrylic intumescent mastic, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.

2. Gaps between 10mm and 20mm must be tightly packed with mineral fibre capped on both sides with a 10mm depth of acrylic intumescent mastic, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1. Architraves are optional.



<p>3. Gaps up to 20mm filled with proprietary fire stopping product (e.g. expanding PU foam or preformed compressible intumescent foam). Products must be tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.</p>	
<p>4. Timber based or non-combustible subframe up to 50mm thick, with gaps up to 10mm between the components filled on both sides with 10mm depth of acrylic intumescent mastic or full depth expanding PU foam, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.</p>	

Guidance for various methods of sealing the frame to structural opening gap is also given in BS 8214: 2016, “Code of practice for fire door assemblies”, which may be referred to where appropriate.

20 Insulation

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

20.1 30 Minutes Performance

Type	Details
Partially insulating	Doorsets incorporating up to 20% of non-insulating or partially insulating glazing
Fully insulating	Unglazed doorsets or doors fitted with 30 minute fully insulating glass (see note in section 9.1.2)

20.2 60 Minutes Performance

Type	Details
Partially insulating	Doorsets incorporating up to 20% of non-insulating or partially insulating glazing
Fully insulating	Unglazed doorsets or doors fitted with 60 minute fully insulating glass (see note in section 9..2.1.1)

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 $3\text{m}^3/\text{m}/\text{hour}$ (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 54mm doorset design 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, it would provide a minimum of 30 or 60 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:

The signature block contains the Moralt AG logo, which features a stylized mountain peak above the word "MORALT". Below the logo, the text "Moralt AG" is printed, followed by the address "Obere Tieleföschstr. 1" and the postal code "D-83734 Hausham". A handwritten signature in blue ink is written over the printed text.

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 initially valid until the date shown on the front cover, 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	Dr K D S Towler
Title:	Senior Product Assessor	Senior Product Assessor

Appendix A

Supporting Performance Data

Test Report No.	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)
BMT/FEP/F14102 ¹ (WoodEx Ash 60)	A - ULSADD	2040 826/303 54	BS 476: Pt 22: 1987	Integrity: 42 Insulation: 42
BMT/FEP/F14102 ¹ (WoodEx Redwood)	B - ULSADD	2040 826/303 54	BS 476: Pt 22: 1987	Integrity: 30 Insulation: 30
271 38944 R1 (cableway)	LSADD	2384 104 54	BSEN 1634-1: 2008 and BSEN 1363-1: 1999	Integrity: 36 Insulation: 36
BMT/CNA/F14191	WoodEx engineered timber door frame assessment		BS 476: Pt 22: 1987	30 & 60

Construction Specialities – Acrovyn facings & edge protectors supporting data

RF11059 (Construction Specialities – Acrovyn edge protectors)	A: ULSADD	2100 x 900/300 x 44	BS 476: Pt 20/22: 1987	Integrity:43
	B: ULSADD	2100 x 900/300 x 44		Insulation: 43
RF11061 (Construction Specialities – Acrovyn edge protectors)	A: ULSADD	2100 x 900/300 x 54		Integrity: 39
	B: ULSADD	2100 x 900/300 x 54		Insulation: 39
IF13094	ULSADD	1400 x 900/300 x 48 ²		Integrity:66
	ULSADD	1400 x 900/300 x 48 ³		Insulation: 66
IF13095 Revision A	ULSADD	1400 x 900/300 x 48 ³		Integrity: 68
	ULSADD	1400 x 900/300 x 48 ³		Insulation: 68
IF13094	ULSADD	1400 x 900/300 x 48 ²	Integrity: 45	
IF13095 Revision A	ULSADD	1400 x 900/300 x 48 ³	Integrity: 60	

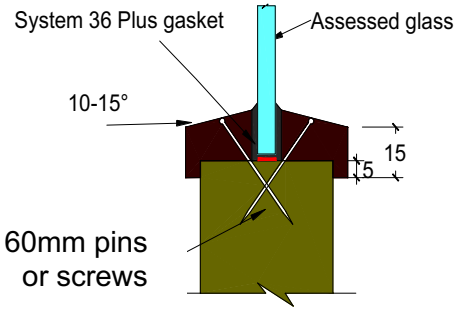
Notes:

1. Test BMT/FEP/F14102 was devised to investigate the influence of the WoodEx engineered timber as a door frame material for use with previously tested and approved door designs. The failure of doorset A was attributable to the latch and has been deemed a result of inadequate intumescent protection. Had the doorset been tested with the approved intumescent specification it would have achieved a minimum of 60 minutes integrity, when tested to BS 476: Part 22: 1987. The failure is therefore completely remote from the door frame and was not influenced by the type of door frame material used. The test is therefore suitable as supporting data for the hardwood WoodEx products with the Laminesse FireSound doorset designs
2. Door leaf thickness includes thickness of the Acrovyn facings
3. Door leaf thickness includes thickness of the Acrovyn facings.

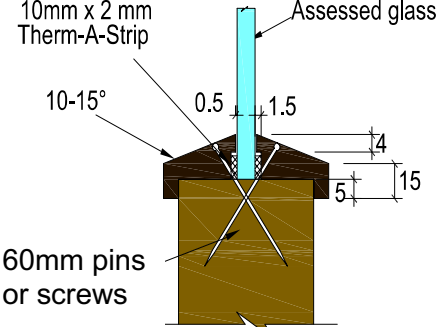
Appendix B

Assessed 30 Minute Glazing Systems

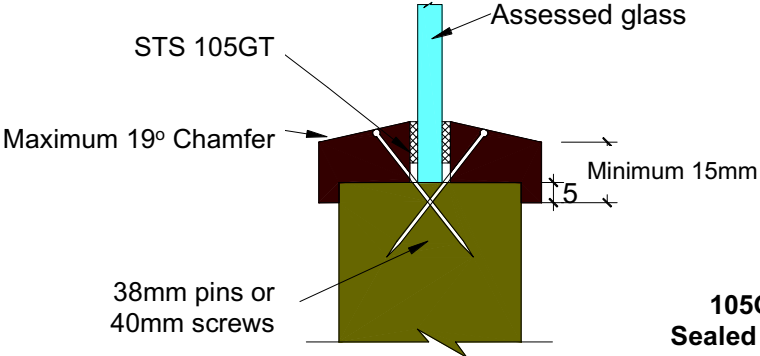
(See section 9 for details of required aperture liners)



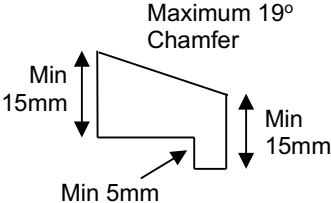
System 36 Plus
 Lorient Polyproducts Ltd



Therm-A-Strip
 Intumescent Seals Ltd

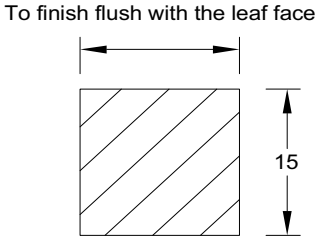
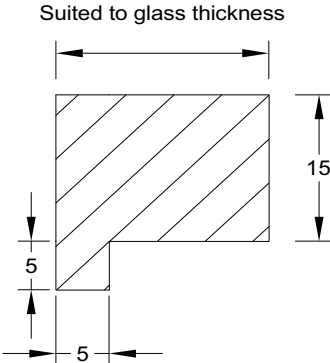
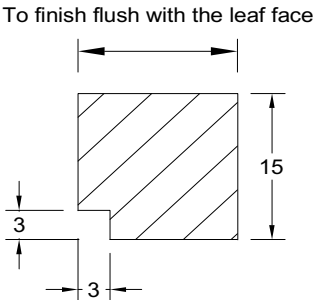


105GT
 Sealed Tight
 Solutions Ltd

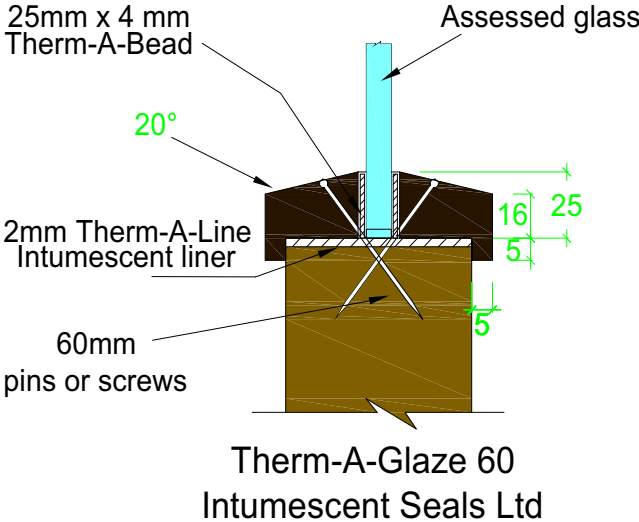


Square Beads

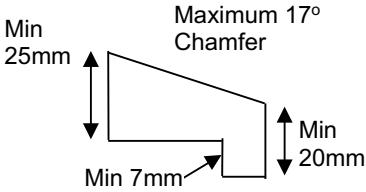
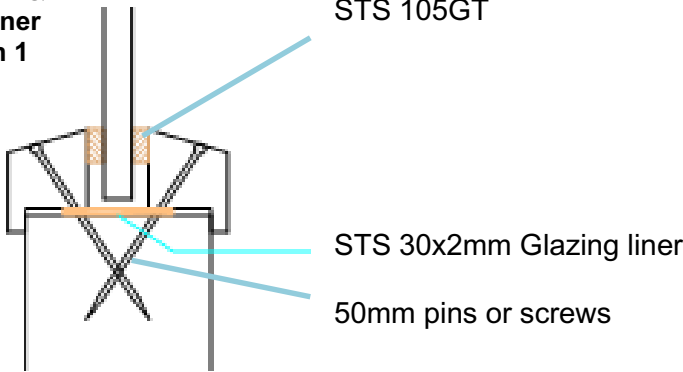
The STS 105GT glazing system has also been tested with a flush, square bead incorporating a 3 x 3mm quirk as shown below left. It is permitted to use any of the square bead profiles shown as an alternative to the tested beads detailed.



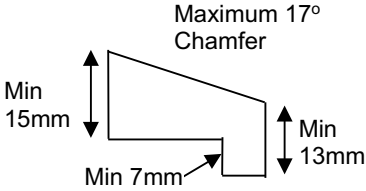
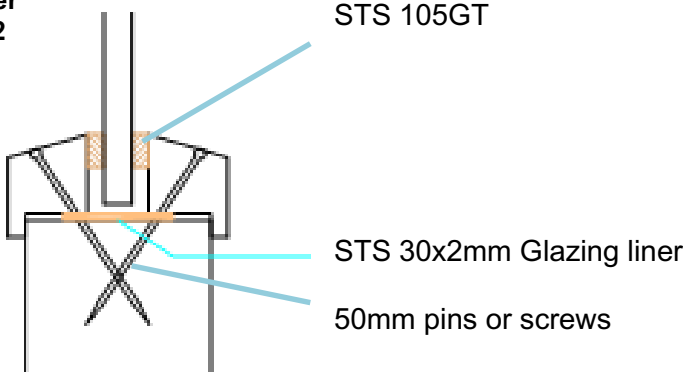
Assessed 60 Minute Glazing Systems



ST105GT & 30x2 Liner Option 1

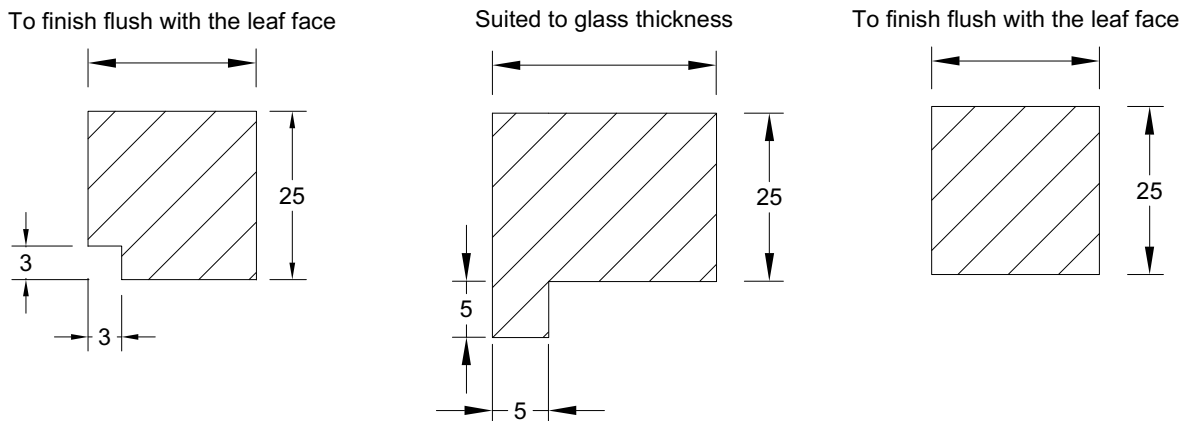


ST105GT & 30x2 Liner Option 2



Assessed Square Glazing Bead Profile

The following square bead profile may be used as an alternative to the splayed beads detailed above.



Bead shape may be altered from that shown above provided the minimum dimensions are maintained; but note that all glass types must be fitted fully in accordance with the manufacturers' tested details/installation requirements, particularly with respect to edge cover and expansion tolerances.

Splayed Flush Bead

A splayed flush bead may be used with either of the STS glazing systems only, subject to the following details.

1. The bead must be ≥ 25 mm high, with a maximum 19° chamfer, the chamfered material must be in addition to the square bead material as shown in drawing above
2. The bead may incorporate a 3 x 3mm quirk as shown above left to accommodate door thickness tolerances
3. Provided any minimum and maximum dimensions are complied with, any bead shape is permitted; all glass types must be fitted fully in accordance with the glass manufacturers tested details/installation requirements, particularly with respect to edge cover and expansion tolerances.

Appendix C
Revisions & Amendments

Rev.	Warringtonfire Ref.	Date	Description



Appendix D

Data Sheets for:

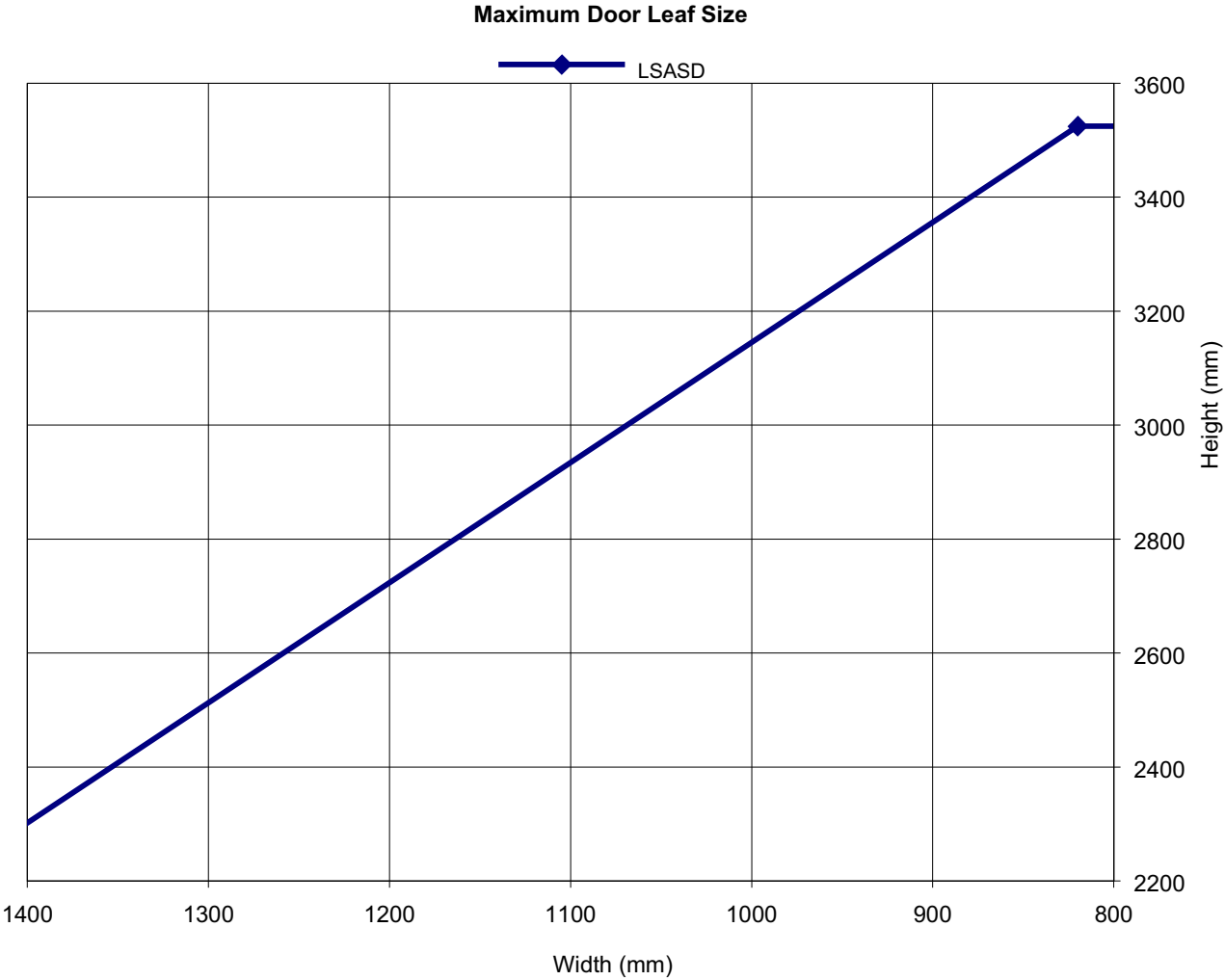
Moralt AG

Laminesse FireSound 54mm Doorsets

30 & 60 Minutes Fire Resistance

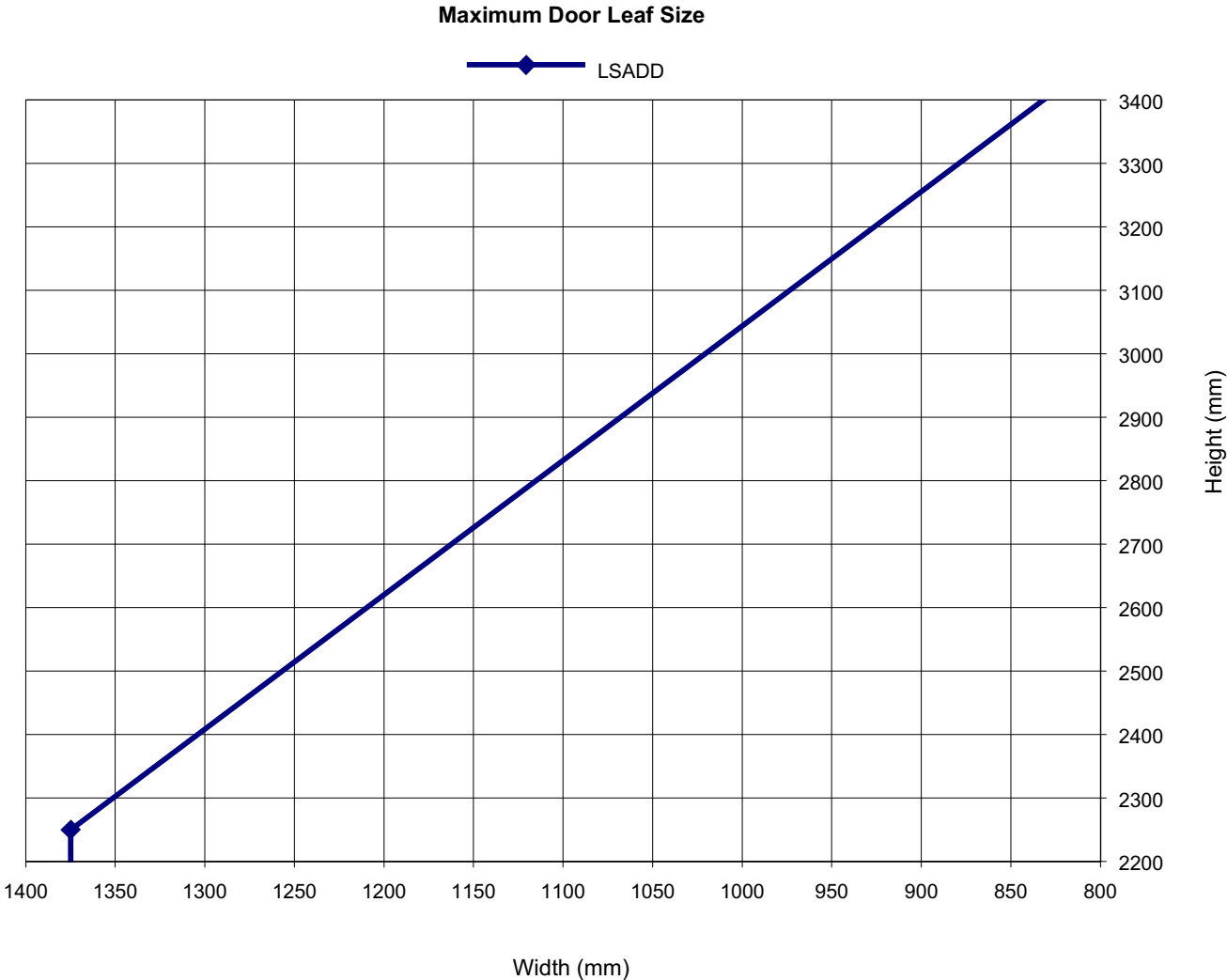
Laminese FireSound 54mm – 30 Minutes Integrity Performance
Latched, Single Acting, Single Doorsets

Leaf Sizes	Configuration		Height (mm)	Width (mm)	
	LSASD	From:	2250	x	1425
To:		3525	x	820	
Maximum Overpanel Height (mm)		Transomed	2000		
<p>Intumescent Materials: PVC encased Pyroplex Rigid Box Seals, Lorient Polyproducts Ltd. Type 617 or Palusol or STS Fire (4mm thick), or Flexilodice (1.8mm thick).</p> <p>Head, Jambs and Overpanel: 2No. 15mm wide seals exposed and fitted 10mm apart - 5mm either side of the centreline in the leaf edge or frame reveal. For leaves over 2900mm high and/or 1100mm wide increase to 2No. 20mm wide seals</p> <p>Hardware Protection: See section 13.</p>					



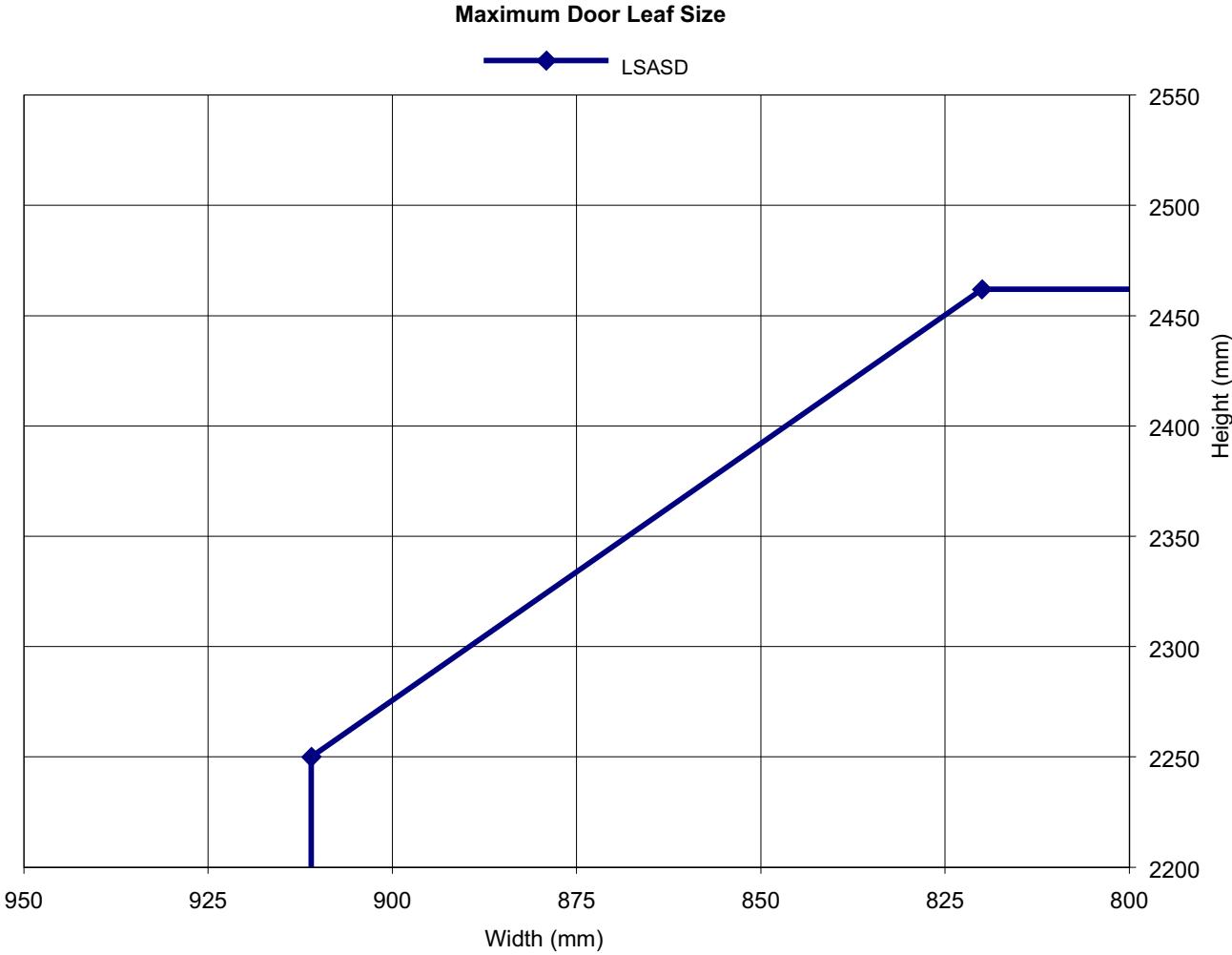
Laminesse FireSound 54mm – 30 Minutes Integrity Performance
Latched, Single Acting, Double Doorsets

Leaf Sizes	Configuration		Height (mm)	Width (mm)	
	LSADD	From:		2250	x
To:			3425	x	820
Maximum Overpanel Height (mm)		Transomed	1500		
<p>Intumescent Materials: PVC encased Pyroplex Rigid Box Seals, Lorient Polyproducts Ltd. Type 617 or Palusol or STS Fire (4mm thick), or Flexilodice (1.8mm thick).</p> <p>Head, Jambs and Overpanel: 2No. 15mm wide seals exposed and fitted 10mm apart - 5mm either side of the centreline in the leaf edge or frame reveal. For leaves over 2900mm high and/or 1100mm wide increase to 2No. 20mm wide seals</p> <p>Meeting Edges: 2No. 15mm wide seals exposed and fitted 10mm apart - 5mm either side of the centreline in one leaf edge only.</p> <p>Hardware Protection: See section 13.</p>					



Laminese FireSound 54mm – 60 Minutes Integrity Performance
Latched, Single Acting, Single Doorsets

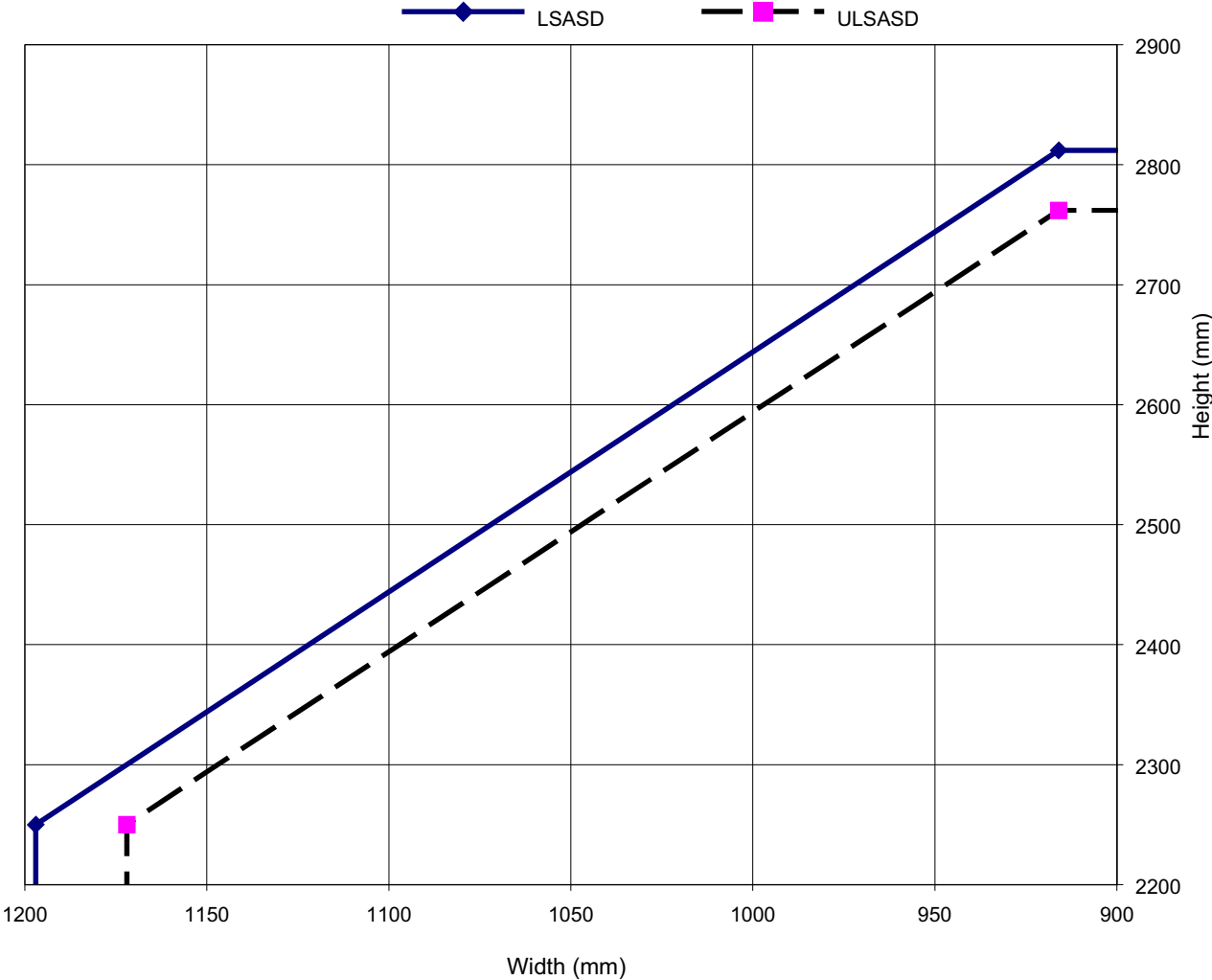
Leaf Sizes	Configuration		Height (mm)		Width (mm)	
	LSASD	From:		2250	x	911
To:			2462	x	820	
Maximum Overpanel Height (mm)		Transomed	2000			
<p>Intumescent Materials: PVC encased Pyroplex Rigid Box Seals, Lorient Polyproducts Ltd. Type 617 or Palusol or STS Fire (4mm thick), or Flexilodice (1.8mm thick).</p> <p>Head: 2No. 15mm wide seals exposed and fitted 10mm apart - 5mm either side of the centreline in the leaf edge or frame reveal.</p> <p>Jams & Overpanel: 2No. 15mm wide seals exposed and fitted 10mm apart - 5mm either side of the centreline in the leaf edge or frame reveal.</p> <p>Hardware Protection: See section 13.</p>						



Laminasse FireSound 54mm – 30 or 60 Minutes Integrity Performance
Latched & Unlatched, Single Acting, Single Doorsets

Leaf Sizes	Configuration	Height (mm)			Width (mm)
	LSASD	From:	2250	x	1197
		To:	2812	x	916
ULSASD	From:	2250	x	1172	
	To:	2762	x	916	
Maximum Overpanel Height (mm)		1250			
INTUMESCENT MATERIALS: PVC encased Lorient Polyproducts Ltd. Type 617 Head, Jambs and Overpanel: 2No. 15 x 4mm seals exposed and fitted 10mm apart - 5mm either side of the centreline in the leaf edge or frame reveal. HARDWARE PROTECTION: See section 13.					

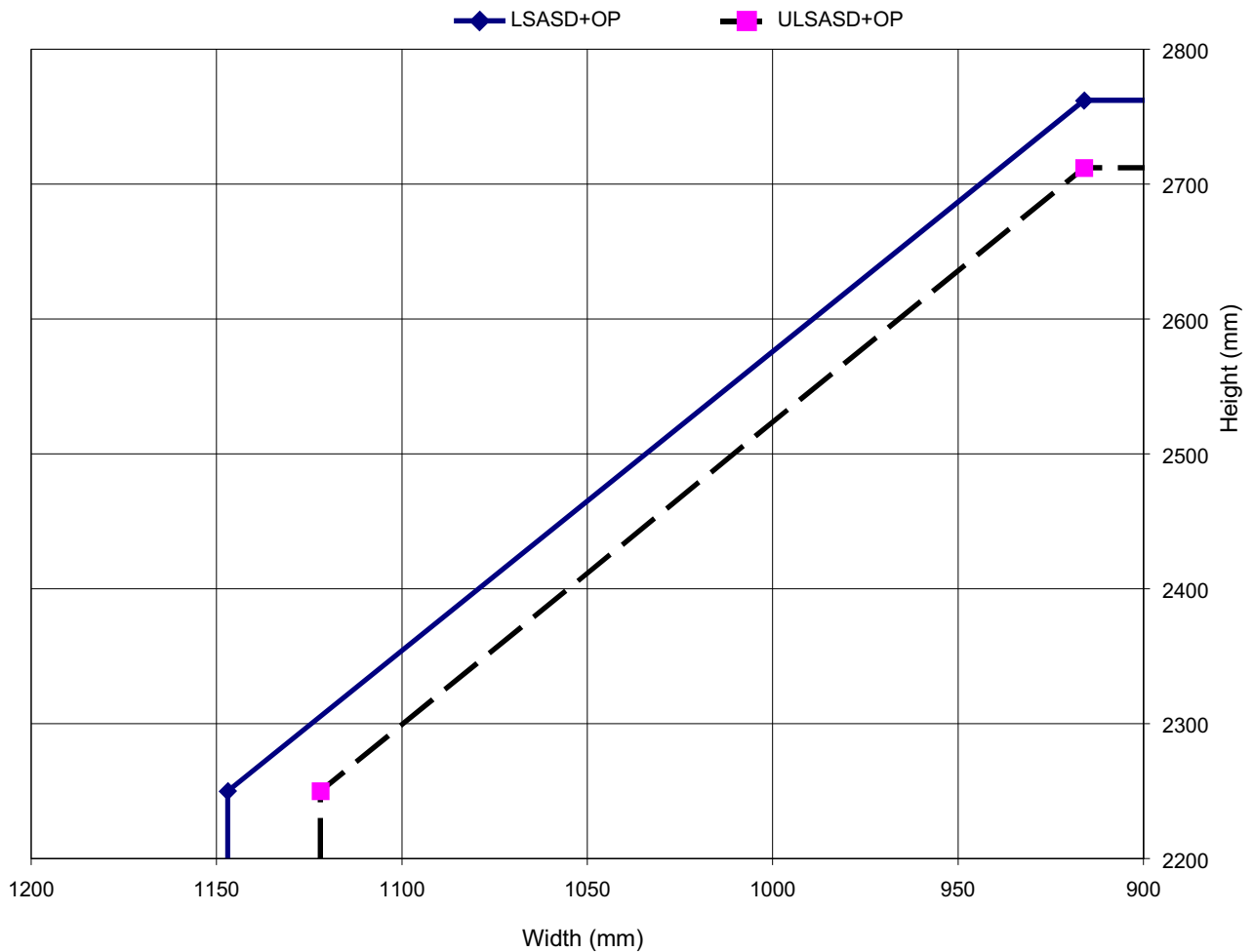
Maximum Door Leaf Size



Laminasse FireSound 54mm – 30 or 60 Minutes Integrity Performance
Latched & Unlatched, Single Acting, Single Doorsets + Overpanel

Leaf Sizes	Configuration		Height (mm)		Width (mm)
	LSASD+OP	From: To:	2250 2762	x x	1147 916
Leaf Sizes	ULSASD+OP	From:	2250	x	1122
		To:	2712	x	916
Maximum Overpanel Height (mm)			1250		
INTUMESCENT MATERIALS: PVC encased Lorient Polyproducts Ltd. Type 617					
Head: 2No. 15 x 4mm seals exposed and fitted 10mm apart - 5mm either side of the centreline in the bottom edge of the overpanel.					
Jambs and Overpanel (other than at leaf head): 2No. 15 x 4mm seals exposed and fitted 10mm apart - 5mm either side of the centreline in the leaf edge or frame reveal.					
HARDWARE PROTECTION: See section 13.					

Maximum Door Leaf Size



Laminesse FireSound 54mm – 60 Minutes Integrity Performance
Latched, Single Acting, Double Doorsets

Leaf Sizes	Configuration		Height (mm)	Width (mm)	
	LSADD	From:		2250	x
To:			2362	x	820
Maximum Overpanel Height (mm)		Transomed	1500		

Intumescent Materials: PVC encased Pyroplex Rigid Box Seals, Lorient Polyproducts Ltd. Type 617 or Palusol or STS Fire (4mm thick), or Flexilodice (1.8mm thick).

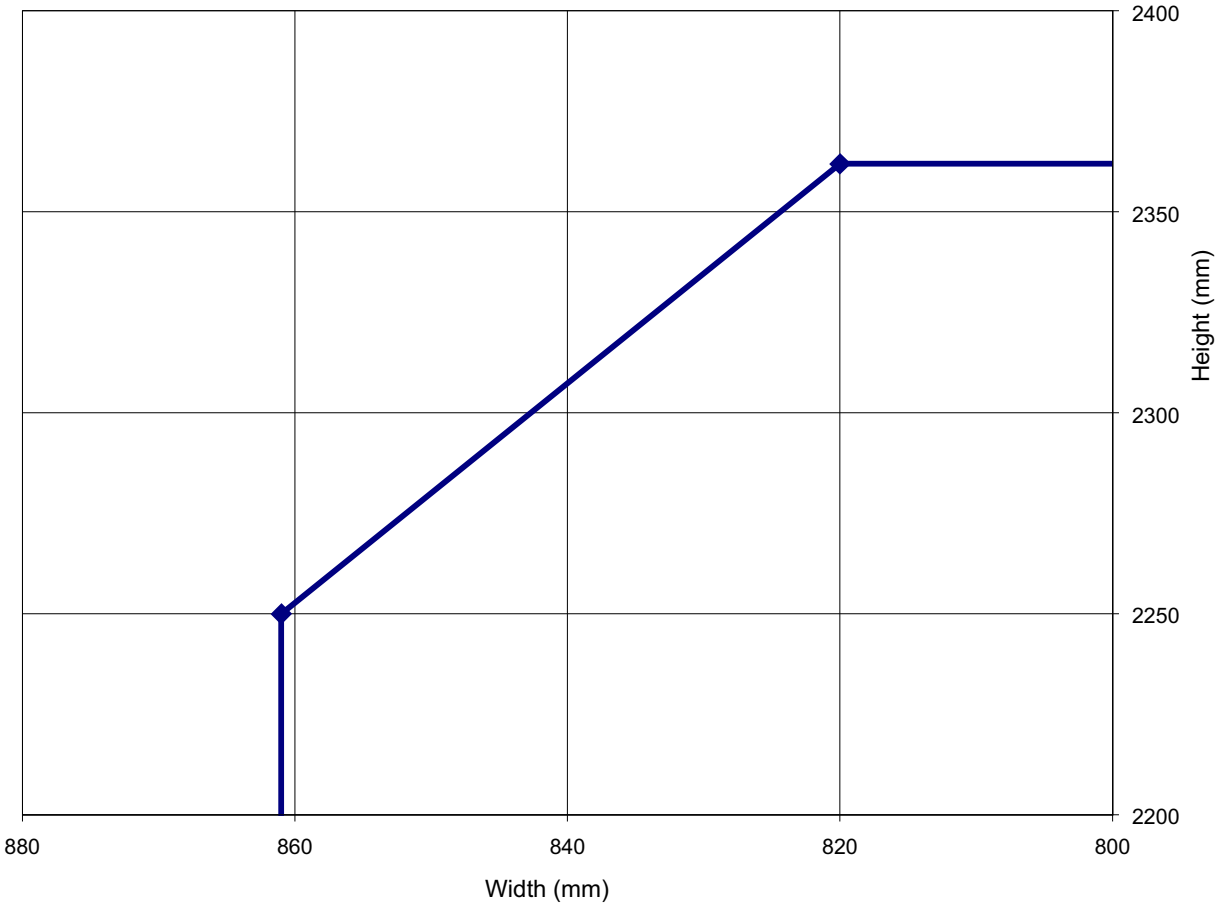
Head, Jambs and Overpanel: 2No. 15mm wide seals exposed and fitted 10mm apart - 5mm either side of the centreline in the leaf edge or frame reveal.

Meeting Edges: 2No. 15mm wide seals exposed and fitted 10mm apart - 5mm either side of the centreline in one leaf edge only.

Hardware Protection: See section 13.

Maximum Door Leaf Size

—◆— LSADD



**Laminasse FireSound 54mm – 30 or 60 Minutes Integrity Performance
 Latched & Unlatched, Single Acting, Double Doorsets**

Leaf Sizes	Configuration		Height (mm)		Width (mm)
	LSADD	From:		2250	x
To:			2662	x	916
ULSADD	From:		2250	x	1072
	To:		2612	x	916
Maximum Overpanel Height (mm)			750		

INTUMESCENT MATERIALS: PVC encased Lorient Polyproducts Ltd. Type 617

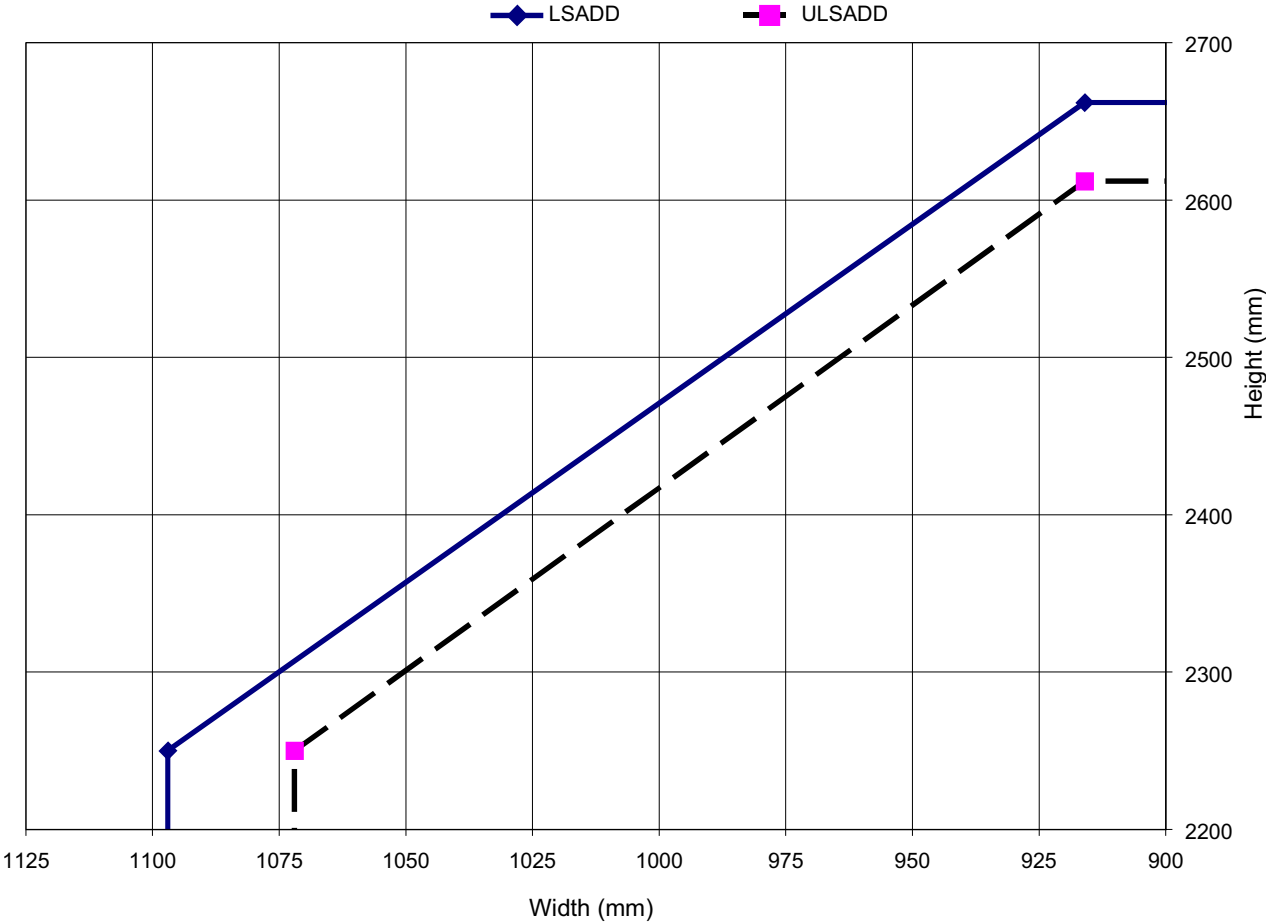
Head, Jambs and Overpanel: 2No. 15 x 4mm seals exposed and fitted 10mm apart - 5mm either side of the centreline in the leaf edge or frame reveal.

Meeting Edges:

Square: 2No. 15 x 4mm seals exposed and fitted 10mm apart - 5mm either side of the centreline in one leaf edge only.

Hardware Protection: See section 13.

Maximum Door Leaf Size



Laminesse FireSound 54mm – 30 or 60 Minutes Integrity Performance
Latched & Unlatched, Single Acting, Double Doorsets + Overpanel

Leaf Sizes	Configuration		Height (mm)		Width (mm)
	LSADD+OP	From:		2250	x
To:			2562	x	916
ULSADD+OP	From:		2250	x	1022
	To:		2512	x	916
Maximum Overpanel Height (mm)			750		

INTUMESCENT MATERIALS: PVC encased Lorient Polyproducts Ltd. Type 617

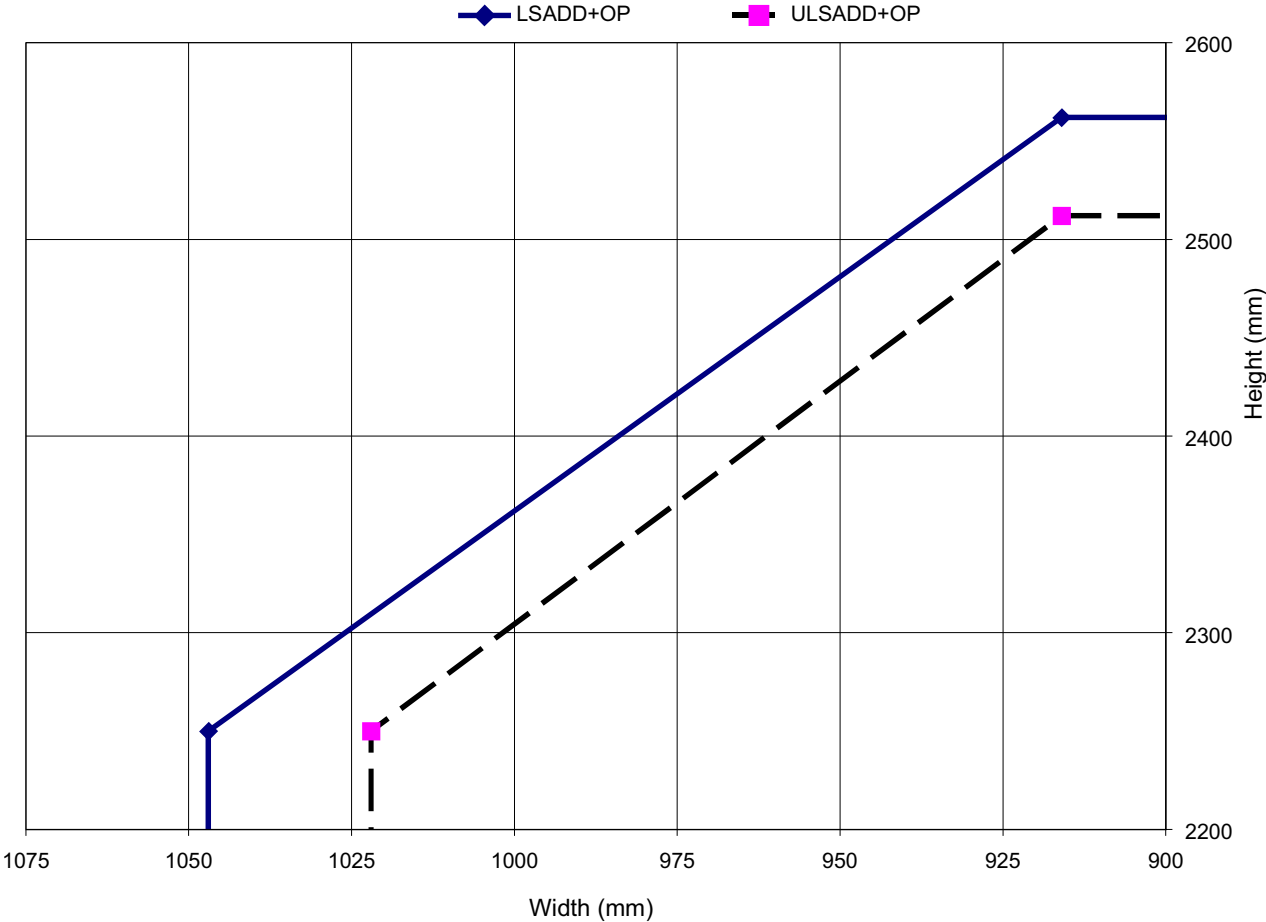
Head: 2No. 15 x 4mm seals exposed and fitted 10mm apart - 5mm either side of the centreline in the bottom edge of the overpanel.

Jambs and Overpanel (other than at leaf head): 2No. 15 x 4mm seals exposed and fitted 10mm apart - 5mm either side of the centreline in the leaf edge or frame reveal.

Meeting Edges:
Square: 2No. 15 x 4mm seals exposed and fitted 10mm apart - 5mm either side of the centreline in one leaf edge only.

Hardware Protection: See section 13.

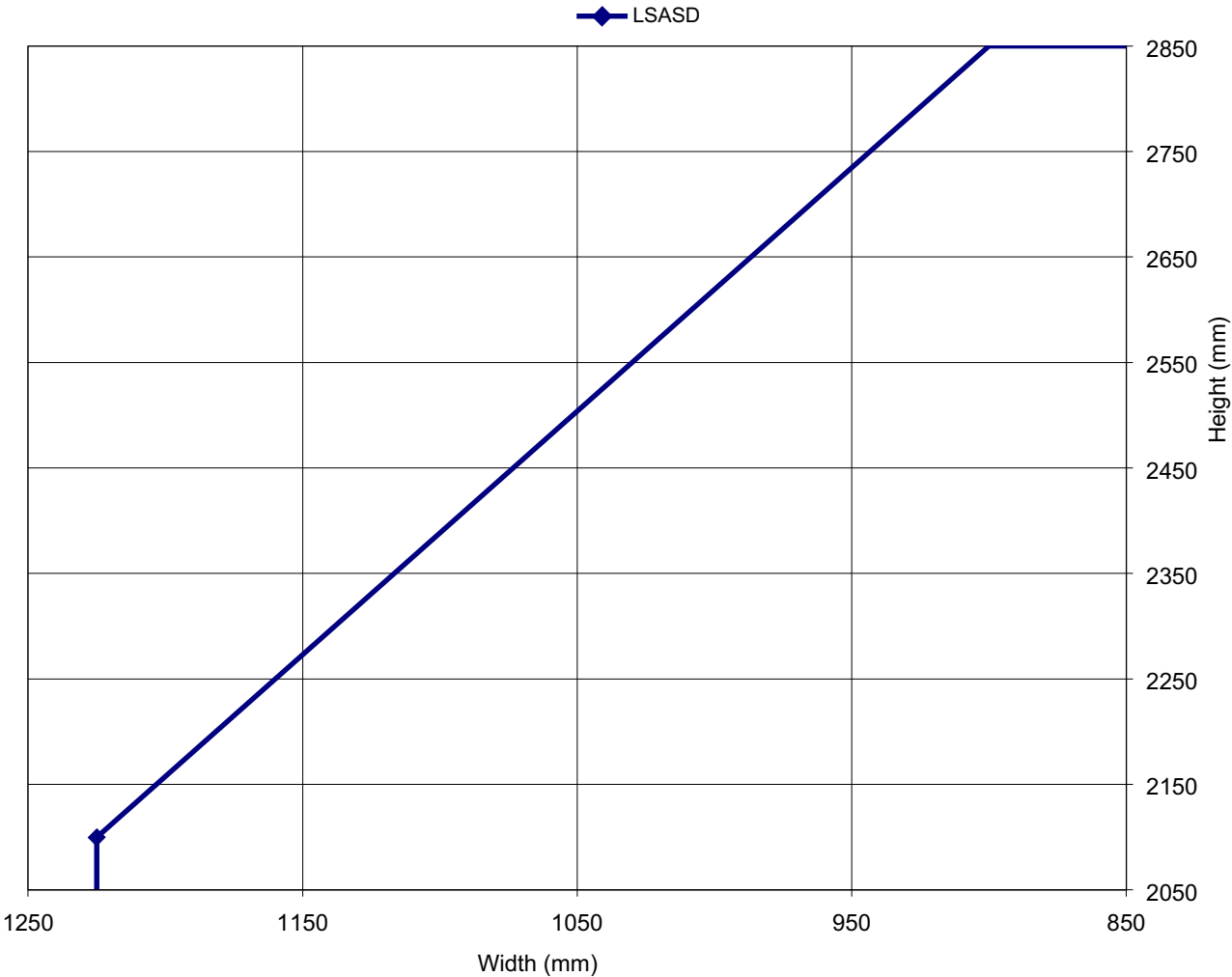
Maximum Door Leaf Size



**Moralt Laminesse FireSound 54mm Doorsets – 30 Minutes Fire Resistance
 CS Edge Protectors/Acrovyn Wrap
 Latched, Single Acting, Single Doorsets**

	Configuration		Height (mm)	Width (mm)
Leaf Sizes	LSASD	From:	2100	x 1225
		To:	2850	x 900
Max. Overpanel Height (mm)	Transomed		2000	
INTUMESCENT MATERIALS: Lorient Polyproducts Ltd - Type 617				
HEAD:				
Square: 1No. 15 x 4mm strips centrally fitted in the leaf head or frame reveal.				
JAMBS & OVERPANEL: 1No. 15 x 4mm strips centrally fitted in the leaf edges or frame reveal.				
HARDWARE PROTECTION: See section 13.				

Maximum Door Leaf Size



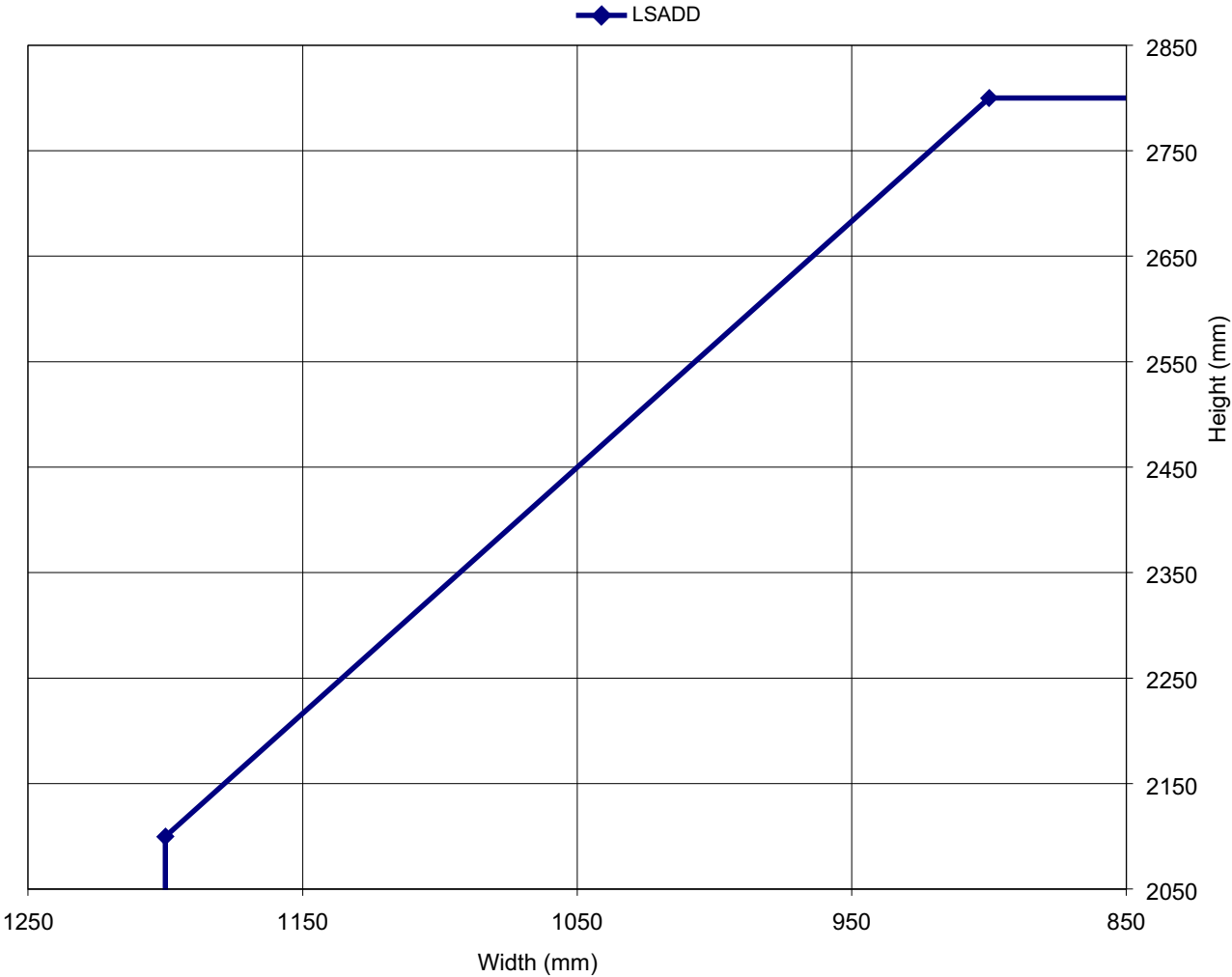
**Moralt Laminasse FireSound 54mm Doorsets – 30 Minutes Fire Resistance
 CS Edge Protectors/Acrovyn Wrap
 Latched, Single Acting, Double Doorsets**

	Configuration		Height (mm)	Width (mm)
Leaf Sizes	LSADD	From:	2100	x 1200
		To:	2800	x 900
Max. Overpanel Height (mm)		Transomed	1500	

INTUMESCENT MATERIALS: Lorient Polyproducts Ltd - Type 617

HEAD:
Square: 1No. 15 x 4mm strips centrally fitted in the leaf heads or frame reveal.
JAMBS & OVERPANEL: 1No. 15 x 4mm strips centrally fitted in the leaf edges or the frame reveal.
Meeting Edges: Square: 1No. 15 x 4mm strip centrally fitted in the meeting edge of both leaves.
HARDWARE PROTECTION: See section 13.

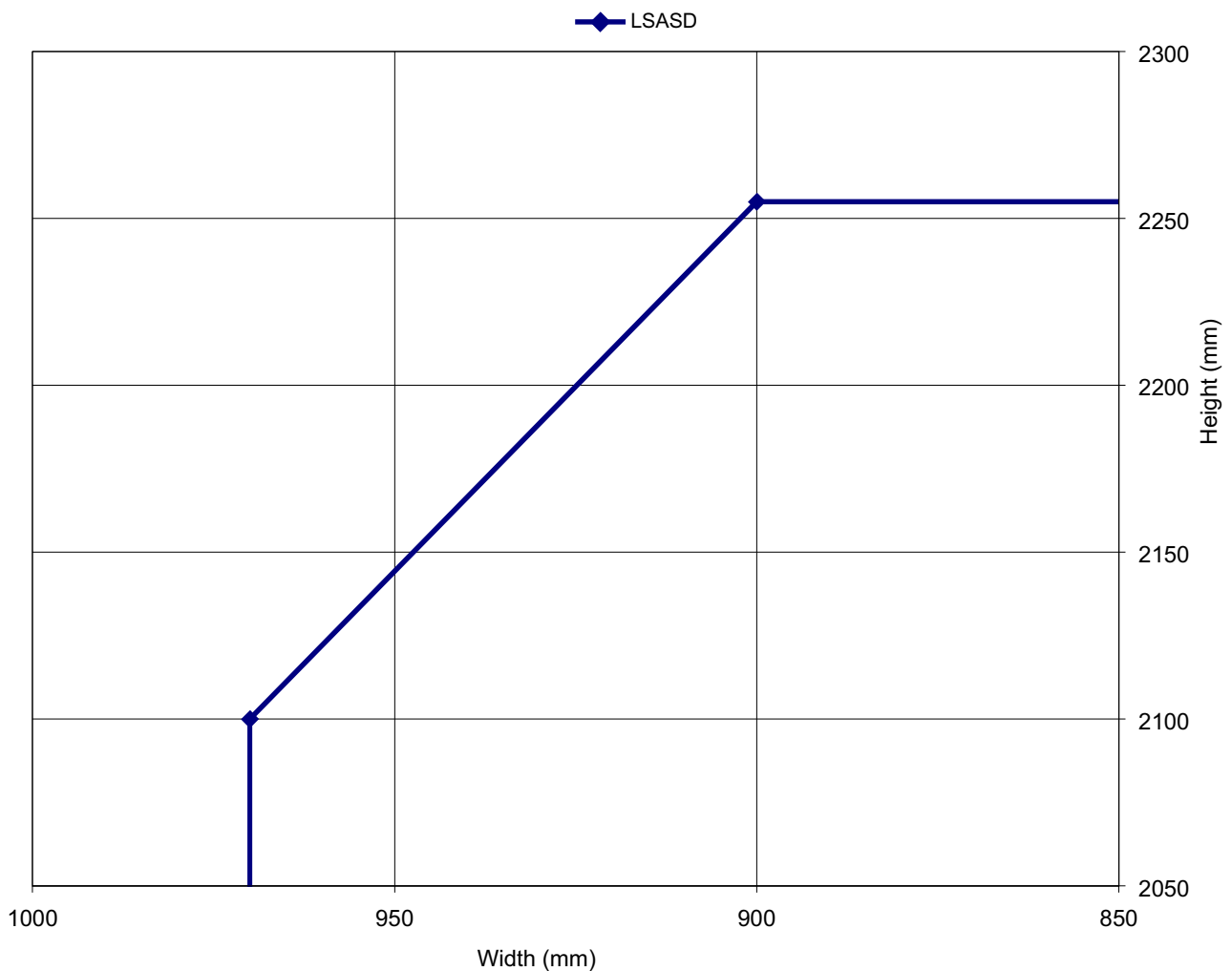
Maximum Door Leaf Size



**Moralt Laminesse FireSound 54mm Doorsets – 60 Minutes Fire Resistance
CS Edge Protectors/Acrovyn Wrap
Latched, Single Acting, Single Doorsets**

	Configuration		Height (mm)	Width (mm)
Leaf Sizes	LSASD	From:	2100	x 970
		To:	2255	x 900
Max. Overpanel Height (mm)		Transomed	2000	
INTUMESCENT MATERIALS: Lorient Polyproducts Ltd - Type 617				
HEAD:				
Square: 2No. 15 x 4mm strips centrally fitted 5mm either side of the centreline in the leaf head or frame reveal.				
JAMBS & OVERPANEL: 2No. 15 x 4mm strips centrally fitted 5mm either side of the centreline in the leaf edges or frame reveal.				
HARDWARE PROTECTION: See section 13.				

Maximum Door Leaf Size



**Moralt Laminesse FireSound 54mm Doorsets – 60 Minutes Fire Resistance
 CS Edge Protectors/Acrovyn Wrap
 Latched, Single Acting, Double Doorsets**

	Configuration		Height (mm)	Width (mm)
Leaf Sizes	LSADD	From:	2100	x 945
		To:	2205	x 900
Max. Overpanel Height (mm)		Transomed	1500	

INTUMESCENT MATERIALS: Lorient Polyproducts Ltd - Type 617

HEAD:
Square: 2No. 15 x 4mm strips centrally fitted 5mm either side of the centreline in the leaf heads or frame reveal.
JAMBS & OVERPANEL: 2No. 15 x 4mm strips centrally fitted 5mm either side of the centreline in the leaf edges or frame reveal.
Meeting Edges: Square: 1No. 15 x 4mm strip centrally fitted in the meeting edge of both leaves.
HARDWARE PROTECTION: See section 13.

Maximum Door Leaf Size

