Exova Warringtonfire
Chiltern House
Stocking Lane
Hughenden Valley
High Wycombe
Buckinghamshire
HP14 4ND

T: +44 (0) 1494 569 800
F: +44 (0) 1494 564 895
E: globalfire@exova.com
W: www.exova.com

Testing, calibrating, advising.

Title:

Global Assessment

Moralt LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm Doorsets for 60 Minutes Fire Resistance

Report No:

Chilt/A13059 Revision B

WF Contract:

399354

Valid From:

22nd August 2018

Valid Until:

22nd August 2023

Prepared for:

Moralt AG

Obere Tiefenbach Str. 1

83734 Hausham

Germany

Exova Warringtonfire – the new name for BM TRADA

On December 1st 2015, Chiltern International Fire Limited (trading as BM TRADA) commenced trading under the name Exova Warringtonfire.

To coincide with this change, our Technical Reports, Test Reports, Product Assessments, company stationery and marketing collateral have been updated to reflect the Exova Warringtonfire branding.

The validity of all documents previously issued by Chiltern International Fire Limited including certificates, test reports and product assessments is unaffected by this change. A letter to this effect is available upon request by e-mailing globalfire@exova.com

About Exova Warringtonfire

Exova Warringtonfire is part of the Exova Group one of the world's leading laboratory-based testing groups, trusted by organisations to test and advise on the safety, quality and performance of their products and operations. Headquartered in Edinburgh, UK, Exova operates 143 laboratories and offices in 32 countries and employs around 4,500 people throughout Europe, the Americas, the Middle East and Asia/Asia Pacific. With over 90 years' experience, Exova specialises in testing across a number of key sectors from health sciences to aerospace, transportation, oil and gas, fire and construction.

Be assured that whilst the name will change, your service provision and primary contacts have not. What will be available to you is a wider team of testing experts and an extended range of testing capabilities including structural steelwork testing, ventilation duct and damper testing, ASTM testing, water mist system testing and smoke toxicity testing and covering additionally both the rail and marine sectors.

If you have any questions, please do not hesitate to contact a member of the team and we will do our best to answer them. We appreciate your business to date and we look forward to working with you in the future.

Kind regards

Exova Warringtonfire

T: +44 (0) 1494 569 800
E:globalfire@exova.com

Contents

1 Introduction

This document constitutes a global assessment relating to LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm, 60 minute fire resisting doorsets, manufactured by Moralt AG. The assessment uses established extrapolation and interpretation techniques in order to extend the scope of application by determining the limits for the design based on the tested constructions and performances obtained. The assessment is an evaluation of the potential fire resistance performance, if the elements were to be tested in accordance with BS 476: Part 22: 1987.

2 General Description of Construction

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

This assessment considers the following design variations without an insert at the head of the door:

1. FireSmoke - 6mm MDF facings
2. FireSmoke - 6mm Chipboard facings
3. FireSafe - 3.8 – 4mm Ply veneer facings.

Annex Z covers the scope of approval for the product when an insert is included at the head of the door blank.

3 Leaf Sizes

The approval for increased leaf dimensions is based on the tests listed in appendix B and takes into account the margin of over performance above 60 minutes integrity for the design 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. Separate envelopes are given depending if a head rail is included

Doorsets with reduced dimensions are deemed to be less onerous. Therefore, doors with dimensions that are less than those tested and stated in appendix D may be manufactured.

4 Configuration and Orientation

4.1 Configuration

Based on the test evidence listed in appendix B, this assessment covers the following doorset configurations.

Abbreviation	Description
LSASD & ULSASD	Latched & unlatched single acting single doorset
DASD	Double acting single doorset

4.2 Orientation

The primary fire resistance tests for this design were all conducted with the doorset hung such that the door leaf opened towards the fire, which is considered the most onerous orientation in terms of fire resistance performance. Based on this testing, assessment is made that doorsets to this design may be hung to open either away from or towards the fire risk side of the doorset.

5 Leaf Size Adjustment

LAMINESSE FireSmoke & LAMINESSE FireSafe 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.
Lipping	The dimensions stated in section 9 may be reduced by 20% for fitting purposes.

6 Overpanels

6.1 Transomed Overpanels

Overpanels of the same construction as the door leaves may be used, only when separated from the leaf head by a transom. The overpanel must be fully contained within the door frame (see following diagram).

The timber frame must be joinery quality, straight grained hardwood free from knots splits and checks and with a minimum density of 640 kg/m3; 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 8.

Beech, Fagus Sylvatica, is not permitted for 60 minute applications.

The transom must be to the same specification as the door frame (see section 9).

The transom to door frame joint must utilise one of the following four methods: mortise and tenon joints; half lapped joints; mitre joints; butt joints (see section 8.2).

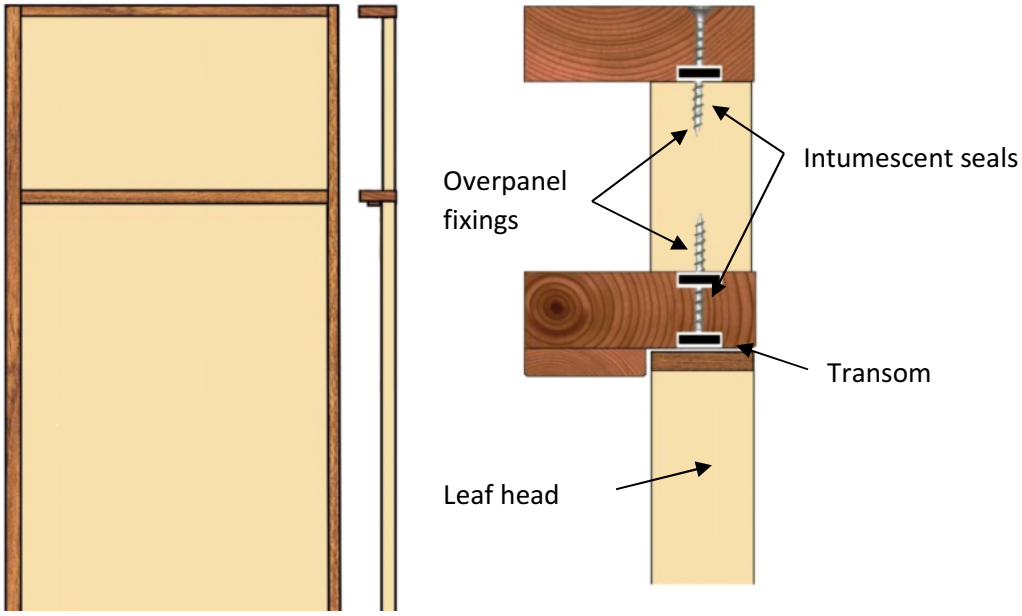
All methods require frame joints to be tight, with no gaps, and require mechanical fixing with the appropriate size ring shank nails or screws. Butt joints must be additionally bonded with urea formaldehyde or equivalent.

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, if required for the manufacturing process.

Maximum overpanel heights are as follows.

Configuration	**Max Overpanel height** (mm)
Single doorsets	2000



Note: Drawing is representative of doorset construction only, actual construction must be as the text within this document specifies.

6.2 Glazed Fanlights

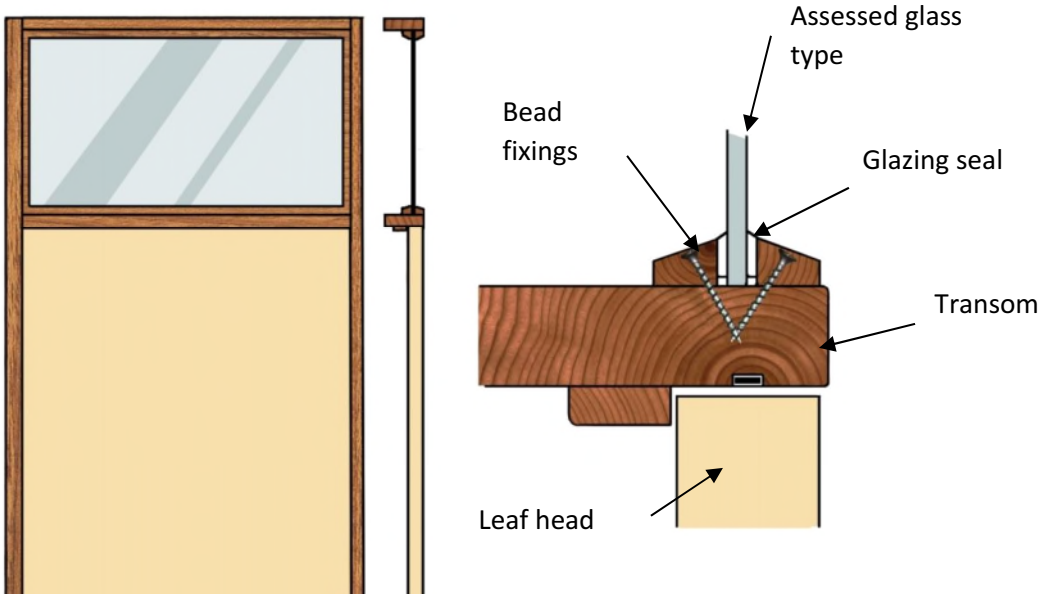
Timber frame doorsets including a transom may include a glazed fanlight. The timber frame and glazing beads must be joinery quality, straight grained hardwood free from knots splits and checks and with a minimum density of 640 kg/m^3; whilst the frame section for the transom must be a minimum of 70mm x 44mm. Timber door frame and transom construction method must comply with the specification contained in section 8.

Beech, Fagus Sylvatica, is not permitted for 60 minute applications.

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 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	≤600	Overall door width



Note: Drawing is representative of doorset construction only, actual construction must be as the text within this document specifies.

7 Glazing

7.1 General

The testing conducted LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm has demonstrated that the design is capable of tolerating glazed apertures, whilst providing a margin of over performance. Glazing is therefore acceptable within the following parameters.

The maximum total area of glazing is 0.56m^2

7.2 Assessed Glazing Systems

The glazing system must be one of the following proprietary tested systems.

Glazing System	Manufacturer	Maximum Area (m^2)
1. Fireglaze 60	Sealmaster Ltd	0.56
2. Therm-A-Glaze 60	Intumescent Seals Ltd	0.56
3. System 36/15	Lorient Polyproducts Ltd	0.56
4. System 90+	Lorient Polyproducts Ltd	0.56
5. System 63 (circular apertures only)	Lorient Polyproducts Ltd	0.56
6. Pyroglaze 60	Mann McGowan Ltd	0.56

Note: Pyroglaze 60 must be used with 60mm long steel screw fixings for the beads.

7.3 Assessed Glass Products

Assessed glass types are as follows.

Glass Type	Manufacturer	Thickness (mm)	Max Area (m^2)
1. Pyroshield	Pilkington UK Ltd	6 & 7	0.56
2. Pyroshield 2	Pilkington UK Ltd	6 & 7	0.56
3. Pyran S	Schott Glass Ltd	6	0.56
4. Pyrostem	Pyroguard UK Ltd	6	0.56
5. Pyrodur 60-10	Pilkington UK Ltd	10	0.56
6. Pyroguard EW 60	Pyroguard UK Ltd	11	0.56
7. Pyranova 15-S2	Schott UK Ltd	11	0.56
8. Pyrobelite 12	AGC Glass UK Ltd	12	0.56
9. Pyrodur 60-20	Pilkington UK Ltd	13	0.56
10. Contraflam EW60	Vetrotech Saint Gobain	14	0.56

11. Pyranova 15-S3.0	Schott UK Ltd	15	0.56
12. Pyroguard EI 30	Pyroguard UK Ltd	15	0.56
13. Pyrostop 30-10	Pilkington UK Ltd	15	0.56
14. Pyrobel 16	AGC Glass UK Ltd	16	0.56

Notes:

1. All glass types must be fitted strictly in accordance with the manufacturers' tested details/installation requirements, particularly with reference to suitable tolerances for expansion of the glass pane.
2. Glass types 5 and 8-14 are fully insulating for 30 minutes in terms of the criteria set out in BS 476: Part 20: 1987.
3. Glass type 14 is fully insulating for 60 minutes in terms of the criteria set out in BS 476: Part 20: 1987.

7.4 Glazing Beads & Installation

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

Bead Profile	Min Density (kg/m^3)	Application
Splayed	640	All proprietary systems detailed in 7.2 and appendix A
Square	640	Proprietary system 1 and 2 as specified in 7.2 and glass types 8 - 14 as specified in 7.3

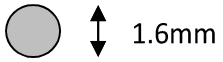
Notes:

1. A square bead profile may be used as an alternative to the splayed beads required for the proprietary systems, subject to the restricted glass types and glazing systems specified in the table above (see appendix A for square bead profile options)
2. Glazing beads must be retained in position with 60mm long steel pins or 60mm long No. 6 - 8 screws, inserted at 35 - 40º 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.
3. The following minimum pin specification is permitted and is considered suitable for gun (pneumatically) fired applications:

   3.1 Option 1 – Round, Oval and Rectangular shaped pins:

   Minimum Standard Wire Gauge (SWG) 16
   Minimum cross section area of $2.03mm^2$
   Minimum linear dimension 1.6mm in any direction

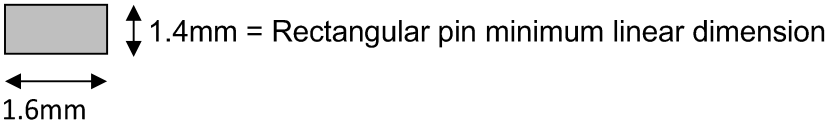
Round pin diameter (mm) = minimum 1.6mm



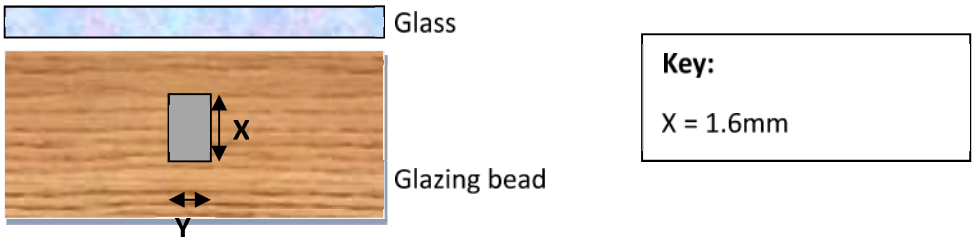
Oval/rectangular pin minimum diameter linear dimension = 1.6mm

3.2 Option 2 – Rectangular shaped pins:

- Minimum Standard Wire Gauge (SWG) 16
- Minimum cross section area of 2.24mm^2
- Minimum linear dimension 1.4mm in any direction



The following plan view illustrates the required orientation of rectangular pins in relation to the plane of the glass, showing the 1.6mm (long) dimension oriented perpendicular to the glass, where possible:



There are many pins/brads on the market which are sold as SWG 16 but are often below the minimum dimensions stated above. The use of these pins is not covered by the scope of this assessment

4. Glazed openings must not be less than 100mm from any door edge. Multiple apertures are acceptable within the permitted glazed area, with a minimum dimension of 80mm of LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm core between apertures
5. Aperture shape is not restricted, providing the glazing system and beads are compatible with that shape
6. Timber for glazing beads must be straight grained joinery quality hardwood, free from knots, splits or checks with a minimum density of 640 kg/m3. Beech, Fagus Sylvatica, is not permitted for 60 minute applications.
7. 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

8. **Pyroshield 2**; the following table details the maximum pane sizes and approved glazing systems permitted for Pyroshield 2 in the LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm doorset design

Glass Type	**Glazing System** (section 7.2)	**Maximum Pane Dimensions*** (height & width – mm)	**Maximum Area (m²)**
Pyroshield 2	2	1300 & 550	0.56
	4	1300 & 310	0.4

*The heights and widths listed are the maximum single dimension allowable for an individual pane utilising the relevant glazing system; maximum area listed takes precedence over pane dimensions; maximum dimensions may not be increased even if the other dimension for the pane is reduced.

9. False glazing beads must not be fitted to the face of Pyroshield or Pyroshield 2 glasses.

8 Door Frames

8.1 Door frame construction

Timber based door frames for LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm must be constructed to meet the following specification.

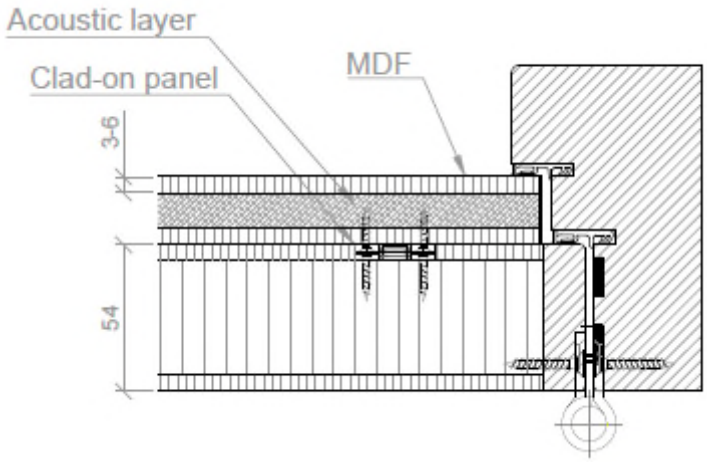
Material	**Minimum Section Size** (mm)	**Min Density** (kg/m^3)
Hardwood	70 x 32	640
WoodEx 60	70 x 32	640

Notes:

1. If the doorset features a transomed overpanel, the transom must be hardwood with a minimum density of 640kg/m^3 and with a minimum section of 70mm x 44mm. WoodEx 60 is not permitted for use as an overpanel transom.
2. All door frame timber must be joinery quality hardwood, free from knots, splits or checks with a minimum density of 640 kg/m3. Beech, Fagus Sylvatica, is not permitted for 60 minute applications.
3. A 12mm (15mm for WoodEx 60) deep planted or integral stop is adequate for single acting frames whilst double acting frames may be scalloped or square (see diagram below)
4. Frame joints may be mortice and tenoned, mitred, half lapped or butted and glued; and with no gaps. All jointing methods require mechanical fixing with the appropriate size ring shank nails or screws.

8.2 Double rebated frame option

The Moralt acoustic clad on panel can be fitted with a double rebated frame as shown below. The minimum timber details for the standard frame dimensions A, B and C, must be complied with as shown in sections 8.1 to 8.5 and see section 10.3.1 for further detail.

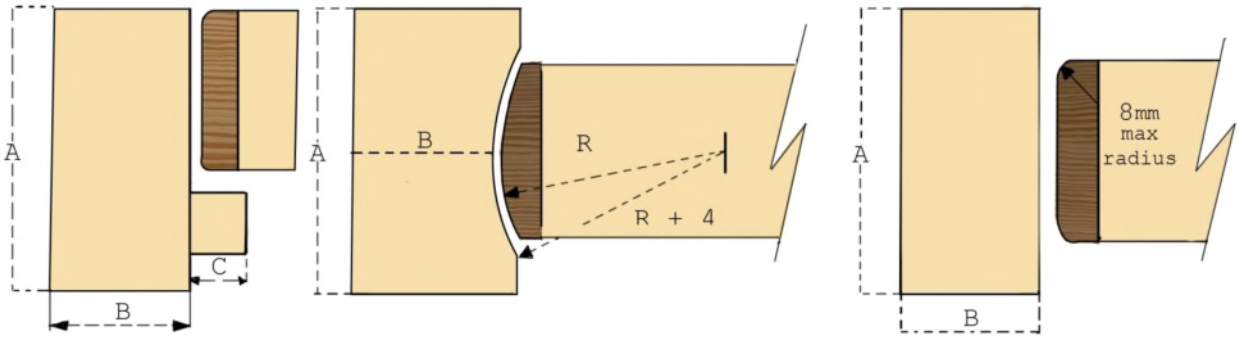


8.3 Frame Section details

The following diagram depicts the assessed frame profiles and dimensions:

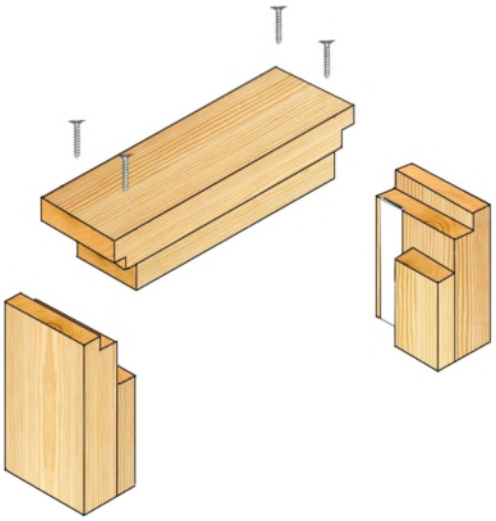
A = min 70mm B = 32 mm C = min 12mm

R = radius from floor spring 8mm max radius to create a maximum 2mm edge profiling

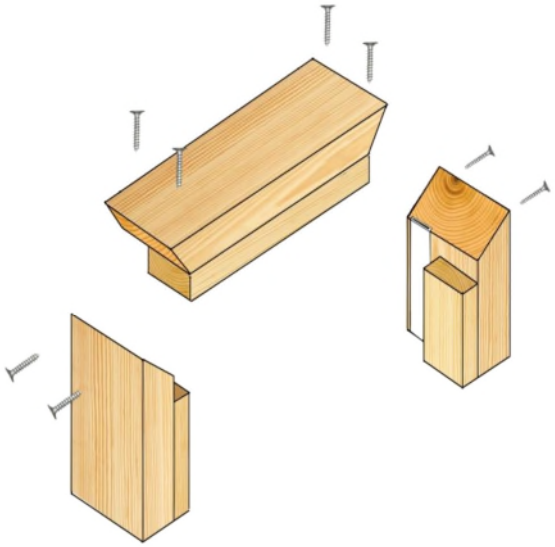


Standard **Scalloped** **Profiled edges**

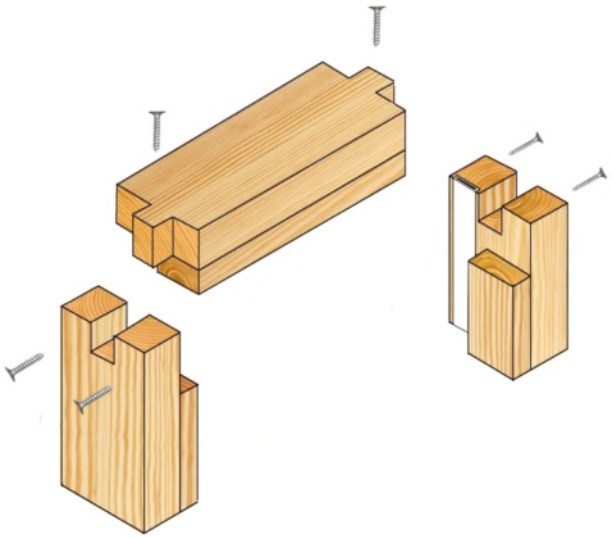
8.4 Door Frame Joints



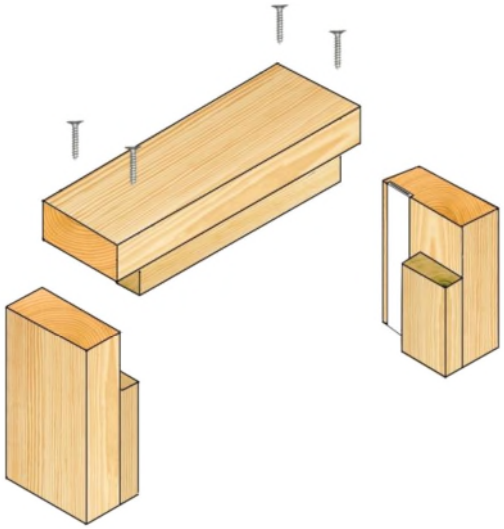
Half Lapped Joint



Mitre Joint



Mortice and Tenon Joint

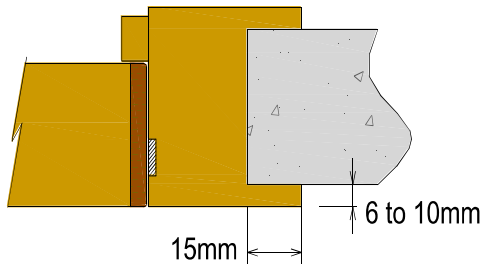


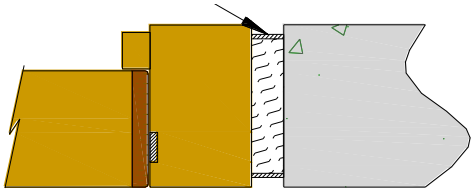
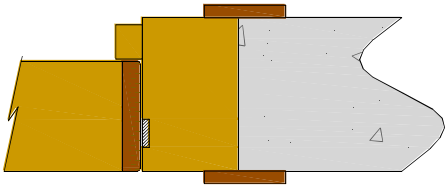
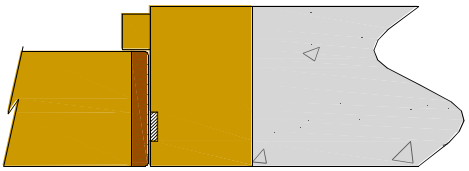
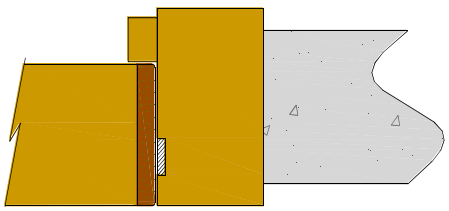
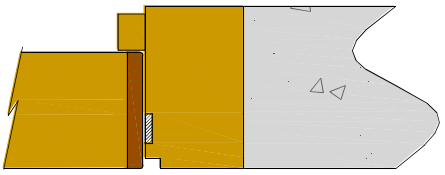
Butt Joint

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

8.5 Door frame installation

The following diagrams indicate acceptable and unacceptable door frame installations:

<table>
<tr><th colspan="2">Permitted Installations</th></tr>
<tr><td> 

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.</td><td>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.</td></tr>
<tr><td> 
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.</td><td> 
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.</td></tr>
<tr><th colspan="2">Installations Not Permitted</th></tr>
<tr><td> 
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.</td><td> 
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.</td></tr>
</table>

Notes:

1. The drawings are representative of door frame installation only; actual installation must be as the text within this document specifies. See section 19 for specification on sealing to structural opening
2. For the shadow detail depicted (top right), the sub-frame material must be the same material as is approved for the door frame; or a non-combustible board tightly fitted between frame and supporting construction with no gaps.

9 Lipping Material

9.1 Timber Lippings

LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm must be lipped in accordance with the following specification.

Material	**Size** (mm)	**Min Density** (kg/m^3)
Hardwood	1. Flat = 6 – 19 thick with a maximum of 2mm profiling permitted at corners of lipping (see section 8.1) 2. Rounded = 11 – 21 thick with a radius matching the distance between leaf edge and floor pivot (see section 8.1) 3. Rebated = Not permitted	640

Notes:

1. Overpanels must be lipped on all edges
2. 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
3. Timber for lippings must be straight grained joinery quality hardwood, free from knots, splits or checks, with a minimum density of 640 kg/m^3. Beech, Fagus Sylvatica, is not permitted for 60 minute applications.
4. Lippings must not conceal intumescent materials.

10 Leaf Construction and Facing Materials

10.1 General

The overall 54mm thick leaf construction may comprise the following leaf facing variations:

1. FireSmoke - 6mm MDF facings
2. FireSmoke - 6mm Chipboard facings
3. FireSafe - 3.8 – 4mm Ply veneer facings.

10.2 Grooves

Both faces of LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm door leaves may be grooved to the following specification when constructed using 6mm thick facings. Grooves may coincide with the top and bottom of glazed apertures if desired.

Element	Details	
Max groove size (mm)	6 wide x 4 deep	
Proximity to door edges (mm)	Horizontal Grooves	≥ 250 from top and bottom
	Vertical Grooves	≥ 150 from sides
Groove spacing (mm)	Horizontal Grooves	≥ 100
	Vertical Grooves	≥ 100
Orientation	Vertical or horizontal	
Configuration	Latched and unlatched, single and double acting, single leaf doorsets	
Leaf size range (mm)	All for Firesmoke 54 with 6mm facings	
Intumescent seal dimensions (mm)	≥ to 15 x 4	

A maximum of 6 No. vertical and 6 No. horizontal grooves are permitted perpendicular to one another providing all other details meet the specification given in the table above.

10.3 Decorative and 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
Cellulosic papers / non-metallic foils	0.4

Notes:

1. Metallic facings are not permitted except for push plates and kick plates
2. The door leaf thickness may be reduced by a total maximum of 0.5mm for calibration purposes in order to accommodate the chosen finish
3. Materials must not conceal intumescent strips
4. PVC and plastic laminates must not return around the leaf edges without specific test evidence.

10.3.1 Moralt acoustic clad on panel

The Moralt acoustic clad on panel has been included into the LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm thick designs to improve acoustic performance. See below for the details of the panel and fixing. The panel is held in position by a minimum of 6 clips (note only 4 shown on the figure. The following limitations apply:-

This board can only be attached to unglazed doors.

The panel must be a single piece covering the entire face of the door leaf.

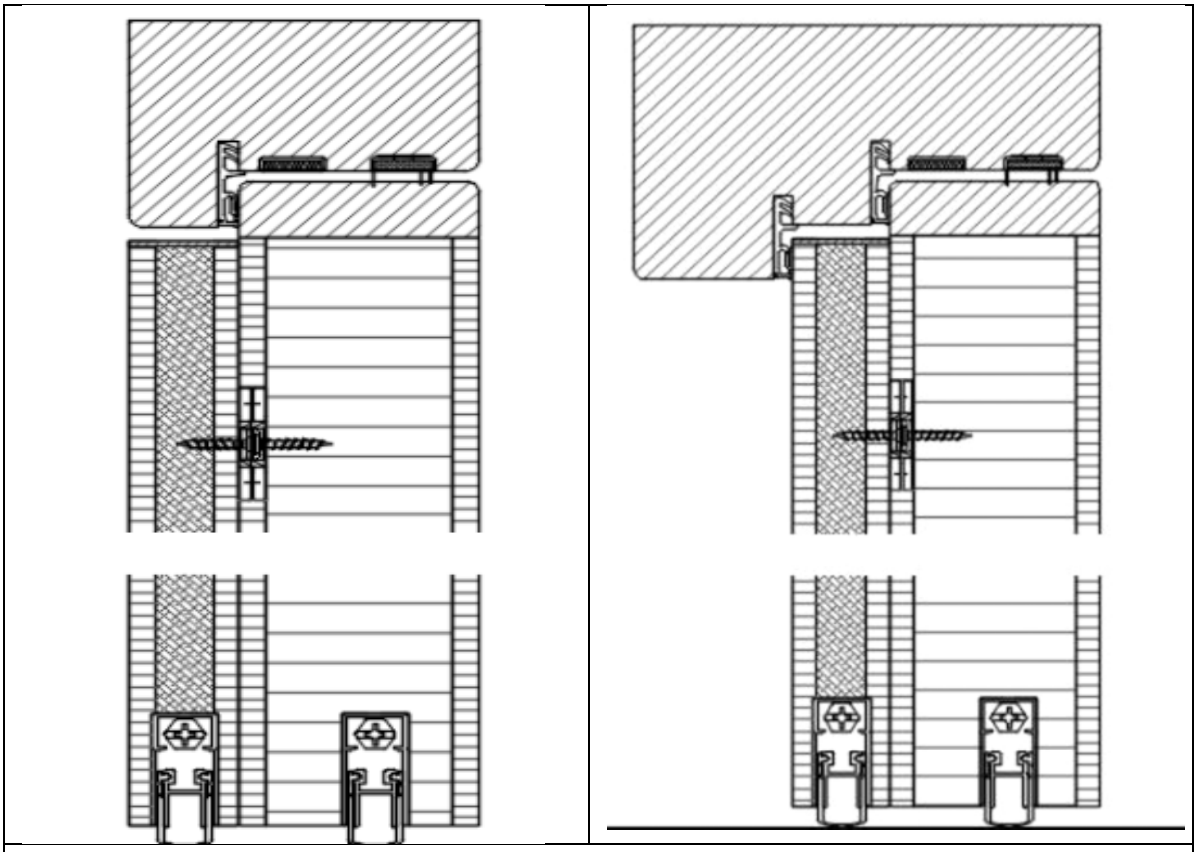
Any item of hardware which is required to be mortice into the edge of the door must be morticed into the timber door core and not into the clad on panel.

The location of the seals must remain on the doorleaf.

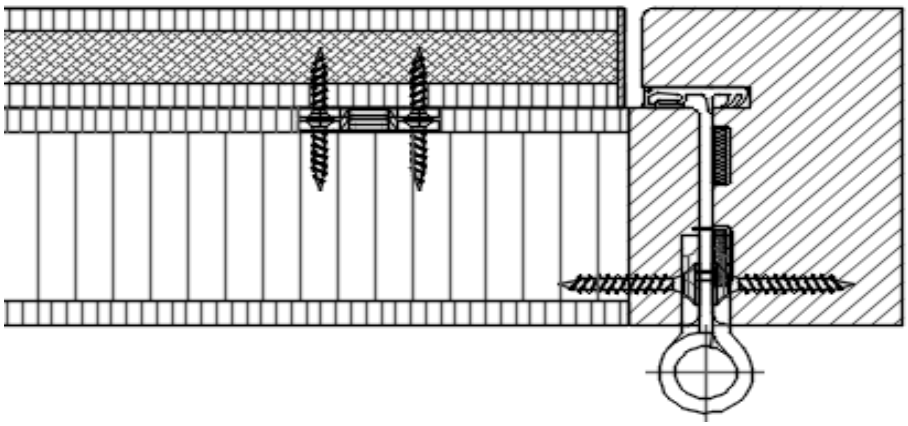
The panel to be located on a minimum of 6 fixing points

Clips secured by screws 3.5 by 16mm long or 3.5 by 20mm long.

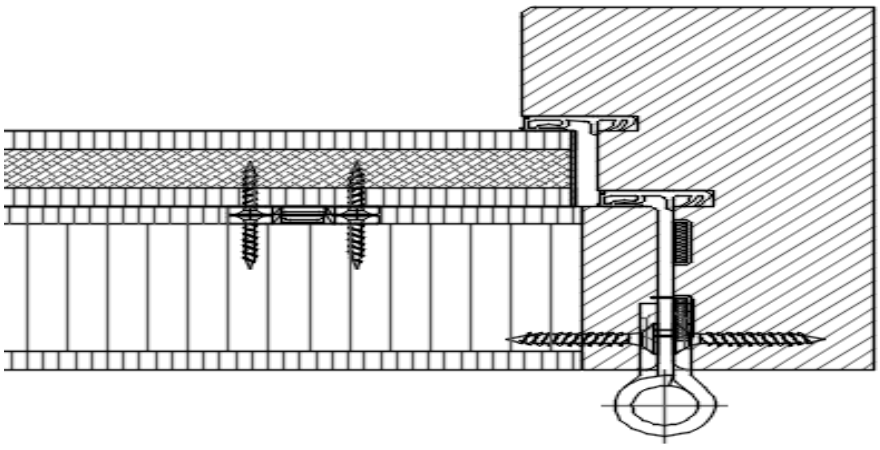
These door designs have been found to be fully insulating which means the unexposed face temperature has not risen more than 140 deg C. The panel is primarily a Rockwool core with MDF facings, which would not in the opinion of Exova Warringtonfire adversely affect the performance of the door.



Vertical Sections Showing Single and Double rebate details



Horizontal Section Showing Single Rebate Details



Horizontal Section Showing Double Rebate Details

11 Intumescent Materials

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

Application	Location	Product/Manufacturer
Edge seals	Fitted in the frame jambs or leaf edges **See note 1 for multipoint locking**	1. PVC encased Type 617 – Lorient Polyproducts Ltd 2. PVC encased seal ref: 30141 - Pyroplex Ltd
	Meeting Edge of Double Doorsets	
Hinges	Underneath both hinge blades	1. 1mm Interdens - Dufaylite Developments Ltd 2. 1mm MAP paper - Lorient Polyproducts Ltd 3. 1mm Pyrostrip 300 - Mann McGowan 4. 1mm Therm-A-Strip - Intumescent Seals Ltd
Lock/latches	Under forend & keep	
Top pivots	Lining all sides of the mortices	1. 2mm Interdens - Dufaylite Developments Ltd 2. 2mm MAP paper - Lorient Polyproducts Ltd 3. 2mm Pyrostrip 300 - Mann McGowan 4. 2mm Therm-A-Strip - Intumescent Seals Ltd
Concealed closer	Lining all sides of the closer and slide arm mortices	Manufacturers tested intumescent intumescent protection pack
Concealed hinges	Lining all sides of mortice in frame and leaf	1mm BASF exterdens Graphite TE 527 3D intumescent pack
Multipoint locking	Lining mortices of lock/latch and top and bottom locks all keeps	1mm thick BASF interdens kit

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

Note 1 when multipoint locking systems used the edge seals must go in the frame.

12 Adhesives

The following adhesives must be used in construction.

Element	Product/Manufacturer
Facings	Held in on file in confidence by Exova Warringtonfire
Lippings	UF, Phenol Formaldehyde, or PU
Core Lamels	Held in on file in confidence by Exova Warringtonfire

13 Hardware

13.1 General

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

The following items of hardware must also bear the CE mark:

Locks and latches (EN 12209),

Electro mechanically operated locks (EN 14846),

Single axis hinges (EN 1935),

Controlled door closing devices (EN 1154),

Electrically powered hold open devices (EN 1155),

Door co-ordinators (EN 1158),

Emergency exit hardware (EN 179),

Panic exit hardware (EN 1125).

13.2 Certifire

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).

14 Tested Hardware

The following hardware has been successfully incorporated in the tests on LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm doorsets.

Item	**Make/type**	**Size** (mm)
Top pivot /strap	Dorma Door Controls ref: 8066	122 long x 25 wide
Bottom strap	Dorma Door Controls ref: 7421	235 long x 24 wide
Bottom strap protection	None fitted	-
Floor springs	Dorma Door Controls BTS 80	341 wide x 60 high x 78 deep
Overhead Closer	Boss TS4.224 overhead type door closer	220 x 58 (footprint size)
Hinges	CNS steel butt	100 x 35 (blade size)
	Royde & Tucker H102 hi-load	101x 35 (blade size)
Latches	Legge cylinder type	75 long
	Newstar SL1-SSS sashlock	235 x 25 (forend size)
		185 x 24 (keep size)
Hardware	Aluminium lever handles	185 x 24 (keep size)
Concealed closer	Dorma ITS 96 with channel guide	52 x 34 x 340 (body) 31 x 22 x 440 (channel)
Concealed hinges	Simonswerk Tectus TE	155 x 26
Multipoint locking system	Glutz Multipoint lock/latch (Ref 1839.7.60.78.1788)	1788 x 20 (forend) 241 x 24 (strike) 110 x 24 (strike) Lock 200 x 89 x 20 Bolts 44 x 67.5 x 20

15 Additional & Alternative Hardware

15.1 Latches & Locks

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

Element	Specification
Maximum forend and strike plate dimensions:	235mm high by 25mm wide by 4mm thick
Maximum body dimensions:	18mm thick by 100mm wide by 165mm high.
Intumescent protection:	See section 11
Materials:	All parts essential to the locking/latching action (including the latch bolt, forend and strike) to be steel
Position	800 – 1200mm above the threshold

15.1.1 Multipoint locking

The Glutz multipoint locking system have been tested successfully in this doorset. Other multipoint locking systems can be fitted provided they have been successfully tested in timber based doorsets for 60 minutes to BS 476: Part 22: 1987 or BS EN 1634-1. The mortices must be no bigger than that detailed in section 14 for the Glutz multipoint locking system and the manufacturers tested intumescent protection system for the mortices must be installed.

This includes the following Winkhaus systems

AV2 – The system variants acceptable to this assessment are those which fit into the mortices detailed in section 14 for multipoint locking systems. However, if the manufacturer assessments permits other system variants for this type of door construction and this fire rating, then they can be used providing the recommendations contained in that assessment are applied.

When a multipoint locking system is used the door edge seal must be in the frame.

15.2 Hinges

Leaves ≤2400mm (h) must be hung on minimum 3 hinges. Leaves >2400mm (h) 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 4 No. 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 bottom of 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 bottom of top hinge and 3rd hinge equally spaced between 2nd and bottom hinge
		Bottom	150 - 250mm from the foot of leaf to bottom of hinge
Intumescent protection:		See section 11	

15.3 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.

Concealed closer can be fitted provided they have been successfully tested in timber based doorsets for 60 minutes to BS 476: Part 22: 1987 or BS EN 1634-1. The mortices must be no bigger than that detailed in section 14 for the Dorma ITS 96 and the manufacturers tested intumescent must be installed.

Note: The top pivots to floorspring assemblies must be protected with 2mm thick intumescent gasket (see section 11) or alternatively the manufacturers tested intumescent pack.

15.4 Pull Handles

Handles may be surface-fixed or bolted through the door leaf, providing they are steel or stainless steel and the length is limited to 1200 mm between the fixing points. If through fixed, there must be no more than 1mm clearance between the hole and stud.

15.5 Push Plates and Kick Plates

Steel or Stainless steel face-fixed hardware such as push plates and kick plates may be fitted to the doorsets. 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.

15.6 Panic Hardware

Panic hardware may be fitted, providing the installation does not require the removal of any timber from the leaf, stop or frame reveal and it does not interfere with the self-closing action of the door leaf.

15.7 Door Selectors

Selectors may be fitted providing the installation does not require the removal of any timber from the leaf, stop or frame reveal and they do not interfere with the self-closing action of the door leaf.

15.8 Environmental seals

Silicon based flame retardant acoustic, weather and dust seals (e.g. Norsound 710, Lorient IS1212, IS1511, IS7025, IS7060) 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.

The following Deventer seals can be incorporated as shown in the figure in section 8.2

DS6955a

DS6922a

DS155a

DS112a

15.9 Threshold seals

The following types of automatic threshold drop seals may be recessed in to the bottom of the leaves to this design without compromising the performance.

Manufacturer	Product Reference
Lorient Polyproducts Ltd.	IS8010si
	LAS8005si
Raven	RP8Si
Athmer	Schall-Ex L-15 (range)
Norsound Ltd.	810 range
STS Ltd	ST422
Planet	HS, RH and US

15.10 Letter / Plates

Letter boxes/plates may be fitted, providing the product has 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, when installed in a timber based doorset of comparable thickness. Products may be fitted up to 1200mm from floor level and no closer than 100mm to any leaf edge.

15.11 Air Transfer Grilles

Air transfer grilles may be fitted providing the product has suitable test evidence to BS 476: Part 22: 1987 or BS EN 1634-1, which demonstrates a minimum 60 minutes integrity performance, when installed within a timber based doorset of comparable thickness. Margins to the leaf edges will remain as detailed for glazing and the position of the unit will be dictated by the pressure regime tested in the proving evidence (normally below mid height). The area occupied by the air transfer grille must not exceed that proven by the supporting fire test for the specific type of grille being used, and must be deducted from the area of glazing, if both elements are fitted.

15.12 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 +1 mm). Lenses must be glass and the item must be protected with a tested acrylic intumescent mastic.

16 Door Gaps

For fire resistance performance, door gaps and alignment tolerances must fall within the following range:

Location	Dimension
Door edge gaps	Representative of those tested but as a guideline, 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 For ambient smoke control tolerances see section 21

17 Structural Opening

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

18 Fixings

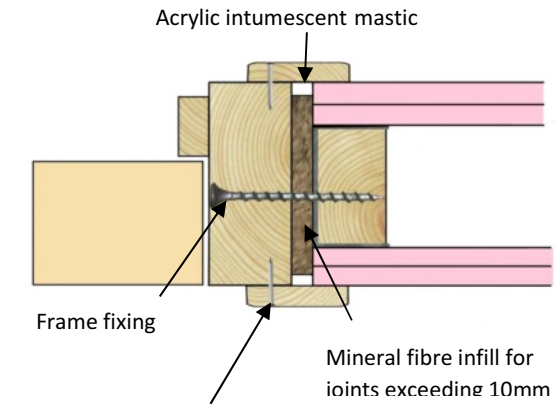
The frame jambs are to be fixed to the supporting construction using steel fixings at 600mm maximum centres. The fixings must be of the appropriate type for the supporting construction and must penetrate to a minimum depth of 50mm. It is not necessary to fix the frame head, although packers must be inserted.

19 Sealing to Structural Opening

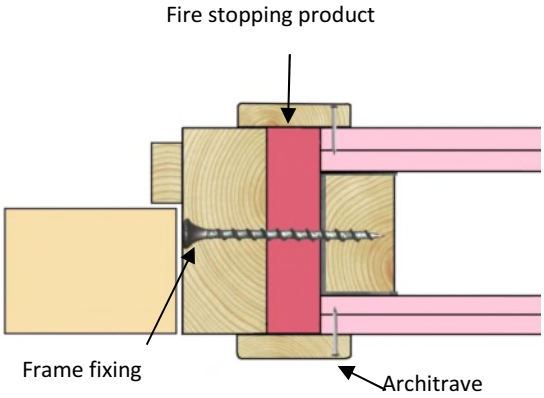
The door frame to structural opening gap must be protected using one of the following methods:

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.

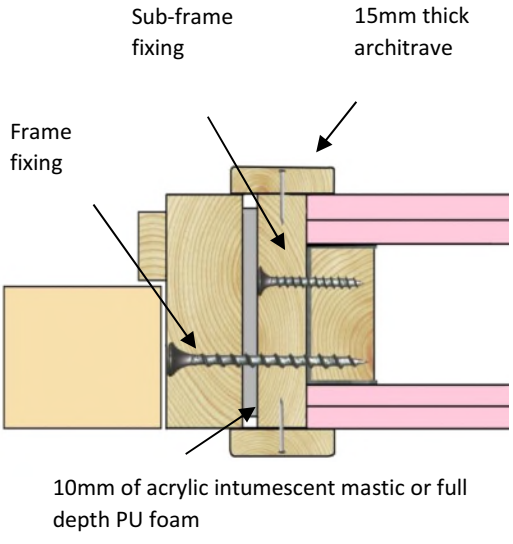
2. Gaps between 10mm and 20mm must be tightly packed with mineral fibre capped on both sides with a 10mm depth of acrylic intumescent mastic, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1. Architraves are optional.



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.



4. Timber based or non-combustible sub-frame 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.



Guidance for various methods of sealing the frame to structural opening gap is also given in BS 8214: 2016, "*Timber –based fire door assemblies. Code of Practice*", which may be referred to where appropriate.

Note: Drawings are representative of doorset installation only; actual installations must be as the text within this document specifies.

20 Insulation

Insulation performance may be claimed for a doorset to this design 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, in the absence of a suitable pressurisation system, 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

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

22 Conclusion

If the Moralt LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm doorset design, constructed in accordance with the specification documented in section 2, were to be tested in accordance with BS 476: Part 22: 1987, it is our opinion that it would provide a minimum of 60 minutes integrity and insulation (subject to section 20).

23 Declaration by the Applicant

Report WF 399354 for Chilt/A13059 Rev B

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:

Name: Helmut Hahn / Senior Sales Manager

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. 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, Exova 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 BS476: Parts 20 and 22: 1987], on the basis of the evidence referred to in appendix B. 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.

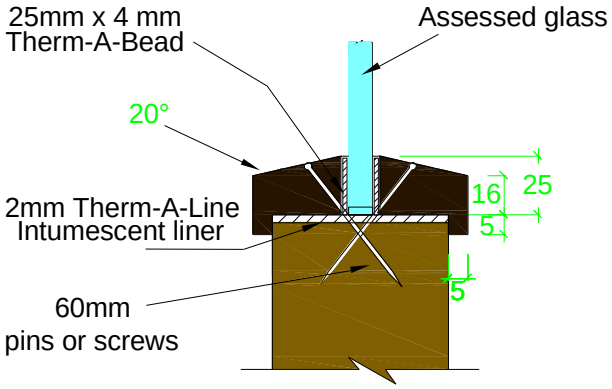
25 Validity

1. The assessment is valid for the dates shown on the front cover after which time it must be submitted to Exova 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.

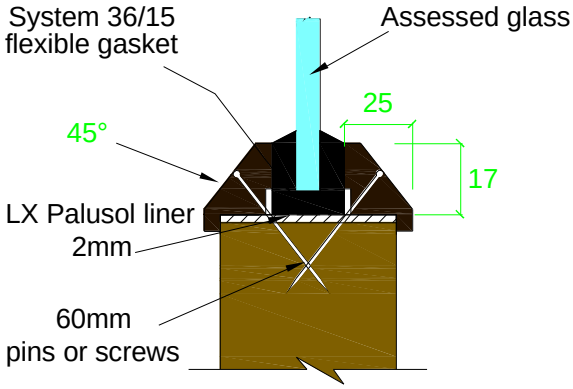
Signature:		
Name:	**Dr K D S Towler**	**A M Winning**
Title:	Senior Product Assessor	Senior Product Assessor

Appendix A

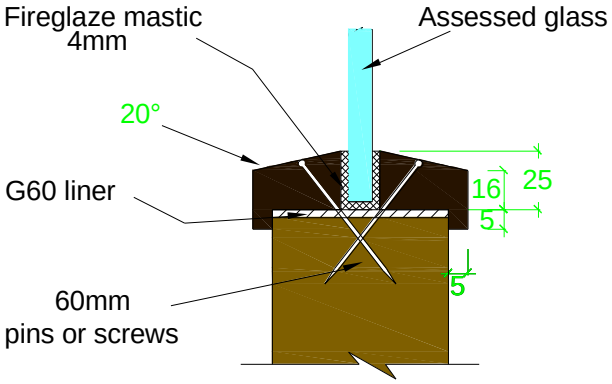
Proprietary 60 Minute Glazing Systems



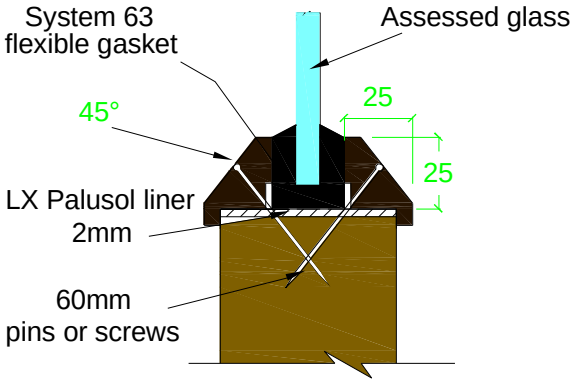
Therm-A-Glaze 60
Intumescent Seals Ltd



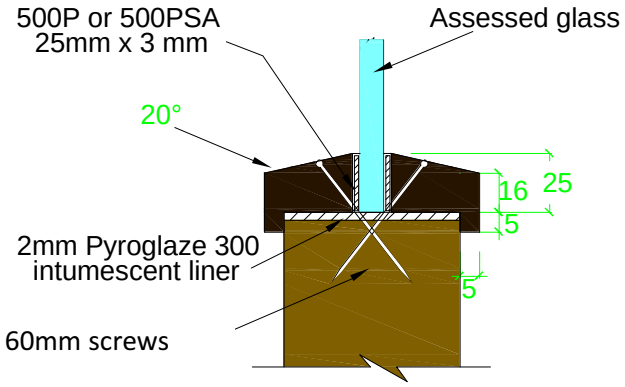
System 36/15
Lorient Polyproducts Ltd



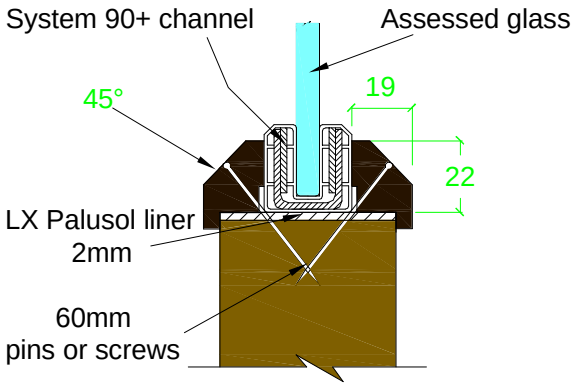
Fireglaze Mastic
Sealmaster Ltd



System 63
Lorient Polyproducts Ltd



Pyroglaze 60
Mann McGowan Ltd

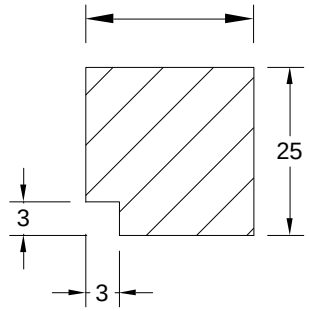


System 90+
Lorient Polyproducts Ltd

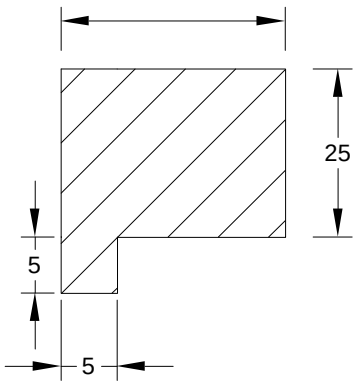
Assessed Square Glazing Bead Profile

The following square bead profile may be used as an alternative to the splayed beads detailed above - refer to section 7 for glazing system and glass restrictions.

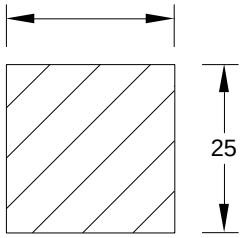
To finish flush with the leaf face



Suited to glass thickness



To finish flush with the leaf face



Appendix B

Performance Data

Primary Data for design WITH OUT insert

Test Report No	Configuration	Leaf Size H x W x D (mm)	Test Standard	Performance (mins)
BMT/FEP/F14102 (WoodEx 60)	A - ULSADD	2040 x 826/303 x 54	BS 476: Pt 22: 1987	Integrity: 42** Insulation: 42
BMT/FEP/F14256 (6mm MDF facings)	A - ULSASD	2135 x 926 x 54	BS 476: Pt 22: 1987	Integrity: 64 Insulation: 64
WF382394 AR1	B – ULSASD	2250 x 1000 x 54	BS 476: Pt 22: 1987	Integrity: 69 Insulation: 69

Primary Data for design WITH insert

Test Report No	Configuration	Leaf Size H x W x D (mm)	Test Standard	Performance (mins)
RF07055 (head insert included)	ULSADD	2600 x 950 x 54	BS 476: Part 22: 1987	61 Glazing 72 Leaf Perimeter
J85454/1 (Fulmer Yarsley report)	LSASD (inward opening)	2145 x 926 x 54	BS 476: Part 22: 1987	66
	LSASD (outward opening)	2145 x 926 x 54	BS 476: Part 22: 1987	72
XF11016 (head insert included)	ULSADD	2040 x 926/425 x 58.5	BS 476: Part 22: 1987	Integrity: 68 Insulation: 68*

Test WF382394 AR1 successfully tested a concealed closer, concealed hinges and multipoint locking system

Supporting Data

P1009/14-530-1 (ST422 and NOR810+ Dropseals)	A - LSADD	2135 x 915/490 x 54	SIST EN 1634-1: 2014 & SIST EN 1363-1: 2012	82
	B - LSASD	2135 x 915 x 59		64

* In accordance with the note to clause 7.6.1.1 of BS 476: Part 22: 1987, the glazing has not been evaluated for insulation

** 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 WoodEx 60 product with the Laminesse FireSafe & Smoke 54mm, 60 minute doorset designs.

Appendix C

Revisions

Revision	Exova Warringtonfire Reference	Date	Description
A	CNA/F14309	10 Feb 2015	Addition of WoodEx60 door frame and grooving options added
B	A13059 Rev A	22 August 2018	Changed into Exova Warringtonfire format and Technically reviewed and revalidated for a further 5 years. Test WF382394 included which enabled, concealed closers, concealed hinges and multipoint locking to be included and new leaf size envelope. Annex Z created to cover door designs with insert. Acoustic clad on panel included.

Appendix D

Data Sheets

for

Moralt

LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm

WITHOUT HEAD INSERT

60 Minute Fire resisting Doorsets

LAMINESSE FireSmoke & FireSafe 54mm Doorsets – 60 Minutes Fire Resistance

Latched and Unlatched Single Acting & Double Acting Single Doorsets – No Head rail inserts

	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2040 2226	x x	1012 926
	ULSASD & DASD	From: To:	2040 2176	x x	987 926

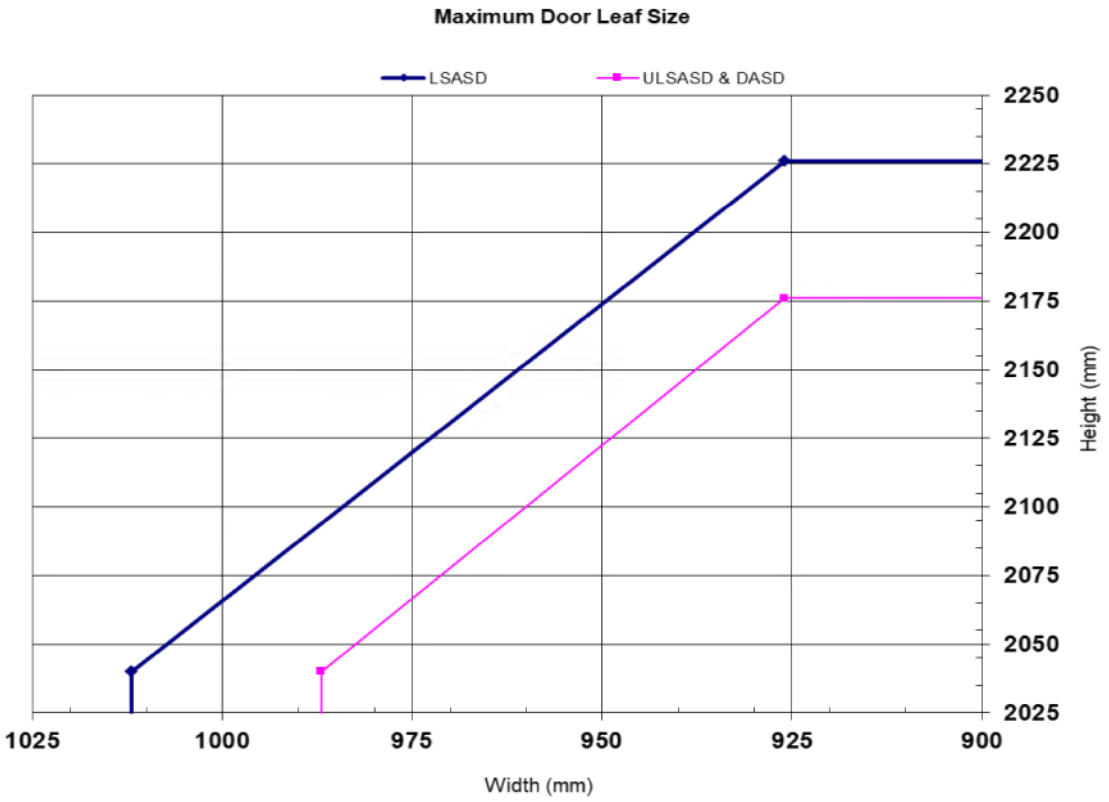
Intumescent Materials:

PVC encapsulated Type 617 - Lorient Polyproducts Ltd or 30141 - Pyroplex Ltd

Head: 2 No 15 x 4mm exposed and fitted 5mm either side of the centreline in the leaf or frame head. Alternatively, for LSASD only, 1 No 25 x 4mm exposed and centrally fitted in the leaf head or frame reveal.

Jambs & Overpanel: 2 No 15 x 4mm exposed and fitted 5mm either side of the centreline in the leaf edge or frame reveal. Alternatively, for LSASD only, 1 No 25 x 4mm exposed and centrally fitted in the leaf edge or frame reveal.

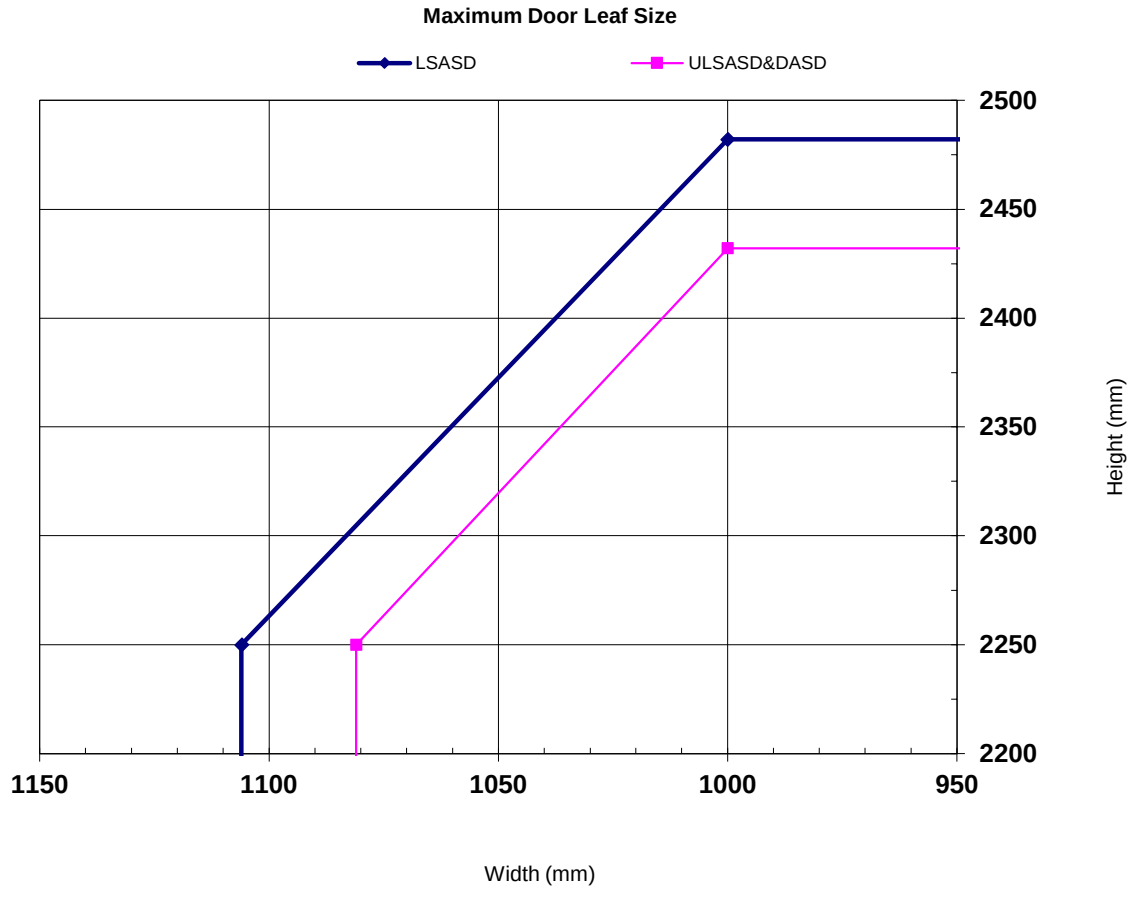
Hardware Protection: see section 11



LAMINESSE FireSmoke & FireSafe 54mm Doorsets – 60 Minutes Fire Resistance

Latched and Unlatched Single Acting & Double Acting Single Doorsets – No Head rail inserts

	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2250 2482	x x	1106 1000
	ULSASD & DASD	From: To:	2250 2482	x x	1081 1000
Intumescent Materials: **Rigid box seal ref 8700 - Pyroplex Ltd** **Head:** 2 No 15 x 4mm exposed and fitted 5mm either side of the centreline in the leaf or frame head. **Jambs & Overpanel:** 2 No 15 x 4mm exposed and fitted 5mm either side of the centreline in the leaf edge or frame reveal. **Hardware Protection**: see section 11					



LAMINESSE FireSmoke & FireSafe 54mm Doorsets – 60 Minutes Fire Resistance

Latched and Unlatched Single Acting & Double Acting Single Doorsets - No Head Rail Insert

	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2135 2256	x x	981 926
	ULSASD & DASD	From: To:	2135 2206	x x	956 926

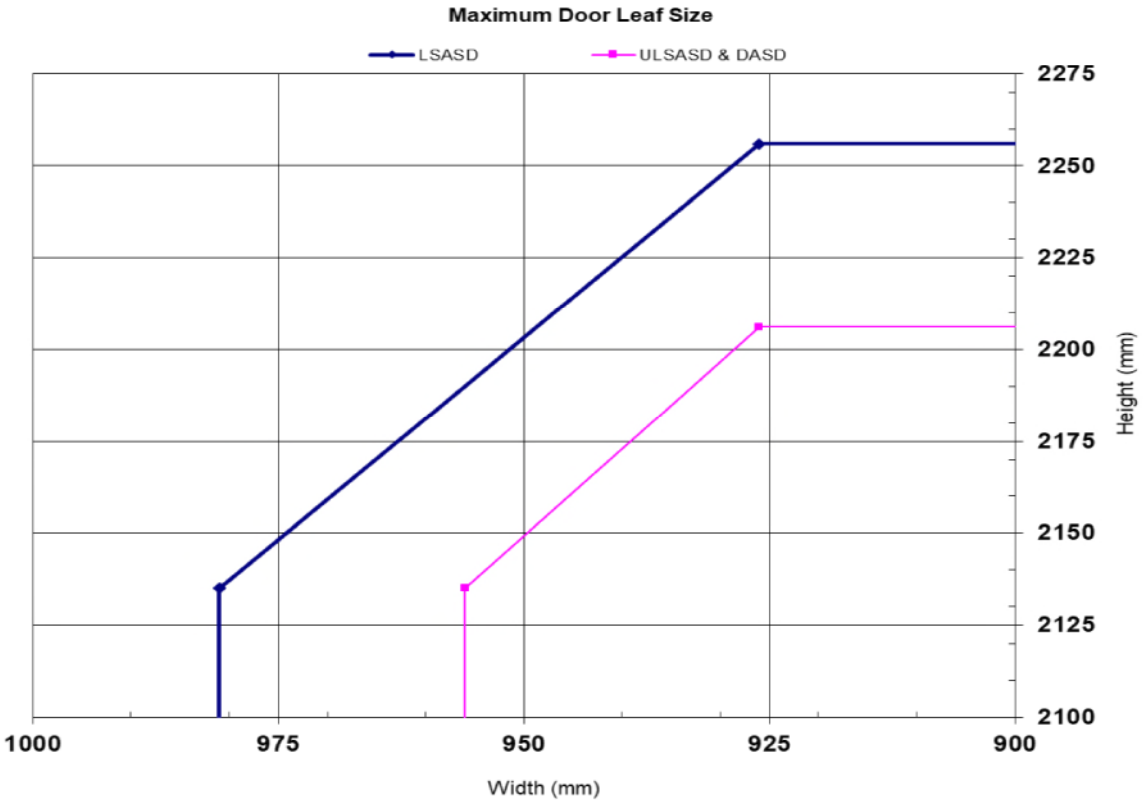
Intumescent Materials:

PVC encapsulated Type 617 - Lorient Polyproducts Ltd or 30141 - Pyroplex Ltd

Head: 2 No 15 x 4mm exposed and fitted 5mm either side of the centreline in the leaf or frame head. Alternatively, for LSASD only, 1 No 25 x 4mm exposed and centrally fitted in the leaf head or frame reveal.

Jambs & Overpanel: 2 No 15 x 4mm exposed and fitted 5mm either side of the centreline in the leaf edge or frame reveal. Alternatively, for LSASD only, 1 No 25 x 4mm exposed and centrally fitted in the leaf edge or frame reveal.

Hardware Protection: see section 11



Annex Z

LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm

WITH HEAD INSERT

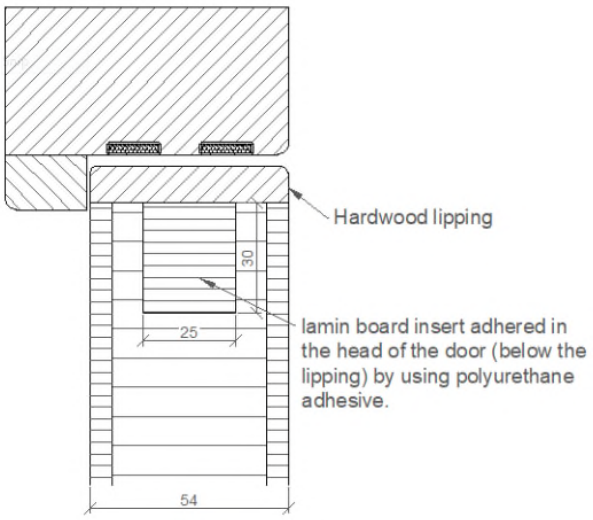
Z1 General Description of Construction

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

This assessment considers the following design variations without an insert:

1. FireSmoke - 6mm MDF facings
2. FireSmoke - 6mm Chipboard facings
3. FireSafe - 3.8 – 4mm Ply veneer facings.

The insert is fabricated and installed by the Fabricator as detailed below



The insert is

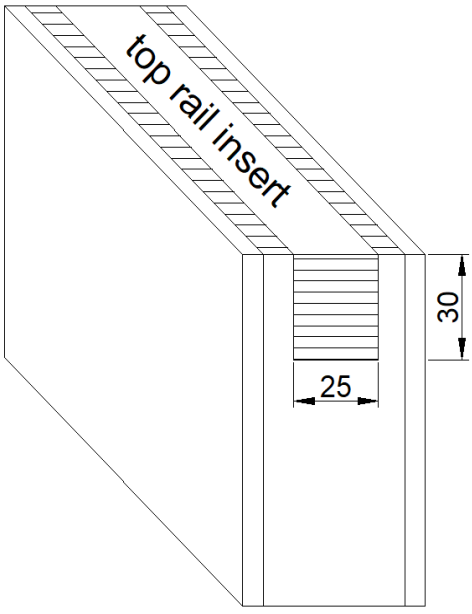
Cut from the core and the facings are removed

located centrally in the leaf

fitted tightly into the groove

fitted with the lamels perpendicular to the lamels of the door blank

See below for illustration and required dimensions.



Z2 Leaf Sizes

The approval for increased leaf dimensions is based on the tests listed in appendix B and takes into account the margin of over performance above 60 minutes integrity for the design 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 Annex ZA. Separate envelopes are given depending if a head rail is included

Doorsets with reduced dimensions are deemed to be less onerous. Therefore, doors with dimensions that are less than those tested and stated in Annex ZA may be manufactured.

Z3 Configuration and Orientation

Z3.1Configuration

Based on the test evidence listed in appendix B, this assessment covers the following doorset configurations.

Abbreviation	Description
LSASD & ULSASD	Latched & unlatched single acting single doorset
DASD	Double acting single doorset
LSADD & ULSADD	Latched & unlatched single acting double doorset
DADD	Double acting double doorset

Unequal leaf double doorsets are covered by this assessment with no restriction on the smaller leaf dimension, however the second leaf dimension should be equal to or less than the main leaf.

Z3.2 Orientation

The primary fire resistance tests for this design were all conducted with the doorset hung such that the door leaf opened towards the fire, which is considered the most onerous orientation in terms of fire resistance performance. Based on this testing, assessment is made that doorsets to this design may be hung to open either away from or towards the fire risk side of the doorset.

Z4 Leaf Size Adjustment

LAMINESSE FireSmoke & LAMINESSE FireSafe 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, provided the reduction in height is made from the bottom edge of the leaf only and the top rail remains intact.

Lipping	The dimensions stated in section 9 may be reduced by 20% for fitting purposes.

Z5 Overpanels

Z5.1 Transomed Overpanels

See section 6.1 (of the main assessment) for details but the table below applies for max overpanel height.

Configuration	**Max Overpanel height** (mm)
Single doorsets	2000
Double doorsets	1500

Z5.2 Glazed Fanlights

See section 6.2 (of the main assessment) for details but the table below applies for max overpanel height.

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

Z6 Glazing

See section 7 (of the main assessment) for details.

Z7 Door Frames

See section 8 (of the main assessment) for details

Z8 Lipping Material

See section 9 (of the main assessment) for details

Z9 Leaf Construction and Facing Materials

Z9.1 General

The overall 54mm thick leaf construction may comprise the following leaf facing variations:

1. FireSmoke - 6mm MDF facings
2. FireSmoke - 6mm Chipboard facings
3. FireSafe - 3.8 – 4mm Ply veneer facings.

Z9.2 Leaf construction

The LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm designs have been tested with a head rail insert.

See relevant data sheet in Annex ZA for permitted leaf sizes and configurations where head rail is fitted.

Z9.3 Grooves

See section 10.3 (of the main assessment) for details

Z9.4 Decorative and Protective Facings

See section 10.4 (of the main assessment) for details.

Z10 Intumescent Materials

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

Application	Location	Product/Manufacturer
Edge seals	Fitted in the frame jambs or leaf edges **See note 1 for multipoint locking**	3. PVC encased Type 617 – Lorient Polyproducts Ltd 4. PVC encased seal ref: 30141 - Pyroplex Ltd
	Meeting Edge of Double Doorsets	
Hinges	Underneath both hinge blades	5. 1mm Interdens - Dufaylite Developments Ltd 6. 1mm MAP paper - Lorient Polyproducts Ltd 7. 1mm Pyrostrip 300 - Mann McGowan 8. 1mm Therm-A-Strip - Intumescent Seals Ltd
Lock/latches	Under forend & keep	
Top pivots & flush bolts	Lining all sides of the mortices	5. 2mm Interdens - Dufaylite Developments Ltd 6. 2mm MAP paper - Lorient Polyproducts Ltd 7. 2mm Pyrostrip 300 - Mann McGowan 8. 2mm Therm-A-Strip - Intumescent Seals Ltd
Concealed hinges	Lining all sides of mortice in frame and leaf	1mm BASF exterdens Graphite TE 527 3D intumescent pack
Multipoint locking	Lining mortices of lock/latch and top and bottom locks all keeps	1mm thick BASF interdens kit

The seal specification for each configuration is contained in Annex ZA.

Note 1 when multipoint locking systems used the edge seals must go in the frame.

Z11 Adhesives

See section 12 (of the main assessment) for details

Z12 Hardware

Z12.1 General

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

The following items of hardware must also bear the CE mark:

Locks and latches (EN 12209),

Electro mechanically operated locks (EN 14846),

Single axis hinges (EN 1935),

Controlled door closing devices (EN 1154),

Electrically powered hold open devices (EN 1155),

Door co-ordinators (EN 1158),

Emergency exit hardware (EN 179),

Panic exit hardware (EN 1125).

Z12.2 Certifire

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).

Z13 Tested Hardware

The following hardware has been successfully incorporated in the tests on LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm doorsets.

Item	**Make/type**	**Size** (mm)
Top pivot /strap	Dorma Door Controls ref: 8066	122 long x 25 wide
Bottom strap	Dorma Door Controls ref: 7421	235 long x 24 wide
Bottom strap protection	None fitted	-
Floor springs	Dorma Door Controls BTS 80	341 wide x 60 high x 78 deep
Overhead Closer	Boss TS4.224 overhead type door closer	220 x 58 (footprint size)
Hinges	CNS steel butt	100 x 35 (blade size)
	Royde & Tucker H102 hi-load	101x 35 (blade size)
Latches	Legge cylinder type	75 long
	Newstar SL1-SSS sashlock	235 x 25 (forend size)
		185 x 24 (keep size)
Hardware	Aluminium lever handles	185 x 24 (keep size)
Concealed hinges	Simonswerk Tectus TE	155 x 26
Multipoint locking system	Glutz Multipoint lock/latch (Ref 1839.7.60.78.1788)	1788 x 20 (forend) 241 x 24 (strike) 110 x 24 (strike) Lock 200 x 89 x 20 Bolts 44 x 67.5 x 20

Z14 Additional & Alternative Hardware

Z14.1 Latches & Locks

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

Element	Specification
Maximum forend and strike plate dimensions:	235mm high by 25mm wide by 4mm thick
Maximum body dimensions:	18mm thick by 100mm wide by 165mm high.
Intumescent protection:	See section 11
Materials:	All parts essential to the locking/latching action (including the latch bolt, forend and strike) to be steel
Position	800 1200mm above the threshold

Z14.1.1 Multipoint locking

The Glutz multipoint locking system have been tested successfully in this doorset. Other multipoint locking systems can be fitted provided they have been successfully tested in timber based doorsets for 60 minutes to BS 476: Part 22: 1987 or BS EN 1634-1. The mortices must be no bigger than that detailed in section 14 for the Glutz multipoint locking system and the manufacturers tested intumescent protection system for the mortices must be installed.

This includes the following Winkhaus systems

AV2 – The system variants acceptable to this assessment are those which fit into the mortices detailed in section Z13 for multipoint locking systems. However, if the manufacturer assessments permits other system variants for this type of door construction and this fire rating, then they can be used providing the recommendations contained in that assessment are applied.

When a multipoint locking system is used the door edge seal must be in the frame.

Z14.2 Hinges

Leaves ≤2400mm (h) must be hung on minimum 3 hinges. Leaves >2400mm (h) 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 4 No. 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 bottom of 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 bottom of top hinge and 3rd hinge equally spaced between 2nd and bottom hinge
		Bottom	150 - 250mm from the foot of leaf to bottom of hinge
Intumescent protection:		See section 11 (of the main assessment)	

Z14.3 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.

Concealed closer cannot be installed into this design.

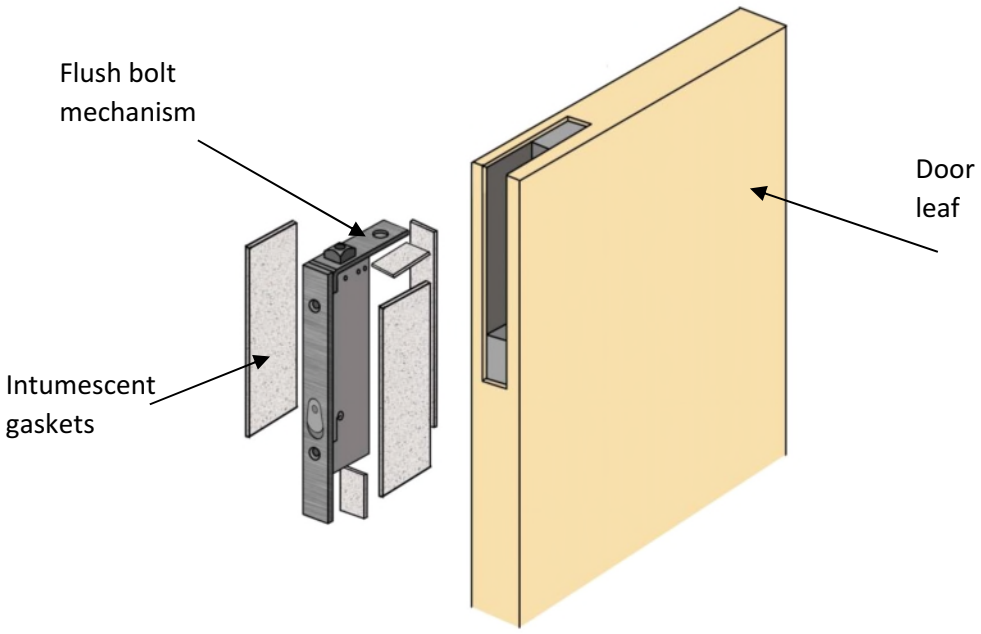
Note: The top pivots to floorspring assemblies must be protected with 2mm thick intumescent gasket (see section 11(of the main assessment)) or alternatively the manufacturers tested intumescent pack.

Z14.4 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:

200mm 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 mortices of the keep and body mechanism must be protected with intumescent gaskets as specified in section 11(of the main assessment). Alternatively the hardware manufacturers tested gaskets may be used.



Z14.5 Pull Handles

Handles may be surface-fixed or bolted through the door leaf, providing they are steel or stainless steel and the length is limited to 1200 mm between the fixing points. If through fixed, there must be no more than 1mm clearance between the hole and stud.

Z14.6 Push Plates and Kick Plates

Steel or Stainless steel face-fixed hardware such as push plates and kick plates may be fitted to the doorsets. 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.

Z14.7 Panic Hardware

Panic hardware may be fitted, providing the installation does not require the removal of any timber from the leaf, stop or frame reveal and it does not interfere with the self-closing action of the door leaf.

Z14.8 Door Selectors

Selectors may be fitted providing the installation does not require the removal of any timber from the leaf, stop or frame reveal and they do not interfere with the self-closing action of the door leaf.

Z14.9 Environmental seals

Silicon based flame retardant acoustic, weather and dust seals (e.g. Norsound 710, Lorient IS1212, IS1511, IS7025, IS7060) 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.

The following Deventer seals can be incorporated as shown in the figure in section 8.2(of the main assessment)

DS6955a

DS6922a

DS155a

DS112a

Z14.10 Threshold seals

The following types of automatic threshold drop seals may be recessed in to the bottom the leaves to this design without compromising the performance.

Manufacturer	Product Reference
Lorient Polyproducts Ltd.	IS8010si
	LAS8005si
Raven	RP8Si
Athmer	Schall-Ex L-15 (range)
Norsound Ltd.	810 range
STS Ltd	ST422
Planet	HS, RH and US

Z14.11 Letter / Plates

Letter boxes/plates may be fitted, providing the product has 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, when installed in a timber based doorset of comparable thickness. Products may be fitted up to 1200mm from floor level and no closer than 100mm to any leaf edge.

Z14.12 Air Transfer Grilles

Air transfer grilles may be fitted providing the product has suitable test evidence to BS 476: Part 22: 1987 or BS EN 1634-1, which demonstrates a minimum 60 minutes integrity performance, when installed within a timber based doorset of comparable thickness. Margins to the leaf edges will remain as detailed for glazing and the position of the unit will be dictated by the pressure regime tested in the proving evidence (normally below mid height). The area occupied by the air transfer grille must not exceed that proven by the supporting fire test for the specific type of grille being used, and must be deducted from the area of glazing, if both elements are fitted.

Z14.13 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 +1 mm). Lenses must be glass and the item must be protected with a tested acrylic intumescent mastic.

Z15 Door Gaps

See section 16 for details.

Z16 Structural Opening

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

Z17 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.

Z18 Sealing to Structural Opening

See section 19 (of the main assessment) for details.

Z19 Insulation

See section 20 (of the main assessment) for details.

Z20 Smoke Control

See section 21 (of the main assessment) for details.

Z21 Conclusion

If the Moralt LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm doorset design, constructed in accordance with the specification documented Annex Z, were to be tested in accordance with BS 476: Part 22: 1987, it is our opinion that it would provide a minimum of 60 minutes integrity and insulation (subject to section Z19).

ANNEX ZA

Data Sheets

for

Moralt

LAMINESSE FireSmoke & LAMINESSE FireSafe 54mm

WITH HEAD INSERT

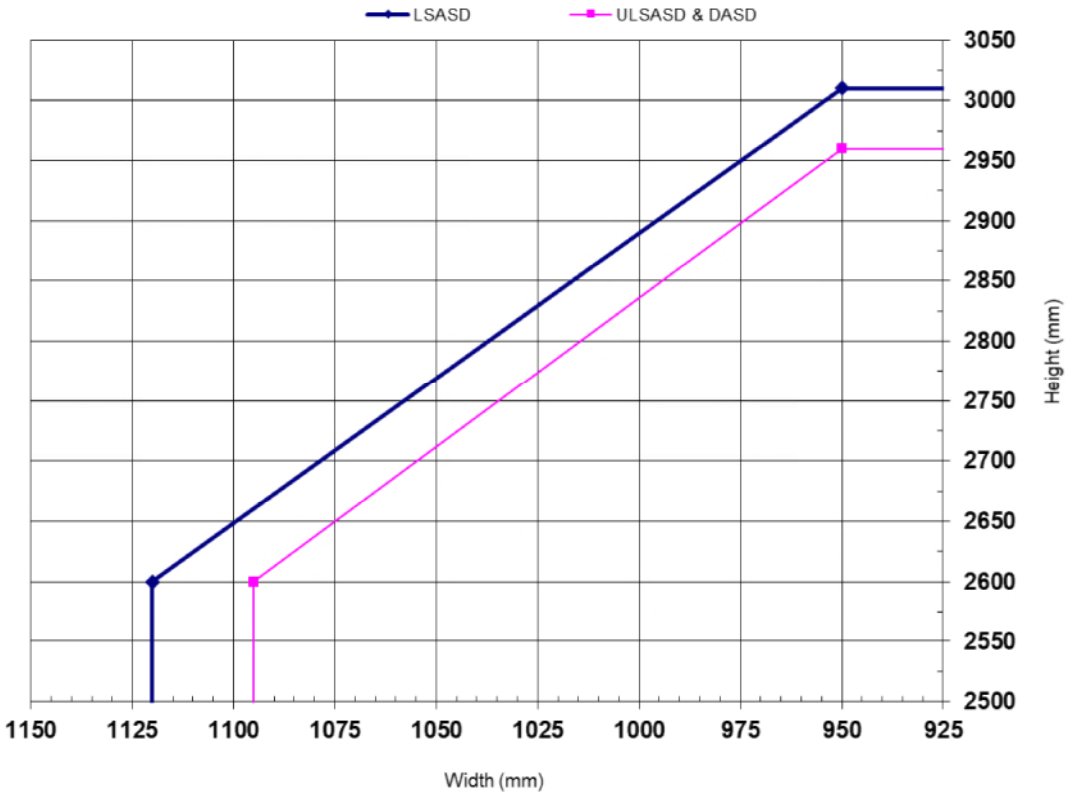
60 Minute Fire resisting Doorsets

LAMINESSE FireSmoke & FireSafe 54mm Doorsets – 60 Minutes Fire Resistance

Latched and Unlatched Single Acting & Double Acting Single Doorsets – Includes Head rail insert

	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2600 3010	x x	1120 950
	ULSASD & DASD	From: To:	2600 2960	x x	1095 950
Intumescent Materials: PVC encapsulated Type 617- Lorient Polyproducts Ltd **Head:** 1No 40 x 6mm exposed and fitted centrally in the leaf head or frame reveal **Jambs and Overpanel:** 2No 15 x 4mm exposed and fitted 5mm either side of the centreline in the leaf edge or frame reveal. **Hardware Protection**: see section 11(of the main assessment)					

Maximum Door Leaf Size



Laminesse FireSmoke & FireSafe 54mm Doorsets – 60 Minutes Fire Resistance

Latched and Unlatched Single Acting & Double Acting Double Doorsets – Includes Head rail inserts

	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From: To:	2600 2910	x x	1070 950
	ULSADD & DADD	From: To:	2600 2860	x x	1045 950

Intumescent Materials: PVC encapsulated Type 617 - Lorient Polyproducts Ltd

Head: 1No 40 x 6mm exposed and fitted centrally in the leaf head or frame reveal

Jambs and Overpanel: 2No 15 x 4mm exposed and fitted 5mm either side of the centreline in the leaf edge or frame reveal

Meeting Edges: 2No 15 x 4mm exposed and fitted 5mm either side of the centreline in one leaf edge only

Hardware Protection: see section 11(of the main assessment)