High Wycombe Office:
Chiltern House, Stocking Lane,
High Wycombe,
HP14 4ND,
United Kingdom
T: +44 (0)1494 569750
W: www.warringtonfire.com

Title

Field of Application for:

Moralt LAMINESSE FireSmoke 54mm Door Blanks in Timber Based Door Frames

For 60 minutes Fire Resistance

Report No.:

Chilt/A13059 Revision E

Issue Date:

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Job Reference:

WF534963

Prepared for:

Moralt AG
Obere Tiefenbach Str. 1
83734 Hausham
Germany

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

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1 Foreword

This Field of Application report has been commissioned by Moralt AG and relates to the fire resistance of 60 minute fire resisting doorset designs.

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

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

This scope document cannot be used as supporting documentation for either a UKCA or 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 UKAS accredited laboratories[1], to the relevant test standard. The supporting test evidence has been deemed appropriate to support the manufacturers stated door design and is summarised in section 3.

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

This Field of Application has been prepared and checked by product assessors with the necessary competence, who subscribe to the principles outlined in the Passive Fire Protection Forum (PFPF) 'Guide to Undertaking Technical Assessments of the Fire Performance of Construction Products Based on Fire Test Evidence'. The aim of the PFPF guidelines is to give confidence to end-users that assessments that exist in the UK are of a satisfactory standard to be used for building control and other purposes.

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

[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).

The drawings provided in this report are for guidance and illustrative purposes only. Please note that the written scope of application takes precedence.

2 Proposal

It is proposed to consider the fire resistance performance of the specified proprietary LAMINESSE FireSmoke 54mm doorset designs, for 60 minutes fire resistance integrity performance (and where appropriate insulation performance), if the doorset designs were to be tested to the requirements of BS 476-22: 1987, *Methods for determination of the fire resistance of non-loadbearing elements of construction.*

The field of application defined in this report is based on the fire resistance test evidence for the doorset design, 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.

Whilst specific items are included within this Field of Application report that may be used to provide additional performance characteristics (such as acoustic or smoke control for example), it is beyond the remit of this Field of Application report to provide scope for performance characteristics other than fire resistance integrity and (where applicable) insulation performance. Any other performance requirement for the door designs contained herein is to be subject to a separate analysis.

2.1 Assumptions

- All densities referred to in this document are based upon an assumed moisture content of 10 - 12%.
- It is assumed that unless otherwise documented in the field of application sections of this report, the doorset subject to this report will be constructed in accordance with the test evidence referred to herein.
- For components created using solid timber sections referred to in this assessment, it is assumed that, for all timbers, they will be of a quality deemed to meet or exceed class J30 as specified in BS EN 942: 2007, subject to adequate repairs, other than glazing beads which must meet a minimum class J10. Note that areas under intumescent seals/gaskets are not considered to be concealed faces and defects must be repaired.
- Where timber is referred to within this document it is assumed that the timber element is made from a continuous solid piece, unless specifically detailed otherwise.
- All dimensions detailed herein may be varied by ±2% except where minimum, maximum or a range of dimensions are given.

3 Test Data

The test evidence summarised below has been generated to support the fire resistance performance of the door designs that are the subject of this field of application. The summary details are considered to be the key aspects of the design tested. These test summaries are not intended to be a definitive guide to constructing a doorset. The details for the construction of a doorset must be taken from other sections within this Field of Application.

Note:

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

The test evidence has been generated across a number of different doorset configurations, including single leaf, double leaf, latched and unlatched doorsets.

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

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

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

It is therefore the opinion of Warringtonfire that the evidence citied in the following section, tested to both named standards referenced above can be utilised in this assessment which will conclude in terms of the fire resistance performance of the LAMINESSE FireSmoke 54mm doorset designs if tested in accordance with BS 476: Part 22: 1987.

3.1 Primary Test Evidence

The following summaries are provided to give the key details relevant to the tested specimen. Throughout this assessment report, relevant sections will reference the tests where they have been used to support the scope of application.

3.1.1 Test Report XF 11016

This test was conducted on an unlatched, one and a half leaf, single acting doorset with glazing. Test is presented as primary data for the LAMINESSE FireSmoke 54mm, 60 minute fire resisting doorset design with head rail insert and with 6mm thick particleboard facings being considered in this field of application.

Test Date	17th November 2011
Identification of test body	Chiltern International Fire, now trading as Warringtonfire Testing and Certification. UKAS 1762
Test Sponsor	Moralt AG
Tested Product	Unlatched, single acting, double door (ULSADD)
Tested Orientation	Leaves oriented to open towards fire test conditions
Sampling Information	No information on sampling is available. The component parts of the doorsets were identified based on information provided by the client and verified and agreed by the laboratory insofar as reasonably practicable
Summary of test construction (mm)	**Specimen:** LAMINESSE FireSmoke 54mm blank with 10mm thick hardwood lippings on all edges, 6mm thick particleboard facings and head rail insert. **Leaf Size:** 2040 (h) x 926/425 (w) x 54(t) **Glazing:** 7 thick Pilkington Pyroshield 2 glass in an aperture 1210(h) x 410(w) was protected with the Intumescent Seals Ltd Therm-A-Glaze 60 and 'Liner S' liner behind hardwood beads 30(h) x 25(w). **Hardware:** 3No Royde & Tucker H102 butt type hinges and a Boss TS4.224 overhead closer were fitted, with a Newstar sashlock latch with a 235 high forend ref: SL1-SSS, 204 long disengaged flush bolts and a Sherringham aluminium handleset. **Door frame**: White Beech of nominal density 720kg/m^3 installed without architraves. **Leaf Edge Intumescent Seals:** Lorient Polyproducts Ltd Type 617 seals were fitted in the frame reveals and leaf meeting edges.
Test Standard	BS 476: Part 22: 1987
Test Results (minutes) Tested opening into the furnace	Integrity: 68 Insulation: 68* *In accordance with the note to clause 7.6.1.1 of BS 476: Part 22: 1987, the glazing was not evaluated for insulation.

3.1.2 Test Report RF07055

Test is presented as secondary data to support double acting hardware and larger leaf sizes with a head rail insert and an enhanced intumescent seal arrangement at the head of the leaves. The test has been deemed acceptable to support these design options with the 6mm particleboard faced LAMINESSE FireSmoke design due to the similarities in the products and the enhanced intumescent specification tested.

Test Date	1st May 2007
Identification of test body	BMTRADA, now trading as Warringtonfire Testing and Certification. UKAS 1762
Test Sponsor	Moralt AG
Tested Product	Double acting, double door (DADD)
Tested Orientation	Leaves opening in both directions with respect to fire test conditions
Sampling Information	No information on sampling is available. The component parts of the doorsets were identified based on information provided by the client and verified and agreed by the laboratory insofar as reasonably practicable
Summary of test construction (mm)	**Specimen:** LAMINESSE FireSmoke 54mm blank with 9mm thick hardwood lippings on all edges except hanging edges which were 15 thick, 4mm thick particleboard facings and head rail insert. **Leaf Size:** 2600 (h) x 950/950 (w) x 54(t) **Glazing:** 6 thick wired Pilkington Pyroshield glass in an aperture 1200(h) x 200(w) was protected with Mann McGowan Pyroglaze and a Palusol liner behind hardwood beads 26(h) x 25(w). **Hardware:** Dorma Door Controls Top strap ref: 8066 and Dorma bottom strap ref: 7421 with Dorma floor springs ref: BTS80 fitted in the threshold, no latch was installed. **Door frame**: Sapele 40 thick (radiused at hanging jambs to 32) of nominal density 640kg/m^3.with Sapele architraves. **Leaf Edge Intumescent Seals:** Lorient Polyproducts Ltd Type 617 seals were fitted in the frame reveals and leaf meeting edges.
Test Standard	BS 476: Part 22: 1987
Test Results (minutes)	Integrity: 61* Insulation: 61* *61 minutes was the time to the failure of the glazing, the failure at the perimeter of the leaf was 72minutes and it is this performance that has been used to calculate increased leaf sizes. In this instance, the fire resistance performance of the glazing can be separated from the perimeter performance of the doorset to provide increased leaf dimensions as a function of over-run beyond 60 minutes

3.1.3 Test Report DMT-DO-50-1216

The referenced test report, the essential details of which are summarised below, is primary data for the Mann McGowan Pyrostrip intumescent seals being considered for assessment in this report.

Date of Test	1st December 2022
Identification of Test Body	DMT Gmbh & Co. KG
Sponsor	Moralt AG
Tested Product	One single leaved timber based doorset with thickness of 54mm in a wooden door frame.
Tested Orientation	Opening out, away from heating condition
Summary of Test Specimen	LEAF LAMINESSE FireSmoke 54mm, laminboard headrail: Dimensions: 2443 (h) x 1000 (w) x 54 (t), Lipping: 5 (t) Sapele to all edges. Door Frame: Sapele head and Jambs, 100 (w) x 38(t). Hardware: Hinges: 3No Bartels GmbH ref: Pivota DXS 100 3-D design Closer: integrated Geze Boxer EN 2-4 Lock/Latch: 2No Salto LE7s mortice lock – forend 235 (h) at 450 and 1047 above the threshold with a Salto control unit ref: AFB01MBA8 above each sashlock. Cylinder: Abus – dummy cylinder ref: T185. Lever handles – Salto R1SJRIM480 Smoke Seal Mann McGowan ACS1 against the upstand of the frame stop and a Mann McGowan 'Enviroseal Tri-blade' in the leaf edges. Drop Seal: Mann McGowan DD_1703ACU. Intumescent Materials: 2No Mann McGowan Pyrostrip 5mm either side of the centreline in frame reveals - head and jambs. Hinge protection: Mann McGowan kit ref: MMG567. Closer Protection: Mann McGowan kites ref MMG107, MMG109 and MMG579 Drop Seal Protection: 1 (t) Interdens to top and long sides of seal. Lock Body Mortice – 1 (t) Exitex graphite to all sides
Test Standard	EN1634-1:2014+A1:2018
Performance	**Integrity:** 60 minutes **Insulation:** 60 minutes

3.1.4 Test Report DMT-DO-50-1090

The referenced test report, the essential details of which are summarised below, is supplementary data for the Bartels 'Pivota' concealed hinges being considered for assessment in this report.

Date of Test	17th February 2022		
Identification of Test Body	DMT Gmbh & Co. KG		
Sponsor	Moralt AG		
Tested Product	Three, single leaved timber based doorset with thickness of 54mm in a wooden door frame.		
Tested Orientation	All opening in towards heating condition		
Summary of Test Specimen	All Specimens: LEAF: LAMINESSE FireSmoke 54mm, Sapele head rail adhered with PUR. Doors 1 and 2 with 42.7 (t) core and 3(t) MDF facings, Doors 3 with 36.7 (t) core and 6(t) MDF facings Dimensions: 2204 (h) x 970 (w) x 54 (t), Lipping: 5 (t) Sapele to vertical edges and 8 (t) to top edge. Door Frame: Sapele head and Jambs, 100 (w) x 38(t), 18 (h) stop. Hardware: Hinges: 3No Doorfit CBH102.R butt hinges Closer: Doorfit ICK1955V-SSS face fixed Lock/Latch: Doorfit Mortice lock – CH7260FR with 235 (h) forend, disengaged for test. Cylinder: Doorfit ref: DF70CTTSKD. Lever handles – Doorfit CH100/G3SS Smoke Seal Mann McGowan ACS1 against thee upstand of the frame stop and a Mann McGowan 'Enviroseal Tri-blade' in the leaf edges. Drop Seal: Mann McGowan DD-703ACU. Intumescent Materials: 2No Mann McGowan Pyrostrip 5mm either side of the centreline in frame reveals - head and jambs. Hinge protection: 1 (t) graphite behind both blades. Drop Seal Protection: 1 (t) Interdens to top and long sides of seal. Lock Body Mortice – 1 (t) Exitex graphite to all sides		
Test Standard	EN1634-1:2014+A1:2018		
Performance (minutes)	**Door 1**	**Door 2**	**Door 3**
	Integrity: 74 **Insulation:** 74	**Integrity:** 75 **Insulation:** 70	**Integrity:** 73 **Insulation:** 73

3.2 Supplementary Test Data

3.2.1 Test Report 20220908-004512 Revision B

The referenced test report, the essential details of which are summarised below, is supporting data for the Moralt Laminesse Firesmoke 54 design using Safehinge Primera hardware items being considered for assessment in this report.

Date of test	13th October 2022
Identification of Test Body	United Kingdom Testing and Certification. UKAS No. 21542
Sponsor	Safehinge Primera
Sampling Information	Both door assemblies were sampled by BMTRADA under contracts SC22207 and SC22208 at Principal Doorsets Ltd.
Tested Product	1No unlatched, double leaf, double acting, flush timber doorset and 1No unlatched single leaf, double acting, flush timber doorset. For the purpose of the test the leaves were referenced as left hand doorset - specimen A and right hand doorset as specimen B.
Tested Orientation	Specimen A opened in towards the heating conditions and Specimen B opened in towards the heating conditions
Summary of test specimen	Specimen A: Overall Size: 2020 (h) x 920/500 (w) x 54 (t) Specimen A: Overall Size: 2020 (h) x 920 (w) x 54 (t) Both Specimens: Moralt Firesmoke lamel core and 6(t) particleboard BOTH DOORSETS: FRAME: Sapele timber 'Sureclose' (ref: TIM5163-01A-SCH-H); Head 125(w) x 69(t), jambs 125(w) x 32(t). A timber stop 25(w) x 9(t) x 2028(long) was fitted to the frame hanging jambs. Fixings to supporting construction 7No wood screws per jamb. INTUMESCENT: Lorient LP1004/LP1004SS/LP1504/LP1504DS/LP2004. HARDWARE: Common to both specimens: Primera Lockset ref: PR-3S-56-729A Top Pivot straps: (Dorma) SHC68-106 and SHC01-005, bottom strap: SHC001-004 and SHC03-022SP (L-bracket bottom pivot). Transom mounted closer DormaKaba SHC68-100. Safehinge hinge system SHC50-862 Aluminium. Doorset A: Flush Bolt Face fixed ref: Safehinge PR-6304-RB-RK-LL Rhino and SHC96-22 Astragal fixed to secondary leaf. Doorset B: Movastop removable anti-barricade stop.

		Transom mounted closer, ref: Dorma Kaba SHC68-100 with 2(t) graphite intumescent kit around closer body and behind mounting plate. Top Pivot straps: SHC68-106, bottom strap: SHC001-004 Primera Lockset ref: PR-3S-56-729A. <u>GLAZING, both doorsets:</u> Hygeno unit ref SHC16-261 Sureview, aperture size 806mm high x 256mm wide with hardwood beading and incorporating a thumbturn through the glass panes to operate the central glass pane. Unit oriented with10mm thick Pyroswiss to the non-fire side of specimen A and the fire risk side of specimen B.
Test Standard		BS 476: Part 22:1987
Performance	Specimen A	Integrity: 59 minutes[1] Insulation: 59 minutes
	Specimen B	Integrity: 65 minutes Insulation: 65 minutes
Failure Mode		[1] Sustained flaming at the glazing unit

3.2.2 Test Report 20220426-151912 Revision A_B

The referenced test report, the essential details of which are summarised below, is supporting data for the Moralt Laminesse Firesmoke 54 design using Safehinge Primera hardware items being considered for assessment in this report.

Date of test	8th June 2022
Identification of Test Body	United Kingdom Testing and Certification. UKAS No. 21542
Sponsor	Safehinge Primera
Tested Product	Specimen B - 1No unlatched, single leaf, double acting, flush timber doorset. Specimen A has not been considered herein and is reported in separate test report
Tested Orientation	Specimen B opened out, away from the heating conditions
Summary of test specimen	Leaf Size: 2020 (h) x 920 (w) x 54 (t) Core: Moralt Firesmoke lamel core and 6(t) particleboard, with a Sapele headrail 35 (w) x 25 (h) adhered in position with PUR FRAME: Sapele timber; Head 139(w) x 75(t), jambs 139(w) x 44(t). Fixings to supporting construction 7No wood screws per jamb. INTUMESCENT: Lorient LP1004/LP1004SS/LP1504/LP1504DS/LP2004. HARDWARE: Common to both specimens: Primera Lockset ref: PR-3S-56-729A Top Pivot straps: (Dorma) SHC68-106 and SHC01-005, bottom strap: SHC001-004 and SHC03-022SP (L-bracket bottom pivot). Transom mounted closer, ref: Dorma Kaba SHC68-100 with 2(t) graphite intumescent kit around closer body and behind mounting plate. Safehinge hinge system Alu60 with Lorient GPF1503 under each profile. Intastop Secura doorstop mounted. Kickplate – stainless steel 828 (l) x 200 (w) x 1.5 (t).
Test Standard	BS 476: Part 22:1987
Performance	Integrity: 65 minutes Insulation: 65 minutes

3.2.3 Test Report 20220908-004512 Revision B

The referenced test report, the essential details of which are summarised below, is supporting data for the Moralt Laminesse Firesmoke 54 design using Safehinge Primera hardware items and multipane glazing systems being considered for assessment in this report.

Date of test	13th October 2022
Identification of Test Body	United Kingdom Testing and Certification. UKAS No. 21542
Sponsor	Safehinge Primera
Sampling Information	Both door assemblies were sampled by BMTRADA under contracts SC22207 and SC22208 at Principal Doorsets Ltd.
Tested Product	1No unlatched, double leaf, double acting, flush timber doorset and 1No unlatched single leaf, double acting, flush timber doorset. For the purpose of the test the leaves were referenced as left hand doorset - specimen A and right hand doorset as specimen B.
Tested Orientation	Specimen A opened in towards the heating conditions and specimen B opened in towards the heating conditions
Summary of test specimen	Specimen A: Overall Size: 2020 (h) x 920/500 (w) x 54 (t) Specimen A: Overall Size: 2020 (h) x 920 (w) x 54 (t) Both Specimens: Moralt Firesmoke lamel core with 6 (t) particleboard facings BOTH DOORSETS: FRAME: Sapele timber; Head 125(w) x 69(t), jambs 125(w) x 32(t). A timber stop 25(w) x 9(t) x 2028(long) was fitted to the frame hanging jambs. Fixings to supporting construction 7No wood screws per jamb. Threshold – Non combustible INTUMESCENT: Lorient LP1004/LP1004SS/LP1504/LP1504DS/LP2004. HARDWARE: Common to both specimens: Primera Lockset ref: PR-3S-56-729A Top Pivot straps: (Dorma) SHC68-106 and SHC01-005, bottom strap: SHC001-004 and SHC03-022SP (L-bracket bottom pivot). Transom mounted closer DormaKaba SHC68-100 (RTS87). Safehinge hinge system SHC50-862 Aluminium with Lorient GPF1503 under each profile. Doorset B: Movastop removable anti-barricade stop. Transom mounted closer, ref: Dorma Kaba SHC68-100 with 2(t) graphite intumescent kit around closer body and behind mounting plate. Top Pivot straps: SHC68-106, bottom strap: SHC001-004 GLAZING, both doorsets:

		Hygeno unit ref SHC16-261 Sureview, aperture size 806mm high x 256mm wide with hardwood beading and incorporating a thumbturn through the glass panes to operate the central glass pane. Unit oriented with10mm thick Pyroswiss to the non-fire side of specimen A and the fire risk side of specimen B.
Test Standard		BS 476 Part 22:1987
Performance	Specimen A	Integrity: 59 minutes[1] Insulation: 59 minutes
	Specimen B	Integrity: 65 minutes Insulation: 65 minutes
Failure Mode		[1] Sustained flaming at the glazing unit

3.2.4 Test Report DMT-DO-50-172-001

The referenced test report, the essential details of which are summarised below, is supplementary data for the Bartels 'Pivota' concealed hinges being considered for assessment in this report.

Date of Test	31st August 2021
Identification of Test Body	DMT Gmbh & Co. KG
Sponsor	Moralt AG
Tested Product	One single leaved timber based doorset with thickness of 54mm in a wooden door frame.
Tested Orientation	Opening in towards heating condition
Summary of Test Specimen	LEAF LAMINESSE FireSmoke 54mm: Dimensions: 2440 (h) x 1000 (w) x 54 (t), Lipping: 5 (t) to vertical edges and 8 (t) to horizontal edges. Door Frame: Sapele head and Jambs, 100 (w) x 38(t). Hardware: Hinges: 2No Bartels GmbH ref: Pivota DXS 100 3-D design Closer: integrated Geze Boxer EN 2-4 Lock/Latch: Doorfit Products mortice lock – forend 165 (h) Cylinder: Doorfit Products Ltd – EP70CTSKD. Drop Seal: Lorient LAS8001 Si. Intumescent Materials: 2No Lorient LP1504 in hanging jamb. Hinge protection: Mann McGowan kit ref: MMG567. Closer Protection: Mann McGowan kites ref MMG107, MMG109 and MMG579 Drop Seal Protection: 1 (t) Interdens to top and long sides of seal. Lock Body Mortice – 1 (t) Exitex graphite to all sides
Test Standard	BS476 Part22:1987
Performance	**Integrity:** 67 minutes **Insulation:** 67 minutes

3.2.5 Test Report WF429105

The referenced test report, the essential details of which are summarised below, is supplementary data for the Rutland ITS11204concealed closers being considered for assessment in this report.

Date of Test	24th June 2020	
Identification of Test Body	Warringtonfire Testing and Certification UKAS 1762	
Sponsor	Rutland UK, Whittington Way, Chesterfield, S41 9AG	
Tested Product	Two unlatched, single leaved timber based doorsets in timber door frames.	
Tested Orientation	Specimen A tested opening out, away from the furnace Specimen B tested opening in towards heating conditions	
Summary of Test Specimen	Both specimens Leaf: 54mm thick particleboard: Dimensions: 2040 (h) x 926 (w) x 54 (t), Lipping: 8 (t) to vertical edges, none on horizontal edges. Door Frame: Sapele head and Jambs, 90 (w) x 44(t) with integral 12 high stop. Hardware: Hinges: 3No bearing butt ref: Rutland RH.BB. 43R.SS Closer: Rutland ITS1204 concealed head mounted Lock/Latch: Rutland RDL.ESL.60.SSR mortice lock – forend 235 (h) Cylinder: Eurospec – CYP71282SC. Intumescent Materials: 2No Lorient LP1504 in frame jambs Hinge protection: 1mm thick graphite pads. Closer Protection: Rutland 'IP.114 2mm intumescent kit for ITS11204' Lock Body Mortice – Rutland 1mm thick graphite jacket and pads	
Test Standard	BSEN1634-1:2014+A1:2018	
Performance	A:	B:
	Integrity 73	Integrity 54 – top closing corner

3.2.6 Test report DMT-DO-50-1010

Date of test	17th March 2015		
Identification of test body	DMT GmbH & CO KG, Tremoniastrasse 13, 44137 Dortmund, Germany		
Sponsor	Moralt AG		
Sampling	Specimens were sampled by a representative of BMTRADA under contracts SC21026, SC210272, SC32206B, SC21105 and SC21104		
Tested Product	Specimen A & B: Latched, single acting, double leaf specimens comprised of Moralt FireSound Plus 54 core leaves with the vertical edges lipped with 8-14mm thick sapele of nominal density 640kg/m3. The leaves for both specimens were 2440mm (h) x 1000mm (w) x 54mm (t) and hung in sapele hardwood frames. The doorsets were oriented to open in towards the furnace of the test.		
Test Standard	BS 476 Part 22:1987		
Test Results (minutes)	**Integrity**	**Specimen A** 42	**Specimen B** 54
	Insulation:	11 Glass	11 Glass
DMT-DO-50-1010 has been incorporated to permit consideration of concealed hinges and closers, alternative glass and glazing options. Failures were recorded at the apertures glazed with the 13mm thick Pyroguard EW60 glass, which is not permitted for use within this report.			
Summary of test specimen	The tested specimens included 3No. PIVOTA DXS 100 3-D concealed steel hinges, a Geze Boxer EN 2-4 concealed overhead closer, an Assa Abloy 'Signature MPA RFID mortice lock with a 235mm high forend and an Assa Abloy EA280 cable loop and associated cableway installation. For both specimens: 2No. 15 x 4 Mann McGowan Pyrostrip 500P perimeter intumescent seals with co-extruded 'Tri-blade' smoke seals were fitted in the frame reveal of the head and jambs. A Mann McGowan ACS1 PVC finned smoke seal was fitted to the upstand of the frame stop. A Mann McGowan DD-1703ACU dropseal was fitted in the threshold of the leaf. The hinges were protected with a MMG567 Mann McGowan gasket set, the concealed closer was protected with Mann McGowan MMG107 Boxer Fire, MMG109 Rail pack and MMG579 longer forend cover gasket sets, latch forend and body protected with Mann McGowan pack ref: MMG568, drop seal included 2mm thick Interdens on the top surface. The leaf was glazed with one aperture using 13mm thick Pyroguard EW60 and one aperture with 25mm thick Pyroguard EI60 from Pyroguard UK.		

3.2.7 Test report WF364240

Date of test	11th May 2016		
Identification of test body	Warringtonfire now trading as Warringtonfire Testing and Certification UKAS 0249		
Sponsor	Abloy Oy		
Sampling	A representative of Warrington Certification sample selected the hardware on 26th April 2016		
Tested Product	Specimens A & B: Latched, single acting, single leaf specimens comprised of a graduated chipboard core with the vertical edges lipped with 8mm thick sapele of nominal density 640kg/m3. The leaves for both specimens were graduated chipboard cores 2040mm (h) x 931mm (w) x 54mm (t) and hung in hardwood frames. Specimen A was oriented to open in towards the furnace and specimen B to open away from the heating conditions for the test.		
Test Standard	BS EN 1634-1:2014		
Test Results (minutes)	**Integrity**	**Specimen A** 68	**Specimen B** 68
	Insulation:	68	68
WF364240 has been incorporated as supporting data to permit consideration of the Abloy Oy EL520 lockset range.			
Summary of test specimen	The tested specimens were mounted on 4No. Royde and Tucker Hi-Load H102 steel butt hinges, with a Abloy Oy EA281 cable loop and Inoxi lever handles. Both specimens incorporated an EL520/100 lockset and EA329 strike plate.		

3.2.8 Test Report Technalia 088745-002-1-a

Test 088745-002-1-a is presented as suitable supporting data for the use of the Onity card reader and handle ref: Advance Trillium RFID. Locksets installed with the increased intumescent specification 'option 2' had not been recorded as the cause of integrity failure prior to termination of the test at 60 minutes on either of the specimens.

Date of Test	22 July 2020	
Identification of Test Body	Technalia Research and Innovation, Area Anardi, 5, E-20730 Azpeitia (Gipuzkoa).	
Sponsor	Onity, Poligono Industrial Lanbarren, C/Aranaburu 4D, 20180 Oiartzun, Spain	
Tested Product	2 No identical - Latched, Single Acting, Single Leaf, Timber Doorsets - LSASD.	
Tested Orientation	Door 1 tested Opening out, away from heating conditions Door 2 tested Opening in towards heating conditions	
Summary of Test Specimen	**LEAF:** Overall Size: 2229 (h) x 958 (w) x 54mm (t) Core: graduated density chipboard (630kg/m^3). Lippings: 6mm thick Sapele to all edges. **FRAME:** Head & Jambs: MDF (700kg/m^3), 151 x 48mm thick including 5mm return around wall face, with 100 x 18mm thick planted stops, butt jointed. Threshold: non-combustible board Architraves: Sapele (640kg/m^3), integral with frame 12mm projection x 5mm overlap. **INTUMESCENT Materials:** Frame Reveals: 2No 15x4 STS STS154FO. Fitted 10mm apart with 1st seal fitted 5.5mm from opening face. Bottom Leaf Edge. Drop Seal – STS ST422. Smoke Seals: STS ST1009. **HARDWARE:** Hinges: 4No Zoo Hardware ref: ZCHSS243S Closer: Dorma ITS96, concealed overhead Lock/Latch – installed as 'option2': Onity card reader and handle ref: Advance Trillium RFID + Onity mortice latch ref: Euro 5470H. Lock/Latch Size: Central Lockcase: 174 high x 14 wide x 105 deep (mm), spindle at 1675mm above threshold. RFID reader backing plate 90 x 60 mounted to face of leaf above main latch body. Forend: 240 x 23 x 3mm, keep: 200 x 40 (O/all) x 3mm. Lock/Latch Status: engaged for test. **HARDWARE PROTECTION:** Under Hinges: 1mm thick Norseal Interdens hinge pad behind all hinge blades. Latch/Lock: 1mm thick 'Interdens 15' Encasing Lockcase, under forend & keep, inside card reader mounting plate, handle rosette and under reader mounting plate. Dropseal – 2mm thick Interdens on top face of dropseal	
Test Standard	EN1634-1:2014+A1:2018	
	Doorset 1	**Doorset 2**

Performance (minutes)	**Integrity:** 42* **Insulation:** 42	**Integrity:** 42* **Insulation**: 42
Failure Mode	Failure was recorded on doorset 1 at the card reader installed as 'option 1' (with reduced intumescent protection) and at the top hinge position on doorset 2. No further integrity failures were recorded prior to termination of the test at 60 minutes.	

3.2.9 Test Report CFR1101041 Rev 1

Date of Test	04.JAN.2011
Identification of Test Body	Cambridge Fire Research. UKAS No. 4319
Sponsor	Harrison Thompson & Co. Ltd
Tested Product	Unlatched, Single Acting, Double Leaf, Glazed Apertures – ULSADD Noberne Group, Chipboard core, LL 2040 x 927 x 58 (63 at edge protector), RL 2040 x 926 x 58(63 at edge protector). Leaf with laminated hardwood rails and stiles, chipboard core with Calcium Silicate inner sub-facing, MDF outer sub-facing and Harrison Thompson Yeoman Shield PVC facings, incorporating sapele lippings on the horizontal edges and Harrison Thompson Yeoman Shield PVC edge protection on the vertical edges. Glass: Pyrostop 15mm, overall size 892 x 242 x 15mm Glazing Bead: Sapele (600kg/m^3), 34 x 26mm with a 7 x 10 ‡ bolection, splay angle 25°.
Tested Orientation	Opening in towards heating condition
Sampling information	Cambridge Fire Research was not involved in any selection or sampling procedures for the tested specimens
Test Standard	BS EN 1634-1:2008
Performance	**Integrity:** 68 minutes **Insulation:** 44 minutes
Reason for Use	PVC encapsulation
Failure Mode	Initial Failure: Cotton Pad Test at right hand head/hanging stile corner at 68 minutes (Insulation failure at 45 minutes as thermocouple temperature exceeded the max criteria) Further Failure: Cotton Pad Test at left hand hanging stile/head corner at 70 minutes

3.2.10 Test Report Chilt/RF07141 Revision B (Doorset B)

Date of Test:	27.Nov.2007
Identification of Test Body:	Chiltern International Fire Ltd (now trading as: Warringtonfire Testing & Certification Ltd)
Sponsor:	Lorient Polyproducts Ltd
Tested Product:	Unlatched, Single Acting, Double Doorset - ULSADD.
Tested Orientation:	Opening in towards heating condition
Sampling information:	N/A
Summary of Test Specimen:	Leaf: Leaf Sizes: 2045 (h) x 850/323 (w) x 54 (t) Core: Halspan Prima FD60, 54mm thick. Horizontal Lipping: Sapele (640kg/m3) 6mm thick, horizontal edges only Vertical Lipping: PVCu Yeoman Shield/Lorient Polyproducts Ltd Intumescent: Frame Reveal Head Only: 2no 15x4 Lorient Polyproducts Ltd LP1504 Type 617. Centrally fitted in the frame reveal spaced 10mm apart. Leaf Vertical Edges: 1no 20x4 Lorient Polyproducts Ltd LP2004 Type 617. Centrally fitted in the Yeoman Shield/Lorient PVCu door edge protector. Frame: Head & Jambs: Sapele (640kg/m^3), 70 x 32mm deep including a planted (pinned) stop 16 x 12mm deep. Architrave: Sapele (640kg/m^3)16mm thick. Hardware: Hinges: 3No Royde & Tucker H105 Hi load lift off type hinges Closer: 1No Dorma Door Controls Ltd TS83 Latch/Lock: E*S Easi-T latch - disengaged. Handle: 1No Aluminium lever type handle Hardware Protection: Under Forend & Keep: 1mm thick Lorient Polyproducts Ltd monoammonium phosphate (MAP) Under Hinge Blade: 1mm thick Lorient Polyproducts Ltd monoammonium phosphate (MAP) Encashing Latch Body: 1mm thick Lorient Polyproducts Ltd monoammonium phosphate (MAP)
Test Standard:	BS 476 Part 22: 1987
Performance:	**Integrity:** 67 minutes **Insulation:** 67 minutes
Reason for Use	For the use of Yeoman Shield / Lorient Polyproducts Ltd. PVCu door edge protectors to the vertical edges of the leaf. Constructed with a Yeoman Shield 2.0mm outer edging strip with 50mm long return legs, formed around a 54mm wide x 9mm thick toughened PVCu insert. Fixed using 50mm long screws at nominally 200mm centres and PVA adhesive. The horizontal edges were lipped with 10mm thick Sapele and fixed using PU adhesive.

3.2.11 Test report WF383782

Date of test	26th September 2017		
Identification of test body	Exova Warrington fire now trading as Warringtonfire Testing and Certification UKAS 0249		
Sponsor	Salto Systems, Arkotz 9, Poligono, Lanbarren, 20180 Oiartzun- Gipuzkoa, Spain		
Sampling	A representative of Warrington Certification sample selected the hardware on 23rd February 2017		
Tested Product	Specimens A & B: Latched, single acting, single leaf specimens comprised of a graduated chipboard core with the vertical edges lipped with 8mm thick sapele of nominal density 640kg/m3. The leaves for both specimens were 2040mm (h) x 932mm (w) x 44mm (t) and hung in softwood frames. The doorsets were oriented to open in towards the furnace of the test.		
Test Standard	BS EN 1634-1:2014		
Test Results (minutes)	**Integrity**	**Specimen A** 45	**Specimen B** 37
	Insulation:	45	37
WF383782 has been incorporated as supporting data to permit consideration the Salto entry systems discussed in section 10.4.1.2.			
Summary of test specimen	The tested specimens were mounted on 5No. Royde and Tucker Hi-Load H102 steel butt hinges, other than the latches no other hardware was installed. Specimen A incorporated a Salto LE7 lockset and strike plate with a Salto lever handle on a plastic backplate ref: E915RUIMB39 to the unexposed face and a steel lever handle on a steel rose on the exposed face. Specimen B incorporated a Salto LE8 electric escutcheon ref: E9652U851M3K.		

3.2.12 Test report WF383783

Date of test	26th September 2017
Identification of test body	Exova Warrington fire now trading as Warringtonfire Testing and Certification
Sponsor	Salto Systems, Arkotz 9, Poligono, Lanbarren, 20180 Olartzun- Gipuzkoa, Spain
Sampling	A representative of Warrington Certification sample selected the hardware on 23rd February 2017
Tested Product	Specimens A & B: Single leaf specimens comprised of a graduated chipboard core with the vertical edges lipped with 8mm thick sapele of nominal density 640kg/m3. The leaves for both specimens were 1490mm (h) x 584mm (w) x 54mm (t) and mounted in hardwood jambs. The specimens were screwed in position to the jambs.
Test Standard	Principles of BS EN 1363-1:2012
Test Results (minutes)	No integrity failures were recorded prior to termination of the test at 68 minutes.
WF383783 has been incorporated as supporting data to permit consideration the Salto entry system discussed in section 10.4.1.2.	
Summary of test specimen	Other than the latches no other hardware was installed. Specimen A incorporated a Salto LE7 lockset with electric escutcheon ref: E96P0U001M48K and also an LE8 lockset with electronic escutcheon ref: E9150RUIMB49. Specimen B incorporated 4,5,6,7,9 a Salto LE7 lockset with electric escutcheon ref: E96P0U001M48K and also an LE8 lockset with electronic escutcheon with reader ref: E9452U72IM49W.

3.2.13 Test Report CFR2010021 Doorset A

Date of Test	02.Oct.2020 at Cambridge Fire Research Ltd to BS EN 1634-1:2014 + A1:2018
Tested Product	Latched, Single Acting, Single Door – LSASD A: Left hand specimen, Insulated, unglazed timber doorset
This test report is being used as supplementary evidence to support electronic lock with card reader	Leaf: Overall Size: 2285 (h) x 855 (w) x 44mm (t); Core: Halspan particleboard, 43mm thick, Lipped with Sapele 8mm thick to all four edges mounted in a softwood frame. Hardware: Hinges: 4No JNF IN 05.020.100 CF SB butt hinges Closer: 1No Dorma ITS96 2-4 concealed closer Electric Lock with Card reader: 1No Salto Mortice Lock LE7Sxx with AElement Fusion, spindle height 865mm above the bottom of door (latch engaged for test) Cylinder with thumbturn: 1No Salto TE010H35PM with escutcheon. Handle: Salto R1SWRIA080, brass lever on rose Eye Viewer: JNF IN.23. 010.B Kick Plate: 290 (h) x 802 (w) x 1.2mm (t) brass kickplate face fixed with 25mm screws to both faces of door. Drop Seal: Halspan SIS-DRP-308 drop seal. Hardware Protection: Under Hinges: None Around Latch body and card reader box, and under strike of Electronic Lock: 1mm thick BASF Interdens Closer: ITS 96 30 minute intumescent pack, 1mm MAP encasing track body, closer body and beneath forend. Specific Feature Being Tested: Electric Lock with Card Reader. Doorset Orientation: Opening towards heating conditions.
Performance	**Integrity:** 38 minutes **Insulation:** 38 minutes

3.2.14 Test report DMT-DO-50-1148

Date of test	7th July 2022
Identification of test body	DMT GmbH & CO KG, Tremoniastrasse 13, 44137 Dortmund, Germany
Sponsor	Moralt AG
Sampling	Specimens were sampled during manufacture at Moralt AG by a representative of BMTRADA under contracts SC21024 and SC21026
Tested Product	Eight specimens of Moralt Laminesse FireSound 54mm were installed with various items of hardware. The leaves for all specimens were 508mm (h) x 508mm (w) x 54mm (t) and mounted in hardwood jambs. Each specimen was mounted on 2No hinges and latched by the various tested hardware items. Only specimens 7 & 8 are considered herein, both specimens were mounted opening in towards the heating conditions. Specimen 7 incorporated the DormaKaba RT Plus handleset and specimen 8 incorporated the Assa Abloy EL520 lockset with Inoxi handles.
Test Standard	Principles of EN1634-1:2014+A1 2018 and EN 1363-1:2020
Test Results (minutes)	No integrity or insulation failures were recorded on specimens 7 or 8 prior to termination of the test at 88 minutes.
DMT-DO-50-1148 has been incorporated as supporting data to permit consideration the Assa Abloy EL520 lockset with Inoxi handles and the DormaKaba RT Plus handleset discussed in section 10.4.1.2.	
Summary of test specimen	Specimen 7 incorporated a DormaKaba RT Plus handleset with protective steel plate (ref: PS7901012ER30-626) operating a mortice latch and also an ITS96 concealed closer. Lockcase and keep protected with intumescent pack ref: MMG631 – 2mm thick Interdens SA. Specimen 8 incorporated an Inoxi handleset operating an EL520 mortice latch engaging into a EL520 keep and also a Dorma concealed closer in the head. Lockcase protected with intumescent pack ref: ITL-Abloy-EL560-100 – 2mm thick Phosphate.

3.2.15 Test report DMT-DO-50-994

Date of test	13th April 2021
Identification of test body	DMT GmbH & CO KG, Tremoniastrasse 13, 44137 Dortmund, Germany
Sponsor	Elton B.V, 2e Energieweg 5, 9301 LL Roden, Netherlands
Tested Product	One timber based door leaf, 54mm tested opening into furnace. The leaf was 1235 (w) x 2485 (h) and mounted in a hardwood timber frame on 2No hinges, latched at mid-height with a sashlock.
Test Standard	EN1634-1:2014+A1 2018 and EN 1363-1:2020
Test Results (minutes)	No integrity or insulation failures were recorded prior to termination of the test at 91 minutes.
DMT-DO-50-994 has been incorporated as supporting data to permit consideration the Elton B.V dropseals discussed in section 10.9.6.	
Summary of test specimen	Specimen incorporated an 'Ellenmatic Soundproof' dropseal no additional intumescent protection was installed.

3.2.16 Test Report FER/F14102

Test RF14102 was conducted on 2No. unlatched, double leaf, single acting doorsets, only specimen A is relevant to this report. Test is presented as supporting data for the LAMINESSE FireSmoke 54mm, 60 minute fire resisting doorset designs installed within James Latham timber based WoodEx 60 door frames.

Test Date	8th July 2014
Identification of test body	Chiltern International Fire, now trading as Warringtonfire Testing and Certification. UKAS 1762
Test Sponsor	James Latham, Unit 2, Swallow Park, Fenway Road, Hemel Hempstead, Hertfordshire, HP2 7QU
Tested Product	Unlatched, single acting, double door (ULSADD – unequal pair)
Tested Orientation	Leaves oriented to open towards fire test conditions
Sampling Information	No information on sampling is available. The component parts of the doorsets were identified based on information provided by the client and verified and agreed by the laboratory insofar as reasonably practicable
Summary of test construction (mm)	**Specimen B:** Graduated Density chipboard 54 thick blank with 8mm thick hardwood lippings on all edges. **Leaf Size:** 2040 (h) x 826/303 (w) x 54 (t). **Hardware:** 3No Royde & Tucker lift off butt type hinges ref: H101 and a Geze UK TS2000V overhead closer were fitted to each leaf, with a Zoo tubular latch with a 62 high forend and aluminium handleset and steel flush bolts fitted in the meeting edge. **Door frame**: Latham WoodEx Engineered European Ash 30 thick of nominal density640kg/m^3 with Sapele architraves. **Leaf Edge Intumescent Seals:** Lorient Polyproducts Ltd Type 617 were fitted in the frame jambs and leaf edges, with a Norsound NOR710 environmental seals fitted against the door stop.
Test Standard	BS 476: Part 22: 1987
Test Results (minutes)	Integrity: 30; Insulation: 30 Tested opening in toward the furnace

Note:

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 FireSmoke 54mm, 60 minute doorset designs.

3.2.17 Test Report FEP/F14256

Test is deemed acceptable for use as secondary data to support specific items of hardware and a drop seal with the LAMINESSE FireSmoke 54mm, 60 minute fire resisting doorset design with head rail insert and 6mm particleboard facings.

Test Date	10th November 2014
Identification of test body	BMTRADA, now trading as Warringtonfire Testing and Certification. UKAS 1762
Test Sponsor	Moralt AG
Tested Product	Unlatched, single acting, single door (ULSASD)
Tested Orientation	Leaf oriented to open towards fire test conditions
Sampling information	No information on sampling is available. The component parts of the doorsets were identified based on information provided by the client and verified and agreed by the laboratory insofar as reasonably practicable
Summary of test construction (mm)	**Specimen A:** LAMINESSE FireSmoke 54mm blank with 8mm thick hardwood lippings on all edges, and 4mm deep grooves in 6mm thick MDF integral facings. **Leaf Size:** **Specimen B:** 2135 (h) x 926 (w) x 54(t) **Hardware:** 3No Eclipse bearing butt type hinges and a Rutland TS3204 overhead closer, Euro spec latch with a 235 high forend and steel Glutz handleset. **Door frame**: CND Beech 32 thick of nominal density 720kg/m^3.with MDF architraves. **Leaf Edge Intumescent Seals:** Pyroplex Ltd Triple Flipper Seals ref: 30141 were fitted in the frame reveals with a Norsound NOR710dB+ drop seal in the threshold of the leaf.
Test Standard	BS 476: Part 22: 1987
Test Results (minutes) Tested opening in toward the furnace	Specimen A
	Integrity: 64 Insulation: 64

3.2.18 Test Report WF 382394

Test WF382394 was conducted on 2No. unlatched, single leaf doorsets, only specimen B is relevant to this report. The test has been deemed acceptable for use as secondary data to support specific items of hardware with the LAMINESSE FireSmoke 54mm, 60 minute fire resisting doorset design with head rail insert and 6mm particleboard facings:

Test Date	8th July 2014
Identification of test body	Exova Warringtonfire, now trading as Warringtonfire Testing and Certification. UKAS 1762
Test Sponsor	Details of the test sponsor are held on file, in confidence, at Warringtonfire
Tested Product	Unlatched, single acting, single Leaf
Tested Orientation	Leaf oriented to open towards test conditions
Sampling Information	No information on sampling is available. The component parts of the doorsets were identified based on information provided by the client and verified and agreed by the laboratory insofar as reasonably practicable
Summary of test construction (mm)	**Specimen B:** LAMINESSE FireSmoke 54 thick blank with 8mm thick hardwood lippings on all edges and with 6mm thick MDF facings. **Leaf Size:** 2250 (h) x 1000 (w) x 54 (t). **Hardware:** 3No Simonswerk Tectus concealed hinges ref: TE5273.SSE FD60 and a Dorma ITS96 concealed closer with ITS slide arm and channel guide, with a Glutz multipoint latch with a 1788 high forend and aluminium handleset and security Euro cylinder. **Door frame**: Hardwood 38 thick of nominal density 650kg/m^3.with MDF architraves. **Leaf Edge Intumescent Seals:** Pyroplex Ltd Rigid Box Seals ref: 6700 and 30141 were fitted in the frame jambs.
Test Standard	BS 476 Part 22: 1987
Test Results (minutes)	Integrity: 69; Insulation: 69 Tested opening in toward the furnace

3.2.19 Test Report Chilt/RF11061

The referenced test report, the essential details of which are summarised below, is to be used to support the fire resistance performance of the LAMINESSE FireSmoke54, for 60 minute fire resisting performance when installed encapsulated with Construction Specialties Ltd 'Acrovyn' and/or Construction Specialties Ltd edge protectors.

The left doorset was designated doorset A and the right doorset was designated doorset B. The left leaf of each doorset measured 2100mm high x 900mm wide x 54mm thick and the right leaf of each doorset measured 2100mm high x 300mm wide x 54mm thick. Vertical leaf edges were protected with the CS Group Acrovyn. Both doorsets were orientated with leaves opening towards the furnace, considered to be the most onerous direction based on experience of testing similar door constructions. It is therefore the opinion of Warringtonfire that the test results can be applied to doors opening in either direction. Both doorsets were fitted with latches disengaged for the test.

When tested in accordance with the requirements of BS 476: Part 22: 1987, the specimens achieved the following performance:

Criteria	Doorset A - Halspan	Doorset B - Blankfort
Integrity:	66 minutes	68 minutes
Insulation:	66 minutes	68 minutes

3.2.20 Fire Resistance Test Chilt/IF13095

The referenced test report, the essential details of which are summarised below, is to be used to support the fire resistance performance of the LAMINESSE FireSmoke54, for 60 minute fire resisting performance when installed encapsulated with Construction Specialties Ltd 'Acrovyn' and/or Construction Specialties Ltd edge protectors.

The leaves measured 1400mm high x 900mm and 300mm wide x 57mm thick. Top and bottom edges were lipped with 2.5mm thick Acrovyn and the leaves faced with 2.5mm thick Acrovyn. Vertical edges were protected with 2mm thick Acrovyn. The doorset was orientated opening towards the furnace, which is considered to be the most onerous direction based on experience of testing doors of similar construction. It is therefore the opinion of Warringtonfire that the test results can be applied to doors opening in either direction. The doorset was fitted with a latch disengaged for the test.

When tested utilizing the temperature and pressure conditions of BS 476: Part 20: 1987 and in accordance with the principles of BS 476: Part 22: 1987, the specimen achieved the following performance:

Criteria	Blankfort 60 based door leaves
Integrity:	60 minutes
Insulation:	60 minutes

3.2.21 Test Report P1009/14-530-1

The referenced test, the essential details of which are summarised below, has been deemed acceptable to support the use of the Norseal NOR710 drop seal in the 60 minute fire resisting timber doorset design being considered in this assessment.

Date of test	16th October 2014
Identification of test body	Slovenian National Building and Civil Engineering Institute, Ljubljana
Sponsor	Details of the test sponsor are held on file, in confidence, at Warringtonfire
Tested Product	Latched, single acting, double leaf specimen comprised of Moralt FireSound 59 core leaf with the vertical edges lipped with 15mm thick Mahogany of nominal density 640kg/m3. The leaves measured 2135mm (h) x 915/490mm (w) x 58mm (t) and were hung in a Mahogany hardwood frame.
Tested Orientation	Leaves oriented to open towards test conditions
Sampling Information	No information on sampling is available. The component parts of the doorsets were identified based on information provided by the client and verified and agreed by the laboratory insofar as reasonably practicable
Summary of test specimen	The tested specimen included 3No. H101 bearing butt steel hinges, an overhead face fixed closer, a mortice lock with a 110mm high forend, a Norsound NOR710 drop seal in the centre of the leaf threshold and an edge mounted flush bolt in the edge of the secondary leaf. 2No. 15 x 1.8mm ODICE Flexilodice graphite perimeter intumescent seals were fitted in the frame reveal of the head and jambs and in one leaf meeting edge. The hinge blades and latch body were protected with 1mm thick Interdens intumescent gaskets. The doorset was oriented to open in towards the furnace for the test.
Test Standard	EN 1634-1: 2014 and EN 1363-1: 2012
Test Results (minutes)**:**	**Integrity:** Cotton Pad: 82 Continuous Flaming: 82 Gap Gauges: 83
	Insulation: I_1: 78 I_2: 83

4 Technical Specification

4.1 General

The technical specification for the proposed LAMINESSE FireSmoke 54mm doorset design is given in the following sections and is based on the test evidence for the door designs, summarised in section 3.

4.2 Intended Use

The intended use of the proposed door assembly 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 Door Leaf

The LAMINESSE FireSmoke 54mm door design can include various design features.

1. Glazing
2. Various hardware options
3. Decorative and acoustic facings
4. Decorative planted on timber mouldings.
5. Leaf encapsulation in PVC.

Specific sections within this assessment must be referred to for design limitations and construction requirements.

Section 5 gives the description of the leaf type in terms of composition and density etc.

Specific sections within this assessment must be referred to for design limitations and construction requirements.

4.4 Door Frames

Specific sections within this assessment must be referred to for design limitations and construction requirements where doorsets are constructed using different frame options, where applicable.

4.4.1 Frame 1 – Hardwood Timber

The construction of the door frames is hardwood with minimum frame dimensions. For further information on the specification and construction of the door frames see section 7.

4.4.2 Frame 2 – WoodEx 60 Engineered Timber

The construction of the door frames is engineered timber elements with minimum frame dimensions. For further information on the specification and construction of the door frames see section 7.

4.5 Doorset Configurations & Maximum Leaf Sizes

4.5.1 General

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

1. The margin of over performance above 60 minutes integrity for the design
2. The characteristics exhibited during test and
3. The doorset configuration tested.

The evaluation of the permitted configurations included in this field of application is based on the configuration(s) tested. The principle is that the more components included in testing, for example, double door leaves and an overpanel – the harder it becomes to pass a test. In this specific example it is because the junction between two door leaves or door leaf and overpanel introduces a discontinuity into the doorset which can be a means of failure. This approach leads to the following statements:

1. A test on a double doorset is more onerous than a test on a single doorset.
2. A test on an unlatched doorset is more onerous than a test on a latched doorset as the leading edge is unrestrained and will deflect more in fire test conditions.
3. A test on an unlatched single acting doorset is considered to be equivalent to a double acting doorset, due to the known deflection of an unlatched single acting doorset towards the furnace conditions i.e. away from the door stop. However, this does not cover doorsets with flush overpanels.
4. A doorset with transomed overpanel is considered to perform comparably to a similar doorset without an overpanel. This is because the transom structurally separates the overpanel from the doorset.

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

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

4.5.2 Configuration

The table below shows the permitted configurations for the LAMINESSE FireSmoke 54mm doorset design, with the abbreviation and full description of each configuration.

The following sections detail the assessed maximum leaf size envelops for each permitted configuration based on the intumescent specification and door frame tested.

Doorset Configurations		
Depiction	Abbreviation	Description
	LSASD	Latched Single Acting Single Doorset
	ULSASD	Unlatched Single Acting Single Doorset
	DASD	Double Acting Single Doorset
	LSADD	Latched Single Acting Double Doorset
	ULSADD	Unlatched Single Acting Double Doorset
	DADD	Double Acting Double Doorset

4.5.3 Orientation

The majority of primary fire resistance tests for these designs were conducted with the doorset hung such that the door leaf opened towards the fire, which is considered the most onerous orientation in terms of fire resistance performance. Based on this testing, assessment is made that the doorsets to this design may be hung either away from or towards the fire risk side of the doorset. The rationale behind the direction of fire testing timber based doorsets opening towards the fire test conditions is further explained in Annex C of BS EN 1634-1:2014 +A1:2018.

4.5.4 Envelopes for each Configurations

The following sections detail the door leaf envelopes which indicate the permitted leaf sizes for the listed configurations based on the perimeter intumescent, door leaf option and door frame.

Unequal leaf double doorsets are covered by this assessment with no restriction on the smaller leaf dimensions providing it does not exceed the relevant leaf size envelope and is not smaller in width than 300mm.

For equal double doorsets both leaves must comply with the door leaf envelope size limitations.

A table of essential hardware is given in section 10.3 for each doorset configuration, as a minimum requirement for the doorset described. Changes to hardware can affect the intumescent specification and frame details which are subsequently considered for each specific hardware component, where required.

4.5.4.1 General Note on Intumescent Seals

- Intumescent seals are to be fitted centrally unless stated otherwise.
- Intumescent seals are fully interrupted at hardware locations unless stated otherwise.
- Intumescent seals must run the full length of the leaf edge or frame reveals, with tightly formed abutting corner joints, unless stated otherwise.
- Vertical perimeter intumescent seals may include one tight butt joint in their length if needed.
    - Where two seals are fitted, the joints must be offset by a minimum of 100mm and may not be coincident.
    - Where one seal is fitted the joint must be in the lower half of the doorset.

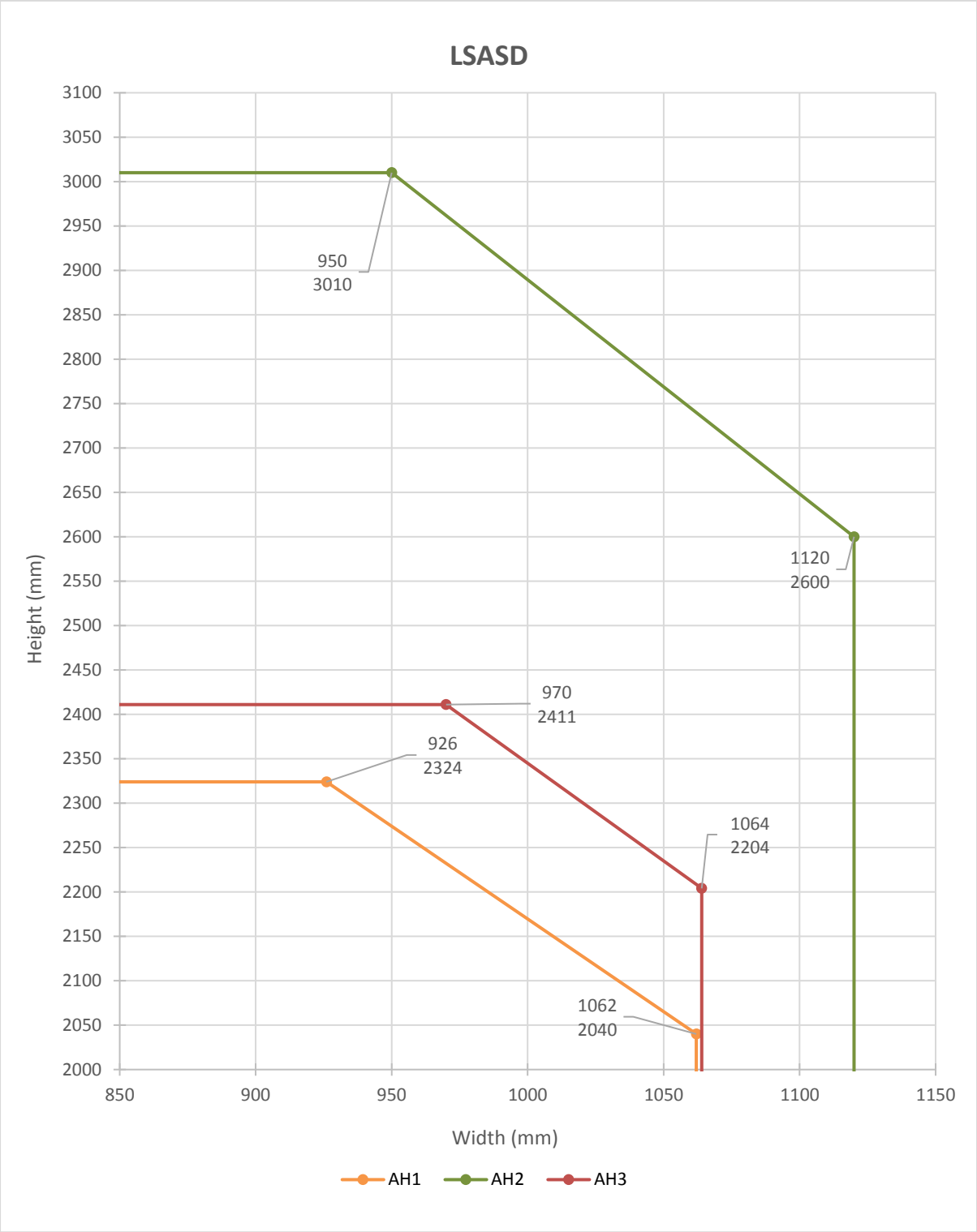
4.5.4.2 Explanation for following sections

The performance of a doorset in terms of configuration and size is dependent on the leaf type, perimeter intumescent used and frame type. These elements are not automatically interchangeable. Each envelope is linked to a specific perimeter intumescent which is given a unique reference and is based directly on test evidence.

The envelopes are presented as follows:

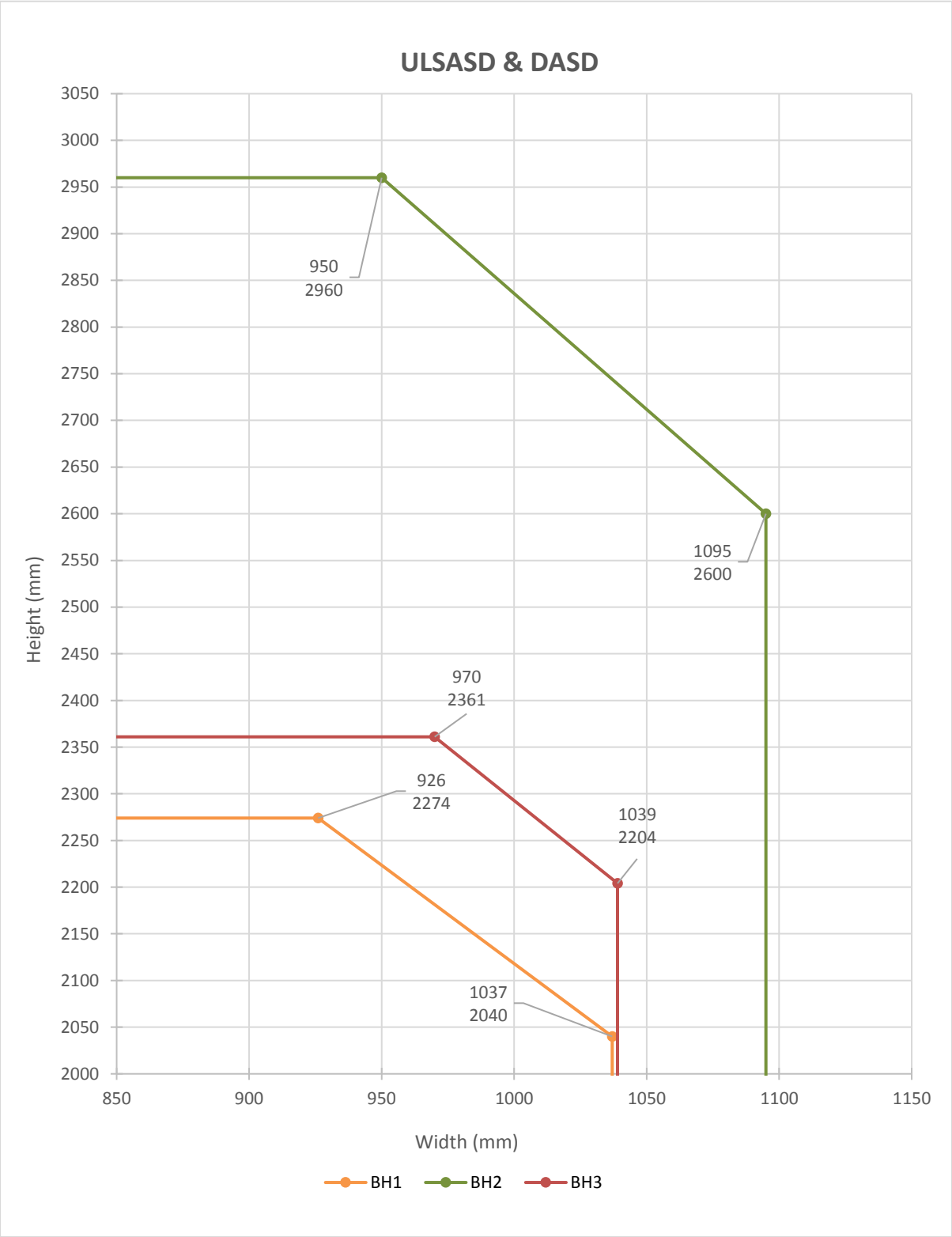
- for LSASD increasing in configuration complexity up to DADD
- for each configuration, each leaf type is considered separately.
- for each configuration and leaf type, each frame type is considered separately.
- for each configuration, leaf type, frame type and intumescent specification is considered separately, and a unique envelope of permitted leaf sizes is presented based on the configuration, leaf type, frame type and intumescent and the envelope is directly linked to a unique test.

4.5.5 LSASD Configuration: Leaf Sizes & Intumescent Specification



Intumescent Specification for LSASD Leaf 1 with Frame 1 and 2			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
AH1 (Chilt/XF11016)	Type617	Lorient Polyproducts	**Head & Jambs:** 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges.
	30141	Pyroplex	
AH2 (RF07055)	Type617	Lorient Polyproducts	**Head:** 1no 40 x 6. Fitted centrally in the frame reveals or leaf edges. **Jambs**: 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges.
AH3 (DMT-DO-50-1090 Door 3)	Pyrostrip 500PSA	Mann McGowan	**Head & Jambs:** 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges.

4.5.6 ULSASD & DASD Configurations: Leaf Sizes & Intumescent Specification

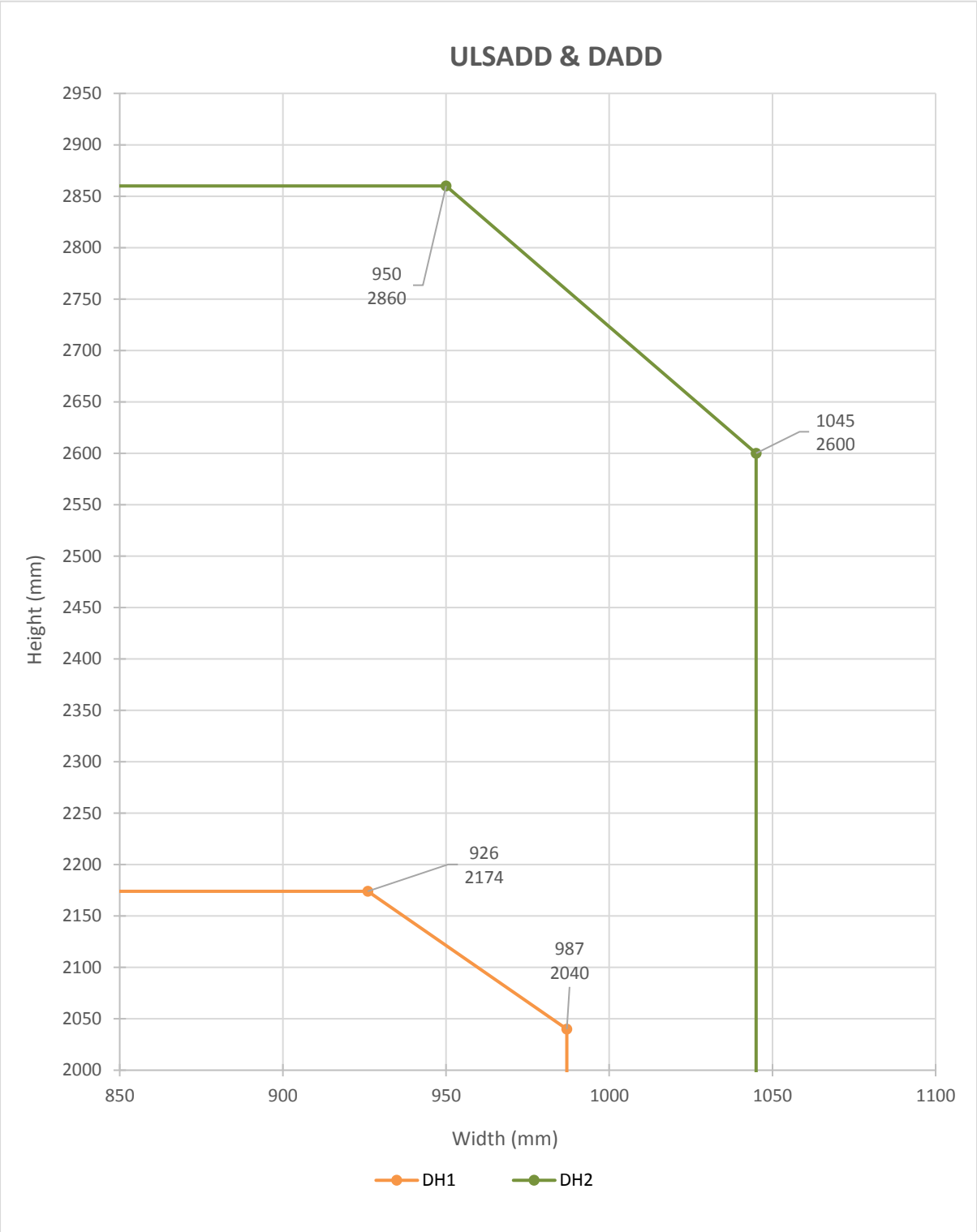


Intumescent Specification for ULSASD & DASD **Leaf 1 with Frame 1 and 2**			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
BH1 (Chilt/XF11016)	Type617	Lorient Polyproducts	**Head & Jambs:** 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges.
	30141	Pyroplex	
BH2 (RF07055)	Type617	Lorient Polyproducts	**Head:** 1no 40 x 6. Fitted centrally in the frame reveals or leaf edges. **Jambs**: 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges.
BH3 (DMT-DO-50-1090 Door 3)	Pyrostrip 500PSA	Mann McGowan	**Head & Jambs:** 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges.

4.5.7 LSADD Configuration: Leaf Sizes & Intumescent Specification

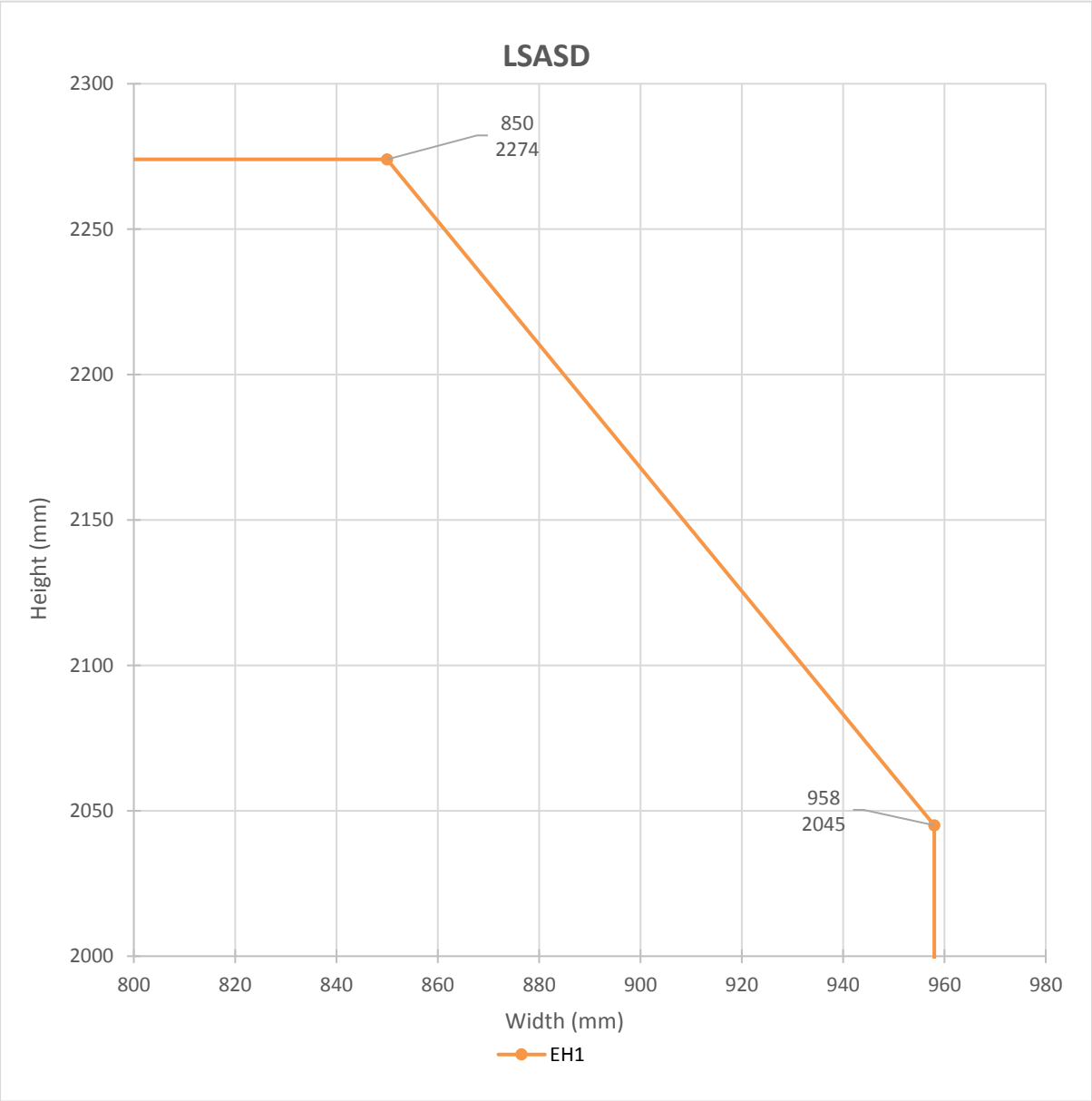
Intumescent Specification for LSADD Leaf 1 with Frame 1 and 2			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
CH1 (Chilt/XF11016)	Type617	Lorient Polyproducts	**Head & Jambs:** 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges. **Meeting Edges:** 2no 15 x 4. Fitted 5mm either side of the centreline in one leaf edge only
CH2 (RF07055)			**Head:** 1no 40 x 6. Fitted centrally in the frame reveals or leaf edges. **Jambs:** 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges. **Meeting Edges:** 2no 15 x 4. Fitted 5mm either side of the centreline in one leaf edge only

4.5.8 ULSADD & DADD Configuration: Leaf Sizes & Intumescent Specification



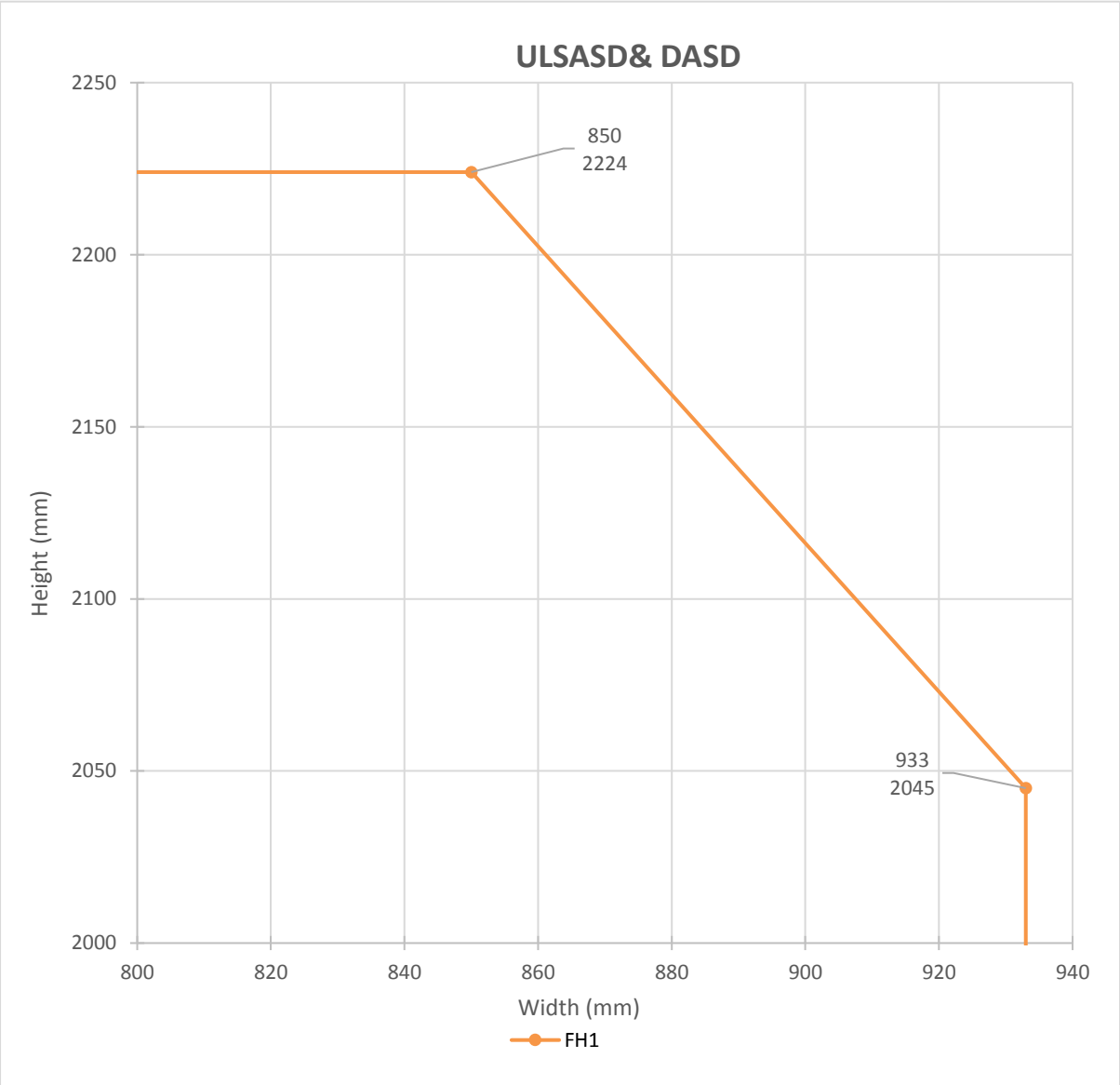
Intumescent Specification for ULSADD & DADD Leaf 1 with Frame 1 and 2			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
DH1 (Chilt/XF11016)	Type617	Lorient Polyproducts	**Head & Jambs:** 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges. **Meeting Edges:** 2no 15 x 4. Fitted 5mm either side of the centreline in one leaf edge only
DH2 (RF07055)			**Head:** 1no 40 x 6. Fitted centrally in the frame reveals or leaf edges. **Jambs:** 2no 15 x 4. Fitted 5mm either side of the centreline in the frame reveals or leaf edges. **Meeting Edges:** 2no 15 x 4. Fitted 5mm either side of the centreline in one leaf edge only

4.5.9 LSASD Configuration: Leaf Sizes & Intumescent Specification Lorient/Yeoman Shield PVC Encapsulation



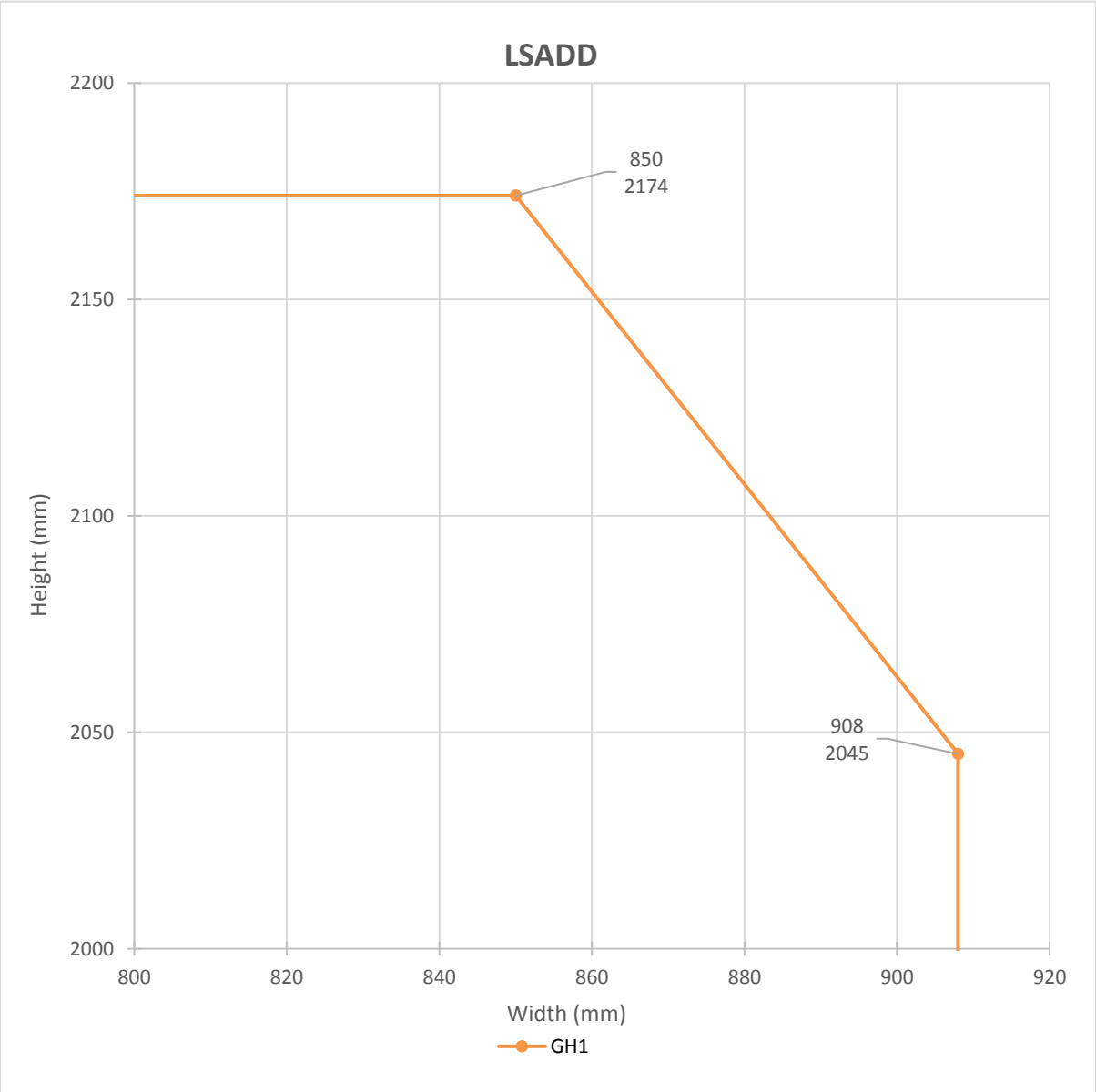
Intumescent Specification for LSASD Leaf 1 with Frame 1 and 2			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
EH1 (Chilt/RF07141 Revision B)	LP2004 & LP1504	Lorient Polyproducts Ltd	**Leaf Edges:** 1no 20x4 fitted centrally in frame reveal or leaf edges **Frame Head:** 2no fitted centrally in the frame reveal spaced 10mm apart

4.5.10 ULSASD & DASD Configuration: Leaf Sizes & Intumescent Specification Lorient/Yeoman Shield PVC Encapsulation



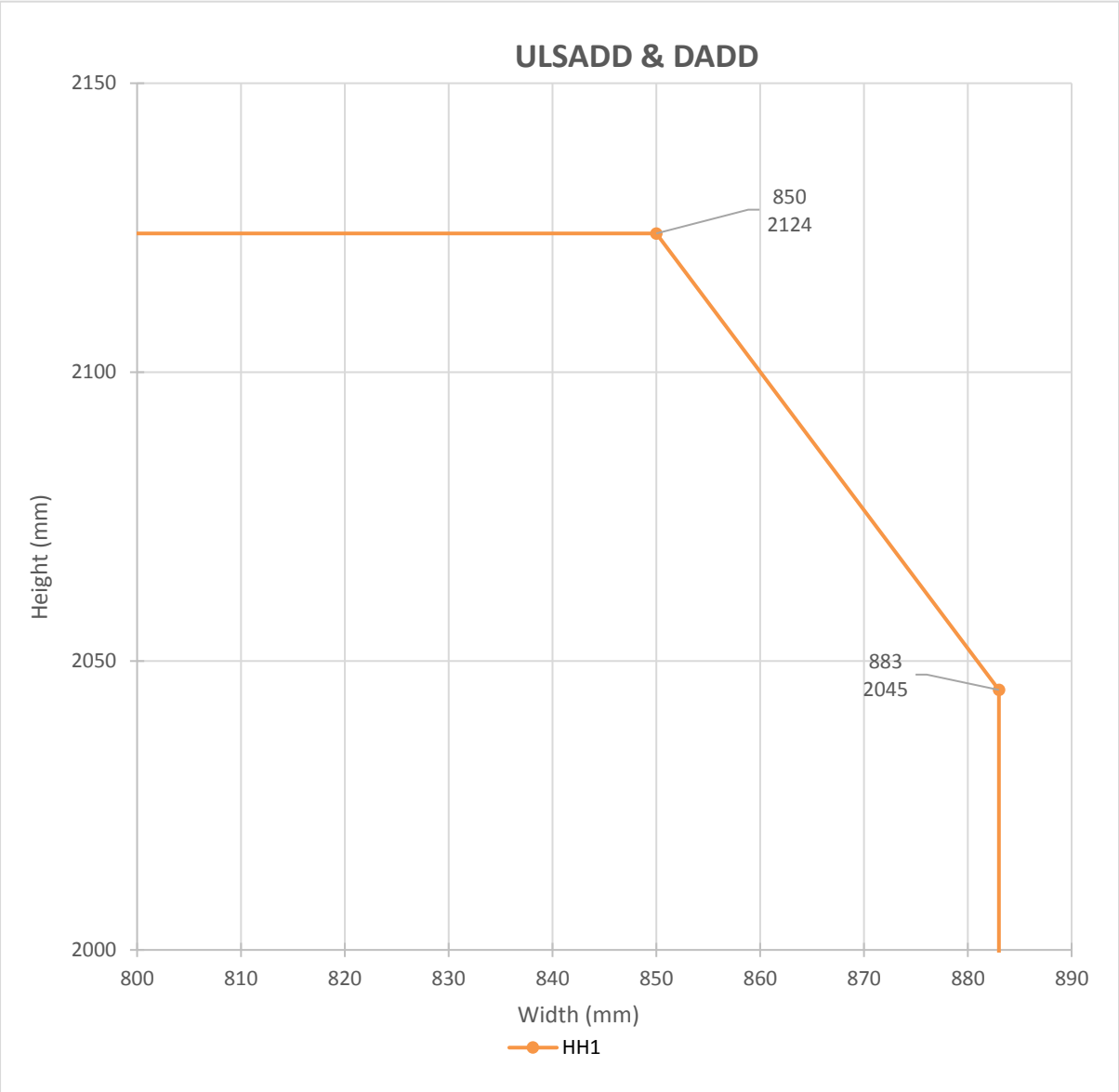
Intumescent Specification for ULSASD & DASD Leaf 1 with Frame 1 and 2			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
FH1 (Chilt/RF07141 Revision B)	LP2004 & LP1504	Lorient Polyproducts Ltd	**Leaf Edges:** 1no 20x4 fitted centrally in frame reveal or leaf edges **Frame Head:** 2no fitted centrally in the frame reveal spaced 10mm apart

4.5.11 LSADD Configuration: Leaf Sizes & Intumescent Specification Lorient/Yeoman Shield PVC Encapsulation



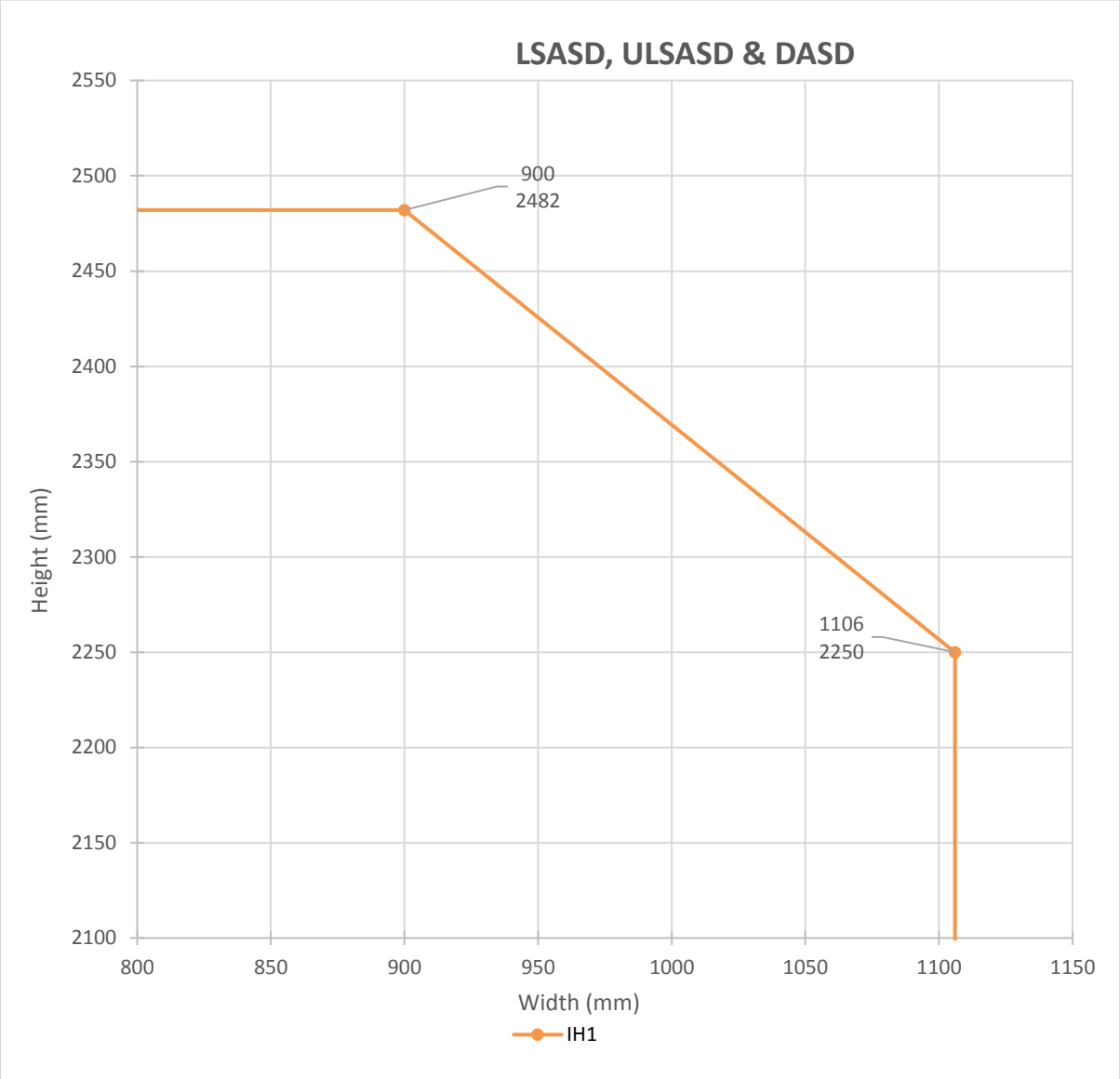
Intumescent Specification for LSADD Leaf 1 with Frame 1 and 2			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
GH1 (Chilt/RF07141 Revision B)	LP2004 & LP1504	Lorient Polyproducts Ltd	**Leaf & Meeting Edges:** 1no 20x4 fitted centrally in frame reveal or leaf edges **Frame Head:** 2no fitted centrally in the frame reveal spaced 10mm apart

4.5.12 ULSADD & DADD Configuration: Leaf Sizes & Intumescent Specification Lorient/Yeoman Shield PVC Encapsulation



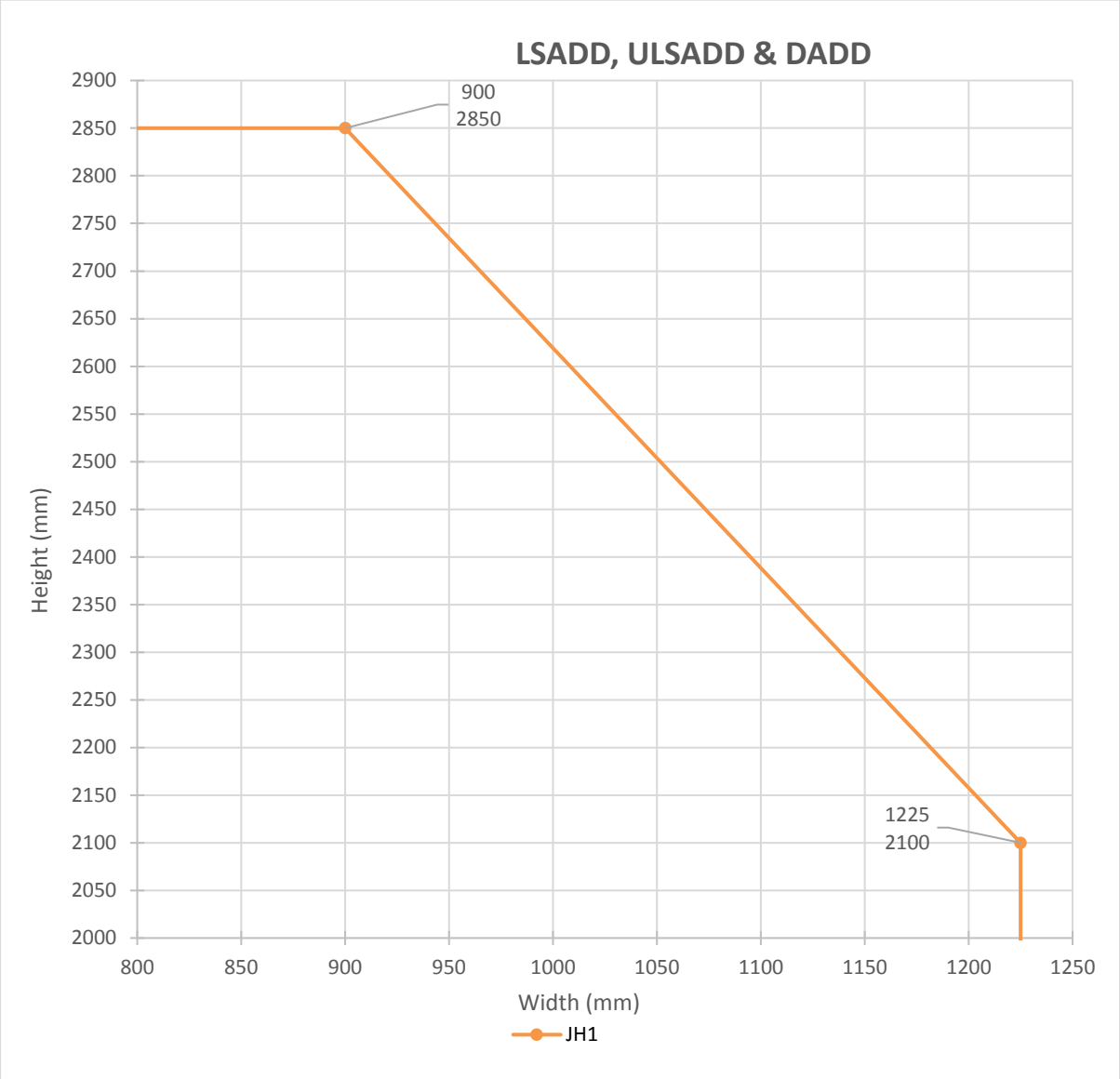
Intumescent Specification for ULSADD & DADD Leaf 1 with Frame 1 and 2			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
HH1 (Chilt/RF07141 Revision B)	LP2004 & LP1504	Lorient Polyproducts Ltd	**Leaf & Meeting Edges:** 1no 20x4 fitted centrally in frame reveal or leaf edges **Frame Head:** 2no fitted centrally in the frame reveal spaced 10mm apart

4.5.13 LSASD, ULSASD & DASD Configuration: Leaf Sizes & Intumescent Specification CS Group PVC Encapsulation



Intumescent Specification for LSASD, ULSASD & DASD Leaf 1 with Frame 1 and 2			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
IH1 (Chilt/A11129)	Type617 LP1504	Lorient Polyproducts Ltd	**Head:** 2no fitted centrally in the frame reveal or leaf edges spaced 10mm apart **Frame Jambs:** 2no fitted centrally in the frame reveal spaced 10mm apart

4.5.14 LSADD, ULSADD & DADD Configuration: Leaf Sizes & Intumescent Specification CS Group PVC Encapsulation



Intumescent Specification for LSADD, ULSADD & DADD Leaf 1 with Frame 1 and 2			
Intumescent Spec. Reference & (Test Reference)	**Make / Type**	**Manufacturer / Supplier**	**Location & Size** (mm)
JH1 (A11129)	Type617 LP1504	Lorient Polyproducts Ltd	**Head:** 2no fitted centrally in the frame reveal or leaf edges spaced 10mm apart **Frame Jambs:** 2no fitted centrally in the frame reveal spaced 10mm apart **Meeting Edges:** 1No fitted in both leaf edges

5 General Description of Leaf Construction

5.1 Leaf Core Construction (LAMINESSE FireSmoke 54mm)

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

The door leaf option detailed below is approved by this assessment.

- LAMINESSE FireSmoke 54mm – 6mm Particleboard facings

The LAMINESSE FireSmoke 54mm design with 6mm particleboard facing has been tested with a head rail insert, which is required for all design options contained in this assessment.

The requirements for the head rail insert are given below.

The top rail insert may be produced by the doorset converter or may be supplied by Moralt AG.

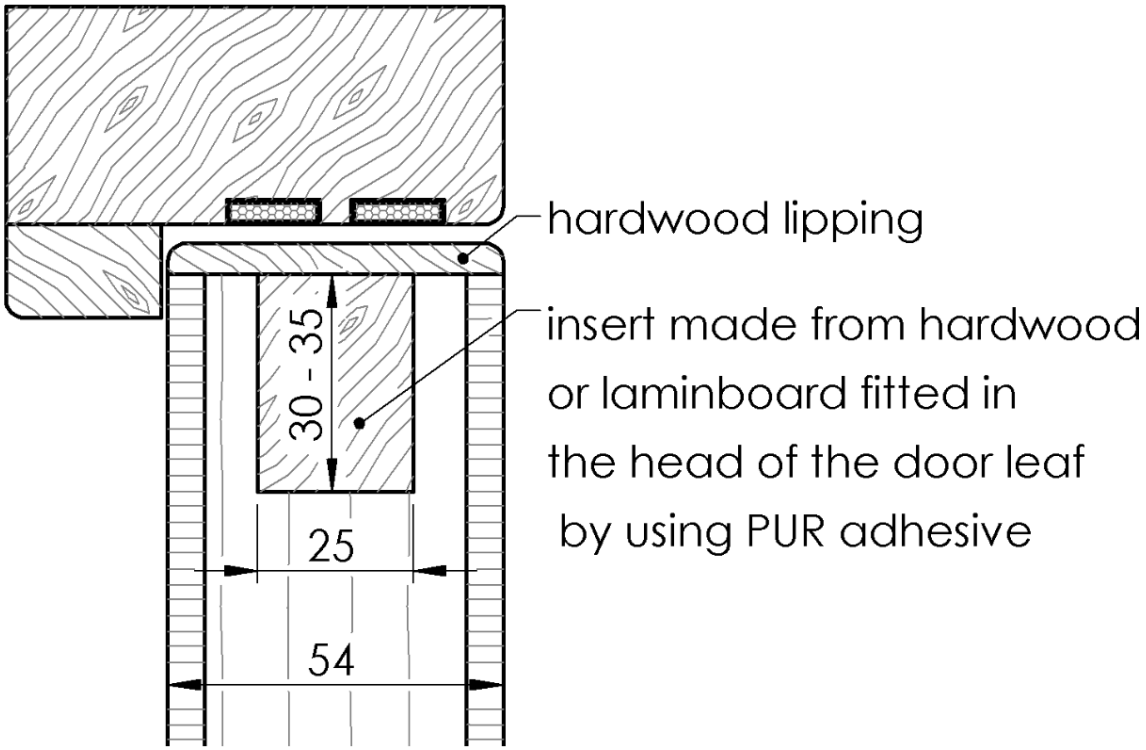


Fig 1 – Cross section through head of door leaf showing position of head rail insert

The insert is:

- Constructed using the laminboard as in the core of the door leaf, or may be hardwood of minimum density 640kg/m^3 (as tested in 20220908-04512 and 20220426-151912A)
- located centrally in the leaf.
- fitted tightly into the groove.
- When constructed using the laminboard, shall be fitted with the lamels perpendicular to the lamels in the door leaf.

See below for illustration and required dimensions.

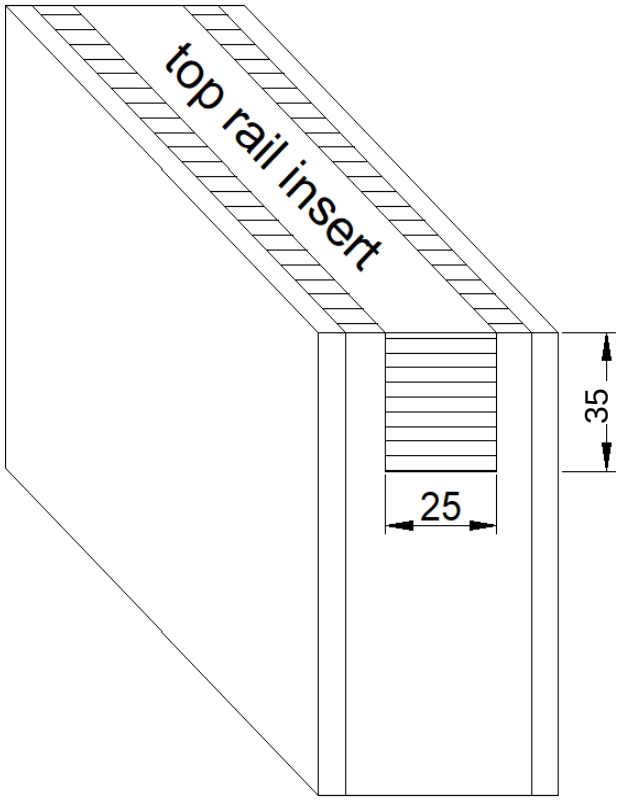


Fig 2 – Isometric cross section of the head of the leaf with head rail insert in position (required lipping not shown)

The head rail insert must remain in position at the top of the door leaf. The head rail insert decribed has been increased by 5mm in height from that originally tested (increased from 30mm to 35mm (h), to allow for the head of the leaf to be reduced by a maximum of 5mm prior to fitting the lipping.

A maximum of 5mm reduction is permitted at the head, as this will result in a head rail of dimensions no smaller than that orginally tested.

Leaf size adjustment is not restricted at the vertical edges and from the bottom of the door leaf prior to fitting the lippings as required (see section 5.2).

5.2 Leaf Size Adjustment During Manufacture

Door leaves may be altered as follows prior to the machining for hardware.

Note: PVC edge protectors and encapsulation adjustments are not permitted and must remain unaltered**.**

Element	Reduction
Leaf	For the purpose of manufacturing doorsets containing smaller door leaves, the door leaf may be reduced in height or width without restriction from the vertical edges and the bottom of the door leaf. The head rail insert must remain in position but can be reduced by a maximum of 5mm prior to application of lippings (see section 5.1 for details)
Timber Lipping	The timber lipping thickness can be reduced after it has been glued in place, providing it is not reduced below the minimum stated in section 5.3

5.3 Timber Lipping

The testing documented in section 3 has generally been undertaken using 5 - 13mm thick lippings applied to edges using species at varying densities. A number of different adhesives have also been used to seal the lippings.

On the above basis, LAMINESSE FireSmoke 54mm door blanks must be lipped with the following specification, for all leaf types and solid overpanels.

Material	Size (mm)	Min Density (kg/m^3)
Hardwood (not Beech *fagus species*)	Flat = 5 – 18 thick	640
	Rounded = 15 – 20 thick with a radius matching the distance between leaf edge and floor pivot (see section 7)	
	Rebated = Not permitted	

Notes:

1. All lippings are to be the same thickness as the door blank.
2. All door leaves and overpanels must be lipped on the vertical and top edges and may be lipped on the bottom edge if required.
3. Lippings can be bonded with UF, PF or PUR. These may be hand applied or may be applied using an edgebander. With either method it must be ensured that sufficient glue is applied to across the entire surface area between the 2No substrates being adhered to guarantee a robust bond. Other manufacturers guidance should be followed, for either installation application.
4. For flat lippings it is permitted to apply maximum 8mm radius to the corners of the lipping at vertical edges to create a maximum 2mm edge profiling.
5. For rounded lippings a minimum of 6 to 8mm thickness of lipping shall be measured at the face of the door leaf where the lipping is its minimum thickness.

5.4 Decorative & Protective Facings – all Leaf Options

Relatively thin leaf facing materials are deemed to be decorative and their application is not considered to be of detriment to the overall stability or performance of the doorset design. In fact, when applied as an additional component on top of the minimum facing material required by the door blank, they are likely to provide a small enhancement in performance as an additional barrier to fire spread, although, this is likely to be negligible.

The following additional facing materials are therefore permitted to the leaf for this door design since they would have limited influence under fire resistance test conditions.

Decorative & Protective Facing Specification	
Facing Material	Maximum Permitted Thickness (mm)
Paint[6]	0.4
Timber veneers[4]	2
Plastic or resin laminates (HPL)	2
PVC[5]	2
Cellulosic and non-metallic foils[4]	0.4

Notes:

1. Metallic facings are not permitted except for push plates and kick plates.
2. The door leaf thickness may be reduced on both sides by a maximum of 0.5mm for calibration purposes in order to accommodate the chosen finish. The minimum overall leaf thickness must remain at 54mm after finishes have been applied.
3. For all options, materials must not conceal intumescent strips.
4. Materials may over sail lippings but must not return around leaf edges.
5. Materials may over sail lippings but must not return around leaf edges, except where detailed within this report using specific products.
6. Intumescent paints are not permitted.

Decorative finishes listed above may be painted within the limits for paint finish, above.

5.5 CS Group PVC Edge Protectors & Post-Formed Acrovyn Facings

5.5.1 CS Group Edge Protectors

The Moralt FireSmoke 54mm design has been assessed for use with CS Group edge protectors as detailed below. CS Group edge protectors are supplied pre-formed with the approved intumescent materials included. 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 section 4.5. CS Group must be contacted for precise installation and fixing details (www.c-sgroup.co.uk).

5.5.2 Post-Formed CS Group Acrovyn

It is possible to encapsulate the Moralt FireSmoke 54mm design by post-forming the leaf in CS Group Acrovyn, based on the supporting test evidence in 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 section 5.3). 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 section 5.3). 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 details as specified in sections 4.5 must be replicated.
6. CS Group Acrovyn must be bonded to the leaf using 3M Scotch-Grip cement 10 contact adhesive.
7. See datasheets in sections 4.5 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 solid timber door frames (i.e. frame type 1) only, meeting the specification given in section 7.

5.6 Yeoman Shield/Lorient Polyproducts Ltd. PVC door edge protectors

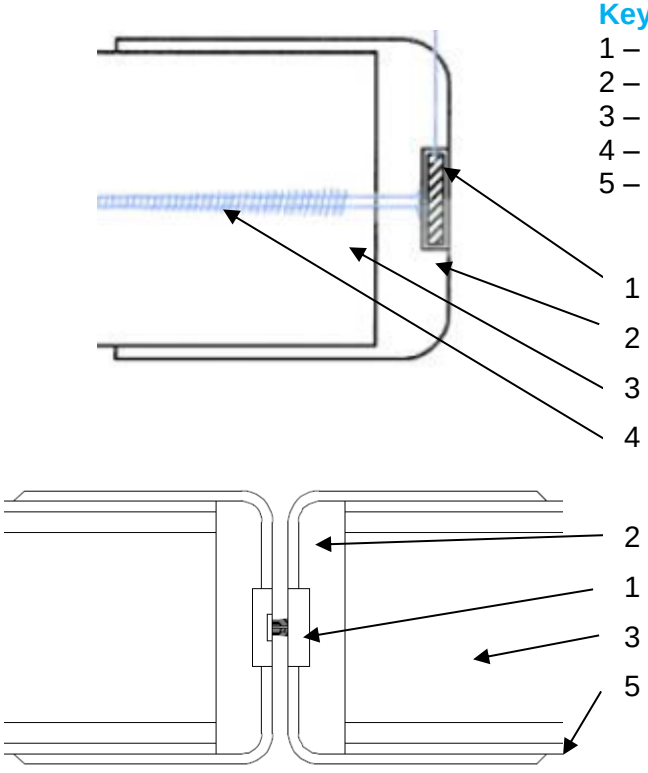
The Moralt FireSmoke 54mm design has been assessed for use with Yeoman Shield/Lorient Polyproducts Ltd. PVC door edge protectors as detailed below. Yeoman Shield/Lorient Polyproducts Ltd. PVC door edge protectors are supplied pre-formed with the approved intumescent material. The Yeoman Shield/Lorient Polyproducts Ltd. PVC door 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 section 4.5. Yeoman Shield/Lorient Polyproducts Ltd. must be contacted for precise installation and fixing details.

5.6.1 Installation Requirements

The Yeoman Shield/Lorient PVCu door edge protectors must be constructed and installed to the specification tested, as depicted below. The test evidence summarised in section 3 justifies the use of Yeoman Shield/Lorient Polyproducts Ltd. PVC edge protectors when fitted to single and double doorsets. The following requirements must also be adhered to when installing the edge protectors.

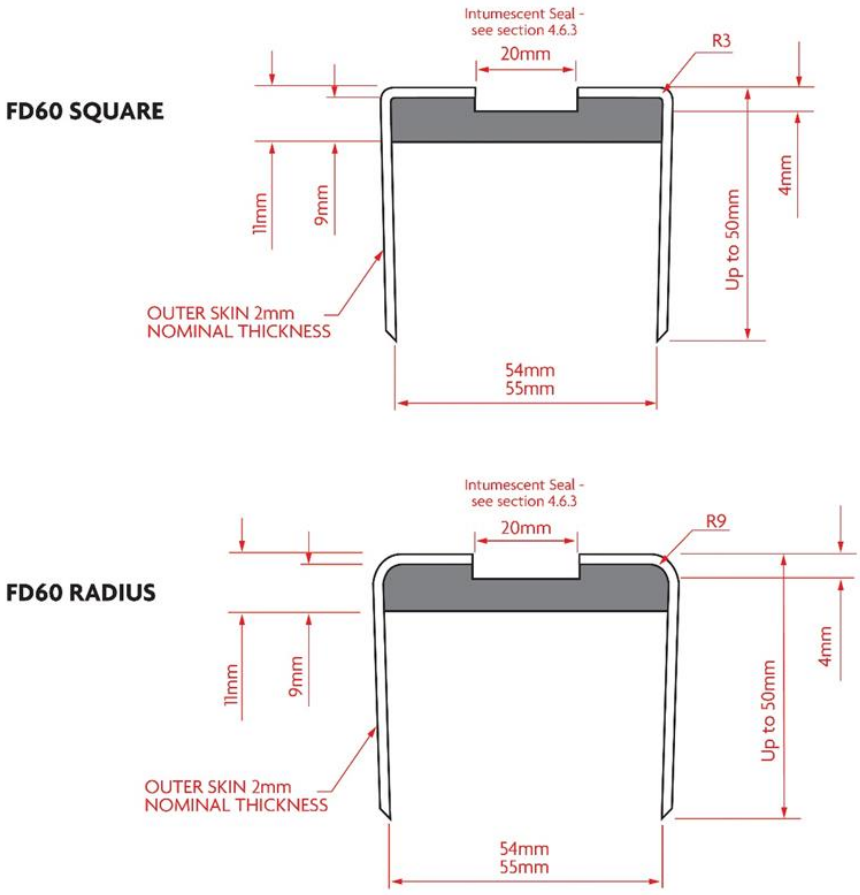
- Yeoman Shield/Lorient PVCu door edge protectors may only be fitted to the vertical edges of doorsets. It is permitted to fit the edge protectors to the closing edge and/or hanging edge of single leaf doorsets. It is permitted to fit the edge protectors to one or both hanging edges of double leaf doorsets.
- Where edge protectors are fitted to the meeting edges of a double doorset, they must be fitted to both meeting edges.
- The intumescent specification permitted for the maximum leaf size for each fire resistance performance, frame option and configuration are given in section 4.5.
- The PVC protectors may be used on latched or unlatched, single acting, double and single leaf doorsets.
- The edge protector must be constructed from 2mm thick PVC outer shell formed around a 9mm thick toughened PVC insert, which is wrapped around the door leaf edge via 50mm long legs. If the door leaf is encapsulated, the edge protector must travel over the PVC leaf facings as depicted in the drawing below.
- The edge protectors must be glued into position using PU adhesive for 60 minutes integrity fire resistance performance. All edge protectors must be additionally fixed using 50mm long screws at a maximum 200mm centres. Double doorset configurations incorporating flush bolts must include a screw installed a maximum 50mm from the flush bolt and at the maximum centres given above. See drawing below for fixing location.

Key:
1 – Perimeter intumescent seal.
2 – Edge protector
3 – Door leaf
4 – Fixing
5 – PVC leaf facing (encapsulated door)



5.6.2 Edge Protector Detail Drawings

5.6.2.1 Typical 60 minute Sections



5.6.3 Yeoman Shield/Lorient Polyproducts Ltd. PVC Facings

It is possible to add Harrison Thompson Yeoman Shield PVC facings to the LAMINESSE FireSmoke 54mm designs by gluing to the leaf faces based on the supporting test evidence in CFR1101041 Rev 1, and the following specification.

1. Harrison Thompson Yeoman Shield PVC facings may be applied to the leaf faces only, not permitted to return around leaf edges.
2. The edge protectors detailed in section 5.6.2.1 may also be applied and are permitted oversail the PVC facings.
3. The door must be lipped at all edges with hardwood with maximum 8mm thickness bonded to the door using Dorus RS G270/3 adhesive. PVC lippings must be bonded directly to the door core (not onto a separate lipping)
4. Rebated timber lippings are not permitted.
5. The intumescent detail as specified in the relevant (Lorient/Yeoman Shield headed) datasheets contained in section 4.5 of this assessment must be replicated.
6. The Harrison Thompson Yeoman Shield PVC sheet must be bonded to the leaf and vertical lippings using Everbuild Smart Tack UN3161 contact adhesive, as tested.
7. See relevant (Lorient/Yeoman Shield headed) datasheets in section 4.5 of this assessment for maximum permitted leaf sizes.
8. 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.
9. It is permitted to hang leaves fitted with Lorient/Yeoman Shield headed in frame type 1 or 2 door frames meeting the specification given in section 7.

5.7 Moralt acoustic clad on panel

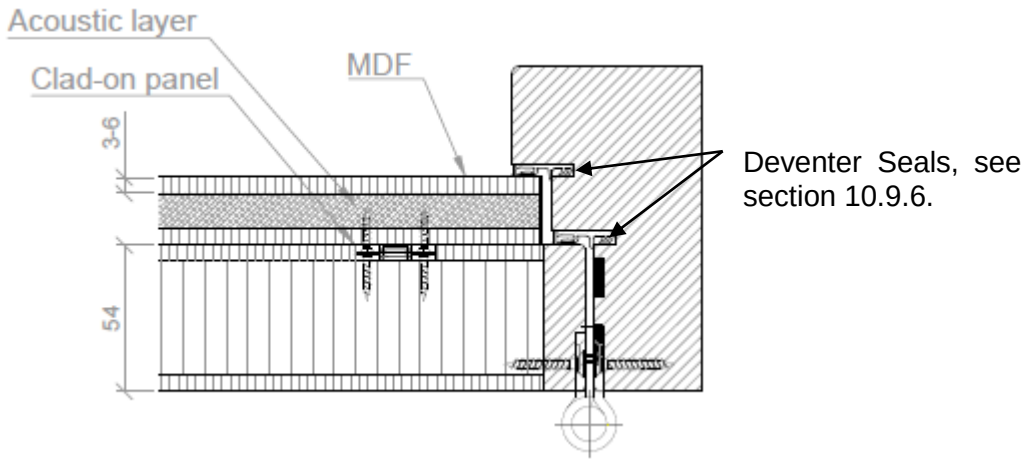
The Moralt acoustic clad on panel has been included into the LAMINESSE FireSmoke 54mm thick designs to improve acoustic performance. See below for the details of the panel and fixing. The panel is held in position by a minimum of 6 clips (note only 1 shown on the figure). The following limitations apply:

- 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 morticed 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 must be located on a minimum of 6 fixing points.
- Clips secured by screws 3.5 by 16mm long or 3.5 by 20mm long
- It is not permitted to apply the Moralt acoustic clad on panel in addition to encapsulating the leaf as in section 5.5 above, or to apply the panel and then encapsulate the complete assembly.

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

5.7.1 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 in section 7.1 or 7.2 must be complied with.



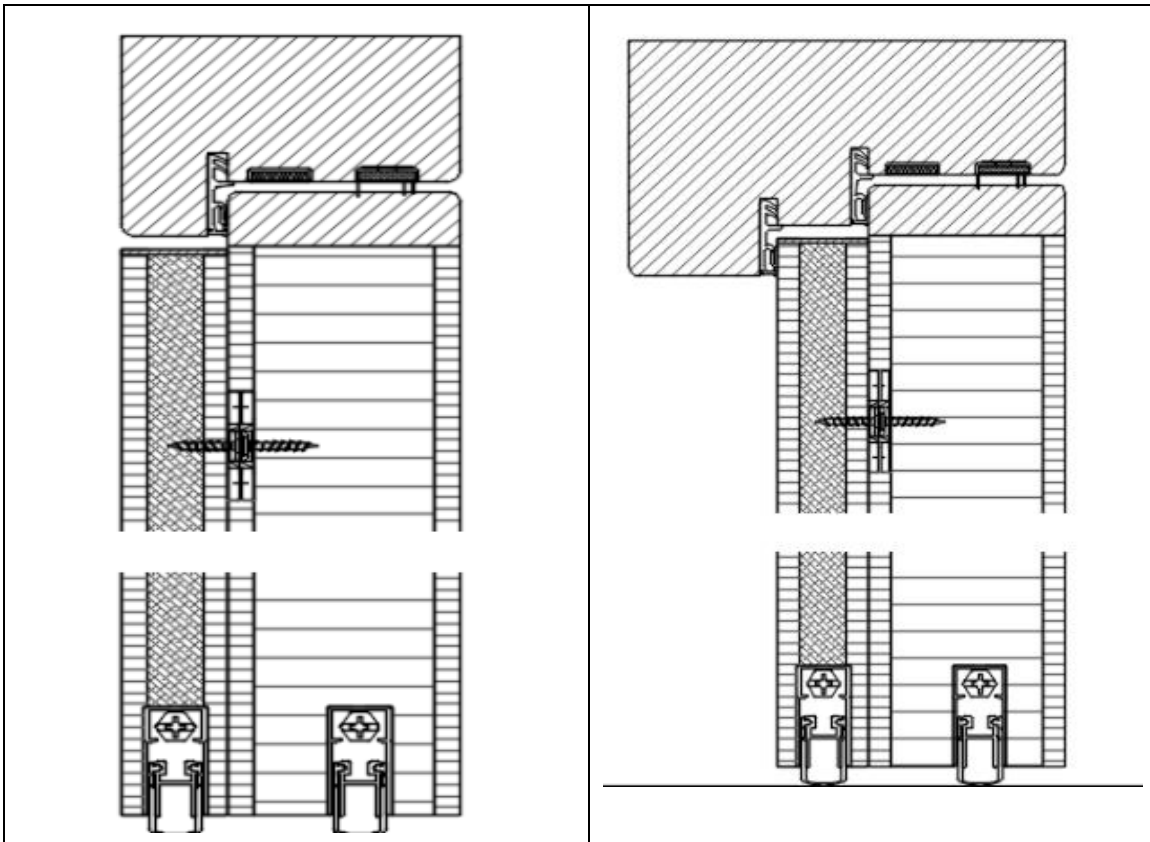


Fig 11: Vertical Sections Showing Single and Double rebate details

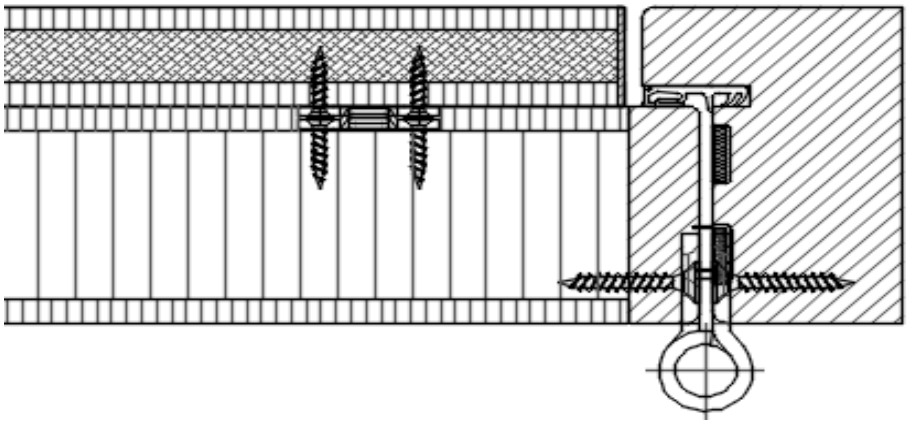


Fig 12: Horizontal Section Showing Single Rebate Details

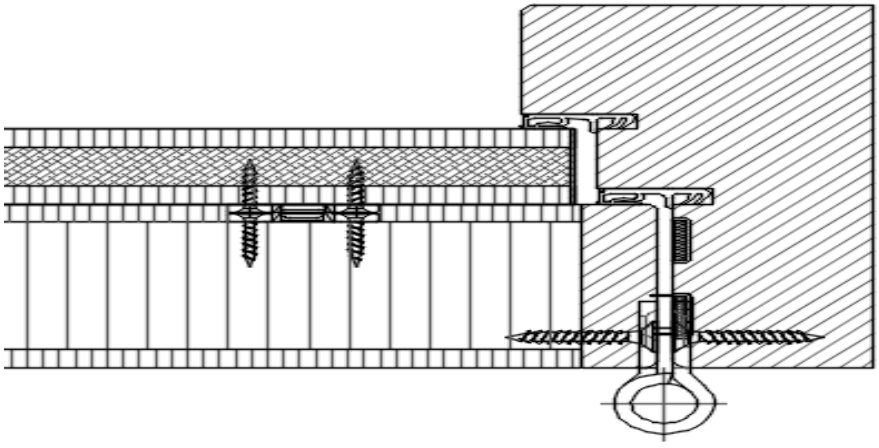


Fig 13: Horizontal Section Showing Double Rebate Details

5.8 Decorative Planted on Timber Mouldings – all Leaf Options

Decorative mouldings can be applied to the FireSmoke 54mm door blank providing the following criteria is adhered to:

The mouldings:

1. Are surface applied to the door.
2. Are no higher than 30mm i.e. proud of the door.
3. Are no wider than 50mm.
4. Cover no more than 20% of the door leaf area.
5. Are no closer than 80mm to the door leaf edge.
6. Are bonded into position with no mechanical fixings.
7. Are bonded using any glue which is suitable for bonding the lipping of the door.
8. May not be applied in combination with the acoustic panels in section 5.6.

5.9 Feature Grooves

Decorative mouldings were included within test reference F14256 without being of detriment to the overall performance of the doorset. The doorset they were included within achieved 64 minutes integrity performance.

Both sides of the door leaves may be grooved to the following specification.

Feature grooves cannot be located within 20mm of any mortice for hardware (i.e. any item which requires material to be removed from the door)

Grooves may coincide with the top and bottom of glazed apertures if desired, the use of square or flush beads is not permitted in this instance.

The following table details the tested grooving arrangement and the associated limitations.

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.

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)	2206mm x 956mm	

5.10 Astragal

The inclusion of timber astragals is permitted providing they meet the following specification:

- The astragal shall consist of the same material as the door frame with at least the same or greater density.
- The astragal shall be mechanically fixed using steel screws at no greater than 250mm centres, the screws shall penetrate into the substrate by at least 15mm and no greater than ½ the thickness of the substrate.
- The astragal shall measure 50mm wide x 18mm thick and shall be positioned centrally over the junction.

Other materials or dimensions of astragals are not permitted.

It has been considered possible to include the above specified astragal based on the fact that the effective rebate of the doorset design will remain unchanged. The addition of the astragal element will provide further protection at the meeting edge gaps increasing the time in which failure modes may develop.

Astragals are permitted in the following designs:

- Optionally permitted at meeting edges of double doors.

Astragals may only be fitted to one side of any single doorset design.

When fitted to double doors, a door selector as defined within section 10.9.4 shall be fitted to the doorset to ensure functionality.

6 Glazing within the Leaf

6.1 General

The testing conducted on the LAMINESSE FireSmoke 54mm door design has demonstrated that they are capable of tolerating glazed apertures, whilst providing a margin of over performance. For example, test reference XF11016 included a glazed aperture 1210mm high x 410mm wide fitted with 7mm thick Pyroshield 2 glass.

Glazing is therefore acceptable within the following parameters:

- The maximum total assessed aperture area for any individual door leaf is 0.62m².
- Any single aperture may not be greater than 0.62m².
- Maximum glass thickness permitted is 16mm, unless thicker types have been directly tested in the LAMINESSE FireSmoke 54mm door design.
- Minimum glass thickness may not be reduced from that tested.
- Multiple apertures are not permitted.
- Multipane vision panels must be installed as tested and detailed in section 6.4 below.
- Apertures must not be less than 100mm from top and side edges and 500mm from the bottom edge.
- Aperture shape must be rectilinear unless alternative shape has been proven by test.
- Apertures cannot be rotated (e.g. a square to be rotated to create a diamond effect).

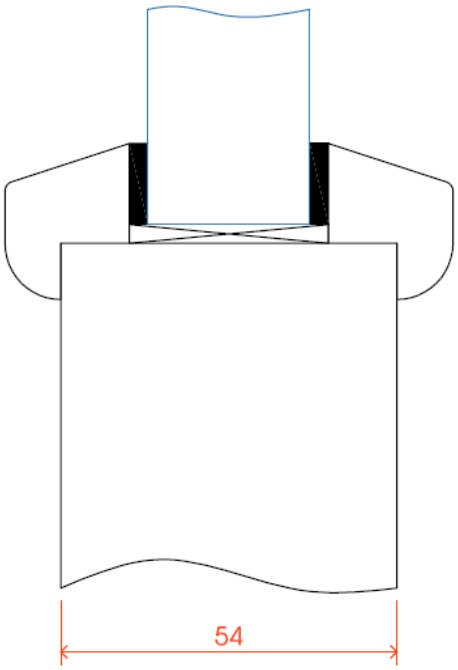
6.2 Certifire Glass and Glazing System Options

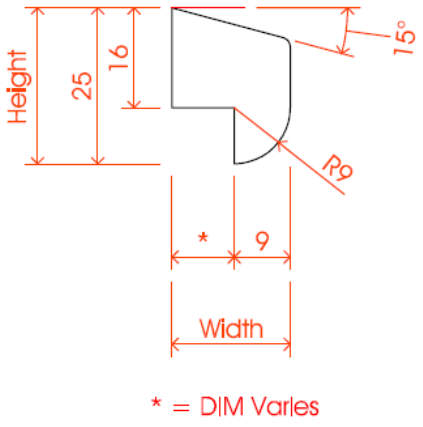
Alternative glass and glazing systems to those directly tested which have a valid Certifire certificate may be used, subject to the following.

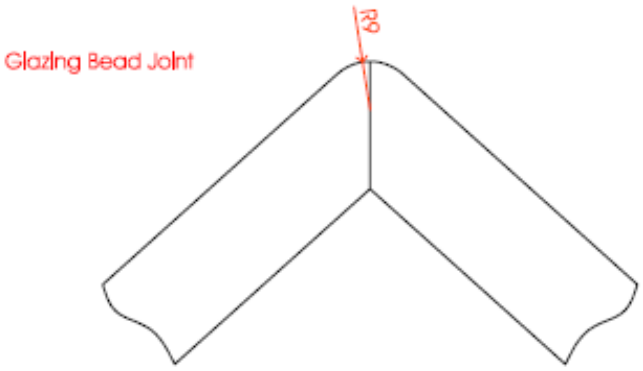
- The proposed glass and/or glazing system must be Certifire approved for use at the appropriate fire resistance required from the LAMINESSE FireSmoke 54mm door design on 54mm thick timber door leaves.
- Parameters in section 6.1 above must take precedence over those in the supporting Certifire certificate, i.e. the glazed area above may not be increased on the basis of the area permitted within the Certifire certificate. If the area in the proposed Certifire certificate is smaller than that above, the smaller dimension will take precedence.

6.3 Anti-Ligature Glazing Beads

Where timber glazing beads are utilised with single pane glazing, providing the glass edge coverage is maintained as specified for the particular glass and glazing application, it is permitted to fit anti-ligature glazing beads with the profile shown in the drawings below. To ensure the correct glass edge coverage, the height of the bead may need adjusting to meet the requirements of the tested or assessed glazing system (see note 1. below).







Notes:

1. The height of the bead to the glass (shown as 16mm above) must correspond with the tested and assessed bead height for the in question design. This is particularly important for toughened glass types where edge cover may be critical for performance and must therefore remain as tested.
2. The depth of the bead, excluding the 9 x 9 bolection, will vary, depending on the thickness of the glass or glazed unit and the glazing system.

6.4 Hygeno Privacy Vision Panels

6.4.1 General

Based on the testing conducted in 20220908-004512 Revision B and 20220803-001609 Revision A summarised in section 3 of this report, Hygeno privacy vision panels are permitted for use within the Moralt Laminesse Firesmoke 54 leaf design.

The test specimen B in 20220908-004512 Revision B successfully incorporated the Hygeno unit with timber beads and the Pyroswiss glass oriented to the exposed face of the test specimen and therefore this FoA report only supports the use of the Hygeno unit with timber beads when the fire risk side can be identified and the Pyroswiss glass is oriented to the fire risk face.

The testing conducted in 20220803-001609 Revision A has demonstrated that the Hygeno unit may be installed with the Pyroswiss glass oriented in either direction with respect to the fire risk side when installed using steel beads. Integrity failure was recorded at the head of the door leaf containing the glazed aperture in both specimens, however no integrity failures were recorded at the glazing installation prior to termination of the test at 63 minutes.

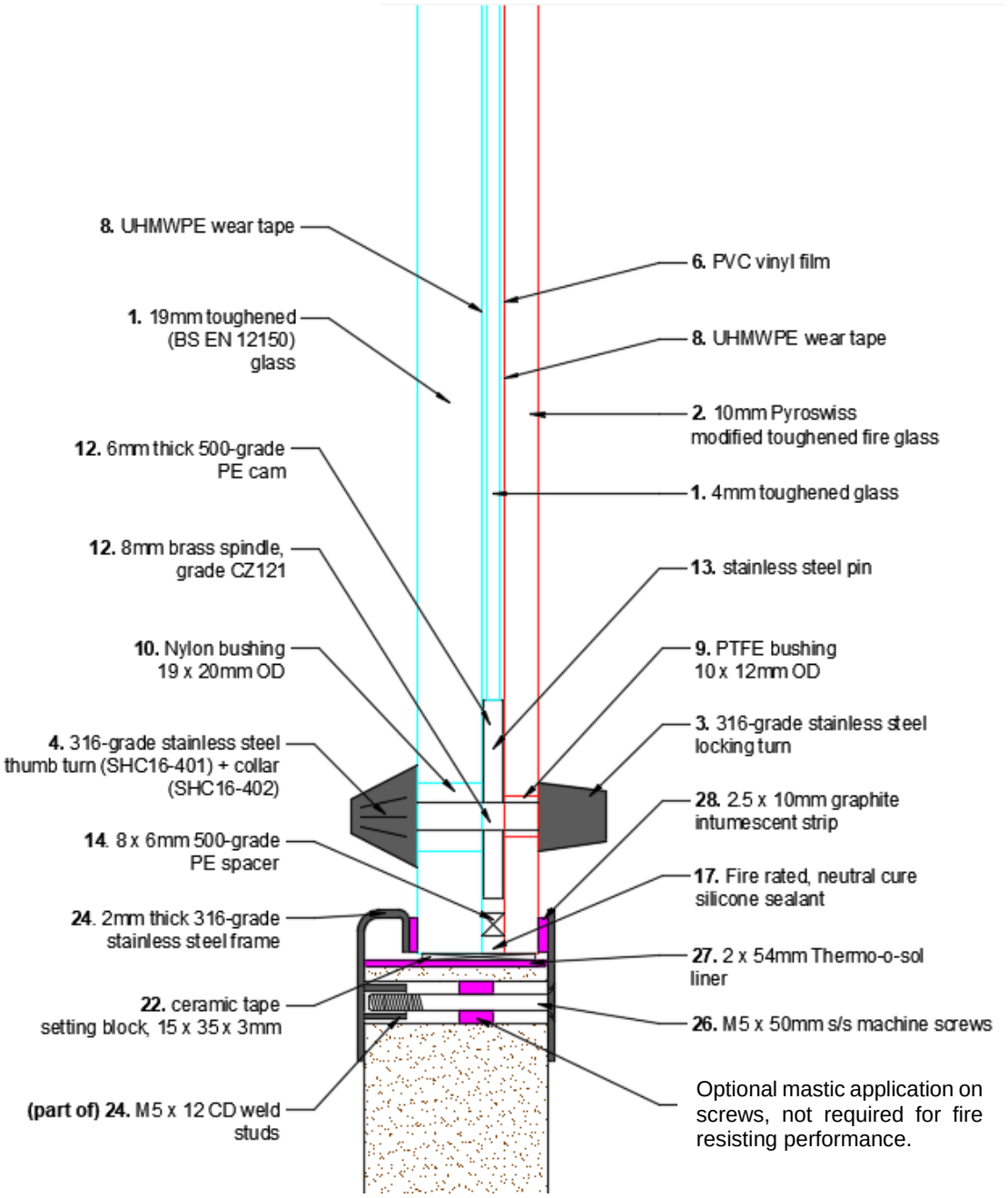
Based on the performance obtained in the referenced tests, assessment is made that the tested Hygeno design with steel or timber glazing beads may be utilised with double glazed units to a maximum height of 800mm and to a maximum width 404mm, but with a maximum area of 0.25m^2, allowing specified glazed unit sizes of 800mm x 250mm and 404mm x 404mm. Apertures for the sizes specified above must meet the manufacturer's tested expansion and glazing system requirements.

Glazed openings must not be less than 200mm from any door edge. Multiple apertures are not permitted.

See sections 6.4.2 and 6.4.3 for diagrams showing the tested and assessed details of the Hygeno unit.

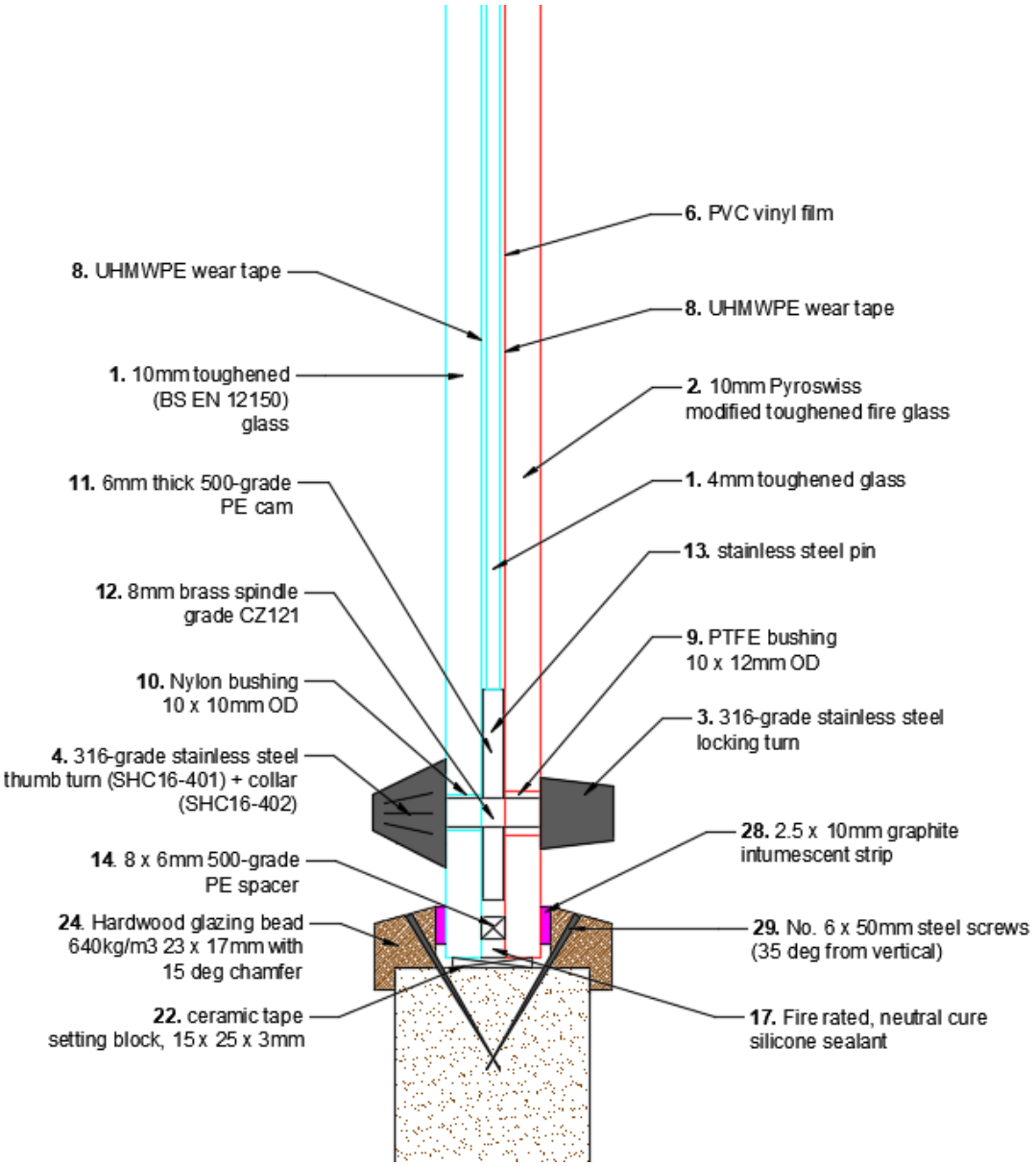
6.4.2 Hygeno Vision Panel with steel beads

The Hygeno privacy vision panel fitted with steel beads is supplied as a complete unit and must be constructed as tested and shown in the diagram below.



6.4.3 Hygeno Vision Panel with timber beads

The Hygeno privacy vision panel fitted with timber beads is supplied as a complete unit and must be constructed as tested and shown in the diagram below, the Pyroswiss glass must be oriented tot eh exposed face.



6.5 Glazing Pins for Glazing Within Leaf

The following pin specification is permitted and has been considered suitable for applications requiring a pin fixing to glazing beads:

Option 1 – Round, Oval & Rectangular Pins

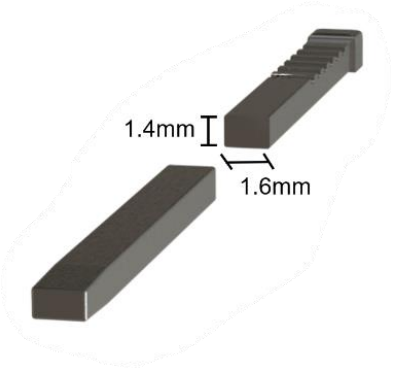
The following dimension of pin has been approved for round, oval and rectangular shaped pins which are hand applied:

- Minimum Standard Wire Gauge (SWG) 16.
- Minimum cross section area of 2.03mm^2.
- Minimum linear dimension of 1.6mm in any direction, see figure below. The maximum pin diameter or any linear dimensions may be no greater than 2.0mm.

Option 2 – Gun (Pneumatically) Fired Rectangular Pins

The following dimension of rectangular pin has been deemed suitable for gun (pneumatically) fired applications.

- Minimum Standard Wire Gauge (SWG) 16.
- Minimum cross section area of 2.24mm^2.
- Minimum linear dimensions as shown in the figure.
- The 1.6mm dimension is predominately oriented perpendicular to the glass, where possible.
- The maximum pin diameter or any linear dimensions may be no greater than 2.0mm.



Pins with dimensions less than those stated above are not covered by this assessment.

7 Door Frame Construction

The door frames listed below are the minimum size and density which have been successfully tested and assessed by this report.

7.1 Details for Frame 1

Frame type 1 must be constructed to meet the following specification for single and double acting frames, where applicable.

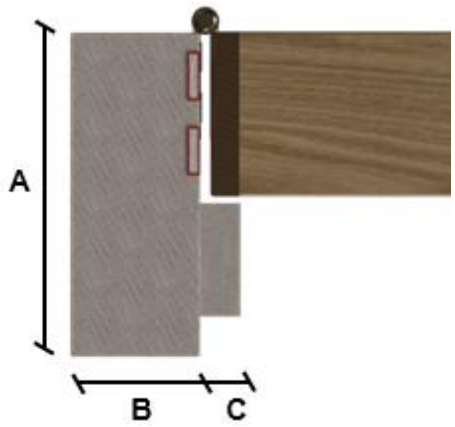
Frame type	Material	Minimum section size (mm)	Minimum density (kg/m^3)
1	Hardwood:	Frame: 70 (d) x 32 (t) (excluding stop) Stop: 12 (h) (integral or planted on)	640

Notes:

Minimum section size is subject to size of hardware and the use of transomed overpanel (see frame details below).

7.1.1 Standard frame detail

The diagram below shows detail of the standard frame construction. Minimum section is permitted in two sizes subject to hardware size and the use of transom overpanel. Any radius to the lipping must comply with section 5.3.



A: Frame depth = 70mm minimum

B: Frame thickness = 32mm minimum

C: Stop height = 12mm minimum

Minimum section size when using a transom overpanel:

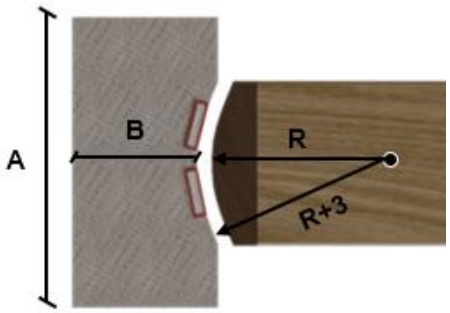
A: Frame depth = 70mm minimum

B: Frame thickness = 44mm minimum

C: Stop height = 12mm minimum

7.1.2 Scalloped frame detail

The diagram below shows detail of the scalloped frame construction hanging edge only. When using scalloped frames for double acting doorsets, the groove for the specified intumescent strips must be as shown below and to the correct depth.



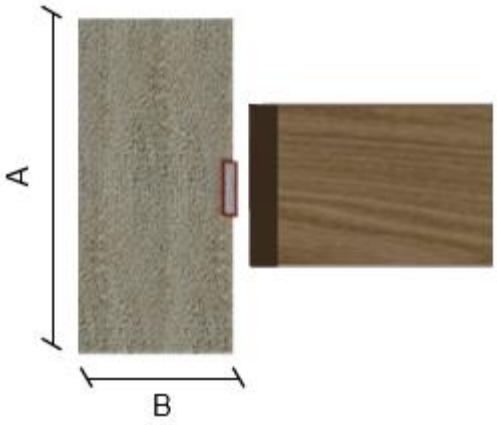
A: Frame depth = 70mm minimum

B: Frame thickness = 32mm minimum

R: Radius from floor spring or pivot = 8mm maximum to create a maximum 2mm edge profiling

7.1.3 Square frame detail for double acting doorsets

The diagram below shows detail of the square frame construction for the closing edge of a double acting doorset. Where utilising square frames for double acting doorsets, any radius to the lipping must comply with section 5.3.



A: Frame depth = 70mm minimum

B: Frame thickness = 32mm minimum

7.2 Details for Frame 2

Frame type 2 must be constructed to meet the following specification for single and double acting frames, where applicable.

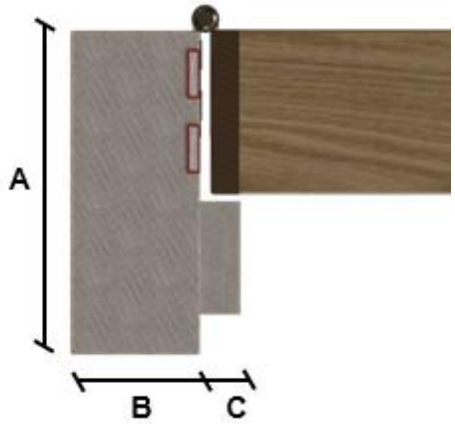
Frame type	Material	Minimum section size (mm)	Minimum density (kg/m^3)
2	WoodEx60	Frame: 70 (d) x 32 (t) (excluding stop) Stop: 15 (h) (integral or planted on)	640

Notes:

Minimum section size is subject to size of hardware and the use of transomed overpanel (see frame details below).

7.2.1 Standard frame detail

The diagram below shows detail of the standard frame construction. Minimum section is permitted in two sizes subject to hardware size and the use of transom overpanel. Any radius to the lipping must comply with section 5.3.



A: Frame depth = 70mm minimum

B: Frame thickness = 32mm minimum

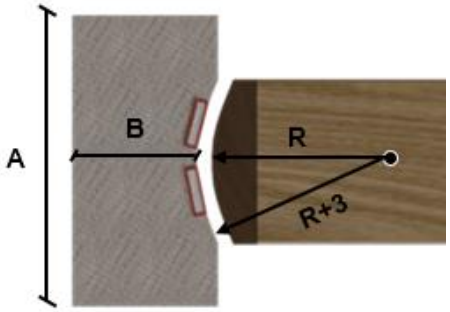
C: Stop height = 15mm minimum

Minimum section size when using a transom overpanel:

Not permitted with frame type 2.

7.2.2 Scalloped frame detail

The diagram below shows detail of the scalloped frame construction hanging edge only. When using scalloped frames for double acting doorsets, the groove for the specified intumescent strips must be as shown below and to the correct depth.



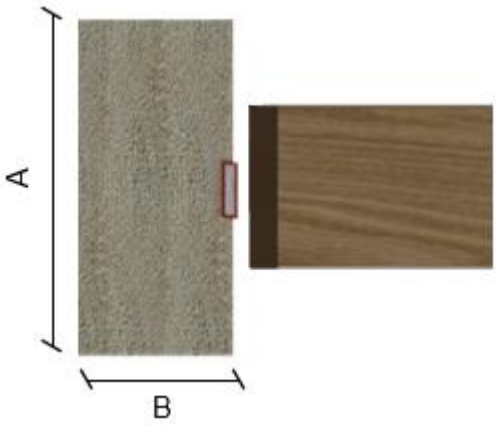
A: Frame depth = 70mm minimum

B: Frame thickness = 32mm minimum

R: Radius from floor spring or pivot = 8mm maximum to create a maximum 2mm edge profiling

7.2.3 Square frame detail for double acting doorsets

The diagram below shows detail of the square frame construction for the closing edge of a double acting doorset. Where utilising square frames for double acting doorsets, any radius to the lipping must comply with section 5.3.



A: Frame depth = 70mm minimum

B: Frame thickness = 32mm minimum

7.3 Door Frame Joints

Below are depictions of the door framing joints that are deemed acceptable. Please note that the drawings are provided as general illustrations 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. The door frame joints are required to be tight, with no gaps, and require mechanical fixing with the appropriate size ring shank nails or screws. Frame joints may additionally be reinforced with any of the adhesives approved for the application of lippings, on the basis that the approved lipping adhesive has been proven to contribute to the positive fire resistance performance of the timber to timber junction at the door leaf edge.

Double Rebated Joint

Mitre Joint

Mortice & Tenon Joint

Butt Joint

Trenched or Half Lapped Joint

Approved door frame jointing options

7.4 Decorative Facings – All Frame Options

Relatively thin facing materials are deemed to be decorative, and their application is not considered to be of detriment to the overall stability or performance of the doorset design.

The following additional facing materials are therefore permitted to the frame for this door design, including frame reveal, since they would have limited influence under fire resistance test conditions.

Decorative & Protective Facing Specification	
Facing Material	Maximum Permitted Thickness (mm)
Paint[3]	0.2
Timber veneers	0.7

Notes:

1. Facing materials not listed above are not permitted.
2. For all options, materials must not conceal intumescent strips.
3. Intumescent paints are not permitted.

Decorative finishes listed above may be painted within the limits for paint finish, above.

8 Overpanels

8.1 Solid Overpanels - Framed on all edges (transomed)

The following specification for doorsets with overpanels has been deemed acceptable as the door leaf section that is used to form the overpanel is retained on all four sides with mechanical fixings, and additonally protected with perimeter intumescent strips. The mechanical fixings will remain in position for the majority of the duration of the test, given the central location and protection offered by the charring timber, and the strips will help to fill any gaps around the perimeter of the panel, in additon to holding the panel in place for the required period of fire resistance. It is therefore reasonable to expect the overpanel to provide at least the same level of fire reistance as the tested doorset design with swinging leaves, providing the specification outlined below is followed.

- Overpanels of the same construction as the door leaf may be used ONLY when separated by a transom. In this application they are required to be lipped on all edges. The overpanel must be fully contained within the door frame (see following diagram).
- A transom is required to separate the leaf head(s) from the overpanel and must be to the same specification as frame option 1, as described in the table in section 7.1.
- Transom joints must utilise one of the following methods: mortice and tenon joints or butt joints (see section 7.3). Either method requires 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.
- Joints are required to be tight, with no gaps, and require mechanical fixing with the appropriate size ring shank nails or screws.
- Solid overpanels must be fixed 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 frame to overpanel junction is permitted to have a maximum 1mm gap tolerance.

8.1.1.1 Fitted in square edge frame sections (i.e. no rebate)

The intumescent seals specified for the jambs in section 4.5 must also be fitted to all four edges of the panel. The seals may be fitted either in the panel edges or alternatively in the frame reveal.

Maximum panel dimensions are given as below:

Assembly Element		**Height** (mm)	**Width** (mm)
Overpanel	Single Doorsets	2000	Overall doorset width
	Double Doorsets	1500	Overall doorset width

9 Adhesives

The following adhesives must be used in the construction of the doorsets. These may be hand applied or may be applied using an edgebander. With either method it must be ensured that sufficient glue is applied across the entire surface area between the 2No substrates being adhered to guarantee a robust bond. Other manufacturers guidance should be followed, for either installation application used.

Element	Product/Material Type
Door blank core	Held in confidence at Warringtonfire
Door blank facings	
Timber lippings	UF, PF or PUR
Decorative facings	UF, PF, PVA or PUR

10 Hardware

10.1 General

The following section details the permitted scope and constraints for fitting hardware to this door design. The following items of hardware must also bear the UKCA or CE Mark in addition to the requirements outlined in the following sections. The UKCA or CE mark must indicate that the hardware is suitable for fire doors in the classification code and declaration of performance issued by the hardware manufacturer:

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

Where an item of hardware is not covered by the scope of a relevant harmonised or designated standard, and cannot therefore be UKCA or CE Marked, inclusion of the hardware is only permitted with this doorset design if it meets the specific requirements of the appropriate section within this Field of Application (i.e. supporting test evidence and specification). All items of hardware must be fitted in accordance with requirements of this assessment.

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

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

- The component has been successfully tested to BS 476: Part 22: 1987 or BS EN 1634-1 in a suitably similar type of doorset e.g. timber leaf in timber frame.
- As a result of an assessment of the appropriateness of the item of hardware, based on test evidence not commissioned by Moralt AG.
- As a result of the Certifire approval of the item of hardware

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

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

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

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

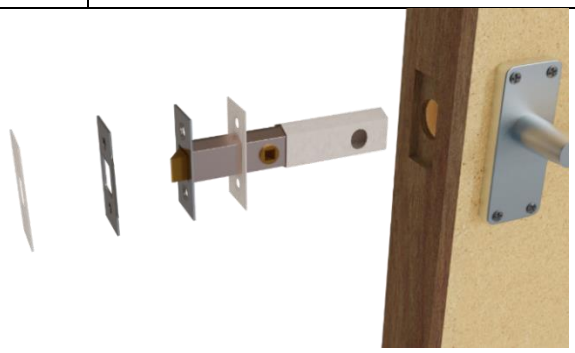
10.2 Intumescent to Hardware

The intumescent materials used to protect hardware that have been tested and assessed for this doorset design are detailed below. Note that any one of the product/manufacturer options listed in the table may be used in the specific application noted. However, only 1No manufacturer should be considered per doorset application.

The door gap perimeter intumescent seal specifications are documented in conjunction with the leaf envelope size limitations in section 4.5.

Item	Location	Product/Manufacturer
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 5. Mann McGowan kit ref: MMG567
Flush bolts	Encasing the entire body of the flush bolt including the back surface of the face plate	
Lock/latches	Under forend & keep and encasing the lock body in the leaf edge for all doorsets	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 5. Mann McGowan kit ref: MMG567 6. STS ref: Din60 Kit
Concealed Hinges	Lining all sides of mortice in frame and leaf	See section 10.6.2
Concealed overhead closers	Lining all sides of the closer and slide arm mortices	Manufacturers tested intumescent protection pack
Multipoint Locking	Lining mortices of lock/latch and top and bottom locks all keeps	1mm thick BASF interdens kit

Example of hinge protection detail



Example of lock & latch protection detail

Gaskets must be fitted where required by supporting evidence, for example, test evidence or Certifire certificates. If gaskets are not required by the supporting evidence but are within this Field of Application, the requirements of this Field of Application take precedence.

Where it is stated that intumescent is not required for a particular element of hardware, it is permitted to use up to 2mm thick MAP, Interdens or graphite-based gasket tested for the particular application [as appropriate for the hardware]. It is the opinion of Warringtonfire that the additional protection will not detract from the fire resistance performance under test conditions.

10.3 Essential Hardware

The following table details the essential hardware for the various doorset configurations that are referenced in this assessment.

Configuration	Hardware
LSASD	• Latch • Handle • Hinges • Self-closing device (closer)
ULSASD	• Hinges • Self-closing device (closer)
DASD	• Top pivot & bottom strap • Self-closing device (closer)
LSADD	• Latch • Handle • Hinges • Self-closing device (closer) • Flush bolt
ULSADD	• Hinges • Self-closing device (closer) • Flush bolt
DADD	• Top pivot & bottom strap • Self-closing device (closer)

10.4 Latches & Locks

Unless explicitly detailed within the sections below only 1No. lock or latch shall be applied within any individual doorset. When fitted the lock or latch body shall be installed within the vertical edge of the door leaf in all cases, at a height as detailed within the relevant section below. Refer to specific notes contained within each section for further considerations on lock or latch type.

10.4.1 Single Point Engagement

These items are suitable in the following applications only:

Frame options: 1 and 2.

Configurations: LSASD & LSADD

The table below details the tested latches and locks that are approved.

Element	Manufacturer & Product Reference
Locks & latches	1. Newstar SL1-SSS sashlock – 235mm high forend 2. Safehinge Primera PR-3S-56-729A 3. Safehinge Primera PR-3S-46-730A 4. Legge cylinder type – 75mm high forend 5. CH7260FR with 235mm (h) forend 6. Assa Abloy 'Vingcard Essence with 235mm high forend Entry System Locksets (see section 10.4.1.2 below): 1. Assa Abloy 'Vingcard Signature MPA 4G RFID' 2. Salto LE7 lockset with electric escutcheon 3. Salto LE7 lockset with control unit ref: AFB01MBA8 4. Salto LE7 lockset and strike plate 5. Salto LE7 with Aelement Fusion card reader 6. Salto LE8 7. Advance Trillium RFID 8. Assa Abloy Inoxi handleset operating a EL520 mortice latch and EL520 keep 9. Häfele Dialock handleset 10. DormaKaba RT Plus handleset

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

Single & Double leaf doorsets

Element	Specification
Maximum forend and strike plate dimensions	235mm high x 25mm wide x 4mm thick
Maximum body dimensions	165mm high x 100mm wide x 18mm thick
Intumescent protection	see section 10.2
Materials	All parts essential to the locking/latching action (including the latch bolt, forend and strike) to be steel, stainless steel or brass with a melting point ≥ 800^0 C

Notes:

1. In all instances the location of the spindle (or cylinder where the lockcase has no spindle location) must be between 800 – 1200mm from the threshold (threshold is defined as finished floor level). In lockcases where the cylinder is located above the spindle the cylinder should be taken as the height reference location.

10.4.1.1 Abloy Oy Mortice Latches

At the specific request of Moralt AG, the following range of Abloy Oy latches have been assessed based on test WF364240.

The tested EL520/100 represents the most onerous lockcase design, having the largest lockcase dimensions and backset of the range below. The EL520 also incorporates electromechanical components and was tested in WF364240 complete with the associated cable loop and cableway installed which represents a more onerous condition in fire resistance terns compared to mechanical lock variants.

The tested EA329 strike plate represents the largest strike plate design including the largest apertures for bolts.

Based on the above and provided that the lock and forend dimensions are not increase over those tested, it is reasonable to assume the following range of Abloy Oy latches and strike plates may be incorporated in the FireSmoke 54mm designs for 60 minutes integrity performance.

The intumescent protection detailed in section 10.2 must be installed protecting all locksets.

Motor Locks	Solenoid Locks	Mechanical Locks	Strike Plates	
EL520	EL560	EL160	EA321	EA327
EL532	EL561	EL162	EA322	EA328
EL522	EL562	EL163	EA323	EA329
EL524	EL563	EL165	EA324	EA330
EL534	EL564	EL360	EA325	EA331
EL535	EL565	EL362	EA326	EA332

10.4.1.2 Lock Specification when using PVC Edge Protectors or Acrovyn Wrap

Element	Specification
Maximum forend and strike plate dimensions:	155mm high by 25mm wide by 4mm thick[1]
Maximum body dimensions:	18mm thick by 100mm wide by 150mm high.
Intumescent protection:	See section 10.2
Materials:	All parts essential to the locking/latching action (including the latch bolt, forend and strike) to be steel

Notes:

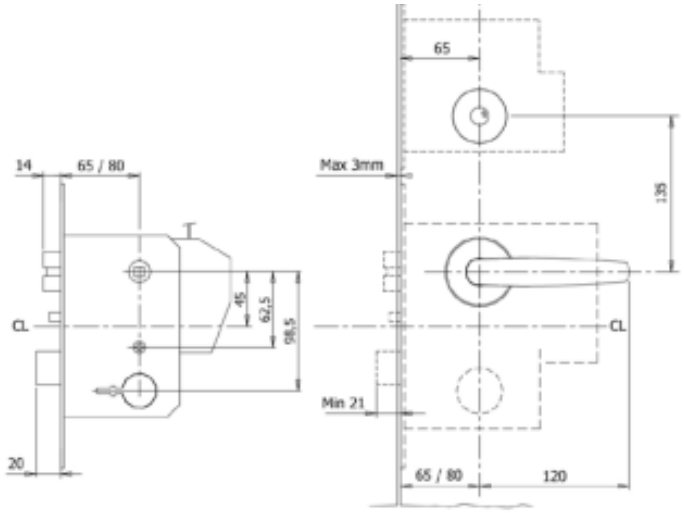
1. In all instances the location of the spindle (or cylinder where the lockcase has no spindle location) must be between 800 – 1200mm from the threshold (threshold is defined as finished floor level). In lockcases where the cylinder is located above the spindle the cylinder should be taken as the height reference location.

10.4.1.3 Entry System Locksets

A number of different entry system locksets have been proven to not be a cause of premature failure in the tests cited in section 3. Provided the card reader or digilock element is surface mounted to the leaf face requiring no additional holes through the leaf thickness, the installation of these elements would not be expected to be a cause of premature integrity failure. The entry system hardware must conceal the latch spindle protecting the through holes from attack by fire in the way a lever handle on its rose would.

Assa Abloy 'Vingcard'

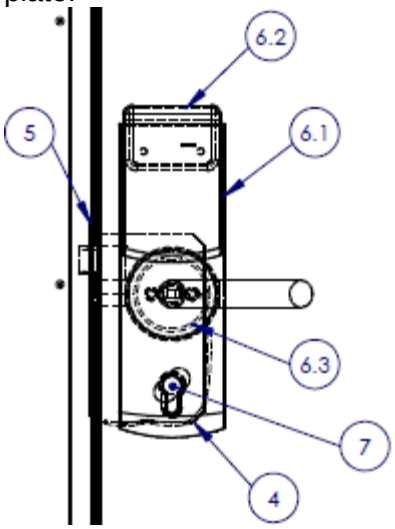
The Assa Abloy 'Vingcard Signature MPA 4G RFID' with Assa Abloy steel handles ref: 2035 was successfully tested in DMT-50-1010, installed within the rebates shown below, the lower lockcase is of essentially the same dimensions as those given in the table above, further justifying the use of alternative 'Euro' size locksets. Where the Assa Abloy 'Vingcard Signature MPA 4G RFID' is used the Mann McGown MMG630 intumescent pack must be used protecting all sides of the required mortices and behind the forend and keep.



Onity Advance Trillium

Based on the results of DMT-DO-50-1148, cited in section 3, the Onity card reader and handle ref: Advance Trillium RFID may be installed, subject to the following intumescent protection being installed.

1mm thick 'Interdens 15' must be installed as tested - encasing the lockcase, under forend & keep, inside card reader mounting plate, handle rosette and under RFID reader mounting plate.



Key:

4 'Euro' Mortice Lockcase

5 Strike Plate

6.1 Advance Trillium RFID

6.2 RFID Unit

6.3 Trillium Escutcheon

7 Advance Trillium Key Cylinder

Salto locksets ref LE7 and LE8

Based on the results of tests DMT-DO-50-1216, WF383782 and WF383783, cited in section 3 the Salto LE7 and LE8 locksets may be installed, subject to the following intumescent protection being installed.

The Mann McGown MMG651 & MMG652 intumescent packs (Moralt references M-MVPM_DB_T-020-08 & M-MVPM_DB_T-020-05) comprised of 1mm thick Interdens 15 must be installed as tested - encasing all faces of lockcase and under the forend & keep.

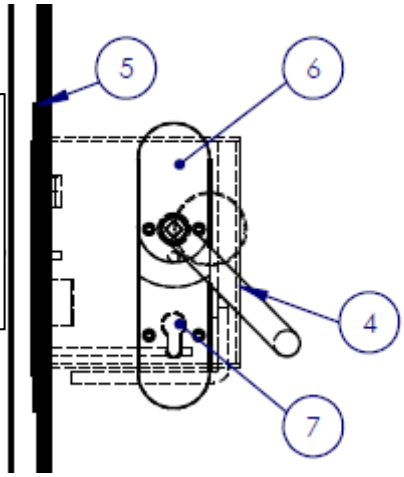
	LE7 Lock case and keep showing tested keep box
	E96P0U001M48K Handleset and electronic escutcheon
	E9150RUIMB49 Handleset and electronic escutcheon

Assa Abloy Inoxi handleset and EL520 mortice latch

Based on the results of DMT-DO-50-1148, cited in section 3, the Inoxi handleset (ref: 3-19/242/115 PZBL DIN Exit) operating an EL520 mortice latch and EL520 keep may be installed, subject to the following intumescent protection being installed.

- Lockcase must be protected with the tested intumescent pack ref: ITL-Abloy-EL560-100 – 2mm thick Phosphate.

Key:
4 – EL520 latch
5 – Keep
6 - Inoxi Handle
7 - Cylinder



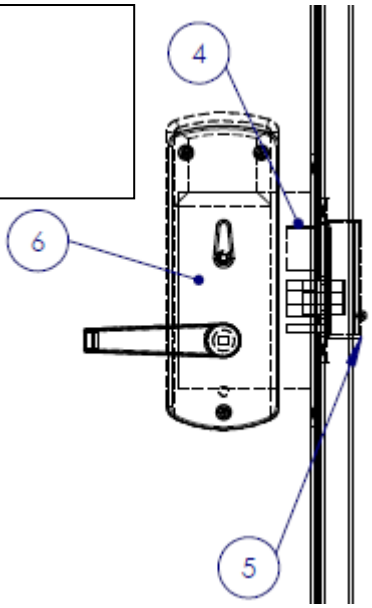
Hafele Dialock DT600/DT700/DT710 Handles

These products may be used as lever handles to operate rebated locks/latches. These surface mounted products, and their accessories may not replace any part of the latch(es) as assessed in section 10.4.1 and must be installed with the Mann McGowan MMG633 (Moralt reference M-MVPM_DB_T-011-06), MMG655 (Moralt reference M-MVPM_DB_T-011-04.1) & MMG656 (Moralt reference M-MVPM_DB_T-011-04.2) intumescent packs.

DormaKaba RT Plus handleset

Specimen 7 within test DMT-DO-50-1148 incorporated a DormaKaba RT Plus handleset with protective steel plate (ref: PS7901012ER30-626) operating a rebated mortice latch protected with the Mann McGown MMG631 intumescent pack. This surface product may be used as lever handles to operate rebated locks/latches. This product and accessories may not replace any part of the latch(es) as assessed in section 10.4.1.

Key:
4 – Latch Body
5 – Keep
6 - RT Plus Handleset



10.4.2 Latches & Locks – Multi Point Engagement

These items are suitable in the following applications only:

Frame option: 1 only, frame thickness must be a minimum of 38mm.

Configurations: LSASD,

The table below details the tested multi point latch that is approved.

Element	Manufacturer & Product Reference
Locks & latches	1. Glutz multipoint Ref 1839.7.60.78.1788 1788 x 20 (forend), 241 x 24 (strike), 110 x 24 (top & bottom strike), Lock 200 x 89 x 20, Bolts 44 x 67.5 x 20

The Glutz multipoint locking system has been tested successfully in a doorset similar to the FireSmoke 54mm design but with 6mm MDF facings (see WF382394). The test evidence can be used to support the use of multi-point locks with the FireSmoke 54mm design covered by this assessment.

Notes:

1. When a multi-point latch is fitted, the leaf perimeter edge intumescent must be located into the frame reveal along the closing edge, see data sheet in section 4.5.
2. The top and bottom hook locks do not need to be engaged for fire performance.
3. Intumescent protection must be as specified in section 10.2.
4. The centre, top and bottom keep plates must be the same as those tested, as supplied by the manufacturer.
5. In all instances the location of the handle must be between 800 – 1200mm from the threshold.
6. Multipoint locking systems are only approved for use with single leaf doorsets and cannot be used with CS Edge protectors/Acrovyn wrap.

In addition to the tested Glutz multi-point lock, 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 the table above for the Glutz multipoint locking system and the manufacturers tested intumescent protection system for the mortices must be installed. Furthermore, the forend height and the dimensions of any alternative multi-point lock must not exceed the dimensions of the tested Glutz lock,

This includes the following Winkhaus systems:

1. AV2 – The system variants acceptable to this assessment are those which fit into the mortices detailed in section 10.4.2 for multipoint locking systems.

10.4.3 Cylinders

These items are suitable in the following applications only:

Frame options: All

Configurations: All

The table below details the tested cylinders that are approved.

Element	Manufacturer & Product Reference
Hinges	• Doorfit ref: DF70CTTSKD • Doorfit Products Ltd – EP70CTSKD • Eurospec – CYP71282SC • Cylinder with thumbturn: Salto TE010H35PM • Abus – dummy cylinder ref: T185.

Components with the following specification are also deemed acceptable.

- Where required for use with either single or multi point latches, the cylinder must be constructed of either brass or steel with a melting point in excess of 800^0C.
- The cylinder must be compatible with the lock/latch.
- Cylinder dimensions may be up to 33mm high x 17mm wide at the maximum dimension and may be of euro profile or oval.
- Single and double cylinders, along with cylinder & turn are permitted.
- Door preparation for single cylinders shall penetrate only half the door thickness.
- Intumescent protection and tightness of fitting:
    - If the lock body is not protected with an intumescent material, the maximum clearance between leaf and cylinder is 1mm to each edge.
    - If the lock body is protected with an intumescent material, maximum clearance between leaf and cylinder is 3mm to each edge.
    - 1mm thick MAP or non-pressure forming graphite intumescent around the cylinder is optionally permitted.

10.5 Handles

These items are suitable in the following applications only:

Frame options: All

Configurations: All

The table below details the tested handles that are approved.

Element	Manufacturer & Product Reference
Handles	• Aluminium lever handles • Salto R1SJRIM480

Alternative handles are permitted providing they meet the specification given below:

- Steel, stainless steel, brass, aluminium or bronze are permitted.
- Surface fixings or through fixings are permitted. If through fixed there must be no more than 0.5mm clearance between the hole and the fixing.
- The hole through the leaf to facilitate the spindle must be no greater than 20mm diameter.

The design may be either lever on rose or lever on back plate up to the following maximum sizes:

- Lever on rose with a rose diameter up to 54mm.
- Lever on back plate with a back plate size up to 243mm high x 56mm wide
- Lever handle length 250mm

The handle must be compatible with the lock/latch, such that the closing action of the doorset is not impeded.

Alternative escutcheons are permitted providing they meet the specification given below:

- Steel, stainless steel, brass, aluminium or bronze are permitted.
- Surface fixings or through fixings are permitted. If through fixed there must be no more than 0.5mm clearance between the hole and the fixing.
- The escutcheon may be up to Ø52mm overall and up to 8mm thick.

10.6 Hinges

10.6.1 Butt Hinges

These items are suitable in the following applications only:

Frame options: All

Configurations: LSASD, ULSASD, LSADD & ULSADD

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

Element	Manufacturer & Product Reference
Hinges	• CNS steel butt • Royde & Tucker H102 hi-load • Eclipse bearing butt hinges • Doorfit CBH102.R

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

Element	Specification
Blade height:	90 - 120mm
Blade width (excluding knuckle):	30 - 35mm
Blade thickness	2.5 - 4mm
Fixings:	Minimum of 4 No[1]. 30mm long No. 8 or No.10 steel wood screws per blade
Materials:	Steel or stainless steel

Note: 1. The tested Royde & Tucker H105 hinge type only required 3 fixings

In all instances, the hinges must have the following specification.

Element		Specification	
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 10.2	

Note:

Leaves less than 2400mm (h) must be hung on a minimum of 3 hinges. Leaves greater or equal 2400mm (h) must be hung on 4 hinges.

10.6.2 Concealed Hinges

Concealed hinges have been successfully tested in the LAMINESSE FireSmoke 54mm door design for 60 minute applications in test WF382394.

10.6.2.1 Simonswerk Tectus Concealed Hinges

These items are suitable in the following applications only:

Frame options: Type 1 only, frame must be a minimum of 38mm thick.

Configurations: LSASD, ULSASD, LSADD & ULSADD

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

Element	Manufacturer & Product Reference
Hinges	• Simonswerk Tectus TE5273.SSE Concealed Hinges

The single action hinges must be fitted with the tested 1mm thick BASF exterdens Graphite 'TE 527 - 3D' intumescent pack.

The hinges must be fixed in accordance with manufacturer's instructions including using the supplied hinge fixings and instructions for morticing and taking into account the necessary details for fire resistance as stated above.

The mortice for concealed hinges must be no closer than 50mm to any aperture or other mortice or recessed area within the door leaf.

The hinges must be used in conjunction with a twin strip perimeter intumescent arrangement where one of the seals remains continuous past the hinge blade in the frame reveal or leaf edge.

The door frame must be hardwood (frame type1) of minimum thickness 38mm and minimum density 640kg/m^3.

Tectus concealed hinges are to be positioned as follows. It is not permitted to fit any more hinges than that stated in the table below, as appropriate for the required leaf height.

Element		Specification	
Hinge positions:	3 Hinges: Leaf height: 1201-2400mm	Top	150 – 200mm from head of leaf to top of hinge
		2nd	Min - 200mm from top hinge Max - centrally between top and bottom hinge
		Bottom	150 – 300mm from foot of leaf to bottom of hinge
	4 Hinges Leaf height: >2401mm	Top	150 – 200mm from head of leaf to top of hinge
		2nd	Min - 200mm from top hinge Max - centrally between top and 3rd hinge
		3rd	Min – 200mm from bottom hinge Max – centrally between 2nd and bottom hinge
		Bottom	150 – 300mm from foot of leaf to bottom of hinge
Intumescent protection:		The tested 1mm thick BASF exterdens Graphite 'TE 527 - 3D' intumescent pack	

10.6.2.2 Bartels Pivota Concealed Hinges

These items are suitable in the following applications only:

Frame options: Type 1 only, frame must be a minimum of 38mm thick

Configurations: LSASD, ULSASD, LSADD & ULSADD

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

Element	Manufacturer & Product Reference
Hinges	• Bartels GmbH - Pivota DXS 100 3-D design

The single action hinges must be fitted with the tested Mann McGowan kit ref: MMG567.

The hinges must be fixed in accordance with manufacturer's instructions including using the supplied hinge fixings and instructions for morticing and taking into account the necessary details for fire resistance as stated above.

The mortice for concealed hinges must be no closer than 50mm to any aperture or other mortice or recessed area within the door leaf.

The hinges must be used in conjunction with a twin strip perimeter intumescent arrangement where one of the seals remains continuous past the hinge blade in the frame reveal or leaf edge.

The door frame must be hardwood (frame type1) of minimum thickness 38mm and minimum density 640kg/m^3.

Pivota concealed hinges are to be positioned as follows. It is not permitted to fit any more hinges than that stated in the table below, as appropriate for the required leaf height.

Element		Specification	
Hinge positions:	2 Hinges: Leaf height: ≤2440mm	Top	180 – 210mm from head of leaf to top of hinge
		Bottom	140 – 180mm from foot of leaf to bottom of hinge
	3 Hinges Leaf height: >2440mm	Top	180 – 210mm from head of leaf to top of hinge
		2nd	Max - centrally between top and bottom hinge
		Bottom	180 – 210mm from foot of leaf to bottom of hinge
Intumescent protection:		The tested Mann McGowan kit ref: MMG567	

10.7 Doorset Self Closing

Doorset automatic self-closing can be provided by:

- Overhead face fixed closers
- Concealed overhead closers.
- Floor springs with top pivots and bottom straps.

Automatic doorset self-closing devices such as transom mounted, and offset pivots used with floor springs are not considered acceptable for use with the LAMINESSE FireSmoke 54mm doorset range.

10.7.1 Overhead Face Fixed Closer

These items are suitable in the following applications only:

Frame options: 1 and 2

Configurations: LSASD, ULSASD, LSADD, ULSADD,

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

Element	Manufacturer & Product Reference
Overhead face-fixed closers	• Doorfit ICK1955V-SSS face fixed • Boss TS4.224 • Doorfit ICK1955V-SSS face fixed

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

- Certifire approved overhead face-fixed closers for 60-minute fire resistance applications on 54mm thick timber door and timber frames.

Note:

It must be ensured that the closer is of sufficient strength and power to ensure the door leaf/leaves fully engage into the frame reveal.

10.7.2 Concealed Overhead Self Closing Device

These items are suitable in the following applications only:

Frame options: Type 1 only

Configurations: LSASD, ULSASD, LSADD & ULSADD

The table below details the tested concealed overhead closers that are approved.

Element	Manufacturer & Product Reference	Minimum Frame Stop Thickness	Intumescent Protection
Concealed overhead closer	• Geze Boxer EN 2-4	18mm	Closer Protection: Mann McGowan kites ref MMG107, MMG109 and MMG579
	• Dorma ITS96	18mm (	ITS 96 - intumescent pack, 1mm MAP encasing track body, closer body and beneath forend
	• Rutland ITS11204	12mm	Closer Protection: Rutland set ref: IP.114 2mm intumescent kit for ITS11204

Note:

1. It must be ensured that the concealed overhead closer is of sufficient strength and power to ensure the door leaf/leaves fully engage into the frame reveal.
2. Intumescent protection shall be as detailed within the above table, as tested.
3. The dimensions of the concealed overhead door closer must not exceed the dimensions given within the table above.

10.7.3 Floor Spring Self Closing Device

These items are suitable in the following applications only:

Frame options: 1 and 2

Configurations: DASD & DADD

The Dorma Door Controls Top strap ref: 8066 and Dorma bottom strap ref: 7421 with Dorma floor springs ref: BTS80 were successfully incorporated in test RF07055. The tested intumescent protection must be incorporated:

- Encasing op pivot/strap – 1mm thick Lorient MAP
- Floor spring & Bottom strap – not required.

Components with the following specification are deemed acceptable.

- Certifire approved floor spring self-closers for 60-minute fire resistance applications on 54mm thick timber door and timber frames.

10.8 Flush Bolts

These items are suitable in the following applications only:

Frame options: 1 and 2

Configurations: LSADD & ULSADD

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 edge fitted with intumescent strips:

- 204mm 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 of the keep and body must be protected with intumescent gaskets as specified in section 10.2. Alternatively, the hardware manufacturers tested gaskets may be used.

Flush bolt installation and intumescent protection

10.9 Non-Essential Hardware

Only the following items of non-essential hardware are permitted in addition to the prescribed essential hardware as detailed within sections 10.3 – 10.8.

10.9.1 Pull Handles

These items are suitable in the following applications only:

Frame options: 1 and 2

Configurations: All configurations

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

The above scope of application is provided as in the opinion of Warringtonfire they will not significantly affect the fire resistance performance of the doorset being considered. This is on the basis of the items being surface mounted away from the edge of the door leaf, therefore unlikely to influence the junction between door leaf and frame. Furthermore, they are generally of lightweight construction, meaning that they are unlikely to destabilise the doorset and therefore cause adverse deflection under test conditions. Lastly, the surface mounted arrangement of the features means no material is removed in terms of the overall thickness of the door leaf beyond the footprint of the item, therefore burn through of the leaf would not be expected.

10.9.2 Push Plates & Kick Plates

Frame options: 1 and 2

Configurations: All configurations

The table below details the tested push plates that are approved.

Element	Product Details
Push plate	• 290 (h) x 802 (w) x 1.2mm (t) brass kickplate face fixed with 25mm screws to both faces of door • stainless steel 828 (l) x 200 (w) x 1.5 (t).

Alternatively, components with the following specification are also deemed acceptable as in the opinion of Warringtonfire they will not significantly affect the fire resistance performance of the doorset being considered. This is on the basis of the items being surface mounted away from the edge of the door leaf, therefore unlikely to influence the junction between door leaf and frame. Furthermore, they are generally of lightweight construction, meaning that they are unlikely to destabilise the doorset and therefore cause adverse deflection under test conditions. Lastly, the surface mounted arrangement of the features means no material is removed in terms of the overall thickness of the door leaf beyond the footprint of the item, therefore burn through of the leaf would not be expected.

Approved specification:

- Polymeric or metal face-fixed hardware such as push plates and kick plates up to 2mm thick may be surface fitted to the doorset. 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.
- In all cases plates meeting the above specification shall not be applied under glazing beads or door stops.

10.9.3 Security Viewers

These items are suitable in the following applications only:

Frame options: 1 and 2

Configurations: All configurations

Up to 2no. viewers are permitted within a single door leaf, viewers are to be positioned no closer than 100mm to door edges, glazed apertures or any other hardware component.

Components with the following specification are deemed acceptable.

- 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 and / or a 0.5 – 1.0mm thick graphite based intumescent wrap.

10.9.4 Door Selectors

These items are suitable in the following applications only:

Frame options: 1 and 2

Configurations: All double leaf door configurations

These may be freely applied, provided that they are not invasive in the leaf edges or door frames, and they do not interfere with the self-closing action of the door leaf. Products that are invasive will require fire resistance test/assessment evidence to support their use.

10.9.5 Environmental Seals

These items are suitable in the following applications only:

Frame options: 1 and 2

Configurations: All configurations

A number of different environmental seals have been successfully tested as part of the LAMINESSE FireSmoke 54mm doorset design. For example, the Mann McGowan ACS1 & 'Enviroseal Tri-blade' seals were successfully tested in reports DMT-DO-50-1216 & DMT-DO-50-1090.

On this basis, silicon or PVC based flame-retardant acoustic, weather and dust seals (for example those referenced above or Lorient IS1212, IS1511, IS7025, IS7060 or Sealed Tight Solutions Ltd. ST1009 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.

Where required, the seals may be fitted either rebated into the timber door stop or rebated into the leaf face.

10.9.6 Threshold drop Seals

These items are suitable in the following applications only:

Frame options: 1 and 2

Configurations: All configurations

A Mann McGowan DD-1703ACU drop seal was successfully tested in report DMT-DO-50-1010 and is acceptable and an Elton B.V. 'Ellenmatic Soundproof' drop seal was successfully tested in DMT-DO-50-594.

Note: if a rebated drop seal is fitted to the doorset then flush bolts, if approved, may not be fitted to the bottom of the doorset.

Alternatively, components with the following specification are also deemed acceptable, recessed into the bottom of leaves.

Product	Manufacturer
LAS8007/0935A00	Lorient Polyproducts Ltd.
IS8010si	Lorient Polyproducts Ltd.
RP8Si	Raven Products Ltd.
NOR810, NOR810S, NOR810dB+	Norsound Ltd.
SLS-DRP-100	Halspan Ltd.
ST422, ST422FF, ST422GT	Sealed Tight Solutions Ltd
Schall-Ex L-15 range	Athmer
HS, RH and US	Planet

10.9.7 Knockers, Numerals & Signage

These items are suitable in the following applications only:

Frame options: 1 and 2

Configurations: All configurations

Components with the following specification are deemed acceptable as in the opinion of Warringtonfire they will not significantly affect the fire resistance performance of the doorset being considered. This is on the basis of the items being surface mounted away from the edge of the door leaf, therefore unlikely to influence the junction between door leaf and frame. Furthermore, they are generally of lightweight construction, meaning that they are unlikely to destabilise the doorset and therefore cause adverse deflection under test conditions. Lastly, the surface mounted arrangement of the features means no material is removed in terms of the overall thickness of the door leaf beyond the footprint of the item, therefore burn through of the leaf would not be expected.

Approved specifications:

Knockers:

- Steel, stainless steel, aluminium or bronze knockers, may be surface fixed or bolted through the door leaf, providing they are fitted no closer than 75mm from the leaf edge, other elements of building hardware or to any glazing and are no greater than 200mm high x 120mm wide. If through fixed, there must be no more than 1mm clearance between the hole and stud. It is only permitted to fit 1No. knocker to any one doorset.

Numerals & Signage:

- Steel, stainless steel, aluminium or bronze numerals or signage may be surface fixed to the door leaf, providing they are fitted no closer than 35mm from the leaf edge, other elements of building hardware or to any glazing. The dimension of each numeral or sign must be no greater than 200mm high x 100mm wide x 4mm thick. Up to 5No. numerals or signs may be applied to a doorset, numerals and signs may be applied adjacent to each other providing the 35mm from other elements as detailed above is maintained.

10.9.8 Cableway

A cable loop and cableway were successfully incorporated in the specimens in test DMT-D0-50-1010, the premature integrity failures were recorded at the glazed apertures, use of the glass type which failed is not permitted for use within this report.

10.9.8.1 Cable Loop

These items are suitable in the following applications only:

Frame options: 1 Only

Configurations: LSASD, ULSASD

The table below details the tested cable loop that is approved.

Element	Manufacturer & Product Reference	Body Dimensions
Cable Loop	• Abloy EA280	324mm (h) x 24mm (w) x 17(d) with a Ø12 spring assembly

The top of the loop should be below 1200mm from the threshold and no closer than 200mm from another item of hardware in the leaf edges (e.g. hinges).

The body of the cable loop is to be located centrally in the door frame, 2mm thick Interdens must be fitted to all faces of the rebates required for installation.

10.9.8.2 Cableways

Cableways were also successfully tested in DMT-D0-50-1010, cableways are to be used to route cables around the door leaf to operate electronic hardware. The cableway will be routed from a cable loop fitted at the jambs of a doorset to the relevant item of hardware (e.g. a lockset or electronic strike).

The cableway must be installed as detailed below.

- Groove the edge of the door core with a 10mm wide channel located centrally, to a depth of 12mm prior to installation of lippings. This groove should run from the lock/keep location in the closing/meeting stile, down the stile, along the bottom of the door then back up the hanging stile to the cable loop location. The groove may be machined above the location for a dropseal if one is to be fitted, as tested.
- Install the cable, protected with Mann McGowan Pyrostrip 500FSA-10x 2mm, into the groove.
- Infill the groove with hardwood, bonded in place with PU adhesive.
- The bottom of the groove must be no closer than 100mm from glazed apertures.
- The door core can then be lipped and calibrated in the usual manner.

11 Installation

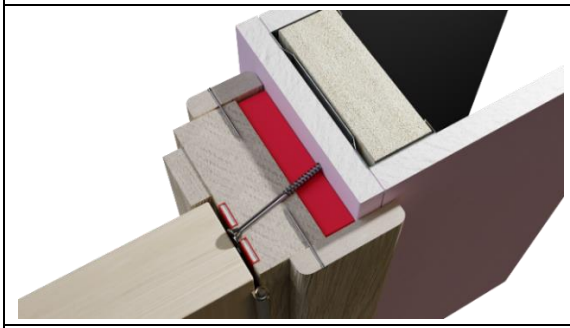
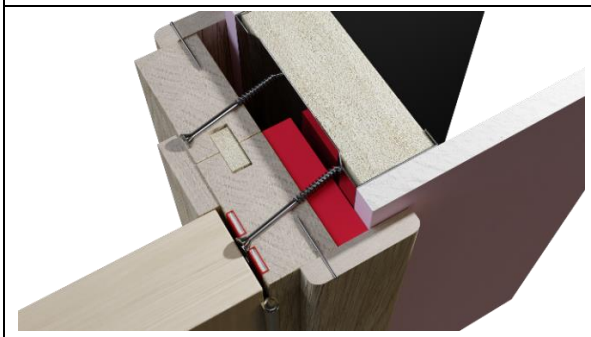
11.1 General

This section considers the installation of doorsets. This section considers:

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

11.2 Door Frame Installation

The following figures indicate the acceptable door frame installations. Please note that the firestopping element is provided in the below 3D models as a generic red coloured seal. For further clarification of the approved firestopping systems see section 11.3.

Permitted Installations	
	Instances where the door frame and the wall of the same depth such that architraves are fitted flush to both faces. Note that the minimum door frame section size (width and depth) must be as per the requirements noted in this report – see door frame section. Architraves requirements are documented in the firestopping section of this report.
	Instances where the wall thickness is greater than the door frame depth. In this scenario timber architraves of minimum 18mm thick must be fitted to both faces, fitted with a minimum 15mm overlap to the door gap, other than when the architrave abuts the wall.
	Split frames are permitted providing that both frame sections are secured to the wall in accordance with section 11.5. Furthermore, the main frame section (from which the door is hung) must be constructed to at least the minimum door frame section size (width and depth) as per the requirements noted in this report – see door frame section. The extension piece must be constructed using the same timber species as the main frame section.

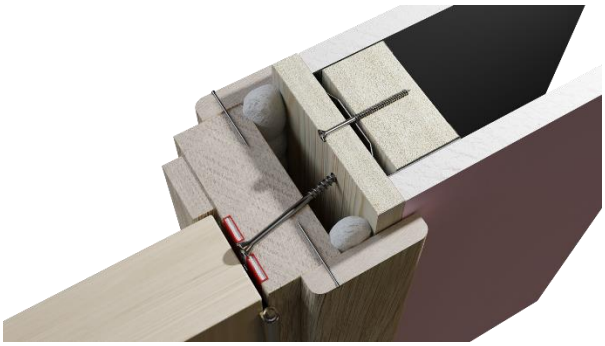
Note:

The drawings are provided as a generalised illustration of the door frame installation only; actual installation must be as per the text within this document specifies.

11.3 Firestopping

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

Gap (mm)	Requirement	3D model depiction
0 – 2	In practice, unlikely to occur, but if present, must be sealed with architraves, as below, fitted over a bead of acrylic intumescent sealant, tested as below.	N/A
3 – 10	Gap 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. Timber architraves of a minimum 15mm thick must be fitted to both faces, fitted with a minimum 15mm overlap to the door gap.	
10 – 20	Gap must be tightly packed with mineral fibre 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 or full depth expanding PU foam, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1. Timber architraves of a minimum 15mm thick must be fitted to both faces, fitted with a minimum 15mm overlap to the door gap.	 

Gap (mm)	Requirement	3D model depiction
Over 20	This would be considered a poor preparation of the structural opening. A timber based or non-combustible subframe up to 50mm thick can be inserted and fixed to the wall bedded on intumescent mastic, the gap between door frame and subframe filled as follows: Gaps 5 to 10mm 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. Timber architraves of a minimum 15mm thick must be fitted to both faces, fitted with a minimum 15mm overlap to the door gap.	 

Note:

Guidance for 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 and implemented where appropriate.

11.4 Packers

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

11.5 Wall Types, Structural Opening & Fixity

11.5.1 Wall Types

The following wall types are approved for this doorset design:

a) Plasterboard clad timber stud partitions
b) Plasterboard clad steel stud partitions including timber lining.
c) Masonry constructions.

Wall types a & b above must have supporting fire resistance test evidence which demonstrates that it is capable of staying in place and intact for a minimum of 60 minutes supporting a doorset design.

Wall type c above must be determined to be able to provide at least the same level of fire resistance of the doorset design.

All wall types detailed above shall provide a suitable medium to permit adequate fixity, it is anticipated that for:

- Plasterboard clad timber stud partitions, the timber stud will be of sufficient dimensions such that the fixing for the door frame penetrates into solid timber.
- Plasterboard clad steel stud partitions will include a timber lining of sufficient dimensions such that the fixing for the door frame penetrates into solid timber.
- Masonry constructions are anticipated to be constructed of a solid block or brickwork to receive the fixings.

Note: Other tested solutions to achieve adequate fixity may be detailed within the above noted supporting fire resistance test evidence.

11.5.2 Structural Opening

For all wall types the structural opening shall be square, plumb and provide a flat surface for installation of the doorset.

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

11.5.3 Fixity

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

For single leaf doorset, the frame jambs only are to be fixed to the supporting construction using steel fixings at 600mm maximum centres and maximum of 150mm from corner. The fixings must be of the appropriate type for the supporting construction and must penetrate to a minimum depth of 50mm. It is not necessary to fix the frame head, although packers must be inserted.

For all other configurations of doorset, the upper horizontal framing section abutting the structural opening must also be secured to the wall using steel fixings at 600mm maximum centres and maximum of 150mm from corner. The fixings must be of the appropriate type for the supporting construction and must penetrate to a minimum depth of 50mm.

11.6 Post Production (Onsite) Leaf Size Adjustment

The LAMINESSE FireSmoke 54mm range of doorsets may be altered as follows:

Leaf Size Adjustment Specification	
Element	Reduction
Lipping	The post-production lipping thickness may be reduced by 1mm for fitting purposes, providing that the door gaps and intumescent conditions remain as required by this assessment and the minimum limitation in terms of lipping thickness is still maintained. Onsite trimming of PVC facings or edge protectors is not permitted.

11.7 Door Gaps

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

Door Gap & Alignment Tolerance Specification	
Location	Dimension
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 / Bottom edge of the leaf.	8mm between bottom of leaf and top of floor covering. This is the maximum tolerance for fire resistance only.

12 Insulation Performance

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 glazing
Fully insulating	Unglazed doorsets or doorsets including 60-minute insulating glazing (if approved)

13 Conclusion

If Moralt A.G. LAMINESSE FireSmoke 54mm doorsets, constructed in accordance with the specification documented in this field of application were to be tested in accordance with BS 476: Part 22: 1987, it is our opinion that they would provide a minimum of 60 minutes integrity and insulation (subject to section 12).

14 Declaration by the Applicant

1) We the undersigned confirm that we have read and comply with obligations placed on us by the Passive Fire Protection Forum (PFPF) Guide to undertaking technical assessments and engineering evaluations based on fire test evidence 2021 Industry Standard Procedure
2) We confirm that any changes to a component or element of structure which are the subject of this assessment have not to our knowledge been tested to the standard against which this assessment has been made.
3) We agree to withdraw this assessment from circulation should the component or element of structure, or any of its component parts be the subject of a failed fire resistance test to the standard against which this assessment is being made.
4) We understand that this assessment is based on test evidence and will be withdrawn should evidence become available that causes the conclusion to be questioned. In that case, we accept that new test evidence may be required.
5) We are not aware of any information that could affect the conclusions of this assessment. If we subsequently become aware of any such information, we agree to ask the assessing authority to withdraw the assessment.

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

Signed:

DocuSigned by:
E178F3EA31B14B0...

Name: Christian Daschner

Position: Director R&D

Date: 21-Feb-2024

For and on behalf of: **Moralt A.G.**

15 Limitations

The following limitations apply to this assessment:

1) This field of application addresses itself solely to the elements and subjects discussed and do not cover any other criteria or modifications. All other details not specifically referred to should remain as tested or assessed.
2) This field of application report is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available to Warringtonfire, the assessment will be unconditionally withdrawn, and the applicant will be notified in writing. Similarly, the assessment evaluation is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence.
3) This field of application has been carried out in accordance with Fire Test Study Group Resolution No. 82: 2001.
4) Opinions and interpretation expressed herein are outside the scope of UKAS accreditation.
5) This field of application relates only to those aspects of design, materials and construction that influence the performance of the element(s) under fire resistance test conditions, against the ISO 834 time/temperature curve that is stipulated in the standard this assessment concludes to. 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 field of application, the element is suitable for its intended purpose.
6) This field of application report 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 test evidence referred to in this report. We express no opinion as to whether that evidence, and/or this field of application would be regarded by any Building Control authorities or any other third parties as sufficient for that or any other 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.
8) The version/revision stated on the front of this Field of Application supersedes all previous versions/revisions and must be used to manufacture doorsets from the stated validity date on this front cover. Previous revisions of the Field of Application cannot be used once an updated Field of Application has been issued under a new revision.

16 Validity

1) The assessment is initially valid for five years after which time it is recommended to be submitted to Warringtonfire for re-appraisal.
2) This assessment report is not valid unless it incorporates the declaration given in Section 14 duly signed by the applicant.

Position:	Assessor	Reviewer
Signature:	DocuSigned by: DE15B987D373423...	DocuSigned by: 3A9C822F3E7F487...
Name:	*A M Winning	*C Newton
Title:	Senior Product Assessor	Product Assessor

* For and on behalf of Warringtonfire

Appendix A: Revisions

Revision	Warringtonfire Reference	Date	Description
A	CNA/F14309	10.02.15	Addition of WoodEx60 door frame and grooving options added
B	WF399354	22.08.18	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.
C	WF421103	06.12.19	Update to Warringtonfire format and in accord with the principles of BSEN 15725: 2010. Option for Acrovyn encapsulation added.
D	WF433075	12.10.20	Assessment revised to provide a scope of application for Moralt Firesmoke 54mm with head rail inserts and 6mm chipboard faces only. The assessment is based on the primary test evidence for the Moralt Firesmoke 54mm design with 6mm chipboard faces and head rails inserts, referenced XF11016 and the approved leaf sizes and configurations in the revised assessment are based on this report. The assessment has been revised to include specific items of hardware and glazing from the following supplementary test reports: RF07055, WF382394 and FEP/F14256. The intumescent specification in RF07055 has been used to support large leaf dimensions. Test report FEP/F14102 has been used as supporting evidence for Woodex engineered timber door frames, the current revision of assessment Chilt/A11129 has been used to support the use of CS Group Acrovyn encapsulation and test report P1009/14-530-1 has been used to support the Norseal NOR710 drop seal
E	WF534963	20.02.24	Amend head rail detail to permit use of solid hardwood as well as LVL. Permit Yeoman shield encapsulation of the leaf(s) (CFR1002181 Rev 2) and Edge Protectors (RF07141) Mann McGowan leaf edge and environmental seals (DMT-DO-50-1216, DMT-DO-50-1090)

			Add additional locksets including Aelement Fusion RFID design. Add Bartels Pivota concealed hinges (DMT-DO-50-1009) Amend current Abloy lock references. Add dropseal scope from new supplier - Elton (DMT-DO-50-992/993/994) Remove all references to smoke control performance.