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Title

Field of Application for:

The HS Optimus Wood Products Range of Doorsets Using Chipboard Core Door Blanks in Timber Based Door Frames

For 30 minutes Fire Resistance

Report No.:

Chilt/A08073 Revision I

Issue Date:

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Job Reference:

WF 525524

Prepared for:

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1 Foreword

This Field of application report has been commissioned by HS Optimus Wood Products Sdn Bhd. and relates to the fire resistance of 30 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, 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.

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 HS Optimus Wood Products doorset designs, for 30 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. Test report WF423349 is reference as sampled test evidence. The summary details are considered to be the key aspects of the design tested.

Note:

1. Dimensions are in mm unless otherwise stated.
2. Abbreviations: (h) = height; (w) = width; (t) = thickness; (d) = deep: (l) = long.
3. 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, 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.

3.1 Primary Test Evidence

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

3.1.1 Test Report Chilt/RF10105

The referenced test report, the essential details of which are summarised below, is the primary data for leaf options 2 and 6 listed in section 5.1 incorporating a panel design and grooving detail being considered for assessment in this report.

Date of test		27th September 2010
Identification of test body:		Warringtonfire Testing and Certification Ltd. formerly known as Chiltern International Fire Ltd. UKAS No. 1762
Sponsor:		KLW Wood Products
Tested Product:		2No. Fully insulating single leaf, unlatched, single acting, timber doorsets. For the purpose of the test the doorsets were referenced 'A' & 'B'
Summary of test specimen:		Leaf dimensions: 1981mm (h) x 838mm (w) x 44mm (t) Doorset A: Veneered Particleboard Core 44mm (t), 21mm (t) mock panels with 6.5mm (t) reduced to 2mm (t) veneered MDF facings, 11.5 h) x 9.5 (w) Oak panel beading, Oak vertical Lippings 6mm (t). Leaf hung in a European Redwood frame on 3No. Stainless steel lift off hinges. This door design can be seen in section 5.1.6 as Leaf Option 6 Doorset B: Veneered Particleboard Core 44mm (t), Oak vertical Lippings 6mm (t), with grooving incorporating Oak decorative inlay 13.5 mm (w) x 7mm (h) with a 10mm (w) x 4mm (d) groove. Leaf hung in a European Redwood frame on 3No. Stainless steel lift off hinges. This door design can be seen in section 5.1.2 as Leaf Option 2. The doorsets were oriented to open towards heat conditions. The doorset included a tubular mortice latch, positioned at approximately mid-height of the doorset. The door leaf was disengaged for the duration of the test
Test Standard:		BS 476: Part 22: 1987
Performance	**Doorset A**	Integrity: 38 minutes Insulation: 38 minutes
	Doorset B	Integrity: 41 minutes Insulation: 41 minutes

3.1.2 Test Report Chilt/RF07159 Doorset B

The referenced test report, the essential details of which are summarised below, is the primary data for the leaf option 4 listed in section 5.1 incorporating mock stile and rail panel design being considered for assessment in this report.

Date of test		11th December 2007
Identification of test body:		Warringtonfire Testing and Certification Ltd. formerly known as Chiltern International Fire Ltd. UKAS No. 1762
Sponsor:		KLW Wood Products
Tested Product:		Fully insulating Latched, single acting, single leaf timber doorset. For the purpose of the test the doorset was referenced 'B'
Summary of test specimen:		Doorset B leaf dimensions: 2050mm (h) x 915mm (w) x 44mm (t). Doorset B: Veneered Chipboard Core 25mm (t), Mock stile Chipboard facings 9mm (t), Oak vertical Lippings 6mm (t), Leaf hung in a European Redwood frame on 3No. Stainless steel lift off hinges. This door design can be seen in section 5.1.4 as Leaf Option 4. The doorset was oriented to open towards heat conditions. The doorset included a tubular mortice latch, positioned at approximately mid-height of the doorset. Doorset B leaf was engaged for the duration of the test
Test Standard:		BS 476: Part 22: 1987
Performance	**Doorset B**	Integrity: 41 minutes Insulation: 41 minutes

Note: Doorset A from this test has not been cited in this assessment due to the failure occurring at 27 minutes. Doorset A was a double doorset design, which is considered more onerous than a single doorset, due to the inclusion of a meeting edge detail. This assessment is therefore restricted to single leaf doorset configurations.

3.1.3 Test Report WF393927

The referenced test report, the essential details of which are summarised below, is the primary data for the leaf options 1 and 4 listed in section 5.1 incorporating glazed apertures being considered for assessment in this report.

Date of test		4th January 2018
Identification of test body:		Warringtonfire Testing and Certification Ltd. formerly known as Exova Warringtonfire Ltd. UKAS No. 1762
Sponsor:		KLW Wood Products
Tested Product:		Single leaf, unlatched, single acting, timber doorset. For the purpose of the test the doorset were referenced 'A' and 'B'
Summary of test specimen:		Doorset A leaf dimensions: 1981mm (h) x 762mm (w) x 44mm (t). Doorset B leaf dimensions: 1981mm (h) x 762mm (w) x 44mm (t). Doorset A: Veneered Particleboard Core 44mm (t), hardwood Lippings 7mm (t), fitted with Pilkington Pyroshield 2 Georgian Wired polished plate glass 6mm (t), with aluminium foil wrapped edges, aperture size 1721mm (h) x 562mm (w), with profile Oak beading 24mm (h) x 19mm (d). Leaf hung in a European Redwood frame on 3No. Stainless steel lift off hinges. This door design can be seen in section 5.1.1 as Leaf Option 1. Doorset B: Particleboard Core 25mm (t), Veneered Particleboard facings 9mm (t), Oak Lippings 6mm (t), fitted with Pilkington Pyroshield 2 Georgian Wired polished plate glass 6mm (t), with aluminium foil wrapped edges, aperture size 1721mm (h) x 562mm (w) with profile Oak beading 19mm (h) x 19mm (d). Leaf hung in a European Redwood frame on 3No. Stainless steel lift off hinges. This door design can be seen in section 5.1.4 as Leaf Option 4. Both doorsets was oriented to open towards heat conditions. The doorset included a tubular mortice latch, positioned at approximately mid-height of the doorset. The leaves were disengaged for the duration of the test
Test Standard:		BS 476: Part 22: 1987
Performance	**Doorset A**	Integrity: 27 minutes [1] Insulation: 0 minutes
	Doorset B	Integrity: 33 minutes Insulation: 0 minutes

[1] The report states the specimen failed a cotton pad test at the latch position at 27 minutes and 38 seconds. The next failure recorded was continuous flaming at the perimeter of the glass at 35 minutes and 12 seconds. The latch was recorded to have no intumescent protection installed behind the forend and around the latch body. It is our opinion that if the latch/lockset was

installed with intumescent protection that complies with section 9.2, this would react and help protect this location from fire attack for the required 30 minutes fire resistance performance and is therefore acceptable herein.

3.1.4 Test Report IF08080

The referenced test report, the essential details of which are summarised below, is the supplementary data for Pilkington Pyroshield glazing being considered for assessment in this report.

Date of test		10th February 2009
Identification of test body:		Warringtonfire Testing & Certification Ltd. formerly known as Chiltern International Fire Ltd. UKAS No. 1762
Sponsor:		KLW Wood Products
Tested Product:		Section of leaf, unlatched, single acting, timber doorset. For the purpose of the test the doorset was referenced 'A'.
Summary of test specimen:		Leaf dimensions: 990mm (h) x 915mm (w) x 43mm (t). Doorset A: Chipboard Core 43mm (t), hardwood lippings vertical edges 6mm (t), fitted with Pilkington Pyroshield glazing 6mm (t), aperture size 790mm (h) x 715mm (w), incorporating Sapele glazing bead 22mm (h) x 17mm (d) including a 5mm x 5mm bolection return with 17mm upstand and a 20Deg chamfer, fitted with 2mm (t) Intumescent Seals Ltd Fireglaze mastic between the glass and bead on both sides. Leaf hung in a European Redwood frame on 2No. Stainless steel lift off hinges. No latch was fitted in the specimen. The handle was wired shut until intumescent seals had reacted.
Test Standard:		To the conditions given in BS 476: Part 22: 1987, the full requirements of the test standard were not complied with.
Performance	**Doorset A**	Integrity: 34 minutes Insulation Door Blank: 34 minutes Insulation Glass: approx. 4 minutes

3.1.5 Test Report IF09014

The referenced test report, the essential details of which are summarised below, is the data for CFG Toughened glazing being considered for assessment in this report.

Date of test		25th February 2009
Identification of test body:		Warringtonfire Testing & Certification Ltd. formerly known as Chiltern International Fire Ltd. UKAS No. 1762
Sponsor:		KLW Wood Products
Tested Product:		Section of leaf, unlatched, single acting, timber doorset. For the purpose of the test the doorset was referenced 'A'.
Summary of test specimen:		Leaf dimensions: 990mm (h) x 906mm (w) x 44mm (t). Doorset A: Chipboard Core 44mm (t), hardwood Lippings vertical edges 6mm (t), fitted with CFG Toughened glass 6mm (t), aperture size 796mm (h) x 721mm (w), incorporating Sapele glazing bead 22mm (h) x 17mm (d) including a 5mm x 5mm bolection return with 17mm upstand and a 20Deg chamfer, fitted with 10mm (w) x 2mm (t) Intumescent Seals Ltd There-A-Strip between the glass and bead on both sides and aluminium foil was fitted to the edge of the glass projecting 11mm on each face. Leaf hung in a European Redwood frame on 2No. Stainless steel lift off hinges. No latch was fitted in the specimen. The handle was wired shut until intumescent seals had reacted.
Test Standard:		To the conditions given in BS 476: Part 22: 1987, the full requirements of the test standard were not complied with.
Performance	**Doorset A**	Integrity: 35 minutes

3.1.6 Test Report WF423349 Doorset B

The referenced test report, the essential details of which are summarised below, is the primary data for a sampled test of the leaf option 2 listed in section 5.1 used for certification being considered for assessment in this report.

Date of test		31st January 2020
Identification of test body:		Warringtonfire Testing & Certification Ltd. UKAS No. 1762
Sponsor:		KLW Wood Products
Tested Product:		Single leaf, latched, single acting, timber doorset.
Sampling		The sampling took place on the 26th-27th November 2019 by a representative of BM TRADA Certification.
Summary of test specimen:		Doorset leaf dimensions: 2040mm (h) x 926mm (w) x 44mm (t). Core: Veneered Particleboard Core 44mm (t), White Oak Lippings 6mm (t) and 7No. vertical and 2No. horizontal White Oak decorative groove inserts 18mm (w) x 7 (t) with a 10mm (w) x 4mm (d) groove. Leaf hung in a White Oak frame measuring 30mm (t) x 100mm (d) including a 15mm x 47mm integral stop on 3No. Stainless Assa Abloy butt hinges. 1No. 15 x 4 Lorient Polyproducts Ltd LP1504 Type 617 seal fitted in the frame head and jambs reveal. This door design can be seen in section 5.1.2 as Leaf Option 2 The doorset was oriented to open towards heat conditions. The doorset included a mortice latch, positioned at approximately mid-height of the doorset. The leaves were engaged for the duration of the test
Test Standard:		BS 476: Part 22: 1987
Performance	**Doorset B**	Integrity: 45 minutes Insulation: 45 minutes

Note: Doorset A from this test has not been cited in this assessment due to the failure occurring at 19 minutes at the closing edge. Doorset A does not match any of the doorset designs currently listed in this assessment and therefore does not change the scope currently provided in this assessment.

3.2 Secondary test evidence

3.2.1 Certifire CF257

The referenced CERTIFIRE certificate, the essential details of which are summarised below, is to be used to support the fire resistance of the *'Pyroguard EW'* fire resisting glass.

Validity period:	First Issued:	20th February 2006
	Valid to:	1st February 2026
Identification of certification body:	Warringtonfire Testing and Certification Ltd	
Sponsor:	Pyroguard UK Limited *International House,* *Millfield Lane,* *Haydock,* *WA11 9GA*	
Certified Products:	'Pyroguard EW' fire resisting glass	
Technical Schedule:	TS25 – Fire resistant glass, glazing systems and materials	
Summary of certification:	Fire resistance approval of 'Pyroguard EW' laminated glass products when used in timber-based door assemblies (amongst other applications specified therein), as defined in BS 476: Part 22: 1987, for periods of 30 and 60 minutes fire resistance integrity performance. (Note: the basis of the approval is outlined in the referenced certificate).	
Test Standard:	BS 476: Part 22: 1987	

3.2.2 Certifire CF5954

The referenced CERTIFIRE certificate, the essential details of which are summarised below, is to be used to support the fire resistance of the *'Pyrostem'* fire resisting glass.

Validity period:	First Issued:	21st February 2021
	Valid to:	24th May 2026
Identification of certification body:	Warringtonfire Testing and Certification Ltd	
Sponsor:	Pyroguard UK Limited *International House,* *Millfield Lane,* *Haydock,* *WA11 9GA*	
Certified Products:	'Pyrostem' fire resisting glass	
Technical Schedule:	TS25 – Fire resistant glass, glazing systems and materials	
Summary of certification:	Fire resistance approval of 'Pyrostem' Safety Wired glass products when used in timber-based door assemblies (amongst other applications specified therein), as defined in BS 476: Part 22: 1987, for periods of 30 and 60 minutes fire resistance integrity performance. (Note: the basis of the approval is outlined in the referenced certificate).	
Test Standard:	BS 476: Part 22: 1987	

3.2.3 Certifire CF328

The referenced CERTIFIRE certificate, the essential details of which are summarised below, is to be used to support the fire resistance of the *'Pyrodur'* and *'Pyrostop'* fire resisting glass.

Validity period:	First Issued:	8th July 2004
	Valid to:	22nd October 2024
Identification of certification body:	Warringtonfire Testing and Certification Ltd	
Sponsor:	Pilkington UK Limited *Hall Lane,* *Lathom,* *Lancashire,* *L40 5UF*	
Certified Products:	'Pyrodur and Pyrostop' fire resisting glass	
Technical Schedule:	TS25 – Fire resistant glass, glazing systems and materials	
Summary of certification:	Fire resistance approval of 'Pyrodur' and 'Pyrostop' laminated glass products when used in timber-based door assemblies (amongst other applications specified therein), as defined in BS 476: Part 22: 1987, for periods of 30 and 60 minutes fire resistance integrity and insulation performance. (Note: the basis of the approval is outlined in the referenced certificate).	
Test Standard:	BS 476: Part 22: 1987	

3.2.4 Certifire CF291

The referenced CERTIFIRE certificate, the essential details of which are summarised below, is to be used to support the fire resistance of the *'Pyran S'* fire resisting glass.

Validity period:	First Issued:	9th September 2002
	Valid to:	29th May 2023
Identification of certification body:	Warringtonfire Testing and Certification Ltd	
Sponsor:	Schott Technical Glass Solutions GmbH *Otto-Schott-StraBe 13,* *D-07745 Jena,* *Germany*	
Certified Products:	'Pyran S' fire resisting glass	
Technical Schedule:	TS25 – Fire resistant glass, glazing systems and materials	
Summary of certification:	Fire resistance approval of 'Pyran S' glass when used in timber-based door assemblies (amongst other applications specified therein), as defined in BS 476: Part 22: 1987, for periods of up to 120 minutes fire resistance integrity performance. (Note: the basis of the approval is outlined in the referenced certificate).	
Test Standard:	BS 476: Part 22: 1987	

3.2.5 Certifire CF718

The referenced CERTIFIRE certificate, the essential details of which are summarised below, is to be used to support the fire resistance of the *'Pyroshield 2 Safety Clear'* fire resisting glass.

Validity period:	First Issued:	18th May 2010
	Valid to:	14th February 2026
Identification of certification body:	Warringtonfire Testing and Certification Ltd	
Sponsor:	Pilkington Group Limited *Prescot Road,* *St. Helens,* *WA10 3TT*	
Certified Products:	'Pyroshield 2 Safety Clear' fire resisting glass	
Technical Schedule:	TS25 – Fire resistant glass, glazing systems and materials	
Summary of certification:	Fire resistance approval of 'Pyroshield 2' glass products when used in timber-based door assemblies (amongst other applications specified therein), as defined in BS 476: Part 22: 1987, for periods of 30 minutes fire resistance integrity performance. (Note: the basis of the approval is outlined in the referenced certificate).	
Test Standard:	BS 476: Part 22: 1987	

4 Technical Specification

4.1 General

The technical specification for the proposed door assemblies 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

Doorsets constructed using the different leaf options can include various design features as summarised below.

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

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

4.3.1 Leaf Option 1 – Chipboard Core – 44mm thick

The door designs can include:

1. Glazing
2. Various hardware options
3. Decorative facings

4.3.2 Leaf Option 2 – Chipboard Core with Decorative Groove Inlay – 44mm thick

The door designs can include:

1. Glazing
2. Various hardware options
3. Decorative groove inlay

4.3.3 Leaf Option 3 – Chipboard Core with Plywood Facings – 50mm thick

The door designs can include:

1. Glazing
2. Various hardware options
3. Decorative facings

4.3.4 Leaf Option 4 – Chipboard Core (25mm thick) with Chipboard Mock Stiles & Rails (Flat Panels) – 44mm thick

The door designs can include:

1. Glazing
2. Various hardware options
3. Panel arrangements

4.3.5 Leaf Option 5 – Chipboard Core (25mm thick) with Chipboard Mock Stiles & Rails & Hardwood Beading (Vertical Bars) – 44mm thick

The door designs can include:

1. Glazing
2. Various hardware options
3. Panel arrangements

4.3.6 Leaf Option 6 – Chipboard Core (25mm thick) with Chipboard Mock Stiles & Rails with MDF Panel Facings & Hardwood Beading (Raised & Fielded Panels) – 44mm thick

The door designs can include:

1. Glazing
2. Various hardware options
3. Panel arrangements

4.4 Door Frame Option

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

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

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 30 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, the harder it becomes to pass a test. This approach leads to the following statement:

1. 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

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 HS Optimus Wood Products doorset designs, with the abbreviation and full description of each configuration.

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

Doorset Configurations			
Depiction	Abbreviation	Description	Design (Leaf Option)
	LSASD	Latched Single Acting Single Doorset	All designs (1, 2, 3, 4, 5 & 6)
	ULSASD	Unlatched Single Acting Single Doorset	Flat designs (1, 2 & 3)

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 option.

A table of essential hardware is given in section 9.3 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, with tightly formed abutting corner joints where the leaf edges meet, unless stated otherwise.

4.5.4.2 Explanation for following sections

The performance of a doorset in terms of configuration and size is dependent on the leaf option, perimeter intumescent used and frame option. These elements are not automatically interchangeable. The following sections present the envelopes for the 6 leaf options and 1 frame option. 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 ULSASD
- for each configuration, each leaf option is considered separately
- for each configuration, leaf option and intumescent specification is considered separately, and a unique envelope of permitted leaf sizes is presented based on the configuration, leaf option and intumescent and the envelope is directly linked to a unique test.

Summary of Permitted Configurations for (HS Optimus Wood Products) blanks, leaf options 1-3 and frame option 1

Permitted Configurations with frame option 1 with leaf options 1-3 (HS Optimus Wood Products)			
		Configuration	
		LSASD	ULSASD
Frame	1 – Softwood or hardwood frame*	Yes	Yes

* See Section 7 for specific limitations with respect to the framing option

Summary of Permitted Configurations for (HS Optimus Wood Products) blanks, leaf options 4-6 and frame option 1

Permitted Configurations with frame option 1 with leaf options 4-6 (HS Optimus Wood Products)		
		Configuration
		LSASD
Frame	1 – Softwood or hardwood frame*	Yes

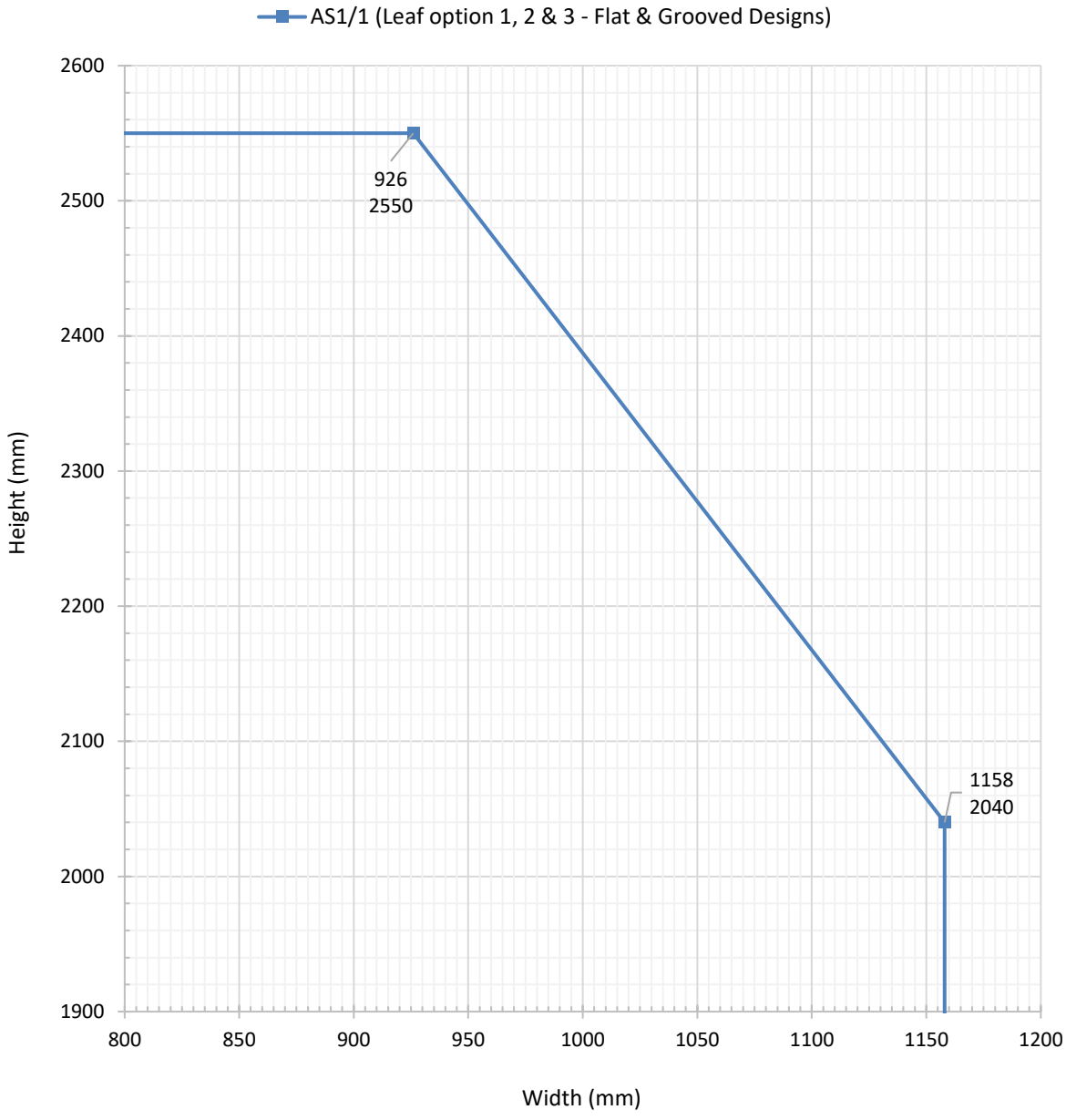
* See Section 7 for specific limitations with respect to the framing option

4.5.5 LSASD Configuration: Leaf Sizes & Intumescent Specification

Doorset created from Leaf option 1, 2 3 with frame option 1

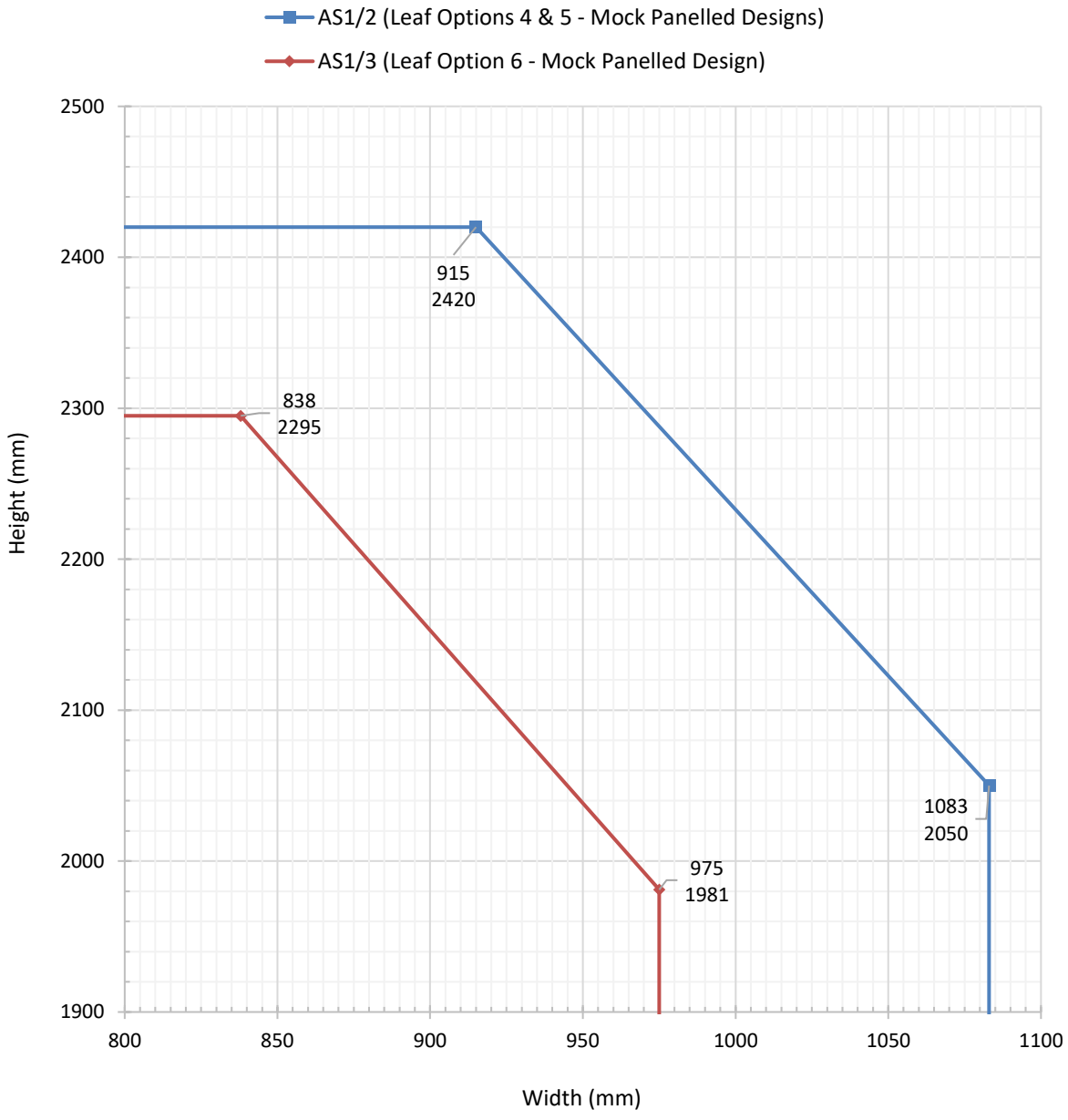
LSASD

Leaf Option 1, 2 & 3 - HS Optimus Wood Products
(Flat Designs)
& Frame Option 1 (Softwood or Hardwood)
(Lorient Polyproducts Type 617 1No. 15x4mm)



LSASD

Leaf Option 4, 5 & 6 - HS Optimus Wood Products
(Mock Panelled Designs)
& Frame Option 1 (Softwood or Hardwood)
(Lorient Polyproducts Type 617 1No. 15x4mm)



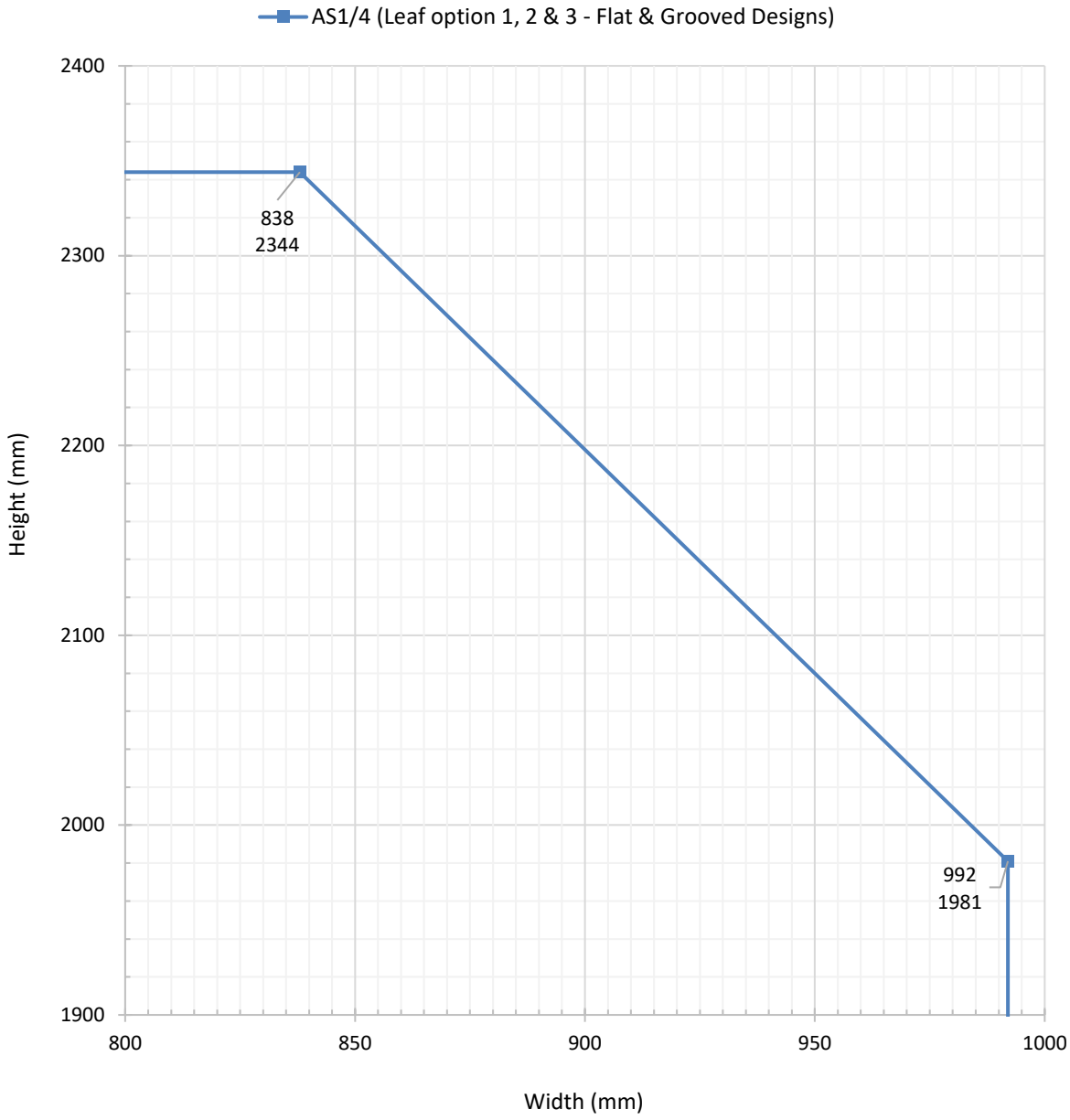
Intumescent Specification for LSASD Leaf Option 1, 2, 3, 4, 5 & 6 (HS Optimus Wood Products) with Frame Option 1 (Softwood or Hardwood)			
Intumescent Spec. Reference & (Test Reference)	Make / Type	Manufacturer / Supplier	Location & Size
AS1/1 (WF423349 Doorset B) [1]	Type 617	Lorient Polyproducts Ltd.	**For leaves under 2300mm high:** **Head & Jambs:** 1No. 15x4mm seal fitted centrally in frame reveal. **For leaves over 2300mm high:** **Head & Jambs:** 1No. 20x4mm seal fitted centrally in frame reveal.
AS1/2 (Chilt/RF07159 Doorset B)			
AS1/3 (Chilt/RF10105 Doorset A)			

4.5.6 ULSASD Configuration: Leaf Sizes & Intumescent Specification

Doorset created from Leaf option 1, 2 3 with frame option 1

ULSASD

Leaf Option 1, 2 & 3 - HS Optimus Wood Products
(Flat Designs)
& Frame Option 1 (Softwood or Hardwood)
(Lorient Polyproducts Type 617 1No. 15x4mm)



Intumescent Specification for ULSASD Leaf Option 1, 2 & 3 (HS Optimus Wood Products) with Frame Option 1 (Softwood or Hardwood)			
Intumescent Spec. Reference & (Test Reference)	Make / Type	Manufacturer / Supplier	Location & Size
BS1/4 (Chilt/RF10105 Doorset B)	Type 617	Lorient Polyproducts Ltd.	**For leaves under 2300mm high:** **Head & Jambs:** 1No. 15x4mm seal fitted centrally in frame reveal. **For leaves over 2300mm high:** **Head & Jambs:** 1No. 20x4mm seal fitted centrally in frame reveal.

5 General Description of Construction

5.1 Leaf Core Construction

The 6 leaf options are detailed below and approved by this assessment.

5.1.1 Leaf Option 1 – Chipboard Core – 44mm thick

The basic tested construction of this door leaf design comprises the following:

Element	Material	Dimensions (mm)	Minimum Density (kg/m^3)
Core	Chipboard	44 thick	650

This doorset design has not been specifically tested. However, considering it is the same basic construction as leaf option 2 below, with no grooves and a denser core, Warringtonfire opine that these changes to the door blank would have no significant effect on the doorsets overall fire resistance performance and would likely be of benefit. Therefore, this design is permitted herein.

The leaf must be lipped as specified in section 5.3.

The minimum leaf thickness after calibration is 43mm (i.e. a maximum of 0.5mm from both sides).

The minimum leaf thickness after finishes applied is 44mm.

5.1.2 Leaf Option 2 – Chipboard Core with Decorative Groove Inlay – 44mm thick

The basic tested construction of this door leaf design comprises the following:

Element	Material	Dimensions (mm)	Minimum Density (kg/m^3)
Core	Veneered particleboard	44 thick with 7 deep grooves on both faces of the door leaf	520-580
Grooves Inlay	See section 5.1.2.1 -	13.5 - 35 wide x 7 deep [1]	500

[1] See section 5.1.2.1 below for the groove and inlay specification requirements. Grooves must incorporate an inlay as described in section 5.1.2.1.

The leaf must be lipped as specified in section 5.3.

The minimum leaf thickness after calibration is 43mm (i.e. a maximum of 0.5mm from both sides).

The minimum leaf thickness after finishes applied is 44mm.

5.1.2.1 Specification for decorative grooves

All grooves must incorporate a timber inlay to the full width and depth of the groove. The groove and inlay requirements are specified below.

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

Element	Details
Max. groove size within the timber inlay (mm)	10 x 4 mm
Max overall inlay size (mm)	13.5 - 35mm x 7mm [1]
Inlay material	Softwood / Hardwood 500 kg/m^3 or MDF 700 kg/m^3
Parallel Grooves	Must be a minimum of 64mm apart
Grooves Running to Edge of the Door Leaf [2]	Maximum of 4 to vertical edges Maximum of 3 to horizontal edges
Configuration	Latched and unlatched, single acting, single leaf doorsets
Leaf size range (mm)	See section 4.5.5 and 4.5.6
Intumescent seal dimensions (mm)	See section 4.5.5 and 4.5.6
Adhesive	See section 8

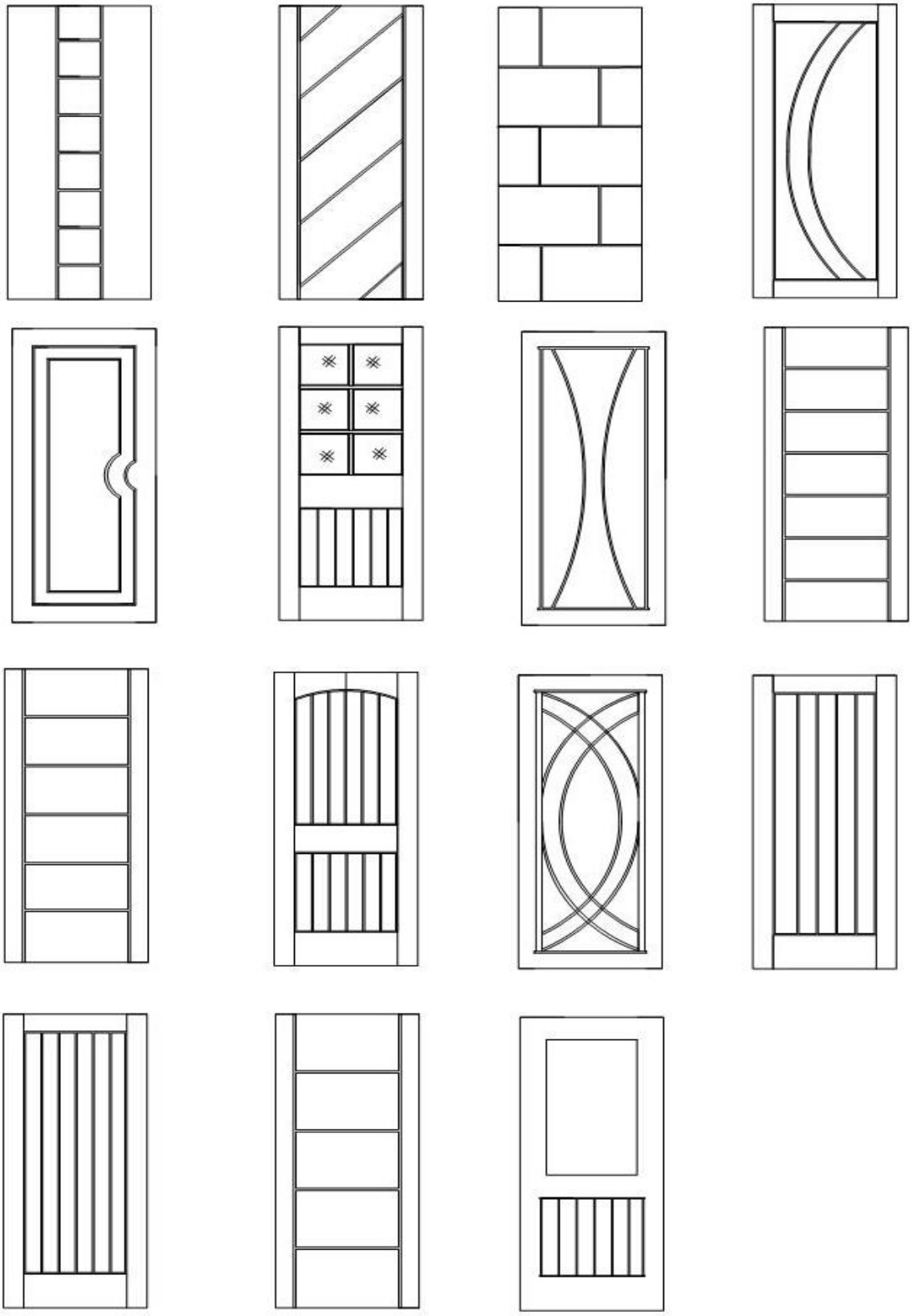
[1] For straight grooves the maximum width is 18mm wide as successfully tested. The inlay must be the full depth and width of the groove routed out of the leaf faces.

[2] 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 glazed apertures but the beading must be modified to fill the groove, and consequently can only be used with a modified bolection moulding.

The grooves and timber inlay were successfully tested at 13.5 and 18mm wide. Considering the overrun achieved in the tests, with no signs of burn through, Warringtonfire has assessed grooves up to 35mm wide, to accommodate curved groove designs. In addition, the grooves are located within the central section of the door leaf, the depth of the groove in the door leaf is not beyond that tested and the inlay width is to be increase pro rata to fill the entire width of the groove. This all provides further confidence in the ability of the door leaf to incorporate 35mm wide grooves.

The following diagrams show the permitted groove designs.



Note:

Limitation on glass type see section 6.5 for false glazing beads.

A maximum 35mm wide inlay is permitted to enable both the semi-circular groove designs where they meet the vertical grooves.

5.1.3 Leaf Option 3 – Chipboard Core with Plywood Facings – 50mm thick

The basic tested construction of this door leaf design comprises the following:

Element	Material	Dimensions (mm)	Minimum Density (kg/m^3)
Core	Chipboard	44 thick	650
Facings	Plywood	3.2 thick	650

This doorset design has not been specifically tested. However, considering it is the same basic construction as leaf option 2 above, with additional facings which will help protect and insulate the core for a period of time in a fire resistance test, Warringtonfire opine that this change to the door blank would have no significant effect on the doorsets overall fire resistance performance and would likely be of benefit. Therefore, this design is permitted herein.

The leaf must be lipped as specified in section 5.3.

The minimum leaf thickness after calibration is 49mm (i.e. a maximum of 0.5mm from both sides).

The minimum leaf thickness after finishes applied is 50mm.

5.1.4 Leaf Option 4 – Veneered Chipboard Core (25mm) with Chipboard Mock Stiles & Rails (Flat Panel) – 44mm thick

The basic tested construction of this door leaf design comprises the following:

Element	Material	Dimensions (mm)	Minimum Density (kg/m^3)
Core	Veneered Chipboard	25 thick	650
Facings (Mock Stiles & Rails) [1]	Chipboard [2]	9 thick	400 [3]

[1] See section 5.5 for panel requirements.
[2] Bonded to both faces of the leaf to create a flat panel effect.
[3] If glazing is used instead of a panel, the minimum density must be 650kg/m^3 as successfully tested in report WF393927 doorset B. The mock stiles and rails must fully cover the remaining core material on both sides of the leaf around the glazed aperture.
The leaf must be lipped as specified in section 5.3.

5.1.5 Leaf Option 5 – Chipboard Core (25mm) with Chipboard Mock Stiles & Rails & Hardwood Beading (Vertical Bars) – 44mm thick

The basic tested construction of this door leaf design comprises the following:

Element	Material	Dimensions (mm)	Minimum Density (kg/m^3)
Core	Veneered Chipboard	25 thick	650
Facings (Mock Stiles & Rails) [1]	Hardwood veneered Chipboard [2]	9 thick	400 [4]
Mouldings [3]	Hardwood	6 thick	500

[1] See section 5.5 for panel requirements.
[2] Bonded to both faces of the leaf to create a flat panel effect.
[3] Bonded in a vertical orientation to both faces of the leaf to create a multi panel effect.
[4] If glazing is used instead of a panel, the minimum density must be 650kg/m^3 as successfully tested in report WF393927 doorset B. The mock stiles and rails must fully cover the remaining core material on both sides of the leaf around the glazed aperture.

This doorset design has not been specifically tested. However, considering it is the same basic construction as leaf option 4 above, with additional mouldings applied to the panel which are considered sacrificial, Warringtonfire opine that this change to the door blank would have no significant effect on the doorsets overall fire resistance performance and is therefore permitted herein.

The leaf must be lipped as specified in section 5.3.

5.1.6 Leaf Option 6 – Chipboard Core (25mm) with Chipboard Mock Stiles & Rails with MDF Panel Facings & Hardwood Beading (Raised & Fielded Panels) – 44mm thick

The basic tested construction of this door leaf design comprises the following:

Element	Material	Dimensions (mm)	Minimum Density (kg/m^3)
Core	Chipboard	25 thick (reduced to 21 thick at panel locations)	650
Facings (Mock Stiles & Rails) [1]	Hardwood veneered Chipboard [2]	9 thick	400 [4]
Beading [3]	Hardwood	11.5 high x 9.5 wide	500
Panel Facings	Hardwood veneered MDF	6.5 thick reducing to 2 thick at fielded areas	650

[1] See section 5.5 for panel requirements.
[2] Bonded to both faces of the leaf to create a panel effect.
[3] Bonded around all 4 edges of each panel to create a raised and field panel effect.
[4] If glazing is used instead of a panel, the minimum density must be 650kg/m^3 as successfully tested in report WF393927 doorset B. The mock stiles and rails must fully cover the remaining core material on both sides of the leaf around the glazed aperture.

The leaf must be lipped as specified in section 5.3.

5.2 Leaf Size Adjustment During Manufacturer – all Leaf Options

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

Pre-Machining Leaf Size Adjustment Specification	
Element	Reduction
Leaf	The size of the leaf may be reduced in height or width without restriction for manufacturing purposes, providing the finished leaf is lipped in accordance with section 5.3 and the minimum stiles and rails section sizes are maintain in section 5.5 for leaf options 4, 5 & 6.
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 – All Leaf Options

The testing documented in section 3 has generally been undertaken using 6-7mm thick lippings applied to the vertical edges using species at varying densities ranging from 500-700kg/m³. PVAC adhesive was used in all cases to seal the lippings.

On the above basis, HS Optimus Wood Products door blanks (leaf option 1, 2, 3, 4, 5 & 6) must be lipped with the following specification, for all leaf options.

Timber Lipping Specification for HS Wood Products door blanks		
Material	Size (mm)	Min Density (kg/m^3)
Hardwood	1. Flat = 6 – 11 thick	500

Notes:

1. All lippings are to be the same thickness as the door leaf.
2. Single doorsets only require lipping on the vertical edges but may be additionally lipped on the top and bottom edges if required. Lipping's used must be square.
3. Lippings must be bonded with PVAC adhesive. 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.

5.4 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[5]	0.2
Timber veneers[3]	2
Plastic laminates[3]	2
PVC[3]	2
Cellulosic and non-metallic foils[3]	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 44mm after finishing has been applied.
3. Materials may over sail lippings but must not return around leaf edges.
4. For all options, materials must not conceal intumescent strips.
5. Intumescent paints are not permitted.

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

5.5 Leaf Facing Materials – Leaf Option 4, 5 & 6

5.5.1 Panel Arrangement

The following variation to the construction of these designs has been assessed as suitable:

- Mock stile and rail panelled doorset designs may be constructed to simulate a minimum of one, and a maximum of ten panels. See section 5.5.2 and 5.5.3 for minimum stile and rail sizes.
- In addition to the flat panel design tested (Leaf options 4 & 5), a raised and fielded option is acceptable for these designs. This is based on the opinion that additional facings applied to the panels will provide cellulosic material that will burn and char and help protect and insulate the core material underneath for a period of time in a fire resistance test. Therefore, the inclusion of facing materials to the panel for leaf option 4 and 5 is permitted. A raised & fielded panel may be bonded to the following specification:

Material	**Min. Density** (kg/m³)	**Dimensions** (mm)	**Fixing Method**
MDF	700	Min. 4 thick, raised to max. 12 thick	Bonding with UF

1. Any profile of MDF or timber moulding up to dimensions of 30mm x 30mm may be surface applied.

5.5.2 Applied Mock Stiles & Rails - Leaf Options 4 & 5 (44mm thick)

The following dimensions for mock stile and rail facings to create panel features have been assessed as suitable for use with this door design type:

Element	**Dimensions** (mm)
Top rail	9 thick x 115-150 wide
Stiles	9 thick x 115-150 wide
Bottom rail	9 thick x 180-250 wide
Intermediate framing	9 thick x 60-150 wide

For glazed options, the stiles and rails may be a minimum 100mm wide as tested in report WF393927.

5.5.3 Applied Mock Stiles & Rails - Leaf Options 6 (44mm thick)

The following dimensions for mock stile and rail facings to create panel features have been assessed as suitable for use with this door design type:

Element	**Dimensions** (mm)
Top rail	9 thick x 120-150 wide
Stiles	9 thick x 125-150 wide
Bottom rail	9 thick x 230-250 wide
Intermediate framing	9 thick x 115-150 wide

For glazed options, the stiles and rails may be a minimum 100mm wide as tested in report WF393927.

6 Glazing within the Leaf

6.1 General

The testing conducted on HS Optimus Wood Products door designs has demonstrated that they are capable of tolerating glazed apertures, whilst providing a margin of over performance. For example, test reference WF393927B included a glazed aperture 1721mm high x 562mm wide fitted with 6mm thick Georgain wired glass with aluminium foil wrapped around the glass edges and Lorient GP 1002 glazing system and Lorient 2002 aperture liner. The aperture was installed 100mm from the leaf head and closing edge in door leaf options 2 and 4 and had no failures associated with the glazed aperture until 33 minutes and 35 minutes respectively. Test report Chilt/IF08080 and Chilt/IF09014 have been included as supporting evidence for additional glass types including 6mm thick CFG Toughened glass using Therm-A-Strip glazing system and aluminium foil around the edge of the glass and 6mm thick Pilkington Pyroshield using Intumescent Seals Ltd. Fireglaze mastic glazing system.

Glazing is therefore acceptable within the following parameters.

Based on test report WF393927B, the maximum total assessed aperture area for any individual door leaf is 0.96m².

Any single aperture may not be greater than 0.96m².

Multiple apertures are acceptable within the permitted glazed area, with a minimum dimension of 100mm of core between apertures and panels.

Apertures must not be less than 100mm from top and side edges and 160mm 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).

The glazing system requirements including maximum aperture size for CFG toughened glass is given in section 6.2 below and must be installed as tested in report Chilt/IF09014.

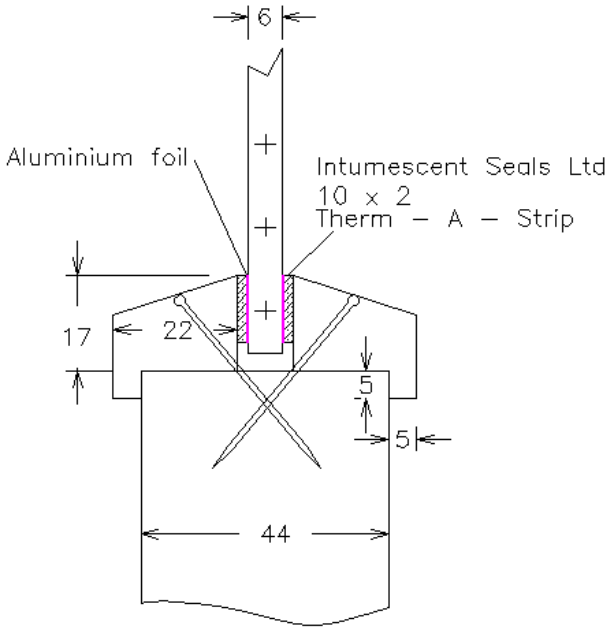
For alternative glass types and glazing systems and the maximum associated glazed aperture size, see section 6.3 below.

If glazing is used for leaf options 4, 5 or 6, the minimum density of the mock stiles and rails must be 650kg/m³ as successfully tested in report WF393927 doorset B. The mock stiles and rails must fully cover the remaining core material on both sides of the leaf around the glazed aperture.

6.2 CFG Toughened Glass and Glazing System

The glazing system tested in Chilt/IF09014 must be installed as tested, unless stated below:

1. Maximum aperture size 0.69m².
2. Intumescent Seals Ltd Therm-A-Strip must be installed between the glass and the bead on both sides and all 4 edges.
3. Hardwood (min. density 640kg/m³) glazing beads 22mm high x 17mm deep with a 20° chamfer and a 5mm x 5mm bolection return.
4. Beads must be retained in position with 40mm long steel pins, inserted at 30° to the vertical and at no more than 50mm from each corner and at 150mm maximum centres.
5. Aluminium foil must be used between the intumescent material and face of the glass and travel around the edge of the glass. The foil must project 11mm on each face.
6. The glass must be fitted with maximum 14mm edge cover.
7. The glass must be fitted to allow for 3mm expansion on all edges.
8. Aperture shape must be rectilinear.
9. Apertures cannot be rotated (e.g. a square to be rotated to create a diamond effect).



6.3 Single Pane Glass & Glazing Systems – Leaf Options 1, 2, 3, 4, 5 & 6

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

The table below specifies the maximum assessed area of glazing for each permitted glass type and glazing system.

The numerical figures in the main body of the table represents the maximum glass height (H), the maximum glass width (W) and the maximum glass area (A), that are considered acceptable for an individual glazed aperture, based upon the specific glazing system.

The total area of all glazed apertures must not exceed that state in Section 6.1 above.

Glass & Glazing System Specification Maximum Assessed Area (m^2)										
Glass Type & Manufacturer (Test reference)		Glazing System & Manufacturer (Test reference)								
		1.	2.	3.	4.	5.	6.	7.	8	9.
		Fireglaze 30 Sealmaster UK Ltd	Therm A Strip Intumescent Seals Ltd	Firestrip 30 Hodgeson Sealants Ltd	Flexible Figure 1 Lorient Polyproducts Ltd	System 36 Plus Lorient Polyproducts Ltd	Pyroglaze 30 Mann McGowan Ltd	R8193 Pyroplex Ltd	Fireglaze mastic Intuescment Seals Ltd. (Chilt/IF/08080)	GP 1002 & GP 2002 Lorient Poylproducts Ltd. (WF393927)
1	6mm Pyroshield 2 - Clear Pilkington UK Ltd (Chilt/IF/08080) (WF393927) (CF718)	824 (H) 741 (W) 0.55 (A)	1721 (H) 562 (W) 0.96 (A)	875 (H) 875 (W) 0.57 (A)	875 (H) 750 (W) 0.66 (A)	1100 (H) 700 (W) 0.65 (A)	1721 (H) 562 (W) 0.96 (A)	600 (H) 600 (W) 0.36 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
2	6mm Pyran S Schott Glass Ltd (CF291)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
4	6mm Pyrostem Pyroguard UK Ltd (CF5954)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) * 0.85 (W) * 0.68 (A) *	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
5	7mm Pyroguard EW30 Pyroguard UK Ltd (CF257)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1236 (H) 750 (W) 0.72 (A)	875 (H) 750 (W) 0.66 (A)	1721 (H) 562 (W) 0.96 (A)	600 (H) 610 (W) 0.36 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
6	7mm Pyrobelite 7 AGC Flat Glass UK	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)

Glass & Glazing System Specification Maximum Assessed Area (m^2)										
Glass Type & Manufacturer (Test reference)		Glazing System & Manufacturer (Test reference)								
		1.	2.	3.	4.	5.	6.	7.	8	9.
		Fireglaze 30 Sealmaster UK Ltd	Therm A Strip Intumescent Seals Ltd	Firestrip 30 Hodgeson Sealants Ltd	Flexible Figure 1 Lorient Polyproducts Ltd	System 36 Plus Lorient Polyproducts Ltd	Pyroglaze 30 Mann McGowan Ltd	R8193 Pyroplex Ltd	Fireglaze mastic Intuescment Seals Ltd. (Chilt/IF/08080)	GP 1002 & GP 2002 Lorient Poylproducts Ltd. (WF393927)
7	7mm Pyrodur 30-104 Pilkington UK Ltd (CF328)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	875 (H) 750 (W) 0.66 (A)	875 (H) 750 (W) 0.66 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
8	10mm Pyrodur 60-10 Pilkington UK Ltd	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
9	11mm Pyroguard EW Maxi Pyroguard UK Ltd (CF257)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1353 (H) 870 (W) 0.95 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
10	15mm Pyranova 15-S2.0	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
11	12mm Pyrobelite 12 AGC Flat Glass UK	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
12	15mm Pyroguard EI30 Pyroguard UK Ltd	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
13	15mm Pyrostop 30-10 Pilkington UK Ltd	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)
14	16mm Pyrobel 16 AGC Flat Glass UK	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	1721 (H) 562 (W) 0.96 (A)	0.94 (H) 0.85 (W) 0.68 (A)	1721 (H) 562 (W) 0.96 (A)

* The permitted maximum dimension given in the supporting evidence for the glass has been reduced in line with the permitted maximum aperture dimension for the door design.

Note:

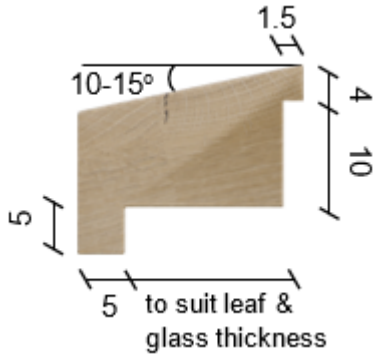
1. All glass types must be fitted fully in accordance with the manufacturers' tested details/installation requirements, particularly with respect to edge cover and expansion tolerances.
2. Glass types 12-14 are fully insulating for 30 minutes in terms of the criteria set out BS 476: Part 20: 1987.
3. Pilkington UK Ltd Pyroshield 2 – Textured glass is not permitted for fire resisting applications.
4. All glass thicknesses given in the table above are approximations. Contact the specific glazing manufacture for information on glass thicknesses.

6.4 Glazing Beads & Installation – all Leaf Options

The 3D models in the following sections are provided as a generalised illustration of the glazing installation only; actual installation must be as per the specific details noted within this document.

6.4.1 Chamfered Bead

Permitted with glazing system 1 & 2 (Fireglaze 30 & Therm-A-Strip) from the table in Section 6.3

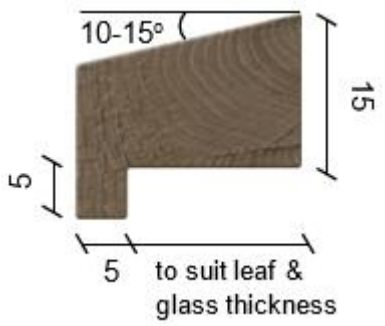


- The glazing beads must be created from hardwood of a minimum 640kg/m^3 density.
- Glazing beads must be retained in position with 40mm long steel pins or 40mm long No. 6-8 screws, inserted at 35-40º to the vertical.
- Fixings must be at 150mm maximum centres and no more than 50mm from each corner. Pneumatically fired pins are acceptable providing the pins meet the specification given in section 6.4.3 below.
- The fitting of the glazing seal between the bead and the glass should be in accordance with the manufacturer's instructions.
- Glass shall be aligned within the aperture using hardwood or non-combustible setting blocks placed at the bottom horizontal edge only, sized to provide edge cover and expansion allowance as the specific system requires

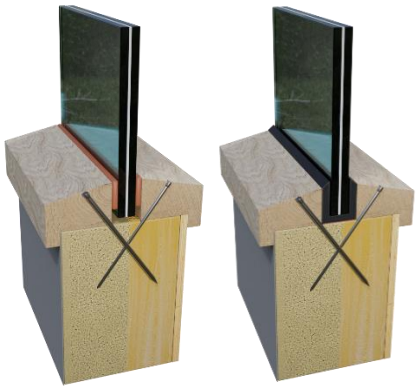
Example drawing of Therm-A-Strip glazing system.

Example drawing of Fireglaze 30 glazing system.

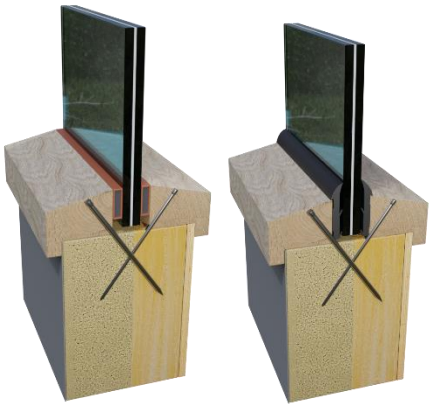
Permitted with glazing systems 3 – 7 (Firestrip 30, System 36 Plus, Pyroglaze 30, Flexible Figure 1 & R8193) from the table in Sections 6.3



- The glazing beads must be created from hardwood of a minimum 640kg/m^3 density.
- Glazing beads must be retained in position with 40mm long steel pins or 40mm long No. 6-8 screws, inserted at 35-40º to the vertical.
- Fixings must be at 150mm maximum centres and no more than 50mm from each corner. Pneumatically fired pins are acceptable providing the pins meet the specification given in section 6.4.3 below.
- The fitting of the glazing seal between the bead and the glass should be in accordance with the manufacturer's instructions.
- Glass shall be aligned within the aperture using hardwood or non-combustible setting blocks placed at the bottom horizontal edge only, sized to provide edge cover and expansion allowance as the specific system requires

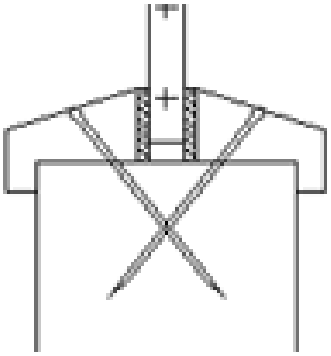


Example drawings of Firestrip 30 & System 36 Plus glazing systems.

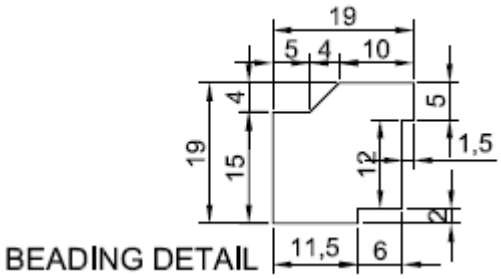


Example drawings of Pyroglaze & Flexible Figure 1 glazing systems.

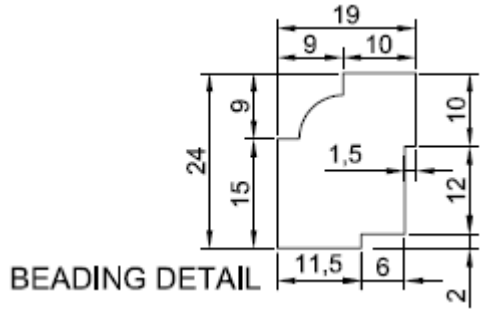
Example drawing of R8193 glazing system.

Permitted with glazing system 8 (Fireglaze mastic) glazing system from the table in Section 6.3	
• The glazing beads must be created from hardwood of a minimum 640kg/m^3 density. • The beading must be a minimum 22mm high incorporating a 5x5mm bolection return and with a 15-20º chamfer. • Glazing beads must be retained in position with 40mm long steel pins or 40mm long No. 6-8 screws, inserted at 30-40º to the vertical. • Fixings must be at 150mm maximum centres and no more than 50mm from each corner. Pneumatically fired pins are acceptable providing the pins meet the specification given in section 6.4.3 below. • 2mm thick Intumescent Ltd. Fireglaze mastic must be fitted between the glass and the beading on both sides and on all four edges as tested. • Glass shall be aligned within the aperture using hardwood or non-combustible setting blocks placed at the bottom horizontal edge only, sized to provide edge cover and expansion allowance as the specific system requires, • 3mm expansion allowance should be maintained on all edges of the glass.	 Example drawing extracted from test report Chilt/IF08080 of Fireglaze glazing system.

Permitted with glazing system 9 (GP 1002 & GP 2002) glazing system from the table in Section 6.3

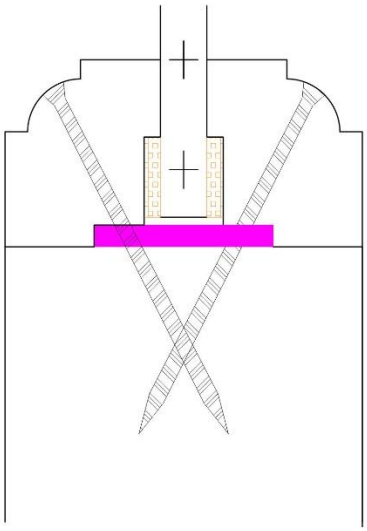


BEADING DETAIL



BEADING DETAIL

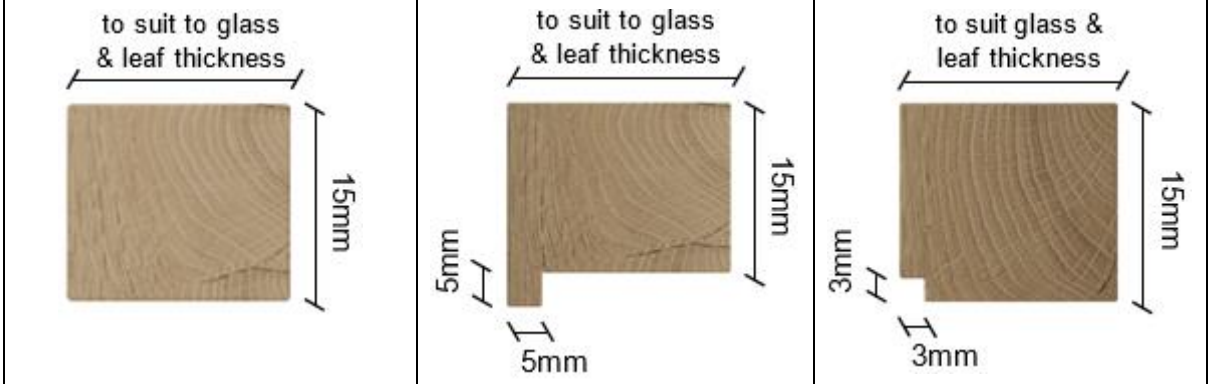
- The glazing beads must be created from hardwood of a minimum 650kg/m^3 density.
- Glazing beads must be retained in position with 50mm long steel pins or 50mm long No. 6-8 screws, inserted at 35-40º to the vertical.
- Fixings must be at 150mm maximum centres and no more than 50mm from each corner. Pneumatically fired pins are acceptable providing the pins meet the specification given in section 6.4.3 below.
- 2mm thick x 10mm wide Lorient GP 1002 seal must be fitted between the glass and the beading on both sides and on all four edges as tested. 2mm thick x 20mm wide Lorient GP 2002 aperture liner must be installed centrally to all four edges of the aperture.
- Glass shall be aligned within the aperture using hardwood or non-combustible setting blocks placed at the bottom horizontal edge only, sized to provide edge cover and expansion allowance as the specific system requires.
- 4mm expansion allowance should be maintained on all edges of the glass.



Example drawing of the GP 1002 & GP 2002 glazing system

6.4.2 Square Beads

Permitted with glass types 6 – 14 & glazing systems 1 – 3 from the table in section 6.3



- The glazing beads must be created from hardwood of a minimum 640kg/m^3 density.
- Glazing beads must be retained in position with 40mm long steel pins or 40mm long No. 6-8 screws, inserted at 35-40º to the vertical.
- Fixings must be at 150mm maximum centres and no more than 50mm from each corner. Pneumatically fired pins are acceptable providing the pins meet the specification given in section 6.4.3 below.
- A 6 – 10mm thick square aperture liner is permitted for use with square beads providing it is constructed from hardwood of minimum density 640kg/m^3 and glued in position using a UF, PVA or PU type adhesive.
- The fitting of the glazing seal between the bead and the glass should be in accordance with the manufacturer's instructions.
- Glass shall be aligned within the aperture using hardwood or non-combustible setting blocks placed at the bottom horizontal edge only, sized to provide edge cover and expansion allowance as the specific system requires

6.4.3 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

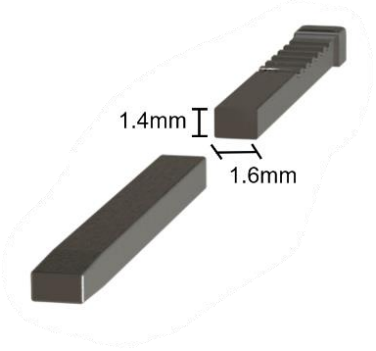
The following dimension of pin has been approved for round, oval and rectangular shaped pins which are hand applied:

- 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 dimension 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 dimension may be no greater than 2.0mm.



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

6.5 False Glazing Beads

False timber beads may be applied to glass types 6-8 and 11-14 using one of the following intumescent glazing products:

Glazing System	Manufacturer
1. Therm-A-Strip 30	Intumescent Seals Ltd.
2. Fireglaze 30	Sealmaster Ltd.
3. Firestrip 30	Hodgson Sealants Ltd.
4. Envirograf Product 77 - G10/10	Intumescent Systems Ltd.

Seals for false glazing beads must be a minimum of 10mm wide x 0.5 - 3mm thick. Preformed strip systems 1-4 may be self adhesive and grooved into the rear of the false glazing bead. The bead must be adhered to the glass using thermo-softening glue. No other fixings may be

used. The false beads must be no larger than 25mm in high and 25mm wide with a maximum of 3No. mounted vertical and horizontally onto the glass on both sides.

7 Door Frame Construction

7.1 Details for Frame Option 1

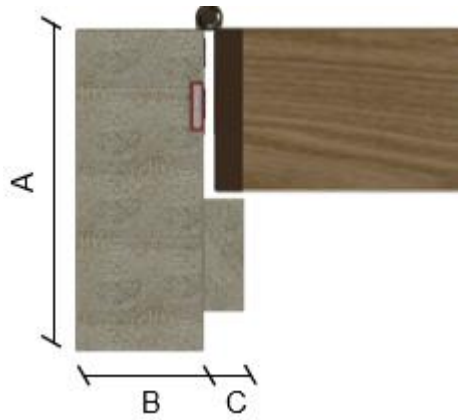
The door frame option listed below are the minimum size and density which have been successfully tested and assessed by this report. The frame must be constructed to meet the following specification for single and double acting frames, where applicable.

Frame Specification				
Frame Option	Material	Minimum Section Size (mm)	Minimum Density (kg/m^3)	Acceptable Leaf Options
1	Softwood / Hardwood	Frame: 70 (d) x 32 (w) (excluding stop) Stop: 12 (w) [1] (integral or planted on)	510 [1]	All leaf options (1, 2, 3, 4, 5 & 6)

Note:
[1] A frame with a minimum density of $700kg/m^3$ must be used for design AS1/1 in section 4.5.5 as successfully tested in report WF423349. This must incorporate a minimum 15mm high stop.

7.1.1 Standard frame detail

The diagram below shows detail of the standard frame construction.



A: Frame depth = 70mm minimum

B: Frame width = 32mm minimum

C: Stop width = 12mm minimum

7.2 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.

Half Lapped Joint

Mitre Joint

Mortice & Tenon Joint

Butt Joint

Trenched Joint

Figure 1 – Approved door frame jointing options

7.3 Decorative Facings – Frame

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 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 facings	UF (Leaf option 3)
Mock stiles & rails	UF (Leaf options 4, 5 & 6)
Timber lipping	PVAC (All leaf Options)
Decorative facings	UF (All leaf Options)
Panel facings	UF (Leaf Options 4, 5 & 6)
Panel mouldings/beading	PVAC (Leaf Options 4, 5 & 6)
Decorative groove inlay	PVAC (Leaf Option 2)

9 Hardware

9.1 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

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 HS Optimus Wood Products Sdn Bhd.
- 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 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.

9.2 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.

Hardware Intumescent Specification		
Item	**Location**	**Product/Manufacturer**
Hinges	For leaves smaller than 2300mm high	Not required
	Fitted behind both hinge blades on the door leaf and frame for door leaves larger than 2300mm high	1. 1mm thick Lorient Polyproducts Ltd. – MAP paper 2. 1mm thick Dufaylite Development Ltd. – Interdens 3. 1mm thick Sealmaster Ltd. – G30 4. 1mm thick Intumescent Seals Ltd. – Therm-A-Strip
Lock/latches [1]	Under forend & keep and encasing latch body for all doorset designs	1. 1mm thick Lorient Polyproducts Ltd. – MAP paper 2. 1mm thick Dufaylite Development Ltd. – Interdens 3. 1mm thick Sealmaster Ltd. – G30 4. 1mm thick Intumescent Seals Ltd. – Therm-A-Strip

[1] Due the premature failure at the latch position at 27 minutes in test report Chilt/RF07159 Doorset A, all latches and locks must be installed with hardware protection as specified above. This intumescent protection will react and fill the mortice cut out and door gap at the latch location when subject to fire attack. This will protect and help insulate this area and item of hardware for a period of time in a fire resistance test. It is the opinion of Warringtonfire that if the latches were protected with a minimum 1mm thick intumescent gaskets, as successfully tested in report WF423349 Doorset B, this would likely provide adequate protection at the latch position for 30 minutes fire resistance performance.

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.

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.

9.3 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)

9.4 Latches & Locks

9.4.1 Single Point Engagement

These items are suitable in the following applications only:

Leaf options: 1, 2, 3, 4, 5 & 6

Configurations: LSASD & ULSASD

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

Element	Manufacturer & Product Reference
Locks & latches	1. E*S Eurospec tubular steel mortice latch. 2. Assa Abloy mortice latch Ref. AA5103

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

Flat leaf doorset designs – Leaf options 1, 2 & 3

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 9.2
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 ≥ 800ºC

Mock stile and rail doorset designs – Leaf option 4, 5 & 6

Element	Specification
Maximum forend and strike plate dimensions	65mm high by 25mm wide by 4mm thick
Maximum body dimensions	40mm high by 65mm wide by 18mm thick
Intumescent protection	see section 9.2
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 ≥ 800ºC

Notes:

1. In all instances the location of the handle must be between 800 – 1200mm from the threshold.

9.4.2 Cylinders

These items are suitable in the following applications only:

Leaf options: 1, 2, 3, 4, 5 & 6

Configurations: LSASD & ULSASD

The table below details the tested cylinder that is approved.

Element	Manufacturer & Product Reference
Cylinder	1. Assa Abloy cylinder Ref. AADC35

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

- Where required for use with either single, 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:
    - 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.

9.5 Handles

These items are suitable in the following applications only:

Leaf options: 1, 2, 3, 4, 5 & 6

Configurations: LSASD & ULSASD

The table below details the tested handles that are approved.

Element	Manufacturer & Product Reference
Handles	1. Assa Abloy lever type handle Ref. ATL-10 2. Zoo Hardware ZLA22514 aluminium lever type handle

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

- The handle may be any size up to 240mm high x 35mm wide. The handle must be compatible with the lock/latch and cylinder (if required), such that the closing action of the doorset is not impeded.

9.6 Butt Hinges

These items are suitable in the following applications only:

Leaf options: 1, 2, 3, 4, 5 & 6

Configurations: LSASD & ULSASD

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

Element	Manufacturer & Product Reference
Hinges	1. Royde and Tucker H105 Hi load lift off type hinges. 2. Royde and Tucker H101 lift off type hinges. 3. Assa Abloy bearing butt type hinge Re. AH2BB-02.

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. 30mm long No. 8 or No.10 steel wood screws per blade
Materials:	Steel or stainless steel

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 top hinge or centrally fitted between top and bottom hinge
		Bottom	150 - 250mm from the foot of leaf to bottom of hinge
	If 4 hinges are required:	Top	100-180mm from the head to top of hinge
		2nd & 3rd	Equispaced between top and bottom or 2nd hinge 200mm from top hinge and 3rd hinge equally spaced between 2nd and bottom hinge
		Bottom	150 - 250mm from the foot of leaf to bottom of hinge
Intumescent protection:		See section 9.2	

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.

9.7 Doorset Self Closing

Doorset automatic self-closing can be provided by:

- Overhead face fixed closers

Automatic doorset self-closing devices such as concealed overhead, jamb mounted, transom mounted, and pivots used with floor springs are not considered acceptable for use with the HS Optimus Wood Products Range.

9.7.1 Overhead Face Fixed Closer

These items are suitable in the following applications only:

Leaf options: 1, 2, 3, 4, 5 & 6

Configurations: LSASD & ULSASD

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

Element	Manufacturer & Product Reference
Overhead face-fixed closers	1. Dorma UK Ltd. TS71 overhead surface mounted closer. 2. Dorma UK Ltd. TS73V overhead surface mounted closer. 3. Rutland TS3204 overhead surface mounted closer. 4. Assa Abloy overhead surface mounted closer Ref. DC 200.

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

- CERTIFIRE approved overhead face-fixed closers for 30-minute fire resistance applications on 44mm 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.

9.8 Non-Essential Hardware

Only the following items of non-essential hardware are permitted in addition to the prescribed essential hardware as detailed within section 9.3.

9.8.1 Push Plates & Kick Plates

Leaf options: 1, 2, 3, 4, 5 & 6

Configurations: LSASD & ULSASD

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 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 or 'notch out'/interrupt the door stop.

9.8.2 Security Viewers

These items are suitable in the following applications only:

Leaf options: 1, 2, 3, 4, 5 & 6

Configurations: LSASD & ULSASD

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.
- Must be fitted no closer than 100mm to door edge, glazing or any other hardware component
- The viewer must be installed through a location of the door leaf containing 44mm thickness of timber.
- The viewer must be situated a minimum 50mm away from any panel or glazed aperture.

9.8.3 Environmental Seals

These items are suitable in the following applications only:

Leaf options: 1, 2, 3, 4, 5 & 6

Configurations: LSASD & ULSASD

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

9.8.4 Threshold drop Seals

These items are suitable in the following applications only:

Leaf options: 1, 2, & 3

Configurations: LSASD & ULSASD

Components with the following specification are deemed acceptable, recessed centrally into the bottom of leaf.

Product	Manufacturer
IS8010si	Lorient Polyproducts Ltd.
RP8Si	Raven Products Ltd.
NOR810, NOR810S, NOR810dB+	Norsound Ltd.
STS 422	Sealed Tight Solutions Ltd

9.8.5 Knockers, Numerals & Signage

These items are suitable in the following applications only:

Configurations: LSASD & ULSASD

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 Installation

10.1 General

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

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

10.2 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 coloured seal. For further clarification of the approved firestopping systems see section 10.3.

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 10.5. 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. The partition must suitably framed and lined.

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.

10.3 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 18mm thick must be fitted to both faces, fitted with a minimum 15mm overlap to the door gap. This application as successfully tested in report Chilt/RF10105 and Chilt/RF07159.	
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 18mm thick must be fitted to both faces, fitted	

Gap (mm)	Requirement	3D model depiction
	with a minimum 15mm overlap to the door gap. This application was successfully tested in report WF393927 and WF423327.	
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 18mm 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.

10.4 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.

10.5 Wall Types, Structural Opening & Fixity

10.5.1 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 30 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.

10.5.2 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.

10.5.3 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.

The frame jambs only are to be fixed to the supporting construction using steel fixings at 500mm 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.

10.6 Post Production (Onsite) Leaf Size Adjustment

The HS Optimus Wood Products 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

10.7 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	8mm between bottom of leaf and top of floor covering. This is the maximum tolerance for fire resistance only.

11 Insulation Performance

Insulation performance may be claimed for a doorset to this design meeting the following:

Insulation Performance Criteria	
Type	Details
Partially insulating	Doorsets incorporating up to 20% of non-insulating glazing
Fully insulating	Unglazed doorsets or doorsets including 30-minute insulating glazing (e.g. 15mm Pyrostop or 16mm Pyrobel)

12 Conclusion

If HS Optimus Wood Products Range of 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 30 minutes integrity and insulation (subject to section 11).

13 Declaration by the Applicant

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

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

Signed: 

Name: Albert Tan Sai Beng

Position: Chief Marketing Officer

Date: 29th March 2023

For and on behalf of: HS Optimus Wood Products Sdn Bhd.

14 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.

15 Validity

1) The assessment is initially valid for five years after which time it is recommended to be submitted to Warringtonfire for technical review and revalidation.
2) This assessment report is not valid unless it incorporates the declaration given in Section 13 duly signed by the applicant.

Position:	Assessor	Reviewer
Signature:		
Name:	***Liam Dunk**	***Nikolas Whitelock**
Title:	Senior Product Assessor	Senior Product Assessor

* For and on behalf of Warringtonfire

Appendix A: Revisions

Revision No.	Date	Description
A – CIFL Ref. 08172	09/09/2008	Inclusion of assessed 44mm thick solid particleboard doorsets – Design C.
B – CIFL Ref. 09090	12/06/2009	Inclusion of glass type and increase glazing size. Correction to graphs in appendix D of intumescent seal type.
C – CIFL Ref. 12309	27/03/2013	Review and revalidation with assessed inclusion of MDF door frames.
D – WF390116	6/04/2018	Technical review, updated to Exova Warringtonfire format and 5 year revalidation. Double acting doorsets design option removed with MDF frame. Test WF 393927 included specification for intumescent protection at latch position modified and changes to glazed areas and beads. New designs added and supporting test evidence for designs C, D, F and G
E - 417001	26/07/19	Updated into the new Warringtonfire format and to the general principles of BS EN 15725 and incorporate additional grooving options.
F - 418906	13/09/19	Removal of door design names within grooving section and the addition of 2 more grooved designs.
G - 433300	28/09/20	Incorporate test report WF423349 doorset B into the assessment as sampled test evidence of door design C.
H- 435719	04/12/20	Update assessment to include the new company name and address: HS Optimus Wood Products Sdn Bhd.
I – WF525524	06/04/23	Technical review and revalidation of the document. The following was updated: Design A – RF07159 doorset A removed as it only achieved 27 minutes. Restircted to single doorset configuration only. Double acting doorsets removed. Overpanels removed. The glass maximum aperture size for the CFG toughened glass was reduced. Reduce the amount of glass types and glazing systems. Remove MDF frame option. Projecting frame option and shadow gap detail removed. Increase minimum mock stile and rail size to that tested. Restrict the maximum latch forend size of 65mm high with the exception of test specimen B in report WF4233349 which was tested with a full height latch. Remove letter box section. Remove smoke control section.