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Testing, calibrating, advising.

Title:

Global Fire Resistance Assessment of Vicamia 60 Minutes Fire Resistance

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Prepared for:

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Exova Warringtonfire – the new name for BM TRADA

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

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

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

About Exova Warringtonfire

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

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

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

Kind regards

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Contents

1 Introduction

This document constitutes a global assessment relating to Halspan® 60, fire resisting doorsets, for Vicaima Ltd and Vicaima Industria de Madeiras e Derivados S.A. The assessment uses established extrapolation and interpretation techniques in order to extend the scope of application by determining the limits for the design based on the tested constructions and performances obtained. The assessment is an evaluation of the potential fire resistance performance, if the elements were to be tested in accordance with BS 476-22:1987.

2 General Description of Construction

The construction for door leaves of this design comprises a solid sheet of 54mm thick Halspan® 60 three layered particleboard (nominal density 620kg/m³ +/- 10%). Where specified, the leaves are lipped with hardwood.

3 Leaf Sizes

The approval for increased leaf dimensions is based on the tests listed in appendix C and takes into account the margin of over performance above 60 minutes integrity for the design and the characteristics exhibited during test. Data sheets specifying the maximum approved leaf sizes and graphs showing the permitted gradient between maximum height and width, are contained in appendix F.

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

4 Configurations and Orientation

4.1 Configurations

Based on the test evidence listed in appendix C, this assessment covers the following doorset configurations:

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

Unequal leaf double doorsets are covered by this assessment with no restriction on the smaller leaf dimension.

4.2 Orientation

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

5 Leaf Size Adjustment

Halspan® 60 door leaves may be altered as follows:

Element	Reduction
Leaf	The manufactured size of the leaf may be reduced in height or width without restriction
Lipping	The dimensions stated in section 9.1 may be reduced by 20% for fitting purposes

6 Overpanels

6.1 Solid

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

If a transom is required to separate the leaf heads from the overpanel, it must be to the same specification as the door frame (see the note under the table in section 8.1).

Door frame joints must utilise one of the jointing methods specified in section 8.2.

Overpanels must be fixed by either:

- screwing through the rear of the frame with steel screws passing at least 30mm into the centre line of the overpanel. Fixings must be no more than 100mm from each corner and a maximum of 250mm centres in between, or,
- using 75mm long x 8mm diameter steel dowels fitted centrally in the frame reveal across the head of the overpanel no closer than 150mm from each corner of the overpanel and equispaced between at a maximum of 450mm centres. A minimum of four dowels must be used. A further 75mm long screw fixing is required to be inserted at an angle through the bottom corners of the overpanel into the door frame.

The intumescent seals specified for the jambs in appendix F, may be fitted in the overpanel edges or frame reveal, if required for the manufacturing process. Providing the intumescent seals are fitted to all edges of the overpanel, the frame to overpanel junction is permitted to have a maximum 2mm gap tolerance.

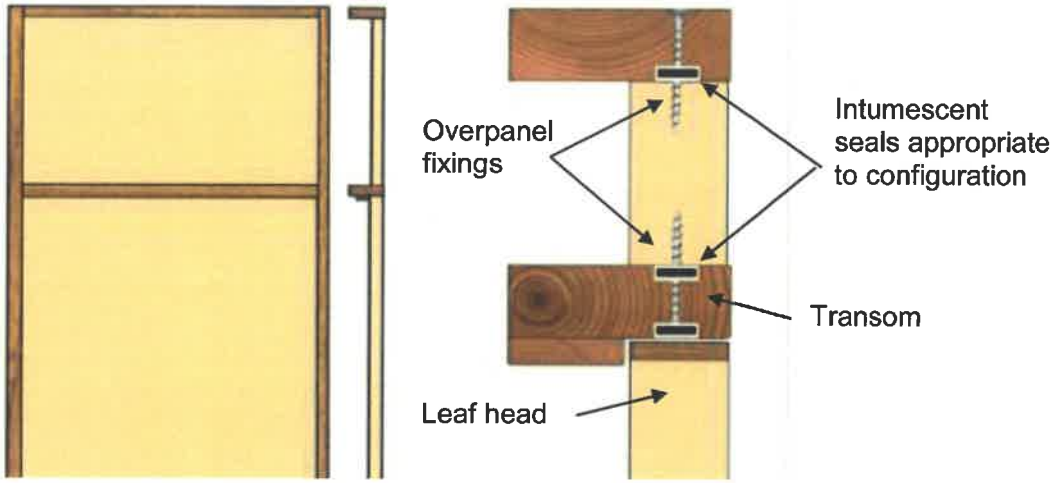
However, it is not mandatory to fit intumescent seals to the edges of the overpanel for a compliant doorset providing the frame to overpanel junction is tight with no gaps.

It is permitted to include a glazed aperture within the overpanel providing the glazing is within the parameters given in section 7.

Maximum overpanel heights are as follows.

- Single doorsets – 2000mm
- Double doorsets – 1500mm

The following diagram illustrates the principles described:



6.2 Fanlights

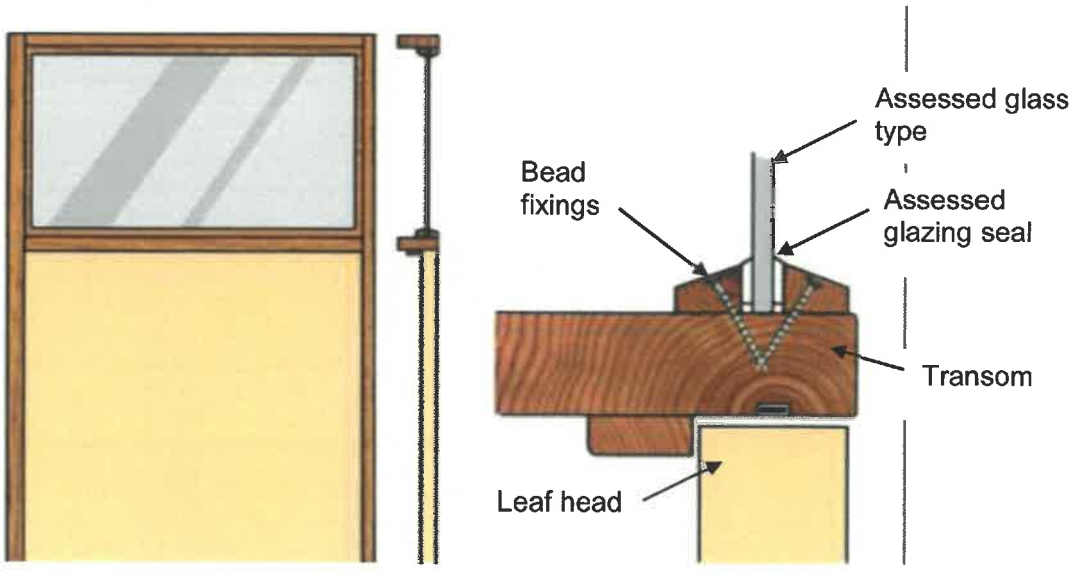
Timber frame doorsets including a transom may include a glazed fanlight. The timber frame and glazing beads must be hardwood with a minimum density of 640 kg/m^3, whilst the frame section must be a minimum of 70mm x 44mm. Timber door frame and transom construction must comply with the specification contained in section 8.

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

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

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

The following diagram illustrates the principles described:



7 Glazing

7.1 General

The testing conducted on Halspan® 60 has demonstrated that the design is capable of tolerating relatively large glazed apertures, whilst providing a margin of over performance. Glazing is therefore acceptable within the following parameters.

The maximum assessed glazed area for all configurations is 0.82m².

7.2 Assessed Glazing Systems

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

Glazing System	Manufacturer	Maximum Area (m^2)
1. Fireglaze 60	Sealmaster Ltd	0.82
2. Therm-A-Glaze 60	Intumescent Seals Ltd	0.82
3. System 36/15	Lorient Polyproducts Ltd	0.50
4. System 90+	Lorient Polyproducts Ltd	0.50
5. System 63 (circular apertures only)	Lorient Polyproducts Ltd	0.50
6. Pyroglaze 60	Mann McGowan Ltd	0.50
7. Halspan 60	Halspan Ltd	0.50
8. Halspan Slimglaze 60	Halspan Ltd	0.50
9. ST105GT & 30x2 Liner	Sealed Tight Solutions Ltd	0.82

1. Pyroglaze 60 and Halspan 60 must be used with 60mm long steel screw fixings only
2. Halspan Slimglaze 60 must be installed as depicted in appendix B

7.3 Assessed Glass Products

Assessed glass types are as follows:

Glass Type	Manufacturer	Maximum Area (m^2)
1. 6 & 7mm Pyroshield	Pilkington Group Ltd	0.82
2. 6 & 7mm Pyroshield 2	Pilkington Group Ltd	See section 7.7
3. 6mm Sureglaze Wired	Halspan Ltd	0.82
4. 6mm Pyran S	Schott Glass Ltd	0.82
5. 6mm Pyrocet	Securiglass Co. Ltd	See note 2
6. 6mm Pyrostem	Pyroguard UK Ltd	0.60

7. 7mm Pyroguard FD60	Pyroguard UK Ltd	0.82
8. 10mm Pyrodur	Pilkington Group Ltd	0.82
9. 11mm Pyroguard	Pyroguard UK Ltd	0.52
10. 12mm Pyrobelite	AGC Flat Glass Europe	0.82
11. 13mm Pyrodur	Pilkington Group Ltd	0.82
12. 15mm Pyroguard EI 30	Pyroguard UK Ltd	0.82
13. 16mm Contraflam	Vetrotech Saint Gobain Ltd	0.82
14. 15mm Pyrostop	Pilkington Group Ltd	0.82
15. 16mm Pyrobel	AGC Flat Glass Europe	0.82
16. 25mm Pyrobel	AGC Flat Glass Europe	See section 7.6

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. Limited by glazing system. See section 7.5 for approved glazing system.

7.4 Glazing Beads & Installation

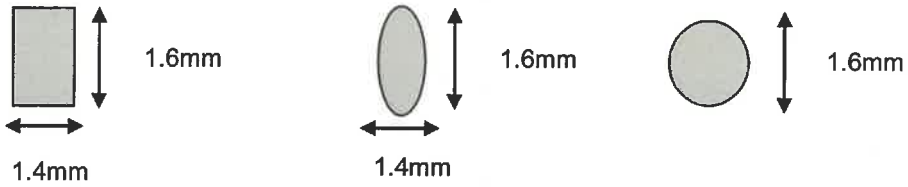
Glazing beads must be from hardwood [1] as specified in the following table:

Profile	Minimum Density (kg/m^3)	Application	Maximum Aperture (m^2)
Splayed	640	All proprietary systems detailed in 7.2 and appendix B	0.82
Square	640	Proprietary system 1 with aperture lined using 33 x 2mm Therm-A-Line in lieu of GL60 liner with glass types 1 – 3 as specified in 7.3 and appendix B	0.2
Square	640	Proprietary system 1 and 2 as specified in 7.2 and glass types 10-16 as specified in 7.3 and appendix B	0.82

1. Beech, *Fagus Sylvatica,* is not permitted for 60 minute applications.
2. A square bead profile may be used as an alternative to splayed beads subject to the restricted glass types and glazing systems above. See appendix B for square bead options. A 6–10mm thick square aperture liner is permitted with square beads providing it is constructed from hardwood of minimum density 640 kg/m^3 and glued in position using a UF type adhesive.
3. Glazing beads must be retained in position with 60mm long x 2mm diameter steel pins or 60mm long No 8 screws, inserted at 35-40° to the vertical at no more than 50mm from each corner and at 150mm maximum centres.

4. Alternatively, pneumatically (gun) fired steel pins are acceptable providing the pins meet the specifications shown below, are a minimum of 60mm long, and with the 1.6mm dimension orientated perpendicularly to the glass wherever possible.

5.
6.
7.
8.



9. Glazed openings must not be less than 100mm from any door edge. Multiple apertures are acceptable within the permitted glazed area, with a minimum dimension of 80mm of Halspan® 60 core between apertures. Alternatively, the dimension may be reduced to 38mm using the Halspan® 60 multipane glazing system and inserting solid 54mm x 38mm hardwood transoms/mullions dividing the apertures (see appendix B for details).
10. Aperture shape is not restricted, providing the glazing system and beads are compatible with that shape.
11. Timber for glazing beads must be straight grained joinery quality hardwood, free from knots, splits and checks.

7.5 Zeroplus Slimport Glazing System

Additional test data ref: Warres 117483 is suitable evidence to allow the use of two alternative glazing methods i.e. Zeroplus Slimport SP250 or SP450 for use with Pyrocet glass only. Installation must be as per the test data. Zero Seal Systems Ltd must be contacted for details on glazing materials and installation.

7.6 Fully Insulating Glazing Option

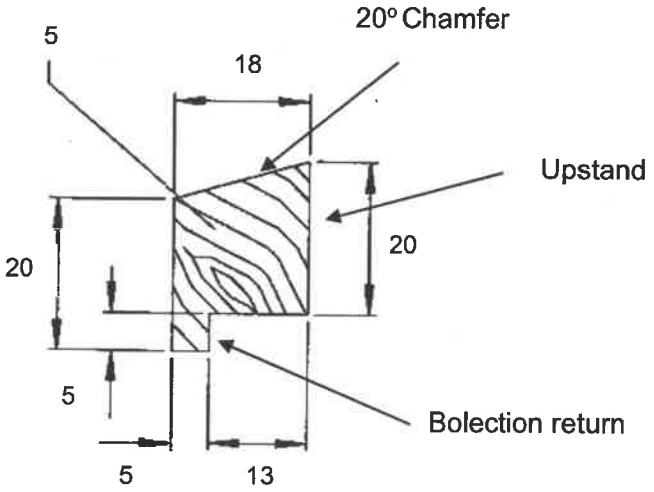
The testing conducted on Halspan® 60 under ITB report No 636.7/09 has demonstrated that the design is capable of providing 60 minutes integrity and insulation performance when glazed with 25mm thick Pyrobel glass from AGC Flat Glass Ltd. The option for fully insulating glazing is therefore acceptable within the following parameters.

The maximum assessed glazed area for all configurations is 1.31m². The glazing system must be one of the following tested proprietary systems (see appendix B for further details).

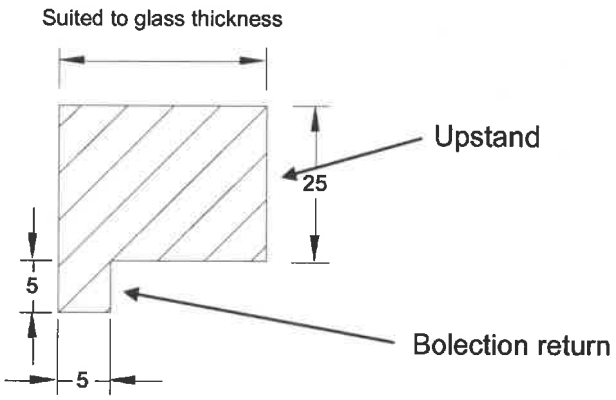
Glazing System	Manufacturer	Maximum Area (m^2)
1. Fireglaze 60	Sealmaster Ltd	1.31
2. Therm-A-Glaze 60	Intumescent Seals Ltd	1.31

1. The glass type is to be 25mm thick Pyrobel manufactured by AGC Flat Glass Ltd
2. A 6–10mm thick square aperture liner is permitted for use providing it is constructed from hardwood of minimum density 640 kg/m^3 and glued in position using a PVA or UF type adhesive.

3. Glazing bead fixings must be retained in position with 70mm long No 8 screws, inserted at 30-35° to the vertical at no more than 50mm from each corner and at 150mm maximum centres.
4. Glazed openings must not be less than 100mm from any door edge. Multiple apertures are acceptable within the permitted glazed area, with a minimum dimension of 80mm of Halspan® 60 core between apertures.
5. Aperture shape is not restricted, providing the glazing system and beads are compatible with that shape.
6. Timber for glazing beads must be straight grained joinery quality, free from knots, splits and checks.
7. The glass must be fitted fully in accordance with the manufacturers' tested details/installation requirements, particularly with respect to edge cover and expansion tolerances.
8. The permitted bead shapes are shown below. .



Chamfered Bead



Square Bead

7.7 Pyroshield 2

The following table details the maximum pane sizes and approved glazing systems permitted for Pyroshield 2 in the Halspan® 60 doorset design.

Glass Type	Glazing System (Section 7.2)	Maximum Pane Size [1] (height x width – mm)	Maximum Area (m^2)
Pyroshield 2	2	1300 x 550	0.715
	4	1300 x 310	0.4

1. The heights and widths listed are the maximum single dimension allowable for an individual pane utilising the relevant glazing system; maximum dimensions may not be increased even if the other dimension for the pane is reduced.
2. Glazed openings must not be less than 100mm from any door edge. Multiple apertures are acceptable up to the maximum approved area, with a minimum dimension of 80mm between apertures. The aperture shape is not restricted, providing the intumescent material and beads are proven to be compatible with that shape.
3. Glazing bead fixings must be retained in position with 60mm long x 2mm diameter steel pins or 60mm long No 6-8 screws, inserted at 35-40° to the vertical at no more than 50mm from each corner and at 150mm maximum centres. Pneumatically fired pins are acceptable providing they meet the specification given above.
4. Timber for glazing beads must be straight grained joinery quality, free from knots, splits and checks.
5. False timber beads must not be applied across the glass face without specific test evidence to justify the system used.
6. Sectional drawings detailing the tested and approved proprietary glazing systems are contained in appendix B.

8 Door Frames

8.1 Door frame construction

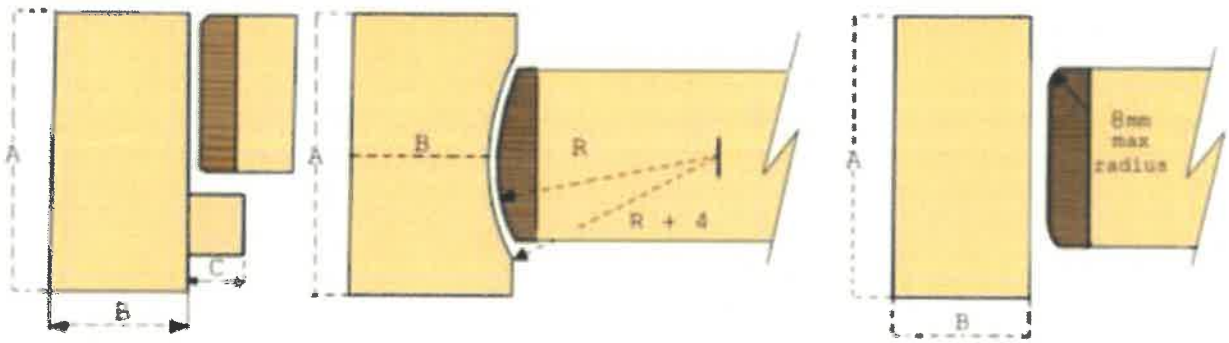
Timber based door frames for Halspan® 60 must be constructed to meet the following specification (for steel door frame options see appendix A).

Material	Minimum Section Size (mm)	Minimum Density (kg/m^3)	Permitted Configurations	Max Leaf Dimensions (mm)
Hardwood [1] (with reduced intumescent)	70 x 32 [3]	640	LSASD, ULSASD, DASD, LSADD, ULSADD, DADD	See relevant data sheet in appendix F
Hardwood [1,2]	70 x 32	530	LSASD & ULSASD	2100 (h) x 900 (w)
Hardwood [1,2]	70 x 44	530	All	All
Hardwood [1,2]	70 x 22	640	All	All
MDF [2]	70 x 30	700	All	2440 (h) width not restricted

1. Beech, *Fagus Sylvatica,* is not permitted for 60 minute applications
2. Not permitted for use with reduced intumescent specification
3. If the doorset features a transomed overpanel, the door frame must be hardwood with a minimum density of 640kg/m^3 and with a minimum section of 70mm x 32mm.
4. Timber for door frames must be straight grained joinery quality hardwood, free from knots splits and checks.
5. A 12mm deep planted or integral stop is adequate for single acting frames whilst double acting frames may be scalloped or square (see diagram below). However, a 14mm deep stop is required when using the Dorma ITS 96 concealed closer mounted in the leaf head – see section 14 for details.
6. Frame joints may be mortice and tenoned, mitred, half lapped or butted and with no gaps. All jointing methods require mechanical fixing with the appropriate size ring shank nails or screws.
7. Hinge fixings must be fit for purpose and if they penetrate through the rear of the frame, a sub frame of the same hardwood will be required. The entire screw length must be within a timber substrate.
8. The door frame (MDF or timber based) may be entirely clad in 2mm thick PVC sheeting for use with leaves either with or without 2mm thick PVC edge protectors (see section 10) and facing material (see section 11).

The following diagram depicts the assessed frame profiles and dimensions:

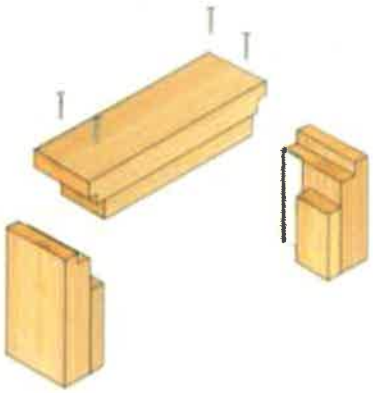
A = min 70mm
R = radius from floor spring
B = min 22 - 44mm (see table above)
8mm max radius to create a maximum 2mm edge profiling
C = min 12mm



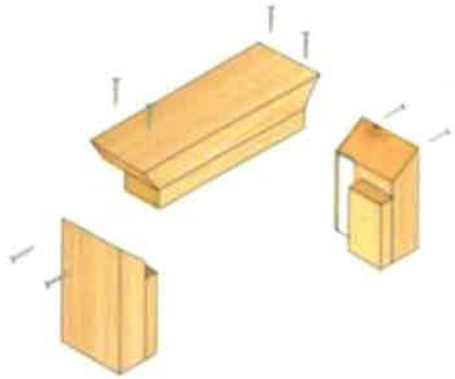
Standard **Scalloped** **Profiled edges**

8.2 Door Frame Joints

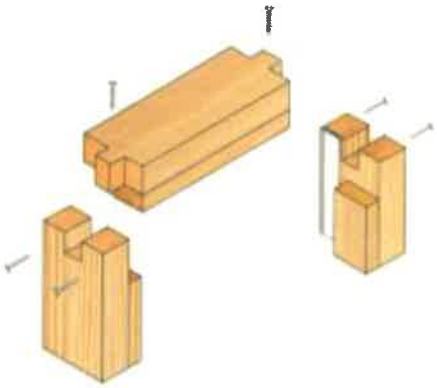
The following diagrams illustrate approved joints types.



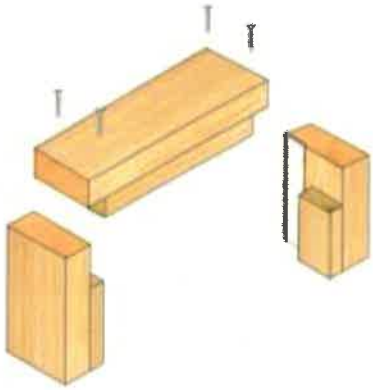
Half Lapped Joint



Mitre Joint



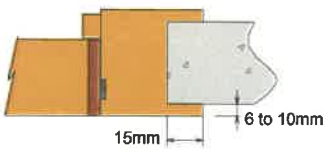
Mortice and Tenon Joint



Butt Joint

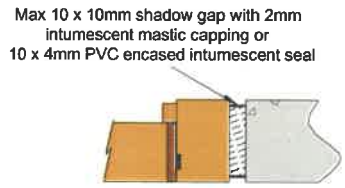
8.3 Door frame installation

The following diagrams indicate acceptable and unacceptable frame installations.



Permitted

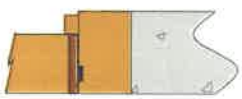
Permitted



Permitted

Not Permitted

Not Permitted



Permitted

9 Lipping Materials

9.1 Timber Lippings

Halspan® 60 must be lipped in accordance with the following specification. The lipping specifications for steel frame doorsets are contained in appendix A.

Material	**Size** (mm)	**Min Density** (kg/m^3)
Straight grained, joinery quality hardwood [1], free from knots, splits and checks.	1. Flat = 6 – 18 thick with a maximum of 2mm profiling permitted at corners of lipping (see section 8.1) 2. Rounded = 8 – 18 thick with a radius matching the distance between leaf edge and floor pivot (see section 8.1) 3. Rebated = 20 – 30 thick with a 13mm deep equal rebate	640

1. Beech, *Fagus Sylvatica,* is not permitted for 60 minute applications.
2. Overpanels separated from the leaf heads with a transom do not need to be lipped.
3. Overpanels flush with the leaf heads must be lipped on their bottom edge but may additionally be lipped on all edges if required.
4. Single and double doorsets without overpanels only require lipping on the vertical edges but may be additionally lipped on the top and bottom edges if required.
5. Leaves to doorsets with flush overpanels must be lipped on the vertical edges and additionally at the bottom edge of the overpanel and top edge of the doors.
6. Double doorsets without flush overpanels may use square or rebated meeting edges.
7. Double doorsets with flush overpanels may use a rebated overpanel junction and rebated meeting edge junction concurrently.
8. A 2.5^0 chamfer is permitted to the lipping at the leading edge of leaves providing the door gaps meet the requirements of section 17.

9.2 PVC Lippings

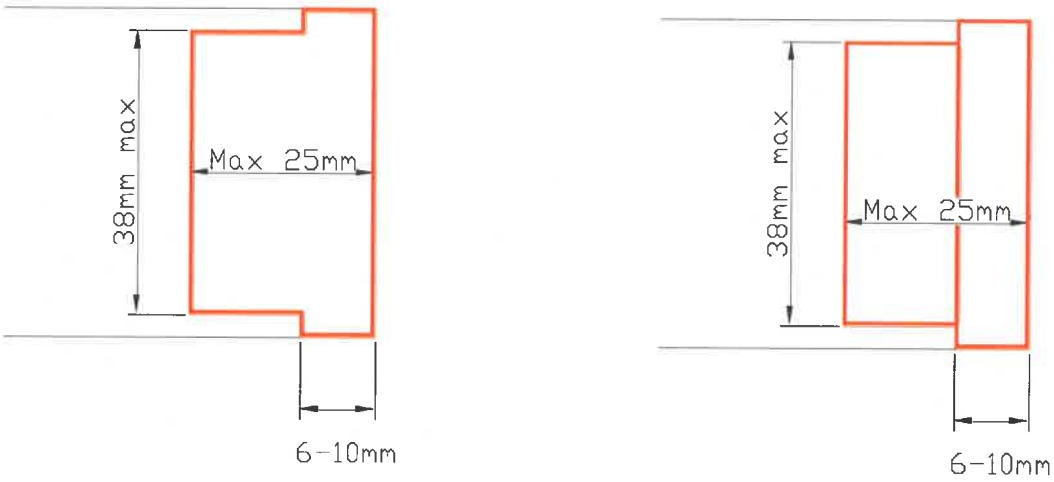
Halspan® 60 may be lipped with PVC in accordance with the following specification.

Material	**Size** (mm)
PVC	2 thick

1. Can be fitted direct to Halspan® 60 core or onto hardwood lippings as per section 9.1

9.3 'T' Section Lippings

In certain circumstances, a 'T' section lipping may be required which will be bonded into a groove machined in the edge of the leaf. This option is acceptable providing the tongue is a maximum of 38mm wide and otherwise meets the specification given in section 9.1. The 'T' section lipping may be in two sections with the exposed lipping being within the range of 6 – 10mm thick. All glue lines must be as stated in section 13. See drawings below:



10 Edge Protectors

Fire resistance test RF02083 justifies the use of PVC 2mm thick edge protectors reference 'Type 1, 2, 3, and 4' (see appendix E for sketch details) on the vertical edges of the door leaves. The minimum intumescent specification given in appendix F must be maintained and the relevant glue lines specified in section 13 must be used. The edge protectors are suitable for use with leaves installed within both timber based and steel based frames. The PVC protectors may be used on double and single leaf doorsets alike.

The performances obtained and the leaf sizes tested in RF02083, when using the PVC edge protectors, will enable the use of these edge protectors on limited door leaf dimensions albeit on all configurations assessed in this report. The maximum leaf dimensions (whichever is the smaller between the appendix graphs and the table below) are therefore as follows:

Doorset Configuration	Maximum Height and Width	
	Type 1 and 3	Type 2 and 4
Single leaf doorsets	2090mm high x 853mm wide	2212 high x 902 wide
Double leaf doorsets	2040mm high x 828mm wide	2162 high x 877 wide

11 Leaf Facing Materials

11.1 General

The basic 54mm thick Halspan® 60 leaf construction has integral facings and does not therefore require additional facing materials as standard.

11.2 Alternative Facing Materials

If MDF or plywood faced leaves are required for a particular end use application, the leaf construction and facing materials must meet one of the following specifications:

11.2.1 Option 1

Reduce the Halspan® 60 54mm thick particleboard by sanding down to 48mm thick and bonding 3mm thick MDF (min density 730kg/m^3) or 3mm thick plywood (min density 650kg/m^3) onto each face. Facings may oversail or butt up to the lippings.

The facings must be bonded using urea or phenol formaldehyde type adhesives.

11.2.2 Option 2

Reduce the Halspan® 30 44mm thick particleboard by sanding down to 42mm and bonding 6mm plywood (min density 650kg/m3) or 6mm MDF (min density 730kg/m3) skins onto each face, which must butt up to the applied lippings.

The facing must be bonded using urea or phenol formaldehyde type adhesives.

11.2.3 Option 3

Using Halspan® 30 44mm thick particleboard and bonding 5mm thick WBP Far Eastern plywood (min density 650kg/m^3 and minimum grade BB/CC) onto each face which must butt up to the applied lippings.

The facing must be bonded using urea or phenol formaldehyde type adhesives

11.3 Grooves

Both sides of Halspan® 60 door leaves may be grooved to the following specification. Grooves may coincide with the top and bottom of glazed apertures:

11.3.1 Option A

Element	Details	
Max groove size (mm)	5 wide x 4 deep	
Proximity to door edges (mm)	Horizontal Grooves	≥ 150 from top and bottom
	Vertical Grooves	≥ 150 from sides
Groove spacing	Maximum 6 No. grooves divided between horizontal and vertical orientations as required	
Orientation	Vertical or horizontal	
Configuration	Latched and unlatched, single and double acting, single and double leaf doorsets	
Leaf size range	All	
Intumescent seal dimensions	All	

11.3.2 Option B

Element	Details	
Max groove size (mm)	15 wide x 8 deep in filled with hardwood timber (density ≥ 640kg/m^3). The hardwood insert can be machined with a decorative 4mm deep x 5 wide groove or a 4 deep 'V' groove	
Adhesive	The hardwood insert must be tightly fitted and glued on all edges using a PVA adhesive	
Proximity to door edges (mm)	Horizontal Grooves	≥ 150 from top and bottom
	Vertical Grooves	≥ 150 from sides
Groove spacing (mm)	Maximum 8 No. grooves divided between horizontal and vertical orientations as required and spaced minimum 150mm apart	
Orientation	Vertical or horizontal	
Configuration	Latched and unlatched, single and double acting, single and double leaf doorsets	
Leaf size range	All	
Intumescent seal dimensions	All	

11.4 Decorative and Protective Facings

The following facing materials are permitted for this door design since they would degrade rapidly under test conditions without significant effect:

Facing Material	Maximum Permitted Thickness (mm)
Paint	0.5
Timber veneers	2
Plastic laminates	2
PVC	2
Cellulosic and non-metallic foils	0.4

1. Metallic facings are not permitted except for push plates and kick plates (see section 15.6)
2. The door leaf thickness may be reduced by a total maximum of 0.5mm for calibration purposes in order to accommodate the chosen finish
3. Other than PVC, materials must not return around leaf edges
4. Materials must not conceal intumescent strips
5. The PVC may be post-formed over the vertical and horizontal edges provided that the required intumescent specification detailed in appendix F is maintained. The maximum radius at the corners of the leaf for post formed doors is 8mm, see diagram in section 8.1 for details.

12 Intumescent Materials

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

Application	Location	Product/Manufacturer
Edge seals	Fitted in the frame jambs or leaf edges	1. PVC encased Therm-A-Seal – Intumescent Seals Ltd 2. PVC encased Type SLS – Halspan Ltd 3. PVC encased 500P – Mann McGowan Ltd 4. PVC encased Palsuol 100 – Lorient Polyproducts Ltd/Mann McGowan Ltd 5. PVC encased Type 617 – Lorient Polyproducts Ltd 6. PVC encased Pyroplex – Pyroplex Ltd 7. PVC encased STS 154FO – Sealed Tight Solutions Ltd
Hinges	Underneath both hinge blades	1. 1mm Interdens - Dufaylite Developments Ltd 2. 1mm MAP paper - Lorient Polyproducts Ltd 3. 1mm Pyrostrip 300 - Mann McGowan 4. 1mm Therm-A-Strip - Intumescent Seals Ltd 5. 1mm SLS-PAD-106 – Halspan Ltd 6. 1mm STS Graphite – Sealed Tight Solutions Ltd
Lock/latches	Under forend & keep	1. 1mm Interdens - Dufaylite Developments Ltd 2. 1mm MAP paper - Lorient Polyproducts Ltd 3. 1mm Pyrostrip 300 - Mann McGowan 4. 1mm Therm-A-Strip - Intumescent Seals Ltd 5. 1mm STS Graphite – Sealed Tight Solutions Ltd 6. 1mm SLS-PAD-106 – Halspan Ltd
Top pivots & flush bolts	Lining all sides of the mortices including pivot housings and flush bolt keeps	1. 2mm Interdens - Dufaylite Developments Ltd 2. 2mm MAP paper - Lorient Polyproducts Ltd 3. 2mm Therm-A-Strip - Intumescent Seals Ltd 4. 2mm Therm-A-Flex - Intumescent Seals Ltd 5. 1mm SLS-PAD-107 – Halspan Ltd

The seal specification for each configuration is contained in appendix F

13 Adhesives

The following adhesives must be used in construction:

Element	Product/Manufacturer
MDF or Plywood facings	Urea formaldehyde (UF) Phenol Formaldehyde (PF)
Timber lippings	UF, PF, PVA, PVAC or PU
PVC lippings	Contact adhesive

14 Tested Hardware

The following hardware has been successfully incorporated in the tests on Halspan® 60 doorsets:

Element	Manufacturer and Product Reference
Hinges	1. 100 x 30mm standard steel butt hinges 2. 101 x 30mm Fireblock stainless steel hinges 3. Royde & Tucker H105 lift off hinges 4. Royde & Tucker H101 lift off hinges 5. Cairney Hardware SOSS type hinges 6. 114 x 30mm ASSA lift off type butt hinge ref: 3244 7. 101 x 30mm Halspan R60 butt hinge ref: BOM-HIN-200/1
Closers	1. Dorma TS83 face fixed overhead closer 2. Geze TS200 VW face fixed overhead closer 3. Halspan R60 Eco closer ref: CLR-AGN-101 4. Halspan R60 power closer ref: CLR-BSS-101 5. Cairney Hardware Ltd Mitron C2300 concealed overhead closer 6. ITS 96 concealed overhead closer with tested proprietary intumescent system 7. Dorma BTS75V floorsprings
Locks/latches	1. Standard tubular mortice latch 2. Ferco multi point lock/latch 3. Halspan R60 latch/lock ref: BOM-LCK-104 4. Cairney Architectural Hardware Solutions – C4100 Shearmag lock
Threshold seals	1. Halspan threshold drop seal ref: SAC PA 08935 ref: SLS-DRP-100 range 2. Norsound threshold drop seal ref: 810

1. The GU Ferco 3 Deadbolt requires a 25 x 4mm thick intumescent strip in the closing edge frame reveal in lieu of the specification shown in appendix F and can only be used on single leaf doorsets of maximum leaf height 2231mm, and must be used in a hardwood (640kg/m^3) door frame.
2. The Cairney Hardware Shearmag lock must be used in conjunction with a twin strip perimeter intumescent specification at the head of the door in conjunction with the Halspan intumescent protection pack fitted around the body of the lock
3. The Cairney Hardware Mitron C2300 concealed overhead closer must be used in conjunction with a twin strip perimeter intumescent specification at the head of the door in conjunction with the Halspan intumescent protection pack fitted around the body of the closer
4. The Dorma ITS 96 concealed overhead closer may be used with a single strip perimeter intumescent specification providing the strip is ≥ 25 x 4mm and centrally fitted. The closer may also be used with a twin strip perimeter intumescent specification at the head of the door providing the seals are ≥ 15 x 4mm. The closer must always be used in conjunction with the proprietary intumescent pack to be provided by the supplier of the closer. The door stop will need to be a minimum depth of 14mm to accommodate the closer.
5. Locksets with forends/keeps ≥ 150mm high must either be used with a twin strip perimeter intumescent specification or if a single strip system is to be used an additional seal must be fitted to run along side the forend/keep.

15 Additional & Alternative Hardware

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 CE Mark:

- Latches & Locks: Test Standard EN 12209
- Single Axis Hinges: Test Standard EN 1935
- Controlled Door Closing Devices: Test Standard EN 1154
- Door Co-ordinators: Test Standard EN 1158
- Electro-Mechanically Operated Locks: Test Standard EN 14846

15.1 Latches & Locks

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

Element	Specification
Maximum forend and strike plate dimensions:	235mm high by 25mm wide by 4mm thick
Maximum body dimensions:	18mm thick by 100mm wide by 165mm high.
Intumescent protection:	See section 12
Materials:	All parts essential to locking/latching action, including latch bolt, forend and strike to be steel or stainless steel
Position	1000 -1200mm from the threshold

15.2 Hinges

Leaves < 2400mm (h) must be hung on a minimum of 3 hinges. Leaves ≥ 2400mm (h) must be hung on 4 hinges. Hinges with the following specification are acceptable:

Element		Specification	
Blade height:		90 - 120mm	
Blade width (excluding knuckle):		30 - 35mm	
Blade thickness		2.5 - 4mm	
Fixings:		Minimum of 4 No. 30mm long No. 8 or No.10 steel wood screws per blade	
Materials:		Steel or stainless steel	
Hinge positions:	If 3 hinges are required:	Top	100 –180mm from the head to top of hinge
		2nd	Minimum 200mm from top hinge or centrally fitted between top and bottom hinge. Additional hinges may be fitted equispaced between 2nd and bottom.
		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 a minimum of 200mm from top hinge and 3rd hinge equally spaced between 2nd and bottom hinge. Additional hinges may be fitted with 3rd and 4th equispaced between 2nd and bottom hinge
		Bottom	150 - 250mm from the foot of leaf to bottom of hinge
Intumescent protection:		See section 12	

15.3 Automatic Closing

Automatic closing devices must be as tested or components that have demonstrated contribution to the required 60 minutes performance of this type of flush doorset design and intumescent specification (as in appendix F), at a similar leaf thickness and when tested to BS 476-22:1987 or BS EN 1634-1.

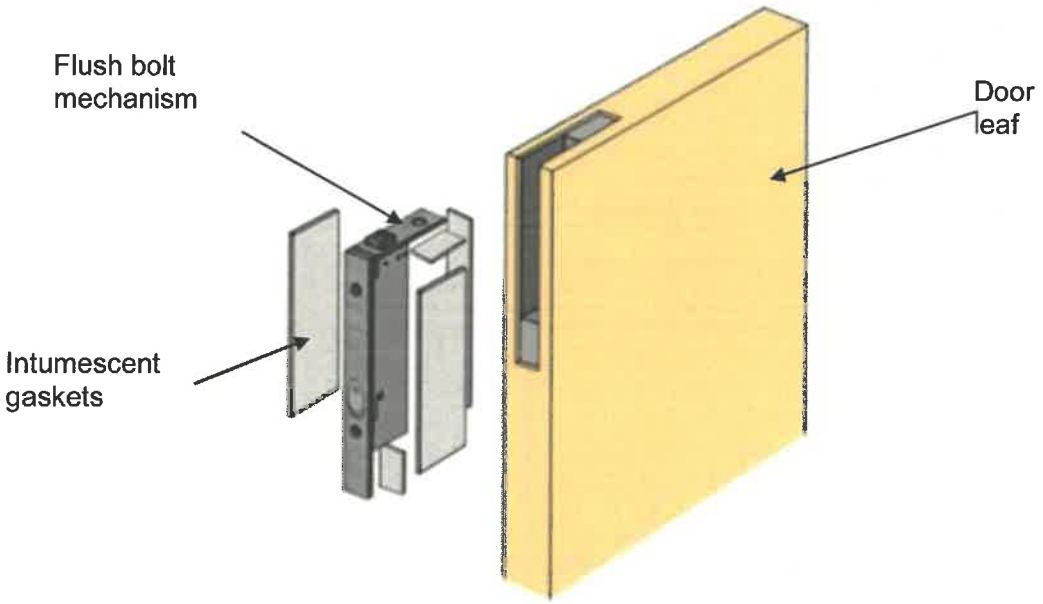
The top pivots and frame housing to floorspring assemblies must be protected with 1mm or 2mm thick intumescent gasket (as specified in section 12) or alternatively the manufacturers tested intumescent gaskets.

15.4 Flush Bolts

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

- 200mm long x 20mm deep x 20mm wide.

Flush bolts must be steel and the mortice must be as tight to the mechanism as is compatible with its operation. All edges of the mortices, including keep plates, must be protected with intumescent gaskets as specified in section 12. Alternatively the hardware manufacturers tested gaskets may be used.



15.5 Pull Handles

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

15.6 Push Plates & Kick Plates

Steel or stainless steel face-fixed hardware such as push plates and kick plates may be fitted to the doorsets and may be recessed to a maximum depth of 2mm on both sides of the door leaf. These items of hardware are permitted up to a maximum of 20% of the door leaf area if mechanically fixed and a maximum of 30% if bonded with a contact or other thermally softening adhesive. Plates must not return around the door edges.

15.7 Panic Hardware

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

15.8 Door Selectors

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

15.9 Environmental Seals

Silicon based flame retardant acoustic, weather and dust seals (e.g. Halspan Triple Fin ref: SLS-TRI-100 range, Norsound 710, Lorient IS1212, IS1511, IS7025, IS7060) may be fitted to this doorset design with out compromising the performance, providing their fitting does not interfere with the activation of the intumescent seals or hinder the self closing function of the leaves.

15.10 Threshold Seals

The following types of automatic threshold drop seals may be recessed in to the bottom rail of leaves to this design with out compromising the performance:

Manufacturer	Product
Halspan	SLS-DRP-100 range
Lorient Polyproducts	IS8010si
Raven	RP8Si
Athmer	Schall-Ex Duo L-15
Norsound	810

15.11 Letter Boxes/Plates

Letter boxes/plates may be fitted providing the product has demonstrated contribution to the required integrity performance of this type of doorset design, when tested to BS 476-22:1987 or BS EN 1634-1, when installed in a timber based doorset of comparable thickness. Products may be fitted up to 1200mm from floor level and no closer than 100mm to any leaf edge.

15.12 Air Transfer Grilles

15.12.1 General

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

15.12.2 Pyroplex Air Transfer Grilles

Based on the available test evidence the following Pyroplex air transfer grilles have been considered acceptable for use with the Halspan® 60 design.

The grilles must be fitted 100mm from the edge of the door leaf and 80mm apart if more than one grille is to be fitted. The area occupied by the air transfer grille must be deducted from the area of glazing, if both elements are fitted. The grilles may be fitted up to a maximum height of 2200mm from the threshold unless otherwise stated.

Part No.	**Dimensions** (mm)	**Air Flow** (sq. cm)	**Compatible Faceplates**
ATG 1500	150 x 150	153	FP1500
ATG 1503	150 x 300	307	FP1503
ATG 1300	300 x 300	614	FP1300
ATG 2251*	112 x 225	161	FP2251
ATG 2250*	225 x 225	323	FP2250

*ATG 2251 and ATG 2250 must only be used above 1000mm height from the threshold of the door

The Pyroplex air transfer grilles must be installed in accordance with the manufacturer's installation details, which include a 6mm thick hardwood aperture liner and Pyroplex intumescent mastic applied around the perimeter of the grille. Full details can be obtained from Pyroplex Ltd.

15.13 Cable-Way

Based on the integrity performance of the doorset construction, with no burn through of the core material, we consider it acceptable to allow the provision for a concealed cable-way to facilitate electro-magnetic closing/latching mechanisms. The cable-way must be concealed in the following way:

1. A hole drilled centrally through the leaf of maximum 10mm diameter.
2. The cable for the electronic closing/latching mechanisms must be no more than 2mm smaller in diameter than the hole through the leaf.
3. The cable for the electronic closing/latching mechanism must be PVC encased
4. Cable ways are only permitted for use with latched, single leaf, single acting doorsets with maximum leaf dimensions of 2100mm (h) x 900mm (w).
5. The hole must be located below 1500mm from the threshold and must be spaced a minimum of 90mm from any apertures within the leaf e.g. glazing, air transfer grilles or letter plates etc.

This approval is subject to the hardware manufacturer having the appropriate test evidence for the product for use with this type of 60 minute construction. Test evidence generated in steel doorsets is not acceptable. Any tested intumescent gaskets for the lockset, closing mechanism, receiver plate, cable loops etc. must be replicated.

15.14 Security Viewers

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

16 Classification of Timber

All timber must meet or exceed class J30 as specified in BS EN 942:2007, providing any defects are adequately repaired.

17 Door Gaps

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

Location	Dimension
Door edge gaps	Representative of those tested but as a guideline, a minimum of 2mm and a maximum of 4mm
Alignment tolerances	Leaves must not be proud of each other or from the door frame by more than 1mm.
Threshold	10mm between bottom of leaf and top of floor covering [1]

[1] 10mm is the maximum tolerance for fire resistance integrity only. Where smoke control is required refer to section 22.

18 Structural Opening

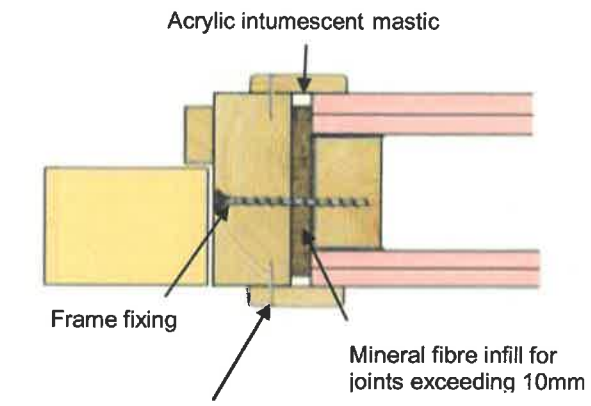
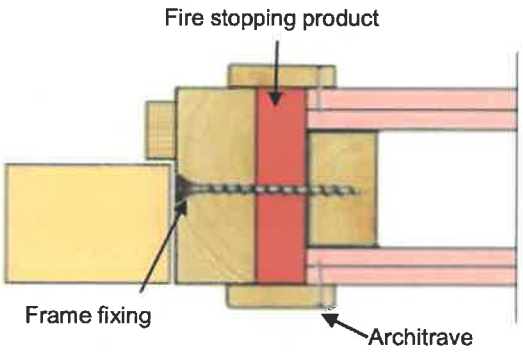
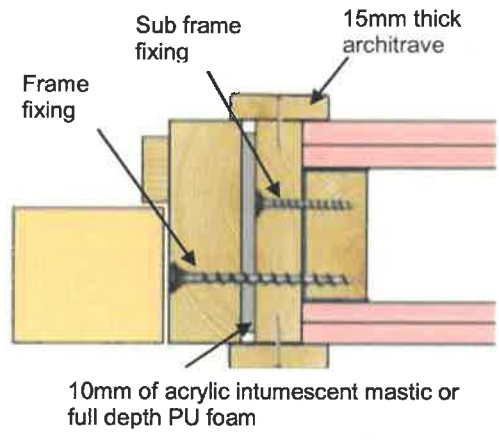
The supporting construction must provide the required level of fire resistance designated for the doorset design and be a suitable medium to permit adequate fixity.

19 Fixings

The frame jambs are to be fixed to the supporting construction using steel fixings at 600mm maximum centres. The fixings must be of the appropriate type for the supporting construction and must penetrate to a minimum depth of 40mm. It is not necessary to fix the frame head, although packers must be inserted.

20 Sealing to Structural Opening

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

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

Guidance for sealing the frame to structural opening gap is also given in BS 8216 *"Timber-based fire doors assemblies. Code of practice"*, which may be referred to where appropriate.

21 Insulation

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

Type		Details
Partially insulating		Doorsets incorporating up to 20% of non-insulating or partially insulating glazing
Fully insulating	Timber frames	Unglazed doorsets or doorsets glazed with 25mm thick Pyrobel (see section 7.6)
	Steel frames back filled with mortar/concrete	Unglazed doorsets or doorsets glazed with 25mm thick Pyrobel (see section 7.6)

22 Smoke Control

22.1 General

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

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

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

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

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

22.2 Further Considerations

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

Responsibility for the appropriate smoke sealing specification and performance of the doors should be agreed between the relevant parties (i.e. specifier, manufacturer, contractor) prior to commencing manufacture and/or installation.

Additional guidance on smoke sealing is given in BS 8214: 2008, "Code of practice for fire door assemblies" and BS 9999: 2017 "Code of practice for fire safety in the design, management and use of buildings" both of which advise that for effective ambient smoke sealing the threshold gap should either be controlled to a maximum of 3mm or a suitably fire performance tested threshold drop down seal fitted (eg one of the types described in section 15.10 or below)

The following products can be used for smoke control purposes:

- Halspan Triple Fin (ref: SLS-TRI-100/2) – fitted in the frame reveal against the upstand of the stop
- Halspan Trident Seal (ref: SLS-TRI-103/5)
- Halspan threshold drop seal (ref: SLS-DRP-100 range) – fitted in the bottom edge of the leaf
- Norsound 810 drop seal – fitted in the bottom edge of the leaf
- Norsound 710 perimeter seal – fitted in the frame reveal against the upstand of the doorstop
- Norsound 720 perimeter seal – fitted in the leaf edge or frame reveal
- STS 154FS combined perimeter intumescent and brush smoke seal – fitted as specified in the relevant data sheets in appendix F
- STS 154FL combined perimeter intumescent and acoustic/smoke seal – fitted as specified in the relevant data sheets in appendix F

Note: The incorrect specification and fitting of smoke seals may impair the operation of a fire resisting doorset assembly such that integrity is reduced, or in the extreme case completely diminished.

23 Conclusion

If the Halspan® 60 doorset design, constructed in accordance with the specification documented in this global assessment, was to be tested in accordance with BS 476-22:1987, it is our opinion that it would provide a minimum of 60 minutes integrity and insulation (subject to section 21).

24 Declaration by the Applicant

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

Signed Andy Gordon

Name: ANDY GORDON

For and on behalf of Vicaima Ltd & Vicaima Industria de Madeiras e Derivados S.A.

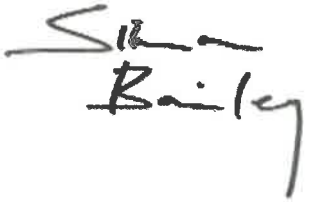
25 Limitations

The following limitations apply to this assessment:

1. This assessment addresses itself solely to the elements and subjects discussed and does not cover any other criteria. All other details not specifically referred to should remain as tested or assessed.
2. This assessment is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available, Exova Warringtonfire reserves the right to withdraw the assessment unconditionally but not retrospectively.
3. This assessment has been carried out in accordance with Fire Test Study Group Resolution No 82: 2001.
4. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
5. This assessment relates only to those aspects of design, materials and construction that influence the performance of the element(s) under fire resistance test conditions. It does not purport to be a complete specification ensuring fitness for purpose and long-term serviceability. It is the responsibility of the client to ensure that the element conforms to recognised good practice in all other respects and that, with the incorporation of the guidance given in this assessment, the element is suitable for its intended purpose.
6. This assessment represents our opinion as to the performance likely to be demonstrated on a test in accordance with BS 476 Part 22; 1987, on the basis of the evidence referred to above. We express no opinion as to whether that evidence, and/or this assessment, would be regarded by any Building Control authority as sufficient for that or any other purpose. This assessment is provided to the client for its own purposes and we cannot opine on whether it will be accepted by Building Control authorities or any other third parties for any purpose.

26 Validity

1. The assessment is initially valid until 22nd August 2023, after which time it must be submitted to Exova Warringtonfire for technical review and revalidation.
2. This assessment report is not valid unless it incorporates the declaration given in Section 24 duly signed by the applicant.

Signatures:		
Name:	**Dr K D S Towler**	**S Bailey**
Title:	Senior Product Assessor	Senior Product Assessor

Appendix A
Halspan® 60 Steel Frame Doorsets

1. Introduction

This appendix contains information relating to Halspan® 60 doorsets utilising steel door frames. The assessment uses the same extrapolation and interpretation techniques applied for the main assessment and is an evaluation of the potential fire resistance performance, if the elements were to be tested in accordance with BS 476-22:1987.

2. General specification of construction

The door leaves for Halspan® 60 steel framed doorsets are manufactured in accordance with the design as specified in section 2 of Chilt/A12064 Revision A. All other aspects of the construction specification are identical to that detailed in the main assessment except where specifically discussed in the following paragraphs.

3. Leaf sizes and configurations

The assessed leaf sizes and configurations are based on the constructions and performances obtained from the specimens tested in Warres 111201, RF01073 and RF01074. Data sheets specifying the maximum approved leaf sizes and graphs detailing the permitted gradient between height and width are contained in appendix F.

The maximum assessed overpanel height for steel framed doorsets is 500mm. Doorsets must use a flush overpanel to leaf head junction. Steel transomed assemblies are not permitted.

4. Lippings

Steel framed Halspan® 60 must be lipped on all edges in accordance with the following specification:

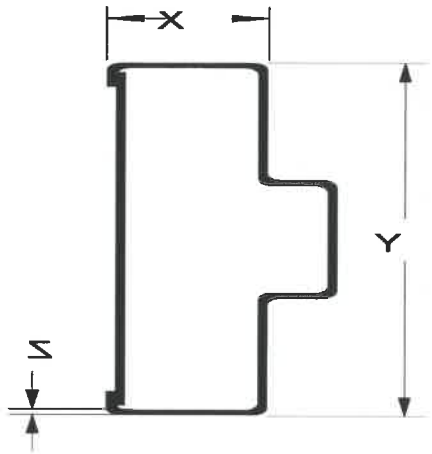
Material	**Size** (mm)	**Minimum Density** (kg/m^3)
Straight grained, joinery quality hardwood, free from knots, splits and checks.	1. Flat = 6 – 13 thick with a maximum of 2mm profiling permitted at corners of lipping (see section 8.1) 2. Rounded = 6 – 13 thick with a radius matching the distance between leaf edge and floor pivot (see section 8.1)	640

5. Door frames

The tested frame specification for doorsets to this design comprised the following:

- Material: 1.5mm thick rolled mild steel
- Section: 151mm wide x 62mm thick excluding a 13mm deep x 48mm wide integral stop
- Head to jamb jointing detail

The door frames must be manufactured from mild steel as tested or alternatively stainless steel of the appropriate grade e.g. 304 or 316 may be used. The frame dimensions may be varied within the following parameters:



X: + or - 30%
Y: + or - 50% (providing the frame reveal dimensions are maintained)
Z: + 100 % and – 0%

Steel frames for doorsets without overpanels may be hollow or back filled with mortar or concrete. Plasterboard, mineral fibre, glass fibre, polyurethane expanding foam and ceramic wool must not be used

Steel frames for doorsets with flush overpanels must be back filled with mortar or concrete. Hollow frames, plasterboard, mineral fibre, glass fibre, polyurethane expanding foam and ceramic wool must not be used.

Appendix F details the different leaf size scopes and intumescent specifications for hollow and backfilled frame constructions.

6. Fixings

Fixings must be of the appropriate type and length for the structural opening medium and must include a minimum of 1 fixing per 600mm of vertical edge, with a fixing no more than 350mm from the top and bottom corners and two across the head.

7. Sealing to Structural Opening

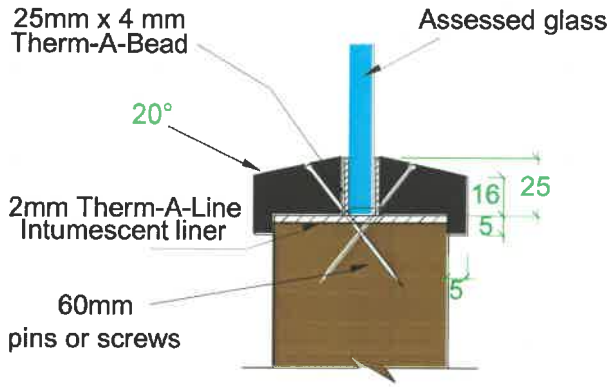
Gaps between door frames and structural openings must be protected with proprietary materials that have been successfully tested for this application.

8. Structural openings

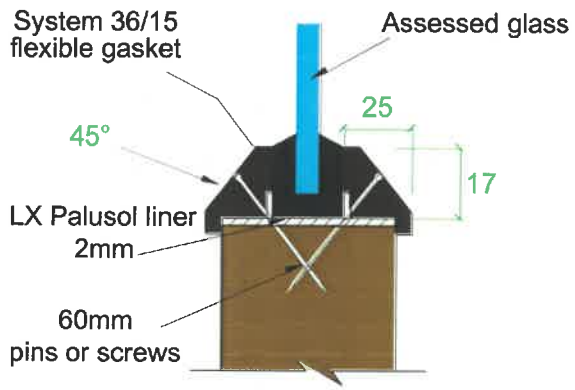
Halspan® 60 steel framed doorsets may be fitted into the following types of structural opening:

- Cast dense concrete
- Dense concrete blocks or brickwork
- Masonry
- Lightweight concrete
- Lightweight aerated concrete
- Timber stud partition
- Steel stud partition (apertures must be framed by steel studs, which have a minimum of 45 x 45mm softwood stiffeners to the vertical edges)

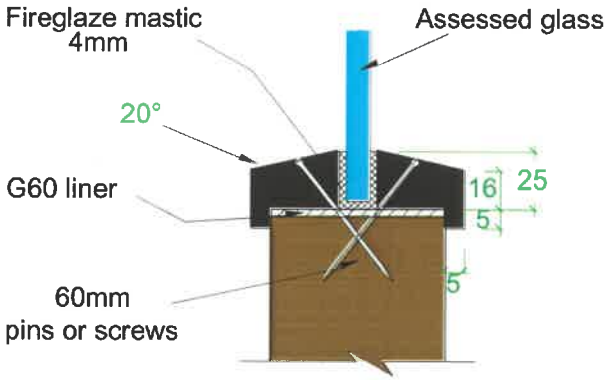
Appendix B
60 Minute Glazing Systems



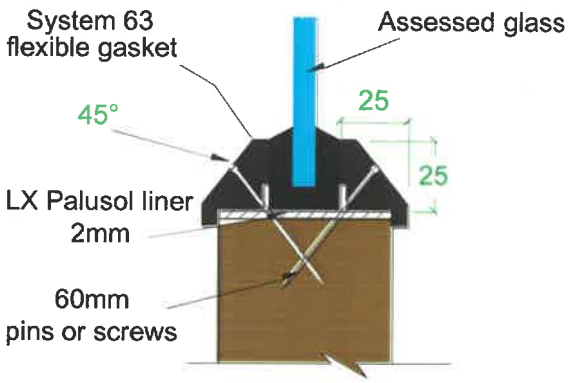
Therm-A-Glaze 60
Intumescent Seals Ltd



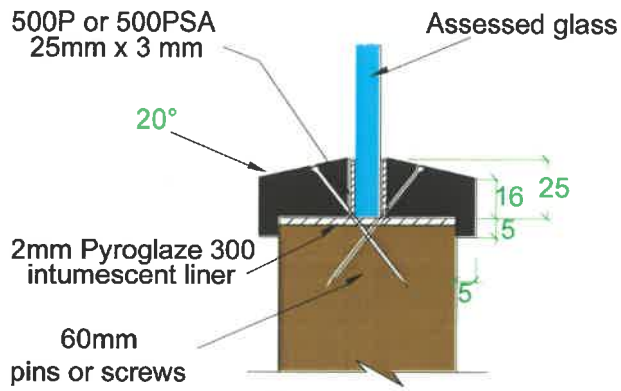
System 36/15
Lorient Polyproducts Ltd



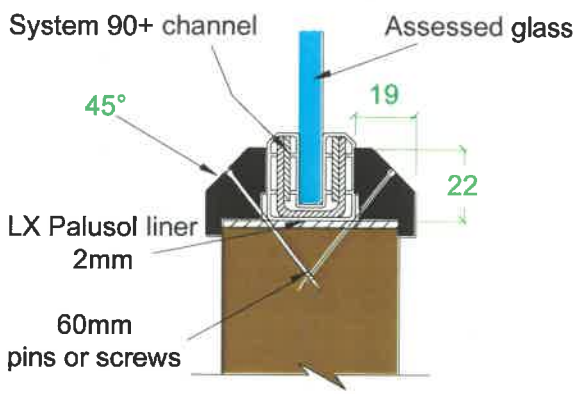
Fireglaze Mastic
Sealmaster Ltd



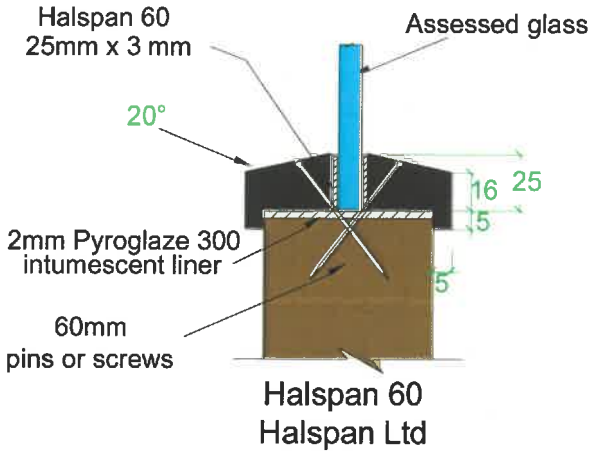
System 63
Lorient Polyproducts Ltd



Pyroglaze 60
Mann McGowan Ltd

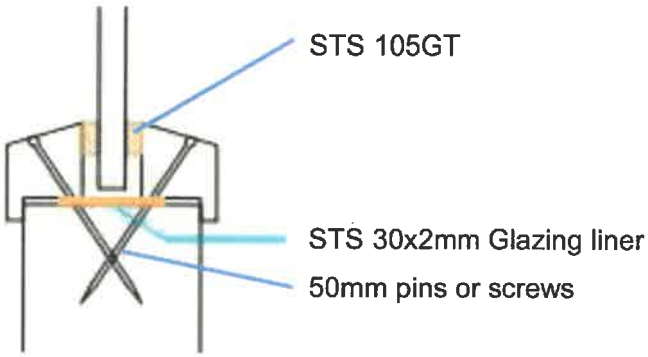


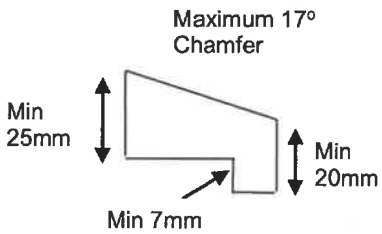
System 90+
Lorient Polyproducts Ltd



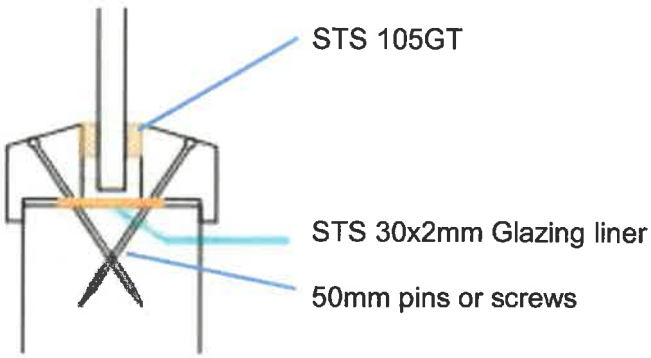
Sealed Tight Solutions Glazing System ST105GT & 30x2 Liner

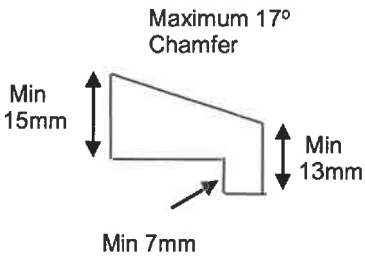
Option 1



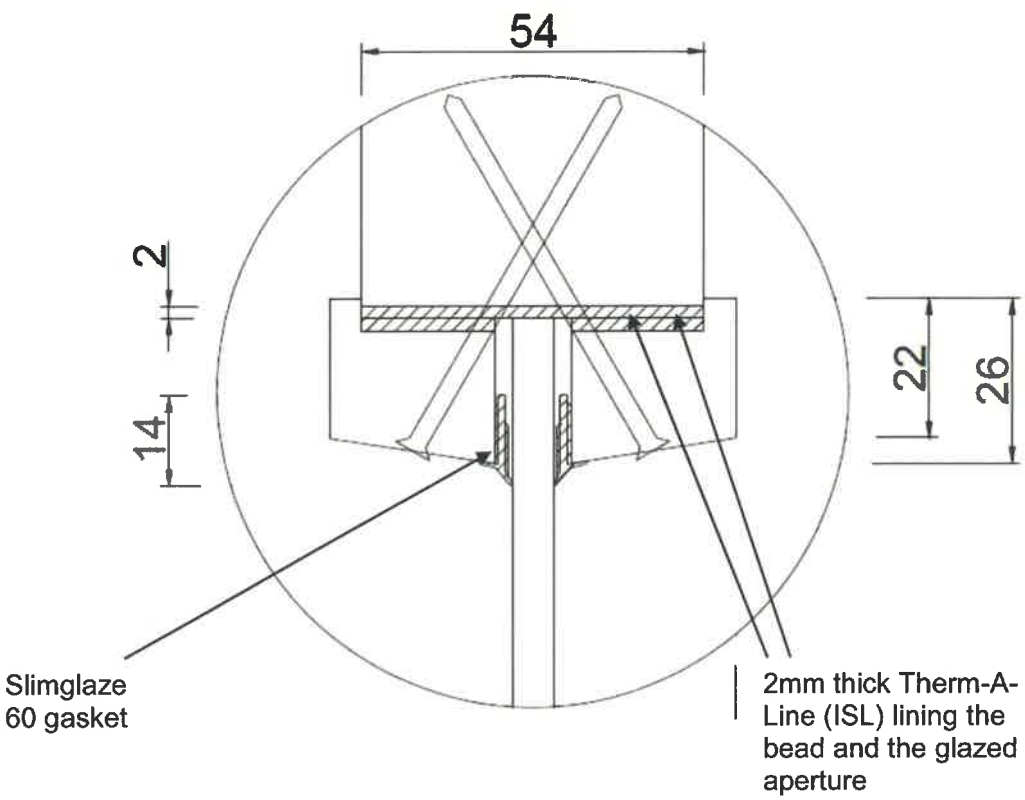


Option 2

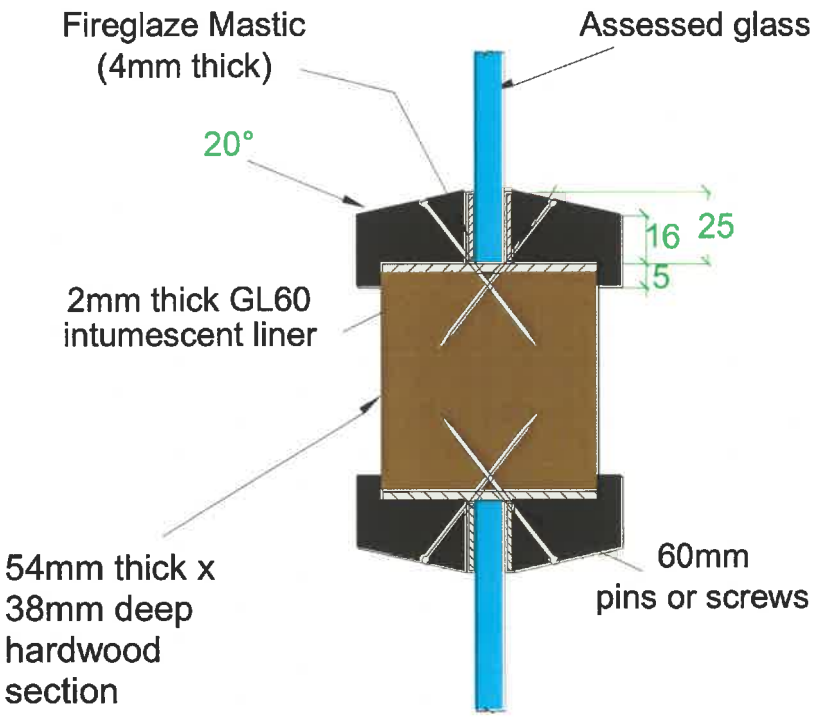




Halspan Slimglaze 60 System



Halspan® 60 Multipane glazing system

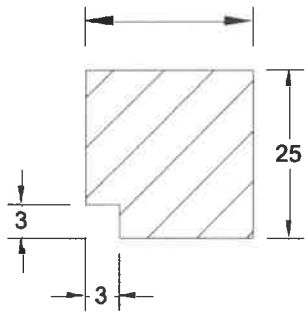


Assessed Square Glazing Bead Profiles

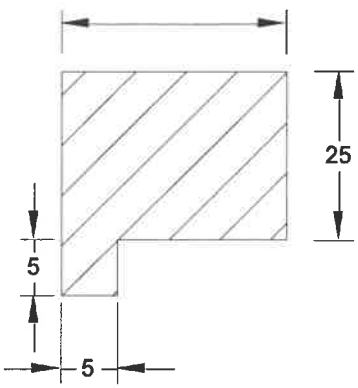
The following square bead profiles may be used as an alternative to the splayed beads detailed above - refer to section 7 for glazing system and glass restrictions.

When utilising flush square beads, with or without quirks, the assessed aperture liner for the chosen glazing system may be concealed by trimming to a minimum of 40mm wide and recessing into the base of the glazing bead.

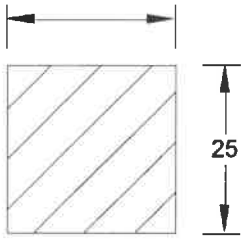
To finish flush with the leaf face



Suited to glass thickness



To finish flush with the leaf face



Appendix C

Performance Data

Primary Data

The supporting test evidence and specification for the Halspan® 60 door design is held in confidence at Exova Warringtonfire.

Where verification of the supporting test evidence is required, contact Halspan Ltd.

Appendix D

Revisions

Revision	Exova Warringtonfire Reference	Date	Description
A	402409	22.8.2018	Technical review and 5 year revalidation; update to Exova branding; inclusion of STS perimeter and glazing seal intumescents. Use of beech removed. Note 6 in section 25 added

Appendix E

PVC Edge Protectors