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

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

Testing, calibrating, advising.

Title:
Fire Resistance Assessment for:

Halspan® 30 Optima
30 Minute Timber Based Fire Resisting Doorsets

WF Contract No :

BMT/CNA/F16082

Sponsor:

Greenlam Industries Ltd.
1501-1505,
Narain Manzil,
23 Barakhamba Road,
New Delhi 110001

Valid From:

12th May 2016

Valid Until:

12th May 2021

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 advice on the safety, quality and performance of their products and operations. Headquartered in Edinburgh, UK, Exova operates 143 laboratories and offices in 32 countries and employs around 4,500 people throughout Europe, the Americas, the Middle East and Asia/Asia Pacific. With over 90 years' experience, Exova specialises in testing across a number of key sectors from health sciences to aerospace, transportation, oil and gas, fire and construction.

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

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

Kind regards

Exova Warringtonfire

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

Contents

1 Introduction

This document constitutes a global assessment relating to Halspan® 30 Optima doorsets, manufactured by Greenlam Industries Ltd. The assessment uses established extrapolation and interpretation techniques in order to extend the scope of application by determining the limits for the design based on the tested constructions and performances obtained. The assessment is an evaluation of the potential fire resistance performance, if the elements were to be tested in accordance with BS 476: Part 22: 1987.

2 General Description of Construction

The construction for door leaves of this design comprises a solid sheet of 44mm thick three layered particleboard (nominal density 620kg/m³ +/- 10%), manufactured by C.P.S (Continuous Press System). Where specified, the leaves require lipping as detailed in section 8.

Test: RF09115 is suitable evidence to allow the use of a single, timber reinforced vertical joint in the leaf core (which may be reduced to 38mm thick as tested in RF09115), subject to the leaf size envelope limits contained in appendix B and see section 9.4. The joint must be no closer than 320mm from the vertical leaf edges.

3 Leaf Sizes

Assessment for increased leaf dimensions is based on the design's performance and the characteristics exhibited during test. Data sheets specifying the maximum assessed leaf sizes and graphs showing the permitted gradient between maximum height and width are contained in appendix B.

Doorsets containing leaves with smaller dimensions than those stated are deemed to be less onerous and are therefore automatically covered.

4 Configurations

Based on the test evidence listed in appendix H, 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 with overpanel
DASD+OP	Double acting single doorset with overpanel
LSADD & ULSADD	Latched & unlatched single acting double doorset
DADD	Double acting double doorset
LSADD+OP & ULSADD+OP	Latched & unlatched single acting double doorset with overpanel
DADD+OP	Double acting double doorset with overpanel

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

5 Leaf Size Adjustment

Halspan® 30 Optima door leaves may be may be altered as follows.

Element	Reduction
Leaf	The manufactured size of the leaf may be reduced in height or width without restriction, providing lippings meeting the requirements in section 8 are applied
Timber lippings	The dimensions stated in section 8.1 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 with this doorset design either with a transom or flush with the leaf heads. If a transom is fitted, it must be of the same section and material assessed for the door frames (see the note under the table in section 10.1).

In either case the overpanel must be fully contained within the door frame (see following diagram).

Joints between the transom and frame jambs must be either mortise and tenon or butt joints (see section 10.2). Either method requires joints to be tight, with no gaps, and require mechanical fixing with the appropriate size ring shank nails or screws. Butt joints must be additionally bonded with urea formaldehyde or equivalent.

Where flush overpanels are used the overpanel to leaf junction must be lipped as specified in section 8.1.

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
- using 75mm long x 8mm diameter steel dowels inserted in the frame 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 B, may be fitted to all edges of the overpanel if required for the manufacturing process. The seals may be fitted in the overpanel edges or frame reveal. Providing the intumescent seals are fitted to all edges of the overpanel, the frame to overpanel junction is permitted to have a maximum 3mm 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.

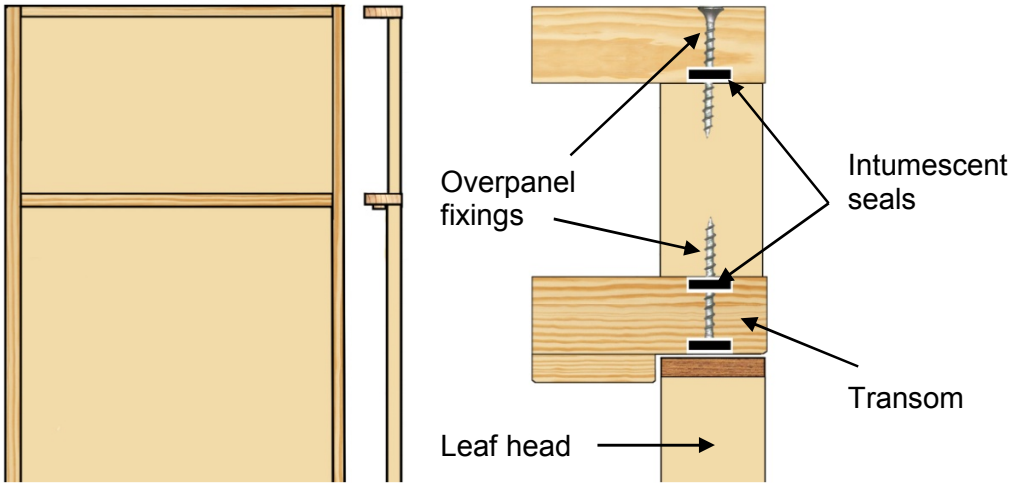
It is permitted to include a glazed aperture within the overpanel providing the glazing is within the parameters given in section 7.

Maximum overpanel heights are as follows.

Configuration	Height (mm)	Width (mm)
Single doorsets	2000	Overall door width
Double doorsets	1500	Overall door width

For steel frame overpanel heights see appendix C.

Aluminium frame doorsets are not permitted with overpanels.



Notes:

1. Drawing is representative of doorset construction only; actual construction must be as the text within this document specifies
2. Details for wire-ways in overpanels are contained in appendix K.

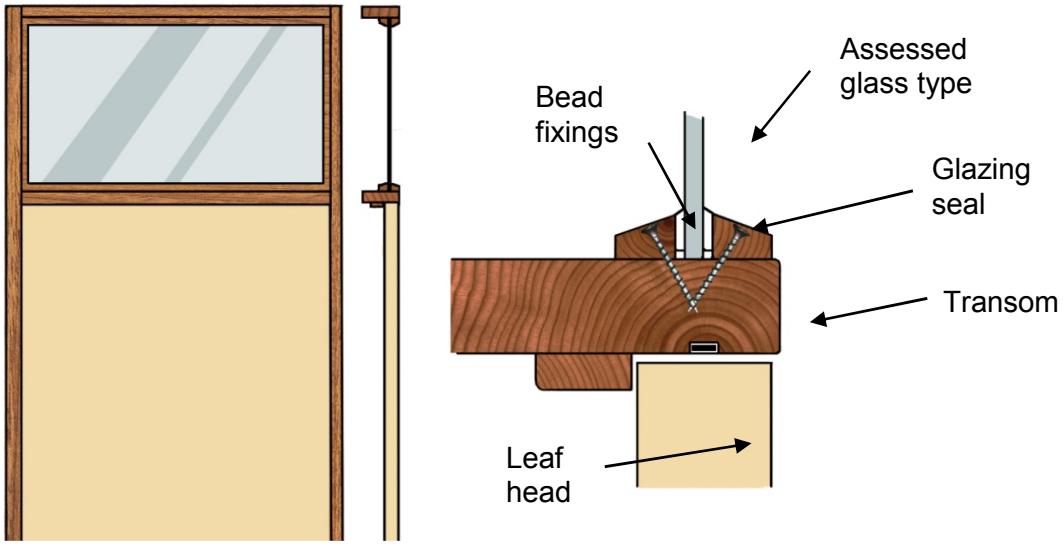
6.2 Fanlights

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 10.

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

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

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

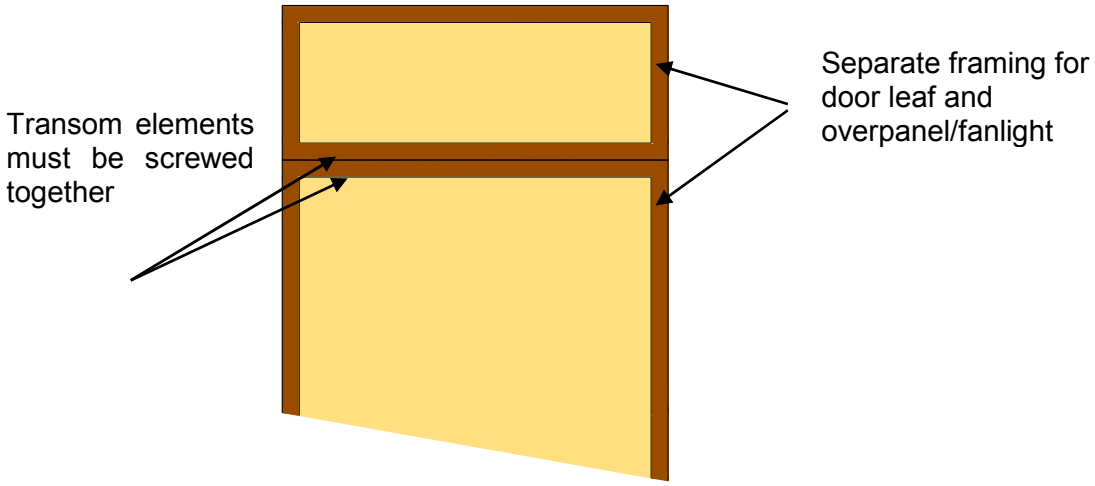


Drawing is representative of doorset construction only; actual construction must be as the text within this document specifies

Steel, aluminium and MDF frame doorsets are not assessed for glazed fanlights.

6.3 Split Transom

Separate frames for the door leaf and overpanel are acceptable; both transom elements must be to the same specification as the door frame (see the note under the table in section 10.1). The two transom elements must be screwed together at maximum 200mm centres and the joint between the two must be tight with no gaps.



7 Glazing

7.1 General

The testing conducted on the Greenlam Industries Ltd. Halspan® 30 Optima 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 is 1.75m^2 and glazing must meet the following criteria.

7.2 Assessed Glazing Systems

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

System	Manufacturer	Maximum Area (m^2)
1. Fireglaze 30	Sealmaster Ltd	1.75
2. Therm-A-Strip	Intumescent Seals Ltd	1.75
3. Hodgsons Firestrip 30	Hodgsons Sealants Ltd	1.75
4. Flexible Figure 1	Lorient Polyproducts Ltd	1.75
5. System 36 Plus	Lorient Polyproducts Ltd	1.25
6. Pyroglaze 30	Mann McGowan Ltd	1.25
7. R8193	Pyroplex Ltd	1.25
8. 30049	Pyroplex Ltd	1.25
9. Sureglaze 30	Halspan Ltd	1.25

Diagrams detailing the systems are contained in appendix A.

7.3 Assessed Glass Products

Assessed glass types are as follows:

Glass Type	Manufacturer	Maximum Area (m^2)	Thickness (mm)	Minimum Edge Distance (mm)
1. Pyroshield	Pilkington UK Ltd	1.75	6 & 7	90
2. Pyroshield 2	Pilkington UK Ltd	1.75	6 & 7	90
3. Pyran S	Schott Glass Ltd	1.75	6	90
4. Firelite glass (see note 2)	Southern Ceramic Supplies	0.5	6	90
5. Sureglaze clear	Halspan Ltd	0.8	6	90
6. Sureglaze wired	Halspan Ltd	0.8	6	90
7. Interglaze E30	Halspan Ltd	1.25	6	90
8. Pyrostem	Pyroguard UK	1.25	6	90
9. Pyroswiss (see note 3)	Vetrotech Saint Gobain	0.8	6	90
10. Pyrotech 630 (see note 4)	Essex Safety Glass Ltd	1.25	6	90
11. Pyroguard EW30 - clear	Pyroguard UK	1.25	7	90
12. Pyroguard EW30 - wired	Pyroguard UK	1.25	7	90
13. Sureglaze insul	Halspan Ltd	0.8	7	90
14. Pyrobelite 7	AGC Flat Glass Europe	1.75	7	90
15. Pyrodur 30-104	Pilkington UK Ltd	1.75	7	90
16. Pyrodur 60-10	Pilkington UK Ltd	1.75	10	90
17. Pyroguard EW Maxi	Pyroguard UK	1.25	11	90
18. Pyranova 15-S2.0	Schott UK Ltd	1.75	11	90
19. Pyrobelite 12	AGC Flat Glass Europe	1.75	12	90
20. Pyroguard EI30	CGI Ltd	1.75	15	90
21. Pyrostop 30-10	Pilkington UK Ltd	1.75	15	90
22. Pyrobel 16	AGC Flat Glass Europe	1.75	16	90

Notes:

1. All glass types must be fitted fully in accordance with the manufacturers' tested details/installation requirements, particularly with respect to edge cover and expansion tolerances
2. In accordance with the requirements of Approved Document N: Glazing – safety in relation to impact, opening and cleaning, panes of Firelite glass are limited to a smaller dimension not exceeding 250mm in height or width and an area not exceeding 0.5m^2 (see Approved Document N for details)
3. Based on test RF02110 6mm Pyroswiss manufactured by Vetrotech may only be used with glazing system 3 (Firestrip 30) listed in section 7.2
4. Based on test RF08169 6mm Pyrotech 630 manufactured by Essex Safety Glass Ltd may only be used with the tested glazing system as depicted in appendix A
5. Glass types 19 - 22 are fully insulating for 30 minutes in terms of the criteria set out BS 476: Part 20: 1987.

7.4 Glazing Beads & Installation

Glazing beads must be as specified in the following table.

Material	**Profile**	**Permitted Glazing System** (section 7.2)	**Permitted Glass Type** (section 7.3)	**Minimum Density** (kg/m^3)
Hardwood	Chamfer	1 - 9	1 - 22	640
	Square	2	1 - 8 & 11 - 22	640
		1 - 9	11 & 12 & 14 - 22	640
MDF	Chamfer	1 - 4	1 - 22	700
	Square	1 - 4	14 - 22	700

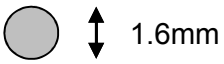
Notes:

1. Sectional drawings detailing the tested and approved proprietary glazing systems are contained in appendix A
2. See appendix A for square and splayed bead profile options. A 6 – 10mm thick square aperture liner is permitted for use with square beads providing it is constructed from hardwood of min density 640 kg/m^3 and glued in position using a UF, PVA or PU type adhesive
3. Glazing beads must be retained in position with 40mm long 2mm diameter steel pins or 40mm long No 6 - 8 screws, inserted at:
   - either 35 - 40º to the plane of the glass
   - or perpendicular to the bead splay (fixings for square beads must be at 35 - 40º to the plane of the glass)
4. Bead fixings must be at 150mm maximum centres and no more than 50mm from each corner
5. The following minimum pin specification is permitted and is considered suitable for gun (pneumatically) fired applications:

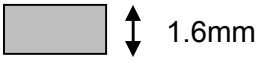
5.1 Option 1 – Round, Oval and Rectangular shaped pins:

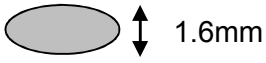
- Minimum Standard Wire Gauge (SWG) 16
- Minimum cross section area of 2.03mm^2
- Minimum linear dimension 1.6mm in any direction

Round pin diameter (mm) = minimum 1.6mm



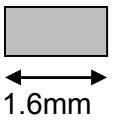
Oval/rectangular pin minimum diameter linear dimension = 1.6mm





5.2 Option 2 – Rectangular shaped pins:

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



Note:

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

6. Pins cannot be used in conjunction with the Halspan® 30 multipane glazing system
7. Glazed openings must not be less than 90mm from any door edge. Multiple apertures are acceptable within the permitted glazed area, with a minimum dimension of 80mm of Halspan® 30 Optima core between apertures. Alternatively, the dimension may be reduced to 20mm using the Halspan® 30 multipane glazing system by inserting 44mm x 20mm hardwood transoms/mullions dividing the apertures (see appendix A for details)
8. Aperture shape is not restricted, providing the glazing system and beads can effectively accommodate the required profile
9. False timber (hardwood) beads ≤ 50mm wide may be applied across the glass face with glass types 11 & 12 & 14 - 22 only, using one of the following methods:
    - Intumescent mastic/silicone tested for glazing applications to BS 476: Part 22: 1987 or BS EN 1634-1
    - 1 - 2mm thick acrylic high tack/high shear glazing tape tested for glazing applications to BS 476: Part 22: 1987 or BS EN 1634-1
    - The Halspan® Cassette system shown in appendix A.

7.4.1 Sureguard Cladding

Test ref: RF02083 is suitable evidence to allow the use of glazing beads clad with 2mm thick Sureguard, provided that the same glazing bead profile and glazing system is used as that tested (i.e. 39^O chamfer to the top face of the hardwood bead and Fireglaze 30 mastic as the glazing system).

7.5 Greenlam Industries Ltd. Visicom Glazing Systems

7.5.1 General

As an alternative to the single glazed systems above Visicom panels may be installed within Halspan® 30 Optima door designs to the specifications within this assessment.

All installation and intumescent details for the Visicom panels must remain as detailed in test report DFR0401121 unless specified below; further options and information relating to Visicom installations may be found in Chilt/A05064 (it is the responsibility of the user of this document to ensure that they have the latest revision - liaise with Greenlam Industries Ltd).

Glass types used must remain as tested and detailed in the tables below.

Apertures must be no closer than 150mm from any leaf edge with a minimum of 80mm of Halspan® 30 Optima core between apertures.

7.5.2 Standard System

The maximum assessed glazed area for all orientations is 0.65m², should the required area of glazing exceed 0.42m^2 an aperture liner must be installed i.e. 2mm thick Therm-A-Line from Intumescent Seals Ltd.; glazing must meet the following specification.

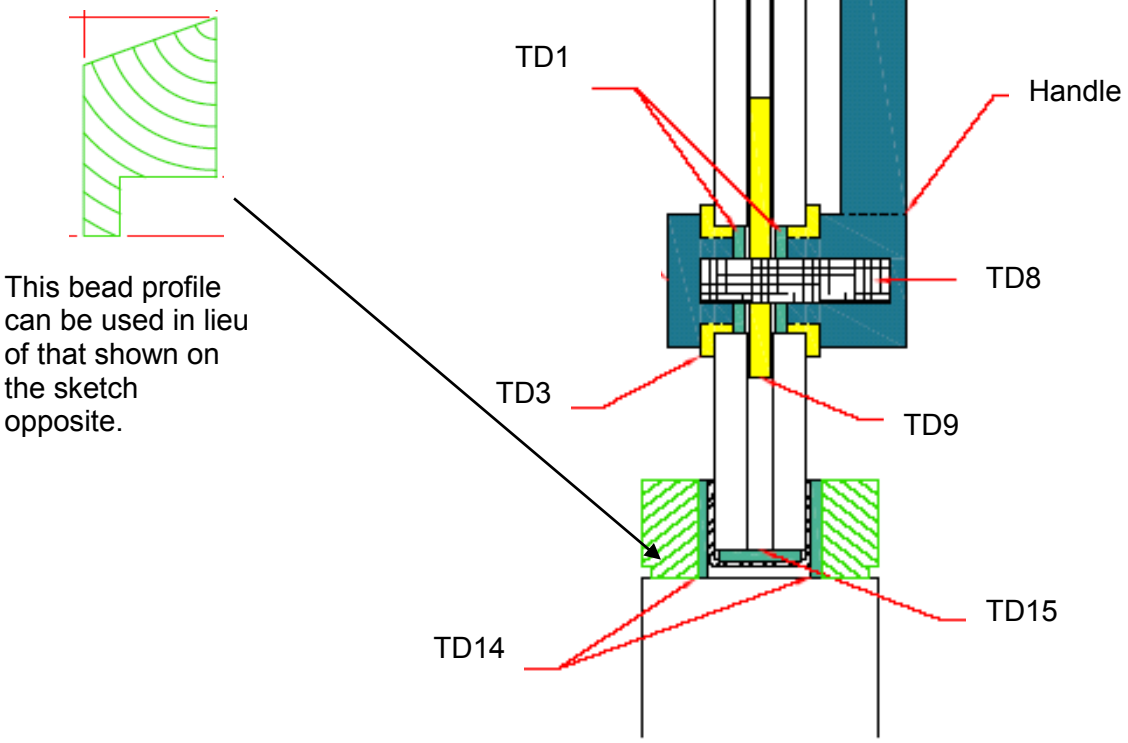
Location	**Glass Description** (mm)	
Exposed Face	6 Toughened or 6 Pyroshield II or 7 Pyrobelite	
Centre Pane	4 Toughened or 4 Float	4 Perspex (only to be used in conjunction with Pyroshield or Pyrobelite on either exposed or unexposed face)
Unexposed Face	6 Toughened or 6 Pyroshield II or 7 Pyrobelite	

7.5.2.1 Installation

The Visicom system must remain as tested, as summarised in the drawing below. Glazing may incorporate an aluminium lever handle (to operate the middle pane) which may be orientated on either the exposed face, the unexposed face or both faces.

Hardwood beads having a minimum density of 640kg/m^3 must be retained in position with 39mm long x No6 to No8 steel screws or 50mm long x 2mm diameter steel pins inserted at nominally 150mm to 180mm centres. Timber for glazing beads must be straight grained joinery quality, free from knots, splits and checks.

TD references are held in confidence on file at Exova Warringtonfire



This bead profile can be used in lieu of that shown on the sketch opposite.

7.5.3 Visicom Plus

The construction of the Visicom Plus design is identical to the standard shown in section 7.5.2, except that (where fitted) the single centre pane of glass is replaced with 2 thinner panes. The extra pane in conjunction with a modified operating shaft shape allows lower operating forces and increases the viewable area of the system when open.

It is our assessment that where a 4mm thick pane is required in the centre of the Visicom designs as detailed in section 7.5.2, the single pane may be replaced with two as described.

8 Edging Materials

8.1 Timber Lippings

Greenlam Industries Ltd Halspan® 30 Optima must be lipped in accordance with the following specification. The lipping specifications for steel and aluminium frame doorsets are contained in appendices C & D.

Material	**Size** (mm)	**Min Density** (kg/m^3)
Hardwood - must be joinery quality, free from knots, splits and checks	1. Flat = 6 – 18 thick with a maximum of 2mm profiling permitted at corners of lipping (see section 10.1) 2. Rounded = 8 – 28 thick with a radius matching the distance between leaf edge and floor pivot (see section 10.1) 3. Rebated = 18 – 28 thick with a 13mm deep equal rebate	500

Notes:

1. Overpanels separated from the leaf heads with a transom do not need to be lipped
2. Overpanels flush with the leaf heads must be lipped on the bottom edge but may additionally be lipped on all edges if required
3. Single and double doorsets without overpanels only require lipping on the vertical edges but additionally may be lipped on the top and bottom edges if required
4. 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
5. Double doorsets without flush overpanels may use square or rebated meeting edges
6. Double doorsets with flush overpanels may use a rebated overpanel junction and rebated meeting edge junction concurrently
7. 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 14
8. Single doorsets are not permitted with rebated vertical edges
9. Single and double doorsets without overpanels are not covered for rebated edges which must be square or rounded - except on the vertical meeting edges.

8.2 PVC Lippings

Halspan® 30 Prima (only) may be lipped with PVC in accordance with the following specification, lippings may be applied to all edges as required.

Material	**Size** (mm)
Dolken PVC edgebands	1. Flat = 1 - 2 thick
	2. Curved 1 - 2 thick (for double acting doorsets)

Halspan® 30 Prima doorsets lipped with PVC may not be used in conjunction with steel or aluminium door frames. The full intumescent seal, doorframe and leaf size dimensions are detailed in the data sheets contained in appendix J. PVC lippings may be fitted direct to Greenlam Industries Ltd Halspan® 30 Prima core or onto hardwood lippings as per section 8.1

8.3 Edge Banding Materials

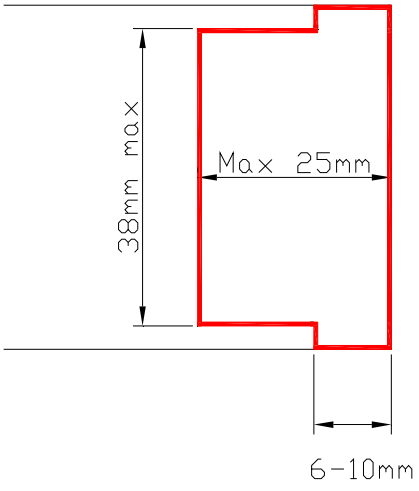
Halspan® 30 Optima doorsets may also have the leaf edges finished with the following materials in addition to the timber lipping specification given in section 8.1.

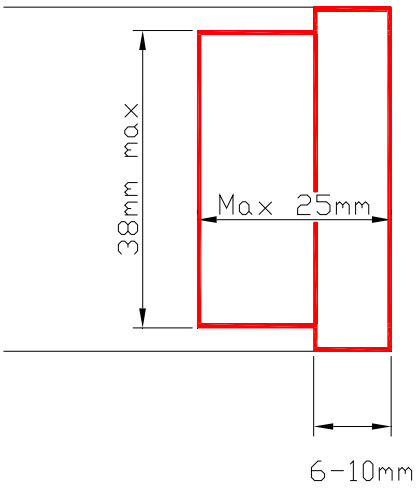
Material	**Max thickness** (mm)	**Specification**
Hardwood	1.6	640 kg/m³
Paper foils	1	-
High pressure laminates	1	-

These elements may be applied to the leaf edges but must not conceal the intumescent strips. All elements may be used with all types of door frames.

8.4 T Section Hardwood 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 8.1. 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 12.





8.5 PVC Finishes

8.5.1 General

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

8.5.2 CS Group PVC Edge Protectors

The Halspan® 30 Optima design has been tested and assessed for use with CS Group edge protectors. CS Group edge protectors are supplied pre-formed incorporating the approved intumescent material. The CS Group edge protectors must be used as part of a complete intumescent system and the required intumescent specification and leaf sizes are given in the relevant data sheets in appendix B. CS Group must be contacted for precise installation and fixing details (www.c-sgroup.co.uk).

8.5.3 Post-Formed CS Group Acrovyn

It is possible to encapsulate the Halspan® 30 Optima design by post-forming the leaf in CS Group Acrovyn, based on the supporting test evidence in Chilt/RF11059 and the following specification:

1. CS Group Acrovyn must be wrapped around the vertical edges of the leaf only, i.e. the top and bottom of the leaf must remain exposed
2. The vertical edge detail prior to post-forming must be lipped with hardwood as detailed in this assessment (see section 8.1)
3. The maximum radius of the lipping at the corners of the vertical edges before post-forming must be 9mm, which provides for 11mm external radius after the CS Group Acrovyn has been applied
4. The intumescent detail as specified in section 11 and the relevant (CS Group headed) datasheets contained in appendix B of this assessment must be replicated
5. CS Group Acrovyn must be bonded to the leaf using 3M Scotch-Grip cement 10 contact adhesive, or equivalent
6. See relevant (CS Group headed) datasheets in appendix B of this assessment for maximum permitted leaf sizes
7. The maximum thickness of CS Group Acrovyn used must be 2mm, as per test evidence
8. The CS Group Acrovyn can be provided as pre-formed trays with dimensions to suit the proposed leaf sizes, as well as sheets for post-forming by the door manufacturer.

8.6 DDA Compliant Contrast Strips

In certain circumstances, edging to the door leaf may be required to provide contrast to comply with The Equality Act regulations; it will be permissible to fit solid 2mm x 15mm wide PVC strips into a groove machined in the edge of the leaf, provided the installation does not interfere with any installed intumescent system. Intumescent strips may be in a contrasting colour.

9 Leaf Facing Materials

9.1 General

The basic 44mm thick Halspan® 30 Optima leaf construction has integral facings and does not therefore require additional facing materials as standard.

9.2 Feature Grooves

Both sides of Halspan® 30 Optima door leaves may be grooved to the following specification. Grooves may coincide with the top and bottom of glazed apertures if desired.

9.2.1 Option A

Element		Details	
Max groove size (mm)		Width as required (to a maximum of 50mm wide) x 3mm deep	
Proximity to door edges (mm)		Horizontal Grooves	May extend full width
		Vertical Grooves	May extend full height
Groove spacing (mm)		No closer than 50mm apart. Vertical and horizontal grooves may intersect each other.	
Orientation		Vertical or horizontal	
Configuration		Latched and unlatched, single and double acting, single and double leaf doorsets	
Leaf size range (mm)	From:	2135 high x 976 wide	
	To:	2525 high x 825 wide	
Intumescent seal dimensions (mm)		≥ to 20 x 4	

9.2.2 Option B

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 (mm)	Max 6 no grooves divided between horizontal and vertical orientations as required and spaced minimum 150mm apart	
Orientation	Vertical & horizontal	
Configuration	Latched and unlatched, single and double acting, single and double leaf doorsets	
Leaf size range (mm)	All	
Intumescent seal dimensions (mm)	All	

9.3 Decorative and Protective Facings

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

Facing Material	**Maximum Permitted Thickness** (mm)
Paint	0.5
Timber veneers	2
PVC	2
Plastic laminates	2
Decorative paper / non-metallic foil	0.4

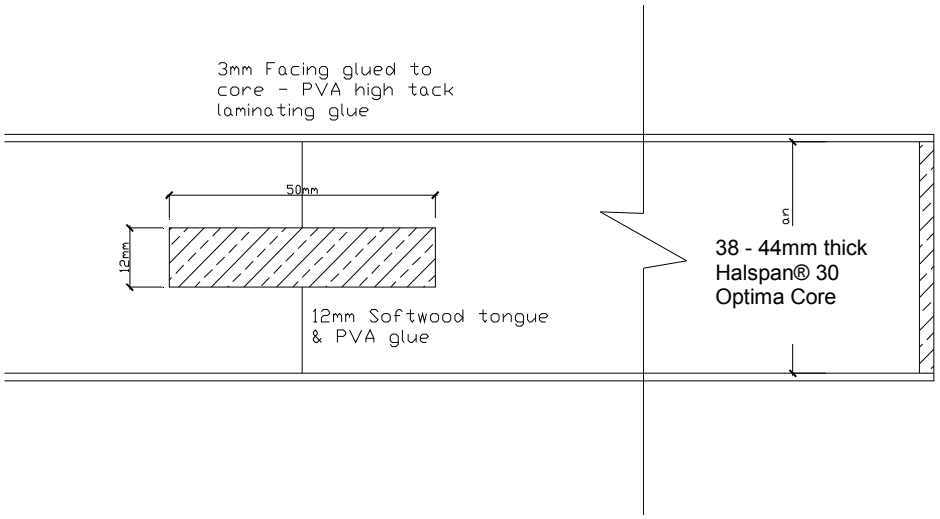
Notes:

1. Metallic facings are not permitted except for push plates and kick plates
2. The door leaf thickness may be reduced by a maximum of 0.6mm to each face (a maximum of 1.2mm in total) for calibration purposes, only in order to accommodate one of the additional facings shown in the table above. The finished leaf thickness must be a minimum of 44mm
3. Materials must not conceal intumescent strips
4. Other than PVC, the facing materials must not return around the edge of leaf
5. The PVC may be post-formed over the vertical and horizontal edges provided that the required intumescent specification detailed in appendix B is maintained. The maximum radius at the corners of the leaf for post formed doors is 8mm, see diagram in section 10.1 for details.

9.4 Jointed Core

Test: RF09115 is suitable evidence to allow the use of a single, timber reinforced vertical joint in the leaf core (which may be reduced to 38mm thick as tested), subject to the leaf size envelope limits contained in appendix B.

3mm facings must be adhered to both faces of the leaves as shown below.



10 Door Frames

10.1 Door frame construction

Timber based door frames for Halspan® 30 Optima must be constructed to meet the following specification (for steel and aluminium door frame options see appendices C and D).

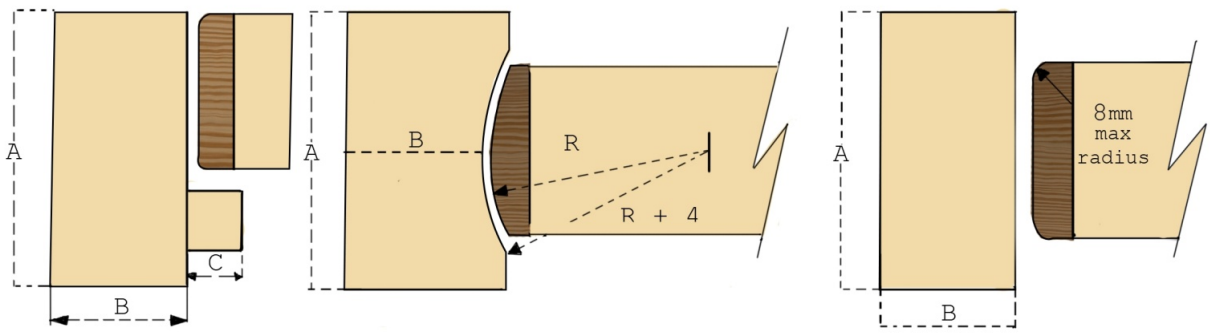
Material	Minimum Section Size (mm)	Min Density (kg/m^3)
Softwood or hardwood	70 x 28[1,2]	450
Hardwood	70 x 22[2]	640
MDF	70 x 30[2]	700

Notes:

1. If the doorset features a transomed overpanel, the door frame must be softwood or hardwood with a minimum section of 70mm x 32mm
2. Dimension excludes the required stop
3. A 12mm deep planted stop is adequate for single acting frames whilst double acting frames may be scalloped or square (see diagram below)
4. All door frame timber must be joinery quality, free from knots, splits and checks
5. Frame joints may be mortice and tenoned, mitred, half lapped or butted and with no gaps (see section 10.2). All jointing methods require mechanical fixing with the appropriate size ring shank nails or screws
6. The door frame (MDF or timber) may be entirely clad in 2mm thick PVC sheeting for use with leaves either with or without 2mm thick facing material (see section 9.3)
7. Hinge fixings should be fit for purpose. If fixings penetrate through the rear of the door frame, a sub frame will be required to ensure that the entire screw length is providing fixity.

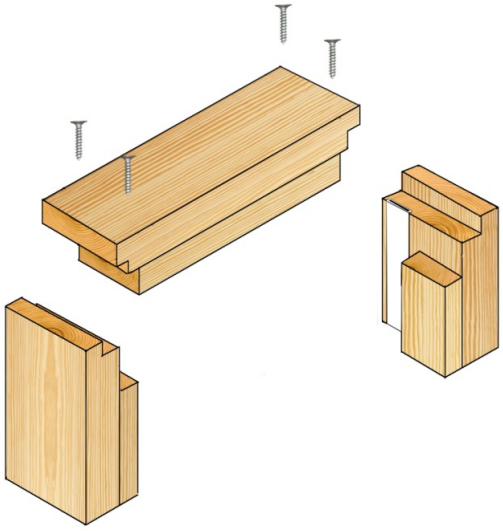
The following diagram depicts the assessed frame profiles and dimensions:

A = min 70mm B = min 22 - 30mm (see table above) C = min 12mm
R = radius from floor spring 8mm max radius to create a maximum 2mm edge profiling

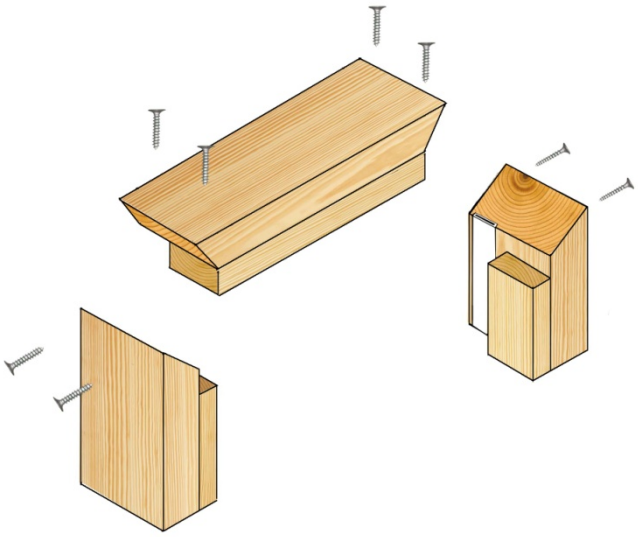


Standard **Scalloped** **Profiled edges**

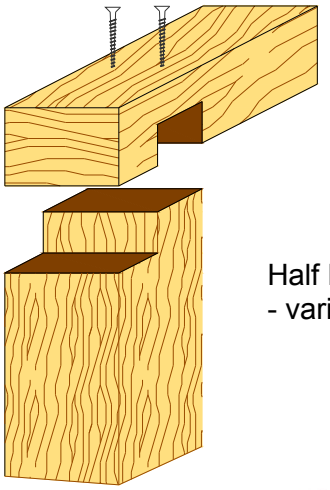
10.2 Door Frame Joints



Half Lapped Joint

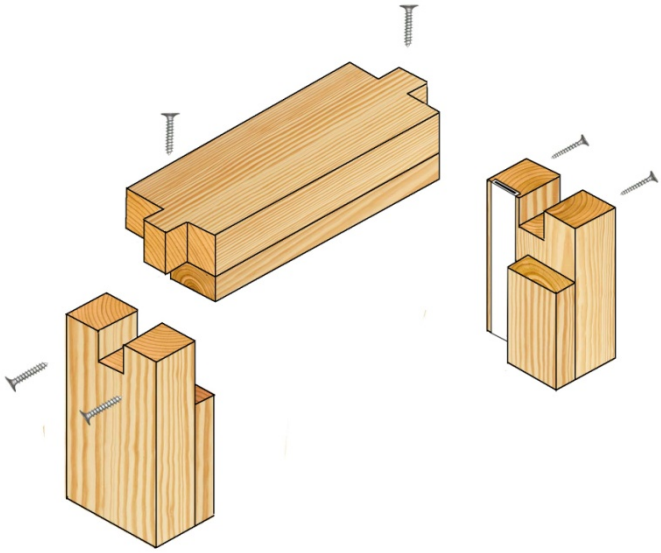


Mitre Joint

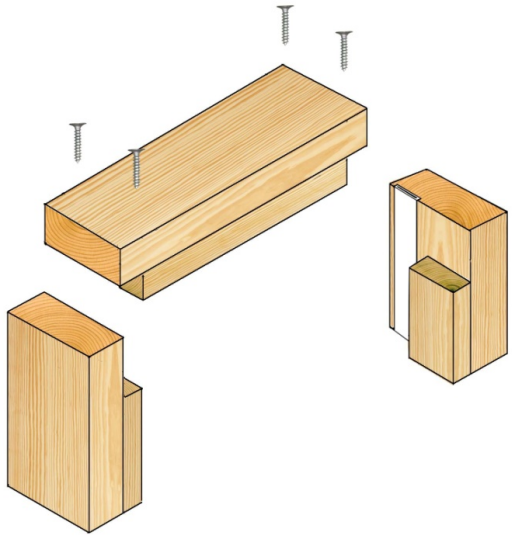


Half Lapped Joint
- variation

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



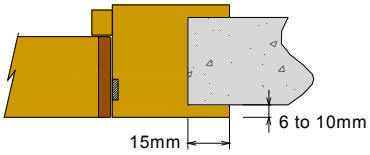
Mortise and Tenon Joint



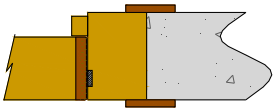
Butt Joint

10.3 Door frame installation

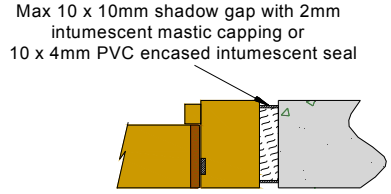
The following diagrams indicate acceptable and unacceptable door frame installations.



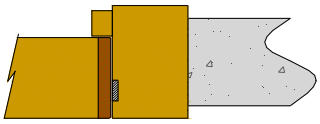
Permitted



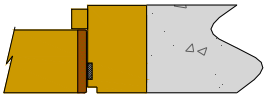
Permitted



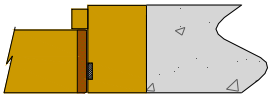
Permitted



Not Permitted



Not Permitted



Permitted

Notes:

1. Drawing is representative of door frame installation only; actual installation must be as the text within this document specifies. See section 16 for sealing to structural opening specification
2. For the shadow detail depicted above (top right), the sub-frame material must be the same material as approved for the door frame, or a non-combustible board, tightly fitted and with no gaps.

10.3.1 Additional Permitted Frame Installation Details

The following variation to the standard installation details is additionally permitted for solid hardwood frames (MDF frames are not permitted).

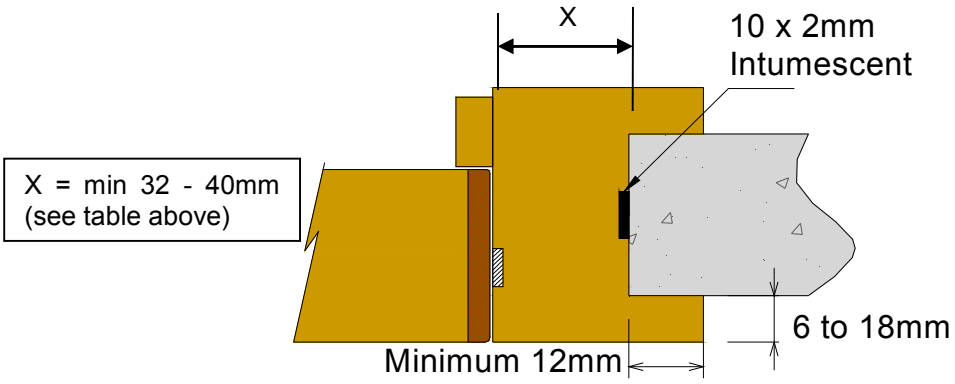
Based on the testing conducted for this design and Exova Warringtonfire's general experience of testing both door frames and glazed screens (where the char rate of the timber increases as a result of charring from two faces simultaneously), solid timber frames may project a maximum of 18mm from the structural surround, providing one of the two frame material specifications below is met.

Material	**Min. Section Size**[1] (mm)	**Min. Density** (kg/m^3)
Hardwood	70 x 32	640
Hardwood	70 x 40	530

Notes:

1. Excluding both the stop and any bolection around the structural surround
2. The integral frame bolection must overlap the structural surround by a minimum of 12mm (reduced from the 15mm shown in section 10.3); providing the frame section meets the requirements shown in the table above
3. A 2mm thick intumescent gasket of one of the types shown for top pivots & flush bolts in section 11 must be rebated in to the rear of the frame as shown below.

The following diagram illustrates the principles described:



11 Intumescent Materials

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

Application	Location	Product and Manufacturer
Edge seals	Fitted in the frame reveals or leaf edges	1. Therm-A-Seal - Intumescent Seals Ltd 2. PVC encapsulated Pyroplex - Pyroplex Ltd 3. PVC encapsulated Palusol 100 – • Mann McGowan Fabrications Ltd or • Lorient Polyproducts Ltd 4. Type 617 – Lorient Polyproducts Ltd 5. PVC Encased Type SLS - Halspan Ltd 6. 500P - Mann McGowan Fabrications Ltd
Hinges	Not required	-
Lock/latches	Not required* unless the forend & keep exceed 235mm high Under forend and keep for all doorsets in aluminium frames	1. 1mm MAP paper - Lorient Polyproducts Ltd 2. 1mm thick Interdens – Dufaylite Developments Ltd. 3. 1mm G30 – Sealmaster Ltd 4. 1mm Therm-A-Strip - Intumescent Seals Ltd 5. 1mm Pyrostrip 300 – Mann McGowan
Flush bolts	See section 13.3.9	
Top pivots	Lining all sides of the mortices	1. 2mm MAP paper - Lorient Polyproducts Ltd 2. 2mm thick Interdens - Dufaylite Developments Ltd 3. 2mm G30 – Sealmaster Ltd 4. 2mm Therm-A-Strip - Intumescent Seals Ltd 5. 2mm Therm-A-Flex - Intumescent Seals Ltd
Cableways	Lining the base of the groove	

* Intumescent protection is required under forend & keep when using a single intumescent seal specification in the meeting edge of a double doorset

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

11.1 Anti-Ligature Installations

Based on the test evidence in appendix H it is our assessment that it is permissible (in order to maintain the anti-ligature status of Halspan® 30 Optima doorsets when used within mental health institutions) to fit the required intumescent strips in sections of a minimum length of 200mm; subject to the provisos below.

11.1.1 Intumescent Seal Details

Element	Details
Leaf Configurations	Latched single acting single doorsets and Latched single acting double doorsets
Leaf Dimensions (mm)	Maximum 2100 (h) x 1000 (w), but note that smaller maximum leaf sizes within the envelopes in appendix B take precedence.
Door Frame Dimensions (mm)	Minimum 70 x 32 thick
Door Frame Material	Hardwood with a minimum density of 640kg/m^3 which must be joinery quality, free from knots, splits and checks
Intumescent Strip	1. Lorient Polyproducts Type 617 2. Graphite based seals as detailed in appendix B
Intumescent Fixing	Each strip section must be pinned with fine gauge, 20mm long steel pins 25mm from each end.

The joints between intumescent sections must be tightly butted to each other with no gaps.

It must be ensured that the intumescent material is present and unbroken for the full length of its PVC casement for each strip.

All other details must remain as specified in the relevant sections of this document.

12 Adhesives

Halspan® 30 Optima door leaves must use the following adhesives in construction.

Element	Adhesive Type
Timber Lippings	UF, PF, PU, PVA, EVA, PVAC or hot melt
PVC lippings	EVA – Dorus US241/4 natur

13 Hardware

13.1 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 CE Mark:

- Latches & locks: Test Standard EN 12209
- Single axis hinges: Test Standard EN 1935
- Controlled door closing devices: Test Standard EN 1154
- Electro-mechanically operated locks: Test Standard EN 14846
- Electrically powered hold-open devices: Test Standard EN 1155
- Door co-ordinators: Test Standard EN 1158
- Emergency exit hardware: Test Standard EN 179
- Panic exit hardware: Test Standard EN 1125.

13.2 Tested Hardware

The following hardware has been successfully incorporated in the tests on Greenlam Industries Ltd. Halspan® 30 Optima.

Element	Manufacturer and Product Reference
Hinges	1. 100 x 30mm standard steel butt hinges 2. 110mm Crompton lift off hinges 3. Royde & Tucker H105 lift off hinges 4. Royde & Tucker H101 lift off hinges 5. Stanley Journal lift off hinges 6. 3No Cairney Hardware SOSS type hinges 7. 114 x 30mm ASSA lift off type butt hinge ref: 3244 8. 115 x 31mm ASSA lift off hinges ref: 3248 9. 102 x 30mm Halspan R30 stainless steel bearing butt hinge (radius) ref: HIN-BSS-104 10. 101 x 30mm Halspan R30 steel bearing butt hinge (square) ref: HIN-BSS-103
Closers	1. Briton 2003 face fixed overhead closer 2. Dorma TS73 face fixed overhead closer 3. Ultra 70 series regular arm face fixed overhead closer 4. Halspan R30 power closer ref: CLR-BSS-100 5. Halspan R30 Eco closer ref: CLR-AGN-100 6. Cairney Hardware Ltd Mitron C2300 concealed overhead closer 7. Dorma BTS75V floor spring assembly
Locks / latches	1. Ingersol Rand latch ref: 5520.60.R.SS 2. Halspan 30 latch ref: LCK-BSS-100 (forend size 155 x 25mm) 3. Henderson Hardware three lever latch/lock 4. Standard tubular mortice latch 5. GU Ferco 3 Deadbolt 6. E*S steel mortice latch 7. Aluminium lever type handle – 53mm rose
Threshold seals	1. Halspan threshold drop seal ref: SLS-DRP-100 range 2. Lorient Polyproducts Ltd IS8010 drop seal

Notes:

1. All double acting doorsets will require a proprietary intumescent gasket set to protect the top pivot position
2. The Cairney Hardware Mitron C2300 concealed overhead closer must be used with the perimeter intumescent specification given in appendix B but with the seals fitted in the frame reveal, in conjunction with the Cairney Hardware Mitron 30 minute intumescent package (contact manufacturer for details). The closer is permitted for use with single acting doorsets and the door frame will require a minimum stop depth of 14mm
3. 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 B and can only be used on single leaf doorsets of maximum leaf height 2231mm, when used in a hardwood (640kg/m^3) door frame
4. The Geze Boxer concealed overhead closer may be used in lieu of the Cairney Hardware Mitron C2300, subject to the same installation requirements shown in point 2. Assessment is made on the basis of the close similarity in rebate sizes required and material specifications of the two closers.

13.3 Additional & Alternative Hardware

13.3.1 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 170mm high.
Intumescent protection:	Required - see section 11
Materials:	All parts essential to the locking/latching action (including the latch bolt, forend and strike) to be steel or stainless steel.
Location	800 – 1200mm from the threshold

13.3.2 Hinges

Halspan® 30 Optima leaves must be hung on a minimum of 3 hinges. Leaves over 2400mm high must use 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:		All mounting holes in each hinge blade fixed with 30mm long No 8 or No10 steel wood screws	
Materials:		Steel, stainless steel or brass (melting point ≥ 800°C)	
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:		Not required	

13.3.3 Automatic Closing

Automatic closing devices, must either be as tested or components of equal specification that have demonstrated contribution to the required performance of this type of 30 minute doorset design, when tested to BS 476: Part 22: 1987 or BS EN 1634-1.

Perkomatic jamb mounted closers may be fitted provided the inactive leaf of any associated double doorset is bolted closed, a minimum width of 80mm of core material remains from the end of the rebate required by the Perkomatic to the closing or meeting edge of the door leaf and the manufacturers installation instructions are followed.

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

13.3.4 Roller Catches

Roller catches may be used with this door design but only in conjunction with a self-closing device. Roller catches may only be fitted to single acting, single leaf doorsets (SASD) and with door dimensions that fall within that permitted for unlatched, single acting, single leaf doorsets (ULSASD).

The roller catch must be steel or brass and must meet the specification given below:

Maximum forend and strike plate dimensions: 80mm (h) x 35mm (w) x 4mm (t)

Maximum body dimensions: 20mm (t) x 50mm (w) x 70mm (h).

13.3.5 Pull Handles

These may be surface-fixed or bolted through the door providing they are steel or aluminium and the length is limited to 1200 mm between the extreme fixing points. No additional intumescent protection is required provided that the hole for the bolt through the leaf is tight, unless test evidence dictates otherwise.

13.3.6 Push Plates/Kick Plates

Face-fixed hardware such as metallic 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.

13.3.7 Panic Hardware

Panic hardware may be fitted, provided that its installation does not require the removal of any timber from the leaf, stop or frame reveal and it in no way interferes with the self-closing action of the door leaf.

13.3.8 Door Security Viewers

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

13.3.9 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:

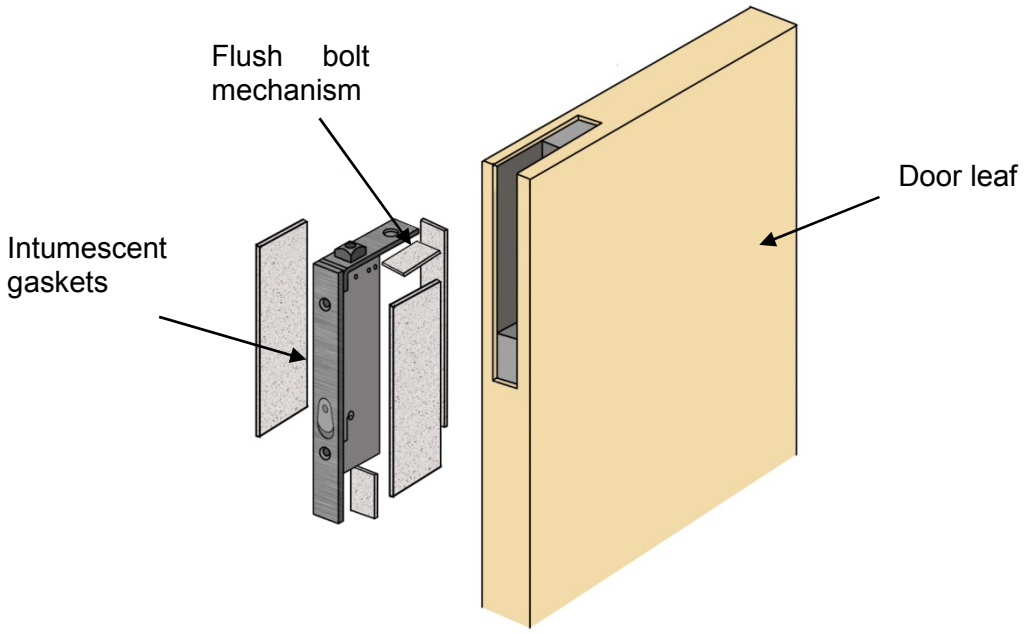
200mm long x 20mm deep x 20mm wide.

Flush bolts must be steel or brass (with a melting point ≥ 800 degrees C) and the mortice must be as tight to the mechanism as is compatible with its operation.

Intumescent Protection

Flush bolts may be installed with or without intumescent gaskets subject to the provisos below, either:

1. All edges of the mortice must be protected with the intumescent gaskets specified in section 11 for locks and latches. Alternatively the hardware manufacturers tested gaskets may be used. See diagram below for example of intumescent protection to flush bolt.



2. Bolts may be installed with no protection provided that the fitted meeting edge intumescent seals are either:
    1. 1No 15mm wide x 4mm thick Lorient Polyproducts Ltd Type 617 which must be fitted centrally in the opposite leaf edge to the bolts
    2. 2No 10mm wide x 4mm thick Pyroplex Ltd - PVC encapsulated Pyroplex seals which must be fitted spaced 5mm either side of the centreline in the opposite leaf edge to the bolts.

13.3.10 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.

13.3.11 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 30 minute construction. Test evidence generated in steel doorsets is not acceptable. Any tested intumescent gaskets for the lockset, closing mechanism, receiver plate, cable loops, etc. must be replicated.

13.3.12 Environmental Seals

Silicon based flame retardant acoustic, weather and dust seals (e.g. Halspan Triple Fin ref: SLS-TRI-100 range, Norsound 710, Greenlam Industries Ltd PS01, 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.

13.3.13 Threshold Seals

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

Manufacturer	Product
Lorient Polyproducts	IS8010si
Raven	RP8Si
Athmer	Schall-Ex Duo L-15
Norsound	Norsound 810 Range

13.3.14 Sportshall Brackets

Door stop functionality may be provided to single and double acting doorsets using 3mm thick stainless steel brackets as detailed below.

Installation of the brackets must not involve removal of material from the door leaf.

Brackets may be mounted on either the fire risk or non-fire risk side of a doorset, including opposite sides of double leaf doorsets where leaves are arranged to open asymmetrically.

Element		**Dimensions** (mm)	**Location**
Bracket		40 x 35 x 25 with 3 mounting holes for minimum 25mm long steel screws	1No per leaf in frame head – 100mm from closing edge
Intumescent protection	Leaf Edge Seals	2 No 15 x 4 Lorient Palusol 100P or Type 617	Fitted 5mm either side of the centre line of the leaf hanging edges and head
	Hinge Blades	1mm thick Interdens	Under both blades
Lipping		6 – 18 thick Hardwood min density 640 kg/m^3	All leaf edges

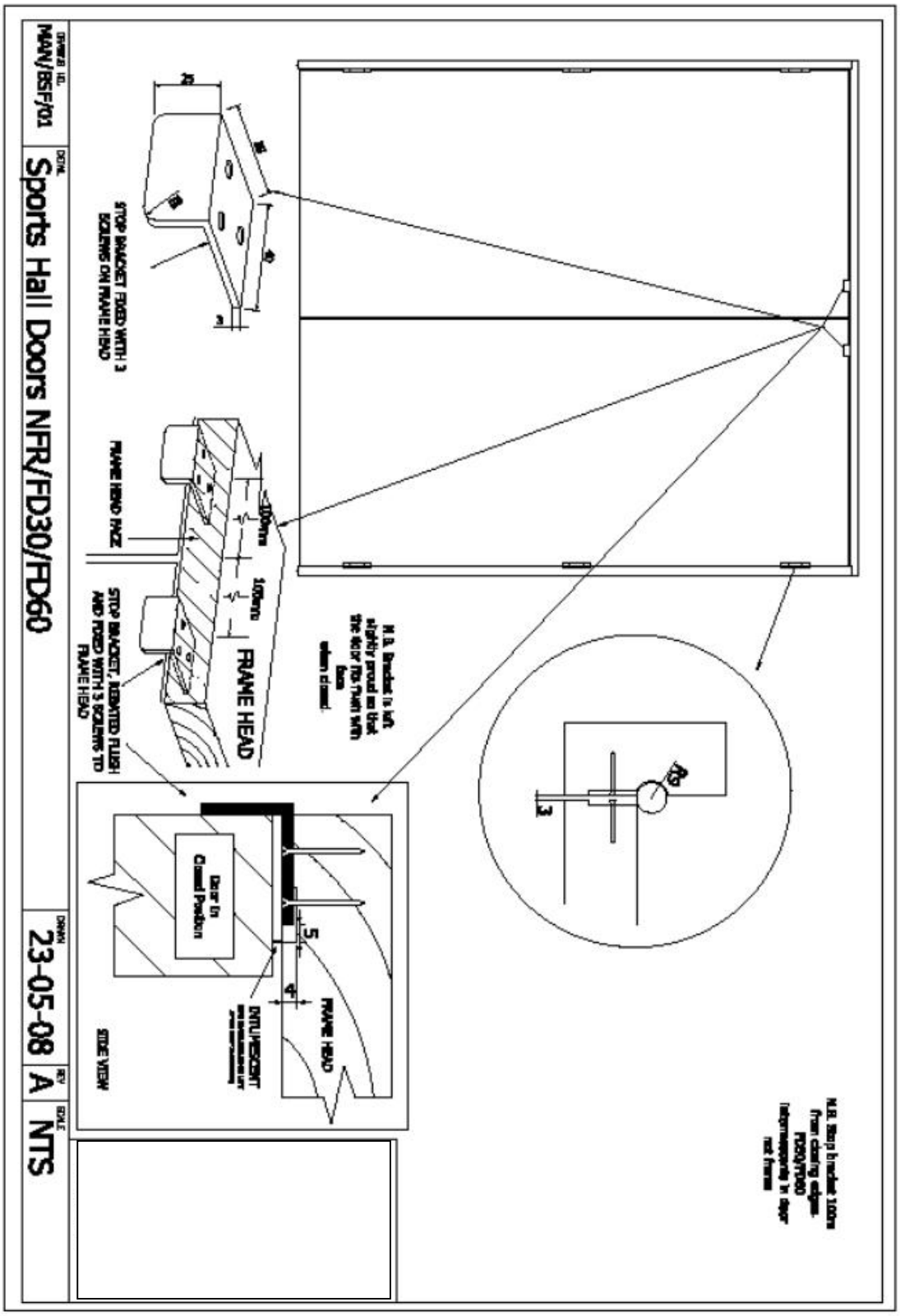
See drawing below detailing the brackets.

Adhesives for lippings must be either Urea formaldehyde (UF) or Phenol Formaldehyde (PF).

Door frames for use with these brackets must meet the following specifications:

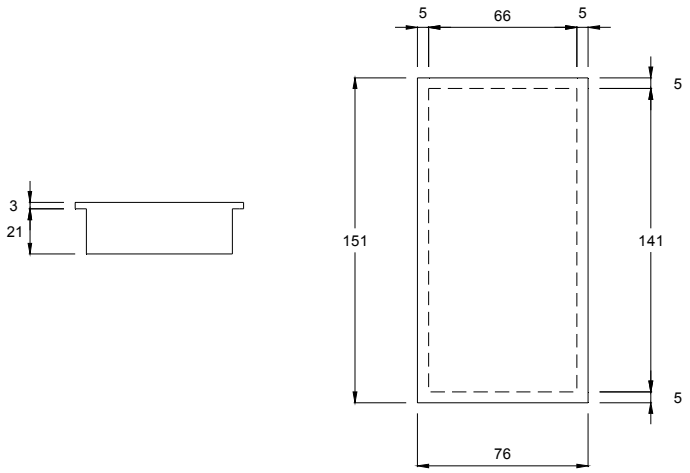
Material	**Minimum Dimensions** (mm)	**Density** (kg/m^3)
Hardwood	70 x 32	640
MDF	70 x 30	750

Doorsets must be fitted with an automatic face fixed self-closing device which complies with the requirements in section 13.3.3.


MAN/BSF/01
Sports Hall Doors NFR/FD30/FD60
23-05-08
A
NTS
FRAME HEAD
STOP BRACKET FIXED WITH 3 SCREWS ON FRAME HEAD
FRAME HEAD FACE
STOP BRACKET, REBATED FLUSH AND FIXED WITH 3 SCREWS TO FRAME HEAD
Door In Closed Position
FRAME HEAD
SIDE VIEW

13.3.15 Flush Door Handles

The evidence cited in test DFR0511252 demonstrates that rectangular shaped steel flush handles with a maximum linear dimension of 141mm and an area of 0.01m^2 may be fitted on both faces of Halspan® 30 Optima door leaves provided the required rebates are offset from each other by a minimum of 100mm and fitted no closer than 100mm from the leaf edge and may be fitted up to 1200mm from the foot of the leaf. The diagram below illustrates the tested handle.



Provided the rebate for the 'tray' is tight, no additional intumescent material is required.

13.3.16 Air Transfer Grilles

Air transfer grilles may be fitted providing the product has suitable test evidence to BS 476: Part 22: 1987 or BS EN 1634-1 that demonstrates a minimum 30 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 assessed for glazing, if both elements are fitted.

13.3.16.1 Smoke Control

Except where the installed grille or louvre is linked to a smoke detection system such that it will be closed in the event of smoke being detected, smoke control as defined by the performance criteria set out in BS 476: Part 31: Section 31.1 cannot be claimed for a doorset fitted with an air transfer grille(s).

13.3.17 Letter Boxes/Plates

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

14 Door Gaps

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

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	Maximum 10mm between bottom of leaf and top of floor covering

For details of acceptable gap tolerances contact Greenlam Industries Ltd. sales department.

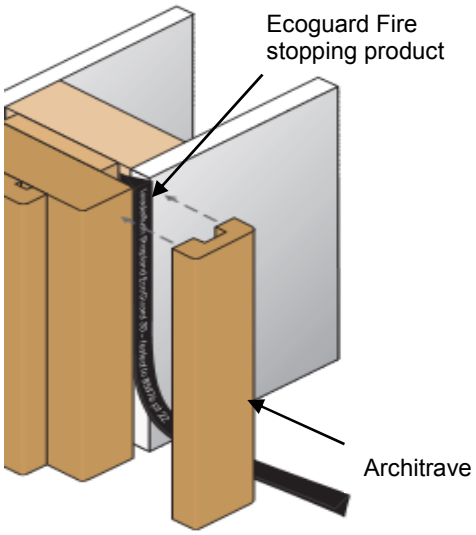
15 Fixings

The supporting construction must be capable of staying in place and intact for the full period of fire resistance required from the doorset. The frame jambs are to be fixed to the supporting construction using steel fixings at 600mm maximum centres. The fixings must be of the appropriate type for the supporting construction and must penetrate to a minimum depth of 50mm. It is not necessary to fix the frame head, although packers must be inserted.

16 Sealing to Structural Opening

The door frame to structural opening gap must be appropriately protected; guidance for various methods of sealing the frame to structural opening gap is given in BS 8214: 2008, Code of practice for timber fire doors, which may be referred to where appropriate.

Alternatively the Greenlam Industries Ltd. Ecoguard Fire stopping product may be utilised as illustrated below.

Gaps between 6 and 14mm may be sealed may be sealed on either face with Greenlam Industries Ltd Ecoguard – as illustrated. Ecoguard must be fully inserted with its' wider edge flush with the supporting construction. Infilling between the Ecoguard and opposite face is optional. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side. Full details are available from Greenlam Industries Ltd.	

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

17 Smoke Control

17.1 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.

17.2 Further Considerations

Other guidance is available, including BS EN 9999-2008 - *Code of practice for fire safety in the design, management and use of buildings*, which may impose different or additional requirements. It is the responsibility of the relevant parties to stipulate the precise smoke control specification, prior to commencing manufacture and/or installation.

The following products can be used for smoke control purposes:

- Greenlam Industries Ltd PS01 perimeter seals – fitted in the leaf edge or frame reveal
- 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 seals – fitted in the leaf edge or frame reveal
- Lorient Batwing range – fitted in the frame reveal against the upstand of the stop
- Lorient DS range of combined intumescent, smoke and sound control seals

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.

18 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 glazing
Fully insulating	Timber frames	Unglazed doorsets or doorsets including 30 minute insulating glazing (see note 5 of section 7.3)
	Steel frames back filled with mortar/concrete	Unglazed doorsets or doorsets including 30 minute insulating glazing (see note 5 of section 7.3)

19 Conclusion

If Greenlam Industries Ltd. Halspan® 30 Optima doorset design constructed in accordance with the specification documented in this global assessment, were to be tested in accordance with BS 476 : Part 22 : 1987, it is our opinion that it would provide a minimum of 30 minutes integrity and insulation (subject to section 18).

20 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:

Name:

For and on behalf of **Greenlam Industries Ltd**.

21 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.

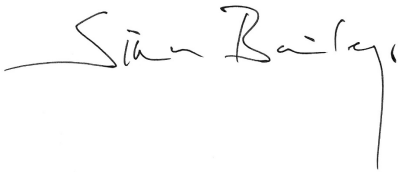
4) Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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.

22 Validity

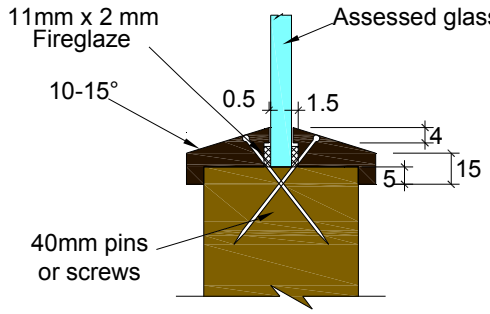
1) The assessment is initially valid for five years after which time it must be submitted to Exova Warringtonfire for technical review.

2) This assessment report is not valid unless it incorporates the declaration given in Section 20 duly signed by the applicant.

Signature:		
Name:	**A M Winning**	**S Bailey**
Title:	Senior Product Assessor	Product Assessor

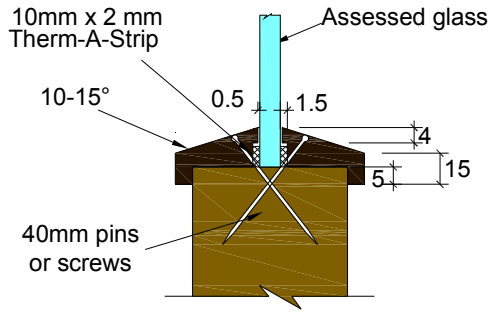
Appendix A

Proprietary 30 Minute Glazing Systems



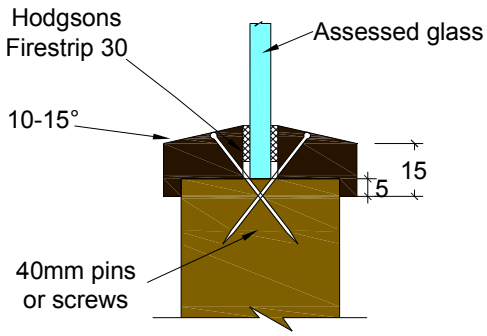
Fireglaze
Sealmaster Ltd

Glazing System 1

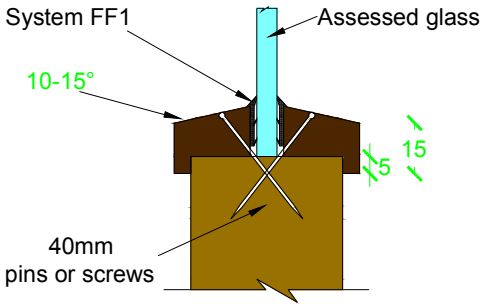


Therm-A-Strip
Intumescent Seals Ltd

Glazing System 2

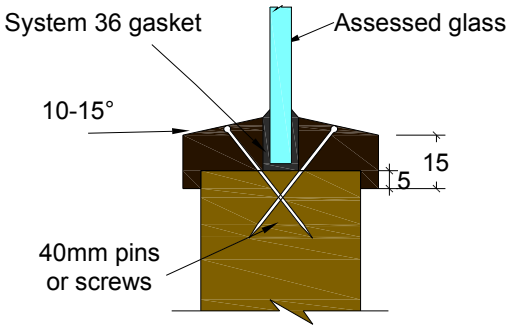


Firestrip 30
Hodgsons Sealants Ltd



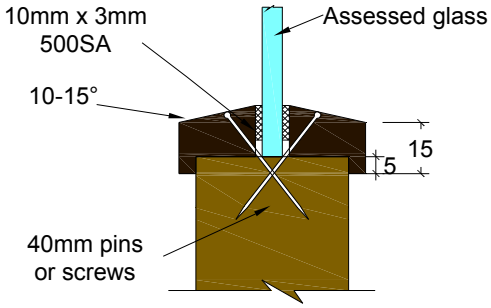
System FF1
Lorient Polyproducts Ltd

Glazing System 3



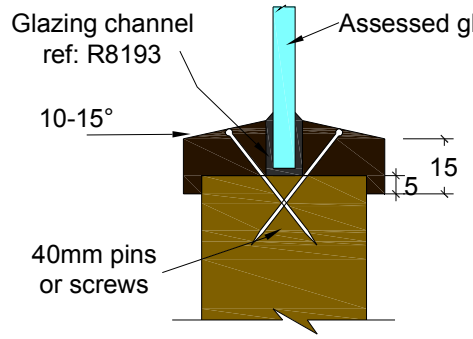
System 36Plus
Lorient Polyproducts Ltd

Glazing System 4



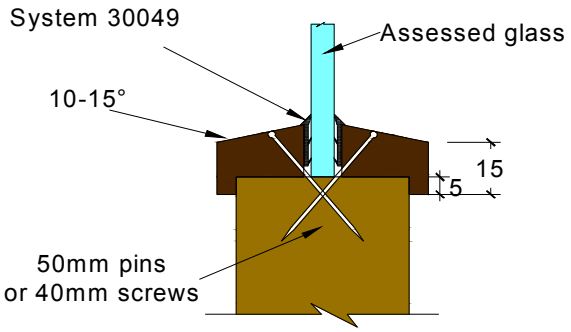
Pyroglaze 30
Mann McGowan Ltd

Glazing System 5



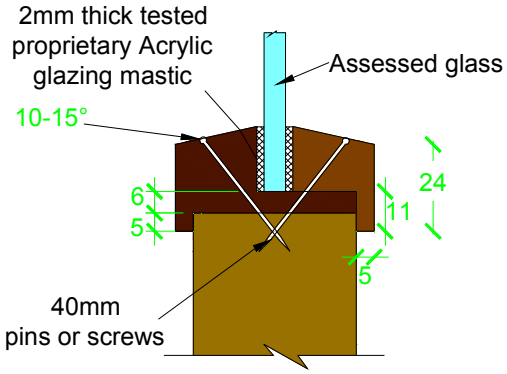
Pyroplex Ltd

Glazing System 6



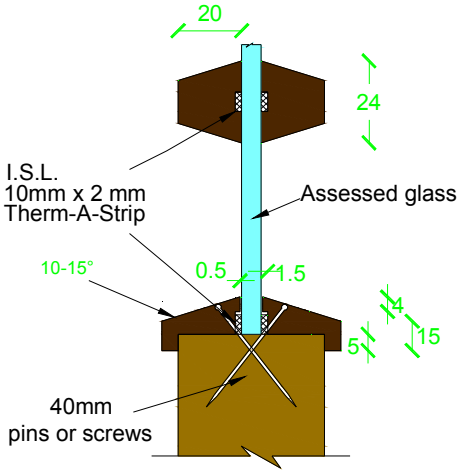
Pyroplex Ltd

Glazing System 7



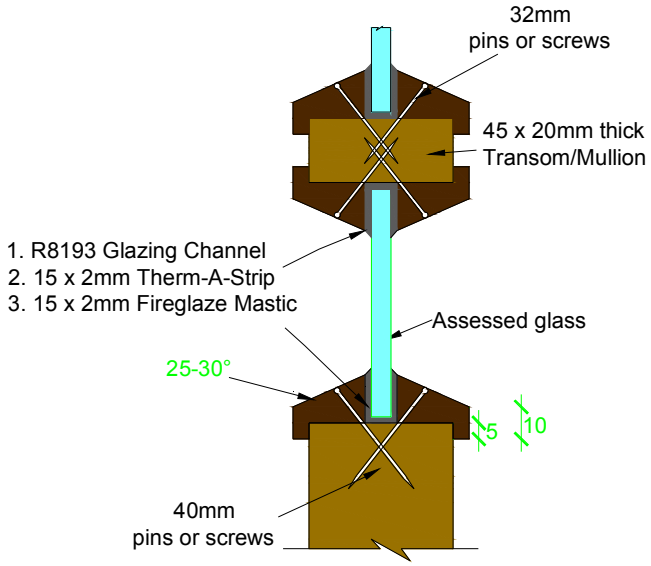
Sureglaze 30 Splayed
Halspan Glazing

Glazing System 8



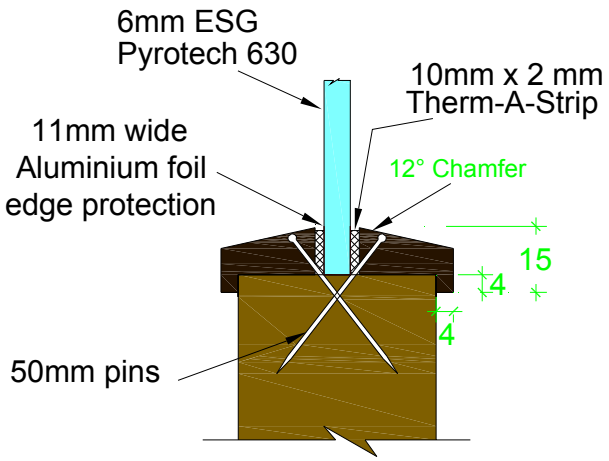
Halspan Cassette
Halspan Ltd

Glazing System 9



Halspan Multi-Pane Glazing
Halspan Ltd

Tested Glazing System for ESG Pyrotech 630 Glass



Summary of Glazing Restrictions

Glazing System	Maximum Area (m^2)
1. Fireglaze 30	1.75
2. Therm-A-Strip	
3. Hodgsons Firestrip 30	
4. Flexible Figure 1	
5. System 36 Plus	1.25
6. Pyroglaze 30	
7. R8193	
8. 30049	
9. Sureglaze 30	

Glazing systems 1 – 9 may be used with any of the assessed glasses shown on the right.

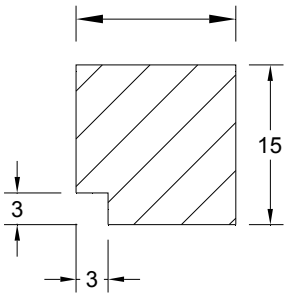
Further restrictions apply beyond the limits given for area (area for glazing system takes precedence over area for glass) – see section 7 for full details.

Assessed Glass	Maximum Area (m^2)
6 & 7mm Pyroshield	1.75
6 & 7mm Pyroshield 2	
6mm Sureglaze Wired	0.8
6mm Pyrocet	0.2
6mm Pyran S	1.75
6mm Firelite	0.5
6mm Pyrostem	1.25
6mm Pyroswiss	0.8
Interglaze E30	1.25
Sureglaze clear	0.8
Sureglaze insul	0.8
Pyrobelite 7	1.75
Pyrodur 30-104	1.75
Pyroguard EW30 clear	1.25
Pyroguard EW30 wired	1.25
Pyrodur 60-10	1.75
Pyranova 15-S2.0	1.75
Pyroguard EW Maxi	1.25
Pyrobelite 12	1.75
Pyroguard EI30	1.75
Pyrostop 30-10	1.75
Pyrobel 16	1.75

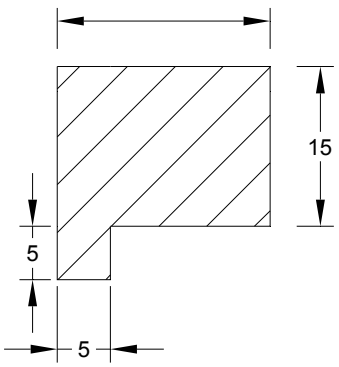
Assessed Square Glazing Bead Profiles

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.

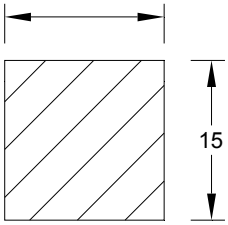
To finish flush with the leaf face



Suited to glass thickness



To finish flush with the leaf face



Square Bead Material - Minimum Density (kg/m^3)	**Permitted Glazing System** (as shown above)		**Permitted Glass Type**	**Maximum Glazed Area** (m^2)
MDF - 700	1 - 4	MDF beads may be used with the glass types shown on the right	Pyrobelite 7	1.75
			Pyrodur 30-104	1.75
			Pyrodur 60-10	1.75
			Pyroguard EW Maxi	1.25
Hardwood - 640	1 - 9	Hardwood beads may additionally use glazing systems 5 - 9 with the glass types shown on the right	Pyranova 15-S2.0	1.75
			Pyrobelite 12	1.75
			Pyroguard EI30	1.75
			Pyrostop 30-10	1.75
			Pyrobel 16	1.75
Hardwood - 640	2 only	Hardwood beads using the Therm-A-Strip glazing system may use any of the glass types shown in the column on the right	6 & 7mm Pyroshield	1.75
			6 & 7mm Pyroshield II	1.75
			6mm Pyran S	1.75
			6mm Firelite glass	0.5
			Sureglaze clear	0.8
			Sureglaze wired	0.8
			Interglaze E30	1.25
			Pyrostem	1.25
			Pyroguard EW Maxi clear	1.25
			Sureglaze Insul	0.8

Appendix B

Data Sheets for

Greenlam Industries Ltd.

Halspan® 30 Optima Doorsets

Halspan® 30 Optima Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Single Doorsets

Fig: G1	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From:	2130	x	1227
		To:	2799	x	915
	ULSASD & DASD	From:	2130	x	1202
		To:	2749	x	915
Maximum Overpanel height (mm)		Transomed	2000		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 and appendix A		
Frame specification		See Section 10			

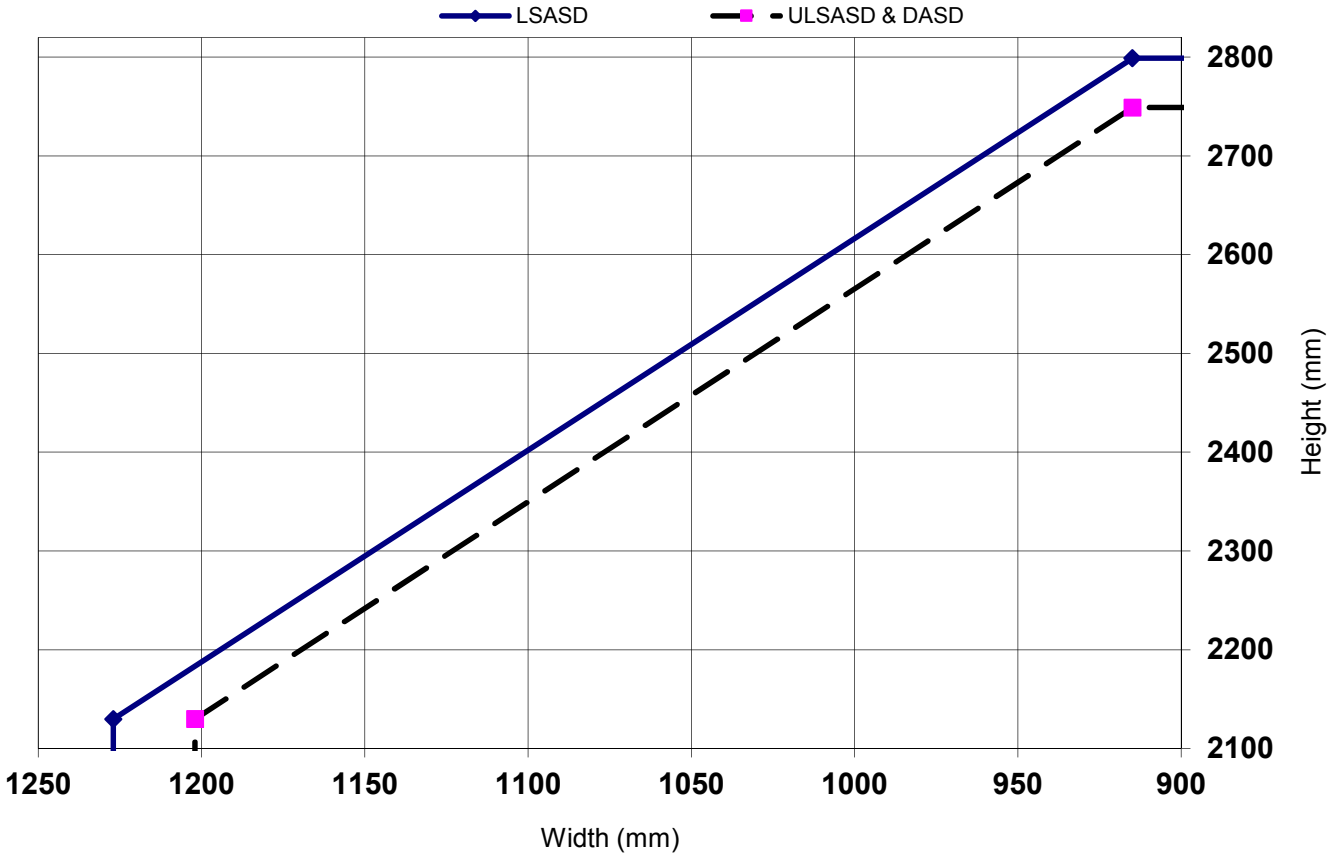
Intumescent Materials: PVC encapsulated Palusol 100, Type 617, Therm-A-Seal or Pyroplex.

Head: Square - 15 x 4mm exposed and fitted centrally in the leaf or frame head. Leaves over 2200mm increase to 20 x 4mm.

Jambs: 15 x 4mm exposed and fitted centrally in the leaf edge or frame reveal. It is permitted to increase the intumescent specification to match that given for the leaf head if required for all leaf dimensions.

Hardware Protection: see section 11

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Single Doorsets - Transom Optional

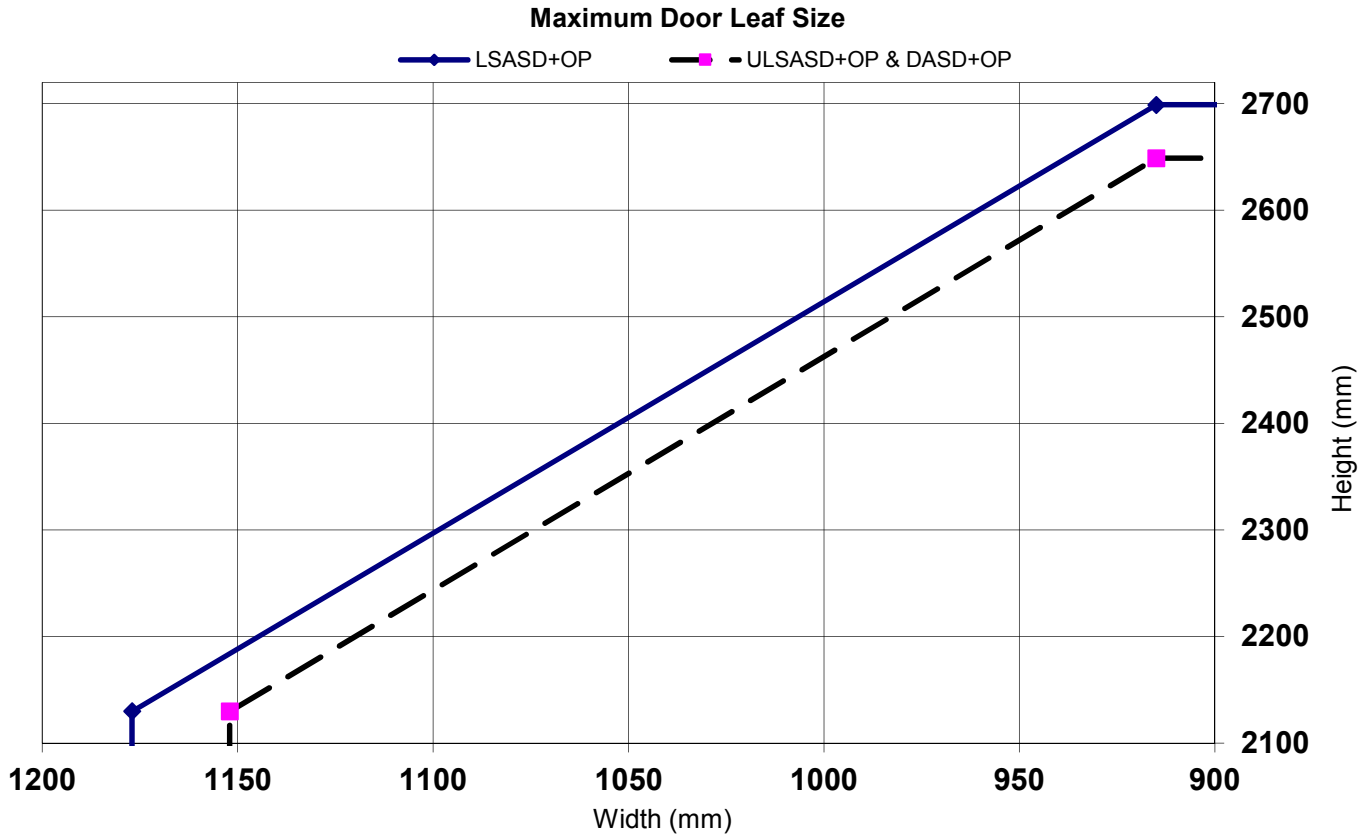
Fig: G2	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD+OP	From:	2130	x	1177
		To:	2699	x	915
	ULSASD+OP & DASD+OP	From:	2130	x	1152
		To:	2649	x	915
Maximum Overpanel height (mm)		No Transom Required	2000		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 and appendix A		
Frame specification		See Section 10			

Intumescent Materials: PVC encapsulated Palusol 100, Type 617, Therm-A-Seal or Pyroplex.

Head: Square - 15 x 4mm exposed and fitted centrally in the leaf head or bottom of the overpanel. Leaves over 2400mm increase to 20 x 4mm.
Rebated (No Transom Fitted): 2 No 10 x 4mm exposed with one seal fitted centrally in the rebate of the leaf and one seal fitted centrally in the bottom of overpanel rebate.

Jambs: 15 x 4mm exposed and fitted centrally in the leaf edge or frame reveal. For square leaf heads only, it is permitted to increase the intumescent specification to match that given for the leaf head if required for all leaf sizes.

Hardware Protection: see section 11



Halspan® 30 Optima Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Double Doorsets

Fig:G3	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From:	2130	x	1127
		To:	2599	x	915
	ULSADD & DADD	From:	2130	x	1102
		To:	2549	x	915
Maximum Overpanel height (mm)		Transomed	1500		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 and appendix A		
Frame specification		See Section 10			

Intumescent Materials: PVC encapsulated Palusol 100, Type 617, Therm-A-Seal or Pyroplex.

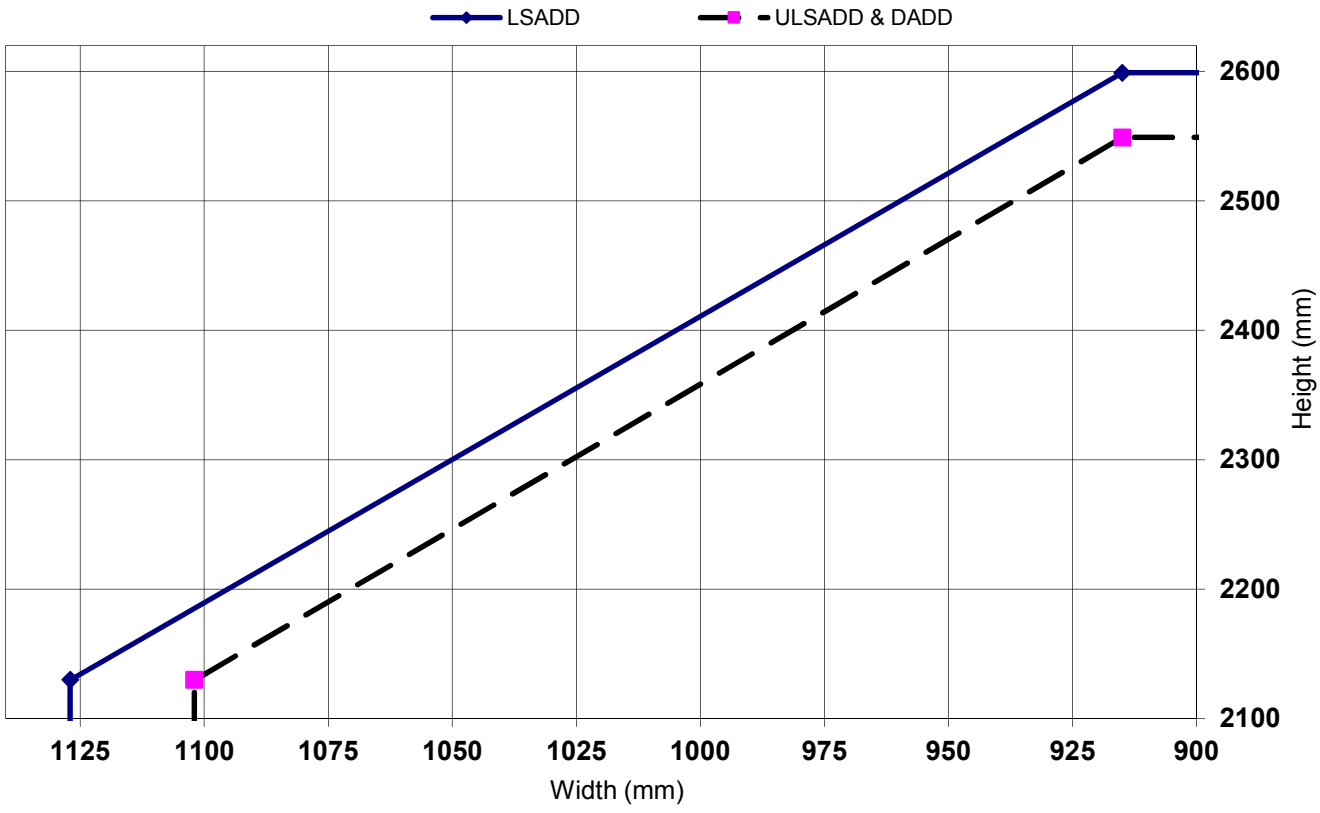
Head: Square -15 x 4mm exposed and centrally fitted in the leaf or frame head. Leaves over 2400mm increase to 20 x 4mm.

Jambs: 15 x 4mm exposed and centrally fitted in the leaf edge or frame reveal. It is permitted to increase the intumescent specification to match that given for the leaf head if required for all leaf sizes.

Meeting Edges:
Square: 2No 10 x 4mm exposed and fitted centrally, one in each leaf edge, or, 2No 10 x 4mm exposed and spaced 5mm either side of the centreline on one leaf only.
Rebated: 15 x 4mm exposed and fitted centrally in the rebate of each leaf.

Hardware Protection: see section 11

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Double Doorsets - Transom Optional

Fig: G4	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD+OP	From:	2130	x	1077
		To:	2499	x	915
	ULSADD+OP & DADD+OP	From:	2130	x	1052
		To:	2449	x	915
Maximum Overpanel height (mm)		No Transom Required	1500		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 and appendix A		
Frame specification		See Section 10			

Intumescent Materials: PVC encapsulated Palusol 100, Type 617, Therm-A-Seal or Pyroplex.

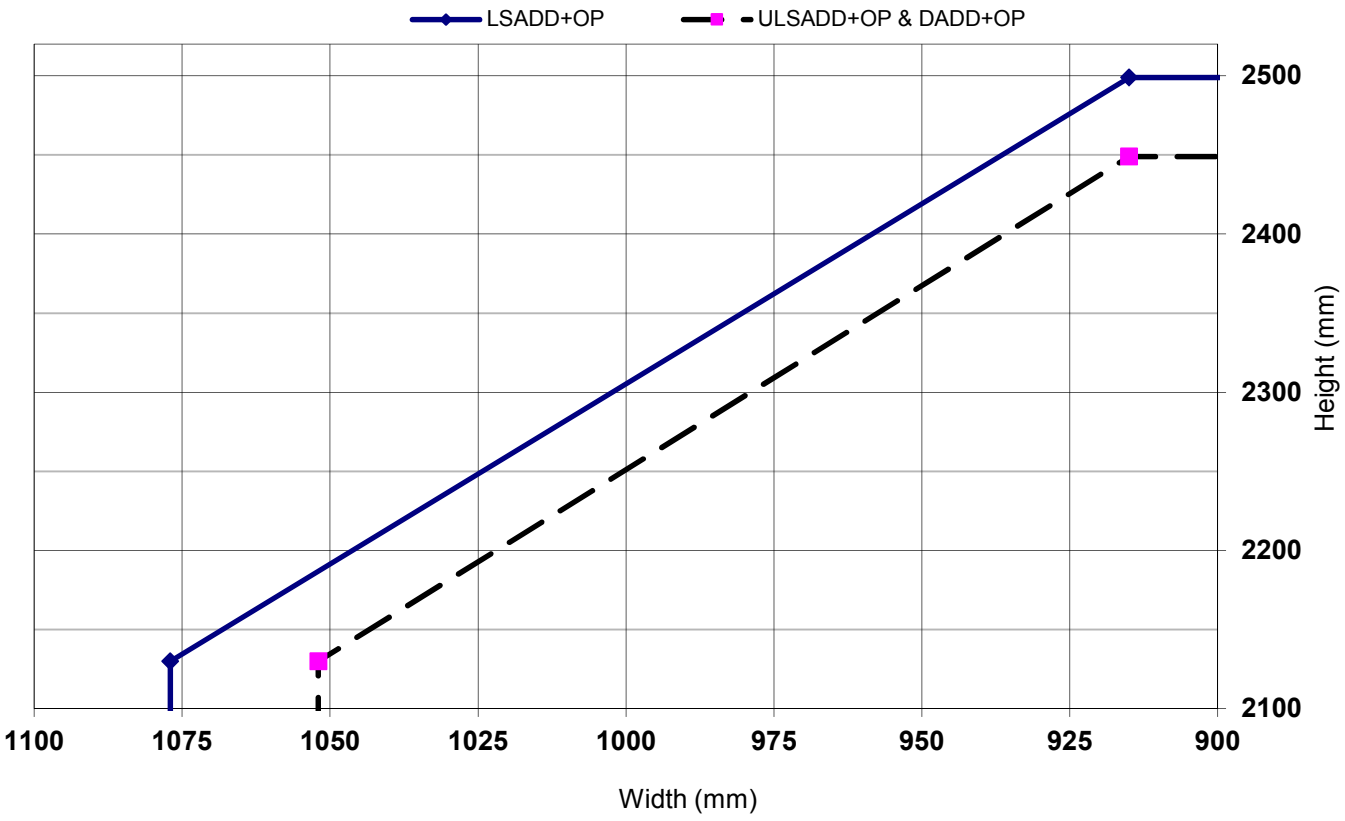
Head:
Square -15 x 4mm exposed and centrally fitted in the leaf head or bottom of overpanel. Leaves over 2400mm increase to 20 x 4mm.
Rebated (No Transom Fitted): 2 No 15 x 4mm exposed with one seal fitted centrally in the rebate of the leaves and one seal fitted centrally in the bottom of overpanel rebate .

Jambs: 15 x 4mm exposed and centrally fitted in the leaf edge or frame reveal. For square leaf heads only, it is permitted to increase the intumescent specification to match that given for the leaf head if required for all leaf sizes.

Meeting Edges:
Square: 2 No 10 x 4mm exposed with one seal fitted centrally in both leaf edges, or 2 No 10 x 4mm exposed and fitted 5mm either side of the centreline in one leaf edge only.
Rebated: 2 No 15 x 4mm exposed with each seal fitted centrally in the rebate of each leaf.

Hardware Protection: see section 11

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets – FD30 Rating - CS Edge Protectors/Acrovyn Wrap

Latched & Unlatched Single & Double Acting Single Doorsets

Fig: G5	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From:	2100	x	1110
		To:	2565	x	900
	ULSASD & DASD	From:	2100	x	1085
		To:	2515	x	900
Maximum Overpanel Height (mm)		Transomed	2000		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved Systems:	See section 7 and appendix A		
Frame Specification		See Section 10			

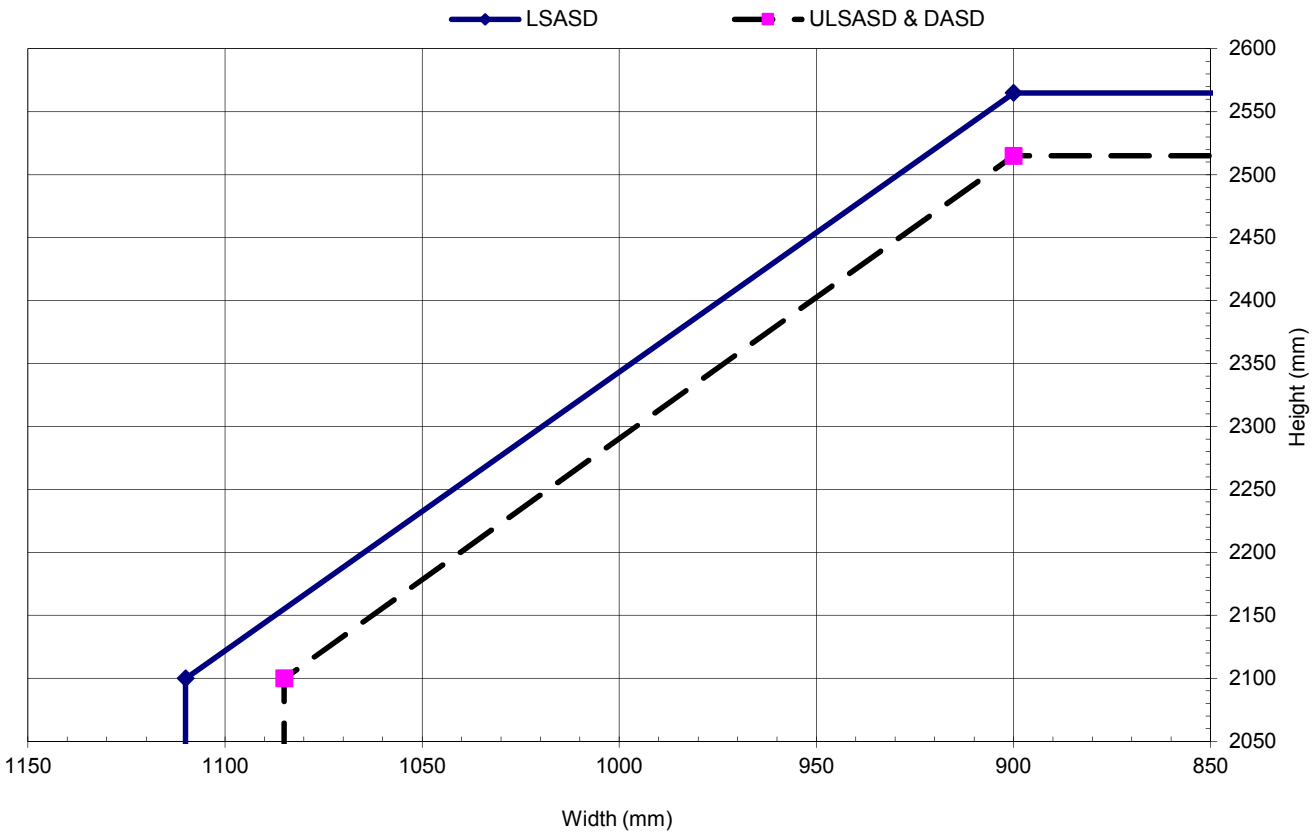
Intumescent Materials: Type 617 – Lorient Polyproducts Ltd.

Head:
Square: 1No. 15x4mm fitted centrally in the leaf head or frame reveal.

Jambs & Overpanels: 1No. 15x4mm fitted centrally in the leaf edge.

Hardware Protection: See section 11.

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets – FD30 Rating - CS Edge Protectors/Acrovyn Wrap

Latched & Unlatched Single & Double Acting Double Doorsets

Fig: G6	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From:	2100	x	1060
		To:	2465	x	900
	ULSADD & DADD	From:	2100	x	1035
		To:	2415	x	900
Maximum Overpanel Height (mm)		Transomed	1500		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved Systems:	See section 7 and appendix A		
Frame Specification		See Section 10			

Intumescent Materials: Type 617 – Lorient Polyproducts Ltd.

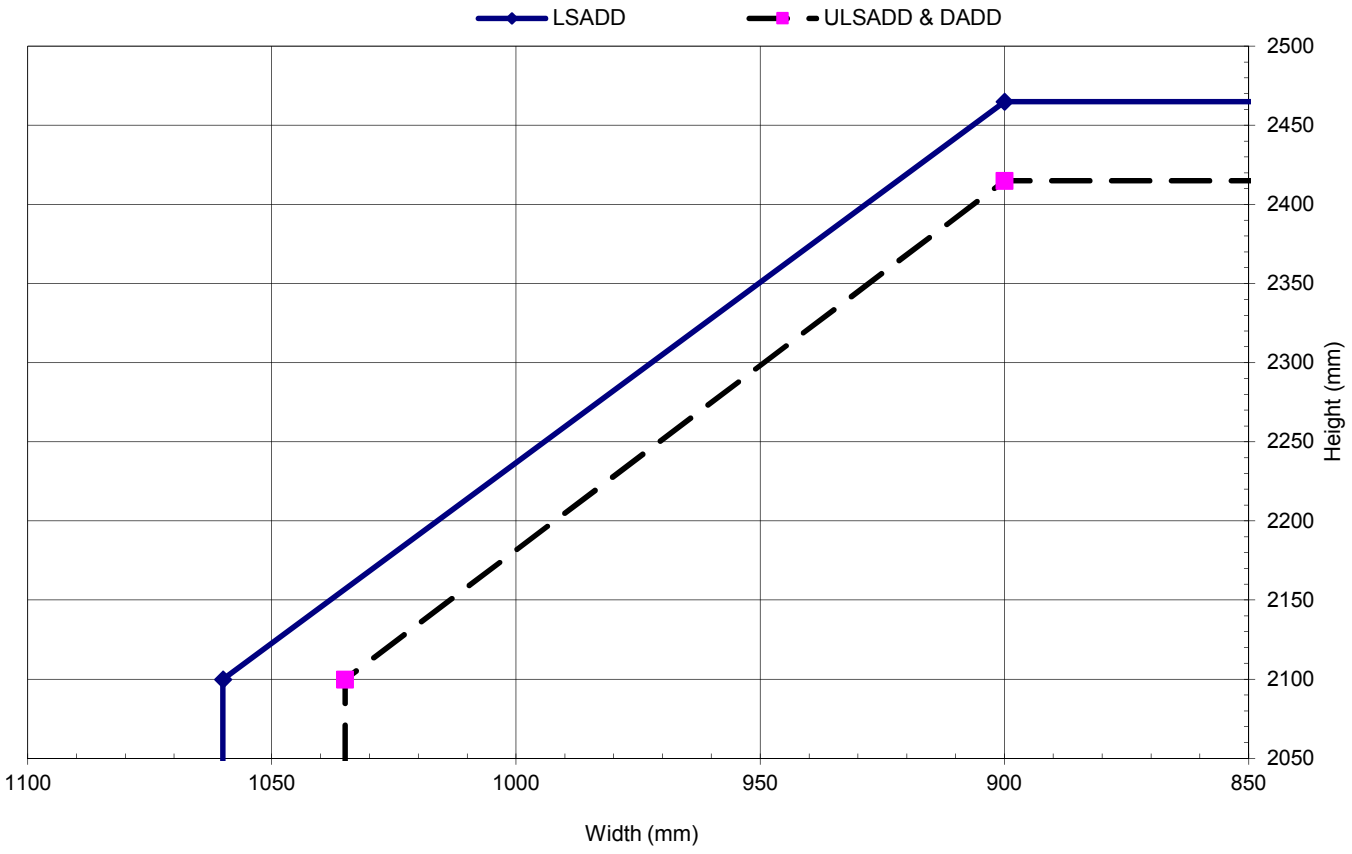
Head:
Square: 1No. 15x4mm fitted centrally in the leaf heads or frame reveal.

Meeting Edges:
Square: 1No. 15x4mm fitted centrally in the meeting edges of both leaves.

Jambs & Overpanels: 1No. 15x4mm fitted centrally in the leaf edge.

Hardware Protection: See section 11.

Maximum Door Leaf Size



Appendix C

Greenlam Industries Ltd. Halspan® 30 Optima Steel Frame Doorsets

1. Introduction

This appendix contains the information relating to Greenlam Industries Ltd. Halspan® 30 Optima 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 BS476: Part 22: 1987.

2. General specification of construction

The door leaves for Halspan® 30 Optima steel framed doorsets are manufactured in accordance with the design specified in section 2 of the main assessment. All other aspects of the construction specification must be 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 at the end of this appendix.

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® 30 Optima must be lipped on all edges in accordance with the following specification.

Material	**Size** (mm)	**Min Density** (kg/m^3)
Hardwood - must be joinery quality timber, free from knots, splits and checks	1. Flat = 6 – 13 thick with a maximum of 2mm profiling permitted at corners of lipping (see section 10.1 of the main assessment) 2. Not Permitted	640

5. Door frames

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

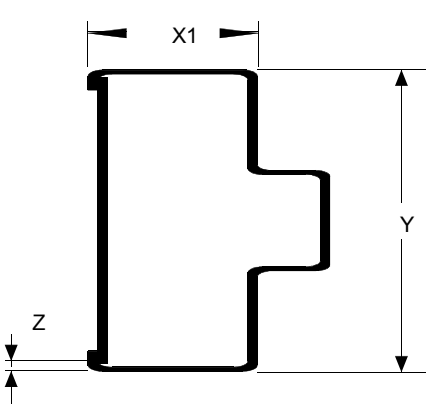
- Material: 1.5mm thick rolled mild steel.
- Section: 151mm wide x 62mm thick excluding a 13mm deep x 48mm wide integral stop
- Head to jamb joints may be folded and tack welded tabs or mitred and welded.

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.

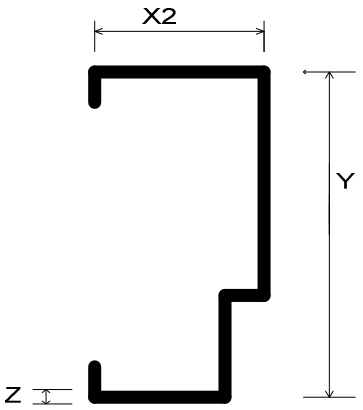
The frame profile may be either single or double rebated of the size tested.

I.e. X1 = 62; X2 = 75mm; Y = 151 mm; Z = 1.5mm.

The following diagram depicts the X, Y and Z dimensions along with the percentage increases and decreases that are acceptable.



Tested double rebate frame



Assessed single rebate frame

X = ± 30%
Y = - 50% **+** Unlimited providing the frame reveal dimensions are maintained
Z = + 100% only, no reduction

The frame 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.

Data sheets detailing the different leaf size scopes and intumescent specifications for hollow and backfilled frame constructions are in appendix C.

6. Fixings

Fixings must be of the appropriate type and length for the structural opening medium and must include a minimum of 1No. fixing per 600mm of vertical edge, with a fixing no more than 350mm from the top and bottom corners and two across the head. Fixing locations through the frame may be capped with steel or plastic grommets without compromising the integrity.

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® 30 Optima 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).

Halspan® 30 Optima Doorsets - Hollow Steel Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Single Doorsets

Fig: G7	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2040 2598	x x	1066 826
	ULSASD & DASD	From: To:	2040 2548	x x	1041 826
Maximum Overpanel height (mm)		-	Not Permitted		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

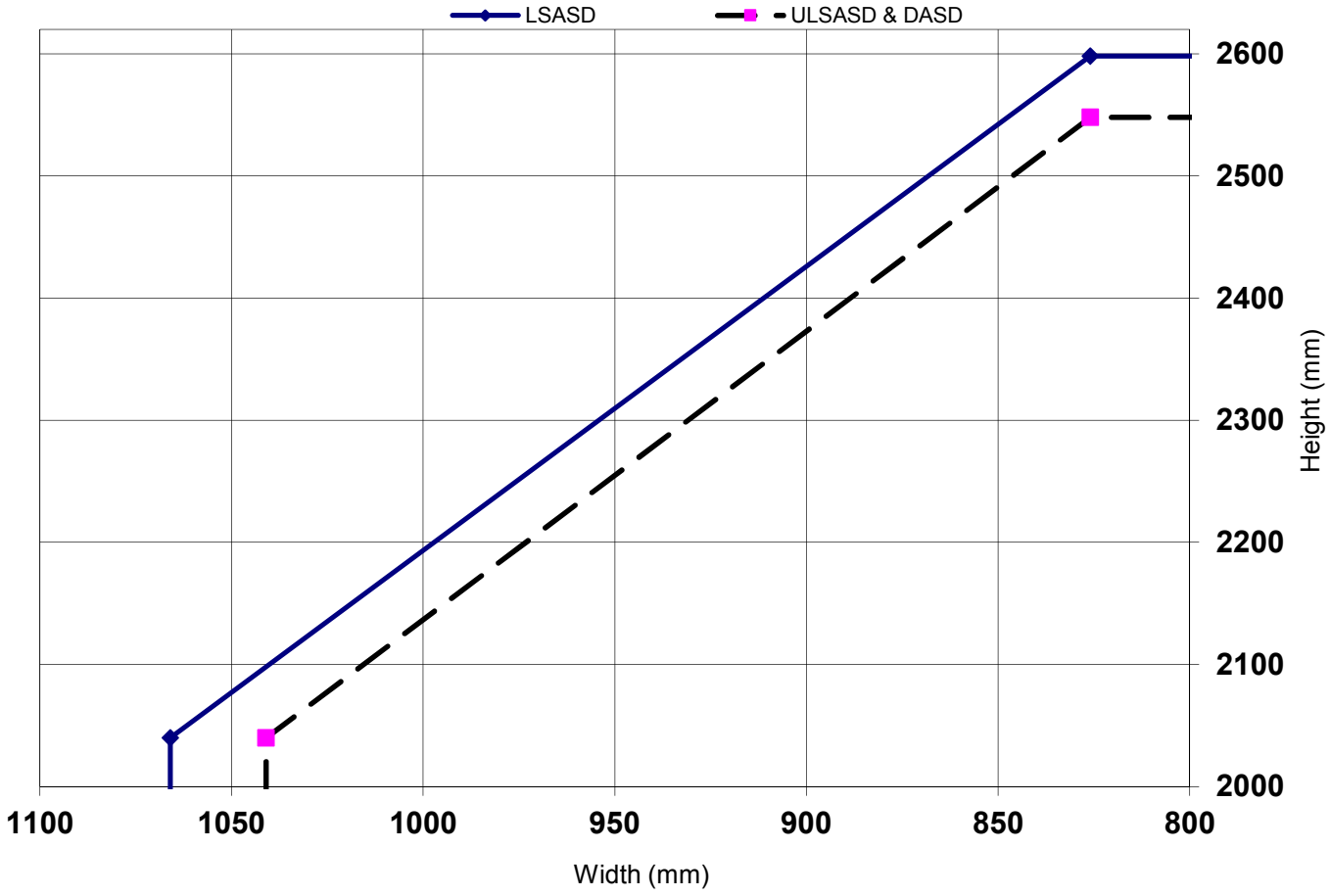
Intumescent Materials: PVC Encapsulated Halspan® Type SLS

Head: H30 (details held in confidence).

Jambs: H30 (details held in confidence on file at Exova Warringtonfire).

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets - Hollow Steel Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Single Doorsets + Overpanel

Fig: G8	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD+OP	From:	2040	x	901
		To:	2190	x	826
	ULSASD+OP & DASD+OP	From:	2040	x	876
		To:	2140	x	826
Maximum Overpanel height (mm)		Transom Not Permitted	500		
Glazing		Maximum Glazed Area:	1.75m²		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

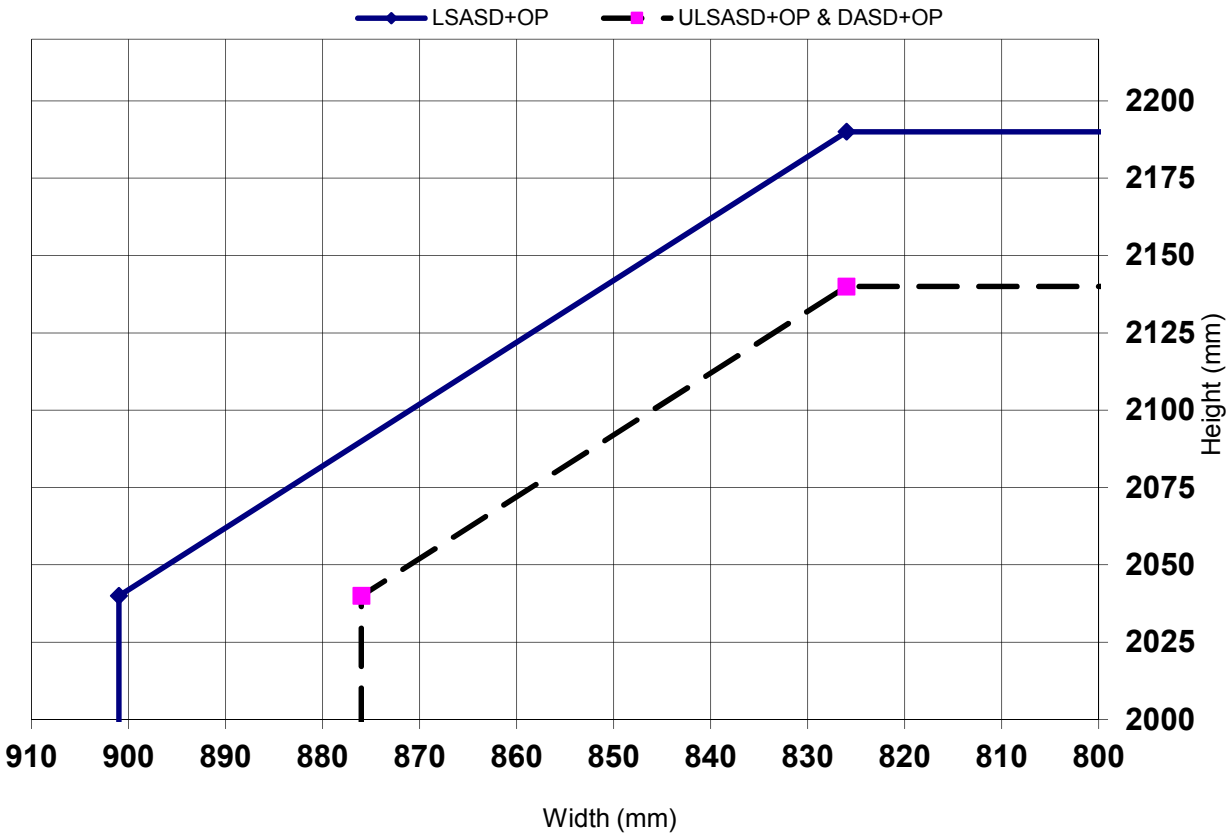
Intumescent Materials: PVC Encapsulated Halspan® Type SLS

Head:
Square: 20 x 4mm exposed and centrally fitted in the leaf head or bottom of overpanel.
Rebated (No Transom Permitted): 2 No 10 x 4mm exposed with one seal fitted centrally in the rebate of the leaf and one seal fitted centrally in the bottom of the overpanel rebate

Jambs & Overpanel: H30 (details held in confidence on file at Exova Warringtonfire).

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets - Hollow Steel Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Double Doorsets

Fig: G9	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From:	2040	x	1016
		To:	2498	x	826
	ULSADD & DADD	From:	2040	x	991
		To:	2448	x	826
Maximum Overpanel height (mm)		-	Not Permitted		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

Intumescent Materials: Head & meeting edges – PVC encapsulated Palusol 100, Therm-A-Seal or Pyroplex

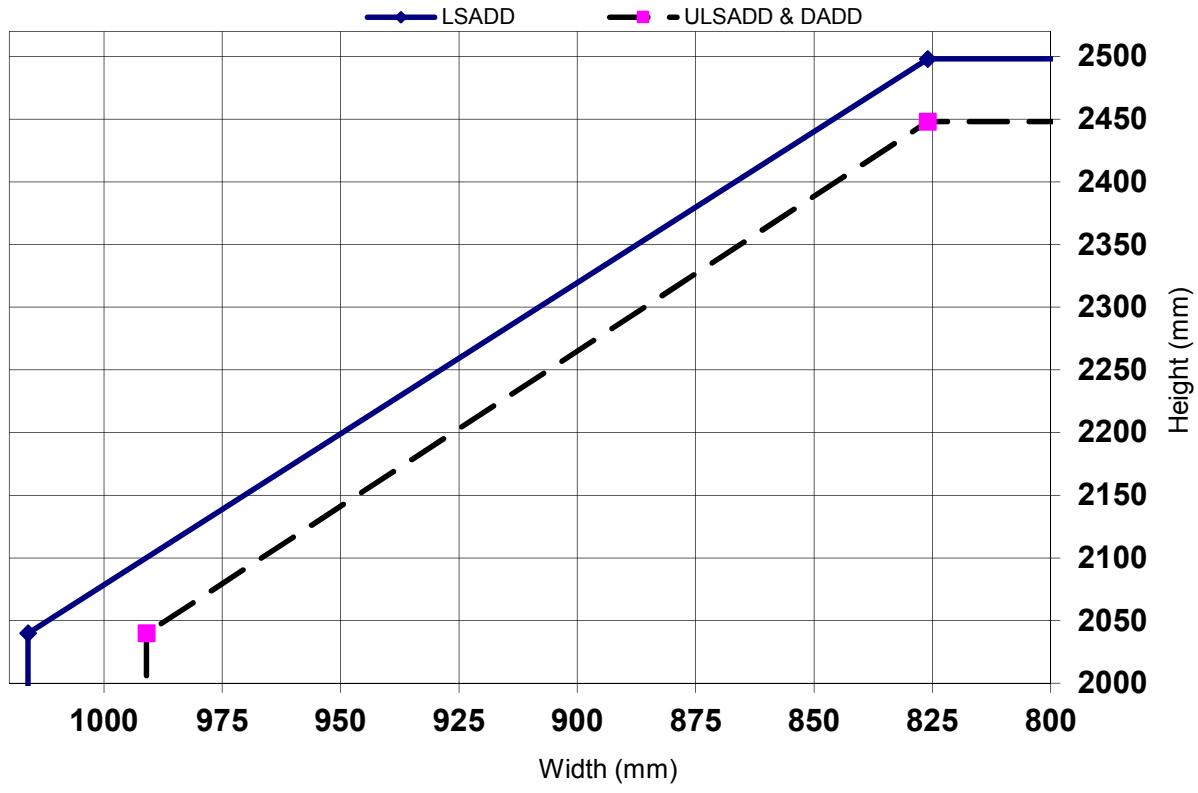
Head: H30 (details held in confidence).

Meeting Edges: Square – 2No 10 x 4mm exposed and spaced 5mm each side of the centreline in one edge only.

Jambs & Overpanel: H30 (details held in confidence on file at Exova Warringtonfire).

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets - Hollow Steel Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Double Doorsets + Overpanel

Fig: G10	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD+OP	From: To:	2040 2090	x x	851 826
	ULSADD+OP & DADD+OP	Max:	2040	x	826
Maximum Overpanel height (mm)		No Transom Permitted	500		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

Intumescent Materials: Head & meeting edges – PVC encapsulated Palusol 100, Therm-A-Seal or Pyroplex.

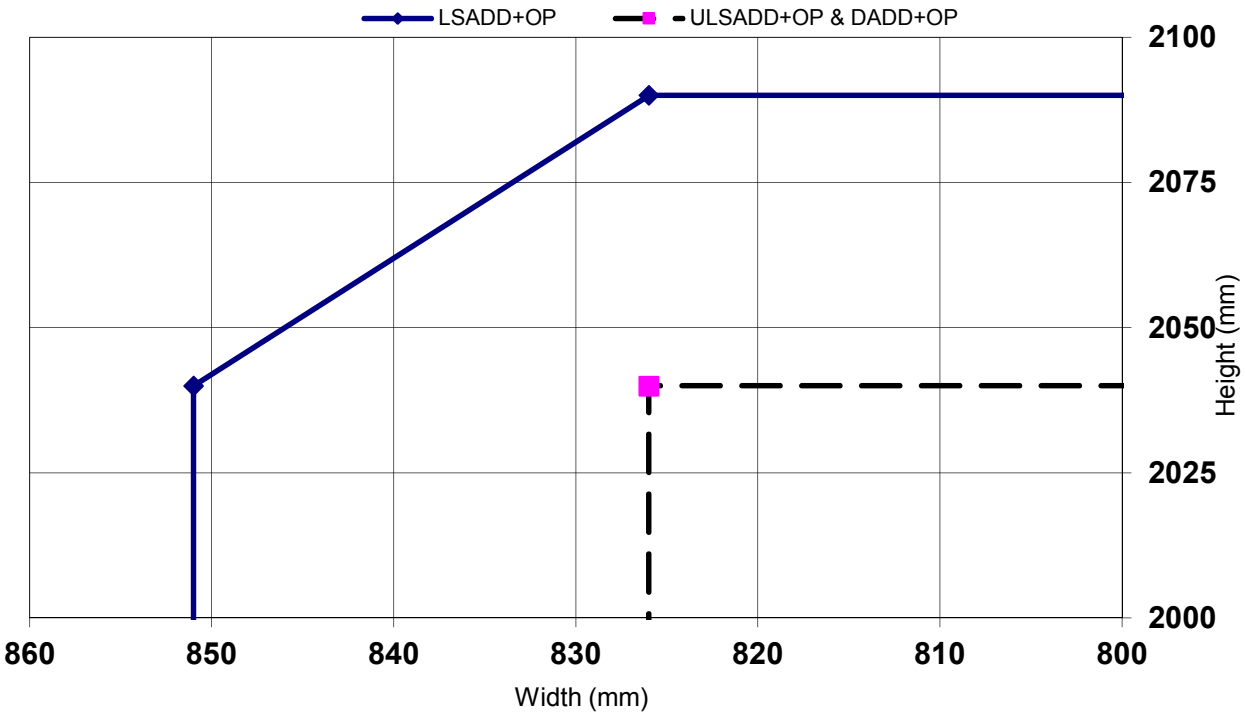
Head:
Square: 20 x 4mm exposed and centrally fitted in the leaf head or bottom of overpanel.
Rebated (No Transom Permitted): 2 No 15 x 4mm exposed with one seal fitted centrally in the rebate of leaves and one seal fitted centrally in the bottom of the overpanel rebate .

Meeting Edges: Square – 2No 10 x 4mm exposed and spaced 5mm each side of the centreline in one edge only.

Jambs & Overpanel: H30 (details held in confidence on file at Exova Warringtonfire).

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets - Backfilled Steel Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Single Doorsets

Fig: G11	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2135 3167	x x	1638 1105
	ULSASD & DASD	From: To:	2135 3117	x x	1613 1105
Maximum Overpanel height (mm)		-	Not Permitted		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

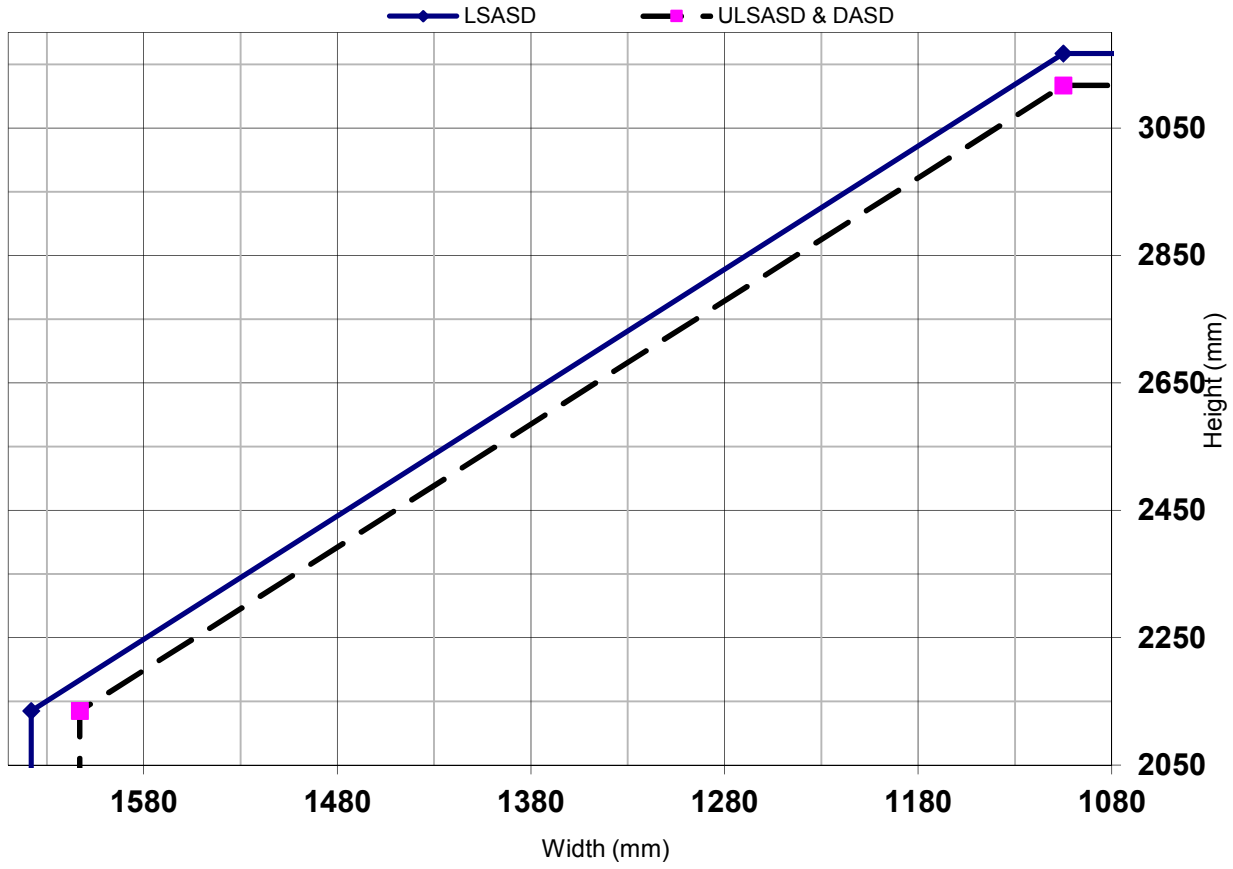
Intumescent Materials: - Therm-A-Seal.

Head: 20 x 4mm fitted centrally in the leaf edge. Leaves over 2300mm increase to 25 x 4mm. Leaves over 2600mm increase to 38 x 4mm.

Jambs & Overpanel: 20 x 4mm fitted centrally in the leaf edge. Leaves over 1300mm increase to 25 x 4mm. Leaves over 1500mm increase to 38 x 4mm. It is permitted to increase the intumescent specification to match that given for the leaf head if required.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets - Backfilled Steel Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Single Doorsets + Overpanel

Fig: G12	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD+OP	From: To:	2135 2285	x x	875 800
	ULSASD+OP & DASD+OP	From: To:	2135 2235	x x	850 800
Maximum Overpanel height (mm)		No Transom Permitted	500		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

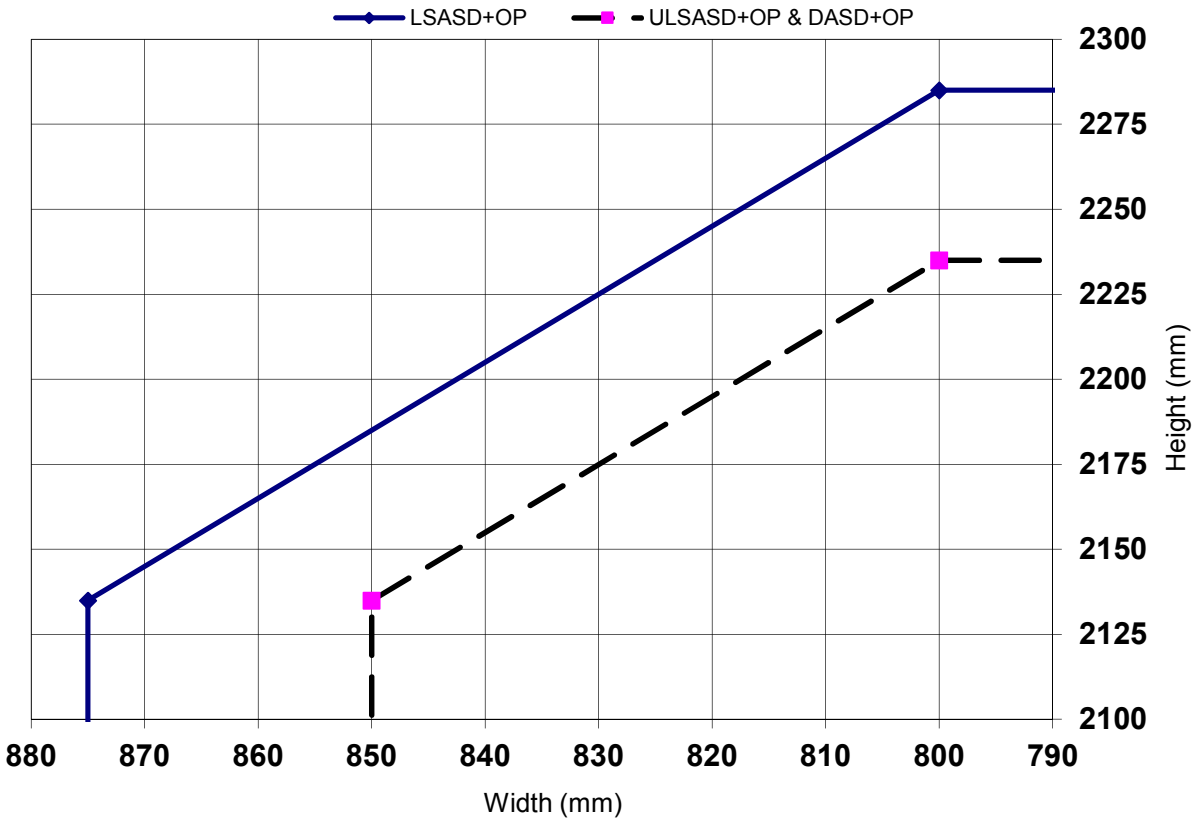
Intumescent Materials: Therm-A-Seal

Head:
Square: 1No 20 x 4mm exposed and centrally fitted in the leaf head or bottom of overpanel.
Rebated (No Transom Permitted): 2 No 10 x 4mm exposed with one seal fitted centrally in the rebate of leaf and one seal fitted centrally in the bottom of the overpanel rebate.

Jambs & Overpanel: 1No 20 x 4mm centrally fitted in the leaf and overpanel edge.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets - Backfilled Steel Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Double Doorsets

Fig: G13	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From: To:	2135 2462	x x	929 800
	ULSADD & DADD	From: To:	2135 2412	x x	904 800
Maximum Overpanel height (mm)		-	Not Permitted		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

Intumescent Materials: Therm-A-Seal

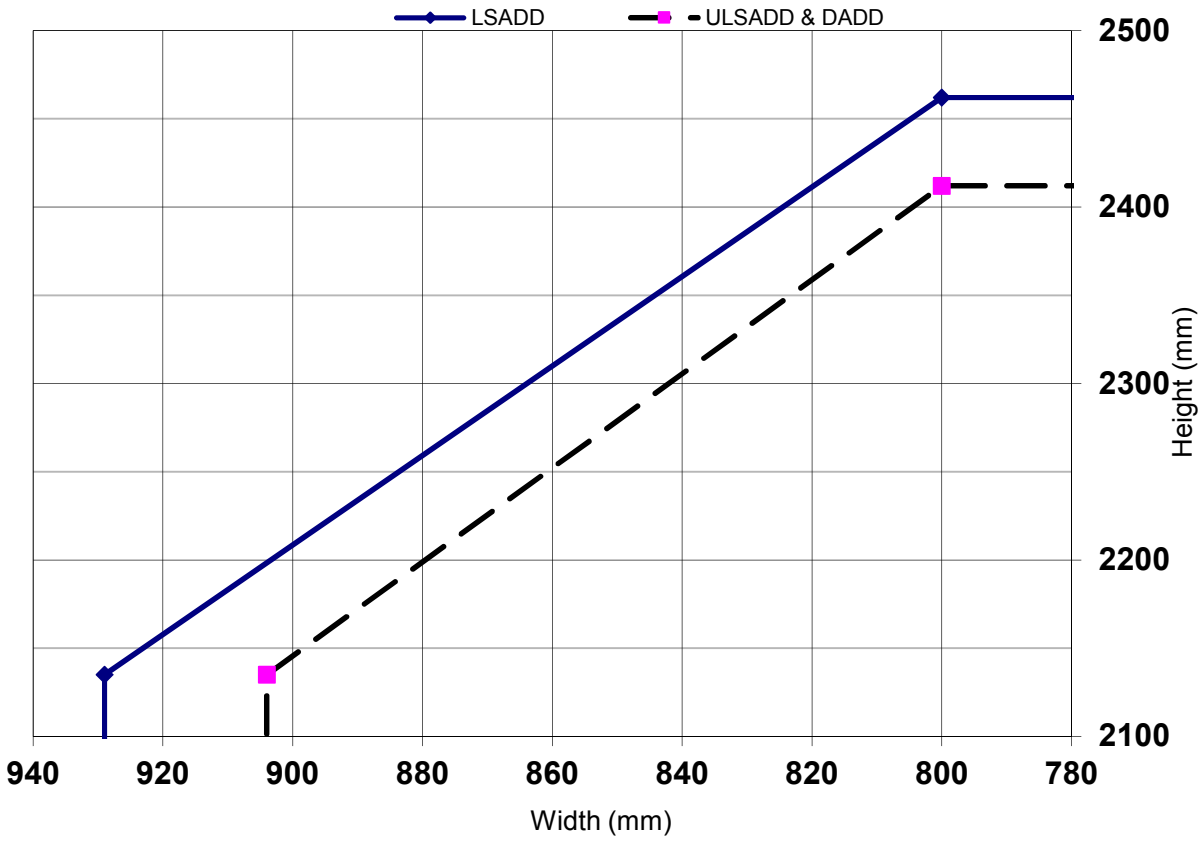
Head: 1No 20 x 4mm fitted centrally in the leaf edge.

Meeting Edges: Square – 2No 10 x 4mm exposed and spaced 5mm each side of the centreline in one edge only.

Jambs & Overpanel: 1No 20 x 4mm fitted centrally in the leaf edge.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets - Backfilled Steel Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Double Doorsets + Overpanel

Fig: G14	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD+OP	From: To:	2135 2185	x x	825 800
	ULSADD+OP & DADD+OP	Max:	2135	x	800
Maximum Overpanel height (mm)		No Transom Permitted	500		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

Intumescent Materials: Therm-A-Seal.

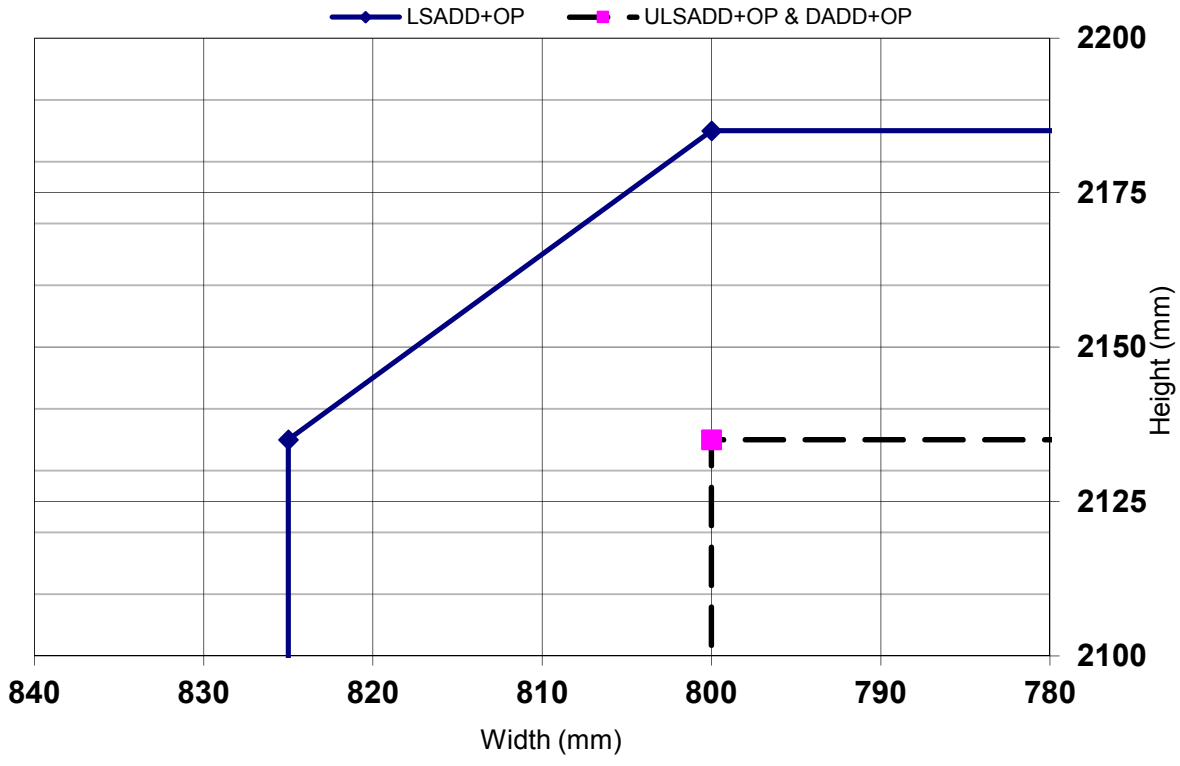
Head:
Square: 1No 20 x 4mm exposed and centrally fitted in the leaf head or bottom of overpanel.
Rebated (No Transom Permitted): 2 No 15 x 4mm exposed with one seal fitted centrally in the rebate of leaves and one seal fitted centrally in the bottom of the overpanel rebate .

Meeting Edges: Square – 2No 10 x 4mm exposed and spaced 5mm each side of the centreline in one edge only.

Jambs & Overpanel: 1No 20 x 4mm fitted centrally in the leaf edge.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Appendix D

Halspan® 30 Optima Aluminium Frame Doorsets

1. Introduction

This appendix contains the information relating to Greenlam Industries Ltd. Halspan® 30 Optima doorsets utilising aluminium 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 BS476: Part 22: 1987.

2. General specification of construction

The door leaves for aluminium framed Greenlam Industries Ltd Halspan® 30 Optima doorsets are manufactured in accordance with the design as specified in section 2 of the main assessment. 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 BTC 5547F and Warres 118289. Data sheets specifying the maximum approved leaf sizes and graphs detailing the permitted gradient between height and width are contained at the end of this appendix.

The maximum assessed overpanel height for aluminium framed doorsets is 500mm. Doorsets must use a flush overpanel to leaf head junction.

Steel or aluminium transomed assemblies are not permitted.

4. Lippings

Aluminium framed Halspan® 30 Optima must be lipped on all edges in accordance with the following specification.

Material	**Size** (mm)	**Min Density** (kg/m^3)
Hardwood - must be joinery quality timber, free from knots, splits and checks	1. Flat = 6 – 13 thick with a maximum of 2mm profiling permitted at corners of lipping (see section 10.1 of the main assessment) 2. Rounded = Not Permitted	640

5. Door frames

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

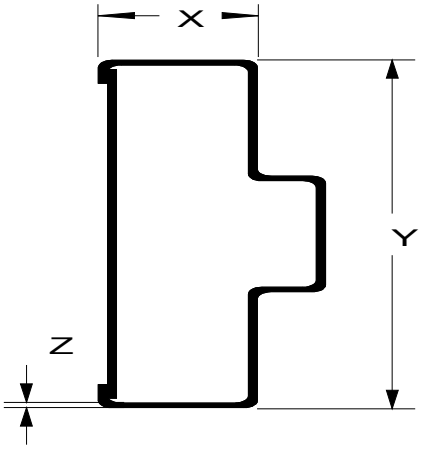
Material: Aluminium

Section: Minimum 100mm wide x 35mm wide (including integral architraves covering the partition or structural opening by 20mm) x 2mm thick.

X = 35; Y = 100 mm; Z = 2.0mm.

Only single acting frames are assessed requiring a minimum of a 12mm deep stop.

Door frames may be of the wrap around type, enclosing the partition edge and the rear of the frame must be a contact fit with the structural opening. Alternatively frames may sit within the structural opening and be infilled with a minimum of 87mm x 20mm hardwood (min density 640kg/m^3) and aluminium or other suitable architraves fitted on both sides of the frame to partition junction. Frames must be manufactured from grade 6063-16 aluminium, or superior.



X: – 0% + 10%

Y: – 35% + Unlimited providing the frame reveal dimensions are maintained

Z: – 0% + Unlimited

6. Fixings

Fixings must be of the appropriate type and length for the structural opening medium and must include a minimum of 5 fixings per jamb and one fixing across the head of single leaf doors and two fixings equally spaced across the head of double leaf doors.

7. Structural openings

Greenlam Industries Ltd Halspan® 30 Optima aluminium 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 25mm softwood stiffeners to the vertical edges)

Gaps between doorframes and structural openings are not acceptable.

Halspan® 30 Optima Doorsets - Aluminium Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting Single Doorsets

Fig: G15	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2700 2931	x x	935 835
	ULSASD	From: To:	2700 2881	x x	910 835
Maximum Overpanel height (mm)		-	Not Permitted		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

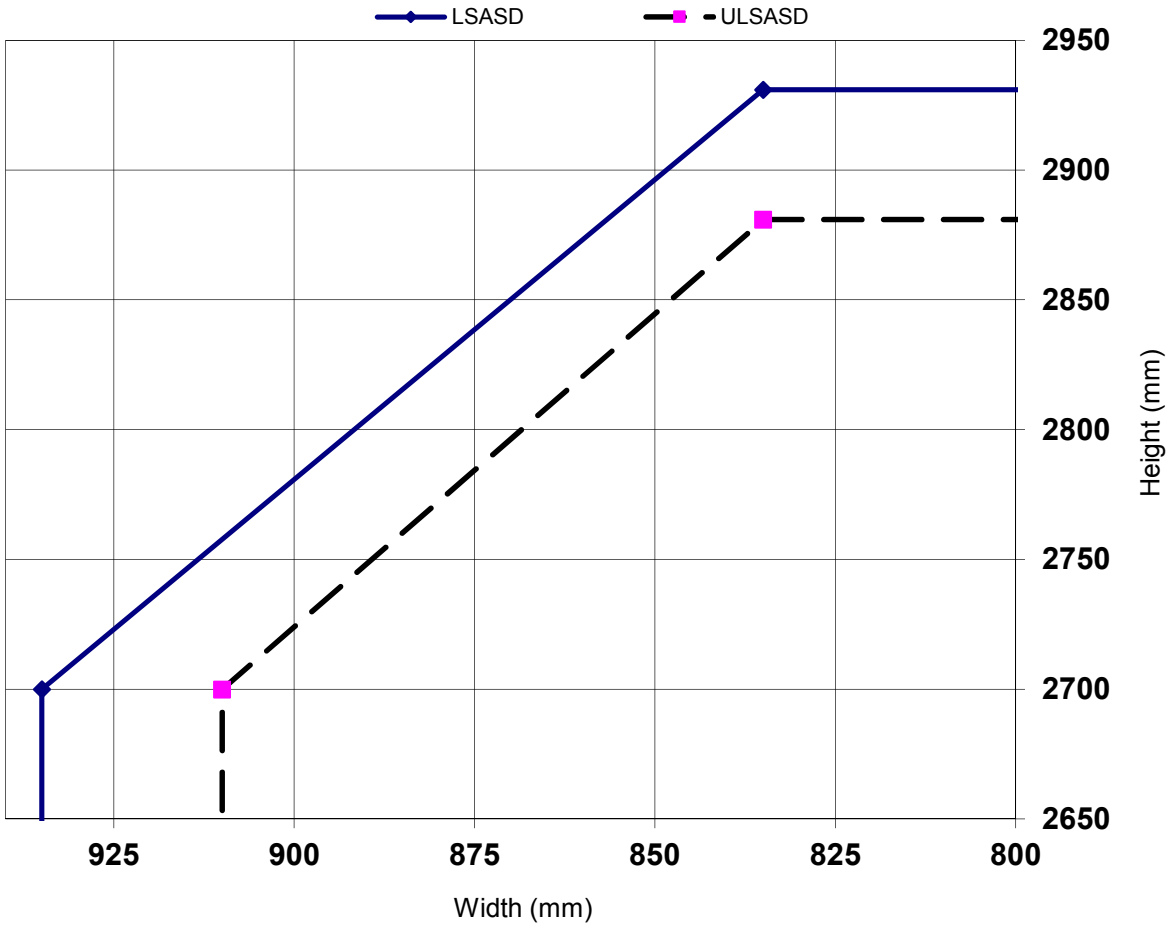
Intumescent Materials: Therm-A-Seal

Head: 1No 30 x 4mm fitted centrally in a groove in the leaf head.

Jambs: 1No 20 x 4mm fitted centrally in a groove in the leaf edge.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets - Aluminium Frame Doorsets – FD30 Rating

Latched and Unlatched Single Acting Double Doorsets

Fig: G16	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From: To:	2700 2831	x x	885 835
	ULSADD	From: To:	2700 2781	x x	860 835
Maximum Overpanel height (mm)		-	Not Permitted		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See Section 5 of this appendix			

Intumescent Materials: Therm-A-Seal

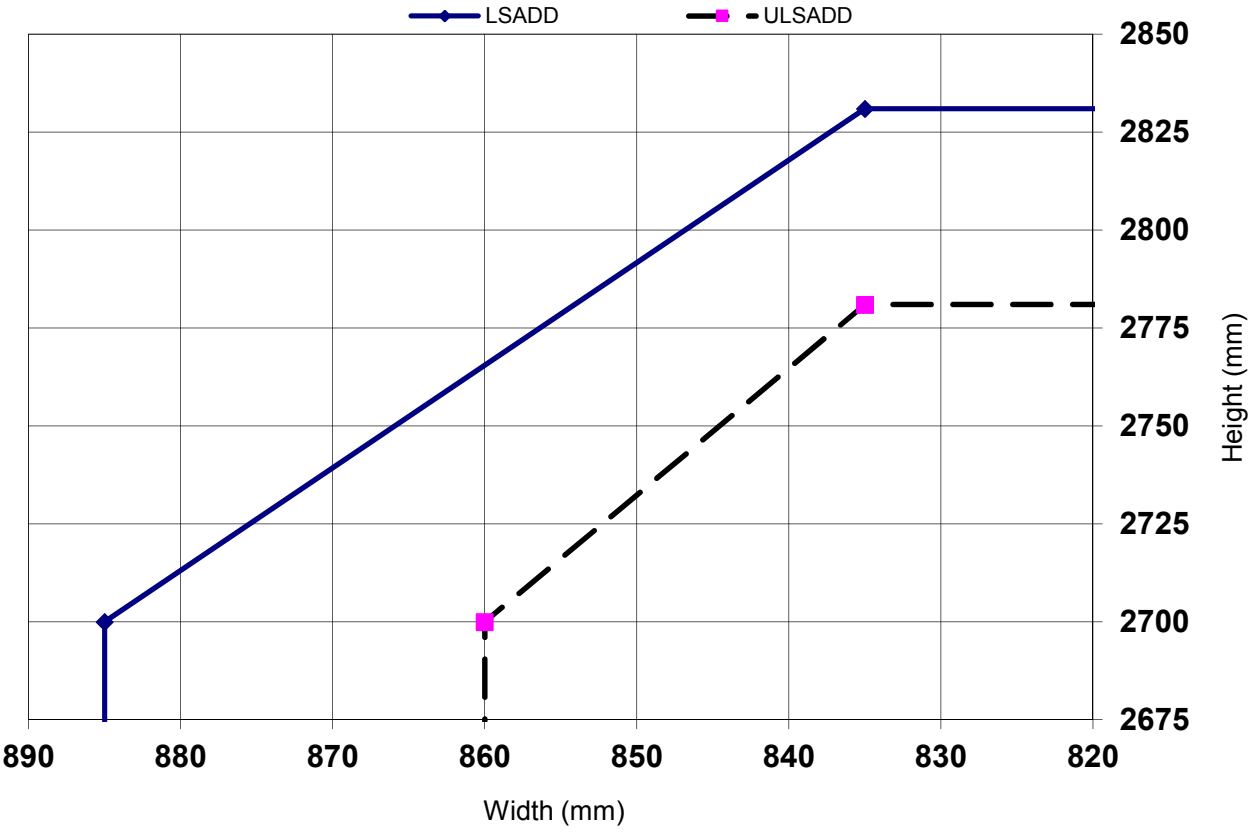
Head: 1No 30 x 4mm exposed and fitted centrally in a rebate in the leaf head or frame reveal.

Meeting Edges: Square – 2 No 10 x 4mm exposed and spaced 5mm each side of the centreline in one edge only.

Jambs: 1No 20 x 4mm exposed and fitted centrally in a rebate in the leaf edge or frame reveal.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Appendix E

Duraguard Edge Protectors

1. General

Door leaves for Halspan® 30 Optima doorsets using Duraguard aluminium edge protectors are manufactured in accordance with the design as specified in section 2 of BMT/CNA/F16082. All aspects of the construction specification must remain as detailed in the main assessment except where specifically discussed in the following paragraphs. Duraguards may be fitted to both hanging and closing edges of single doors and the hanging and meeting edges of double doors; Duraguards must be fitted to both meeting edges.

2. Lippings

Where Duraguard edge protectors are fitted to the leaf edges, timber lippings meeting the specification below must still be fitted with the Duraguard profile added on top. Where Duraguards are not fitted to the vertical edges the lipping specification in section 8.1 of the main assessment must be followed.

Material	**Size** (mm)	**Min Density** (kg/m^3)
Hardwood which must be straight grained, joinery quality, free from knots, splits and checks	1. Flat = 6 – 11 thick 2. Rounded = not permitted 3. Rebated = not permitted	640

3. Intumescent Materials

3.1 General

The Duraguard edge protectors must only be used on the vertical edges of door leaves. The perimeter intumescent seals specified in section 11 of the main assessment must be fitted in the frame reveals (not leaf edges) and be used in addition to that contained within the Duraguard edge protectors.

Duraguard edge protectors may only be used with those door leaf configurations, sizes and types permitted to utilise the perimeter edge intumescent specification shown below.

Frame Reveal – Head and Jambs	**Intumescent Seal Type**
1 No 15 x 4mm thick seal fitted centrally	Therm-A-Seal

3.2 Single Leaf Doorsets

For single leaf doorsets, the required intumescent specification for either or both hanging and closing jambs is.

Location	**Details** (mm)
Concealed – fitted between the rear of the Duraguard and leaf edge	44 x 2 thick Therm-A-Strip
Exposed - and within the Duraguard edge	10 x 4 Therm-A-Seal centrally fitted plus a Therm-A-Blade smoke seal

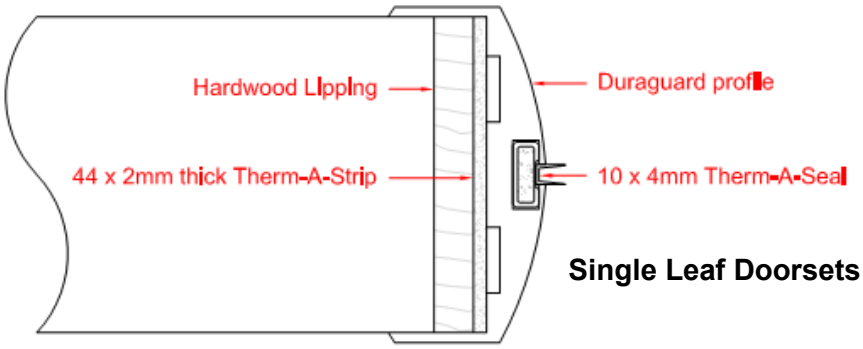
3.3 Double Leaf Doorsets

For double leaf doorsets, the intumescent requirement for the hanging edges (where Duraguards are fitted) must remain as shown in section 3.2 above.

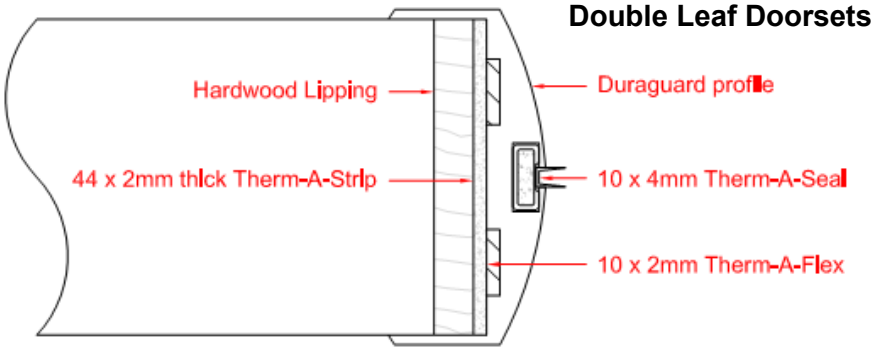
The meeting edge intumescent specification for double leaf doorsets given in appendix B will be replaced by that contained within the Duraguard edge protector.

The meeting edge intumescent specification for double leaf doorsets is shown below.

Location	**Details** (mm)
Concealed – fitted between the rear of the Duraguard and leaf edge	2No. 10x2mm thick Therm-A-Flex in the rebates in the rear of the Aluminium profile on top of 44x2 thick Therm-A-Strip
Exposed - and within the Duraguard edge	10x4 Therm-A-Seal centrally fitted plus a Therm-A-Blade smoke seal



Single Leaf Doorsets



Double Leaf Doorsets

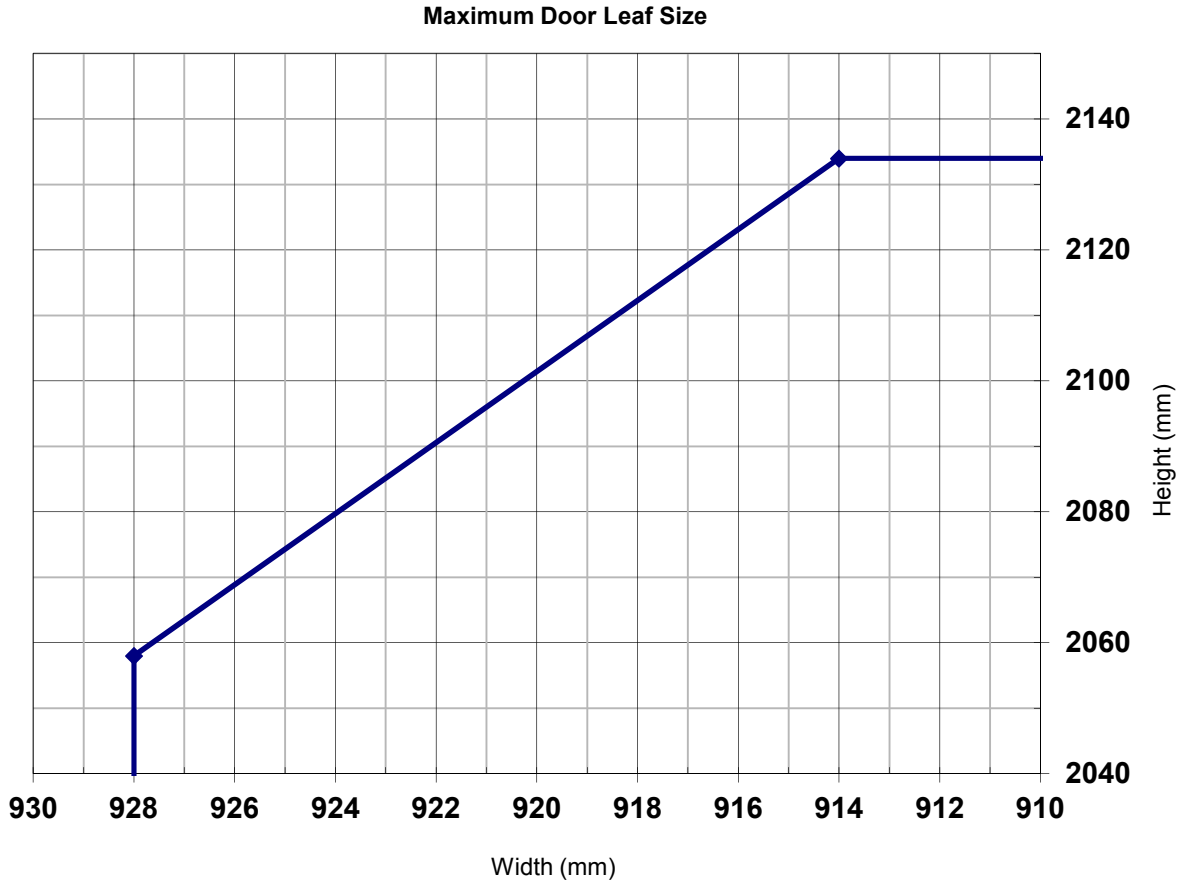
3.4 Hardware

The following items of hardware are directly affected by the installation of Duraguard edge protectors and must be installed with the following protection. Intumescent protection for all other hardware will remain as specified in section 11 of the main assessment.

Item	**Specification**	**Required Intumescent Protection**
Hinges	As per section 13	Not required - unless door test data requires hinge protection on the frame
Locks and latches	As per section 13	2mm Therm-A-Strip under the forend and keeps at all sizes
Flushbolts	Maximum 200mm long	Not required

4. Leaf Sizes

As the test data has been generated on double leaf doorsets then the Duraguard may be used on both double and single leaf configurations. The maximum leaf dimensions for doorsets that the Duraguard edge protectors may be applied to must fall below the graph line shown below; however if the dimensions given for the relevant doorset configuration in appendix B are smaller, then those dimensions take precedence:



5. Frame Fixings

The fixings for hinges on doorsets using Duraguard edge protectors must be of sufficient length to penetrate the timber door leaf by a minimum of 24mm.

6. Plastic Facings

If plastic type face materials are to be applied, the plastic must be cut back to finish flush with the edge of the Duraguard edge protector.

7. Duraguard Installation

The Duraguard edge protectors are to be cut 6mm short in order to allow a minimum 3mm expansion.

Appendix F

Greenlam Industries Ltd Plasdor Doorsets

1. General

Door leaves for Greenlam Industries Ltd Plasdor doorsets are manufactured in accordance with the design as specified in section 2 of BMT/CNA/F16082 for Halspan® 30 Optima doorsets; modified with PVC facings, lippings and alternative glazing details. All aspects of the construction specification are identical to that detailed in the main assessment except where specifically discussed in the following paragraphs.

2. Test Evidence

The test data that has been submitted in support of this assessment of Plasdor doorsets is contained within the reports listed in appendix H. Full details are held in confidence at Exova Warringtonfire. This evidence provides confidence in the burn through issues and distortion characteristics of the individual constructions discussed below.

3. Leaf Sizes

The maximum leaf dimensions for the Plasdor range are shown in the data sheets at the end of this appendix.

Note: On site leaf size adjustment is not permitted.

4. Configurations

All doorset configurations shown in section 4 of BMT/CNA/F16082 may be modified to the Plasdor specification, however doorsets with overpanels must use a transom to the specification in section 6.1 of BMT/CNA/F16082.

5. Facing Materials

The doorset constructions detailed in section 2 of BMT/CNA/F16082 for Halspan® 30 Optima are to be clad with 2mm thick PVC – facings, lippings and alternative glazing details.

This forms the basis of the Plasdor range and alternative materials must not be used.

The PVC faces may be post-formed around the leaf edges provided that the edges are lipped with the required lipping specification given in section 6 below.

6. Lippings

The doorset constructions detailed in section 2 of BMT/CNA/F16082 for Halspan® 30 Optima and modified as above must be lipped on all edges with one of the following:

1. 2 – 8mm thick PVC in lieu of the hardwood which is specified in the relevant section of BMT/CNA/F16082
2. 6 – 10mm thick hardwood with a minimum density of 640 kg/m^3 which may then be clad with 2mm thick PVC.

The lippings may be rounded by a maximum of 8mm provided that a 10mm thick lipping is used.

The lippings are to be bonded to the leaf edges with a PU adhesive.

7. Intumescent Materials

The intumescent material tested as door edge seals and therefore approved for this Plasdor doorset design is Therm-A-Seal (Intumescent Seals Ltd) as specified in the table below. All other intumescent materials (e.g. hardware protection) must be as detailed in section 11 of BMT/CNA/F16082 for Greenlam Industries Ltd Halspan® 30 Optima doorsets.

Application	Location	Product/Manufacturer
Edge seals	Fitted in the frame jambs or leaf edges	PVC encased Therm-A-Seal – Intumescent Seals Ltd

The seal specification for each Plasdor doorset configuration is contained in the data sheets at the end of this appendix.

8. Door Frames

Door frames for the Plasdor range must be as specified in section 10 of BMT/CNA/F16082 for Greenlam Industries Ltd Halspan® 30 Optima doorsets; if Ovi Super is used the frame material is limited to either hardwood with a minimum density of 640 kg/m^3 or MDF with a minimum density of 700kg/m^3.

9. Glazing

9.1 General

The testing conducted on Halspan® 30 Optima has demonstrated that the design is capable of tolerating relatively large glazed apertures, whilst providing a margin of over performance. The testing conducted on doorsets modified with the Plasdor materials permits the use of the following glazing.

Details of the tested glazing systems for the Plasdor range of doorsets incorporating PVC facings and flush glazing details are shown in section 9.3 below.

Glazing is therefore acceptable within the following parameters.

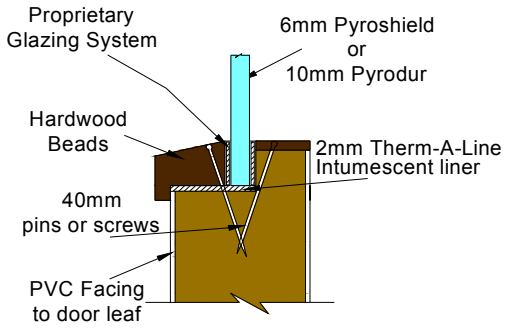
9.2 Tested Glazing Systems

Glazing System	Manufacturer	Maximum Area (m^2)
1. Flushglaze	Proprietary to Greenlam Plasdor	0.60
2. Duoglaze		
3. Trueglaze*		
If a single, central pane of glass is required; and it is glazed with a proprietary intumescent system and hardwood beads		0.99

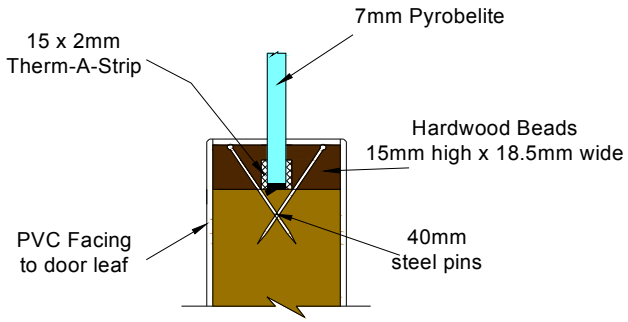
*Trueglaze systems are referenced 1 – 3 as illustrated below.

9.3 Assessed Plasdor designs

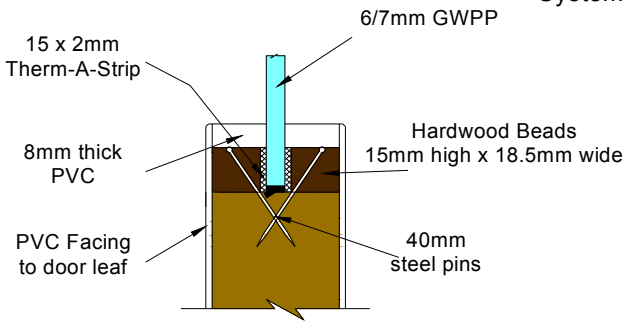
Assessed glazing system types are contained in the drawings below:



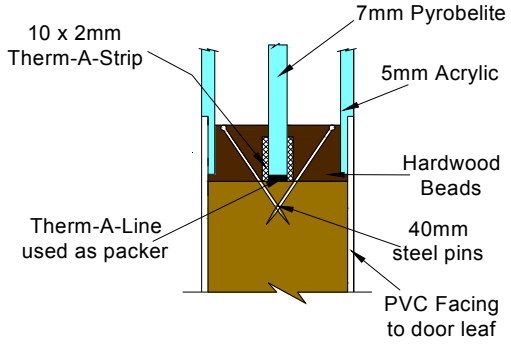
Trueglaze 30
System 1



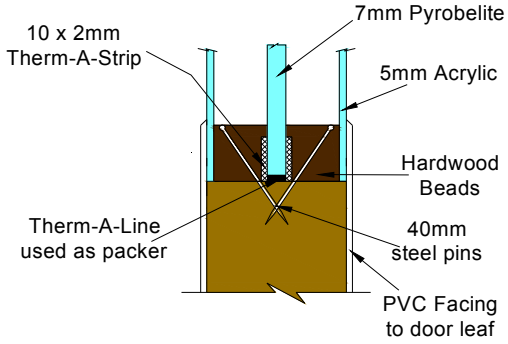
Trueglaze 30
System 2



Trueglaze 30
System 3



Flushglaze 30



Duoglaze 30

Notes:

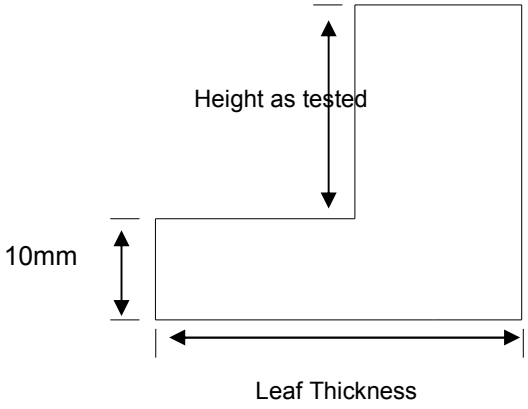
1. All glass types must be fitted fully in accordance with the manufacturers' tested details/installation requirements, particularly with respect to edge cover and expansion tolerances
2. 5mm thick acrylic as shown above may be replaced with 6mm thick acrylic as required
3. 7mm thick Pyrobelite 7 as shown above may be replaced with 12mm thick Pyrobelite 12 as required.

9.4 Glazing Beads & Installation

Glazing beads must be from hardwood as specified within section 7 of BMT/CNA/F16082 for Greenlam Industries Ltd Halspan® 30 Optima doorsets.

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® 30 Optima core between apertures.

If the integral upstand system is to be used, the aperture must be lined out with hardwood (minimum density 640kg/m^3) glued in position with a urea formaldehyde adhesive. The upstand must provide the minimum edge cover as specified in the drawings in appendix A and have a minimum thickness of 10mm as shown below.



Aperture shape is not restricted, providing the glazing system and beads are compatible with that shape.

10. Duraguard

It will be acceptable to use the Duraguard edge protectors as per specifications in appendix E (up to the maximum leaf size specified therein) provided that the leaf edges under the Duraguard are lipped with hardwood and that the Plasdor PVC facing material is cut such that it does not extend under the aluminium profile.

11. Data Sheets

The data sheets below detail the intumescent requirements for 30 minutes fire resistance performance when Halspan® 30 Optima doorsets are modified with Plasdor materials. Details specified below take precedence over those in the main body of this assessment – BMT/CNA/F16082.

Halspan® 30 Optima Plasdor Doorsets– 30 Minutes Fire Resistance

Latched and Unlatched Single Acting & Double Acting Single Doorsets

Fig: G17	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From:	2135	x	1012
		To:	2854	x	740
	ULSASD & DASD	From:	2135	x	987
		To:	2804	x	740
Maximum Overpanel height (mm)		Transomed	2000		
Glazing		Maximum Glazed Area:	0.60m² (see section 9 of this appendix for details)		
		Approved systems:	See section 9 of this appendix		
Frame specification		see section 8 of this appendix			

Intumescent Materials: Intumescent Seals Ltd – Therm-A-Strip

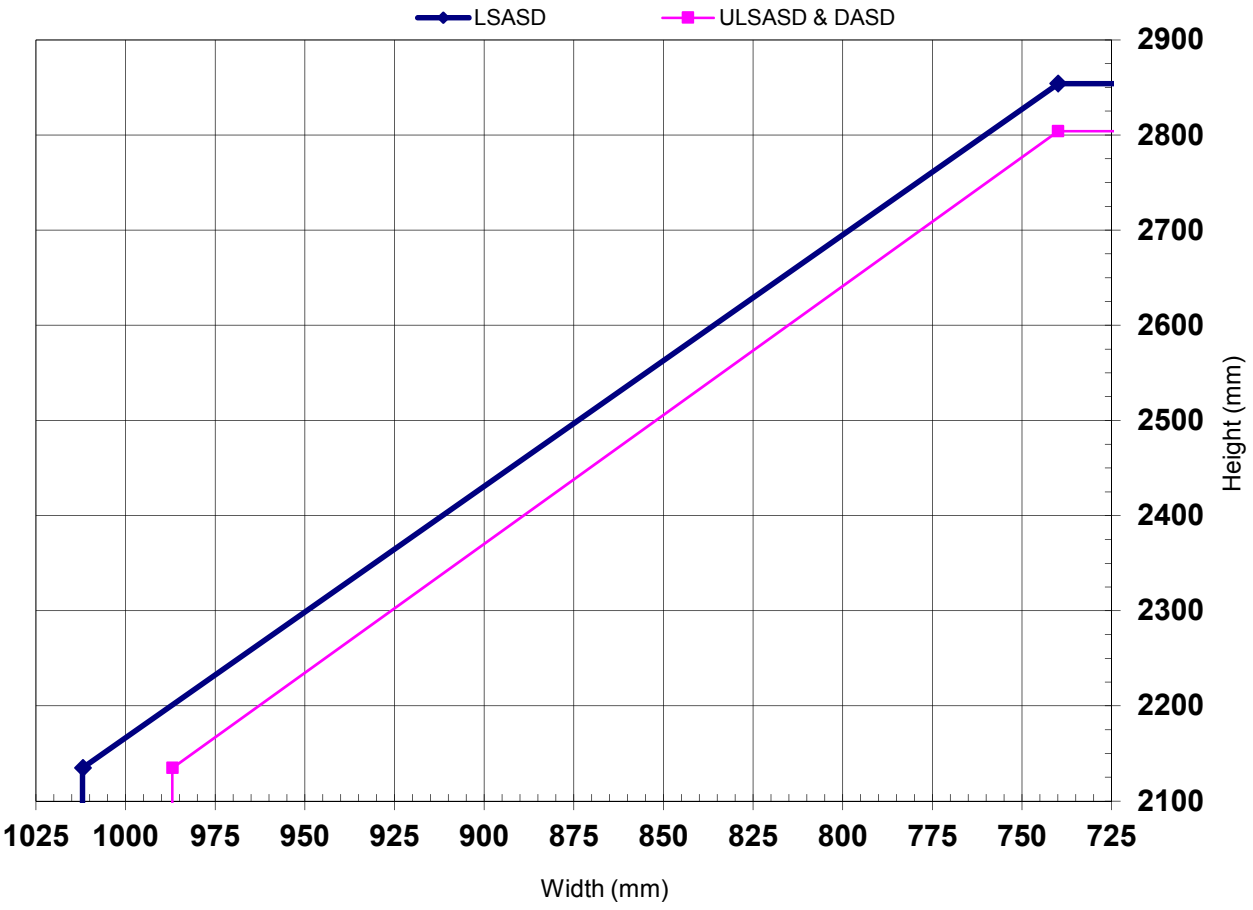
Head: 1 No 20 x 4mm exposed and fitted in the leaf edge. Leaves over 2440mm high, increase to 25 x 4mm.

Jambs: 1 No 20 x 4mm exposed and fitted in the leaf edges. Leaves over 2440mm high, increase to 25 x 4mm.

Overpanel: 1 No 20 x 4mm exposed and fitted in all overpanel edges or frame reveal.

Hardware Protection: see section 11 of main assessment

Maximum Door Leaf Size



Halspan® 30 Optima Doorsets Plasdor– 30 Minutes Fire Resistance

Latched and Unlatched Single Acting & Double Acting Double Doorsets

Fig: G18	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From:	2135	x	962
		To:	2754	x	740
	ULSADD & DADD	From:	2135	x	937
		To:	2704	x	740
Maximum Overpanel height (mm)		Transomed	1500		
Glazing		Maximum Glazed Area:	0.60m² (see section 9 of this appendix for details)		
		Approved systems:	See section 9 of this appendix		
Frame specification		see section 8 of this appendix			

Intumescent Materials: Intumescent Seals Ltd – Therm-A-Strip

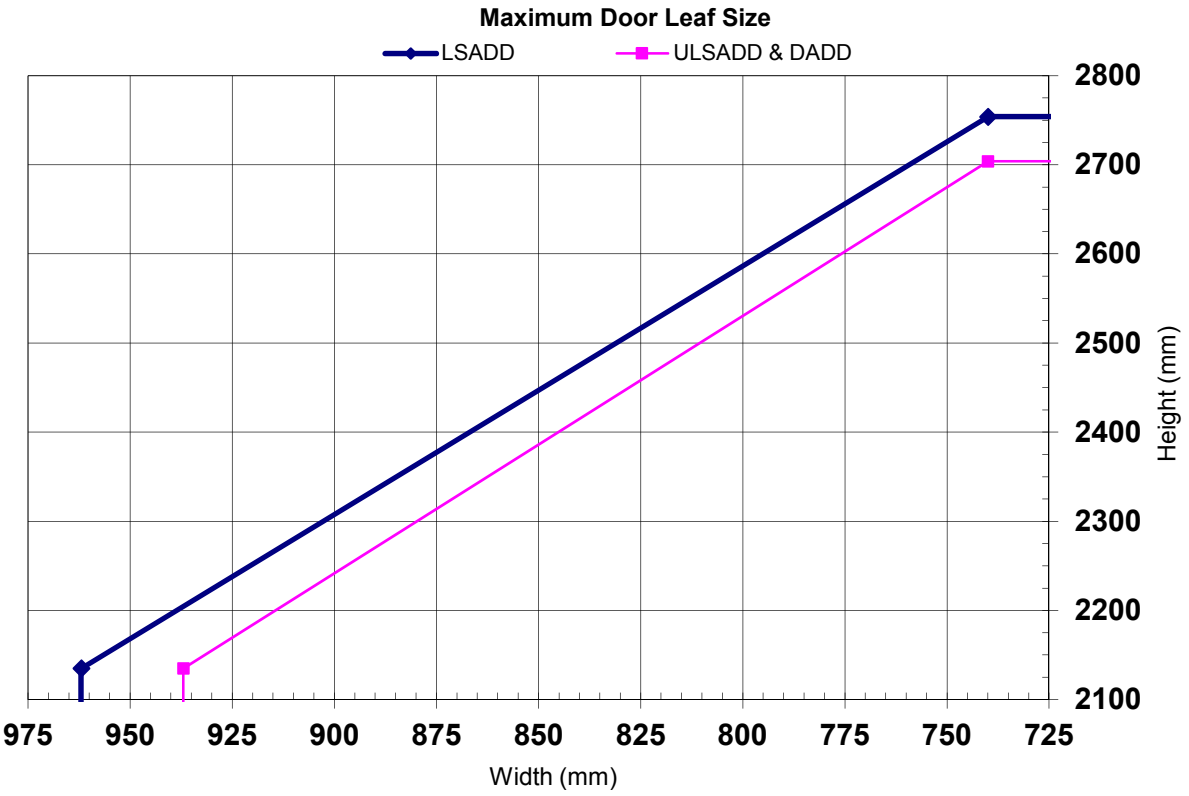
Head: 1 No 20 x 4mm exposed and fitted in the leaf edge. Leaves over 2440mm high, increase to 25 x 4mm.

Jambs: 1 No 20 x 4mm exposed and fitted in the leaf edges. Leaves over 2440mm high, increase to 25 x 4mm.

Meeting Edges:
1 No 20 x 4mm exposed and fitted in one leaf edge only. Leaves over 2440mm high, increase to 25 x 4mm.

Overpanel: 1 No 20 x 4mm exposed and fitted in all overpanel edges or frame reveal.

Hardware Protection: see section 11 of main assessment



Appendix G
Intastop Hinges

1 General

Door leaves for Halspan® 30 Optima doorsets installed using Intastop continuous hinges must be manufactured in accordance with the design as specified in section 2 of BMT/CNA/F16082. All aspects of the construction specification must remain as detailed in the main assessment except where specifically discussed in the following sections.

2 Hinge Types

Based on the test evidence listed in appendix H, this assessment covers the following hinge types:

Finger Protective Double Swing - types A & B

Continuous Geared Double Swing Hinge with plastic or aluminium bearings

3 Lippings

Timber lippings on the hanging edges where the Intastop hinges are to be fitted must meet the following specification. Adhesive for lippings must be UF, PF or PU.

Material	**Size** (mm)	**Min Density** (kg/m^3)
Hardwood which must be straight grained, joinery quality, free from knots, splits and checks	1. Flat = 6 – 18 thick 2. Rounded = not permitted 3. Rebated = not permitted	640

Where hinge packers are required as part of the Intastop installation requirements for fitment of the hinge components they must meet the timber specification given above.

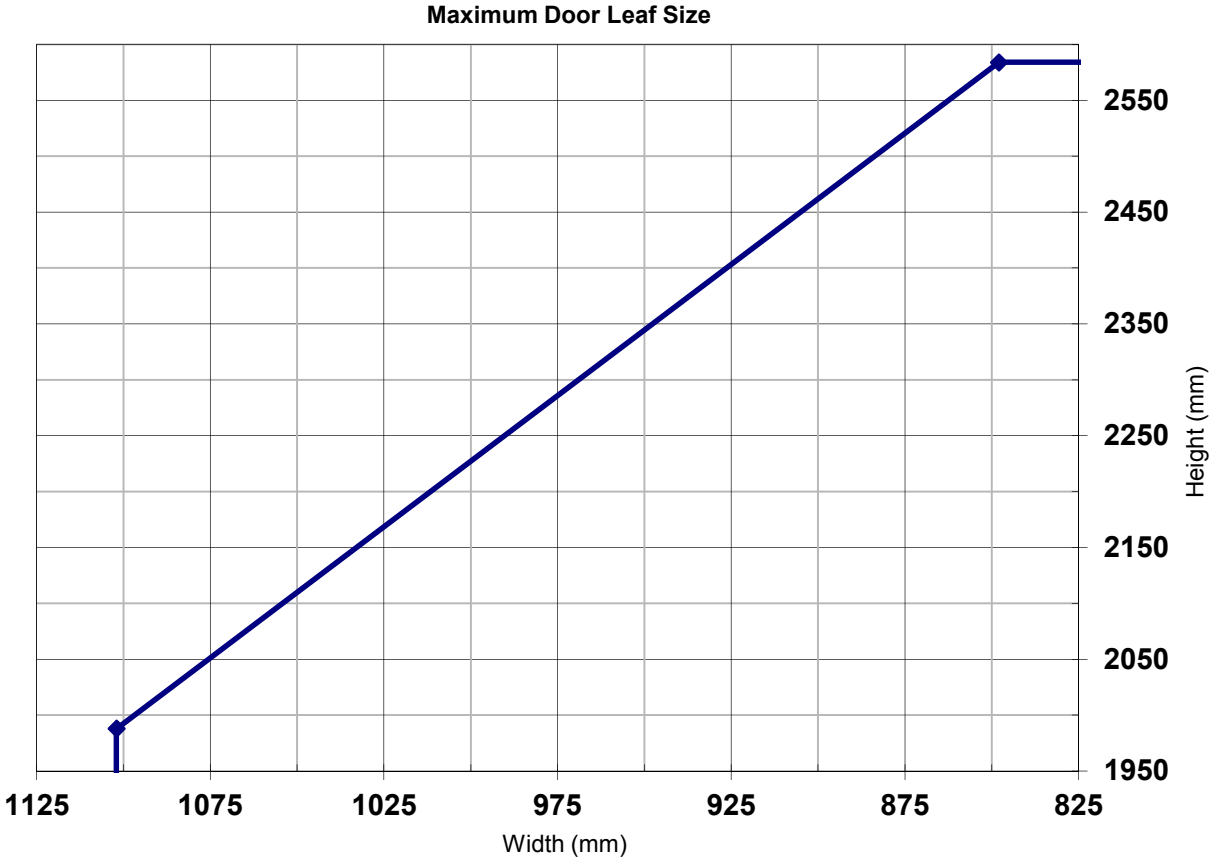
4 Intumescent Materials

4.1 General

The Intastop hinges must use the tested intumescent materials, including all strips positioned within and around the various hinge components. Refer to the supporting test data or Greenlam Industries Ltd sales department for full details of intumescent and installation requirements.

5 Leaf Sizes

As the test data has been generated on double leaf doorsets the Intastop hinges may be used on both double and single leaf configurations. The maximum leaf dimensions for doorsets that the Intastop hinges may be applied to must fall below the graph line shown below; however if the dimensions given for the relevant doorset configuration in appendix B are smaller, then those dimensions take precedence:



6 Door Frames

Material for door frames for Halspan® 30 Optima door leaves mounted on Intastop hinges must be timber based meeting the requirements given in section 10.1 of BMT/CNA/F16082.

Appendix H

Performance Data

Primary Test Evidence

Report Reference	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)
RF95042	A: ULSASD	2100 874 44	BS 476: Part 22: 1987	49
	B: ULSADD	2100 874 44	BS 476: Part 22: 1987	35
RF97091	ULSADD+OP	2130+800 op 915 45	BS 476: Part 22: 1987	39
RF99036 (glazing)	ULSADD	2126 915 45	BS 476: Part 22: 1987	26
Warres 111201 (steel frames)	ULSADD	2042 826 44	BS 476: Part 22: 1987	42
BTC 5547F (aluminium frames)	LSASD	2700 838 44	BS 476: Part 22: 1987	36
Warres 112248 (softwood frames, 10 x 4 seals & glazing)	A: ULSASD	2040 926 44	BS 476: Part 22: 1987	28[2]
	B: ULSADD	2040 726/412 44	BS 476: Part 22: 1987	30
Warres 118409A	ULSASD	2700 836 44	BS 476: Part 22: 1987	41
Warres 118289 (aluminium door frame)	ULSADD	2700 835 44	BS 476: Part 22: 1987	32
RF01037	A: ULSASD	2135 915 44	BS 476: Part 22: 1987	A: 36
	B: ULSADD	2135 850/444 44	BS 476: Part 22: 1987	B: 39
RF01056 (Mitron concealed closer)	A: ULSASD	2040 827 44	BS 476: Part 22: 1987	A: 39

Report Reference	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)
RF04058A (PVC Cladding, large forend)	ULSADD	2135 740 48	BS 476: Part 22: 1987	46
RF01059B (MDF)	ULSASD	2040 825 44	BS 476: Part 22: 1987	39
RF01073 (backfilled steel frames)	A: ULSADD	2135 800+300 44	BS 476: Part 22: 1987	38
RF01074 (backfilled steel frame)	ULSADD	2145 795 +300 59	BS 476: Part 22: 1987	76
RF02018 (Pyroplex)	DADD	2040 826 54	BS 476: Part 22: 1987	72
Warres 135011	DADD + OP	2040 +622 921 44	BS 476: Part 22: 1987	36
RF02098 (wireway)	ULSASD	2040 936 44	BS 476: Part 22: 1987	36
Warres 131998 (Halspan Lite MDF beads)	A: ULSADD	2040 926/200 44	BS 476: Part 22: 1987	A: 27
RF09115 (Jointed Core & Lorient 617)	B: ULSADD + OP	2040+696 930/200 44	BS 476: Part 22: 1987	B: 32
	A: ULSADD (unequal pair)	2135 926/500 44	BS 476: Part 22: 1987	A – 25 Latch[1] 44 Perimeter
RF08039 (Halspan® 30 Prima PVC lippings)	ULSADD	2055 912/415 46	BS 476: Part 22: 1987	50
RF11059 (Post-formed Acrovyn)	B - ULSADD	2100 900/300 44	BS 476: Part 22: 1987	B = 39

[1] Latch body and forend were not protected with intumescent material, it is our assessment that if such protection were present as detailed in section 11 the doorset would achieve at least 30 minutes integrity

Report Reference	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)
RF10128 (PVA glueline for facings)	B: ULSADD	2696 950/446 54	BS 476: Part 22: 1987	65
Warres 135011	DADD + OP	2040 + 622 921 44	BS 476: Part 22: 1987	36
RF03076 (Sidescreen)	ULSASD	2060 995 45	BS 476: Part 22: 1987	26 (letter plate) 30 (perimeter)
RF03076 (Sidescreen)	ULSASD	2060 995 45	BS 476: Part 22: 1987	26 (letter plate) 30 (perimeter)
RF04074	LSASD	2040 923 54	BS 476: Part 22: 1987	67
Warres 118472	Timber screen	2955 2978	BS 476: Part 22: 1987	34
DFR0501311 (Plasdor[2])	Fixed sample	1900 1100 44	BS 476: Part 22: 1987	31
RF08092 (EVA lipping glueline)	B: ULSADD (unequal)	2040 826 44	BS 476: Part 22: 1987	38
DFR0511251 (Duraguard)	SA + DASD	1830 530 45	BS 476: Part 22: 1987	32

[2] Plasdor glazing systems have been renamed Flushglaze and Duoglaze from the tested Smoothglaze and Surfaceglaze respectively, no material changes made to the design.

Supplementary Data

Report Reference	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)
IF02098 (Glazing)	Fixed indicative panel	2100 600 54	Principles of BS 476: Part 22: 1987	62
RF00067 (Glazing)	A:ULSADD	2102 877+509 44	BS EN 1634-1	A: 37
	B:ULSASD	2102 826 44	BS EN 1634-1	B: 43
RF00068 (Intumescent in rear of lipping)	A: ULSASD	2702 915 44	BS EN 1634-1	A: 42
RF10111 (Ovi Super + Norfast sealing system, recessed push /kick plates)	ULSADD	2800 928 44	BS EN: 1634-1: 2000 & BS EN: 1363-1: 1999	46
WF117483 (Zeroplus glazing system)	Fixed panel	990 990 54	Principles of BS 476: Part 20: 1987	73
CFR0909211 (Visicom)	Fixed indicative panel	A - 440 x 440		62
		B – 1200 x 650		
DFR0401121 (Visicom)	Fixed sample	1955 1180 44		System 1 - 40 System 2- 45 System 3- 36
Chilt/A5040 (11mm Pyroguard)	Indicative	Leaf-1480 x 900 Glazed aperture - 1260 x 410	Principles of BS 476: Part 22: 1987	71
IF09028 (200mm lengths of intumescent)	2 No ULSASD	-		Comparative only
DFR0511252 (Flush Handles)	Fixed leaf with 4 handles	1900 575 44		E 67 F 45 G 51 H 72
CFR100721 (unprotected flush bolts)	LSADD	2227 880/301 45		23 (Latch) 36 middle hinge

Supplementary Data

Report Reference	**Configuration**	**Leaf Size** (mm)	**Test Standard**	**Performance** (mins)
CFR0901061 (Intastop Plastic Bearing Hinge)	ULDADD	2034 570/570 54	Principles of: BS 476: Part 22: 1987	47
CFR1207251 (Intastop Finger Protective Double Swing - types A & B)	A:ULDASD	2020 847 44	Principles of: BS 476: Part 22: 1987	A: 42
	B:ULDADD	1988 848/397 54		B: 48
CFR0904241 (Intastop Aluminium Bearing Hinge)	ULDADD	2035 826/299 44	Principles of: BS 476: Part 22: 1987	44

Appendix I

Revisions

Revision	Exova Warringtonfire Reference	Date	Description

Appendix J

Greenlam Industries Ltd Halspan® 30 Prima Doorsets

1. Introduction

This appendix contains the information relating to Greenlam Industries Ltd Halspan® 30 Prima doorsets. 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: Part 22: 1987.

2. General specification of construction

The door leaves for Halspan® 30 Prima doorsets are manufactured in accordance with the design as specified in section 2 of BMT/CNA/F16082 utilising the Halspan® 30 Prima blank (nominal density 630kg/m³ +/- 10%) in place of the Halspan® 30 Optima. All other aspects of the construction specification are identical to that detailed in the main assessment except where specifically discussed in the following paragraphs detailing options not available with the Halspan® 30 Optima door blank.

3. Leaf sizes and configurations

The assessed leaf sizes and configurations are based on the constructions and performances obtained from the range of tests utilising the Halspan® 30 Prima door blank. Data sheets specifying the maximum approved leaf sizes and graphs detailing the permitted gradient between height and width are contained in the data sheets at the end of this appendix.

4. Leaf Facing Materials

Whilst the basic Halspan® 30 Prima leaf construction is a monolithic structure, it may be necessary in some situations to face the leaves with plywood or MDF. This will be achieved by using 38mm thick Halspan® 30 Prima and bonding MDF or plywood.

The assessed facings are summarised as follows:

3mm MDF (minimum density 750kg/m³), which may oversail the lippings.

3mm hardwood plywood (minimum density 640kg/m³), which may oversail the lippings.

Facings up to 3mm thick are deemed to have limited structural benefit or significant influence on resistance to burn-through. Therefore, on balance we consider that at the proposed thickness, the relative merits of the different materials will equalise to a certain extent, providing confidence that the performance of the modified construction would not be less than 30 minutes integrity. The facing must be bonded using urea or phenol formaldehyde type adhesives.

5. Concealed Intumescent Materials

The Halspan® 30 Prima design has been successfully tested (RF00068) with intumescent material concealed in the rear of the vertical edge lippings. The permitted leaf sizes, configurations and intumescent specification are given in the relevant data sheet at the end of this appendix.

The following construction details must also be followed:

- The door must only be lipped on the vertical edges and the lippings adhered using PVA type adhesive
- The lippings must be hardwood of minimum density 640kg/m^3
- The lippings must be flat and fall within the range of 8 – 12mm thick
- The door frame must be a minimum of 70mm (w) x 32mm (t) and constructed from hardwood of minimum density 640kg/m^3
- 1mm thick intumescent gaskets must be fitted under all hinge blades, lock forends and keeps.

All other construction details may be as specified in this document, as appropriate.

6. Adhesives

The following adhesives must be used in the construction:

Element	Adhesive Type
Timber Lippings[1]	UF, PF, PU, PVA, EVA, PVAC or hot melt
PVC lippings	EVA – Dorus US241/4 natur
MDF & Ply facings	Urea formaldehyde (UF) Phenol Formaldehyde (PF) or PVA

Note: 1. See note in section 5 above for required adhesive when using concealed intumescents.

7. 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. The glazing area is limited to 0.2m^2; installation must be as per the test data.

Zero Seal Systems Ltd must be contacted for details on glazing materials and installation.

8. Door Frames

8.1 Door frame construction

Timber based door frames for Greenlam Industries Ltd Halspan® 30 Prima must be constructed to meet the following specification (for steel door frame options see appendix C of the main assessment).

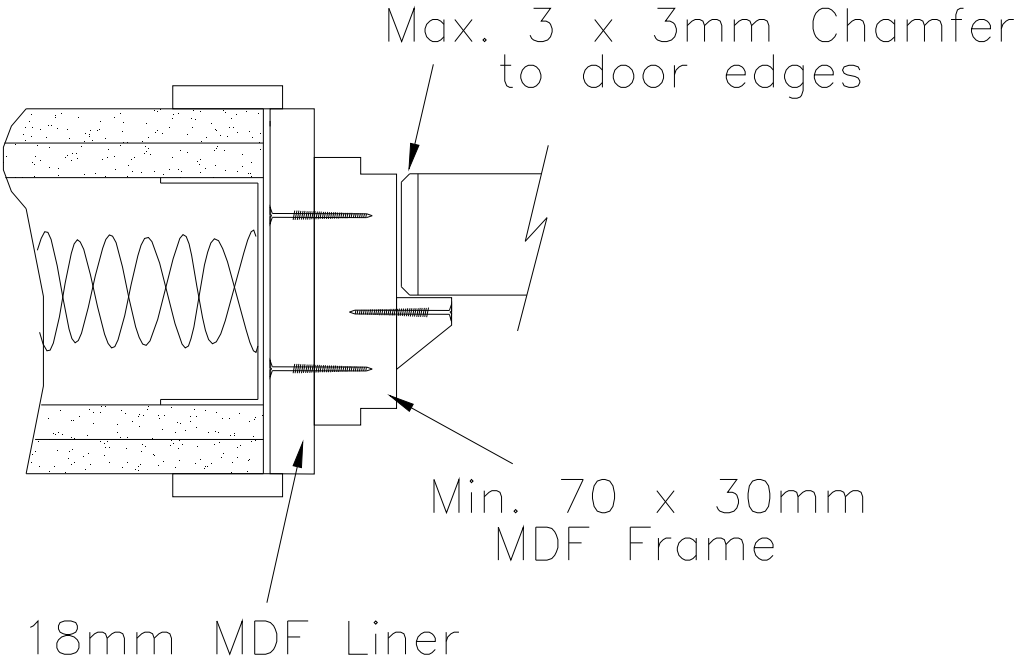
Material	**Min Section Size** (mm)	**Min Density** (kg/m^3)	**Permitted configuration**	**Max leaf dimensions** (mm)
Hardwood (for use with reduced intumescent)	70 x 32[2]	640	LSASD, ULSASD & DASD, LSADD, ULSADD & DADD	See relevant data sheet in appendix B
Hardwood[1]	70 x 32[2]	530	LSASD & ULSASD	2100 (h) x 900 (w)
Hardwood[1]	70 x 44[2]	530	All	All
Hardwood[1]	70 x 22[2]	640	All	All
MDF[1]	70 x 30[2]	700	All	2440 (h) and not restricted in width

Notes:

1. Not permitted for use with concealed intumescent specification in section 5 of this appendix
2. Dimension does not include any required door stop
3. A 12mm deep planted or integral stop is adequate for single acting frames whilst double acting frames may be scalloped or square (see section 10 of main assessment). 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
4. 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
5. All door frame timber must be joinery quality, free from knots, splits and checks
6. 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
7. 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 8.2 of the main assessment) and facing material (see section 9 of main assessment)
8. See section 10 of main assessment for diagrams depicting the assessed frame profiles and dimensions
9. See section 15 of main assessment for details of required frame fixings, and section 16 of main assessment for details of sealing to the structural opening
10. Steel and MDF frame doorsets are not assessed for transomed overpanels or glazed fanlights.

8.2 MDF Frame Option

The installation detail illustrated below is allowable provided the door frame and liner are screwed and additionally glued together using Urea or Phenol Formaldehyde, PVA, PVAC or PU gluelines, frame joints must be mitre type, tight with no gaps. All other details must as specified in section 7.1 of this appendix and the datasheets for Halspan® 30 Prima doorsets.



Data Sheets

For

Greenlam Industries Ltd

Halspan® 30 Prima

30 Minute Fire resisting Doorsets

Halspan® 30 Prima Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Single Doorsets – PVC Lipped Doors

Fig: G19	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2055 2883	x x	1288 912
	ULSASD & DASD	From: To:	2055 2833	x x	1263 912
Maximum Overpanel height (mm)		Transomed	2000		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See section 7 of this appendix			

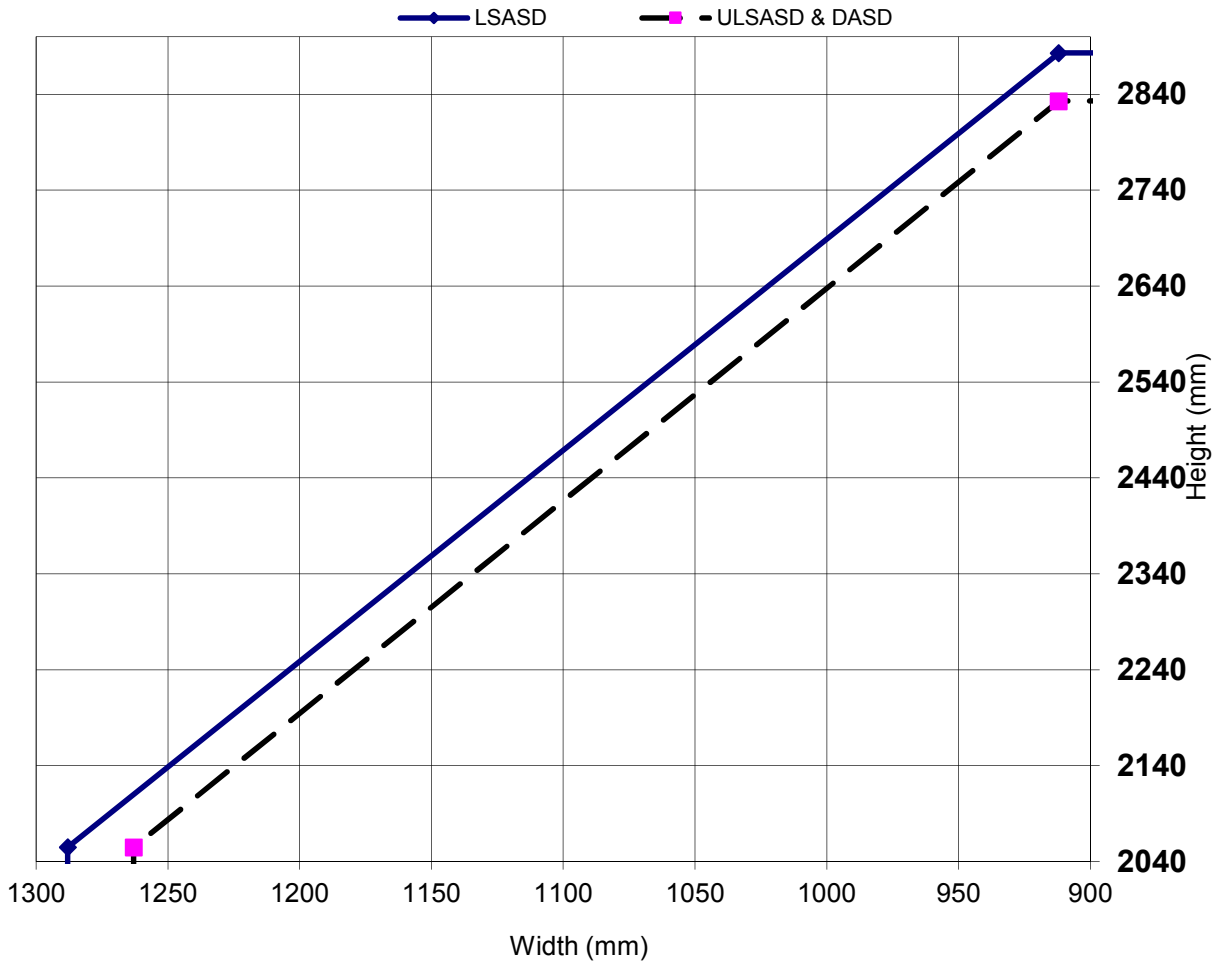
Intumescent Materials: Halspan Fireseal SF strips.

Head: 15 x 4mm centrally fitted in the leaf or frame head. Leaves over 2300mm increase to 20 x 4mm.

Jambs: 15 x 4mm centrally fitted in the leaf edge or frame reveal. Leaves over 1100mm increase to 20 x 4mm. It is permitted to increase the intumescent specification to match that given for the leaf head if required.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Prima Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Double Doorsets – PVC Lipped Doors

Fig: G20	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From: To:	2055 2783	x x	1238 912
	ULSADD & DADD	From: To:	2055 2733	x x	1213 912
Maximum Overpanel height (mm)		Transomed	1500		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See section 7 of this appendix			

Intumescent Materials: Halspan Fireseal SF strips.

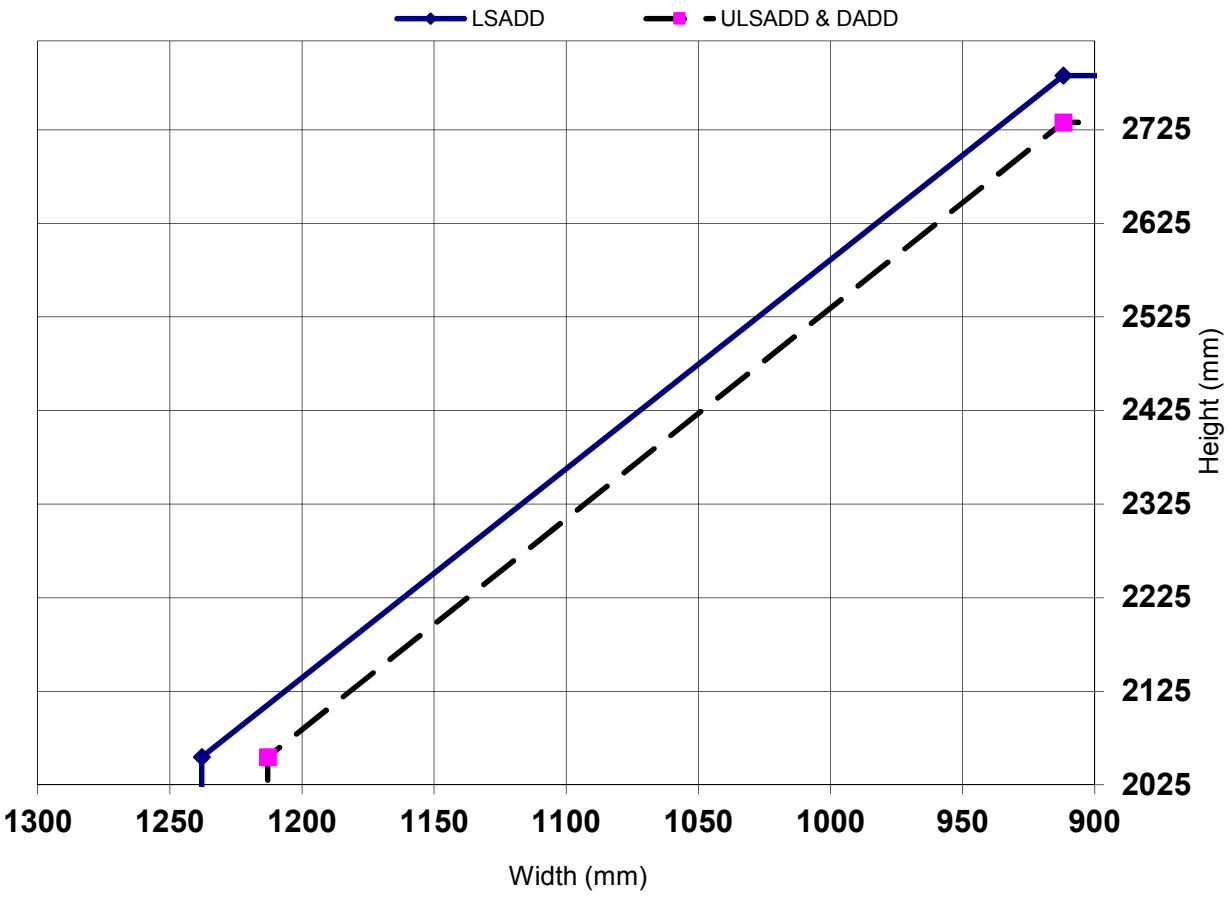
Head: 15 x 4mm centrally fitted in the leaf or frame head. Leaves over 2300mm increase to 20 x 4mm.

Jambs: 15 x 4mm centrally fitted in the leaf edge or frame reveal. It is permitted to increase the intumescent specification to match that given for the leaf head if required.

Meeting Edges: 15 x 4mm centrally fitted in one meeting edge.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Prima Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Single Doorsets – Offset Intumescent

Fig: G21	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2040 2294	x x	1054 936
	ULSASD & DASD	From: To:	2040 2244	x x	1029 936
Maximum Overpanel height (mm)		Transomed	2000		
Glazing		Maximum Glazed Area:	1.75m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See section 7 of this appendix			

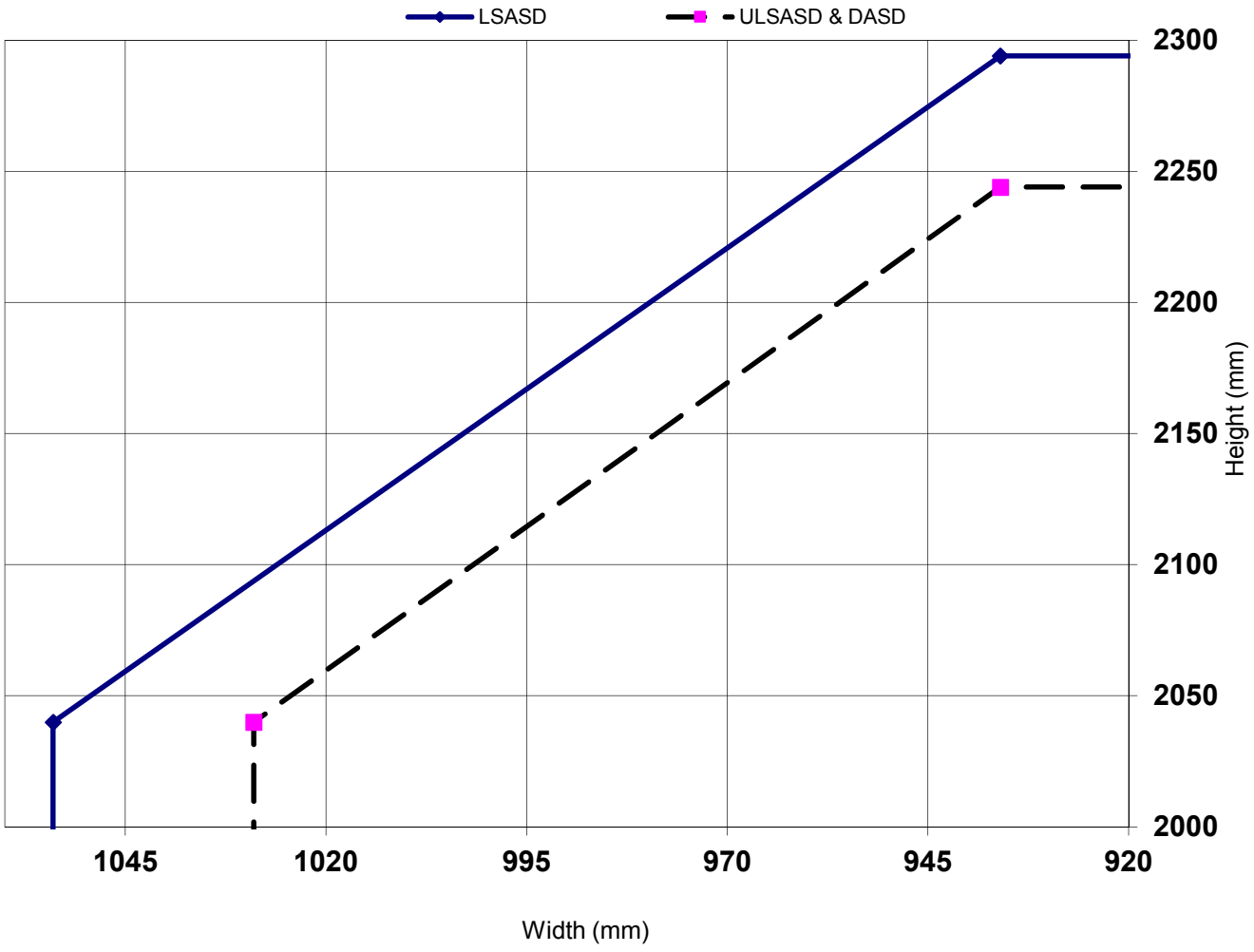
Intumescent Materials: Therm-A-Seal.

Head: Square – 1No 10 x 4mm exposed and fitted in the frame reveal abutting the door stop.

Jambs: 1No 10 x 4mm exposed and fitted in the frame reveal abutting the door stop.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Prima Doorsets – FD30 Rating

Latched and Unlatched Single Acting Single Doorsets – Norfast

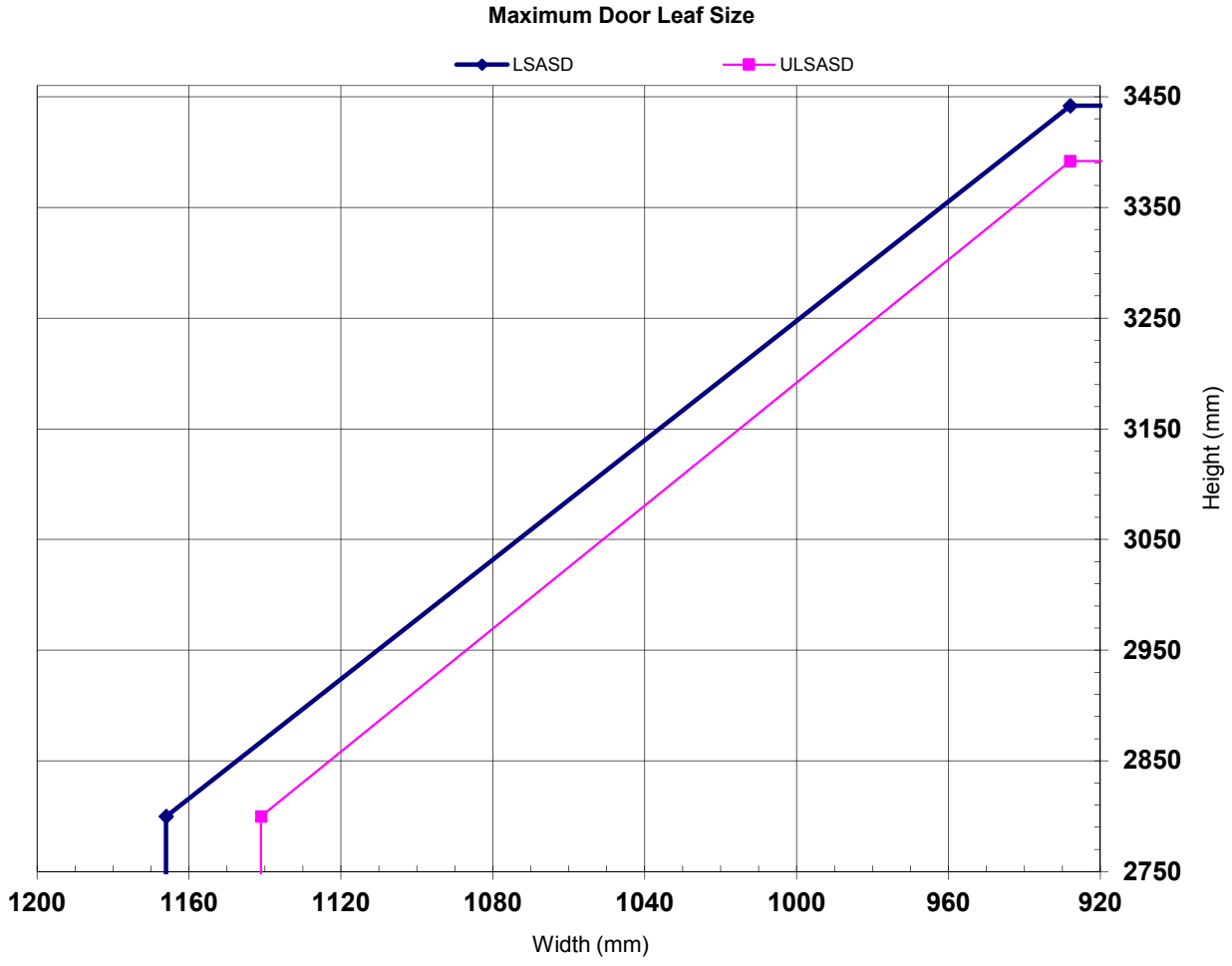
Fig: G22	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From:	2800	x	1166
		To:	3442	x	928
	ULSASD	From:	2800	x	1141
		To:	3392	x	928
Maximum Overpanel height (mm)		Transomed	2000		
Glazing		Maximum Glazed Area:	1.75m^2 (see section 7 for details)		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See section 7 of this appendix			

Intumescent Materials: Norfast – Norsound ltd

Head 1 No Norfast seal fitted in the frame reveal abutting the door stop

Jambs: 1 No Norfast seal fitted in the frame reveal abutting the door stop

Hardware Protection: see section 11 of the main assessment



Halspan® 30 Prima Doorsets – FD30 Rating

Latched and Unlatched Single Acting Double Doorsets – Norfast

Fig: G23	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From:	2800	x	1116
		To:	3342	x	928
	ULSADD	From:	2800	x	1091
		To:	3292	x	928
Maximum Overpanel height (mm)		Transomed	1500		
Glazing		Maximum Glazed Area:	1.75m² (see section 7 for details)		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See section 7 of this appendix			

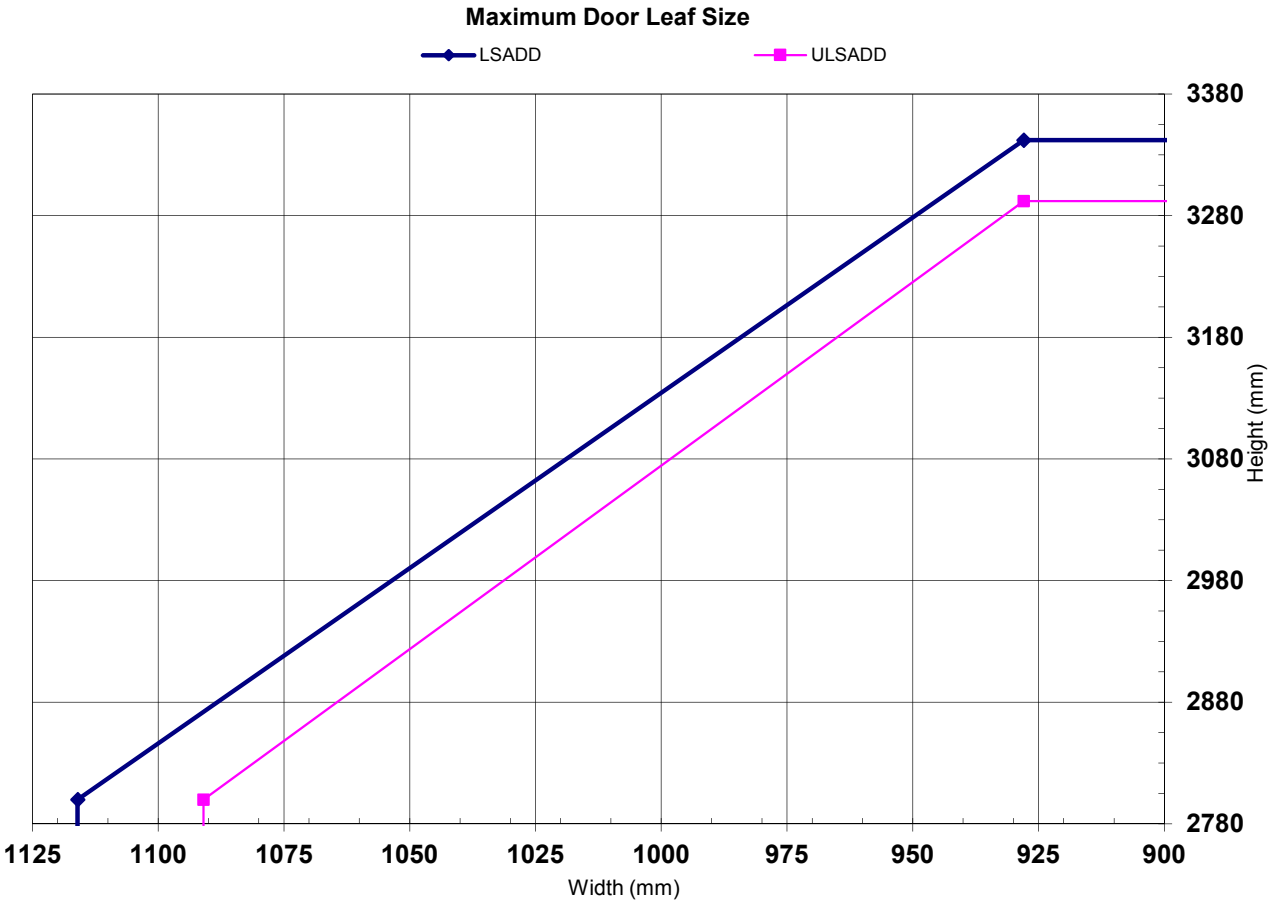
Intumescent Materials: Norfast – Norsound Ltd, Therm-A-Seal – Intumescent Seals Ltd

Head: 1 No Norfast seal fitted in the frame reveal abutting the door stop

Meeting Edges:
Square: 2 No 10 x 4mm Therm-A-Seal with each seal spaced 10mm apart and fitted centrally in the meeting edge of one leaf

Jambs: 1 No Norfast seal fitted in the frame reveal abutting the door stop

Hardware Protection: see section 11 of the main assessment



Halspan® 30 Prima Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Single Doorsets – Extended Sizes

Fig: G24	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From: To:	2700 3236	x x	1011 836
	ULSASD & DASD	From: To:	2700 3186	x x	986 836
Maximum Overpanel height (mm)		Transomed	2000		
Glazing		Maximum Glazed Area:	1.29m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See section 7 of this appendix			

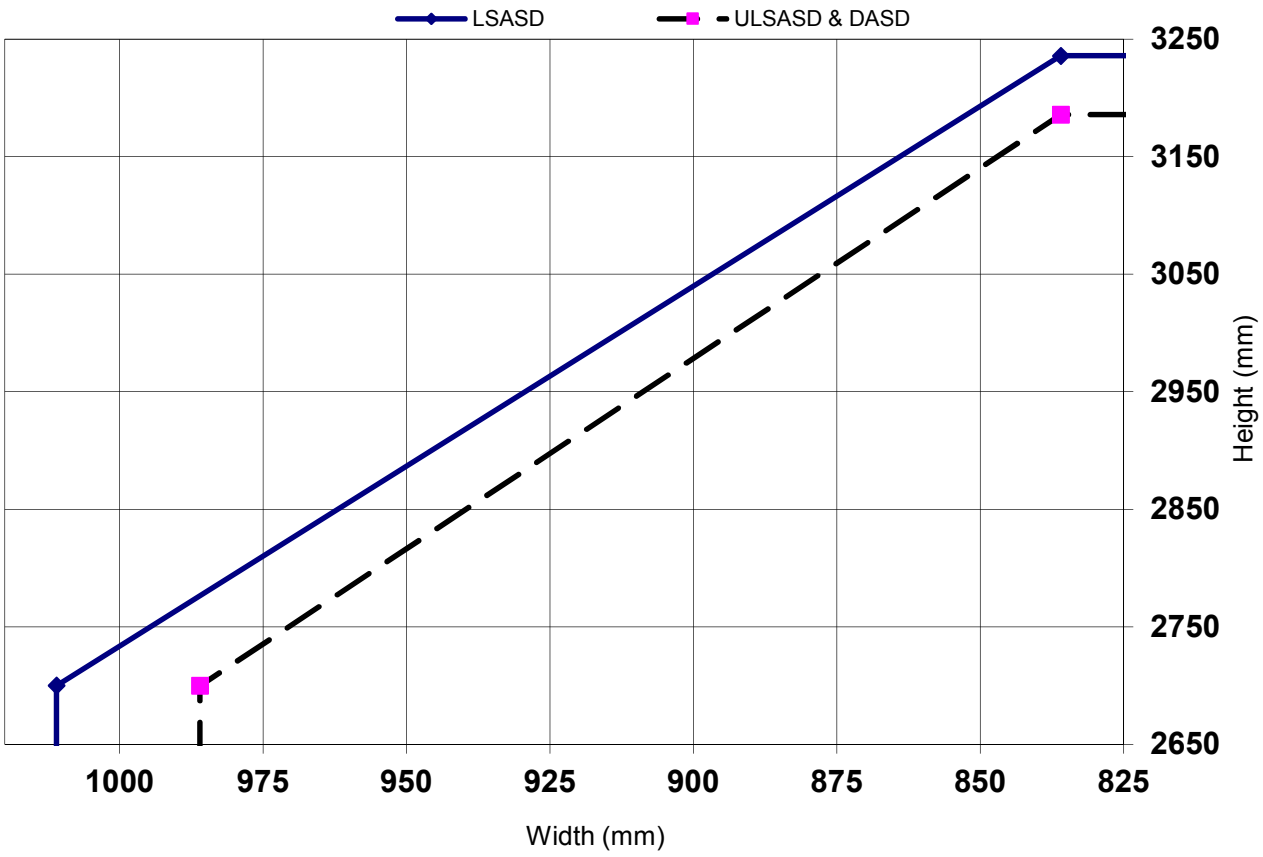
Intumescent Materials: PVC encapsulated Palusol 100, Type 617, Therm-A-Seal or Pyroplex.

Head: Square - 20 x 4mm exposed and fitted centrally in the leaf or frame head. Leaves over 3000mm increase to 25 x 4mm.

Jambs: 10 x 4mm exposed and fitted centrally in the leaf edge or frame reveal. Leaves over 950mm increase to 15 x 4mm. It is permitted to increase the intumescent specification to match that given for the leaf head if required.
Alternatively, 1No 32 x 2mm Palusol 100EC concealed in a rebate in the rear of the lipping.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size



Halspan® 30 Prima Doorsets – FD30 Rating

Latched and Unlatched Single Acting & Double Acting Double Doorsets – Extended Height

Fig: G25	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From: To:	2700 2831	x x	885 835
	ULSADD & DADD	From: To:	2700 2781	x x	860 835
Maximum Overpanel height (mm)		Transomed	1500		
Glazing		Maximum Glazed Area:	1.29m^2		
		Approved systems:	See section 7 of the main assessment and appendix A		
Frame specification		See section 7 of this appendix			

Intumescent Materials: PVC encapsulated Palusol 100, Type 617, Therm-A-Seal or Pyroplex.

Head: Square - 30 x 4mm exposed and centrally fitted in the leaf edge or frame reveal.

Jambs: 10 x 4mm exposed and centrally fitted in the leaf edge or frame reveal; it is permitted to increase the intumescent specification to match that given for the leaf head if required. Alternatively, 1No 32 x 2mm Palusol 100EC concealed in a rebate in the rear of the lipping.

Meeting Edges:
Square: 2No 10 x 4mm exposed and spaced 5mm either side of the centreline on one leaf only.
Rebated: 1No 15 x 4mm exposed and fitted centrally in the rebate of each leaf.

Hardware Protection: see section 11 of the main assessment

Maximum Door Leaf Size