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

t +44 (0) 1494 569 800 **f** +44 (0) 1494 564895
e cif@chilternfire.co.uk **w** www.chilternfire.co.uk

Global Assessment

SENTRY 60 Doorsets

Report reference:	**FEA/F97155 Revision D**
Issue date:	**12 March 2007**
Valid until:	**12 March 2012**
Prepared for:	**SENTRY INTERNATIONAL LTD** **COLLINGWOOD HOUSE** **WHITING STREET** **BURY ST EDMUNDS** **SUFFOLK** **IP33 1NS**

Contents

1 Introduction

This document comprises a global assessment, which has been commissioned by Sentry International Ltd to collate the 60 minute fire resistance test evidence relating to Sentry 60 doorsets. The assessment uses established extrapolation and interpretation techniques in order to extend the scope of application. It achieves this by determining the limits for the design, based on the tested constructions and performances obtained. The assessment is conducted in terms of BS476: Part 22: 1987.

2 General Description of Construction

The construction of these door leaves comprises a 47mm thick x 24mm wide laminated core, of mixed tropical hardwood (stated nominal density 600-650kg/m³), including 70mm wide top and mid rails in two equal sections. The core is faced on both sides with 3.6mm Far-Eastern plywood and is lipped where appropriate (see Section 8) with hardwood.

3 Leaf Sizes and Configurations

It can be seen from the list of fire resistance tests contained in appendix A, that the most demanding configuration tested is the unlatched, single acting, double leaf doorset. Extrapolation is therefore based primarily on this test. The assessment of increased leaf dimensions is based on the design's margin of over performance above 60 minutes integrity 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 included as appendix D

Unequal leaf double doorsets are covered by this assessment with no restriction on the smaller leaf dimension, provided that the main leaf remains within the permitted size limits.

4 Leaf Size Adjustment

Leaves may be reduced in height and width without restriction, but reduction in height must be from the bottom edge only as the top rail must be preserved at its manufactured dimension.

Lipping reduction may be made to facilitate site fitting, providing the minimum dimensions specified in Section 8 are maintained.

5 Overpanels

Overpanels may be used with this doorset design, provided that:

1. They are of the same construction as the door leaves and;
2. They are separated from the leaves by a transom member, which must be of the same section and material assessed for the door frames, mortice and tenon jointed to the jambs and bonded using a urea formaldehyde adhesive.

All overpanels must be fixed by screwing through the rear of the frame with steel screws passing at least 30mm into the centre line of the overpanel. Fixings must be no more than 100mm from each corner and a maximum of 250mm centres in between. The intumescent seals specified for the jambs in appendix D, must also be fitted to all concealed edges of the overpanel. The seals may be fitted in the overpanel edges or alternatively in the frame reveal. Maximum overpanel heights are as follows. Overpanels may be increased in height up to the stated combined height for the assembly, with a corresponding proportional decrease in leaf height:

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

6 Glazing

The testing conducted on the Sentry 60 has demonstrated that the design is capable of tolerating glazed apertures, whilst providing a margin of over performance. The maximum glazed area is 0.40m^2 The glazing system may be one of the following proprietary tested systems.

THERM-A-GLAZE 60	- Intumescent Seals Ltd
FIREGLAZE 60	- Sealmaster Ltd
SYSTEM 63 (circular apertures only)	- Lorient Polyproducts Ltd
SYSTEM 90+	- Lorient Polyproducts Ltd
PYROGLAZE 60	- Mann McGowan Fabrications Ltd

Glazed openings must not be less than 100mm from any door edge. Multiple apertures are acceptable up to the maximum approved area, with a minimum dimension of 80mm between apertures. The aperture shape is not restricted, providing the intumescent material and beads are proven to be compatible with that shape.

Assessed glass types are:

6 & 7mm PYROSHIELD	- Pilkington Glass Ltd
6mm PYRAN*	- Schott Glass Ltd
10mm PYRODUR	- Pilkington Glass Ltd
14mm SWISSFLAM LITE 60**	- Vetrotech Saint Gobain Ltd
15mm PYROSTOP	- Pilkington Glass Ltd
16mm PYROBEL	- Glaverbel (UK)Ltd

*Approval based on experience of testing the product
**May only be used with the system detailed in appendix B.

Alternative glass products are acceptable in lieu of those stated above, providing they can demonstrate adequate performance in the required pane size, when tested in timber doorsets of comparable construction. It is recommended that the user should request documentary evidence to satisfy this requirement. Glasses that have been proven solely by tests in screens are not acceptable. False timber beads must not be applied across the glass face without specific test evidence to justify the system used.

Note: All glass types must be fitted strictly in accordance with the manufacturers tested details/installation requirements. With toughened glass types in particular, the glass edge preparation, amount of edge cover and expansion clearance etc. is critical.

Sectional drawings detailing the tested and approved proprietary glazing systems is contained in appendix B.

7 Facing Materials

The primary facing material for this design of doorset is 3.6mm thick Far-Eastern plywood adhered both sides of a 47mm thick core.

Fire resistance test RF97038 demonstrated that a door leaf constructed using 9mm thick MDF facings and a 36mm thick core was capable of providing a 25% level of over run. Since high-density chipboard at equal thickness to the MDF is considered to provide comparable levels of protection and exhibit similar characteristics under exposure to fire conditions, both 9mm chipboard and MDF may be utilised for the construction, in conjunction with a 36mm thick core.

In addition to the above, 5.5mm thick Far Eastern plywood can be used, in conjunction with a reduction in thickness of the 47mm thick core to 43mm.

Additional paint, timber veneers, Formica and plastic laminates up to 2mm thick are acceptable finishes for these door leaves. The door leaf thickness must not be reduced to accommodate the finish. Planted timber mouldings may also be glued or pinned to the door faces, since these elements would degrade rapidly under test conditions without significant effect. Laminates must not be applied to the edges of doors or within the frame reveal. Metallic facings are not assessed.

8 Lippings

The minimum lipping specifications are as follows:

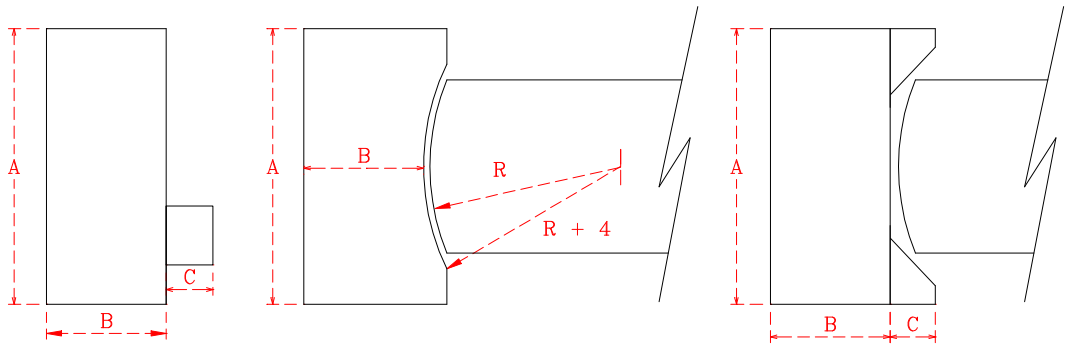
SQUARE: 6mm thick
ROUNDED: 10mm with maximum of 4mm profiling
REBATED: Not assessed

Lippings must be from hardwood with a minimum density of 650kg/m^3 and be lipped to all leaf edges with the following exception.

Single doorsets with a maximum dimension of 2134mm high x 915mm wide can be used unlipped if required.

9 Door Frames

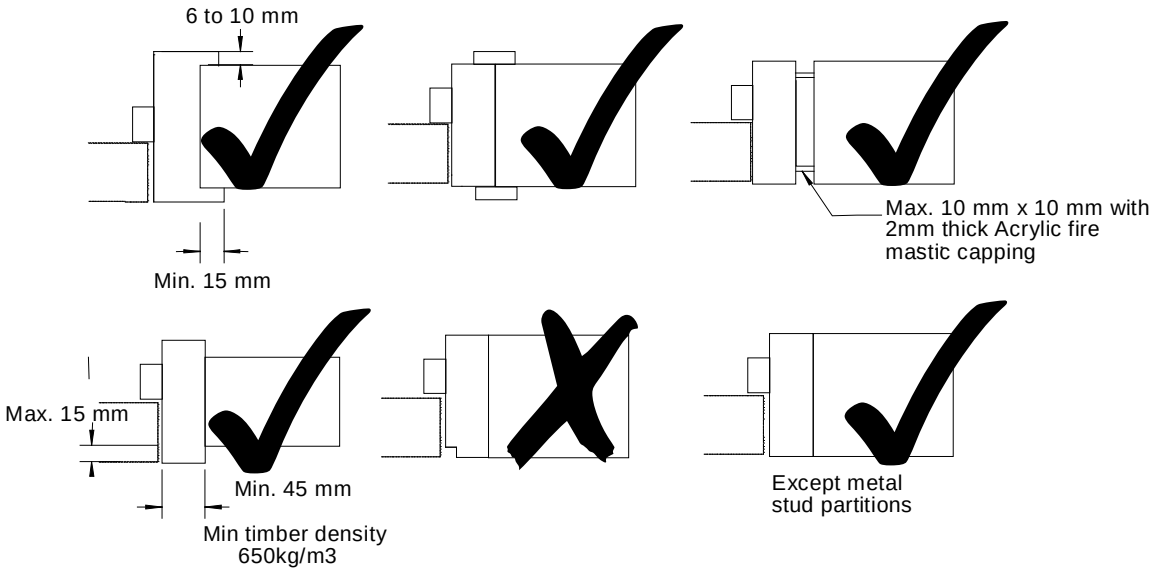
The minimum size of the doorframe section assessed (based on the fire test evidence) is 80mm wide x 40mm thick, after rebating or profiling etc. A 12mm deep planted or rebated stop is adequate for single acting doorframes. Frames for double acting doorsets should be scalloped or fitted with shoulders so that the gaps recommended in Section 13 are maintained:



A:	80mm	B:	40mm
C:	12mm	R:	Recommended floorspring pivot radius

See Section 8 for recommendations on profiling lippings.

Frame joints may be mortice and tenon, half lapped or mitred, except transoms that must be mortice housed and glued. Frames must be contained within and not offset in relation to the structural opening and must not be rebated adjacent to the door junction. The following diagram depicts acceptable specifications.



Door frame material may be hardwood (minimum density 640kg/m³) and to class J30 as specified in BS EN 942: 1996.

10 Intumescent materials

It is important that the type, size and fitting detail for the intumescent seals around the door edges remains as tested. These products can often exhibit significantly different characteristics, which could alter the performances obtained during test. They must therefore not be considered interchangeable, irrespective of whether the product has been tested or otherwise 'certified' and the seal dimensions are maintained.

The intumescent material tested as door edge seals and therefore assessed for this doorset design is PVC encapsulated Palusol 100.

The seal specification for each configuration is shown in the data sheets included as appendix D.

11 Adhesives

The following adhesives must be used with this doorset design:

Core lamels = PVA
Facings = urea formaldehyde
Lippings = urea formaldehyde

12 Ironmongery

12.1 Tested and Essential Ironmonmgery

The following ironmongery has been successfully incorporated in the tests:

1. 100mm x 35mm steel butt hinges.
2. Royde and Tucker H105 lift Off Hinges
3. Dale Door Controls DC773 overhead closers
4. Standard 75mm tubular mortise latch with aluminium lever handles.
5. Dorma TS83 overhead closers

Locks/latches, overhead closers and floor spring assemblies must either be as tested or components of equal specification that can demonstrate a successful contribution to the required performance of this type of doorset design when tested to BS476: Part 22: 1987.

Note: Double acting doorsets will require a proprietary intumescent gasket set to protect the top pivot position.

The leaves must be hung on a minimum of 3 hinges. Leaves over 2300mm high must be hung on 4 hinges. Hinges with the following specification are acceptable:

Blade height:	90 - 120mm
Blade width (excluding knuckle):	32 - 37mm
Blade thickness	3-5mm
Fixings:	Equal number and nominally same pattern as tested
Materials:	Steel or stainless steel
Hinge positions:	Top - 120-150mm from the head Bottom - 120-180mm from the foot Remainder – from central to 200mm below the upper hinge
Intumescent protection:	1mm Interdens gasket fitted under both hinge blades

Latches/locks with the following specification are acceptable:

Maximum forend and strike plate dimensions:	235mm high by 32mm wide by 6mm thick
Maximum body dimensions:	25mm thick by 100mm wide by 150mm high.
Intumescent protection:	1mm thick Interdens gasket under the forend and keep/strike plate
Materials:	All parts essential to the locking/latching action (including the latch bolt, forend and strike) to be steel.

12.2 Non-Essential Ironmongery

12.2.1 Flush Bolts

Flush bolts may be incorporated into the top and bottom of the meeting edge of the inactive leaf (of a double doorset), provided that the following maximum dimensions are not exceeded;

- 200mm long x 20mm deep x 34mm wide.

The mechanisms of the flush bolts must be of steel and the ironmongery itself must be bedded (on all edges) on 2mm thick Therm-A-Flex gasket. The rebate must be as tight to the mechanism as is compatible with its operation.

12.2.2 Pull Handles

These may be surface-fixed to the door leaf provided that they are steel or aluminium, and that their length is limited to 1000 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.

12.2.3 Push Plates/Kick Plates

Face-fixed ironmongery such as push plates and kick plates may be fitted to the doorsets provided that their fitting requires the removal of no part of the door leaf. These items of ironmomgery must not amount to more than 30% of the door leaf area.

12.2.4 Door Selectors

These may be freely applied, provided that they are not invasive in the leaf edges or door frames. Those that are invasive will require fire resistance test/assessment evidence to support their use. No additional intumescent protection is required unless test evidence dictates otherwise.

12.2.5 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). Both glass and plastic lenses are acceptable. No additional intumescent protection is required unless specific test evidence in comparable doorsets dictates otherwise.

12.2.6 Panic Ironmongery

Panic ironmongery 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 Door Gaps

Leaf-to-frame and leaf-to-leaf gaps must be representative of those tested. If substantially different gaps are employed, the fire resistance performance of this doorset design may change. As a general guideline, gaps should not exceed 4mm, apart from at the leaf threshold where a gap of up to 10mm (to a solid fire resisting threshold) as acceptable, to allow for floor finishes etc. BS 8214: 1990 recommends that ‘S’-rated doors (that are required to perform a smoke control function) should have a threshold gap of 3mm or less.

14 Fixing and Sealing to Structural Opening

Fixing the frame and sealing the frame against the structural opening are an important factor in the fire resistance performance of fire resisting doorsets. 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 500mm 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. Guidance for various methods of sealing the frame to structural opening gap is given in BS 8214: 1990, "Code of practice for fire door assemblies with non-metallic leaves", which should be referred to where appropriate.

15 Smoke Control

If the doorset design is required to provide a smoke control function to comply with Building Regulations, then it must be fitted with a smoke seal or combined intumescent/smoke seal, that has been tested in accordance with BS 476: Part 31: Section 31.1 and demonstrated to maintain the leakage rate below $3m^3/m/h$ when tested at 25Pa. Providing the smoke seals, door gaps, type/configuration of door is consistent with the tested detail, then the doorset will comply with current smoke control legislation and a suffix 'S' may be added to the designation.

Note that the seals must be carefully selected and fitted in order that they are able to maintain their sealing function whilst allowing the doors to self-close. It may be that it is not desirable to have smoke seal blades or brushes on all the seals in a door edge, since the resultant closing resistance may be too high.

16 Conclusion

It is our opinion that, if the doorset design constructed in accordance with the specification documented in this global assessment were to be tested in the appropriate configuration in accordance with BS476: Part 22: 1987, it would maintain a minimum of 60 minutes integrity.

17 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 Sentry International Ltd

18 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, CIF 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.

19 Validity

1) The assessment is valid initially for a period of five years after which time it should be resubmitted to CIFL for re-appraisal.

2) This assessment report is not valid unless it incorporates the declaration given in Section 17 duly signed by the applicant.

	Amended by:	**Checked by:**
Signature:		
Name:	pp **K Seow**	**A J Forecast**
Title:	Product Assessor	Principal Consultant

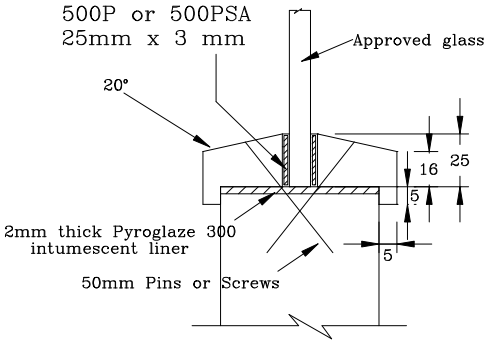
Appendix A

FIRE RESISTANCE TEST DATA

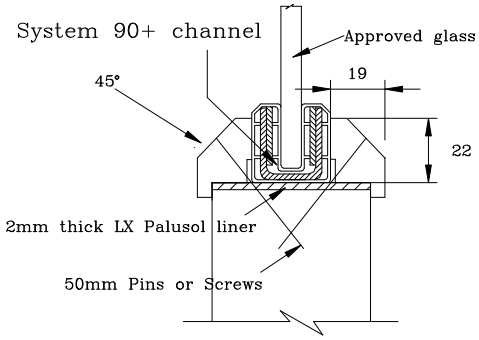
Test/ Assessment No	Configuration	Leaf Size (mm)	Standard (BS476 Part)	Performance (mins)
RF96014	LSASD	2135 915 53.5	22	67
RF97038	LSASD	A: 2135 915 54.5 B: 2440 1220 53.5	22	A: 68 B: 75
RF97103	ULSADD	2135 914 54.5	22	69
CFR0701311	LSASD	1800 900 54	22	63

Appendix B

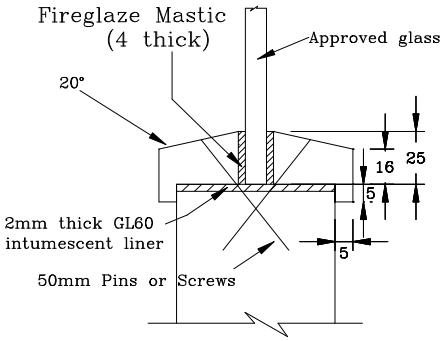
Glazing Systems



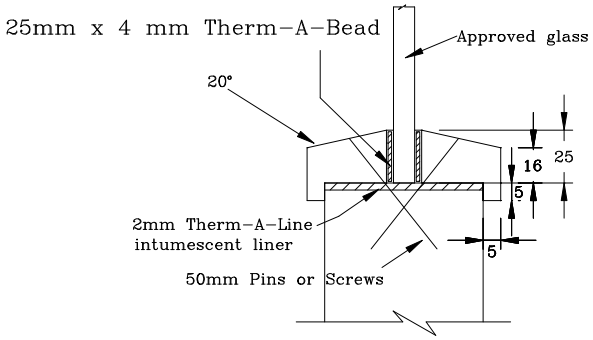
Mann McGowan Ltd
Pyroglaze 60



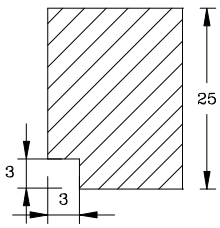
Lorient Polyproducts Ltd
System 90+



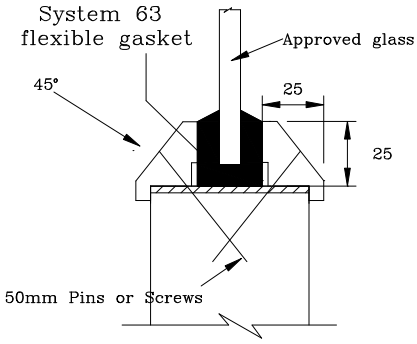
Sealmaster Ltd
Fireglaze Mastic



Intumescent Seals Ltd
Therm-A-Glaze 60

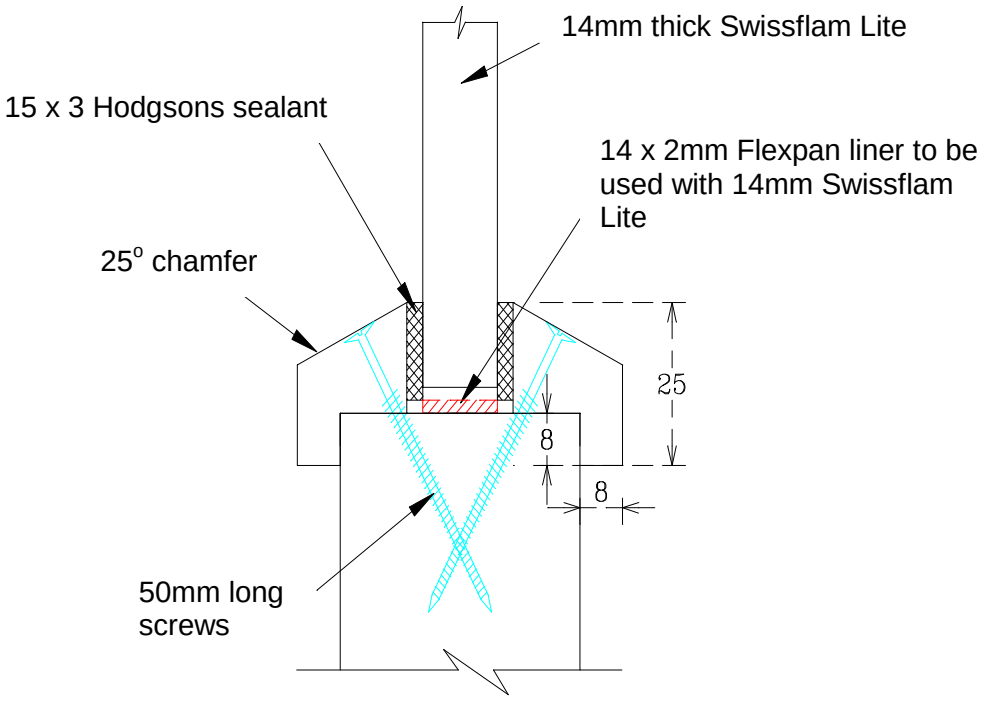


This bead shape may be used as an alternative to splayed beads with all of the above proprietary intumescent materials but only with 15mm Pyrostop 16mm Pyrobel and 14mm Swissflam Lite.



Lorient Polyproducts Ltd
System 63

Appendix B (cont`)
Vetrotech Glazing System



Vetrotech 60 Minute Glazing System

Appendix C

Revisions & Amendments

Revision No	Date	Description
FEA/F97155 Revision A	10.01.00	Issued under reference FEA/F00002 – 2 year revalidation and update
FEA/F97155 Revision B	10.01.02	Issued under reference FEA/F01238 – 5 year revalidation and update.
FEA/F97155 Revision C	13.11.02	Reinstatement of 5.5mm thick plywood facing option
FEA/F97155 Revision D	12.03.07	Issued under reference Chilt/A06205 – • Inclusion of tests CFR0701311 • update and revalidated for a further 5 year period

Appendix D

Data Sheets for Sentry International Ltd

Sentry 60 Doorsets

To be read in conjunction with Assessment No. FEA/F97155 Revision D

Latched and Unlatched Single Acting and Double Acting Single Doorsets

	Configuration		Height (mm)		Width (mm)
Leaf sizes	DASD &	From:	2135	x	1032
	ULSASD	To:	2395	x	914
	LSASD	From:	2440	x	1372
		To:	2745	x	1220
Max. Overpanel height (mm)	Transomed		1500		
Glazing		Max. glazed area:	0.40m^2		
		Approved systems:	See section 6 & appendix B		
Frame specification		Min. Section (mm):	80	x	40
		Material:	Hardwood		
		Density:	Min 640kg/m^3		

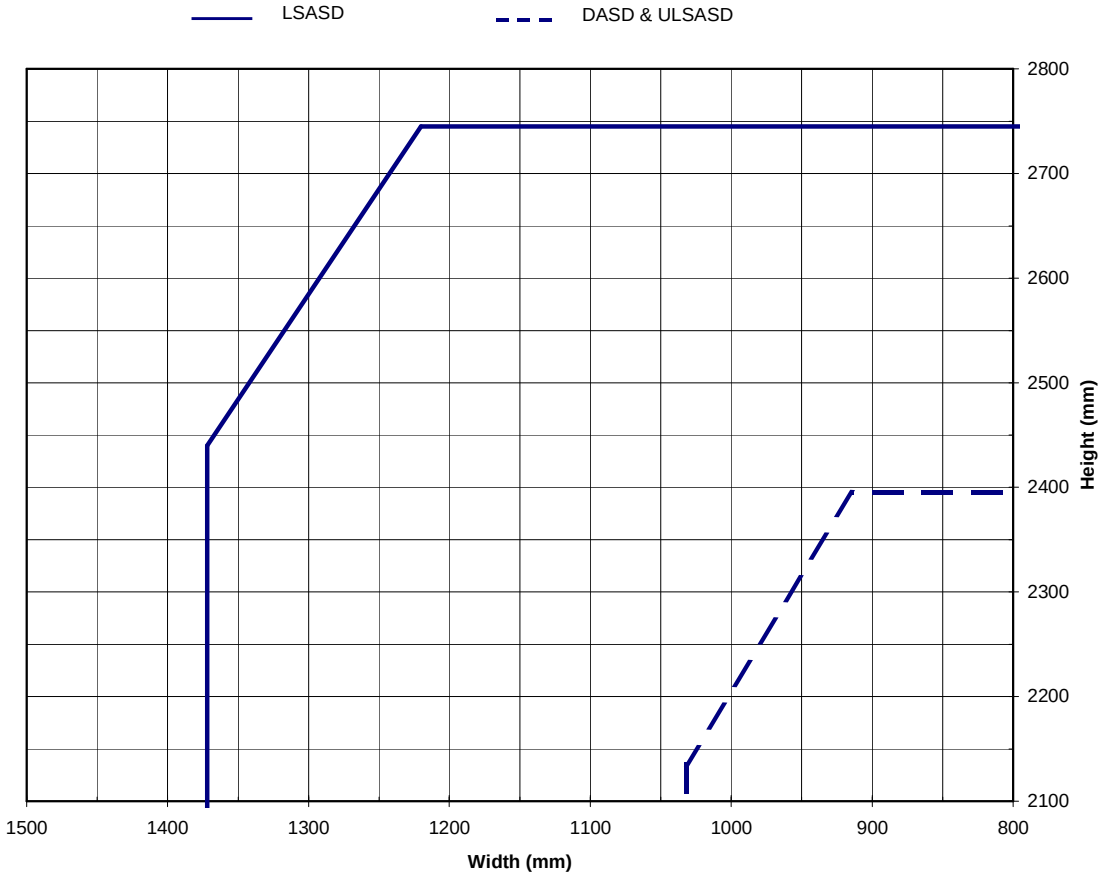
Assessed Intumescent Materials - PVC encapsulated Palusol

Head: 25 x 4mm thick strip centrally fitted in either the frame reveal or leaf edge. For leaves over 2270mm high increase to 35 x 4mm.

Jambs: 2 No 15 x 4mm thick strips spaced 5mm each side of the centre line in either frame reveal or leaf edges.

Double acting doorsets must have the top pivot mortice encased with and the strap plates fitted on to 1mm thick Interdens gasket or alternatively the manufacturers tested material. 1mm thick Interdens must also be fitted underneath hinge blades and lock forends and keep plates.

Maximum door leaf size



Latched and Unlatched Single Acting and Double Acting Double Doorsets

	Configuration		Height (mm)		Width (mm)
Leaf sizes	DADD & ULSADD	From:	2135	x	982
		To:	2295	x	914
	LSADD	From:	2135	x	1007
		To:	2345	x	914
Max. Overpanel height (mm)	Transomed		1500		
Glazing		Max. glazed area:	0.40m^2		
		Approved systems:	See section 6 & appendix B		
Frame specification		Min. Section (mm):	80	x	40
		Material:	Hardwood		
		Density:	Min 640kg/m^3		

Assessed Intumescent Materials - PVC encapsulated Palusol

Head: 1No 35 x 4mm thick strip centrally fitted in the frame head plus 10 x 2mm Interdens fitted centrally in the leaf head

Meeting Edges: 2 No 15 x 4mm thick strips spaced 5mm each side of the centre line plus 10 x 2mm Interdens fitted centrally in one leaf.

Jambs: 2 No. 15 x 4mm thick strips spaced 5mm each side of the centre line plus 10 x 2mm Interdens fitted centrally in the leaf edge.

Double acting doorsets must have the top pivot mortice encased with and the strap plates fitted on to 1mm thick Interdens gasket or alternatively the manufacturers tested material. 1mm thick Interdens must also be fitted underneath hinge blades and lock forends and keep plates.

Maximum door leaf size