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Pacific Rim Wood Ltd

‘Flamebreak’ Doorsets

FD60 Performance

Report reference:	**FEA/F02141 Revision D**
Issue date:	**22 August 2007**
Valid until:	**22 August 2012**
Prepared for:	**Pacific Rim Wood Ltd**
	[Address held on file].

Contents

1 Introduction

This document constitutes a global assessment to collate the fire resistance test evidence for Pacific Rim Wood Ltd 'Flamebreak' 60 minute fire resisting doorsets, a construction manufactured by P.T. Kutai Timber of Indonesia. 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 conducted in terms of the current fire resistance test standard, BS476: Part 22: 1987.

2 General Description of Construction

The construction of door leaves includes the following basic components:

Component		Species/type	Configuration (all dimensions in mm)	Min. density (kg/m³)
Core - three layer	Outer layers	Albisia falcata	Vertically orientated 13.5 thick x 45 wide lamels	200-300
	Inner layer	Mixed tropical hardwood	Horizontally orientated 15 thick x 28 wide lamels	600
Stiles		Not required	Not required	-
Rails – Top		Agathis or Mixed tropical hardwood – in 3 lamels	100 wide (total) x 42 thick with an 8 wide x 10 deep tongue into the core	Agathis - 480 or Mixed tropical hardwood - 600
Bottom –		Not required	Not required	**-**
Facings		Hardwood plywood	6 thick	520-530
Lippings – all edges		Hardwood	10 thick	640

The construction described above for this design does not require stiles or a bottom rail, since the testing has evaluated constructions with and without these elements. Stiles and bottom rails may be incorporated if deemed necessary for non fire resistance requirements, which are not covered by this document.

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 of the tested design is the unlatched, single acting, double leaf doorset and therefore extrapolation is based primarily upon this test. Single leaf doorsets are justified based on the double leaf test evidence. The assessment for increased leaf dimensions is based on the margin of the designs over performance above 60 minutes integrity and the characteristics exhibited during test.

Unequal leaf double doorsets are covered by this assessment with no restriction on the smaller leaf dimension, providing the main leaf remains within the permitted size limits. Doorsets containing leaves with smaller dimensions than those stated are deemed to be automatically covered.

Data sheets specifying the maximum approved leaf sizes and graphs showing the permitted gradient between maximum height and width are contained in appendix D.

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 of the same construction as the door leaves may be used with this doorset design only when fitted with a transom. The transom must be of the same section and material assessed for the door frames, mortice and tenon jointed (with no gaps) or screwed in to the jambs and bonded with urea formaldehyde. 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 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

Test CHILT/RF02055 has demonstrated that the design is capable of tolerating glazed apertures, whilst providing a margin of over performance. The maximum glazed area is 0.72m^2 The glazing system may be one of the following proprietary tested systems.

1.	THERM-A-GLAZE 60	Intumescent Seals Ltd
2.	FIREGLAZE 60	Sealmaster Ltd
3.	SYSTEM 90+	Lorient Polyproducts Ltd
4.	SYSTEM 36/15	Lorient Polyproducts Ltd (glass types 4-6)
5.	SYSTEM 63	Lorient Polyproducts Ltd (circular apertures only)
6.	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:

1.	6 & 7mm PYROSHIELD	Pilkington Glass Ltd
2.	6mm PYRAN	Schott Glass Ltd
3.	10mm PYRODUR	Pilkington Glass Ltd
4.	14mm SWISSFLAM LITE 60	Vetrotech Saint Gobain Ltd
5.	15mm PYROSTOP	Pilkington Glass Ltd
6.	16mm PYROBEL	AGC Flat Glass Europe

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 are contained in appendix B.

7 Facing Materials

The primary facing material for this doorset design is 6mm thick hardwood plywood (stated density 520-530kg/m³). Facings at this thickness are deemed as being structural and hence substitutions for alternative facings are limited. However, comparative testing at 30 minutes shows little reduction in performance when using 6mm thick MDF as opposed to 6mm thick plywood. Therefore, limited substitution of 6mm MDF facing can be justified on latched, single leaf, single acting doorsets up to 2135mm high x 915mm wide. Minimum MDF density 750kg/m³.

Additional paint, timber veneers, foils and plastic laminates up to 2mm thick are acceptable finishes for this design. 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:

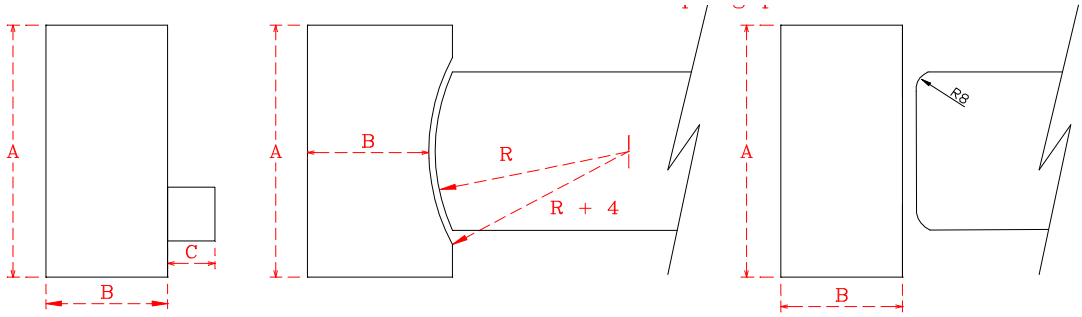
- SQUARE 10 - 20mm thick
- ROUNDED 12-22mm thick with maximum of 2mm rounding
- REBATED Not assessed

All edges of the leaves require lipping, which must be from hardwood with a minimum density of 640kg/m^3 and be to class J10 as specified in BS EN 942: 1996. The vertical edge lippings must over-run the horizontal edge lippings.

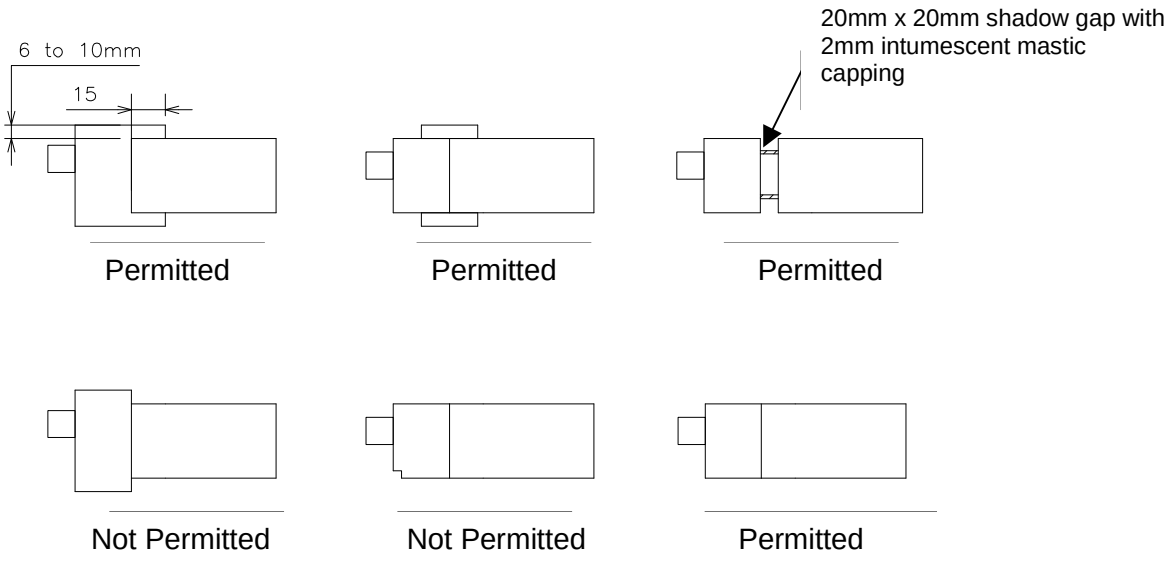
9 Door Frames

The minimum timber frame section must be 70mm x 32mm. A 12mm deep planted stop is adequate for single acting frames whilst double acting frames may be scalloped or square. If frames are square, the maximum radius to the corners of the leaf is 8mm. Frame joints must be mortice and tenoned, mitred, half lapped, butt jointed, nailed or screwed and with no gaps. The following diagram depicts the assessed frame profiles and dimensions:

A = 70mm B = 32mm C = 12mm R = Radius of floorspring



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 with a minimum density of 640kg/m³ and to class J10 as specified in BS EN 942: 1996.

10 Intumescent materials

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

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

Application	Location	Product/Manufacturer
Edge seals	Fitted in the frame jambs or leaf edges	1. PVC encapsulated Palusol 100 – Mann McGowan 2. Pyrostrip 500P – Mann McGowan 3. Type 617 Lorient Polyproducts Ltd
Hinges	Under both hinge blades	1mm thick Therm-A-Strip, G30 or Interdens
Locks/latches	Under forend & keep	1mm thick Therm-A-Strip, G30, Interdens or tested acrylic intumescent mastic
Top Pivots	Lining all sides of the mortices	1mm thick Therm-A-Strip, G30 or Interdens and 5mm of head seal remaining continuous past each side
Flush bolts	Lining all sides of the mortices	1mm thick Therm-A-Strip, G30 or Interdens

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

11 Adhesives

The following adhesives must be used in the construction of doorsets to this design:

Application	Product
Facings	Melamine
Core	PVA
Lippings	Urea or resorcinol formaldehyde

Core lamels = PVA
Facings = Melamine
Lippings = Urea or resorcinol formaldehyde

12 Tested Ironmongery

The following ironmongery has been successfully incorporated in the tests:

1. Royde & Tucker H101 steel butt hinges
2. Dorma TS83V overhead closers
3. Henderson Hardware 63mm tubular mortise latch with aluminium lever handles

13 Additional & Alternative Ironmongery

13.1 Latches & Locks

Latches and locks must either be as tested, or alternatively components 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 150mm 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 or brass.

13.2 Hinges

Hinged doorsets must be hung on a minimum of 3 hinges, whilst leaves over 2300mm high must fit 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, stainless steel
Hinge positions:	Top - 150-200mm from the head Second - 400mm from head to mid height Bottom - 150-200mm from foot 4th – Equispaced between second and bottom
Intumescent protection:	1mm Interdens gasket fitted under all hinge blades

13.3 Automatic Closing

Automatic closing devices, must either be as tested or components of equal specification that can demonstrate contribution to the required performance of this type of 60 minute doorset design, when tested to BS476: Part 22: 1987 or BSEN 1634-1: 2000.

Note: Floor spring top pivots must be protected 1mm thick intumescent gasket as specified in section 10.

13.4 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 and square edge lippings are used:

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

The mechanisms of the flush bolts must be of steel and the mortice must be lined on all edges with 1mm thick intumescent gasket as specified in section 10. The mortice must be as tight to the mechanism as is compatible with its operation.

13.5 Pull Handles

These may be surface-fixed to the door leaf provided that they are steel or brass, and that their length is limited to 1000mm between the fixing points. No additional intumescent protection is required provided that the hole for the bolt through the leaf is tight.

13.6 Push Plates/Kick Plates

Face-fixed ironmongery such as push plates and kick plates may be fitted to the doorsets providing they do not exceed 30% of the door leaf area.

13.7 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.

13.8 Letter Boxes/Plates

Letter boxes/plates may be fitted providing the product can demonstrate contribution to the required performance of this type of 60 minute doorset design, when tested to BS476: Part 22: 1987 or BSEN 1634-1: 2000, when installed within a timber based doorset of comparable thickness. Margins to the leaf edges must remain as detailed for glazing. The position of the letter box/plate will be dictated by the pressure regime tested in the proving evidence (normally below mid height).

13.9 Door Security Viewers

Door security viewers with brass or steel bodies and glass lenses may be fitted, providing they have been tested to 60 minutes integrity in this type of timber composite doorset design, in accordance with BS476: Part 22: 1987 or BSEN 1634-1: 2000. Any intumescent materials used for protecting the product during testing must be replicated.

13.10 Air Transfer Grilles

Air transfer grilles may be fitted providing the product has suitable test evidence to BS 476: Part 22: 1987 or BSEN 1634-1: 2000 that demonstrates a minimum 60 minutes integrity performance when installed within a timber based doorset of comparable thickness. Margins to the leaf edges will remain as detailed for glazing and the position of the unit will be dictated by the pressure regime tested in the proving evidence (normally below mid height). The area occupied by the air transfer grille must not exceed $0.1m^2$.

13.11 Acoustic, Weather and Dust Seals

Silicon based acoustic, weather and dust seals may be fitted to this doorset design with out compromising the performance, providing their fitting does not interfere with the activation of the intumescent seals or hinder the self closing function of the leaves:

13.12 Threshold Seals

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

- Lorient Polyproducts IS8005si and IS8010si
- Pemko 411-AR, 411-RL & 411-NBL
- Raven RP8 and RP78
- Domatic A6003

Alternative products may be used providing they are essentially of the same construction, materials and dimensions.

14 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, except for the threshold, where 10mm is acceptable to allow for floor coverings. Door leaves must not be proud of each other or from the doorframe by more than 1mm.

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 40mm. 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 protected using one of the following methods:

1. Gaps up to 20mm must be tightly packed with mineral fibre capped with a 10mm depth of a tested acrylic intumescent mastic on both sides (a 10mm x 10mm shadow gap may be used with this detail).
2. Full depth timber/timber based composite material or non-combustible subframe up to 20mm thick, with gaps up to 10mm between components sealed with a 10mm depth of a tested acrylic intumescent mastic on both sides or full depth tested expanding PU foam.
3. Full depth timber/timber based composite material or non-combustible subframe up to 40mm thick, with no gaps between the components and fitted with a minimum of 10mm thick architraves.
4. Gaps up to 20mm filled with proprietary product tested for similar gap filling applications to the required integrity (e.g. expanding PU foam or preformed compressible intumescent foam)

Guidance for various methods of sealing the frame to structural opening gap is also given in BS 8214: 1990, "Code of practice for fire door assemblies with non-metallic leaves", which may be referred to where appropriate.

17 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.

18 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 Pacific Rim Wood Ltd

19 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.

20 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 18 duly signed by the applicant.

	Prepared by:	**Checked by:**
Signature:		
Name:	**J P Mullett**	**P N Barker**
Title:	Principal Consultant	Consultant

Appendix A

Test Data

Test Reference	Configuration	Leaf Size (mm)	Test Standard (BS 476: Part)	Integrity (mins)
RF02054	2 No. ULSASD	A = 2070 x 935 x 54 B = 2062 x 935 x 54	22	A = 54* B = 58*
RF02055	ULSADD	2155 x 935/845 x 54	22	60
RF02117	2 No. ULSASD	A = 2080 x 937 x 54 B = 2380 x 1179 x 54	22	A = 71 B = 61
RF02118	ULSADD	2460 x 1240/1188 x 54	22	56**
Chilt/07051 (assessment of Lorient 617 seals)	Single and double doorsets	Various	22	60

ULSASD – Unlatched, Single Acting, Single Doorset
ULSADD – Unlatched, Single Acting, Double Doorset

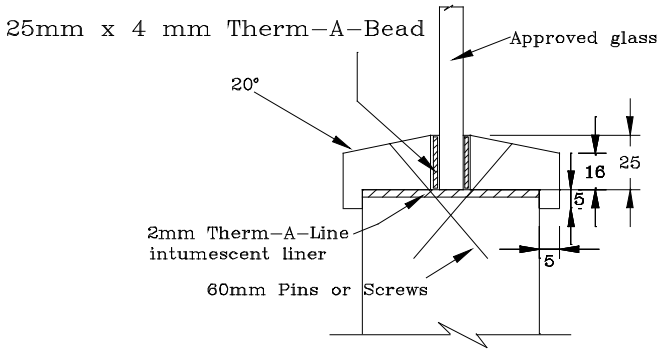
* The failed single leaf, single acting doorset designs have been assessed through a change in intumescent specification.
** The failed double leaf, single acting doorset design has been assessed through a reduction in leaf size and a change in intumescent specification.

Supplementary test evidence
(Justification for MDF facings**)**

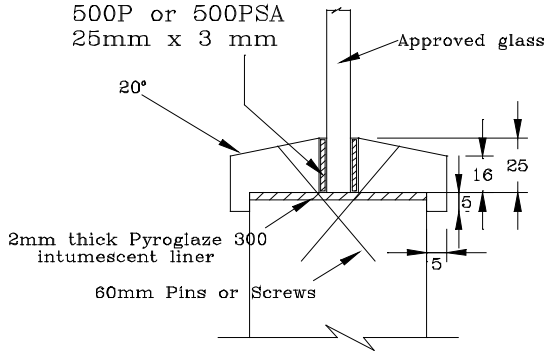
Test Reference	Configuration	Leaf Size (mm)	Test Standard (BS 476: Part)	Integrity (mins)
RF98033	ULSADD	2135 x 915 x 45	22	36
RF00098	2No.ULSASD	A= 2090 x 916 x 44 B=2080 x 860 x 44	22	A = 32 B= 33
RF05042	ULSASD	2080 x 936 x 54	22	63

Appendix B

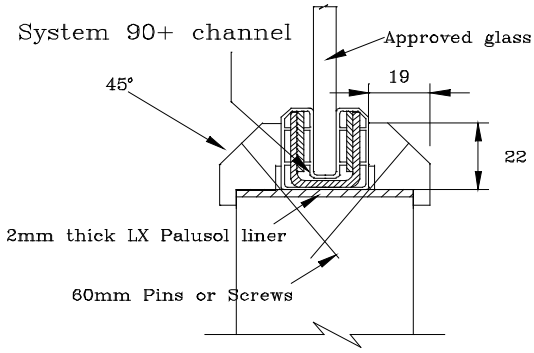
Glazing Systems



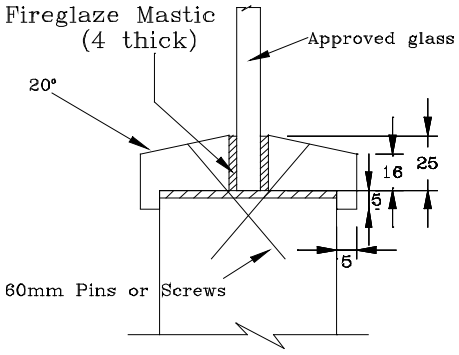
Intumescent Seals Ltd
Therm–A–Glaze 60



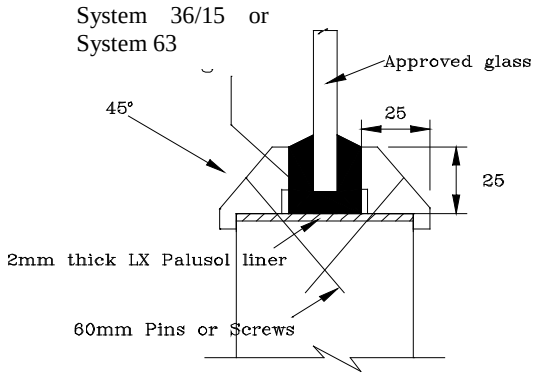
Mann McGowan Ltd
Pyroglaze 60



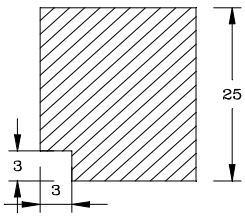
Lorient Polyproducts Ltd
System 90+



Sealmaster Ltd
Fireglaze Mastic



Lorient Polyproducts Ltd
System 36/15 & System 63



The adjacent bead shape may be used with the following glass types and appropriate glazing system:

1. 14mm SWISFLAM LITE 60
2 15mm PYROSTOP
3 16mm PYROBEL

Appendix C

Revisions & Amendments

Revision No	Date	Description
FEA/F02141 Revision A	05.03.03	Incorporation of additional test evidence Ref: RF02117 and RF02118 to include mixed hardwood stiles and rails and increase the leaf sizes in Appendix D. Inclusion of MDF facings on LSASD. Filed under FEA/F03047.
FEA/F02141 Revision B	01.02.06	Change of top rail dimension to 100mm. Files under FEA/F03047 Revision A.
FEA/F02141 Revision C	21.06.07	Update and revalidated for a further five year period. Issued under reference FEA/F07039.
FEA/F02141 Revision D	22.8.07	Inclusion of Lorient Type 617 seals and revalidation for 5 years

Appendix D

Data Sheets for

Pacific Rim Wood Ltd

‘Flamebreak’ Doorsets

FD60 Performance

To be read in conjunction with Assessment No. FEA/F02141 Revision D

Pacific Rim Wood Ltd – Flamebreak 60 Doorsets

Latched and Unlatched Single and Double acting Single Leaf Doorsets - PYROSTRIP & PALUSOL

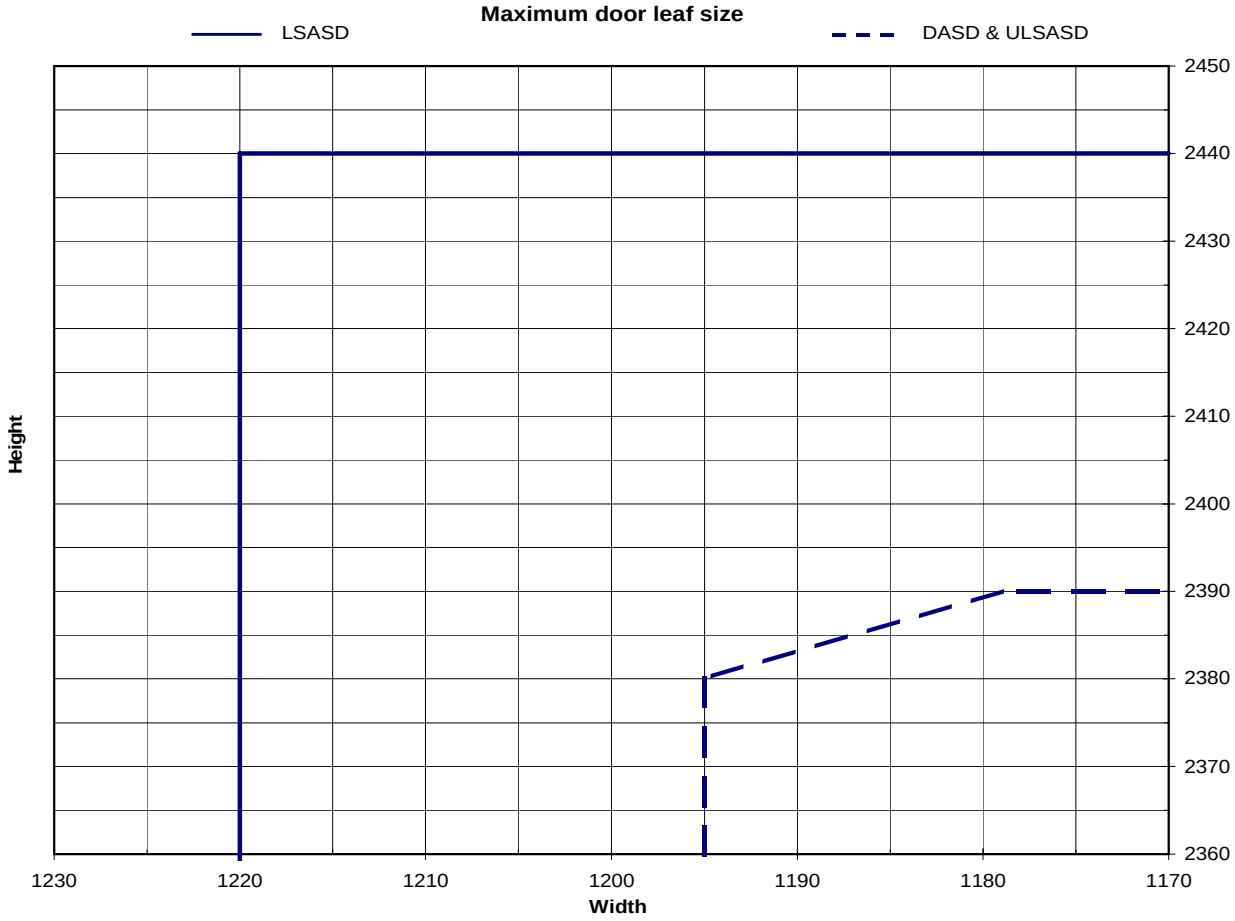
	Configuration		Height (mm)		Width (mm)
Leaf sizes	LSASD	From:	2440	x	1220
		To:	2440	x	1220
	ULSASD & DASD	From:	2380	x	1195
		To:	2390	x	1179
Max. Overpanel height (mm)		Transomed	2000		
Glazing		Max. glazed area:	0.72m2		
		Approved systems:	See section 6 & Appendix B		
Frame specification		Min. Section (mm):	70	x	32
		Material:	Hardwood		
		Density:	Min 640kg/m³		

INTUMESCENT MATERIALS - Mann McGowan Fabrications Ltd - Pyrostrip 500P or PVC cased Palusol

HEAD:
1 No. 30 x 4mm fitted centrally in the frame reveal.

JAMBS:
2 No. 15 x 4mm strips each fitted 5mm either side of the centre line in the frame reveal.

IRONMONGERY:
For additional ironmongery protection see section 10



Latched and Unlatched Single Acting and Double Acting Double Doorsets - PYROSTRIP & PALUSOL

	Configuration		Height (mm)		Width (mm)
Leaf sizes	LSADD	From:	2155	x	960
		To:	2205	x	935
	ULSADD & DADD	From:	2155	x	935
		To:	2155	x	935
Max. Overpanel height (mm)		Transomed	1500		
Glazing		Max. glazed area:	0.72m2		
		Approved systems:	See section 6 & Appendix B		
Frame specification		Min. Section (mm):	70	x	32
		Material:	Hardwood		
		Density:	Min 640kg/m³		

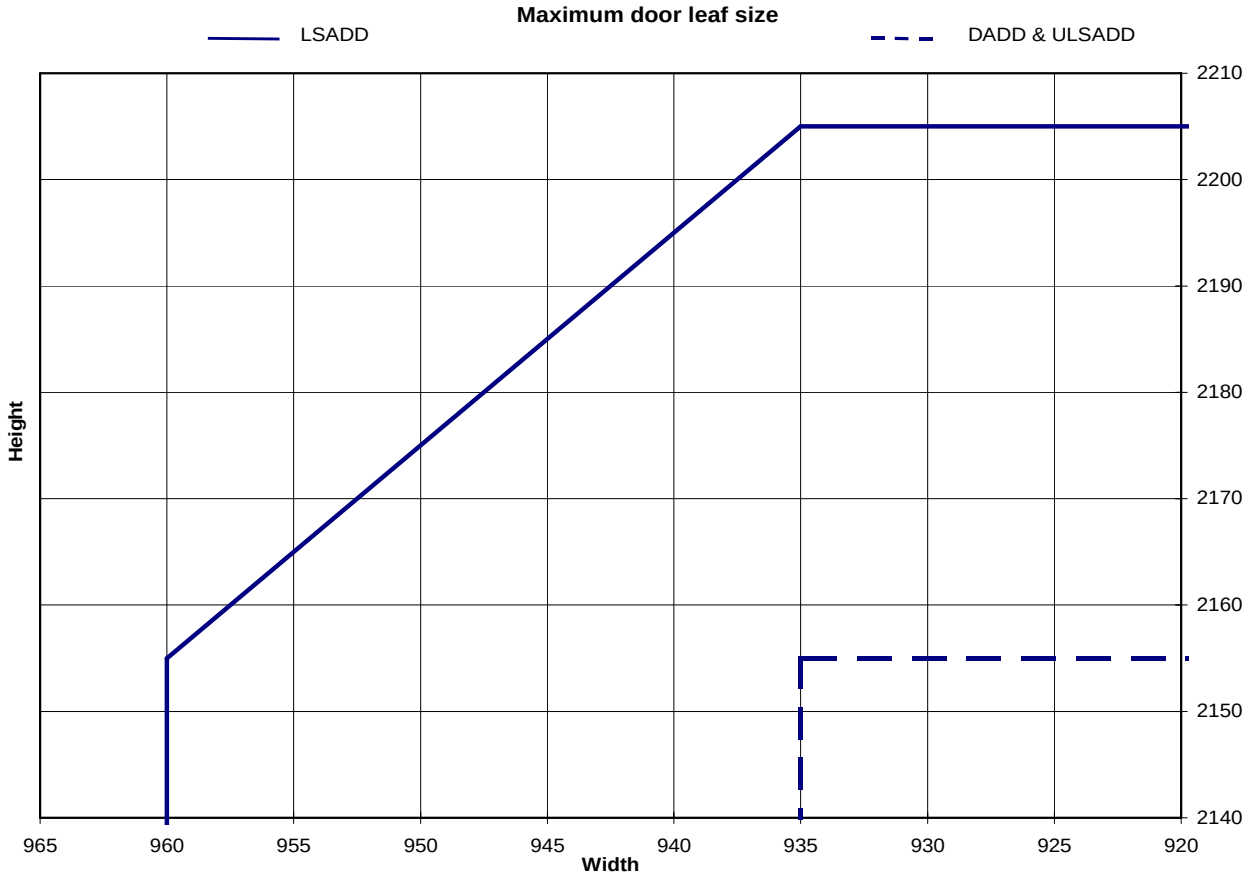
INTUMESCENT MATERIALS - Mann McGowan Fabrications Ltd - Pyrostrip 500P or PVC cased Palusol

HEAD:
1 No. 30 x 4mm fitted centrally in the frame reveal.

MEETING EDGES:
2 No 15 x 4mm strips each fitted 5mm either side of the centre line of one leaf edge only.

JAMBS:
2 No 15 x 4mm strips each fitted 5mm either side of the centre line in the frame reveal.

IRONMONGERY:
For additional ironmongery protection see section 10



Latched and Unlatched Single and Double acting Single Leaf Doorsets - TYPE 617

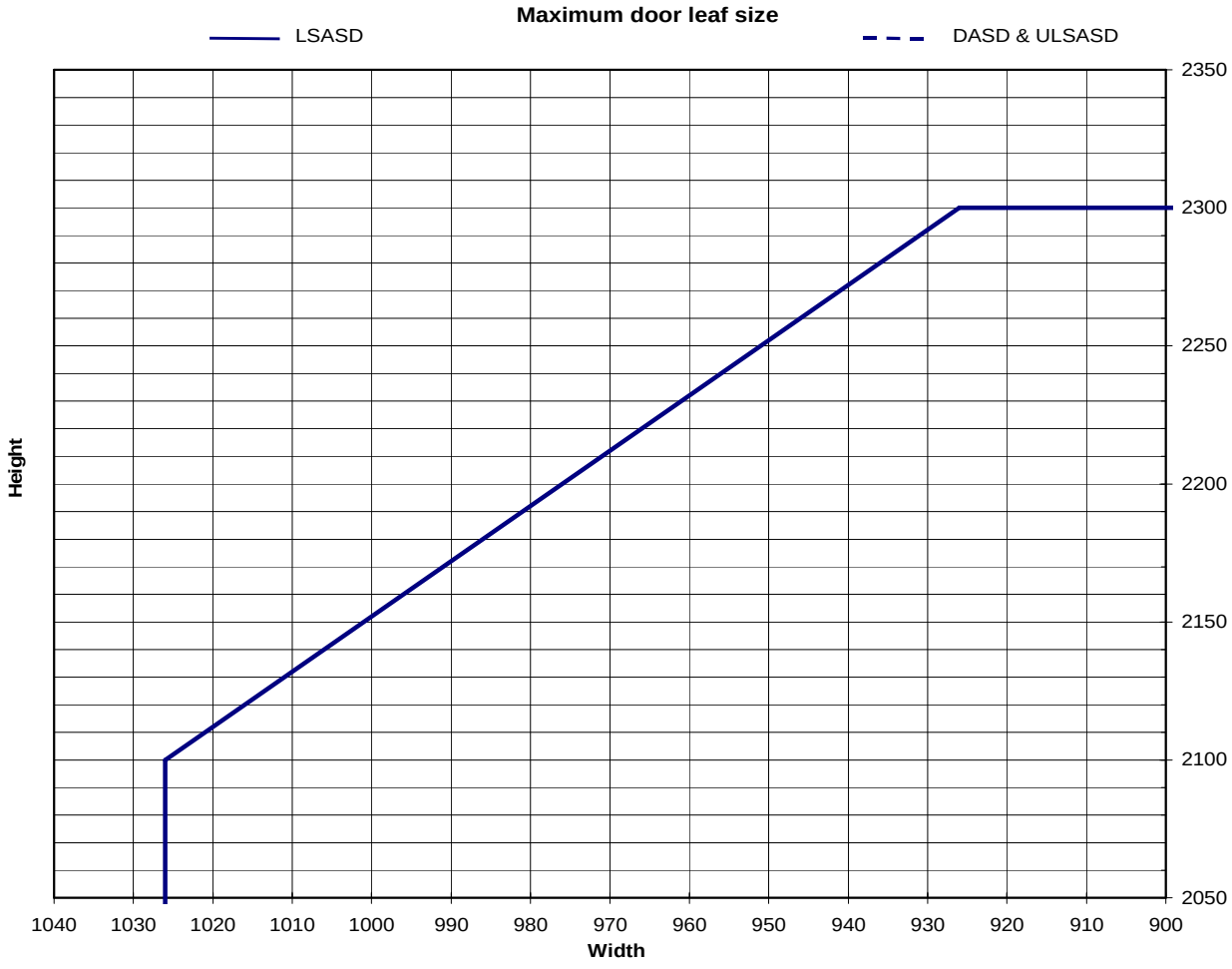
	Configuration		Height (mm)		Width (mm)
Leaf sizes	LSASD	From:	2100	x	1026
	ULSASD & DASD	To:	2300	x	926
Max. Overpanel height (mm)		Transomed	2000		
Glazing		Max. glazed area:	0.72m2		
		Approved systems:	See section 6 & Appendix B		
Frame specification		Min. Section (mm):	70	x	32
		Material:	Hardwood		
		Density:	Min 640kg/m³		

INTUMESCENT MATERIALS -

HEAD:
1 No. 30 x 4mm fitted centrally in the frame reveal.

JAMBS:
2 No. 15 x 4mm strips each fitted 5mm either side of the centre line in the frame reveal.

IRONMONGERY:
For additional ironmongery protection see section 10



Latched and Unlatched Single Acting and Double Acting Double Doorsets - TYPE 617

	Configuration		Height (mm)		Width (mm)
Leaf sizes	LSADD	From:	2100	x	926
	ULSADD & DADD	To:	2300	x	826
Max. Overpanel height (mm)		Transomed	1500		
Glazing		Max. glazed area:	0.72m2		
		Approved systems:	See section 6 & Appendix B		
Frame specification		Min. Section (mm):	70	x	32
		Material:	Hardwood		
		Density:	Min 640kg/m³		

INTUMESCENT MATERIALS

HEAD:
1 No. 30 x 4mm fitted centrally in the frame reveal.

MEETING EDGES:
2 No 15 x 4mm strips each fitted 5mm either side of the centre line of one leaf edge only.

JAMBS:
2 No 15 x 4mm strips each fitted 5mm either side of the centre line in the frame reveal.

IRONMONGERY:
For additional ironmongery protection see section 10