BMTRADA

Global Fire Resistance Assessment

Sponsor:
Blankfort Inc.
25 Avenue Côté
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QC
Canada
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CONFIDENTIAL

Report: BMT/CNA/F15018 Revision A

Contract: BMT/CNA/F15222

64mm thick Blankfort 90 Doorsets for:
90 Minutes Fire Resistance

Valid From: 16 October 2015
Valid Until: 11 March 2020

Contents

1 Introduction

This document constitutes a global assessment report relating to 64mm thick, 90 minute fire resisting doorsets for Blankfort Inc. 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 64mm thick door leaves of this design comprises the following essential components.

Element		Material	Dimensions (mm) [1]	Density (kg/m³)
Stiles and rails		None fitted	-	-
Core - inner		Type A[2]	12 thick	1050 +/-100
Core – outer		Easter White Pine Vertically orientated lamels	12.7 thick x 35 wide	450[3]
Facings	Inner	Particleboard	9 thick	650[3]
	Outer	MDF	3 thick	710[3]
Adhesives	Facing	[2]	-	-
	Core			
	Lippings	Polyurethane	-	-
Lippings – vertical edges only		Hardwood	3 thick	613[4]

[1] Nominal values

[2] Precise construction details held on file, in confidence, at BM TRADA

[3] Stated by manufacturer, not verified by laboratory

[4] Measured density.

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 C.

4 Configurations

Based on the test evidence listed in appendix A, this assessment covers the following doorset configurations.

Abbreviation	Description
LSASD	Latched, single acting, single doorset
LSADD	Latched, single acting, double doorset

Unequal leaf double doorsets are covered by this assessment with no restriction on the smaller leaf dimension. Doorsets containing leaves with smaller dimensions than those stated are deemed to be less onerous and are therefore automatically covered.

5 Leaf Size Adjustment

Blankfort Inc 90 door leaves may be altered as follows.

Element	Reduction
Leaf	The manufactured size of the leaf may be reduced in height or width without restriction, provided the lippings meet the requirements within section 9
Lipping	The dimensions stated in section 9 may be reduced by 20% for site fitting purposes

6 Overpanels

6.1 Solid

Overpanels of the same construction as the door leaves may be used only when separated by a transom. The overpanel must be fully contained within the door frame (see following diagram).

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

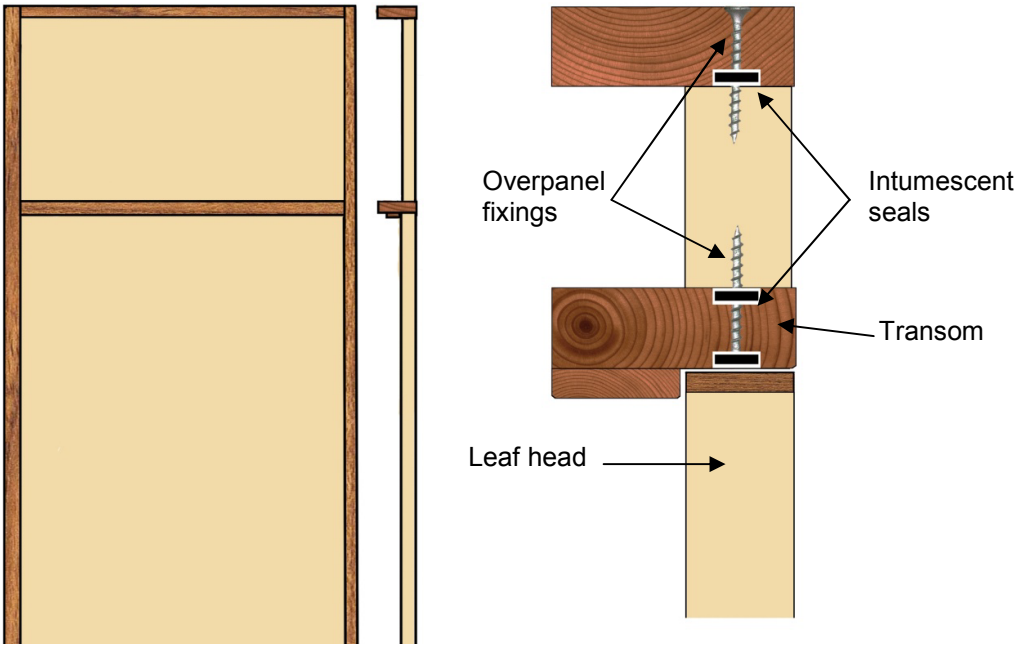
Door frame joints must utilise mortise and tenon joints (see section 8.3). Joints must be tight, with no gaps, and require mechanical fixing with the appropriate size ring shank nails or screws.

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 C must also be fitted to all four edges of the overpanel. The seals may be fitted in the overpanel edges or alternatively in the frame reveal. A maximum 2mm gap is permitted between the edge of the overpanel and the frame reveal.

Maximum overpanel dimensions are as follows.

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



Note: Drawing is representative of doorset construction only; actual construction must comply with the specification contained in this document.

7 Glazing

7.1 General

The testing conducted on the Blankfort Inc 90 doorset has demonstrated that the design is capable of tolerating glazed apertures, whilst providing a margin of over performance. Glazing is therefore acceptable within the following parameters.

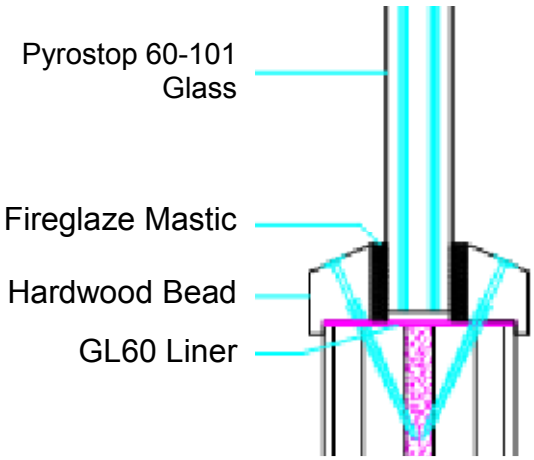
The maximum assessed glazed area is 0.39m^2.

7.2 Assessed Glazing System

The glazing system must remain specifically as tested and described below.

	Make/type	**Size** (mm)	**Location**
Expansion allowance	-	5 all round	-
Beading	Hardwood of minimum 640 kg/m^3 nominal density	32 high x 22 deep including a 5 x 5 bolection return and a 24° chamfer	Fitted around the glazing aperture on both faces
Beading fixings	Steel screws	70 long	Fitted 50mm from corners at 130mm centres
Glazing perimeter	Sealmaster Ltd – GL 60 liner	2 thick	Fitted lining the glazing aperture
	Sealmaster Ltd Fireglaze mastic	4 thick	Fitted between the glass and bead on both faces

1. Glazed apertures must not be nearer than 200mm to any leaf edge
2. Multiple apertures are acceptable up to the maximum approved area with a minimum dimension of 120mm of Blankfort Inc 90 core separating the apertures
3. Glazed apertures may be any shape (including curvi-linear) provided that the required bead shape can be adequately manufactured.



7.3 Assessed Glass Types

The tested and assessed glass must remain as follows.

Glass Type	**Manufacturer**	**Thickness** (mm)	**Max. Area** (m^2)
Pyrostop 60-101	Pilkington Group	23	0.39

8 Door Frames

8.1 Door Frame Construction

Timber based door frames for Blankfort Inc 90 doorsets must be constructed to meet the following specification.

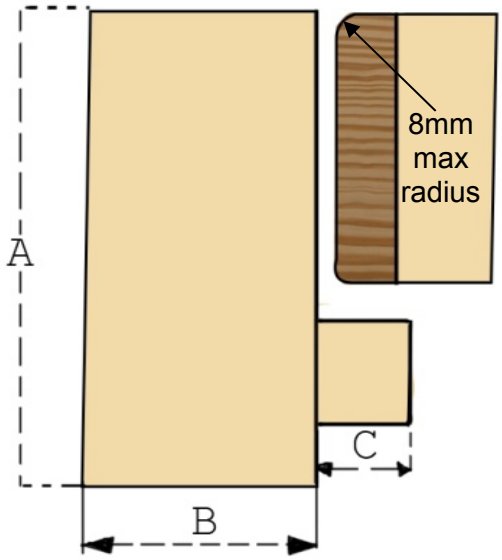
Material	**Section Size** (mm)	**Min. Density** (kg/m³)
Hardwood	90 x 44	613

All door frame timber must be straight grained, joinery quality, free from knots, splits and checks. It is advised that the density of timber being used for the door frame is verified to ensure that it meets the minimum density requirements stated above. Timber is a naturally varying product that can exhibit densities lower than its nominal density value, which could influence the fire resistance performance of the doorset.

An 18mm deep integral or planted stop is adequate for single acting frames.

Frame joints must be mortice and tenoned, mechanically fixed with the appropriate size ring shank nails or screws and with no gaps.

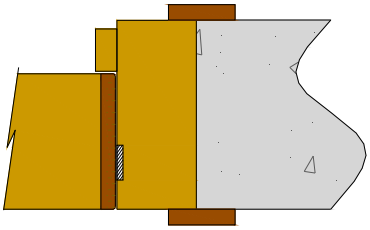
The following diagram depicts the assessed frame profiles and dimensions.



A = min. 90mm B = min. 44mm C = min. 18mm
8mm radius to create maximum 2mm edge profiling

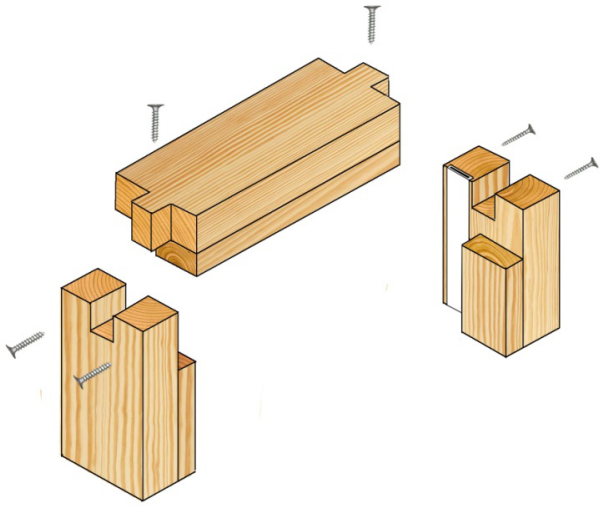
8.2 Door Frame Installation

The following diagram indicates the acceptable door frame installation method.



Note: 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.

8.3 Permitted Door Frame Joint



Mortise and Tenon Joint

9 Lipping Materials

Blankfort Inc 90 doorsets must be lipped on the vertical edges only, in accordance with the following specification.

Material	**Size** (mm)	**Min. Density** (kg/m³)
Straight grained, joinery quality hardwood, free from knots, splits and checks	1. Square = 3 thick (with maximum 8mm radius permitted at the corners – see section 8.1)	613
	2. Rounded = Not permitted	
	3. Rebated = Not permitted	

Note:

A 2.5° chamfer is permitted to the closing edge lipping at the leading edge of leaves providing the door gaps meet the requirements of section 14.

10 Leaf Facing Materials

10.1 General

The 3mm thick outer facings for the 64mm thick Blankfort Inc 90 leaf construction are not considered to have a structural effect on the design; therefore the following outer facing materials have been approved for use with the Blankfort 90 design in conjunction with the 9mm particleboard sub face.

Outer Face Material	**Thickness** (mm)	**Min. Density** (kg/m^3)	**Permitted Configurations**
MDF	3	720	All
Chipboard	3	700	All
Hardwood Plywood	3	640	All

10.2 Decorative & 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 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 64mm
3. Materials must not conceal intumescent strips
4. PVC/Plastic laminates must not be applied to the edges of leaves.

11 Intumescent Materials

The intumescent materials tested and approved for this doorset design are shown below.

Application		Product/Manufacturer	Size (mm)
Door Edges	Head, & vertical edges	Pyroplex Rigid Box Seal – Ref: 30137	15 x 6
	Leaf Threshold	Pyroplex graphite – Ref: 30146	50 x 2
Frame reveal – Head & Jambs		Pyroplex Rigid Box Seal – Ref: 30138	25 x 6
		Pyroplex Rigid Box Seal – Ref: 8500	10 x 4
Encasing latch body, under latch keep and latch forend		Interdens – Dufaylite Developments Ltd or Lorient Polyproducts Ltd	2 thick
Hinges – Under both blades			

The seal specification for each configuration is shown in appendix C.

12 Adhesives

The following adhesives must be used in construction.

Element	Product
Lippings	Polyurethane
Core & Facings	*

* Precise construction details held on file, in confidence, at BM TRADA

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
- Panic exit hardware: Test Standard EN 1125.

13.2 Tested Hardware

The following hardware has been successfully incorporated in the tests on the Blankfort Inc 90 doorset design.

Element	Product	**Size** (mm)
Lift-off hinges	3 No. Royde and Tucker H101 lift off type hinge	101 x 32 (blade size)
Closer	Rutland TS3204 overhead type closer	220 x 59 (footprint size)
Mortice lock/latches	Arrone steel mortice latch	155 x 24 (forend size)
		175 x 30 (keep size)
	Carlisle Brass tubular steel mortice latch Ref: TL2	57 x 26 (forend size)
		57 x 25 (keep size)
Furniture	Aluminium lever type handle	103 x 41 (footprint size)
Surface Mounted Shoot bolts	Cranked barrel bolt Ref. 981823	200 x 38 (footprint)

Intumescent protection must be fitted to all hinges and locks/latches, see section 11.

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 165mm high.
Intumescent protection	See section 11
Materials	All parts essential to the locking/latching action (including the latch bolt, forend and strike) to be steel
Location	1000-1200mm from the threshold of the leaf

13.3.2 Hinges

Leaves must be hung on a minimum of 3 hinges. Hinges with the following specification are acceptable.

Element	Specification	
Blade height	100 - 120mm	
Blade width (excluding knuckle)	30 - 35mm	
Blade thickness	2.5 - 4mm	
Fixings	Min. of 4No. 30mm long No. 8 or No. 10 steel wood screws per blade	
Materials	Steel or stainless steel	
Hinge positions	Top	150 - 180mm from the head to the top of the hinge
	Middle	Minimum 200mm from top hinge or centrally fitted between top and bottom hinge
	Bottom	210 - 260mm from the foot of the leaf to the bottom of the hinge
Intumescent gaskets	See section 11	

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 doorset design, when tested to BS 476: Part 22: 1987 or BS EN 1634-1.

13.3.4 Surface-Fixed Bolts

Surface-fixed bolts must be steel or stainless steel and must be located a minimum of 50mm from the meeting edge.

13.3.5 Pull Handles

Handles may be surface-fixed or bolted through the door leaf, providing they are steel or stainless steel and the length is limited to 1200mm between the fixing points. Bolted through products require the hole to be lined with 1mm thick Interdens gasket.

13.3.6 Push Plates & Kick Plates

Face-fixed hardware 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 hardware are permitted up to a maximum of 20% of the door leaf area if mechanically fixed, or a maximum of 30% of the door leaf area if bonded with a contact or other thermally softening adhesive. Plates must not return around the leaf 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 Environmental Seals

Silicon-based flame retardant acoustic, weather and dust seals, (e.g. Norsound 710, Lorient IS1212, IS1511, IS7025 or 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.

14 Door Gaps

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

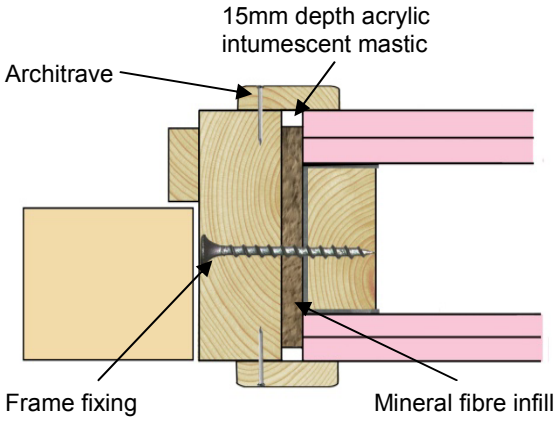
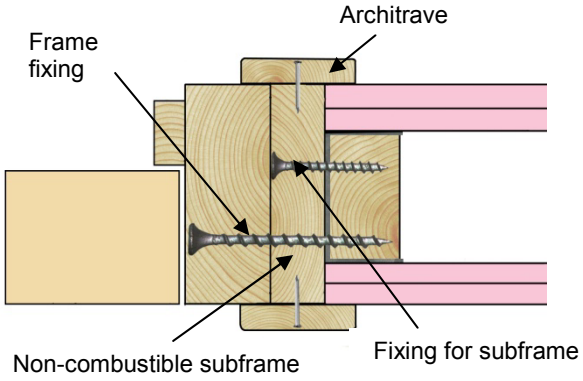
Location	Dimensions
Door edge gaps	A minimum of 2mm and a maximum of 4mm
Alignment tolerances	Leaves must not be proud of each other or from the door frame by more than 1mm
Threshold	10mm between bottom of leaf and top of floor covering

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 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.

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 15mm must be tightly packed with mineral fibre, capped on both sides with a 15mm depth of acrylic intumescent mastic. Products must be tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1.	
2. Gaps up to 20mm must be filled with non-combustible sub-frame up to 20mm thick, with any gaps between the components sealed with acrylic intumescent mastic. Products must have been tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1.	

Note: Drawings are representative of doorset construction only; actual construction must comply with the specification contained in this document.

17 Insulation

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

Type	Details
Fully insulating	Unglazed doorsets meeting the specifications within this assessment

18 Smoke Control

18.1 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.

18.2 Further Considerations

Note that there is other guidance 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, such as consideration of the gap between door leaf and threshold.

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

19 Conclusion

If the Blankfort Inc 90 minute 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 90 minutes integrity and insulation performance, subject to section 17.

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: **Blankfort Inc**

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, BM TRADA 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 a period of five years from the date of issue, after which time it must be submitted to BM TRADA for re-appraisal

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**	**P N Barker**
Title:	Senior Product Assessor	Principal Technical Officer

Appendix A

Performance Data

Test Ref.	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)
PF14213	B: LSASD	2140 926 64	BS 476: Pt 22: 1987	Integrity: 113 Insulation: 113
PF14214	B: LSASD	2100 928 64		Integrity: 130 Insulation: 130
PF14284	A: LSASD	2100 926 64		Integrity: 110 Insulation: 110
PF14285	LSADD	2135 927/927 64		Integrity: 96 Insulation: 96
PF15112	A: LSASD	2135 925 64		Integrity: 112 Insulation: 112

Appendix B

Revisions

Rev. No.	BM TRADA Ref.	Date	Description
A	CNA/F15222	16.10.2015	Increase in glazed area based on results of PF14213 and alternative intumescent specification based on PF15112 doorset A

Appendix C

Data Sheets for:

Blankfort Inc

90 Minute Fire Resisting Doorsets

Blankfort Inc – 90 Minute Fire Resisting Doorsets

Latched, Single Acting, Single Doorsets

	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From:	2100	x	1082
		To:	2450	x	928
Maximum Overpanel Height (mm)		Transomed	2000		

Intumescent Materials: Pyroplex Ltd - Rigid Box Seal

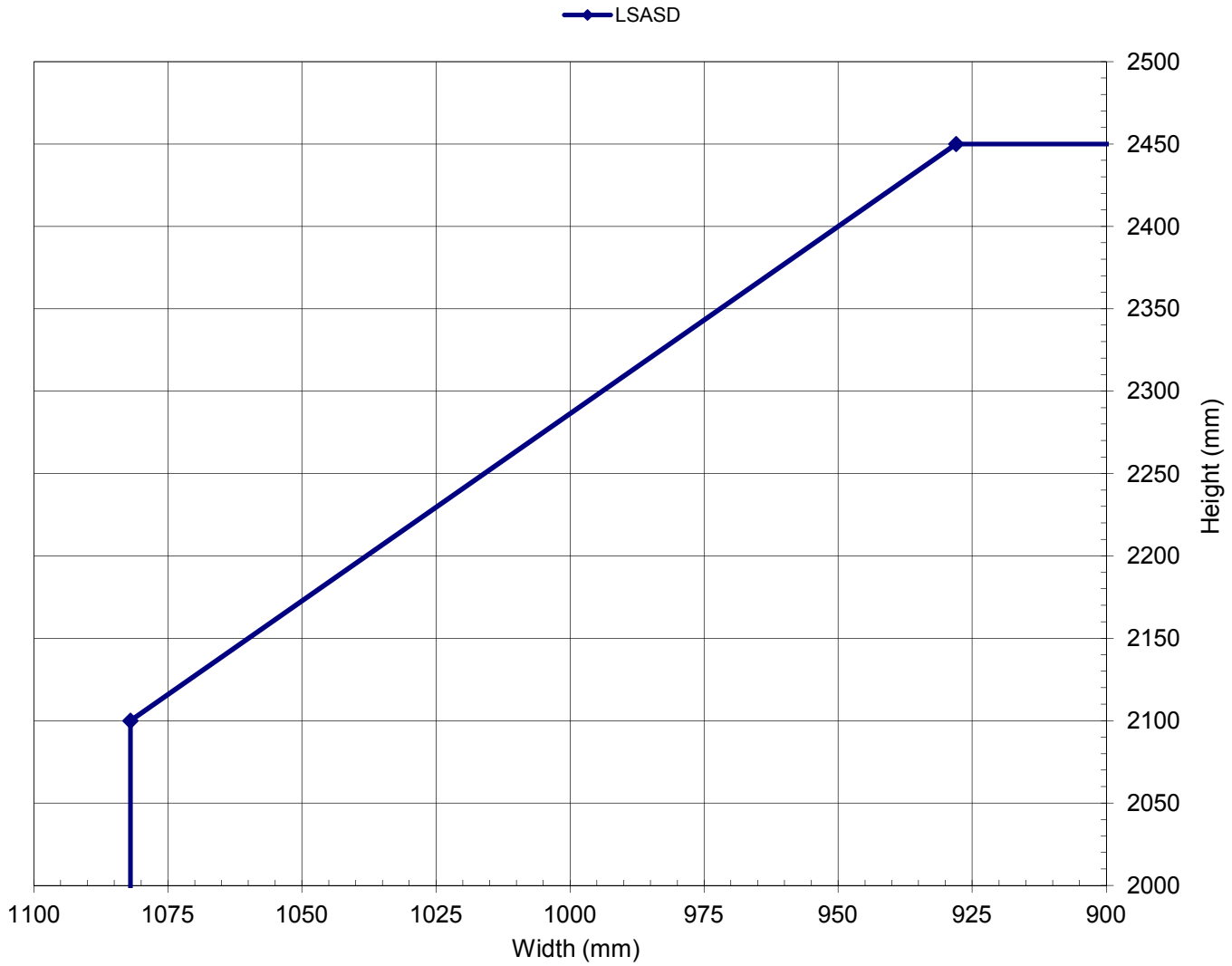
Leaf Head & Jambs: 1No Rigid Box Seal Ref 30137 - 15 x 6mm strip, fitted 11mm from the closing (stop side) face in the leaf edges.

Frame Head & Jambs: 1No Rigid Box Seal Ref 30138 - 25 x 6mm strip, fitted 8mm from the opening face in the frame reveal.

Leaf Threshold: Pyroplex graphite type Ref 30146: 50 x 2mm strip fitted centrally in the bottom edge of the leaf.

Hardware Protection: See section 11.

Maximum Door Leaf Size



Blankfort Inc – 90 Minute Fire Resisting Doorsets

Latched, Single Acting, Single Doorsets – Alternative Intumescent

	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSASD	From:	2135	x	1038
		To:	2395	x	925
Maximum Overpanel Height (mm)		Transomed	2000		

Intumescent Materials: Pyroplex Ltd - Rigid Box Seal

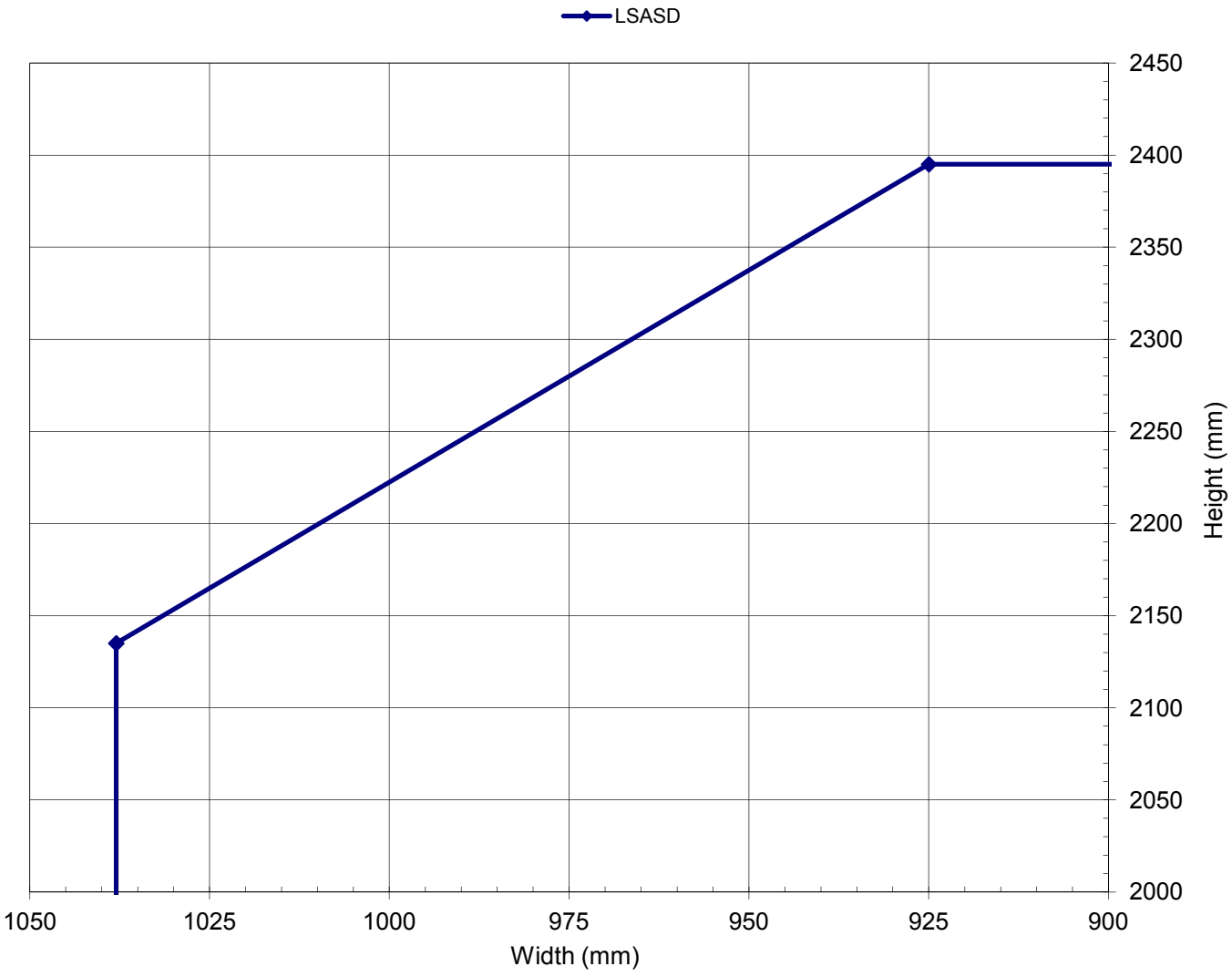
Leaf Head & Jambs: 2No Rigid Box Seals Ref 30137 - 15 x 6mm strips, fitted 7mm either side of the centreline in the leaf edges.

Frame Head & Jambs: 1No Rigid Box Seal Ref 8500 - 10 x 4mm strip, fitted centrally in the frame reveal.

Leaf Threshold: Pyroplex graphite type Ref 30146: 50 x 2mm strip fitted centrally in the bottom edge of the leaf.

Hardware Protection: See section 11.

Maximum Door Leaf Size



Blankfort Inc – 90 Minute Fire Resisting Doorsets

Latched, Single Acting, Double Doorsets

	Configuration		Height (mm)		Width (mm)
Leaf Sizes	LSADD	From:	2135	x	958
		To:	2206	x	927
Maximum Overpanel Height (mm)		Transomed	1500		

Intumescent Materials: Pyroplex Ltd - Rigid Box Seal

Leaf Head & Hanging Jambs: 1No Rigid Box Seal Ref 30137 - 15 x 6mm strip, fitted 11mm from the closing (stop side) face in the leaf edges.

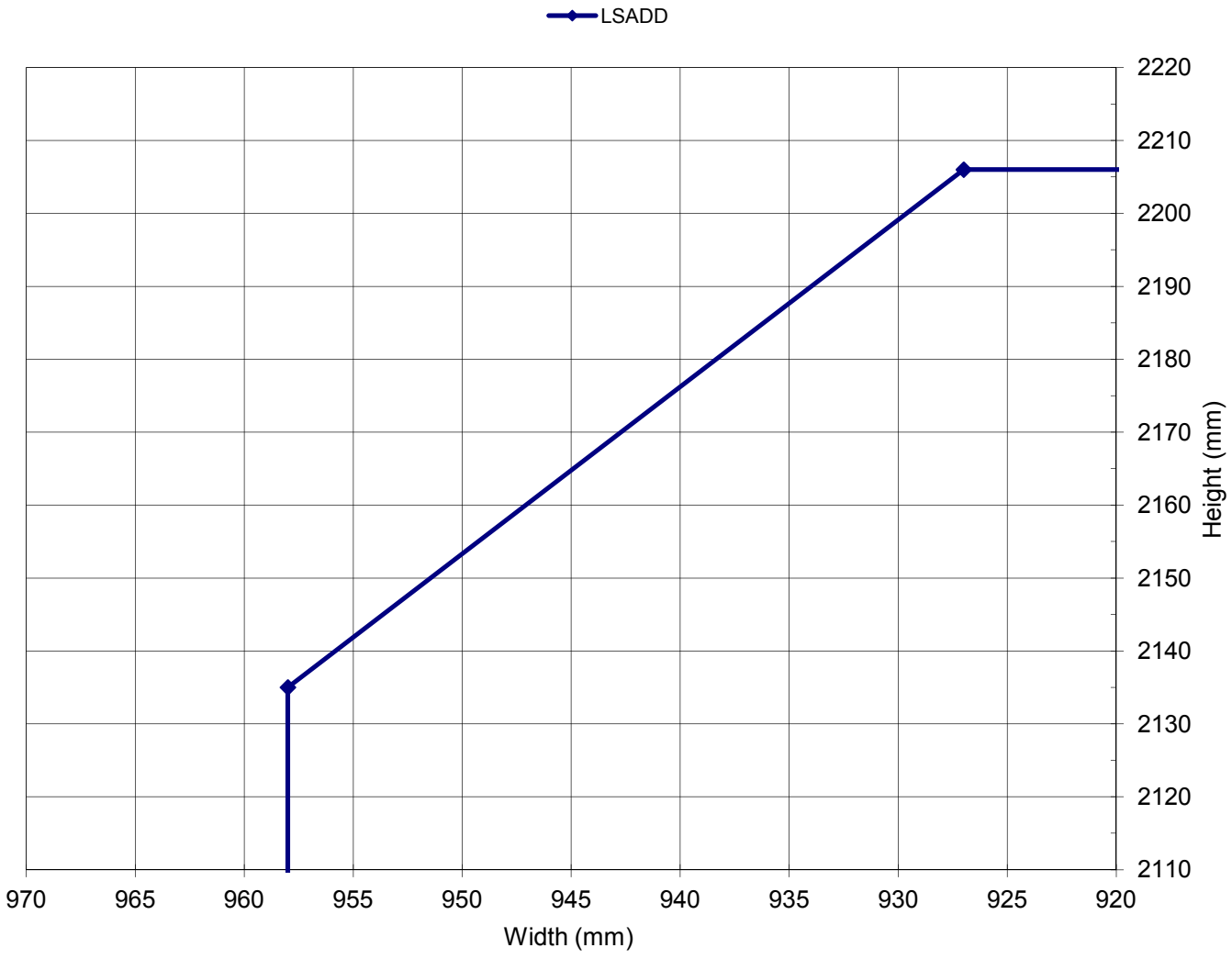
Frame Head & Jambs: 1No Rigid Box Seal Ref 30138 - 25 x 6mm strip, fitted 8mm from the opening face in the frame reveal.

Leaf Meeting Edges: 1No Rigid Box Seal Ref 30137 - 15 x 6mm strip, centrally fitted in one leaf edge, with 2No Rigid Box Seal Ref 30137 - 15 x 6mm strips, centrally fitted 14mm apart (7mm either side of the centreline) in the opposing leaf edge.

Leaf Threshold: Pyroplex graphite type Ref 30146: 50 x 2mm strip fitted centrally in the bottom edge of the leaf.

Hardware Protection: See section 11.

Maximum Door Leaf Size



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