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Fire Resistance Assessment

CONFIDENTIAL

Report: Chilt/A10152 Revision A

Contract reference: CNA/F14170

A Fire Resistance Assessment of Strebord 54[®] Panelled Doorsets to 60 minutes.

Issue Date: 18 July 2014

Valid Until: 09 September 2015



This document is confidential and remains the property of Chiltern International Fire Ltd. The legal validity of this report can only be claimed on the presentation of the complete report.



BM TRADA – the new name for Chiltern International Fire Ltd

From July 1st 2013, Chiltern International Fire Ltd commenced trading under the name of its parent company BM TRADA and at the same time adopted a brand new visual identity.

Historically, the group has delivered its services through a number of individual companies: BM TRADA Certification Ltd, TRADA Technology Ltd, Chiltern International Fire Ltd (including Chiltern Dynamics) and a network of international offices. Both BM TRADA Group and these individual companies will now trade under the same name - BM TRADA - and adopt the new visual identity.

To coincide with this change, our Technical Reports, Test Reports, Products Assessments, company stationery and marketing collateral have been re-designed to carry the new branding and visual identity.

The validity of all documents previously issued by the individual companies including certificates, test reports and product assessments is unaffected by this change and a letter to this effect will be available to download from our website www.bmtradagroup.com.

About BM TRADA.

With origins dating back to 1934, we have a deep history and services which are highly valued by our customers. We offer independent certification, testing, inspection, training and technical services around the world. In all these areas we continue to use industry-leading experts in their chosen fields to develop and deliver services – an ethos that has been at the heart of our approach since we began.

A recent review of our businesses and customers revealed that the individual identities sometimes make communications confusing, and that in an already complex business area, clarity and simplicity in communications is rare, but valued. It also revealed that a single identity and combined offer would help us strengthen our appeal.

With this in mind, we brought the companies together under the name BM TRADA and took the opportunity to create a fresh new visual identity.

We have modernised our image and combined our strengths. However, our values, our people and the integrity of our services remain the same. I hope you will welcome these changes and the improvements they will bring.



Jon Osborn
Chief Operating Officer

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1 Introduction

This document constitutes a global fire assessment relating to Strebord 54[®], 60 minute panelled doorsets, for Falcon Panel Products 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 basic tested constructions for Strebord 54[®] panelled door leaves covered by this assessment comprises the following elements:

Element		Material	Dimensions (mm)	Density (kg/m ³)
Stiles and rails		None fitted	-	-
Core		Falcon Strebord Particleboard with 2 No. routed mock panels	54 thick reduced to 30 thick at mock panel areas	630*
Panel facings		Hardboard	3 thick	900**
Panel beading		European redwood	12 high x 9 deep	510**
Beading fixings		Steel pins	30 long x 1.2 diameter fitted 50 from corners at 150 centres	-
Adhesive	Lipping	PU	-	-
	Panel facing	PU or PVA	-	-
Lippings – vertical edges only		Sapele	8 thick	640**

* Stated density not checked by laboratory

** Nominal density

3 Leaf Sizes

Assessment of 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 D.

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

4 Configuration

Based on the test evidence listed in appendix A, this assessment covers the following Strebord 54[®] panelled doorset configuration:

Abbreviation	Description
LSASD	Latched single acting single doorset

5 Leaf Size Adjustment

Strebord 54[®] panelled door leaves may be altered as follows:

Element	Reduction
Leaf	The leaf may be reduced in height or width without restriction, subject to the minimum framing dimensions stated in section 7.
Timber lippings	The lipping dimensions stated in section 10 may be reduced by 20% for fitting purposes

6 Variation to Construction

Assessment of variation to the tested designs is permitted within the following parameters:

- 1 A minimum of 2 and a maximum of 10 panels may be included, subject to section 7 & 8
- 2 Panels must be constructed in accordance with one of the options detailed in section 8
- 3 Panels may be flat or raised and profiled, subject to the minimum thickness detailed in section 8

7 Leaf Framing

The minimum leaf framing specification for Strebord 54[®] panelled doorsets (where applicable) is as follows:

Element	Dimensions (mm)
Head rails and stiles	100
Mid rails	170
Bottom rails	200
Intermediate framing	80

8 Panel Construction

Construction of panels for Strebord 54[®] panelled doorsets must be to the following specification:

Panel Core	Facing		
	Dimensions (mm)	Product	Density (kg/m ³)
Strebord 54 [®] routed to 30 thick	3 thick	MDF	750
		Chipboard	680
		Hardboard	1000

Notes:

1. Facing materials must be bonded to the core with PU or PVA or superior adhesive
2. Additional planted beads/mouldings must be fitted at the edges of the panelled areas and retained using minimum 30mm long x 1.2mm diameter pins inserted at 35-40° to the vertical, 50mm from each corner and at 150mm centres. The beading must be a minimum of 9mm deep and 12mm high.
3. Additional decorative/protective facing options are detailed in section 11

A diagram of the panel construction is contained in appendix B.

9 Glazing

Glazing has not been tested and is not assessed for use with this doorset design.

10 Lippings

10.1 Timber lippings

Strebord 54[®] panelled doors only require lipping on the vertical edges, but may be lipped all round if required. Lippings must meet the following specification:

Material	Size (mm)	Min Density (kg/m ³)
Straight grained joinery quality hardwood free from knots, splits and checks	1. Flat = 8 – 13 thick with a maximum of 2mm profiling permitted at corners of lipping	640

Notes:

1. A 2.5⁰ chamfer is permitted to the lipping at the leading edges of leaves, providing the door gaps meet the requirements of section 20.

11 Facings

11.1 General

The facings for Strebord 54® panelled doors are integral with the core construction and therefore alternative materials are not permitted.

11.2 Decorative and Protective Materials

The following 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/Plastic laminates	2
Decorative paper / non-metallic foil	0.5

Notes:

1. Metallic facings are not permitted (except for push plates and kick plates see section 16.5)
2. The door leaf framing thickness may be reduced by a total maximum of 0.5mm for calibration purposes in order to accommodate the chosen finish
3. Materials must not conceal intumescent strips
4. PVC/Plastic laminates must not be applied to the edges of leaves

12 Door Frames

12.1 Door Frame Construction

Door frames for Strebord 54® panelled doors must be timber as follows:

Material	Section Size (mm)	Minimum Density (kg/m ³)
Hardwood	70 wide x 32 thick	640

All door frame timber must meet or exceed class J30 as specified in BS EN 942: 2007 (subject to adequate repair of any defects).

A 12mm deep planted stop is adequate for single acting frames.

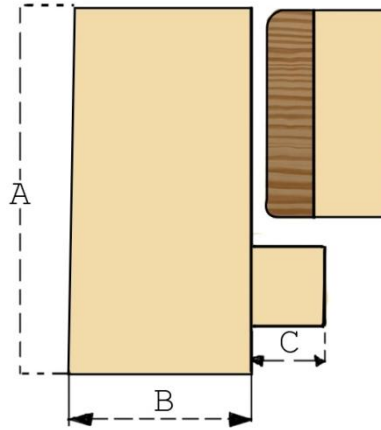
Frame joints may be mortice and tenoned, mitred, half lapped or butted and with no gaps (see section 12.2). All jointing methods require mechanical fixing with the appropriate size ring shank nails or screws.

The following diagram depicts the assessed frame profile and dimensions:

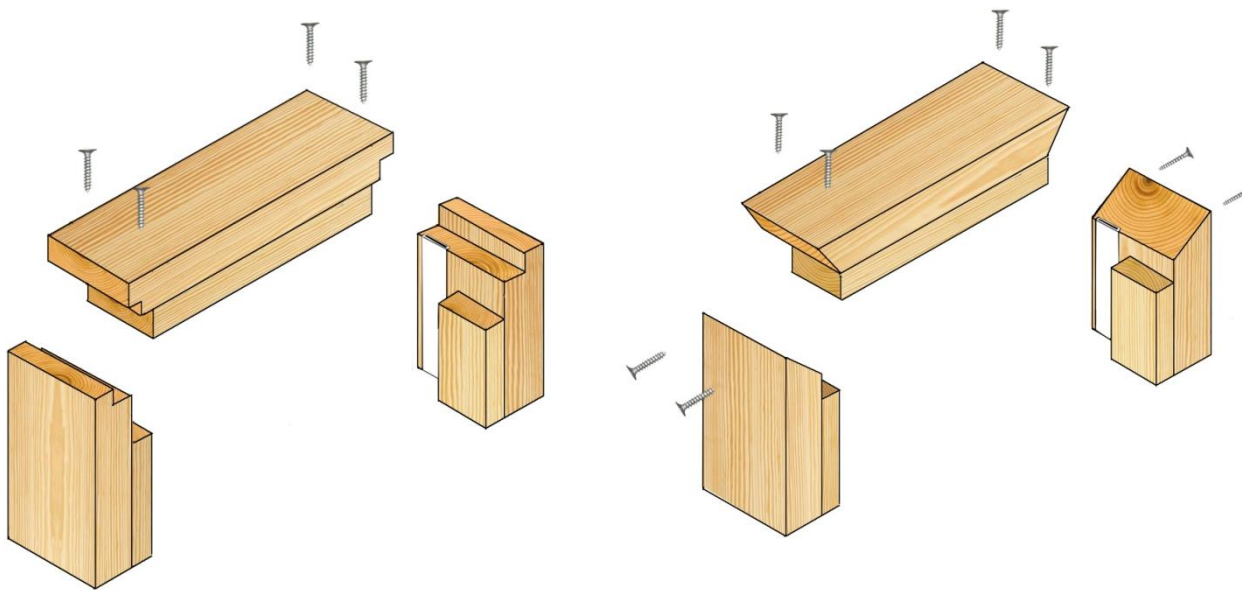
A = min 70mm

B = min 32mm (see table above)

C = min 12mm

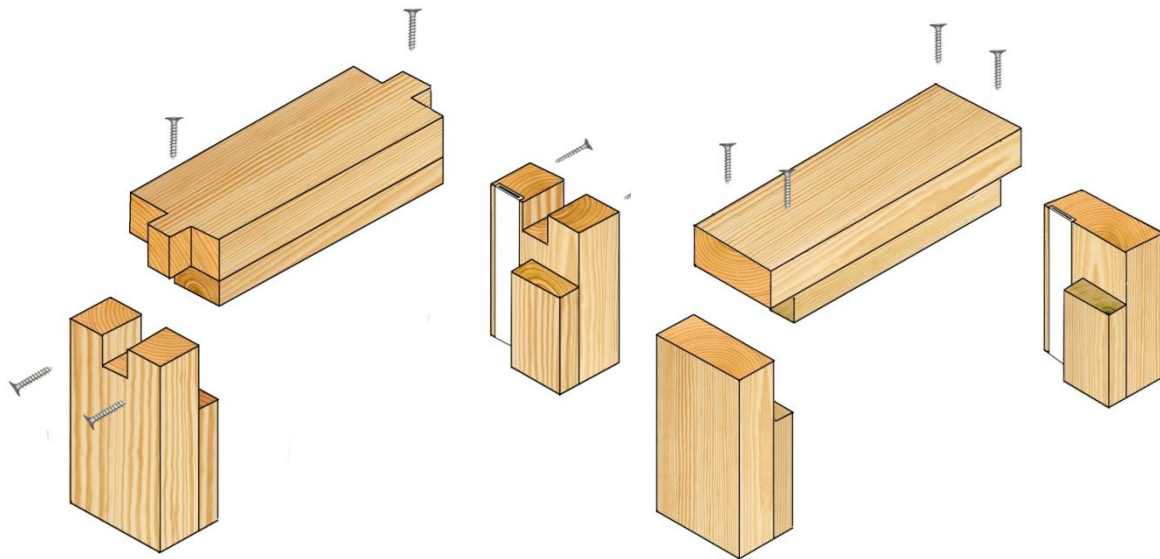


12.2 Door frame joints



Half Lapped Joint

Mitre Joint



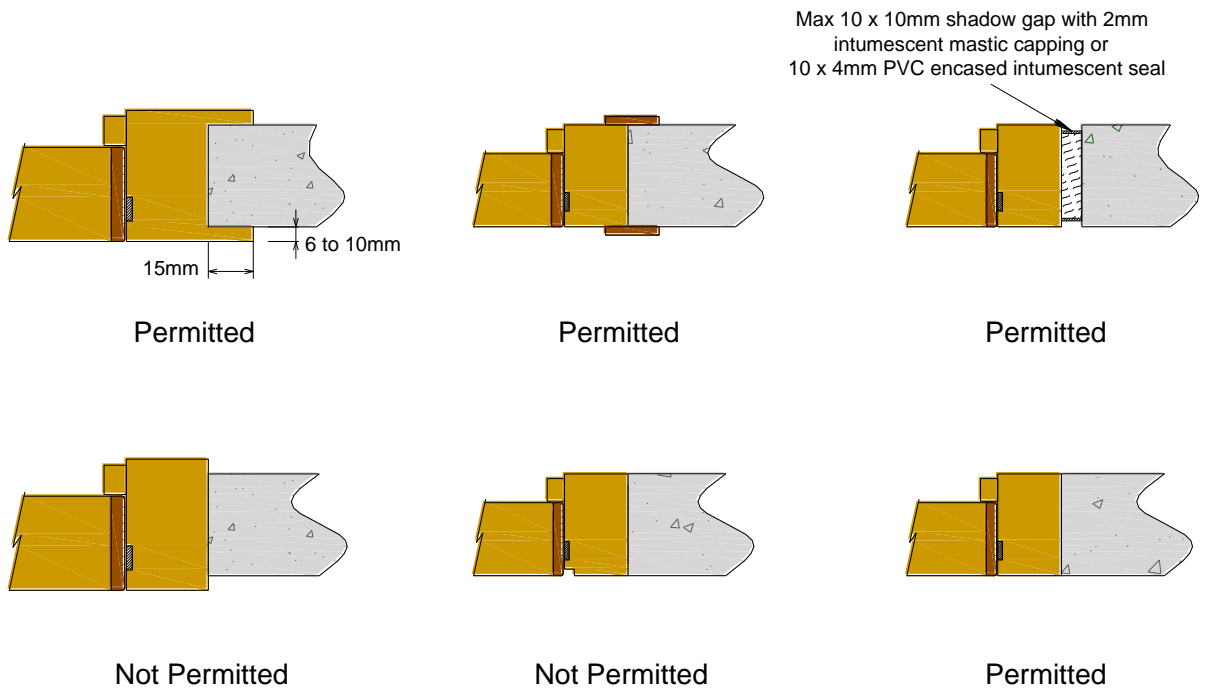
Mortise and Tenon Joint

Butt Joint

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

12.3 Door Frame Installation

The following diagrams indicate acceptable and unacceptable door frame installations:



13 Intumescent Materials

It is important that the type, size and fitting detail for the intumescent seals remains as tested. These products 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 Strebord 54[®] panelled doorsets are as follows:

Element	Product	Size (mm)	Location
Head and jambs	Pyroplex Rigid Box Seal FO 8700	15 x 4	2 No. seals fitted 8mm apart and 8mm from the exposed face, located in the frame reveal
Around hinges	Partially interrupted	-	Hinge blade fully interrupts first seal leaving second seal continuous on frame jamb
Under hinge blade	Interdens	1 thick	Fitted underneath both hinge blades
Encasing latch body	Interdens	1 thick	
Around latch keep	Partially interrupted	1 thick	Latch keep fully interrupts first seal leaving second seal continuous on frame jamb
Under latch forend	Interdens	1 thick	Fitted under the latch forend
Under latch keep	Interdens	1 thick	Fitted under the latch keep

The seal specification for each configuration is specified in appendix D.

14 Adhesives

The following adhesives must be used in construction of Strebord 54[®] panelled doorsets:

Element	Adhesive Type
Panel Facings	PU, PVA
Lippings	PU

15 Tested Hardware

The following hardware has been successfully incorporated in the tests on the Strebord 54[®] panelled design:

Element	Product	Size (mm)	Location
Hinges	3 No. Royde and Tucker H105 lift off type hinge	100 x 35 (blade size)	Fitted 150mm, 985mm and 1820mm from the head of the leaf
Closer	Dorma UK Ltd TS 68 overhead type closer	220 x 54 (footprint size)	Fitted on the exposed face as per the manufacturers instructions
Latch	Standard tubular mortise latch	57 x 26 (forend size)	Fitted 1100mm from the head-
Furniture	Aluminium lever type handle	100 x 38	Fitted appropriate to the latch

16 Additional & Alternative Hardware

16.1 Hinges

Leaves must be hung on a minimum of 3 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:	Min of 4 No. 38mm long fully threaded 'twinfast' or chipboard screws per blade	
Materials:	Steel or stainless steel	
Hinge positions:	Top	150 -180mm from the head of the leaf to the top of the hinge
	2 nd	Minimum 200mm from top hinge to central between top and bottom hinge
	Bottom	180 - 250mm from the foot of the leaf to the bottom of the hinge
Intumescent protection:	See section 13	

16.2 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 13
Materials:	All parts essential to the locking/latching action (including the latch bolt, forend and strike) to be steel.
Location	1000mm – 1200mm from threshold

16.3 Automatic Closing

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

Note: Concealed head mounted closers are not acceptable for use with this door design because they remove a substantial portion of the head rail.

16.4 Pull Handles

These may be surface-fixed to the door leaf provided that they are steel or brass and the length is limited to 1200 mm between the fixing points. No additional intumescent protection is required provided that the hole for the bolt through the leaf is tight.

16.5 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 10% of the door leaf area.

16.6 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 in to a tested intumescent mastic. Viewers may only be fitted through solid framing members and must be centrally located.

16.7 Acoustic, Weather and Dust Seals

Silicon based flame retardant acoustic, weather and dust seals (e.g. Lorient IS1212, IS1511, IS7025, IS7060 and Mann McGowan ACS-1, Flexifin Twin) 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.

16.8 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	RP8
Athmer	Schall-Ex Duo L-15
Norseal	AR -1

16.9 Letter Boxes/Plates

Letter boxes/plates may be fitted providing the product has demonstrated contribution to the required integrity performance of this type of doorset design, when tested to BS 476: Part 22: 1987 or BS EN 1634-1, when installed in a timber based doorset of comparable thickness. Letterboxes may only be fitted through a 200mm x 54mm mid rail and the margin to the leaf edges must be a minimum of 100mm.

17 Structural Opening

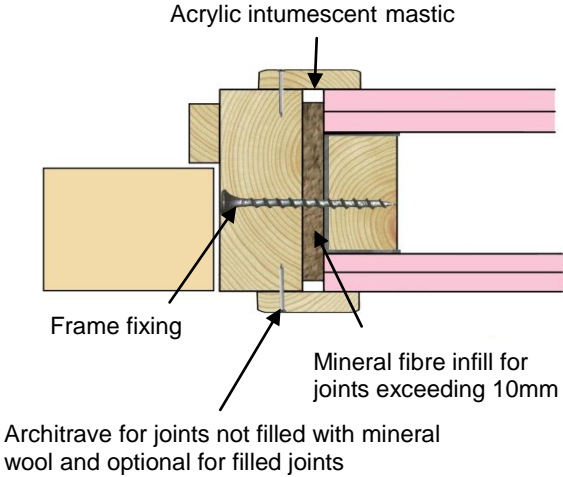
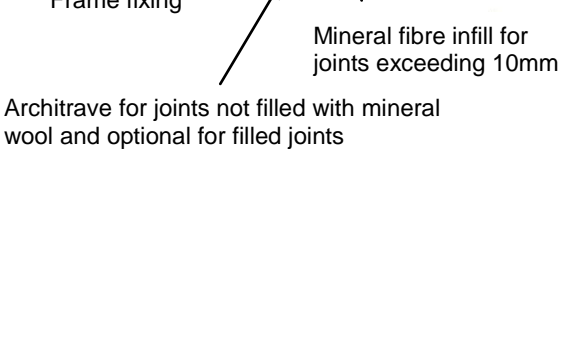
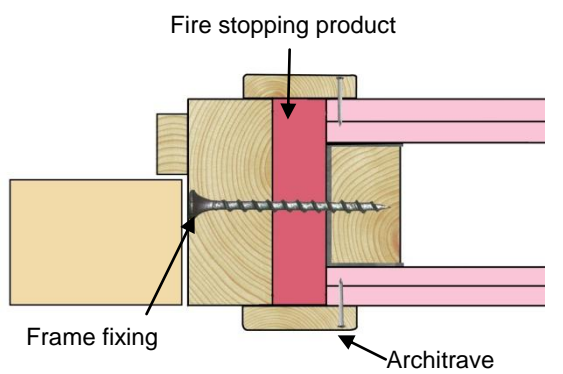
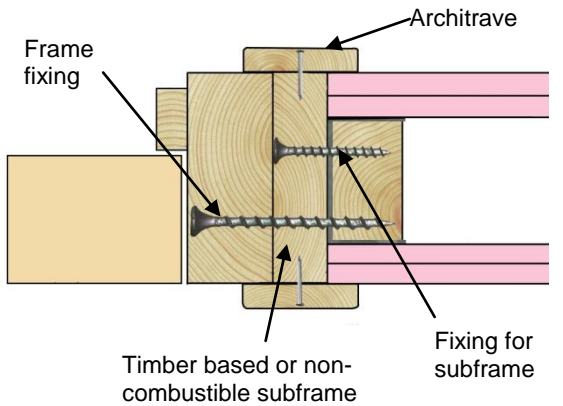
The supporting construction must provide the required level of fire resistance designated for the doorset design and be a suitable medium to permit adequate fixity.

18 Fixings

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.

19 Sealing to Structural Opening

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

<p>1. Gaps up to 10mm must be sealed on both sides with a 10mm depth of acrylic intumescent mastic, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.</p>	
<p>2. Gaps between 10mm and 20mm must be tightly packed with mineral fibre capped on both sides with a 10mm depth of acrylic intumescent mastic, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1. Architraves are optional.</p>	
<p>3. Gaps up to 20mm filled with proprietary fire stopping product (e.g. expanding PU foam or preformed compressible intumescent foam). Products must be tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.</p>	
<p>4. Timber based or non-combustible subframe up to 50mm thick, with no gaps between the components. Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.</p>	

<p>5. Timber based or non-combustible subframe up to 50mm thick, with gaps up to 10mm between the components filled on both sides with 10mm depth of acrylic intumescent mastic or full depth expanding PU foam, fire tested for this application to BS 476: Part 22: 1987 or BS EN 1634-1 Joint must be fitted with 15mm thick architraves overlapping at least 15mm each side.</p>	
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Guidance for various methods of sealing the frame to structural opening gap is also given in BS 8214: 2008, “Code of practice for fire door assemblies”, which may be referred to where appropriate.

Note: Drawings are representative of doorset installation only, actual installations must be as the text within this document specifies.

20 Door Gaps

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 from the door frame by more than 1mm.
Threshold gap	A maximum of 10mm between bottom of leaf and top of floor covering.

21 Insulation

A fully insulating performance may be claimed for a doorset to this design.

22 Smoke Control

22.1 General

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

- (a) have a leakage rate not exceeding $3\text{m}^3/\text{m}/\text{hour}$ (head and jambs only) when tested at 25Pa under BS 476 *Fire tests on building materials and structures*, Section 31.1 - *Methods for measuring smoke penetration through doorsets and shutter assemblies, Method of measurement under ambient temperature conditions*; or
- (b) meet the additional classification requirement of Sa when tested to BS EN 1634-3: 2004 - *Fire resistance tests for door and shutter assemblies, Part 3 – Smoke control doors*.

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

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

22.2 Further Considerations

Note that there is other guidance available, including BS 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.

23 Conclusion

If Strebord 54[®] panelled doorsets, 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 they would provide a minimum of 60 minutes integrity and insulation.

24 Declaration by the Applicant

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

Signed

Name:

For and on behalf of: Falcon Panel Products Ltd


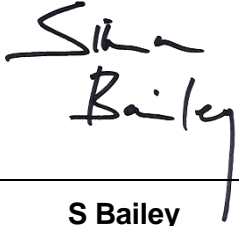
25 Limitations

The following limitations apply to this assessment:

- 1 This assessment addresses itself solely to the elements and subjects discussed and does not cover any other criteria. All other details not specifically referred to should remain as tested or assessed.
- 2 This assessment is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available, 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.

26 Validity

- 1 The assessment is initially valid until 9 September 2015 after which time it must be submitted to BM TRADA for technical review.
- 2 This assessment report is not valid unless it incorporates the declaration given in Section 24 duly signed by the applicant.

Signature:		
Name:	P N Barker	S Bailey
Title:	Senior Consultant	Product Assessor

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Appendix A

Performance Data

Primary Data

Report No	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)	
RF09140	A: LSASD	2100 927 54	BS 476: Part 22: 1987	Integrity:	58
				Insulation:	58
	B: ULSASD	2742 928 54	BS 476: Part 22: 1987	Integrity:	72
				Insulation:	72

Supplementary Data

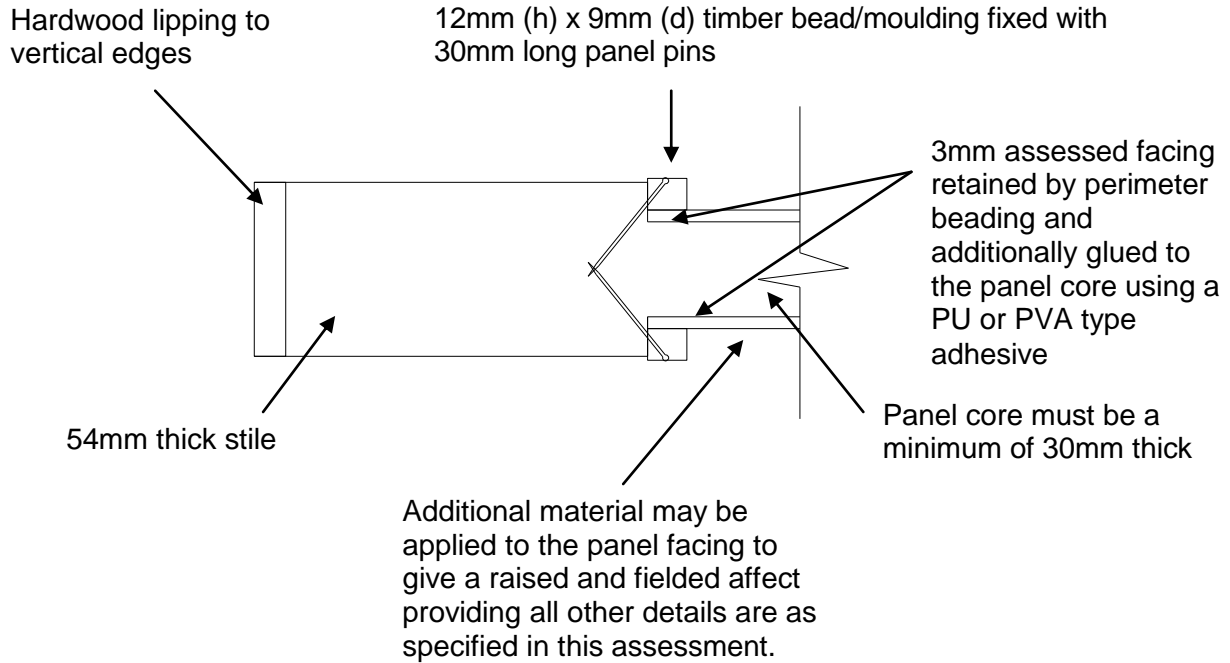
Report No	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)	
IF10035	Fixed panel	1000 915 54	BS 476: Part 22: 1987	Integrity:	70

Notes:

1. The integrity failure observed for the panelled doorset tested in RF09140 was due to burn through of the panel core at 58 minutes. The panel design was re-tested at small scale (IF10035) to investigate a remedial solution for the failure. The testing on the 60 minute panel design at both full scale and small scale demonstrated that the fire integrity performance of the panel design depends on the fixity of the 3mm thick hardboard facing to the panel core. Therefore it has been assessed that the panel facing must be suitably bonded to the panel core, using PVA or PU adhesive as tested, but also retained using timber beading at the perimeter of the panel. The beading must be fixed using steel pins (see section 8 for details).
2. Doorset B, in conjunction with the panel design tested under IF10035 and the panel design tested under RF09140 (doorset A), has been used to support a positive result at full scale for the panelled door design covered by this assessment.

Appendix B

Panel Construction Diagram



Appendix C**Revisions**

Rev.	BM TRADA Ref.	Date	Description
A	A14170	07.07.2011	Inclusion of doorset B tested under RF09140 to support a positive result for the panelled design at full scale in conjunction with indicative test IF10035

Appendix D

Data Sheets for:

Strebord 54[®] Panelled Doorsets

60 Minutes Fire Resistance

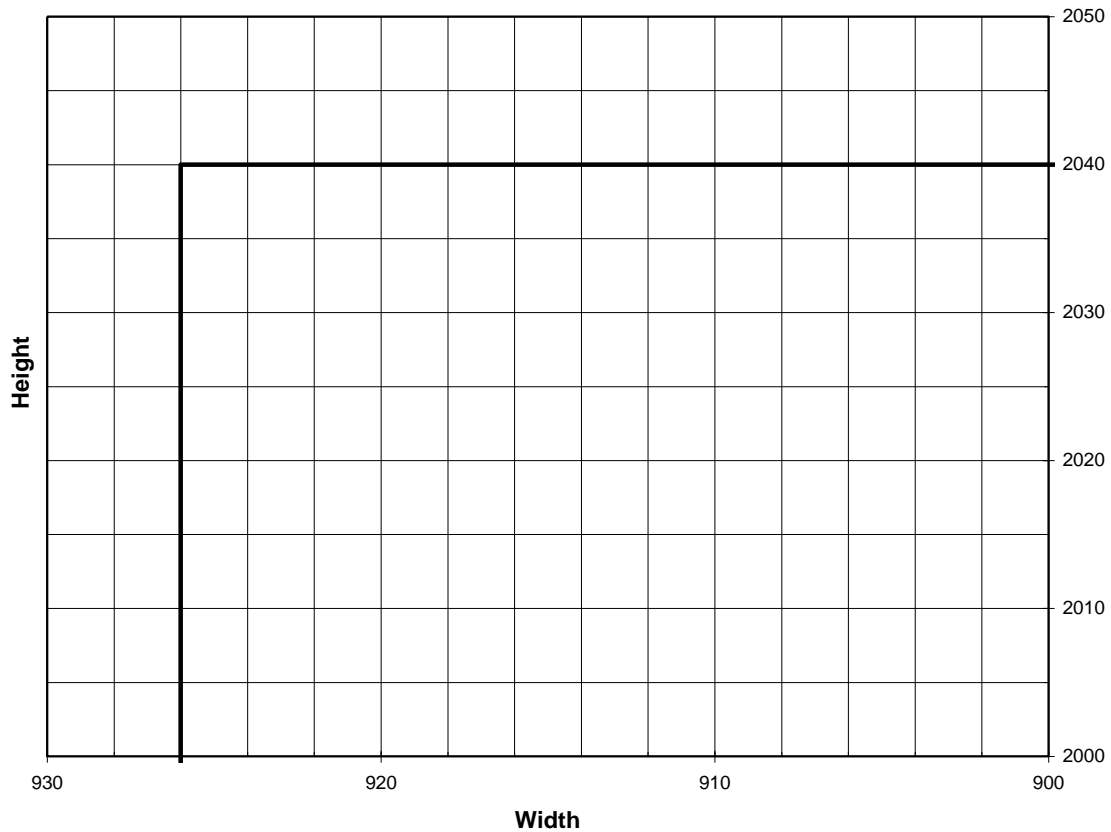
Strebord 54® Panelled Doorsets

Latched Single Acting Single Leaf Doorsets

Leaf sizes	Configuration		Height (mm)	Width (mm)
	LSASD	From:	2040	x
	To:	2040	x	926
Max. Overpanel height (mm)		N/A		
Glazing		Max. glazed area:	N/A	
		Approved systems:	N/A	
Frame specification		Minimum Section (mm):	70 x 32	
		Material:	Hardwood	
		Minimum Density:	640kg/m³	
<p>Approved intumescent materials: Pyroplex rigid box seal PVC encapsulated graphite</p> <p>Head 2 No. 15 x 4mm strips exposed and fitted 8mm apart and 8mm from the opening face in the frame reveal</p> <p>Jamb: 2 No. 15 x 4mm strips exposed and fitted 8mm apart and 8mm from the opening face in the frame reveal</p> <p>Hardware protection: See section 13</p>				

Maximum door leaf size

— LSASD



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BM TRADA provides independent certification, testing, inspection, training and technical services around the world. We help customers large and small to prove their business and product credentials and to improve performance and compliance. With an international presence across many industry sectors, we offer a special focus and long history of technical excellence in supply chain certification, product certification and testing, and technical services to the timber, building, fire and furniture industries.



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