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

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

Testing, calibrating, advising.

Title:

Global Fire Resistance Assessment on Safehinge and Best of Steel SWIFTfit Steel Frames

60 Minutes Fire Resistance

Valid From: 30 November 2015

Valid Until: 30 November 2020

WF Report No:

BMT/CNA/F15269
Revision A

Prepared for:

Safehinge Ltd
Level 4
Skypark 3
14 Elliot Place
Glasgow
G3 8EP

Notified Body No:

1314

Exova Warringtonfire – the new name for BM TRADA

On December 1st 2015, Chiltern International Fire Limited (trading as BM TRADA) commenced trading under the name Exova Warringtonfire.

To coincide with this change, our Technical Reports, Test Reports, Product Assessments, company stationery and marketing collateral have been updated to reflect the Exova Warringtonfire branding.

The validity of all documents previously issued by Chiltern International Fire Limited including certificates, test reports and product assessments is unaffected by this change. A letter to this effect is available upon request by e-mailing globalfire@exova.com

About Exova Warringtonfire

Exova Warringtonfire is part of the Exova Group one of the world's leading laboratory-based testing groups, trusted by organisations to test and advise on the safety, quality and performance of their products and operations. Headquartered in Edinburgh, UK, Exova operates 143 laboratories and offices in 32 countries and employs around 4,500 people throughout Europe, the Americas, the Middle East and Asia/Asia Pacific. With over 90 years' experience, Exova specialises in testing across a number of key sectors from health sciences to aerospace, transportation, oil and gas, fire and construction.

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

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

Kind regards

Exova Warringtonfire

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

Contents

1 Introduction

This assessment has been commissioned by Safehinge Ltd. to consider the fire resistance performance of timber based doorsets with Safehinge and Best of Steel (BOS) SWIFTfit steel door frames. The assessment uses established extrapolation and interpretation techniques in order to extend the scope of application. It does this 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 Proposal

It is proposed to assess the use of the Safehinge™ ALUmax with the following scope of application:

1. BOS SWIFTfit steel door frames
2. 54mm thick Blankfort 60 or 60+ door cores
3. Double leaf doorset configurations
4. Leaves finished with timber edges
5. Decorative and protective faces
6. Concealed transom closers
7. Face fixed over head closers
8. Proprietary glass types and glazing systems
9. Vistamatic glazed units (VS1)
10. Kingsway glazed units (Duralux, Pyrolux, Visilux)

The door designs are required to provide 60 minutes fire resistance performance when judged against BS 476: Part 22: 1987, one of the current fire test standards for non-load bearing elements of construction. This assessment only covers the SWIFTfit steel door frame for use with the tested 54mm thick Blankfort 60/60+ design.

3 Leaf Sizes

The approval for increased leaf dimensions is based on the tests listed in appendix A and takes into account the margin of over-performance above 60 minutes integrity for the design 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.

Doorsets with reduced dimensions are deemed to be less onerous. Therefore, doors with dimensions which are less than those tested and stated in appendix C may be manufactured.

4 Configurations

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

Abbreviation	Description
LSADD & ULSADD	Latched & unlatched, single acting, double doorsets
DADD	Double acting double doorsets

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

5 Leaf Size Adjustment

The Blankfort 60/60+ door leaves approved for use with the Safehinge™ ALUmax system and SWIFTfit may be altered as follows:

Element	Reduction
Leaf	Leaves may be reduced in width without restriction. Reduction in height must be from the bottom edge, in order to maintain a top rail dimension of 100mm. After adjustment the relevant lipping specification must be applied to the specified leaf edges in section 9.1 before fitting the Safehinge ALUmax.
Lipping	The dimensions stated in section 9.1 may be reduced by 20% for fitting purposes at the head and closing/meeting edges only

6 Overpanels and Fanlights

Overpanels and fanlights are not approved for use with the Safehinge and SWIFTfit steel frame.

7 Glazing

7.1 General

For conventional glazing applications the full range of leaf glazing options given in the latest revision of the Blankfort 60/60+ global assessment can be used in conjunction with this assessment. The glazing must installed precisely following the details contained within the latest revision of Chilt/A12152.

For specialist glazing applications the following units have been assessed for use with this door design and are listed below.

7.2 Vistamatic

Vistamatic units are approved for use with the Blankfort 60/60+ door cores. The following sections contain the approved scope for the Vistamatic unit.

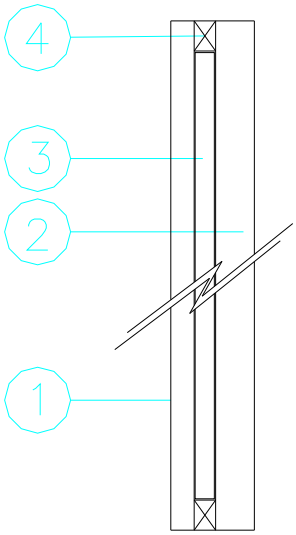
7.2.1 General

The Vistamatic VS1 vision panel comprises a double glazed unit with an additional, movable, centre layer of obscure glass.

The following drawing shows the essential elements of the double glazed unit. The 19mm thick toughened glass must be oriented to the fire risk side of the doorset.

The maximum glazed area permitted within a door leaf for the Vistamatic VS1 is 0.32m^2

Glazed openings must not be less than 100mm from any door edge. Multiple apertures are acceptable within the permitted glazed area, with a minimum dimension of 80mm of core between apertures.

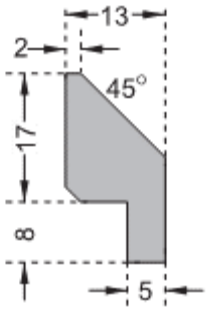


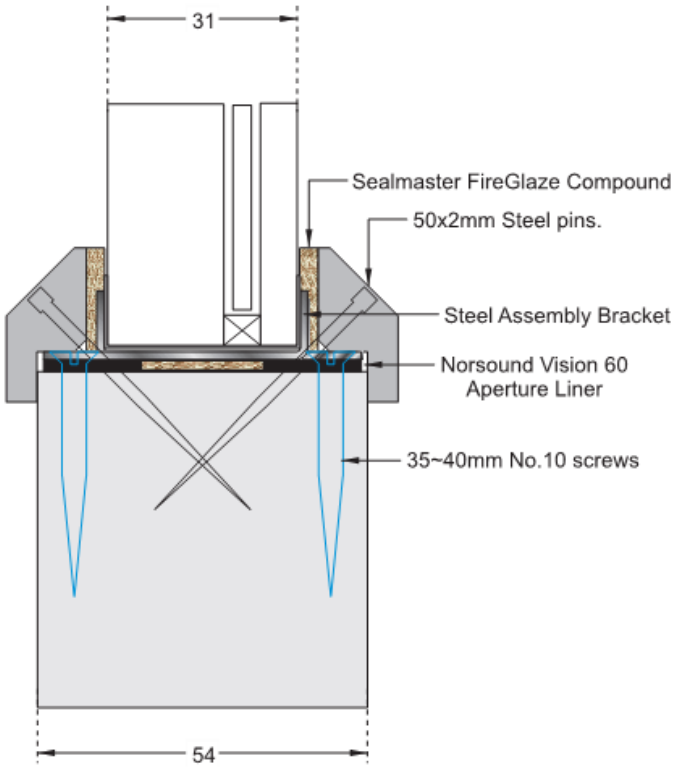
Key:

1. 6mm thick Pyro-EX Toughened Glass
2. 19mm thick Pyro-EX Toughened Glass
3. 4mm thick Annealed Glass
4. 5.5mm thick Stainless Steel Spacer

The vision panel is retained within the door leaf or screen element with either timber or steel beads, which must meet the specifications below.

7.2.2 Timber Beads

Element	Specification
Timber Bead material:	Hardwood (min density 640kg/m^3) excluding beech (Fagus sylvatica)
Glazing System:	4mm (t) Fireglaze – Sealmaster
Aperture liner:	54mm (w) x 2mm (t) Vision 60 glazing liner – Norsound Ltd
Bead fixings:	50mm x 2mm steel pins fitted 50 from corners at 100mm centres at 45º to the face of the glass and located to 'cradle' the vision panel.
Glazing clips:	6 No. steel assembly brackets (glazing clips) 1.2mm (t) x 52mm (w) x 11.2mm (w) fitted around glazing aperture, fixed with 2 No. M8 x 40 (l) screws per bracket
Minimum required bead size (dims in mm):	
Unit installation	Gaps between glass and framing, to permit expansion, should be set at 2 – 3mm on all edges, using non-combustible or hardwood setting blocks at the bottom edge

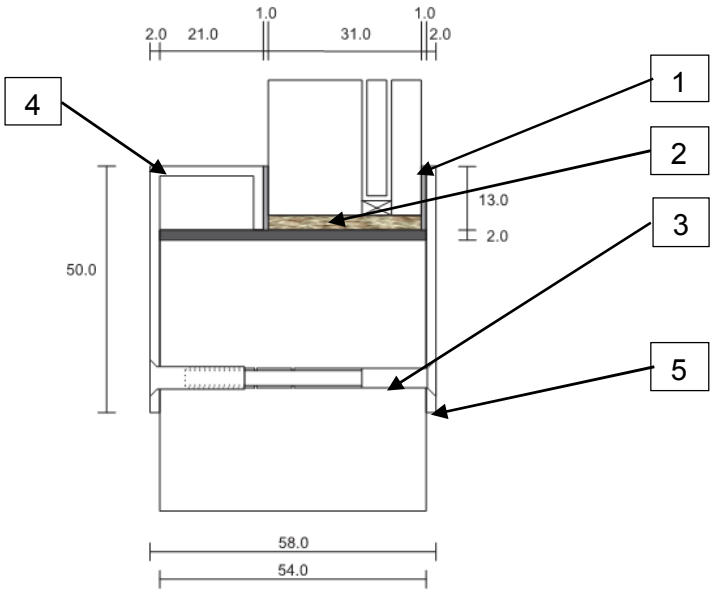


In addition to the provisos above, the following points must be considered when glazing fire resisting doorsets using the Vistamatic VS1 vision panel and timber beads.

1. Pneumatically fired pins are acceptable providing the pins meet the specification given in the table above
2. Timber for glazing beads must be straight grained joinery quality hardwood, free from knots, splits and checks.

7.2.3 Steel Beads

Element		Specification
Bead material:		2mm thick stainless steel
Glazing System[1]:		Autostic adhesive 1mm (t) fitted between glass face and bead
Aperture liner[2]:		54mm (w) x 2mm (t) Vision 60 glazing liner – Norsound Ltd
Bead fixings[3]:		Threaded studs M5 x 12mm (l) welded to unexposed face bead and machine security screws fixed from exposed face M6 x 40mm (l) at 30mm corners and 200mm centres
Bead Profile	Exposed Face[4]	54mm high x 2mm thick
	Unexposed Face[5]	54mm (h) x 22 mm (d) x 2mm (t)
Unit installation		Gaps between glass and framing, to permit expansion, should be set at 2 – 3mm on all edges, using non combustible or hardwood setting blocks at the bottom edge



7.2.4 Glass types

Glass used for the outer panes of the Vistamatic VS1 vision panel must be remain as tested (see section 7.2.1) or the assessed variations shown in the table below.

7.3 Kingsway

The following Kingsway glazed units are approved for use with the Blankfort 60/60+ door cores. The latest revision of Kingsway assessment BMT/CNA/F14154 must be referred to for full details including installation and orientation etc. when installing the units with this door design:

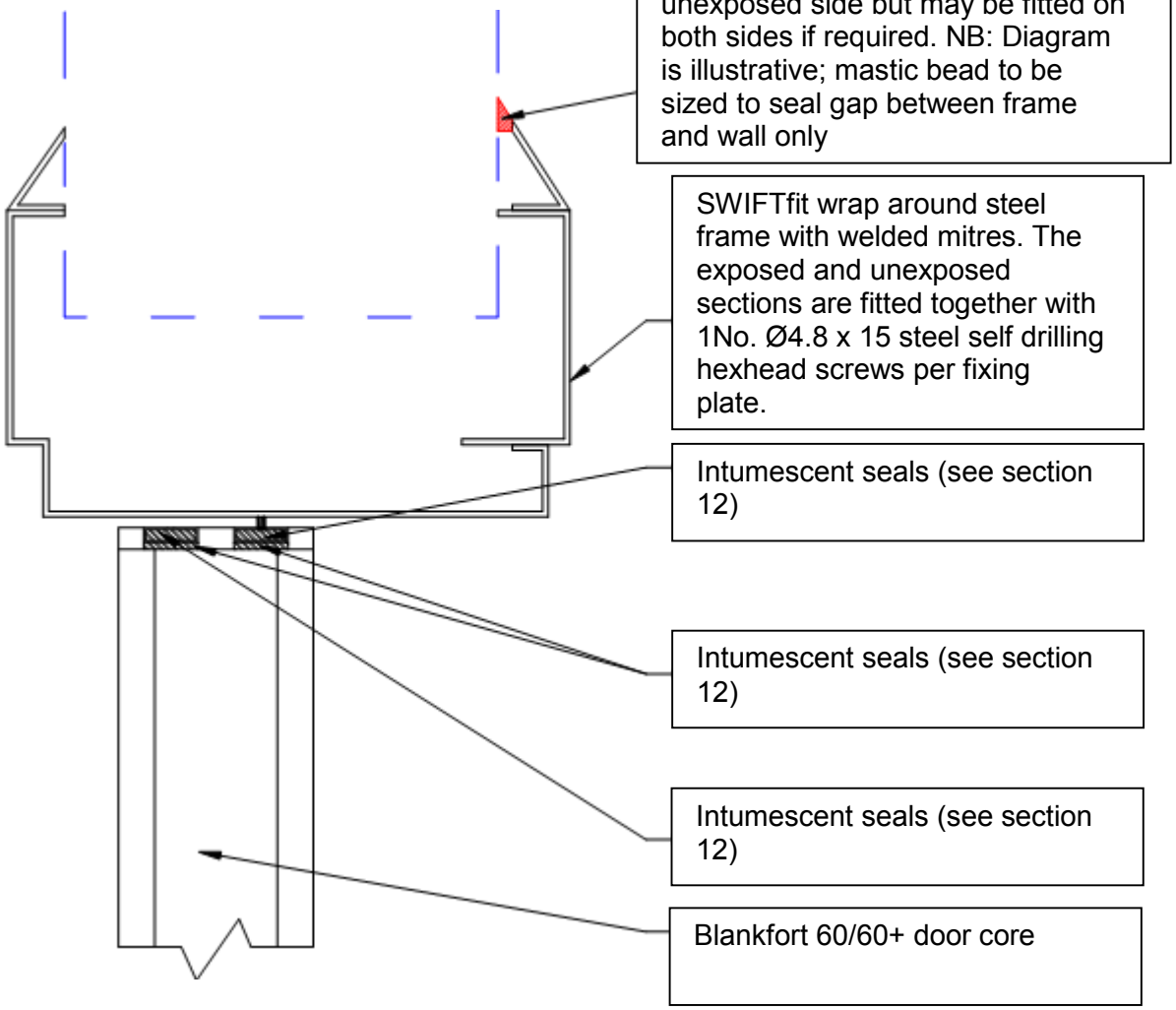
- Visilux 60 Vision Panels
- Duralux 60 Vision Panels
- Duralux Platinum 60 Vision Panels
- Pyrolux 60 Vision Panels

8 Door Frames

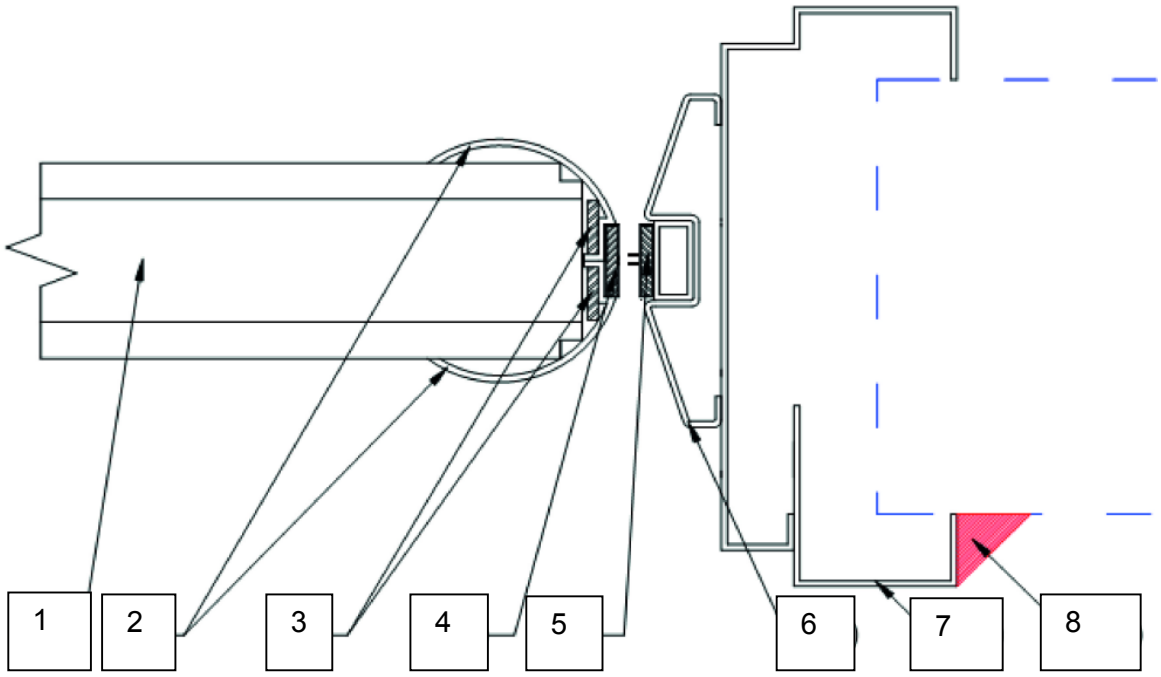
8.1 Tested SWIFTfit Frame Construction

Door frames must be constructed to meet the following specification:

8.1.1 Cross section through head detail



8.1.2 Cross section through hanging edge detail



Key to drawing

1. Blankfort 60/60+ core
2. 2No. SHC50-204 – ALU60 profiles
3. Safehinge intumescent specification (see section 12)
4. Safehinge intumescent (see section 12)
5. Lorient LP2004TS PVC encased Type 617 intumescent seal set in a rebate in the add on hanging jamb component (see section 12)
6. SWIFTfit add on hanging jamb component affixed to hanging jamb with self-drilling screws Ø4.8 x 16 long.
7. SWIFTfit wrap around steel frame with welded mitres. The exposed and unexposed sections are fitted together with 1No. Ø4.8 x 15 steel self drilling hexhead screws per fixing plate.
8. Anti-pick mastic must be fitted on unexposed side but may be fitted on both sides if required. NB: Above diagram is illustrative; mastic bead to be sized to seal gap between frame and wall only

9 Lipping materials

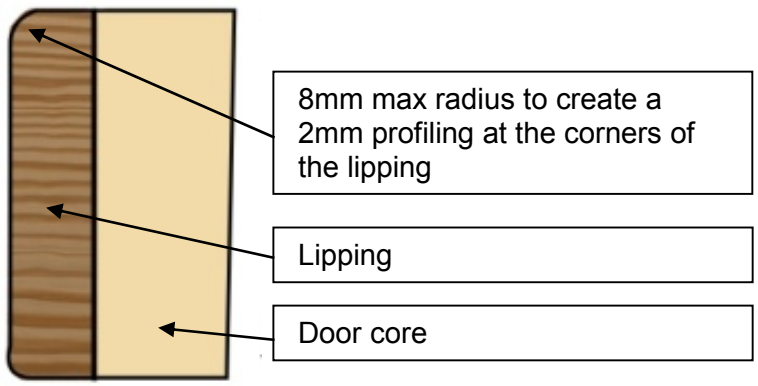
9.1 Timber lippings

Doors must be fitted with timber lippings and lipped in accordance with the following specification:

Material	**Dimensions** (mm)	**Min. Density** (kg/m³)
Timber for lippings must be straight grained, joinery quality hardwood, free from knots, splits and checks	1. Flat = 6 – 10mm thick with a maximum of 2mm profiling permitted at corners of lipping (see diagram below)	640*
	2. Rounded = Not permitted	
	3. Rebated = Not permitted.	

Notes:

1. All edges of the door leaf need to be lipped apart from the hanging edges (where the Safehinge product is fitted)
2. A 2.5° chamfer is permitted to the lipping at the leading edge of leaves providing the door gaps meet the requirements in section 15



10 Decorative and Protective Facings

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

Facing Material	**Maximum Permitted Thickness** (mm)
Paint	0.5
Timber Veneers	2
PVC/Plastic Laminates	2
Decorative Paper/Non-Metallic Foil	0.5

Notes:

1. Metallic facings are not permitted except for push plates and kick plates
2. The door leaf 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

11 Adhesives

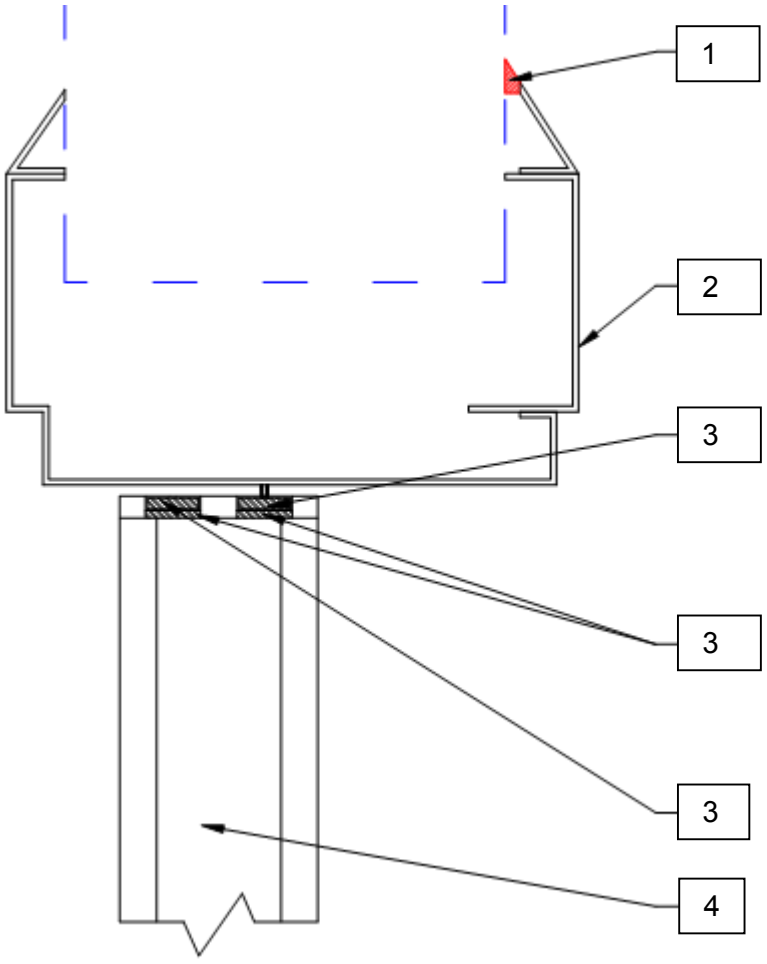
The adhesives used in construction are as follows:

Element	Product
Lippings	Urea Formaldehyde, Phenol Formaldehyde, Polyurethane, PVA
Door core and facings	Manufacturers specification

12 Intumescent Materials

The following diagrams show the location, type and manufacturer of the intumescent materials required for the Safehinge ALUMax and SWIFTfit system.

12.1 Leaf head



1. Anti-pick mastic must be fitted on unexposed side but may be fitted on both sides if required. NB: Above diagram is illustrative; mastic bead to be sized to seal gap between frame and wall only

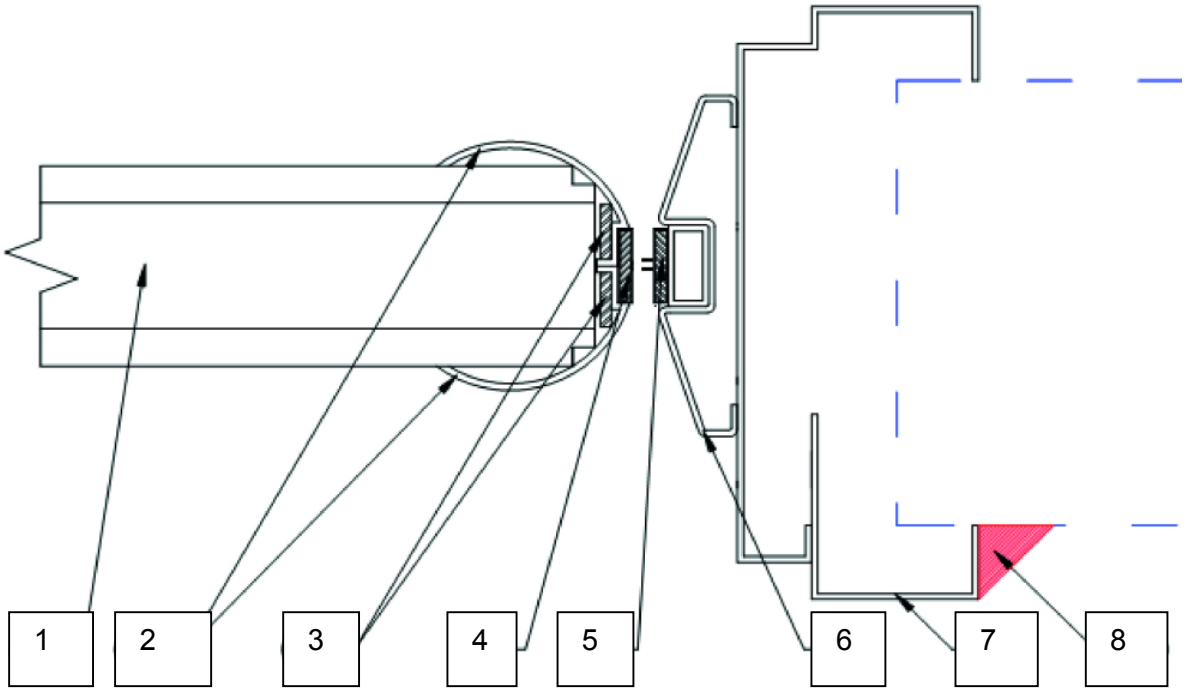
2. SWIFTfit frame system

3. SHC31-153 Seal dual 15x6 light-brown PVC (15x2 Interdens/LP1504 Type 617) and SHC31-250 Seal TS dual 15x6 light-brown PVC (15x2 Interdens/LP1504 Type 617) spaced 10mm apart and centrally fitted in the leaf edge

4. Blankfort 60/60+ door core

12.2 Hanging edge

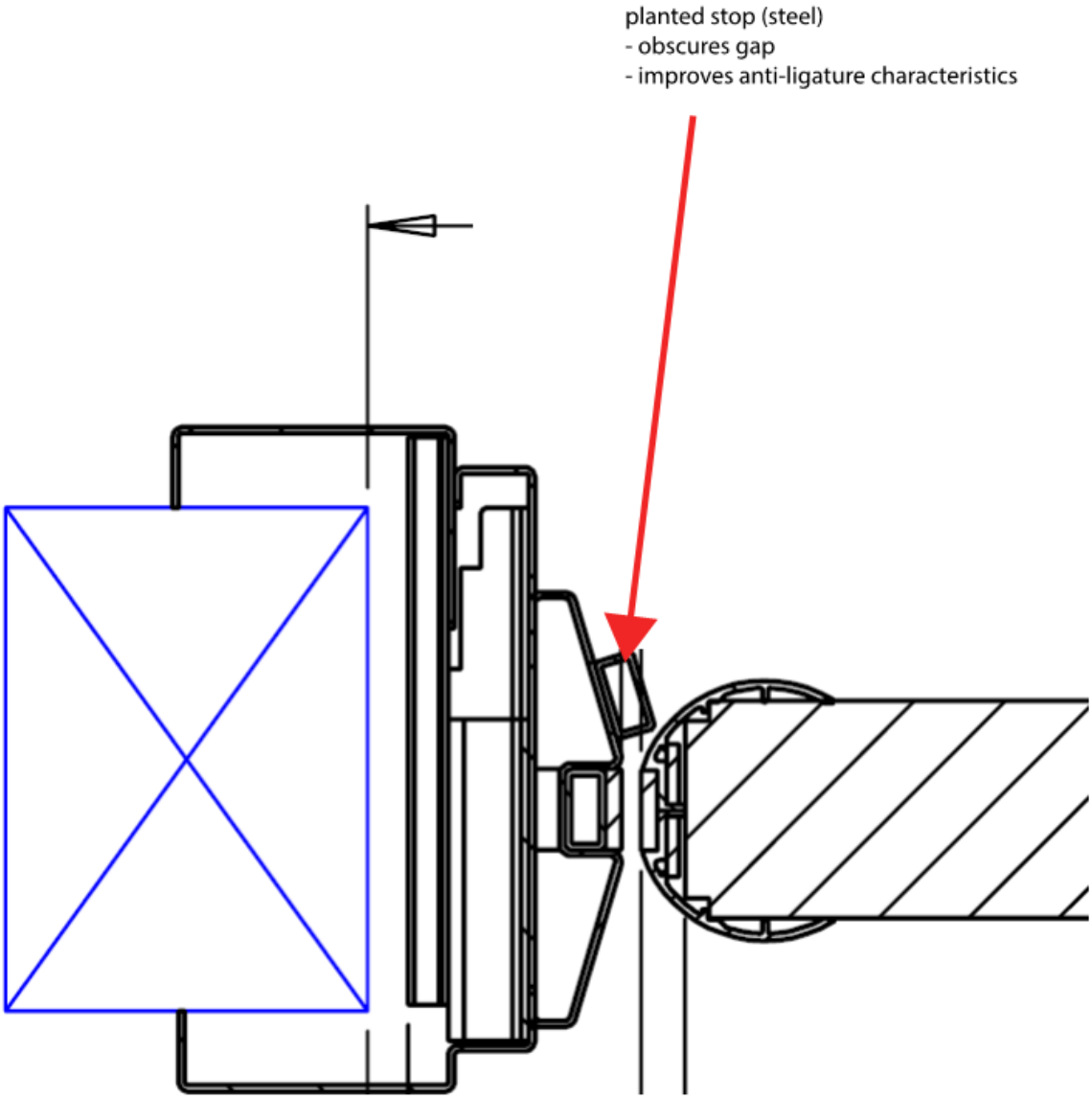
12.2.1 Detail without stop



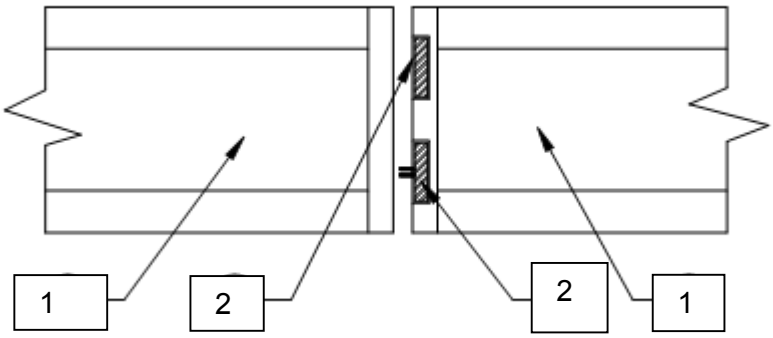
1. Blankfort 60/60+ door core
2. 2No. SHC50-204 – ALU60 profiles
3. 2No. GPF1503 foamed graphite (supplied by Safehinge)
4. LP2004 Type 617 seal – Lorient Polyproducts located centrally within the Safehinge profile
5. LP2004TS Type 617 seal – Lorient Polyproducts located centrally within the SWIFTfit frame jamb add-on
6. SWIFTfit frame jamb add-on
7. SWIFTfit frame system
8. Anti-pick mastic must be fitted on unexposed side but may be fitted on both sides if required. NB: Above diagram is illustrative; mastic bead to be sized to seal gap between frame and wall only

12.2.2 Planted door stop detail

For single acting doorsets and emergency release (double-acting) doors the following planted door stop detail has been assessed as an acceptable detail at the hanging edge door frame jamb on the opposite side from the normal swing of the door.



12.3 Meeting edges – double doors



1. Blankfort 60/60+ door core
2. Lorient Polyproducts LP1504 Type 617 and LP1504TS seal centrally fitted and spaced 10mm apart

12.4 Intumescent protection for hardware

Element	Location	Product
Locksets	Fitted on all faces of the latch body and at the rear of the forend cover plate and rear of the strike	1mm thick Interdens
Transom closer	Fitted around the body of the transom closer and closer arm. The perimeter intumescent seals in the leaf head also run either side of the closer arm in the leaf head	2mm thick Interdens
Rhino lock	Wrapped around the body of the bolt for 350mm from the forend of the bolt	2mm thick Interdens
	Fitted to the rear of the forend and rear of the keep	1mm thick Interdens

13 Tested Hardware

13.1 General

The following hardware has been successfully incorporated in the tests on this doorset design:

Element	Product
Pivot	Safehinge Ltd – Safehinge ALU60 pivot set
Closers	Dorma UK – RTS87 transom closer EN1-4
Locks/Latches	Primera Ltd – lockset PR-3S-46-730A-SSS
Furniture	Primera Ltd – pull handle
Bolts	Primera Ltd –Rhino Lock PR-6304-RB-RK-LL (internal bolt)

14 Additional & Alternative Hardware

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
- Controlled Door Closing Devices: Test Standard EN 1154

14.1 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 24mm wide by 4mm thick
Maximum body dimensions	165mm high by 100mm wide by 18mm thick
Intumescent protection	See section 12.4
Materials	All parts essential to the locking/latching action (including the latch bolt, forend & strike) to be steel or stainless steel
Location	800 – 1200mm from the threshold

14.2 Automatic Closing

14.2.1 Surface fixed closers

It is permitted to fit a surface fixed closer in lieu of the tested concealed overhead closer in conjunction with the Safehinge ALUmax and SWIFTfit door frame system. The closer must have demonstrated contribution to the required performance of this type of 60 minute doorset design, when tested to BS 476: Part 22: 1987, BS EN 1634-1 or BS EN 1634-2.

14.2.2 Concealed overhead closer

It is permitted to use the Dorma RTS80 EMB transom closer in lieu of the tested Dorma RTS87 transom closer, in conjunction with the Safehinge ALUmax and SWIFTfit door frame system. The closer must be fitted with the same intumescent protection as that specified for the transom closer in section 12.4.

14.3 Pull Handles

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

14.4 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 must not amount to more than 20% of the door leaf area if mechanically fixed and a maximum of 30% if bonded with a contact or other thermally softening adhesive. Plates must not return around the leaf edges.

14.5 Threshold Seals

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

Product	Manufacturer
IS8010si	Lorient Polyproducts Ltd.
SUREsound	Lorient Polyproducts Ltd
RP8Si	Raven Products Ltd.
Schall-Ex Duo L-15	Athmer
NOR810, NOR810S, NOR810dB+	Norsound Ltd.
950.05.513	Hafele (UK) Ltd.

15 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	A maximum of 10mm between bottom of leaf and top of floor covering

16 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. Doorsets hung in steel door frames may be fitted into the following types of structural opening:

- Cast dense concrete
- Dense concrete blocks or brickwork
- Masonry
- Lightweight concrete
- Lightweight aerated concrete
- Timber stud partition
- Steel stud partition.

17 Fixings

The door frame jambs must be fixed to the structural opening using screws appropriate for the substrate.

Door frames must be fixed using a minimum of 1No. 5mm diameter steel panhead screws per fixing plate with fixing plates positioned at 450 – 500mm centres.

There must be a minimum of 4 No. fixings per jamb.

18 Sealing to Structural Opening

The SWIFTfit door frame fits over the structural opening and does not require any specific fire stopping material between the frame and the structural opening. However, there must be a continuous seal of anti-pick mastic at the jambs and head as shown in section 12 of this report.

19 Insulation

Doorsets hung within the SWIFTfit door frame are capable of a maximum of 15 minutes insulation performance in terms of the criteria defined by BS 476: Part 20: 1987. This claim can only be made for unglazed doorsets or doorsets fitted with glass capable of a minimum 15 minutes insulation performance.

20 Smoke Control

20.1 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.

20.2 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.

21 Conclusion

If the 60 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 60 minutes integrity and 15 minutes insulation (subject to section 19).

22 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: **Safehinge Ltd**

23 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.

24 Validity

1) The assessment is initially valid for five years from the date of issue stated on the front cover, 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 22, duly signed by the applicant.

Signature:		
Name:	**P N Barker**	**A M Winning**
Title:	Principal Technical Officer	Senior Product Assessor

Appendix A

Performance Data

Primary Data

Report No.	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)	
CFR1411261	ULSASD	2025 889 54	BS 476: Part 22: 1987	Integrity	55[1]
				Insulation	16
	ULSADD	2025 426/889 54	BS 476: Part 22: 1987	Integrity	65
				Insualtion	16

Notes:

1. Doorset A has been used to support the use of the Primera anti-ligature pull handle at 60 minutes. The failure at 55 minutes was at the head of the doorset, which was remote from the pull handle.

Supplementary Data

Report No.	Configuration	Leaf Size (mm)	Test Standard	Performance (mins)
BMT/CNA/F14154 Rev B (Kingsway vision panels)	Varies	Varies	BS 476: Part 22: 1987	30 and 60
IF13037 (Vistamatic VS1 vision panels)	Door leaf sample	1250 (h) x 1230 (w)	Temperature and pressure conditions of BS476: Part 20/22	65
Chilt/A12152 Rev D (Blankfort 60/60+ door design)	Varies	Varies	BS 476: Part 22: 1987	60

Appendix B

Revisions

Rev.	BM TRADA Ref.	Date	Description
A	CNA/F15269	06.01.16	Addition of decorative faces and rebrand.

Appendix C

Data Sheets for:

Safehinge Ltd

Safehinge ALUmax and SWIFTfit steel door frames

60 Minute Fire Resisting Doorsets

Safehinge Ltd. –60 Minute Doorsets

Latched & Unlatched Single and Double Acting Double Doorsets

Leaf Sizes	Configuration		Height (mm)		Width (mm)
	LSADD	From: To:	2025 2106	x x	949 889
	ULSADD & DADD	From: To:	2025 2056	x x	924 889
Maximum Overpanel Height (mm)		N/A	-		

INTUMESCENT MATERIALS:

HEAD: See section 12.1
JAMBS: See section 12.2
MEETING EDGES: See section 12.3
HARDWARE PROTECTION: See section 12.4

Maximum Door Leaf Size