



Testing. Advising. Assuring.

WF Report No. 303718  
Page 1 of 2  
3<sup>rd</sup> March 2016

**Mr Philip Jones**  
**P C Henderson Limited**  
Durham Road  
Bowburn  
Co. Durham  
DH6 5NG

**Review of Assessment Report Referenced WFRC No. C116602 issue 2**

**1 Introduction**

The assessment referenced WFRC No. C116602 issue 2 provides an appraisal on the fire resistance performance of previously tested and assessed FD30 and FD60 timber based doorsets when supplied in a sliding configuration using a 'Marathon' fire door kit.

The appraisal report concludes that the previously tested and assessed doorsets when installed in a sliding configuration by the use of a 'Marathon' fire door kit, would be expected to be capable of providing the required 30 minutes integrity and insulation (where applicable) performance, if tested in accordance with BS 476: Part 22: 1987. The appraisal is valid only when the sliding mechanism is positioned to the non fire risk side of the construction, and also when the specification of the door leaf satisfies the dimensional constraints detailed within this report.

**2 Confirmation of Specification**

It has been confirmed by P C Henderson Limited that there have been no changes to the specification of the construction considered in the original appraisal referenced WFRC No. C116602 issue 2.

**3 Conclusions**

The data used for the original appraisal has been re-examined and found to be satisfactory.

The procedures adopted for the original assessment have been re-examined and are similar to those currently in use.

Therefore, with respect to the assessment of performance given in WFRC No. C116602 issue 2, the contents should remain valid until the 1<sup>st</sup> April 2021.

#### 4 Validity

This review is based on information used to formulate the original assessment. No other information or data has been provided by P C Henderson Limited which could affect this review.

The original appraisal report was performed in accordance with the principles of the UK Fire Test Study Group Resolution 64A: 1993, which has since been superseded by Resolution 82: 2001. This review has therefore also been conducted using the principles of Resolution 82: 2001.

Performed by:



**A Kearns**  
Technical Manager  
Technical Department  
**Exova Warringtonfire**

Reviewed By:



**D Hankinson**  
Principal Certification Engineer  
Technical Department  
**Exova Warringtonfire**

This copy has been produced from a .pdf format electronic file that has been provided by **Exova Warringtonfire** to the sponsor of the report and must only be reproduced in full. Extracts or abridgements of reports must not be published without permission of **Exova Warringtonfire**. The pdf copy supplied is the sole authentic version of this document. All pdf versions of this report bear authentic signatures of the responsible **Exova Warringtonfire** staff.

Exova Warringtonfire  
Holmesfield Road  
Warrington  
WA1 2DS  
United Kingdom

T : +44 (0) 1925 655 116  
F : +44 (0) 1925 655 419  
E : warrington@exova.com  
W : www.exova.com



Testing. Advising. Assuring.

**Title:**

The Fire Resistance  
Performance of Previously  
Tested Timber Door  
Assemblies When Installed  
as Sliding Doors Using a  
Marathon Fire Door Kit

**WF Assessment Report  
No:**

116602 issue 2

**Prepared for:**

**P C Henderson Limited**

Durham Road  
Bowburn  
Durham  
DH6 5NG

**Date:**

**26<sup>th</sup> January 2011**

## **TABLE OF CONTENTS**

<b>SECTION</b>	<b>PAGE</b>
<b>Executive Summary.....</b>	<b>3</b>
<b>Introduction .....</b>	<b>4</b>
<b>Assumptions .....</b>	<b>4</b>
<b>Proposals .....</b>	<b>5</b>
<b>Basic Test Evidence .....</b>	<b>6</b>
<b>Assessed Performance .....</b>	<b>6</b>
<b>Conclusions .....</b>	<b>10</b>
<b>Validity .....</b>	<b>10</b>
<b>Summary of Primary Supporting Data .....</b>	<b>11</b>
<b>Declaration by PC Henderson Ltd.....</b>	<b>12</b>
<b>Signatories .....</b>	<b>13</b>
<b>Annex A – Details of FDK1 and FDK2 .....</b>	<b>14</b>

## Executive Summary

---

<b>Objective</b>	<p>This report presents an appraisal of the expected fire resistance performance of FD30 or FD60 timber based door leaves, similar to those previously successfully tested (or assessed by Warringtonfire), but modified for use as detailed in Section 3 of this report by the fact that the doorsets will be supplied in a sliding configuration using a Marathon Fire Door Kit.</p> <p>The doorsets are required to provide 30 minutes integrity and insulation (where applicable) performance should the doorsets be tested in accordance with the relevant Clause of BS 476: Part 22: 1987, when exposed on the side of the doorset not containing the sliding gear mechanism.</p>
<b>Report Sponsor</b>	<b>P C Henderson Limited</b>
<b>Address</b>	Durham Road Bowburn Durham DH6 5NG
<b>Summary of Conclusions</b>	<p>Previously tested, assessed (by warringtonfire) or CERTIFIRE approved, FD30 or FD60 timber based door leaves, installed in a sliding configuration by the use of a Marathon Fire Door Kit, would be expected to be capable of satisfying the integrity and insulation (where applicable) criteria for a period of 30 minutes, if subjected to a test in accordance with BS 476: Part 22: 1987.</p> <p>This appraisal is valid only when the sliding mechanism is positioned to the non fire risk side of the construction, and also when the specification of the door leaf satisfies the dimensional constraints detailed within this report.</p>
<b>Valid until</b>	1 <sup>st</sup> February 2016

**This report may only be reproduced in full. Extracts or abridgements of reports shall not be published without permission of Exova warringtonfire.**



## Introduction

---

This report presents an appraisal of the expected fire resistance performance of FD30 or FD60 timber based door leaves, similar to those previously successfully tested (or assessed by Warringtonfire), but modified for use as detailed in Section 3 of this report by the fact that the doorsets will be supplied in a sliding configuration using a Marathon Fire Door Kit.

The doorsets are required to provide 30 minutes integrity and insulation (where applicable) performance should the doorsets be tested in accordance with the relevant Clause of BS 476: Part 22: 1987, when exposed on the side of the doorset not containing the sliding gear mechanism.

### FTSG

The data referred to in the supporting data section has been considered for the purpose of this appraisal which has been prepared in accordance with the Fire Test Study Group Resolution No. 82: 2001.

## Assumptions

---

It is assumed that the door leaves which will be installed as sliding doorsets will have been incorporated into doorsets which have been successfully tested to BS 476: Part 22: 1987, assessed by Warringtonfire or will be CERTIFIRE approved, for a period of at least 30 minutes.

It is also assumed that the construction of the door leaves and the materials used in their construction will, unless specifically detailed in this report, be identical to those of the tested, or assessed, assemblies.

In addition, it is assumed that the doorsets will be installed by competent installers in a similar manner to that used when installing the fire tested assembly.

It is assumed door leaves which are to be installed as sliding doors utilising the Marathon Fire Door Kit will comprise a construction consisting of a timber based, timber framed, solid cored construction. Providing relevant test or assessment evidence is available any specification of core and facings material is acceptable.

The sliding doors will be mounted onto masonry, concrete or timber stud partitioning systems. This report does not consider the installation of the doorset assemblies when mounted to steel stud partitioning systems.

The conclusions offered within this report regarding the expected fire resistance of the sliding door assemblies are based on the fact that the doors will be in the fully closed position. **Note: The FDK2 design variant (without counterweights or associated components) is not self closing and so it must be reinforced that any conclusions stated in this report only apply when the door is in the fully closed position. It is recommended that guidance is sought with regards to the acceptability of doors with no self closing function.**

## Proposals

---

It is proposed that a timber sliding doorset mechanism, previously tested in accordance with BS 476: Part 8: 1972, Section 7 be assessed against the testing procedures and performance criteria given in BS 476: Part 22: 1987, Clause 7.

In addition, it is proposed that any previously tested, assessed or CERTIFIRE approved timber door leaf (successfully tested or assessed at the dimensions required, when part of a standard doorset construction, and shown to achieve a fire resistance of at least 30 minutes) may be combined with a Marathon Fire Door Kit in a sliding configuration.

Briefly, the proposed sliding door assemblies comprise a timber based door leaf suspended from running gear attached to the structural opening. The bottom edge of the door leaf will be provided with a steel guide channel which engages into a steel floor mounted guide. The door leaf is counterbalanced by a steel weight such that the door leaf will be returned to the fully closed position once operated. Plywood or non-combustible board fascias will be fitted over the sliding mechanism and also over the counterbalance weight pocket such that a rebate is formed into which the leading edge of the door leaf engages when in the closed position.

In the closed position, the leading edge of the door leaf will engage into a rebate formed from timber. The trailing edge of the leaf will be fitted, at mid-height, with a steel angle which again in the closed position will engage into a steel 'receiving plate' fitted into a timber post which will be positioned on the closing edge side of the aperture.

It is proposed that the previously appraised sliding doorsets may be further modified for an increase in size over that previously appraised, as follows:

Height:	maximum 3000 mm
Width:	minimum 750 mm, maximum 1500 mm
Thickness:	50 mm
Weight:	90 kg

Full details and specification of the sliding mechanism and framing requirements are given in the drawing attached to this report and within the test report referenced WARRES No. 40991.

It is proposed that for domestic dwellinghouse applications (where the self closing function of a fire door is not mandatory), the Marathon FDK2 design variant may be utilised. This variant does not include the counterweight components which are normally used on the FDK1 self closing variant. It is proposed that the FK2 variant may still satisfy the proposed fire resistance performance (assuming the door is in the fully closed position).



In addition it is proposed that modifications may be made to the pulley closing mechanism such that the weight closing system may be positioned to either side of the sliding gear.

## Basic Test Evidence

---

The doorset tested and reported under the reference WARRES No. 40991 comprised a sliding door within a frame. The overall size of the door leaf was 2096 mm high by 1064 mm wide by 43 mm thick. The door leaf contained a glazed opening of a sight size 760 mm high by 210 mm wide. The door leaf comprised a chipboard core. The specimen satisfied the performance criteria specified in BS 476: Part 8: 1972, Section 7 for the following periods:

Stability: 54 minutes (test discontinued)

Integrity: 35 minutes

Insulation: 0 minutes (glazing included)

A summary of the test report is given later in this report.

## Assessed Performance

---

### Testing Standard Comparison - Test procedures

The available test evidence indicating the fire resistance performance of timber leaves installed using the Marathon sliding mechanism is provided by the test report referenced WARRES No. 40991. Since this report relates to a test conducted in accordance with the test standard BS 476: Part 8: 1972, and this standard has been superseded by the standard referenced BS 476: Part 22: 1987, a comparison of the test standards should therefore be made to ensure the results of the original test remain valid.

The following comments are related specifically to areas of the test methods which are directly concerned with the fire resistance performance of the type of doorset in question. The comments refer to sections of the test methods most likely to affect the fire resistance performance of the previously tested doorset.

### Heating Regime

The furnace temperature/time curves and allowable tolerances specified by each of the British Standards are almost identical and allow for correlation. Similar temperature monitoring devices and positional requirements are common to each test method.

### Furnace Pressure

The atmospheric pressure within the furnace chamber as stated within the Standard, and confirmed within the test report referenced WARRES 40991, was controlled such that at three-quarters of the height of the specimen its value was  $10 \pm 2$  Pa.



The current British Standard BS 476: Part 22: 1987, requires a maximum over pressure of 20 Pa irrespective of a specimen height. The pressure gradient within the furnace chamber is specified at 8.5 Pa/m and a neutral value is required at a height of 1 metre above the notional floor level. In the case of the tested doorset, the maximum pressure at the head of the door leaf under this regime would be approximately 9.4 Pa.

These requirements are considered to be sufficiently similar to allow a direct comparison. Therefore similar test results would be expected if a similar assembly was to be subjected to a fire resistance test in accordance with BS 476: Part 22: 1987.

**Performance  
Criteria - Stability**

Whilst BS 476: Part 8: 1972 included a stability criteria, the current British Standard has dispensed with this requirement completely. Instead, the occurrence of collapse of the specimen has been taken into account under the requirements for integrity in the more recent Standard.

**Performance  
Criteria -  
Integrity**

Sustained flaming on the unexposed surface of the specimen is considered by both test methods to constitute a loss of integrity. The definition of sustained flaming is similar in both Standards.

Both Standards include a provision for the use of a cotton pad in order to determine whether cracks in the specimen would allow the passage of hot gases or flames. The specification and use of the cotton pad remains similar for both testing Standards.

Integrity failure is also considered by both Standards in relation to the formation of through gaps of specified size. The specified gap sizes recommended by each of the Standards is generally similar, therefore the determination of integrity in this respect is reasonably consistent for each of the Standards.

**Performance  
Criteria -  
Insulation**

The tested doorset incorporated a glazed vision panel and as such when it was tested in accordance with BS 476: Part 8: 1972, it was given an insulation value of 0 minutes.

Should an identical doorset be tested in accordance with the current Standard - BS 476: Part 22: 1987, the doorset would be classified as a partially insulating doorset (since the doorset incorporates less than 20% non-insulating features) and so would be tested according to Clause 7 of the Standard.

In accordance with Clause 7 of BS 476: Part 22: 1987, the temperatures on the unexposed surface of the non-insulating feature, are not utilised when determining the mean or maximum temperature rise of the specimen, and consequently the doorset would be given an insulation value.

It is considered therefore, that the results obtained from the fire test referenced WARRES No. 40991 would be similar to those achieved if the construction were to be tested in accordance with the current standard, and as such the evidence may be used as the basis for justification of the additional proposals.

### **Use of Alternative Doorsets**

The proposal involves allowing any previously tested, assessed or CERTIFIRE approved, timber based door leaves, which have been shown to achieve at least 30 minutes fire resistance when tested in accordance with BS 476: Part 22: 1987.

The doorset section that was included in the test referenced WARRES No. 40991, comprised a flaxboard core, hardwood rails and softwood stiles.

It is generally considered that flaxboard is the most onerous material with respect to burn through resistance and dimensional stability under fire conditions. However, doorsets having different constructions are likely to exhibit varying deflection and distortion characteristics when exposed to standardised fire conditions.

The specimen tested under the reference WARRES No. 40991, incorporating the flaxboard door leaf proved its ability to satisfy the integrity requirements of the standard for a period of 35 minutes. No significant distortion of the leaf was exhibited during the test. However, when considering the utilisation of alternative door leaf constructions, any variation in exhibited deflection may have a detrimental effect on the fire resistance performance of the doorset.

### **Leaf Size and Weight**

Generally, larger door leaves (when hung in a typical 'swing' configuration) experience increased deflections and distortions which can lead to potential failure around the perimeter leaf to frame junctions. However, in the case of the door leaves installed with the Marathon Fire Door Kit restraint is given to all four edges of the leaf.

In order to limit the deflection of the leaf, a steel 'binder' angle will be fitted to the mid height of the trailing edge of the door leaf which will engage into a steel retaining plate fitted to the door frame. The use of this 'binder' would be expected to limit any undue deflection at the trailing edge of the leaf. In addition, restraint to the leaf will be provided along its top edge (by the sliding mechanism), along its closing edge (by the rebated formed by the framing members) and along its bottom edge (by the door guide fitted to the floor and engaging into a groove provided in the bottom edge of the leaf).

The restraint provided to all four edges of the door leaf is therefore considered more than adequate to compensate for any variation in the likely dimensional stability experienced by alternative door leaf constructions. In addition, the use of the intumescent seal which is required to be fitted (the seal specification to be an aluminium encased, mono-ammonium phosphate intumescent referenced Sealmaster IF60 – which has large gap filling but low pressure forming characteristics) will provide the necessary sealing requirements around the leaf/frame interface.

It is therefore considered acceptable to positively appraise the use of the Marathon Fire Door Kit with door leaves of alternative construction at sizes previously tested (and suitable for use with the marathon door kit) assessed by Warringtonfire or CERTIFIRE approved.



The dimensional specification constraints of doors which are deemed to be suitable for use with the marathon sliding door kit are as follows:

Height:	maximum 3000 mm
Width:	minimum 750 mm, maximum 1500 mm
Thickness:	maximum 50 mm
Weight:	90kg

#### **Pulley Closing Mechanism**

The modification proposed to the pulley system simply comprises the use of additional rollers such that the pulley rope may double back on itself, i.e. such that the weighted closing bar may be positioned on the 'trailing' edge side of the door leaf. This modification would not be considered to have any significant detrimental effect on the fire resistance performance of the assembly since all sliding gear and closing gear components will continue to be situated on the non-fire side of the construction.

#### **FDK2 Variant**

The FDK2 variant is designed for use in domestic dwellinghouse situations where the self-closing function is not required. This variant is identical to the self-closing FDK1 variant with the exception that the counterweight (and associated components) are not utilised.

Although the self-closing functionality of the FDK2 variant is removed, it is considered that, providing the door is fully closed and that the leading edge is fully located within the receiving pocket of the frame, the ability of the doorset to provide the required fire resistance performance is unlikely to be compromised.

The main principles of the sliding door assembly is that the leading edge of the leaf locates within a frame pocket with the head and trailing edges incorporating interlocking steel angles. The intumescent door leaf edge protection at these positions is orientated such that they act upon the face of the door leaf and seal the gap between the door face and the framing components. Their intumescent 'swelling' action does not induce any forces on the door which may cause it to open – in fact their reaction will effectively 'clamp' the door leaf in position. Providing the leaf is in the fully closed position at the commencement of any fire exposure conditions, it is unlikely that the door will 'open', thus rendering the counterweight component superfluous.

The FDK2 variant is therefore positively assessed.



## Conclusions

---

Previously tested, assessed (by Warringtonfire) or CERTIFIRE approved, FD30 or FD60 timber based door leaves, installed in a sliding configuration by the use of a Marathon Fire Door Kit, would be expected to be capable of satisfying the integrity and insulation (where applicable) criteria for a period of 30 minutes, if subjected to a test in accordance with BS 476: Part 22: 1987.

It is an essential prerequisite of this report that the following conditions are satisfied:

- the Marathon Fire Door Kit and sliding mechanism must be fitted to the non-fire risk side of the construction. No comment of the suitability of the system when installed on the fire risk side of the wall is given.
- any door leaf which is utilised with the Marathon Fire Door Kit and sliding mechanism must have either been tested or assessed (to BS 476: Part 22: 1987), or be CERTIFIRE approved, ***at the dimensions required***, for the minimum required period of 30 minutes.

## Validity

---

This assessment is issued on the basis of test data and information available at the time of issue. If contradictory evidence becomes available to Exova **warringtonfire** the assessment will be unconditionally withdrawn and **P C Henderson Limited** will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion. The assessment is valid initially for a period of five years i.e. until 1<sup>st</sup> February 2016, after which time it is recommended that it be returned for re-appraisal.

The appraisal is only valid provided that no other modifications are made to the tested construction other than those described in this report.

## Summary of Primary Supporting Data

---

**WARRES No.  
40991**

A report on a fire resistance test performed in accordance with BS 476: Part 8: 1972, Section 7, on a specimen of a sliding door and frame assembly.

The overall size of the door leaf was 2096 mm high by 1064 mm wide by 43 mm thick. The door leaf contained a glazed opening containing Georgian wire reinforced polished plate glass and the perimeter edges of the glazing and the door framing contained intumescent seals. The sight size of the glazed opening was 760 mm high by 210 mm wide and the core of the door leaf consisted of a chipboard material.

The door assembly was fitted to a timber stud and plasterboard lined partitioning system such that the side of the assembly which did not contain the sliding mechanism faced the heating conditions of the test.

The specimen satisfied the performance criteria of the above mentioned Standard for the following periods:

**Stability:**54 minutes (test discontinued)

**Integrity:**35 minutes

**Insulation:**0 minutes (glazing included)

Test Date : 10<sup>th</sup> April 1987

Sponsor : Permission has been given by the original sponsor of the test to use the above test information in the formulation of this appraisal.

## Declaration by PC Henderson Ltd

---

We the undersigned confirm that we have read and complied with the obligations placed on us by the UK Fire Test Study Group Resolution No. 82: 2001.

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 the assessment is being made.

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.

We are not aware of any information that could adversely affect the conclusions of this assessment.

If we subsequently become aware of any such information we agree to cease using the assessment and ask Exova **warringtonfire** to withdraw the assessment.

Signed:

---

For and on behalf of:

---

Signed:

---

For and on behalf of:


---



## Signatories

---


Responsible Officer
A. Kearns* - Technical Manager


Approved
C. Johnson* - Principal Certification Engineer

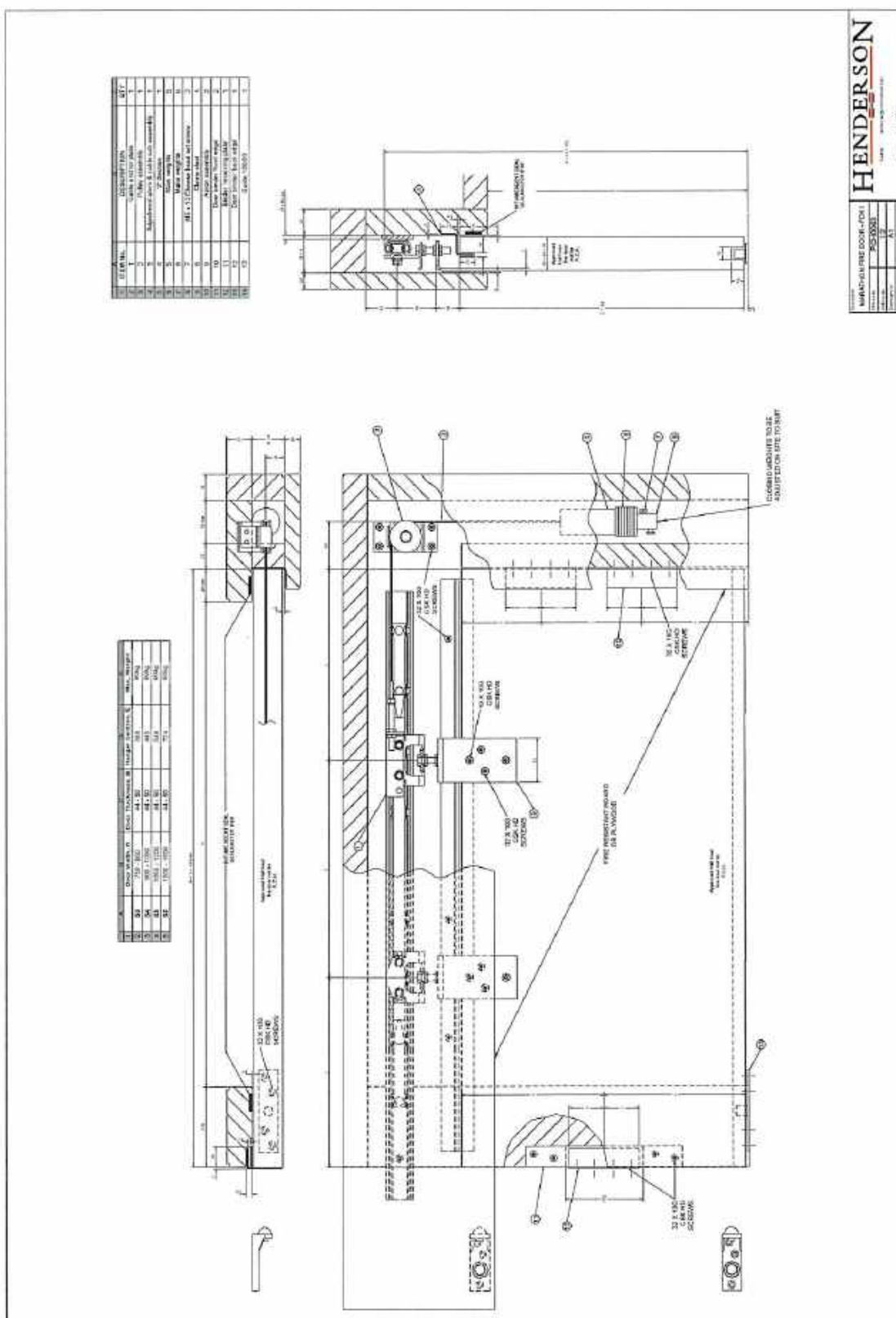
\* For and on behalf of Exova **warringtonfire**.

Report Issued: 26th January 2011
----------------------------------

The assessment report is not valid unless it incorporates the declaration duly signed by the applicants.

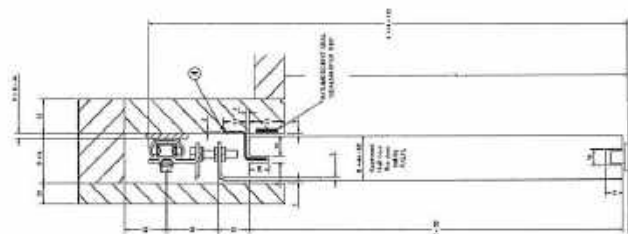
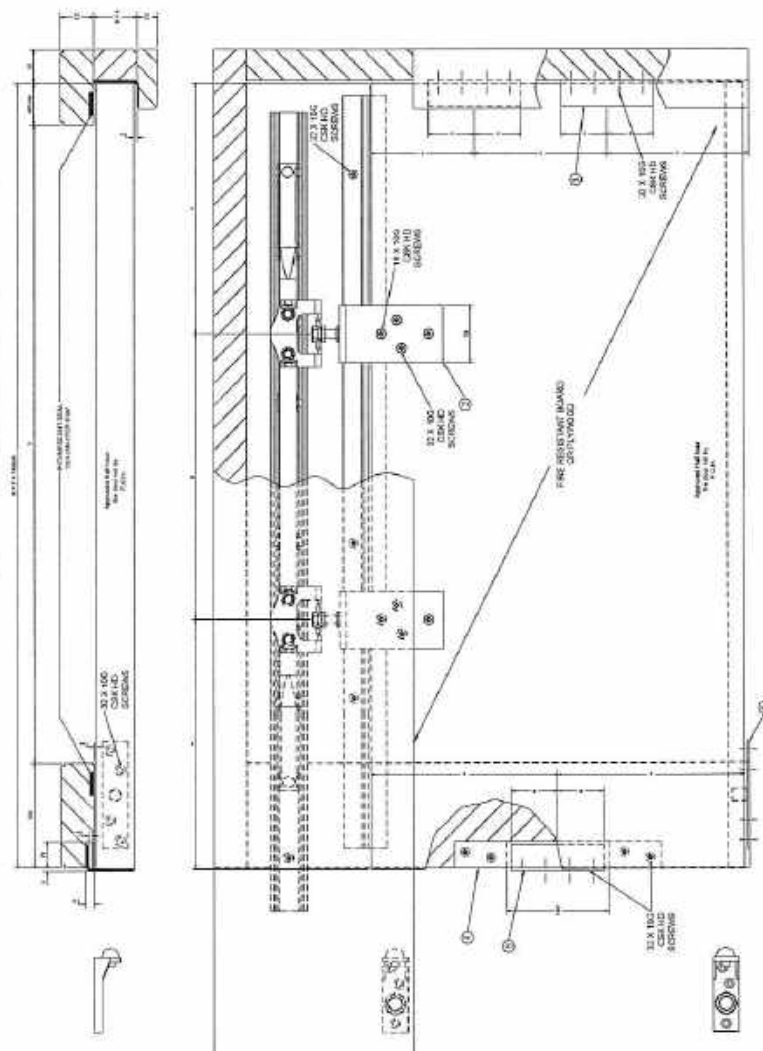
This copy has been produced from a .pdf format electronic file that has been provided by Exova Warringtonfire to the sponsor of the report and must only be reproduced in full. Extracts or abridgements of reports must not be published without permission of Exova Warringtonfire. The original signed paper version of this report is the sole authentic version. Only original paper versions of this report bear authentic signatures of the responsible Exova Warringtonfire staff.

## Annex A – Details of FDK1 and FDK2



ITEM NO.	DESCRIPTION	QTY
1	2" square	1
2	Active internally	1
3	Four holes "flat edge"	3
4	Bracket to mounting plate	1
5	Near 1/2" thick copper	1
6	Cable 10073	1

	Base Wages, \$	Base Pensions, %	Manager Covenants, %	Min. Height
1	5.5	7.5 (10)	04-50	5'10"
2	5.4	6.0 (7.5)	02-50	5'10"
3	5.5	10.0 (12.5)	04-50	5'10"
4	5.8	7.0 (10)	04-50	5'10"



	PG-830	
Trade		
Creative	1.2	
Production	6.7	
Total	8	

© 1998 by The McGraw-Hill Companies, Inc.

# HENDERSON

U.S.A. [www.henderson.com.au](http://www.henderson.com.au)

Australia 02 9550 4444