# Fire Resistance Test

**Sponsor:**
Pyroplex Ltd
The Furlong
Droitwich
Worcestershire
WR9 9BG

## CONFIDENTIAL

**Report: Chilt/RF13175**

A fire resistance test performed on a double leaf single acting doorset with glazing

Test conducted in accordance with BSEN 1634-1: 2008 and BSEN 1363-1: 1999

**Test date:** 30th August 2013



UKAS TESTING 1762



**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.

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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

## Contents

# 1 Summary of performance

The following performance was achieved from the specimens tested. Full details of the testing and specimen construction are described in the report.

**Results:**

**Fire resistance test in accordance with BSEN 1634-1: 2008 and BSEN 1363-1: 1999**

| | |
|---|---|
| **Integrity** | |
| Cotton pad | 30 (thirty) minutes |
| Continuous flaming | 30 (thirty) minutes |
| Gap gauges | 33 (thirty three) minutes |
| **Insulation** | |
| Average set | 30 (thirty) minutes** |
| Maximum ≥ 100mm in from leaf edge | 30 (thirty) minutes** |
| Maximum ≥ 25mm in from leaf edge | 29 (twenty nine) minutes |
| Door frame ≥ 180ºc temp rise | 30 (thirty) minutes** |
| Door frame ≥ 360ºc temp rise | 30 (thirty) minutes** |
| Glass | 30 (thirty) minutes** |
| **Radiation** | |
| Time to reach 15k W/m$^2$ | 34 (thirty four) minutes* |

* No failure of the test criteria had occurred at termination of the test at 34 minutes
** Failure by virtue of integrity failure at 30 minutes


**Summary of specimen:**

**A double leaf single acting doorset with glazing**

Left leaf size: 2148mm high x 928mm wide x 44mm thick

Right leaf size: 2148mm high x 928mm wide x 44mm thick

# 2 Introduction

The doorset was installed into a flexible supporting construction. In accordance with BS EN 14600: 2005 the leaves were pre-cycled before the fire test. The doorset was instrumented with the standard and supplementary sets of thermocouples and was installed opening in towards the furnace.

# 3 Specimen verification

The doorblanks was delivered to BM TRADA during August, who subsequently further produced the specimen with respect to the following:

Hardwood lippings
Softwood door frame
Intumescent materials
Hardware
Overhead closers
Glazed apertures

The component parts of the doorset were identified and, where appropriate, moisture content readings and density checks were performed on either the original specimen, or, samples provided by the sponsor. These details are outlined in the construction section of this report.

## 3.1 Conditioning

BM TRADA stored the specimen in climatic conditions approximate to those in normal service.

## 3.2 Sampling

The intumescent and sealing products were sampled by Ross Newman of BM TRADA Certification on 2nd July 2013 (see appendix 3). These products were then delivered to BM TRADA for use in the test.

The other elements used in the construction of the test specimen were bought by BM TRADA from distributor's group stock.

# 4 Description of supporting construction

The supporting construction comprised a British Gypsum steel stud partition built in accordance with Clause 7.2.2.4 of BSEN 1363: Part 1, for a flexible supporting construction. The vertical studs surrounding the apertures created for the doorsets incorporated a 67mm x 29mm softwood timber infill to facilitate the fixings for the specimens. The specimen tested is a 30 minute product with an anticipated Category B performance, therefore intended fire resistance is 36 minutes and two layers of type F Gypsum plasterboard are required. The supporting construction was only fixed on the horizontal edges, the vertical edges remained free.

# 5 Description of specimen

Details of the specimen are shown in Figures 1 to 6 of Appendix 1.

## 5.1 Door leaves

Both leaves measured 2148mm high x 928mm wide x 44mm thick.

# 6 Description of construction (refers to Figures 1 to 6 of Appendix 1)

## Both leaves – identified as Pacific Rimwood Flamebreak FD30 doorblanks

| | | Species/type | Dimensions (mm) | Density (kg/m³) | Moisture (% w/w) | Key to figures |
|---|---|---|---|---|---|---|
| Stiles | | None fitted | - | - | - | - |
| Top rail | | 'Mixed tropical hardwood' | 36 thick x 70 deep including a 9 x 9 tongue into the core | 610* | - | 1 |
| Bottom rail | | 'Mixed tropical hardwood' | 36 thick x 35 deep including a 9 x 9 tongue into the core | 610* | - | 2 |
| Core | | Parasorianthes falcateria or Albisia falcate - 3 layers of lamels lain in alternate directions – grooved to accept the stiles and rails. | 12 thick each layer | 280* | - | 3 |
| Facings | | Hardwood plywood | 4 thick | 610* | 9.1 | 4 |
| Adhesive | Lipping | PU | - | - | - | - |
| | Core | PVA | - | - | - | - |
| | Facings | PVA or Melamine | - | - | - | - |
| Lippings – all edges | | Sapele | 6 thick | 640** | 10.6 | 5 |

* Manufacturers stated density, not checked by laboratory ** Nominal density

## Door frame

| | Species/type | Dimensions (mm) | Density (kg/m³) | Moisture (% w/w) | Key to figures |
|---|---|---|---|---|---|
| Head & jambs | European Redwood | 70 wide x 32 thick | 621* | 9.1 | 6 |
| Stops – planted (pinned) | European Redwood | 20 wide x 12 thick | 621* | 10.4 | 7 |
| Frame jointing detail | Mortice and tenon (screwed with 2No. 80mm long screws per joint) | - | - | - | - |
| Architrave | MDF | 45 wide x 18 thick | - | 10.4 | - |
| Threshold | Non combustible | - | - | - | - |
| Frame fixings | 4No. steel screws per jamb | 80Ø x 100 long | - | - | - |
| Frame to supporting construction fire stopping | Rockwool mineral fibre capped with intumescent mastic | Nominally 10-15 wide x full depth of frame | - | - | - |

* Determined by laboratory at 16.5% mc

## Intumescent materials and seals

| | | Make/type | Size (mm) | Location | Key to figures |
|---|---|---|---|---|---|
| Door edges | Left leaf closing edge only | Pyroplex Rigid Box Single Flipper Seal Ref. 30160 | 10 x 4 | Fitted 26mm from the exposed face | 8 |
| | | Pyroplex Pile Rigid Box Seal Ref. PO8512 | 10 x 4 | Fitted 6mm from the unexposed face | 9 |
| Frame reveal | Right jamb and right half of frame head | Pyroplex Pile Rigid Box Seal Ref. PO8712 | 15 x 4 | Fitted 15mm from the exposed face in the frame reveal | 10 |
| | Left jamb and left half of frame head | Pyroplex Rigid Box Seal Ref. FO8700 | 15 x 4 | Fitted 15mm from the exposed face in the frame reveal | 11 |
| Glazing perimeter – both apertures | | Pyroplex FG30 Ref.30049 | 12 x 7 overall | Fitted between the glass and bead on both faces | 12 |

## Intumescent interruptions by hardware and additional protection

| | Make/type | Size (mm) | Location |
|---|---|---|---|
| Around hinges - frame | Fully interrupted | - | Hinge blade fully interrupts seal in frame reveal |
| Under hinge blade | Interdens | 1 thick | Fitted under hinge blade on frame and leaf |
| Encasing latch body | None fitted | - | - |
| Under latch forend | Interdens | 1 thick | Fitted under the latch forend |
| Around latch keep | Partially interrupted | - | Latch keep partially interrupts both seals with 3mm of 1st seal and 5mm of 2nd seal remaining continuous |
| Under latch keep | Interdens | 1 thick | Fitted under the latch keep |

## Hardware

| | Make/type | Size (mm) | Location | Key to figures |
|---|---|---|---|---|
| Hinges | 3No. Royde and Tucker H101 lift off type hinge | 101 x 34 x 2 (blade size) | Fitted 150mm, 1010mm and 1865mm from the head of the leaf, fixed with 4No. M5 x 32mm long stainless steel screws per blade | 13 |
| Closer | Rutland TS3204 overhead type closer | 220 x 58 (footprint size) | Fitted on the exposed face as per the manufacturer's instructions | 14 |
| Latch - disengaged | Easi-T steel mortice latch and Eurospec Eurocylinder lock (33 high x 17 wide x 70 long overall) | 235 x 24 x 1.5 (forend size)<br>150 x 85 x 14 (case size)<br>58 backset | Fitted 1000mm from the head of the right leaf, fixed with 2No. M4 x 30mm long screws | 15 |
| | | 175 x 22 x 2 (keep size) | Fixed with 3No. M4 x 30mm long screws | |
| Furniture | Aluminium lever type handle | Ø52 (rose size) | Fitted appropriate to the latch through fixed with 2No. M4 x 52mm long machine screws | 16 |
| | Lock escutcheon | Ø52 (rose size) | Fitted appropriate to the latch through fixed with 2No. M4 x 52mm long machine screws | 17 |

## Glazing

| | | Make/type | Size (mm) | Location | Key to figures |
|---|---|---|---|---|---|
| Glass type | Left leaf | CGI International Pyroguard EI30 | 15 thick | Fitted 145mm from the leaf head, central in the leaf width | 18 |
| | Right leaf | | | Fitted 145mm from the leaf head, central in the leaf width | 19 |
| Sight size | Left leaf | - | 175 high x 175 wide | - | - |
| | Right leaf | - | 770 high x 520 wide | - | - |
| Glass size | Left leaf | - | 200 high x 200 wide | - | - |
| | Right leaf | - | 800 high x 550 wide | - | - |
| Expansion allowance | | - | 5 all round | - | - |
| Beading | | Sapele (MC 10.510.6%) | 18 high x 18 wide including a 5 x 5 bolection return and an 11° chamfer | Fitted around the glazing apertures on both faces | 20 |
| Beading fixings | | Steel pins | 50 long | Fitted 50mm from corners at 140mm centres, at 45° to the face of the glass | 21 |

# 7 Pre-test measurements

## 7.1 Pre-cycling

Operability test of 25 manual cycles was completed on each leaf in accordance with BSEN 14600, section 5.1.1.1.

| | |
|---|---|
| Minimum angle of opening | 90º |
| Number of operation cycles completed | 25 |

## 7.2 Door perimeter gaps

The manufacturer did not declare a working range so the doors were installed to open and close freely, maintaining gaps, where possible, to a range of 2-4mm along all edges except the threshold, and 3-8mm along the threshold. The gaps between the edge of the doors and frame were measured prior to test. A total of 21 readings were taken. The measurements (in mm) are given in Figure 5 of Appendix 1.

## 7.3 Closer forces

Measured in accordance with BSEN 1634-1: 2008 Section 10.1.3.

| | Opening Force (Nm) |
|---|---|
| Left leaf | 74.3 @ handle position |
| Right leaf | 69.4 @ handle position |

## 7.4 Method of installation

The doorset was fixed into a pre-prepared opening. The details of the fixings and fire stopping between frame and supporting construction are outlined in the construction section and Figure 4 of Appendix 1. The exposed face of the doorset was flush with the exposed face of the supporting construction.

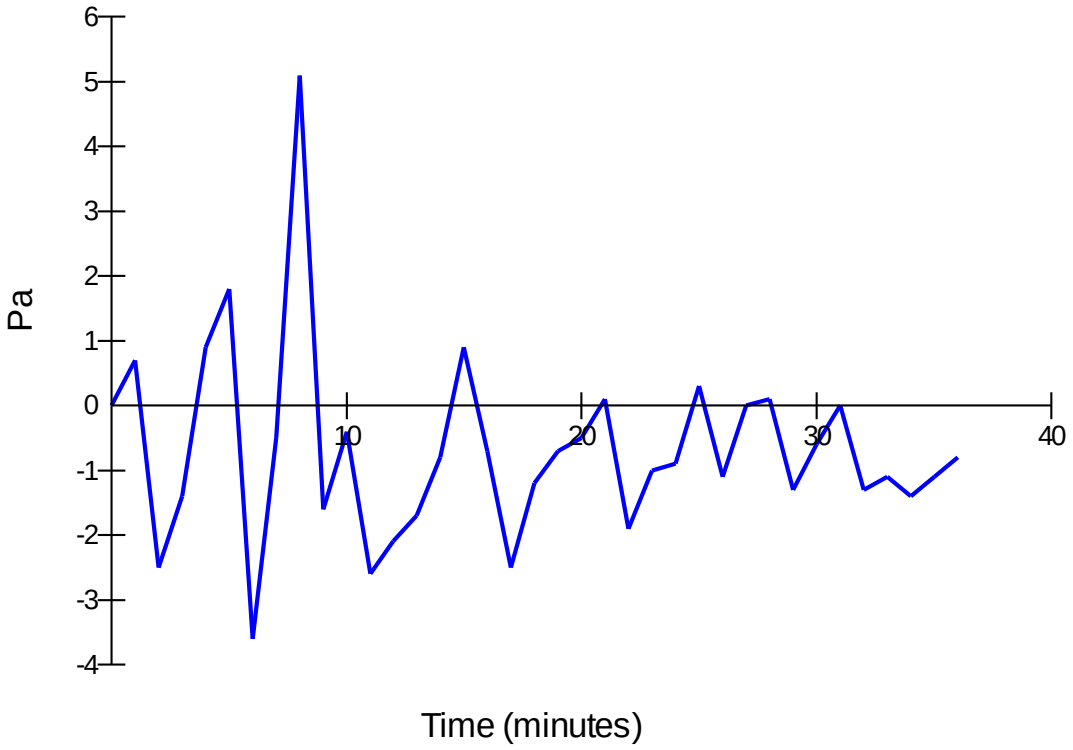
# 8 Test conditions

## 8.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 20°C. The ambient temperature for the duration of the test has been recorded in Appendix 2.

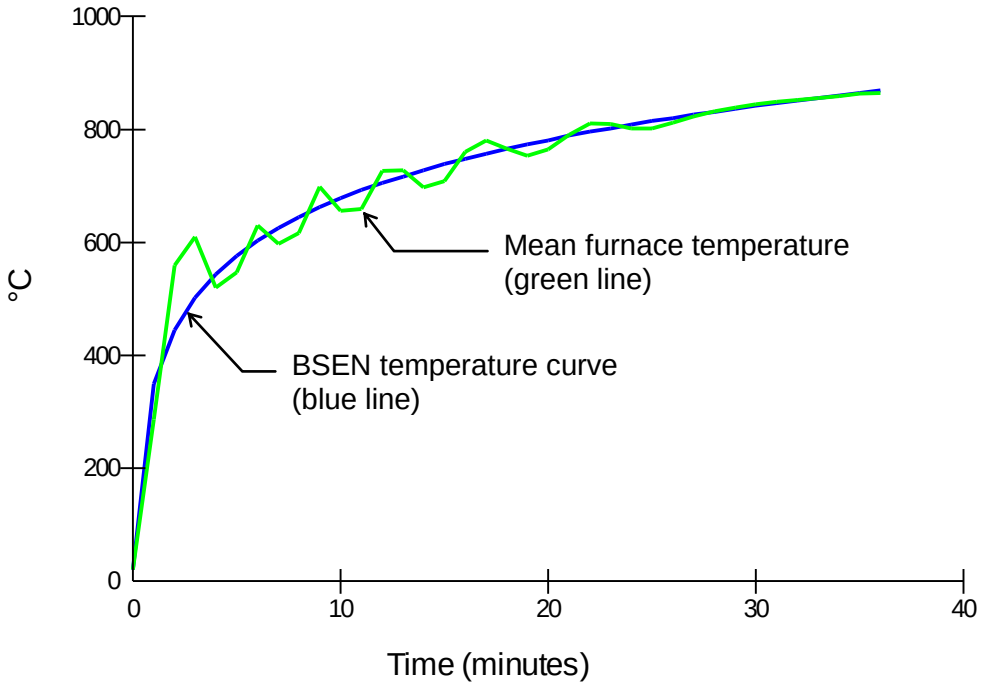
## 8.2 Pressure readings

After the first 5 minutes of the test, the furnace pressure was maintained at 0 ± 5 Pa and after 10 minutes was maintained at 0 ± 3 Pa with respect to atmosphere, at a point 0.5m from the notional floor level. The pressure readings have been tabulated in Appendix 2 and are shown graphically below:



## 8.3 Furnace temperature

The furnace was controlled to follow the temperature/time relationship specified in BSEN 1363: Part 1: 1999 Section 5.1.1 as closely as possible, using the average of nine plate thermometers suitably distributed within the furnace. The temperatures recorded have been tabulated in Appendix 2 and are shown graphically below:



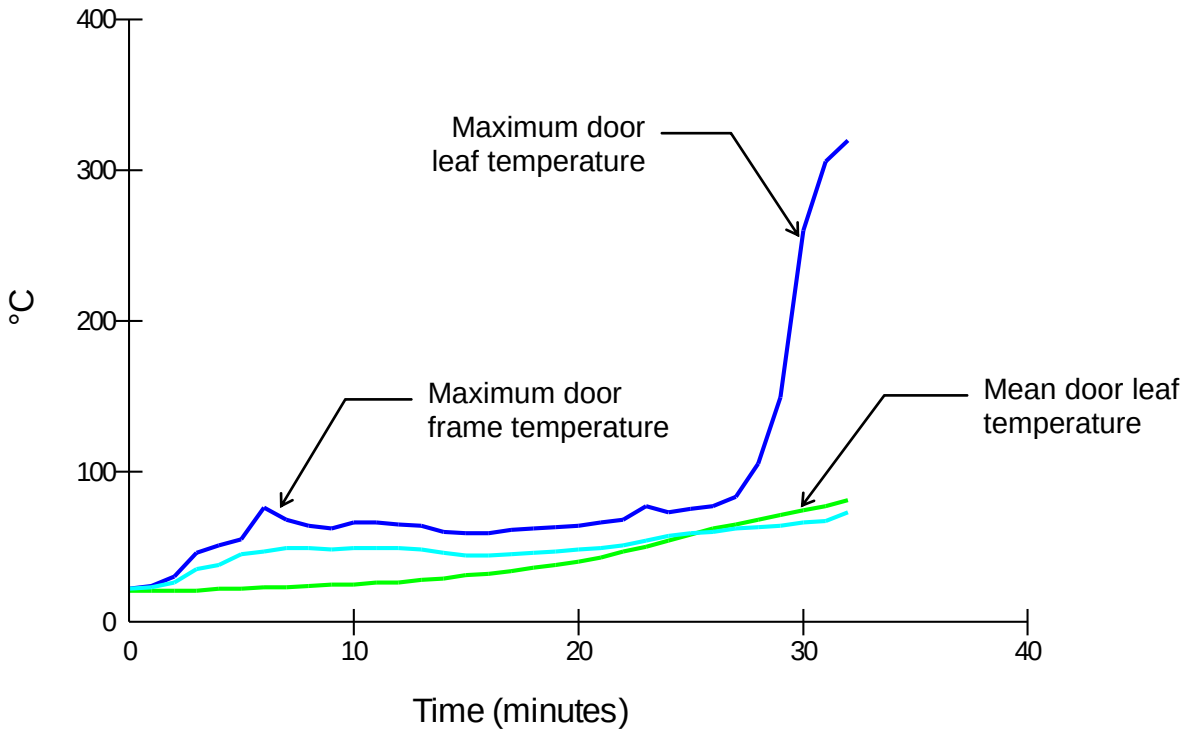
## 8.4 Unexposed face temperatures

The temperature of the unexposed face was monitored by means of the following thermocouples:

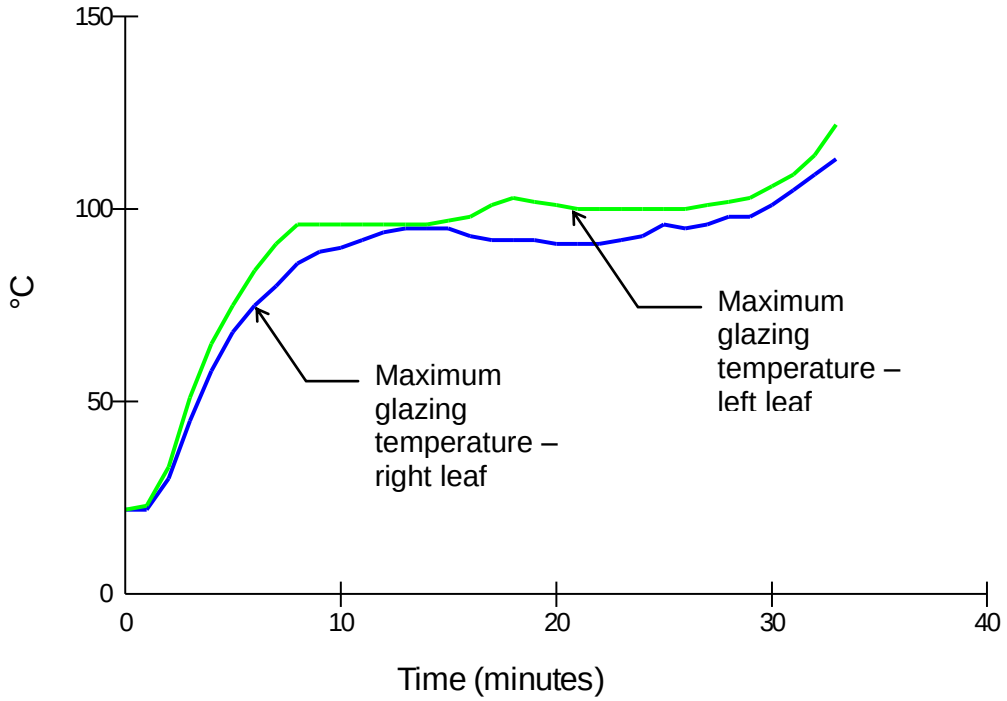
| | | |
|---|---|---|
| Doorset | 2 discrete areas | |
| Leaves | Discrete area 1 (timber) | 5 measuring mean temperature rise.<br>8 measuring maximum temperature rise, standard set 100mm in from the door leaf edges.<br>8 measuring maximum temperature rise, supplementary set 25mm in from the door leaf edges. |
| | Discrete area 2 (glass) | 4 measuring maximum glass temperature. |
| Frame | | 5 measuring maximum temperature rise. |

The location of the thermocouples are shown in Figure 6 of Appendix 1. The temperatures recorded have been tabulated in Appendix 2 and are shown graphically below:

Discrete area 1



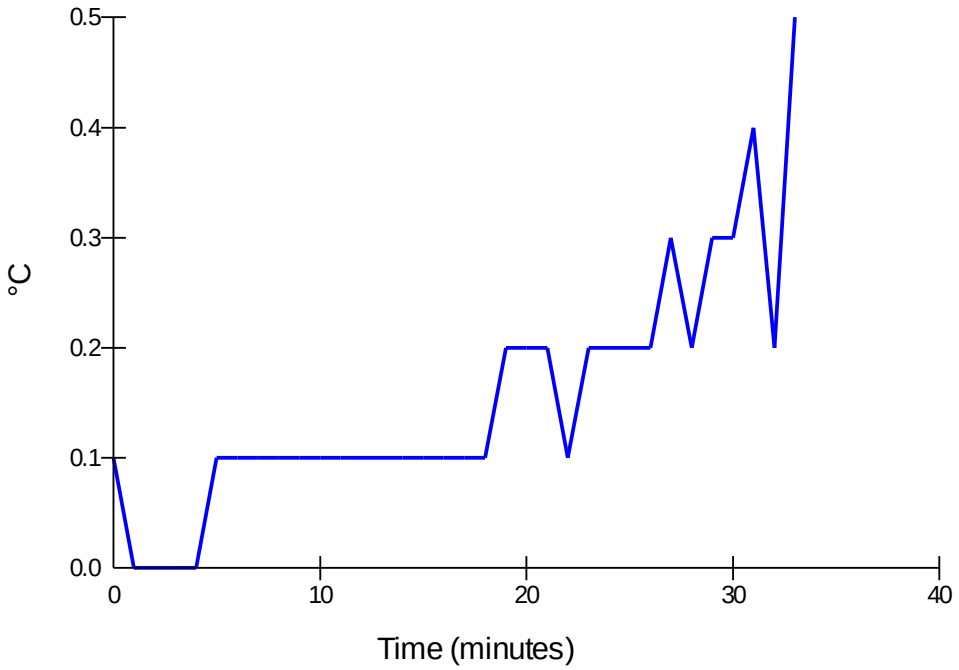
Discrete area 2




## 8.5 Radiation

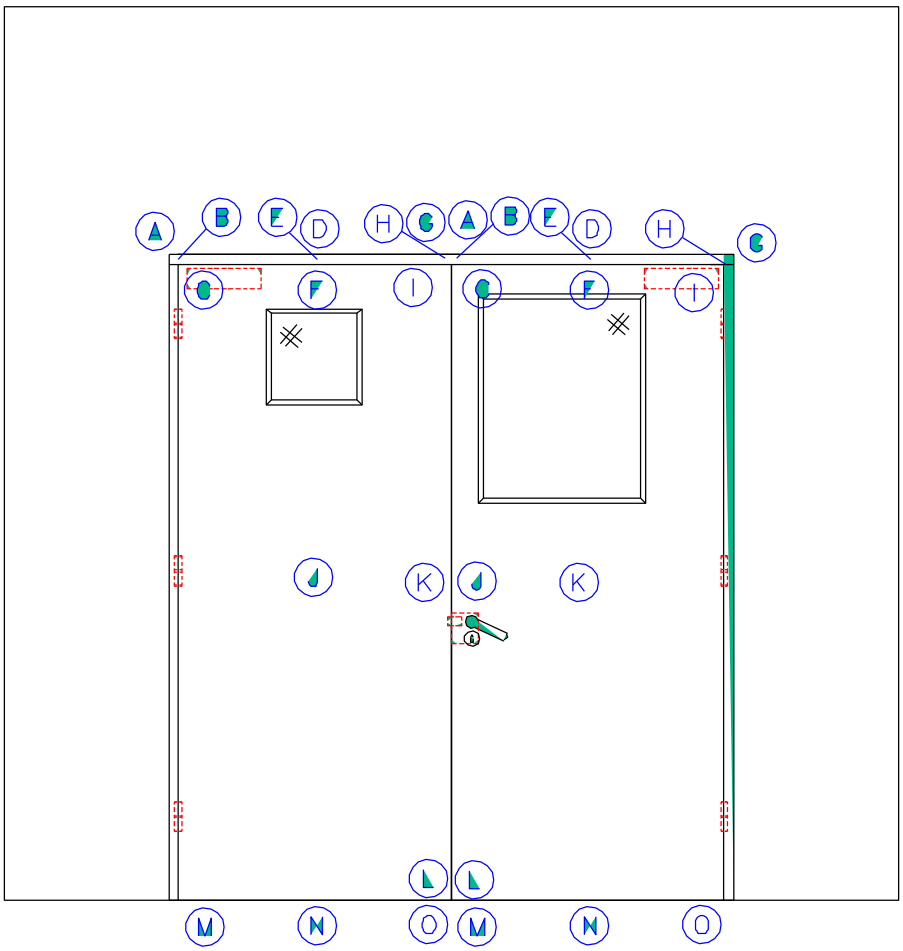
A radiometer was used to measure the radiation 1m away from the doorset.

The results of the radiometer have been tabulated and included in Appendix 2 and are shown graphically below:



## 8.6 Door distortion data

The following tables show the distortion of the doors in mm with an accuracy of ±1mm.
A positive measurement indicates distortion towards the furnace.
A negative measurement indicates distortion away from the furnace.
M, N and O give vertical movement of the door, a negative reading indicates that the door has dropped.




### Left leaf - (leaf hung on the left and opening in towards the furnace)

| Time | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | -2 | 0 | 3 | 1 | 1 | 12 | 2 | 1 | 22 | -7 | -3 | -6 | -2 | -2 | -2 |
| 20 | -4 | -3 | -1 | 17 | -3 | 0 | -2 | -2 | 11 | -25 | -16 | -13 | -3 | -4 | 47 |
| 30 | -6 | -5 | -1 | 15 | -5 | -4 | -4 | -4 | 11 | -64 | -98 | -60 | -4 | -5 | -7 |

### Right leaf – (leaf hung on the right and opening in towards the furnace)

| Time | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 0 | 1 | 17 | 0 | -1 | 5 | 0 | 0 | 2 | -11 | -12 | 0 | -2 | -2 | -1 |
| 20 | -3 | -3 | 13 | -3 | -3 | 1 | -3 | -1 | 2 | -26 | -27 | -2 | -6 | -4 | -2 |
| 30 | -5 | -4 | 10 | -4 | -4 | -3 | -4 | -3 | 2 | -94 | -59 | -47 | - | - | - |

Where a dash (-) applies, a distortion measurement could not be taken

# 9 Observations

All comments relate to the unexposed face unless otherwise specified.

| Time (minutes) | |
|---|---|
| 00.00 | Test started. |
| 00.27 | There is smoke issuing from the top meeting edge of the leaves. |
| 00.46 | There is smoke issuing from the top hinge position on the right leaf and the meeting edge latch position. |
| 01.13 | The glazing is cracking. |
| 01.15 | The glazing interlayer is reacting on both leaves. |
| 02.00 | The glazing interlayer on both leaves has fully reacted. |
| 04.47 | The smoke issuing is continuing from the top hinge position on the right leaf and there is smoke issuing from the centre of the head of the left leaf. |
| 05.29 | There is discolouration at the top hinge position of the right leaf. |
| 07.20 | There is smoke issuing from the top hinge position on the left leaf. |
| 08.06 | Exposed face, the facing has an eggshell effect on the leaves. |
| 15.52 | There is an increase in the discolouration at the top hinge positions on both leaves. The smoke issuing continues from the top hinge position on the left leaf. |
| 20.00 | There is a glow visible at the meeting edge latch position. A gap approximately 6mm wide has opened up at this position. |
| 23.00 | A cotton pad integrity test was performed at the meeting edge latch position, no failure. |
| 26.00 | A cotton pad integrity test was performed at the meeting edge latch position, no failure. |
| 26.54 | There is discolouration at the top hinge position and the top hanging corners of the leaves. There is erosion at the meeting edge latch position and an increase in the glow visible. |
| 27.59 | There is a glow visible at the top meeting edge of the leaves. |
| 28.20 | A cotton pad integrity test was performed at the meeting edge latch position, no failure. |
| 29.25 | There is discolouration at the handle/lock position. |

29.45 A cotton pad integrity test was performed at the top meeting edge of the leaves, no failure.

30.33 A cotton pad integrity test was performed at the meeting edge latch position which resulted in ignition of the cotton pad thereby constituting **integrity failure.**

30.45 There is continuous flaming at the handle and lock area thereby constituting **further integrity failure.**

32.11 There is intermittent flaming at the top meeting edge of the leaves.

32.55 There is continuous flaming at the top meeting edge and head of the leaves thereby constituting **further integrity failure.**

33.51 The right leaf glazing has fallen into the furnace, failing both 6mm and 25mm gap gauge test criteria, thereby constituting **further integrity failure**

34.01 Test terminated.

## 10 Expression of results

| | |
|---|---|
| **Integrity** | |
| Cotton pad | 30 (thirty) minutes |
| Continuous flaming | 30 (thirty) minutes |
| Gap gauges | 33 (thirty three) minutes |
| **Insulation** | |
| Average set | 30 (thirty) minutes** |
| Maximum ≥ 100mm in from leaf edge | 30 (thirty) minutes** |
| Maximum ≥ 25mm in from leaf edge | 29 (twenty nine) minutes |
| Door frame ≥ 180°c temp rise | 30 (thirty) minutes** |
| Door frame ≥ 360°c temp rise | 30 (thirty) minutes** |
| Glass | 30 (thirty) minutes** |
| **Radiation** | |
| Time to reach 15k W/m$^2$ | 34 (thirty four) minutes* |

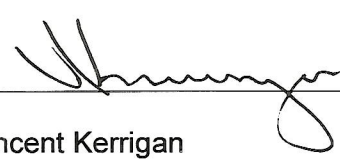
* No failure of the test criteria had occurred at termination of the test at 34 minutes
** Failure by virtue of integrity failure at 30 minutes

## 11 Limitations

The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

The results of this test were obtained using the door to frame gaps recorded in Figure 5 of Appendix 1. The fire resistance performance of doors of this design may change if substantially different gaps are employed.

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. BM TRADA will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

| | | |
|---|---|---|
| Signature: |  |  |
| Name: | Robert Axe | Vincent Kerrigan |
| Title: | Lead Technical Officer | Technical Manager |
| Date of issue: | 12-01-14 | 12-01-2014 |

# 12 Field of direct application of test results

The results of the test are directly applicable to similar constructions where one or more of the changes listed in BSEN 1634-1: 2008, Clause 13, are made and the construction continues to comply with that appropriate design code for its stiffness and stability. Other changes are not permitted by the document.

A copy of the field of direct application is available from BM TRADA upon request.

# Photographs

## Intumescent interruptions by hardware

Latch keep

Hinge blade

At start of test

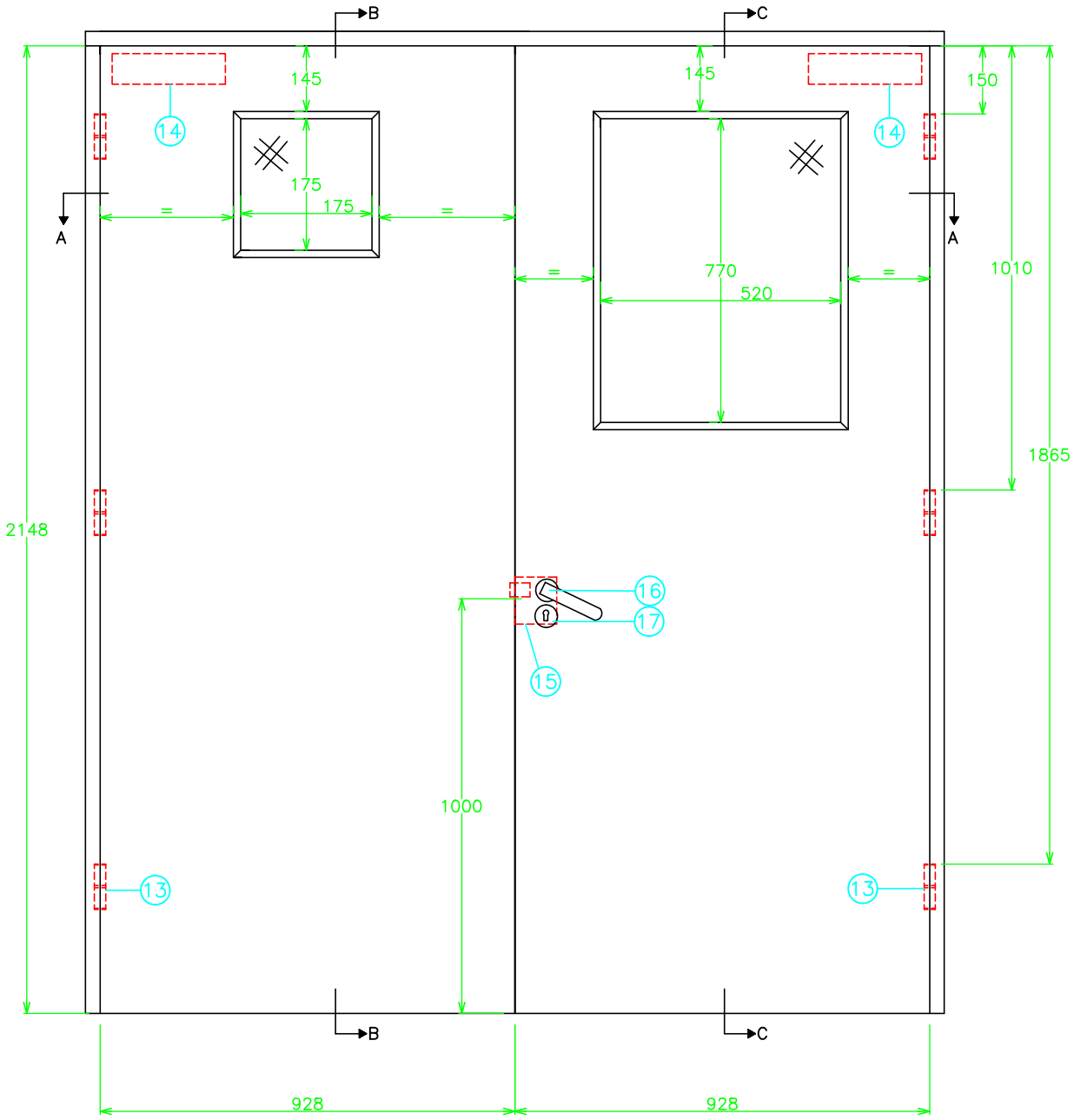
After 10 minutes


At 20 minutes

After 30 minutes

## Appendix 1 - figures 1 to 6

| Figure 1 of 6 | Pyroplex Ltd |
|---|---|

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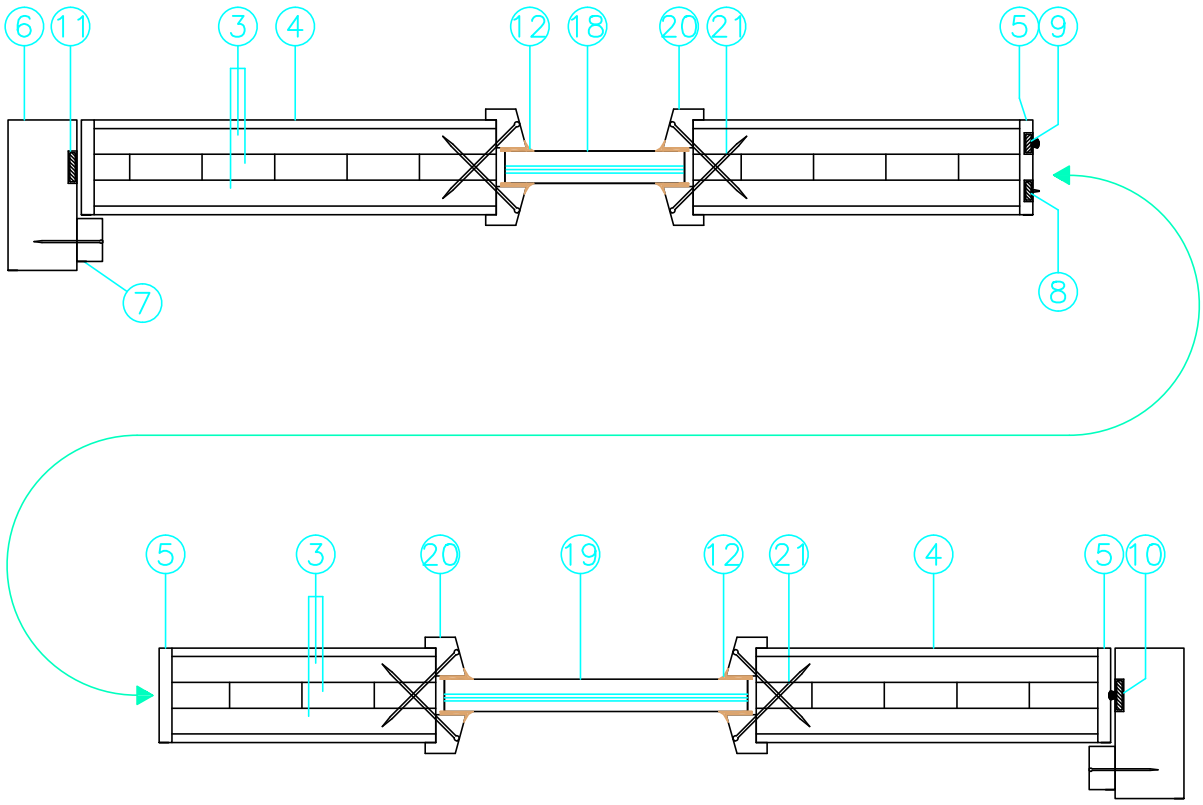
| Title | Unexposed face elevation showing hardware positions (All dimensions in mm) | | |
|---|---|---|---|
| Date Drawn 09/09/13 | Drawn By ARD | Scale NTS | |
| Project No. Chilt/RF13175 | | Appendix 1 | |

| Figure 2 of 6 | Pyroplex Ltd |
|---|---|

Section A–A

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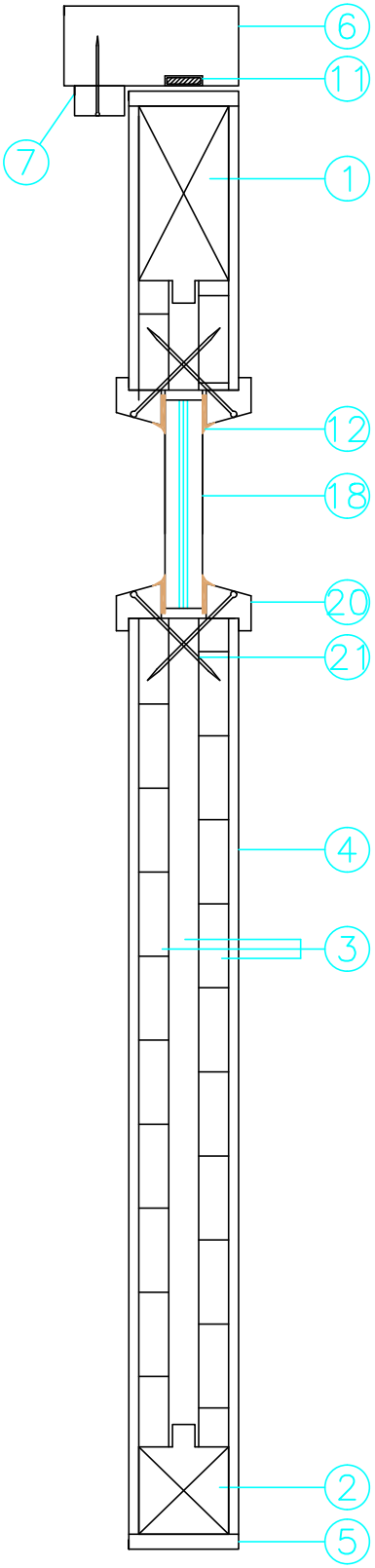
Title
Horizontal cross sections
(All dimensions in mm)

| Date Drawn | Drawn By | Scale |
|---|---|---|
| 09/09/13 | ARD | NTS |

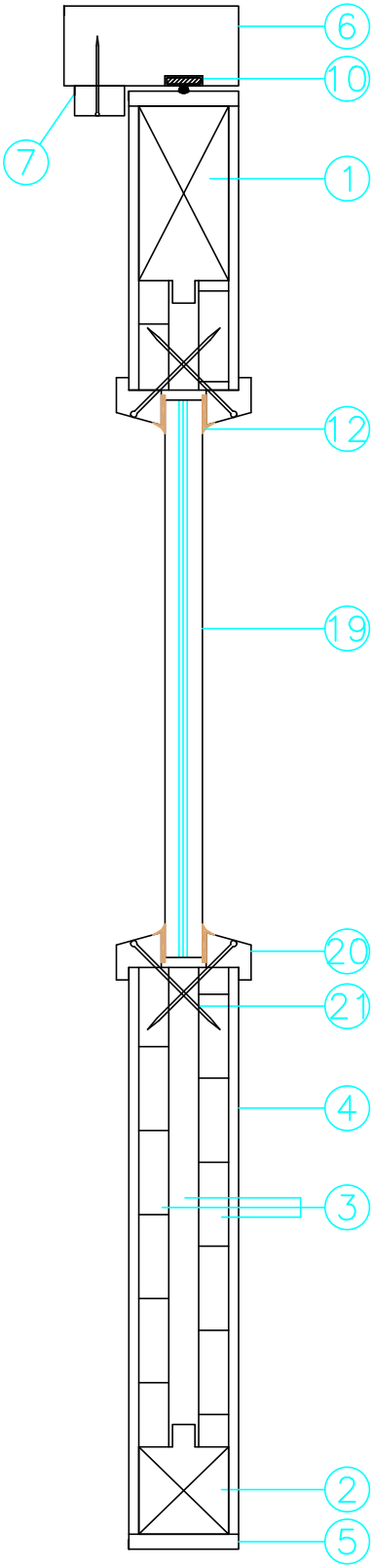
| Project No. | |
|---|---|
| Chilt/RF13175 | Appendix 1 |

| Figure 3 of 6 | Pyroplex Ltd |
|---|---|

Section B–B




Section C–C

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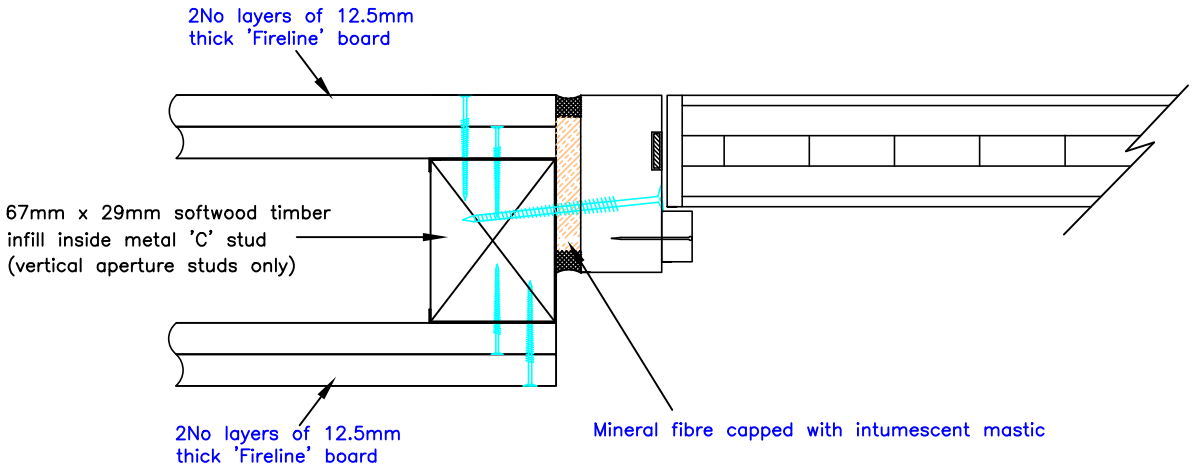
Title

Vertical cross sections
(All dimensions in mm)

| Date Drawn | Drawn By | Scale |
|---|---|---|
| 09/09/13 | ARD | NTS |
| Project No. Chilt/RF13175 | | Appendix 1 |

| Figure 4 of 6 | Pyroplex Ltd |
|---|---|

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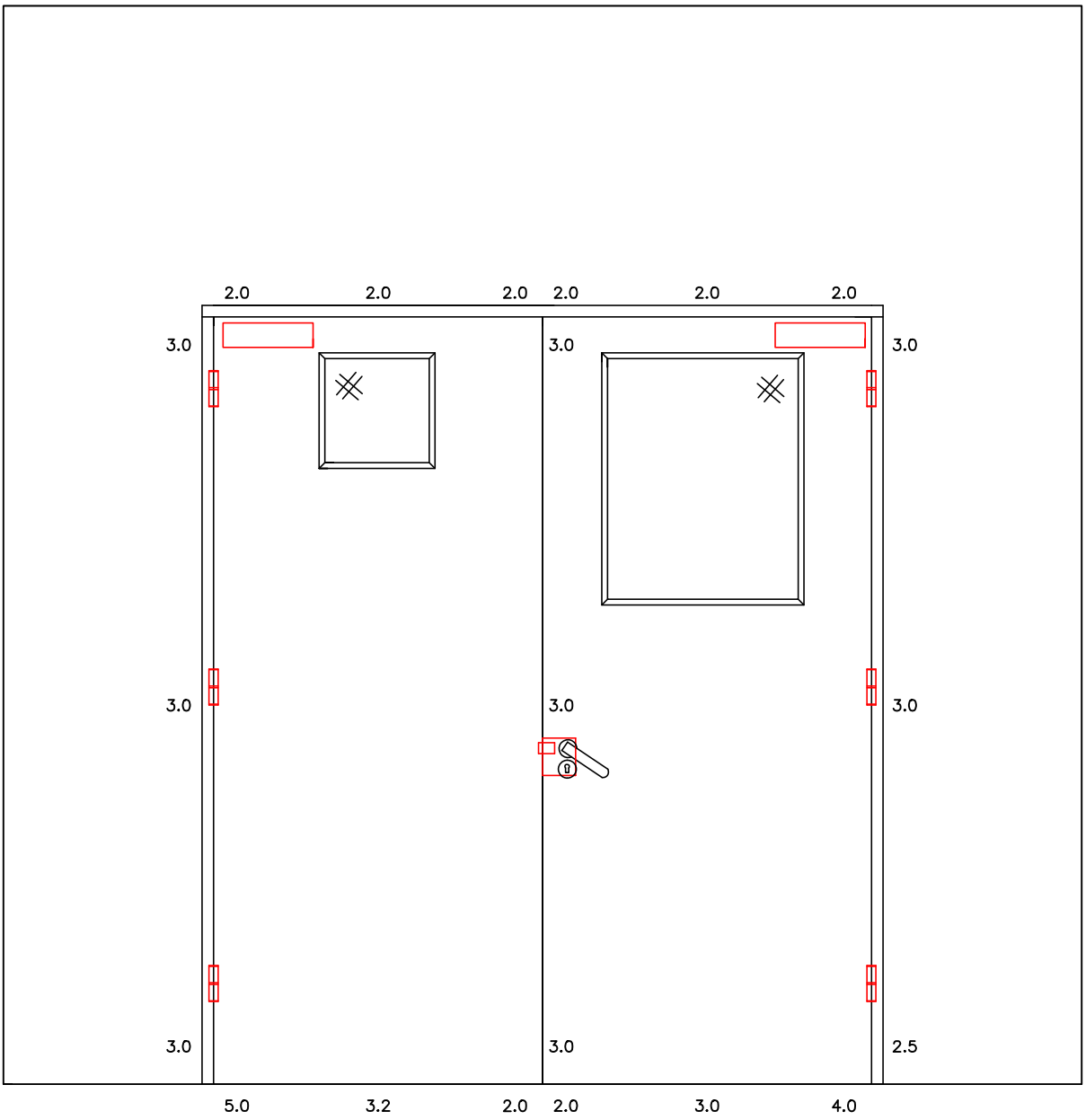
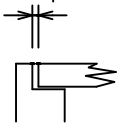
Title
Frame to supporting construction fixing detail
(All dimensions in mm)

| Date Drawn | Drawn By | Scale |
|---|---|---|
| 09/09/13 | ARD | NTS |
| Project No. Chilt/RF13175 | | Appendix 1 |

Figure 5 of 6 | Pyroplex Ltd




Gaps shown



Viewed From Unexposed Face

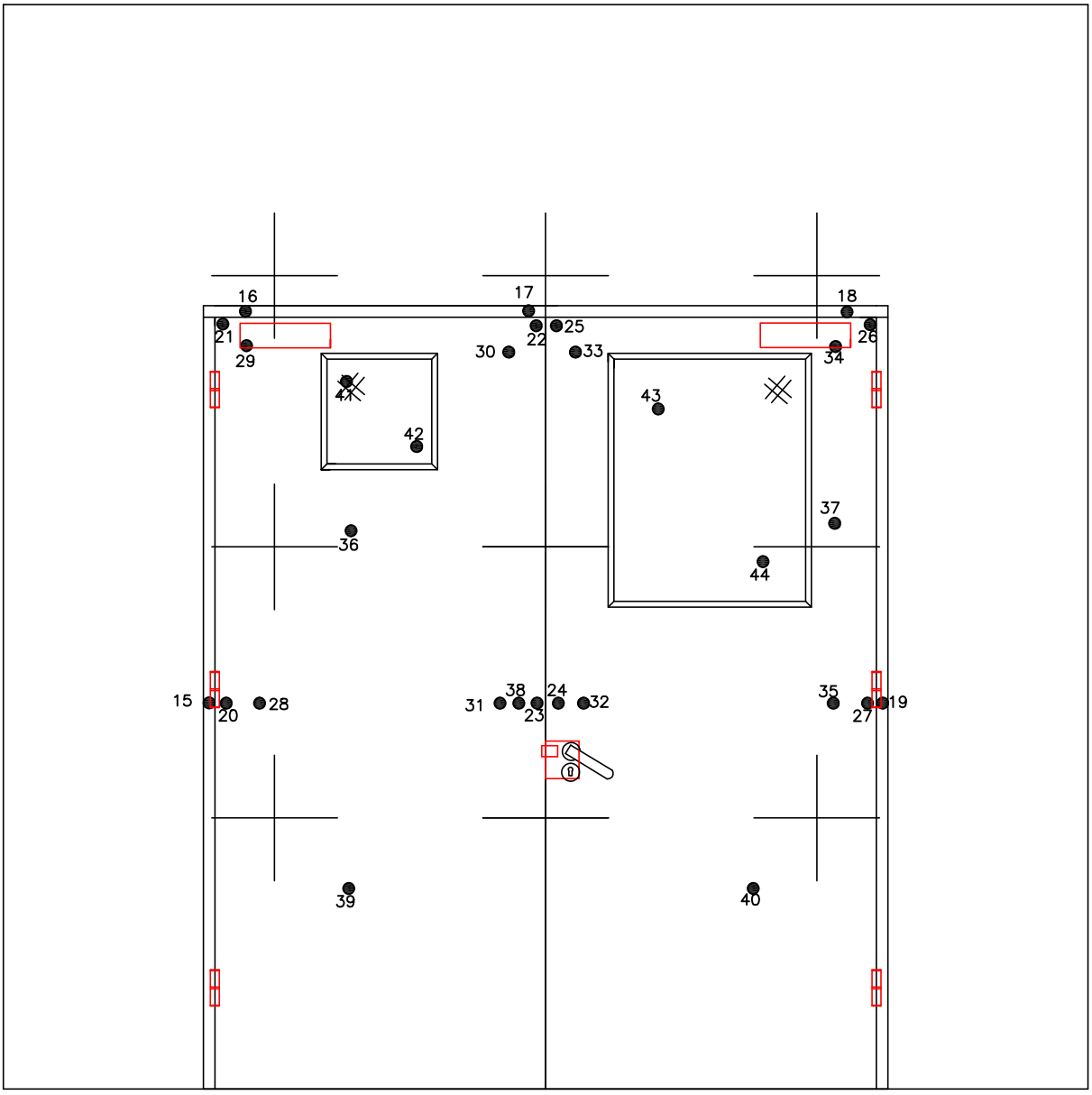
BM TRADA

Chiltern House, Stocking Lane, Hughenden Valley
High Wycombe, Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title
Door leaf/frame gaps
(All dimensions in mm)

| Date Drawn | Drawn By | Scale |
|---|---|---|
| 09/09/13 | ARD | NTS |

| Project No. | |
|---|---|
| Chilt/RF13175 | Appendix 1 |




+ : Furnace Thermocouples

• : Unexposed Face Thermocouples

Viewed From Unexposed Face

BM TRADA

Chiltern House, Stocking Lane, Hughenden Valley
High Wycombe, Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title: Thermocouple positions (All dimensions in mm)

| Date Drawn | Drawn By | Scale |
|---|---|---|
| 09/09/13 | ARD | NTS |

| Project No. | |
|---|---|
| Chilt/RF13175 | Appendix 1 |

BMTRADA

## Appendix 2 - raw test data (5 pages)

(see figure 6 of appendix 1 for channel locations)

Furnace thermocouples  Failure times and corresponding thermocouple

| Time | Chan 0 | Chan 1 | Chan 2 | Chan 3 | Chan 4 | Chan 5 | Chan 6 | Chan 7 | Chan 8 | Chan 9 | Chan 11 | Chan 15 | Chan 16 | Chan 17 | Chan 18 | Chan 19 | Chan 20 | Chan 21 | Chan 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| min | Pa | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C |
| 0 | 0 | 22 | 23 | 23 | 24 | 24 | 24 | 24 | 24 | 24 | 20 | 21 | 22 | 22 | 22 | 22 | 21 | 21 | 22 |
| 1 | 0.1 | 263 | 229 | 236 | 294 | 243 | 292 | 220 | 304 | 425 | 20 | 21 | 22 | 22 | 23 | 21 | 21 | 21 | 22 |
| 2 | -3.2 | 488 | 493 | 450 | 529 | 530 | 560 | 450 | 540 | 596 | 20 | 21 | 22 | 26 | 26 | 22 | 21 | 21 | 30 |
| 3 | -2.5 | 570 | 619 | 575 | 629 | 634 | 654 | 588 | 641 | 676 | 20 | 21 | 22 | 35 | 32 | 21 | 21 | 22 | 46 |
| 4 | -2.1 | 592 | 636 | 585 | 644 | 642 | 667 | 644 | 652 | 694 | 20 | 21 | 23 | 38 | 38 | 22 | 21 | 23 | 43 |
| 5 | -4.8 | 518 | 547 | 508 | 588 | 598 | 601 | 603 | 597 | 612 | 20 | 21 | 34 | 36 | 45 | 21 | 22 | 30 | 39 |
| 6 | 2.2 | 505 | 488 | 493 | 585 | 575 | 584 | 583 | 582 | 602 | 20 | 21 | 38 | 39 | 47 | 22 | 22 | 76 | 37 |
| 7 | -1 | 606 | 597 | 568 | 661 | 667 | 685 | 638 | 664 | 689 | 20 | 22 | 47 | 40 | 49 | 22 | 23 | 68 | 37 |
| 8 | -4.5 | 587 | 604 | 563 | 649 | 661 | 656 | 653 | 665 | 655 | 20 | 22 | 47 | 38 | 49 | 22 | 24 | 64 | 36 |
| 9 | 4.2 | 580 | 584 | 550 | 635 | 633 | 642 | 631 | 642 | 653 | 20 | 22 | 48 | 37 | 48 | 23 | 25 | 62 | 39 |
| 10 | -2.9 | 675 | 696 | 645 | 722 | 729 | 744 | 695 | 723 | 735 | 20 | 23 | 49 | 34 | 48 | 23 | 26 | 66 | 38 |
| 11 | -1.6 | 676 | 684 | 631 | 714 | 735 | 733 | 705 | 720 | 728 | 20 | 23 | 49 | 34 | 48 | 23 | 28 | 66 | 38 |
| 12 | 0.8 | 636 | 623 | 599 | 685 | 695 | 683 | 680 | 695 | 692 | 20 | 24 | 49 | 35 | 46 | 24 | 29 | 65 | 39 |
| 13 | 2.9 | 664 | 664 | 613 | 710 | 719 | 720 | 688 | 708 | 717 | 20 | 25 | 48 | 35 | 46 | 24 | 31 | 64 | 40 |
| 14 | -1.2 | 725 | 731 | 679 | 757 | 772 | 782 | 731 | 754 | 765 | 20 | 25 | 46 | 36 | 44 | 25 | 33 | 60 | 41 |
| 15 | -1.1 | 736 | 743 | 697 | 766 | 779 | 793 | 751 | 769 | 773 | 20 | 25 | 44 | 36 | 42 | 25 | 35 | 59 | 42 |
| 16 | -0.5 | 724 | 726 | 677 | 757 | 767 | 780 | 755 | 765 | 782 | 20 | 27 | 44 | 37 | 41 | 26 | 37 | 59 | 44 |
| 17 | -0.2 | 718 | 715 | 668 | 749 | 759 | 758 | 748 | 759 | 770 | 20 | 27 | 45 | 37 | 41 | 27 | 39 | 61 | 46 |

| Time | Chan 0 | Chan 1 | Chan 2 | Chan 3 | Chan 4 | Chan 5 | Chan 6 | Chan 7 | Chan 8 | Chan 9 | Chan 11 | Chan 15 | Chan 16 | Chan 17 | Chan 18 | Chan 19 | Chan 20 | Chan 21 | Chan 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| min | Pa | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C |
| 18 | 2.1 | 720 | 722 | 672 | 752 | 756 | 761 | 748 | 759 | 769 | 20 | 27 | 46 | 38 | 41 | 27 | 42 | 62 | 48 |
| 19 | 0.6 | 750 | 753 | 707 | 782 | 785 | 789 | 763 | 772 | 779 | 20 | 28 | 47 | 39 | 40 | 28 | 44 | 63 | 50 |
| 20 | -0.7 | 778 | 783 | 741 | 806 | 811 | 819 | 780 | 793 | 800 | 20 | 28 | 48 | 40 | 40 | 29 | 46 | 64 | 53 |
| 21 | -2.2 | 790 | 791 | 747 | 815 | 820 | 820 | 795 | 806 | 808 | 20 | 29 | 49 | 41 | 40 | 30 | 48 | 66 | 55 |
| 22 | -0.9 | 788 | 789 | 747 | 811 | 816 | 817 | 793 | 801 | 804 | 20 | 29 | 51 | 42 | 40 | 31 | 50 | 68 | 58 |
| 23 | -0.4 | 789 | 791 | 742 | 809 | 813 | 811 | 794 | 801 | 803 | 19 | 30 | 54 | 42 | 40 | 32 | 53 | 70 | 61 |
| 24 | 1 | 794 | 794 | 749 | 811 | 814 | 816 | 795 | 802 | 804 | 20 | 31 | 57 | 44 | 41 | 33 | 55 | 73 | 64 |
| 25 | 1.1 | 805 | 808 | 759 | 825 | 825 | 830 | 800 | 809 | 813 | 19 | 33 | 59 | 44 | 42 | 34 | 58 | 75 | 66 |
| 26 | 0.4 | 816 | 817 | 769 | 833 | 836 | 837 | 808 | 818 | 822 | 20 | 34 | 60 | 45 | 43 | 35 | 61 | 77 | 69 |
| 27 | 0.5 | 825 | 826 | 779 | 842 | 845 | 848 | 816 | 825 | 831 | 20 | 35 | 62 | 46 | 44 | 37 | 65 | 79 | 72 |
| 28 | 0.5 | 833 | 833 | 787 | 852 | 853 | 854 | 827 | 835 | 840 | 19 | 36 | 63 | 50 | 45 | 38 | 69 | 83 | 77 |
| 29 | 1.1 | 841 | 840 | 794 | 860 | 859 | 865 | 833 | 841 | 847 | 19 | 37 | 64 | 53 | 46 | 39 | 73 | 88 | 89 |
| 30 | 0.8 | 848 | 847 | 803 | 865 | 866 | 868 | 838 | 847 | 852 | 19 | 39 | 66 | 60 | 47 | 40 | 76 | 93 | 113 |
| 31 | -1.1 | 853 | 849 | 811 | 871 | 871 | 875 | 847 | 853 | 858 | 19 | 40 | 67 | 66 | 49 | 41 | 79 | 97 | 120 |
| 32 | -1.1 | 860 | 856 | 818 | 878 | 874 | 878 | 854 | 859 | 862 | 19 | 41 | 70 | 73 | 50 | 43 | 81 | 101 | 136 |
| 33 | -1.1 | 864 | 861 | 824 | 880 | 879 | 883 | 856 | 861 | 867 | 19 | 42 | 72 | 268 | 51 | 44 | 83 | 106 | 187 |
| 34 | -6 | 852 | 849 | 817 | 877 | 875 | 870 | 856 | 854 | 854 | 20 | 44 | 75 | 100 | 55 | 46 | 86 | 112 | 151 |

| Time | Chan 23 | Chan 24 | Chan 25 | Chan 26 | Chan 27 | Chan 28 | Chan 29 | Chan 30 | Chan 31 | Chan 32 | Chan 33 | Chan 34 | Chan 35 | Chan 36 | Chan 37 | Chan 38 | Chan 39 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| min | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C |
| 0 | 21 | 21 | 22 | 22 | 22 | 22 | 22 | 21 | 21 | 21 | 22 | 22 | 21 | 22 | 22 | 22 | 21 |
| 1 | 21 | 22 | 22 | 24 | 22 | 22 | 22 | 21 | 21 | 21 | 22 | 24 | 21 | 21 | 22 | 22 | 21 |
| 2 | 23 | 24 | 25 | 29 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 27 | 21 | 21 | 22 | 22 | 21 |
| 3 | 24 | 25 | 33 | 38 | 22 | 22 | 22 | 23 | 21 | 23 | 25 | 24 | 21 | 22 | 22 | 23 | 21 |
| 4 | 24 | 27 | 42 | 51 | 22 | 22 | 22 | 23 | 21 | 24 | 24 | 24 | 21 | 22 | 22 | 27 | 21 |
| 5 | 25 | 26 | 54 | 55 | 22 | 22 | 22 | 22 | 22 | 24 | 24 | 23 | 21 | 22 | 22 | 29 | 21 |
| 6 | 26 | 27 | 50 | 57 | 23 | 22 | 22 | 22 | 22 | 26 | 23 | 23 | 21 | 22 | 23 | 30 | 22 |
| 7 | 27 | 29 | 52 | 57 | 25 | 22 | 23 | 22 | 23 | 27 | 24 | 23 | 22 | 22 | 24 | 30 | 22 |
| 8 | 28 | 29 | 48 | 55 | 26 | 22 | 23 | 23 | 24 | 26 | 24 | 23 | 22 | 22 | 25 | 30 | 22 |
| 9 | 30 | 31 | 50 | 57 | 28 | 23 | 24 | 24 | 25 | 28 | 25 | 24 | 22 | 23 | 26 | 30 | 24 |
| 10 | 31 | 33 | 48 | 58 | 31 | 24 | 24 | 24 | 26 | 28 | 26 | 24 | 23 | 24 | 27 | 30 | 25 |
| 11 | 32 | 34 | 47 | 55 | 33 | 25 | 25 | 25 | 26 | 28 | 27 | 25 | 24 | 24 | 28 | 30 | 25 |
| 12 | 34 | 36 | 46 | 55 | 35 | 26 | 26 | 26 | 27 | 30 | 29 | 26 | 25 | 25 | 29 | 31 | 25 |
| 13 | 35 | 39 | 47 | 57 | 38 | 28 | 27 | 28 | 28 | 32 | 31 | 27 | 26 | 27 | 31 | 32 | 26 |
| 14 | 36 | 41 | 48 | 56 | 41 | 29 | 28 | 30 | 29 | 33 | 33 | 28 | 27 | 28 | 33 | 33 | 27 |
| 15 | 38 | 44 | 48 | 55 | 43 | 31 | 30 | 31 | 31 | 34 | 35 | 30 | 29 | 30 | 34 | 34 | 29 |
| 16 | 40 | 45 | 50 | 55 | 46 | 33 | 31 | 33 | 32 | 35 | 37 | 32 | 31 | 32 | 36 | 35 | 30 |
| 17 | 41 | 46 | 52 | 56 | 48 | 35 | 33 | 35 | 34 | 36 | 40 | 34 | 32 | 34 | 38 | 37 | 32 |
| 18 | 43 | 49 | 54 | 56 | 51 | 37 | 35 | 37 | 35 | 38 | 42 | 36 | 34 | 36 | 40 | 39 | 34 |
| 19 | 45 | 51 | 56 | 56 | 54 | 39 | 37 | 39 | 37 | 40 | 45 | 38 | 36 | 38 | 42 | 41 | 36 |
| 20 | 48 | 53 | 57 | 57 | 57 | 40 | 39 | 41 | 40 | 41 | 47 | 40 | 39 | 41 | 44 | 43 | 38 |
| 21 | 50 | 54 | 59 | 57 | 59 | 42 | 42 | 43 | 42 | 43 | 51 | 44 | 43 | 44 | 46 | 47 | 40 |
| 22 | 52 | 57 | 61 | 58 | 62 | 45 | 46 | 45 | 45 | 45 | 54 | 48 | 48 | 49 | 49 | 52 | 43 |
| 23 | 77 | 60 | 64 | 60 | 65 | 48 | 50 | 47 | 48 | 48 | 58 | 52 | 53 | 55 | 52 | 56 | 47 |

| Time | Chan 23 | Chan 24 | Chan 25 | Chan 26 | Chan 27 | Chan 28 | Chan 29 | Chan 30 | Chan 31 | Chan 32 | Chan 33 | Chan 34 | Chan 35 | Chan 36 | Chan 37 | Chan 38 | Chan 39 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| min | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C | °C |
| 24 | 40 | 63 | 67 | 62 | 67 | 51 | 54 | 50 | 51 | 51 | 62 | 56 | 57 | 61 | 55 | 60 | 51 |
| 25 | 34 | 65 | 71 | 64 | 70 | 54 | 58 | 53 | 54 | 54 | 65 | 60 | 61 | 67 | 58 | 63 | 54 |
| 26 | 34 | 69 | 74 | 67 | 73 | 58 | 62 | 56 | 58 | 56 | 69 | 64 | 66 | 73 | 61 | 65 | 58 |
| 27 | 49 | 72 | 83 | 69 | 76 | 61 | 66 | 60 | 61 | 59 | 73 | 67 | 70 | 76 | 64 | 68 | 61 |
| 28 | 37 | 76 | 105 | 71 | 79 | 63 | 70 | 63 | 65 | 63 | 77 | 70 | 74 | 79 | 67 | 70 | 63 |
| 29 | 46 | 82 | 149 | 73 | 82 | 67 | 76 | 67 | 68 | 66 | 80 | 73 | 80 | 82 | 70 | 72 | 67 |
| 30 | 54 | 87 | 260 | 76 | 86 | 70 | 82 | 72 | 71 | 70 | 85 | 75 | 87 | 84 | 74 | 75 | 70 |
| 31 | 56 | 179 | 306 | 78 | 91 | 73 | 86 | 77 | 75 | 81 | 90 | 78 | 93 | 86 | 77 | 77 | 73 |
| 32 | 51 | 105 | 320 | 80 | 97 | 75 | 88 | 84 | 72 | 91 | 95 | 80 | 99 | 87 | 81 | 79 | 77 |
| 33 | 57 | 190 | 384 | 83 | 103 | 79 | 90 | 91 | 64 | 96 | 101 | 82 | 102 | 90 | 86 | 81 | 82 |
| 34 | 52 | 144 | 194 | 86 | 106 | 86 | 92 | 94 | 65 | 96 | 86 | 87 | 104 | 89 | 90 | 85 | 88 |

| Time | Chan 40 | Chan 41 | Chan 42 | Chan 43 | Chan 44 | Chan 45 |
|---|---|---|---|---|---|---|
| min | °C | °C | °C | °C | °C | °C |
| 0 | 21 | 21 | 22 | 22 | 22 | 0.1 |
| 1 | 20 | 22 | 22 | 23 | 22 | 0 |
| 2 | 20 | 26 | 30 | 33 | 29 | 0 |
| 3 | 20 | 38 | 45 | 51 | 44 | 0 |
| 4 | 20 | 51 | 58 | 65 | 57 | 0 |
| 5 | 20 | 60 | 68 | 75 | 66 | 0.1 |
| 6 | 21 | 66 | 75 | 84 | 75 | 0.1 |
| 7 | 21 | 71 | 80 | 91 | 81 | 0.1 |
| 8 | 21 | 76 | 86 | 96 | 86 | 0.1 |
| 9 | 22 | 79 | 89 | 96 | 88 | 0.1 |
| 10 | 22 | 81 | 90 | 96 | 88 | 0.1 |
| 11 | 23 | 84 | 92 | 96 | 88 | 0.1 |
| 12 | 24 | 86 | 94 | 96 | 88 | 0.1 |
| 13 | 25 | 87 | 95 | 96 | 88 | 0.1 |
| 14 | 27 | 89 | 95 | 96 | 89 | 0.1 |
| 15 | 28 | 88 | 95 | 97 | 89 | 0.1 |
| 16 | 30 | 86 | 93 | 98 | 90 | 0.1 |
| 17 | 32 | 85 | 92 | 101 | 91 | 0.1 |

| Time | Chan 40 | Chan 41 | Chan 42 | Chan 43 | Chan 44 | Chan 45 |
|---|---|---|---|---|---|---|
| min | °C | °C | °C | °C | °C | °C |
| 18 | 34 | 85 | 92 | 103 | 94 | 0.1 |
| 19 | 36 | 85 | 92 | 102 | 98 | 0.2 |
| 20 | 38 | 85 | 91 | 101 | 97 | 0.2 |
| 21 | 40 | 85 | 91 | 100 | 94 | 0.2 |
| 22 | 42 | 86 | 91 | 100 | 93 | 0.1 |
| 23 | 44 | 87 | 92 | 100 | 93 | 0.2 |
| 24 | 47 | 89 | 93 | 100 | 93 | 0.2 |
| 25 | 50 | 90 | 96 | 100 | 92 | 0.2 |
| 26 | 54 | 91 | 95 | 100 | 92 | 0.2 |
| 27 | 57 | 93 | 96 | 101 | 93 | 0.3 |
| 28 | 61 | 94 | 98 | 102 | 93 | 0.2 |
| 29 | 66 | 96 | 98 | 103 | 93 | 0.3 |
| 30 | 70 | 99 | 101 | 106 | 94 | 0.3 |
| 31 | 75 | 102 | 105 | 109 | 96 | 0.4 |
| 32 | 81 | 105 | 109 | 114 | 98 | 0.2 |
| 33 | 88 | 108 | 113 | 122 | 101 | 0.5 |
| 34 | 92 | 113 | 118 | 572 | 467 | 3 |

# Appendix 3 – Sampling sheet

## Protocol on Sampling

**Manufacturer:** Pyroplex Ltd

**Product(s) to be sampled:** 10X4 + 15X4 graphite door seals 30049 glazing

**Place of sampling:** Pyroplex, Droitwich, Worcestershire WR9 9BG

**Parties present:** Ross Newman, Andy Walsh

**Date of sampling:** 2/7/13

BMTRADA
Chiltern House, Stocking Lane
Hughenden Valley, High Wycombe
Buckinghamshire
HP14 4ND, UK
T: +44 (0) 1494 569800
F: +44 (0) 1494 564895
testing@bmtrada.com
www.bmtradagroup.com

| Description of sample | Quantity and size of sample | Markings applied to the product |
|---|---|---|
| Ref 15X4 Fire only 8700 | 150 No x 2.1m long samples | Box signed + dated + photos across seal. |
| | | |
| | | |
| Ref 15x4 triple fin 30141 seals | 90No x 2.1m long samples | Box signed + dated + photos across seal. |
| | | |
| Pyroplex 4 hour mastic (white) | 25 x 310ml cartridges | box signed + dated + photos across seal. |
| Ref 2WT310PY | 2No boxes | |
| Batch No 030513S652 | | |
| Ex date 11/2014 | | |
| 10079X | 1 x 25M coil | Batch No. 014 15/9/2012 |
| 10148X | 1 x 25M Coil | Batch No. 083 26/8/2010 |
| 30049 | 2 x 100 M Coil | Batch No 076 04/5/2013 |
| | | Boxes taped + photod signed across seals |

**Signed: Prior witness**

**Position:** Business Development - Fire

**Date:** 2/7/13

**Notified Body ID: 1224**

# Protocol on Sampling

**Manufacturer:**

**Product(s) to be sampled:**

**Place of sampling:**

**Parties present:**

**Date of sampling:**

BMTRADA
Chiltern House, Stocking Lane
Hughenden Valley, High Wycombe
Buckinghamshire
HP14 4ND, UK
T: +44 (0) 1494 569800
F: +44 (0) 1494 564895
testing@bmtrada.com
www.bmtradagroup.com

| Description of sample | Quantity and size of sample | Markings applied to the product |
|---|---|---|
| 15 X 4 | 90 No 2.1m long seals | tagged + signed |
| Ref 8712 | Fire + smoke | across tape + photoed |
| | | |
| 10 X 4 | 70 No 2.1m long seals | 〃 〃 |
| Ref 8500 | Fire + smoke. | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Signed: Prior witness**

**Position:** Business Development – Fire

**Date:** 2/7/13

**Notified Body ID: 1224**

**CHILTERN INTERNATIONAL FIRE LTD** *(trading as BM TRADA)*

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**testing@bmtrada.com**

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**CHILTERN INTERNATIONAL FIRE LTD** CHILTERN HOUSE, STOCKING LANE, HUGHENDEN VALLEY, HIGH WYCOMBE, BUCKS, HP14 4ND, UK

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