Fire Resistance Test

Prepared for:
Fire Proofing Services Ltd
Evolution House
Aston Road
Nuneaton
CV11 5EL

CONFIDENTIAL

Report: Chilt/RF13137 Revision A

A fire resistance test performed on a single leaf single acting steel access panel

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

Test date: 23rd May 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.

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 specimen 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		132 (one hundred and thirty two) minutes*
Continuous flaming		132 (one hundred and thirty two) minutes*
Gap gauges		132 (one hundred and thirty two) minutes*
Insulation		
Leaf - discrete area (steel)	Average set	20 (twenty) minutes
	Standard set (Max)	8 (eight) minutes
	Supplementary set (Max)	9 (nine) minutes
Frame - discrete area (steel)	180ºC rise	14 (fourteen) minutes
	360ºC rise	52 (fifty two) minutes
Radiation – time to 15kw/m^2		132 (one hundred and thirty two) minutes*

* No failure had occurred at test termination at 132 minutes

Summary of specimen:

A steel single leaf single acting access panel

Leaf size – 2398mm high x 898mm wide x 44mm thick

2 Introduction

The access panel was manufactured and supplied for test by the client.
The access panel was installed into a flexible supporting construction. In accordance with BS EN 14600: 2005 the leaf was pre-cycled before the fire test. The access panel was instrumented with the standard and supplementary sets of thermocouples and was installed opening away from the furnace

3 Specimen verification

The access panel was delivered to BM TRADA during May 2013. The component parts of the access panel 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

BM TRADA were not involved in factory sampling of the components used for the specimen subject to this report.

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 access panel incorporated a 67mm x 29mm softwood timber infill to facilitate the fixings for the specimen. The specimen tested is a 120 minute product with an anticipated Category B performance, therefore intended fire resistance is 132 minutes, three layers of Gypsum plasterboard type F were fitted on the exposed face and one layer was fitted on the unexposed face. The supporting construction was only fixed on the horizontal edges, the vertical edges remained free.

5 Description of specimen

5.1 Access panel leaf

The leaf measured 2398mm high x 898mm wide x nominally 44mm thick overall.

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6 Description of construction (see clients drawings in appendix)

Leaf

	Material	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Stiles	Profiled steel welded to the steel 'tray section facing (see figure 2)	1.2 thick x 70 wide x 44 thick	-	-	1
Rails	Profiled steel welded to the steel 'tray section facing, butted up to the stiles	1.2 thick x 70 wide x 44 thick	-	-	2
Facings	Profiled steel 'tray' on unexposed face	1.2 thick	-	-	3
	Siniat (formally Lafarge) Soundbloc plasterboard on the exposed	15mm thick	-	-	4
Leaf finish	Polyester powder coating	Nominally 75 microns thick	-	-	-
Welds	Spot welds	12.5 long at nominal 450 centres	-	-	-
Plasterboard retainer	Profiled steel 'Z' section fixed to stiles with 16.5mm long self tapping screws 75mm from corners (see figure 2)	1.5 thick	-	-	5
Leaf stiffeners	None fitted	-	-	-	-

Frame

	Material	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Head, jambs and threshold	Profiled steel (see figure 2)	1.5 thick x 45 wide x 67 deep including a 47 wide x 20 high integral stop and a 25 wide integral architrave	-	-	6
Stops – integral	-	-	-	-	-
Frame jointing detail	Mitred - welded	-	-	-	-
Architrave - integral	-	-	-	-	-
Frame fixings	Steel screws	M4 x 70 long screws fitted at 50mm from corners and at 450mm centres	-	-	-
Frame infill	Rockwool rock mineral fibre	47 wide x 22 thick	33	-	7
Frame fire stopping	Intumescent acrylic mastic on both faces of frame	Nominally 5mm wide sealing frame to supporting construction	-	-	-

Intumescent and sealing materials

	Make/type	Size (mm)	Location	Key to figures
Panel leaf	None fitted	-	-	-
Frame	Lorient IS1020 white 'P' rubber buffer seal	8 x 4	Fitted to the upstand of the stop	8
	Envirograf Paper self adhesive intumescent Product ref: G10-10	10 x 2	Fitted to the upstand of the stop	9

Hardware

	Make/type	Size (mm)	Location	Key to figures
Hinges	Fire Proofing Services Ltd 'in house' manufactured continuous hinge	44.5 wide x full leaf height (blade size)	Fitted for the full height of the leaf	10
Closer	None fitted	-	-	-
Lock – engaged	3-point locking system, with lock operating 2No. Ø8 diameter rods, acting at top and bottom of leaf	112 high x 38 wide x 17 thick (lock body size)	Fitted 1200mm from the threshold of the leaf	11
Locking rod guide blocks	8No. steel rod blocks stitch welded on exposed face of stile	20 x 20 x12 with a 8mm Ø whole to accept Rod	Fitted 60mm, 110mm, 535mm, 1025mm, 1415mm, 1885mm, 2315mm and 2355mm from the threshold of the leaf	12
Furniture	7No. steel hinge bolts	Ø11 x 6mm protruding from leaf edge	Fitted at 290mm centres, 340mm from the threshold of the leaf	13

7 Pre-test measurements

7.1 Pre-cycling

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

7.2 Access panel leaf/frame perimeter gaps

The gaps between the edge of the leaf and frame were measured prior to test. A total of 12 readings were taken. The measurements (in mm) are given in Figure 5 of the appendix.

7.3 Closer forces

No closer was fitted.

7.4 Method of installation

The access panel 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 the appendix.

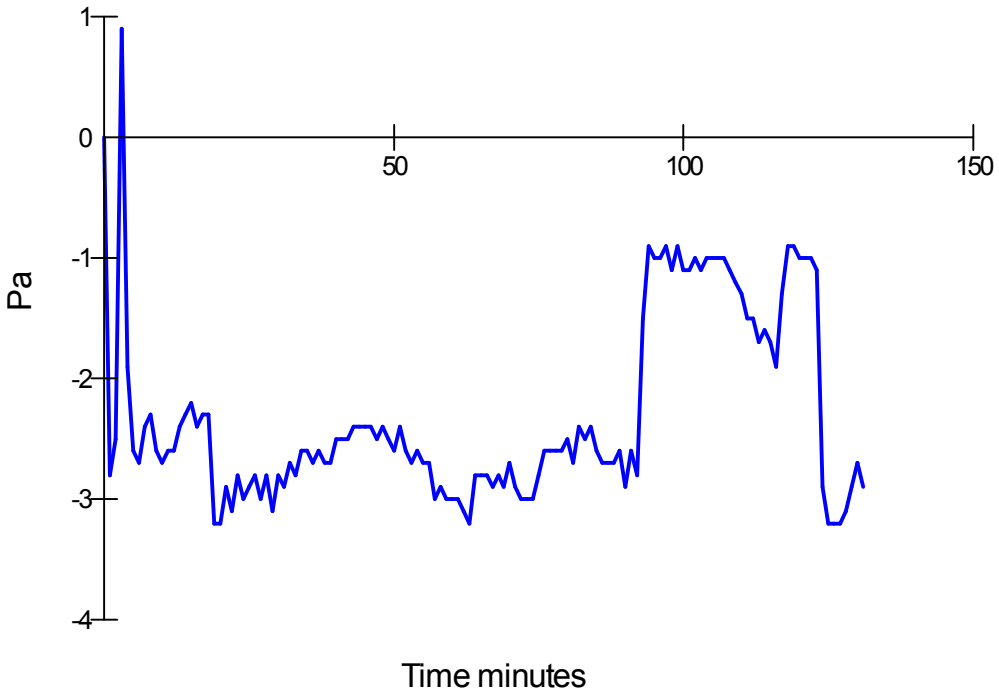
8 Test conditions

8.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 11°C.

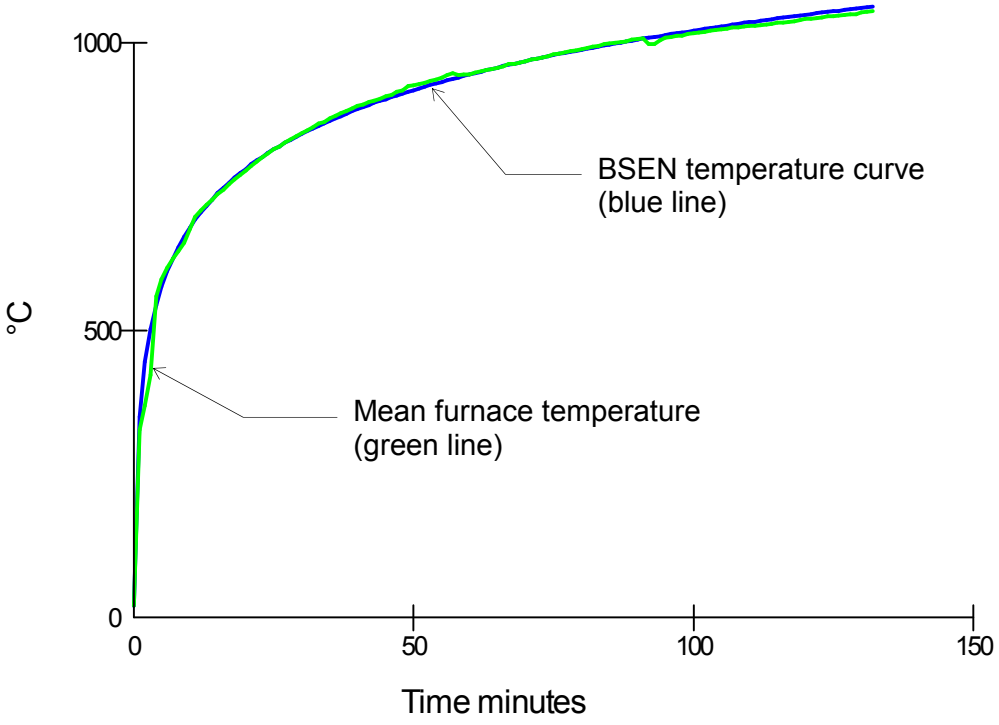
8.2 Pressure readings

After the first 5 minutes of the test, the furnace pressure was maintained at -2 ± 5 Pa and after 10 minutes was maintained at -2 ± 3 Pa with respect to atmosphere at a point 0.5m from the notional floor level, in order to maintain 20Pa at the head of the leaf. The pressure readings recorded 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 thermocouples suitably distributed within the furnace. The temperatures recorded are shown graphically below:



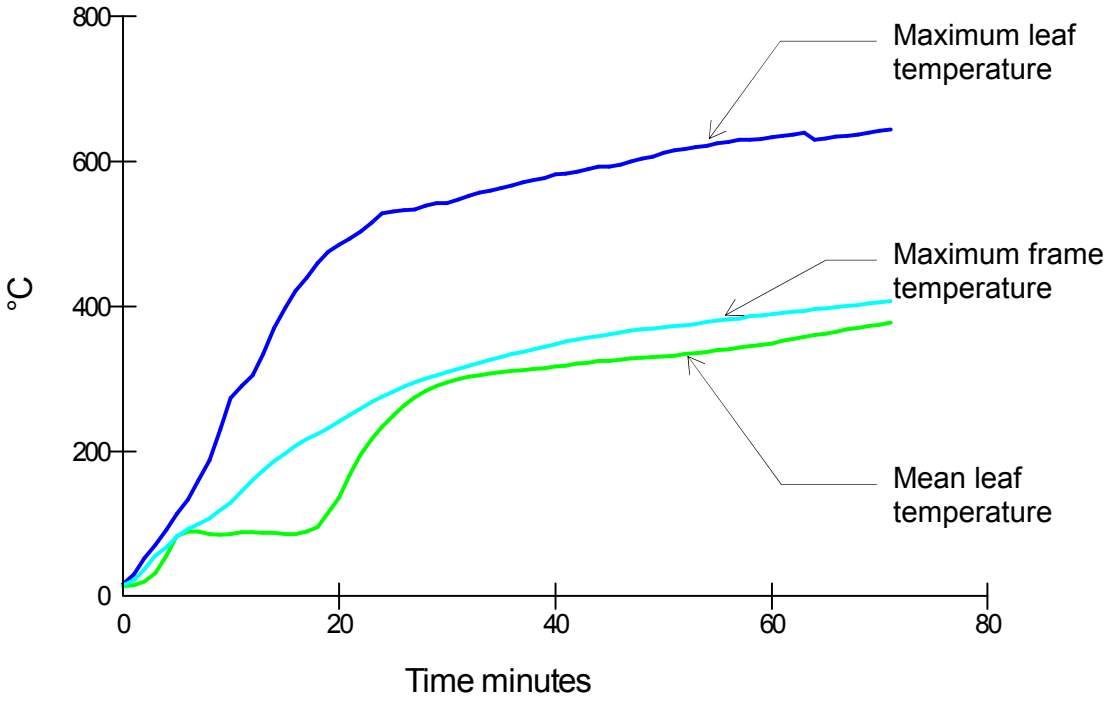
8.4 Unexposed face temperatures

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

Leaf	1 discrete area	
	Discrete area (steel)	5 measuring mean temperature rise.
		5 measuring maximum temperature rise, standard set 100mm in from the leaf edges.
		5 measuring maximum temperature rise, supplementary set 25mm in from leaf edges
Frame		5 measuring maximum temperature rise.

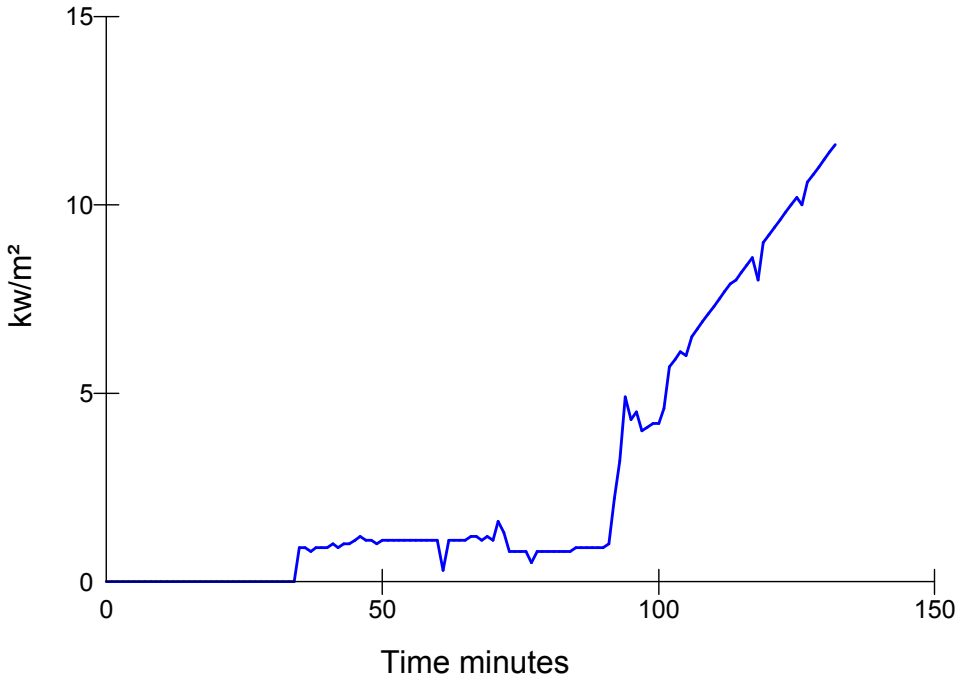
The location of the thermocouples are shown in Figure 6 of the appendix. The temperatures were recorded until 72 minutes, after all insulation criteria failures were achieved at all areas; the readings were recorded and are shown graphically below:

Access panel



8.5 Total heat flux

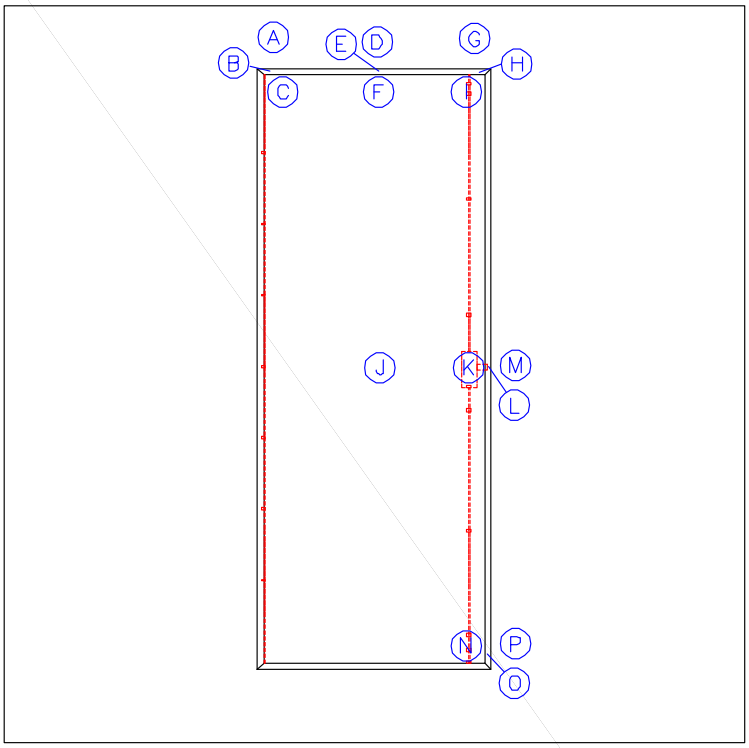
A medtherm heat flux radiometer was used to measure the radiant heat 1m away from the centre of the specimen. The readings recorded are shown graphically below:



* Radiometer malfunction until 35 minutes had elapsed

8.6 Distortion data

The following tables show the distortion of the leaves in mm with an accuracy of ±1mm.
A positive measurement indicates distortion towards the furnace.
A negative measurement indicates distortion away from the furnace.



Access panel - leaf (hung on the left and opening away from the furnace)

Time	A	B	C	D	E	F	G	H	I
15	8	-22	-17	4	-13	10	7	-25	-23
30	3	-32	-30	2	-20	-22	1	-32	-28
45	0	-37	-31	-2	-25	-26	-1	-37	-33
60	-4	-43	-36	-7	-29	-33	-9	-45	-42
75	-9	-48	-42	-14	-40	-40	-18	-56	-50
90	-14	-59	-49	-20	-48	-46	-23	-61	-74

Time	J	K	L	M	N	O	P
15	15	45	37	27	1	-15	5
30	8	36	26	15	-1	-18	3
45	7	31	26	16	-3	-20	3
60	10	30	23	13	-3	-21	3
75	12	30	22	13	-3	-21	2
90	26	18	22	13	-5	-22	0

9 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	Comments
00.00	Test started.
03.00	There is smoke issuing from the perimeter of the frame.
04.00	The corners of the frame are starting to deflect away from the partition by approximately 10-15mm.
06.00	There is an increase in the level of smoke issuing from the head of the frame.
07.00	The top corners of the frame have deflected out by approximately 25mm.
07.30	The bottom corners of the frame have deflected out by approximately 20mm.
10.20	The plasterboard on the exposed face has started to crack
11.10	There is discolouration at the middle of the leaf approximately 100mm down from the head of the leaf.
13.30	The top corners of the frame have deflected out approximately 30mm.
14.10	There is discolouration at the hanging edge of the leaf.
14.30	There is further discolouration to the head of the leaf.
15.00	The powder coating at the top of the leaf is starting to bubble.
16.15	The bottom corners have deflected out approximately 25mm.
16.50	There is discolouration at the closing edge of the leaf.
18.00	The top corners of the frame have deflected out approximately 35mm.
20.00	The paint at the hanging and closing edges of the leaf is starting to bubble.
21.40	There is discolouration on the threshold of the leaf.
24.45	There is an increase in the level of smoke issuing from the perimeter of the frame.
27.00	There is further discolouration to the perimeter of the leaf.
35.00	There is discolouration on the unexposed face of the leaf.

39.00	The plasterboard on the exposed face is starting to deflect away from the leaf face.
49.30	There is smoke issuing from across the face of the leaf.
53.00	A crack in the plasterboard on the exposed face has opened to approximately 10-15mm.
64.00	There is further discolouration across the face of the leaf.
68.00	There is a glow visible behind the frame at the top left corner of the leaf.
72.00	All unexposed thermocouples are removed.
73.00	The crack in the plasterboard on the exposed face has opened to approximately 15-20mm.
75.00	There is an increase in the level of smoke issuing from across the leaf face.
79.00	There is a glow visible behind the frame at the top right corner.
89.30	The crack in the plasterboard on the exposed face has now opened to approximately 20-25mm.
92.00	The exposed face plasterboard has fallen away.
92.40	The leaf face is now glowing.
93.00	The leaf face is starting to ripple and distort.
102.30	The entire unexposed face is now glowing.
132.00	Test terminated

10 Expression of results

Integrity		
Cotton pad		132 (one hundred and thirty two) minutes*
Continuous flaming		132 (one hundred and thirty two) minutes*
Gap gauges		132 (one hundred and thirty two) minutes*
Insulation		
Leaf - discrete area (steel)	Average set	20 (twenty) minutes
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Frame - discrete area (steel)	180ºC rise	14 (fourteen) minutes
	360ºC rise	52 (fifty two) minutes
Radiation – time to 15kw/m^2		132 (one hundred and thirty two) minutes*

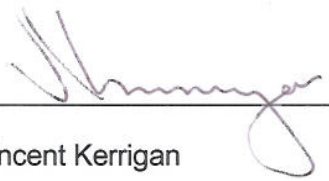
* No failure had occurred at test termination at 132 minutes

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 leaf to frame gaps recorded in Figure 5 of the appendix. The fire resistance performance of access panels 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:	30.09.2013	30-09-2013

Revision A – September 2013 – change of company name and change to name of hinge, page 8.

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.

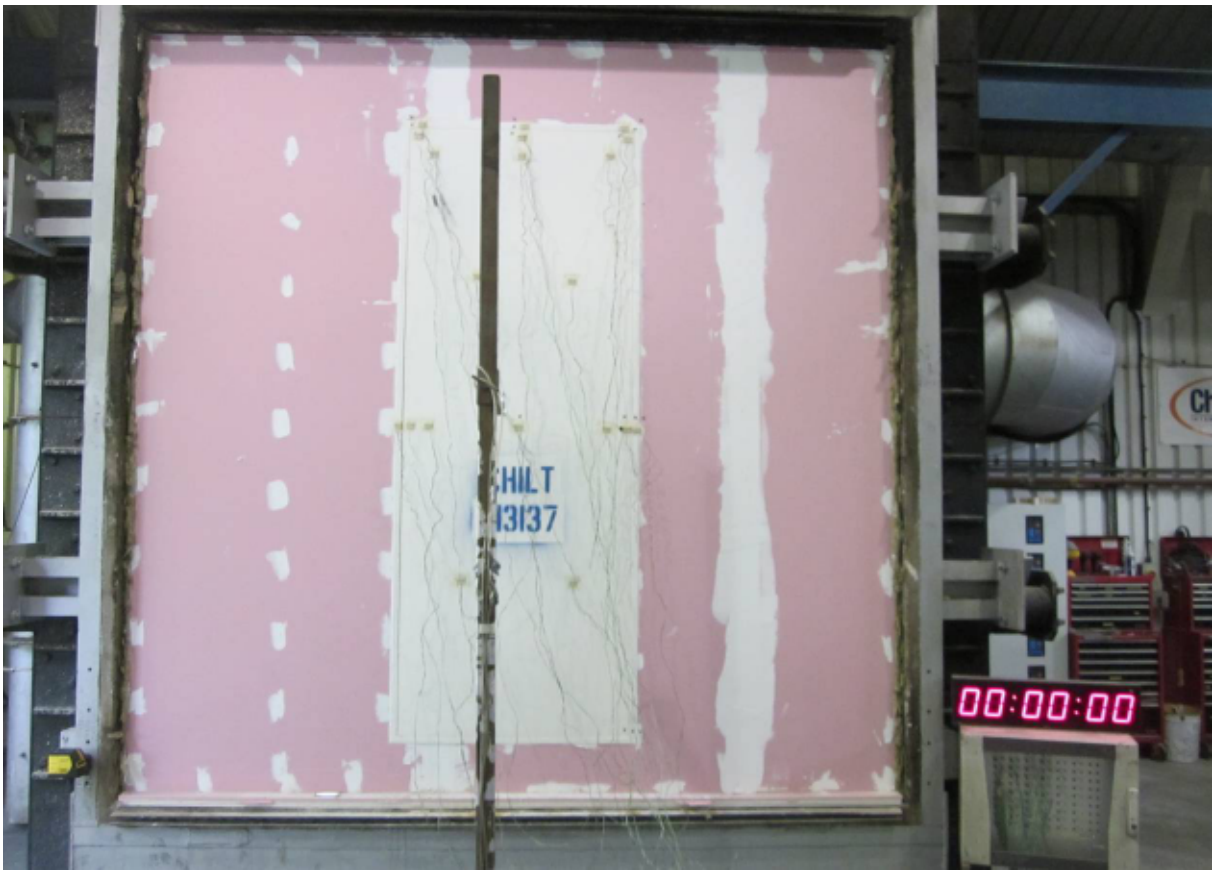
A copy of the field of direct application is available from CIFL upon request.

13 Photographs

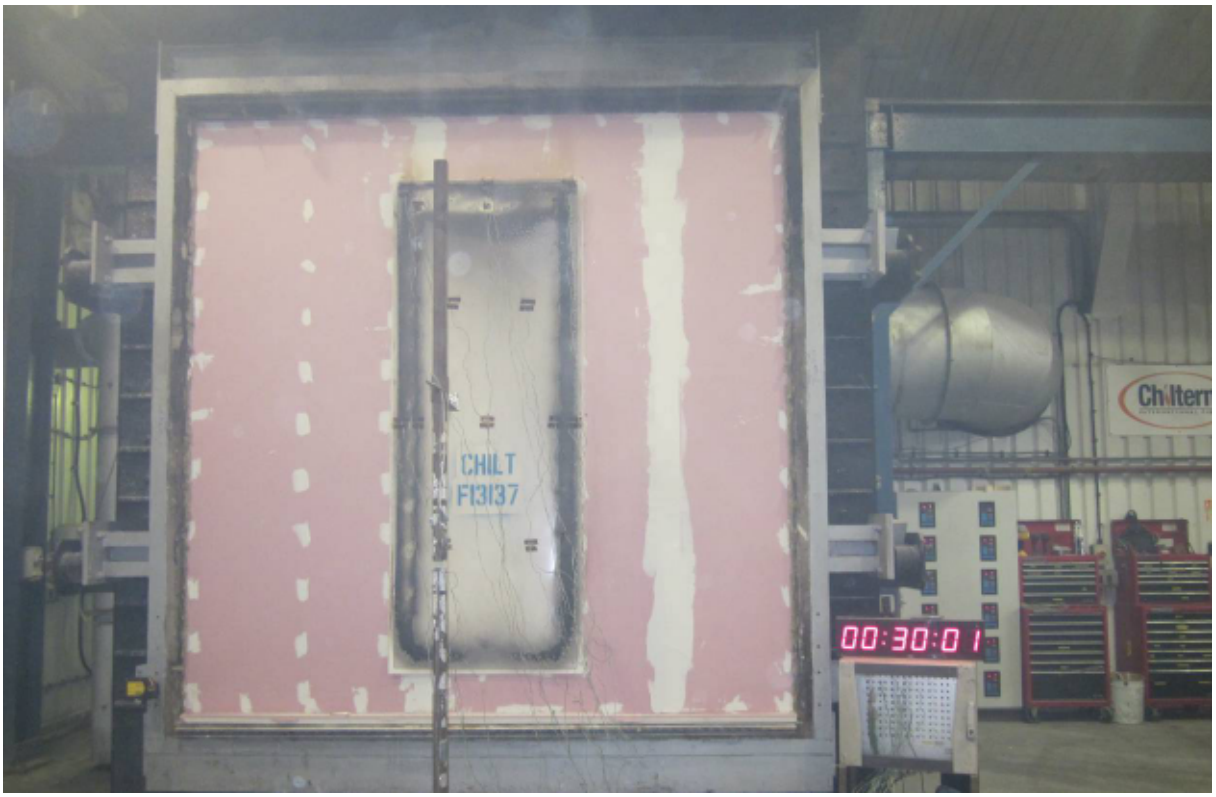
Shoot bolt guide blocks and plasterboard retaining section

Lock bolted to leaf stile

At start of test

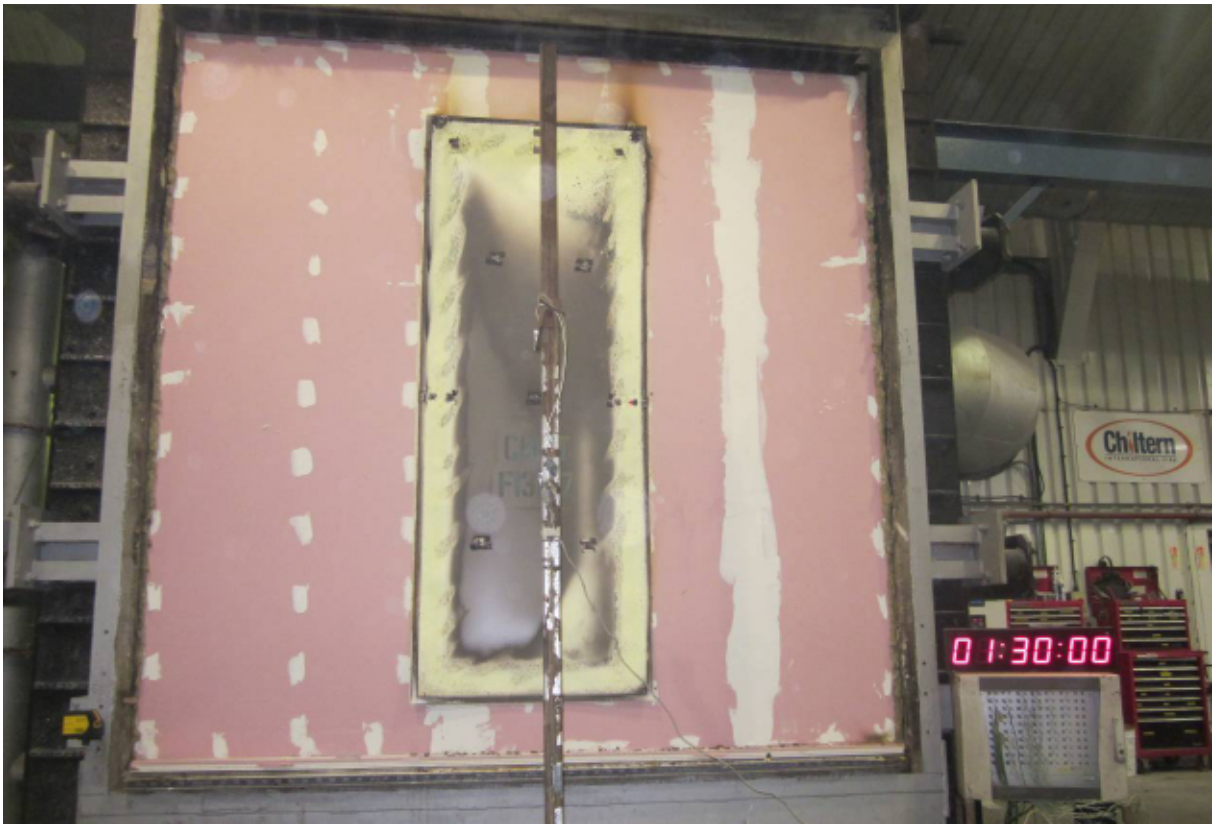


After 30 minutes



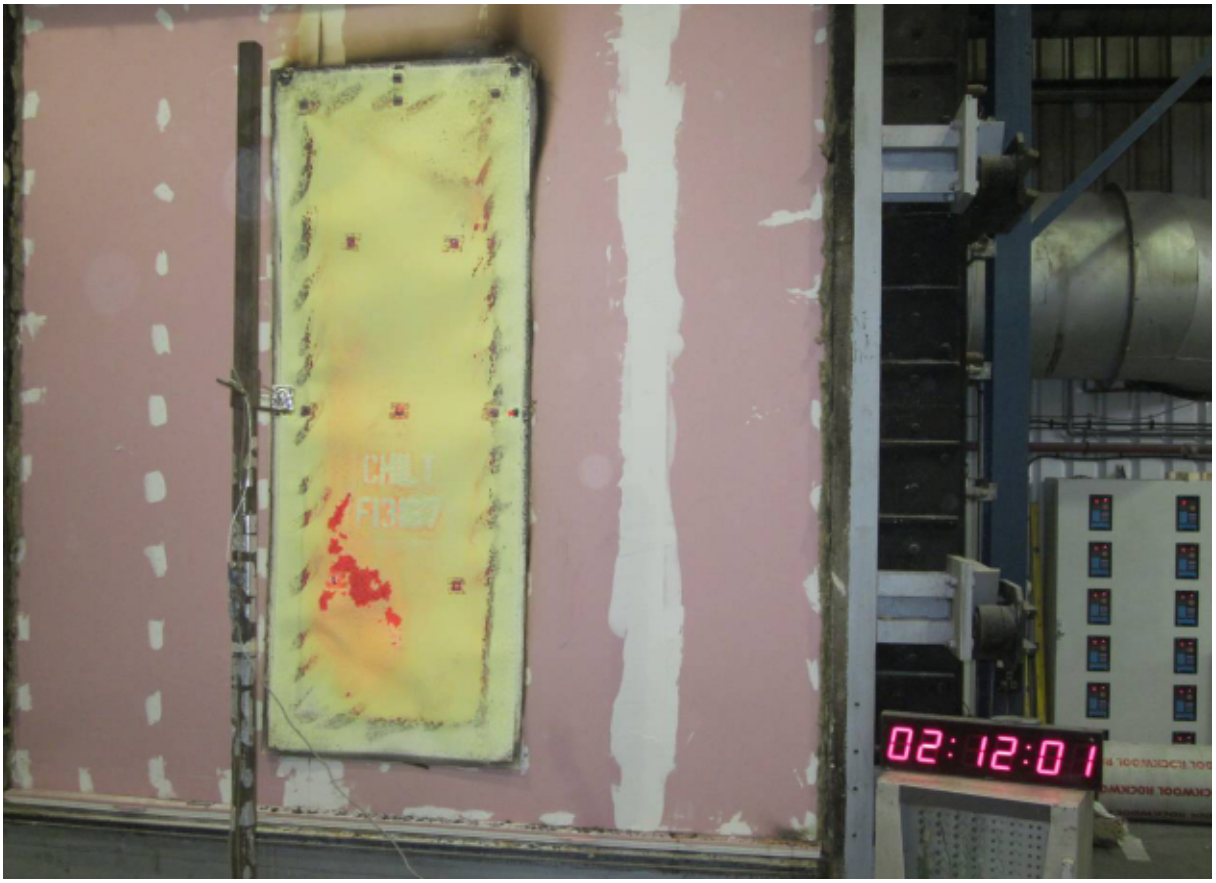
After 60 minutes

At 90 minutes

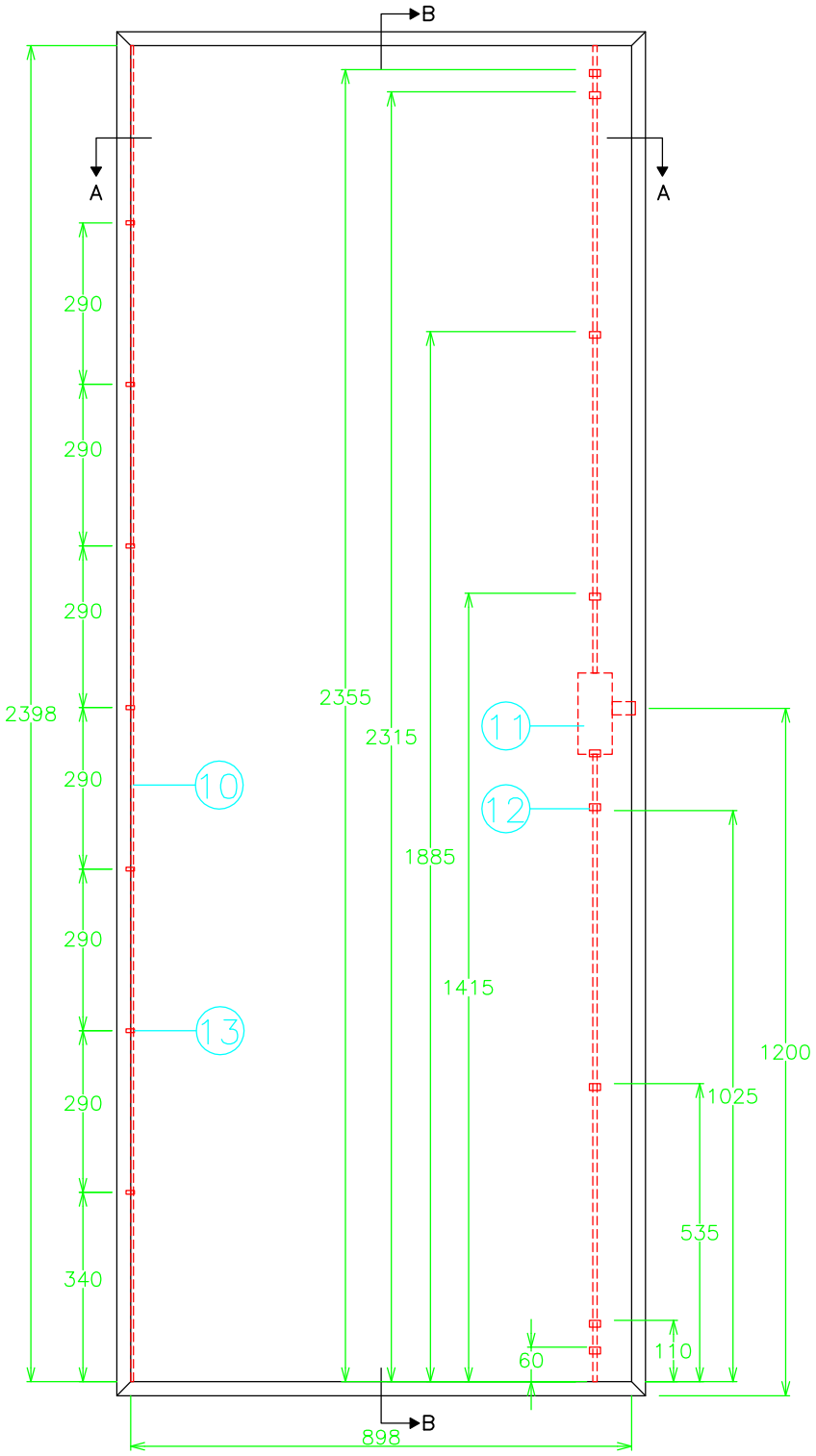


After 120 minutes

After 132 minutes



Appendix – figures 1 - 6



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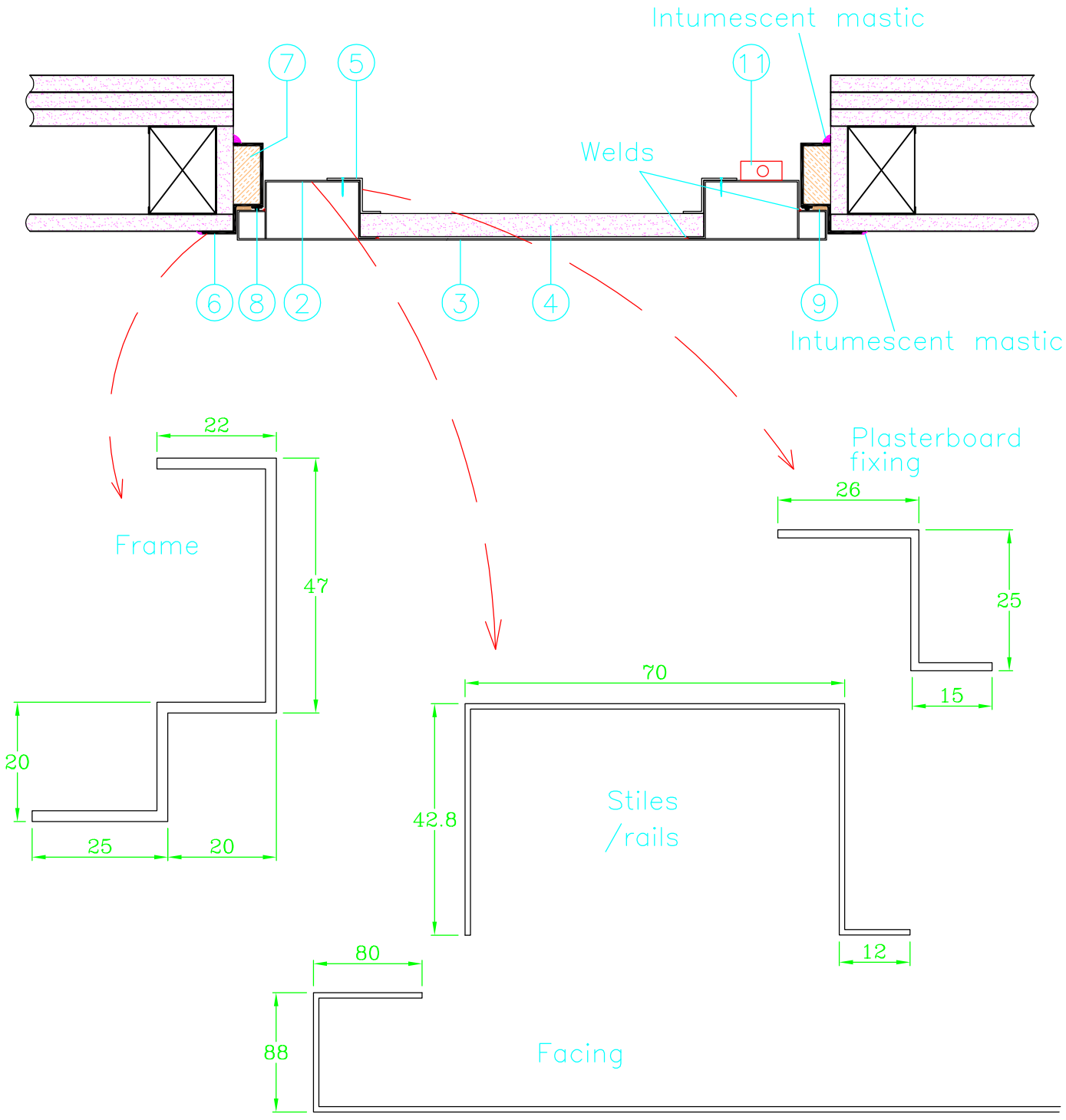
Title: Unexposed face elevation showing hardware positions
(All dimensions in mm)

Date Drawn	Drawn By	Scale
10/06/13	ARD	NTS

Project No.	
Chilt/RF13137 Rev A	Appendix

Section A–A



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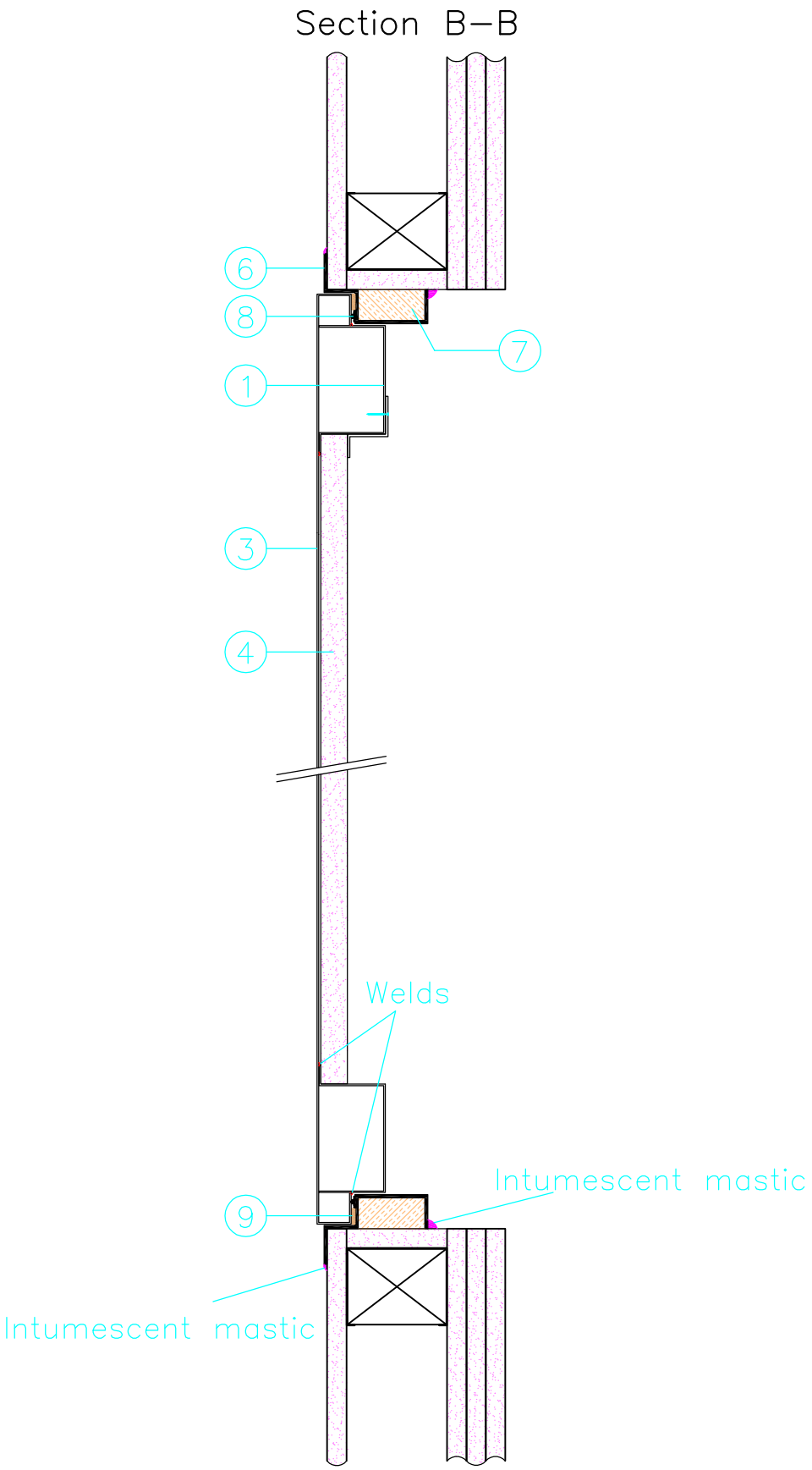
Title		
Horizontal cross–sections (All dimensions in mm)		
Date Drawn 10/06/13	Drawn By ARD	Scale NTS
Project No. Chilt/RF13137 Rev A		Appendix



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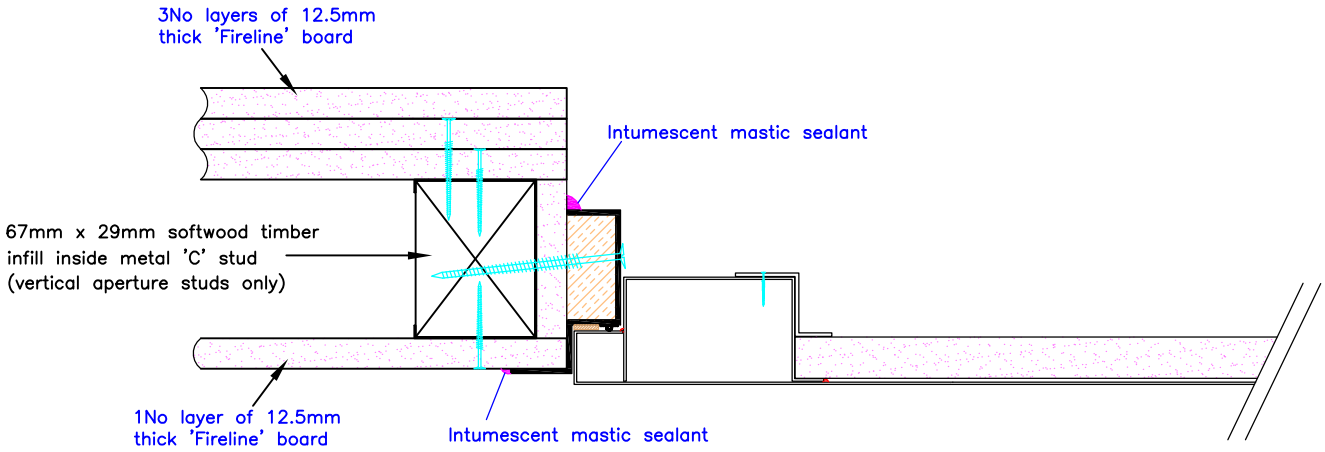
Title		
Vertical cross–sections (All dimensions in mm)		
Date Drawn 10/06/13	Drawn By ARD	Scale NTS
Project No. Chilt/RF13137 Rev A		Appendix



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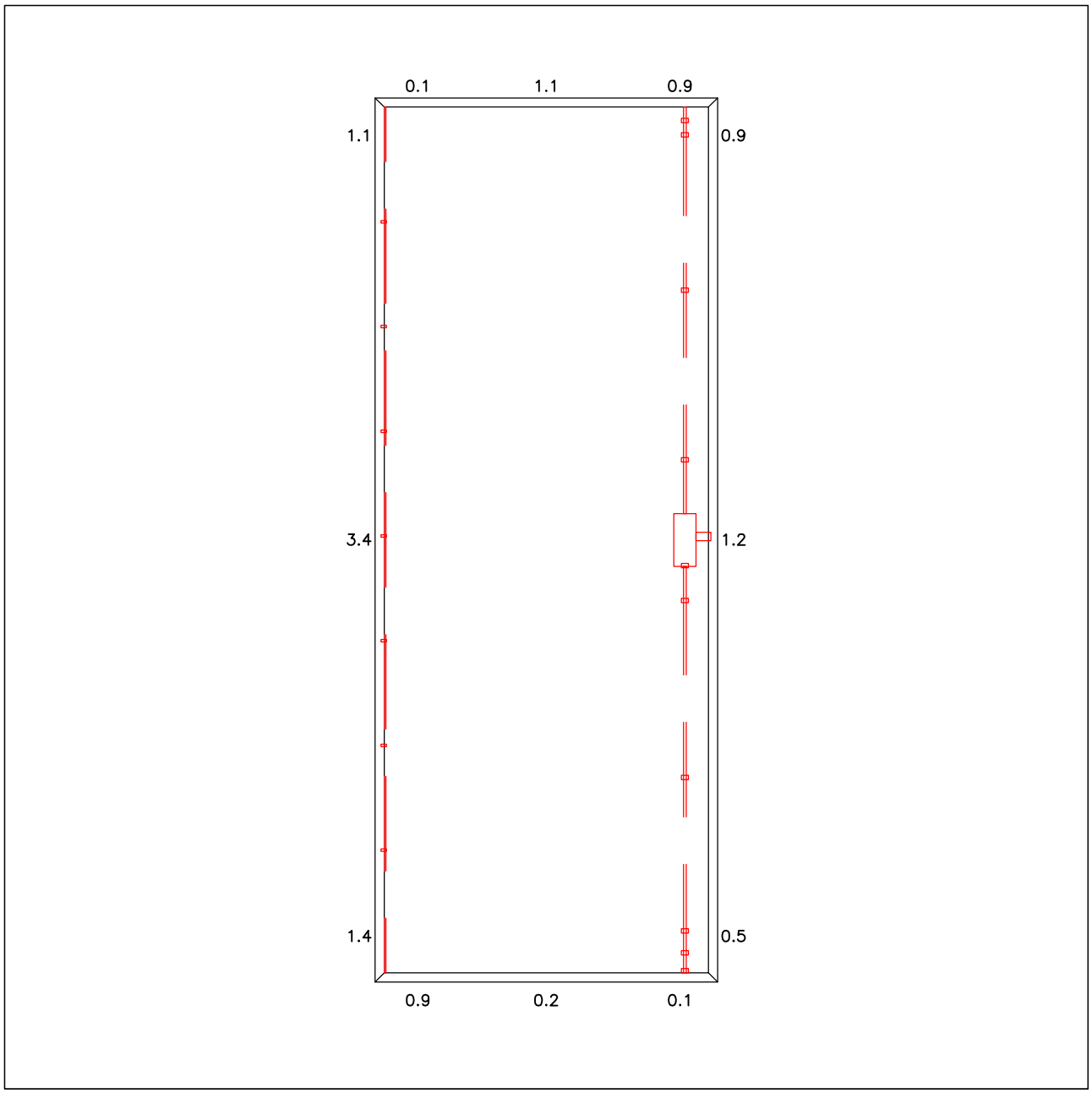
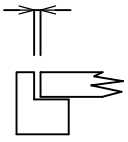
Title: Frame to supporting construction fixing detail (All dimensions in mm)		
Date Drawn: 10/06/13	Drawn By: ARD	Scale: NTS
Project No.: Chilt/RF13137 Rev A		Appendix



Gaps shown



Viewed From Unexposed Face

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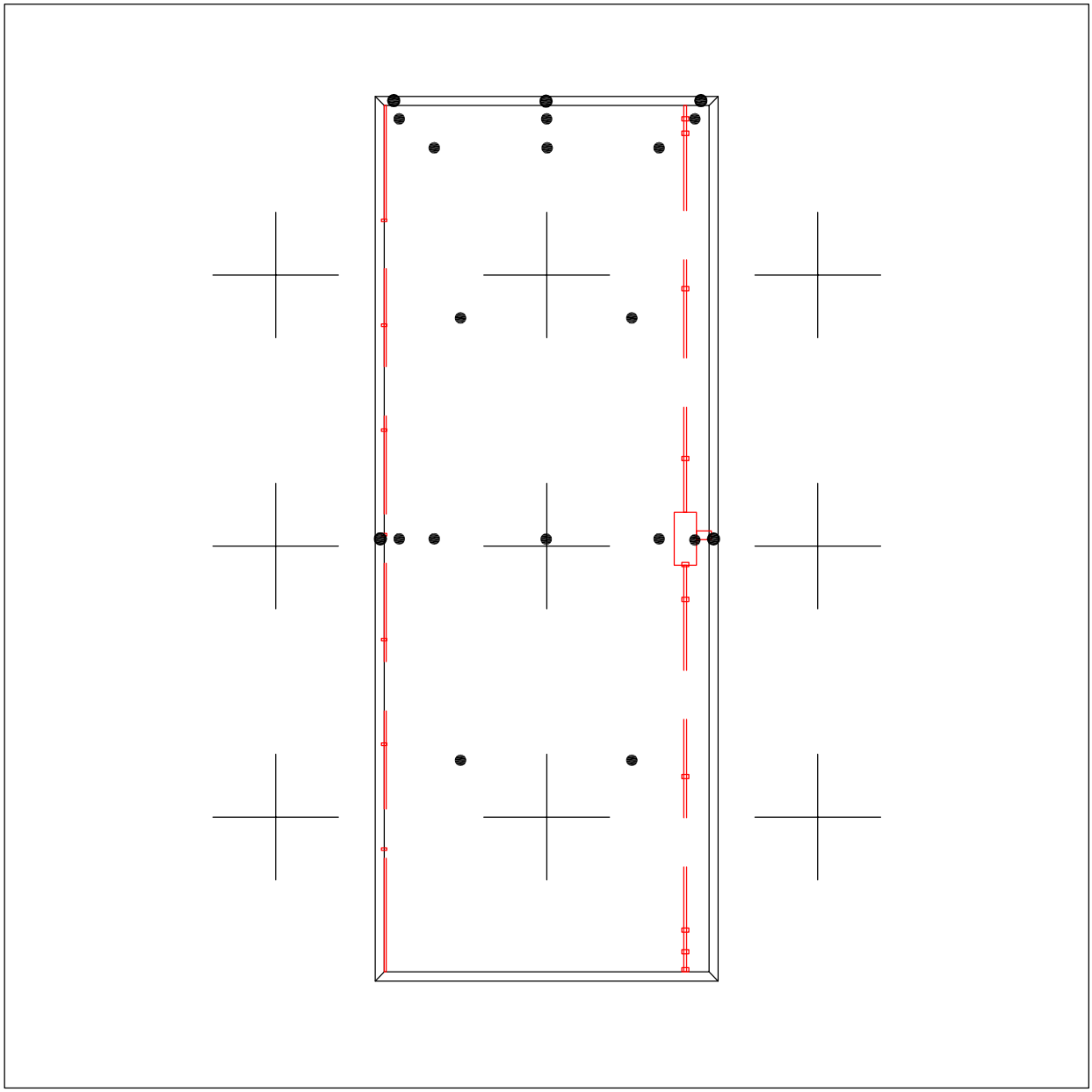
Title	Leaf/frame gaps (All dimensions in mm)		
Date Drawn	Drawn By	Scale	
10/06/13	ARD	NTS	
Project No.			
Chilt/RF13137 Rev A		Appendix	



+ : Furnace Thermocouples

• : Unexposed Face Thermocouples

Viewed From Unexposed Face

BM TRADA

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Title: Thermocouple positions (All dimensions in mm)		
Date Drawn: 10/06/13	Drawn By: ARD	Scale: NTS
Project No.: Chilt/RF13137 Rev A		Appendix

BMTRADA

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

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