CONFIDENTIAL

Report: Chilt/RF12065
Revision B

A fire resistance test performed on 2No two single leaf single acting doorsets with glazing

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

Test date: 10th July 2012

committed to excellence

Prepared for: Vistamatic Ltd
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UKAS TESTING
1762

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

Times to failure

Doorset A

Integrity		
Cotton pad		30 (thirty) minutes*
Continuous flaming		30 (thirty) minutes
Gap gauges		31 (thirty one) minutes
Insulation		
	Average set	15 (fifteen) minutes
	Standard set (Max)	10 (ten) minutes
Glass	Maximum	10 (ten) minutes
Door frame	Maximum	29 (twenty nine) minutes
Radiation		30 (thirty) minutes*

* No failure had occurred prior to initial failure

Doorset B

Integrity		
Cotton pad		34 (thirty four) minutes*
Continuous flaming		34 (thirty four) minutes
Gap gauges		34 (thirty four) minutes*
Insulation		
	Average set	11 (eleven) minutes
	Standard set (Max)	12 (twelve) minutes
Glass	Maximum	10 (ten) minutes
Door frame	Maximum	34 (thirty four) minutes*
Radiation		34 (thirty four) minutes*

* No failure had occurred prior to initial failure

Summary of specimens:

2No Single leaf single acting doorsets both incorporating 2No. glazing panels.

Leaf size – both doorsets: 2100mm high x 1140mm wide x 44mm thick.

2 Introduction

The glazing was supplied for test by the client and delivered during July 2012. Chiltern International Fire Limited (CIFL) constructed two timber doorsets and fitted the glazing into the specimens to the client's specification.
The doorsets were pre-cycled before the fire test. The specimens were instrumented with the standard set of thermocouples and the doorsets were installed opening in towards the furnace.

3 Specimen verification

The component parts of the doorsets were identified and, where appropriate, moisture content readings and density checks were performed. These details are outlined in the construction section of this report.

4 Description of supporting construction

The supporting construction comprised a 150mm thick medium density concrete blockwork wall.

5 Description of specimen

5.1 Door leaves

Doorset A – the leaf measured 2100mm high x 1140mm wide x 44mm thick.

Doorset B – the leaf measured 2100mm high x 1140mm wide x 44mm thick.

6 Description of construction (refers to Figures 1 to 6 of the appendix)

Door leaf – both doorsets – identified as Halspan Prima 44mm door blanks

		Species/type	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Stiles and rails		None fitted	-	-	-	-
Core		Halspan Prima particleboard	44 thick	630* ± 10%	7.2-7.4	1
Facings		None fitted	-	-	-	-
Adhesive	Lipping	PU	-	-	-	-
Lippings – vertical edges only		Sapele	8 thick	640**	-	2

* Manufacturers stated density, not verified by CIFL

** Nominal density

Door frame – both doorsets

	Material	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Head & jambs	European Redwood	70 wide x 32 thick	510**	10.3 - 10.6	3
Head to jamb jointing detail	Mortice and tenon – screwed	-	-	-	-
Stops – planted (pinned)	European Redwood	25 wide x 12 thick	510**	11.6 - 12.8	4
Frame to supporting construction fire stopping detail	Rock mineral fibre capped with intumescent acrylic mastic	Nominally 5-10mm wide x 10-15 deep	-	-	-
Frame to supporting construction fixing detail	4 No. steel wood screws per jamb	80 long	-	-	-
Architrave	European Redwood	18 thick x 50 wide	-	-	-
Threshold	Non combustible	-	-		-

** Nominal density

Intumescent materials – doorset A

	Make/type	Size (mm)	Location	Key to figures
Door edges	None fitted	-	-	-
Frame reveal – head and jambs	Lorient Polyproducts Ltd LP2004 Type 617	20 x 4	Fitted centrally in the frame reveal, 12mm from the exposed face	5
Glazing aperture	Mann McGowan Pyroglaze 30	10 x 3	Fitted between the glass and bead on both faces	6
	Norseal acrylic intumescent mastic (Fire Wizard)	Nominally 3 thick	Fitted lining the glazing aperture between the Pyroglaze 30 intumescent	7
Around centre glass actuator spindle – see clients drawing in Appendix 2	Norseal graphite type intumescent sheet	5 thick (overall)	Fitted around the spindle lining the aperture in the outer glass layers	-

Intumescent materials – doorset B

	Make/type	Size (mm)	Location	Key to figures
Door edges	None fitted	-	-	-
Frame reveal – head and jambs	Lorient Polyproducts Ltd LP2004 Type 617	20 x 4	Fitted centrally in the frame reveal, 12mm from the exposed face	8
Glazing aperture	Norseal Graphite Intumescent (Product ref: 2.5-390 x 10/SA) raw graphite intumescent	10 x 2.5	Fitted between the glass and bead spacer bars on both faces	9
	Norseal Intumescent Liner (Product ref: 1.8-408 x 53/SA) graphite type glazing liner	44 x 1.8	Fitted lining the glazing aperture	10
Around centre glass actuator spindle –	2No. Norseal Graphite Intumescent (Product ref: 2.5-390 x 10/SA) Norseal graphite type intumescent.	5 thick (overall)	Fitted around the spindle lining the aperture in the outer glass layers	-

Intumescent interruptions and hardware protection – both doorsets

	Make/type	Size (mm)	Location
Around hinges	Fully interrupted	-	Hinge blade fully interrupts seal in frame reveal
Under hinge blade	Interdens	1 thick	Fitted under the hinge blade on the frame and leaf
Encasing latch body	Interdens	1 thick	Fitted around the body of the latch
Under latch forend	Interdens	1 thick	Fitted under the latch forend
Around latch keep	Fully interrupted	-	Latch keep fully interrupts seal in frame reveal
Under latch keep	Interdens	1 thick	Fitted under the latch keep

Hardware – both doorsets

	Make/type	Size (mm)	Location	Key to figures
Hinges	3 No. Royde and Tucker H101 lift off type hinges	100 x 35 (blade size)	Fitted 150mm from the head of the leaf and 1016mm and 170mm from the threshold of the leaf	11
Closer	Rutland TS3204 overhead type closer	220 x 59 (footprint size)	Fitted on the exposed face of the leaf as per the manufacturer's instructions	12
Latch – engaged	E*S tubular steel mortice latch	60 x 25 (forend size)	Fitted 1000mm from the threshold of the left leaf	13
		65 x 24 (keep size)		
Furniture – doorset A only	Aluminium lever type handle	100 x 38 (footprint size)	Fitted appropriate to the latch	14

Glazing – doorset A

Vistamatic VS2 secure vision panel – left panel set to obscured, right panel set to clear

		Make/type	Size (mm)	Location	Key to figures
Glazing type – both panels		6mm Pyro-EX toughened glass – Express Toughening	6 thick	Fitted on the unexposed face	15
		4mm Annealed glass – Express Toughening	4 thick	Fitted between the outer glass layers (fitted in the top half only of the longer right side vision panel)	16
		10mm Pyro-EX toughened glass – Express Toughening	10 thick	Fitted on the exposed face	17
		Stainless steel spacer bar – DGS (Product ref: SS/BT05.5)	5.5 thick	Fitted between the outer glass layers	18
Sight size	Left panel	-	985 high x 485 wide	-	-
	Right panel	-	1485 high x 384 wide	-	-
Vision panel size	Left panel	-	1000 high x 500 wide	-	-
	Right panel	-	1500 high x 400 high	-	-
Aperture size	Left panel	-	1006 high x 506 wide	-	-
	Right panel	-	1506 high x 406 high	-	-
Expansion allowance -		-	3mm on all edges	-	-
Beading		Sapele (nominal density 640kg/m^3 m.c. 12.2%)	20 high x 17 deep including a 9 x 9 bolection return and a 15º chamfer	Fitted around the glazing aperture on both faces	19
Beading fixing		Steel pins	40 long	Fitted 50mm from corners at 150mm centres	20
Operating lever		Double lever, chrome plated zinc alloy	80 long	Fitted in the mid width of panel, 43mm up from the base.	-

Glazing – doorset B

Vistamatic VS2 secure vision panel – left panel set to obscured, right panel set to clear

		Make/type	Size (mm)	Location	Key to figures
Glazing type – both panels		6mm Pyro-EX toughened glass – Express Toughening	6 thick	Fitted on the unexposed face	21
		4mm Annealed glass – Express Toughening	4 thick	Fitted between the outer glass layers (fitted in the top half only of the longer left side vision panel)	22
		10mm Pyro-EX toughened glass – Express Toughening	10 thick	Fitted on the exposed face	23
		Stainless steel spacer bar – DGS (Product ref: SS/BT05.5)	5.5 thick	Fitted between the outer glass layers	24
Sight size	Left panel	-	1473 high x 375 wide	-	-
	Right panel	-	976 high x 476 wide	-	-
Vision panel size	Left panel	-	1500 high x 400 wide	-	-
	Right panel	-	1000 high x 500 high	-	-
Aperture size	Left panel	-	1510 high x 410 wide	-	-
	Right panel	-	1010 high x 510 high	-	-
Expansion allowance -		-	3mm on all edges	-	-
Beading	Exposed face	Stainless steel	50 high x 2 thick	Fitted around the glazing aperture on the exposed face	25
	Unexposed face	Profiled stainless steel (see Appendix 1 figure 2)	50 high x 20 deep	Fitted on the unexposed face	26
Beading fixing		Machine security screws – fixed from the exposed face	M5 x 40 long screws	Fitted 20mm from corners at 170mm centres	27
		Threaded studs	M5 x 12 long studs	Welded to unexposed face bead	
Operating lever		Double lever, chrome plated zinc alloy	80 long	Fitted in the mid width of panel, 43mm up from the base.	-

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.

7.2 Door perimeter gaps

The doors were installed to open and close freely, maintaining gaps, where possible, to a range of 2-4mm. The gaps between the edge of the leaves and frames were measured prior to test. A total of 24 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)
Doorset A	79 @ 0.75m from hanging edge
Doorset B	67 @ 0.75m from hanging edge

7.4 Method of installation

The doorsets were 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 doorsets were flush with the exposed face of the supporting construction.

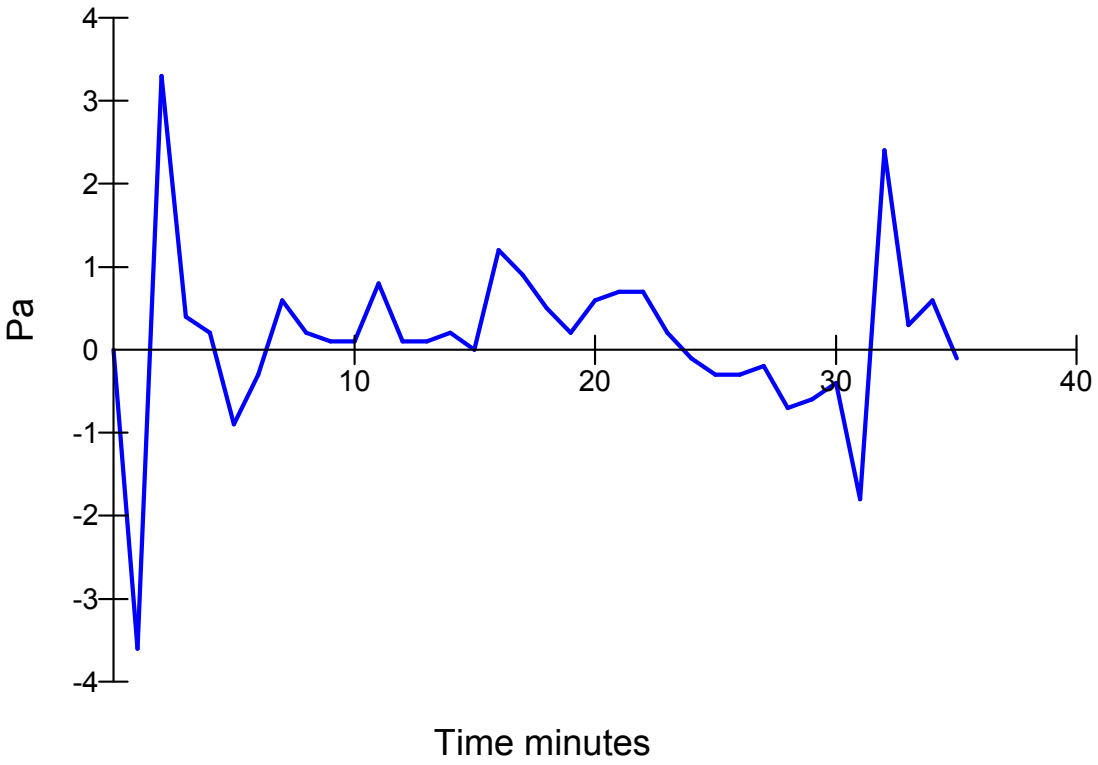
8 Test conditions

8.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 18°C. The ambient temperature for the duration of the test has been recorded in Appendix 2.

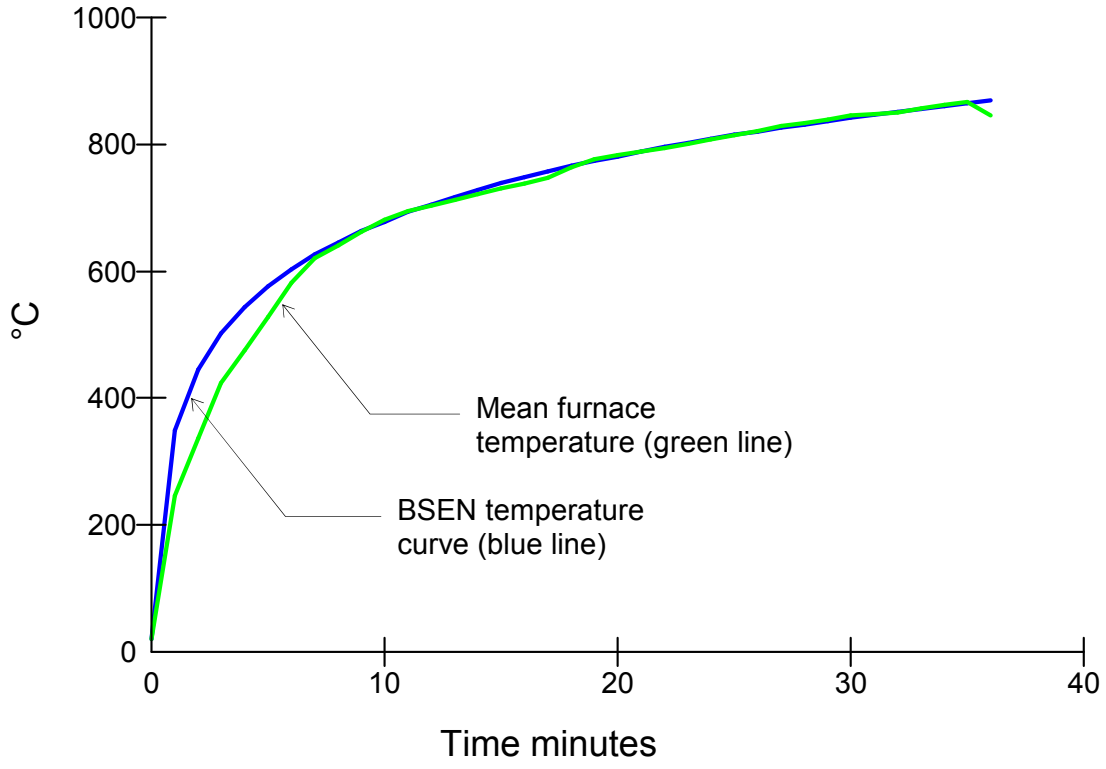
8.2 Pressure readings

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 thermocouples 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 A

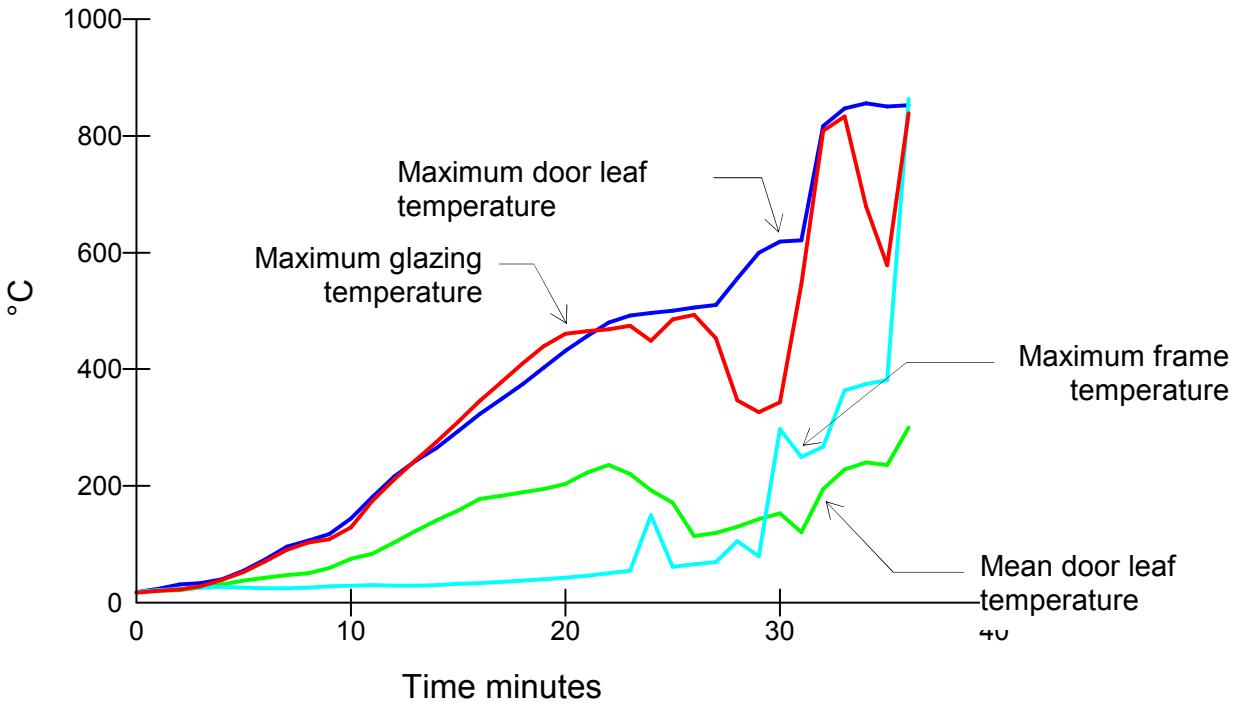
	2 discrete areas
Leaf	5 measuring mean temperature rise. 5 measuring maximum temperature rise, standard set 100mm in from the door leaf edges.
Glass	2 measuring maximum temperature rise
Frame	5 measuring maximum temperature rise.

Doorset B

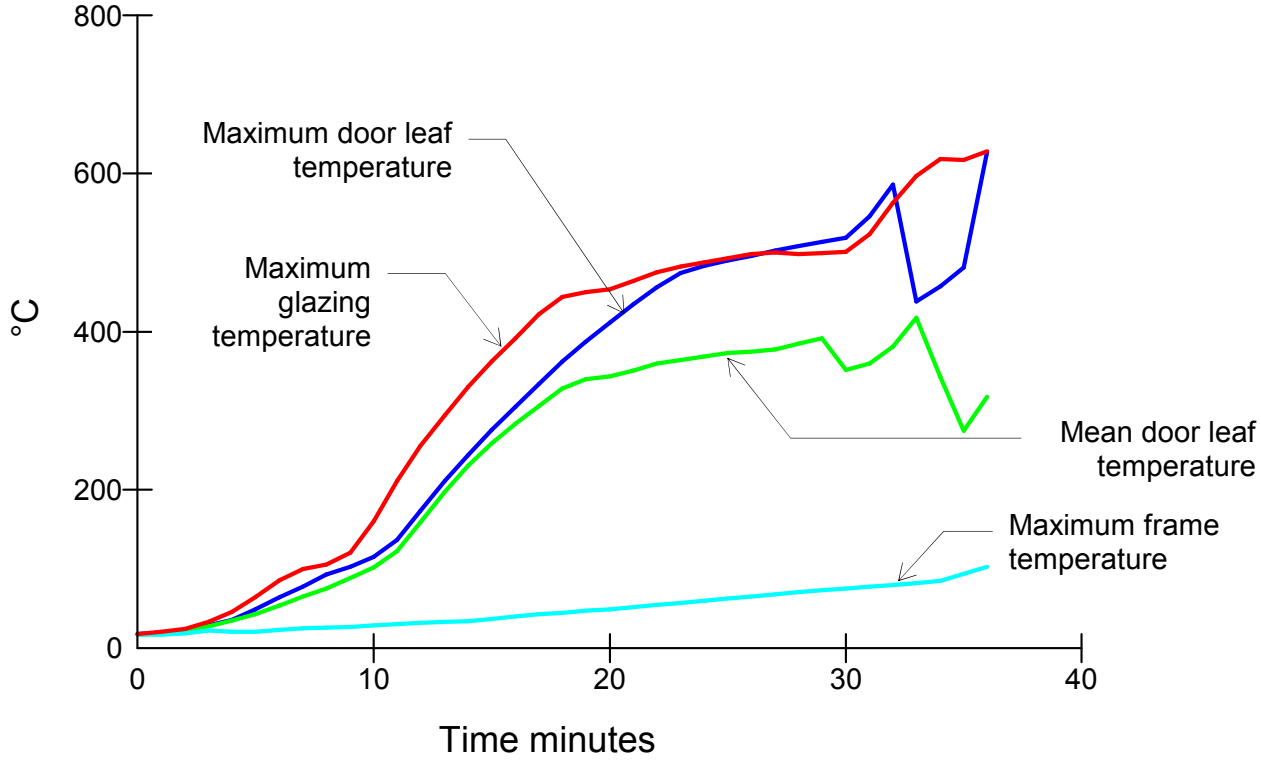
	2 discrete areas
Leaf	5 measuring mean temperature rise. 5 measuring maximum temperature rise, standard set 100mm in from the door leaf edges.
Glass	2 measuring maximum temperature rise
Frame	5 measuring maximum temperature rise

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:

Doorset A



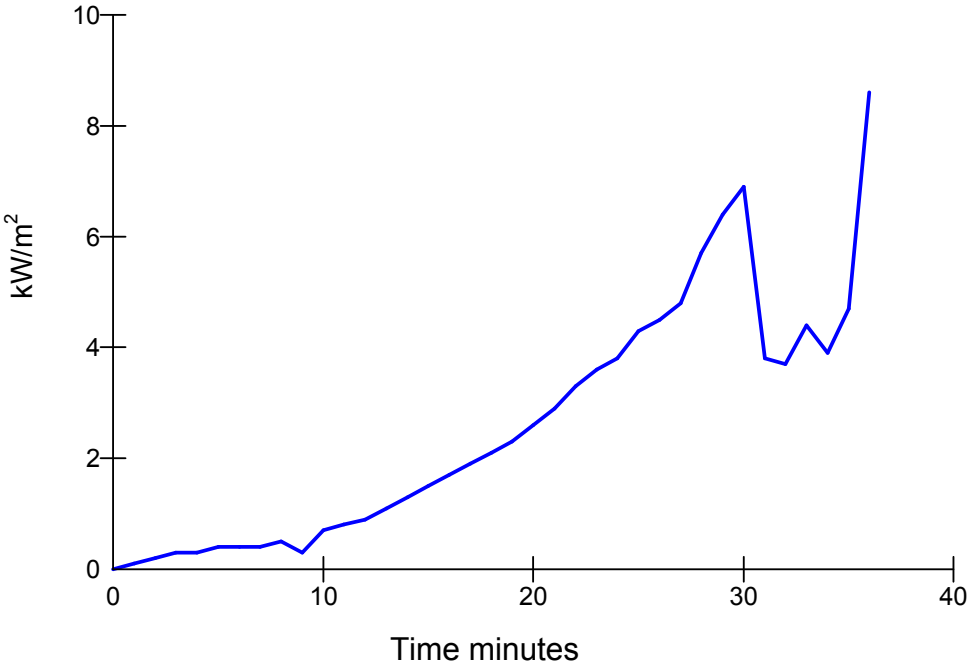
Doorset B



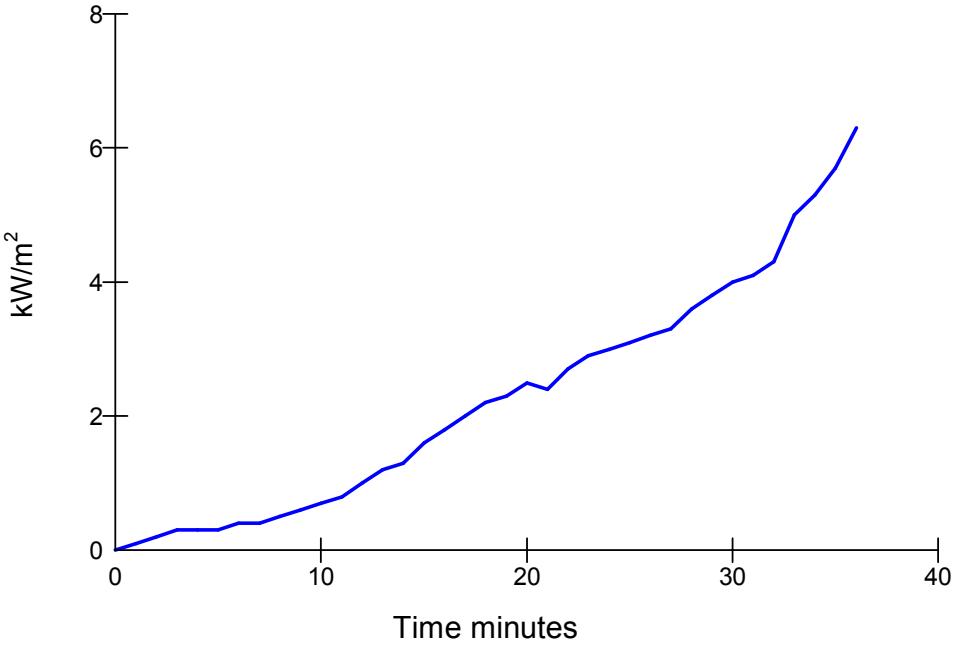
8.5 Radiation

Two radiometers were used to measure the radiation, one each positioned 1m away from the centre of each doorset.
The radiation values have been tabulated in Appendix 2 and are shown graphically below:

Doorset A

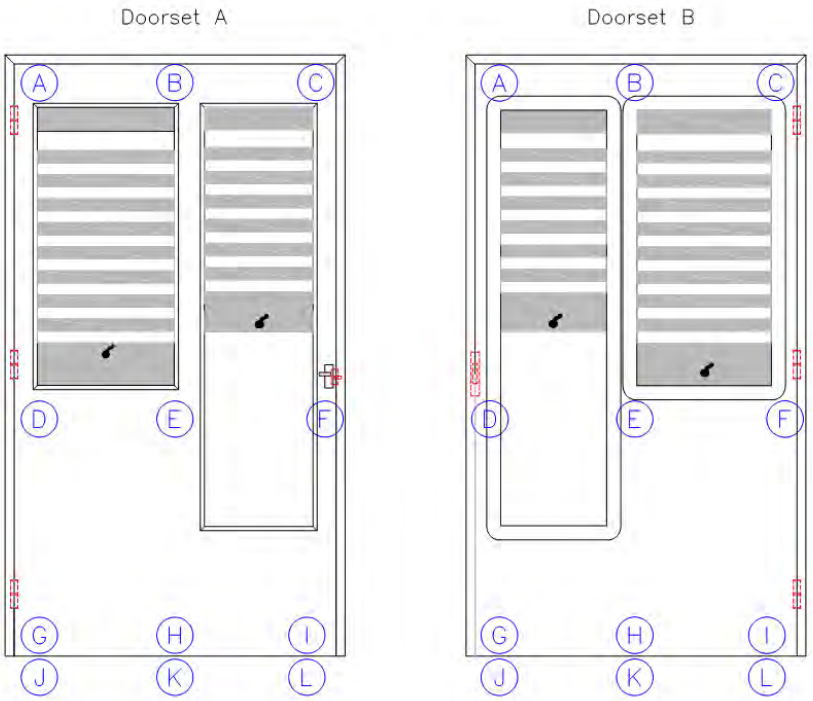


Doorset B



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.
J, K and L give vertical movement of the door; a negative reading indicates that the door has dropped.



Doorset A - left leaf (hung on the left and opening in towards the furnace)

Time	A	B	C	D	E	F	G	H	I	J	K	L
10	-5	5	3	0	-5	1	2	-3	1	-1	-2	-2
20	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-

Doorset B - right leaf (hung on the right and opening in towards the furnace)

Time	A	B	C	D	E	F	G	H	I	J	K	L
10	1	3	2	3	11	0	-2	-4	-1	0	-1	-1
20	4	5	4	10	24	2	-1	-5	0	-1	-2	-2
30	-	-	-	-	-	-	-	-	-	-	-	-

Where a dash (-) occurs, a distortion reading could not be taken

9 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	Comments
00.00	Test started.
01.09	Both doorsets, there is smoke issuing from the top half leaf/frame gaps.
08.00	Both doorsets, the exposed face glazing has cracked across the surface.
10.21	Doorset A, the smoke issuing has reduced to the top hanging corner and the latch position and from the operating lever of the glazed panels.
11.29	Doorset B, the smoke issuing has reduced to the latch position, the top hanging corner, from behind the right panel glazing bead at the top right corner and from the operating lever of the glazed panels.
12.51	Doorset B, there is discolouration at the top right corner of the right glazed panel glazing bead.
17.25	Doorset A, the left glazing panel exposed face glazing has broken and fallen away. The centre glazing layer has deflected in towards the furnace at the top.
17.30	Doorset A, there is a decrease in the level of smoke issuing from the glazed panel operating levers.
20.15	Doorset A, there is smoke issuing from the perimeter of the glazed panels.
21.21	Doorset B, there is smoke issuing from the perimeter of the glazed panels.
22.40	Doorset A, the top half of the left panel centre glazing layer has fallen away.
24.04	Doorset A, there is discolouration of the right glazing panel. Doorset B, there is discolouration of both glazing panels.
24.59	Doorset A, all the exposed face and centre glazed layers have fallen away.
25.43	Doorset A, the exposed face bead on the left panel has fallen away.
26.46	Doorset B, the right hand panel exposed face glazing has fallen away.
27.43	Doorset A, the right hand panel exposed and centre layer glazing layers have fallen away.
30.37	Doorset A, there is continuous flaming at the perimeter of the right glazed panel thereby constituting **integrity failure.**

30.55 Doorset B, the top half of the left panel exposed and centre glazing layers have fallen away.

31.10 Doorset A, a 6mm gap gauge failure was recorded at the bottom third of the right glazed panel thereby constituting **further integrity failure.**

34.37 Doorset B, there is continuous flaming at the perimeter of the right glazed panel thereby constituting **integrity failure**.

35.15 Doorset A, there is intermittent flaming at the top left corner of the left glazed panel.

35.22 Doorset A, the left panel has fallen in and a 25mm gap gauge failure has been recorded thereby constituting **further integrity failure.**

36.00 Test terminated.

10 Expression of results

Doorset A

Integrity		
Cotton pad Continuous flaming Gap gauges		30 (thirty) minutes* 30 (thirty) minutes 31 (thirty one) minutes
Insulation		
	Average set	15 (fifteen) minutes
	Standard set (Max)	10 (ten) minutes
Glass	Maximum	10 (ten) minutes
Door frame	Maximum	29 (twenty nine) minutes
Radiation		30 (thirty) minutes*

* Failure criteria was not achieved prior to initial failure at 30 minutes

Doorset B

Integrity		
Cotton pad Continuous flaming Gap gauges		34 (thirty four) minutes* 34 (thirty four) minutes 34 (thirty four) minutes*
Insulation		
	Average set	11 (eleven) minutes
	Standard set (Max)	12 (twelve) minutes
Glass	Maximum	10 (ten) minutes
Door frame	Maximum	34 (thirty four) minutes*
Radiation		34 (thirty four) minutes

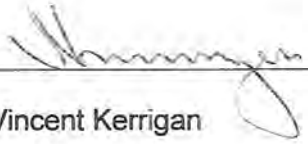
*Failure criteria was not achieved prior to initial failure at 34 minutes

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. CIFL 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:	Deputy Head of Section - Fire Resistance	Technical Manager
Date of issue:	05.11-2012	05-11-2012

Revision A - 17th August 2012 – pages 9 and 10 change to glazing panel description.
Revision B – 1st November – page 7 – product name added. Figures 2 and 3 – glazing unit orientation changed.

12 Photographs

Intumescent interruptions by hardware

Hinge blade – both doorsets

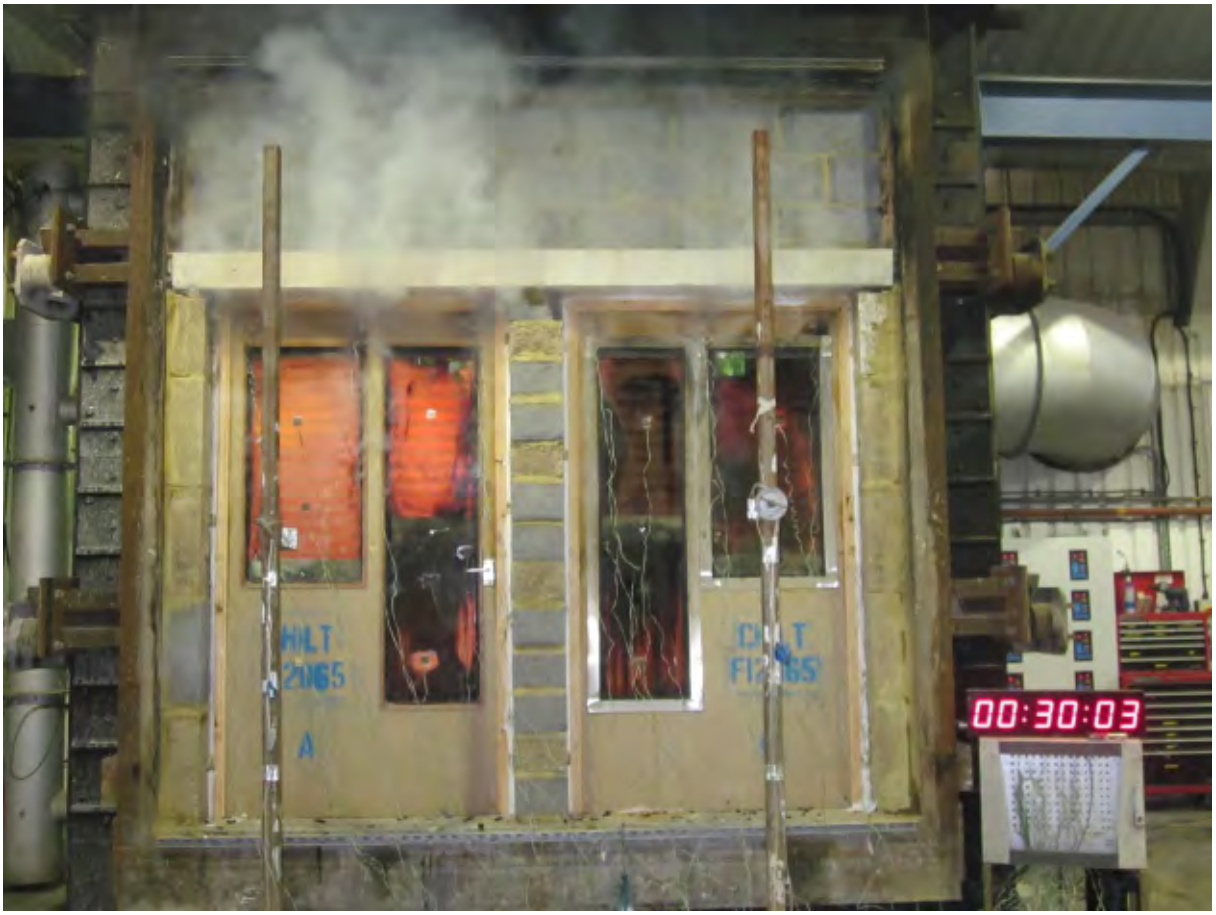
Latch keep – both doorsets

At start of test

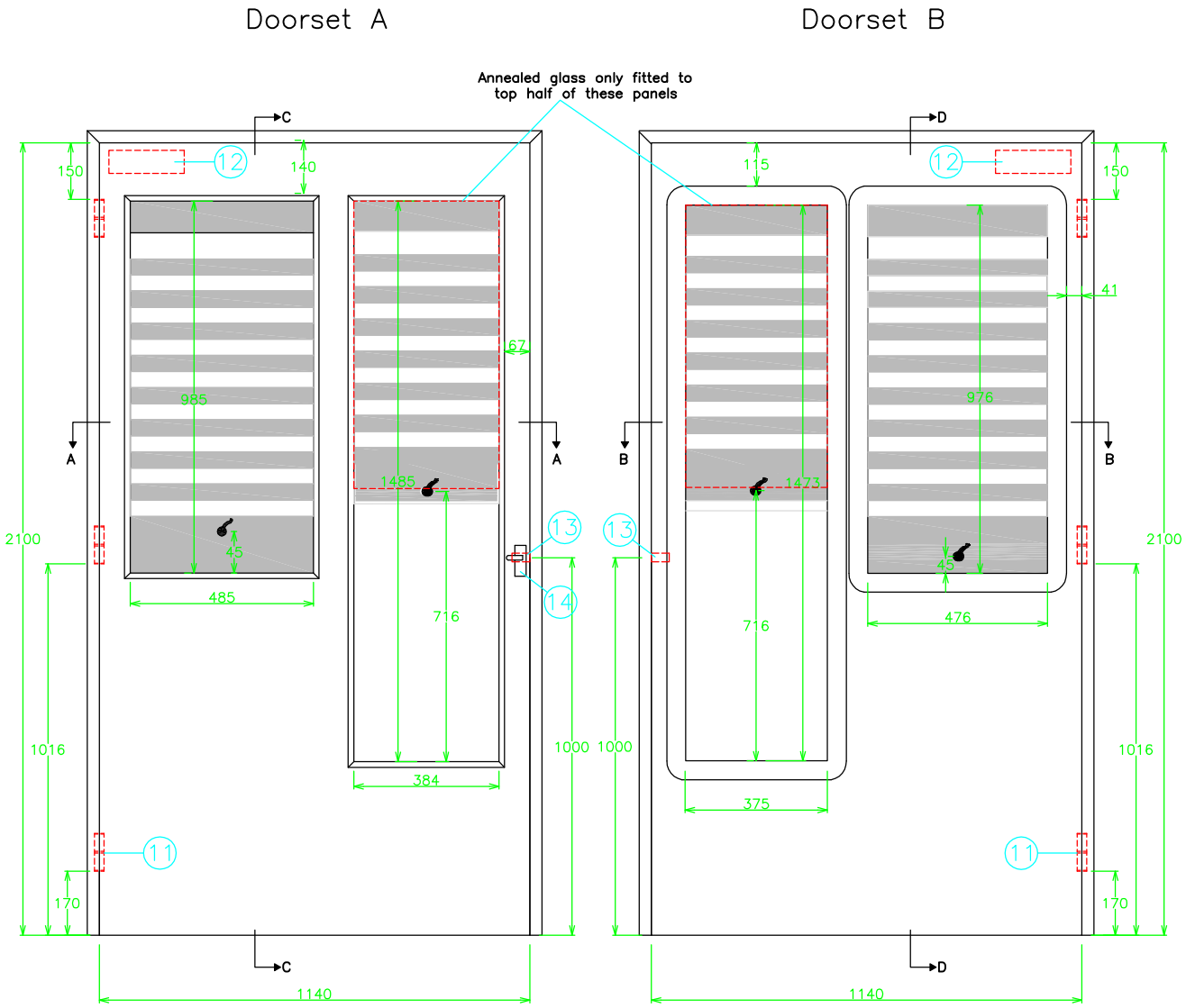
After 10 minutes

After 20 minutes

After 30 minutes



Appendix 1 - figures 1 to 6



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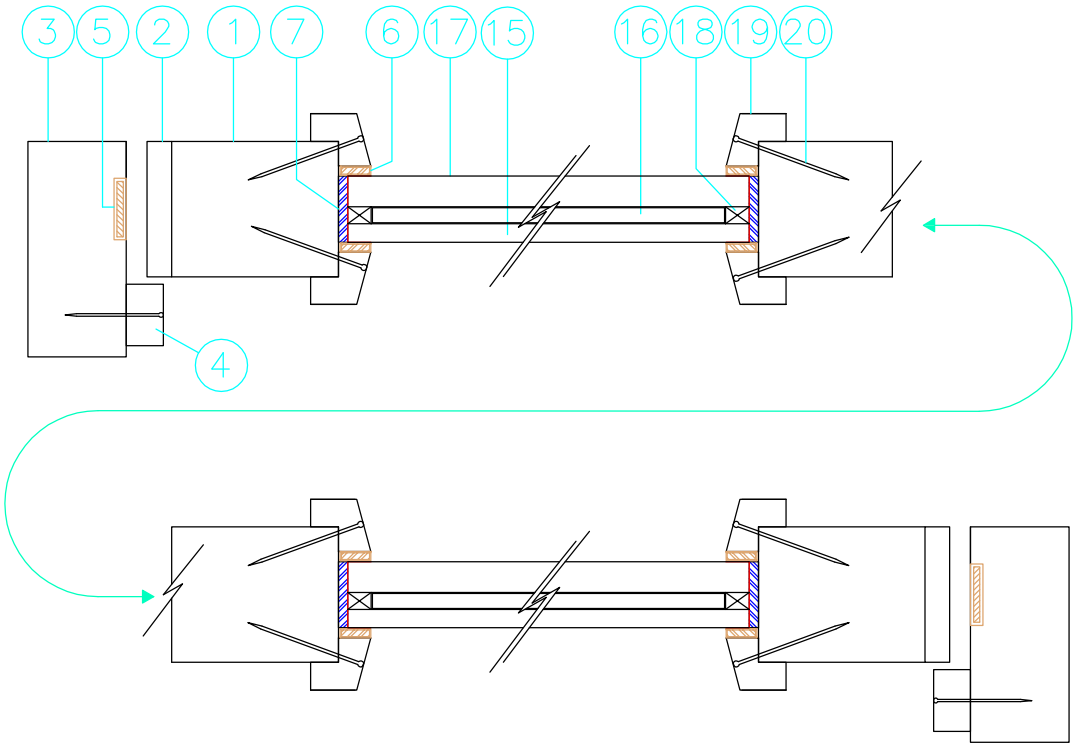
Title: Unexposed face elevation showing hardware positions (All dimensions in mm)

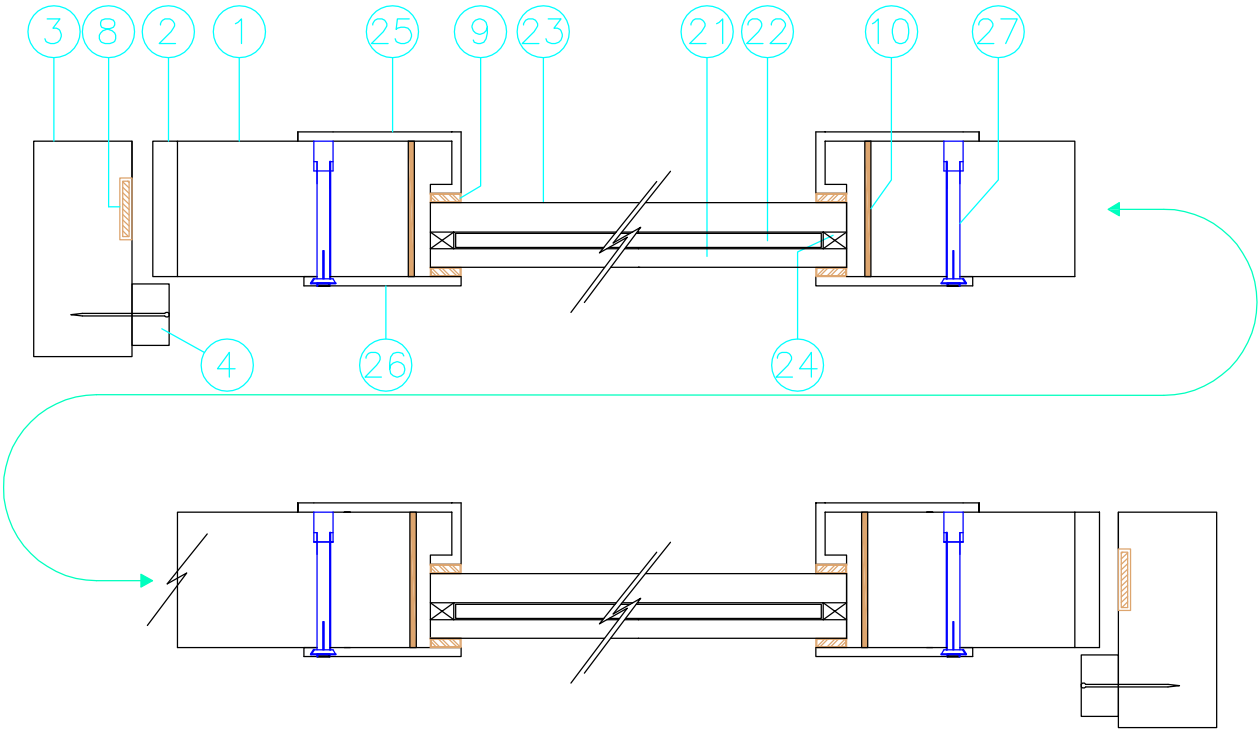
Date Drawn	Drawn By	Scale
12/07/12	ANM	NTS

Project No.	
Chilt/RF12065 Rev B	Appendix 1

Section A – A



Section B – B



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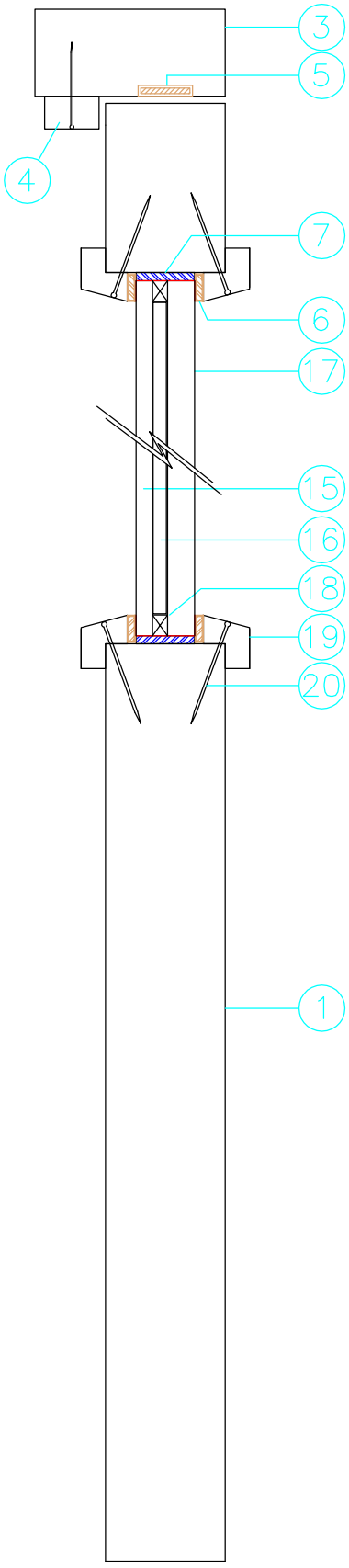
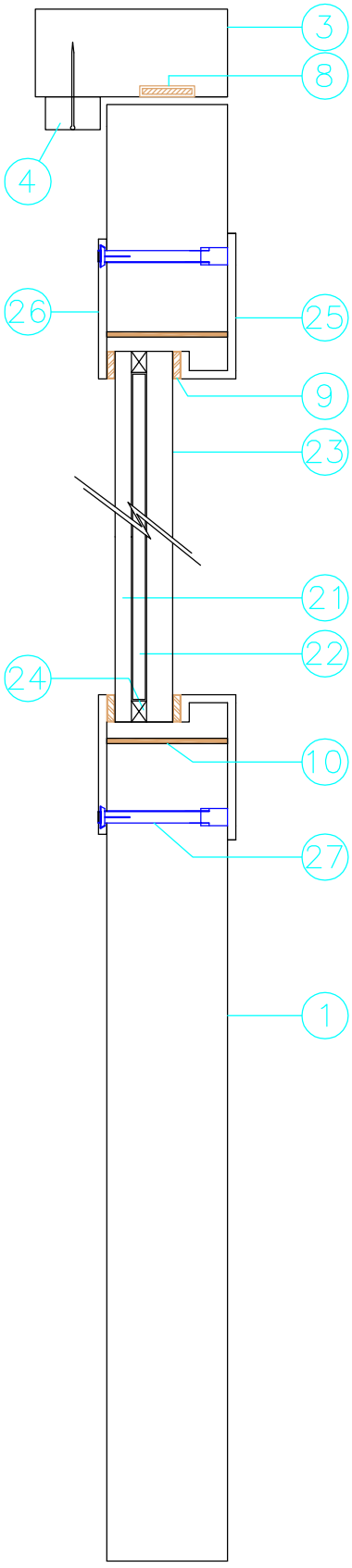
Title		
Horizontal cross sections (All dimensions in mm)		
Date Drawn 12/07/12	Drawn By ANM	Scale NTS
Project No. Chilt/RF12065 Rev B		Appendix 1

Section C – C



Section D – D



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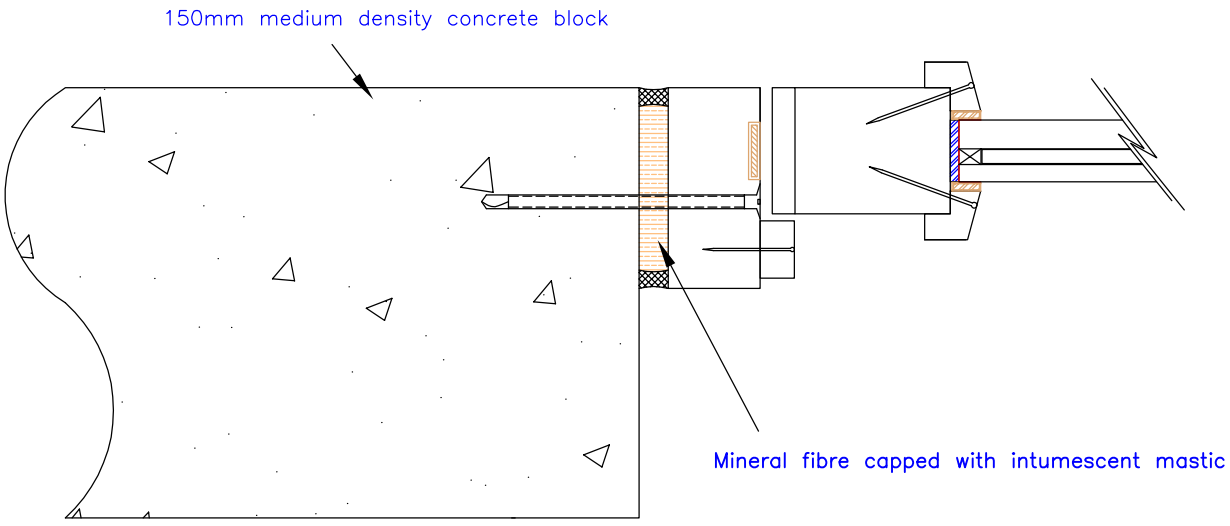
Title
Vertical cross sections
(All dimensions in mm)

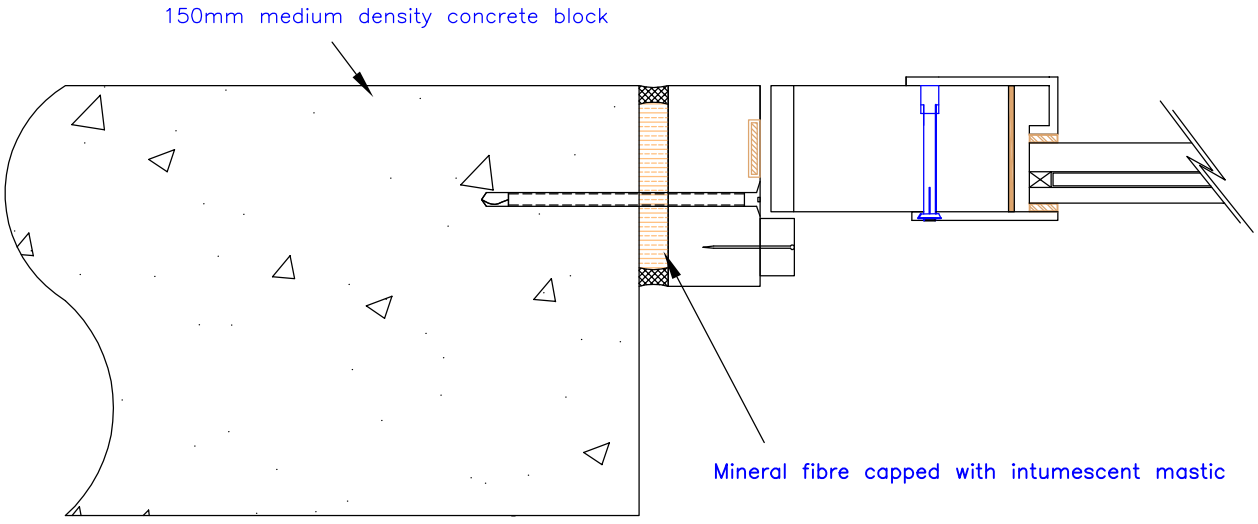
Date Drawn	Drawn By	Scale
12/07/12	ANM	NTS

Project No.	
Chilt/RF12065 Rev B	Appendix 1

Doorset A



Doorset B



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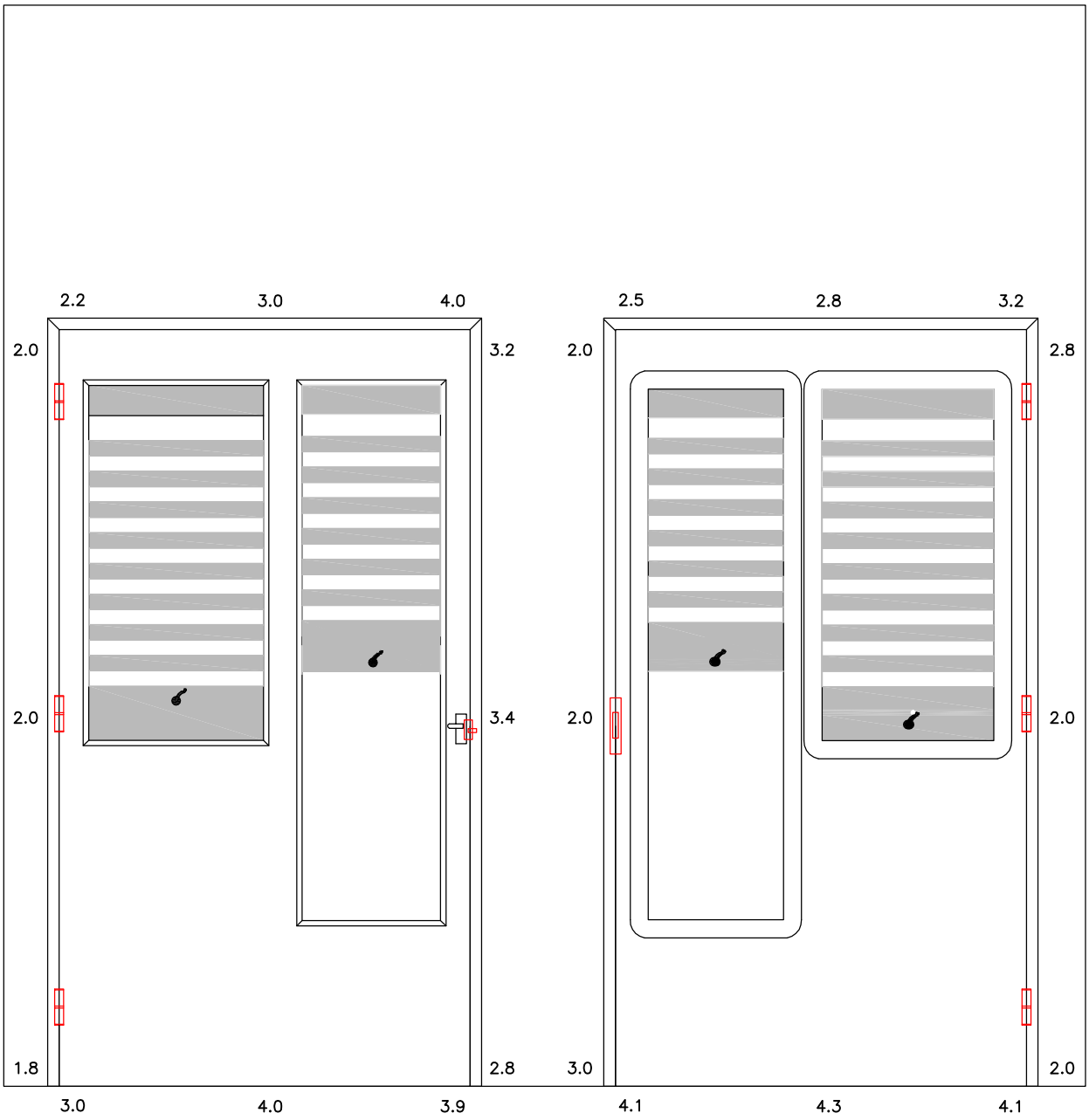
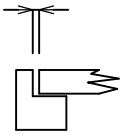
Title
Horizontal cross-sections
(All dimensions in mm)

Date Drawn	Drawn By	Scale
15/12/11	ANM	NTS

Project No.	
Chilt/RF12065 Rev B	Appendix 1



Gaps shown



Viewed From Unexposed Face

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

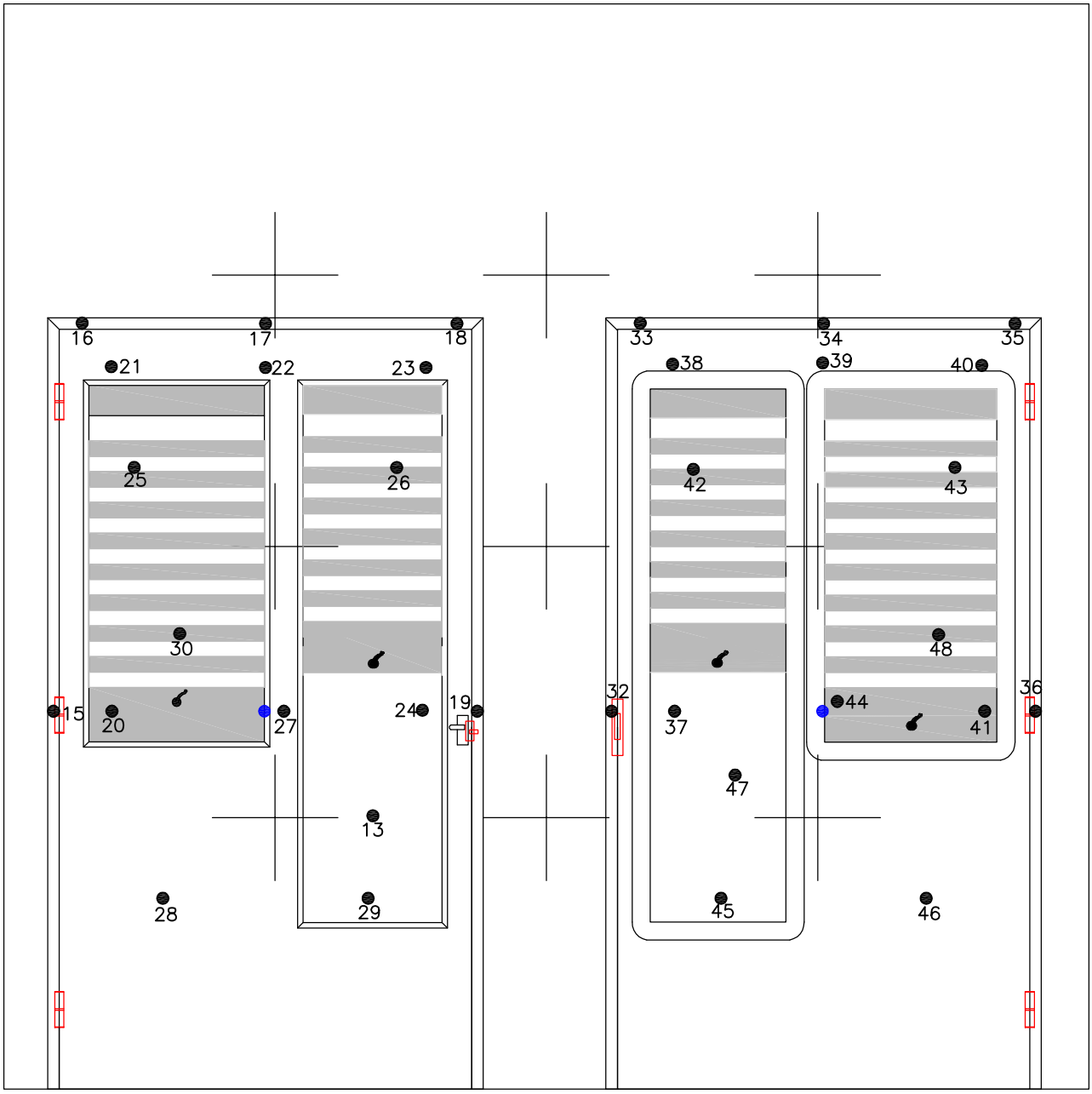
Title

Door leaf/frame gaps

(All dimensions in mm)

Date Drawn	Drawn By	Scale
15/12/11	ANM	NTS

Project No.	
Chilt/RF12065 Rev B	Appendix 1



: Furnace Thermocouples

: Unexposed Face Thermocouples

: Radiometer

Viewed From Unexposed Face

Chiltern International Fire

Chiltern House, Stocking Lane, Hughenden Valley
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Title: Thermocouple positions (All dimensions in mm)		
Date Drawn: 15/12/11	Drawn By: ANM	Scale: NTS
Project No.: Chilt/RF12065 Rev B		Appendix 1

Appendix 2 - raw test data (5 pages)

(see Figure 6 of Appendix 1 for channel locations) Furnace thermocouples Failure time 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	18	18	20	16	20	18	21	18	21	18	17	17	17	17	18	17	17	17
1	-3.6	159	175	271	235	261	94	331	205	488	18	17	17	18	21	18	19	17	18
2	3.3	255	238	383	386	376	107	480	253	563	18	17	18	18	23	18	20	18	18
3	0.4	297	327	496	525	523	111	594	303	645	18	18	18	19	26	18	24	18	18
4	0.2	350	374	567	592	594	115	646	348	692	18	18	18	19	27	19	28	18	18
5	-0.9	374	392	601	621	627	246	670	517	711	18	18	18	19	26	19	34	18	19
6	-0.3	456	461	626	639	650	384	691	620	712	18	18	20	20	25	19	41	19	20
7	0.6	520	533	631	644	654	521	697	684	705	18	18	21	21	25	19	50	21	22
8	0.2	563	567	636	649	654	596	700	704	700	18	18	24	22	26	19	60	25	26
9	0.1	623	600	647	657	664	649	707	710	706	18	18	27	24	28	19	72	28	30
10	0.1	667	640	658	666	673	673	716	722	717	18	19	29	25	29	20	85	34	33
11	0.8	685	666	670	677	681	687	724	734	725	18	19	30	26	29	20	100	34	34
12	0.1	694	681	682	687	692	696	732	738	734	18	19	29	26	29	21	107	33	36
13	0.1	704	692	693	694	701	705	742	746	739	18	20	28	27	29	21	120	34	39
14	0.2	713	701	700	704	714	715	753	752	745	18	20	29	28	30	22	143	36	42
15	0	728	709	710	712	720	722	760	762	754	18	21	30	30	32	23	169	39	46
16	1.2	738	719	719	718	727	727	765	773	758	18	22	33	33	34	25	195	43	52
17	0.9	744	728	724	728	741	738	775	780	771	18	22	35	35	36	26	222	47	56
18	0.5	764	745	742	742	755	752	789	801	791	18	23	37	36	38	27	248	50	59
19	0.2	778	756	760	753	767	759	799	813	799	18	24	39	38	40	28	272	53	62
20	0.6	787	765	770	759	773	768	806	820	803	18	25	42	41	42	30	291	57	67

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
21	0.7	793	773	776	745	784	774	815	828	814	18	27	46	44	44	32	304	62	72
22	0.7	800	778	785	746	792	780	821	836	812	18	28	50	49	46	34	314	68	78
23	0.2	807	786	792	748	798	788	828	841	825	18	30	55	53	48	35	321	73	84
24	-0.1	815	796	802	751	806	795	835	849	830	18	32	150	55	51	37	328	136	89
25	-0.3	820	802	814	754	810	799	839	856	833	18	34	62	58	53	39	346	83	93
26	-0.3	822	806	821	781	812	803	845	860	839	19	37	66	61	55	41	399	248	95
27	-0.2	836	814	821	802	819	810	850	865	848	19	39	69	65	58	42	469	280	98
28	-0.7	845	812	824	813	821	816	852	867	854	19	41	73	105	61	44	556	299	100
29	-0.6	850	823	834	816	827	819	857	871	856	19	44	79	73	68	46	600	306	101
30	-0.4	856	834	840	823	835	820	863	875	862	19	46	84	297	73	48	618	313	103
31	-1.8	860	838	846	831	837	821	865	877	864	19	48	249	87	82	53	621	336	108
32	2.4	861	833	840	836	844	825	866	879	866	19	50	267	205	176	152	621	329	225
33	0.3	866	845	854	841	853	834	872	886	867	19	52	363	147	139	134	624	291	270
34	0.6	870	854	858	844	859	842	875	888	873	19	54	375	128	55	57	630	299	121
35	-0.1	877	862	861	847	865	841	880	891	879	19	56	381	126	26	41	635	300	147
36	-6.6	802	820	856	844	851	813	878	888	856	19	63	863	591	28	40	771	852	128

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	18	17	18	18	18	18	18	17	17	17	17	17	17	-	18	18	18
1	23	20	22	22	18	18	20	20	19	17	17	17	17	-	19	19	18
2	31	22	25	24	18	18	23	22	22	18	19	17	18	-	21	20	18
3	33	29	32	32	18	18	30	27	28	18	22	18	18	-	27	21	18
4	29	40	40	40	18	18	42	33	39	18	21	18	19	-	36	22	19
5	26	55	49	50	18	18	59	40	52	18	20	21	20	-	49	22	19

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
6	26	74	60	31	19	18	82	48	70	19	20	23	21	-	64	23	20
7	28	96	71	24	19	18	104	56	91	19	21	25	23	-	78	24	22
8	32	106	84	21	19	18	110	65	103	19	22	26	24	-	93	26	24
9	36	117	99	27	19	19	133	75	108	19	24	27	27	-	103	29	-
10	38	144	107	48	20	19	183	86	129	20	25	27	29	-	115	32	-
11	40	181	121	30	21	20	232	99	175	20	26	27	30	-	137	34	-
12	40	216	170	24	24	21	277	100	211	21	29	28	32	-	174	38	-
13	43	243	228	20	27	22	318	102	244	22	31	30	33	-	211	43	-
14	47	265	277	19	30	24	357	122	275	23	34	32	34	-	244	48	-
15	50	294	319	18	33	25	395	161	310	24	36	34	37	-	276	53	-
16	54	323	345	48	37	27	433	214	346	25	40	36	40	-	305	58	-
17	58	349	357	34	41	29	458	256	378	26	42	38	43	-	334	62	-
18	63	375	369	28	45	30	473	282	411	27	44	40	45	-	362	66	-
19	67	403	381	24	49	32	490	298	440	28	47	43	47	-	387	71	-
20	71	432	404	22	53	33	506	307	461	30	49	45	49	-	412	75	-
21	75	456	483	21	56	35	515	321	465	31	52	49	51	-	435	79	-
22	78	480	546	20	59	36	521	345	469	33	55	52	53	-	456	83	-
23	79	492	456	20	61	38	528	386	474	34	57	54	55	-	474	85	-
24	81	497	311	21	63	40	526	449	246	35	60	56	57	-	483	87	-
25	83	500	540	19	65	41	191	485	201	36	63	59	58	-	490	89	-
26	84	505	262	19	66	43	181	493	195	38	65	61	60	-	496	91	-
27	84	510	266	19	68	44	205	453	211	39	68	64	62	-	503	93	-
28	87	530	304	19	69	46	215	347	228	40	71	67	64	-	508	95	-
29	92	577	328	19	71	48	250	327	213	42	73	70	66	-	514	96	-
30	96	610	338	19	72	49	287	343	229	44	75	73	68	-	519	98	-

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
31	141	514	352	19	74	51	109	546	312	46	78	76	69	-	546	101	-
32	59	816	306	18	583	53	18	551	809	50	80	79	71	-	586	104	-
33	66	847	331	17	717	57	18	557	833	54	81	82	73	-	382	105	-
34	18	856	351	17	760	58	18	564	679	57	83	85	74	-	387	108	-
35	17	850	365	17	723	58	18	578	519	60	85	94	79	-	415	111	-
36	22	809	637	17	763	60	23	839	336	63	88	103	87	-	627	114	-

Time	Chan 40	Chan 41	Chan 42	Chan 43	Chan 44	Chan 45	Chan 46	Chan 47	Chan 48	Chan 49	Chan 50
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	17	17	17	18	18	18	18	18	18	0	0
1	17	20	21	22	21	21	18	21	22	0.1	0.1
2	17	23	25	25	24	24	18	24	25	0.2	0.2
3	18	29	32	32	29	32	18	33	31	0.3	0.3
4	22	35	41	40	33	44	18	46	37	0.3	0.3
5	22	43	51	48	41	60	18	64	45	0.4	0.3
6	24	52	63	58	52	79	18	86	54	0.4	0.4
7	26	59	75	66	64	102	18	100	64	0.4	0.4
8	27	68	88	76	78	116	18	106	74	0.5	0.5
9	35	78	101	92	94	140	18	121	87	0.3	0.6
10	38	89	106	101	105	179	19	160	103	0.7	0.7
11	38	96	140	119	115	222	20	211	109	0.8	0.8
12	41	106	210	170	135	261	20	256	126	0.9	1
13	46	134	274	231	168	296	22	294	179	1.1	1.2
14	50	171	324	277	202	330	23	330	236	1.3	1.3
15	58	207	362	313	232	363	25	362	285	1.5	1.6

Time	Chan 40	Chan 41	Chan 42	Chan 43	Chan 44	Chan 45	Chan 46	Chan 47	Chan 48	Chan 49	Chan 50
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
16	74	236	399	343	256	399	26	392	327	1.7	1.8
17	80	260	426	372	279	427	28	422	367	1.9	2
18	84	280	455	409	303	446	29	444	403	2.1	2.2
19	86	299	454	426	327	464	31	450	433	2.3	2.3
20	87	317	447	414	350	480	32	454	450	2.6	2.5
21	89	335	446	408	383	487	34	464	448	2.9	2.4
22	90	351	445	408	421	490	36	475	445	3.3	2.7
23	94	367	445	412	432	497	37	482	444	3.6	2.9
24	102	386	448	415	442	504	39	488	446	3.8	3
25	108	406	450	415	454	509	41	493	446	4.3	3.1
26	111	422	452	412	465	505	42	498	445	4.5	3.2
27	114	429	456	420	474	501	43	500	439	4.8	3.3
28	116	432	463	443	476	501	45	498	433	5.7	3.6
29	117	433	472	465	477	501	47	499	436	6.4	3.8
30	117	432	479	253	481	501	49	501	449	6.9	4
31	118	434	498	249	491	514	50	523	462	3.8	4.1
32	118	435	554	261	509	532	52	563	471	3.7	4.3
33	118	438	600	287	538	612	53	597	473	4.4	5
34	119	457	317	275	578	494	54	618	496	3.9	5.3
35	194	481	244	277	296	505	56	617	547	4.7	5.7
36	217	512	263	321	302	649	57	628	596	8.6	6.3