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Title:

The fire resistance performance of three, single leaf, single-acting steel access panels, when tested in accordance with BS EN 1634-1: 2014 +A1: 2018 and BS EN 1363-1: 2012

WF Report No:

422106

Prepared for:

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Notified Body No:

1314

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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 BS EN 1634-1: 2014 +A1: 2018 and BS EN 1363-1: 2012

Access panel A

Integrity	
Cotton pad	132 minutes *
Continuous flaming	132 minutes *
Gap gauges	132 minutes *
Thermal insulation	
Inulation I^2 (mandatory procedure)	2 minutes
Radiation – time to 15kW/m^2	Not evaluated

***** No failure of this test criteria at test termination at 132 minutes

Access panel B

Integrity	
Cotton pad	132 minutes *
Continuous flaming	117 minutes
Gap gauges	132 minutes *
Thermal insulation	
Inulation I^2 (mandatory procedure)	8 minutes
Radiation – time to 15kW/m^2	132 minutes *

***** No failure of the test criteria at test termination at 132 minutes

Access panel C

Integrity	
Cotton pad	132 minutes *
Continuous flaming	55 minutes
Gap gauges	132 minutes *
Thermal insulation	
Inulation I^2 (mandatory procedure)	33 minutes
Radiation – time to 15kW/m^2	132 minutes *

***** No failure of this test criteria at test termination at 132 minutes

Summary of specimens:

Three latched, single leaf single-acting, steel-access panels, all hung opening in towards the furnace

Access panel A leaf size – 1897mm high x 649mm wide x 29mm thick

Access panel B leaf size – 1897mm high x 649mm wide x 29mm thick

Access panel C leaf size – 2397mm high x 894mm wide x 69mm thick

2 Introduction

The access panels were installed into a flexible supporting construction. In accordance with BS EN 16034: 2014 Annex A.2.2 the leaf was pre-cycled before the fire test. The access panels were instrumented with the standard set of thermocouples. At request of the client all access panels were installed opening in towards the furnace.

3 Specimen verification

The specimens were supplied for testing and delivered to Warringtonfire during December 2019. The component parts of the access panels were identified based on nominal information provided by the client. The conformity of the specimens against these nominal values has been verified and agreed by the laboratory insofar as the structure of the specimen allowed verification to take place. If possible, additional moisture content readings, species verification 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 (Section 6).

3.1 Conditioning

Warringtonfire stored the specimens in climatic conditions approximate to those in normal service.

3.2 Sampling

Warringtonfire was not involved in factory sampling of the products and materials used for the test specimen described in this report, and as such the results apply to the sample as received.

4 Description of supporting construction

The supporting construction comprised a plasterboard clad 132mm thick overall steel stud partition with 70mm thick 85kg/m^3 density insulation fitted between the studs, built in accordance with Clause 7.2.2.4 of BS EN 1363-1: 2012, for a flexible supporting construction (table 1 group A). The studs surrounding the apertures created for the access panels incorporated a 67mm x 29mm softwood timber infill to facilitate the fixings for the specimen. The apertures were lined with a single layer of 12.5mm thick Type F plasterboard

The specimens tested are 120 minute product with an anticipated Category B performance, therefore intended fire resistance is 132 minutes and two layers of 15mm thick Gypsum plasterboard type F are required on each face. The supporting construction was fixed on the horizontal edges only, the vertical edges remained free.

5 Description of specimens

Details of the specimens are shown in Figures 1 to 4 of Appendix 1.

5.1 Access panel leaves

Access panel A, the leaf measured 1897mm high x 649mm wide x 29mm thick.
Access panel B, the leaf measured 1897mm high x 649mm wide x 29mm thick.
Access panel C, the leaf measured 2397mm high x 894mm wide x 69mm thick.

6 Description of Construction (Refers to Figures 1 to 4 and the clients drawings of the Appendix)

Leaves – Access panel A

	Material	Dimensions (mm)	Density	Key to figures
Profiled steel tray section	Zintec coated profiled steel tray section on the exposed face	24 deep x 0.9 thick*	-	1
Core	None fitted	-	-	-
Stiles	Profiled steel section (see Figure 2 Appendix 1) fixed with M5 Bright Zinc Plated (BZP) Round Flat Head Serrated Open End Rivet Nuts*	0.9 thick x 21.5 height x 76 width*	-	2
Leaf reinforcement	None fitted	-	-	-

* Stated by client, not verified by laboratory

Leaves – Access panel B

	Material	Dimensions (mm)	Density	Key to figures
Profiled steel tray section	Zintec coated profiled steel tray section on the exposed face	24 deep x 0.9 thick*	-	3
Core / facings	2No. layers Knauf Soundbloc acoustic plasterboard	12.5 thick each layer	-	4
Stiles	Profiled steel section (see Figure 2 Appendix 1) fixed with M5 Bright Zinc Plated (BZP) Round Flat Head Serrated Open End Rivet Nuts	0.9 thick x 21.5 height x 76 width*	-	5
Board retaining clamps	Profiled steel section	0.9mm thick x 6 height x 40 width at full height of the stile	-	6

* Stated by client, not verified by laboratory

Leaf – Access panel C

	Material	Dimensions (mm)	Density	Key to figures
Profiled steel tray section	Zintec coated profiled steel tray section on the exposed face	29 deep x 1.5 thick	-	7
Core – fitted inside the steel tray section	Firepro ablative coated mineral wool batt	50 thick*	160Kg/m³*	8
Core clamps	Profiled steel 3.5 x 25mm Bright Zinc Plated (BZP) Countersunk Pozi Bugle Head Cross Recess Self Drilling Drywall Screws fixed at 300mm centres*	1 thick x 55 wide x full height of the door leaf*	-	9
Stiles	Profiled steel section (see Figure 2 Appendix 1)	1.5 thick	-	10
Facings	Fireline plasterboard – screwed to the core clamps and horizontal reinforcements	15 thick*	-	11
Leaf reinforcement	6No. horizontal brackets 3.5 x 25mm Bright Zinc Plated (BZP) Countersunk Pozi Bugle Head Cross Recess Self Drilling Drywall Screws fixed at 300mm centres*	100mm Wide x 50mm	-	12

* Stated by client, not verified by laboratory

Door frame – Access panels A and B

	Species/type	Dimensions (mm)	Key to figures
Frame (All four edges)	Profiled Zintec steel sections featuring an integral stop and architrave	77 deep x 45 wide x 1.5 thick overall featuring a 19 deep x 44 wide integral stop and a 25 wide x 4 thick lip section oversailing the supporting construction on the exposed face	13
Stop	Integral to the frame section		-
Head to jamb jointing detail	Welded	-	-
Frame to supporting construction fire stopping detail	Intumescent acrylic sealant Mann McGowan Pyromas A*	Continuous bead sealing frame to supporting construction	-
Frame to supporting construction fixing detail	Self-tapping steel screws at 300mm centres	50 long	-

* Stated by client, not verified by laboratory

Door frame – Access panel C

	Species/type	Dimensions (mm)	Key to figures
Frame (All four edges)	Profiled Zintec steel sections featuring an integral stop and architrave	67 deep x 45 wide x 1.5 thick overall featuring a 19 deep x 33 wide integral stop and a 25 wide x 4 thick lip section oversailing the supporting construction on the exposed face	14
Stop	Integral to the frame section		-
Head to jamb jointing detail	Welded	-	-
Frame to supporting construction fire stopping detail	Intumescent acrylic sealant Mann McGowan Pyromas A*	Continuous bead sealing frame to supporting construction	-
	2No. layers plasterboard Gyproc Tapered Edge Fireline Board 15mm thick fitted with 60mm self tapping steel screws*	Fitted lining aperture on the unexposed face	15
Frame to supporting construction fixing detail	Self tapping steel screws at 300mm centres*	50 long	-

* Stated by client, not verified by laboratory

Intumescent and sealing materials – Access panel A

	Make/type	Size (mm)	Location	Key to figures
Frame reveal	None fitted	-	-	-
Leaf edge	None fitted	-	-	-

Intumescent and sealing materials – Access panel B

	Make/type	Size (mm)	Location	Key to figures
Frame reveal	None fitted	-	-	-
Leaf edge	Foam buffer seal – Norseal FS1000*	10 x 4*	Fitted around the leaf face perimeter on the unexposed face	16

* Stated by client, not verified by laboratory

Intumescent and sealing materials – Access panel C

	Make/type	Size (mm)	Location	Key to figures
Frame reveal	None fitted	-	-	-
Leaf edge	Foam buffer seal – Norseal FS1000*	10 x 4*	Fitted around the leaf face perimeter on the unexposed face	17

Hardware – all access panels

	Make/type	Size (mm)	Location	Key to figures
Hinges	Fast fit spring hinges. Product reference - HINGE-RF-R51 Electroplated Fast Fit Spring Hinge	Ø8 (pin size) 19.1 depth x 19.1 width x 40 height	Fitted at the top and bottom of the leaf	18
Latch	3 Point Latch fitted on a steel section, with top and bottom acting shoot bolts running through steel blocks Material number - 3 Point Locking System. Manufactured from Bright Zinc Plated Mild Steel, with 18mm stroke. Product ref. 3WL*	110 x 33 x 16 (centre latch size)	Access panels A and B – fitted 960mm from the bottom of the leaf Access panel C – fitted 1200mm from the bottom of the leaf	19

* Stated by client, not verified by laboratory

7 Pre-test measurements and mechanical conditioning

Pre-test measurements and mechanical conditioning were conducted on the samples in the order detailed below.

7.1 Method of installation

The access panels were fixed into pre-prepared openings. The details of the fixings and fire stopping between frame and supporting construction are outlined in the construction section and Figures 2 and 3 of Appendix 1.

7.2 Pre-cycling operability

Operability test of 25 manual cycles was completed on each leaf in accordance with BS EN 16034: 2014 Annex A, section A.2.2.

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

7.3 Specimen self-closing

No closers were fitted. The multi-point locking systems were engaged for the test at all positions on all access panels.

7.4 Leaf/frame 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 leaf and frame were measured prior to test in accordance with BS EN 1634-1 2014 +A1: 2018, section 10.1.2. A total of 36 readings were recorded. The measurements (in mm) are detailed in Section 8.7.

7.5 Closer forces

No closers were fitted – the leaves were held closed by means of the engaged multi-point locks.

7.6 Final setting

Final setting of the specimens was conducted in accordance with BS EN 1634-1: 2014 +A1: 2018, section 10.1.4.

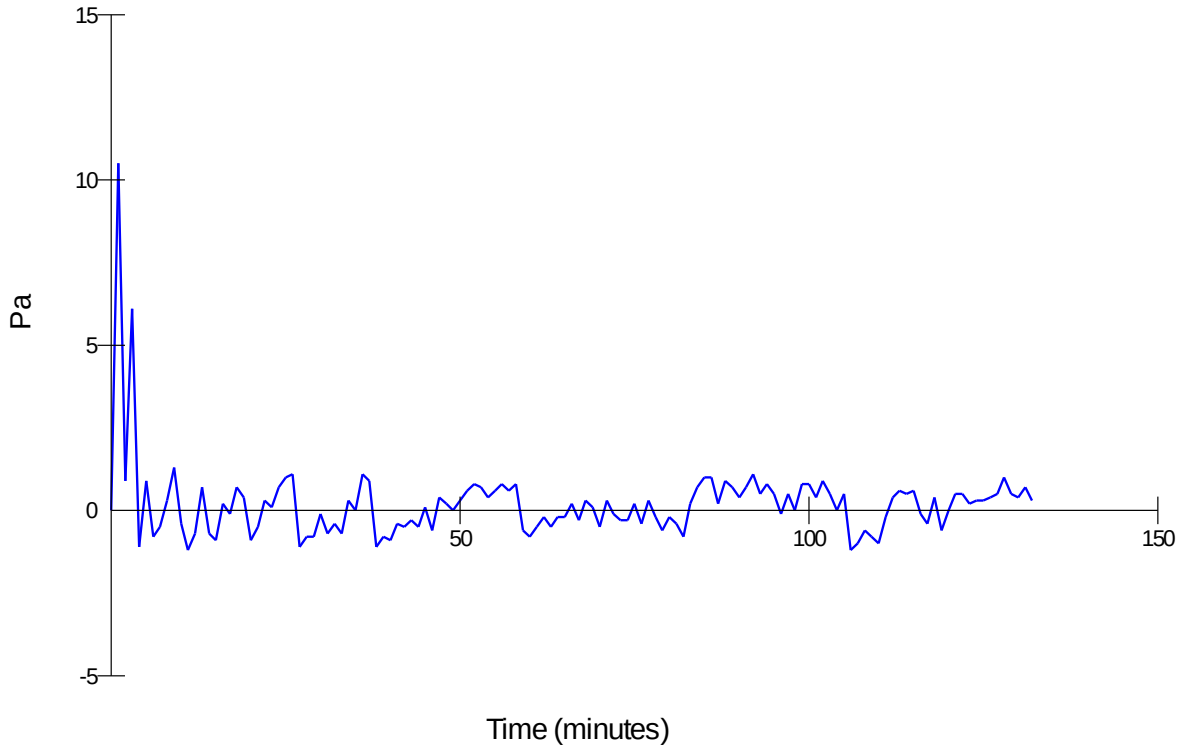
8 Test Conditions

8.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 12°C

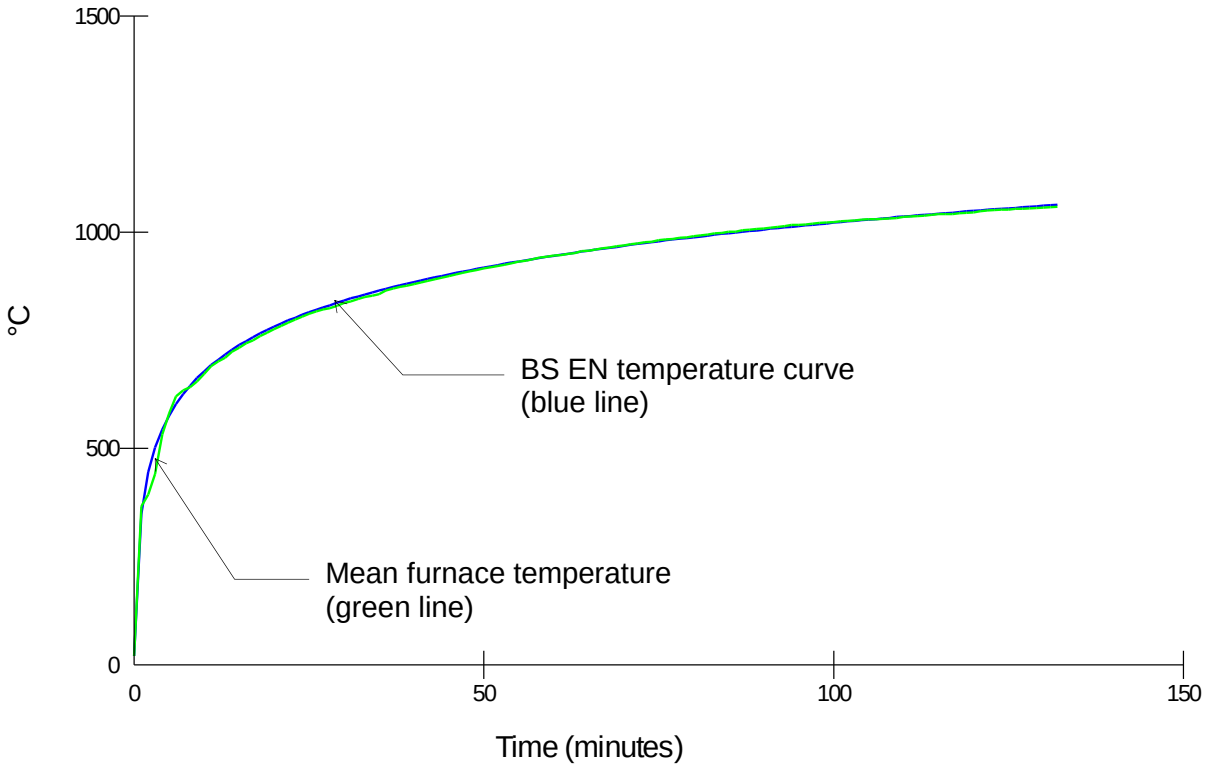
8.2 Pressure readings

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 furnace floor, equating to a pressure of 0 Pa with respect to atmosphere at a point 0.5m from the notional floor level. The pressure readings were recorded and are shown graphically below:



8.3 Furnace temperature

The furnace was controlled to follow the temperature/time relationship specified in BS EN 1363: Part 1: 2012 Section 5.1.1 as closely as possible, using the average of nine plate thermometers suitably distributed within the furnace. The temperatures were recorded and are shown graphically below:



8.4 Unexposed face temperatures

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

Access panel A

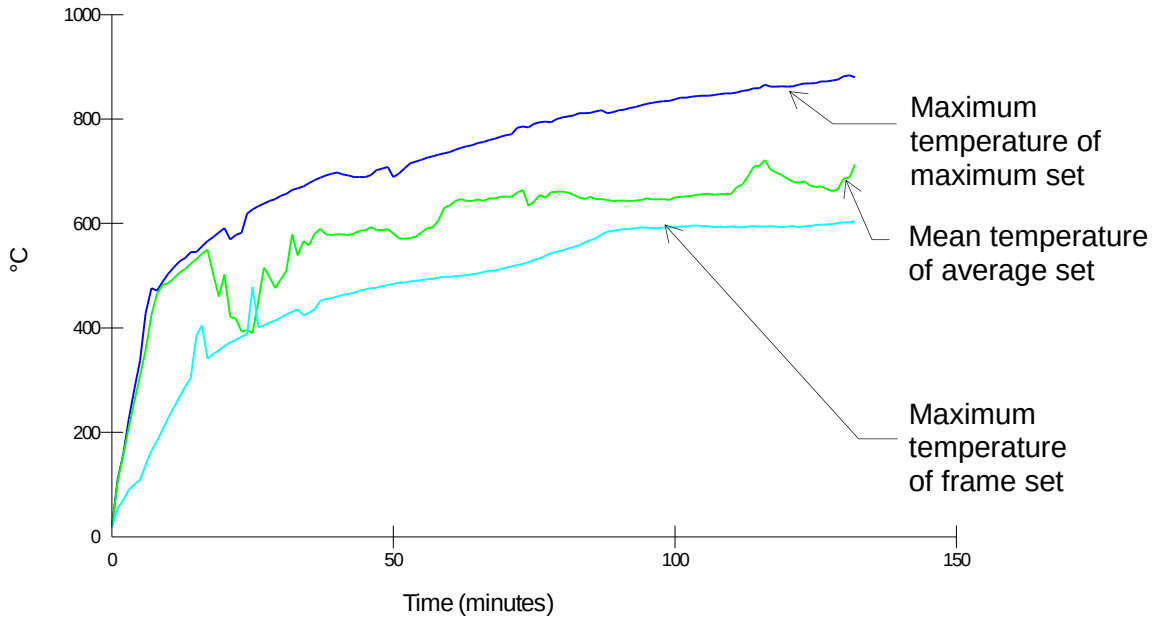
	1 discrete area	
Leaf	Discrete area (steel)	5 measuring mean temperature rise.
		4 measuring maximum temperature rise, standard set 100mm in from the leaf edges.
Frame		5 measuring maximum temperature rise.

Access panels B and C

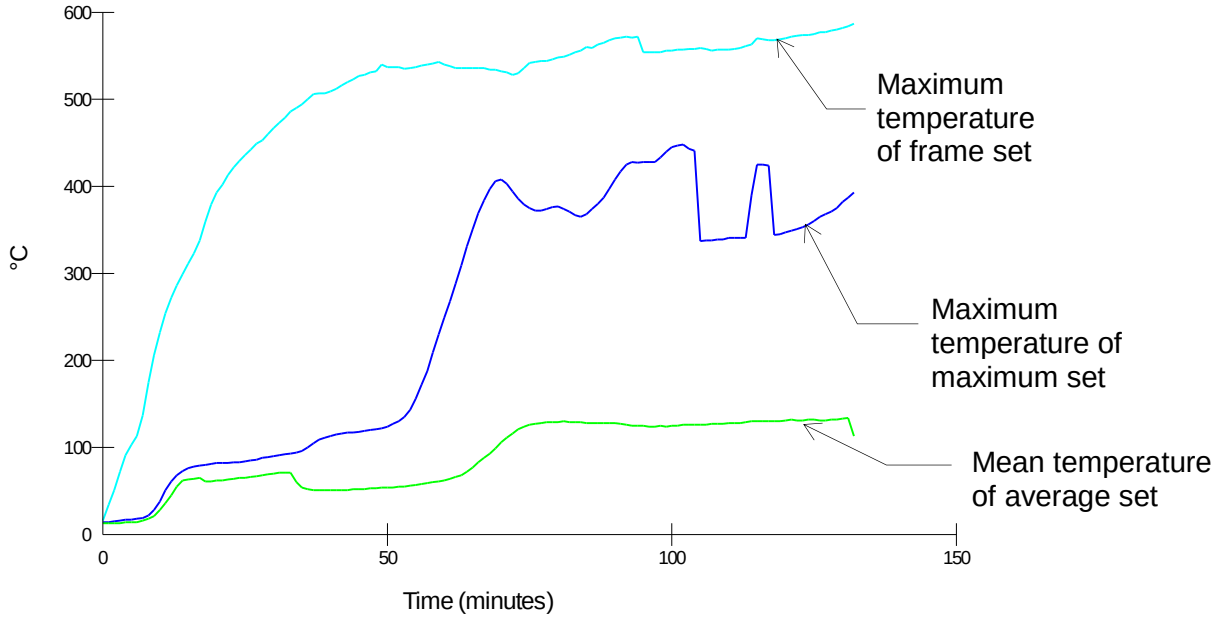
	2 discrete areas	
Leaf	Discrete area 1 (plasterboard)	5 measuring mean temperature rise.
		4 measuring maximum temperature rise, standard set 100mm in from the leaf edges.
Frame	Discrete area 2 (steel)	5 measuring maximum temperature rise.

The locations of the thermocouples are shown in Figure 5 of the appendix. The readings recorded are tabulated in Appendix 2 and are shown graphically below.

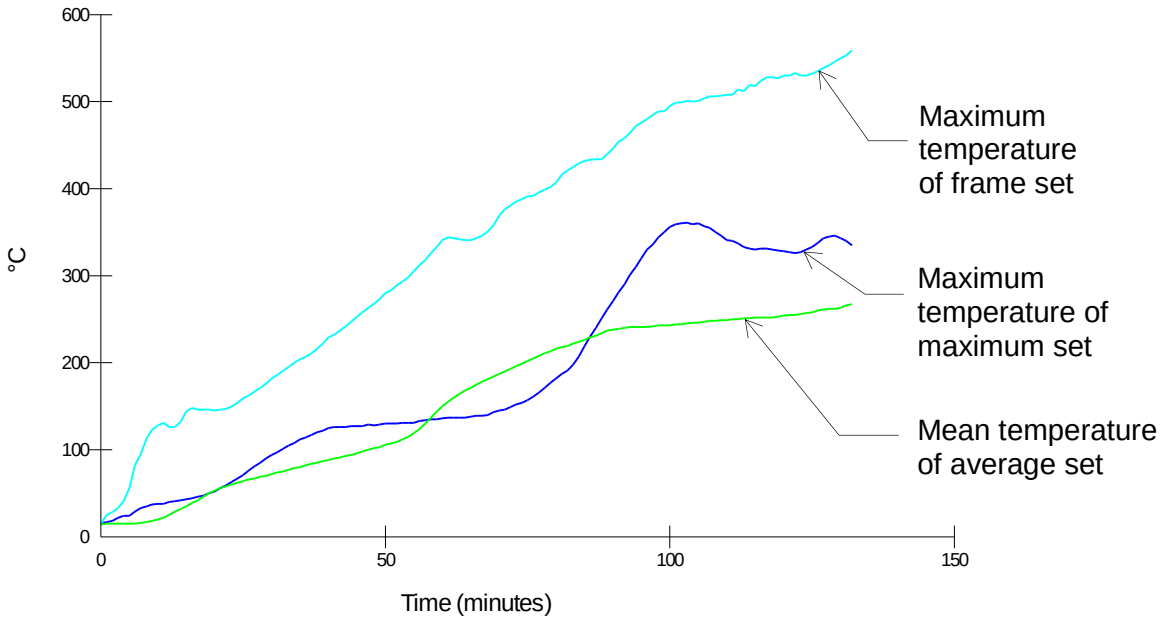
Access panel A



Access panel B

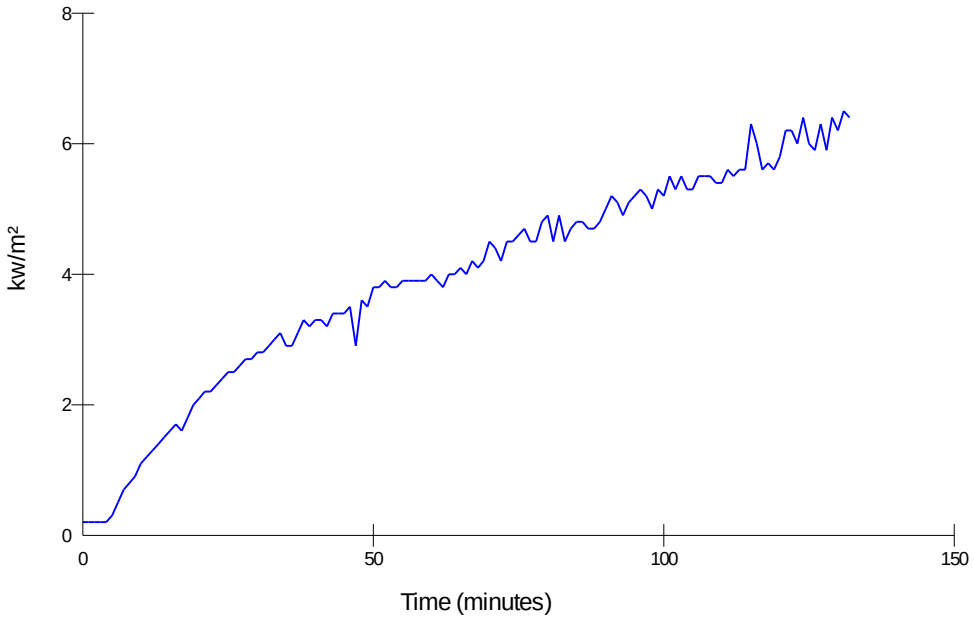


Access panel C

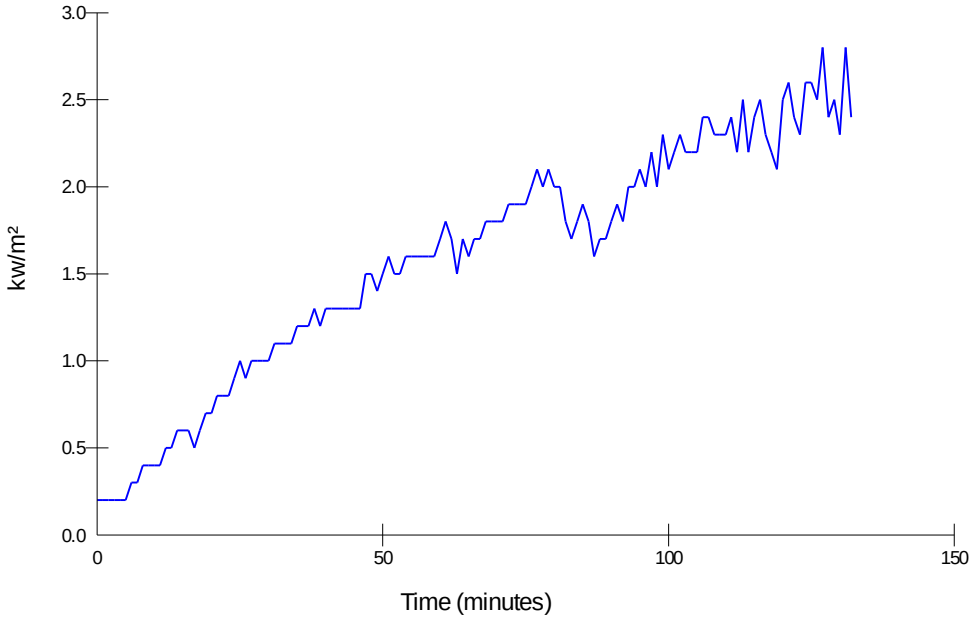


8.5 Radiation

Access panel B

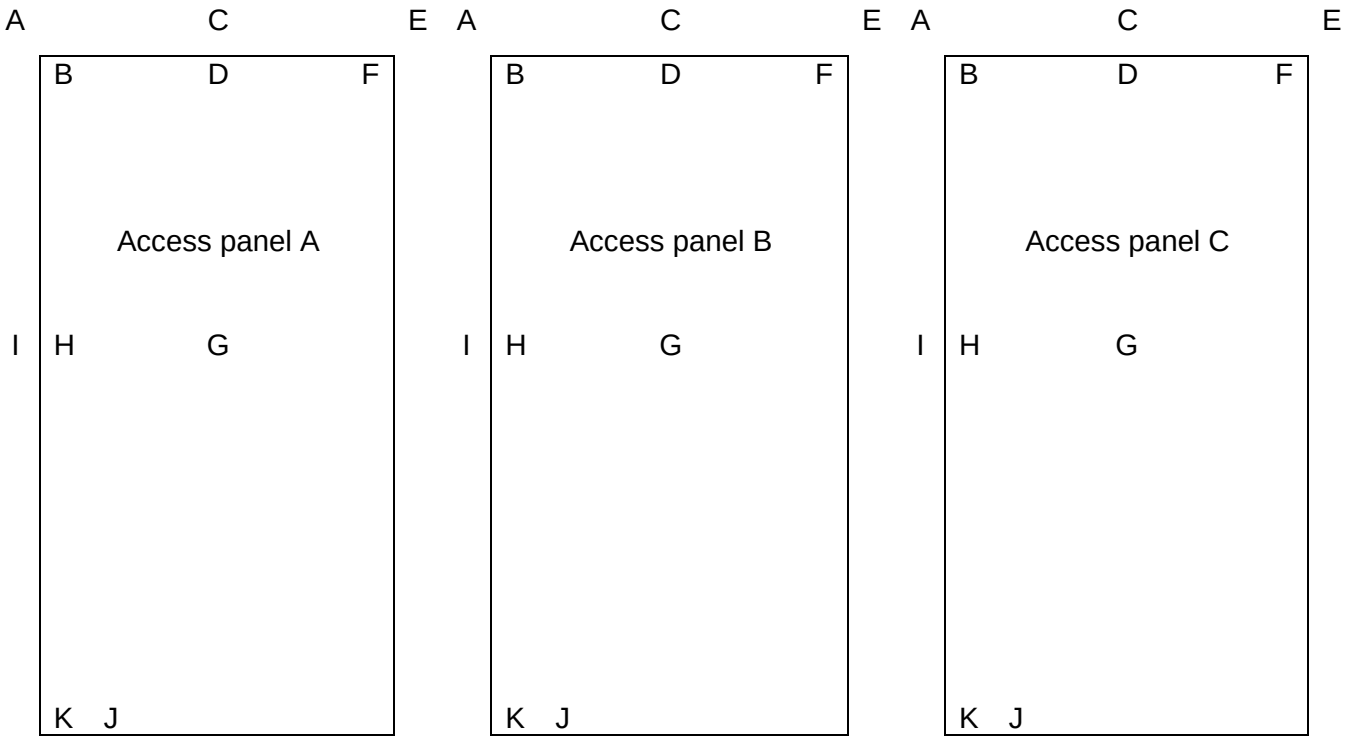


Access panel C



8.6 Leaf and frame distortion data

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



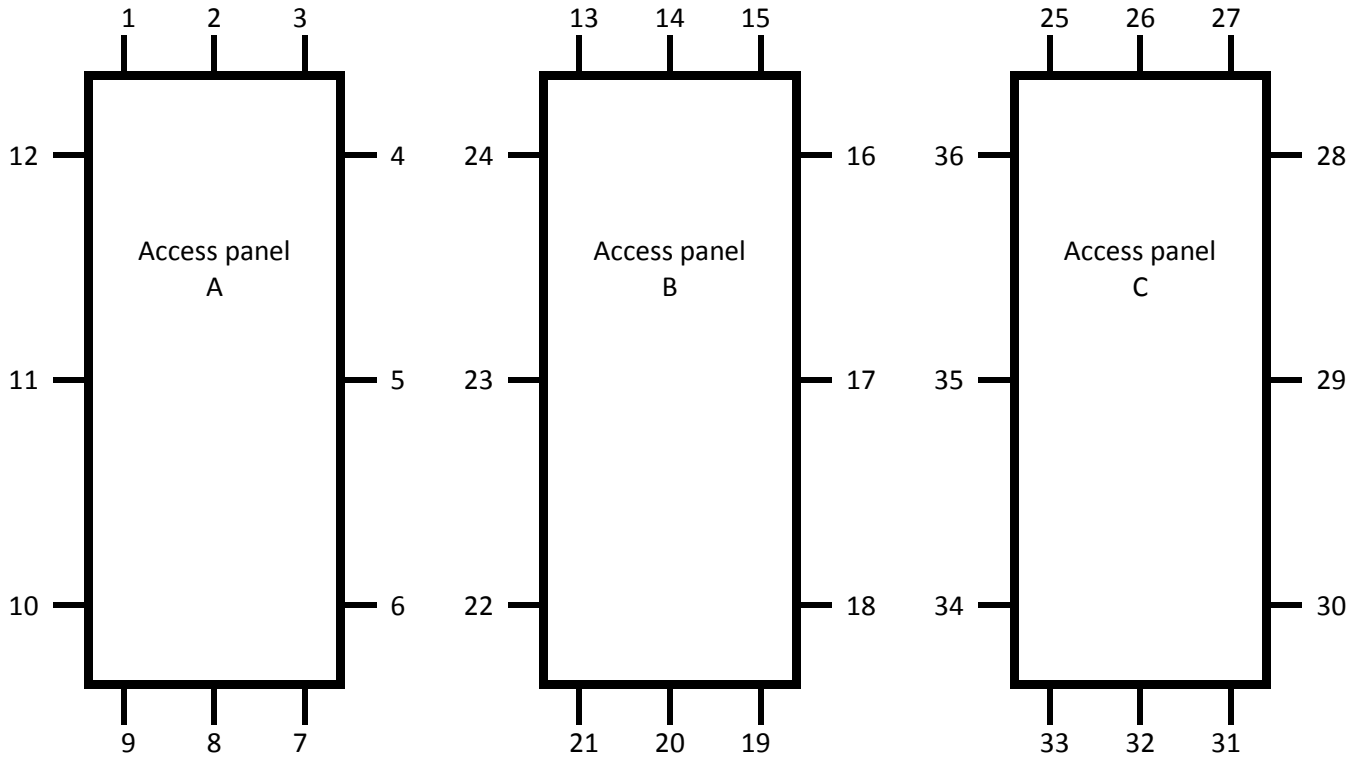
Access panel A											
Deflections – mm											
TIME mins	A	B	C	D	E	F	G	H	I	J	K
0	0	0	0	0	0	0	0	0	0	0	0
15	2	2	6	-	-	-	4	17	13	5	13
30	-	-	-	-	-	-	10	21	17	8	10
45	-	-	-	-	-	-	10	11	9	5	0
60	-	-	-	-	-	-	-	-	-	-2	2
75	-	-	-	-	-	-	-	-	-	10	5
90	-	-	-	-	-	-	-	-	-	14	10
105	-	-	-	-	-	-	-	-	-	14	11
120	-	-	-	-	-	-	-	-	-	15	12

Access panel B											
Deflections – mm											
TIME mins	A	B	C	D	E	F	G	H	I	J	K
0	0	0	0	0	0	0	0	0	0	0	0
15	-	-	-	-	-	-	28	29	21	6	5
30	-	-	-	-	-	-	25	29	31	5	3
45	-	-	-	-	-	-	22	25	27	6	0
60	-	-	-	-	-	-	22	26	52	8	10
75	-	-	-	-	-	-	32	32	57	12	14
90	-	-	-	-	-	-	-	-	-	16	13
105	-	-	-	-	-	-	-	-	-	11	11
120	-	-	-	-	-	-	-	-	-	12	12

Access panel C											
Deflections – mm											
TIME mins	A	B	C	D	E	F	G	H	I	J	K
0	0	0	0	0	0	0	0	0	0	0	0
15	7	10	0	13	8	13	35	29	16	6	4
30	-	-	-	-	-	-	32	28	11	5	10
45	-	-	-	-	-	-	35	29	15	4	11
60	-	-	-	-	-	-	36	45	23	2	11
75	-	-	-	-	-	-	47	58	50	11	18
90	-	-	-	-	-	-	-	-	-	20	23
105	-	-	-	-	-	-	-	-	-	24	20
120	-	-	-	-	-	-	-	-	-	26	78

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

8.7 Leaf edge to frame gaps pre-test measurement



Door Ref	Between Leaf and Head Door Gap Dimension in mm at Positions											
A	1	2	3	4	5	6	7*	8*	9*	10	11	12
	2.4	2.3	2	2.3	2.1	3	1.3	1.2	1	2.9	4.2	4.3
B	13	14	15	16	17	18	19*	20*	21*	22	23	24
	2.1	2	2.3	2.8	4.5	2.6	1.3	1.2	1.4	4	5.5	3.6
C	25	26	27	28	29	30	31*	32*	33*	34	35	36
	1.3	2.5	2.9	2.6	2.6	2.1	1	1.1	1.5	2.9	3.3	3.1

A	Mean	2.4	Maximum	4.3	Minimum	2
B	Mean	2.7	Maximum	5.5	Minimum	2
C	Mean	2.2	Maximum	3.3	Minimum	1

* Dimension not included in calculations at the bottom

Door Ref	Gap Between Face of Leaf and Doorstop in mm at Position											
A	1	2	3	4	5	6	7	8	9	10	11	12
	4.2	4.1	4.2	3.5	4.9	5.3	3.6	3.7	3.7	4.8	5.0	4.6
B	13	14	15	16	17	18	19	20	21	22	23	24
	5.5	5.2	5.0	4.7	4.3	5.1	5.5	5.5	5.5	4.7	4.2	4.3
C	25	26	27	28	29	30	31	32	33	34	35	36
	3.0	1.7	3.4	2.0	5.3	5.0	1.9	1.9	2.7	4.3	3.4	3.1

9 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	Comments
00:00	Test Started.
02:30	There is smoke issuing at the perimeter of all three access panels
04:00	Access panel C. There is an increase in the smoke issuing at the perimeter
05:00	Access panel A. There is a discolouration to the leaf
07:40	Access panel A. There is further discolouration to the leaf
08:44	Access panel B. The seal at the perimeter is reacting
09:13	Access panel B. There is an increase in the smoke issuing at the top half
11:04	Access panel A. There is an increase in the smoke issuing at the latch position
12:20	Access panel C. There is discolouration to the top half of the perimeter
13:09	Access panel A. There is smoke issuing at the top half perimeter of the aperture lining.
13.47	Access panel B. There is smoke issuing at the top half perimeter of the aperture lining.
15:41	Access panel B & C. There is discolouration at the top half perimeter of the aperture lining.
17:45	Access panel A. There is a glow visible at the centre of the hanging edge, behind the vertical support bar
20:15	Access panel A. The leaf is starting to glow at the leaf perimeters
20:45	Access panel B. There is a glow visible across the top edge of the leaf
21:15	Access panel C. There is charring to the plasterboard aperture lining at the top half of the leaf
24:00	Access panel B. There is aluminium melting out of the latch
25:20	Access panel A. There is aluminium melting out of the latch
29:40	Access panel C. There is further charring to the plasterboard aperture lining at the top half of the leaf
31:10	Access panel C. There is a glow visible at the top third of the perimeter
34:36	Access panel B. The entire hanging edge and closing edge of the leaf is glowing
37:00	Access panel B. The seal at the perimeter is falling away
40:00	Access panel A. The entire leaf face is glowing
44:20	Access panel B. There is discolouration to the plasterboard perimeter in the leaf
47:40	Access panel C. There is discolouration to the entire perimeter of the leaf
50:00	Access panel C. There is discolouration to the plasterboard at the fixing positions across the leaf face
55:00	Access panel C. There is intermittent flaming at the hanging edge approximately 300mm down from the top hanging corner

55:50	Access panel C. There is continuous flaming at the head of the leaf, thereby constituting **integrity failure**.
58:00	Access panel C. There is further charging and discolouration at the closing edge and the hanging edge of the plasterboard in the leaf
65:00	Access panel C. There is intermittent flaming at the head of the leaf
66:16	Access panel B. There is charring to the edges of the plasterboard in the leaf
74:15	Access panel C. There is further discolouration to the plasterboard in the leaf
76:00	Access panel B. There is discolouration to the entire face of the plasterboard in the leaf
89:20	Access panels B & C. The paper facing of the plasterboard is starting to flake away at the perimeters
93:00	Access panel B. The plasterboard aperture lining is cracked
110:00	Access panel B. The plasterboard in the leaf appears to have dropped by approximately 10mm
117:10	Access panel B. There is continuous flaming at the bottom closing corner, thereby constituting **integrity failure**
132:00	Test Terminated

10 Expression of results

Access panel A

Integrity	
Cotton pad	132 minutes *
Continuous flaming	132 minutes *
Gap gauges	132 minutes *
Thermal insulation	
Inulation I^2 (mandatory procedure)	2 minutes
Radiation – time to 15kW/m^2	Not evaluated

***** No failure of this test criteria at test termination at 132 minutes

Access panel B

Integrity	
Cotton pad	132 minutes *
Continuous flaming	132 minutes *
Gap gauges	132 minutes *
Thermal insulation	
Inulation I^2 (mandatory procedure)	8 minutes
Radiation – time to 15kW/m^2	132 minutes *

***** No failure of this test criteria at test termination at 132 minutes

Access panel C

Integrity	
Cotton pad	132 minutes *
Continuous flaming	55 minutes
Gap gauges	132 minutes *
Thermal insulation	
Inulation I^2 (mandatory procedure)	33 minutes
Radiation – time to 15kW/m^2	132 minutes *

***** No failure of this test criteria at test termination at 132 minutes

11 Limitations

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outline in EN 1634-1, EN 1363-1, and where appropriate EN 1363-2. Any significant deviation with respect to size, construction details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

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 Section 8.7. 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. Warringtonfire 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.

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

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	Written and checked by:	**Authorised by:**
Signature:		
Name:	Dan Berry	Nikolas Whitelock
Title:	Technical Officer	Technical Manager
Date of issue:	14/08/2020	14/08/2020

12 Field of direct application of test results

BS EN 1363-1:2012, Fire resistance tests - Part 1: General requirements, states within Section 12.1, Clause v) that “The field of direct application of the results for the specimen being evaluated, either in the form of the full text from the appropriate standard, or only those clauses which are relevant for the specimen tested” shall be included within the test report. The full text of the field of direct application for the results of the specimen being evaluated herein, can be found within the appropriate test standard, which is referenced on the front cover of this report.

13 Photographs

At start of test

After 15 minutes

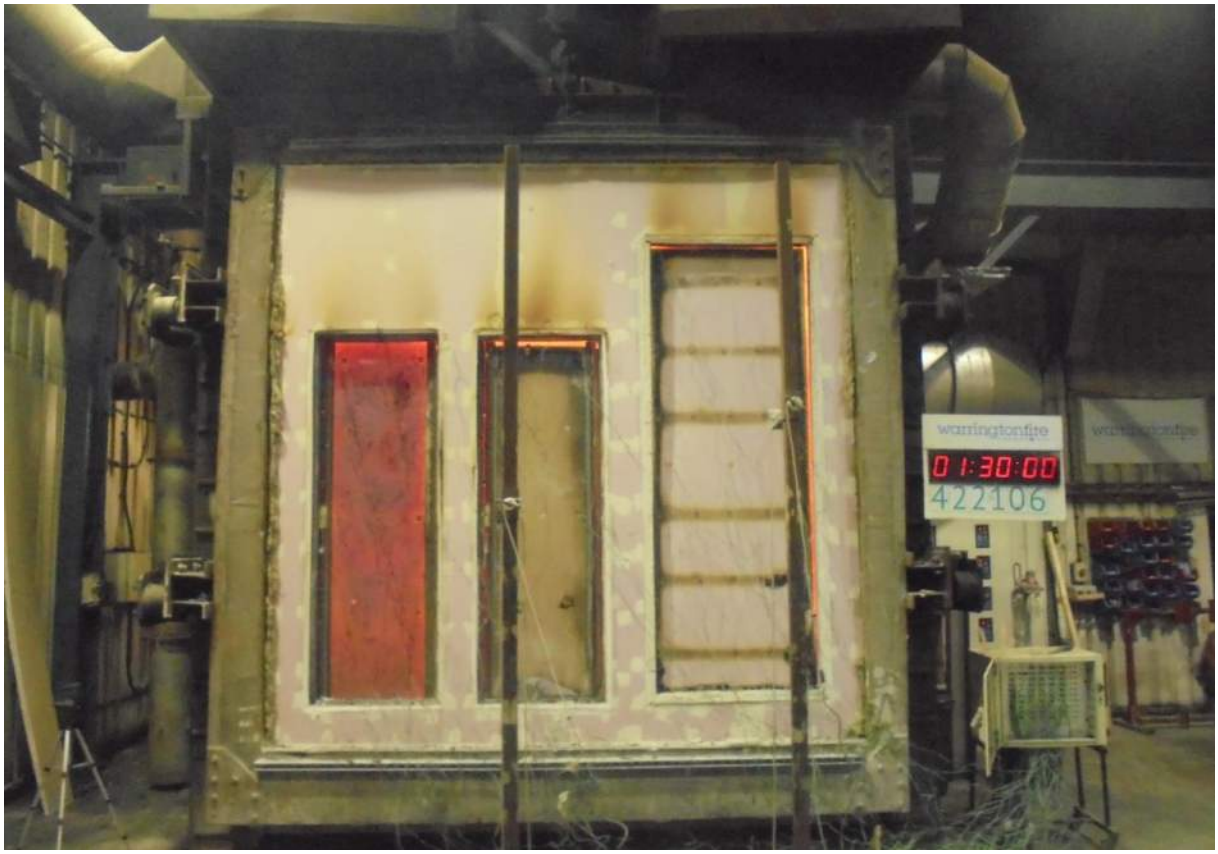
At 30 minutes

At 45 minutes

At 60 minutes

At 75 minutes

At 90 minutes



After 105 minutes

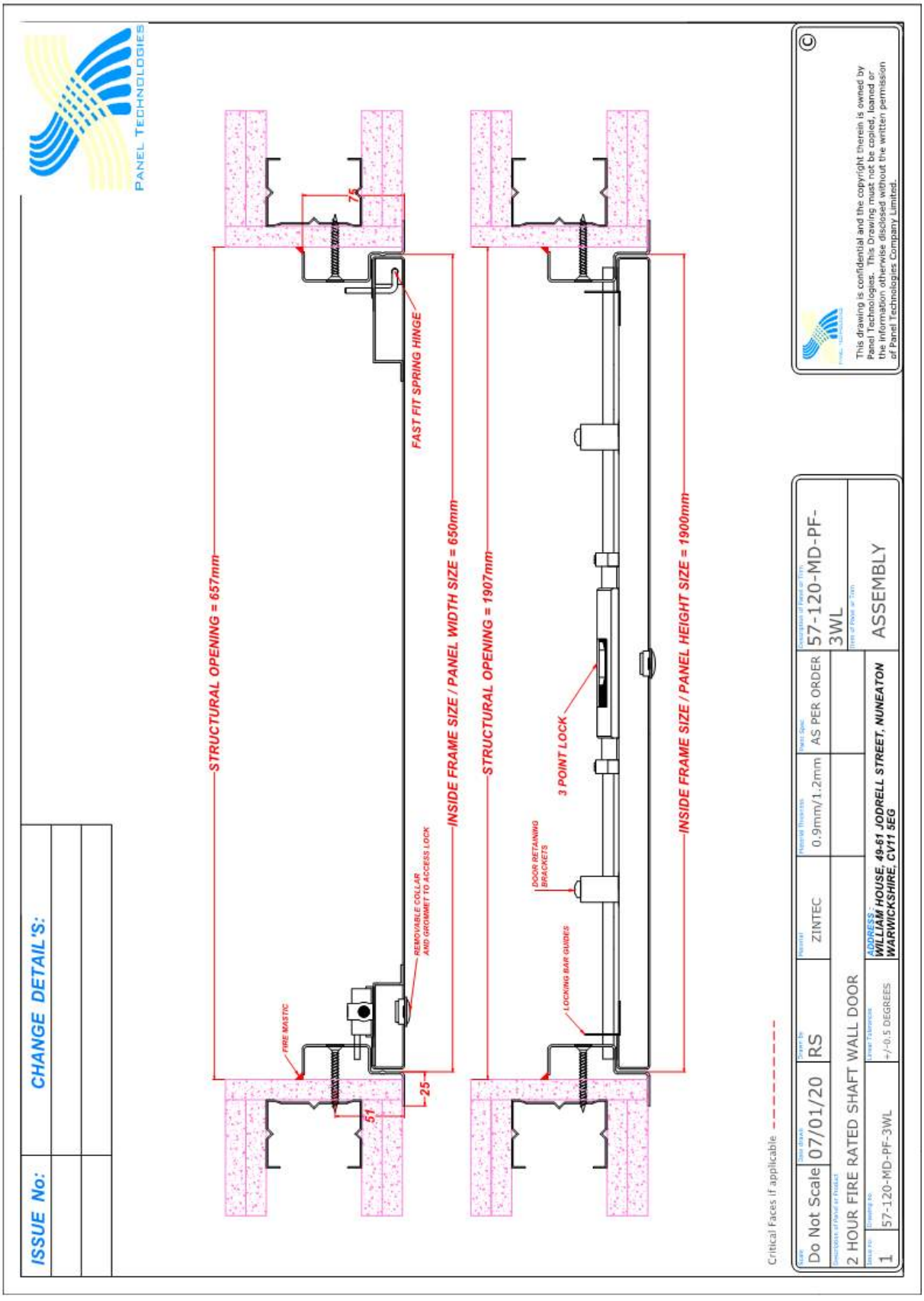
At 120 minutes

At 132 minutes

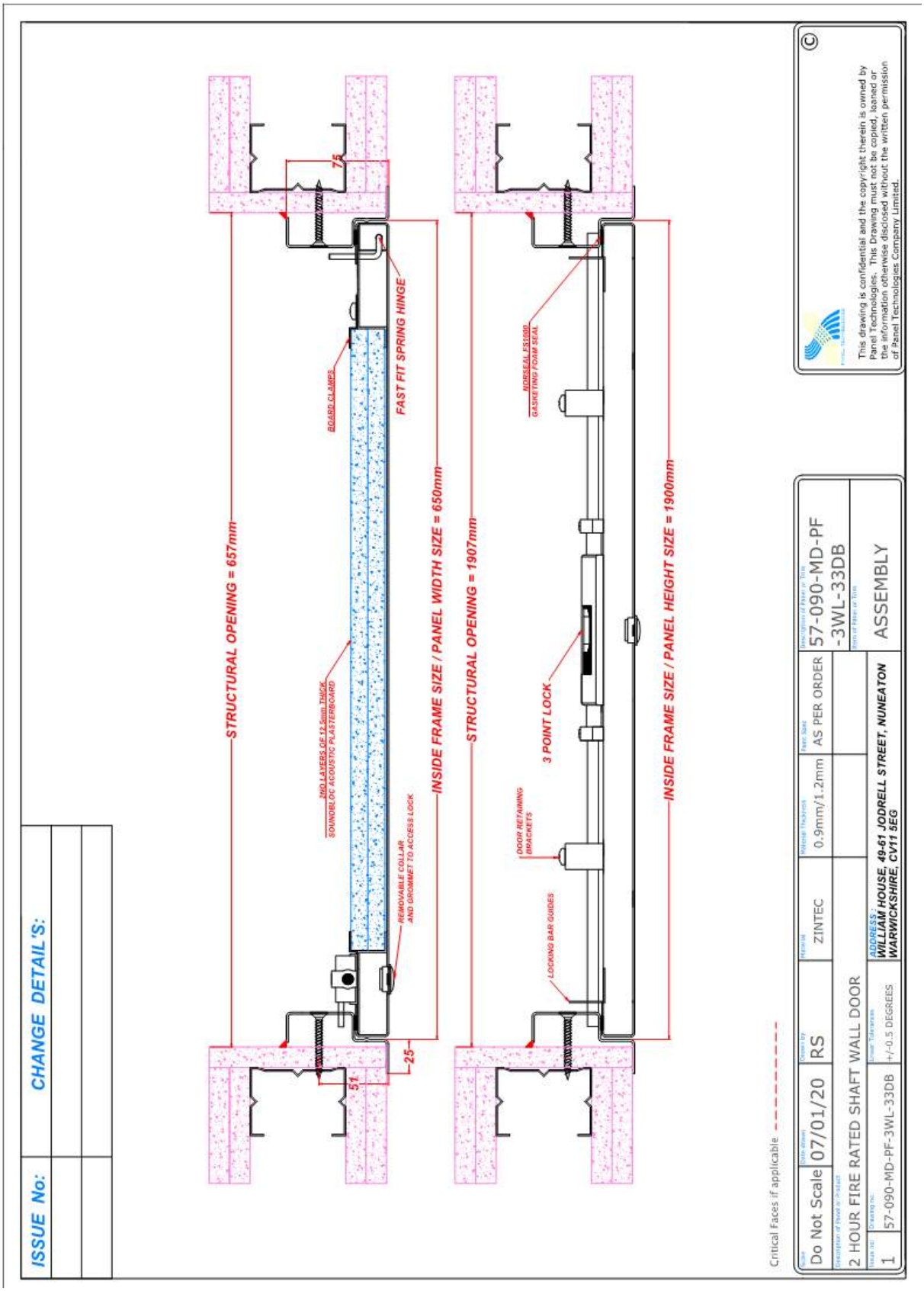
Exposed face – post test

Appendix 1 – Client suppled drawings and Figures 1 to 4

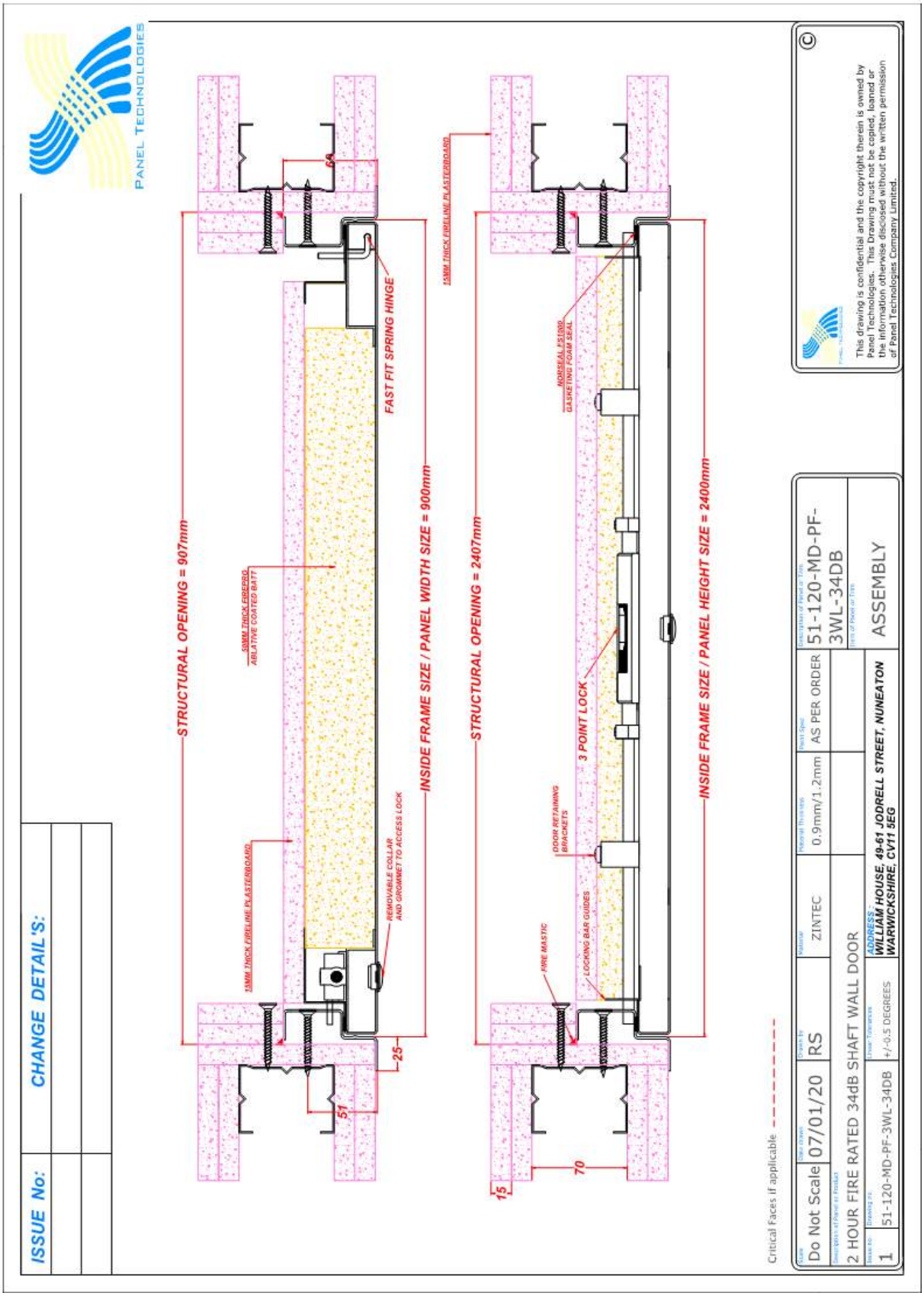
Access panel A



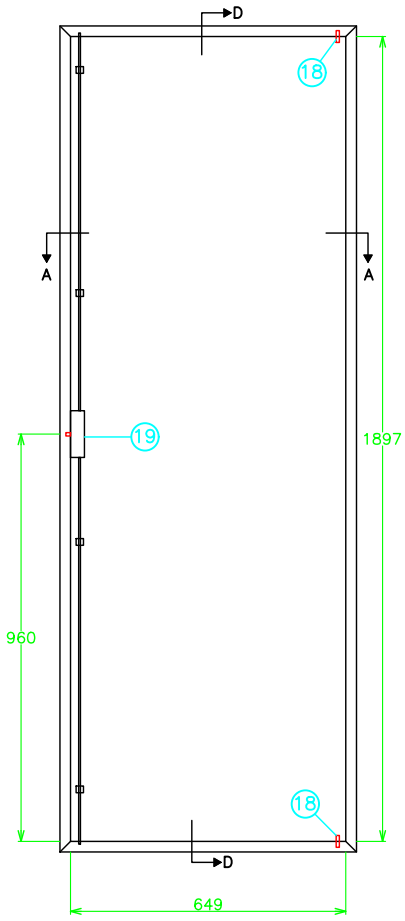
Access panel B


ISSUE No:
CHANGE DETAIL'S:
STRUCTURAL OPENING = 657mm
INSIDE FRAME SIZE / PANEL WIDTH SIZE = 650mm
STRUCTURAL OPENING = 1907mm
INSIDE FRAME SIZE / PANEL HEIGHT SIZE = 1900mm
2NO LAYERS OF 12.5mm THICK SOUNDBLOC ACOUSTIC PLASTERBOARD
BOARD CLAMPS
FAST FIT SPRING HINGE
REMOVABLE COLLAR AND GROMMET TO ACCESS LOCK
NORSEAL FS1000 GASKETING FOAM SEAL
3 POINT LOCK
DOOR RETAINING BRACKETS
LOCKING BAR GUIDES
75
51
25
Critical Faces if applicable
Do Not Scale
07/01/20
RS
ZINTEC
0.9mm/1.2mm
AS PER ORDER
57-090-MD-PF
-3WL-33DB
2 HOUR FIRE RATED SHAFT WALL DOOR
ASSEMBLY
1
57-090-MD-PF-3WL-33DB
+/-0.5 DEGREES
WILLIAM HOUSE, 49-61 JODRELL STREET, NUNEATON
WARWICKSHIRE, CV11 5EG
This drawing is confidential and the copyright therein is owned by Panel Technologies. This Drawing must not be copied, loaned or the information otherwise disclosed without the written permission of Panel Technologies Company Limited.

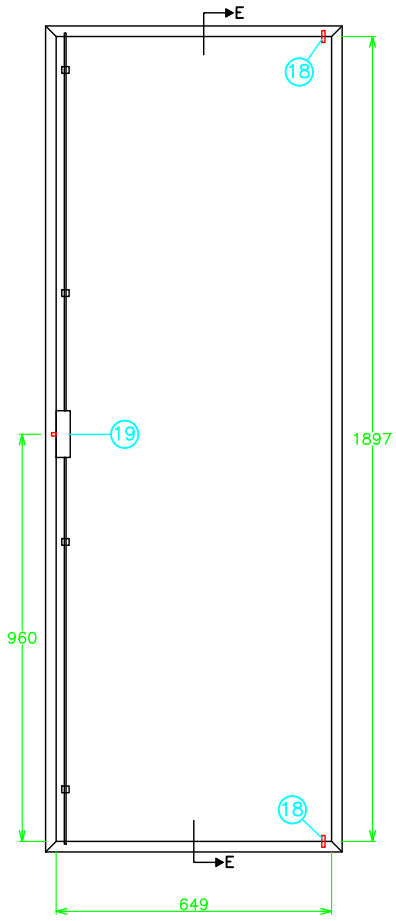
Access panel C



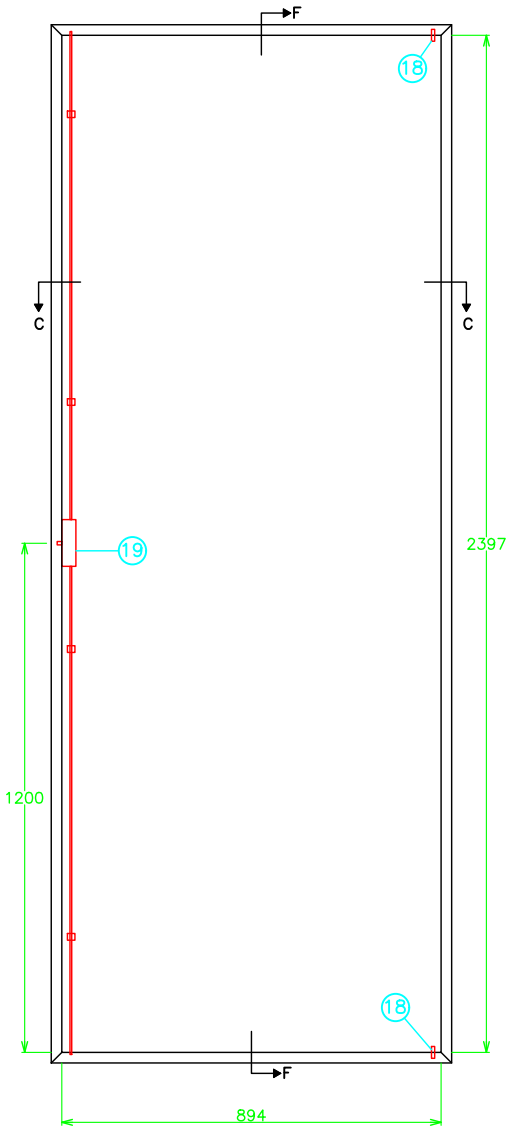
Access panel A



Access panel B



Access panel C



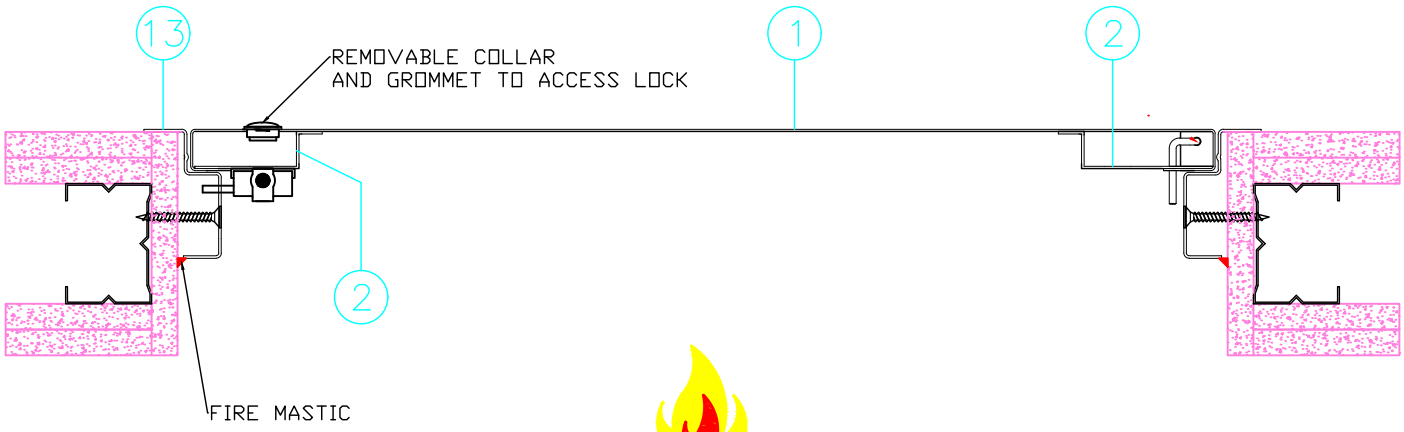
warringtonfire
Proud to be part of element
Warringtonfire, Stocking Lane,
Hughenden Valley, High Wycombe,
Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569750

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

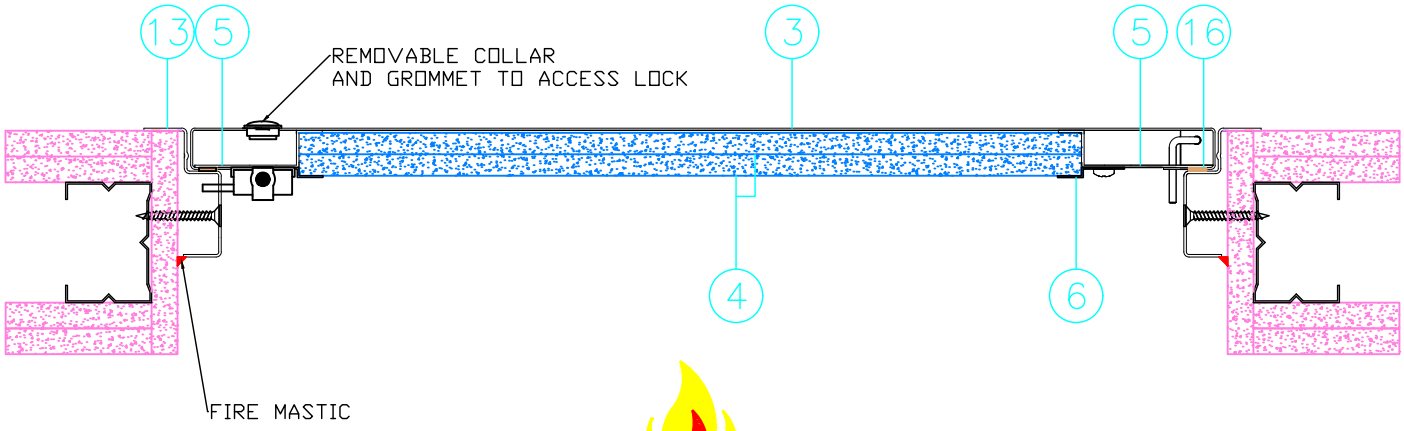
Date Drawn	Drawn By	Scale
14/01/20	ARD	NTS

Project No.	
WF 422106	Appendix 1

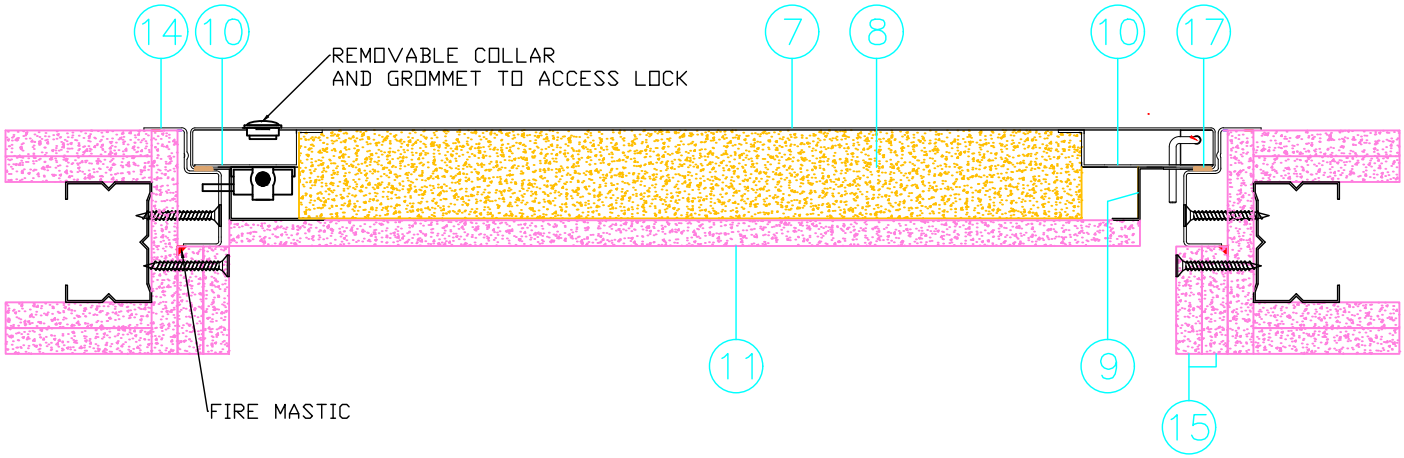
Section A–A



Section B–B



Section C–C



warringtonfire
Proud to be part of element
Warringtonfire, Stocking Lane,
Hughenden Valley, High Wycombe,
Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569750

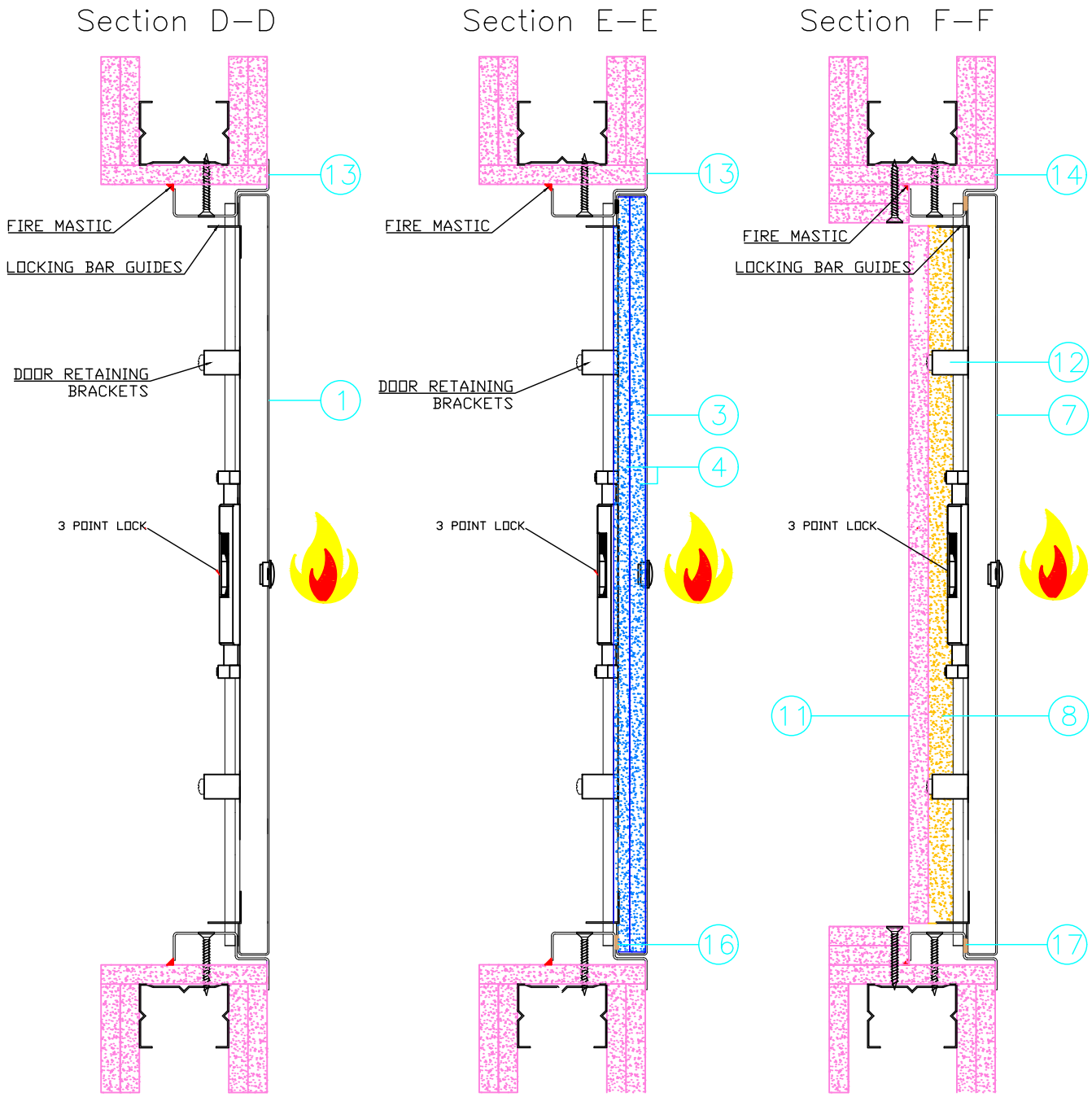
Title

Horizontal cross sections

(All dimensions in mm)

Date Drawn	Drawn By	Scale
14/01/20	ARD	NTS

Project No.	
WF 422106	Appendix 1



warringtonfire
Proud to be part of element
Warringtonfire, Stocking Lane,
Hughenden Valley, High Wycombe,
Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569750

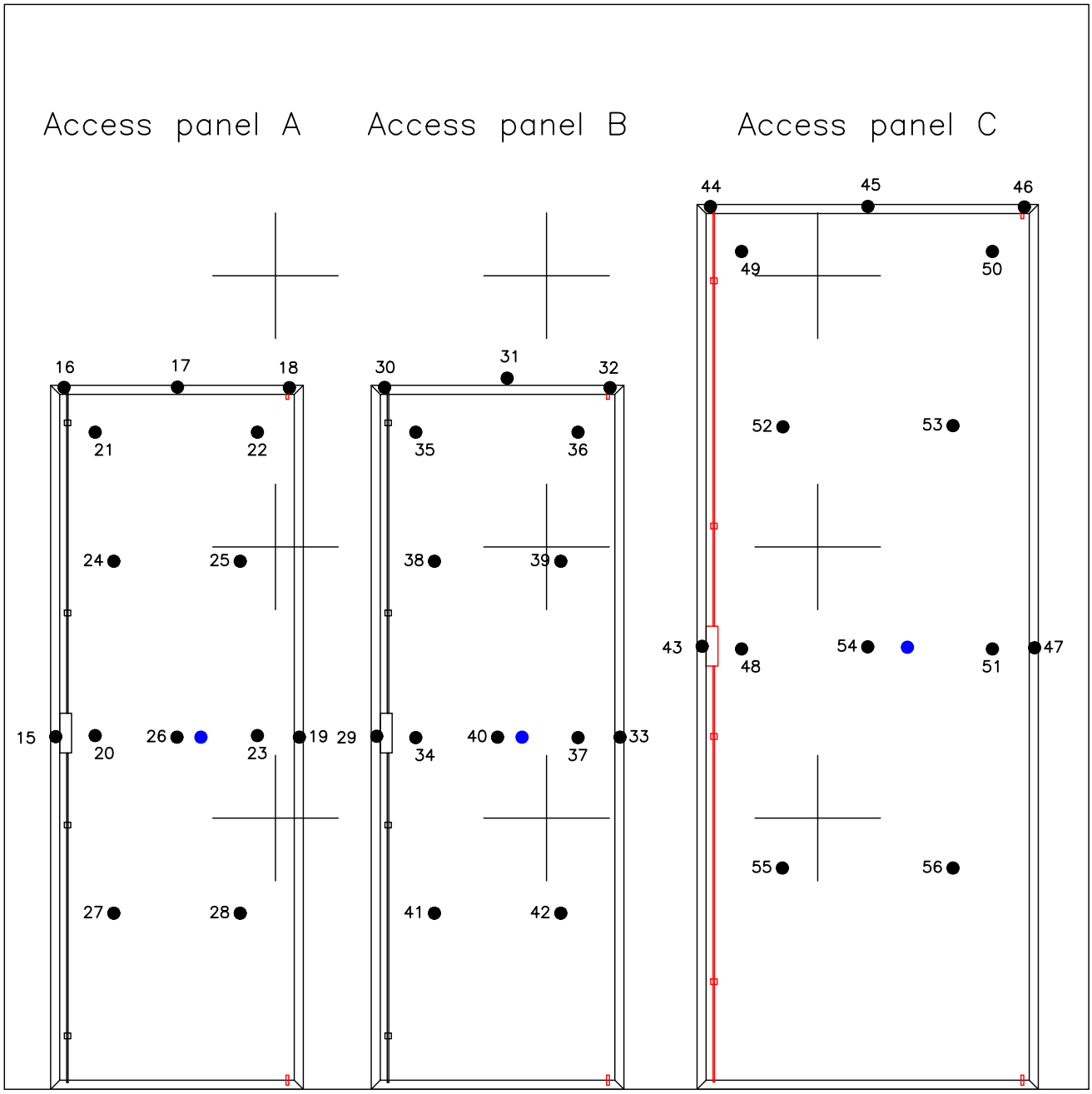
Title

Vertical cross section

(All dimensions in mm)

Date Drawn	Drawn By	Scale
14/01/20	ARD	NTS

Project No.	
WF 422106	Appendix 1



: Furnace Thermocouples

: Unexposed Face Thermocouples

: Radiometer

Viewed From Unexposed Face

warringtonfire
Proud to be part of element
Warringtonfire, Stocking Lane,
Hughenden Valley, High Wycombe,
Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569750

Title

Thermocouple positions

(All dimensions in mm)

Date Drawn	Drawn By	Scale
14/01/20	ARD	NTS

Project No.	
WF 422106	Appendix 1

Appendix 2 - raw test data

(see figure 5 of Appendix 1 for channel locations)

Time	Chan 15	Chan 16	Chan 17	Chan 18	Chan 19	Chan 20	Chan 21	Chan 22	Chan 23	Chan 24	Chan 25	Chan 26	Chan 27	Chan 28	Chan 29	Chan 30
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	17	18	17	17	17	18	20	19	18	18	18	18	18	18	16	15
1	47	42	34	42	55	111	100	106	98	98	113	106	104	112	34	25
2	55	56	49	61	70	158	120	156	104	125	173	150	152	179	51	44
3	61	68	64	80	90	207	188	225	144	182	225	204	202	233	72	53
4	69	78	78	98	101	259	246	285	212	234	278	258	251	290	91	57
5	78	89	93	108	109	303	292	338	265	279	324	306	293	337	103	70
6	88	100	103	138	126	341	334	428	339	318	374	356	329	413	113	98
7	100	106	123	165	152	391	386	476	429	374	451	436	385	478	134	120
8	107	125	150	183	179	463	450	471	465	437	477	481	447	484	160	147
9	122	145	170	201	205	488	469	312	454	463	487	490	476	493	184	72
10	140	161	186	215	228	504	479	322	458	465	495	496	477	497	205	61
11	158	174	202	228	248	516	494	516	472	472	507	508	482	508	223	60
12	175	184	217	243	268	523	506	528	482	480	520	515	492	521	239	64
13	190	198	230	259	287	526	509	534	491	487	528	522	497	530	254	71
14	205	211	241	272	304	536	518	545	499	496	541	533	507	539	265	77
15	221	386	251	280	320	546	526	407	507	506	548	541	517	550	275	80
16	236	405	264	291	332	556	531	413	516	514	559	551	527	561	284	87
17	250	272	275	305	341	566	538	309	524	520	567	559	536	568	294	93
18	264	261	320	314	350	574	545	361	530	249	567	566	545	580	305	99
19	276	266	315	325	357	583	555	278	536	271	569	326	552	583	317	103
20	286	272	250	334	365	591	563	219	545	237	592	524	563	595	327	108
21	295	280	232	340	372	267	569	203	552	220	600	282	565	438	337	112
22	303	284	261	266	377	367	578	201	557	218	350	595	554	375	346	118
23	310	206	252	283	383	299	582	208	375	226	338	602	462	337	354	122

Time	Chan 15	Chan 16	Chan 17	Chan 18	Chan 19	Chan 20	Chan 21	Chan 22	Chan 23	Chan 24	Chan 25	Chan 26	Chan 27	Chan 28	Chan 29	Chan 30
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
24	316	211	271	347	388	619	589	210	243	233	331	609	363	444	363	127
25	323	221	478	239	395	627	613	213	577	242	548	272	264	626	371	131
26	329	321	343	332	401	633	614	242	580	291	361	623	350	635	378	133
27	337	316	344	255	405	638	603	267	327	307	640	629	363	636	386	136
28	345	318	328	251	410	643	622	271	464	310	644	632	264	639	392	140
29	352	313	287	296	414	647	626	281	299	316	261	637	523	645	397	141
30	359	320	262	334	420	653	617	293	313	310	240	640	621	652	400	143
31	366	254	365	404	426	657	622	217	603	310	306	644	625	658	403	145
32	373	248	255	413	431	664	642	218	608	311	636	649	632	668	408	148
33	379	264	377	419	435	667	649	229	612	314	421	652	634	672	412	152
34	385	270	307	424	302	671	638	234	614	318	550	655	637	671	417	155
35	391	278	323	429	263	677	642	305	618	243	565	660	643	678	421	159
36	278	217	328	435	241	683	648	285	620	317	582	666	649	684	424	162
37	252	327	352	441	452	688	653	287	620	328	613	671	653	686	427	163
38	262	232	340	447	455	692	657	283	622	327	549	674	657	688	430	167
39	281	241	333	448	457	695	661	285	625	329	538	677	660	684	432	170
40	266	236	330	450	460	698	664	288	628	332	540	681	660	683	434	172
41	244	233	349	456	463	694	675	315	629	325	548	680	660	682	436	174
42	248	234	276	463	465	692	672	313	632	323	549	681	657	681	439	176
43	268	232	387	467	256	689	662	362	635	337	555	680	656	678	441	179
44	262	235	383	471	309	689	664	345	640	341	567	681	664	677	444	181
45	443	233	434	474	256	689	669	669	643	346	567	679	667	674	448	185
46	447	237	274	476	253	691	674	693	643	350	592	677	675	672	451	186
47	448	247	437	477	288	689	677	702	645	353	558	677	678	672	455	189
48	293	245	281	480	478	686	679	705	648	354	539	676	681	685	458	191
49	459	250	285	482	351	686	682	708	650	357	541	673	682	692	462	194
50	463	249	438	484	298	689	686	630	651	366	535	671	631	700	465	197
51	466	254	399	487	290	696	689	649	653	375	531	669	571	710	469	198

Time	Chan 15	Chan 16	Chan 17	Chan 18	Chan 19	Chan 20	Chan 21	Chan 22	Chan 23	Chan 24	Chan 25	Chan 26	Chan 27	Chan 28	Chan 29	Chan 30
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
52	469	254	371	487	291	706	692	380	655	384	528	666	564	711	472	200
53	472	259	360	489	295	715	694	585	656	397	541	666	537	717	476	203
54	475	248	349	490	299	719	696	698	657	396	547	662	551	718	480	205
55	478	258	347	492	294	722	699	709	661	404	550	664	574	723	483	206
56	480	257	347	493	297	726	703	719	663	406	555	682	588	726	487	208
57	482	260	345	494	304	729	705	720	667	408	563	693	569	732	490	209
58	484	257	344	496	314	732	709	730	669	434	571	698	593	735	493	213
59	486	256	348	498	320	734	713	728	671	437	593	698	687	737	495	215
60	487	258	341	498	313	736	715	737	675	444	601	702	689	740	496	215
61	487	260	344	499	311	739	718	741	677	447	607	704	711	744	497	217
62	489	251	334	500	346	745	720	744	682	438	610	708	723	757	498	219
63	490	253	342	501	343	745	724	748	683	433	610	710	710	753	500	221
64	492	253	344	503	372	748	726	750	686	423	608	715	713	757	502	224
65	494	258	347	504	365	750	730	754	689	425	614	717	717	759	504	227
66	495	255	345	507	365	753	733	756	691	419	615	718	701	762	507	230
67	497	259	347	509	354	758	735	760	695	426	619	722	706	767	511	233
68	499	261	346	510	354	761	737	762	697	403	617	724	723	772	513	236
69	501	264	347	512	366	764	741	766	699	409	619	726	726	773	515	239
70	503	263	346	515	379	767	744	769	701	414	609	728	727	775	518	242
71	506	265	345	518	384	771	746	771	703	415	603	731	729	779	523	247
72	508	261	350	520	375	774	748	783	707	421	611	734	741	787	526	248
73	511	266	360	523	341	776	751	786	707	419	634	736	744	785	530	252
74	514	273	357	526	356	777	754	784	709	408	624	738	747	655	536	255
75	516	269	356	530	378	779	756	791	710	406	605	738	747	715	542	258
76	519	263	354	533	428	782	759	794	713	424	600	741	749	762	543	262
77	521	270	351	538	453	784	760	795	717	421	588	744	752	740	544	264
78	523	268	354	543	474	789	762	794	719	425	587	748	757	784	544	268
79	525	278	365	546	457	791	764	800	723	427	586	751	759	781	546	269

Time	Chan 15	Chan 16	Chan 17	Chan 18	Chan 19	Chan 20	Chan 21	Chan 22	Chan 23	Chan 24	Chan 25	Chan 26	Chan 27	Chan 28	Chan 29	Chan 30
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
80	526	274	358	548	460	792	767	803	723	433	581	749	759	783	548	272
81	527	271	361	552	489	796	768	805	724	441	568	754	765	765	549	268
82	528	274	361	555	536	798	769	807	726	423	547	755	766	786	551	267
83	530	276	362	558	537	799	773	811	728	411	528	756	767	786	554	269
84	532	268	361	564	544	803	774	811	730	405	515	759	769	788	556	273
85	534	273	368	568	538	807	776	812	732	412	514	763	774	792	560	275
86	536	272	357	572	546	808	779	815	733	406	504	762	773	792	559	275
87	538	273	365	579	547	810	780	817	735	409	495	765	774	794	559	276
88	540	274	371	584	444	811	783	804	738	407	487	767	773	792	559	277
89	541	276	362	586	429	813	784	746	738	403	477	768	775	791	560	281
90	542	279	364	588	435	817	786	728	740	408	469	769	780	795	561	283
91	543	286	371	589	444	818	789	701	740	415	463	770	779	794	559	285
92	545	279	368	590	441	821	791	706	742	413	452	771	782	796	557	285
93	547	281	371	591	435	823	792	815	744	414	449	775	784	799	555	285
94	548	281	375	592	431	826	794	820	673	415	448	776	784	801	554	286
95	550	281	382	592	430	829	795	821	747	417	448	780	788	805	554	288
96	551	282	374	591	422	831	797	824	749	416	435	781	791	809	554	288
97	552	268	374	591	418	833	799	826	678	418	429	782	792	811	554	285
98	554	275	375	592	424	834	800	812	731	414	427	785	794	814	554	287
99	555	274	374	592	426	835	804	813	618	419	418	784	793	811	556	287
100	557	268	377	593	439	838	803	829	501	425	427	787	797	816	556	290
101	558	276	374	594	451	841	806	797	651	430	419	789	800	818	557	289
102	559	265	379	594	452	841	806	763	474	434	418	790	800	819	557	287
103	561	269	383	596	458	843	808	746	454	436	417	792	800	818	558	290
104	562	268	382	596	458	844	808	752	498	441	413	794	804	825	558	289
105	563	282	382	595	455	845	812	820	669	444	410	796	804	824	559	291
106	564	279	379	595	442	845	814	842	753	449	410	796	804	824	558	289
107	565	264	386	593	482	846	814	837	516	449	407	796	804	821	556	289

Time	Chan 15	Chan 16	Chan 17	Chan 18	Chan 19	Chan 20	Chan 21	Chan 22	Chan 23	Chan 24	Chan 25	Chan 26	Chan 27	Chan 28	Chan 29	Chan 30
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
108	566	261	381	594	473	848	815	842	452	449	404	797	806	824	557	289
109	567	262	385	593	468	849	816	843	459	450	405	798	807	826	557	290
110	568	263	380	594	448	849	818	843	445	465	388	799	808	826	557	291
111	568	289	388	593	439	851	821	841	763	512	401	800	811	828	558	288
112	569	267	381	593	436	854	821	827	685	542	389	802	812	830	559	287
113	571	286	390	594	437	855	825	846	726	613	389	803	814	832	561	288
114	572	289	388	595	437	859	826	772	730	694	386	807	819	837	563	286
115	573	279	388	594	437	859	827	737	655	712	382	807	818	836	564	285
116	574	286	381	594	426	866	827	615	769	740	379	813	828	846	565	284
117	575	287	385	595	419	862	829	576	774	671	381	808	820	837	567	284
118	575	288	390	594	422	862	829	579	761	641	386	809	820	836	568	286
119	576	290	388	593	416	863	830	576	775	609	386	810	823	837	569	286
120	577	289	385	594	419	862	832	590	775	581	384	809	821	833	570	289
121	578	291	396	595	420	863	833	618	774	545	389	811	822	834	571	289
122	578	293	390	593	419	866	834	580	776	532	386	813	826	834	572	289
123	580	292	388	595	422	868	835	727	778	550	384	815	828	830	573	289
124	581	294	381	595	419	868	836	793	777	521	377	814	828	824	574	291
125	581	290	394	597	425	869	838	780	779	491	390	817	829	821	575	292
126	582	286	389	598	424	872	838	769	779	493	396	817	831	818	577	293
127	582	290	382	598	428	872	839	744	781	471	394	819	832	815	577	293
128	584	286	386	599	425	874	841	740	782	455	388	821	833	813	579	294
129	584	290	386	601	429	876	842	723	784	465	392	822	837	813	580	295
130	585	294	394	602	431	882	843	725	786	523	417	827	844	819	581	301
131	586	297	385	602	432	884	844	715	787	538	406	830	848	817	583	300
132	588	300	424	604	429	880	845	716	784	672	419	826	840	810	585	304

Time	Chan 31	Chan 32	Chan 33	Chan 34	Chan 35	Chan 36	Chan 37	Chan 38	Chan 39	Chan 40	Chan 41	Chan 42	Chan 43	Chan 44	Chan 45
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	15	14	15	13	14	14	13	14	14	13	13	13	13	15	14
1	24	25	26	14	14	14	14	14	14	13	13	13	14	16	15
2	32	34	42	14	15	15	14	14	14	13	13	13	14	21	18
3	31	45	56	14	16	15	14	14	14	13	13	13	17	26	20
4	30	57	72	14	17	15	14	15	14	13	13	13	17	31	24
5	26	72	94	15	17	16	15	15	14	14	14	14	16	35	28
6	27	89	109	15	18	17	16	15	15	14	14	14	16	42	37
7	29	99	137	16	19	19	17	16	16	15	15	16	16	44	44
8	37	112	175	18	21	22	20	17	18	18	18	18	16	47	46
9	47	127	206	22	25	28	25	20	21	22	22	22	16	49	48
10	58	142	232	29	33	38	33	26	27	28	30	29	16	51	54
11	73	154	254	38	42	51	42	33	35	36	38	38	17	53	59
12	88	166	272	47	51	61	51	41	45	45	48	48	17	56	60
13	106	176	286	57	59	68	60	50	55	53	57	58	17	58	61
14	113	186	299	64	65	73	67	57	63	60	65	66	18	62	63
15	123	196	311	71	70	76	72	36	70	65	71	72	19	65	65
16	133	207	323	75	73	78	75	28	75	67	75	75	19	68	65
17	138	218	338	78	75	79	77	27	78	64	78	77	20	73	66
18	140	228	359	80	76	80	79	27	79	44	79	77	21	78	67
19	148	239	379	81	77	81	80	29	80	41	80	77	23	82	65
20	154	249	393	82	77	81	80	30	80	42	80	77	24	87	65
21	156	257	402	82	78	82	81	31	80	43	80	77	25	92	64
22	153	265	413	82	78	82	81	33	80	44	81	78	27	97	64
23	158	273	422	82	78	83	82	35	80	46	81	78	29	101	64
24	151	281	429	83	79	83	83	35	80	48	81	79	31	106	66
25	152	289	436	83	79	84	83	36	80	50	82	79	33	109	68
26	158	296	442	84	80	85	84	38	79	51	82	80	35	113	69
27	161	304	449	86	80	86	85	40	79	53	82	82	37	116	70

Time	Chan 31	Chan 32	Chan 33	Chan 34	Chan 35	Chan 36	Chan 37	Chan 38	Chan 39	Chan 40	Chan 41	Chan 42	Chan 43	Chan 44	Chan 45
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
28	163	310	453	88	81	88	87	41	79	55	84	83	38	119	73
29	168	316	460	89	81	89	88	42	79	57	85	84	40	120	75
30	175	322	467	90	83	90	89	44	74	59	86	85	42	123	78
31	181	328	473	91	84	90	90	45	75	61	87	86	44	125	81
32	182	334	479	92	85	91	90	46	75	62	88	86	46	128	84
33	193	339	486	93	86	93	91	47	71	64	88	87	48	130	86
34	194	345	490	93	86	94	91	40	39	44	89	87	50	131	89
35	200	350	494	94	87	96	92	32	27	33	89	88	51	133	91
36	201	355	500	94	88	100	93	29	22	29	90	88	53	135	93
37	201	358	506	95	91	105	94	30	21	27	90	89	56	135	95
38	194	362	507	95	94	109	95	29	20	26	91	89	57	137	98
39	187	366	507	95	99	111	96	29	20	25	91	90	58	138	99
40	184	370	509	95	103	113	96	29	20	25	91	90	60	139	101
41	172	373	512	95	105	115	97	29	20	25	91	90	62	142	101
42	167	376	516	95	107	116	97	29	20	25	91	90	64	144	104
43	163	380	520	95	108	117	98	30	20	26	91	90	66	148	106
44	161	384	523	95	110	117	99	30	21	26	91	90	70	149	107
45	160	388	527	95	110	118	100	30	21	26	91	91	72	151	108
46	165	391	528	95	111	119	101	32	21	27	91	91	76	151	109
47	168	395	531	96	112	120	102	32	22	27	92	92	78	153	110
48	170	398	532	96	112	121	104	33	22	27	93	92	81	155	111
49	177	402	540	96	113	122	107	32	22	27	94	93	85	157	111
50	182	405	537	96	113	124	111	33	22	27	95	94	89	160	113
51	191	408	537	96	114	127	113	33	22	27	95	95	92	162	113
52	202	411	537	97	115	130	115	33	22	27	96	96	94	165	114
53	206	413	535	97	116	135	117	32	22	27	96	98	96	166	115
54	207	416	536	98	117	143	119	33	23	28	97	100	98	169	115
55	214	419	537	98	118	156	122	34	23	28	97	103	101	171	116

Time	Chan 31	Chan 32	Chan 33	Chan 34	Chan 35	Chan 36	Chan 37	Chan 38	Chan 39	Chan 40	Chan 41	Chan 42	Chan 43	Chan 44	Chan 45
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
56	216	422	539	99	119	172	125	35	23	28	98	105	103	174	115
57	222	425	540	100	120	188	130	35	24	29	98	107	104	177	118
58	223	429	541	103	122	209	137	37	24	30	99	110	104	180	117
59	221	431	543	106	124	230	150	37	25	30	102	113	104	184	117
60	227	434	540	109	127	249	171	37	24	29	105	117	102	188	117
61	228	436	538	113	131	268	194	36	25	29	108	123	101	191	117
62	229	440	536	118	138	288	217	34	25	27	111	132	101	192	117
63	237	443	536	122	148	309	234	33	25	25	114	143	101	193	120
64	228	448	536	127	163	331	248	34	25	24	118	160	102	194	122
65	232	452	536	134	179	351	260	34	26	24	123	180	103	193	120
66	236	457	536	144	201	369	270	34	26	24	130	199	104	195	122
67	238	463	536	160	219	384	278	35	26	24	139	215	106	196	124
68	241	467	534	174	236	397	286	34	26	24	154	229	107	198	123
69	246	473	534	192	251	406	293	35	26	24	170	241	108	201	122
70	248	480	532	209	266	408	298	36	27	24	190	252	109	206	124
71	241	487	531	223	281	403	301	37	27	24	206	263	110	211	127
72	233	494	528	236	299	394	300	36	27	24	218	276	111	216	129
73	235	500	529	250	317	386	297	37	27	25	229	288	112	221	128
74	241	505	532	266	337	379	293	36	26	24	239	296	113	227	129
75	233	510	532	283	354	375	289	35	25	24	247	298	113	231	129
76	226	514	532	297	366	372	285	36	25	24	254	297	114	236	130
77	229	517	533	305	371	372	282	36	25	24	261	294	115	241	132
78	232	521	533	309	370	374	281	38	25	25	267	290	116	245	129
79	235	524	532	309	364	376	280	38	25	25	271	286	116	251	132
80	236	527	533	305	356	377	280	37	25	26	275	283	116	259	134
81	232	530	525	304	352	374	277	39	26	27	278	279	115	264	140
82	232	536	522	302	348	371	272	40	26	27	280	274	114	267	143
83	231	542	519	300	345	367	268	39	26	28	281	269	113	270	149

Time	Chan 31	Chan 32	Chan 33	Chan 34	Chan 35	Chan 36	Chan 37	Chan 38	Chan 39	Chan 40	Chan 41	Chan 42	Chan 43	Chan 44	Chan 45
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
84	230	548	520	299	344	365	268	40	26	28	282	268	114	274	150
85	234	554	518	297	342	368	267	39	26	28	282	267	114	279	154
86	240	559	516	295	340	374	265	40	27	28	281	265	113	282	158
87	239	563	516	294	337	380	265	40	27	28	280	264	113	286	160
88	236	565	515	293	336	387	265	41	27	29	280	263	113	292	161
89	231	568	516	293	336	397	265	41	28	29	279	263	113	297	168
90	238	570	516	292	335	408	265	41	28	29	278	262	113	300	169
91	243	571	519	292	334	417	265	40	28	29	277	261	113	306	174
92	240	572	523	291	333	425	266	38	28	27	277	260	114	311	180
93	238	571	526	291	333	428	267	35	28	25	276	260	114	319	184
94	241	572	527	291	332	427	269	35	28	24	276	260	115	326	186
95	239	231	529	292	333	428	271	35	29	24	276	261	116	333	189
96	240	224	528	292	333	428	272	33	29	23	276	260	117	343	192
97	242	225	529	292	332	428	273	33	29	23	276	260	117	347	194
98	240	223	529	293	334	433	275	34	30	23	276	262	119	351	197
99	247	222	529	293	334	440	275	33	29	23	276	261	119	359	199
100	245	224	531	293	334	445	277	34	30	23	276	262	121	361	202
101	253	223	532	293	334	447	279	34	31	24	276	262	121	360	204
102	244	229	533	294	335	448	280	34	32	24	277	263	122	361	206
103	247	237	537	295	336	443	281	34	31	24	277	263	123	364	209
104	244	247	539	295	336	441	282	34	31	23	278	263	125	367	210
105	245	240	542	296	337	262	285	34	31	23	279	264	126	370	213
106	244	231	543	297	338	251	286	33	31	23	280	264	128	372	214
107	244	231	543	298	338	260	287	34	31	24	280	265	129	375	219
108	240	234	544	298	339	258	287	34	31	24	281	265	132	373	220
109	240	224	546	299	339	269	289	34	31	24	281	266	134	296	222
110	240	227	547	300	341	271	291	34	31	24	282	268	133	245	219
111	242	232	548	300	341	273	292	35	31	24	283	268	134	276	220

Time	Chan 31	Chan 32	Chan 33	Chan 34	Chan 35	Chan 36	Chan 37	Chan 38	Chan 39	Chan 40	Chan 41	Chan 42	Chan 43	Chan 44	Chan 45
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
112	245	251	550	301	341	282	292	35	32	24	283	268	134	232	221
113	241	381	553	302	341	277	293	35	33	24	284	268	135	256	224
114	238	394	555	303	342	390	295	36	33	25	285	269	136	243	226
115	246	570	557	304	342	425	294	36	33	25	286	268	138	234	229
116	250	569	558	304	343	425	295	35	34	25	286	268	141	248	234
117	244	568	560	305	344	424	296	36	34	25	286	268	145	264	231
118	249	567	562	305	344	279	296	36	34	25	286	268	147	235	226
119	250	569	565	305	345	268	298	36	34	25	286	269	149	238	228
120	251	570	568	306	347	269	300	36	35	25	288	271	150	243	232
121	259	567	572	307	349	266	303	37	35	25	288	273	151	263	232
122	267	246	573	307	351	249	305	35	35	25	290	272	154	263	232
123	289	231	574	308	353	257	310	35	35	25	291	271	158	253	235
124	295	214	574	309	356	260	312	36	34	25	292	271	160	291	235
125	297	218	573	310	360	260	314	36	35	25	293	272	163	402	240
126	332	204	575	226	365	268	317	35	33	25	291	270	167	403	236
127	342	209	576	113	368	274	273	36	33	25	290	271	169	403	238
128	341	211	577	67	371	277	275	37	33	25	289	275	173	398	244
129	360	215	578	44	375	278	273	36	33	25	290	277	180	397	247
130	331	206	582	34	382	276	317	36	32	25	289	281	187	407	241
131	320	236	584	30	387	282	274	36	32	26	290	284	194	419	240
132	322	267	587	28	393	352	300	34	30	26	290	185	194	428	241

Time	Chan 46	Chan 47	Chan 48	Chan 49	Chan 50	Chan 52	Chan 53	Chan 54	Chan 55	Chan 56
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	14	15	14	15	14	14	15	14	14	14
1	21	25	17	16	15	16	15	14	14	14
2	28	21	16	18	17	16	15	14	14	14
3	33	23	16	22	20	16	16	14	14	14
4	41	23	16	24	23	16	16	14	14	14
5	56	20	16	24	24	16	16	14	14	14
6	82	19	15	27	29	16	17	14	15	15
7	95	19	15	28	33	17	18	14	15	16
8	113	19	16	28	35	19	19	15	15	17
9	123	19	16	29	37	21	21	15	16	19
10	128	19	16	30	38	24	23	15	17	21
11	131	19	17	31	38	27	27	15	19	24
12	126	20	18	32	40	31	31	16	21	28
13	126	20	18	33	41	35	35	16	24	33
14	132	20	20	34	42	40	39	17	26	37
15	144	20	21	36	43	44	44	18	29	42
16	148	21	22	37	44	47	48	19	32	47
17	146	22	23	39	46	51	53	20	35	53
18	146	23	25	40	47	54	57	22	39	59
19	146	25	26	41	50	59	62	23	42	64
20	145	28	28	43	52	62	66	24	45	68
21	146	31	29	45	56	65	69	26	49	70
22	147	34	31	47	59	68	71	27	52	73
23	150	39	33	49	63	70	73	28	55	74
24	154	45	34	50	67	72	75	30	58	76
25	159	49	36	52	71	73	77	31	60	77
26	162	53	38	54	76	75	79	33	63	78
27	167	57	40	56	81	77	80	35	65	79

Time	Chan 46	Chan 47	Chan 48	Chan 49	Chan 50	Chan 52	Chan 53	Chan 54	Chan 55	Chan 56
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
28	171	58	42	58	85	79	82	36	67	80
29	176	61	44	59	90	80	84	38	68	81
30	182	63	46	61	94	83	85	40	70	83
31	186	69	48	63	97	85	87	42	71	84
32	191	69	51	65	101	86	89	44	72	85
33	195	73	53	67	105	88	91	46	74	87
34	200	75	55	68	108	89	93	48	75	89
35	204	75	58	71	112	91	94	50	76	91
36	207	79	60	73	114	93	96	52	77	94
37	211	80	62	75	117	94	98	54	78	96
38	216	80	63	78	120	95	99	55	79	98
39	222	79	65	81	122	97	100	57	80	100
40	229	78	67	84	125	98	102	59	82	101
41	232	79	68	87	126	99	103	61	84	103
42	237	79	70	90	126	100	104	63	85	104
43	242	80	72	94	126	102	105	65	86	105
44	247	80	74	97	127	103	106	68	88	106
45	253	82	76	99	127	104	108	71	90	108
46	258	82	78	100	127	105	110	74	92	109
47	263	84	82	103	129	107	112	77	93	111
48	268	85	84	103	128	108	113	80	94	113
49	273	86	86	104	129	110	115	81	95	115
50	280	87	89	106	130	112	118	83	97	118
51	283	89	90	105	130	114	120	83	98	120
52	289	90	92	106	130	116	124	84	99	124
53	293	91	93	106	131	119	127	85	100	128
54	298	92	93	107	131	123	132	85	101	134
55	305	93	94	107	131	128	138	85	103	140

Time	Chan 46	Chan 47	Chan 48	Chan 49	Chan 50	Chan 52	Chan 53	Chan 54	Chan 55	Chan 56
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
56	312	94	95	109	133	134	146	86	105	151
57	318	93	95	109	134	141	156	86	106	163
58	326	93	96	112	135	150	166	87	108	175
59	333	93	96	112	135	159	176	87	110	186
60	341	93	97	113	136	168	186	88	111	196
61	344	93	97	115	137	176	194	88	113	205
62	343	93	97	116	137	183	201	88	115	212
63	342	93	97	116	137	189	207	89	116	218
64	341	94	98	117	137	195	213	89	118	224
65	341	94	98	117	138	200	218	89	121	229
66	343	95	99	117	139	205	223	90	123	233
67	346	95	99	117	139	209	228	90	126	237
68	351	96	99	117	140	214	232	91	129	241
69	358	97	99	117	143	217	236	91	133	245
70	369	98	100	119	145	221	239	91	137	248
71	376	99	100	121	146	225	243	92	141	251
72	381	101	100	122	149	228	246	92	147	253
73	385	101	101	123	152	230	249	93	154	256
74	388	103	102	123	154	233	252	93	160	259
75	391	104	102	123	157	236	254	93	167	261
76	392	103	102	123	161	238	257	94	174	264
77	396	104	103	124	166	240	259	94	181	266
78	399	105	103	123	171	242	261	94	187	269
79	402	105	103	123	177	245	263	95	193	271
80	407	106	104	125	182	247	265	95	198	274
81	416	106	104	128	187	249	267	95	203	276
82	421	105	105	129	191	251	269	93	207	277
83	425	105	105	130	198	253	271	93	211	280

Time	Chan 46	Chan 47	Chan 48	Chan 49	Chan 50	Chan 52	Chan 53	Chan 54	Chan 55	Chan 56
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
84	429	106	105	131	207	256	273	93	216	282
85	432	106	106	131	219	257	274	94	220	285
86	433	106	106	131	230	260	276	93	224	290
87	434	107	106	130	240	261	277	94	227	297
88	434	107	107	131	251	263	279	94	231	305
89	440	107	107	133	261	265	281	95	234	310
90	446	107	108	134	271	266	282	95	236	310
91	454	108	109	135	281	268	283	95	239	310
92	458	109	111	136	290	270	284	95	242	311
93	464	109	111	139	301	271	286	96	244	307
94	472	109	113	142	310	272	286	96	246	303
95	476	109	114	147	320	273	288	96	248	300
96	480	109	116	155	330	274	288	96	250	298
97	485	110	118	163	336	276	288	97	252	296
98	489	110	120	171	344	277	290	97	254	295
99	489	110	123	178	350	277	290	97	256	294
100	495	111	126	184	356	277	290	98	257	294
101	499	111	129	194	359	278	290	98	259	294
102	499	112	133	206	360	279	290	98	260	294
103	501	113	138	217	361	280	291	99	261	294
104	500	113	143	227	359	281	291	99	263	295
105	501	114	150	235	360	281	292	99	264	295
106	504	114	158	243	357	281	292	100	266	296
107	506	114	166	252	355	282	293	100	267	297
108	506	114	172	258	350	283	293	100	267	297
109	507	113	180	265	346	284	294	101	268	298
110	508	113	187	271	341	284	294	101	269	299
111	508	113	194	277	340	284	294	102	270	300

Time	Chan 46	Chan 47	Chan 48	Chan 49	Chan 50	Chan 52	Chan 53	Chan 54	Chan 55	Chan 56
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
112	514	113	200	283	337	285	294	102	270	300
113	512	114	205	289	333	286	295	101	271	301
114	519	114	210	295	331	287	295	102	271	302
115	518	114	215	301	330	287	295	102	272	302
116	524	114	219	307	331	287	295	103	272	303
117	528	114	223	310	331	287	295	103	272	303
118	528	114	225	313	330	287	295	104	272	303
119	527	114	228	318	329	288	296	104	272	304
120	530	115	233	323	328	289	297	105	274	305
121	530	115	236	324	327	290	298	106	275	305
122	533	116	239	325	326	290	298	107	276	305
123	530	116	243	327	327	291	299	108	277	305
124	530	117	246	330	327	291	300	110	278	306
125	532	117	250	333	325	291	300	111	282	306
126	535	118	255	338	325	293	301	112	289	306
127	539	118	259	343	322	293	301	113	293	306
128	542	118	264	345	322	293	301	113	294	307
129	546	119	271	346	320	294	302	114	293	308
130	550	121	277	343	320	295	303	116	296	307
131	553	122	289	340	318	296	304	117	305	309
132	559	122	313	335	316	296	305	118	309	308