

Title:

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

WF Report No:

432243



Prepared for:

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

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 *
Thermal insulation	
Insulation I₂ (mandatory procedure)	10 (ten) minutes
Radiation – time to 15kW/m ²	132 (one hundred and thirty two) minutes *

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



Summary of specimen:

A latched, double leaf single-acting, steel-access panel, hung opening in towards the furnace

Leaf size – both leaves:
2397mm high x
897mm wide x
nominally 44mm thick

2 Introduction

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

3 Specimen verification

The specimen was supplied for testing and delivered to Warringtonfire during September 2020. The component parts of the access panel were identified based on nominal information provided by the client. The conformity of the specimen 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 specimen 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/m³ 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 panel incorporated a 67mm x 29mm softwood timber infill to facilitate the fixings for the specimen). The aperture was lined with two layers of 15mm thick Type F plasterboard

The specimen tested is a 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 specimen are shown in Figures 1 to 4 of Appendix 1.

5.1 Access panel leaf

Both leaves measured 2397mm high x 897mm wide x nominally 44mm thick.

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

Leaf

	Material	Dimensions (mm)	Density (kg/m ³)	Key to figures
Profiled steel tray section	Zintec coated profiled steel tray section on the exposed face	21 deep x 1.5 thick	-	1
Core – fitted inside the steel tray section	Manufacturer Custom Audio Designs product ref A325, IsoBase R50	5 thick	33	2
Facing – unexposed face	Siniat Soundbloc plasterboard	12.5 thick	848	3
Core clamps	Profiled Zintec fixed to stiles and rails fixed with M5 x 12mm Bright Zinc Plated (BZP) Pan Pozi Head Cross Recess Machine Screw at 15mm from corners and 425mm centres	1.5 thick x 48 wide overall x 25 high	-	4
Stiles and a rails	Profiled Zintec section (see Figures 2 and 3 of Appendix 1)	1.5 thick x 82 wide x 43 high	-	5
Astragal – right leaf	Profiled Zintec section	1.5 thick x 20 wide x 46 deep	-	6

* Stated by client, not verified by laboratory

Door frame

	Species/type	Dimensions (mm)	Key to figures
Frame (all four edges)	Profiled Zintec steel sections including an integral stop and architrave	75 deep x 45 wide x 1.5 thick overall including a 20 deep x 50 wide integral stop and a 26 wide architrave oversailing the supporting construction on the exposed face	7
Frame infill	Rockwool Product ref RW3 mineral wool*	Fully filling void behind frame	8
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 fitted 45mm from corners at nominally 285mm centres*	50 long – 6No. on head and threshold, 9No. on jambs	-

* Stated by client, not verified by laboratory

Intumescent and sealing materials

	Make/type	Size (mm)	Location	Key to figures
Frame reveal	None fitted	-	-	-
Leaf head, threshold, hanging edges and right leaf closing edge	Envirograf G10/10 intumescent seal	10 x 2*	Fitted around the leaf face edge on the unexposed face	9
	C.R.A International product ref C.R.A 18693 Neoprene buffer seal	9 x 5.5	Fitted around the leaf face perimeter on the unexposed face	10

Hardware – both leaves

	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	11
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)	Fitted 1145mm from the head of both leaves	12

* 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 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 Figures 2 and 3 of Appendix 1.

7.2 Pre-cycling operability

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

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

7.3 Specimen self-closing

No closers were fitted. The multi-point locking system was engaged for the test at all positions.

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 21 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 specimen was conducted in accordance with BS EN 1634-1: 2014 +A1: 2018, Section 10.1.4.

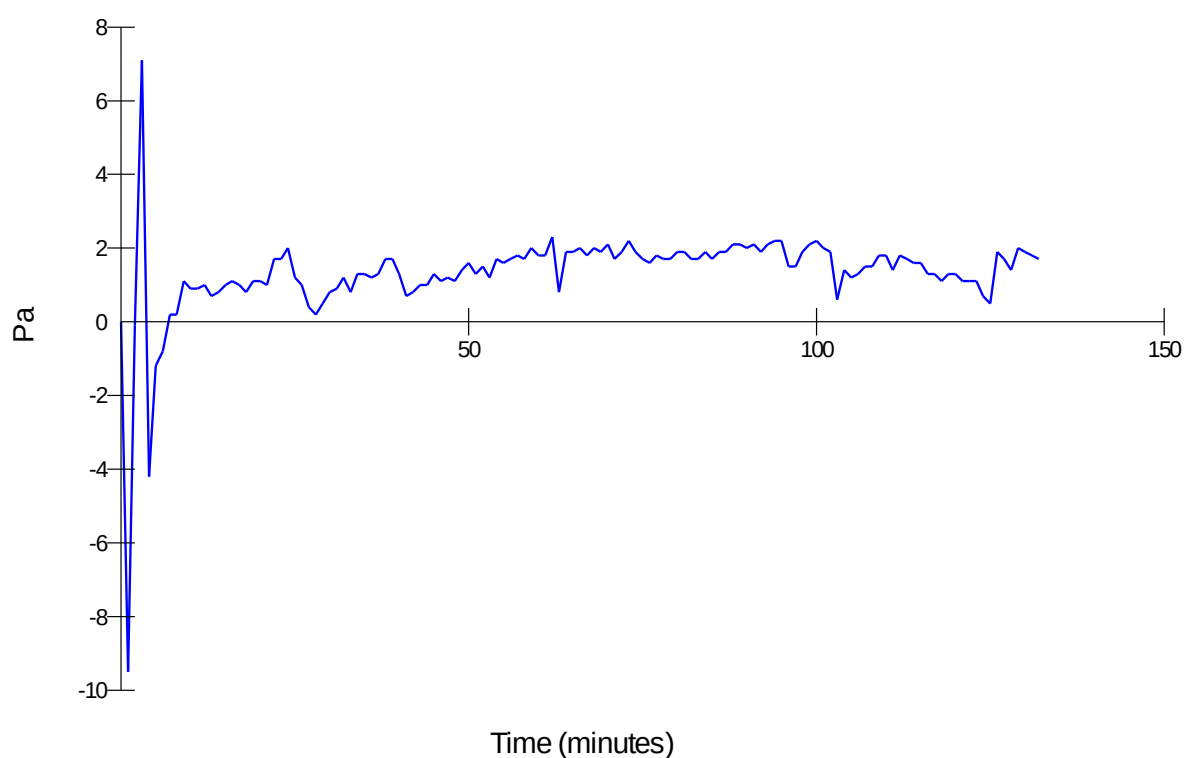
8 Test Conditions

8.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 19°C

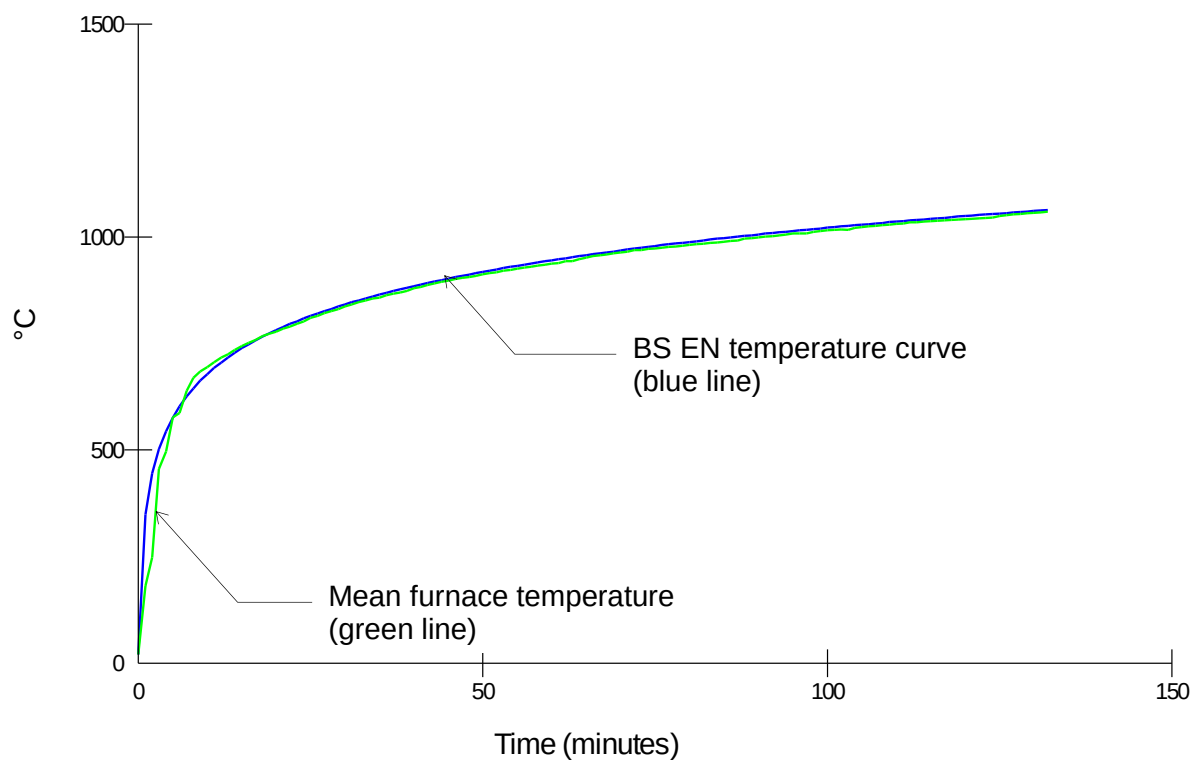
8.2 Pressure readings

After the first 5 minutes of the test, the furnace pressure was maintained at 1.3 ± 5 Pa and after 10 minutes was maintained at 1.3 ± 3 Pa with respect to atmosphere, at a point 0.5m from the furnace floor.. 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:



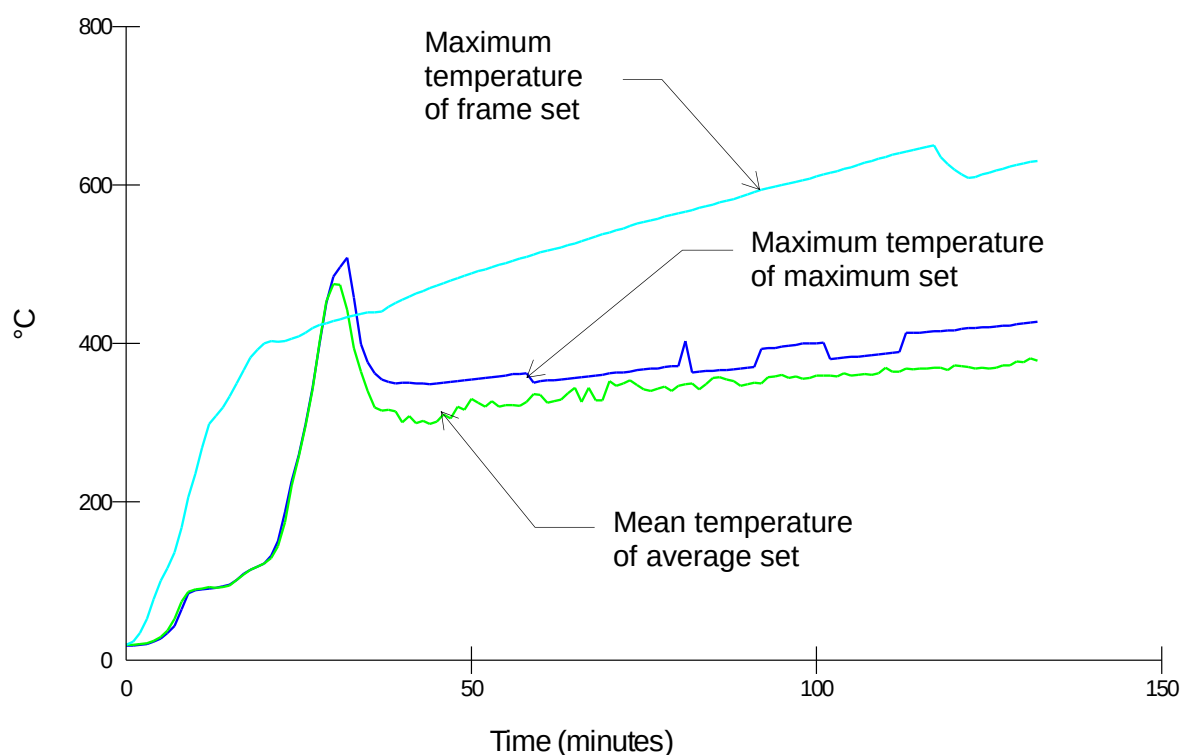
8.4 Unexposed face temperatures

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

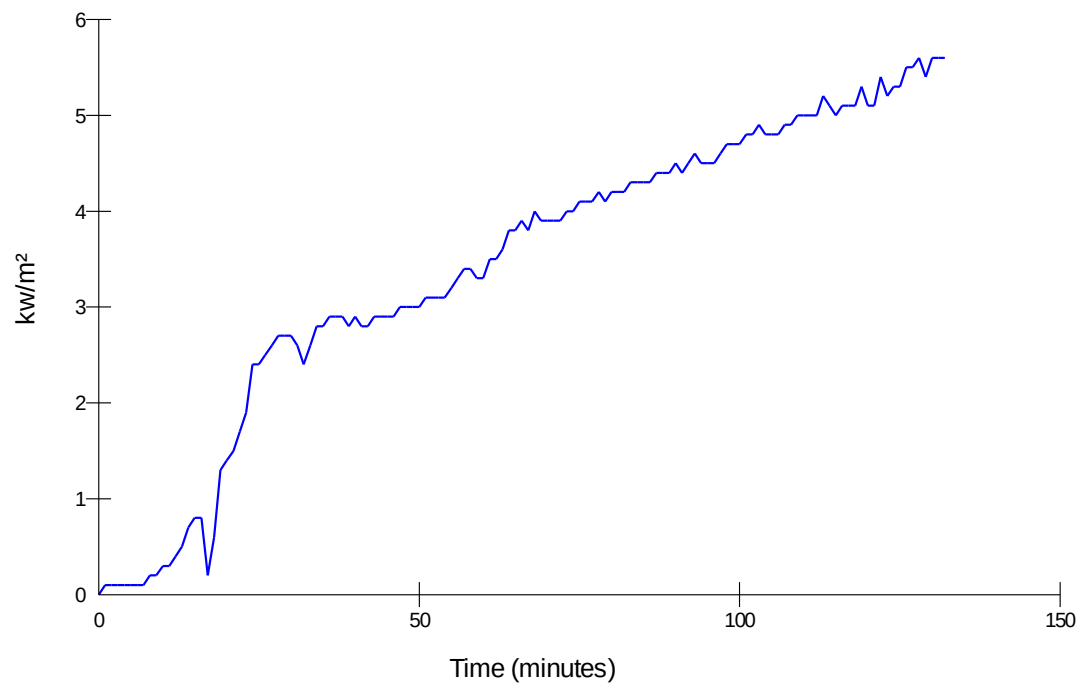
	2 discrete areas	
Leaf	Discrete area 1 (plasterboard)	5 measuring mean temperature rise.
		8 measuring maximum temperature rise, standard set 100mm in from the leaf edges.
Frame	Discrete area 2 (steel)	5 measuring maximum temperature rise.

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

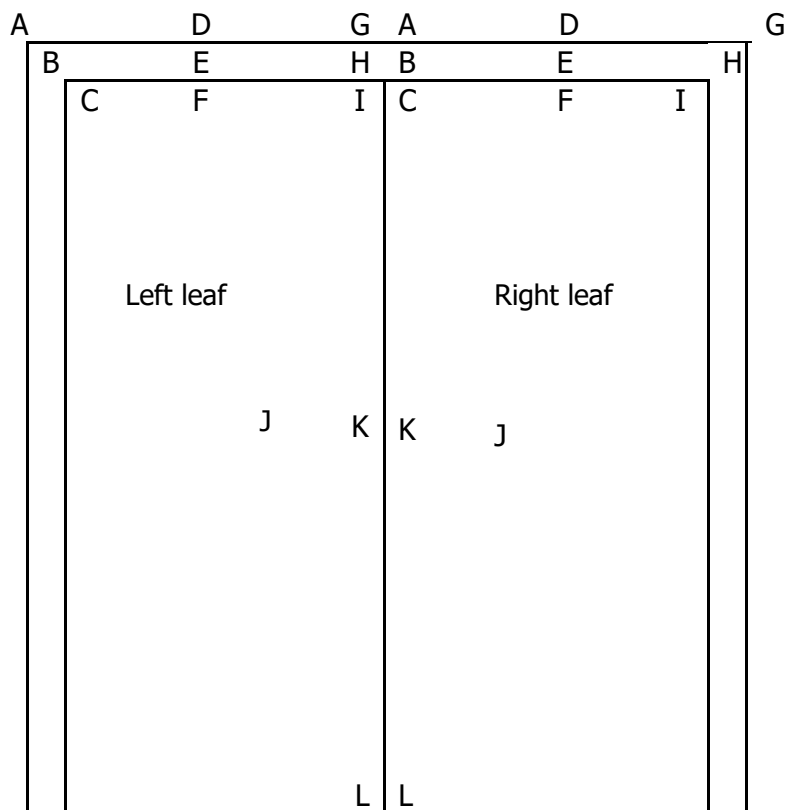


8.5 Radiation



8.6 Leaf and frame distortion data

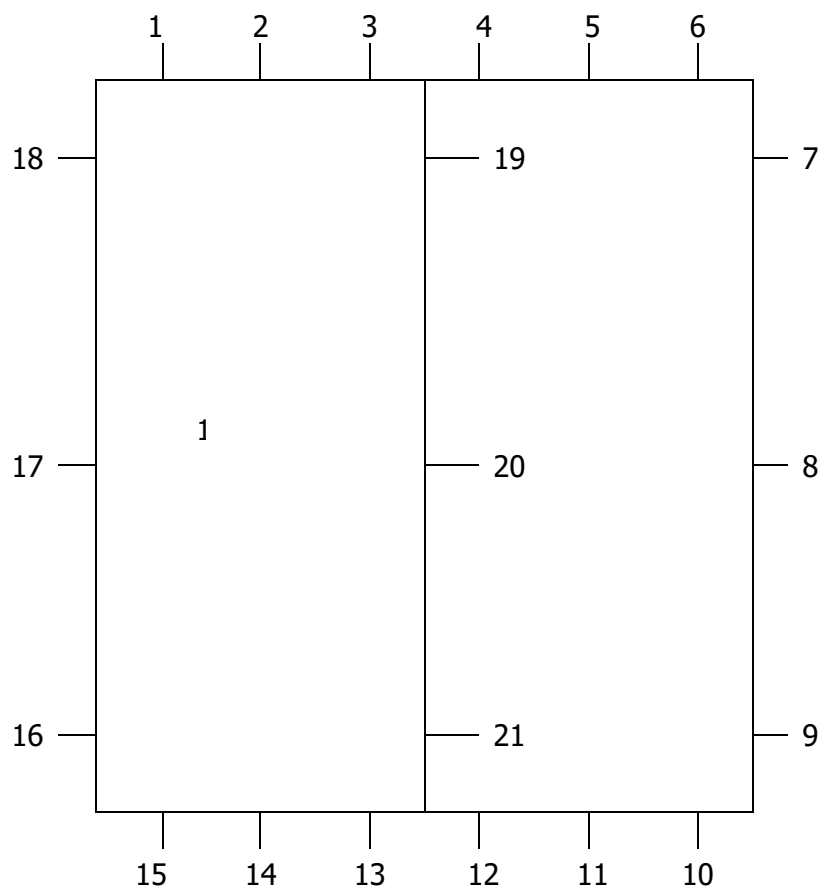
The following tables show the distortion in mm with an accuracy of ± 1 mm.
A positive measurement indicates distortion towards the furnace.
A negative measurement indicates distortion away from the furnace.



Left leaf												
Deflections – mm												
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L
15	11	12	13	19	22	24	19	25	26	32	47	26
30	12	14	17	22	27	28	22	32	33	-7	51	26

Right leaf												
Deflections – mm												
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L
15	18	26	27	17	21	23	12	9	4	35	44	26
30	24	30	30	20	20	28	15	10	14	19	41	21

8.7 Leaf edge to frame gaps pre-test measurement



View from unexposed face

Gap Dimension in mm at Position											
1	2	3	4	5	6	7	8	9	10*	11*	12*
2.1	0	0.9	0	2.0	2.1	2.8	3.9	2.8	1.7	0.8	0
13*	14*	15*	16	17	18	19	20	21			
1.4	1.3	1.6	2.3	1.1	3.3	2.8	2.4	#			
Mean		2.03		Maximum		3.9		Minimum		0	

* Dimension not included in calculations at the bottom

9 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	Comments
00:00	Test Started
04:20	There is smoke issuing at the head of the right leaf
04:30	There is smoke issuing at the head of the left leaf
05:05	There is smoke issuing at the top corners of the plaster board of the leaves and the top meeting corner of the left and right leaf
06:10	There is smoke issuing at the latch position
07:11	There is smoke issuing half way on the leaf of the plaster board of the hanging edge of the right leaf
07:34	There is smoke issuing from half way of the hanging edge of the left leaf
09:04	There is smoke issuing at the top half perimeter gaps of the left and right leaf
11:45	There is discolouration at the top corners of the plaster board and the hanging edge of the left and right leaf
20:10	The paper layer of the plasterboard is falling away and there is discolouration all over the plaster board of the left and right leaf
22:30	There is aluminium melting and dripping down at the latch position of the left and right leaf
37:30	There is no change
45:00	There is no change
60:00	There is no change
75:00	There is no change
90:00	There is no change
105:00	There is no change
120:00	There is no change
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 *
Thermal insulation	
Inulation I² (mandatory procedure)	10 (ten) minutes
Radiation – time to 15kW/m ²	132 (one hundred and thirty two) minutes *

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

11 Limitations

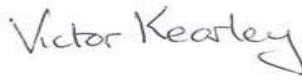
This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outline in EN 1634-1, EN 1363-1, and where appropriate EN 1363-2. Any significant deviation with respect to size, 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:	Courtney Clifford	Dr Vic Kearley
Title:	Lead Technical Officer	Technical Author
Date of issue:	07/07/2021	07/07/2021

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

Latch bodies



Shoot bolt guide blocks



Stile/rail joint and core clips



At start of test



At 15 minutes



At 30 minutes



At 45 minutes



At 60 minutes



At 75 minutes



After 90 minutes



At 105 minutes



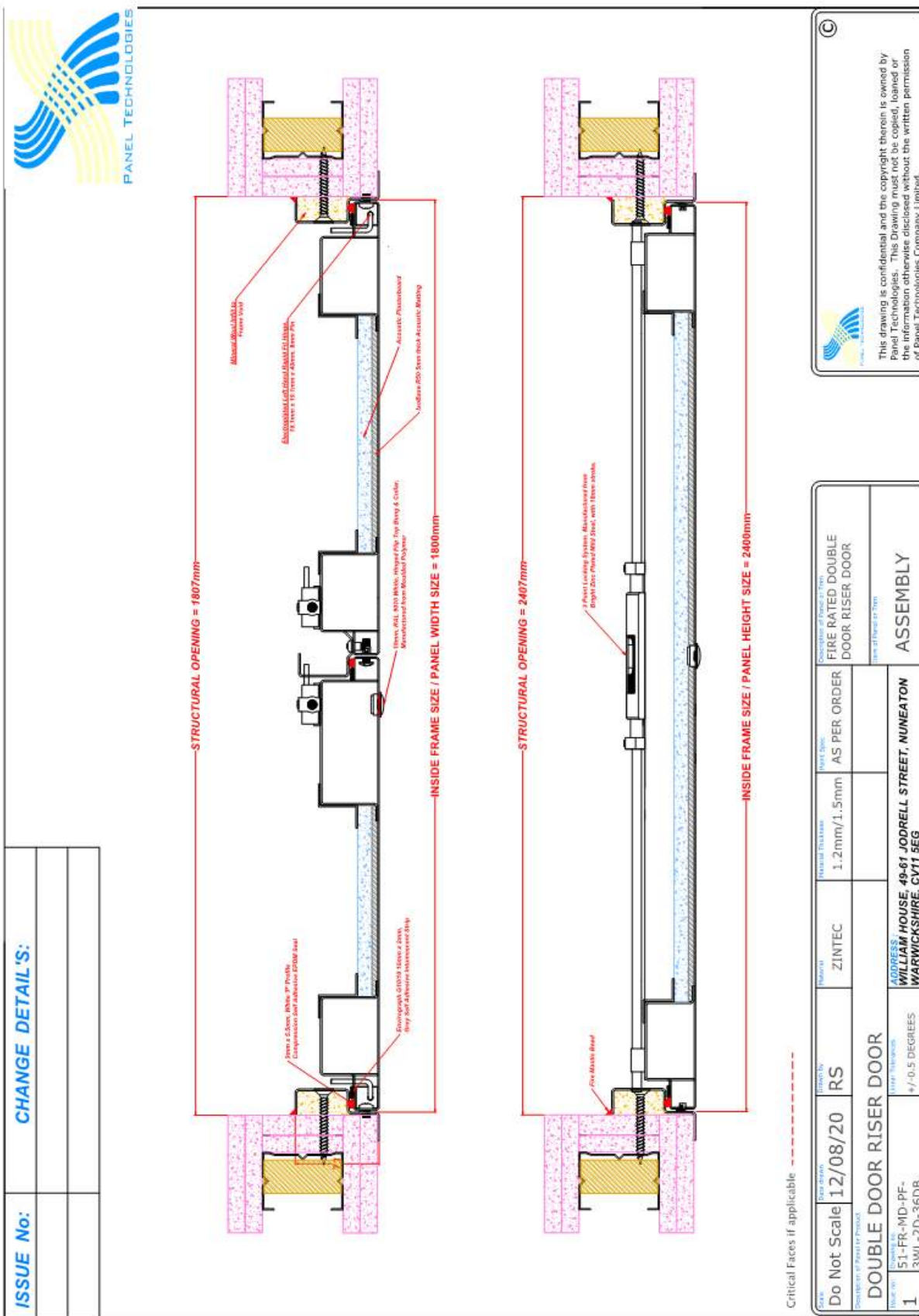
At 120 minutes

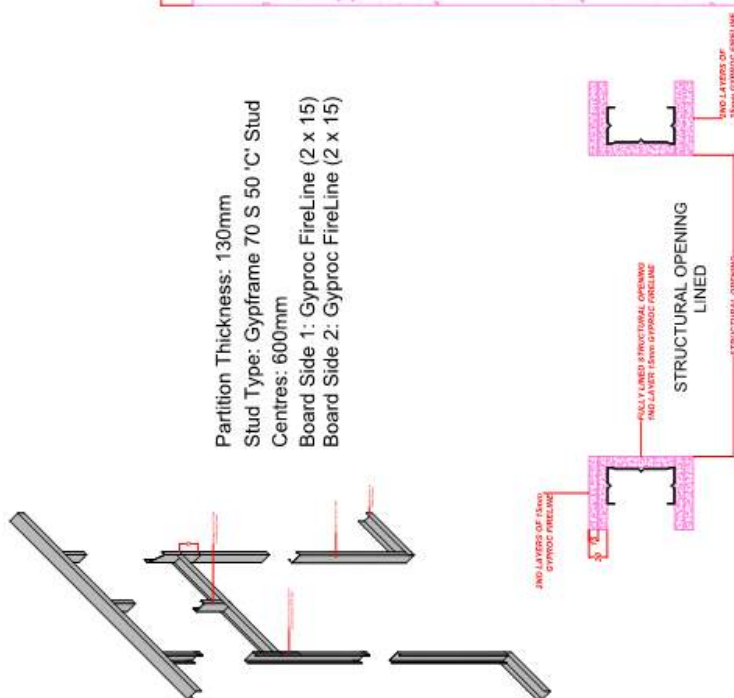


At 132 minutes



Access panel



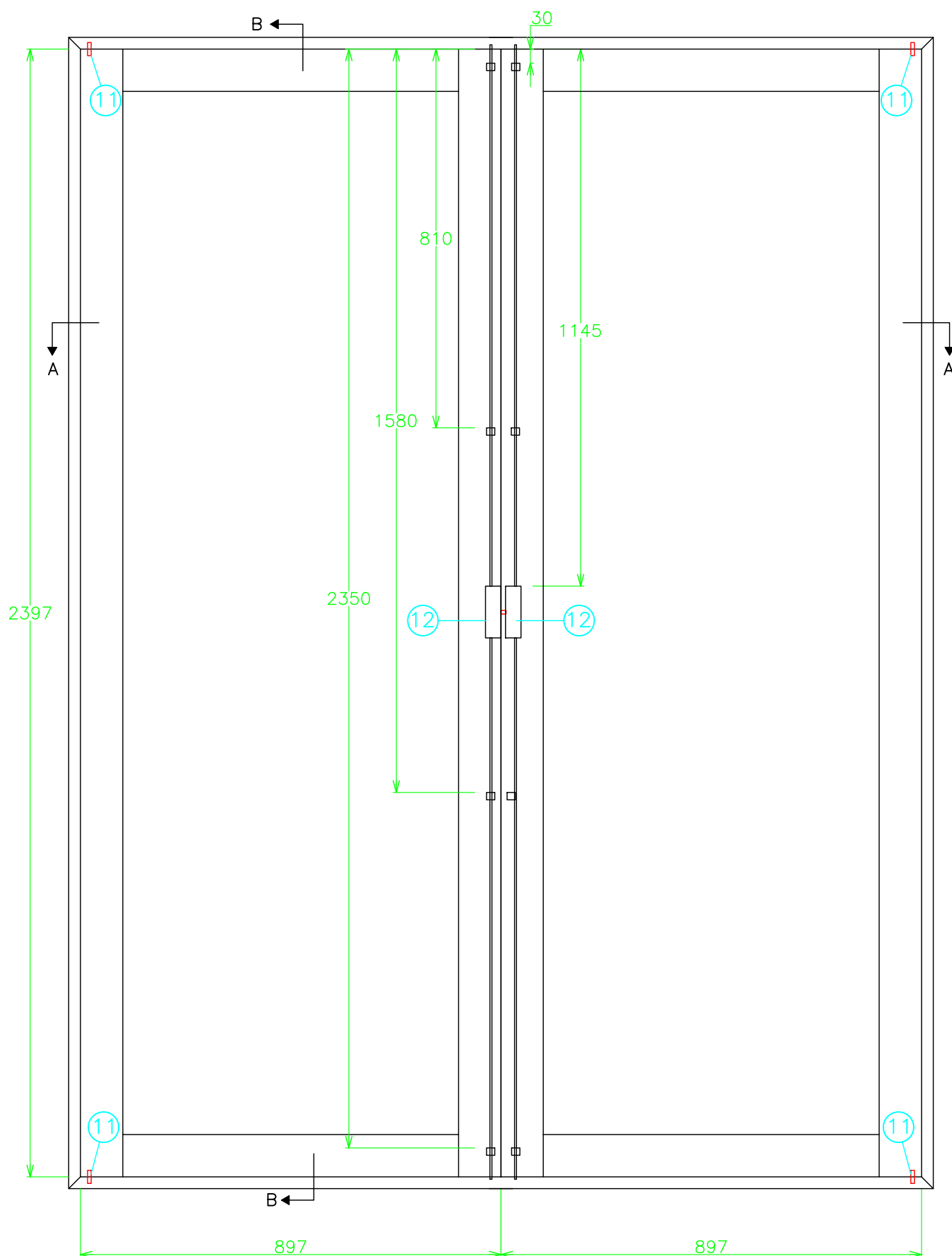


Critical Faces if applicable

Gate	Client Address	Arrival By	Channel	Nearest To (Track/Trail)	Search Status
Do Not Scale	14/08/20	RS	ZINTEC	N/A	N/A
RISER WALL DOORS (Indication of Riser or Double)					
1	Traverse (m) 51-FR-MD- BE-23M1	Linear Classification +/-0.5 DEGREES	ADDRESS : WILLIAM HOUSE 49-41 JODRELL STREET, MUNEEATON		
Notes of Inspection Type: ASSEMBLY					



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Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569750

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

Date Drawn

09/10/20

Drawn By

ARD

Scale

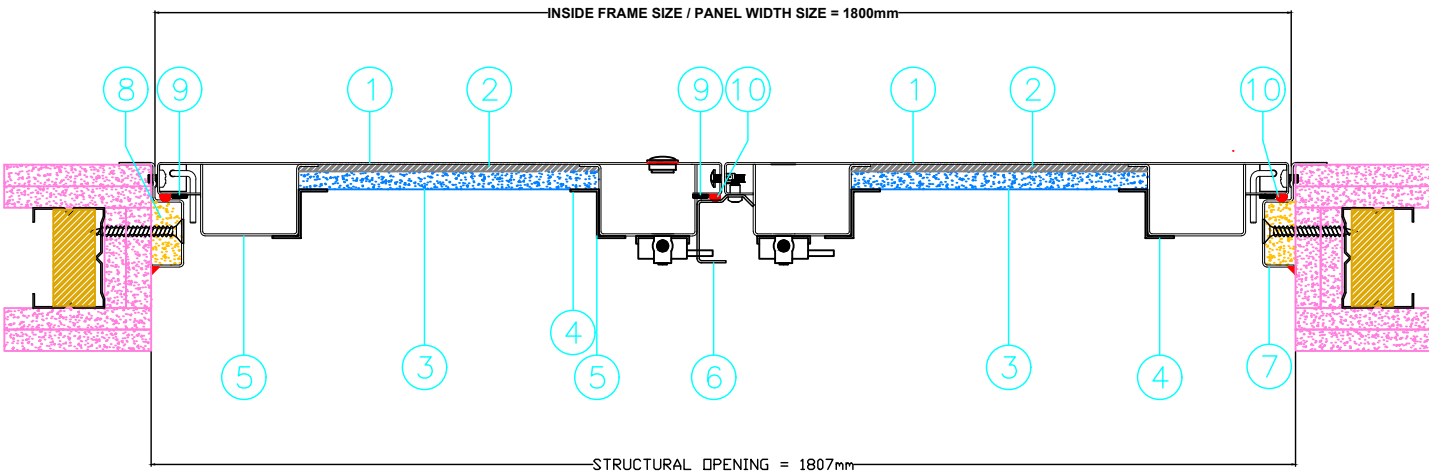
NTS

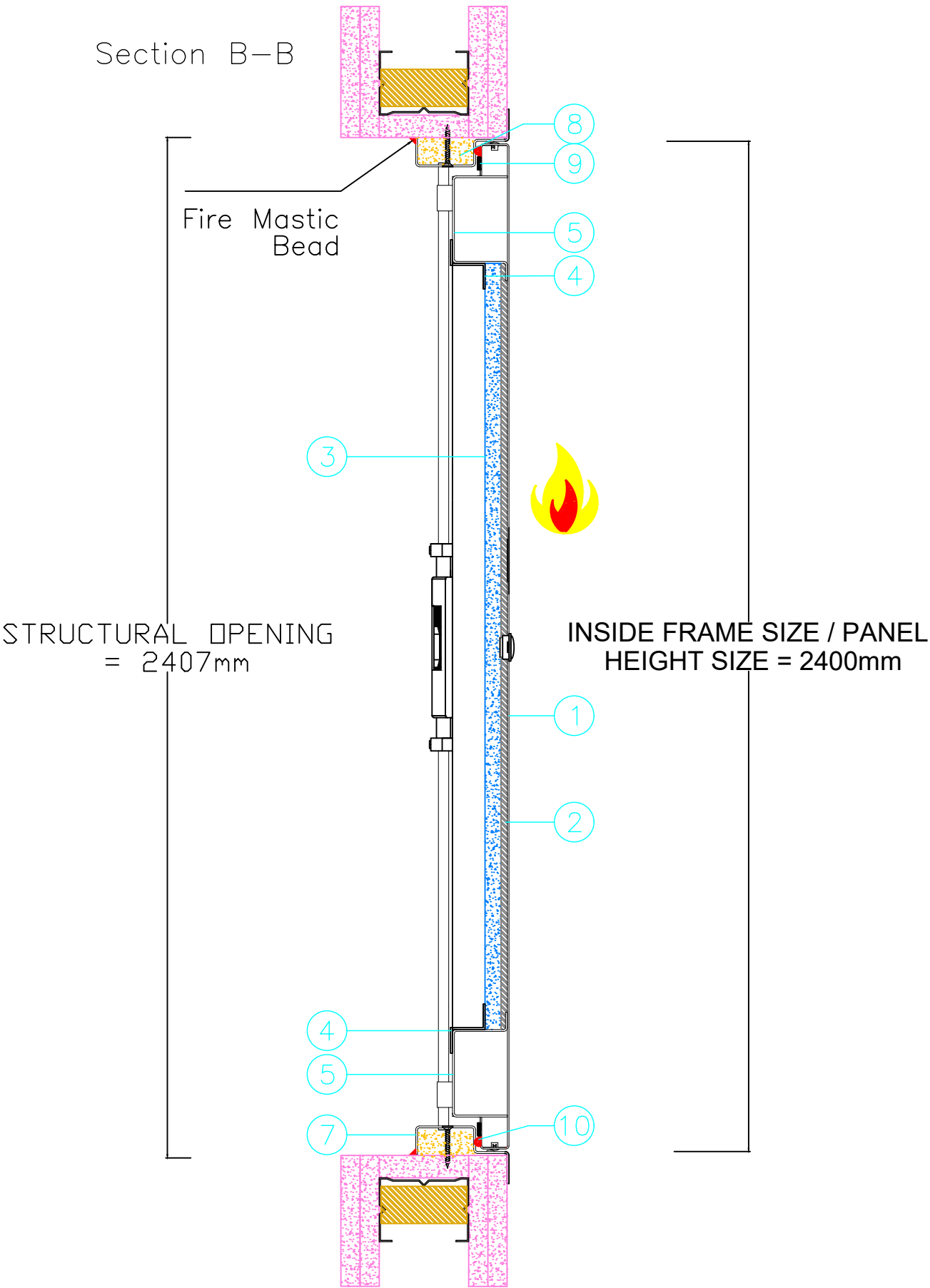
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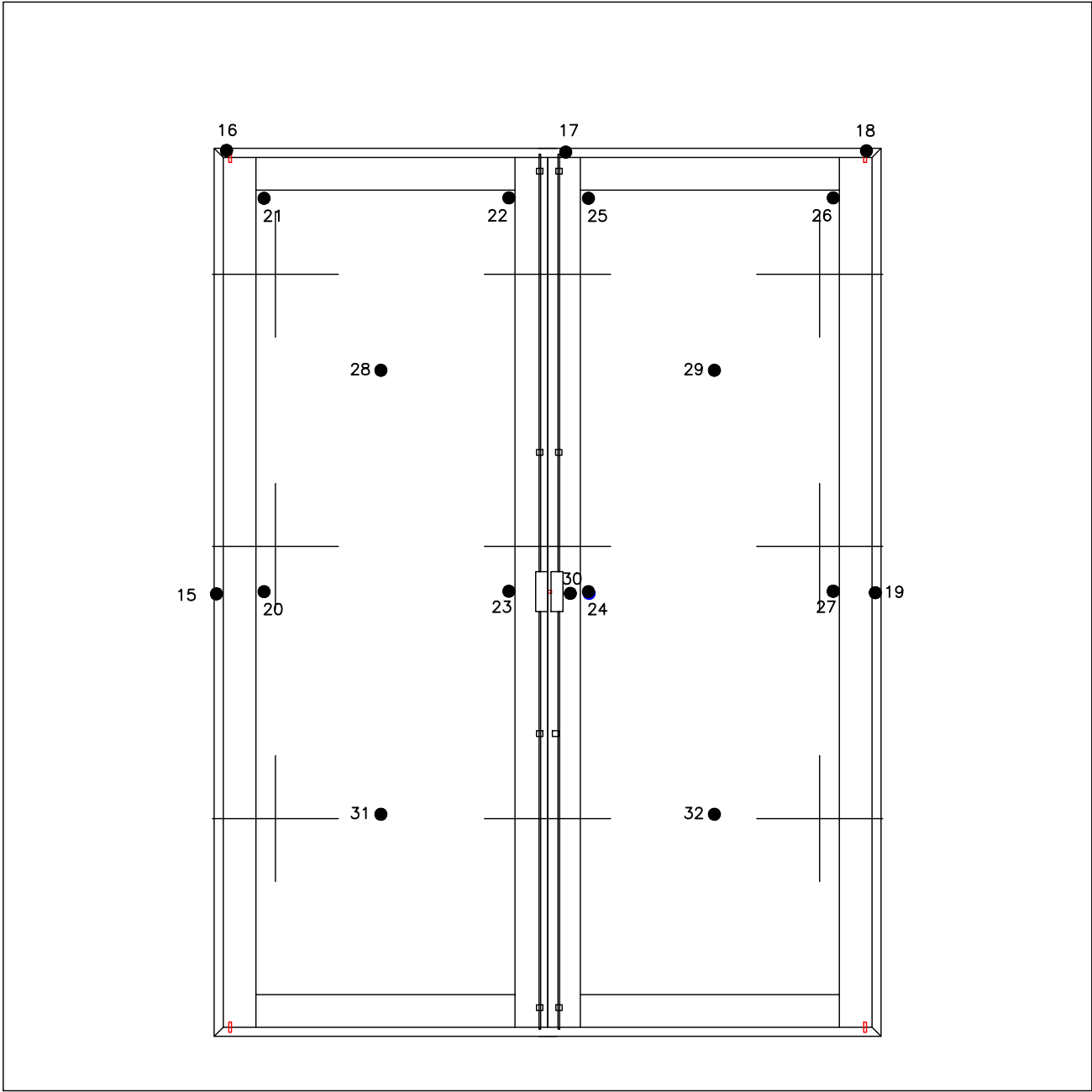
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Appendix 1

Section A-A







- +

:

Furnace Thermocouples
- :

Unexposed Face Thermocouples
- :

Radiometer

Viewed From Unexposed Face

Appendix 2 - raw test data

(see Figure 4 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	Chan 31	Chan 32
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	19	19	19	19	19	18	18	18	18	19	20	19	19	19	19	18	18	19
1	21	20	22	23	20	18	18	18	18	19	20	19	19	18	19	19	18	19
2	26	25	30	34	25	18	19	19	18	19	20	20	19	19	19	20	18	19
3	37	35	42	52	32	19	20	20	19	21	21	22	21	20	20	25	19	21
4	50	50	61	77	43	20	23	21	21	23	24	25	24	21	23	32	22	23
5	68	66	80	100	53	22	27	24	25	27	28	32	29	24	27	42	27	28
6	86	83	102	116	66	26	34	29	30	33	35	42	38	29	34	59	36	38
7	104	99	127	136	80	31	43	37	41	47	50	59	54	36	46	82	57	60
8	115	117	167	156	93	44	60	55	64	71	71	77	76	48	67	111	82	80
9	135	143	206	178	105	69	80	76	84	86	85	86	88	75	82	147	89	89
10	162	167	235	199	123	86	87	86	88	89	89	89	90	90	87	196	93	90
11	188	188	268	219	144	88	89	88	89	90	90	91	91	91	88	241	92	90
12	214	210	298	238	169	90	90	88	89	90	91	94	91	92	89	274	90	91
13	241	231	308	258	196	89	91	89	90	90	92	92	91	92	90	306	91	93
14	267	251	319	276	223	89	93	90	91	90	93	93	93	89	92	345	92	95
15	288	270	333	291	246	91	95	92	94	91	97	95	95	90	94	388	96	103
16	306	288	349	306	270	93	100	95	101	93	105	102	103	91	99	421	104	109
17	321	304	366	321	291	100	107	105	109	99	112	110	110	95	107	441	111	114
18	332	319	382	335	309	107	112	111	114	106	118	116	115	103	112	453	117	117
19	343	334	392	346	325	112	115	115	118	112	122	119	118	109	115	463	121	120
20	362	221	400	354	339	115	118	118	122	116	126	122	122	113	118	472	129	127
21	377	220	403	363	351	118	122	122	132	124	132	127	133	117	122	477	142	140
22	390	319	402	370	362	125	131	131	150	137	146	140	154	124	133	481	170	166
23	399	306	403	375	370	139	149	144	187	166	169	168	195	136	149	489	215	212

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	Chan 31	Chan 32
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
24	404	290	406	379	378	167	184	170	226	208	211	226	236	161	182	496	249	247
25	409	309	408	383	387	210	225	213	259	242	246	271	270	205	221	390	282	280
26	411	324	413	387	395	245	261	251	297	275	279	316	311	239	253	503	323	316
27	415	364	419	391	405	278	301	289	344	315	318	373	360	271	284	506	371	360
28	418	287	423	396	408	320	358	346	400	360	375	449	426	309	319	507	429	417
29	420	289	425	401	412	369	441	413	451	421	447	481	463	356	362	510	465	462
30	423	400	428	405	415	440	484	461	455	471	481	482	467	421	417	512	470	463
31	426	403	430	408	418	463	496	466	457	476	490	467	461	472	464	514	459	457
32	428	409	433	410	421	468	508	461	423	466	483	411	410	479	466	516	403	412
33	430	412	435	413	424	458	450	437	376	394	434	376	370	486	456	514	367	370
34	431	412	437	417	428	399	399	392	354	359	388	360	349	420	406	513	350	350
35	432	413	439	420	432	366	376	364	341	341	328	351	338	372	364	514	338	341
36	433	413	439	422	436	349	362	349	335	331	269	345	331	351	343	516	332	335
37	435	413	440	425	440	338	354	342	330	325	265	343	328	340	332	517	328	330
38	437	414	441	427	446	331	351	337	326	322	273	341	327	335	325	519	325	329
39	439	413	442	428	451	325	349	336	324	320	269	342	325	330	322	522	324	328
40	441	414	444	429	455	323	350	335	322	320	213	343	325	329	322	525	324	329
41	442	413	445	429	459	321	350	334	322	318	243	344	325	329	321	527	325	330
42	443	414	446	431	463	320	349	333	322	320	205	345	327	328	320	530	325	331
43	444	415	447	432	466	321	349	333	323	321	216	345	328	329	320	533	327	333
44	445	416	449	432	470	323	348	333	323	322	192	347	330	329	321	535	328	334
45	447	416	451	433	473	323	349	333	324	323	202	348	331	329	321	538	330	336
46	450	416	452	434	476	324	350	335	326	325	230	350	333	329	321	541	332	338
47	454	416	454	437	479	324	351	336	326	327	208	351	334	329	323	545	333	340
48	457	417	456	439	482	325	352	337	328	329	262	352	335	329	324	548	334	342
49	460	418	458	441	485	325	353	338	329	331	244	353	337	329	324	552	336	344
50	464	420	459	442	488	326	354	339	330	333	292	354	339	329	325	555	339	345
51	467	421	461	444	491	327	355	341	332	335	270	356	340	329	326	558	341	346

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	Chan 31	Chan 32
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
52	473	422	464	446	493	327	356	342	334	337	244	357	342	329	327	562	342	348
53	478	424	466	448	496	328	357	343	335	339	268	358	343	329	329	565	345	349
54	481	426	468	450	499	330	358	344	337	341	236	359	345	328	330	568	346	350
55	483	428	470	451	501	330	359	345	338	342	241	360	346	328	331	570	345	351
56	486	430	472	453	504	332	361	347	339	344	237	362	347	329	332	574	345	353
57	490	432	475	455	507	334	361	348	340	344	230	363	348	329	333	575	346	354
58	493	434	478	457	509	335	362	349	341	345	245	364	349	330	334	577	347	355
59	497	436	480	458	512	337	175	350	342	346	282	366	351	331	335	580	348	356
60	500	437	482	461	515	338	184	352	343	349	271	367	352	332	337	582	349	358
61	503	439	484	463	517	340	180	353	344	350	231	368	352	332	338	584	350	359
62	506	442	486	464	519	341	176	353	345	350	238	368	353	333	339	586	350	358
63	507	443	488	466	521	341	182	354	346	351	243	370	353	335	340	588	351	359
64	511	445	490	467	524	342	182	355	347	352	272	370	354	336	341	590	352	359
65	514	447	491	469	526	342	180	356	348	353	296	371	355	338	343	594	353	360
66	513	449	221	471	529	343	209	357	349	355	220	372	356	338	345	597	354	362
67	511	450	201	473	532	344	185	358	350	355	288	374	357	339	346	599	355	363
68	509	452	197	475	535	344	184	359	351	356	226	374	358	340	347	602	356	364
69	510	454	196	477	538	345	189	360	352	358	222	375	359	340	348	604	358	366
70	511	456	191	479	540	346	194	362	353	359	312	376	360	341	349	606	359	367
71	512	458	195	481	543	346	189	363	354	360	288	377	361	341	350	609	360	369
72	514	460	199	484	545	346	191	363	355	361	295	378	362	342	351	603	361	370
73	517	462	204	485	548	347	189	364	356	361	310	378	363	342	352	476	362	370
74	519	463	213	486	551	348	193	366	357	363	281	379	365	343	353	375	363	372
75	522	466	221	488	553	348	195	367	358	365	254	381	366	344	354	258	364	373
76	524	466	230	489	555	348	195	368	359	366	246	382	368	344	356	237	365	374
77	527	469	230	492	557	350	200	368	359	368	255	382	368	344	357	230	367	376
78	529	471	232	493	560	350	204	370	360	369	258	383	370	345	357	230	368	378
79	532	472	229	494	562	351	203	371	361	370	235	383	371	346	358	232	369	378

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	Chan 31	Chan 32
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
80	535	474	230	495	564	352	204	371	362	371	256	384	372	346	358	231	370	379
81	536	427	240	496	566	353	212	403	362	373	263	384	373	346	360	233	371	381
82	538	216	244	498	568	353	205	196	363	373	263	386	374	346	360	233	371	381
83	540	234	232	500	571	354	209	213	364	375	231	386	375	347	361	233	372	383
84	543	238	206	501	573	354	208	224	365	375	253	387	375	347	363	233	373	384
85	545	221	194	502	575	354	208	195	365	376	283	388	377	348	364	235	374	385
86	547	220	196	502	578	354	212	188	366	376	284	389	378	348	364	239	375	385
87	549	219	198	504	580	354	212	190	366	377	268	390	379	348	365	238	376	387
88	551	219	201	504	582	354	212	195	367	378	259	391	380	348	365	241	376	388
89	553	226	202	505	585	355	218	198	368	379	231	391	381	349	365	244	377	388
90	555	230	202	506	588	356	226	196	369	380	239	392	382	349	366	246	378	390
91	557	231	204	508	591	356	278	203	370	382	243	393	383	351	368	247	379	391
92	559	226	206	510	594	357	393	200	371	383	236	394	384	351	369	246	381	392
93	561	232	205	511	596	358	394	210	371	385	262	395	385	352	370	246	382	393
94	563	234	206	512	598	357	394	198	372	385	263	396	386	216	371	249	383	394
95	565	236	207	514	600	359	396	196	374	387	270	397	387	353	372	250	384	396
96	566	241	206	515	602	359	397	211	374	388	249	398	388	354	373	248	386	397
97	567	244	207	515	604	360	398	205	376	390	255	397	390	355	373	248	387	398
98	568	410	208	514	606	361	400	199	376	390	242	397	391	355	374	252	388	399
99	569	254	210	515	608	361	400	199	377	391	243	397	391	356	374	250	389	400
100	571	246	211	516	611	361	400	193	378	391	254	398	393	357	375	252	390	401
101	572	247	213	517	613	362	401	192	379	392	250	399	394	358	376	253	390	402
102	573	249	214	518	615	364	273	192	380	393	248	399	395	359	377	255	392	403
103	575	261	214	520	617	365	265	201	381	395	241	400	396	360	378	254	393	404
104	576	266	214	522	620	367	269	201	382	396	255	401	397	361	379	255	394	406
105	577	259	216	523	622	368	262	208	383	398	239	402	398	362	380	254	395	407
106	579	268	217	525	625	369	271	201	383	398	238	403	400	363	381	256	396	408
107	581	263	215	526	628	370	267	212	384	399	241	403	400	363	382	256	397	409

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	Chan 31	Chan 32
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
108	583	258	215	528	630	371	259	208	385	399	238	404	401	364	383	257	398	410
109	585	259	215	529	633	372	256	211	386	401	240	404	402	366	384	258	399	412
110	587	266	216	531	635	373	261	215	387	402	263	406	404	366	385	259	401	413
111	588	265	214	532	638	375	263	227	388	403	240	407	405	368	386	258	402	414
112	590	259	217	534	640	375	272	220	389	404	240	408	406	368	387	259	402	416
113	592	267	218	535	642	376	413	243	390	405	253	408	408	369	387	258	403	417
114	594	260	220	537	644	376	413	402	391	406	245	409	409	370	388	260	404	418
115	596	261	221	539	646	378	413	402	392	407	246	410	409	371	390	259	405	420
116	598	259	221	540	648	380	414	403	392	409	244	411	409	372	391	259	407	422
117	600	253	221	542	650	380	415	404	393	409	245	412	410	373	391	259	407	423
118	601	253	223	543	635	381	415	404	393	408	245	412	411	372	391	258	407	423
119	603	242	224	544	626	382	416	405	394	408	230	412	412	372	392	258	407	424
120	604	246	226	544	619	383	416	405	394	409	253	413	413	372	392	260	407	426
121	606	245	226	546	613	384	418	406	395	409	250	413	413	371	393	259	408	427
122	608	258	226	547	609	385	419	407	396	411	241	414	414	372	394	259	409	428
123	610	245	229	548	605	385	419	407	397	411	231	415	415	373	394	259	410	429
124	613	250	230	549	602	386	420	407	397	413	232	416	415	373	395	261	411	431
125	615	251	228	550	599	388	420	409	398	414	228	416	416	373	397	260	412	432
126	618	251	229	551	598	389	421	409	399	415	228	417	417	374	397	259	413	433
127	620	253	230	552	599	389	422	409	400	416	236	418	418	376	398	259	415	436
128	623	250	233	553	598	390	422	410	401	417	236	418	419	377	399	261	415	437
129	625	242	228	555	604	389	424	411	402	418	251	420	420	378	400	248	416	439
130	627	251	229	555	605	389	425	412	402	419	244	422	421	381	401	247	417	440
131	629	252	233	556	618	389	426	413	403	421	257	423	422	384	402	248	419	441
132	630	246	235	557	620	388	427	413	403	422	245	423	423	385	403	248	419	443