Fire Resistance Test

Sponsor:
Fire Proofing Services Ltd
Evolution House
Aston Road
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CV11 5EL

CONFIDENTIAL

Report: BMT/FEP/F14038
A fire resistance test performed on a double leaf single acting steel access panel
Test conducted in accordance with BSEN 1634-1: 2014 and BSEN 1363-1: 2012

Test date: 10th March 2013

BM TRADA – the new name for Chiltern International Fire Ltd

From July 1st 2013, Chiltern International Fire Ltd commenced trading under the name of its parent company BM TRADA and at the same time adopted a brand new visual identity.

Historically, the group has delivered its services through a number of individual companies: BM TRADA Certification Ltd, TRADA Technology Ltd, Chiltern International Fire Ltd (including Chiltern Dynamics) and a network of international offices. Both BM TRADA Group and these individual companies will now trade under the same name - BM TRADA - and adopt the new visual identity.

To coincide with this change, our Technical Reports, Test Reports, Products Assessments, company stationery and marketing collateral have been re-designed to carry the new branding and visual identity.

The validity of all documents previously issued by the individual companies including certificates, test reports and product assessments is unaffected by this change and a letter to this effect will be available to download from our website www.bmtradagroup.com.

About BM TRADA.

With origins dating back to 1934, we have a deep history and services which are highly valued by our customers. We offer independent certification, testing, inspection, training and technical services around the world. In all these areas we continue to use industry-leading experts in their chosen fields to develop and deliver services – an ethos that has been at the heart of our approach since we began.

A recent review of our businesses and customers revealed that the individual identities sometimes make communications confusing, and that in an already complex business area, clarity and simplicity in communications is rare, but valued. It also revealed that a single identity and combined offer would help us strengthen our appeal.

With this in mind, we brought the companies together under the name BM TRADA and took the opportunity to create a fresh new visual identity.

We have modernised our image and combined our strengths. However, our values, our people and the integrity of our services remain the same. I hope you will welcome these changes and the improvements they will bring.

Jon Osborn
Chief Operating Officer

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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 BSEN 1634-1: 2014 and BSEN 1363-1: 2012

Integrity		
Cotton pad		139 (one hundred and thirty nine) minutes*
Continuous flaming		139 (one hundred and thirty nine) minutes*
Gap gauges		139 (one hundred and thirty nine) minutes*
Insulation		
Leaf - discrete area (steel)	Average set	2 (two) minutes
	Standard set (Max)	1 (one) minutes
	Supplementary set (Max)	5 (five) minutes
Frame - discrete area (steel)		8 (eight) minutes
Radiation – time to 15kw/m^2		35 (thirty five) minutes

* No failure had occurred at test termination at 139 minutes

Summary of specimen:

A steel double leaf single acting access panel

Leaf sizes:

Left leaf – 2396mm high x 898mm wide x 44mm thick

Right leaf – 2396mm high x 898mm wide x 44mm thick

Exposed face

2 Introduction

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

3 Specimen verification

The access panel was delivered to BM TRADA on the 8th March 2104. The component parts of the access panel were identified and, where appropriate, moisture content readings and density checks were performed on either the original specimen, or, samples provided by the sponsor. These details are outlined in the construction section of this report.

3.1 Conditioning

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

3.2 Sampling

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

4 Description of supporting construction

The supporting construction comprised a 150mm thick medium density concrete blockwork wall built in accordance with BSEN 1363-1: 2012.

5 Description of specimen

5.1 Access panel leaves

Both leaves measured 2396mm high x 898mm wide x nominally 44mm thick overall.

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6 Description of construction (see clients drawings in appendix)

Leaves

	Material	Dimensions (mm)	Key to figures
Stiles	Profiled Zintec steel welded to the steel 'tray section facing (see figure 2)	1.2 thick x 68 wide x 43 thick	1
Rails	Profiled Zintec steel welded to the steel 'tray section facing, butted up to the stiles	1.2 thick x 68 wide x 43 thick	2
Facings	Profiled Zintec steel 'tray' on unexposed face	1.2 thick	3
Leaf finish	Polyester powder coating	Nominally 75 microns thick	-
Welds	Spot welds	12.5 long at nominal 450 centres	-
Leaf stiffeners	None fitted	-	-
Meeting edge stop	Profiled Zintec steel	1.2 thick x 39 wide x 41 deep welded along the hanging edge exposed face profile of the left leaf facing	4

Frame

	Material	Dimensions (mm)	Key to figures
Head, jambs and threshold	Profiled steel (see figure 2)	1.5 thick x 75 deep x 45 wide including a 47 wide x 20.5 high integral stop and a 25 wide integral architrave	5
Stops – integral	-	-	-
Frame jointing detail	Mitred - welded	-	-
Architrave - integral	-	-	-
Frame fixings	Steel masonry fixings	80 long Spax screws fitted at 50mm from corners and at 250mm centres on all edges	-
Frame fire stopping	Intumescent acrylic mastic on both faces of frame	Nominally 5mm wide sealing frame to supporting construction	-

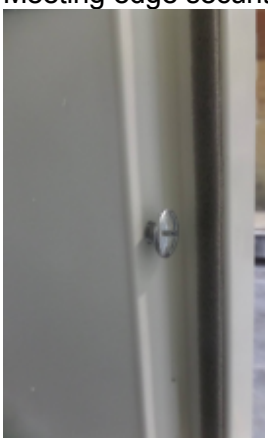
Intumescent and sealing materials

	Make/type	Size (mm)	Location	Key to figures
Panel leaf	CB Frost Foam Sponge Strip	8 x 4	Fitted to the exposed face profile of the facing	6
Frame	None fitted	-	-	-

Hardware

	Make/type	Size (mm)	Location	Key to figures
Hinges	Steel pin hinge	6Ø (pin size)	Fitted at head and threshold of leaf	7
Closer	None fitted	-	-	-
Lock – engaged	3-point locking system, with lock operating 2No. Ø8 diameter rods, acting at top and bottom of both leaves	110 high x 36 wide x 16 thick (lock body size)	Fitted 1200mm from the threshold of the leaf	8
Locking rod guide blocks	8No. steel rod blocks stitch welded on exposed face of stile	20 x 20 x12 with an 8mmØ hole to accept the rod	Fitted 4mm, 30mm, 405mm, 780mm, 1518mm, 1910mm, 2295mm and 2320mm from the head of the leaf	9
Furniture	5No. steel security bolts on hanging edges	Ø5 x 12mm protruding from leaf edge	Fitted at 405mm centres, 340mm from the threshold of the leaf	10
	6No. steel security bolts on meeting edge of left leaf	Ø13 bolt head x 8mm protruding from leaf edge	Fitted equispaced along the meeting edge	11

Meeting edge security bolt and corresponding slot



7 Pre-test measurements

7.1 Pre-cycling

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

7.2 Access panel leaf/frame perimeter gaps

The gaps between the edge of the leaf and frame were measured prior to test. A total of 21 readings were taken. The measurements (in mm) are given in Figure 5 of the appendix.

7.3 Closer forces

No closer was fitted.

7.4 Method of installation

The access panel was fixed into a pre-prepared opening. The details of the fixings and fire stopping between frame and supporting construction are outlined in the construction section and Figure 4 of the appendix.

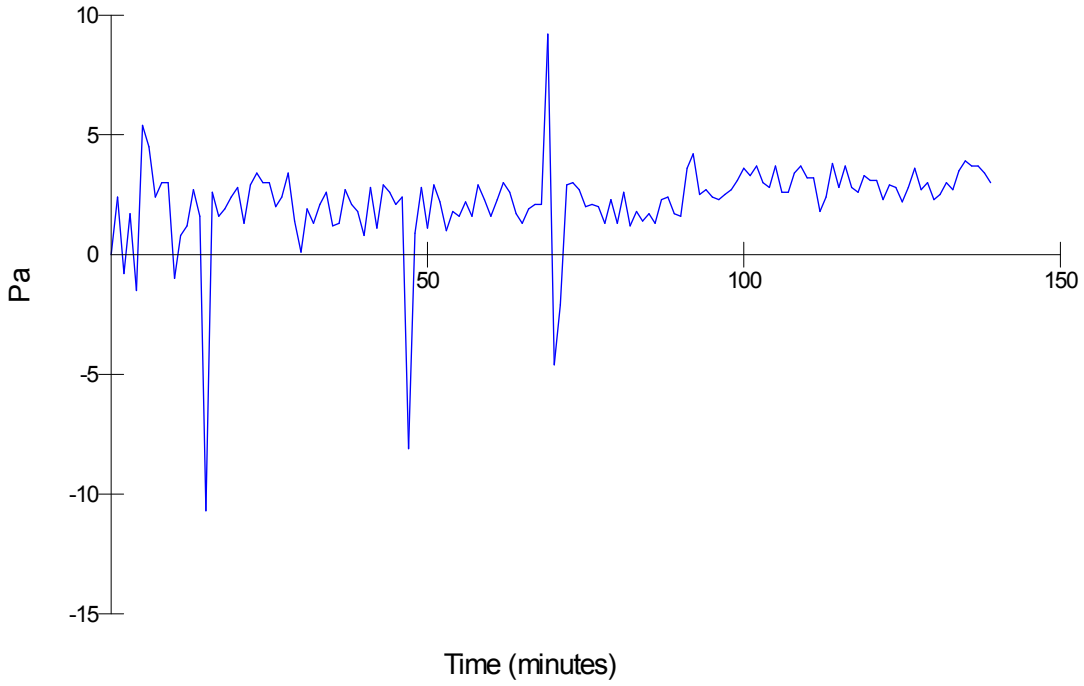
8 Test conditions

8.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 12°C. The ambient temperature during the test is recorded in Appendix 2.

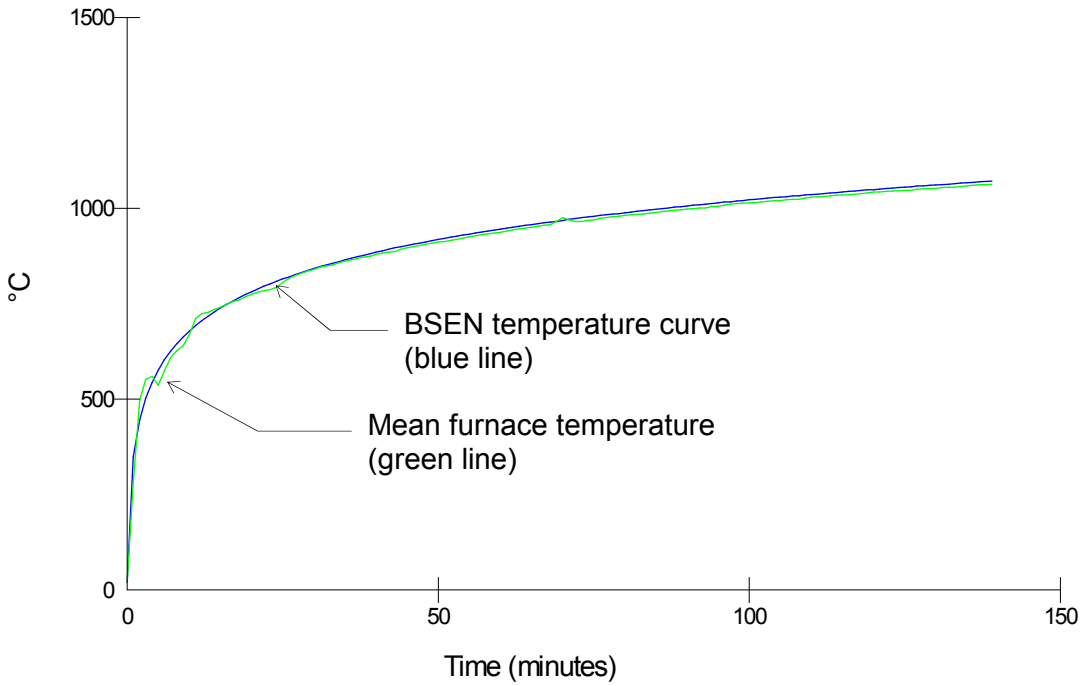
8.2 Pressure readings

After the first 5 minutes of the test, the furnace pressure was maintained at 3 ± 5 Pa and after 10 minutes was maintained at 3 ± 3 Pa with respect to atmosphere at a point 0.5m from the notional floor level, in order to maintain 20Pa at the head of the leaves. The pressure readings are recorded 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: 2012 Section 5.1.1 as closely as possible, using the average of nine plate thermocouples suitably distributed within the furnace. The temperatures readings are recorded in Appendix 2 and are shown graphically below:



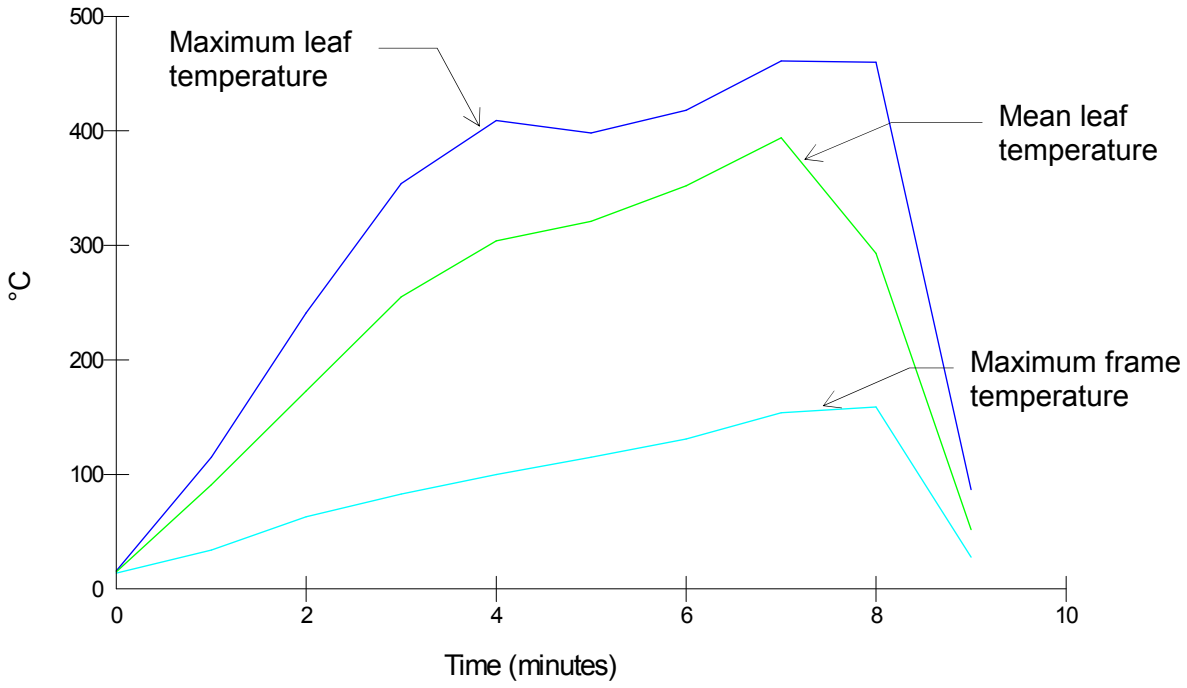
8.4 Unexposed face temperatures

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

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

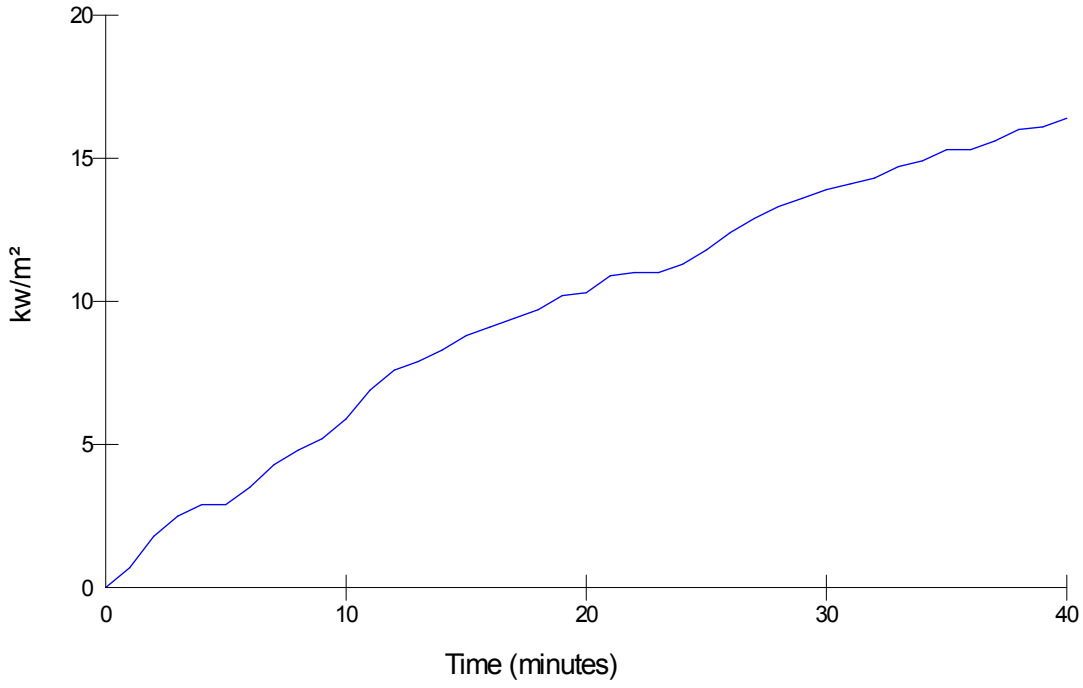
The location of the thermocouples are shown in Figure 6 of the appendix. The temperatures were recorded until 8 minutes, after all insulation criteria failures were achieved at all areas; the readings were recorded in Appendix 2 and are shown graphically below:

Access panel



8.5 Total heat flux

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



* Radiometer removed after failure criterion achieved at 40 minutes

8.6 Distortion data

Due to the nature of the specimen under evaluation, distortion measurements could not be taken.

9 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	
00.00	Test started.
01.36	There is discolouration of the paint which is starting to blister.
02.00	There is smoke issuing from the burning paint.
05.00	All four corners of the frame are pulling away from the wall.
08.30	All thermocouples have been removed.
13.00	There is glow visible at the door lock position.
15.45	The top and the bottom of the leaves are deflecting out and the centre of the leaves is deflecting inwards by approximately 5mm.
19.39	The corners of the door frame are still deflecting away from the wall, the gap is now approximately 19mm wide down the right hand side.
32.42	The frame on the left corner has deflected away from the wall by approximately 13mm.
50.27	The bottom right hand corner has deflected away from the wall by approximately 21mm. The gap at the bottom left corner is now approximately 19mm wide.
63.41	No change.
68.23	The meeting edge along the centre of the door has started to open, the gap is now approximately 5mm wide.
85.26	The meeting edge gap along the centre of the door is now approximately 7mm wide. The gap is spreading up and down the meeting edge.
100.00	No change.
120.00	The leaves are glowing. The gap down the meeting edge is now approximately 9mm wide. There is no change in the door frame movement.
139.00	Test terminated

10 Expression of results

Integrity		
Cotton pad		139 (one hundred and thirty nine) minutes*
Continuous flaming		139 (one hundred and thirty nine) minutes*
Gap gauges		139 (one hundred and thirty nine) minutes*
Insulation		
Leaves - discrete area (steel)	Average set	2 (two) minutes
	Standard set (Max)	1 (one) minutes
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Radiation – time to 15kw/m^2		35 (thirty five) minutes

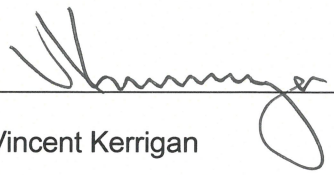
* No failure had occurred at test termination at 139 minutes

11 Limitations

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

The results of this test were obtained using the leaf to frame gaps recorded in Figure 5 of the appendix. The fire resistance performance of access panels of this design may change if substantially different gaps are employed.

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

Signature:		
Name:	Robert Axe	Vincent Kerrigan
Title:	Lead Technical Officer	Technical Manager
Date of issue:	23/06/14	23-06-2014

12 Field of direct application of test results

The results of the test are directly applicable to similar constructions where one or more of the changes listed in BSEN 1634-1: 2014, Clause 13, are made and the construction continues to comply with that appropriate design code for its stiffness and stability. Other changes are not permitted by the document.

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

13 Photographs

Shoot bolt guide blocks at head of leaves

Lock bolted to each leaf stile

At start of test

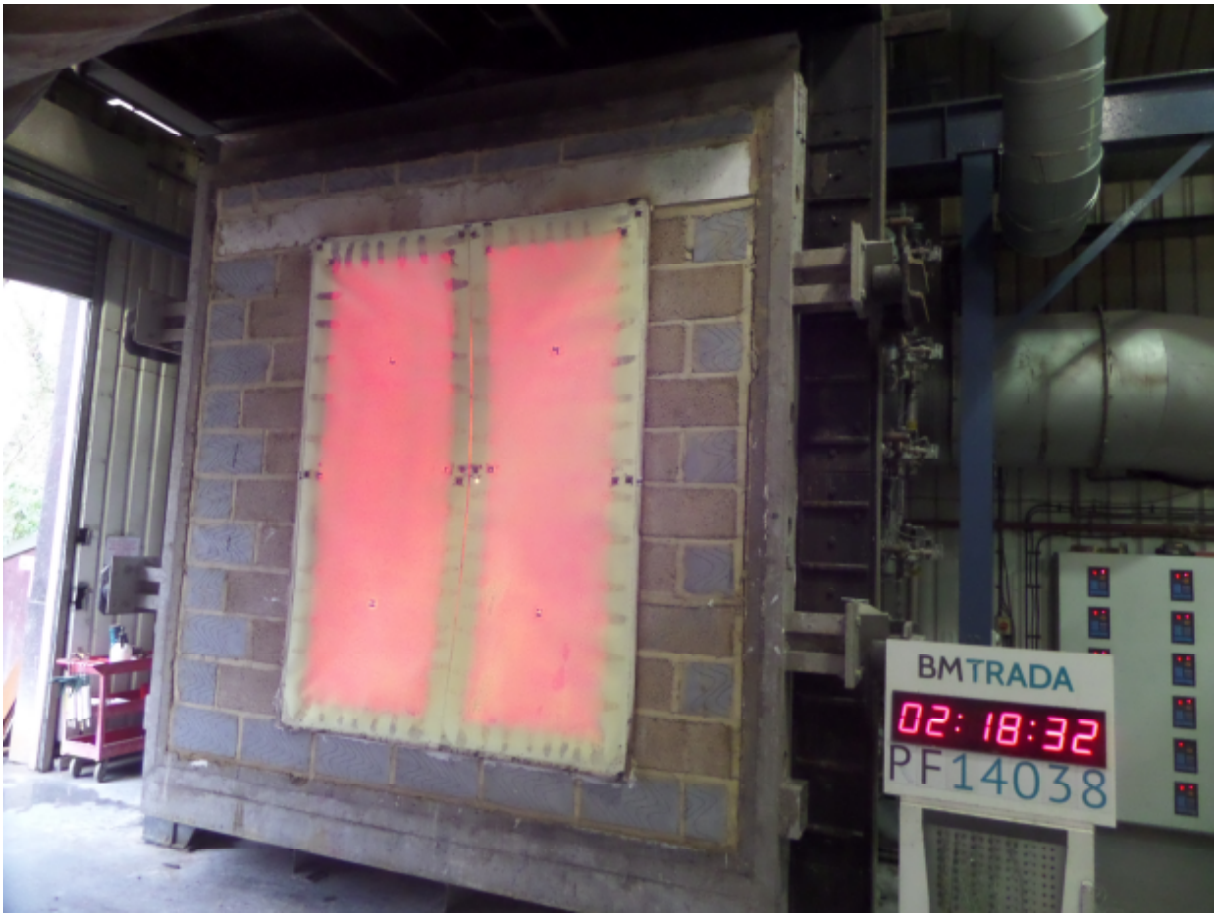
At 30 minutes

At 60 minutes

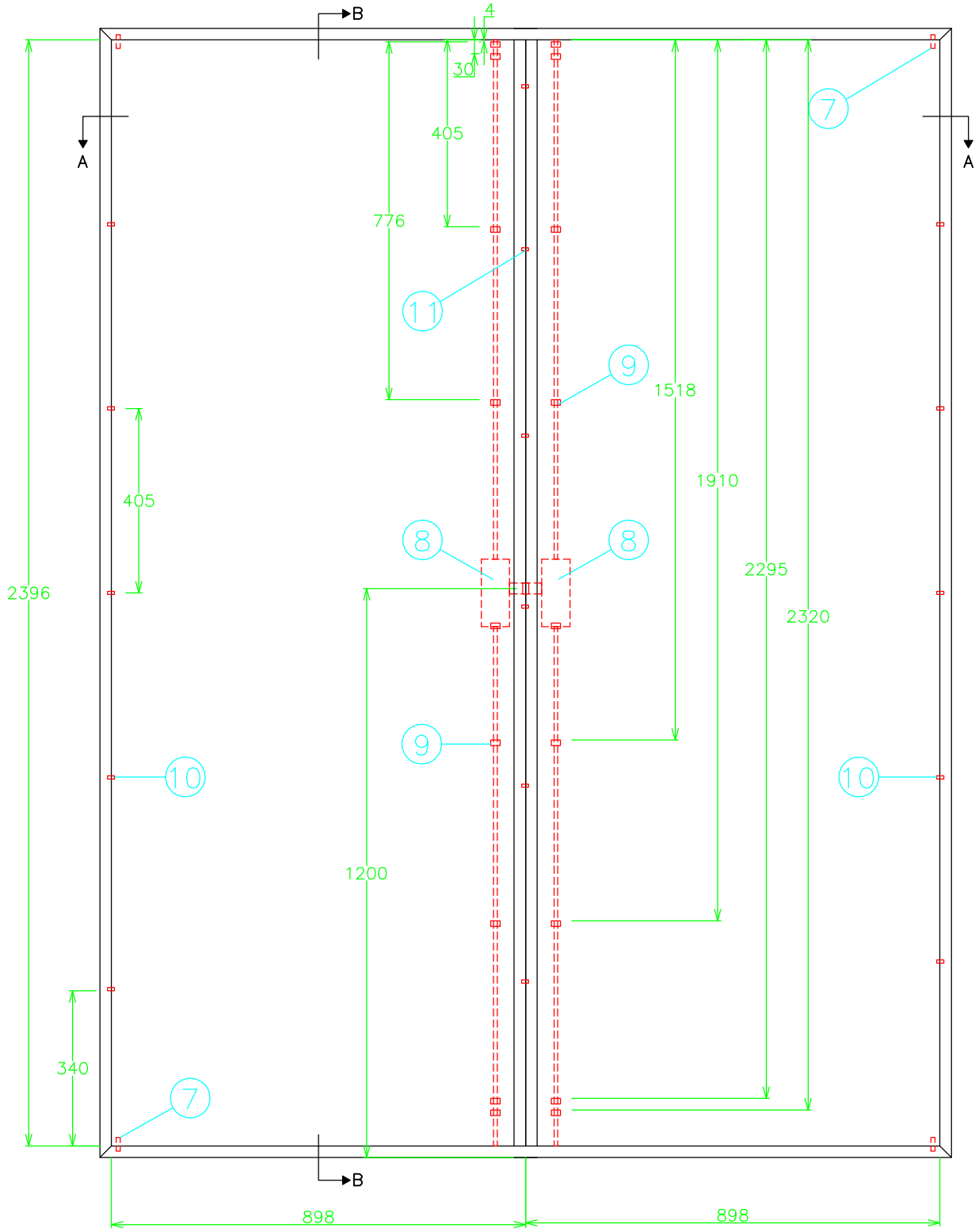
After 91 minutes

At 120 minutes

After 138 minutes



Appendix 1– figures 1 - 6



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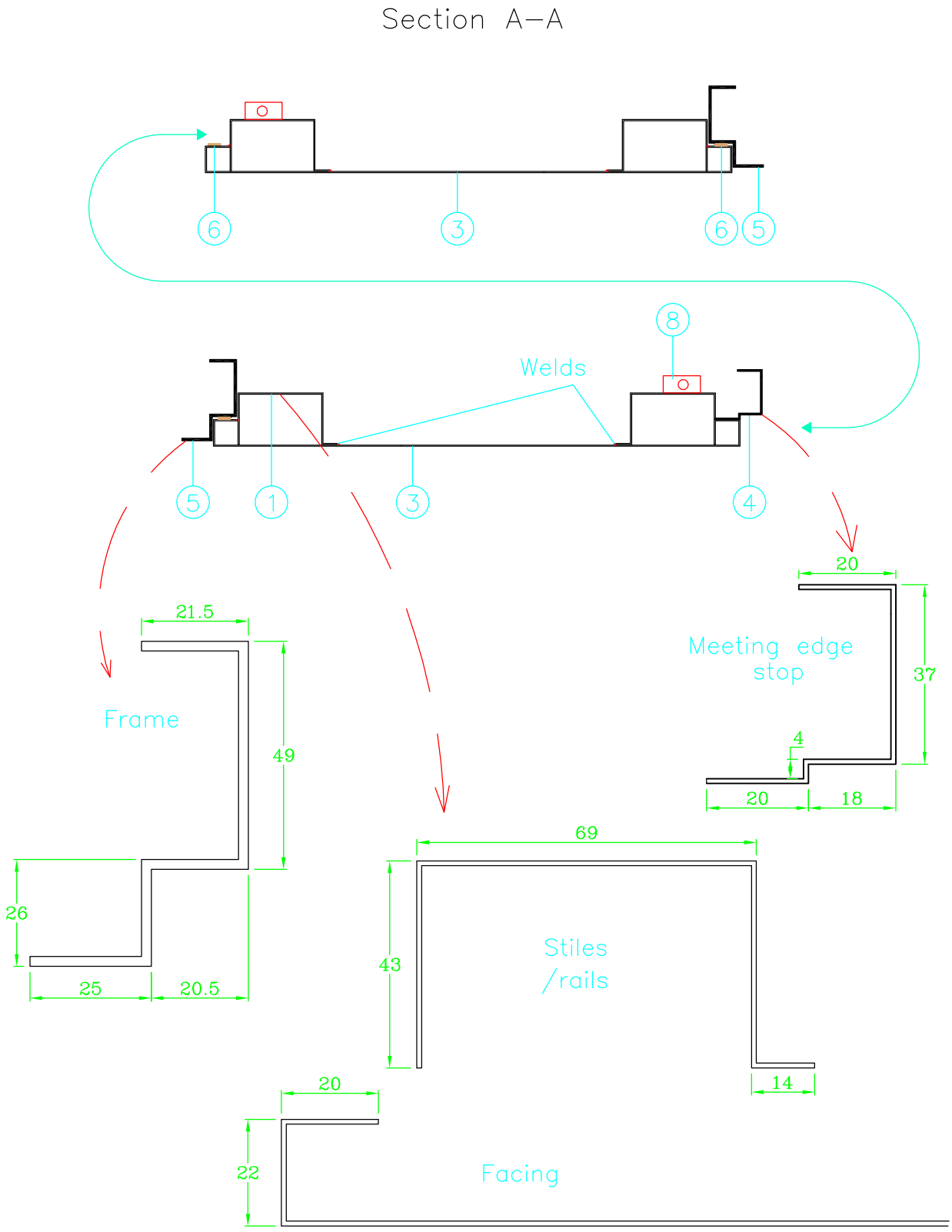
Title: Unexposed face elevation showing hardware positions (All dimensions in mm)

Date Drawn	Drawn By	Scale
30/04/14	ARD	NTS

Project No.	
BMT/FEP/PF14038	Appendix



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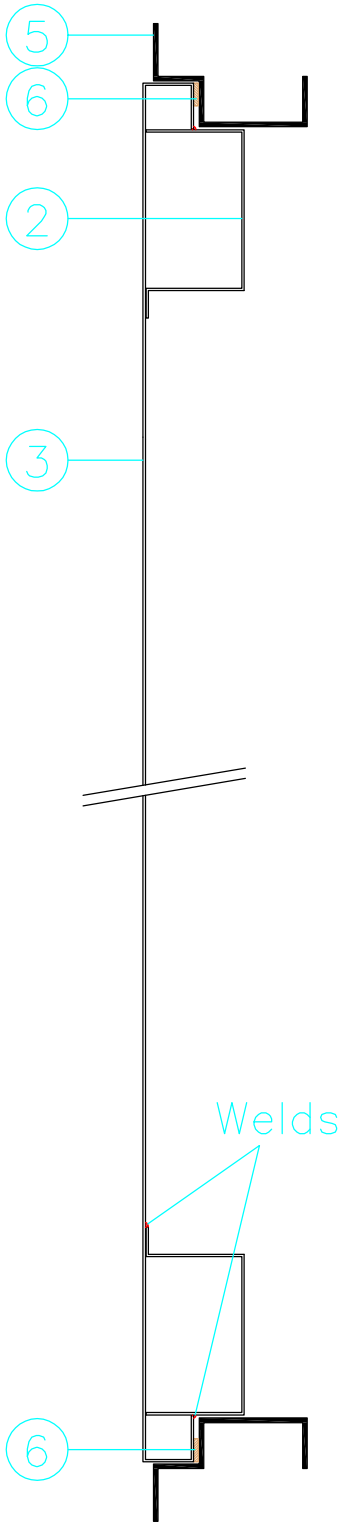
Title
Horizontal cross–sections
(All dimensions in mm)

Date Drawn	Drawn By	Scale
30/04/14	ARD	NTS

Project No.	
BMT/FEP/PF14038	Appendix

Section B–B



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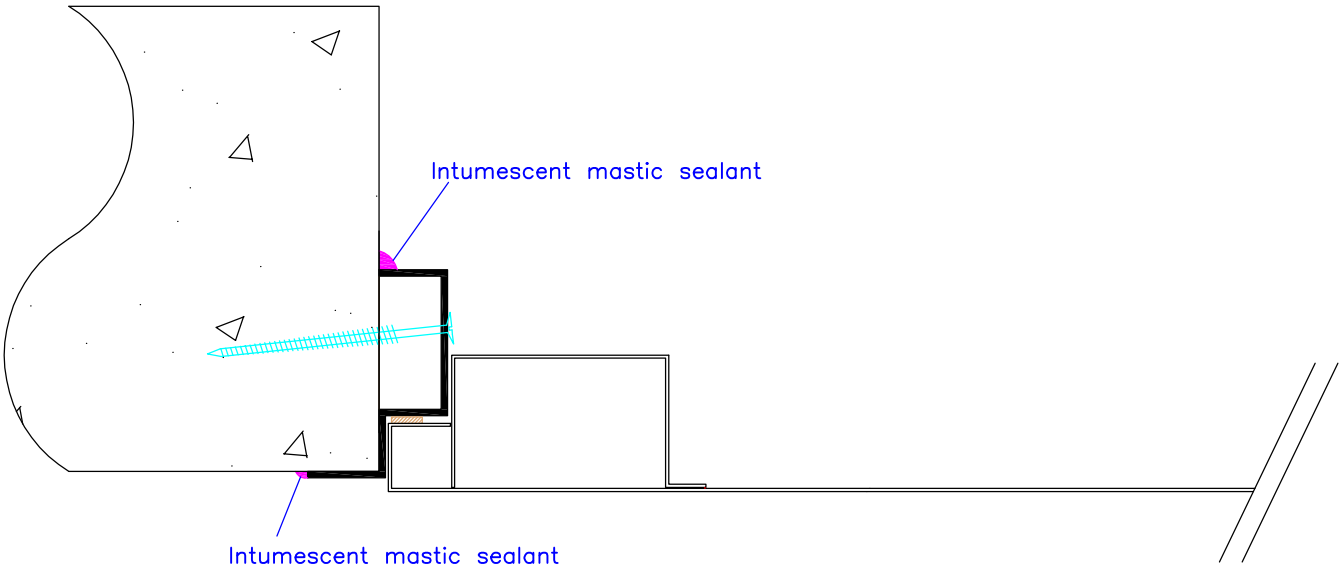
Title
Vertical cross–sections
(All dimensions in mm)

Date Drawn	Drawn By	Scale
30/04/14	ARD	NTS

Project No.	
BMT/FEP/PF14038	Appendix



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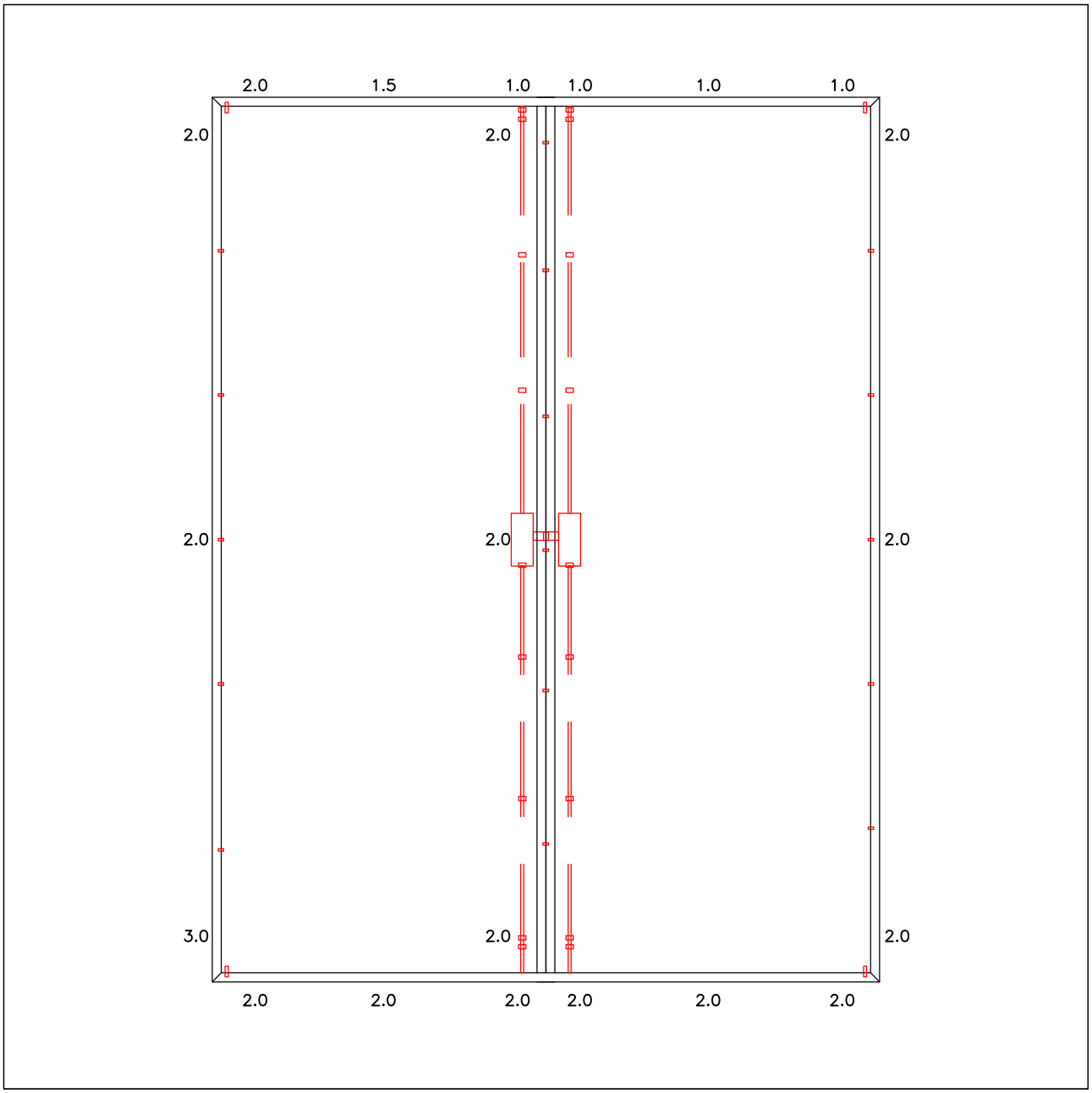
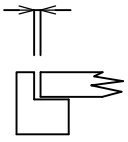
Title: Frame to supporting construction fixing detail (All dimensions in mm)		
Date Drawn: 30/04/14	Drawn By: ARD	Scale: NTS
Project No.: BMT/FEP/PF14038		Appendix



Gaps shown



Viewed From Unexposed Face

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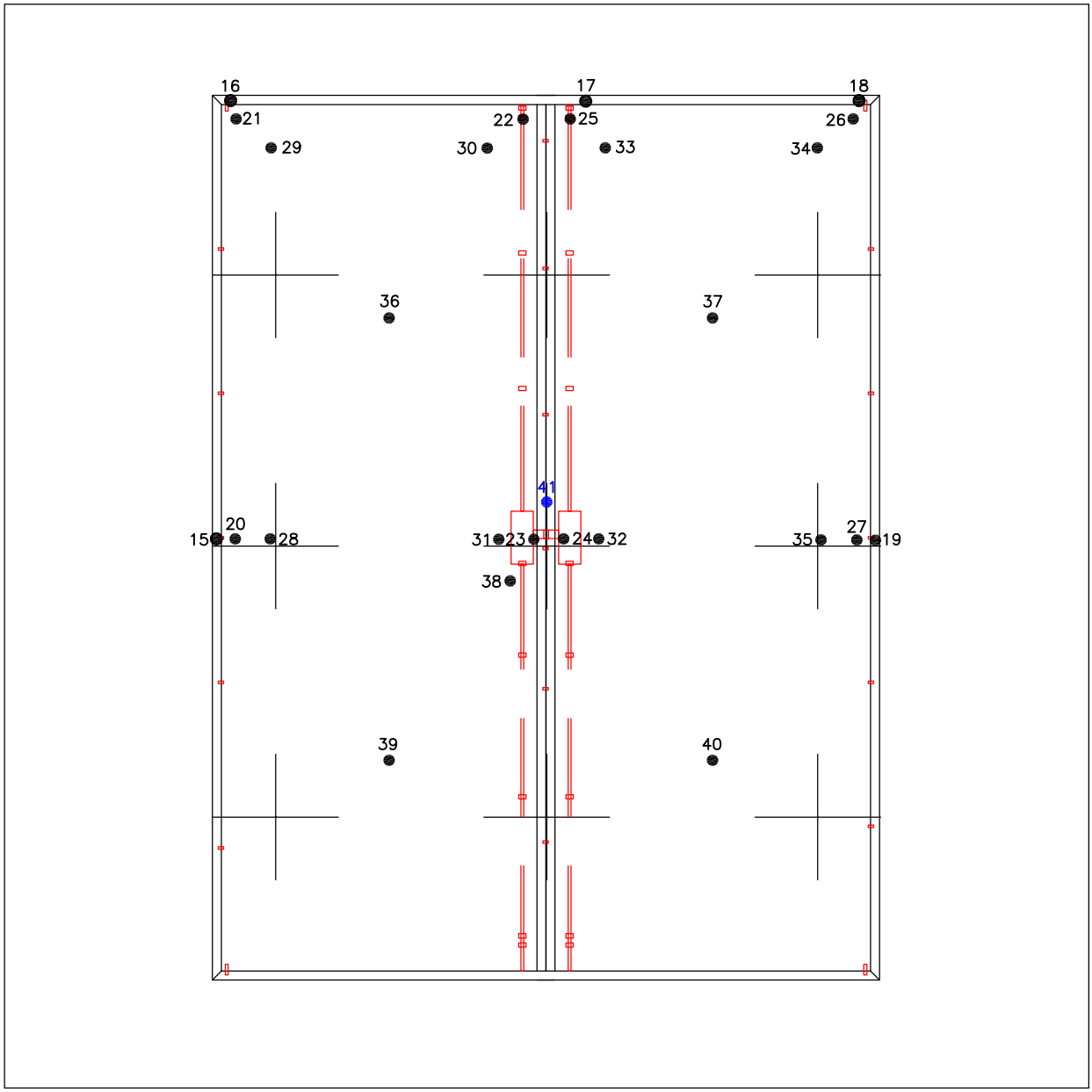
Title	Leaf/frame gaps (All dimensions in mm)		
Date Drawn	Drawn By	Scale	
30/04/14	ARD	NTS	
Project No.		Appendix	
BMT/FEP/PF14038			



: Furnace Thermocouples

: Unexposed Face Thermocouples

: Radiometer

Viewed From Unexposed Face

BM TRADA

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Title: Thermocouple positions

(All dimensions in mm)

Date Drawn	Drawn By	Scale
30/04/14	ARD	NTS

Project No.	
BMT/FEP/PF14038	Appendix

Appendix 2 - raw test data (10 pages)

(see figure 6 of appendix 1 for channel locations)

Furnace thermocouples

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	Chan 23	Chan 24	Chan 25
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	0	18	18	18	19	18	19	19	19	19	12	14	14	14	14	14	14	15	16	15	14	16
1	2.4	280	256	235	310	315	311	233	331	252	13	16	26	22	34	19	25	62	43	23	24	36
2	-0.8	487	484	456	525	546	502	463	520	496	13	29	54	18	63	33	57	98	66	61	55	62
3	1.7	545	535	510	570	591	560	533	571	554	13	48	80	15	83	51	83	127	98	100	91	81
4	-1.5	557	529	519	572	594	575	549	580	566	13	68	100	14	94	68	106	162	116	132	115	102
5	5.4	535	480	491	550	571	559	537	563	546	13	87	115	14	108	84	126	194	146	171	139	106
6	4.5	564	540	534	591	607	593	567	595	580	13	99	131	14	122	97	151	219	181	212	173	119
7	2.4	596	596	574	622	644	621	596	627	610	12	106	154	14	139	104	179	238	208	245	210	146
8	3	616	619	595	640	658	639	613	643	628	12	35	125	14	159	112	57	96	194	198	221	169
9	3	630	638	610	653	669	648	625	653	639	13	14	28	17	28	23	20	28	27	34	24	30
10	-1	664	683	641	680	697	672	648	679	659	13	13	16	16	17	25	16	18	15	19	14	17
11	0.8	712	734	687	728	741	707	687	718	699	12	12	14	15	15	24	14	14	13	15	13	14
12	1.2	728	748	698	738	749	721	702	725	711	12	12	13	14	15	23	14	13	13	14	13	14
13	2.7	734	751	701	743	751	721	703	727	713	12	12	13	14	15	22	14	13	13	14	13	14
14	1.6	744	760	717	747	758	732	710	732	718	12	12	13	14	15	21	14	13	13	14	13	14
15	-9.7	753	772	711	753	765	737	719	737	724	12	13	13	14	14	21	13	13	13	14	13	14
16	2.6	762	775	727	759	772	745	727	745	733	12	13	13	14	14	20	13	13	13	14	13	14
17	1.6	766	782	738	768	778	750	735	752	738	12	13	13	14	14	19	13	13	13	14	13	14
18	1.9	775	792	737	772	780	752	738	757	744	12	13	13	14	14	18	13	13	13	14	13	14
19	2.4	787	796	748	780	791	760	748	764	750	12	12	13	13	14	18	13	13	13	14	13	14
20	2.8	789	803	754	788	794	766	751	769	757	12	12	13	14	14	18	13	13	13	14	13	14
21	1.3	795	811	756	793	801	770	759	775	762	12	13	13	13	14	19	13	13	13	14	13	13
22	2.9	800	816	768	796	803	775	763	781	767	12	15	14	14	14	8	13	13	13	13	13	13

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	Chan 23	Chan 24	Chan 25
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
23	3.4	810	818	749	802	804	774	770	790	773	12	15	14	13	15	9	13	13	13	13	13	13
24	3	815	824	743	810	810	778	776	801	781	12	15	14	13	14	9	13	13	13	13	13	13
25	3	832	839	753	826	824	788	786	812	789	12	15	14	13	15	9	13	13	14	13	13	13
26	2	843	851	766	836	837	798	797	823	801	12	16	14	13	15	9	13	13	14	13	13	13
27	2.4	852	863	777	841	843	803	807	829	809	12	16	14	13	15	9	13	13	14	13	13	13
28	3.4	861	872	776	849	848	809	813	835	813	12	16	14	13	15	9	13	13	13	13	13	13
29	1.4	868	872	785	853	853	814	818	839	817	12	18	14	13	15	9	13	13	14	13	13	13
30	0.1	868	881	792	856	857	819	823	844	823	12	18	14	13	15	9	13	13	14	13	13	13
31	1.9	873	885	793	865	862	825	828	849	826	12	19	14	13	15	9	13	13	14	13	13	13
32	1.3	880	889	801	865	866	828	832	852	831	12	19	14	13	15	9	13	13	14	13	13	13
33	2.1	881	890	803	873	870	830	836	856	835	12	20	14	14	14	8	13	13	14	13	13	13
34	2.6	889	898	804	876	874	834	840	860	838	12	20	14	14	14	8	13	13	13	13	13	13
35	1.2	891	900	815	879	877	842	847	865	843	12	20	14	14	14	8	13	13	13	13	13	13
36	1.3	895	903	814	884	881	845	850	868	846	12	20	14	14	14	8	13	13	13	13	13	13
37	2.7	901	902	818	885	885	846	855	872	849	12	19	14	14	14	8	13	13	14	13	13	13
38	2.1	904	910	824	890	889	851	855	874	853	12	20	14	14	14	8	13	13	13	13	13	13
39	1.8	907	911	824	891	890	852	860	877	857	12	20	14	14	14	8	13	13	13	13	13	13
40	0.8	913	919	834	894	894	857	865	879	860	12	19	14	14	14	7	13	13	13	13	13	13
41	2.8	915	922	835	897	897	861	866	884	861	12	19	14	14	14	7	13	13	13	13	13	13
42	1.1	917	923	837	903	899	862	871	887	866	12	19	14	14	14	7	13	13	13	13	13	13
43	2.9	919	926	838	905	904	864	874	889	870	12	19	14	14	14	7	13	13	13	13	13	13
44	2.6	924	933	846	909	908	869	876	894	874	12	19	14	14	14	7	13	13	13	13	13	13
45	2.1	929	935	853	913	911	872	880	898	878	12	19	14	14	14	7	13	13	13	13	13	13
46	2.4	930	939	856	914	914	877	885	901	880	13	19	14	14	14	8	13	13	13	13	13	13
47	-8.1	936	941	857	918	917	879	888	904	883	13	19	14	14	14	8	12	13	13	13	13	13
48	0.9	939	945	860	924	920	883	891	907	885	13	19	14	14	14	7	13	13	13	13	13	13
49	2.8	943	947	863	924	921	886	894	910	890	13	19	14	14	15	8	13	13	13	13	13	13
50	1.1	943	954	864	929	926	890	898	912	893	13	19	14	14	14	8	12	13	13	12	13	13
51	2.9	949	950	864	930	928	891	899	914	894	13	19	14	14	15	11	12	13	13	13	13	13
52	2.2	949	954	873	933	931	893	901	916	896	13	19	14	14	14	12	12	13	13	12	13	13

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	Chan 23	Chan 24	Chan 25
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
53	1	952	958	874	936	935	896	904	920	901	13	20	14	14	15	8	13	13	13	13	13	13
54	1.8	955	962	878	938	936	899	908	923	903	13	20	14	14	15	8	12	13	13	13	13	13
55	1.6	958	965	879	942	940	903	912	926	906	13	20	14	14	15	13	12	13	13	13	13	13
56	2.2	967	964	884	943	942	908	916	928	907	13	20	14	14	15	13	12	13	13	13	13	13
57	1.6	967	971	888	946	946	908	917	930	909	13	20	14	14	15	15	12	13	13	13	13	13
58	2.9	968	972	890	949	947	909	919	933	911	13	20	14	14	15	14	12	13	13	13	13	13
59	2.3	971	975	888	952	951	915	921	934	914	13	20	14	14	15	14	12	13	13	13	13	13
60	1.6	969	975	892	954	953	914	924	938	916	13	20	14	14	15	15	12	13	13	13	13	13
61	2.3	971	981	899	956	954	917	926	940	920	13	21	14	14	15	15	12	13	13	13	13	13
62	3	976	986	901	958	957	921	931	943	923	13	21	14	14	15	15	13	13	14	13	14	13
63	2.6	981	986	905	962	960	923	933	945	923	13	21	14	14	15	15	13	13	13	13	13	13
64	1.7	981	988	903	963	961	927	934	948	928	13	21	14	14	15	17	13	13	14	13	14	13
65	1.3	987	993	909	964	963	927	938	949	928	13	21	14	14	15	17	12	13	13	13	13	13
66	1.9	989	994	909	968	966	929	938	952	932	13	21	14	14	15	18	12	13	13	12	13	13
67	2.1	990	994	913	970	969	931	942	954	936	13	21	14	14	15	18	12	13	13	12	13	13
68	2.1	991	996	916	972	971	935	944	956	937	13	21	14	14	15	17	12	13	13	12	13	13
69	9.2	1000	1008	929	979	979	939	950	962	943	13	21	14	14	15	18	12	13	13	12	13	13
70	-4.6	1012	1019	942	988	988	950	958	971	950	14	22	14	14	15	18	12	13	13	12	13	13
71	-2.1	1006	1012	933	984	983	946	957	968	949	14	22	14	14	15	18	12	13	13	12	13	13
72	2.9	999	1009	928	977	978	944	951	964	945	14	22	14	14	15	14	12	13	13	13	13	13
73	3	999	1006	927	980	979	943	952	964	945	14	22	14	14	15	15	12	13	13	13	14	13
74	2.7	1005	1008	926	982	980	946	955	965	945	14	22	14	14	15	16	13	13	14	13	14	13
75	2	1003	1011	931	986	984	949	956	968	948	14	22	14	14	16	15	13	13	14	13	14	13
76	2.1	1008	1016	937	988	986	950	959	972	954	14	22	14	14	16	15	13	13	14	13	14	13
77	2	1010	1015	941	990	988	952	962	973	953	14	22	14	14	16	16	13	13	14	13	14	13
78	1.3	1012	1019	939	993	990	955	964	975	956	14	22	14	14	16	16	13	13	14	13	14	13
79	2.3	1012	1022	942	993	992	957	962	976	959	14	22	14	14	15	16	12	13	13	12	13	13
80	1.3	1017	1024	946	995	994	958	967	978	961	14	23	14	14	15	19	12	13	13	13	13	13
81	2.6	1017	1024	944	997	995	959	970	981	962	14	22	14	14	15	19	12	13	14	12	13	13
82	1.2	1020	1023	946	998	997	962	971	981	963	14	23	14	14	15	19	12	13	13	12	13	13

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	Chan 23	Chan 24	Chan 25
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
83	1.8	1019	1025	948	999	1000	962	972	983	964	14	23	14	14	15	19	12	13	13	12	13	13
84	1.4	1021	1026	949	1000	1000	963	975	984	966	14	23	14	14	16	20	12	13	13	12	13	13
85	1.7	1021	1032	951	1003	1002	966	977	985	969	14	23	14	14	16	18	12	13	14	13	13	13
86	1.3	1023	1032	955	1004	1002	968	979	988	971	14	24	14	14	16	19	13	13	14	13	14	13
87	2.3	1028	1034	953	1005	1005	971	980	989	972	14	25	14	14	16	19	13	13	14	13	14	13
88	2.4	1030	1039	961	1008	1007	971	980	991	974	14	26	14	14	16	19	13	13	14	13	14	13
89	1.7	1032	1035	960	1010	1010	974	982	992	976	14	26	14	14	16	20	13	14	14	13	14	13
90	1.6	1031	1040	965	1010	1010	974	984	993	977	14	26	14	14	16	20	13	13	14	12	14	13
91	3.6	1035	1037	964	1011	1012	976	985	995	980	15	27	14	14	16	21	13	13	14	12	14	13
92	4.2	1036	1044	966	1013	1014	979	987	997	979	15	27	14	14	16	21	13	13	14	13	14	13
93	2.5	1036	1042	961	1017	1015	977	990	998	981	15	27	14	14	16	21	13	13	14	12	14	13
94	2.7	1040	1044	970	1018	1018	981	991	1000	984	15	27	14	14	16	22	13	13	14	12	14	13
95	2.4	1041	1046	962	1018	1018	984	992	1001	985	15	27	15	14	17	22	13	14	14	13	14	14
96	2.3	1043	1047	969	1023	1022	986	996	1004	986	15	27	15	14	16	22	13	14	14	13	14	13
97	2.5	1048	1050	975	1024	1024	987	997	1005	989	15	27	15	14	16	23	13	13	14	12	14	13
98	2.7	1048	1051	977	1026	1026	988	998	1006	989	15	28	15	14	16	23	13	13	14	12	14	13
99	3.1	1050	1050	978	1027	1027	989	1000	1008	991	15	27	15	14	17	24	13	13	14	13	14	13
100	3.6	1052	1056	978	1026	1028	991	1001	1009	993	15	28	15	14	17	24	13	13	14	13	14	13
101	3.3	1049	1056	981	1028	1029	991	1002	1011	994	15	28	15	14	16	24	13	13	14	12	14	13
102	3.7	1054	1057	983	1030	1031	994	1004	1012	996	15	27	15	14	16	25	13	13	14	12	14	13
103	3	1056	1056	982	1029	1031	994	1004	1012	998	15	28	15	14	17	25	13	13	14	13	14	13
104	2.8	1055	1059	985	1032	1034	996	1005	1014	1000	15	28	15	14	16	25	13	13	13	12	14	13
105	3.7	1056	1058	984	1035	1034	996	1007	1015	1000	15	28	15	14	17	26	13	13	14	12	14	13
106	2.6	1058	1059	988	1036	1036	999	1009	1016	1000	15	28	15	14	17	26	13	14	14	13	14	13
107	2.6	1061	1060	989	1037	1036	1000	1009	1017	1004	15	28	15	14	17	26	13	13	14	12	14	13
108	3.4	1058	1055	987	1036	1039	1002	1010	1019	1005	16	28	15	14	16	27	13	13	14	12	14	13
109	3.7	1063	1061	990	1041	1042	1003	1014	1021	1006	16	28	15	14	17	27	13	13	14	12	14	13
110	3.2	1068	1063	995	1042	1044	1005	1016	1022	1008	16	28	15	15	17	27	13	13	14	13	14	13
111	3.2	1066	1067	1000	1044	1045	1006	1016	1023	1009	16	29	15	15	17	27	13	13	14	13	14	13
112	1.8	1067	1064	997	1045	1047	1008	1016	1025	1011	16	30	15	15	17	28	13	13	14	12	14	13

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	Chan 23	Chan 24	Chan 25
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
113	2.4	1068	1066	995	1048	1049	1010	1019	1027	1012	16	29	15	15	17	28	13	14	14	13	14	13
114	3.8	1073	1070	1003	1045	1050	1012	1020	1027	1014	16	29	15	15	17	29	13	13	14	12	14	13
115	2.8	1073	1071	1000	1049	1050	1011	1023	1029	1016	16	29	15	15	17	29	13	13	14	12	14	13
116	3.7	1072	1071	1003	1047	1052	1012	1021	1029	1016	16	29	15	15	17	29	13	13	14	12	14	13
117	2.8	1076	1069	1004	1050	1053	1012	1023	1029	1017	16	29	15	15	17	29	13	13	14	12	14	13
118	2.6	1078	1076	1010	1050	1053	1017	1024	1031	1020	16	29	15	14	17	30	13	13	14	12	14	13
119	3.3	1078	1076	1008	1051	1055	1017	1025	1032	1021	16	30	15	15	17	30	13	13	14	13	14	13
120	3.1	1080	1076	1010	1056	1057	1019	1028	1034	1022	16	30	15	15	17	30	13	13	14	13	14	13
121	3.1	1081	1078	1010	1054	1058	1018	1028	1034	1023	16	30	15	15	17	30	13	14	14	13	14	13
122	2.3	1082	1078	1011	1059	1060	1020	1030	1036	1024	16	30	15	15	17	31	13	13	14	13	14	13
123	2.9	1082	1078	1010	1059	1062	1022	1031	1037	1025	16	29	15	15	18	31	13	14	14	13	14	13
124	2.8	1084	1078	1011	1060	1063	1022	1032	1037	1027	16	31	15	15	18	31	13	14	14	13	14	13
125	2.2	1085	1079	1016	1061	1063	1024	1033	1038	1027	16	31	15	15	17	31	13	13	14	12	14	13
126	2.8	1087	1078	1014	1062	1065	1022	1033	1039	1028	16	31	15	15	18	32	13	13	14	12	14	13
127	3.6	1088	1083	1016	1063	1066	1028	1036	1040	1031	16	31	15	15	18	32	13	13	14	12	14	13
128	2.7	1088	1083	1017	1065	1067	1030	1036	1041	1032	16	31	15	15	17	32	12	13	13	12	14	13
129	3	1089	1087	1021	1065	1068	1029	1037	1043	1032	16	30	15	15	17	33	13	13	14	12	14	13
130	2.3	1092	1085	1018	1068	1070	1029	1038	1042	1032	16	30	15	15	18	33	13	14	14	13	15	14
131	2.5	1092	1086	1021	1069	1070	1031	1039	1044	1036	17	31	15	15	18	33	13	14	14	12	14	13
132	3	1093	1091	1021	1069	1071	1031	1040	1045	1037	17	31	15	15	18	34	13	14	14	13	14	13
133	2.7	1094	1086	1021	1070	1073	1032	1041	1045	1036	17	31	15	15	18	34	13	14	14	12	14	13
134	3.5	1095	1092	1026	1071	1074	1032	1042	1046	1040	17	32	15	15	18	34	13	14	15	13	15	14
135	3.9	1096	1092	1025	1075	1077	1036	1044	1048	1040	17	32	15	15	18	34	14	14	15	13	15	13
136	3.7	1099	1095	1032	1075	1077	1035	1045	1048	1041	17	32	15	15	18	35	13	14	14	13	15	13
137	3.7	1100	1096	1030	1077	1078	1038	1045	1049	1045	17	28	15	15	18	35	13	14	14	13	14	13
138	3.4	1102	1096	1032	1076	1078	1039	1046	1050	1043	17	26	15	15	17	36	12	13	14	12	14	13
139	3	1101	1093	1026	1080	1081	1042	1048	1051	1045	17	26	15	15	18	36	13	13	14	12	14	13

Time	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	Chan 40	Chan 41
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	kw/m²
0	14	15	15	16	16	15	15	16	15	15	16	16	15	15	15	0
1	36	24	107	62	64	107	108	77	58	70	107	107	28	115	97	0.7
2	47	60	206	103	90	199	193	100	102	125	206	175	73	241	170	1.8
3	71	85	278	126	124	299	298	122	132	185	301	260	105	354	257	2.5
4	135	106	321	194	167	345	353	158	191	241	351	309	141	409	308	2.9
5	158	123	332	248	211	354	366	209	225	272	367	330	185	398	324	2.9
6	181	155	353	276	243	379	394	245	246	296	395	362	224	418	359	3.5
7	206	185	387	302	270	422	432	276	270	326	441	401	257	461	411	4.3
8	228	208	81	206	284	398	439	286	290	351	192	442	201	172	460	4.8
9	56	24	15	54	97	166	91	89	-699	52	45	59	37	33	87	5.2
10	32	15	14	30	55	81	37	50	-899	23	23	24	21	17	38	5.9
11	22	14	14	21	39	46	22	32	-974	17	16	16	16	14	24	6.9
12	19	14	14	18	30	31	17	24	-1027	15	14	14	15	14	18	7.6
13	17	14	15	16	25	23	15	19	-1092	14	14	14	14	14	15	7.9
14	16	14	15	15	22	19	14	17	-1113	14	13	14	14	14	14	8.3
15	16	15	15	15	20	17	14	16	-1142	14	14	14	14	14	14	8.8
16	15	15	15	15	19	16	14	15	-1176	14	13	14	14	14	14	9.1
17	15	15	15	15	18	15	14	15	-1199	14	13	14	14	14	14	9.4
18	15	15	15	15	17	15	14	15	-1212	14	14	14	14	14	13	9.7
19	15	15	15	15	17	15	14	14	-1211	14	13	14	14	14	13	10.2
20	15	15	15	15	16	15	14	14	-1174	14	14	14	14	14	13	10.3
21	15	15	15	15	16	14	13	14	-1149	13	13	13	13	14	13	10.9
22	15	14	15	14	15	14	13	15	864	14	14	14	14	14	13	11
23	14	14	14	14	15	14	13	15	898	14	14	14	13	14	13	11
24	14	14	14	14	14	14	13	14	940	13	13	14	14	13	13	11.3
25	14	14	15	14	14	13	13	14	837	13	13	14	13	13	13	11.8
26	14	14	15	14	14	13	13	14	986	13	13	14	13	13	13	12.4
27	14	14	15	14	14	13	13	14	995	13	13	14	14	13	13	12.9
28	14	14	15	14	13	13	13	14	1014	13	13	14	13	13	13	13.3
29	14	14	15	14	13	13	13	14	1024	13	13	14	14	14	13	13.6

Time	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	Chan 40	Chan 41
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	kw/m²
30	14	14	15	14	13	13	13	14	1009	13	13	14	14	14	13	13.9
31	14	14	15	14	13	13	13	14	1022	13	13	14	14	14	13	14.1
32	14	14	15	14	14	13	13	14	1016	13	14	14	14	14	13	14.3
33	14	14	15	14	13	13	13	14	1031	13	13	14	14	14	13	14.7
34	14	14	15	14	13	13	13	14	1030	13	13	13	14	14	13	14.9
35	14	14	15	14	13	13	13	14	824	13	13	14	14	14	13	15.3
36	14	14	15	14	13	13	13	14	869	13	13	13	14	14	12	15.3
37	14	14	15	14	13	13	13	14	863	13	13	14	14	14	13	15.6
38	14	14	15	14	13	13	13	14	885	13	13	13	14	14	12	16
39	14	14	15	14	13	13	13	13	885	13	13	13	14	14	12	16.1
40	14	14	15	14	13	13	13	13	871	13	13	13	14	14	12	16.4
41	14	14	16	14	13	13	13	13	916	13	13	13	14	14	12	0
42	14	14	16	14	13	13	13	13	908	13	13	13	14	14	12	0
43	14	14	16	14	13	13	13	13	920	13	13	14	14	14	13	0
44	14	15	16	14	13	13	13	13	920	13	14	14	14	14	13	0
45	14	14	16	14	13	13	13	13	908	13	13	14	14	14	13	0
46	14	14	16	14	13	13	13	13	939	13	13	14	14	14	12	0
47	14	14	16	15	13	13	13	13	944	13	13	14	14	14	12	0
48	14	14	16	15	13	13	13	13	931	13	13	14	14	14	12	0
49	14	14	16	15	13	13	13	13	920	13	13	14	14	14	13	0
50	14	14	16	15	13	13	13	13	912	13	13	14	14	14	12	0
51	14	14	16	15	13	13	13	13	909	13	13	14	14	14	12	0
52	14	14	16	15	13	13	13	13	914	13	13	14	14	14	12	0
53	14	15	16	15	13	13	13	13	902	13	14	14	14	14	13	0
54	14	15	16	15	13	13	13	13	916	13	14	14	14	14	13	0
55	15	15	16	15	13	13	13	13	909	13	13	14	14	14	13	0
56	14	15	16	15	13	13	13	13	905	13	13	14	14	14	13	0
57	14	15	16	15	13	13	13	13	910	13	14	14	14	14	13	0
58	15	15	16	15	13	13	13	13	893	13	14	14	14	14	13	0
59	15	15	16	15	13	13	13	13	902	13	14	14	14	14	13	0

Time	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	Chan 40	Chan 41
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	kw/m²
60	15	15	16	15	13	13	13	13	904	13	14	14	14	14	13	0
61	15	15	17	15	13	13	13	13	904	13	14	14	14	14	13	0
62	15	15	17	15	13	13	13	13	911	13	14	14	14	14	13	0
63	15	15	17	15	13	13	13	13	927	13	14	14	14	14	13	0
64	15	15	17	15	13	13	13	13	925	13	14	14	14	15	13	0
65	15	15	17	15	13	13	13	13	926	13	14	14	14	14	13	0
66	15	15	17	15	13	13	13	13	932	13	13	14	14	14	13	0
67	15	15	17	15	13	13	13	13	914	13	14	14	14	14	13	0
68	15	15	17	15	13	13	13	13	923	13	14	14	14	14	13	0
69	15	15	17	15	13	13	13	13	926	13	13	14	14	14	13	0
70	15	15	17	15	13	13	13	13	926	13	13	14	14	14	13	0
71	15	15	17	15	13	13	13	13	914	13	14	14	14	14	13	0
72	15	15	17	15	13	13	13	13	922	13	14	14	15	15	13	0
73	15	15	17	15	13	13	13	13	907	13	14	14	15	15	13	0
74	15	15	17	15	13	13	13	13	915	13	14	14	15	15	13	0
75	15	15	17	16	13	13	13	13	923	14	14	15	15	15	13	0
76	15	15	17	16	13	13	13	13	933	14	14	15	15	15	13	0
77	15	15	17	16	13	13	13	13	936	13	14	14	15	15	13	0
78	15	15	17	16	13	13	13	13	933	14	14	15	15	15	13	0
79	15	15	17	16	13	13	13	13	935	13	14	14	15	15	13	0
80	15	15	18	16	13	13	13	13	928	13	14	14	15	15	13	0
81	15	15	17	16	13	13	13	13	935	13	14	14	15	15	13	0
82	15	15	17	16	13	13	13	13	928	13	14	14	15	15	13	0
83	15	15	18	16	13	13	13	13	945	13	14	14	15	15	13	0
84	15	16	18	16	13	13	13	13	937	13	14	14	15	15	13	0
85	15	16	18	16	13	13	13	13	878	14	14	14	15	15	13	0
86	15	16	18	16	13	13	12	13	879	14	14	15	15	15	13	0
87	15	16	17	16	13	13	12	13	985	14	14	14	15	15	13	0
88	15	16	18	16	13	13	13	13	804	14	14	15	15	15	13	0
89	16	16	18	17	13	14	13	14	615	14	15	15	15	16	14	0

Time	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	Chan 40	Chan 41
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	kw/m²
90	15	16	18	16	13	13	12	13	1030	14	14	14	15	15	13	0
91	15	16	18	16	13	14	12	13	1113	14	14	14	15	15	13	0
92	15	16	18	17	13	13	12	13	1209	14	14	15	15	15	13	0
93	16	16	18	16	13	13	12	13	1258	14	14	14	15	15	13	0
94	15	16	18	16	13	13	12	13	1271	14	14	14	15	15	13	0
95	16	16	18	17	13	14	13	13	1271	14	15	15	15	16	14	0
96	16	16	18	17	13	13	12	13	1271	14	15	15	15	16	13	0
97	16	16	18	17	13	14	12	13	1272	14	14	14	15	15	13	0
98	15	16	18	17	13	13	12	13	1272	14	14	14	15	15	13	0
99	16	16	18	17	13	14	12	13	1272	14	14	15	15	16	13	0
100	16	16	18	17	13	14	12	13	1273	14	14	15	15	16	13	0
101	16	16	18	17	13	14	12	13	1273	14	14	14	15	15	13	0
102	16	16	18	17	13	14	12	13	1273	14	14	14	15	15	13	0
103	16	16	18	17	13	14	12	13	1273	14	14	15	15	16	13	0
104	16	16	18	17	13	13	12	13	1274	14	14	14	15	15	13	-0.1
105	16	16	18	17	13	13	12	13	1274	14	14	14	15	15	13	0
106	16	16	18	17	13	13	12	13	1274	14	14	15	15	16	13	0
107	16	16	18	17	13	13	12	13	1274	14	14	15	15	16	13	0
108	16	16	18	17	13	14	12	13	1275	14	14	14	15	15	13	0
109	16	16	18	17	13	14	12	13	1275	14	14	14	15	15	13	0
110	16	16	18	17	13	14	12	13	1275	14	14	15	15	16	13	0
111	16	16	18	17	13	14	12	13	1275	14	14	15	15	16	13	0
112	16	16	18	17	13	14	12	13	1276	14	14	14	15	16	13	-0.1
113	16	16	18	17	13	14	12	13	1276	14	15	15	16	16	13	0
114	16	16	18	17	13	14	12	13	1276	14	14	14	15	16	13	0
115	16	16	19	17	13	14	12	13	1276	14	14	14	15	15	13	0
116	16	16	19	17	13	14	12	13	1277	14	14	14	15	16	13	0
117	16	16	19	17	13	14	12	13	1277	14	14	15	16	16	13	0
118	16	16	19	17	13	14	12	13	1277	13	14	14	15	16	13	-0.1
119	16	16	19	17	13	14	12	13	1277	14	14	14	15	16	13	0

Time	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	Chan 40	Chan 41
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	kw/m²
120	16	16	19	17	13	14	12	13	1278	14	14	15	16	16	13	-0.1
121	16	17	19	18	14	14	12	13	1278	14	15	15	16	16	14	0
122	16	16	19	17	13	14	12	13	1278	14	14	15	16	16	13	0
123	16	17	19	18	13	14	12	13	1278	14	15	15	16	16	13	0
124	16	17	19	18	13	14	12	13	1279	14	15	15	16	16	13	0
125	16	16	19	18	13	14	12	13	1279	14	14	14	16	16	13	0
126	16	17	19	18	13	14	12	13	1279	14	15	15	16	16	13	0
127	16	17	19	18	13	14	12	13	1279	14	15	15	16	16	13	0
128	16	16	19	18	14	14	12	13	1280	13	14	14	16	15	13	0
129	16	17	19	18	14	14	12	13	1280	14	14	15	16	16	13	0
130	16	17	19	18	14	14	12	13	1280	14	15	15	16	16	14	0
131	16	17	19	18	15	14	12	13	1280	14	15	15	16	16	13	0
132	16	17	19	18	15	14	12	13	1281	14	15	15	16	16	14	0
133	17	17	19	18	15	14	12	13	1281	14	15	15	16	16	13	-0.1
134	17	17	20	18	15	14	12	13	1281	14	15	15	16	16	14	0
135	17	17	19	18	15	14	12	13	1281	14	15	15	16	16	14	0
136	17	17	20	18	15	14	12	13	1281	14	15	15	16	16	14	0
137	17	17	19	18	15	14	12	13	1282	14	15	15	16	16	14	0
138	16	17	19	18	15	14	11	13	1282	14	14	14	16	16	13	0
139	17	17	19	18	15	14	12	13	1282	14	15	15	16	16	13	0

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