Fire Resistance Test

Sponsor:
Ritherdon and Company Ltd
Lorne Street
Darwen
Lancashire
BB3 1QW

CONFIDENTIAL

Report: BMT/FEP/F14180

A fire resistance test performed on two Riser FireSeal units and two FireSeal Vented units

Test conducted in accordance with BSEN 1364-1: 1999 and utilising the principles of BSEN 1366-3: 2009

Test date: 18th September 2014

UKAS TESTING 1762

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document is confidential and remains the property of Chiltern International Fire Ltd. The legal validity of this report can only be claimed on the presentation of the complete report.

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 Introduction

2 No. Riser FireSeal and 2 No. FireSeal Vented units were tested to determine their fire resistance, with one unit of each type opening in towards the furnace and the other opening away from the furnace.

2 Specimen verification

The specimens were delivered to BM TRADA on 16th September 2014. BM TRADA constructed a nominally 140mm thick timber stud/plasterboard clad partition. BM TRADA then subsequently installed the specimens into the supporting construction.

3 Description of supporting construction

The supporting construction comprised a 3000mm wide x 3000mm high x nominally 140mm thick timber stud/plasterboard clad partition, built into a refractory lined steel restraint frame.

The partition framing was comprised of 95mm thick x 46mm wide timber head and base track, studs and noggins, and clad on the unexposed face with a single layer of 15mm thick type F plasterboard, and clad on the exposed face with 2 No. layers of 15mm thick type F plasterboard. The supporting construction was fixed on all edges, and included 4No. apertures. The apertures were lined with 1 No. layer of 15mm thick type F plasterboard, with an additional extended section of 12mm thick supalux fitted at the head and the base of apertures A and B, protruding by 100mm on each face. This was to represent a soffit and floor section. All plasterboard and Supalux was fixed to the timber framing with the appropriately sized screws in order to achieve a minimum of 10mm penetration into the timber.

3.1 Conditioning

BM TRADA stored the specimens in climatic conditions approximate to those expected in normal service, and used the guidelines of annex F.1 of BSEN 1363 – 1:2012 to establish a suitable conditioned level where possible.

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 specimens

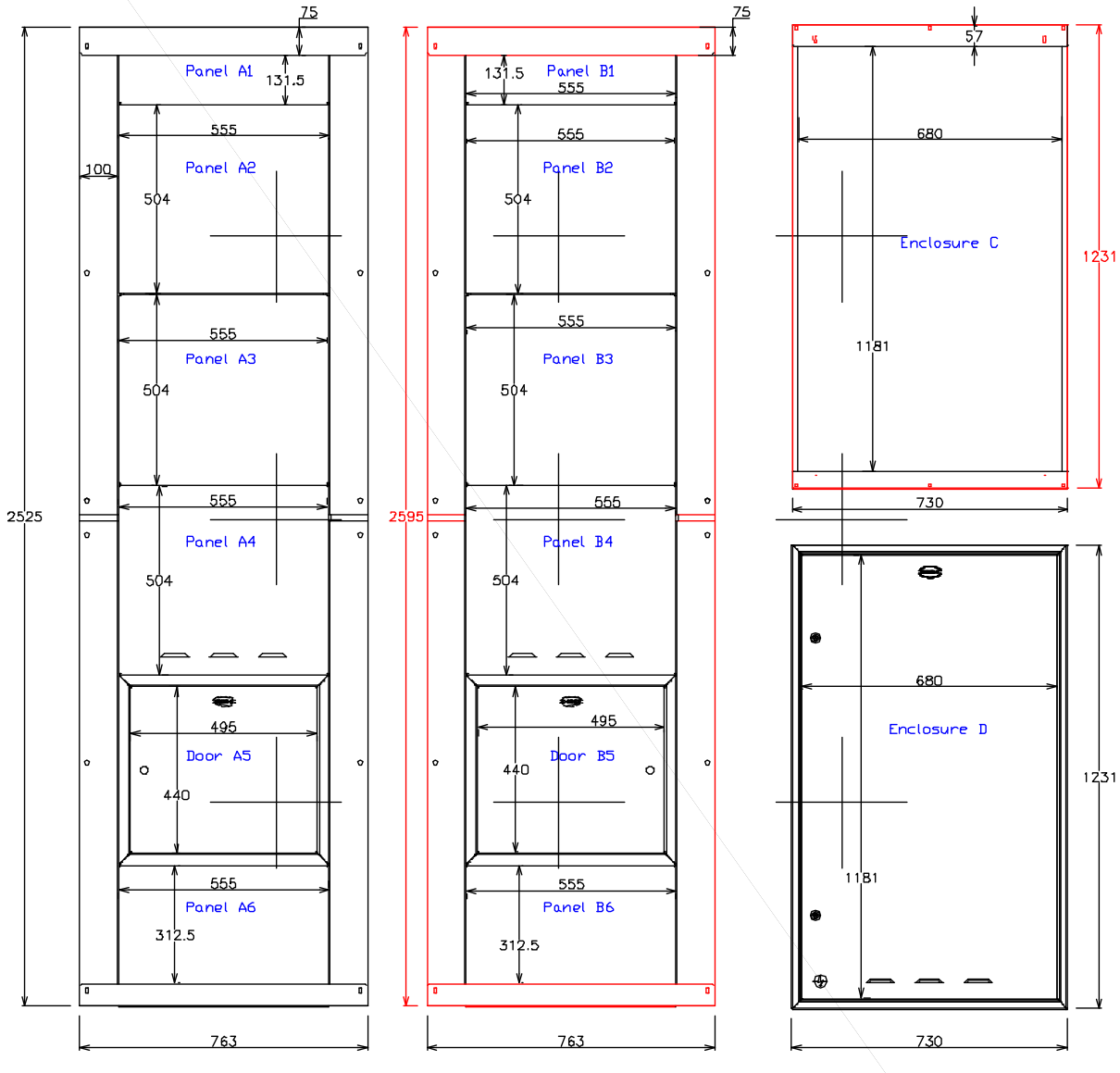
Details of the specimens are shown in section 4.1. All measurements are in mm and the descriptions are written viewing the specimens from the unexposed face unless stated otherwise. The leaf to frame gaps were taken where possible and are shown in section 5.4.

4.1 Riser FireSeal units / FireSeal Vented units fitted in the wall

Riser FireSeal units

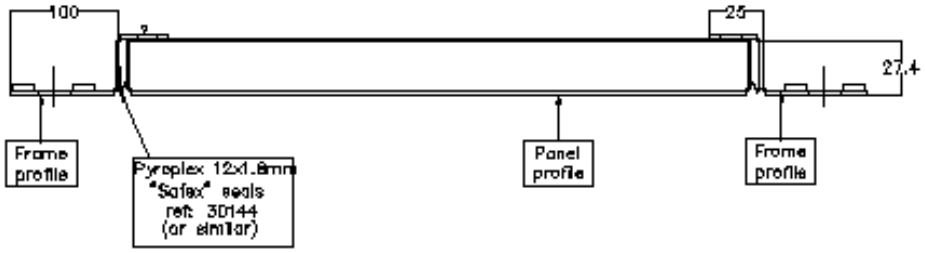
Specimen reference and product reference	Enclosure material – leaf, frame and panels	Mounting position – direction of opening	Unit size (mm)	leaf size (mm)	Lock type
A (Riser Fire Seal unit)	1.2mm thick Zintec steel (polyester powder coated)	Unexposed face - opening away from the furnace	763 wide x 2595 high x 27.4 deep	495 wide x 440 high x 12.5 deep	1No. Tri-key cam lock
B (Riser Fire Seal unit) reverse of A	1.2mm thick Zintec steel (polyester powder coated)	Exposed face - opening into the furnace	763 wide x 2595 high x 27.4 deep	495 wide x 440 high x 12.5 deep	1No. Tri-key cam lock

Front elevation – viewed from the unexposed face

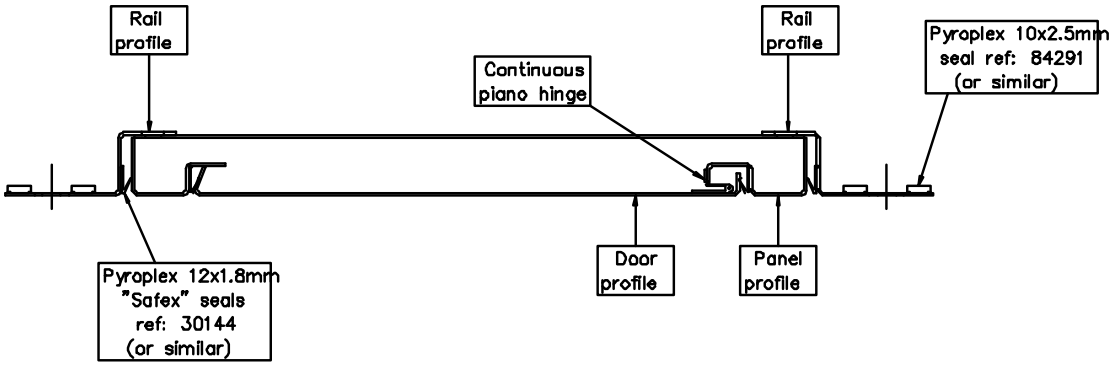


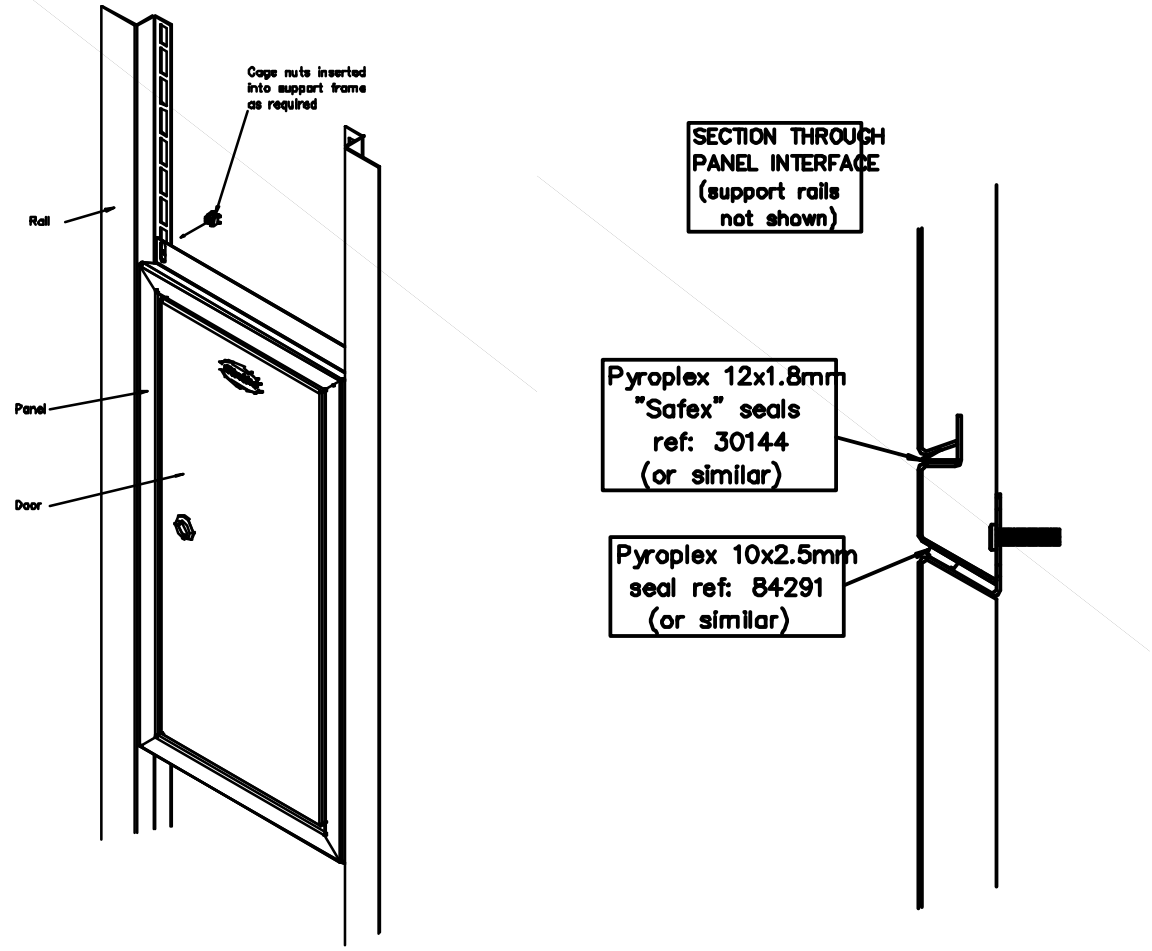
Horizontal cross sections

Panels



Leaf

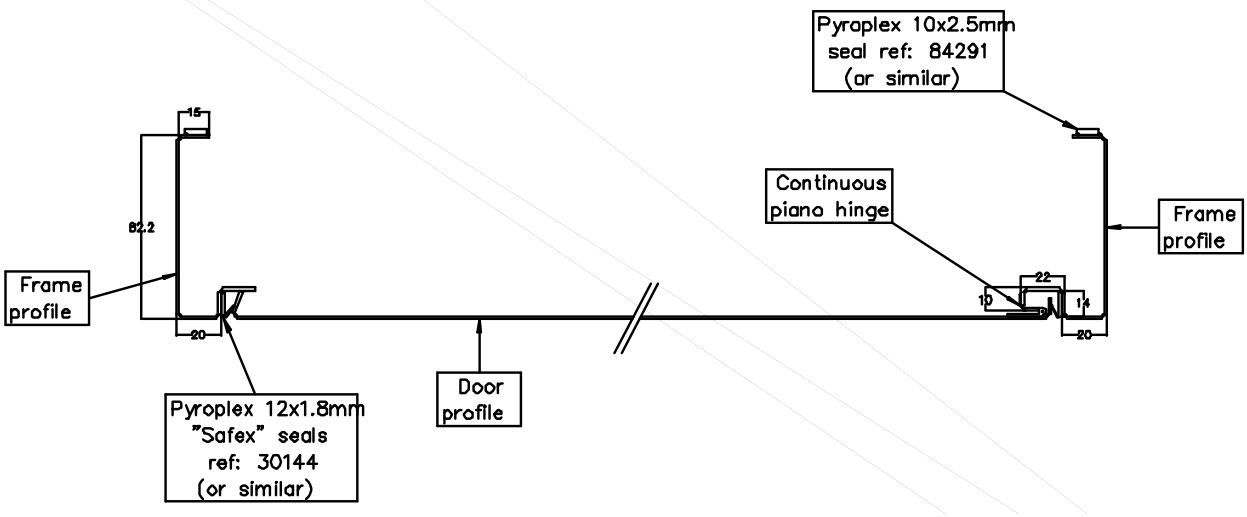




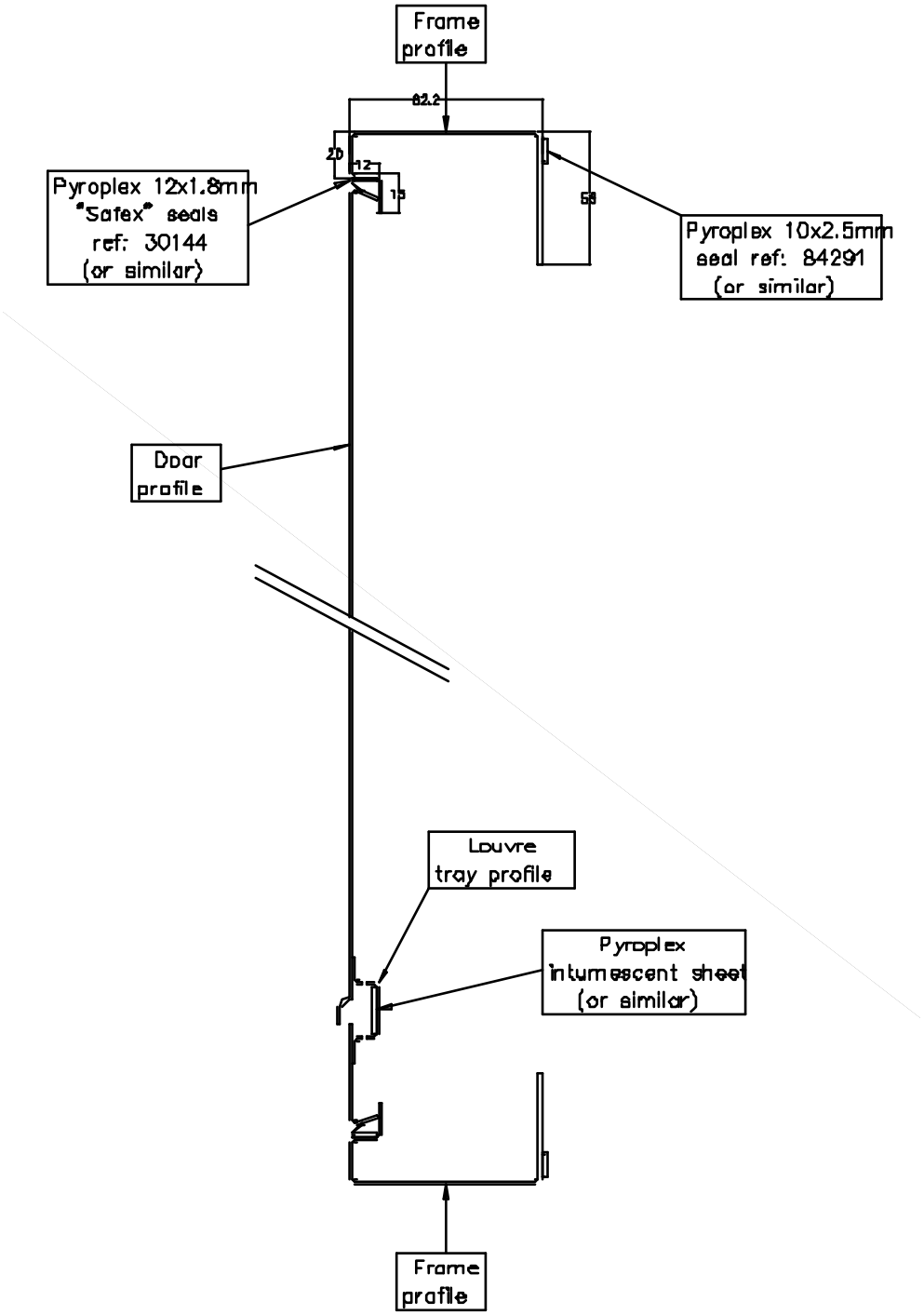
FireSeal Vented Units

Specimen reference and product reference	Enclosure material –Leaf and frame	Mounting position – direction of opening	Unit size (mm)	Leaf size (mm)	Lock type
C (Fire Seal Vented unit)	1.2mm thick stainless steel grade 1.4003 steel (polyester powder coated)	Unexposed face - opening into the furnace	730 wide x 1231 high x 82.2 deep	680 wide x 1180 high	2No. Tri-key cam lock
D (Fire Seal Vented unit), reverse of C	1.2mm thick stainless steel grade 1.4003 steel (polyester powder coated)	Exposed face - opening away from the furnace	730 wide x 1231 high x 82.2 deep	680 wide x 1180 high	2No. Tri-key cam lock

Horizontal cross section



Vertical cross section



4.2 Specimen fixing detail

Specimens A and B were fixed to the supporting construction using 6No. 50mm long steel wood screws on the vertical edges.

Specimens C and D were fixed to the supporting construction using 2No. 50mm long steel wood screws and penny washers on the top and bottom edges.

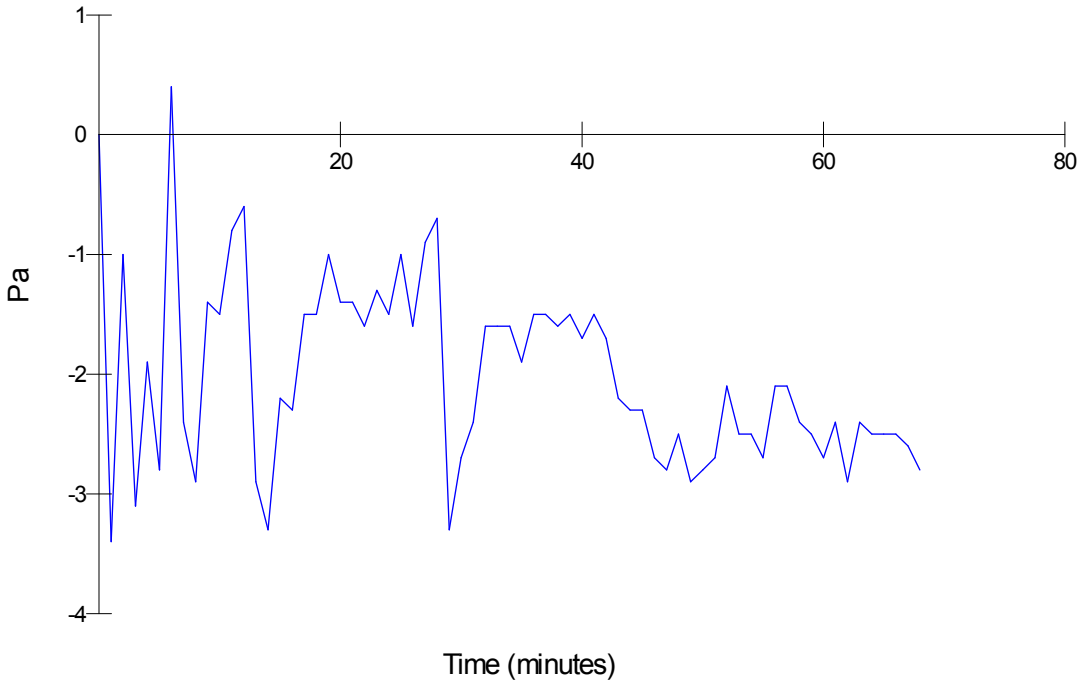
5 Test conditions

5.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 21°C.

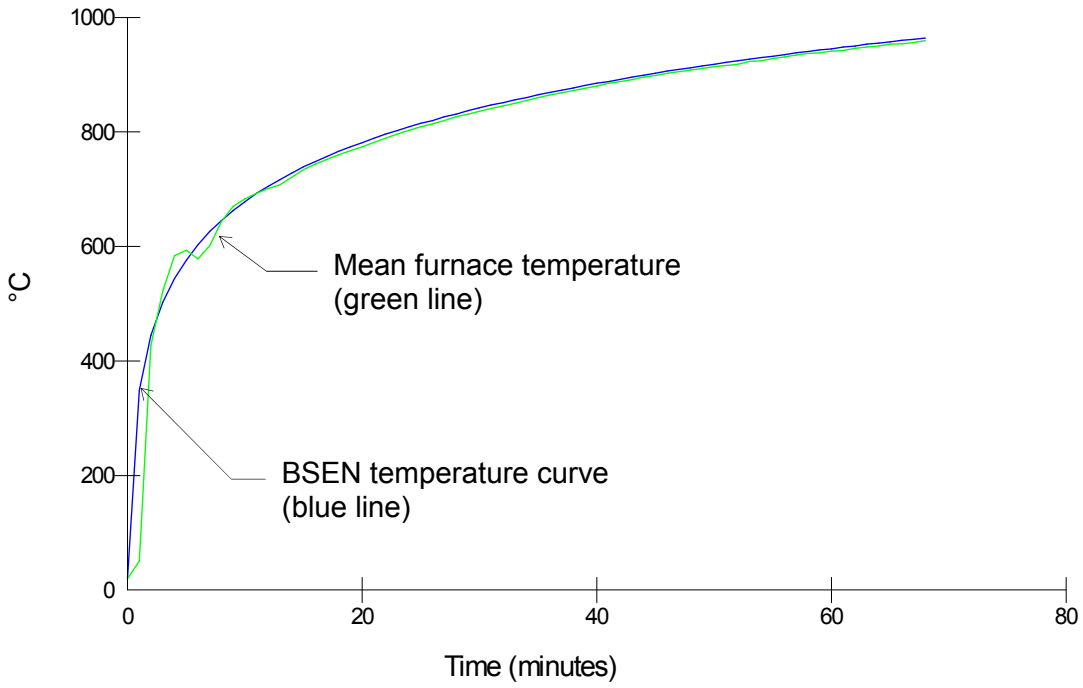
5.2 Pressure readings

After the first 5 minutes of the test, the furnace pressure was maintained at -1.7 ± 5 Pa and after 10 minutes was maintained at -1.7 ± 3 Pa with respect to atmosphere, equating to 20Pa at the head of the specimens A, B and C. The pressure readings have been tabulated in the Appendix and are shown graphically below.



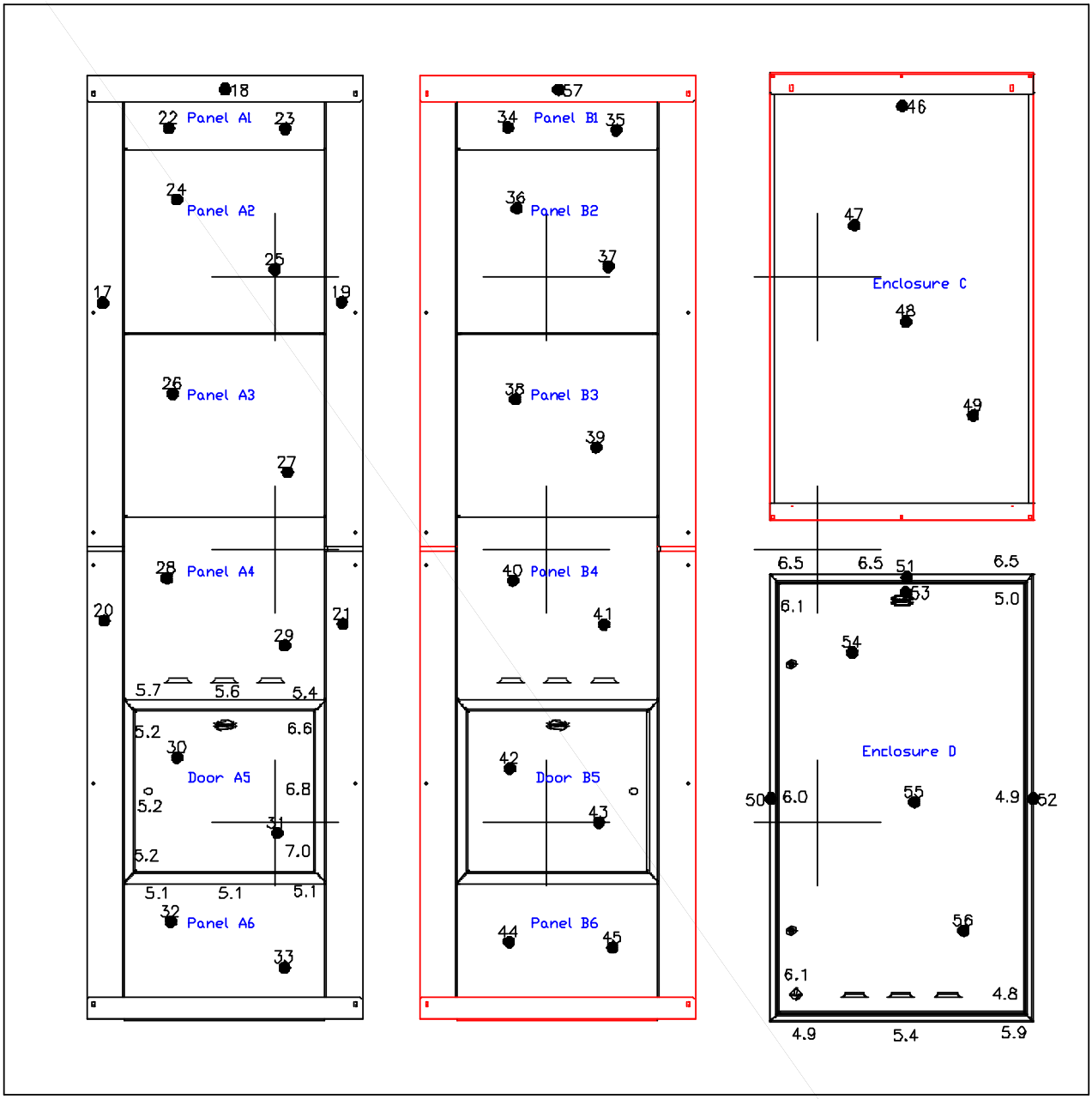
5.3 Furnace temperature

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 recorded have been tabulated in the Appendix and are shown graphically below:

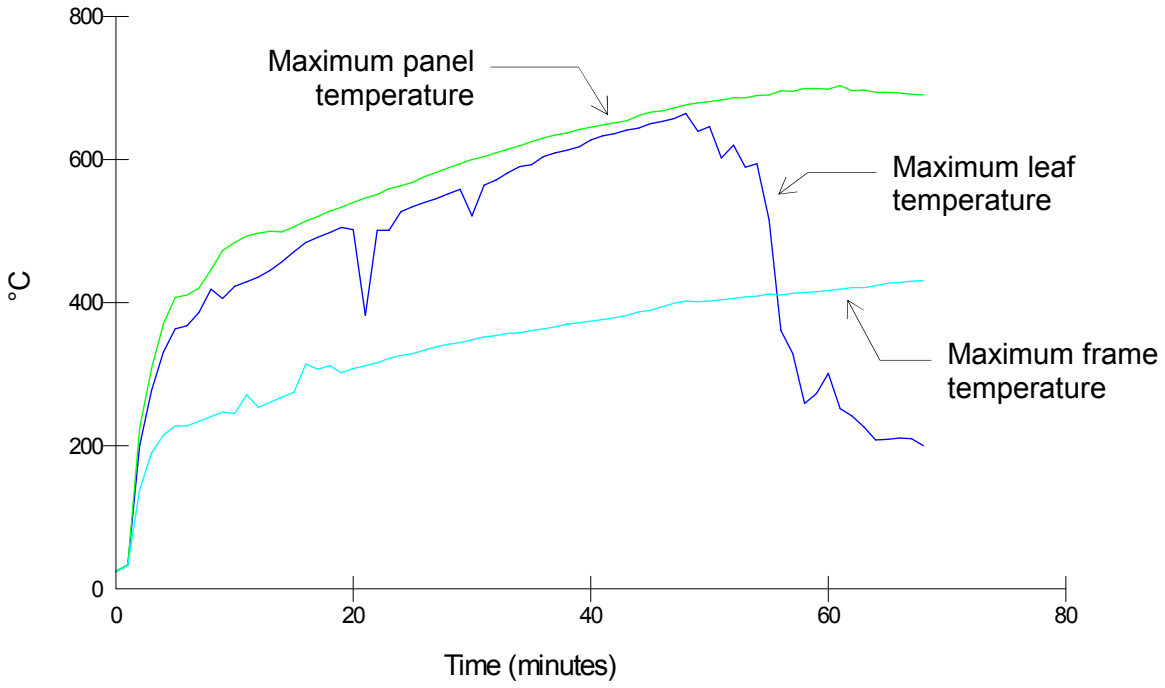


5.4 Thermocouple positions and leaf / frame gaps

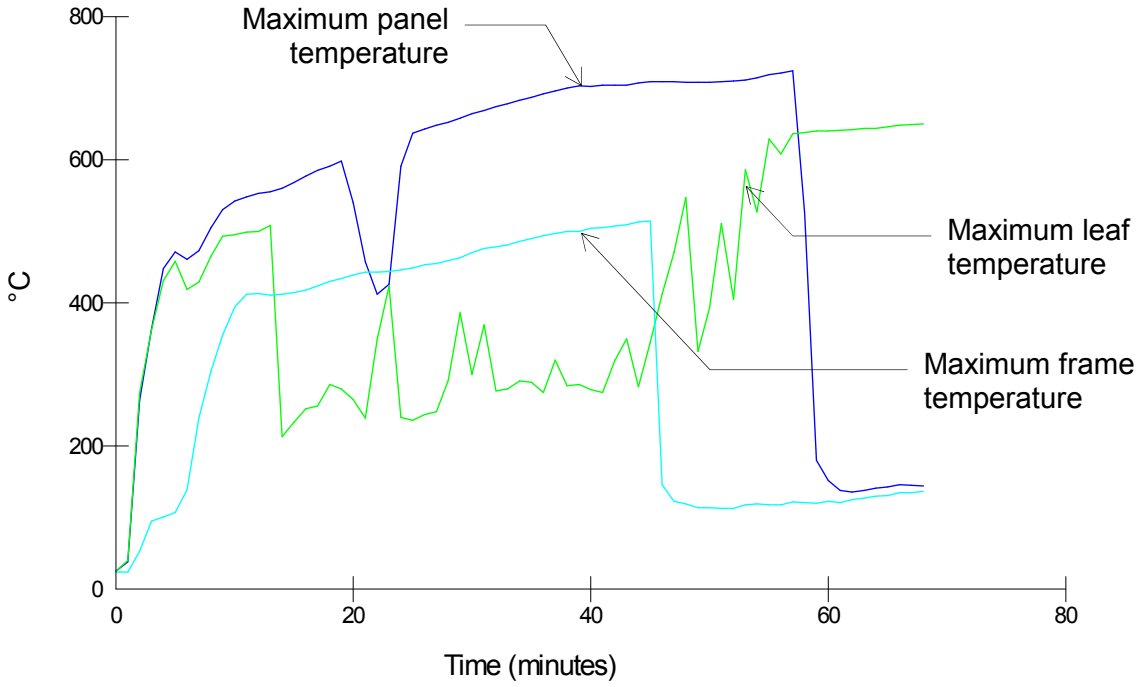
The temperature of the unexposed face of the Riser FireSeal and FireSeal Vented units were monitored by means of thermocouples positioned as shown below. Graphs of the temperatures recorded on the specimens can be found below. The temperatures recorded have been tabulated in the Appendix. The leaf to frame gaps were measured where possible and are given below to one decimal place.



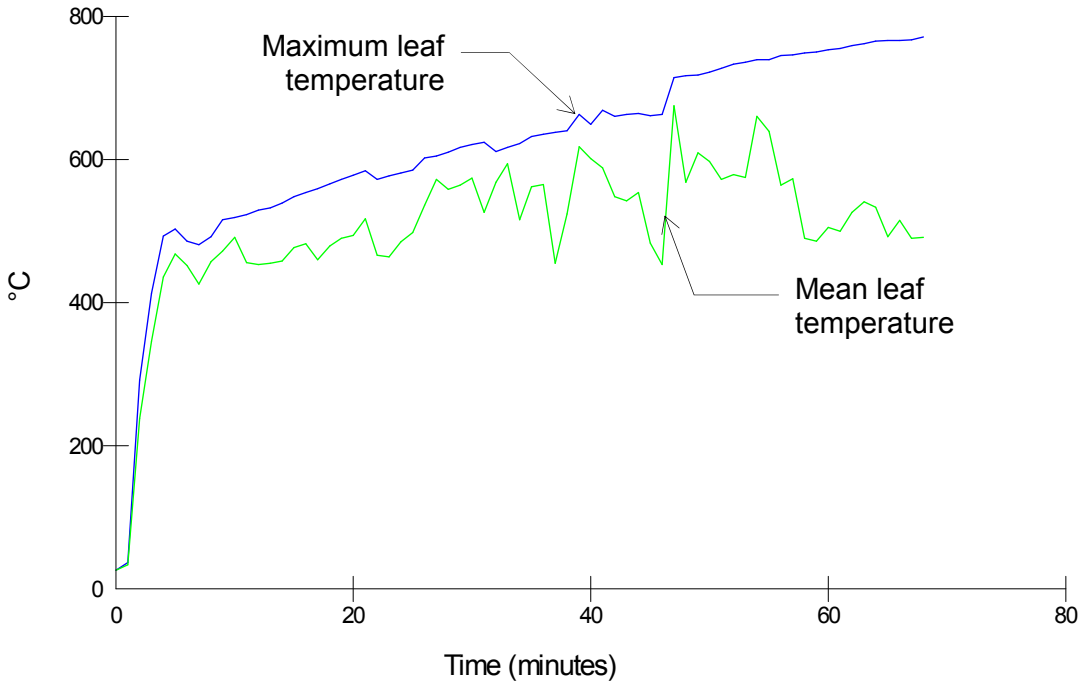
Riser FireSeal A



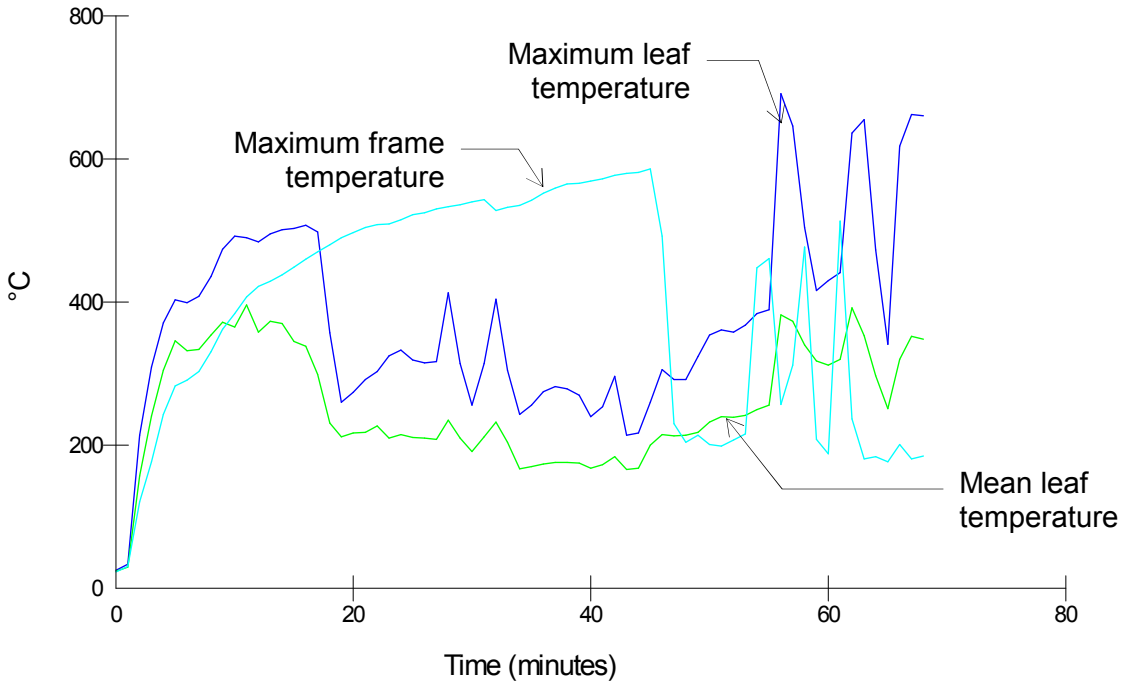
Riser FireSeal B



FireSeal Vented unit C



FireSeal Vented unit D

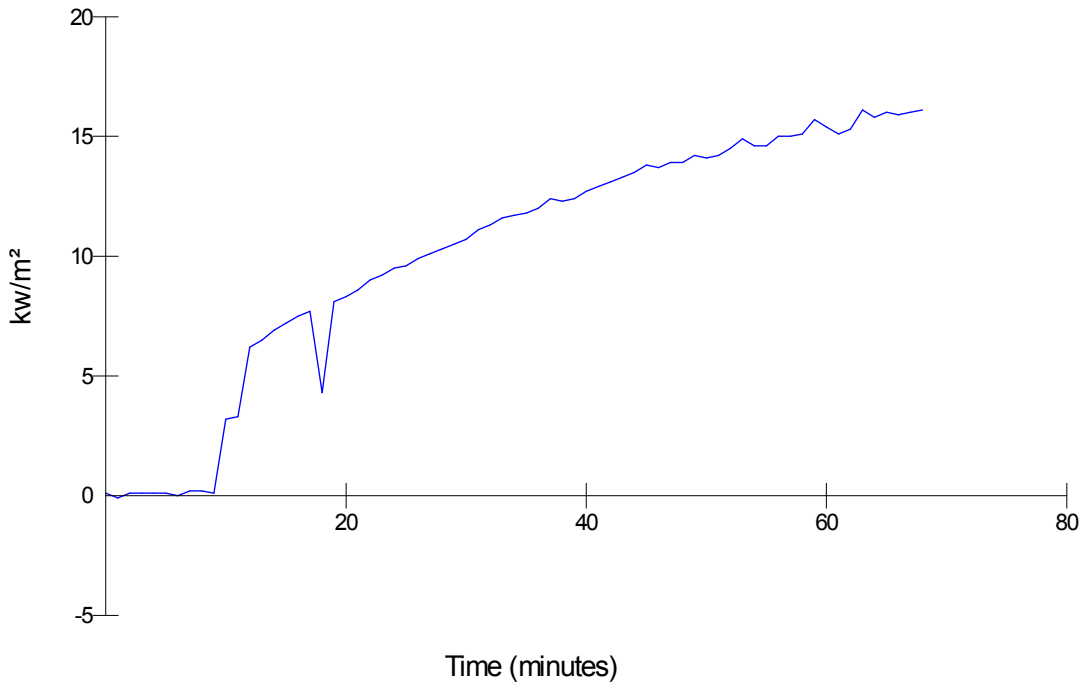


5.5 Radiation

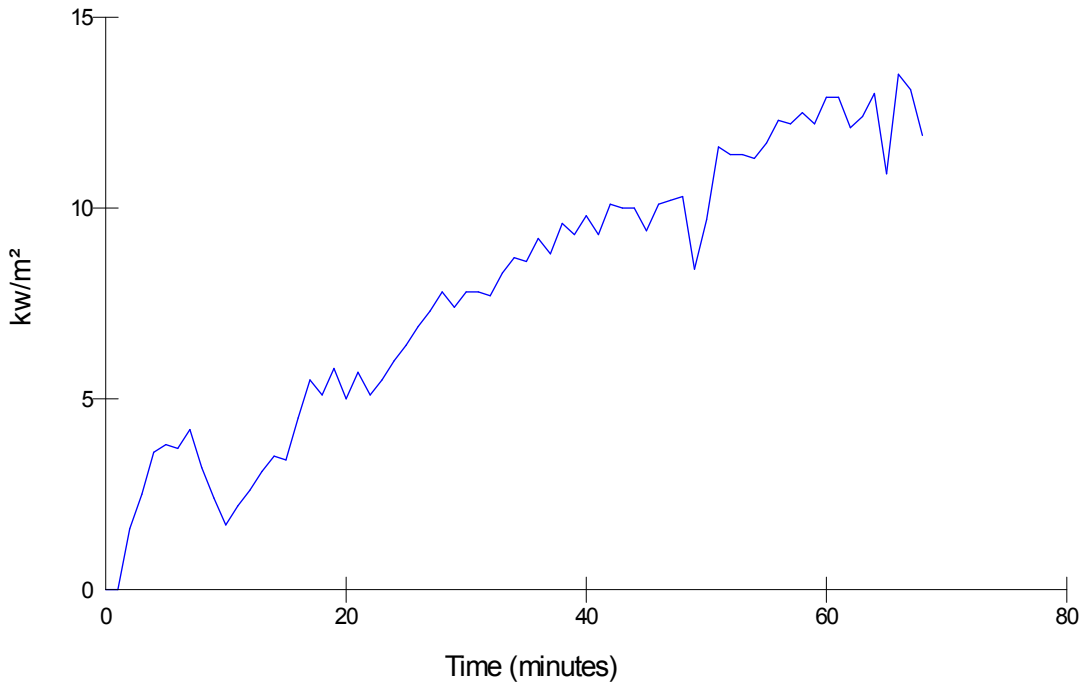
A radiometer was used to measure the radiation at mid height 1m away from specimens B and C.

The readings from the radiometers were recorded and are shown graphically below:

Riser FireSeal B

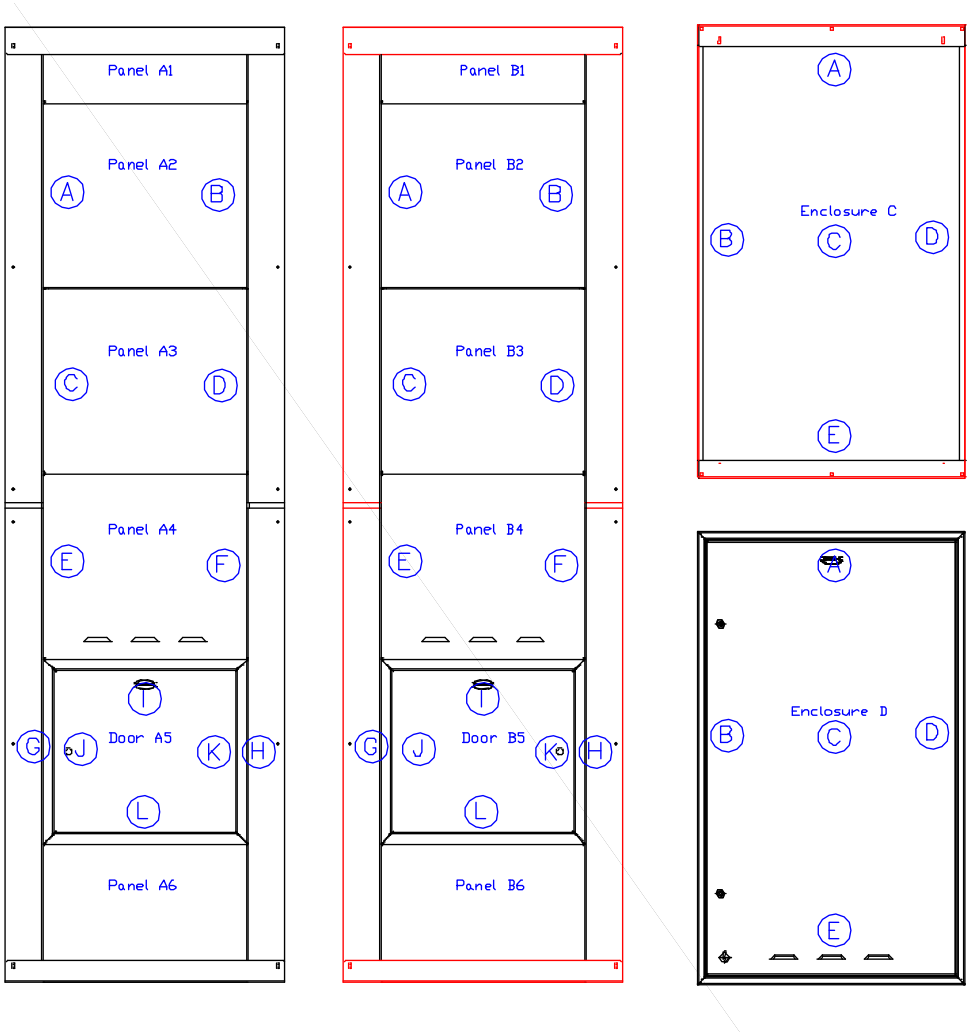


FireSeal Vented unit C



5.6 Deflection

The deflection was measured from various points on each specimen. The readings have been tabulated and are shown graphically below. A positive reading represents deflection in towards the furnace.
A negative reading represents deflection away from the furnace.



A - (front facing Riser FireSeal)

Time	A	B	C	D	E	F	G	H	I	J	K	L
5	3	7	-1	3	-4	-2	-1	4	-1	-2	-1	0
15	5	12	-8	-5	-13	-9	-2	-4	0	4	1	5

B – (rear facing Riser FireSeal)

Time	A	B	C	D	E	F	G	H	I	J	K	L
5	18	15	14	15	16	-15	6	36	21	20	25	15
15	-8	-13	-9	-1	-2	0	16	18	24	20	21	20

C – (rear facing FireSeal Vented unit)

Time	A	B	C	D	E
5	5	14	1	20	13

D – (front facing FireSeal Vented unit)

Time	A	B	C	D	E
5	11	13	18	6	12
15	10	5	16	8	3

6 Observations

All comments relate to the unexposed face unless otherwise specified.

00.00	Test started.
01.14	B and C, there is smoke issuing from the top half perimeter.
01.56	C, there is discolouration across the surface of the panel.
02.18	B, there is discolouration across the surface of the panels.
02.37	A, there is smoke issuing and discolouration across the surface of the panels. The graphite is expanding and falling out from between the panels.
03.37	A, B and C, there is an increase in smoke issuing and discolouration across the surface of the panels. D, there is smoke issuing and discolouration across the surface of the panels.
04.08	B and C, the paint surface is flaking away.
05.08	A and B, there is smoke issuing from the left and right edges.
05.46	D, the graphite is expanding out at the perimeter of the panel leaf.
13.30	There is an increase in discolouration of the perimeter of all panels.
14.46	A, the centre two panels are distorting outwards.
21.59	There is a decrease in smoke issuing from all previously mentioned sites.
22.26	B, there is glow up the centre third of both the left and the right edge.
24.20	The surfaces of all panels have turned yellow.
29.40	C, there is glow at the bottom left corner.
31.58	A, sections of graphite are falling away from the left and right edges of the centre panel, revealing a glow.
33.45	B, there is glow along the left and right edges of the panels. C, there is glow around the top half perimeter.
35.07	B and C, there is discolouration of the plasterboard at the top half perimeter of the specimen.
43.39	C, there is intermittent flaming at the bottom edge and a 6mm gap gauge failure recorded at the centre third of the bottom of the specimen, thereby constituting **integrity failure.**

52.30 B and C, the plasterboard is charring at the top half perimeter.

58.42 D, there is glow at the top left and right corners of the panel leaf.

61.41 B, there is intermittent flaming at the top left corner of the specimen.

64.30 B, there is continuous flaming at the top left corner of the specimen, thereby constituting **integrity failure.**

68.00 Test terminated.

7 Expression of results

Test ref	Integrity			Insulation	Radiation
	Cotton pad	Gap gauge	Continuous flaming		
A	68 (sixty eight) minutes*	68 (sixty eight) minutes*	68 (sixty eight) minutes*	1 (one) minute	Not determined**
B	68 (sixty eight) minutes*	68 (sixty eight) minutes*	64 (sixty four) minutes	1 (one) minute	56 (fifty six) minutes
C	68 (sixty eight) minutes*	43 (forty three) minutes	68 (sixty eight) minutes*	1 (one) minute	68 (sixty eight) minutes*
D	68 (sixty eight) minutes*	68 (sixty eight) minutes*	68 (sixty eight) minutes*	1 (one) minute	Not determined**

* No failure of the test criteria had occurred at termination of the test at 68 minutes
** Although not determined in this test, the radiant heat value of panels with a similar make up and orientation to specimens A and D were evaluated in test report ref FEP/F14083

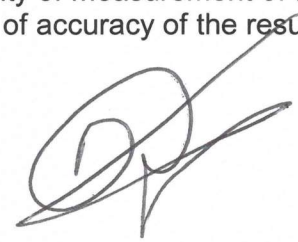
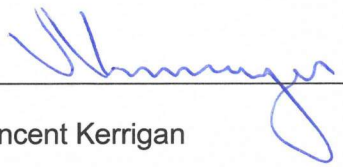
8 Limitations

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 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 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.

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.

Signature:		
Name:	Robert Axe	Vincent Kerrigan
Title:	Lead Technical Officer – Fire Resistance	Technical Manager
Date of issue:	10-11-2014	10-11-2014

9 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 1364-1:1999, 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 BM TRADA upon request.

Allowances in the change of stud depth are also documented within clause 7.2.2.4 of BSEN 1363-1: 2012.

10 Photographs

At start of test

At 15 minutes

At 30 minutes

At 45 minutes

After 60 minutes

At 68 minutes

Appendix – raw test data

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 17	Chan 18	Chan 19
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	0	26	27	27	26	27	27	27	28	28	21	23	24	23
1	-3.4	41	46	49	56	53	54	41	52	69	21	23	33	26
2	-1	353	374	404	460	449	422	394	446	547	21	48	139	85
3	-3.1	444	473	486	541	545	530	507	546	626	21	66	190	111
4	-1.9	512	545	550	590	606	593	577	613	670	21	86	215	132
5	-2.8	540	558	563	589	610	599	598	617	664	21	99	228	156
6	0.4	532	538	552	569	594	582	589	604	650	21	105	228	173
7	-2.4	551	569	573	593	615	610	605	625	676	21	114	234	182
8	-2.9	583	623	630	637	654	653	642	662	704	21	127	241	197
9	-1.4	608	657	662	661	683	678	670	688	727	21	145	247	216
10	-1.5	622	671	678	672	696	693	687	703	732	21	160	245	231
11	-0.8	634	680	688	680	706	702	695	713	745	21	173	271	244
12	-0.6	643	687	696	684	713	710	706	723	752	21	185	252	254
13	-2.9	652	695	705	692	719	716	714	729	757	20	194	251	261
14	-3.3	665	711	719	699	736	729	724	741	768	20	202	252	268
15	-2.2	680	726	734	708	748	744	735	754	783	20	208	257	275
16	-2.3	692	737	746	720	757	753	743	764	790	20	214	314	283
17	-1.5	704	744	753	729	765	761	749	770	797	20	219	307	290
18	-1.5	710	752	763	735	771	769	760	778	803	20	224	312	297
19	-1	719	759	770	743	779	776	767	784	808	20	230	266	302
20	-1.4	726	766	779	748	786	784	771	791	817	20	235	272	308
21	-1.4	739	774	786	755	795	793	775	799	823	20	240	276	312
22	-1.6	746	782	797	762	801	800	784	806	829	20	245	293	316
23	-1.3	752	787	803	773	807	805	795	812	830	20	249	281	322
24	-1.5	761	796	813	775	813	814	801	818	840	20	254	284	326
25	-1	769	805	817	779	818	822	806	823	846	20	258	285	329
26	-1.6	773	810	825	787	824	825	814	828	845	20	261	282	334
27	-0.9	781	816	833	791	828	832	822	834	850	20	234	290	338
28	-0.7	787	821	837	798	834	837	827	838	855	20	187	285	342
29	-3.3	795	827	843	807	838	843	833	843	857	20	174	290	344
30	-2.7	802	833	848	806	844	849	835	848	865	20	173	270	348
31	-2.4	808	837	853	811	850	854	840	852	872	20	166	287	352
32	-1.6	813	841	858	816	852	857	845	856	872	20	174	283	354
33	-1.6	821	848	862	818	858	862	846	861	881	20	173	284	357
34	-1.6	826	852	868	823	860	865	851	865	885	20	174	281	358
35	-1.9	835	859	871	828	869	872	852	869	890	20	170	284	361
36	-1.5	838	863	876	831	872	875	858	872	893	20	166	282	363
37	-1.5	842	866	881	836	875	880	864	877	896	20	161	285	366
38	-1.6	845	868	887	846	875	885	872	880	891	20	161	294	370
39	-1.5	850	871	894	846	880	889	876	884	894	20	167	293	372
40	-1.7	856	878	897	851	884	894	878	887	901	20	177	287	374

The legal validity of this report can only be claimed on presentation of the complete report.

Time	Chan 0	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9	Chan 11	Chan 17	Chan 18	Chan 19
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
41	-1.5	864	884	900	854	889	899	880	892	907	20	177	289	376
42	-1.7	863	885	905	857	892	902	886	896	912	20	260	286	379
43	-2.2	868	890	909	861	896	906	888	898	910	20	265	287	382
44	-2.3	873	895	914	866	899	909	893	902	914	21	251	287	387
45	-2.3	879	899	916	865	903	910	893	904	921	21	217	292	389
46	-2.7	883	901	919	869	906	915	898	908	920	21	214	290	394
47	-2.8	887	905	921	872	909	917	897	910	928	21	213	294	399
48	-2.5	892	910	923	876	912	920	899	914	932	21	211	292	402
49	-2.9	897	913	926	877	915	921	902	916	933	21	212	296	401
50	-2.8	899	915	927	882	918	925	904	919	937	21	193	295	402
51	-2.7	902	918	929	885	920	927	908	922	938	21	190	298	404
52	-2.1	904	919	932	887	923	930	910	924	941	21	196	292	406
53	-2.5	910	925	934	891	927	934	912	928	947	21	189	282	408
54	-2.5	913	927	936	890	928	936	915	930	945	21	200	268	409
55	-2.7	915	930	941	896	931	939	920	933	948	21	199	264	412
56	-2.1	924	934	940	904	936	940	916	934	957	21	204	287	411
57	-2.1	923	935	943	903	937	944	923	939	959	21	225	268	413
58	-2.4	932	939	944	910	942	947	918	940	963	21	217	275	414
59	-2.5	929	942	948	906	942	949	928	943	956	21	219	301	415
60	-2.7	937	944	949	912	946	950	925	943	964	21	217	248	417
61	-2.4	934	945	953	912	946	953	933	947	962	21	221	243	419
62	-2.9	942	949	953	920	951	955	927	949	970	21	229	246	421
63	-2.4	943	951	955	921	955	957	931	952	975	21	233	248	421
64	-2.5	943	953	962	919	955	960	937	954	971	21	235	245	424
65	-2.5	947	955	961	929	960	961	936	956	977	21	238	244	427
66	-2.5	945	957	966	925	957	965	945	959	970	21	243	243	428
67	-2.6	949	957	968	925	959	967	946	961	976	21	248	245	430
68	-2.8	955	961	967	934	965	968	944	962	982	21	266	245	431

Time	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	Chan 33
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	22	22	25	25	25	25	25	25	25	25	25	24	24	24
1	23	23	32	36	31	37	34	35	35	32	33	34	34	30
2	50	51	162	227	146	250	231	220	230	194	201	225	200	143
3	68	71	243	317	224	343	326	314	326	290	288	308	277	216
4	86	93	280	388	313	412	391	384	392	362	354	370	331	274
5	100	104	192	225	376	444	427	426	426	406	394	407	363	313
6	109	112	189	242	398	436	415	216	419	402	399	411	368	322
7	119	126	216	223	405	444	417	240	428	405	351	420	386	337
8	134	143	237	181	425	472	213	201	460	436	210	446	419	371
9	150	160	239	200	451	501	218	247	489	204	228	473	206	406
10	166	174	244	206	469	512	193	206	507	236	269	484	335	423
11	180	187	248	208	474	515	198	212	519	250	223	493	267	429
12	192	196	255	216	478	510	200	214	518	238	228	497	229	436

The legal validity of this report can only be claimed on presentation of the complete report.

Time	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	Chan 33
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
13	201	203	266	223	480	514	204	215	514	188	235	500	213	445
14	209	208	310	231	477	520	242	217	518	191	245	499	286	457
15	217	212	323	235	482	530	266	222	525	199	261	506	296	471
16	225	217	372	236	488	538	221	227	492	208	299	514	228	484
17	231	223	397	241	493	543	224	232	317	196	288	520	207	491
18	237	228	412	249	499	550	222	244	156	209	325	528	204	498
19	241	232	412	258	380	557	213	250	166	217	346	533	213	505
20	245	235	397	264	418	413	201	256	166	215	378	540	224	502
21	250	239	399	266	474	355	198	259	171	219	418	546	221	382
22	254	243	400	277	488	312	205	261	168	219	497	551	231	501
23	259	248	390	282	527	364	216	303	167	220	520	559	224	501
24	263	252	406	247	464	588	223	312	156	226	555	563	223	527
25	267	257	404	238	418	308	227	314	142	227	559	568	221	534
26	271	261	398	278	368	319	227	295	138	235	504	576	223	540
27	275	265	409	220	310	308	262	303	133	241	451	582	223	545
28	279	269	404	290	541	169	252	304	134	247	393	588	218	552
29	282	273	405	418	433	135	256	307	148	255	387	594	228	558
30	285	276	397	308	414	158	245	313	152	252	394	600	231	521
31	289	279	404	296	437	141	241	314	148	268	398	604	235	564
32	292	282	409	165	335	134	222	315	159	274	386	609	234	571
33	296	286	408	123	352	182	207	317	158	277	380	614	238	581
34	300	289	414	115	296	167	205	313	158	282	385	619	239	590
35	303	292	407	114	371	297	208	314	159	273	398	625	229	593
36	306	296	402	115	334	185	202	322	153	277	420	630	227	604
37	309	299	402	114	301	158	203	332	152	281	422	634	244	609
38	312	301	403	121	297	443	207	336	141	283	421	637	248	613
39	316	304	406	120	581	532	205	332	154	298	414	642	254	618
40	319	307	382	130	603	453	205	333	156	297	421	645	257	627
41	322	310	409	124	607	381	205	336	156	287	407	648	265	633
42	325	313	400	245	611	191	207	343	156	289	415	651	287	636
43	327	316	405	414	614	462	207	341	157	289	421	654	301	641
44	330	318	397	617	620	203	209	342	158	295	421	661	336	644
45	333	321	401	428	621	213	208	347	157	297	432	666	317	650
46	336	324	399	572	624	405	208	349	157	283	461	668	312	653
47	338	327	393	473	626	317	209	362	157	295	507	672	320	657
48	340	330	378	569	626	304	209	365	160	299	534	676	361	664
49	343	332	397	555	628	254	211	366	160	299	639	679	345	639
50	345	335	382	579	629	223	210	365	160	303	516	681	311	646
51	347	338	384	542	631	235	211	365	159	302	460	683	274	602
52	350	340	405	505	634	329	216	369	159	303	429	686	279	620
53	352	342	410	345	636	288	221	368	159	304	429	686	275	589
54	354	345	415	268	639	327	221	370	161	307	219	689	287	594
55	356	346	412	269	643	327	221	280	160	310	213	690	327	516
56	358	349	459	263	644	305	219	122	164	306	210	696	361	277

Time	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	Chan 33
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
57	360	350	445	377	646	311	224	127	164	307	212	695	239	329
58	362	352	463	290	641	310	224	126	165	305	215	699	259	217
59	364	354	443	443	646	259	226	127	165	308	214	699	273	230
60	365	355	423	570	645	224	227	130	167	305	215	698	301	222
61	366	356	408	349	649	201	228	125	170	308	214	703	252	186
62	367	358	406	367	651	287	227	126	169	303	224	696	242	194
63	369	361	386	444	650	225	230	133	169	299	243	697	226	205
64	369	248	382	443	615	259	230	183	166	296	235	694	194	208
65	370	211	363	428	648	276	231	193	163	298	228	694	198	209
66	371	206	325	362	470	249	231	163	166	297	248	693	199	211
67	372	171	395	381	479	293	233	147	165	299	247	691	201	210
68	375	160	408	428	620	244	236	156	168	300	281	690	197	200

Time	Chan 34	Chan 35	Chan 36	Chan 37	Chan 38	Chan 39	Chan 40	Chan 41	Chan 42	Chan 43	Chan 44	Chan 45	Chan 46	Chan 47
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	25	25	25	25	25	25	24	25	25	25	25	25	26	26
1	38	38	35	33	33	36	32	37	40	34	36	33	34	34
2	261	264	239	185	182	215	163	264	275	220	235	181	221	247
3	151	363	361	307	284	324	250	359	362	325	329	271	300	367
4	171	448	446	398	212	402	343	437	431	398	392	335	414	463
5	179	471	472	439	169	435	410	459	458	454	426	370	465	481
6	172	461	455	426	143	413	420	435	419	415	410	365	461	457
7	177	473	466	423	148	414	403	445	429	413	421	381	465	459
8	194	505	498	444	165	442	419	483	465	450	463	431	492	476
9	203	530	523	470	176	473	449	513	493	482	498	474	516	494
10	211	542	519	484	192	476	456	512	495	489	516	489	519	505
11	218	548	524	493	201	481	196	514	499	489	517	236	523	512
12	220	553	530	497	199	481	177	514	500	491	513	218	529	518
13	228	555	363	502	203	482	180	519	508	496	516	185	532	521
14	244	560	543	506	193	490	184	529	213	209	524	183	539	527
15	251	568	359	513	204	501	201	540	218	233	536	214	548	535
16	286	577	389	196	198	510	209	547	222	252	545	200	554	540
17	190	585	543	200	191	416	212	553	219	256	549	217	559	545
18	182	591	573	201	189	350	235	556	218	286	556	202	566	550
19	184	598	579	201	205	404	234	561	235	280	410	240	572	555
20	192	540	584	207	203	396	235	565	239	265	533	233	578	561
21	230	457	590	230	197	290	247	571	239	239	549	226	584	567
22	211	412	597	219	204	529	187	573	243	349	573	235	527	572
23	212	426	602	224	198	502	189	579	240	424	577	225	484	577
24	214	591	606	245	199	403	204	585	237	240	586	212	407	581
25	209	637	610	267	197	556	201	591	236	233	415	213	363	585
26	212	643	616	264	200	561	202	594	244	223	590	223	602	588
27	217	648	619	278	205	566	205	597	248	234	472	227	605	591
28	228	652	624	263	208	570	212	602	243	292	362	226	610	596

Time	Chan 34	Chan 35	Chan 36	Chan 37	Chan 38	Chan 39	Chan 40	Chan 41	Chan 42	Chan 43	Chan 44	Chan 45	Chan 46	Chan 47
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
29	218	658	628	275	209	574	208	606	249	386	382	220	617	600
30	239	664	631	279	209	578	213	611	250	300	497	234	621	605
31	253	669	634	310	217	582	216	616	285	369	506	235	624	373
32	259	674	637	310	226	586	216	618	277	266	524	246	528	611
33	257	678	643	338	232	591	222	623	280	268	564	255	582	617
34	316	683	646	553	234	594	218	625	189	291	588	253	414	622
35	323	687	650	374	231	599	222	632	194	289	620	255	406	625
36	127	692	651	372	230	601	225	634	195	275	610	285	469	614
37	339	696	556	417	238	606	219	636	194	320	627	302	336	336
38	333	700	657	543	245	609	223	636	197	284	635	283	246	635
39	338	703	396	613	251	612	223	640	198	286	556	259	663	638
40	340	702	430	431	259	614	227	645	201	279	583	248	506	643
41	326	704	508	392	264	619	231	647	204	275	655	247	669	413
42	335	704	671	369	266	622	228	648	203	319	657	315	273	639
43	351	704	651	421	265	626	230	649	206	350	661	276	280	649
44	350	707	429	339	275	625	238	648	206	283	664	324	274	655
45	346	709	416	341	273	625	239	647	208	345	668	322	350	661
46	116	709	402	328	277	625	256	646	215	412	668	242	289	663
47	112	709	394	332	273	626	259	634	212	470	671	363	714	666
48	114	708	420	337	276	627	259	642	214	547	676	366	717	671
49	110	708	418	343	281	627	259	650	217	332	680	294	718	672
50	109	708	427	355	284	628	267	651	219	393	678	298	722	678
51	110	709	421	372	285	629	276	651	221	511	676	382	727	682
52	110	710	411	398	282	630	267	653	220	405	673	366	733	685
53	112	711	426	383	284	631	267	653	221	586	670	391	736	687
54	113	714	451	377	281	629	272	572	221	527	671	423	739	690
55	115	719	436	388	277	629	278	537	228	629	670	394	739	692
56	117	721	437	385	268	631	280	247	227	608	669	390	745	701
57	117	724	439	390	275	633	322	238	226	636	665	397	746	700
58	117	526	421	392	274	637	321	229	230	638	666	443	749	705
59	124	180	459	386	279	637	320	235	228	640	664	420	750	704
60	130	152	415	398	281	639	325	235	233	640	662	423	753	707
61	136	138	434	390	288	640	322	227	229	641	658	403	755	709
62	136	127	444	392	284	642	318	212	231	642	660	417	759	715
63	138	126	455	404	284	646	319	216	235	644	660	396	762	718
64	141	126	417	419	298	647	325	242	233	644	660	406	765	717
65	143	124	599	384	291	650	321	226	244	646	662	437	766	720
66	146	125	128	398	288	652	320	221	252	648	663	437	766	719
67	145	127	136	402	297	653	330	225	251	649	663	399	767	720
68	144	126	136	395	297	655	334	228	250	650	668	448	771	724

Time	Chan 48	Chan 49	Chan 50	Chan 51	Chan 52	Chan 53	Chan 54	Chan 55	Chan 56	Chan 57	Chan 58	Chan 59
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	kw/m²	kw/m²
0	26	25	23	23	23	23	24	25	24	24	0.1	0
1	37	33	27	31	30	26	32	34	30	24	-0.1	0
2	292	193	110	118	121	105	156	214	152	53	0.1	1.6
3	413	304	152	171	177	150	270	309	236	95	0.1	2.5
4	493	376	214	240	243	199	354	371	295	101	0.1	3.6
5	503	422	248	283	278	251	398	403	330	107	0.1	3.8
6	486	406	253	291	285	270	399	394	266	139	0	3.7
7	481	301	262	303	300	282	405	408	243	239	0.2	4.2
8	485	376	286	327	331	307	436	286	387	305	0.2	3.2
9	498	378	317	359	362	344	474	312	360	355	0.1	2.4
10	503	437	337	383	384	396	492	201	370	394	3.2	1.7
11	512	278	356	401	407	422	490	201	472	412	3.3	2.2
12	517	248	370	413	422	258	483	205	484	413	6.2	2.6
13	515	253	384	418	429	329	476	193	495	411	6.5	3.1
14	523	244	400	423	438	288	481	210	501	412	6.9	3.5
15	531	295	408	428	449	170	487	221	503	414	7.2	3.4
16	535	298	417	436	460	113	495	235	507	418	7.5	4.5
17	466	270	424	446	470	111	498	236	352	424	7.7	5.5
18	523	277	436	453	480	112	357	251	205	430	4.3	5.1
19	546	286	446	461	490	112	256	260	222	434	8.1	5.8
20	544	294	148	466	497	114	251	274	229	439	8.3	5
21	468	448	118	473	504	116	253	292	211	443	8.6	5.7
22	428	336	114	480	508	118	263	303	225	443	9	5.1
23	463	332	112	485	509	118	248	148	325	444	9.2	5.5
24	570	381	115	490	515	119	272	135	333	446	9.5	6
25	528	515	122	496	522	122	267	136	319	449	9.6	6.4
26	431	524	120	502	525	123	270	132	315	453	9.9	6.9
27	565	527	122	508	530	122	258	135	317	455	10.1	7.3
28	494	530	123	510	533	121	269	136	413	459	10.3	7.8
29	501	539	152	514	536	124	264	139	314	463	10.5	7.4
30	525	543	141	516	540	124	242	143	256	470	10.7	7.8
31	560	549	140	524	543	128	258	150	314	476	11.1	7.8
32	607	526	153	528	454	127	257	141	404	478	11.3	7.7
33	617	560	170	532	250	126	243	140	305	481	11.6	8.3
34	607	420	168	535	216	130	243	141	154	486	11.7	8.7
35	632	587	226	542	195	138	256	143	142	490	11.8	8.6
36	635	543	277	552	175	141	275	145	134	494	12	9.2
37	638	511	476	559	179	143	282	147	133	497	12.4	8.8
38	640	573	519	565	156	144	279	149	133	500	12.3	9.6
39	643	529	524	566	173	146	270	150	133	500	12.4	9.3
40	649	605	529	569	154	148	240	151	133	504	12.7	9.8
41	653	615	532	572	154	151	254	153	133	505	12.9	9.3
42	660	622	144	577	158	153	296	155	134	507	13.1	10.1
43	663	574	141	580	154	155	214	158	136	509	13.3	10

The legal validity of this report can only be claimed on presentation of the complete report.

Time	Chan 48	Chan 49	Chan 50	Chan 51	Chan 52	Chan 53	Chan 54	Chan 55	Chan 56	Chan 57	Chan 58	Chan 59
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	kw/m²	kw/m²
44	664	625	140	581	151	157	217	160	136	513	13.5	10
45	327	593	142	586	153	160	220	162	260	514	13.8	9.4
46	232	627	148	492	157	162	222	170	306	146	13.7	10.1
47	681	639	147	230	156	164	223	172	292	123	13.9	10.2
48	237	645	146	204	157	166	222	174	292	119	13.9	10.3
49	448	599	144	214	157	146	227	174	324	114	14.2	8.4
50	345	644	144	201	154	169	230	176	354	114	14.1	9.7
51	238	642	147	199	153	172	248	178	361	113	14.2	11.6
52	241	657	158	207	153	174	233	191	358	113	14.5	11.4
53	223	654	147	216	154	176	239	186	368	118	14.9	11.4
54	567	645	150	448	155	177	250	191	384	119	14.6	11.3
55	471	654	153	461	156	180	263	194	389	118	14.6	11.7
56	523	286	154	257	158	181	255	691	400	118	15	12.3
57	597	249	153	312	160	187	255	646	404	122	15	12.2
58	240	265	154	477	162	185	260	504	410	121	15.1	12.5
59	248	240	153	208	162	186	290	381	416	120	15.7	12.2
60	258	302	152	188	149	189	318	312	430	123	15.4	12.9
61	262	275	161	513	163	190	354	296	441	121	15.1	12.9
62	304	325	166	237	163	189	636	294	448	125	15.3	12.1
63	337	346	158	181	163	187	655	267	302	127	16.1	12.4
64	314	337	154	184	160	189	473	255	270	130	15.8	13
65	233	249	163	177	159	141	341	287	234	131	16	10.9
66	288	287	161	201	160	142	618	277	245	135	15.9	13.5
67	238	235	166	181	165	239	662	264	244	135	16	13.1
68	237	233	155	185	164	191	660	314	229	137	16.1	11.9

BMTRADA

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

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