

CONFIDENTIAL REPORT

Project Title : Indicative Fire Test on 12 mm Thick Versafire
Fire Retardant Construction Board

Client : Euroform Products Ltd

Contact : Mr G Wordswick

Reference : P03192ASKR

Report Prepared by : Mr S A Kessel

Project Manager : Mr S A Kessel

Issue Authorised by :

Mr A Hinton
Manager, Advanced Materials Group
CERAM Process & Materials Division

Date of Issue : 6 October 2003

Circulation : Mr G Coates, Euroform Products Ltd
Mr A Wordswick, Euroform Products Ltd

CONTENTS

SUMMARY

- 1 INTRODUCTION**
- 2 SAMPLE SPECIFICATION**
- 3 CONSTRUCTION DETAILS**
- 4 INSTRUMENTATION DETAILS**
- 5 TEST PROCEDURE**
- 6 TEST RESULTS**
- 7 LIMITATIONS**

APPENDICES

FIGURES

TEST DATA

OBSERVATIONS

HEALTH & SAFETY DATA

This report is issued in accordance with the Conditions of Business of CERAM. It may not be reproduced in part without the written permission of CERAM or used in any way that may lead to misrepresentation of the results or their implications.

SUMMARY

Two separate indicative fire tests were performed on vertical panel systems constructed by Euroform Products Ltd. Each system consisted of a single test specimen built into a steel frame housing. The tests were conducted at CERAM using the reduced scale furnace with each specimen tested to the general principles of BS 476 part 20: 1987.

Test Panel 1

When the test specimen was subjected to temperature conditions specified in BS 476 part 20:1987 and a positive pressure equivalent to 8.5 Pa (± 2.5 Pa) at a height of 1 m, the system maintained both insulation and integrity criteria for the full duration of the test. The test was terminated after 132 minutes. Details relating to insulation and integrity are as follows:

Insulation - The average thermocouple temperature after a period of 132 minutes was 127°C.

Integrity - The test panel specimen showed no signs of integrity damage/failure at the point of test termination.

Test Panel 2

When the test specimen was subjected to temperature conditions specified in BS 476 part 20:1987 and a positive pressure equivalent to 8.5 Pa (± 2.5 Pa) at a height of 1m, the system maintained insulation criteria for 123 minutes. Integrity criteria was maintained for the full test duration of 131 minutes. The test was terminated after 131 minutes. Details relating to insulation and integrity are as follows:

Insulation - Insulation criteria was maintained for 123 minutes.

Integrity - The test panel specimen showed no signs of integrity damage/failure at the point of test termination.

Insulation failure occurred when thermocouple 11 exceeded the maximum tolerance of 201°C after 123 minutes. This thermocouple was adjacent to a vertical joint.

1 INTRODUCTION

This report covers two indicative fire tests conducted at CERAM RESEARCH LTD using a reduced scale furnace with height, width and depth dimensions of 1400 x 1380 x 1000 mm. The results relate to the integrity and insulation performance of two vertical panel systems, to the general principles of fire testing shown in BS 476: Part 22: 1987 with reference to BS 476 Part 20: 1987. The test was conducted on the 30th September 2003 and was sponsored by Euroform Products Ltd.

The tests were witnessed by:

Mr S A Kessel (CERAM Research Ltd)
Mrs E Whieldon (CERAM Research Ltd)
Mr A S Worswick (Euroform Products Ltd)
Mr G Coates (Euroform Products Ltd)

The testing aims were as follows:

- To determine the performance of two vertical panel systems when tested to the general principles of BS 476 Part 22: 1987 reference to BS 476 Part 20: 1987.
- To test for a minimum of 120 minutes to determine insulation and integrity criteria.
- To use as a benchmark test for future work programs.

2 SAMPLE SPECIFICATION

The samples supplied to CERAM were part constructed and consisted of Versafire 12 mm thick board, steel outer frame, studs, insulation, Versafiller and fixings. Method of construction for both panels is given in Section 3. Product Health and data specifications applicable to Versafire board are included in the APPENDIX Section of this report.

3 CONSTRUCTION DETAILS

Test Panel 1 – Steel Stud System

A steel frame housing was installed to provide a tight fit within a testing frame which accommodated an insulated opening size of 1405 mm wide x 1380 mm high. The installation method used single screw fixings at circa 200 mm centres into all the insulation block faces. The intumescent sealant was used to seal gaps between the test panel and blockwork. The steel frame contained two vertical 70 mm x 0.5 mm dry lined steel studs at 600 mm centres. Viewed from the no-fire side, the centre of the left hand vertical joint was 200 mm from the test frame edge (ref: side A-C in Figure 1), with the 2nd joint nominally 1000 mm from the same edge. VERSAFIRE board 12 mm thick was fixed to the studs at 300 mm intervals on the non-fire side of the frame. Versafiller was used to fill/seal the joints between the boards. Two layers of 30 mm thick 100 Kg mineral fibre was used in a staggered formation, to provide friction fit insulation packing between the studs. The VERSAFIRE board (fire-side)

was fixed to the joints at 300 mm intervals, with the unexposed face of the board in contact with the mineral fibre insulation.

Test Panel 2 – Timber Stud System

The installation method/details and specimen construction were consistent with Test Panel 1 with the following exceptions:

- The testing frame insulated opening size was 1415 mm wide x 1385 mm high.
- The two vertical studs were 75 mm (depth) x 50 mm (width) timber studs (as opposed to steel with Test Panel 1).
- The mineral fibre layers were 30 mm and 40 mm thick to provide an overall insulation thickness of 70 mm (compared to 60 mm with Test Panel 1).
- The joint with centre nominally 200 mm from the panel edge was adjacent to the right hand side of the test frame (as opposed to the left side with panel 1).

Figure 1 – APPENDIX Section shows a sketch applicable to both test panels, showing the panel NON-FIRE side with positions for joints and specimen thermocouples.

Figure 2 - APPENDIX Section shows a photograph of the NON FIRE side of the Test Panel 1 prior to test commencement.

Figure 3 - APPENDIX Section shows a photograph of the FIRE side of the Test Panel 1 prior to test commencement.

Figure 9 - APPENDIX Section shows a photograph of the NON FIRE side of the Test Panel 2 prior to test commencement.

4 INSTRUMENTATION/EQUIPMENT DETAILS

Furnace temperature was monitored using four type K mineral insulated thermocouples positioned equidistantly across the furnace opening. The average temperature of the four thermocouples was controlled to the limits specified in BS 476 Part 20: 1987 and BS 476 part 22: 1987 Section 10.4.3. Recorded data is in the APPENDIX.

Specimen surface temperature (non fire side) was measured using seven type K thermocouples as specified in BS 476 Part 20: 1987 section 6.4.2.1. Four thermocouples were positioned on the board face, approximately 50 mm from the panel corners and the bead joints. A fifth thermocouple was located on the centre of the panel face. Two additional thermocouples were positioned adjacent to the perpendicular joints. Thermocouple location details are shown on the specimen sketch Figure 1 in the APPENDIX.

The ambient temperature (Thermocouple 5) was measured using a type K mineral insulated thermocouple protected from the test element by a screen.

The thermocouple temperatures were recorded using an SR mini multizone temperature monitoring system, with a Specview purpose written software package to provide real time information.

Furnace pressure was monitored throughout the test.

5 TEST RESULTS

Test Panel 1

The test specimen was fixed to the furnace and the furnace was operated according to the CERAM Fire Test procedures. A pressure target setting of 8.5 Pa and controlled to ± 2.5 Pa was set at the mid-height of the test specimen. This target setting applied throughout the test duration. The furnace temperature was controlled to conditions specified in BS 476 Part 22:1987 with reference to BS 476 Part 20:1987.

The ambient laboratory temperature at the start of the test was 16°C. The average specimen thermocouple temperature at the start of the test was 18°C.

Up to the time of test termination, the specimen was monitored for its performance against the criteria of insulation and integrity as defined in BS 476 Part 22: 1987.

The specimen maintained integrity and insulation criteria for the full test period.

The furnace temperature conditions were maintained within the specifications given in BS 476 part 22: 1987.

The APPENDIX section contains details of the observations and test data although some specific results are noted below:

- After a period of 12 minutes excessive smoke was observed in the non-fire side test chamber and this lasted for a period of 2 minutes. This co-incident with a temperature surge (see test data in APPENDIX).
- The above observation also triggered a resulting plateau with respect to specimen temperature increase (as measured by the specimen thermocouples).
- Blistering of the filled joint areas was prominent throughout the test (18 minutes onwards).
- Post test observation revealed that the board had bowed by 10 mm +ve at the mid-point.

Test Panel 2

The test specimen was fixed to the furnace and the furnace was operated according to the CERAM Fire Test procedures. A pressure target setting of 8.5 Pa and controlled to ± 2.5 Pa was set at the mid-height of the test specimen. This target setting applied throughout the test duration. The furnace temperature was controlled to conditions specified in BS 476 Part 22:1987 with reference to BS 476 Part 20:1987.

The ambient laboratory temperature at the start of the test was 19°C. The average specimen thermocouple temperature at the start of the test was 21°C.

Up to the time of test termination, the specimen was monitored for its performance against the criteria of insulation and integrity as defined in BS 476 Part 22: 1987.

The specimen maintained insulation criteria for 123 minutes.

The specimen maintained integrity for the full test duration of 131 minutes.

The furnace temperature conditions were maintained within the specifications given in BS 476 part 22: 1987.

The APPENDIX section contains details of the observations and test data although some specific results are noted below:

- There was no excessive smoke/temperature surge behaviour as seen with Test Panel 1.
- Specimen temperature increase was observed but did not "plateau" until a temperature of circa 80°C was attained.
- Blistering of the filled joint areas was less prominent throughout the test (compared to Test Panel 1).
- Fire face observations showed more flaming present in the joint area (compared to Test Panel 1).
- Post test observation revealed that the board had bowed by 45 mm +ve at the mid-point.

6 CONCLUSIONS

When exposed to the temperature and pressure conditions approximating to those given in BS 476 part 22: 1987, both vertical panel systems satisfied insulation and integrity criteria for periods in excess of 120 minutes.

Neither test specimen showed integrity failure at the point of test termination.

7 LIMITATIONS

The results only relate to the behaviour of the specimen of the element of construction under the particular conditions of the 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.

APPENDIX

FIGURES

Figure 1 - Sketch of Thermocouple Locations

The numbers relate to the thermocouple details given in the test data section. Sketch is not to scale.

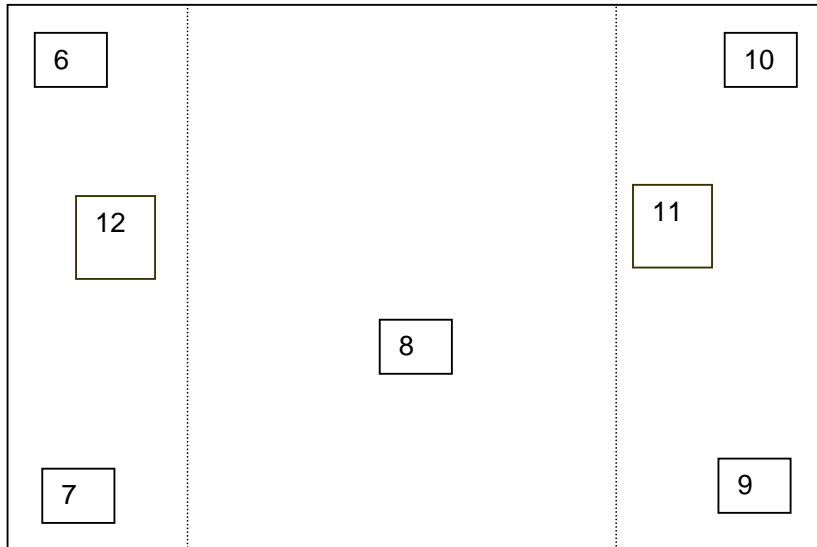


Figure 2 – Pre Test View : Non Fire Side Test Panel 1

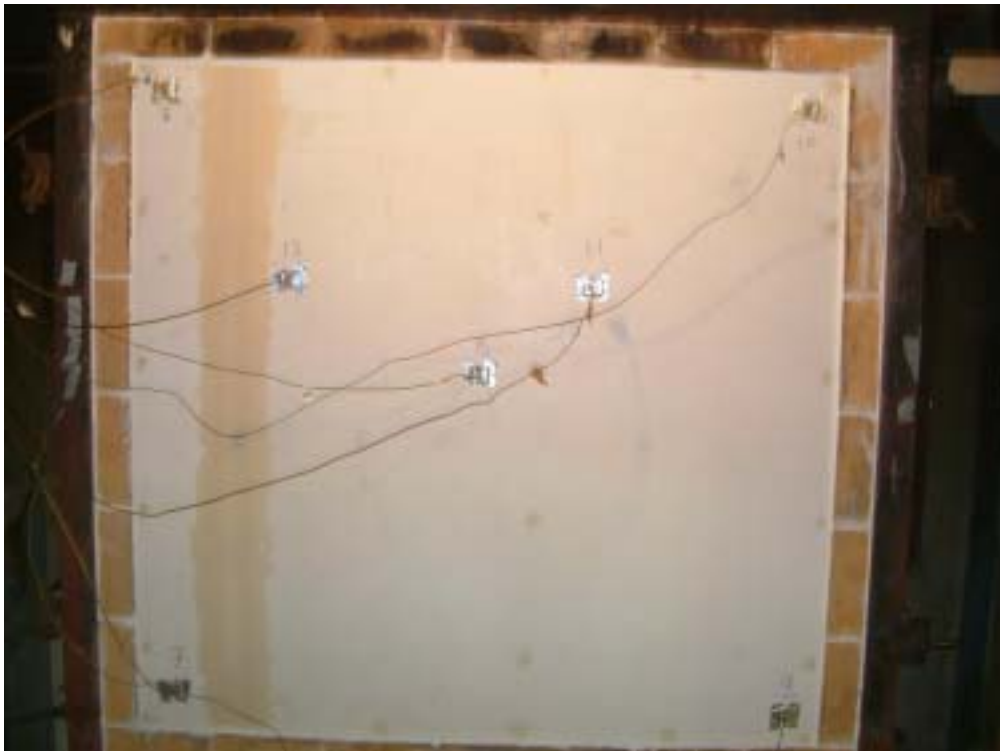


Figure 3 – Pre Test View : Fire Side Test Panel 1



Figure 4 – Observation at 30 Minutes Test Panel 1

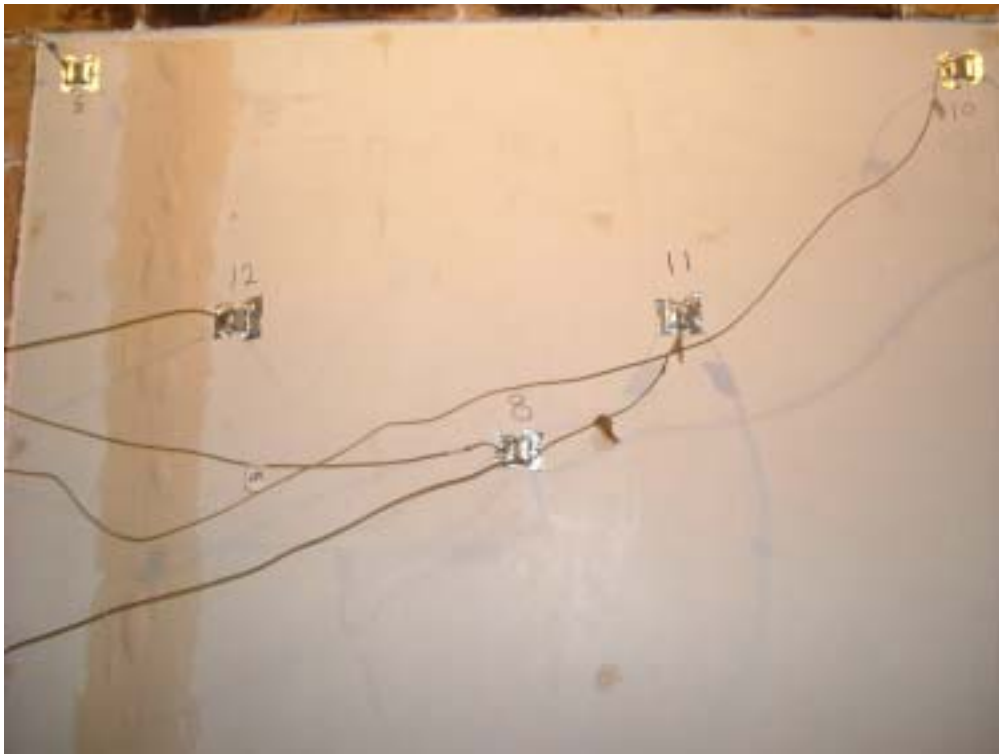


Figure 5 – Observation at 90 Minutes Test Panel 1

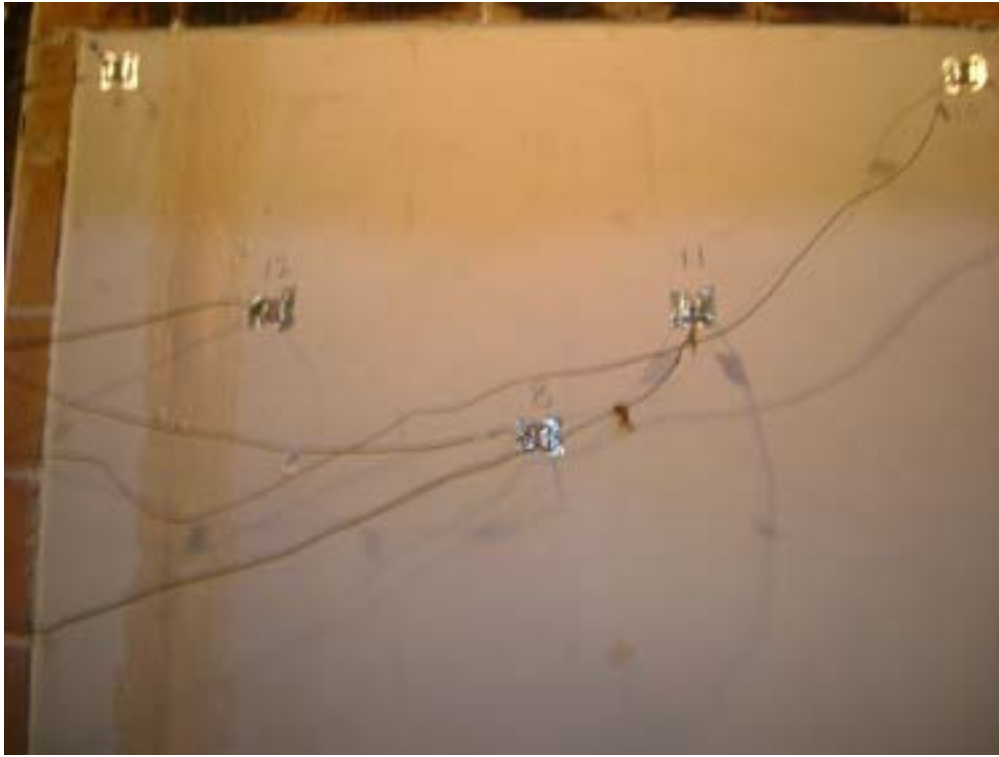


Figure 6 – Observation at 132 Minutes Test Panel 1

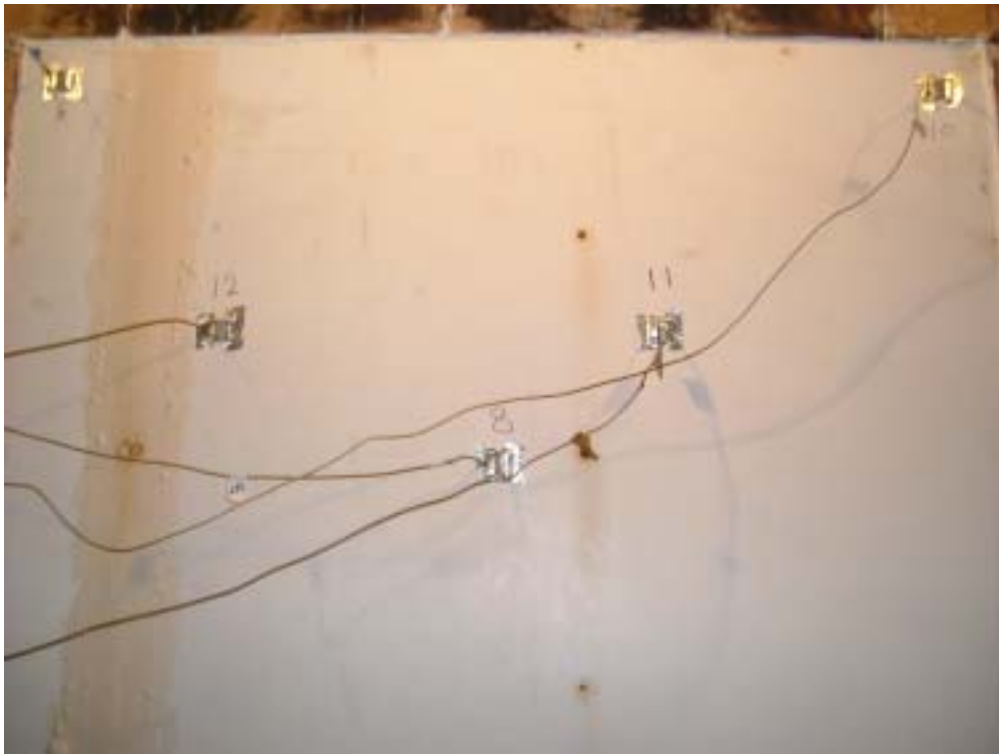


Figure 7 – Post Test of Fire Side of Test Panel 1



Figure 8 – Post Test of Fire Side Test Panel 1



Figure 9 – Pre Test View Non-Fire Side Panel 2

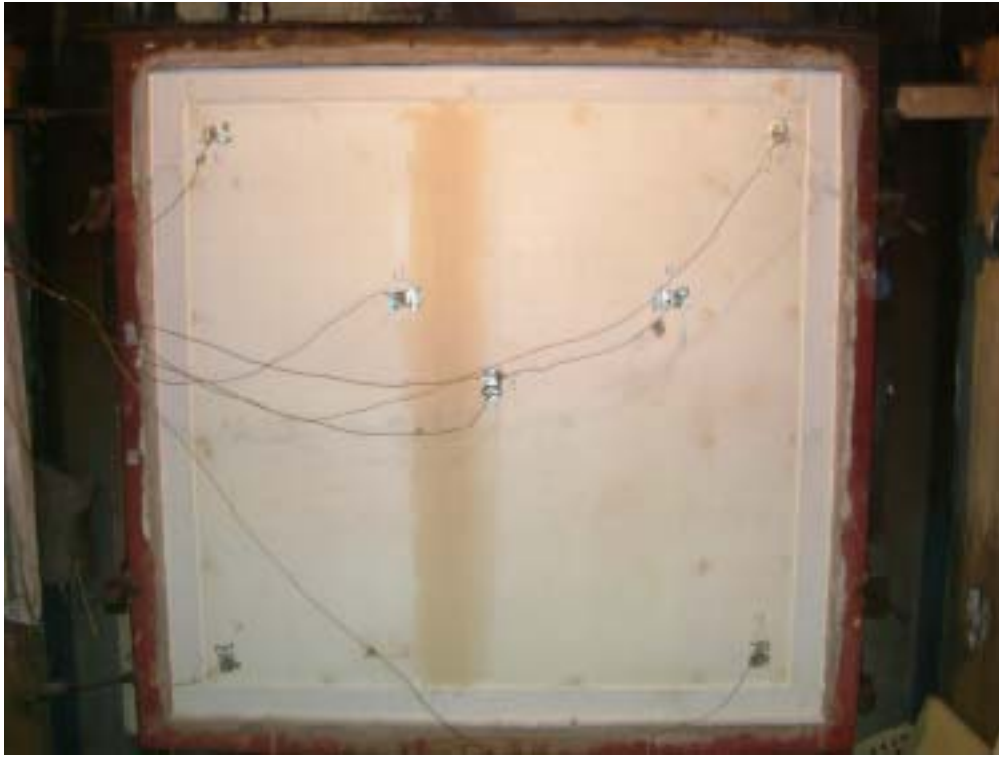


Figure 10 – Observation at 27:09 Minutes Test Panel 2



Figure 11 – Observation 62 Minutes Test Panel 2

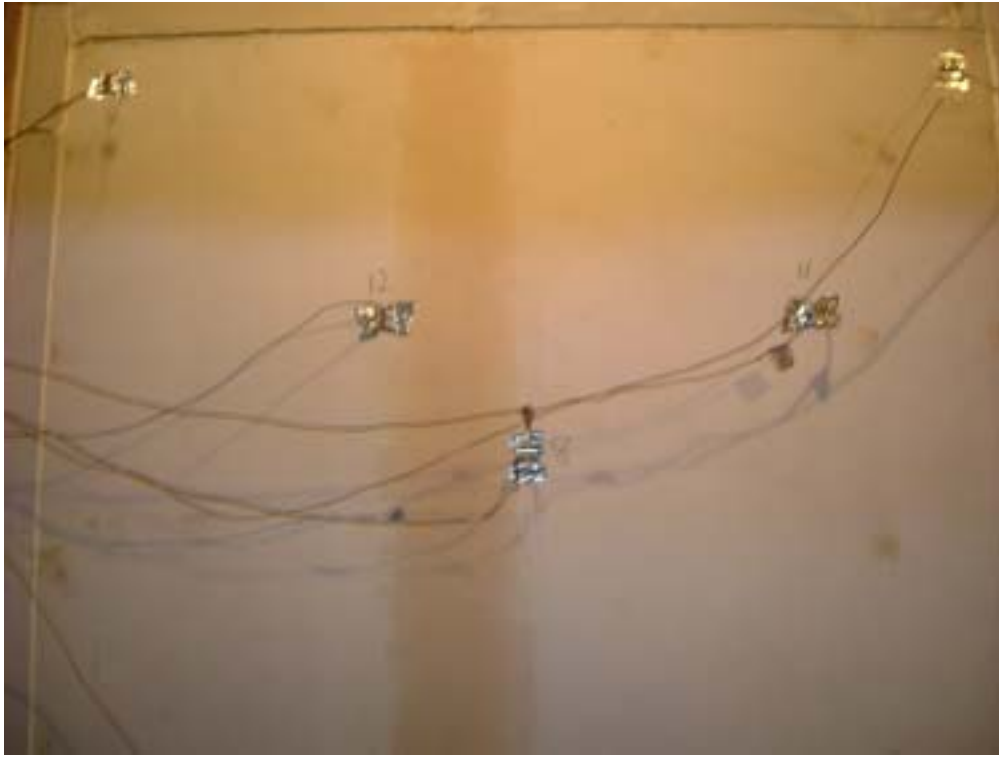


Figure 12 – Observation at 90 Minutes Test Panel 2



Figure 13 – Observation at 120 Minutes Test Panel 2



Figure 14 – Observation at 132 Minutes Test Panel 2

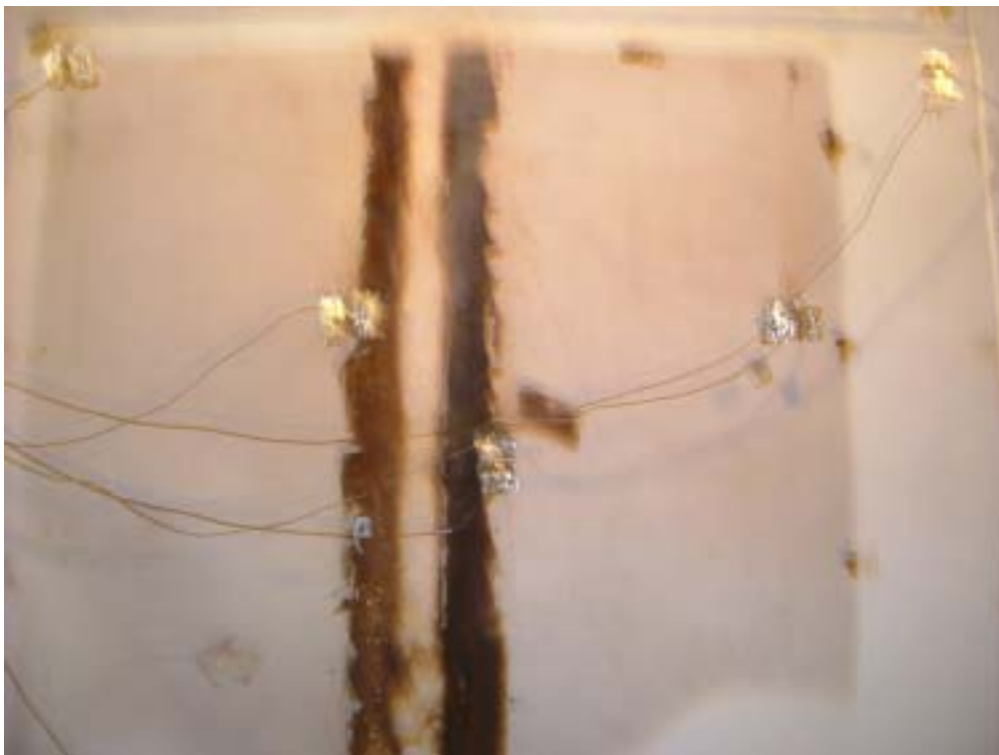


Figure 15 - Post Test Observation Fire Side Panel 2



TEST DATA

Furnace Data: Test Panel 1

Time	Run time	BS curve	AverageF	TC1	TC2	TC3	TC4	TC5
30/09/03 08:26	0:00:00	20	24	23	24	24	25	16
30/09/03 08:27	0:00:46	349	330	299	352	376	381	16
30/09/03 08:28	0:01:43	445	432	411	415	441	461	16
30/09/03 08:29	0:02:44	502	444	421	430	457	482	16
30/09/03 08:30	0:03:46	544	479	463	454	486	514	16
30/09/03 08:31	0:04:47	576	521	529	490	517	560	16
30/09/03 08:32	0:05:46	603	536	546	522	550	580	16
30/09/03 08:33	0:06:43	626	581	585	563	572	611	16
30/09/03 08:34	0:07:44	645	614	632	594	608	646	16
30/09/03 08:35	0:08:46	663	646	682	628	634	670	16
30/09/03 08:36	0:09:44	678	670	696	653	658	692	16
30/09/03 08:37	0:10:46	693	688	718	674	673	714	16
30/09/03 08:38	0:11:46	705	712	732	689	695	729	16
30/09/03 08:39	0:12:46	717	719	744	705	708	739	16
30/09/03 08:40	0:13:46	728	736	753	719	725	754	16
30/09/03 08:41	0:14:44	739	740	754	724	724	759	16
30/09/03 08:42	0:15:44	748	743	754	731	733	757	16
30/09/03 08:43	0:16:44	757	752	756	741	741	770	16
30/09/03 08:44	0:17:45	766	759	766	747	751	776	16
30/09/03 08:45	0:18:45	774	766	775	758	756	784	16
30/09/03 08:46	0:19:44	781	778	780	771	769	793	16
30/09/03 08:47	0:20:45	789	786	793	776	778	798	16
30/09/03 08:48	0:21:45	796	797	805	790	786	809	16
30/09/03 08:49	0:22:46	802	801	812	793	791	809	16
30/09/03 08:50	0:23:46	809	807	818	799	800	816	17
30/09/03 08:51	0:24:45	815	810	810	807	802	822	17
30/09/03 08:52	0:25:46	820	816	815	811	811	828	17
30/09/03 08:53	0:26:45	826	820	820	818	817	836	17
30/09/03 08:54	0:27:46	832	827	829	823	819	841	17
30/09/03 08:55	0:28:45	837	833	833	831	826	844	17
30/09/03 08:56	0:29:45	842	841	843	839	833	850	17
30/09/03 08:57	0:30:46	847	848	851	845	837	857	16
30/09/03 08:58	0:31:46	851	853	854	854	844	863	17
30/09/03 08:59	0:32:43	856	861	862	863	851	867	17
30/09/03 09:00	0:33:46	860	861	859	867	851	866	17
30/09/03 09:01	0:34:45	865	860	860	863	852	869	17
30/09/03 09:02	0:35:46	869	863	868	867	862	878	17
30/09/03 09:03	0:36:46	873	877	881	877	872	889	17
30/09/03 09:04	0:37:45	877	876	876	874	869	883	17
30/09/03 09:05	0:38:46	881	878	877	877	873	889	17
30/09/03 09:06	0:39:45	885	881	879	881	876	892	17
30/09/03 09:07	0:40:46	888	887	885	885	881	895	17
30/09/03 09:08	0:41:46	892	891	889	889	885	899	17
30/09/03 09:09	0:42:45	896	894	890	893	889	902	17
30/09/03 09:10	0:43:46	899	897	896	898	894	908	17
30/09/03 09:11	0:44:45	902	901	902	903	899	911	17
30/09/03 09:12	0:45:45	906	906	905	906	902	914	17

Time	Run time	BS curve	AverageF	TC1	TC2	TC3	TC4	TC5
30/09/03 09:13	0:46:46	909	909	905	910	907	918	17
30/09/03 09:14	0:47:46	912	912	908	913	909	922	17
30/09/03 09:15	0:48:46	915	916	911	917	913	924	17
30/09/03 09:16	0:49:44	918	919	913	919	915	928	17
30/09/03 09:17	0:50:46	918	921	919	923	919	930	17
30/09/03 09:18	0:51:46	924	925	915	926	922	934	17
30/09/03 09:19	0:52:46	927	927	924	928	925	935	17
30/09/03 09:20	0:53:46	930	930	922	931	927	939	17
30/09/03 09:21	0:54:46	932	931	925	934	931	941	17
30/09/03 09:22	0:55:45	935	933	923	937	933	944	17
30/09/03 09:23	0:56:45	938	938	930	939	936	946	17
30/09/03 09:24	0:57:45	940	939	929	941	939	949	17
30/09/03 09:25	0:58:45	943	941	930	944	939	951	17
30/09/03 09:26	0:59:46	945	943	931	945	942	952	17
30/09/03 09:27	1:00:46	948	945	934	947	944	954	17
30/09/03 09:28	1:01:46	950	947	940	948	945	956	17
30/09/03 09:29	1:02:44	953	950	944	951	947	957	17
30/09/03 09:30	1:03:44	953	953	950	953	949	960	18
30/09/03 09:31	1:04:44	957	955	956	954	951	960	18
30/09/03 09:32	1:05:45	960	957	956	955	952	963	18
30/09/03 09:33	1:06:45	960	958	957	957	955	964	18
30/09/03 09:34	1:07:45	960	960	961	960	958	968	18
30/09/03 09:35	1:08:45	960	969	969	966	965	975	18
30/09/03 09:36	1:09:46	960	972	971	971	968	980	18
30/09/03 09:37	1:10:46	968	976	974	974	973	983	18
30/09/03 09:38	1:11:45	968	979	978	977	976	985	18
30/09/03 09:39	1:12:45	968	981	980	980	979	989	18
30/09/03 09:40	1:13:46	968	983	982	981	981	990	18
30/09/03 09:41	1:14:46	968	986	987	983	981	991	18
30/09/03 09:42	1:15:45	979	982	980	981	979	988	18
30/09/03 09:43	1:16:46	979	982	979	980	978	987	18
30/09/03 09:44	1:17:46	979	980	979	979	977	987	18
30/09/03 09:45	1:18:46	979	980	978	979	977	987	18
30/09/03 09:46	1:19:45	979	979	974	978	977	986	18
30/09/03 09:47	1:20:45	988	980	977	979	977	986	18
30/09/03 09:48	1:21:46	988	980	975	980	978	986	18
30/09/03 09:49	1:22:46	988	981	979	979	978	988	19
30/09/03 09:50	1:23:46	988	983	983	980	980	988	19
30/09/03 09:51	1:24:46	988	984	989	980	979	989	19
30/09/03 09:52	1:25:46	997	984	983	982	980	989	19
30/09/03 09:53	1:26:46	997	987	989	987	986	996	19
30/09/03 09:54	1:27:46	997	996	998	995	995	1007	19
30/09/03 09:55	1:28:46	997	1004	1003	999	1002	1013	19
30/09/03 09:56	1:29:44	997	1009	1008	1005	1006	1018	19
30/09/03 09:57	1:30:46	1006	1014	1016	1008	1011	1021	19
30/09/03 09:58	1:31:44	1006	1017	1017	1012	1013	1024	19
30/09/03 09:59	1:32:44	1006	1019	1021	1016	1016	1028	19
30/09/03 10:00	1:33:46	1006	1022	1023	1018	1020	1030	19
30/09/03 10:01	1:34:44	1006	1024	1026	1020	1022	1032	19
30/09/03 10:02	1:35:45	1014	1026	1027	1022	1024	1034	19

Time	Run time	BS curve	AverageF	TC1	TC2	TC3	TC4	TC5
30/09/03 10:03	1:36:45	1014	1017	1019	1013	1014	1023	20
30/09/03 10:04	1:37:46	1014	1010	1011	1005	1005	1013	20
30/09/03 10:05	1:38:46	1014	1011	1013	1007	1008	1016	20
30/09/03 10:06	1:39:46	1014	1010	1011	1005	1007	1016	20
30/09/03 10:07	1:40:46	1022	1010	1011	1006	1007	1016	20
30/09/03 10:08	1:41:46	1022	1009	1012	1004	1007	1015	20
30/09/03 10:09	1:42:44	1022	1016	1018	1010	1012	1023	20
30/09/03 10:10	1:43:45	1022	1026	1033	1019	1022	1031	20
30/09/03 10:11	1:44:45	1022	1022	1025	1016	1020	1028	20
30/09/03 10:12	1:45:45	1029	1023	1025	1016	1020	1030	20
30/09/03 10:13	1:46:45	1029	1027	1028	1021	1023	1034	20
30/09/03 10:14	1:47:46	1029	1032	1034	1025	1029	1039	20
30/09/03 10:15	1:48:46	1029	1034	1037	1029	1032	1041	21
30/09/03 10:16	1:49:45	1029	1037	1039	1030	1034	1044	21
30/09/03 10:17	1:50:46	1036	1039	1042	1036	1036	1046	21
30/09/03 10:18	1:51:46	1036	1041	1044	1038	1039	1049	21
30/09/03 10:19	1:52:44	1036	1045	1044	1041	1041	1052	21
30/09/03 10:20	1:53:45	1036	1045	1046	1043	1043	1052	21
30/09/03 10:21	1:54:44	1036	1047	1046	1044	1043	1053	21
30/09/03 10:22	1:55:45	1043	1049	1049	1046	1045	1054	21
30/09/03 10:23	1:56:45	1043	1050	1050	1048	1047	1057	21
30/09/03 10:24	1:57:45	1043	1049	1050	1046	1046	1055	21
30/09/03 10:25	1:58:46	1043	1047	1048	1044	1044	1053	21
30/09/03 10:26	1:59:45	1043	1047	1047	1043	1043	1051	21
30/09/03 10:27	2:00:45	1049	1049	1049	1046	1045	1056	21
30/09/03 10:28	2:01:46	1049	1052	1053	1049	1048	1059	21
30/09/03 10:29	2:02:46	1049	1053	1054	1050	1050	1059	22
30/09/03 10:30	2:03:46	1049	1054	1055	1051	1051	1060	22
30/09/03 10:31	2:04:45	1049	1056	1057	1053	1053	1062	22
30/09/03 10:32	2:05:46	1055	1058	1059	1054	1054	1063	22
30/09/03 10:33	2:06:45	1055	1055	1056	1051	1051	1059	22
30/09/03 10:34	2:07:45	1055	1054	1056	1050	1050	1059	22
30/09/03 10:35	2:08:45	1055	1053	1056	1052	1052	1062	22
30/09/03 10:36	2:09:44	1055	1057	1059	1054	1054	1064	22
30/09/03 10:37	2:10:45	1061	1059	1060	1056	1056	1065	22
30/09/03 10:38	2:11:45	1061	1060	1059	1057	1057	1065	22
30/09/03 10:39	2:12:44	1061	1061	1060	1058	1058	1067	22

BS Curve = Target temperature; Average F = Average of Furnace thermocouples 1-4.
TC5 = Ambient laboratory temperature

Specimen TC Data: Test Panel 1

Time	Run time	Average	TC6	TC7	TC8	TC09	TC10	TC11	TC12
30/09/03 08:26	0:00:00	18	18	18	17	16	19	18	18
30/09/03 08:27	0:00:46	18	18	18	17	16	19	18	18
30/09/03 08:28	0:01:43	18	18	18	17	16	19	18	18
30/09/03 08:29	0:02:44	18	18	18	17	16	19	18	18
30/09/03 08:30	0:03:46	18	18	18	17	16	19	18	18
30/09/03 08:31	0:04:47	18	18	18	17	16	19	18	18
30/09/03 08:32	0:05:46	18	18	18	17	16	19	18	18
30/09/03 08:33	0:06:43	18	18	18	17	16	19	18	18
30/09/03 08:34	0:07:44	18	19	18	17	17	19	19	18
30/09/03 08:35	0:08:46	19	19	19	18	17	20	19	19
30/09/03 08:36	0:09:44	21	19	22	22	17	22	22	25
30/09/03 08:37	0:10:46	26	20	26	28	18	30	27	33
30/09/03 08:38	0:11:46	34	23	33	38	21	44	35	42
30/09/03 08:39	0:12:46	42	29	40	48	24	56	43	51
30/09/03 08:40	0:13:46	48	36	46	56	28	64	48	58
30/09/03 08:41	0:14:44	53	45	51	61	31	69	53	62
30/09/03 08:42	0:15:44	59	56	57	67	36	74	58	67
30/09/03 08:43	0:16:44	64	63	62	71	41	77	62	70
30/09/03 08:44	0:17:45	67	69	65	74	46	79	66	72
30/09/03 08:45	0:18:45	70	72	68	76	49	80	68	74
30/09/03 08:46	0:19:44	72	75	70	77	52	81	71	75
30/09/03 08:47	0:20:45	73	76	71	78	54	82	73	75
30/09/03 08:48	0:21:45	74	77	73	78	56	82	75	75
30/09/03 08:49	0:22:46	74	78	74	79	57	81	76	75
30/09/03 08:50	0:23:46	75	79	75	79	58	82	77	76
30/09/03 08:51	0:24:45	75	79	75	79	58	81	78	76
30/09/03 08:52	0:25:46	75	79	76	79	59	81	79	75
30/09/03 08:53	0:26:45	76	80	77	80	60	81	79	75
30/09/03 08:54	0:27:46	76	80	77	80	60	81	80	75
30/09/03 08:55	0:28:45	76	80	77	80	61	81	81	75
30/09/03 08:56	0:29:45	77	80	78	80	61	81	81	75
30/09/03 08:57	0:30:46	77	80	78	80	62	81	82	75
30/09/03 08:58	0:31:46	77	81	78	80	62	81	82	75
30/09/03 08:59	0:32:43	77	80	77	79	62	81	82	75
30/09/03 09:00	0:33:46	77	80	77	79	63	81	81	75
30/09/03 09:01	0:34:45	76	80	77	78	63	80	81	74
30/09/03 09:02	0:35:46	76	79	77	77	63	79	81	74
30/09/03 09:03	0:36:46	75	79	77	76	63	79	80	73
30/09/03 09:04	0:37:45	75	78	78	75	64	78	79	73
30/09/03 09:05	0:38:46	74	77	78	75	64	77	78	72
30/09/03 09:06	0:39:45	74	77	78	75	64	77	77	72
30/09/03 09:07	0:40:46	74	76	78	76	65	77	77	71
30/09/03 09:08	0:41:46	74	76	79	76	65	77	76	71
30/09/03 09:09	0:42:45	74	76	79	76	65	77	75	70
30/09/03 09:10	0:43:46	74	75	79	76	66	78	74	70
30/09/03 09:11	0:44:45	74	75	79	76	66	78	73	70
30/09/03 09:12	0:45:45	74	75	79	76	67	79	72	69
30/09/03 09:13	0:46:46	74	75	79	76	67	80	72	69
30/09/03 09:14	0:47:46	74	76	79	75	67	80	71	68

Time Run time Average TC6 TC7 TC8 TC09 TC10 TC11 TC12

30/09/03 09:15	0:48:46	74	76	79	75	68	80	71	68
30/09/03 09:16	0:49:44	74	76	80	75	68	80	70	68
30/09/03 09:17	0:50:46	74	76	80	75	68	80	70	67
30/09/03 09:18	0:51:46	74	76	80	75	68	80	70	67
30/09/03 09:19	0:52:46	74	76	80	75	69	80	70	67
30/09/03 09:20	0:53:46	74	76	80	75	69	80	70	67
30/09/03 09:21	0:54:46	74	76	80	75	69	80	71	67
30/09/03 09:22	0:55:45	74	76	80	75	69	80	71	67
30/09/03 09:23	0:56:45	74	76	80	76	70	80	71	68
30/09/03 09:24	0:57:45	75	76	80	76	70	80	72	68
30/09/03 09:25	0:58:45	75	76	80	76	71	80	73	69
30/09/03 09:26	0:59:46	75	76	80	76	71	80	73	69
30/09/03 09:27	1:00:46	75	76	81	77	71	80	74	69
30/09/03 09:28	1:01:46	76	76	81	77	72	80	75	70
30/09/03 09:29	1:02:44	76	76	81	78	72	81	76	71
30/09/03 09:30	1:03:44	77	76	81	78	73	81	77	71
30/09/03 09:31	1:04:44	77	76	81	79	73	81	78	72
30/09/03 09:32	1:05:45	78	76	82	80	74	81	79	73
30/09/03 09:33	1:06:45	78	76	82	80	74	82	80	74
30/09/03 09:34	1:07:45	79	77	82	81	74	82	81	74
30/09/03 09:35	1:08:45	79	77	82	81	75	82	81	75
30/09/03 09:36	1:09:46	80	77	82	82	75	83	82	76
30/09/03 09:37	1:10:46	80	78	83	83	75	83	84	77
30/09/03 09:38	1:11:45	81	78	83	83	76	83	84	77
30/09/03 09:39	1:12:45	81	78	83	84	76	84	85	78
30/09/03 09:40	1:13:46	82	79	83	85	76	84	87	79
30/09/03 09:41	1:14:46	82	79	83	86	76	85	88	80
30/09/03 09:42	1:15:45	83	79	84	87	76	85	89	81
30/09/03 09:43	1:16:46	84	80	84	88	76	86	90	82
30/09/03 09:44	1:17:46	84	80	84	89	77	86	91	83
30/09/03 09:45	1:18:46	85	80	84	90	77	87	92	84
30/09/03 09:46	1:19:45	86	80	84	92	77	88	93	85
30/09/03 09:47	1:20:45	86	81	85	94	77	88	94	86
30/09/03 09:48	1:21:46	87	81	85	96	76	89	95	87
30/09/03 09:49	1:22:46	88	81	85	98	77	90	97	89
30/09/03 09:50	1:23:46	89	82	85	100	77	90	98	91
30/09/03 09:51	1:24:46	90	82	85	102	77	91	99	92
30/09/03 09:52	1:25:46	91	83	85	104	76	92	101	95
30/09/03 09:53	1:26:46	92	83	86	106	77	93	103	96
30/09/03 09:54	1:27:46	92	83	86	107	77	93	104	97
30/09/03 09:55	1:28:46	93	83	86	108	77	94	105	98
30/09/03 09:56	1:29:44	94	84	87	110	77	95	107	100
30/09/03 09:57	1:30:46	95	84	87	111	77	96	108	101
30/09/03 09:58	1:31:44	95	85	88	111	78	96	108	102
30/09/03 09:59	1:32:44	96	85	88	112	78	97	109	103
30/09/03 10:00	1:33:46	97	86	88	113	78	98	109	104
30/09/03 10:01	1:34:44	97	86	89	113	79	99	110	105
30/09/03 10:02	1:35:45	98	87	89	114	79	99	111	106
30/09/03 10:03	1:36:45	98	88	89	114	80	100	111	106
30/09/03 10:04	1:37:46	99	88	90	115	80	101	112	107
30/09/03 10:05	1:38:46	100	89	90	115	81	102	113	108
Time	Run time	Average	TC6	TC7	TC8	TC09	TC10	TC11	TC12
30/09/03 10:06	1:39:46	100	90	90	115	81	102	113	108
30/09/03 10:07	1:40:46	101	91	91	115	82	103	114	109

30/09/03 10:08	1:41:46	101	91	91	115	82	104	115	110
30/09/03 10:09	1:42:44	102	92	92	116	83	104	116	110
30/09/03 10:10	1:43:45	103	93	92	117	83	105	117	111
30/09/03 10:11	1:44:45	103	94	92	117	84	106	117	112
30/09/03 10:12	1:45:45	104	94	93	118	85	107	118	112
30/09/03 10:13	1:46:45	104	95	93	118	85	107	119	113
30/09/03 10:14	1:47:46	105	96	94	119	86	108	120	113
30/09/03 10:15	1:48:46	106	97	95	120	87	108	121	114
30/09/03 10:16	1:49:45	107	97	95	121	87	109	123	115
30/09/03 10:17	1:50:46	108	98	95	122	88	110	124	116
30/09/03 10:18	1:51:46	108	99	96	123	89	110	125	117
30/09/03 10:19	1:52:44	109	99	96	124	89	111	126	118
30/09/03 10:20	1:53:45	110	100	97	126	90	111	128	119
30/09/03 10:21	1:54:44	111	101	98	127	91	112	129	119
30/09/03 10:22	1:55:45	112	102	98	128	92	113	130	120
30/09/03 10:23	1:56:45	113	102	99	130	92	113	132	121
30/09/03 10:24	1:57:45	114	103	99	131	93	114	133	123
30/09/03 10:25	1:58:46	115	104	99	133	94	114	135	124
30/09/03 10:26	1:59:45	116	105	100	135	94	115	136	125
30/09/03 10:27	2:00:45	116	105	100	136	95	115	137	126
30/09/03 10:28	2:01:46	118	106	101	138	96	116	139	128
30/09/03 10:29	2:02:46	118	107	102	139	96	116	140	129
30/09/03 10:30	2:03:46	119	107	102	141	97	117	141	130
30/09/03 10:31	2:04:45	120	108	102	142	97	117	142	132
30/09/03 10:32	2:05:46	121	109	103	143	98	118	143	133
30/09/03 10:33	2:06:45	122	109	104	145	98	118	144	134
30/09/03 10:34	2:07:45	123	110	104	146	99	119	145	135
30/09/03 10:35	2:08:45	124	111	105	148	99	120	147	136
30/09/03 10:36	2:09:44	124	111	105	149	100	120	148	137
30/09/03 10:37	2:10:45	125	112	106	151	101	121	149	138
30/09/03 10:38	2:11:45	126	112	106	152	101	121	150	140
30/09/03 10:39	2:12:44	127	113	106	154	101	121	151	140

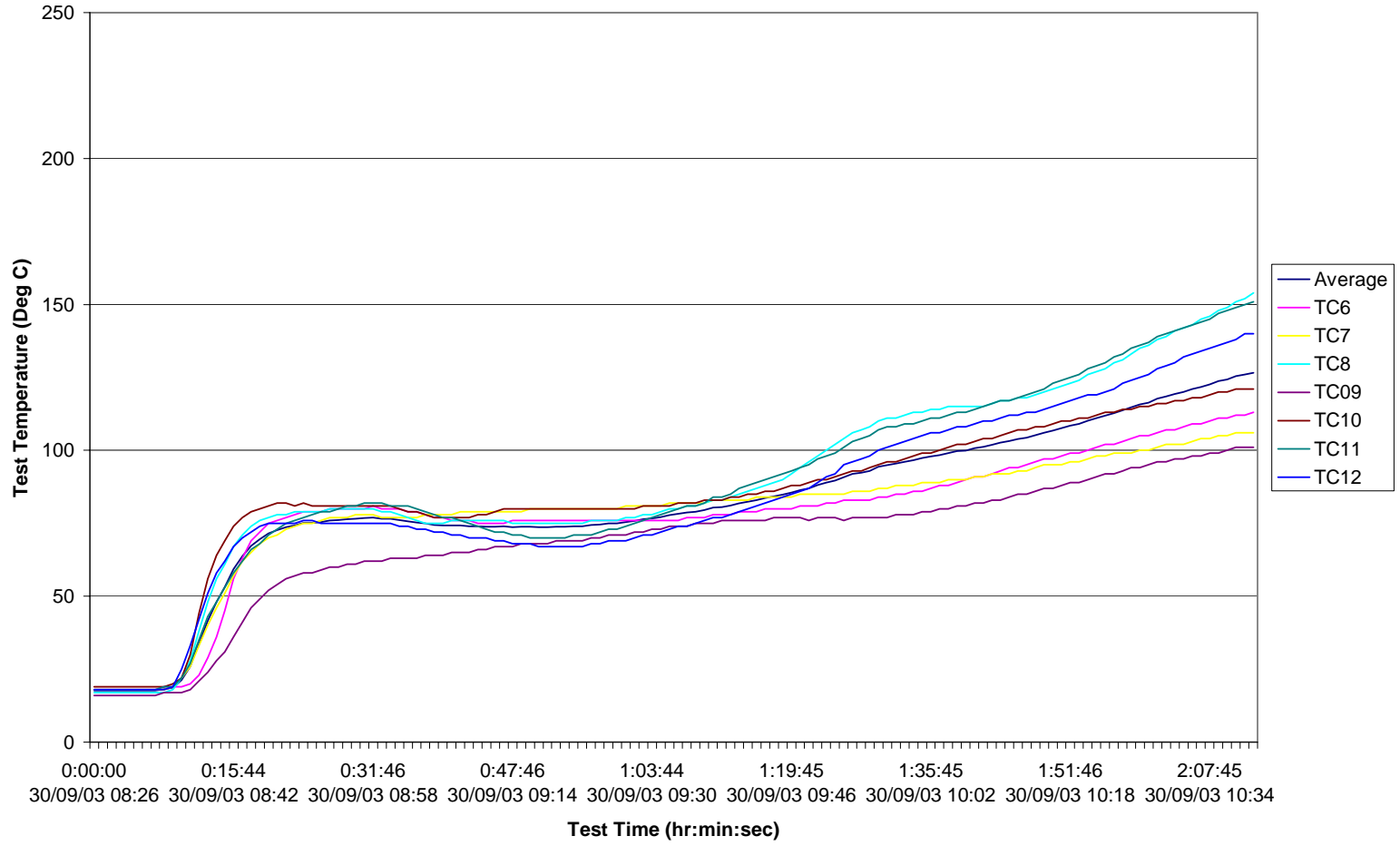
Insulation failure is denoted in **bold**.

Blank cells denote thermocouple failure or detachment of thermocouple from specimen.

Area Under the Curve Data - CERAM Fire Test P03192ASKR

Time (min)	Area Std	Area actual	% Diff.	% Tol
0 to 10	5651	5278	-6.6	15
11 to 30	15576	15531	-0.3	10
31 to 60	27033	26919	-0.4	5
60 to 132	73674	73858	0.2	5

Specimen Thermocouple Data - CERAM Fire Test P03192ASKR -



Test Observation Sheet :

CERAM Test reference No: P03192ASKR

Date: 30/09/03

Customer: Euroform Products Ltd

Specimen: Test Panel 1

A	B
C	D

Time (min;sec)	Face (U/E) *	Pressure (Pa)	Observation details made by Test Operator.
0:00	U		See Figure 2 Pre-Test View Non-Fire Side
0:00	E		See Figure 3 Pre-Test View Fire Side
5:30	E	8	Joint blackened right hand side (U)
8:00	U	8-8.3	Smoke exiting panel/block work joint A-B
12:00	U	8-10	Increase in smoke exiting panel/block work joint A-B. Visibility poor (Pressure surge)
13:30	E	8-10	Blistering and cracking on surface. Flames on surface in joint area
14:00	U	8-10	Smoke in chamber decreased
14:50	U	8-9.2	Blistering of top section of LHS vertical panel joint.
16:00	E	8-8.8	Flames licking joint and joint showing vertical cracks
16:25	U	8-8.8	LHS vertical panel joint starting to discolour
17:36	U	8-8.5	Above joint showing more pronounced blistering now spreading down joint line.
20:28	U	8-8.6	Increase in smoke from panel/block work joint (as shown at 12:00min)
22:30	U	>30	Smoke increase (position as above) and pressure surge noted.
23:00	U	8-10	Pressure Decrease.
24:45	U	7-7.8	Smoke reduced.
25:16	U	7.7-8.3	LHS vertical panel joint more pronounced
30	U		See Figure 4
40:27	U	7.4-8.2	Smoke exiting panel/block work joint A-B decreased
52:00	U	>20	Pressure surge and more smoke exiting blockwork at panel/joint A-B
52:00	E	7.2-8.4	RHS vertical panel joint showing crack along entire length (U)
55:05	U	9.5-9.1	LHS vertical panel joint blisters shrinking
65:31	U	7.5-8.7	LHS vertical panel joint blisters increasing
79:48	U	7.5-8.0	Minor blisters appearing at panel/block work joint C-D and D corner
84:00	U	>25	Pressure surge and increase in smoke
85:00	E	17.5	RHS vertical panel joint opening
86:21	U	7.9-8.6	Increase in number of small blisters along LHS vertical panel joint
90:00	U		See Figure 5
105:00	U	7.5-8.6	LHS vertical panel joint line large blisters shrinking, increase in number small blisters
113:00	U	7.8-8.2	RHS panel vertical joint line starting to blacken at screw head positions
118:00	U	7.8-8.2	Smoke exiting A-C block work/panel joint

Time (min;sec)	Face (U/E) *	Pressure (Pa)	Observation details made by Test Operator.
120:00	U	8.6-9.1	LHS vertical panel joint starting to discolour
132	U		See Figure 6
132			Test Terminated
			See Figure 7 Post Test Fire Side
			See Figure 8 Post Test Fire Side
Post Test Observations.			
The maximum bow at the specimen centre was			
	U		A maximum bow of 45mm (+ve) was noted adjacent to LHS vertical panel joint
	E		Panel was intact until test frame removal (LHS side became detached on removal of test frame – see figure...)

* U = Test specimen unexposed face, E = test specimen exposed face.

Furnace Test Data:Panel 2

Time	Run time	BS Curve	Average F	TC1	TC2	TC3	TC4	TC5
30/09/03 13:32	0:00:00	20	40	39	40	40	40	19
30/09/03 13:33	0:01:00	349	382	374	368	378	409	19
30/09/03 13:34	0:02:00	445	410	416	402	420	450	19
30/09/03 13:35	0:03:00	502	451	453	433	462	491	19
30/09/03 13:36	0:03:58	544	489	480	462	500	526	19
30/09/03 13:37	0:04:59	576	512	498	485	518	552	19
30/09/03 13:38	0:05:58	603	534	521	513	546	576	19
30/09/03 13:39	0:06:59	626	586	568	563	588	624	19
30/09/03 13:40	0:07:59	645	620	594	609	632	670	19
30/09/03 13:41	0:08:58	663	654	632	640	654	690	19
30/09/03 13:42	0:09:58	678	676	665	665	679	719	19
30/09/03 13:43	0:10:58	693	693	684	681	698	736	19
30/09/03 13:44	0:11:59	705	715	709	697	716	749	19
30/09/03 13:45	0:12:58	717	730	723	709	729	758	19
30/09/03 13:46	0:13:59	728	732	723	713	730	761	19
30/09/03 13:47	0:15:00	739	740	733	722	739	764	19
30/09/03 13:48	0:16:00	748	748	745	736	750	774	19
30/09/03 13:49	0:17:00	757	761	750	750	763	788	19
30/09/03 13:50	0:17:58	766	772	764	760	773	797	19
30/09/03 13:51	0:19:00	774	783	777	766	782	805	20
30/09/03 13:52	0:20:00	781	793	793	779	789	812	20
30/09/03 13:53	0:21:00	789	787	787	772	781	799	20
30/09/03 13:54	0:22:00	796	786	785	774	784	802	20
30/09/03 13:55	0:23:00	802	790	785	785	795	813	20
30/09/03 13:56	0:23:59	809	805	795	796	805	822	20
30/09/03 13:57	0:25:00	815	813	807	807	814	834	20
30/09/03 13:58	0:25:58	820	821	814	814	819	837	20
30/09/03 13:59	0:26:58	826	829	827	821	828	845	20
30/09/03 14:00	0:27:58	832	837	850	828	835	852	20
30/09/03 14:01	0:28:59	837	848	866	834	842	860	20
30/09/03 14:02	0:29:59	842	860	877	846	851	867	20
30/09/03 14:03	0:30:58	847	870	891	855	860	875	20
30/09/03 14:04	0:32:00	851	852	866	841	844	856	20
30/09/03 14:05	0:33:00	856	848	860	837	840	852	20
30/09/03 14:06	0:34:00	860	846	866	841	845	857	20
30/09/03 14:07	0:34:57	865	863	871	854	858	871	20
30/09/03 14:08	0:36:00	869	873	884	862	866	879	20
30/09/03 14:09	0:36:59	873	879	892	873	875	888	20
30/09/03 14:10	0:38:00	877	880	889	876	874	885	20
30/09/03 14:11	0:39:00	881	882	889	876	876	887	20
30/09/03 14:12	0:40:00	885	886	894	882	880	891	20
30/09/03 14:13	0:41:00	888	891	906	886	885	894	20
30/09/03 14:14	0:41:59	892	896	906	891	889	899	20
30/09/03 14:15	0:43:00	896	896	907	892	890	898	20
30/09/03 14:16	0:44:00	899	900	914	895	892	901	20
30/09/03 14:17	0:44:58	902	905	916	902	897	903	20
30/09/03 14:18	0:45:59	906	907	918	904	900	906	20
30/09/03 14:19	0:47:00	909	912	924	910	904	910	20
30/09/03 14:20	0:48:00	912	915	924	911	904	908	20
30/09/03 14:21	0:48:58	915	910	922	908	901	906	20
30/09/03 14:22	0:49:58	918	909	922	906	901	905	20
30/09/03 14:23	0:50:58	918	913		915	910	915	20
30/09/03 14:24	0:52:00	924	921		919		922	21

Time	Run time	BS Curve	Average F	TC1	TC2	TC3	TC4	TC5
30/09/03 14:25	0:52:58	927	921	948	928	924	929	20
30/09/03 14:26	0:53:58	930	937	954	934	929	935	21
30/09/03 14:27	0:54:58	932	939	948	928	925	930	21
30/09/03 14:28	0:56:00	935	932	947	929	924	927	21
30/09/03 14:29	0:56:58	938	932	947	929	924	927	21
30/09/03 14:30	0:57:58	940	932	947	929	924	927	21
30/09/03 14:31	0:59:00	943	932	947	929	924	927	21
30/09/03 14:32	1:00:00	945	932	947	929	924	927	21
30/09/03 14:33	1:00:59	948	932	947	929	924	927	21
30/09/03 14:34	1:02:00	950	932	947	929	924		21
30/09/03 14:35	1:03:00	953	969	992	966	964	971	21
30/09/03 14:36	1:04:00	953	965	981	961	957	961	21
30/09/03 14:37	1:04:59	957	954	968	949	946	948	21
30/09/03 14:38	1:06:00	960	959	971	952	952	955	21
30/09/03 14:39	1:07:00	960	962	979	955	954	958	21
30/09/03 14:40	1:07:58	960	962	977	955	955	959	21
30/09/03 14:41	1:08:59	960	964	986	960	957	961	21
30/09/03 14:42	1:09:59	960	965	981	958	959	961	21
30/09/03 14:43	1:11:00	968	967	986	954	959	963	21
30/09/03 14:44	1:12:00	968	965	987	951	961	964	21
30/09/03 14:45	1:12:58	968	968	990	953	962	965	21
30/09/03 14:46	1:13:59	968	967	994	958	969	974	21
30/09/03 14:47	1:14:59	968	985	1014	969	980	985	21
30/09/03 14:48	1:16:00	979	993	1017	976	986	992	21
30/09/03 14:49	1:17:00	979	997	1027	981	992	997	21
30/09/03 14:50	1:18:00	979	976	1001	960	971	972	21
30/09/03 14:51	1:18:58	979	979	999	961	973	976	21
30/09/03 14:52	1:19:59	979	977	1006	961	972	975	21
30/09/03 14:53	1:20:59	988	977	1000	961	972	974	21
30/09/03 14:54	1:22:00	988	978	1004	960	971	974	21
30/09/03 14:55	1:23:00	988	976	1000	963	971	974	22
30/09/03 14:56	1:23:58	988	989	1012	971	984	988	22
30/09/03 14:57	1:24:59	988	1000	1022	983	995	1000	22
30/09/03 14:58	1:25:59	997	1007	1029	990	1003	1008	22
30/09/03 14:59	1:27:00	997	1013	1041	993	1007	1012	22
30/09/03 15:00	1:28:00	997	1003	1024	986	998	1001	22
30/09/03 15:01	1:29:00	997	997	1016	986	998	1001	22
30/09/03 15:02	1:29:58	997	1008	1029	992	1005	1009	22
30/09/03 15:03	1:30:59	1006	1000	1015	984	995	997	22
30/09/03 15:04	1:31:58	1006	998	1019	984	995	997	22
30/09/03 15:05	1:32:59	1006	1003	1022	987	999	1003	22
30/09/03 15:06	1:34:00	1006	1008	1028	993	1005	1008	22
30/09/03 15:07	1:35:00	1006	1013	1034	996	1008	1012	22
30/09/03 15:08	1:36:00	1014	1015	1036	999	1011	1015	22
30/09/03 15:09	1:37:00	1014	1018	1041	1002	1013	1017	22
30/09/03 15:10	1:37:58	1014	1020	1042	1004	1014	1020	22
30/09/03 15:11	1:38:59	1014	1022	1046	1007	1015	1022	22
30/09/03 15:12	1:39:59	1014	1024	1046	1008	1017	1024	22
30/09/03 15:13	1:41:00	1022	1025	1046	1007	1018	1022	22
30/09/03 15:14	1:41:59	1022	1022	1047	1007	1017	1020	22
30/09/03 15:15	1:42:59	1022	1022	1043	1008	1017	1020	22
30/09/03 15:16	1:43:58	1022	1022	1043	1008	1017	1020	22
30/09/03 15:17	1:44:59	1022	1030	1053	1013	1024	1028	22
30/09/03 15:18	1:45:59	1029	1032	1054	1017	1027	1031	22

Time	Run time	BS Curve	Average F	TC1	TC2	TC3	TC4	TC5
30/09/03 15:19	1:47:00	1029	1035	1047	1026	1037	1035	22
30/09/03 15:20	1:48:00	1029	1041	1051	1040	1045	1041	22
30/09/03 15:21	1:48:58	1029	1044	1050	1041	1043	1040	22
30/09/03 15:22	1:49:59	1029	1034	1042	1027	1031	1029	22
30/09/03 15:23	1:50:59	1036	1025	1044	1038	1032	1030	23
30/09/03 15:24	1:52:00	1036	1050	1076	1046	1034	1030	23
30/09/03 15:25	1:52:58	1036	1045	1100	1028	1027	1024	23
30/09/03 15:26	1:53:59	1036	1038	1065	1020	1026	1028	23
30/09/03 15:27	1:54:59	1036	1024	1040	1010	1018	1019	23
30/09/03 15:28	1:56:00	1043	1026	1034	1017	1022	1024	23
30/09/03 15:29	1:57:00	1043	1028	1035	1021	1029	1027	23
30/09/03 15:30	1:57:59	1043	1033	1040	1025	1036	1033	23
30/09/03 15:31	1:59:00	1043	1015		1001	1021	1022	23
30/09/03 15:32	1:59:58	1043	1000		974	1011	1014	23
30/09/03 15:33	2:00:59	1049	1021		998	1032	1034	23
30/09/03 15:34	2:02:00	1049	1038		1024	1041	1048	23
30/09/03 15:35	2:03:00	1049	1035		1021	1029	1054	23
30/09/03 15:36	2:04:00	1049	1034		1020	1029	1054	23
30/09/03 15:37	2:05:00	1049	1057		1033	1047	1092	23
30/09/03 15:38	2:06:00	1055	1070		1052	1065	1094	23
30/09/03 15:39	2:07:00	1055	1074		1060	1075	1088	23
30/09/03 15:40	2:08:00	1055	1070		1055	1072	1082	23
30/09/03 15:41	2:09:00	1055	1068		1051	1073	1079	23
30/09/03 15:42	2:10:00	1055	1059		1044	1062	1071	23
30/09/03 15:43	2:11:00	1061	1051		1037	1054	1061	23

BS Curve = Target temperature; Average F = Average of Furnace thermocouples 1-4.
TC5 = Ambient laboratory temperature

Speciman TC Test Data: Test Panel 2

Run time	Average	TC6	TC7	TC8	TC09	TC10	TC11	TC12
0:00:00	21	21	20	20	19	22	21	21
0:01:00	21	21	20	20	19	22	21	21
0:02:00	21	21	20	20	19	22	21	21
0:03:00	21	21	20	20	19	22	21	21
0:03:58	21	21	20	20	19	22	21	21
0:04:59	21	21	20	20	19	22	21	21
0:05:58	21	21	20	20	19	22	21	21
0:06:59	21	21	20	20	19	22	21	21
0:07:59	21	21	24	20	20	23	21	21
0:08:58	24	22	32	21	23	24	22	21
0:09:58	27	29	42	26	32	30	24	23
0:10:58	35	41	49	33	42	39	31	26
0:11:59	44	52	55	41	51	49	41	30
0:12:58	52	58	59	47	57	57	50	35
0:13:59	59	65	64	55	64	65	60	40
0:15:00	63	68	67	60	68	70	66	45
0:16:00	67	72	69	65	71	75	72	50
0:17:00	70	74	70	68	73	78	75	54
0:17:58	72	75	71	70	74	80	77	57
0:19:00	73	76	71	71	74	81	79	59
0:20:00	74	77	71	71	75	82	80	61
0:21:00	74	77	71	72	75	83	80	62
0:22:00	75	78	71	72	75	83	81	63
0:23:00	75	78	70	72	76	84	80	64
0:23:59	75	78	70	72	77	84	80	64
0:25:00	75	78	70	72	77	84	80	65
0:25:58	75	78	70	71	77	84	80	66
0:26:58	75	78	69	71	77	84	79	66
0:27:58	75	78	69	71	77	83	79	67
0:28:59	75	78	69	71	77	83	79	67
0:29:59	75	78	68	71	77	83	79	67
0:30:58	75	78	68	71	77	83	79	67
0:32:00	75	78	67	71	77	83	79	67
0:33:00	74	79	67	70	77	83	79	67
0:34:00	74	78	66	70	76	82	78	67
0:34:57	74	78	66	70	76	82	78	67
0:36:00	74	78	65	69	76	82	78	67
0:36:59	73	78	65	69	76	81	77	66
0:38:00	73	78	65	68	75	81	77	66
0:39:00	72	78	64	68	75	81	76	65
0:40:00	72	78	64	68	75	81	76	65
0:41:00	72	78	64	67	75	80	75	65
0:41:59	72	77	64	67	75	80	75	65
0:43:00	72	77	63	67	74	80	75	64
0:44:00	72	77	63	67	74	80	75	64
0:44:58	71	77	63	67	74	80	74	64
0:45:59	71	77	63	67	73	80	74	64
0:47:00	71	77	63	66	73	79	74	64
0:48:00	71	77	63	66	73	79	74	63
0:48:58	70	77	63	66	73	79	73	63
0:49:58	71	76	63	67	73	79	74	63
0:50:58	70	76	63	67	72	79	73	63
0:52:00	71			67	72	79	73	63
0:52:58	71	76	64	67	72	78	73	64

Run time Average TC6 TC7 TC8 TC09 TC10 TC11 TC12

0:53:58	71	76	65	68	72	78	74	64
0:54:58	71	76	65	68	72	78	74	65
0:56:00	71	76	65	68	72	78	74	65
0:56:58	71	76	65	68	72	78	74	65
0:57:58	71	76	65	68	72	78	74	65
0:59:00	71	76	65	68	72	78	74	65
1:00:00	70	76	65	68	72		74	65
1:00:59	70	76	65	68	72			
1:02:00	70	76	65	68	72			
1:03:00	73	77	67	72	72	78	77	69
1:04:00	74	77	68	73	72	77	78	70
1:04:59	74	77	68	73	72	77	78	70
1:06:00	74	77	68	74	72	77	79	71
1:07:00	74	77	68	74	72	77	80	71
1:07:58	75	77	69	75	72	77	80	72
1:08:59	75	77	69	75	73	77	81	72
1:09:59	75	77	69	75	73	77	81	73
1:11:00	75	77	70	76	73	77	82	73
1:12:00	76	77	70	77	73	77	83	74
1:12:58	76	77	70	77	74	77	83	75
1:13:59	76	77	70	78	74	77	84	75
1:14:59	77	77	71	78	74	77	84	76
1:16:00	77	77	71	79	74	77	85	76
1:17:00	77	77	71	79	74	77	86	77
1:18:00	78	77	71	80	74	78	87	77
1:18:58	78	77	72	81	75	78	87	78
1:19:59	79	77	72	81	75	78	88	79
1:20:59	79	77	72	82	75	78	89	79
1:22:00	79	77	72	83	75	78	89	80
1:23:00	79	77	72	83	75	78	90	80
1:23:58	80	77	72	84	76	78	91	81
1:24:59	80	77	73	85	76	79	92	81
1:25:59	81	77	73	86	76	79	93	82
1:27:00	81	77	73	86	76	79	93	83
1:28:00	81	77	73	87	76	79	94	83
1:29:00	82	78	73	88	76	79	95	84
1:29:58	82	78	73	88	76	79	95	84
1:30:59	82	78	73	89	76	79	96	85
1:31:58	83	78	73	90	76	79	97	86
1:32:59	83	78	73	90	76	79	98	86
1:34:00	83	78	74	91	77	80	98	87
1:35:00	84	78	74	92	77	80	99	88
1:36:00	84	78	74	93	77	80	100	88
1:37:00	85	78	74	93	77	80	101	89
1:37:58	85	78	74	94	77	80	101	89
1:38:59	85	79	74	95	77	80	102	90
1:39:59	85	79	74	95	77	80	103	90
1:41:00	86	79	74	96	77	80	103	91
1:41:59	86	79	74	97	77	80	104	91
1:42:59	86	80	74	97	77	81	104	92
1:43:58	87	80	74	98	77	81	105	92
1:44:59	87	81	74	98	77	81	105	93
1:45:59	88	82	75	99	78	81	106	94
1:47:00	88	82	75	100	78	81	107	94
1:48:00	88	83	75	100	78	81	107	95
1:48:58	89	84	75	101	78	81	108	95

Run time	Average	TC6	TC7	TC8	TC09	TC10	TC11	TC12
1:49:59	89	86	74	101	78	81	108	96
1:50:59	89	87	74	101	78	81	109	97
1:52:00	90	88	74	102	78	81	109	98
1:52:58	91	90	74	103	79	81	111	98
1:53:59	92	92	75	104	79	81	114	99
1:54:59	93	94	75	104	79	81	117	100
1:56:00	94	96	75	105	79	82	119	100
1:57:00	94	98	76	105	79	82	120	101
1:57:59	95	102	77	106	79	82	122	102
1:59:00	97	108	77	106	79	82	131	104
1:59:58	101	117	77	110	80	83	140	106
2:00:59	107	128	78	123	80	83	151	108
2:02:00	110	132	79	129	80	83	161	110
2:03:00	117	136	80	137	80	84	181	123
2:04:00	124	140	81	150	80	84	217	130
2:05:00	134	149	81	171	80	84	257	136
2:06:00	150	161	82	209	81	84	307	147
2:07:00	167	180	82	247	81	85	337	159
2:08:00	182	211	83	293	81	85	361	183
2:09:00	202	244	84	327	82	86	380	214
2:10:00	216	285	86	347	82	87	395	257
2:11:00	230	320	87	356	82	88	401	295

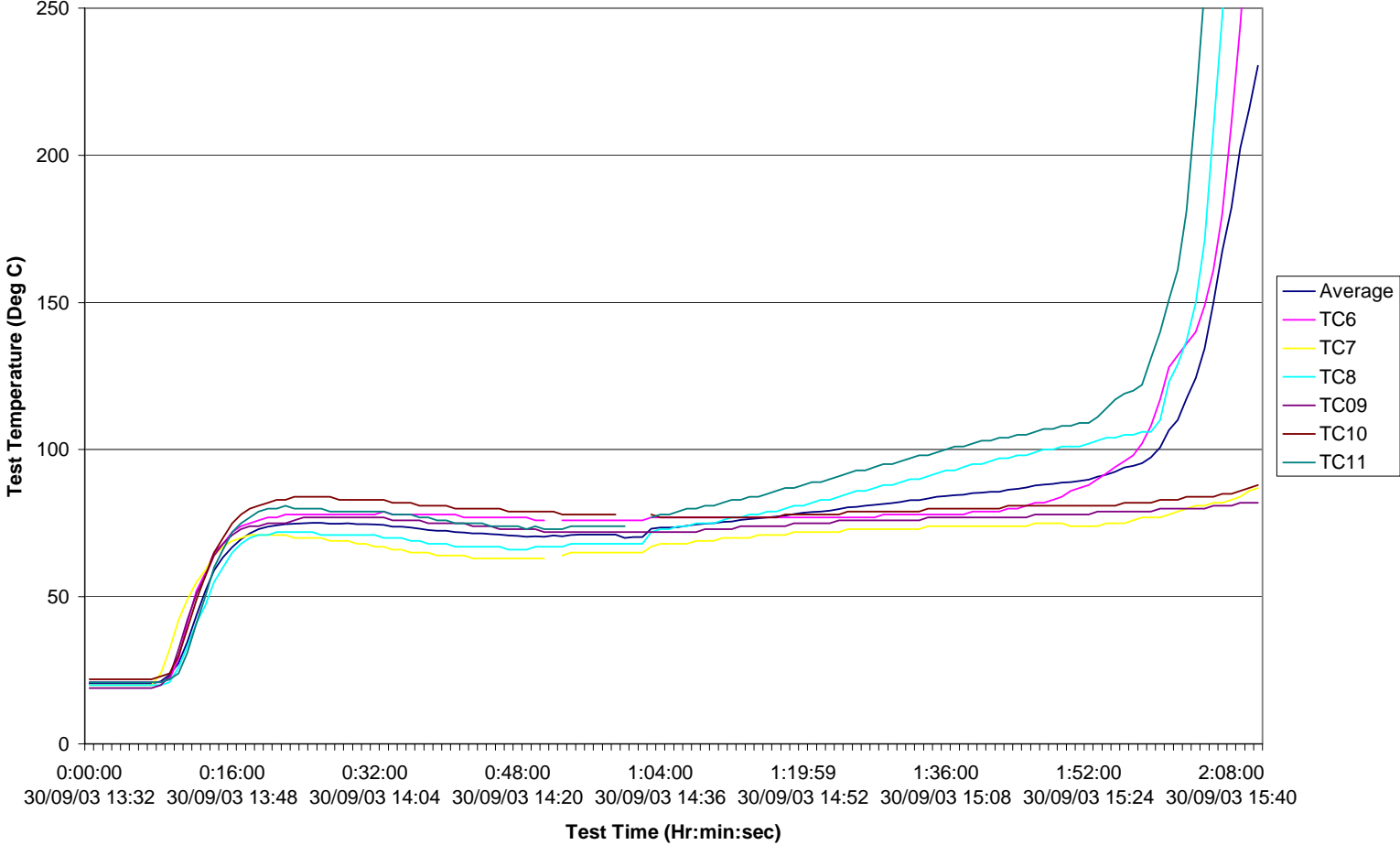
Insulation failure is denoted in **bold**.

Blank cells denote thermocouple failure or detachment of thermocouple from specimen.

Area under the curve data Test 2 - CERAM Fire Test P03192ASKR

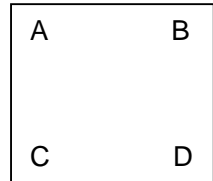
Time (min)	Area Std	Area actual	% Diff.	% Tol
0 to 10	5651	5352	-5.2	15
11 to 30	15576	15637	0.4	10
31 to 60	27033	27007	-0.1	5
60 to 131	71552	71569	0.02	5

Specimen Thermocouple Data - CERAM Fire Test P03192ASKR - Test Panel 2 - 30/09/03



Test Observation Sheet :
CERAM Test reference No: P03192ASKR
 Customer: Euroform Products Ltd
 Specimen: Test Panel 2.

Date: 30/09/03



Time (min;sec)	Face (U/E) *	Pressure (Pa)	Observation details made by Test Operator.
0	U		See Figure (Picture 1)
04:01	U	6.6-7.9	Smoke exiting at furnace/test frame seal
06:51	E	6.6-7.9	Blackened screw head in center of panel
09:20	U	6.6-7.9	Increase in smoke exiting the furnace/test frame seal
12:23	U	7.1-8.5	Smoke exiting block work/test frame joint A-B circa 60mm nearer B
13:20	E	7.6-7.9	Panel blackened, random surface cracking, central region very blackened
16:57	U	8.0	Blister appearing at bottom of RHS vertical panel joint
19:00	U	7.9-8.5	Screw positions on B-D line of panel face more obvious
20:00	E	7.7-8.0	Random cracking and pitted appearance
21:9	U	8.0-8.2	Blisters on bottom of RHS vertical panel joint
27:09	E	7.4-8.0	Black region in central region of panel expanding
27:09	U	7.6-8.0	Moisture Seepage on base of block work C-D
27:30	E	7.9-8.0	Temporary flaming from panel surface at RHS vertical panel joint region
30:23	U	7.5-8.6	Small blisters along RHS vertical panel joint
36:00	E	7.2-7.6	Flames present blackened central area - main joint
41:00	E	7.3-7.6	Flames noted 36:00 min more pronounced
49:00	E	7.6-8.0	Flames noted above more pronounced
51:05	U	>35	Pressure surge Smoke exiting from block work/test frame joint B
52:35	E	8.5	Flames noted 36:00 min still present
55:53	U	9-11	Smoke exiting C-D panel/blockwork intumescent joint
56:00	U		Pressure surge
58:00	E	9-11	Flames noted 36:00 min still present
62:00	U		See Figure (Picture 3)
74:00	U		Increase in smoke exiting panel/block work intumescent joint C-D
79:00	E	7.3-7.7	Flames noted 36:00 min decreased
89:41	U	7.8-8.2	Smoke exiting from panel/block work intumescent joint B-D
90:00	U		See Figure (Picture4)
97:39	E	7.9-8.5	Flames noted 36:00 min intermittent
100:21	U	8.1-9.2	Increase in blisters along RHS vertical panel joint
108:00	U	8.6	Increase in smoke exiting from panel/block work joint B-D

Time (min;sec)	Face (U/E) *	Pressure (Pa)	Observation details made by Test Operator.
110:00	U	8.6-9.0	Smoke exiting from panel/block work joint corner A
116:00	U	8.5-9.5	Smoke exiting from panel/block work joint A-C circa 700 mm
117:00	U	8.5-9.6	Blistering along RHS vertical panel joint increased
119:00	E	7.7-8.0	RHS of panel became detached
120:00	U		See Figure (Picture 4)
122:00	E	7.7-8.0	Central section exposed and wooden support in sections
123:00	E	7.7-9.0	LHS side of panel became detached
125:00	U	7.7-8.0	Central joint proud to surface of panel
126:00	U	8.2	Central area charring smoke exiting from the region of thermocouple 8
127:00	U	8.8	See Figure (Picture 5)
128:00	U	8.8	Increase in smoke exiting from central region
210:00	U	8-8.4	RHS vertical panel joint becoming blackened, RHS of panel exhibiting discolouration
212:00	U		See Figure (Picture 6)
212:00			Test Terminated
Post Test Observations.			
The maximum bow at the specimen centre was			
	U		Maximum Bow 25mm(+ve) at centre of specimen
	E		Panel material collapsed into furnace during test (noted at 119 and 123 mins)

- U = Test specimen unexposed face, E = test specimen exposed face.