



Sponsor:

FireCrunch Australasia Pty Ltd
Level 44, MLC Centre
19 Martin Place
Sydney NSW 2000

Test Report – Fire Resistance:

TESTING PERFORMED ON: A steel framed, stud wall with one layer of R2.5 x 90mm thk earthwool and sheeted with a dual layer of 10mm thk SE FireCrunch board each side.

TEST DATE:	05/09/2018
REPORT WRITTEN BY:	M. Lewis
REPORT DATE:	13/09/2018
RTL REPORT NO:	TR-F026.01 (PR0057)
TEST ID:	FR34.S3/2018
SCOPE:	Measurement of fire resistance in general accordance with AS 1530.4-2014 Sections 1, 2 and 3

1. DOCUMENT HISTORY


Revision #	Date	Sent to	Additional Information
TR-F026.DR (PR0057)	14/09/2018	Client	Draft issue for comment
TR-F026.01 (PR0057)	18/09/2018	Client	Final Issue

2. TESTING FACILITY NAME AND ADDRESS

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3. REPORT AUTHORISATION

Report Written by	Title	Date	Signature
M. Lewis	Technical Manager Fire & Smoke	18/09/2018	


Report Authorised by	Title	Date	Signature
M. Lewis	Technical Manager Fire & Smoke	18/09/2018	

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4. REPORT SUMMARY

Fire resistance test on a steel framed, stud wall with one layer of R2.5 x 90mm thk earthwool and sheeted with a dual layer of 10mm thk SE FireCrunch board each side. The specimen under test achieved the following fire-resistance levels in general accordance with AS 1530.4-2014.

Test Results	
Structural adequacy	n/a
Integrity	121 minutes ¹
Insulation	121 minutes ¹
FRL	-/120/120

¹ No failure recorded

STATEMENTS

THE RESULTS OF THESE FIRE TESTS MAY BE USED TO DIRECTLY ASSESS FIRE HAZZARD, BUT IT SHOULD BE RECOGNIZED THAT A SINGLE TEST METHOD WILL NOT PRODUCE A FULL ASSESSMENT OF FIRE HAZARD UNDER ALL FIRE CONDITIONS.

THIS REPORT DETAILS METHODS OF CONSTRUCTION, THE TEST CONDITIONS AND THE RESULTS OBTAINED WHEN THE SPECIFIC ELEMENT OF CONSTRUCTION DESCRIBED HERIN WAS TESTED FOLLOWING THE PROCEDURE OUTLINED IN AS 1530.4. ANY SIGNIFICANT VARIATION WITH RESPECT TO SIZE, CONSTRUCTION DETAILS, LOADS STRESSES, EDGE OR END CONDITIONS, OTHER THAN THAT ALLOWED UNDER THE FIELD OF DIRECT APPLICATION IN THE RELEVANT TEST METHOD, IS NOT COVERED BY THIS REPORT.

BECAUSE OF THE NATURE OF FIRE RESISTANCE TESTING AND THE CONSEQUENT DIFFICULTY IN QUANTIFYING UNCERTAINTY OF MEASUREMENT OF FIRE RESISTANCE TESTING, IT IS NOT POSSIBLE TO PROVIDE A STATED DEGREE OF ACCURACY OF THE RESULT.

5. INTRODUCTION

This report details a test carried out on a steel framed, stud wall with one layer of R2.5 x 90mm thk earthwool and sheeted with a dual layer of 10mm thk SE FireCrunch board each side. The test was carried out in general accordance with AS 1530.4-2014 to measure the fire-resistance of the specimen. The specimen under test was installed into steel restraint frame suitable for mounting to the test apparatus.

6. STANDARDS

The measurements leading to the results presented in this report have been undertaken in accordance with standards which specify a method for measuring the fire resistance of building elements:

- AS 1530.4—2014 Methods for fire tests on building materials, components and structures – Part 4: Fire-resistance tests for elements of construction.

The test facility and equipment were in accordance with:

- AS 1530.4—2014 Methods for fire tests on building materials, components and structures – Part 4: Fire-resistance tests for elements of construction.

7. DEVIATIONS FROM THE TEST STANDARD:

Only the general principals of the test Standard were followed as wall testing is required to be carried out at full scale.

Specific variations include edge and end conditions, fixing, and deflection measurements.

During the test the internal furnace pressure fluctuated outside of the control parameters intermittently.

8. PERFORMANCE CRITERIA

Criteria of Failure

Under AS 1530.4-2014 the following conditions are set out to describe failure of the element under test with regards to:

Structural Adequacy (loadbearing capacity)

Structural adequacy not evaluated.

Integrity

Failure in relation to integrity shall be deemed to have occurred when evaluated in accordance with Clauses 2.13.2.2 to 2.13.2.4.

The measurement of the integrity of the test specimen shall be made by cotton pad, gap gauge or sustained flaming. For uninsulated assemblies, other than service penetrations, the cotton pad is deemed inappropriate and gap gauges shall be used. The cotton pad is also deemed inappropriate, except for penetration systems, where a fixed or roving thermocouple measures a temperature exceeding 300°C.

Insulation

The measurement of insulation performance is made by thermocouples on the unexposed face compared to the initial temperature.

The specimen shall be deemed to have failed when:

The average temperature on the unexposed face of the test specimen exceeds the initial temperature by more than 140 K; or

The temperature at any location on the unexposed face of the test specimen exceeds the initial temperature by more than 180 K.

Radiation

Radiation not evaluated.

9. CONSTRUCTION DETAILS

Manufacture Information

The test specimen wall was constructed offsite by the Clients contractor GHA Group. It was delivered to Resolute labs on the 14th August. Resolute attached internal thermocouples over the 16th and 17th August and the Client and GHA Group returned on the 20th August to fix off and seal the non-fire side boards.

Supporting Construction

No supporting construction was used in this test as the entire wall comprised of the test specimen.

Test Specimen(s) Description

(Client supplied)

1X 92 X 45MM SINGLE STEEL STUD FRAME 1.15BMT
 2 X10MM FCA SHEETS EACH SIDE
 1 POWER POINT AND FIRE BOX EITHER CLIPSAL OR HPM EXPOSED SIDE
 INSULATION R2.5 GLASS WOOL BATT 90MM
 AS1530.4 FIRE SEALANT, BOSTIK FIRE BAN TO JOINTS AND PERIMETERS
 SEALANT IN 3X 3 MM BEADS DOWN EACH (VERTICAL) JOINT 45MM STUD FACE
 4MM FIRE GAP BETWEEN VERTICALLY SET BOARDS FILLED WITH SAME FIRE SEALANT
 FIXED WITH 10 GAUGE x 40MM SELF-EMBEDDING, METAL WINGED COUNTERSUNK HEAD, GALV CLASS 3 PHILLIPS
 DRIVE AT MIN 200 CENTRES

10. SUPPORT AND RESTRAINT CONDITIONS

The wall was installed within one of the vertical test specimen frames suitable for mounting to the test apparatus. The wall sat upon a refractory blanket and was compressed against the vertical faces of the test specimen frame, which was fitted with the same refractory blanket, by way of four off compression brackets acting on two vertical angles to spread the compression load evenly across the wall.

11. PRE-TEST CONDITIONING

The specimen was completed on 20/08/18 and left to cure in the indoor laboratory environment for 16 days.

12. DIRECTION OF EXPOSURE

The specimen was subjected to fire exposure from the inside. The wall was symmetrical.

13. SELECTION OF TEST SPECIMEN(S)

The laboratory was not involved in the selection of any specimen materials for this test. The Client supplied and installed all materials for their specimen.

14. TEST PROCEDURE

Furnace Heating Conditions – Temperature Curve

The temperature of the furnace shall be controlled to vary with time, as close as possible, in accordance with the following relationship:

$$T = 345 \log_{10}(8t + 1) + 20$$

Where

T = furnace temperature at time (t), in degrees centigrade

T = time into the test, measured from the ignition of the furnace, in minutes

Laboratory Ambient Temperature at Commencement of fire test

At 10:19 on the 05/09/18 at the commencement of the test, the indoor ambient temperature was 20°C. Over the 121-minute test duration the temperature increased to 21°C.

Furnace Pressure Differential

Furnace pressure was measured with a Dwyer Magnesense pressure transmitter (S:N 71640), with a probe located 100mm from the face of the test specimen.

Specimen Temperatures

Specimen temperatures measured with type K thermocouples of wire diameter not exceeding 0.5mm, with the measuring junction silver soldered to the face of a 12mm diameter by 0.2mm thick copper disc. Each thermocouple shall be covered with a 30±0.5mm x 30±0.5mm x 2.0±0.5mm thick millboard pad.

Deflection Measurement

Deflection measurement was not taken during this test.

Validation to Variation in Tolerances on the Time/Temperature Curve, Pressure Conditions and/or Ambient Laboratory Conditions

The pressure variations within the furnace chamber are not expected to have detrimentally affected the performance of the test.

15. TEST RESULTS

Performance (whole minutes and FRL)

Specimen: A steel framed, stud wall with one layer of R2.5 x 90mm thk earthwool and sheeted with a dual layer of 10mm thk SE FireCrunch board each side

Test Results	
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Appendix A – FIGURES

Figure 1 – Furnace Temperature vs Time

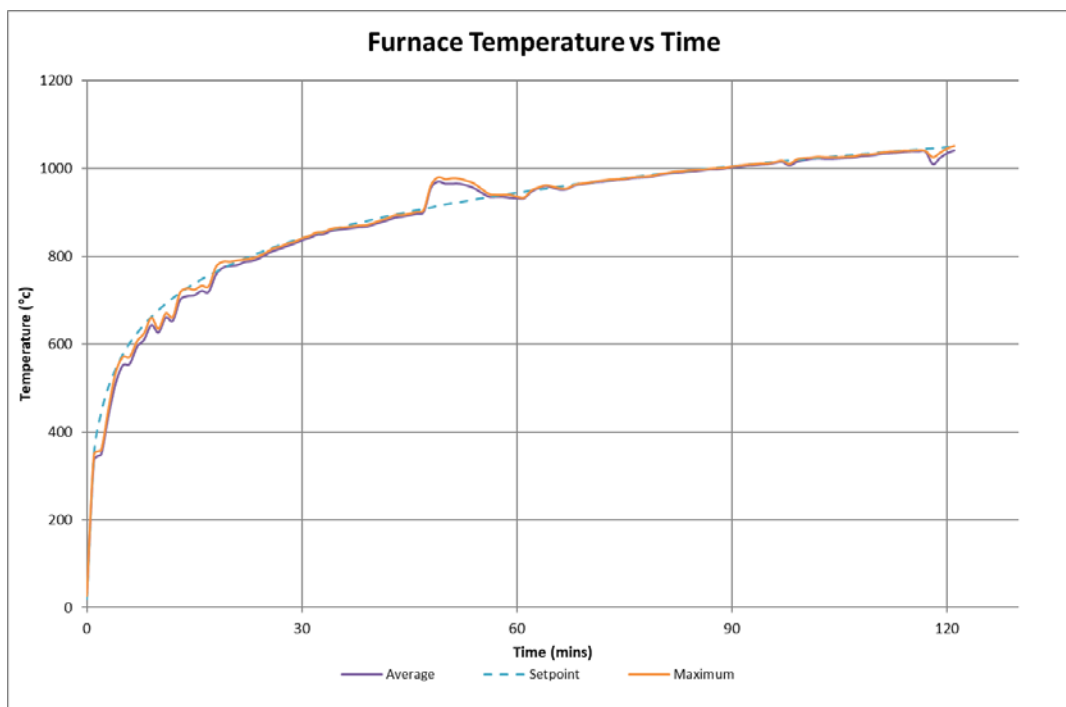


Figure 2 – Furnace Severity vs Time

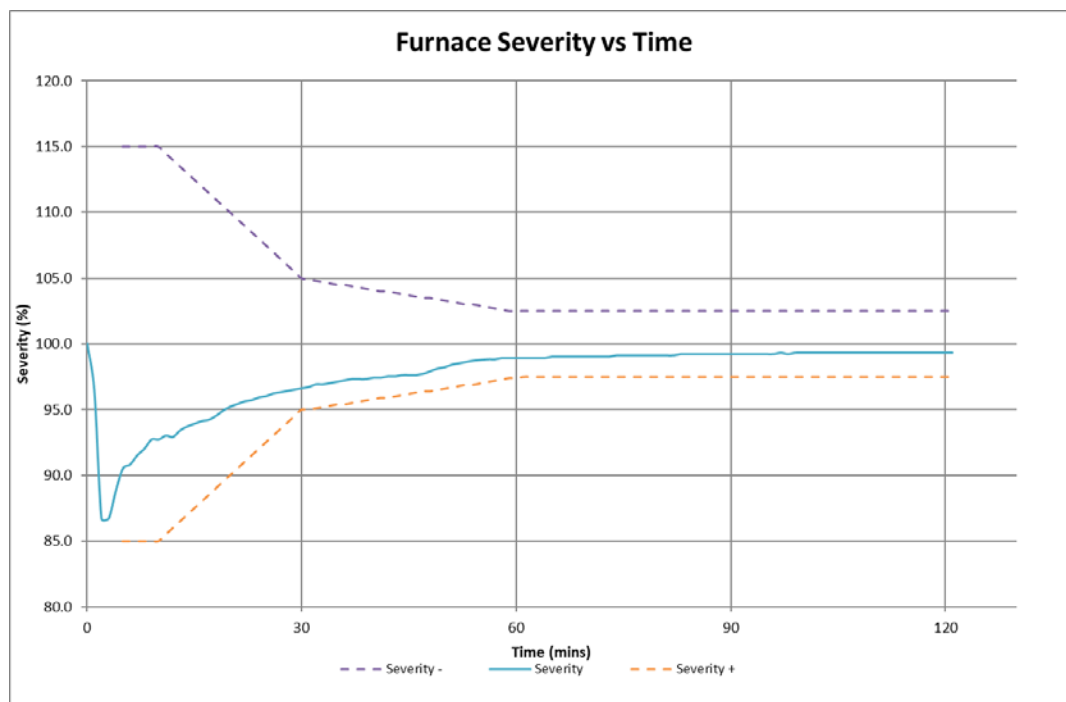


Figure 3 – Furnace Pressure vs Time

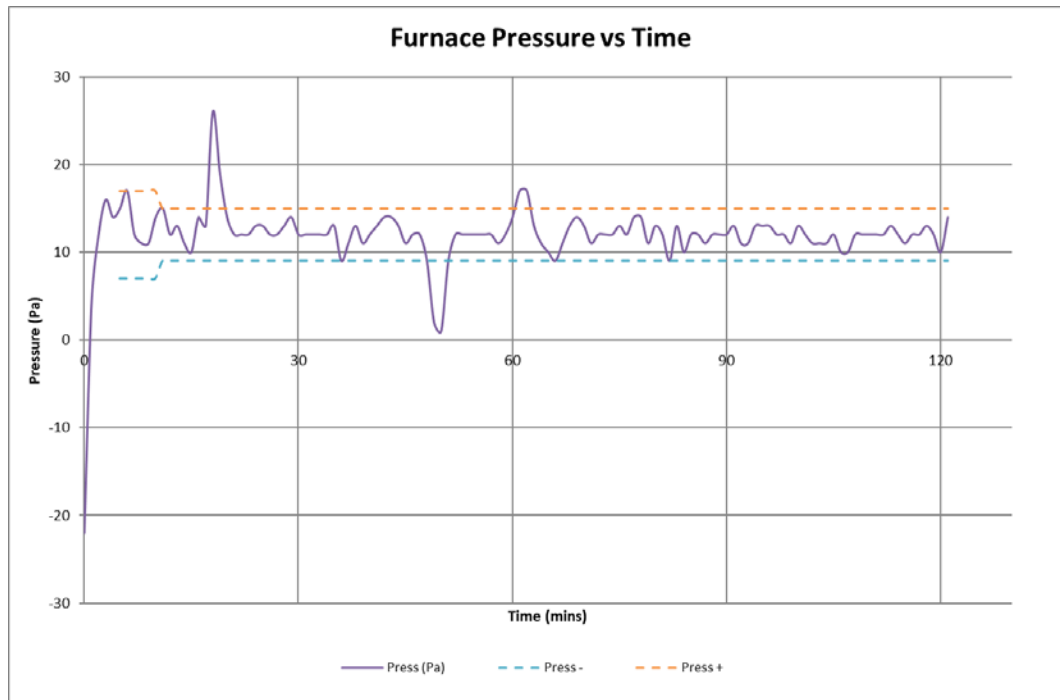


Table 1 – Specimen Thermocouple Locations

Group Location	T/C Location	T/C Designation
Specimen Group 1	Unexposed face of fire side board – NW	SP1
	Unexposed face of fire side board – SW	SP2
	Unexposed face of fire side board – NE	SP3
	Unexposed face of fire side board – SE	SP4
Specimen Group 2	W side stud, mid height	SP5
	E side stud, mid height	SP6
Specimen Group 3	Non-fire side of insulation – NW	SP7
	Non-fire side of insulation – SW	SP8
	Non-fire side of insulation – NE	SP9
	Non-fire side of insulation – SE	SP10
Specimen Group 4	Non-fire side board – NW	SP11
	Non-fire side board – NE	SP12
	Non-fire side board – Central	SP13
	Non-fire side board – SW	SP14
	Non-fire side board – SW	SP15
Specimen Group 5	RHS of vertical board joint	SP16
	LHS of vertical board joint	SP17

Figure 4 – Specimen Group 1 Temperatures vs Time

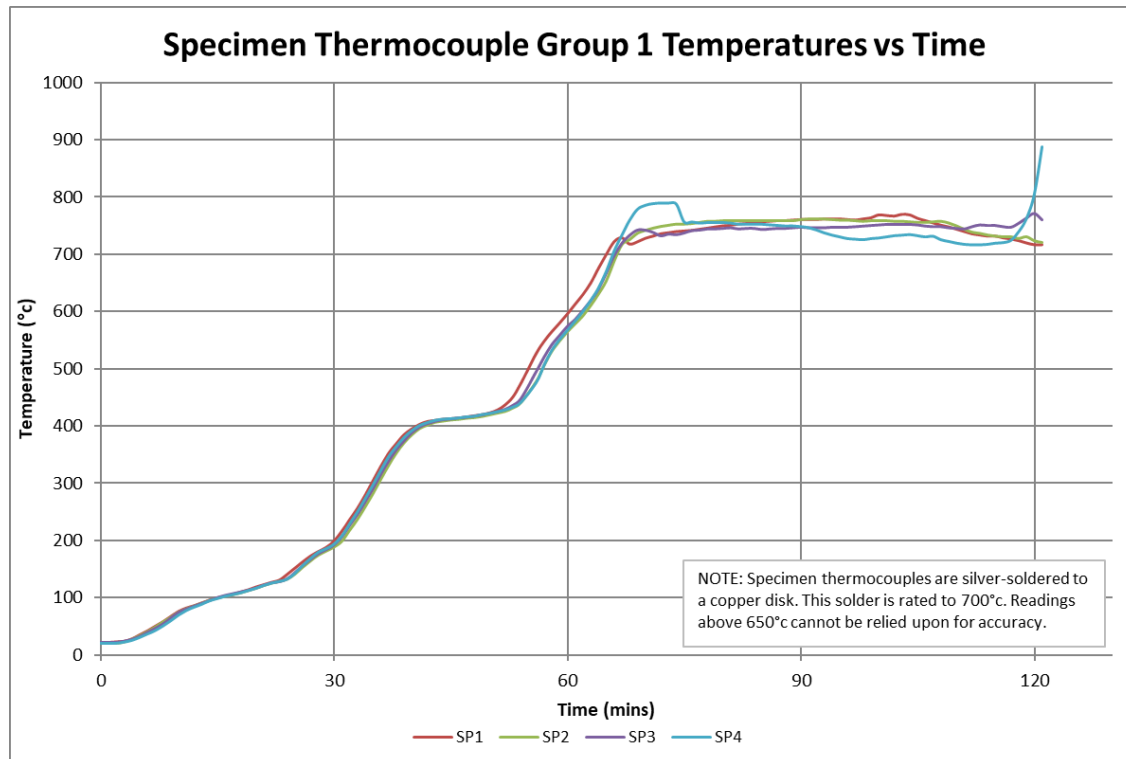


Figure 5 – Specimen Group 2 Temperatures vs Time

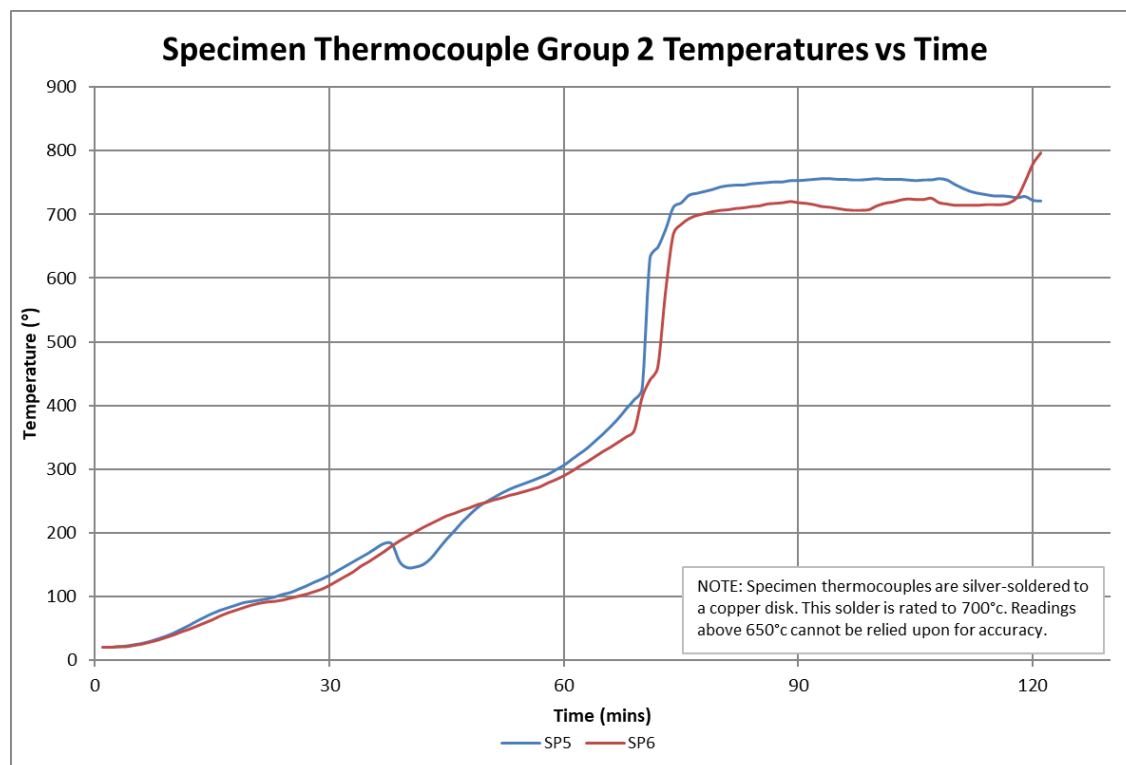


Figure 6 – Specimen Group 3 Temperatures vs Time

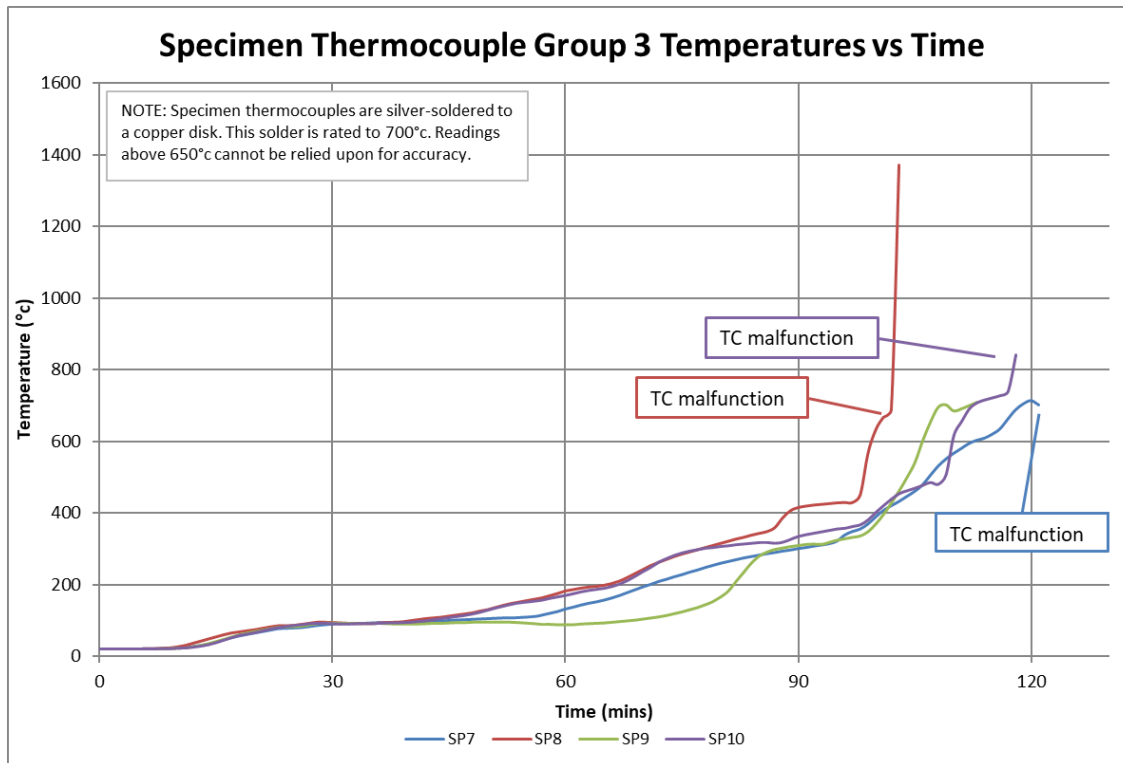


Figure 7 – Specimen Group 4 Temperatures vs Time

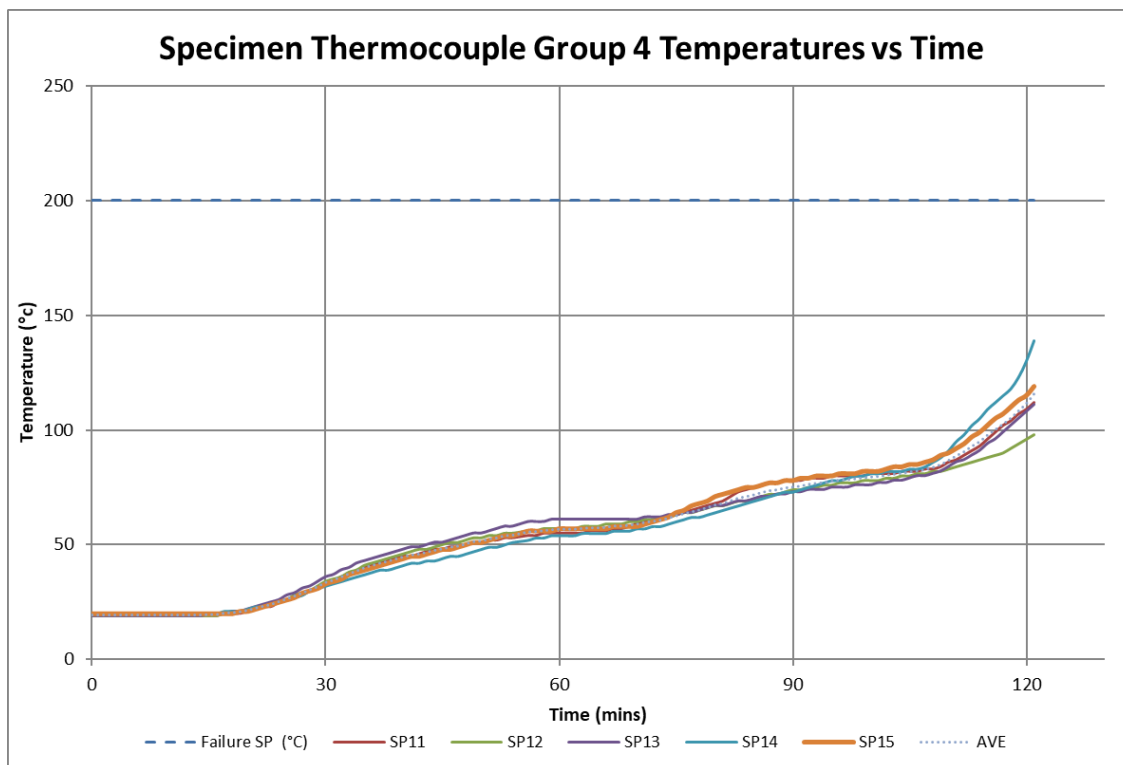
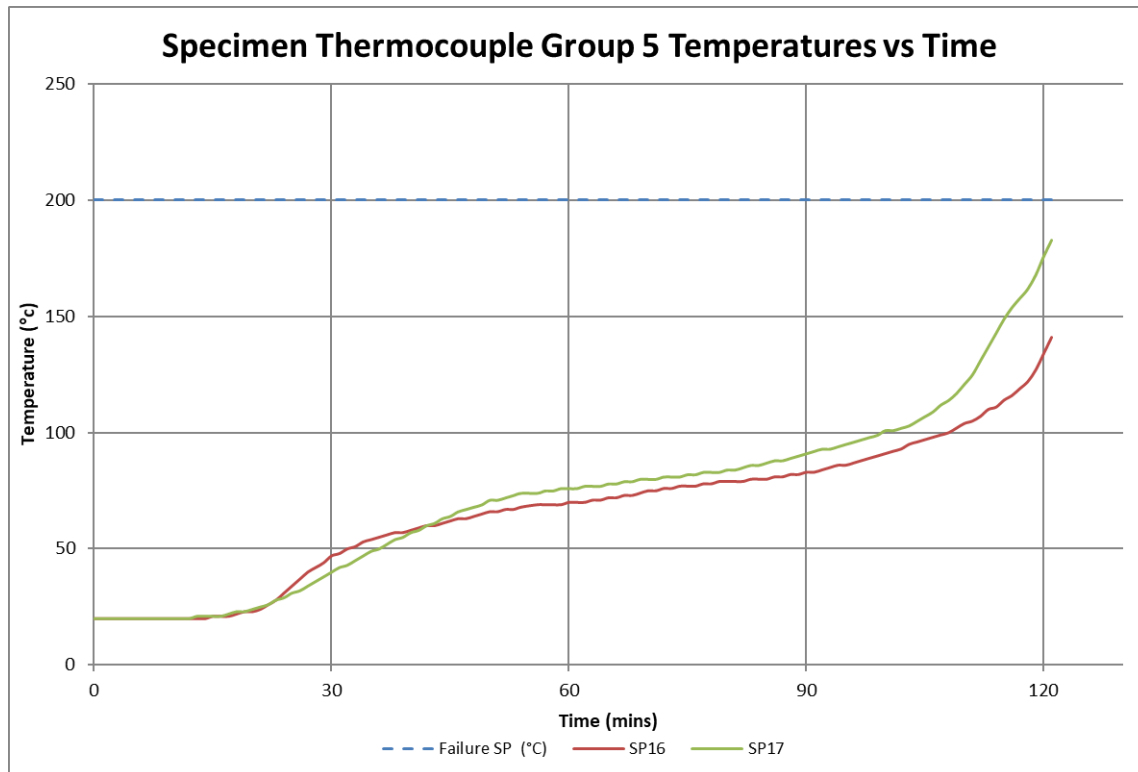


Figure 8 – Specimen Group 5 Temperature vs Time



Appendix B – TABLES

Table 2 – Specimen Group 1 Temperatures

Date / Time	Test Time (mins)	SP1	SP2	SP3	SP4
05-09-18 10:19	0	22	21	22	21
05-09-18 10:20	1	22	21	22	21
05-09-18 10:21	2	23	21	22	21
05-09-18 10:22	3	24	23	24	23
05-09-18 10:23	4	28	28	27	26
05-09-18 10:24	5	35	34	32	31
05-09-18 10:25	6	42	41	39	37
05-09-18 10:26	7	50	49	46	43
05-09-18 10:27	8	58	58	54	51
05-09-18 10:28	9	67	66	64	60
05-09-18 10:29	10	76	75	74	70
05-09-18 10:30	11	82	81	80	78
05-09-18 10:31	12	86	86	85	84
05-09-18 10:32	13	91	91	90	89
05-09-18 10:33	14	96	96	95	95
05-09-18 10:34	15	100	100	100	99
05-09-18 10:35	16	103	103	104	103
05-09-18 10:36	17	106	106	107	106
05-09-18 10:37	18	110	109	110	109
05-09-18 10:38	19	114	113	113	113
05-09-18 10:39	20	119	117	117	117
05-09-18 10:40	21	123	122	122	122
05-09-18 10:41	22	127	126	126	126
05-09-18 10:42	23	131	129	128	129
05-09-18 10:43	24	141	133	133	133
05-09-18 10:44	25	152	142	144	143
05-09-18 10:45	26	163	154	156	157
05-09-18 10:46	27	173	165	167	169
05-09-18 10:47	28	181	175	177	180
05-09-18 10:48	29	188	182	184	186
05-09-18 10:49	30	199	189	192	194
05-09-18 10:50	31	216	199	206	208
05-09-18 10:51	32	236	218	226	229
05-09-18 10:52	33	256	237	245	250
05-09-18 10:53	34	279	259	267	273
05-09-18 10:54	35	304	282	290	297
05-09-18 10:55	36	329	307	315	322

Date / Time	Test Time (mins)	SP1	SP2	SP3	SP4
05-09-18 10:56	37	352	331	338	346
05-09-18 10:57	38	369	353	358	364
05-09-18 10:58	39	385	371	374	380
05-09-18 10:59	40	395	385	388	392
05-09-18 11:00	41	403	396	398	401
05-09-18 11:01	42	408	402	404	406
05-09-18 11:02	43	410	407	408	410
05-09-18 11:03	44	412	409	411	412
05-09-18 11:04	45	413	411	412	413
05-09-18 11:05	46	414	412	414	414
05-09-18 11:06	47	416	414	415	416
05-09-18 11:07	48	418	415	417	417
05-09-18 11:08	49	420	417	419	420
05-09-18 11:09	50	423	420	422	422
05-09-18 11:10	51	428	423	425	425
05-09-18 11:11	52	437	426	429	428
05-09-18 11:12	53	451	432	436	433
05-09-18 11:13	54	474	441	447	441
05-09-18 11:15	56	527	478	495	476
05-09-18 11:16	57	548	506	520	506
05-09-18 11:17	58	565	531	542	532
05-09-18 11:18	59	580	549	558	551
05-09-18 11:19	60	596	565	574	567
05-09-18 11:20	61	613	579	586	583
05-09-18 11:21	62	630	593	602	600
05-09-18 11:22	63	650	611	619	619
05-09-18 11:23	64	676	631	639	641
05-09-18 11:24	65	700	654	667	670
05-09-18 11:25	66	722	688	697	705
05-09-18 11:26	67	729	717	719	733
05-09-18 11:27	68	718	726	733	759
05-09-18 11:28	69	722	737	742	778
05-09-18 11:29	70	728	742	742	785
05-09-18 11:30	71	732	746	738	788
05-09-18 11:31	72	736	749	732	789
05-09-18 11:32	73	738	751	735	789
05-09-18 11:33	74	740	753	734	787
05-09-18 11:34	75	741	753	737	756
05-09-18 11:35	76	742	754	741	756

Date / Time	Test Time (mins)	SP1	SP2	SP3	SP4
05-09-18 11:36	77	744	756	742	754
05-09-18 11:37	78	746	758	744	755
05-09-18 11:38	79	748	758	744	755
05-09-18 11:39	80	750	759	745	755
05-09-18 11:40	81	751	759	746	754
05-09-18 11:41	82	753	759	744	752
05-09-18 11:42	83	754	759	745	752
05-09-18 11:43	84	756	759	745	752
05-09-18 11:44	85	757	759	743	752
05-09-18 11:45	86	758	759	744	751
05-09-18 11:46	87	759	759	745	750
05-09-18 11:47	88	759	759	745	749
05-09-18 11:48	89	760	759	746	749
05-09-18 11:49	90	761	761	747	748
05-09-18 11:50	91	761	762	746	746
05-09-18 11:51	92	761	762	746	742
05-09-18 11:52	93	762	762	746	737
05-09-18 11:53	94	762	761	747	733
05-09-18 11:54	95	762	760	747	730
05-09-18 11:55	96	761	760	747	727
05-09-18 11:56	97	760	759	748	726
05-09-18 11:57	98	762	758	749	725
05-09-18 11:58	99	764	759	750	727
05-09-18 11:59	100	769	759	751	728
05-09-18 12:00	101	768	759	752	730
05-09-18 12:01	102	767	758	752	732
05-09-18 12:02	103	770	758	752	733
05-09-18 12:03	104	769	757	752	734
05-09-18 12:04	105	763	756	751	732
05-09-18 12:05	106	759	756	749	730
05-09-18 12:06	107	755	757	748	731
05-09-18 12:07	108	751	758	748	725
05-09-18 12:08	109	748	755	746	722
05-09-18 12:09	110	744	750	745	719
05-09-18 12:10	111	740	744	744	717
05-09-18 12:11	112	736	739	748	716
05-09-18 12:12	113	734	737	751	716
05-09-18 12:13	114	732	734	750	717
05-09-18 12:14	115	732	732	750	719

Date / Time	Test Time (mins)	SP1	SP2	SP3	SP4
05-09-18 12:15	116	729	731	748	720
05-09-18 12:16	117	727	731	747	724
05-09-18 12:17	118	724	728	754	739
05-09-18 12:18	119	720	731	763	762
05-09-18 12:19	120	717	724	771	804
05-09-18 12:20	121	717	721	760	887

Table 3 – Specimen Group 2 Temperatures

Date / Time	Test Time (mins)	SP5	SP6
05-09-18 10:19	0	20	21
05-09-18 10:20	1	20	21
05-09-18 10:21	2	20	21
05-09-18 10:22	3	21	22
05-09-18 10:23	4	22	22
05-09-18 10:24	5	24	24
05-09-18 10:25	6	26	26
05-09-18 10:26	7	29	29
05-09-18 10:27	8	33	32
05-09-18 10:28	9	37	36
05-09-18 10:29	10	42	40
05-09-18 10:30	11	48	45
05-09-18 10:31	12	54	49
05-09-18 10:32	13	61	54
05-09-18 10:33	14	67	59
05-09-18 10:34	15	73	64
05-09-18 10:35	16	78	70
05-09-18 10:36	17	82	75
05-09-18 10:37	18	86	79
05-09-18 10:38	19	90	83
05-09-18 10:39	20	92	87
05-09-18 10:40	21	94	90
05-09-18 10:41	22	96	92
05-09-18 10:42	23	99	93
05-09-18 10:43	24	103	95
05-09-18 10:44	25	106	98
05-09-18 10:45	26	111	101
05-09-18 10:46	27	116	104
05-09-18 10:47	28	122	108
05-09-18 10:48	29	127	112

Date / Time	Test Time (mins)	SP5	SP6
05-09-18 10:49	30	133	118
05-09-18 10:50	31	140	125
05-09-18 10:51	32	147	132
05-09-18 10:52	33	154	139
05-09-18 10:53	34	161	148
05-09-18 10:54	35	168	155
05-09-18 10:55	36	176	163
05-09-18 10:56	37	183	171
05-09-18 10:57	38	182	180
05-09-18 10:58	39	154	188
05-09-18 10:59	40	145	195
05-09-18 11:00	41	146	202
05-09-18 11:01	42	150	209
05-09-18 11:02	43	160	215
05-09-18 11:03	44	175	221
05-09-18 11:04	45	190	227
05-09-18 11:05	46	203	231
05-09-18 11:06	47	217	236
05-09-18 11:07	48	229	240
05-09-18 11:08	49	240	245
05-09-18 11:09	50	248	248
05-09-18 11:10	51	255	252
05-09-18 11:11	52	262	255
05-09-18 11:12	53	268	259
05-09-18 11:13	54	273	262
05-09-18 11:15	56	282	269
05-09-18 11:16	57	287	273
05-09-18 11:17	58	292	279
05-09-18 11:18	59	299	284
05-09-18 11:19	60	306	290
05-09-18 11:20	61	315	297
05-09-18 11:21	62	324	305
05-09-18 11:22	63	333	312
05-09-18 11:23	64	344	320
05-09-18 11:24	65	355	328
05-09-18 11:25	66	367	335
05-09-18 11:26	67	380	343
05-09-18 11:27	68	395	351
05-09-18 11:28	69	409	361

Date / Time	Test Time (mins)	SP5	SP6
05-09-18 11:29	70	426	413
05-09-18 11:30	71	631	440
05-09-18 11:31	72	648	460
05-09-18 11:32	73	676	579
05-09-18 11:33	74	711	669
05-09-18 11:34	75	718	684
05-09-18 11:35	76	730	693
05-09-18 11:36	77	733	698
05-09-18 11:37	78	736	701
05-09-18 11:38	79	739	704
05-09-18 11:39	80	743	706
05-09-18 11:40	81	745	707
05-09-18 11:41	82	746	709
05-09-18 11:42	83	746	710
05-09-18 11:43	84	748	712
05-09-18 11:44	85	749	713
05-09-18 11:45	86	750	716
05-09-18 11:46	87	751	717
05-09-18 11:47	88	751	718
05-09-18 11:48	89	753	720
05-09-18 11:49	90	753	718
05-09-18 11:50	91	754	717
05-09-18 11:51	92	755	715
05-09-18 11:52	93	756	712
05-09-18 11:53	94	756	711
05-09-18 11:54	95	755	709
05-09-18 11:55	96	755	707
05-09-18 11:56	97	754	706
05-09-18 11:57	98	754	706
05-09-18 11:58	99	755	707
05-09-18 11:59	100	756	713
05-09-18 12:00	101	755	717
05-09-18 12:01	102	755	719
05-09-18 12:02	103	755	722
05-09-18 12:03	104	754	724
05-09-18 12:04	105	753	723
05-09-18 12:05	106	754	723
05-09-18 12:06	107	754	725
05-09-18 12:07	108	756	718

Date / Time	Test Time (mins)	SP5	SP6
05-09-18 12:08	109	754	716
05-09-18 12:09	110	747	714
05-09-18 12:10	111	741	714
05-09-18 12:11	112	736	714
05-09-18 12:12	113	733	714
05-09-18 12:13	114	731	715
05-09-18 12:14	115	729	715
05-09-18 12:15	116	729	715
05-09-18 12:16	117	728	718
05-09-18 12:17	118	726	727
05-09-18 12:18	119	728	751
05-09-18 12:19	120	722	779
05-09-18 12:20	121	721	796

Table 4 – Specimen Group 3 Temperatures

Date / Time	Test Time (mins)	SP7	SP8	SP9	SP10
05-09-18 10:19	0	19	19	19	19
05-09-18 10:20	1	19	19	19	19
05-09-18 10:21	2	19	19	19	19
05-09-18 10:22	3	19	19	19	19
05-09-18 10:23	4	19	19	19	19
05-09-18 10:24	5	19	19	19	19
05-09-18 10:25	6	20	20	19	19
05-09-18 10:26	7	20	20	19	19
05-09-18 10:27	8	20	21	20	20
05-09-18 10:28	9	21	22	20	20
05-09-18 10:29	10	22	25	21	21
05-09-18 10:30	11	23	29	22	22
05-09-18 10:31	12	26	35	25	24
05-09-18 10:32	13	29	41	29	27
05-09-18 10:33	14	33	47	34	31
05-09-18 10:34	15	38	53	40	37
05-09-18 10:35	16	45	59	46	44
05-09-18 10:36	17	51	64	53	51
05-09-18 10:37	18	56	67	59	57
05-09-18 10:38	19	60	70	64	61
05-09-18 10:39	20	64	73	68	65
05-09-18 10:40	21	68	77	72	70
05-09-18 10:41	22	72	81	76	75

Date / Time	Test Time (mins)	SP7	SP8	SP9	SP10
05-09-18 10:42	23	76	84	80	79
05-09-18 10:43	24	77	84	81	82
05-09-18 10:44	25	78	85	82	85
05-09-18 10:45	26	79	88	83	87
05-09-18 10:46	27	82	91	87	90
05-09-18 10:47	28	85	94	90	91
05-09-18 10:48	29	87	94	92	91
05-09-18 10:49	30	89	93	92	90
05-09-18 10:50	31	90	92	91	89
05-09-18 10:51	32	90	91	91	89
05-09-18 10:52	33	90	90	91	90
05-09-18 10:53	34	91	90	90	90
05-09-18 10:54	35	92	90	90	90
05-09-18 10:55	36	93	92	91	91
05-09-18 10:56	37	93	93	90	92
05-09-18 10:57	38	93	94	89	92
05-09-18 10:58	39	93	95	89	93
05-09-18 10:59	40	93	98	89	94
05-09-18 11:00	41	94	101	89	96
05-09-18 11:01	42	95	104	90	98
05-09-18 11:02	43	96	106	91	101
05-09-18 11:03	44	97	108	91	104
05-09-18 11:04	45	99	111	92	107
05-09-18 11:05	46	100	114	93	110
05-09-18 11:06	47	101	117	93	113
05-09-18 11:07	48	102	120	94	117
05-09-18 11:08	49	103	125	94	122
05-09-18 11:09	50	104	129	94	128
05-09-18 11:10	51	105	135	94	134
05-09-18 11:11	52	106	141	94	139
05-09-18 11:12	53	106	146	94	144
05-09-18 11:13	54	107	150	93	148
05-09-18 11:15	56	110	158	90	153
05-09-18 11:16	57	114	162	88	156
05-09-18 11:17	58	119	168	88	161
05-09-18 11:18	59	124	174	87	165
05-09-18 11:19	60	131	181	87	169
05-09-18 11:20	61	136	185	87	174
05-09-18 11:21	62	142	189	89	179
05-09-18 11:22	63	147	192	90	183

Date / Time	Test Time (mins)	SP7	SP8	SP9	SP10
05-09-18 11:23	64	151	194	91	186
05-09-18 11:24	65	156	197	92	189
05-09-18 11:25	66	162	202	94	194
05-09-18 11:26	67	169	209	96	201
05-09-18 11:27	68	177	219	98	211
05-09-18 11:28	69	185	230	100	223
05-09-18 11:29	70	193	241	103	236
05-09-18 11:30	71	200	252	106	248
05-09-18 11:31	72	208	261	109	262
05-09-18 11:32	73	214	269	113	272
05-09-18 11:33	74	221	277	118	281
05-09-18 11:34	75	227	284	123	288
05-09-18 11:35	76	234	290	129	293
05-09-18 11:36	77	240	296	135	297
05-09-18 11:37	78	247	302	143	301
05-09-18 11:38	79	253	308	152	303
05-09-18 11:39	80	259	314	165	306
05-09-18 11:40	81	264	320	182	308
05-09-18 11:41	82	269	326	209	311
05-09-18 11:42	83	274	331	235	313
05-09-18 11:43	84	278	337	261	315
05-09-18 11:44	85	282	342	280	317
05-09-18 11:45	86	286	347	291	317
05-09-18 11:46	87	289	358	298	315
05-09-18 11:47	88	293	385	302	318
05-09-18 11:48	89	296	405	306	326
05-09-18 11:49	90	300	414	309	334
05-09-18 11:50	91	303	418	312	339
05-09-18 11:51	92	307	421	313	343
05-09-18 11:52	93	310	423	312	347
05-09-18 11:53	94	314	425	318	351
05-09-18 11:54	95	321	427	324	355
05-09-18 11:55	96	338	428	328	357
05-09-18 11:56	97	348	428	332	362
05-09-18 11:57	98	355	449	336	367
05-09-18 11:58	99	369	565	348	381
05-09-18 11:59	100	389	631	370	402
05-09-18 12:00	101	407	666	397	421
05-09-18 12:01	102	420	687	429	439

Date / Time	Test Time (mins)	SP7	SP8	SP9	SP10
05-09-18 12:02	103	432	1370	463	454
05-09-18 12:03	104	446		500	462
05-09-18 12:04	105	460		541	469
05-09-18 12:05	106	478		602	477
05-09-18 12:06	107	504		654	485
05-09-18 12:07	108	530		696	480
05-09-18 12:08	109	550		703	506
05-09-18 12:09	110	566		686	616
05-09-18 12:10	111	580		692	655
05-09-18 12:11	112	594		701	691
05-09-18 12:12	113	603		710	708
05-09-18 12:13	114	609			716
05-09-18 12:14	115	620			722
05-09-18 12:15	116	635			728
05-09-18 12:16	117	662			740
05-09-18 12:17	118	688			842
05-09-18 12:18	119	705			
05-09-18 12:19	120	714			
05-09-18 12:20	121	702			

Table 5 – Specimen Group 4 Temperatures

Date / Time	Test Time (mins)	Failure SP (°C)	SP11	SP12	SP13	SP14	SP15	AVE
05-09-18 10:19	0	200	19	19	19	20	20	19.4
05-09-18 10:20	1	200	19	19	19	20	20	19.4
05-09-18 10:21	2	200	19	19	19	20	20	19.4
05-09-18 10:22	3	200	19	19	19	20	20	19.4
05-09-18 10:23	4	200	19	19	19	20	20	19.4
05-09-18 10:24	5	200	19	19	19	20	20	19.4
05-09-18 10:25	6	200	19	19	19	20	20	19.4
05-09-18 10:26	7	200	19	19	19	20	20	19.4
05-09-18 10:27	8	200	19	19	19	20	20	19.4
05-09-18 10:28	9	200	19	19	19	20	20	19.4
05-09-18 10:29	10	200	19	19	19	20	20	19.4
05-09-18 10:30	11	200	19	19	19	20	20	19.4
05-09-18 10:31	12	200	19	19	19	20	20	19.4
05-09-18 10:32	13	200	19	19	19	20	20	19.4
05-09-18 10:33	14	200	19	19	19	20	20	19.4
05-09-18 10:34	15	200	19	19	20	20	20	19.6

Date / Time	Test Time (mins)	Failure SP (°C)	SP11	SP12	SP13	SP14	SP15	AVE
05-09-18 10:35	16	200	19	19	20	20	20	19.6
05-09-18 10:36	17	200	20	20	20	21	20	20.2
05-09-18 10:37	18	200	20	20	21	21	20	20.4
05-09-18 10:38	19	200	20	21	21	21	21	20.8
05-09-18 10:39	20	200	21	21	22	22	21	21.4
05-09-18 10:40	21	200	22	22	23	23	22	22.4
05-09-18 10:41	22	200	23	23	24	23	23	23.2
05-09-18 10:42	23	200	23	24	25	24	24	24
05-09-18 10:43	24	200	25	25	26	25	25	25.2
05-09-18 10:44	25	200	26	26	28	26	26	26.4
05-09-18 10:45	26	200	27	28	29	27	27	27.6
05-09-18 10:46	27	200	28	29	31	28	29	29
05-09-18 10:47	28	200	30	30	32	30	30	30.4
05-09-18 10:48	29	200	31	32	34	31	31	31.8
05-09-18 10:49	30	200	33	34	36	32	33	33.6
05-09-18 10:50	31	200	34	35	37	33	34	34.6
05-09-18 10:51	32	200	36	36	39	34	35	36
05-09-18 10:52	33	200	37	38	40	35	37	37.4
05-09-18 10:53	34	200	38	39	42	36	38	38.6
05-09-18 10:54	35	200	40	41	43	37	39	40
05-09-18 10:55	36	200	41	42	44	38	40	41
05-09-18 10:56	37	200	42	43	45	39	41	42
05-09-18 10:57	38	200	43	44	46	39	42	42.8
05-09-18 10:58	39	200	44	45	47	40	43	43.8
05-09-18 10:59	40	200	45	46	48	41	44	44.8
05-09-18 11:00	41	200	45	47	49	42	45	45.6
05-09-18 11:01	42	200	46	48	49	42	45	46
05-09-18 11:02	43	200	47	48	50	43	46	46.8
05-09-18 11:03	44	200	48	49	51	43	47	47.6
05-09-18 11:04	45	200	48	50	51	44	48	48.2
05-09-18 11:05	46	200	49	51	52	45	48	49
05-09-18 11:06	47	200	49	51	53	45	49	49.4
05-09-18 11:07	48	200	50	52	54	46	50	50.4
05-09-18 11:08	49	200	51	53	55	47	51	51.4
05-09-18 11:09	50	200	51	53	55	48	51	51.6
05-09-18 11:10	51	200	52	54	56	49	52	52.6
05-09-18 11:11	52	200	52	54	57	49	53	53
05-09-18 11:12	53	200	53	55	58	50	54	54
05-09-18 11:13	54	200	53	55	58	51	54	54.2

Date / Time	Test Time (mins)	Failure SP (°C)	SP11	SP12	SP13	SP14	SP15	AVE
05-09-18 11:15	56	200	54	56	60	52	56	55.6
05-09-18 11:16	57	200	54	56	60	53	56	55.8
05-09-18 11:17	58	200	55	57	60	53	56	56.2
05-09-18 11:18	59	200	55	57	61	54	56	56.6
05-09-18 11:19	60	200	55	57	61	54	57	56.8
05-09-18 11:20	61	200	55	57	61	54	57	56.8
05-09-18 11:21	62	200	55	57	61	54	57	56.8
05-09-18 11:22	63	200	55	58	61	55	57	57.2
05-09-18 11:23	64	200	56	58	61	55	57	57.4
05-09-18 11:24	65	200	56	58	61	55	57	57.4
05-09-18 11:25	66	200	56	59	61	55	57	57.6
05-09-18 11:26	67	200	57	59	61	56	58	58.2
05-09-18 11:27	68	200	57	59	61	56	58	58.2
05-09-18 11:28	69	200	58	60	61	56	58	58.6
05-09-18 11:29	70	200	59	60	61	57	58	59
05-09-18 11:30	71	200	60	61	62	57	59	59.8
05-09-18 11:31	72	200	60	61	62	58	60	60.2
05-09-18 11:32	73	200	61	62	62	58	61	60.8
05-09-18 11:33	74	200	62	62	63	59	62	61.6
05-09-18 11:34	75	200	63	63	63	60	64	62.6
05-09-18 11:35	76	200	64	64	64	61	65	63.6
05-09-18 11:36	77	200	65	64	64	62	67	64.4
05-09-18 11:37	78	200	66	65	65	62	68	65.2
05-09-18 11:38	79	200	67	66	66	63	69	66.2
05-09-18 11:39	80	200	68	67	67	64	71	67.4
05-09-18 11:40	81	200	69	67	67	65	72	68
05-09-18 11:41	82	200	71	68	68	66	73	69.2
05-09-18 11:42	83	200	73	69	69	67	74	70.4
05-09-18 11:43	84	200	74	69	69	68	75	71
05-09-18 11:44	85	200	75	70	70	69	75	71.8
05-09-18 11:45	86	200	76	71	71	70	76	72.8
05-09-18 11:46	87	200	77	72	71	71	77	73.6
05-09-18 11:47	88	200	77	72	72	72	77	74
05-09-18 11:48	89	200	78	73	72	73	78	74.8
05-09-18 11:49	90	200	78	74	73	73	78	75.2
05-09-18 11:50	91	200	78	74	73	74	79	75.6
05-09-18 11:51	92	200	79	75	74	75	79	76.4
05-09-18 11:52	93	200	79	75	74	76	80	76.8

Date / Time	Test Time (mins)	Failure SP (°C)	SP11	SP12	SP13	SP14	SP15	AVE
05-09-18 11:53	94	200	79	76	74	77	80	77.2
05-09-18 11:54	95	200	80	76	75	78	80	77.8
05-09-18 11:55	96	200	80	77	75	78	81	78.2
05-09-18 11:56	97	200	80	77	75	79	81	78.4
05-09-18 11:57	98	200	80	77	76	80	81	78.8
05-09-18 11:58	99	200	80	78	76	80	82	79.2
05-09-18 11:59	100	200	81	78	76	81	82	79.6
05-09-18 12:00	101	200	81	78	77	81	82	79.8
05-09-18 12:01	102	200	81	79	77	82	83	80.4
05-09-18 12:02	103	200	81	79	78	82	84	80.8
05-09-18 12:03	104	200	82	80	78	82	84	81.2
05-09-18 12:04	105	200	82	80	79	83	85	81.8
05-09-18 12:05	106	200	82	81	80	83	85	82.2
05-09-18 12:06	107	200	83	81	80	84	86	82.8
05-09-18 12:07	108	200	83	82	81	86	87	83.8
05-09-18 12:08	109	200	84	82	82	88	89	85
05-09-18 12:09	110	200	86	83	84	91	90	86.8
05-09-18 12:10	111	200	87	84	86	95	92	88.8
05-09-18 12:11	112	200	89	85	87	98	94	90.6
05-09-18 12:12	113	200	91	86	89	102	97	93
05-09-18 12:13	114	200	93	87	91	105	99	95
05-09-18 12:14	115	200	96	88	94	109	102	97.8
05-09-18 12:15	116	200	99	89	96	112	105	100.2
05-09-18 12:16	117	200	102	90	99	115	107	102.6
05-09-18 12:17	118	200	104	92	102	118	110	105.2
05-09-18 12:18	119	200	107	94	105	123	113	108.4
05-09-18 12:19	120	200	109	96	108	130	115	111.6
05-09-18 12:20	121	200	112	98	111	139	119	115.8

Table 6 – Specimen Group 5 Temperatures

Date / Time	Test Time (mins)	Failure SP (°C)	SP16	SP17
05-09-18 10:19	0	200	20	20
05-09-18 10:20	1	200	20	20
05-09-18 10:21	2	200	20	20
05-09-18 10:22	3	200	20	20
05-09-18 10:23	4	200	20	20
05-09-18 10:24	5	200	20	20
05-09-18 10:25	6	200	20	20

Date / Time	Test Time (mins)	Failure SP (°C)	SP16	SP17
05-09-18 10:26	7	200	20	20
05-09-18 10:27	8	200	20	20
05-09-18 10:28	9	200	20	20
05-09-18 10:29	10	200	20	20
05-09-18 10:30	11	200	20	20
05-09-18 10:31	12	200	20	20
05-09-18 10:32	13	200	20	21
05-09-18 10:33	14	200	20	21
05-09-18 10:34	15	200	21	21
05-09-18 10:35	16	200	21	21
05-09-18 10:36	17	200	21	22
05-09-18 10:37	18	200	22	23
05-09-18 10:38	19	200	23	23
05-09-18 10:39	20	200	23	24
05-09-18 10:40	21	200	24	25
05-09-18 10:41	22	200	26	26
05-09-18 10:42	23	200	28	28
05-09-18 10:43	24	200	31	29
05-09-18 10:44	25	200	34	31
05-09-18 10:45	26	200	37	32
05-09-18 10:46	27	200	40	34
05-09-18 10:47	28	200	42	36
05-09-18 10:48	29	200	44	38
05-09-18 10:49	30	200	47	40
05-09-18 10:50	31	200	48	42
05-09-18 10:51	32	200	50	43
05-09-18 10:52	33	200	51	45
05-09-18 10:53	34	200	53	47
05-09-18 10:54	35	200	54	49
05-09-18 10:55	36	200	55	50
05-09-18 10:56	37	200	56	52
05-09-18 10:57	38	200	57	54
05-09-18 10:58	39	200	57	55
05-09-18 10:59	40	200	58	57
05-09-18 11:00	41	200	59	58
05-09-18 11:01	42	200	60	60
05-09-18 11:02	43	200	60	61
05-09-18 11:03	44	200	61	63
05-09-18 11:04	45	200	62	64
05-09-18 11:05	46	200	63	66

Date / Time	Test Time (mins)	Failure SP (°C)	SP16	SP17
05-09-18 11:06	47	200	63	67
05-09-18 11:07	48	200	64	68
05-09-18 11:08	49	200	65	69
05-09-18 11:09	50	200	66	71
05-09-18 11:10	51	200	66	71
05-09-18 11:11	52	200	67	72
05-09-18 11:12	53	200	67	73
05-09-18 11:13	54	200	68	74
05-09-18 11:15	56	200	69	74
05-09-18 11:16	57	200	69	75
05-09-18 11:17	58	200	69	75
05-09-18 11:18	59	200	69	76
05-09-18 11:19	60	200	70	76
05-09-18 11:20	61	200	70	76
05-09-18 11:21	62	200	70	77
05-09-18 11:22	63	200	71	77
05-09-18 11:23	64	200	71	77
05-09-18 11:24	65	200	72	78
05-09-18 11:25	66	200	72	78
05-09-18 11:26	67	200	73	79
05-09-18 11:27	68	200	73	79
05-09-18 11:28	69	200	74	80
05-09-18 11:29	70	200	75	80
05-09-18 11:30	71	200	75	80
05-09-18 11:31	72	200	76	81
05-09-18 11:32	73	200	76	81
05-09-18 11:33	74	200	77	81
05-09-18 11:34	75	200	77	82
05-09-18 11:35	76	200	77	82
05-09-18 11:36	77	200	78	83
05-09-18 11:37	78	200	78	83
05-09-18 11:38	79	200	79	83
05-09-18 11:39	80	200	79	84
05-09-18 11:40	81	200	79	84
05-09-18 11:41	82	200	79	85
05-09-18 11:42	83	200	80	86
05-09-18 11:43	84	200	80	86
05-09-18 11:44	85	200	80	87
05-09-18 11:45	86	200	81	88

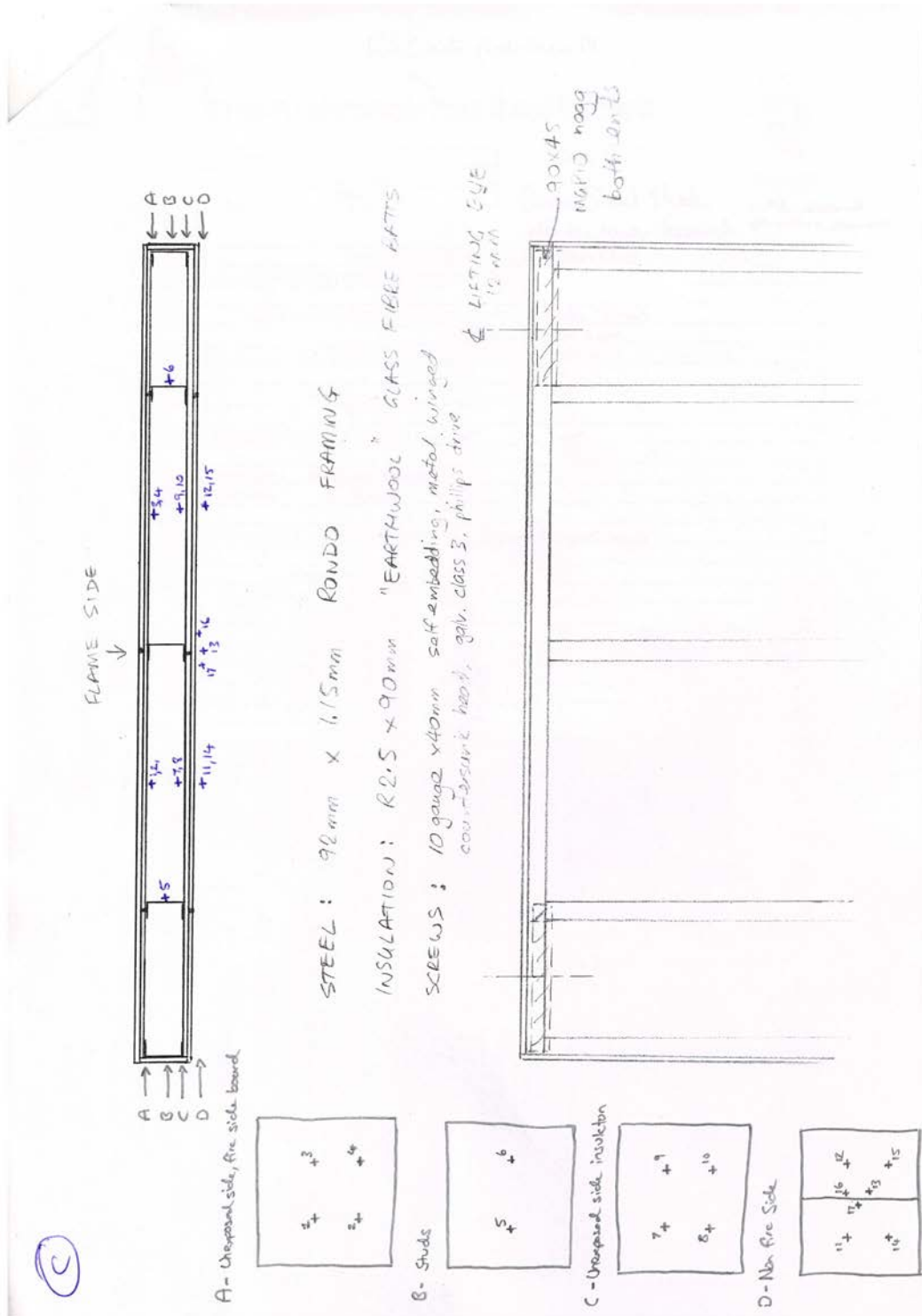
Date / Time	Test Time (mins)	Failure SP (°C)	SP16	SP17
05-09-18 11:46	87	200	81	88
05-09-18 11:47	88	200	82	89
05-09-18 11:48	89	200	82	90
05-09-18 11:49	90	200	83	91
05-09-18 11:50	91	200	83	92
05-09-18 11:51	92	200	84	93
05-09-18 11:52	93	200	85	93
05-09-18 11:53	94	200	86	94
05-09-18 11:54	95	200	86	95
05-09-18 11:55	96	200	87	96
05-09-18 11:56	97	200	88	97
05-09-18 11:57	98	200	89	98
05-09-18 11:58	99	200	90	99
05-09-18 11:59	100	200	91	101
05-09-18 12:00	101	200	92	101
05-09-18 12:01	102	200	93	102
05-09-18 12:02	103	200	95	103
05-09-18 12:03	104	200	96	105
05-09-18 12:04	105	200	97	107
05-09-18 12:05	106	200	98	109
05-09-18 12:06	107	200	99	112
05-09-18 12:07	108	200	100	114
05-09-18 12:08	109	200	102	117
05-09-18 12:09	110	200	104	121
05-09-18 12:10	111	200	105	125
05-09-18 12:11	112	200	107	131
05-09-18 12:12	113	200	110	137
05-09-18 12:13	114	200	111	143
05-09-18 12:14	115	200	114	149
05-09-18 12:15	116	200	116	154
05-09-18 12:16	117	200	119	158
05-09-18 12:17	118	200	122	162
05-09-18 12:18	119	200	127	168
05-09-18 12:19	120	200	134	176
05-09-18 12:20	121	200	141	183

Table 7 – Test Observations

TIME		Observations
Min	Sec	
5	0	NFS no change, no smoke
10	0	NFS no change, no smoke
20	0	NFS no change, no smoke, no visible deflection
25	0	NFS no change, no smoke, no visible deflection
30	0	Minor smoke, minor inward deflection to SE quarter
35	0	Slight smoke from perimeter, SE & SW deflected inwards slightly
40	0	Slight smoke from perimeter, defection noted at 35 min more noticeable
45	0	Slight increase to smoke developed from perimeter, deflection stable
50	0	Smoke steady, deflection increasing
55	0	Smoke steady, deflection increasing
60	0	Smoke steady, NFS no significant change, inward deflection noticeable across wall surface
70	0	NFS no significant change, inward deflection in N-S plain quite noticeable. Minor E-W deflection
80	0	NFS no significant change, deflection stable
90	0	NFS no significant change, deflection stable, smoke emissions slowed
100	0	NFS no significant change, deflection stable, smoke emissions slowed
105	0	Central joint approx. 500mm up smoking and small cracks appearing in sealant
110	0	Substantial smoke increase, central joint showing degradation throughout
117	0	Cotton pad applied to central joint 500mm up. Pass
119	0	Cotton pad applied to TC16 location. Pass
121	0	Test terminated

Appendix C – DRAWINGS

Drawing 1 – Client supplied drawing. Lab added TC locations



Appendix D – PHOTOGRAPHS

Photo 1 – Unexposed side at commencement of test



Photo 2 – Exposed side pre-test



Photo 3 – Unexposed side post-test



Photo 4 – Exposed side post-test



-----END OF REPORT-----