



Sponsor:

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

Test Report – Fire Resistance:

TESTING PERFORMED ON: A timber framed, discontinuous double stud wall with two layers of R2.5 x 90mm thk earthwool and sheeted with a single layer of 10mm thk SE FireCrunch board each side.

TEST DATE:	03/09/2018
REPORT WRITTEN BY:	M. Lewis
REPORT DATE:	17/09/2018
RTL REPORT NO:	TR-F024.01 (PR0057)
TEST ID:	FR32.S3
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-F024.DR (PR0057)	17/09/2018	Client	Draft issue for comment
TR-F024.01 (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 timber framed, discontinuous double stud wall with two layers of R2.5 x 90mm thk earthwool and sheeted with a single 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	90 minutes ¹
Insulation	90 minutes
FRL	-/90/90

¹ deterioration of the non-fire side board occurred from 86 minutes onward but a cotton pad was not available to be used in the final minutes of the test. Had one been applied at 88-89 minutes it is not known if it would have passed due to the observed breakdown in the board surface. No flaming or fissures occurred during this period, only surface cracking.

5. INTRODUCTION

This report details a test carried out on a timber framed, discontinuous double stud wall with two layers of R2.5 x 90mm thk earthwool and sheeted with a single 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.

Due to the nature of the mounting of the wall into the Labs test frame, it was not possible to maintain a completely discontinuous construction. Around the perimeter of the stud wall was a 200x45mm LVL timber frame creating one solid test wall.

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)

2 X 90 X 45MM TIMBER MGP10 DOUBLE STUD FRAME 20MM AIR GAP
 1 X10MM FCA SHEET EACH SIDE
 1 POWER POINT AND FIRE BOX EITHER CLIPSAL OR HPM UNEXPOSED SIDE
 INSULATION R2.5 "EARTHWOOL" BATT 90MM IN EACH FRAME
 AS1530.4 FIRE SEALANT BOSTIK FIRE BAN TO JOINTS AND PERIMETERS
 SEALANT IN 3X 3MM BEADS DOWN EACH (VERTICAL) JOINT 45MM STUD FACE
 4MM FIRE GAP BETWEEN BOARD FILLED WITH SAME FIRE SEALANT
 FIXED WITH NEEDLE POINT STAINLESS STEEL SCREWS AT MIN 200 CENTRES. 10 GAUGE x 35mm SELF
 EMBEDDING TYPE 17, COUNTERSUNK HEAD, GALV CLASS 3, PHILLIPS DRIVE

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 14 days.

12. DIRECTION OF EXPOSURE

The specimen was subjected to fire exposure from the inside, with the exception of the switchbox, 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 10:18 on the 03/09/18 at the commencement of the test, the indoor ambient temperature was 22°C. Over the 90-minute test duration the temperature increased to 24°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 timber framed, discontinuous double stud wall with two layers of R2.5 x 90mm thk earthwool and sheeted with a single layer of 10mm thk SE FireCrunch board each side

Test Results	
Structural adequacy	n/a
Integrity	90 minutes ¹
Insulation	90 minutes ¹
FRL	-/90/90

¹ deterioration of the non-fire side board occurred from 86 minutes onward but a cotton pad was not available to be used in the final minutes of the test. Had one been applied at 88-89 minutes it is not known if it would have passed due to the observed breakdown in the board surface. No flaming or fissures occurred during this period, only surface cracking.

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.

Appendix A – FIGURES

Figure 1 – Furnace Temperature

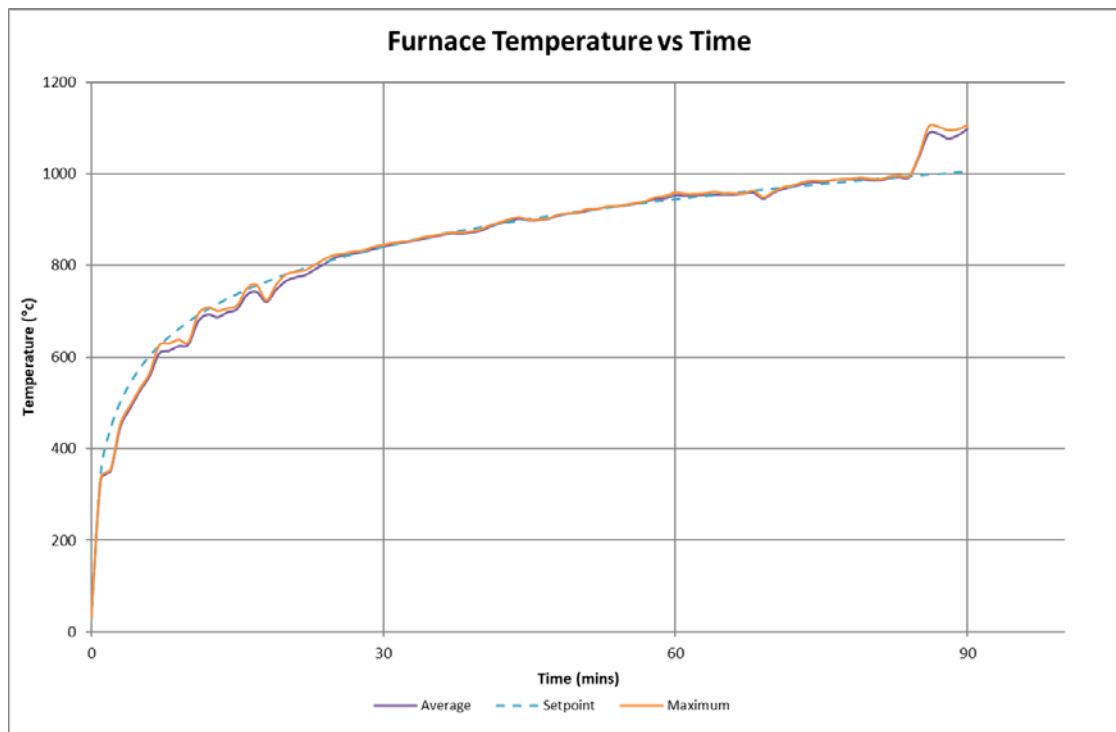


Figure 2 – Furnace Severity

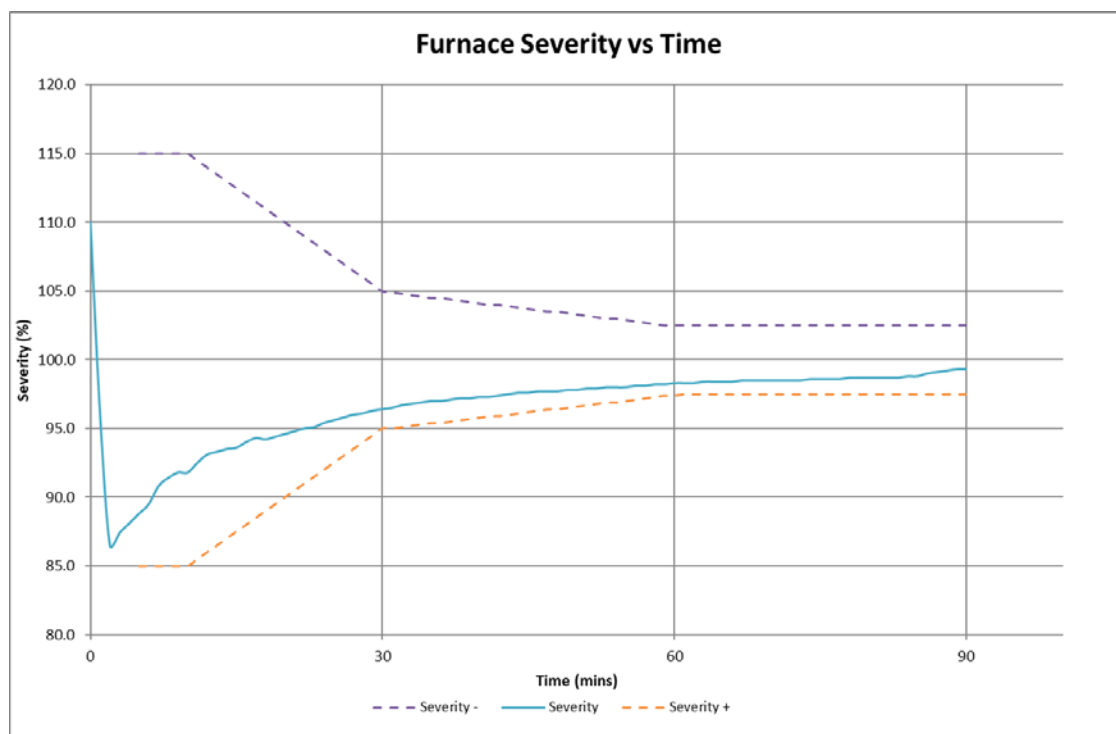


Figure 3 – Furnace Pressure

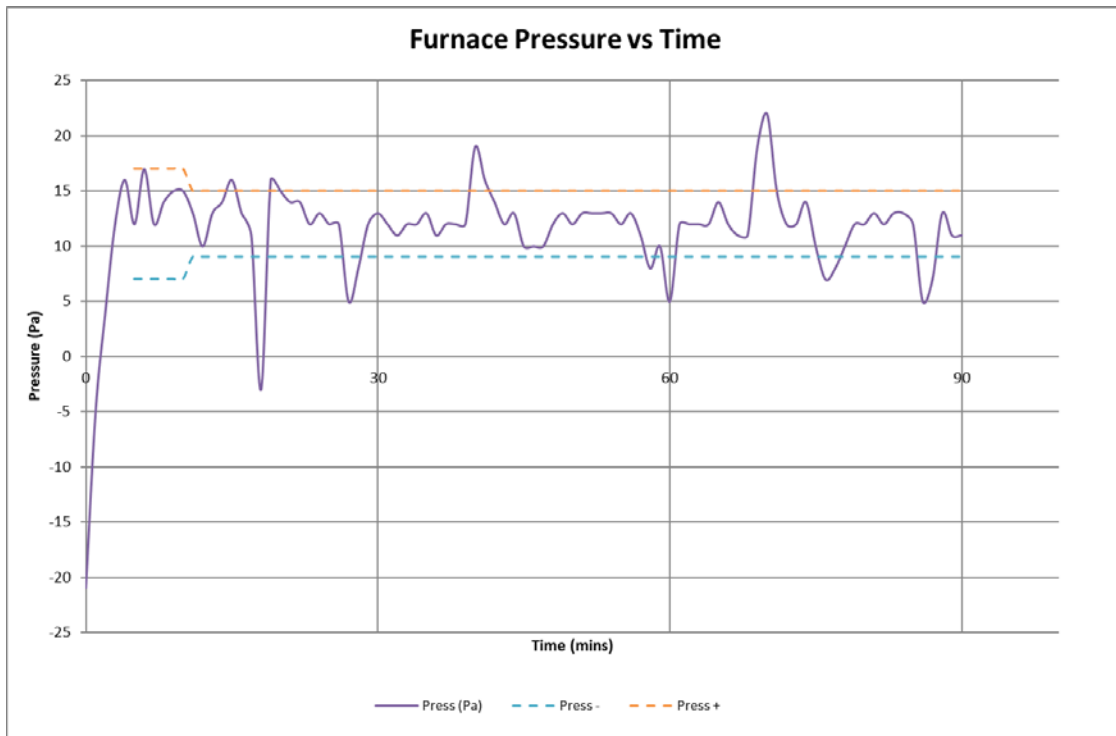


Table 1 – Specimen Thermocouple Locations

Group Location	T/C Location	T/C Designation
Specimen Group 1	Unexposed face fire side board – Central E	SP1
	Unexposed face fire side board – Central W	SP2
Specimen Group 2	Fire side timber stud – SE	SP3
	Fire side timber stud – S central	SP4
	Fire side timber stud – NW	SP5
	Fire side timber stud – N central	SP6
Specimen Group 3	Non-fire side timber stud – SE	SP7
	Non-fire side timber stud – S central	SP8
	Non-fire side timber stud – NW	SP9
	Non-fire side timber stud – N central	SP10
Specimen Group 4	Mid insulation – NW	SP11
	Mid insulation – NE	SP12
	Mid insulation – SW	SP13
	Mid insulation – SE	SP14
Specimen Group 5	NFS insulation – NW	SP15
	NFS insulation – NE	SP16
	NFS insulation – SW	SP17
	NFS insulation – SE	SP18
Specimen Group 6	Fire side of non-fire side board – SW	SP19
	Fire side of non-fire side board – SE	SP20
Specimen Group 7	NFS – NW	SP21
	NFS – NE	SP22
	NFS – Central	SP23
	NFS – SW	SP24
	NFS – SE	SP25
Specimen Group 8	NFS E side joint	SP26
	NFS E side joint	SP27

Figure 4 – Specimen Group 1 Temperatures

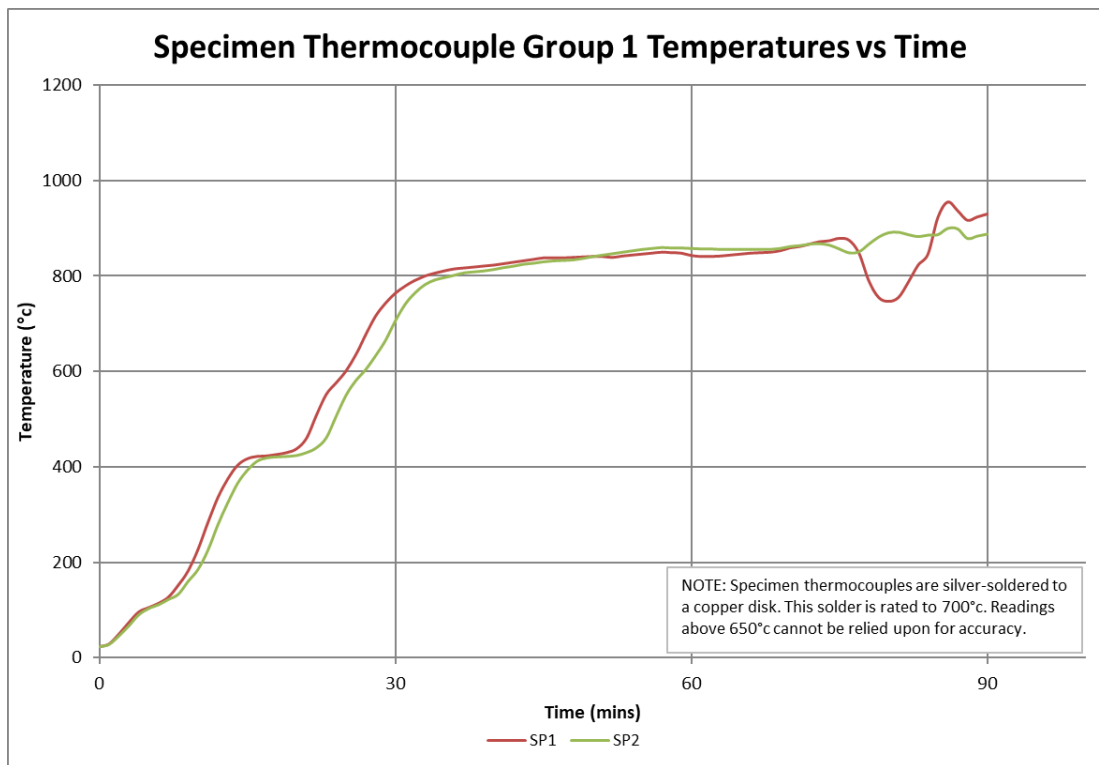


Figure 5 – Specimen Group 2 Temperatures

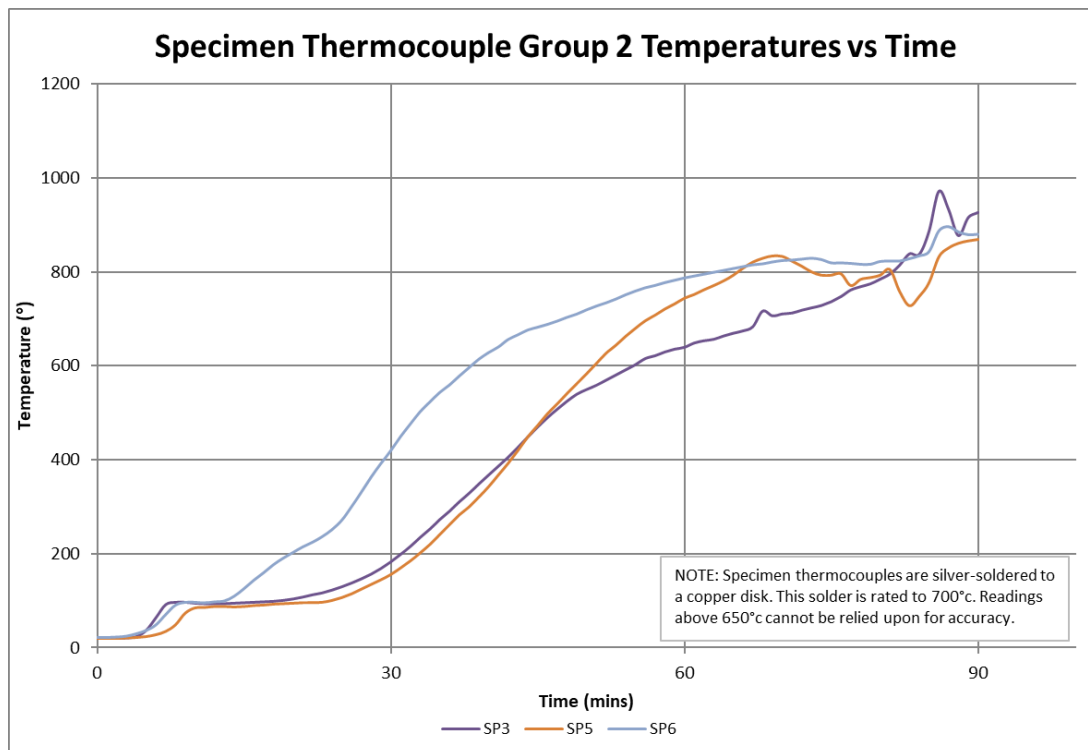


Figure 6 – Specimen Group 3 Temperatures

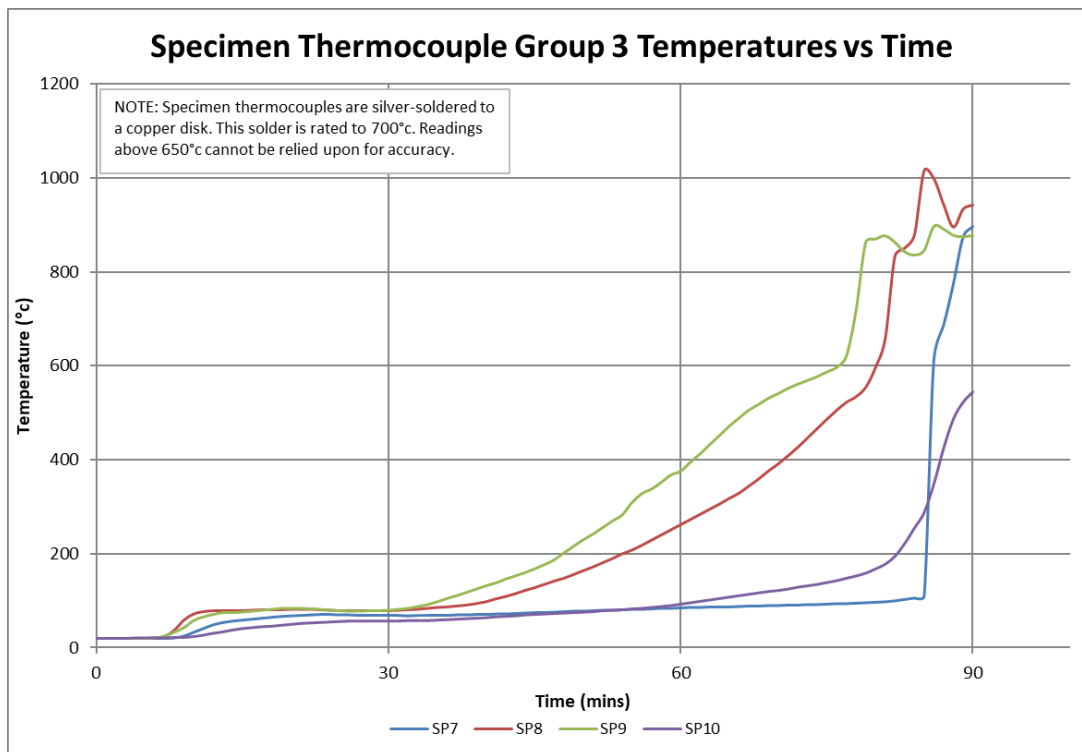


Figure 7 – Specimen Group 4 Temperatures

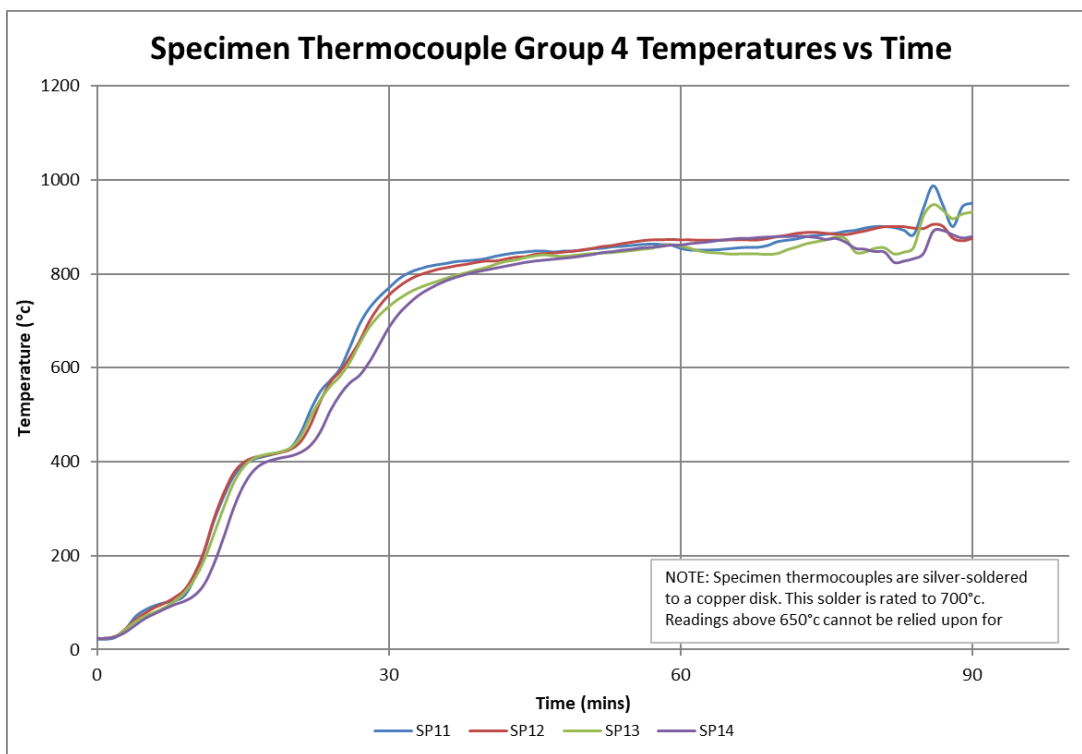


Figure 8 – Specimen Group 5 Temperatures

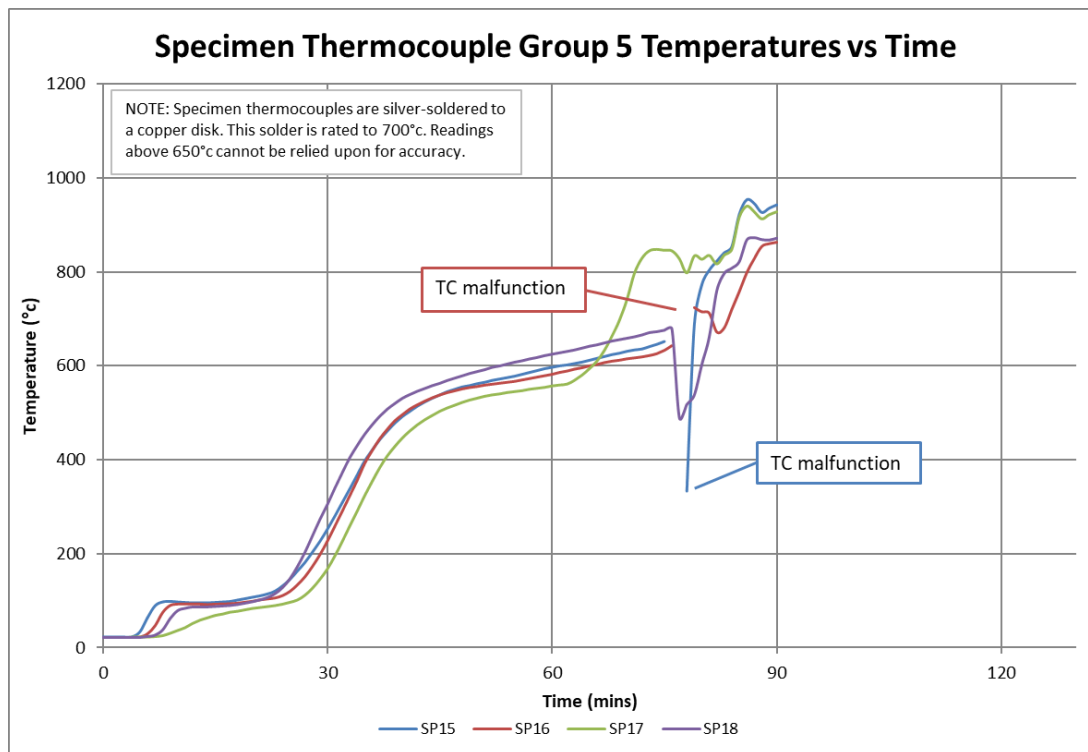


Figure 9 – Specimen Group 6 Temperatures

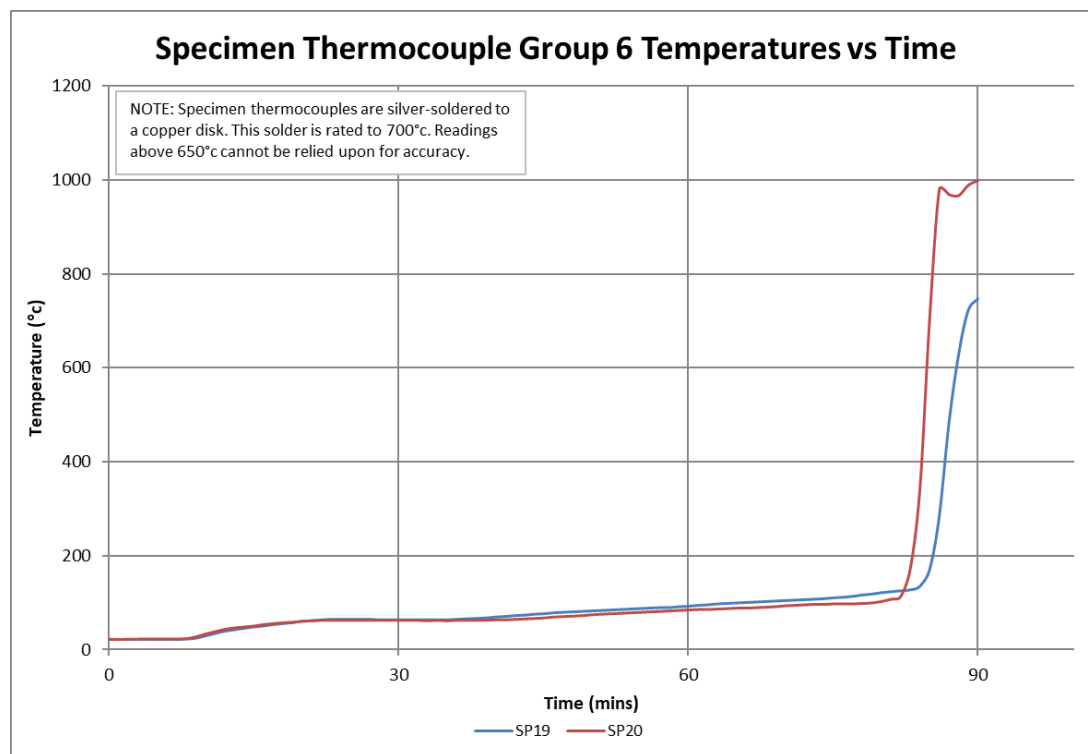


Figure 10 – Specimen Group 7 Temperatures

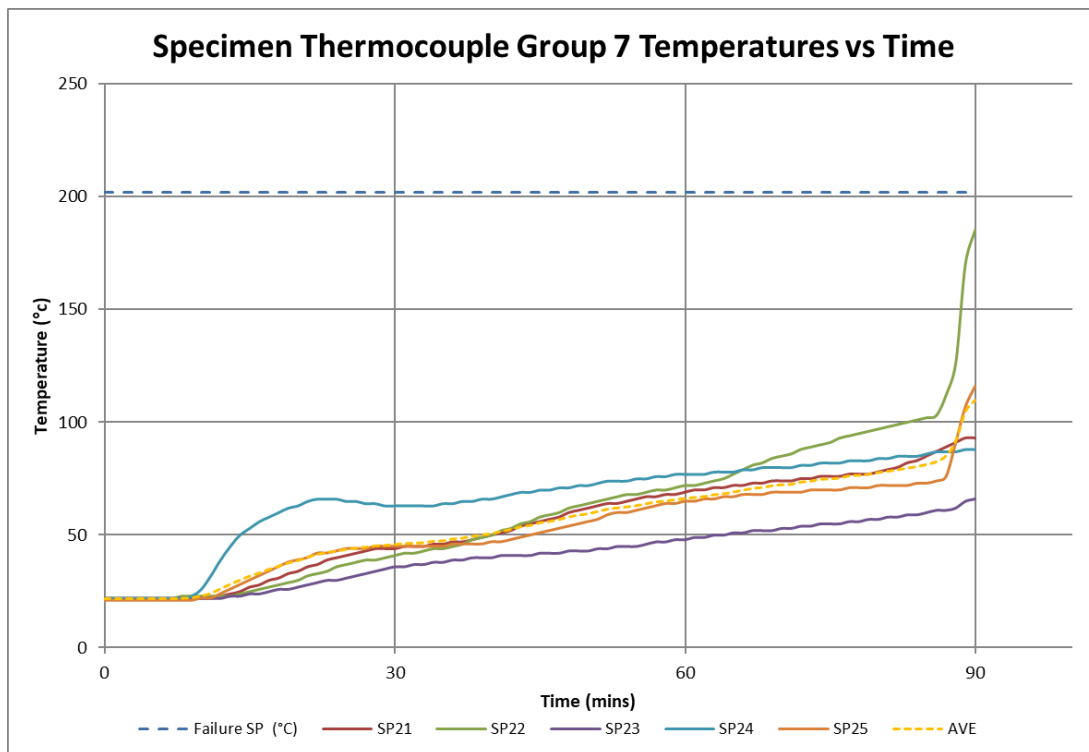
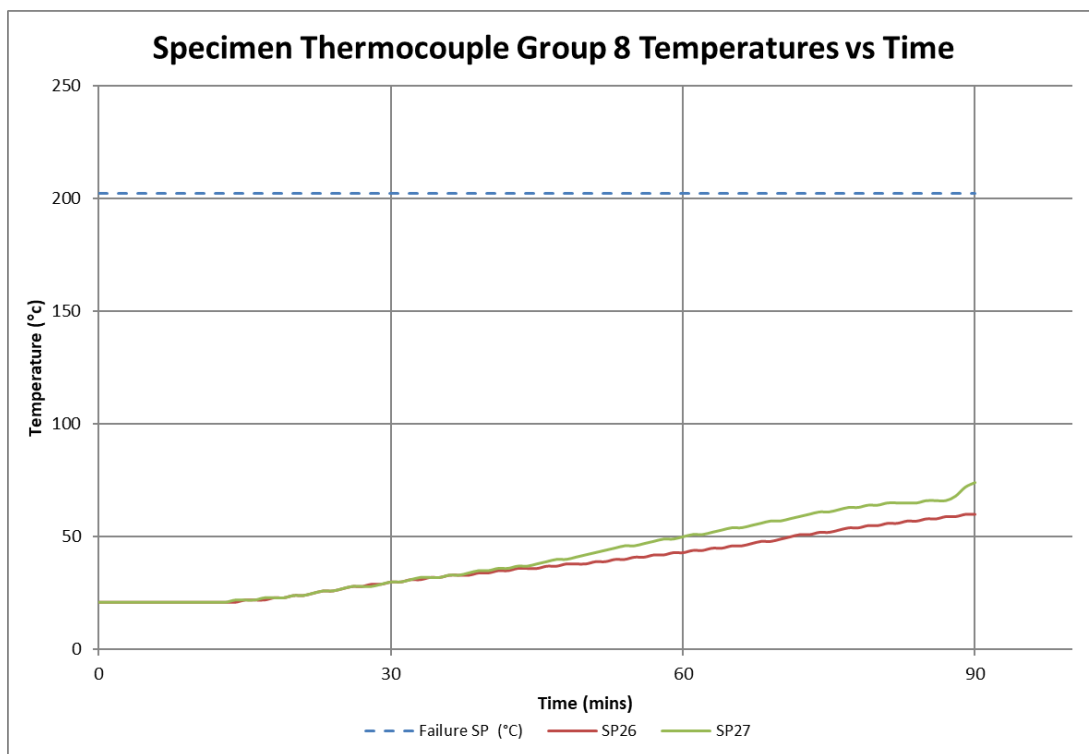


Figure 11 – Specimen Group 8 Temperatures



Appendix B – TABLES

Table 2 – Specimen Group 1 Temperatures

Date / Time	Test Time (mins)	SP1	SP2
03-09-18 10:18	0	23	23
03-09-18 10:19	1	29	28
03-09-18 10:20	2	50	46
03-09-18 10:21	3	74	67
03-09-18 10:22	4	96	90
03-09-18 10:23	5	105	103
03-09-18 10:24	6	114	111
03-09-18 10:25	7	127	122
03-09-18 10:26	8	152	133
03-09-18 10:27	9	182	160
03-09-18 10:28	10	227	185
03-09-18 10:29	11	283	225
03-09-18 10:30	12	335	278
03-09-18 10:31	13	374	324
03-09-18 10:32	14	403	365
03-09-18 10:33	15	417	393
03-09-18 10:34	16	422	412
03-09-18 10:35	17	423	419
03-09-18 10:36	18	426	421
03-09-18 10:37	19	430	422
03-09-18 10:38	20	438	424
03-09-18 10:39	21	460	430
03-09-18 10:40	22	508	440
03-09-18 10:41	23	552	461
03-09-18 10:42	24	576	506
03-09-18 10:43	25	601	550
03-09-18 10:44	26	635	581
03-09-18 10:45	27	677	604
03-09-18 10:46	28	716	633
03-09-18 10:47	29	743	665
03-09-18 10:48	30	764	706
03-09-18 10:49	31	779	741
03-09-18 10:50	32	791	765
03-09-18 10:51	33	800	782
03-09-18 10:52	34	806	792
03-09-18 10:53	35	811	797
03-09-18 10:54	36	815	802
03-09-18 10:55	37	817	807

Date / Time	Test Time (mins)	SP1	SP2
03-09-18 10:56	38	819	809
03-09-18 10:57	39	821	811
03-09-18 10:58	40	823	814
03-09-18 10:59	41	826	818
03-09-18 11:00	42	829	821
03-09-18 11:01	43	832	825
03-09-18 11:02	44	835	827
03-09-18 11:03	45	838	830
03-09-18 11:04	46	838	832
03-09-18 11:05	47	838	833
03-09-18 11:06	48	839	834
03-09-18 11:07	49	840	837
03-09-18 11:08	50	841	841
03-09-18 11:09	51	841	844
03-09-18 11:10	52	839	847
03-09-18 11:11	53	842	850
03-09-18 11:12	54	844	853
03-09-18 11:13	55	846	856
03-09-18 11:14	56	848	858
03-09-18 11:15	57	850	860
03-09-18 11:16	58	849	859
03-09-18 11:17	59	848	859
03-09-18 11:18	60	843	858
03-09-18 11:19	61	841	857
03-09-18 11:20	62	841	857
03-09-18 11:21	63	842	856
03-09-18 11:22	64	844	856
03-09-18 11:23	65	846	856
03-09-18 11:24	66	848	856
03-09-18 11:25	67	849	856
03-09-18 11:26	68	850	856
03-09-18 11:27	69	853	858
03-09-18 11:28	70	859	862
03-09-18 11:29	71	862	864
03-09-18 11:30	72	867	867
03-09-18 11:31	73	872	868
03-09-18 11:32	74	874	865
03-09-18 11:33	75	879	857
03-09-18 11:34	76	875	849
03-09-18 11:35	77	848	851

Date / Time	Test Time (mins)	SP1	SP2
03-09-18 11:36	78	790	867
03-09-18 11:37	79	755	882
03-09-18 11:38	80	747	891
03-09-18 11:39	81	755	892
03-09-18 11:40	82	787	887
03-09-18 11:41	83	823	883
03-09-18 11:42	84	846	886
03-09-18 11:43	85	923	887
03-09-18 11:44	86	955	900
03-09-18 11:45	87	937	899
03-09-18 11:46	88	917	879
03-09-18 11:47	89	924	884
03-09-18 11:48	90	930	888

Table 3 – Specimen Group 2 Temperatures

Date / Time	Test Time (mins)	SP3	SP4	SP5	SP6
03-09-18 10:18	0	20	*	20	22
03-09-18 10:19	1	20		20	22
03-09-18 10:20	2	20		20	23
03-09-18 10:21	3	21		21	25
03-09-18 10:22	4	24		22	30
03-09-18 10:23	5	37		24	37
03-09-18 10:24	6	64		28	49
03-09-18 10:25	7	92		35	71
03-09-18 10:26	8	97		49	91
03-09-18 10:27	9	97		74	97
03-09-18 10:28	10	95		85	97
03-09-18 10:29	11	94		86	96
03-09-18 10:30	12	94		88	98
03-09-18 10:31	13	94		88	100
03-09-18 10:32	14	95		87	110
03-09-18 10:33	15	96		88	126
03-09-18 10:34	16	97		90	144
03-09-18 10:35	17	98		91	160
03-09-18 10:36	18	99		93	177
03-09-18 10:37	19	101		94	191
03-09-18 10:38	20	104		95	203
03-09-18 10:39	21	108		96	215
03-09-18 10:40	22	113		96	225
03-09-18 10:41	23	117		97	237

Date / Time	Test Time (mins)	SP3	SP4	SP5	SP6
03-09-18 10:42	24	123		101	252
03-09-18 10:43	25	130		107	272
03-09-18 10:44	26	138		115	301
03-09-18 10:45	27	147		125	332
03-09-18 10:46	28	157		135	364
03-09-18 10:47	29	169		145	393
03-09-18 10:48	30	183		156	420
03-09-18 10:49	31	199		170	450
03-09-18 10:50	32	216		185	477
03-09-18 10:51	33	235		202	503
03-09-18 10:52	34	253		220	524
03-09-18 10:53	35	273		241	544
03-09-18 10:54	36	291		262	560
03-09-18 10:55	37	311		283	579
03-09-18 10:56	38	329		300	597
03-09-18 10:57	39	349		321	615
03-09-18 10:58	40	368		343	629
03-09-18 10:59	41	387		368	641
03-09-18 11:00	42	406		393	657
03-09-18 11:01	43	427		420	667
03-09-18 11:02	44	449		449	677
03-09-18 11:03	45	470		473	683
03-09-18 11:04	46	490		498	689
03-09-18 11:05	47	508		519	696
03-09-18 11:06	48	525		541	704
03-09-18 11:07	49	540		562	711
03-09-18 11:08	50	550		583	720
03-09-18 11:09	51	559		605	728
03-09-18 11:10	52	570		627	735
03-09-18 11:11	53	581		644	743
03-09-18 11:12	54	592		663	752
03-09-18 11:13	55	603		680	760
03-09-18 11:14	56	616		696	767
03-09-18 11:15	57	622		708	772
03-09-18 11:16	58	630		721	778
03-09-18 11:17	59	636		732	783
03-09-18 11:18	60	640		744	788
03-09-18 11:19	61	649		752	792
03-09-18 11:20	62	654		762	796
03-09-18 11:21	63	657		771	800
03-09-18 11:22	64	664		781	804

Date / Time	Test Time (mins)	SP3	SP4	SP5	SP6
03-09-18 11:23	65	670		793	808
03-09-18 11:24	66	675		808	812
03-09-18 11:25	67	684		821	816
03-09-18 11:26	68	717		829	818
03-09-18 11:27	69	707		834	822
03-09-18 11:28	70	711		833	825
03-09-18 11:29	71	713		823	826
03-09-18 11:30	72	719		812	828
03-09-18 11:31	73	724		800	830
03-09-18 11:32	74	729		793	827
03-09-18 11:33	75	737		793	820
03-09-18 11:34	76	748		796	820
03-09-18 11:35	77	762		771	819
03-09-18 11:36	78	769		784	817
03-09-18 11:37	79	775		788	817
03-09-18 11:38	80	785		793	823
03-09-18 11:39	81	796		805	824
03-09-18 11:40	82	815		758	824
03-09-18 11:41	83	839		728	829
03-09-18 11:42	84	838		748	835
03-09-18 11:43	85	887		777	844
03-09-18 11:44	86	972		832	888
03-09-18 11:45	87	933		851	897
03-09-18 11:46	88	878		861	886
03-09-18 11:47	89	916		866	880
03-09-18 11:48	90	927		869	881

*SP4 malfunctioned from the start of the test

Table 4 – Specimen Group 3 Temperatures

Date / Time	Test Time (mins)	SP7	SP8	SP9	SP10
03-09-18 10:18	0	20	20	20	19
03-09-18 10:19	1	20	20	20	19
03-09-18 10:20	2	20	20	20	19
03-09-18 10:21	3	20	20	20	19
03-09-18 10:22	4	20	20	20	20
03-09-18 10:23	5	20	20	20	20
03-09-18 10:24	6	20	21	21	20
03-09-18 10:25	7	20	24	25	20
03-09-18 10:26	8	21	37	33	21

Date / Time	Test Time (mins)	SP7	SP8	SP9	SP10
03-09-18 10:27	9	25	59	43	21
03-09-18 10:28	10	33	72	58	23
03-09-18 10:29	11	41	77	66	26
03-09-18 10:30	12	49	79	71	30
03-09-18 10:31	13	54	79	75	33
03-09-18 10:32	14	57	79	75	37
03-09-18 10:33	15	59	79	76	40
03-09-18 10:34	16	61	80	78	42
03-09-18 10:35	17	63	81	80	44
03-09-18 10:36	18	65	81	82	45
03-09-18 10:37	19	67	81	84	47
03-09-18 10:38	20	68	82	84	49
03-09-18 10:39	21	69	82	84	51
03-09-18 10:40	22	70	82	83	52
03-09-18 10:41	23	71	81	82	53
03-09-18 10:42	24	71	80	80	54
03-09-18 10:43	25	70	79	79	55
03-09-18 10:44	26	70	79	78	56
03-09-18 10:45	27	69	79	78	56
03-09-18 10:46	28	69	79	79	56
03-09-18 10:47	29	69	79	79	56
03-09-18 10:48	30	69	79	80	56
03-09-18 10:49	31	69	80	82	56
03-09-18 10:50	32	68	81	84	57
03-09-18 10:51	33	69	82	88	57
03-09-18 10:52	34	69	84	92	57
03-09-18 10:53	35	69	86	98	58
03-09-18 10:54	36	69	87	105	59
03-09-18 10:55	37	70	89	111	60
03-09-18 10:56	38	70	91	118	61
03-09-18 10:57	39	71	94	125	62
03-09-18 10:58	40	71	98	132	63
03-09-18 10:59	41	72	104	138	65
03-09-18 11:00	42	72	109	146	66
03-09-18 11:01	43	73	115	153	67
03-09-18 11:02	44	74	122	160	69
03-09-18 11:03	45	75	128	168	70
03-09-18 11:04	46	75	135	177	71
03-09-18 11:05	47	76	142	187	72
03-09-18 11:06	48	77	148	202	73
03-09-18 11:07	49	78	156	216	74

Date / Time	Test Time (mins)	SP7	SP8	SP9	SP10
03-09-18 11:08	50	78	164	230	75
03-09-18 11:09	51	79	172	242	76
03-09-18 11:10	52	80	181	256	78
03-09-18 11:11	53	80	190	270	79
03-09-18 11:12	54	81	200	283	80
03-09-18 11:13	55	82	208	309	82
03-09-18 11:14	56	82	218	328	83
03-09-18 11:15	57	83	229	338	85
03-09-18 11:16	58	84	240	352	87
03-09-18 11:17	59	84	251	368	89
03-09-18 11:18	60	85	262	376	92
03-09-18 11:19	61	86	273	395	95
03-09-18 11:20	62	86	284	413	98
03-09-18 11:21	63	87	295	433	101
03-09-18 11:22	64	87	306	452	104
03-09-18 11:23	65	87	318	472	107
03-09-18 11:24	66	88	329	489	110
03-09-18 11:25	67	89	344	506	113
03-09-18 11:26	68	89	359	518	116
03-09-18 11:27	69	90	376	531	119
03-09-18 11:28	70	90	391	541	121
03-09-18 11:29	71	91	408	552	124
03-09-18 11:30	72	91	426	561	128
03-09-18 11:31	73	92	446	569	131
03-09-18 11:32	74	92	466	577	134
03-09-18 11:33	75	93	486	587	138
03-09-18 11:34	76	94	505	597	142
03-09-18 11:35	77	94	522	620	147
03-09-18 11:36	78	95	534	717	152
03-09-18 11:37	79	96	554	863	158
03-09-18 11:38	80	97	596	870	167
03-09-18 11:39	81	98	657	877	177
03-09-18 11:40	82	100	833	863	194
03-09-18 11:41	83	103	850	843	221
03-09-18 11:42	84	106	878	836	254
03-09-18 11:43	85	110	1015	846	287
03-09-18 11:44	86	614	998	897	348
03-09-18 11:45	87	687	943	891	424
03-09-18 11:46	88	775	895	878	486
03-09-18 11:47	89	875	933	875	522

Date / Time	Test Time (mins)	SP7	SP8	SP9	SP10
03-09-18 11:48	90	897	942	878	544

Table 5 – Specimen Group 4 Temperatures

Date / Time	Test Time (mins)	SP11	SP12	SP13	SP14
03-09-18 10:18	0	23	23	24	25
03-09-18 10:19	1	23	24	25	25
03-09-18 10:20	2	28	29	30	29
03-09-18 10:21	3	46	45	45	39
03-09-18 10:22	4	72	64	61	54
03-09-18 10:23	5	86	78	73	68
03-09-18 10:24	6	95	90	81	78
03-09-18 10:25	7	101	99	91	88
03-09-18 10:26	8	105	111	104	97
03-09-18 10:27	9	116	127	122	104
03-09-18 10:28	10	152	160	150	116
03-09-18 10:29	11	207	209	190	139
03-09-18 10:30	12	273	277	245	182
03-09-18 10:31	13	325	331	301	238
03-09-18 10:32	14	368	374	353	299
03-09-18 10:33	15	392	397	387	347
03-09-18 10:34	16	405	408	406	379
03-09-18 10:35	17	411	412	414	396
03-09-18 10:36	18	416	416	418	404
03-09-18 10:37	19	422	420	422	409
03-09-18 10:38	20	432	427	431	413
03-09-18 10:39	21	464	444	455	421
03-09-18 10:40	22	512	480	497	436
03-09-18 10:41	23	551	530	533	465
03-09-18 10:42	24	574	569	561	509
03-09-18 10:43	25	599	592	582	543
03-09-18 10:44	26	644	622	612	568
03-09-18 10:45	27	693	656	651	584
03-09-18 10:46	28	727	698	686	612
03-09-18 10:47	29	751	730	711	648
03-09-18 10:48	30	770	754	730	685
03-09-18 10:49	31	789	772	746	714
03-09-18 10:50	32	802	786	759	735
03-09-18 10:51	33	810	796	769	753
03-09-18 10:52	34	816	803	777	766
03-09-18 10:53	35	820	809	784	777
03-09-18 10:54	36	823	813	791	786

Date / Time	Test Time (mins)	SP11	SP12	SP13	SP14
03-09-18 10:55	37	827	817	797	793
03-09-18 10:56	38	828	820	802	799
03-09-18 10:57	39	830	824	808	804
03-09-18 10:58	40	833	827	813	808
03-09-18 10:59	41	838	827	820	812
03-09-18 11:00	42	842	831	826	816
03-09-18 11:01	43	845	835	829	820
03-09-18 11:02	44	847	836	834	824
03-09-18 11:03	45	849	841	838	827
03-09-18 11:04	46	849	843	840	829
03-09-18 11:05	47	847	844	838	831
03-09-18 11:06	48	849	846	837	833
03-09-18 11:07	49	849	848	839	835
03-09-18 11:08	50	851	851	841	838
03-09-18 11:09	51	854	854	843	841
03-09-18 11:10	52	855	858	844	845
03-09-18 11:11	53	858	860	845	847
03-09-18 11:12	54	859	864	847	850
03-09-18 11:13	55	861	867	849	852
03-09-18 11:14	56	863	870	852	855
03-09-18 11:15	57	864	872	854	856
03-09-18 11:16	58	863	872	859	858
03-09-18 11:17	59	862	873	862	861
03-09-18 11:18	60	855	872	859	861
03-09-18 11:19	61	851	872	854	864
03-09-18 11:20	62	851	871	848	866
03-09-18 11:21	63	851	871	845	868
03-09-18 11:22	64	852	871	844	871
03-09-18 11:23	65	854	872	842	873
03-09-18 11:24	66	856	872	842	875
03-09-18 11:25	67	857	872	842	875
03-09-18 11:26	68	857	872	842	877
03-09-18 11:27	69	861	875	841	878
03-09-18 11:28	70	869	879	843	879
03-09-18 11:29	71	872	882	851	879
03-09-18 11:30	72	875	886	857	880
03-09-18 11:31	73	880	888	864	879
03-09-18 11:32	74	882	888	868	877
03-09-18 11:33	75	885	886	872	873
03-09-18 11:34	76	887	884	878	875

Date / Time	Test Time (mins)	SP11	SP12	SP13	SP14
03-09-18 11:35	77	891	883	874	867
03-09-18 11:36	78	893	887	846	854
03-09-18 11:37	79	898	891	846	852
03-09-18 11:38	80	901	896	854	847
03-09-18 11:39	81	901	900	855	846
03-09-18 11:40	82	899	900	842	824
03-09-18 11:41	83	893	900	846	827
03-09-18 11:42	84	884	897	856	832
03-09-18 11:43	85	940	896	923	843
03-09-18 11:44	86	988	905	947	890
03-09-18 11:45	87	947	901	935	892
03-09-18 11:46	88	901	876	917	883
03-09-18 11:47	89	943	870	927	876
03-09-18 11:48	90	951	875	931	879

Table 6 – Specimen Group 5 Temperatures

Date / Time	Test Time (mins)	SP15	SP16	SP17	SP18
03-09-18 10:18	0	22	22	21	22
03-09-18 10:19	1	22	22	21	22
03-09-18 10:20	2	22	22	21	22
03-09-18 10:21	3	22	22	21	22
03-09-18 10:22	4	23	22	22	22
03-09-18 10:23	5	34	23	22	22
03-09-18 10:24	6	64	30	22	24
03-09-18 10:25	7	89	47	23	27
03-09-18 10:26	8	97	75	25	38
03-09-18 10:27	9	98	90	30	62
03-09-18 10:28	10	97	93	36	79
03-09-18 10:29	11	96	93	42	84
03-09-18 10:30	12	95	93	51	87
03-09-18 10:31	13	95	93	58	87
03-09-18 10:32	14	95	92	63	87
03-09-18 10:33	15	96	93	68	88
03-09-18 10:34	16	97	93	71	89
03-09-18 10:35	17	98	94	75	90
03-09-18 10:36	18	101	95	77	92
03-09-18 10:37	19	104	97	80	95
03-09-18 10:38	20	107	99	83	98
03-09-18 10:39	21	110	102	85	102
03-09-18 10:40	22	114	104	87	107

Date / Time	Test Time (mins)	SP15	SP16	SP17	SP18
03-09-18 10:41	23	120	106	89	115
03-09-18 10:42	24	131	111	92	128
03-09-18 10:43	25	145	120	96	147
03-09-18 10:44	26	163	134	101	173
03-09-18 10:45	27	181	151	111	203
03-09-18 10:46	28	203	173	126	238
03-09-18 10:47	29	226	198	145	273
03-09-18 10:48	30	252	227	167	305
03-09-18 10:49	31	280	259	195	340
03-09-18 10:50	32	309	291	226	373
03-09-18 10:51	33	338	324	259	405
03-09-18 10:52	34	368	357	291	431
03-09-18 10:53	35	398	393	324	455
03-09-18 10:54	36	421	420	354	475
03-09-18 10:55	37	443	445	383	493
03-09-18 10:56	38	461	465	408	508
03-09-18 10:57	39	478	483	428	520
03-09-18 10:58	40	492	496	446	531
03-09-18 10:59	41	503	508	461	539
03-09-18 11:00	42	514	517	474	546
03-09-18 11:01	43	523	525	485	552
03-09-18 11:02	44	531	532	494	558
03-09-18 11:03	45	538	538	503	563
03-09-18 11:04	46	545	543	510	569
03-09-18 11:05	47	550	547	516	574
03-09-18 11:06	48	555	551	522	579
03-09-18 11:07	49	558	554	527	584
03-09-18 11:08	50	562	556	531	588
03-09-18 11:09	51	565	559	535	592
03-09-18 11:10	52	569	561	538	597
03-09-18 11:11	53	572	563	540	600
03-09-18 11:12	54	575	565	543	604
03-09-18 11:13	55	578	567	545	608
03-09-18 11:14	56	582	570	547	611
03-09-18 11:15	57	586	573	550	615
03-09-18 11:16	58	590	576	552	618
03-09-18 11:17	59	594	579	554	622
03-09-18 11:18	60	597	582	557	625
03-09-18 11:19	61	600	586	559	628
03-09-18 11:20	62	602	589	561	631
03-09-18 11:21	63	605	593	569	634

Date / Time	Test Time (mins)	SP15	SP16	SP17	SP18
03-09-18 11:22	64	608	596	580	638
03-09-18 11:23	65	612	600	594	642
03-09-18 11:24	66	616	603	610	645
03-09-18 11:25	67	620	607	633	649
03-09-18 11:26	68	624	610	663	653
03-09-18 11:27	69	627	612	697	656
03-09-18 11:28	70	631	615	741	659
03-09-18 11:29	71	634	617	797	662
03-09-18 11:30	72	636	619	829	666
03-09-18 11:31	73	641	622	845	671
03-09-18 11:32	74	646	626	848	673
03-09-18 11:33	75	652	633	846	676
03-09-18 11:34	76		643	845	679
03-09-18 11:35	77			828	490
03-09-18 11:36	78	333		798	518
03-09-18 11:37	79	688	724	834	538
03-09-18 11:38	80	773	715	827	603
03-09-18 11:39	81	804	712	835	662
03-09-18 11:40	82	823	672	817	760
03-09-18 11:41	83	841	681	836	797
03-09-18 11:42	84	854	720	848	808
03-09-18 11:43	85	923	758	917	822
03-09-18 11:44	86	954	798	940	868
03-09-18 11:45	87	946	828	928	873
03-09-18 11:46	88	927	854	913	869
03-09-18 11:47	89	936	860	922	868
03-09-18 11:48	90	943	863	928	872

Table 7 – Specimen Group 6 Temperatures

Date / Time	Test Time (mins)	SP19	SP20
03-09-18 10:18	0	21	22
03-09-18 10:19	1	21	21
03-09-18 10:20	2	21	22
03-09-18 10:21	3	21	22
03-09-18 10:22	4	21	22
03-09-18 10:23	5	21	22
03-09-18 10:24	6	21	22
03-09-18 10:25	7	21	22
03-09-18 10:26	8	22	23
03-09-18 10:27	9	24	27

Date / Time	Test Time (mins)	SP19	SP20
03-09-18 10:28	10	29	33
03-09-18 10:29	11	34	38
03-09-18 10:30	12	39	43
03-09-18 10:31	13	42	46
03-09-18 10:32	14	45	48
03-09-18 10:33	15	48	50
03-09-18 10:34	16	50	53
03-09-18 10:35	17	53	55
03-09-18 10:36	18	55	57
03-09-18 10:37	19	57	58
03-09-18 10:38	20	60	60
03-09-18 10:39	21	61	61
03-09-18 10:40	22	63	62
03-09-18 10:41	23	64	62
03-09-18 10:42	24	64	62
03-09-18 10:43	25	64	62
03-09-18 10:44	26	64	62
03-09-18 10:45	27	64	62
03-09-18 10:46	28	63	62
03-09-18 10:47	29	63	62
03-09-18 10:48	30	63	62
03-09-18 10:49	31	63	62
03-09-18 10:50	32	63	62
03-09-18 10:51	33	63	61
03-09-18 10:52	34	63	62
03-09-18 10:53	35	63	61
03-09-18 10:54	36	64	62
03-09-18 10:55	37	65	62
03-09-18 10:56	38	66	62
03-09-18 10:57	39	67	62
03-09-18 10:58	40	69	63
03-09-18 10:59	41	70	63
03-09-18 11:00	42	72	64
03-09-18 11:01	43	73	65
03-09-18 11:02	44	75	66
03-09-18 11:03	45	76	67
03-09-18 11:04	46	78	69
03-09-18 11:05	47	79	70
03-09-18 11:06	48	80	71
03-09-18 11:07	49	81	72
03-09-18 11:08	50	82	74

Date / Time	Test Time (mins)	SP19	SP20
03-09-18 11:09	51	83	75
03-09-18 11:10	52	84	76
03-09-18 11:11	53	85	77
03-09-18 11:12	54	86	78
03-09-18 11:13	55	87	79
03-09-18 11:14	56	88	80
03-09-18 11:15	57	89	81
03-09-18 11:16	58	89	82
03-09-18 11:17	59	91	83
03-09-18 11:18	60	92	84
03-09-18 11:19	61	94	85
03-09-18 11:20	62	95	85
03-09-18 11:21	63	97	86
03-09-18 11:22	64	98	87
03-09-18 11:23	65	99	88
03-09-18 11:24	66	100	88
03-09-18 11:25	67	101	89
03-09-18 11:26	68	102	90
03-09-18 11:27	69	103	91
03-09-18 11:28	70	104	93
03-09-18 11:29	71	105	94
03-09-18 11:30	72	106	95
03-09-18 11:31	73	107	96
03-09-18 11:32	74	108	96
03-09-18 11:33	75	110	97
03-09-18 11:34	76	111	97
03-09-18 11:35	77	113	97
03-09-18 11:36	78	116	98
03-09-18 11:37	79	118	99
03-09-18 11:38	80	121	102
03-09-18 11:39	81	123	107
03-09-18 11:40	82	125	113
03-09-18 11:41	83	127	173
03-09-18 11:42	84	135	347
03-09-18 11:43	85	171	707
03-09-18 11:44	86	286	981
03-09-18 11:45	87	484	969
03-09-18 11:46	88	630	967
03-09-18 11:47	89	724	989
03-09-18 11:48	90	748	999

Table 8 – Specimen Group 7 Temperatures

Date / Time	Test Time (mins)	Failure SP (°C)	SP21	SP22	SP23	SP24	SP25	AVE
03-09-18 10:18	0	202	22	22	22	22	21	21.8
03-09-18 10:19	1	202	22	22	22	22	21	21.8
03-09-18 10:20	2	202	22	22	22	22	21	21.8
03-09-18 10:21	3	202	22	22	22	22	21	21.8
03-09-18 10:22	4	202	22	22	22	22	21	21.8
03-09-18 10:23	5	202	22	22	22	22	21	21.8
03-09-18 10:24	6	202	22	22	22	22	21	21.8
03-09-18 10:25	7	202	22	22	22	22	21	21.8
03-09-18 10:26	8	202	22	23	22	22	21	22
03-09-18 10:27	9	202	22	23	22	23	21	22.2
03-09-18 10:28	10	202	22	23	22	26	22	23
03-09-18 10:29	11	202	22	23	22	32	22	24.2
03-09-18 10:30	12	202	23	23	22	39	24	26.2
03-09-18 10:31	13	202	24	23	23	45	26	28.2
03-09-18 10:32	14	202	25	24	23	50	28	30
03-09-18 10:33	15	202	27	25	24	53	30	31.8
03-09-18 10:34	16	202	28	26	24	56	32	33.2
03-09-18 10:35	17	202	30	27	25	58	34	34.8
03-09-18 10:36	18	202	31	28	26	60	36	36.2
03-09-18 10:37	19	202	33	29	26	62	38	37.6
03-09-18 10:38	20	202	34	30	27	63	39	38.6
03-09-18 10:39	21	202	36	32	28	65	40	40.2
03-09-18 10:40	22	202	37	33	29	66	42	41.4
03-09-18 10:41	23	202	39	34	30	66	42	42.2
03-09-18 10:42	24	202	40	36	30	66	43	43
03-09-18 10:43	25	202	41	37	31	65	44	43.6
03-09-18 10:44	26	202	42	38	32	65	44	44.2
03-09-18 10:45	27	202	43	39	33	64	44	44.6
03-09-18 10:46	28	202	44	39	34	64	45	45.2
03-09-18 10:47	29	202	44	40	35	63	45	45.4
03-09-18 10:48	30	202	44	41	36	63	45	45.8
03-09-18 10:49	31	202	45	42	36	63	45	46.2
03-09-18 10:50	32	202	45	42	37	63	45	46.4
03-09-18 10:51	33	202	45	43	37	63	45	46.6
03-09-18 10:52	34	202	46	44	38	63	45	47.2
03-09-18 10:53	35	202	46	44	38	64	45	47.4
03-09-18 10:54	36	202	47	45	39	64	46	48.2
03-09-18 10:55	37	202	47	46	39	65	46	48.6

Date / Time	Test Time (mins)	Failure SP (°C)	SP21	SP22	SP23	SP24	SP25	AVE
03-09-18 10:56	38	202	48	48	40	65	46	49.4
03-09-18 10:57	39	202	49	49	40	66	46	50
03-09-18 10:58	40	202	50	50	40	66	47	50.6
03-09-18 10:59	41	202	51	52	41	67	47	51.6
03-09-18 11:00	42	202	52	53	41	68	48	52.4
03-09-18 11:01	43	202	54	55	41	69	49	53.6
03-09-18 11:02	44	202	55	56	41	69	50	54.2
03-09-18 11:03	45	202	56	58	42	70	51	55.4
03-09-18 11:04	46	202	57	59	42	70	52	56
03-09-18 11:05	47	202	58	60	42	71	53	56.8
03-09-18 11:06	48	202	60	62	43	71	54	58
03-09-18 11:07	49	202	61	63	43	72	55	58.8
03-09-18 11:08	50	202	62	64	43	72	56	59.4
03-09-18 11:09	51	202	63	65	44	73	57	60.4
03-09-18 11:10	52	202	64	66	44	74	59	61.4
03-09-18 11:11	53	202	64	67	45	74	60	62
03-09-18 11:12	54	202	65	68	45	74	60	62.4
03-09-18 11:13	55	202	66	68	45	75	61	63
03-09-18 11:14	56	202	67	69	46	75	62	63.8
03-09-18 11:15	57	202	67	70	47	76	63	64.6
03-09-18 11:16	58	202	68	70	47	76	64	65
03-09-18 11:17	59	202	68	71	48	77	64	65.6
03-09-18 11:18	60	202	69	72	48	77	65	66.2
03-09-18 11:19	61	202	70	72	49	77	65	66.6
03-09-18 11:20	62	202	70	73	49	77	66	67
03-09-18 11:21	63	202	71	74	50	78	66	67.8
03-09-18 11:22	64	202	71	75	50	78	67	68.2
03-09-18 11:23	65	202	72	77	51	78	67	69
03-09-18 11:24	66	202	72	79	51	79	68	69.8
03-09-18 11:25	67	202	73	81	52	79	68	70.6
03-09-18 11:26	68	202	73	82	52	80	68	71
03-09-18 11:27	69	202	74	84	52	80	69	71.8
03-09-18 11:28	70	202	74	85	53	80	69	72.2
03-09-18 11:29	71	202	74	86	53	80	69	72.4
03-09-18 11:30	72	202	75	88	54	81	69	73.4
03-09-18 11:31	73	202	75	89	54	81	70	73.8
03-09-18 11:32	74	202	76	90	55	82	70	74.6
03-09-18 11:33	75	202	76	91	55	82	70	74.8
03-09-18 11:34	76	202	76	93	55	82	70	75.2
03-09-18 11:35	77	202	77	94	56	83	71	76.2

Date / Time	Test Time (mins)	Failure SP (°C)	SP21	SP22	SP23	SP24	SP25	AVE
03-09-18 11:36	78	202	77	95	56	83	71	76.4
03-09-18 11:37	79	202	77	96	57	83	71	76.8
03-09-18 11:38	80	202	78	97	57	84	72	77.6
03-09-18 11:39	81	202	79	98	58	84	72	78.2
03-09-18 11:40	82	202	80	99	58	85	72	78.8
03-09-18 11:41	83	202	82	100	59	85	72	79.6
03-09-18 11:42	84	202	83	101	59	85	73	80.2
03-09-18 11:43	85	202	85	102	60	86	73	81.2
03-09-18 11:44	86	202	87	103	61	87	74	82.4
03-09-18 11:45	87	202	89	112	61	87	76	85
03-09-18 11:46	88	202	91	126	62	87	91	91.4
03-09-18 11:47	89	202	93	170	65	88	107	105
03-09-18 11:48	90	202	93	185	66	88	116	110

Table 9 – Specimen Group 8 Temperatures

Date / Time	Test Time (mins)	SP26	SP27
03-09-18 10:18	0	21	21
03-09-18 10:19	1	21	21
03-09-18 10:20	2	21	21
03-09-18 10:21	3	21	21
03-09-18 10:22	4	21	21
03-09-18 10:23	5	21	21
03-09-18 10:24	6	21	21
03-09-18 10:25	7	21	21
03-09-18 10:26	8	21	21
03-09-18 10:27	9	21	21
03-09-18 10:28	10	21	21
03-09-18 10:29	11	21	21
03-09-18 10:30	12	21	21
03-09-18 10:31	13	21	21
03-09-18 10:32	14	21	22
03-09-18 10:33	15	22	22
03-09-18 10:34	16	22	22
03-09-18 10:35	17	22	23
03-09-18 10:36	18	23	23
03-09-18 10:37	19	23	23
03-09-18 10:38	20	24	24
03-09-18 10:39	21	24	24
03-09-18 10:40	22	25	25
03-09-18 10:41	23	26	26

Date / Time	Test Time (mins)	SP26	SP27
03-09-18 10:42	24	26	26
03-09-18 10:43	25	27	27
03-09-18 10:44	26	28	28
03-09-18 10:45	27	28	28
03-09-18 10:46	28	29	28
03-09-18 10:47	29	29	29
03-09-18 10:48	30	30	30
03-09-18 10:49	31	30	30
03-09-18 10:50	32	31	31
03-09-18 10:51	33	31	32
03-09-18 10:52	34	32	32
03-09-18 10:53	35	32	32
03-09-18 10:54	36	33	33
03-09-18 10:55	37	33	33
03-09-18 10:56	38	33	34
03-09-18 10:57	39	34	35
03-09-18 10:58	40	34	35
03-09-18 10:59	41	35	36
03-09-18 11:00	42	35	36
03-09-18 11:01	43	36	37
03-09-18 11:02	44	36	37
03-09-18 11:03	45	36	38
03-09-18 11:04	46	37	39
03-09-18 11:05	47	37	40
03-09-18 11:06	48	38	40
03-09-18 11:07	49	38	41
03-09-18 11:08	50	38	42
03-09-18 11:09	51	39	43
03-09-18 11:10	52	39	44
03-09-18 11:11	53	40	45
03-09-18 11:12	54	40	46
03-09-18 11:13	55	41	46
03-09-18 11:14	56	41	47
03-09-18 11:15	57	42	48
03-09-18 11:16	58	42	49
03-09-18 11:17	59	43	49
03-09-18 11:18	60	43	50
03-09-18 11:19	61	44	51
03-09-18 11:20	62	44	51
03-09-18 11:21	63	45	52
03-09-18 11:22	64	45	53

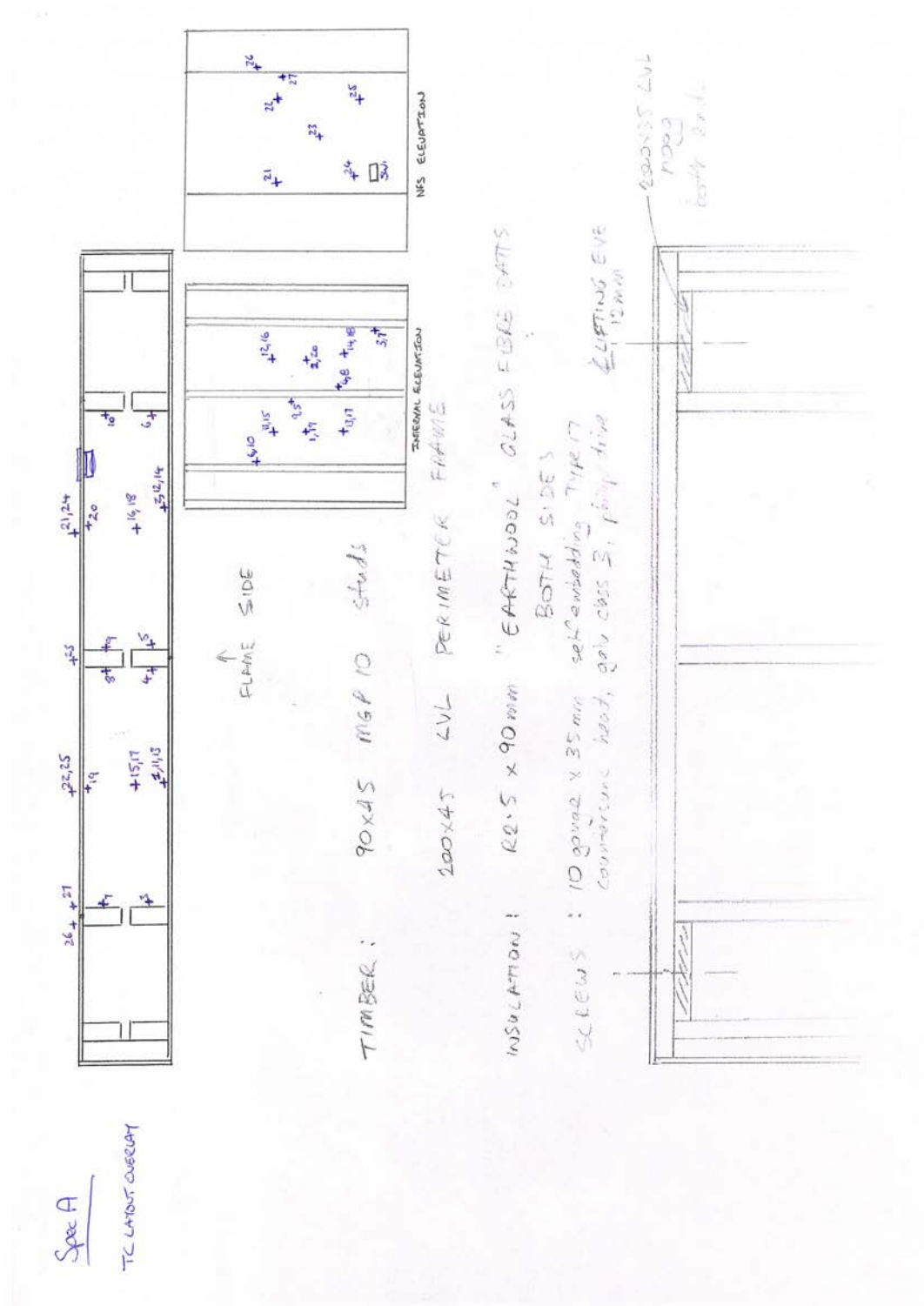
Date / Time	Test Time (mins)	SP26	SP27
03-09-18 11:23	65	46	54
03-09-18 11:24	66	46	54
03-09-18 11:25	67	47	55
03-09-18 11:26	68	48	56
03-09-18 11:27	69	48	57
03-09-18 11:28	70	49	57
03-09-18 11:29	71	50	58
03-09-18 11:30	72	51	59
03-09-18 11:31	73	51	60
03-09-18 11:32	74	52	61
03-09-18 11:33	75	52	61
03-09-18 11:34	76	53	62
03-09-18 11:35	77	54	63
03-09-18 11:36	78	54	63
03-09-18 11:37	79	55	64
03-09-18 11:38	80	55	64
03-09-18 11:39	81	56	65
03-09-18 11:40	82	56	65
03-09-18 11:41	83	57	65
03-09-18 11:42	84	57	65
03-09-18 11:43	85	58	66
03-09-18 11:44	86	58	66
03-09-18 11:45	87	59	66
03-09-18 11:46	88	59	68
03-09-18 11:47	89	60	72
03-09-18 11:48	90	60	74

Table 10 – Test Observations

TIME		Observations
Min	Sec	
12	0	Smoke from perimeter, no change to NFS
17	0	Steady increase to smoke from perimeter
22	0	Smoke steady, no change to NFS
26	0	Slight decrease to smoke, no change to NFS
31	0	No change
42	0	Slight decrease in smoke, no change to NFS
47	0	Cracking heard from specimen. No visible deflection or surface board cracking
52	0	Cracking sounds continue
57	0	Cracking sounds continue
60	0	Cracking sounds still present. No change to NFS
67	0	Cracking more audible on NFS, no visual change to NFS.
74	0	Smoke increasing from switchbox
77	0	Loud cracking is heard
82	0	Loud and persistent cracking. Some screw heads showing discolouration and board expanding around them.
84	0	Approx. time of fire side board collapse
86	0	NFS board visually cracking, NW of TC22
87	0	Cracking noted at 86 min increasing
88	0	Discolouration around cracking noted at 86 min
89	0	Discolouration around cracking noted at 86 min increasing, cracking has spread considerably
90	7	Test terminated

Appendix C – DRAWINGS

Figure 12 – Client supplied drawing with Lab marked TC locations



Appendix D PHOTOGRAPHS

Photo 1 – Exposed side pre-test

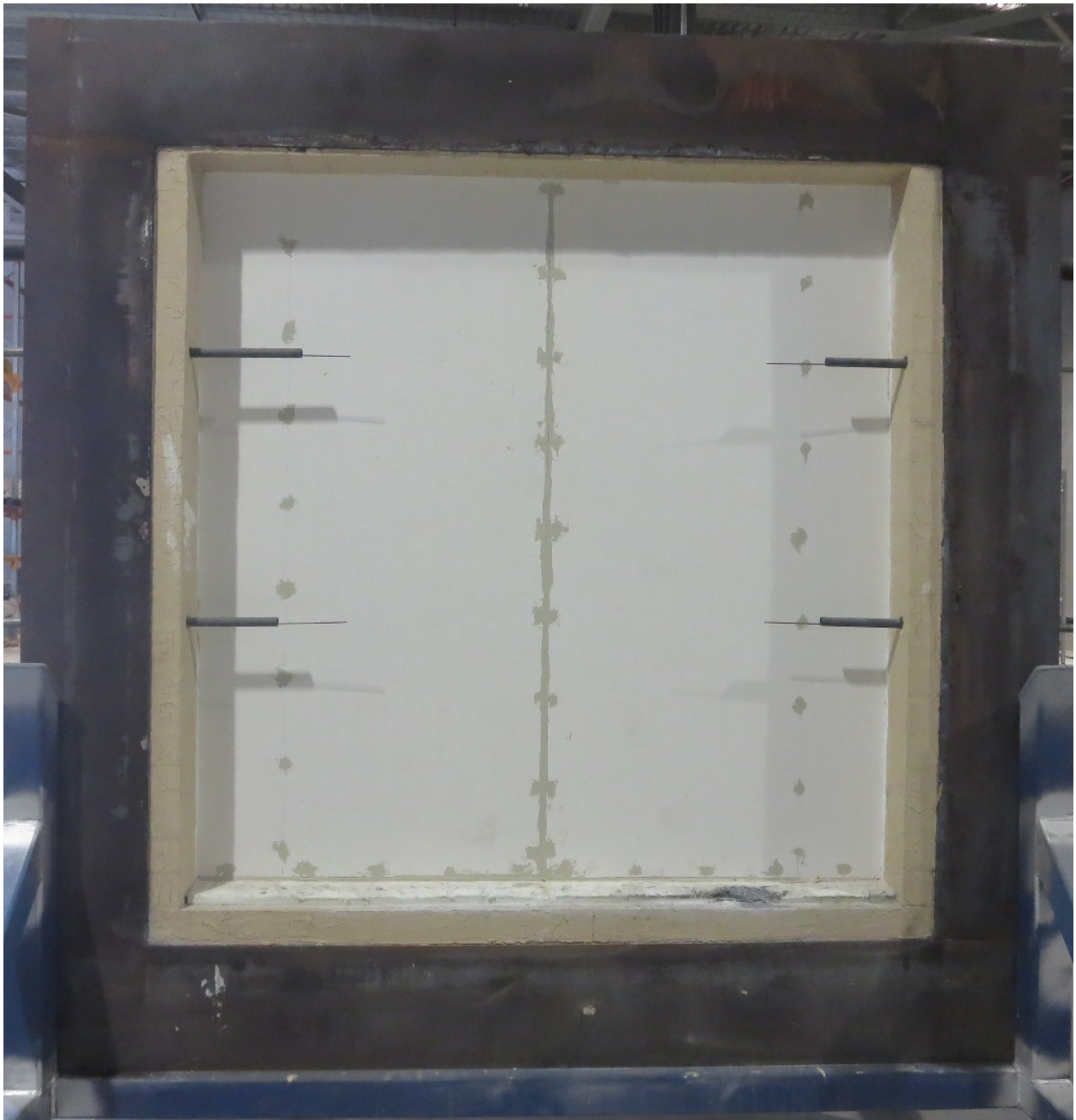


Photo 2 – Unexposed side pre-test



Photo 3 – Cracking at 87 minutes



Photo 4 – Cracking at 88 minutes



Photo 5 – Cracking & discolouration at 89 minutes



Photo 6 – Cracking and discolouration at 90 minutes



Photo 7 – Exposed side post test (after extinguishment of timbers)



Photo 8 – Unexposed side post test (after extinguishment of timbers)



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