

TEST REPORT



Intertek

REPORT NUMBER: 100305541COQ-003
ORIGINAL ISSUE DATE: January 26, 2011
REVISION DATE: February 1, 2011

EVALUATION CENTER
Intertek Testing Services NA Ltd.
1500 Brigantine Drive
Coquitlam, B.C. V3K 7C1

RENDERED TO
ATI Composites Inc.
9245-35th Ave NW
Edmonton, AB T6E 5Y1

PRODUCTS EVALUATED: FRC - Mineral Foam Comparative Testing
EVALUATION PROPERTY: Thermal Resistance

Report of R and D testing of FRC - Mineral Foam for thermal resistance comparative testing. The furnace conditions met the following criteria: ASTM E119-10A – *Standard Test Methods for Fire Tests of Building Construction and Materials* and CAN/ULC S101-07 – *Standard Methods of Fire Endurance Tests of Building Construction and Materials*.

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2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted R and D testing for ATI Composites Inc. on FRC - Mineral Foam, to compare the thermal resistance to various materials. The Furnace was operated in accordance with the following standard methods of ASTM E119-10A – *Standard Test Methods for Fire Tests of Building Construction and Materials* and CAN/ULC S101-07 – *Standard Methods of Fire Endurance Tests of Building Constructions and Materials*.

This evaluation began January 24, 2011 and was completed the same day. Testing was witnessed by Mr. Mike Mabey representing ATI Composites Inc.

3 Test Samples

3.1. SAMPLE SELECTION

Samples were submitted to Intertek directly by ATI Composites Inc. All product descriptions and identifications were provided by ATI Composites Inc., and Intertek accepts no responsibility for any inaccuracies provided. Samples were not independently selected for testing. The samples were received at the Evaluation Centre on January 24, 2011.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

ATI Composite Inc. has submitted a series of panels to compare the thermal resistance of a spray applied foaming material with various products. The overall nominal dimensions of each panel were 60 in. wide by 36 in. high and consisted of a 2 x 4 SPF wood stud frame with 1/4 in. thick Hardi Backer cement board fastened to one side of the frame. The foam and other materials were then applied to the cement board and thermocouples were placed on the opposite side. The foam was identified by the client as Fire Resistant Composite (FRC) Mineral Foam.

Test #1: This panel consisted of FRC Mineral Foam applied to one half of the panel to a thickness of 3/4 in. The other half of the panel was left as bare cement board. Four thermocouples were placed behind the cement board panel and four thermocouples were placed behind the FRC Mineral Foam.

Test #2: This panel consisted of a generic cementitious fire proofing material that was applied by Donalco to a thickness of 3/4 in. Four thermocouples were placed on the opposite side of the cement board.

Test #3: This panel consisted of FRC Mineral Foam applied to one half of the panel to a thickness of 5/8 in. One layer of 5/8 in. Type X Fire Rated gypsum board (by CertainTeed) was fastened to the other half of the panel. Four thermocouples were placed behind the FRC Mineral Foam and four thermocouples were placed behind the Type X gypsum board.

3.3. THERMOCOUPLE LOCATIONS

Test No.	Thermocouple No.	Location As Seen From the Unexposed Side
1	TC #1	Behind the bare cement board at the center of the top left quadrant
	TC #2	Behind the bare cement board at the center of the top right quadrant
	TC #3	Behind the bare cement board at the center of the bottom left quadrant
	TC #4	Behind the bare cement board at the center of the bottom right quadrant
	TC #5	Behind the FRC Mineral Foam at the center of the top left quadrant
	TC #6	Behind the FRC Mineral Foam at the center of the top right quadrant
	TC #7	Behind the FRC Mineral Foam at the center of the bottom left quadrant
	TC #8	Behind the FRC Mineral Foam at the center of the bottom right quadrant
2	TC #1	Behind the generic cementitious material at the center of the top left quadrant
	TC #2	Behind the generic cementitious material at the center of the top right quadrant
	TC #3	Behind the generic cementitious material at the center of the bottom left quadrant
	TC #4	Behind the generic cementitious material at the center of the bottom right quadrant
3	TC #1	Behind the FRC Mineral Foam at the center of the top left quadrant
	TC #2	Behind the FRC Mineral Foam at the center of the top right quadrant
	TC #3	Behind the FRC Mineral Foam at the center of the bottom left quadrant
	TC #4	Behind the FRC Mineral Foam at the center of the bottom right quadrant
	TC #5	Behind the Type X gypsum at the center of the top left quadrant
	TC #6	Behind the Type X gypsum at the center of the top right quadrant
	TC #7	Behind the Type X gypsum at the center of the bottom left quadrant
	TC #8	Behind the Type X gypsum at the center of the bottom right quadrant

4 Testing and Evaluation Methods

4.1. TEST WALL CONSTRUCTION

The ATI Composites Inc. wall assemblies were placed on a concrete block wall built into our pilot scale test frame. The finished test wall measured 6 ft. in height and 6 ft. in width. The restraint frame is mounted on a cart, which allows it to be moved in front of the furnace for fire tests and away from the furnace at the end of the test. The walls were oriented so that the coatings were facing into the furnace chamber.

See Appendix B – Photographs.

4.2. THE FIRE TEST

The moveable wall containing the test assembly was secured to the furnace. The pilot burners were ignited and burned until the temperature inside the furnace reached $20 \pm 2^\circ\text{C}$ ($70 \pm 3^\circ\text{F}$).

All burners were fired and timing was begun immediately upon achieving maximum high fire.

Observations were made throughout the fire exposure period.

The temperatures inside the furnace are monitored by six equally spaced thermocouples. These readings were recorded by a Yokogawa data acquisition system (ID no. WH D3593/WH D3595) recorded every 30 seconds and displayed every 15 seconds. See Appendix C – Temperature Data.

The furnace pressure was monitored throughout the fire test period. At 5 minutes from the start of the test, the furnace damper was closed to set the neutral pressure plane at the top of the wall. The incline manometer ID no. 1038 and the pressure transducer ID no. WH 2200 were used to monitor the pressure.

5 Testing and Evaluation Results

5.1. FIRE TEST OBSERVATIONS

Test #1

TIME (min.)	EXPOSED SIDE	UNEXPOSED SIDE
26:00		Studs are beginning to burn
30:00		Average temp. of cement board = 1400°F, Average temp. of FRC foam = 254°F
45:00	Test discontinued	Average temp. of cement board = 1446°F, Average temp. of FRC foam = 434°F

Test #2

TIME (min.)	EXPOSED SIDE	UNEXPOSED SIDE
30:00		Darkening of the cement board backing in the bottom left corner
33:30		Roving TC max. temp. = 417°F
37:45		Cement board backing is beginning to crack in the lower left corner
38:00	Crack has formed through the spray applied cementitious fire proofing in the area where the cement board backer has cracked	
45:00	Test discontinued	Average temp. of generic cementitious material = 688°F

Test #3


TIME (min.)	EXPOSED SIDE	UNEXPOSED SIDE
1:49	Surface of the gypsum has ignited	
2:30	Flaming has extinguished	
14:00	Paper has flaked off the face of the gypsum	
30:00		Average temp. of Type X gypsum = 308°F, Average temp. of FRC foam = 218°F
45:00		Average temp. of Type X gypsum = 725°F, Average temp. of FRC foam = 319°F
60:00	Test discontinued	Average temp. of Type X gypsum = 973°F, Average temp. of FRC foam = 571°F


6 Conclusion

The ATI Composite Inc. FRC Mineral Foam product performed as indicated in this test report when assembled as described in section 3.2. The furnace was operated in accordance with ASTM E119-10A – *Standard Test Methods for Fire Tests of Building Construction and Materials* and CAN/ULC S101-07 – *Standard Methods of Fire Endurance Tests of Building Constructions and Materials*.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK TESTING SERVICES NA LTD.

Tested and
Reported by: 
Scott Leduc, EIT
Technician – Construction Products Testing

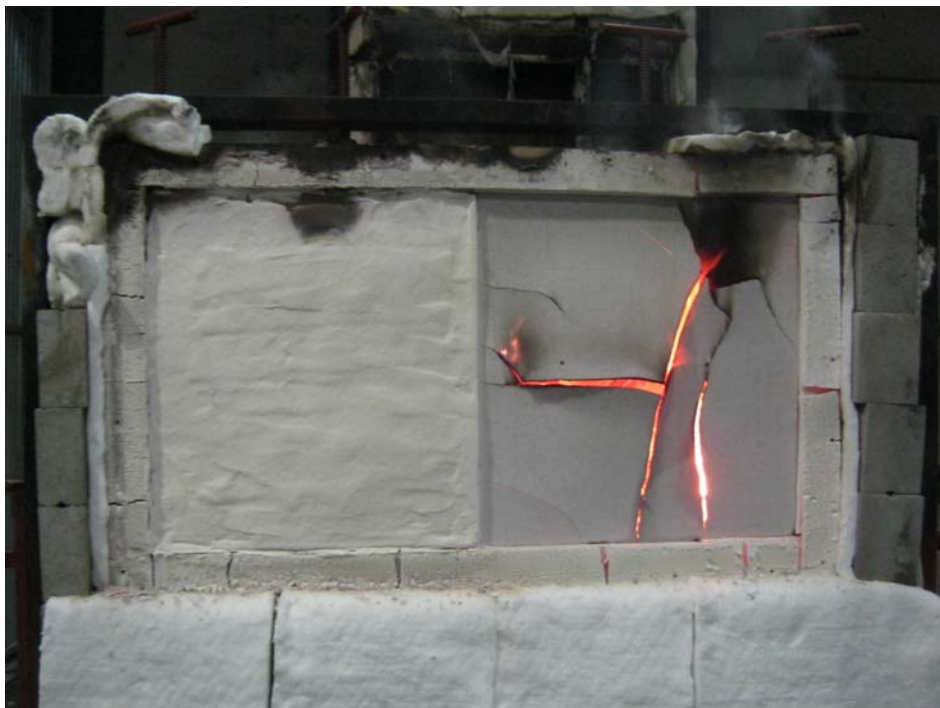
Reviewed by: 
Greg Philp
Reviewer, Fire Testing

APPENDIX A

Photographs



Test #1 - Exposed Side Prior to the Fire Test (FRC Left / Cement Board Right)



Test #1 - Exposed Side After the Fire Test



Test #2 - Exposed Side Prior to the Fire Test (Spay Applied Cementitious Fire Proofing)



Test #2 - Exposed Side After the Fire Test



Test #2 - Exposed Side After the Fire Test
(note: crack extends through the surface and cement backer board)



Test #3 - Exposed Side Before the Fire Test (Type X Left / FRC Right)

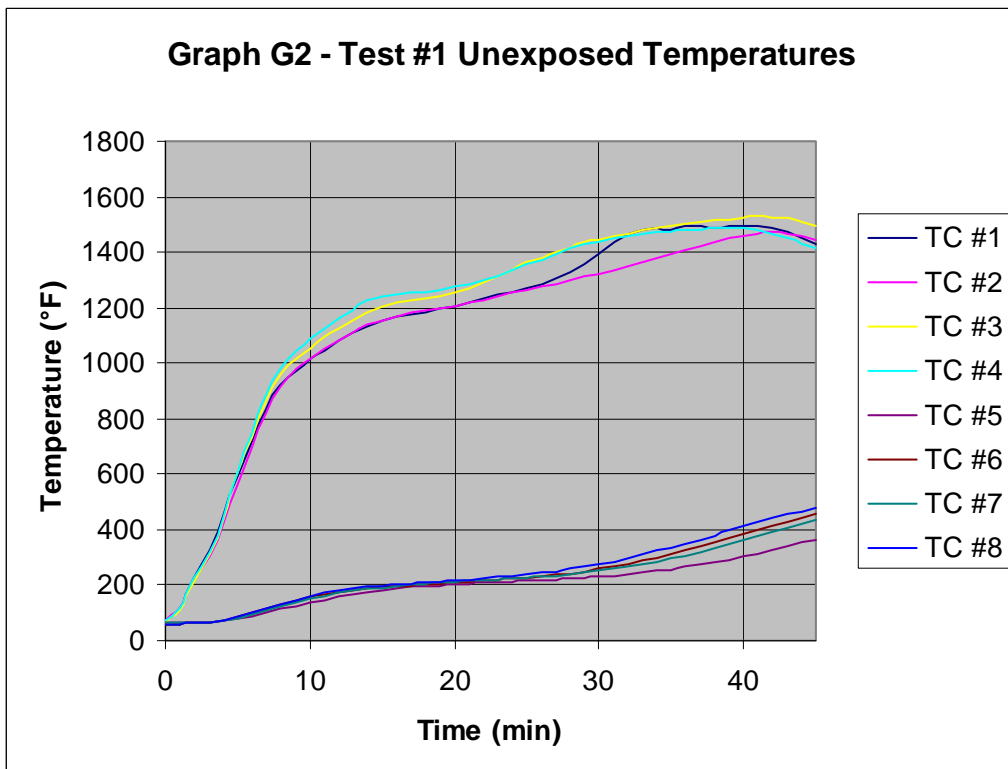
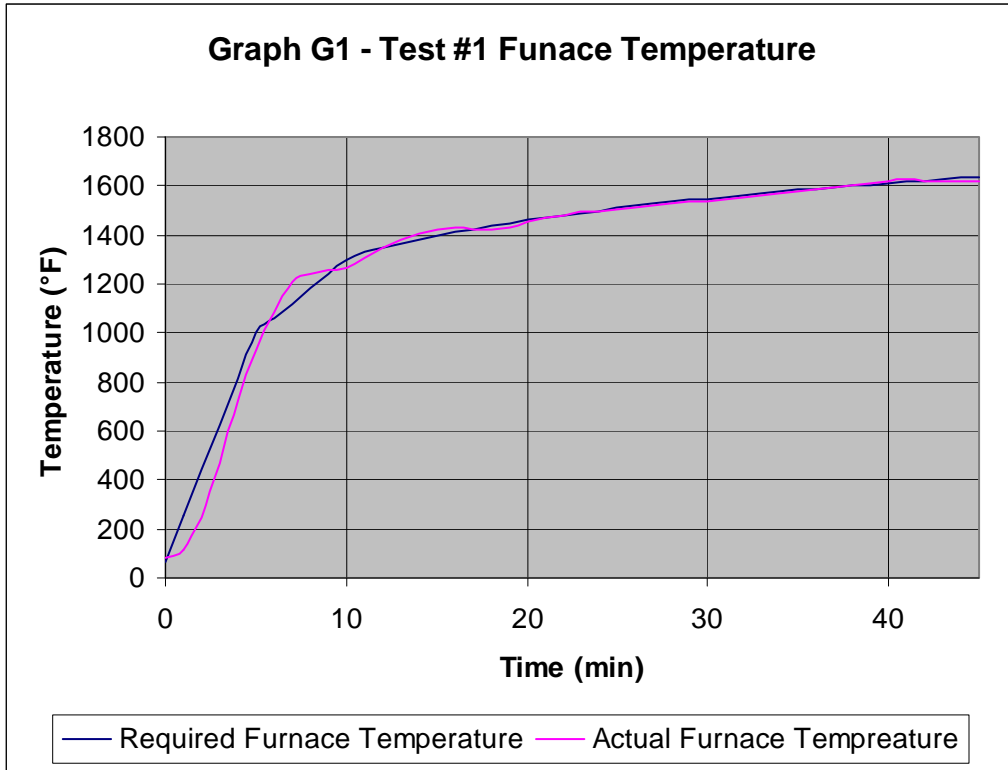


Test #3 - Exposed Side After the Fire Test

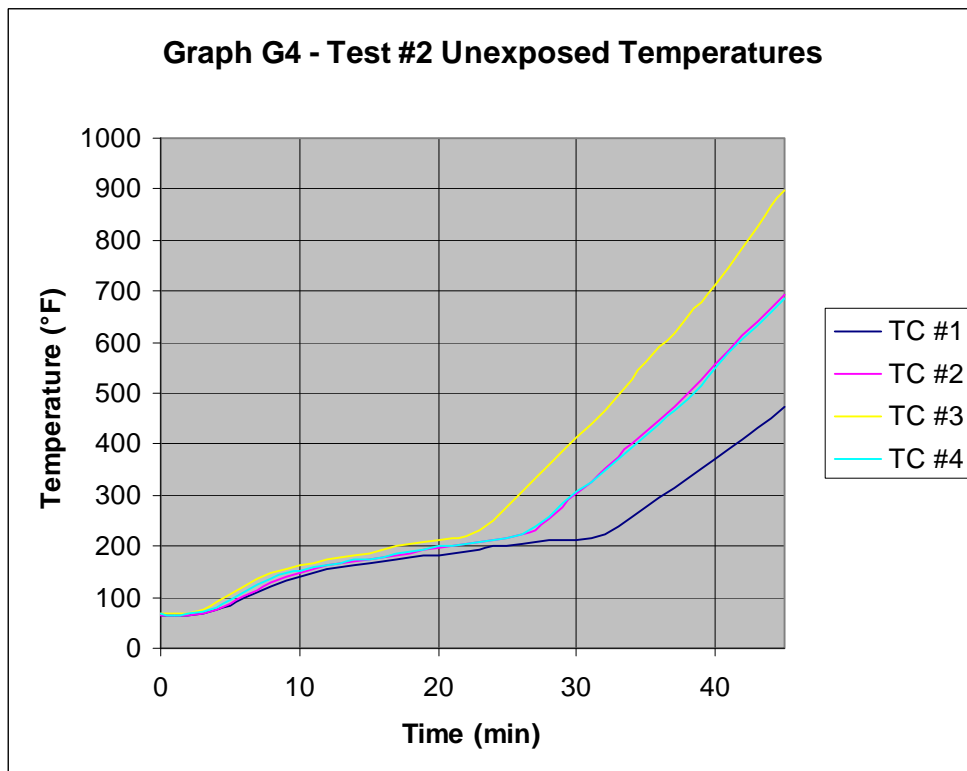
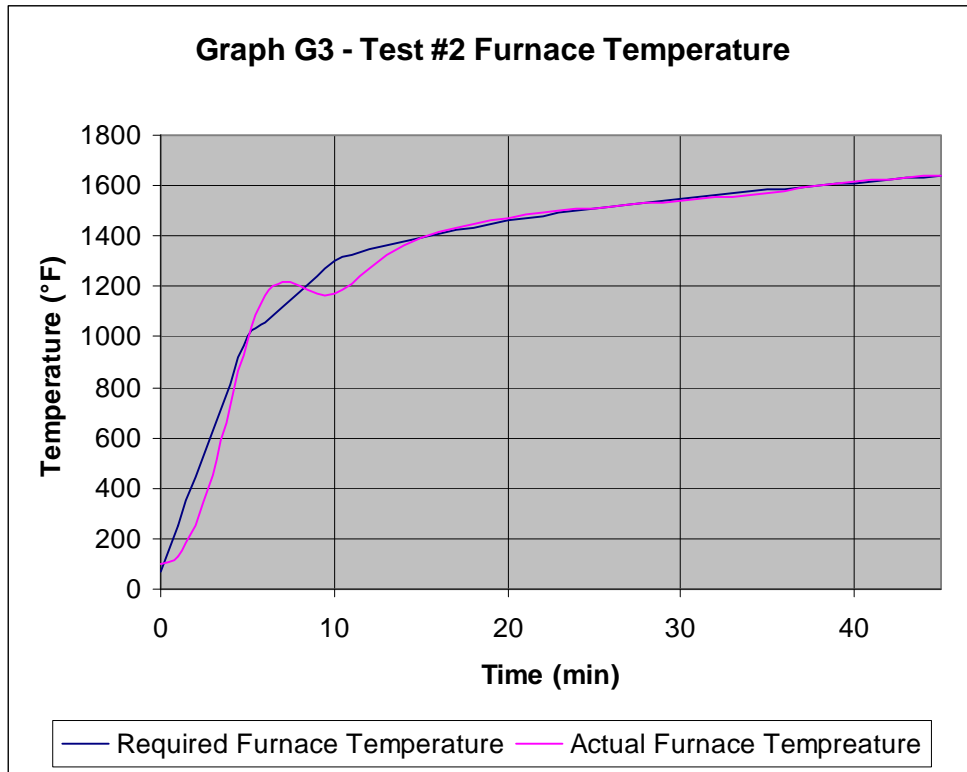
APPENDIX B

Temperature Data

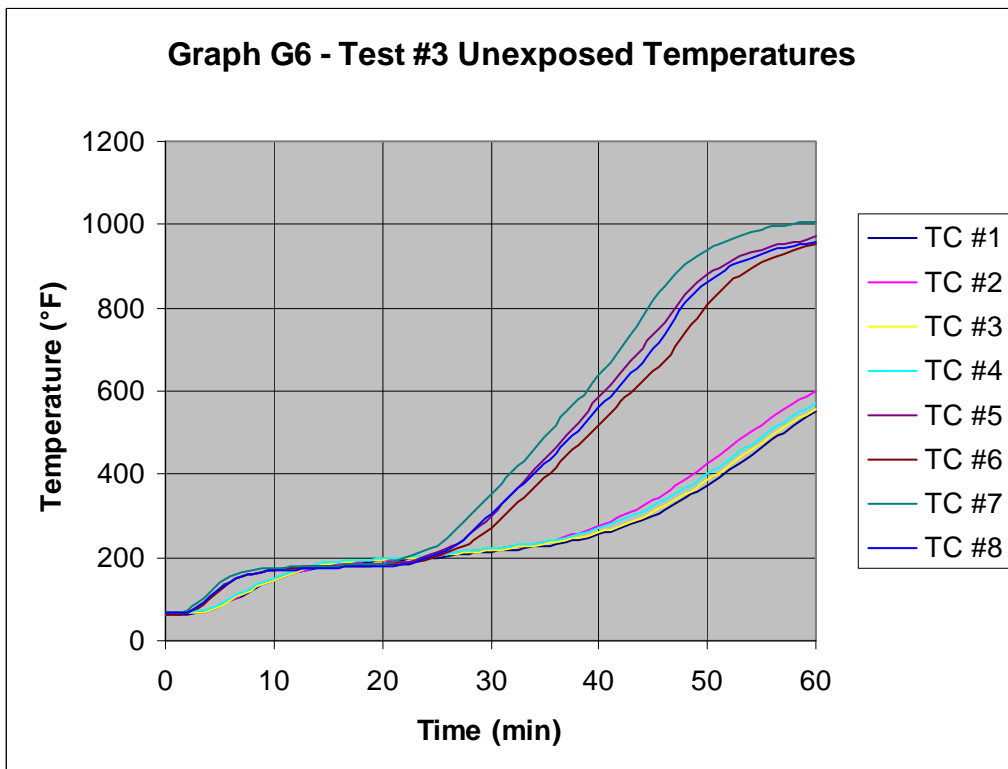
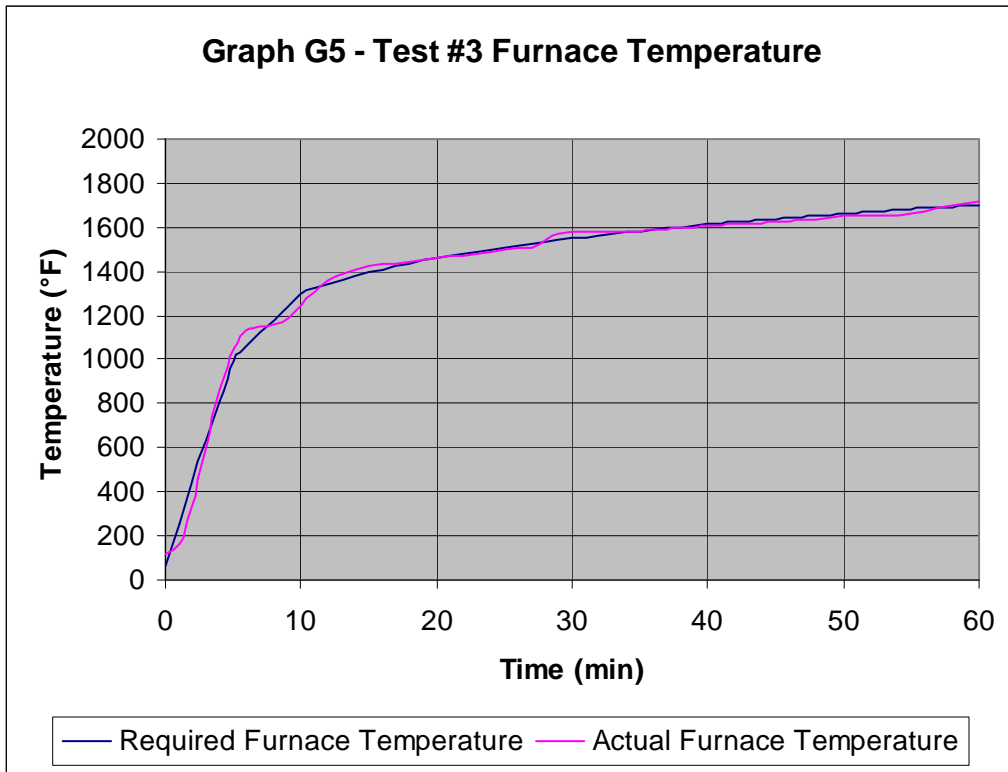
TIME / TEMPERATURE GRAPHS



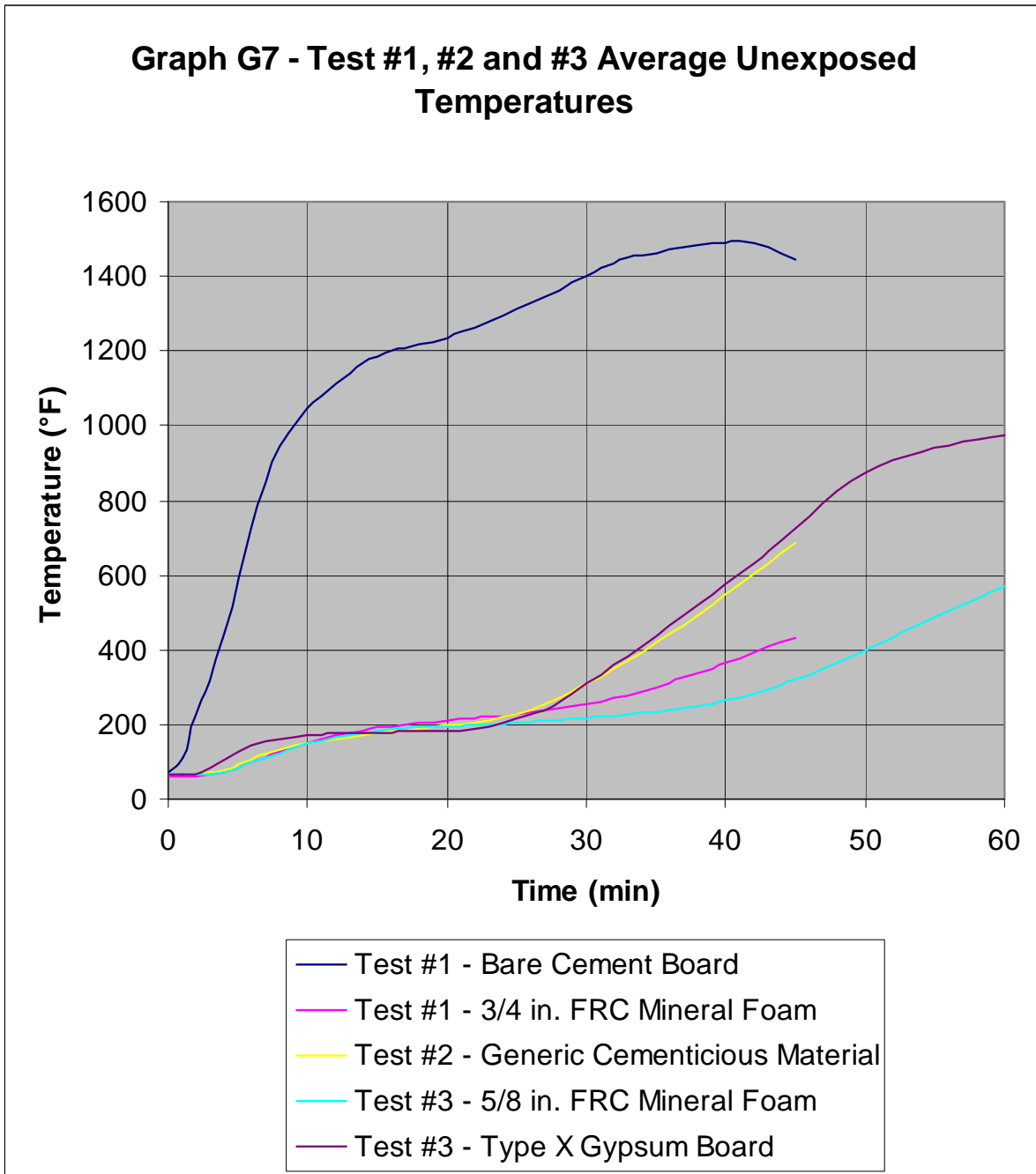
TIME / TEMPERATURE GRAPHS - *Continued*



TIME / TEMPERATURE GRAPHS - *Continued*



TIME / TEMPERATURE GRAPHS - *Continued*



TEST #1 - UNEXPOSED TEMPERATURE DATA (°F)

Time (min)	TC #1	TC #2	TC #3	TC #4	TC #1-#4 Average	TC #5	TC #6	TC #7	TC #8	TC #5-#8 Average
0	70	72	68	70	70	62	61	62	61	62
1	115	113	106	113	112	62	61	62	61	62
2	223	218	212	222	219	62	62	62	62	62
3	324	305	311	321	315	64	66	65	66	65
4	454	425	446	454	445	69	74	71	76	72
5	596	564	606	607	593	78	87	82	89	84
6	719	697	733	745	724	89	102	96	104	98
7	834	818	865	883	850	102	118	111	119	113
8	921	918	958	982	945	115	134	126	133	127
9	976	978	1015	1045	1003	127	146	139	146	140
10	1014	1018	1055	1089	1044	138	157	151	160	152
11	1047	1052	1093	1127	1080	149	166	162	173	162
12	1078	1085	1126	1162	1113	158	174	171	183	171
13	1107	1113	1154	1191	1141	166	180	178	190	179
14	1131	1136	1182	1224	1168	174	187	185	195	185
15	1151	1154	1201	1241	1187	181	193	192	199	191
16	1168	1170	1218	1249	1201	188	196	197	202	196
17	1178	1180	1226	1253	1209	193	199	202	205	200
18	1186	1187	1234	1258	1216	197	202	205	209	203
19	1195	1194	1243	1266	1225	199	206	208	213	207
20	1206	1205	1257	1276	1236	202	210	211	217	210
21	1218	1217	1273	1288	1249	204	213	214	221	213
22	1232	1228	1289	1302	1263	207	216	218	225	216
23	1246	1241	1312	1317	1279	210	219	220	229	220
24	1259	1252	1337	1337	1296	212	223	224	233	223
25	1272	1263	1361	1355	1313	215	227	227	238	227
26	1286	1274	1382	1374	1329	218	231	231	244	231
27	1305	1286	1402	1395	1347	220	237	235	250	236
28	1328	1298	1418	1413	1364	223	243	240	258	241
29	1359	1311	1435	1428	1383	227	250	246	267	247
30	1392	1324	1447	1441	1401	231	258	252	276	254
31	1437	1338	1459	1452	1421	235	267	258	286	262
32	1465	1353	1468	1461	1437	240	276	266	298	270
33	1482	1368	1478	1466	1448	245	287	275	310	279
34	1486	1382	1485	1474	1457	251	299	285	323	289
35	1484	1396	1494	1477	1463	258	311	295	337	300
36	1492	1411	1500	1479	1470	265	325	307	351	312
37	1493	1425	1508	1484	1478	273	338	319	365	324
38	1490	1438	1514	1487	1482	283	353	332	380	337
39	1494	1450	1520	1489	1488	293	368	346	396	350
40	1494	1460	1525	1486	1491	303	382	360	411	364
41	1498	1468	1528	1480	1493	315	398	374	427	378
42	1487	1470	1526	1465	1487	328	413	389	442	393
43	1472	1466	1522	1449	1477	340	429	404	457	407
44	1453	1456	1512	1428	1462	353	443	420	467	421
45	1431	1442	1495	1415	1446	366	458	435	478	434

TEST #2 - UNEXPOSED TEMPERATURE DATA (°F)

Time (min)	TC #1	TC #2	TC #3	TC #4	Average
0	66	66	69	66	67
1	65	66	68	66	66
2	66	66	70	67	67
3	68	68	77	71	71
4	74	75	91	81	80
5	84	86	107	94	93
6	97	101	123	109	107
7	109	116	137	124	121
8	122	129	148	136	134
9	132	141	157	146	144
10	140	149	163	153	151
11	147	156	168	159	158
12	154	162	173	164	163
13	159	167	177	168	168
14	164	172	182	173	173
15	168	175	187	176	177
16	172	179	193	180	181
17	175	182	200	184	185
18	178	187	204	190	190
19	180	192	208	195	194
20	183	198	211	199	198
21	186	202	215	203	202
22	190	206	220	206	205
23	195	209	230	208	211
24	199	213	251	212	219
25	203	217	278	216	228
26	206	222	305	222	239
27	209	232	332	238	253
28	211	253	359	259	271
29	214	277	385	283	290
30	212	301	413	307	308
31	217	327	439	327	328
32	223	352	466	350	348
33	238	376	494	373	370
34	256	400	525	395	394
35	276	424	559	418	419
36	295	448	590	441	443
37	314	473	619	465	468
38	334	499	650	490	493
39	353	526	679	517	519
40	372	556	710	550	547
41	391	585	745	580	575
42	411	612	785	605	603
43	431	638	824	633	632
44	451	665	867	659	661
45	473	692	898	687	687

TEST #3 - UNEXPOSED TEMPERATURE DATA (°F)

Time (min)	TC #1	TC #2	TC #3	TC #4	TC #1-#4 Average	TC #5	TC #6	TC #7	TC #8	TC #5-#8 Average
0	64	65	66	67	65	67	65	68	67	67
1	64	65	66	67	66	67	65	69	67	67
2	65	66	67	68	66	69	67	71	68	69
3	67	68	69	70	69	83	77	91	82	83
4	73	75	74	76	75	104	100	117	106	107
5	83	85	84	87	85	124	122	139	126	128
6	96	98	96	100	97	140	140	154	142	144
7	109	111	110	114	111	153	152	163	154	155
8	122	124	123	127	124	161	161	169	161	163
9	134	136	136	140	136	167	166	173	166	168
10	144	146	146	151	147	170	170	174	168	171
11	154	156	156	161	157	173	172	176	170	173
12	162	164	165	170	165	175	174	177	172	175
13	170	172	173	177	173	177	175	179	173	176
14	176	177	179	182	179	179	177	180	174	177
15	181	182	184	187	184	180	178	181	176	178
16	184	185	188	190	187	181	179	181	176	179
17	187	188	191	193	190	182	180	182	177	180
18	189	190	192	194	191	183	180	182	177	181
19	191	191	194	196	193	184	181	183	178	182
20	192	193	195	197	194	186	182	184	178	183
21	193	194	197	198	196	188	184	188	179	185
22	195	197	198	200	197	190	186	197	182	189
23	196	199	199	202	199	195	189	210	189	196
24	198	202	201	204	201	204	195	218	200	204
25	201	205	204	207	204	214	203	228	209	214
26	203	208	206	210	207	224	212	248	218	225
27	206	211	209	213	210	235	221	272	234	241
28	208	215	212	216	213	254	232	298	256	260
29	211	217	215	218	215	277	251	324	280	283
30	214	220	217	221	218	302	273	351	304	307
31	216	223	220	224	221	327	296	378	329	333
32	219	226	223	227	224	354	321	405	354	358
33	222	230	226	230	227	382	345	433	379	384
34	226	234	230	235	231	409	369	461	403	411
35	229	239	233	239	235	436	394	490	428	437
36	233	244	237	243	239	463	418	519	452	463
37	237	251	242	249	245	491	443	550	478	491
38	242	258	247	255	251	521	468	580	504	518
39	248	266	253	262	257	552	493	607	534	547
40	255	276	260	270	265	583	519	639	562	576
41	262	286	268	279	274	613	547	669	586	604
42	271	298	277	289	284	644	574	701	614	633
43	280	310	287	300	294	674	597	738	641	662
44	291	324	297	312	306	703	622	778	670	693
45	302	339	309	325	319	734	647	818	701	725

TEST #3 - UNEXPOSED TEMPERATURE DATA (°F) – *Continued*

Time (min)	TC #1	TC #2	TC #3	TC #4	TC #1-#4 Average	TC #5	TC #6	TC #7	TC #8	TC #5-#8 Average
46	315	354	323	339	333	766	674	854	736	757
47	329	371	337	353	347	801	708	883	775	792
48	343	389	353	368	363	834	741	907	811	823
49	359	408	370	384	380	861	774	926	841	850
50	375	427	386	400	397	880	807	941	863	873
51	392	446	403	418	415	897	836	953	882	892
52	410	466	422	436	433	911	859	965	898	908
53	428	484	440	453	451	923	878	974	910	921
54	447	502	459	470	469	932	894	982	920	932
55	465	519	476	489	487	940	907	989	929	941
56	483	537	494	507	505	946	919	995	937	949
57	501	555	511	523	522	952	928	999	943	955
58	519	571	528	540	539	958	940	1002	948	962
59	536	586	543	555	555	964	948	1005	952	967
60	553	601	559	571	571	971	955	1009	956	973

REVISION SUMMARY

DATE	PAGE(S)	SUMMARY	Initial
January 26, 2011		Original Issue Date	
February 1, 2011	3	Added gypsum thickness and manufacturer	gp
February 1, 2011	5	Changed client name / edited setup to describe proper wall assembly	gp
February 1, 2011	6	Expanded on observation about a crack in the material	gp
February 1, 2011	9	Added materials to description / changed typo from unexposed to exposed	gp
February 1, 2011	10	Added material to description	gp
February 1, 2011	11	Added description of the crack formed / Changed After test to Before test	gp
February 1, 2011	14-17	Updated graph titles	gp