NFPA 285 TEST REPORT

Report No.: G3361.01-121-24
Test Date: October 28, 2016

Rendered to:

BAMCO INC.
Middlesex, New Jersey

WALL SYSTEM: Exterior Non-loadbearing Wall Assembly
COMBUSTIBLE COMPONENTS: DuPont™ Tyvek® CommercialWrap® Installed under Bamco D-500 Composite Panel System made from Almaxco® FR Metal Composite Panels

This report contains in its entirety:

Cover Page:	1 page
Report Body:	8 pages
Graphical Data:	6 pages
Numerical Data:	18 pages
Photographs:	9 pages
Drawings:	6 pages

1.0 Report Issued To: Bamco Inc.
30 Baekeland Avenue
Middlesex, New Jersey 08846-2601

2.0 Test Laboratory: Architectural Testing, Inc., an Intertek company ("Intertek-ATI")
130 Derry Court
York, Pennsylvania 17406-8405
717-764-7700

3.0 Introduction:

[Section 1.3.1, NFPA 285] The NFPA 285 test apparatus is used to evaluate the fire propagation characteristics of exterior non-load-bearing wall assemblies and panels used as components of curtain wall assemblies that are constructed using combustible materials or that incorporate combustible components within the wall assemblies as specified in the following:

A. The ability of the wall assembly to resist flame propagation over the exterior face of the wall assembly.
B. The ability of the wall assembly to resist vertical flame propagation within the combustible core or within other combustible components from one story to the next.
C. The ability of the wall assembly to resist vertical flame propagation over the interior surface of the wall assembly from one story to the next.
D. The ability of the wall assembly to resist lateral flame propagation from the compartment of fire origin to adjacent compartments or spaces.

4.0 Project Summary:

4.1 Wall System: Exterior Non-loadbearing Wall Assembly

4.2 Combustible Components: DuPont™ Tyvek® CommercialWrap® Installed under Bamco D-500 Composite Panel System made from Almaxco® FR Metal Composite Panels

4.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test method(s). The specimen(s) were tested and evaluated against the requirements of the standard. A summary of the results is listed in the Test Results section and the complete graphical test data is included in Appendix A of this report.

4.4 Test Date: 10/28/2016

4.5 Test Location: Intertek-ATI test facility in York, Pennsylvania.

4.6 Test Sample Source: The components of the test specimen were provided by the client except for the core wall components, which were selected by the client were then assembled by Intertek-ATI personnel.

4.0 Project Summary: (Continued)

4.7 Test Method(s), Practices and/or Classifications: NFPA 285 - *Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components, 2015*

4.8 List of Official Observers:

Name	Company
Scott Gingrich	Intertek-ATI
Benjamin Green	Intertek-ATI
Ethan Grove	Intertek-ATI

5.0 Calibration Information: The apparatus is considered to be under calibrated conditions when the time average temperatures and the time average heat flux readings obtained for a calibration wall match the requirements of Table 8.1.6 of NFPA 285. Calibration was performed on February 18, 2016. Table 1 shows the average burner flow and heat flux. Table 2 shows the time average temperatures obtained during the calibration test. The values are within the allowable ranges as specified in Table 8.1.6 (±10%).

Table 1 Average Burner Output Information

Time Interval (min)	Room Burner (SCFM)	Window Burner (SCFM)	2 FT Flux (W/cm^2)	3 FT Flux (W/cm^2)	4 FT Flux (W/cm^2)
0:00-5:00	35.4	0.0	1.2	1.0	0.8
5:00-10:00	35.5	4.2	2.3	2.1	1.7
10:00-15:00	43.6	5.6	2.8	2.6	2.2
15:00-20:00	43.5	8.0	3.1	3.0	2.5
20:00-25:00	43.5	11.1	3.5	3.2	2.7
25:00-30:00	47.3	15.6	4.0	3.8	3.3

Table 2 Average Time Temperature Values for Calibration

	Location							
Time (min)	Burn Room (°F)	Int. Wall (°F)	1FT (°F)	2FT (°F)	3FT (°F)	4FT (°F)	5FT (°F)	6FT (°F)
0:00-5:00	1144	1010	704	781	741	663	588	484
5:00-10:00	1277	1197	909	1020	1050	1001	919	764
10:00-15:00	1451	1378	999	1101	1151	1112	1048	898
15:00-20:00	1504	1445	1034	1140	1189	1159	1108	962
20:00-25:00	1528	1475	1051	1161	1216	1182	1158	1019
25:00-30:00	1592	1546	1089	1216	1276	1241	1230	1088

6.0 Test Specimen Description:

Interior Cladding:

The interior surface of the wall was clad with National Gypsum Gold Bond® Fire Shield 5/8 in. thick Type X gypsum board meeting ASTM C1396 and fastened to the core wall with #6 x 1-1/4 in. long flat head self-drilling screws with a nominal spacing of 8 inches on the perimeter and 12 inches in the field. Drywall orientation on the burn floor consisted of four pieces of Type X gypsum fastened to the core wall, parallel with the studs. Drywall orientation on the second floor consisted of vertically oriented sheets with the long dimension running parallel with the studs. Drywall orientation for the gaps above the top support angle and below the bottom support angle consisted of drywall that was oriented with the long dimension running perpendicular with the steel studs. All joints were taped with USG Sheetrock paper joint tape, and spackled with USG Sheetrock Joint Compound.

Core Wall:

The core wall was consisted of 18 ft. long, 3-5/8 in. deep, 18 gauge galvanized steel studs fastened to 14 ft. length, 18 gauge galvanized steel track every 16 inches on center. The studs were connected to the track with #6 x 1/2 in. long self-drilling screws. Johns Manville MinWool® Safing pieces with a nominal density of 4.0 lbs./cu. ft. were installed per the manufacturer's installation instructions to fit into each stud cavity placed at the floor line. The safing length dimensions were no less than the apparatus floor slab thickness measuring 8 inches.

Window Opening:

A 78 inch wide x 30 inch tall window opening was constructed with 18 gauge galvanized steel track centered on the vertical centerline of the wall assembly. The finished sill of the opening was 30 inches above the first story floor line. The steel track sections were mechanically fastened with #6 x 1/2 in. long self-drilling pan head fasteners at each corner. Excess Tyvek® CommercialWrap® was wrapped around the window opening perimeter and taped with DuPont™ Tyvek® Tape to the window opening perimeter framing. Once the exterior cladding system was installed, the window opening perimeter was flashed with 0.040 inch thick aluminum flashing.

6.0 Test Specimen Description: (Continued)

Exterior Sheathing:

5/8 inch thick National Gypsum eXP® exterior gypsum sheathing meeting ASTM C1177 was placed horizontally across the exterior surface of the assembly. The gypsum sheathing vertical joints were offset 16 inches each row. The gypsum was fastened to the framing members with #6 x 1-5/8 inch bugle head fasteners spaced every 8 inches along the perimeter and every 12 inches in the field.

Air/Water Barrier:

Upon completion of the installation of the exterior sheathing, Dupont™ Tyvek® CommercialWrap® air and water barrier was installed horizontally across the full width and height of the exterior surface of the wall assembly. The CommericalWrap® utilized a 4 inch overlap and was mechanically fastened to the exterior sheathing with 3/8 inch deep T50 staples every 12 inches horizontally and vertically.

Exterior Cladding:

Upon completion of the Tyvek® CommericalWrap® installation, a DX-5400 extruded aluminum starter strip was placed across the full width of the assembly at the assembly sill and fastened through the exterior sheathing and into each vertical framing member with #10-16 x 1-1/2 inch long hex head, self-drilling fasteners. A DX-5400 extruded aluminum starter rail was also placed across the full with of the window opening at the window opening header and fastened into each vertical framing member with #10-16 x 3/4 inch long hex head, self-drilling fasteners. 7/8 inches deep x 0.080 aluminum hat channels, utilizing 1-1/4 inch wide flanges were placed across the full assembly width at predetermined heights, at the cations of the future exterior panel horizontal joints would be located, and fasted through the exterior sheathing and into each vertical framing member with one #10-16 x 1-1/2 inch long hex head, self-drilling faster per flange per vertical framing member. Once all hat channel lengths were installed, the Almaxco® FR Metal Composite panels, utilizing the Bamco D500 Extrusion and attachment system and a 1/2 inch vertical and horizontal joint reveal, were installed over the full exterior surface of the assembly. The first row of panels were installed into the DX-500 starter rail and were fastened to the first horizontal hat channel with #10-16 x 3/4 inch long hex head, self-drilling fasteners through either an DX-5100, DX-5200, or DX-5300 extrusions depending on the panel location and position. The supplied drawing has details to this final process.

7.0 Instrumentation and Test Procedure:

7.1 Instrumentation: The wall assembly was instrumented with thermocouples in accordance with Figure 6.1 of the NFPA 285 test method. Thermocouples in the burn room were 18-gauge Type "K" TCs and 20-gauge Type "K" RCs were used on exterior façade and stud cavity air space. The window burner was positioned in the center of the opening and 3 in. from the exterior face of the wall assembly. The position of the window burner was determined by calibration of the ISMA on February 18, 2016.

7.2 Test Procedure: Testing was performed on October 28, 2016, in accordance with the NFPA 285 test method. Ambient conditions were 63°F and 41% relative humidity. An anemometer was used to verify airflow across test assembly was less than 4 ft./s as specified in the test method. Video recording, digital photographs, visual observations, and data collection were performed prior, during, and after testing was completed. Temperature data was recorded every 15 seconds.

8.0 Test Results:

The test was started at 11:48 AM with the burners on for 30 minutes. The burners were turned off and the specimen was allowed to burn for an additional 10 minutes after the test. All observations are recorded in the following table.

Table 3 Test Observations

Time (min:sec)	Observations
00:00	Ignition of the room burner.
01:48	Window flashing begins to bow.
02:15	Panels above the window header begin to swell and buckle.
05:00	Window burner ignition.
06:15	Smoking from the window jabs.
09:12	Paint chars on panels above the window header.
15:21	Smoke from panel joint @ 9 feet.
25:11	Header ignition.
30:00	The burners were extinguished.
40:00	Test observations stopped.

8.0 Test Results: (Continued)

Table 4 Test Requirements

Test Requirements	Test Observations	Pass/Fail
Flames did not reach 10 ft. above the window opening header.	Flames did reach 10 ft. above the window opening header.	**PASS**
Flames did not reach a lateral distance of 5 ft. from the vertical centerline.	Flames did not reach a lateral distance of 5 ft. from the vertical centerline.	**PASS**
Flames did not propagate beyond the limits of the first story test room.	Flames did not propagate beyond the limits of the first story test room.	**PASS**
No visible flaming in the second story test room	No visible flaming in the second story test room.	**PASS**
TC's 11 and 14-17 (1000°F limit)	TC's 11, and 14-17 did not exceed their 1000°F test limit.	**PASS**
TC's 18-19, 28, and 31-40 (1000°F limit)	TC's 18-19, 28, and 31-40 did not exceed the 1000°F limit	**PASS**
TC's 49-54 (500°F above ambient)	TC's 49-54 did not exceed 500°F above their ambient temperatures.	**PASS**

8.0 Test Results: (Continued)

Description of Extent of Damage:

Interior Cladding:

The interior gypsum was still intact after the separation of the assembly from the test fixture. However, the area exposed to the test room was heavily fatigued and showed significant flame damage.

Exterior Sheathing/Air/Water Barrier:

The exterior sheathing of the assembly showed minimal damage from the flame exposure. Damage was localized to the flame plume area above the window opening header. The Tyvek® CommercialWrap® was melted up to 8 feet above the window opening header and did not extended beyond the vertical window opening jamb planes.

Exterior Cladding:

The first two panel rows above the window opening header were consumed through both aluminum facings and their cores. The third panel row above the window opening header showed charring to the panel exterior. The panel row at the header/parapet only exhibited surface burning up to 3 feet above the window opening header.

The assembly tested and described in this report met the Conditions of Acceptance of NFPA 285.

Intertek-ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI for the entire test record retention period.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:

Digitally Signed by: Scott Gingrich

Scott Gingrich
Senior Technician – Fire Testing

Digitally Signed by: Ethan Grove

Ethan Grove
Manager – Fire Testing

SDG:ddr

Attachments (pages): This report is complete only when all attachments listed are included.
- Appendix-A: Graphical Data (6)
- Appendix-B: Numerical Data (18)
- Appendix-C: Photographs (9)
- Appendix-D: Drawings (6)

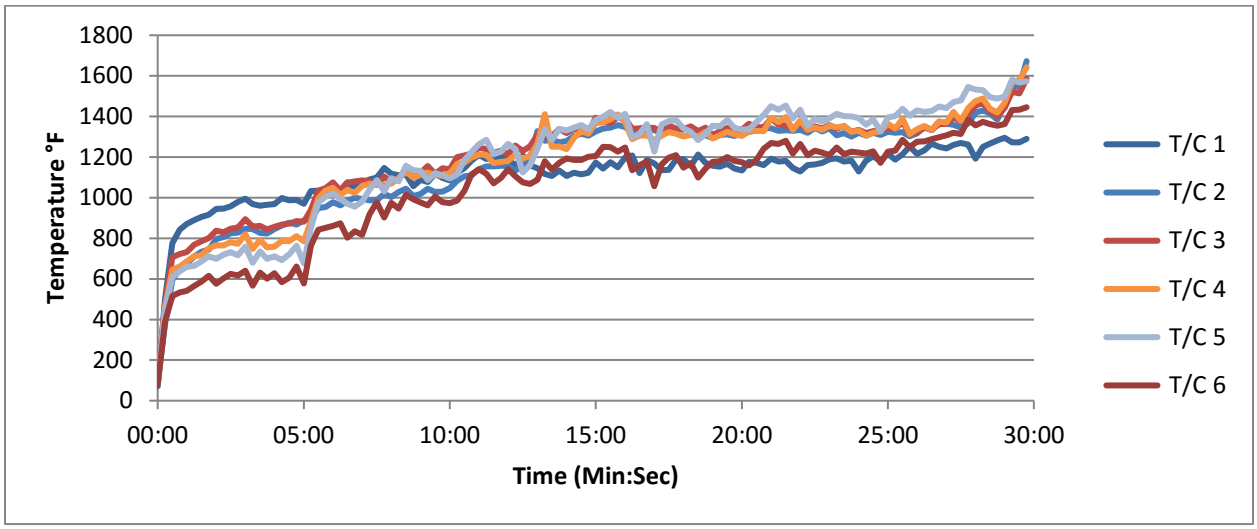
Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	11/23/2016	N/A	Original Report Issue

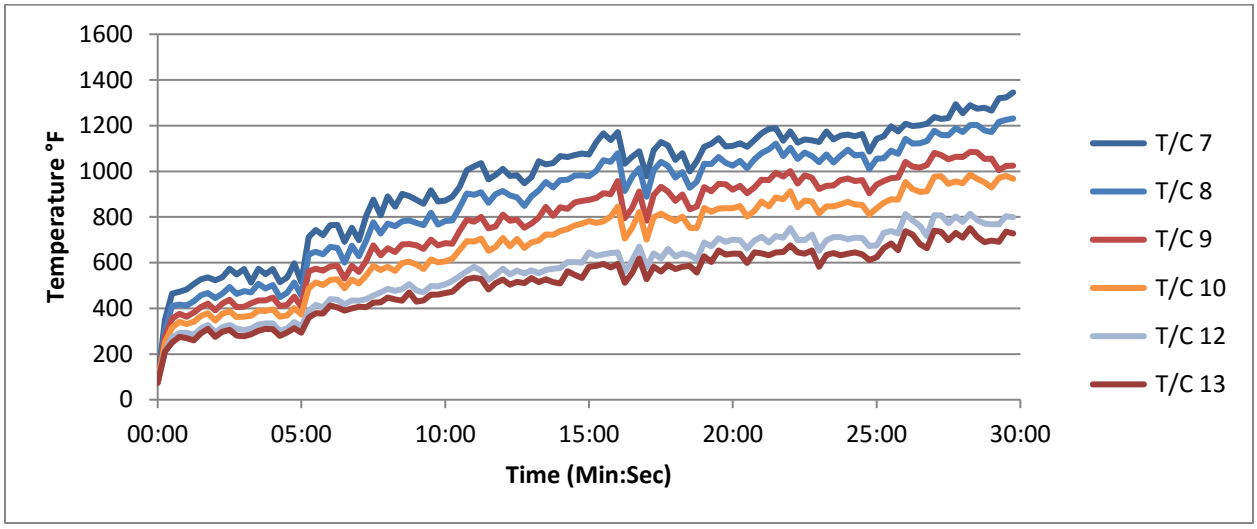
This report produced from controlled document template ATI 00587, revised 05/07/15.

Appendix A

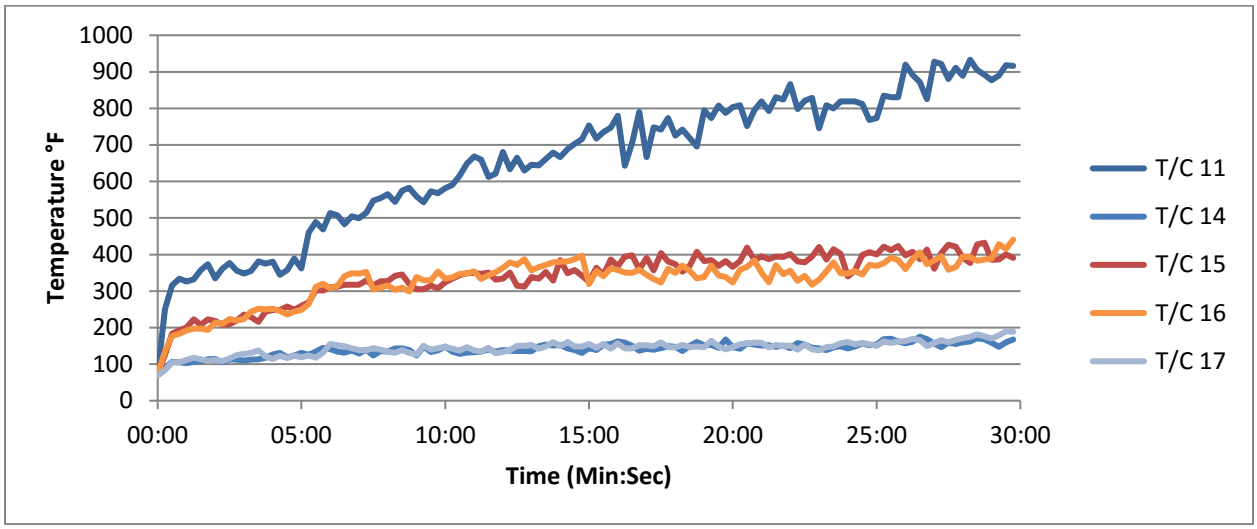
Graphs



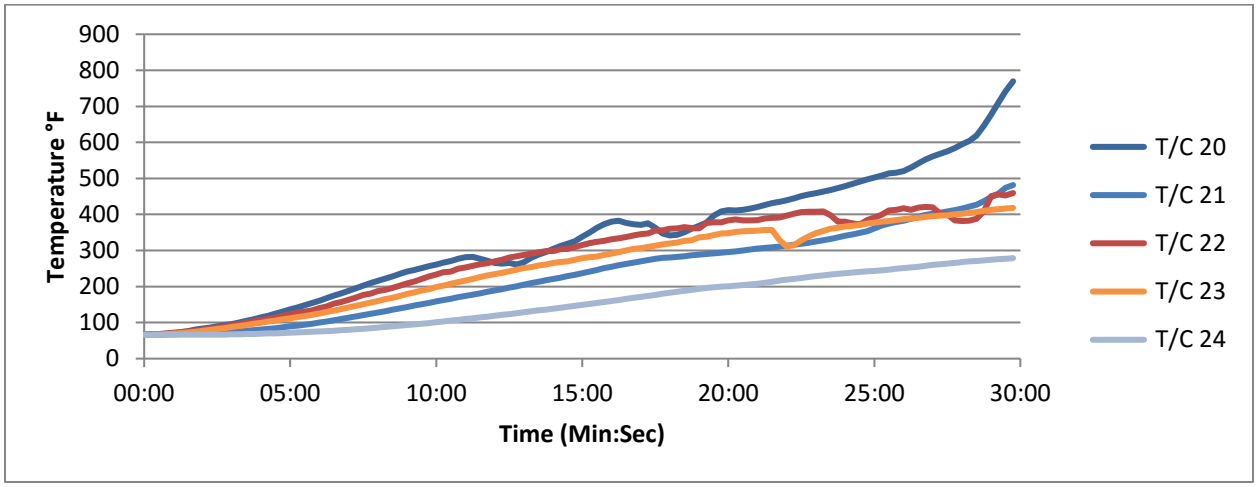
Graph No. 1
Assembly Centerline (Assembly Exterior)



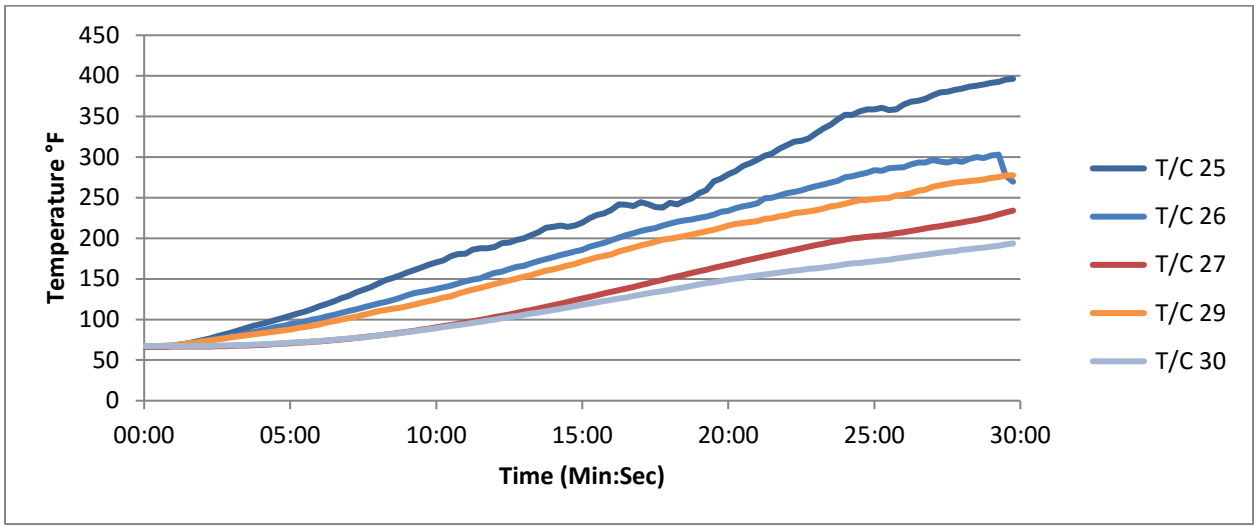
Graph No. 2
Assembly Centerline (Assembly Exterior)



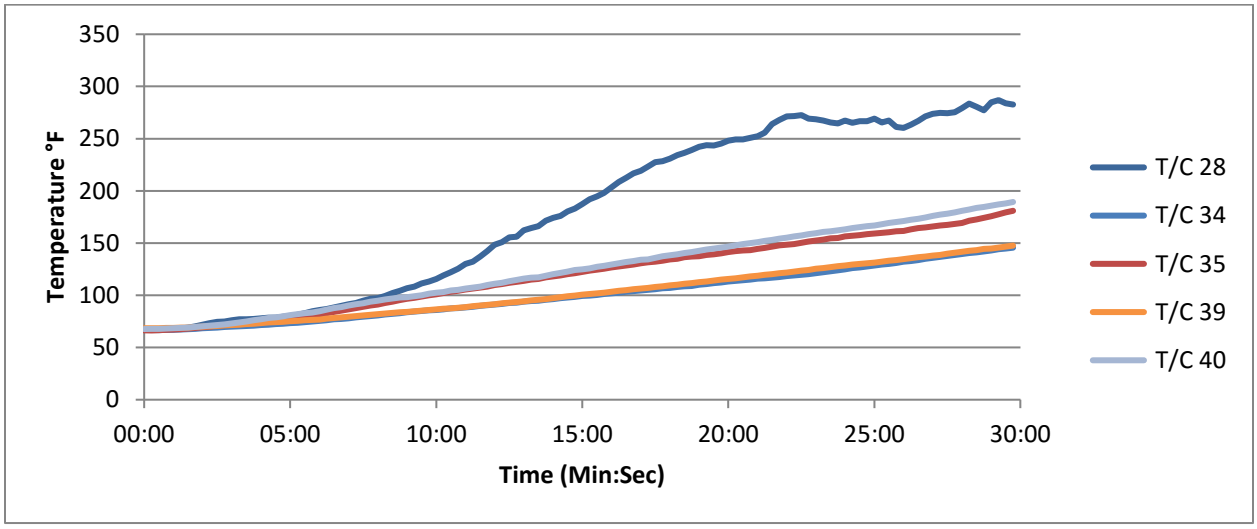
Graph No. 3
10 ft. above the Window Opening Header (Assembly Exterior)



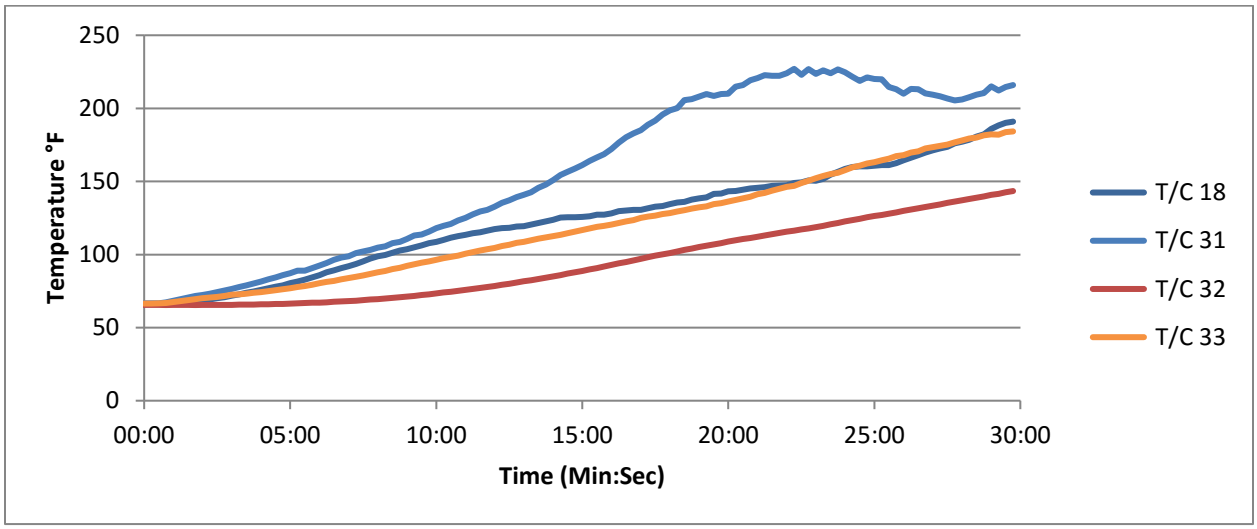
Graph No. 4
Assembly Centerline (Air Cavity Space)



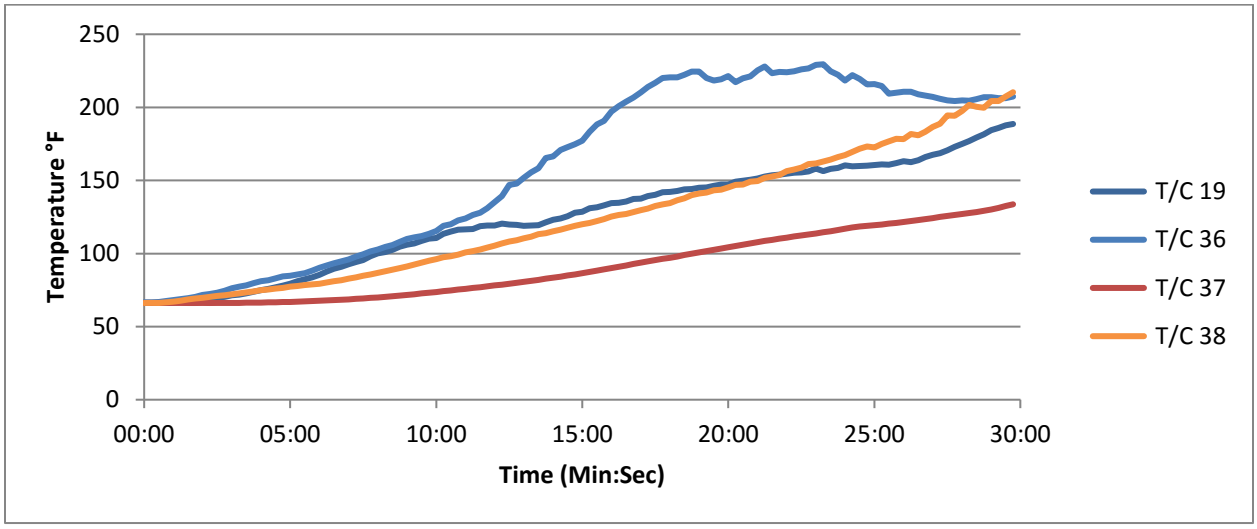
Graph No. 5
Assembly Centerline (Air Cavity Space)



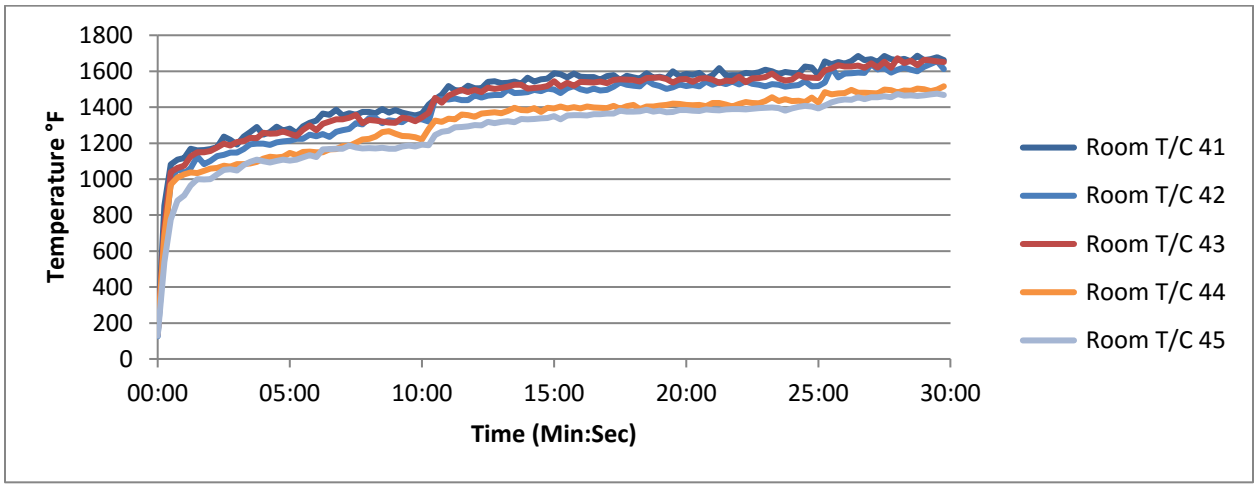
Graph No. 6
10 ft. above the Window Opening Header (Air Cavity Space)



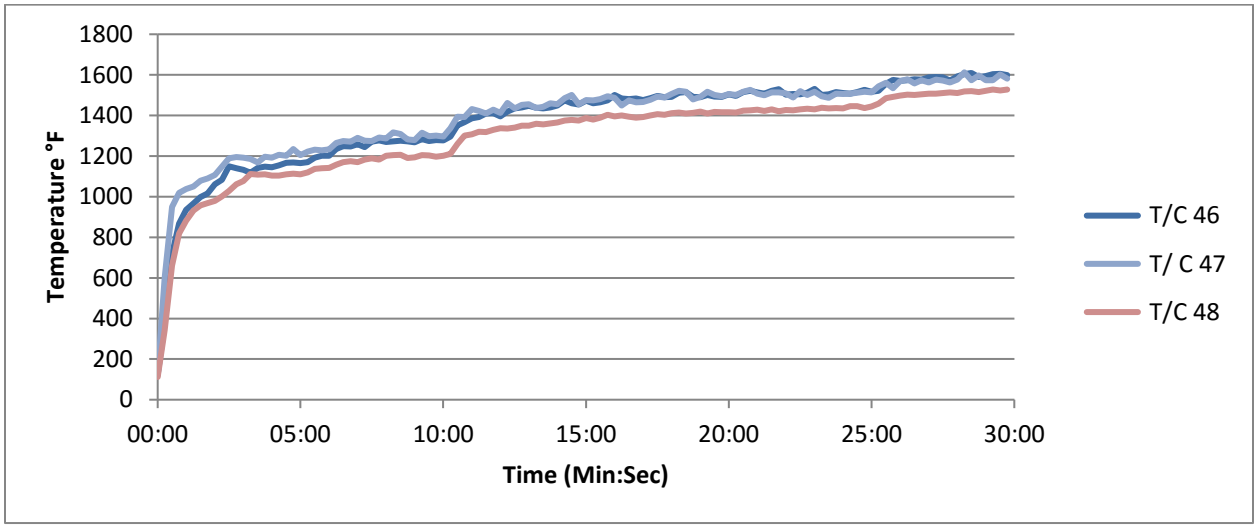
Graph No. 7
Left of Assembly Centerline (Air Cavity Space)



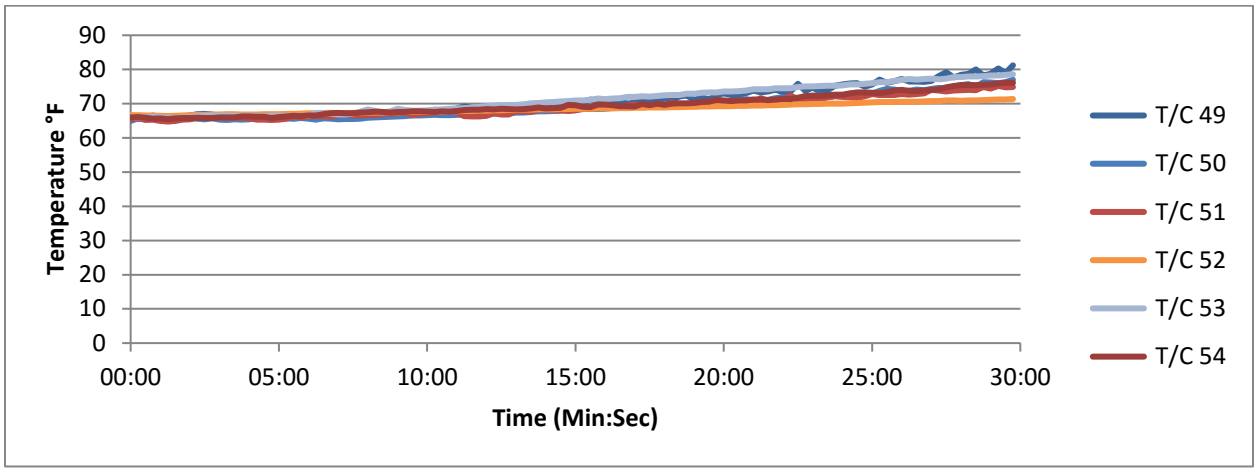
Graph No. 8
Right of Assembly Centerline (Air Cavity Space)



Graph No. 12
First-story Test Room Ceiling



Graph No. 13
First-story Interior Wall Surface



Graph No. 14
Second-story Interior Wall Surface

Appendix B

Numerical Data

Time (Min:Sec)	Room Gas Flow	Window Gas Flow	T/C 1	T/C 2	T/C 3	T/C 4	T/C 5	T/C 6	T/C 7	T/C 8	T/C 9
00:00	0.1	0.0	71	93	85	80	80	78	78	77	76
00:15	24.9	0.0	499	375	472	460	450	389	351	304	275
00:30	35.7	0.0	776	596	707	645	609	516	465	411	356
00:45	36.5	0.0	842	647	723	661	638	534	473	417	375
01:00	36.5	0.0	871	675	731	686	660	541	482	412	363
01:15	36.5	0.0	890	710	767	712	664	564	507	431	381
01:30	36.5	0.0	905	734	786	717	686	586	528	457	406
01:45	36.5	0.0	916	745	801	750	712	615	536	466	420
02:00	36.5	0.0	944	797	838	765	699	576	523	445	392
02:15	36.5	0.0	946	806	829	765	720	602	535	464	420
02:30	36.5	0.0	957	825	846	781	732	625	573	494	437
02:45	36.5	0.0	979	828	853	772	717	617	548	462	405
03:00	36.4	0.0	995	847	894	821	758	640	572	475	407
03:15	36.4	0.0	968	845	857	748	680	566	513	470	423
03:30	36.5	0.0	961	826	861	792	735	630	573	508	435
03:45	36.5	0.0	966	823	844	755	699	601	550	487	435
04:00	36.5	0.0	969	845	857	758	711	627	572	501	447
04:15	36.5	0.0	998	863	868	786	693	583	515	449	410
04:30	36.5	0.0	987	877	872	785	720	606	536	468	415
04:45	36.5	0.0	988	868	885	811	763	661	598	514	452
05:00	36.5	0.0	971	888	881	785	677	578	514	456	406
05:15	36.5	0.5	1032	895	940	883	849	763	712	637	563
05:30	36.4	3.4	1035	949	1035	997	976	843	744	648	573
05:45	36.5	4.6	1027	955	1047	1036	1004	851	721	637	565
06:00	36.5	4.2	1060	977	1076	1049	1020	861	764	669	583
06:15	36.4	4.3	1036	962	1035	1015	994	874	766	665	586
06:30	36.5	4.4	1075	984	1074	1038	970	803	691	599	531
06:45	36.4	4.4	1047	1000	1080	1024	957	835	753	674	587
07:00	36.5	4.5	1071	994	1086	1059	981	817	698	628	559
07:15	36.5	4.5	1090	987	1082	1069	1039	918	806	697	608
07:30	36.5	4.5	1100	988	1063	1063	1086	977	876	776	676
07:45	36.5	4.4	1147	1019	1103	1064	1031	902	807	727	633
08:00	36.5	4.4	1118	1004	1078	1070	1096	975	890	771	663
08:15	36.4	4.4	1111	1028	1097	1096	1080	947	846	760	646
08:30	36.5	4.4	1115	1045	1137	1127	1157	1014	901	781	679
08:45	36.5	4.4	1057	1009	1099	1100	1135	992	891	785	682
09:00	36.4	4.4	1088	1019	1122	1114	1133	976	875	774	675
09:15	36.4	4.4	1078	1044	1156	1125	1087	962	858	764	661
09:30	36.5	4.4	1118	1027	1117	1111	1122	1006	917	819	701
09:45	36.5	4.3	1097	1031	1144	1109	1110	978	868	767	676

Time (Min:Sec)	Room Gas Flow	Window Gas Flow	T/C 1	T/C 2	T/C 3	T/C 4	T/C 5	T/C 6	T/C 7	T/C 8	T/C 9
10:00	36.5	4.4	1085	1047	1139	1120	1094	974	872	782	686
10:15	38.7	4.8	1123	1083	1199	1166	1116	985	889	784	683
10:30	44.3	5.6	1146	1106	1208	1174	1186	1034	932	842	740
10:45	44.9	5.8	1183	1110	1217	1197	1225	1114	1005	902	787
11:00	45.0	5.8	1211	1141	1245	1212	1262	1140	1021	897	780
11:15	45.0	5.7	1190	1155	1240	1211	1285	1118	1036	908	800
11:30	45.0	5.6	1195	1154	1221	1170	1215	1071	964	863	749
11:45	45.0	5.6	1203	1158	1231	1177	1227	1098	983	900	758
12:00	44.8	5.7	1194	1157	1215	1181	1264	1140	1011	914	810
12:15	44.8	5.7	1154	1134	1257	1211	1239	1105	980	894	783
12:30	44.9	5.7	1208	1155	1229	1192	1124	1075	982	885	788
12:45	44.9	5.7	1159	1196	1254	1206	1161	1067	947	849	753
13:00	44.9	5.7	1145	1328	1308	1266	1243	1088	974	890	771
13:15	44.9	5.7	1117	1281	1301	1412	1337	1179	1044	917	798
13:30	45.0	5.7	1107	1285	1303	1250	1285	1139	1031	952	843
13:45	45.0	5.7	1133	1273	1339	1252	1338	1172	1036	930	805
14:00	44.8	5.7	1107	1279	1318	1239	1331	1194	1067	961	843
14:15	45.0	5.7	1123	1305	1338	1294	1345	1186	1062	963	835
14:30	44.9	5.7	1115	1314	1339	1328	1357	1187	1071	981	863
14:45	44.9	5.7	1123	1306	1322	1314	1337	1202	1077	983	871
15:00	44.9	5.7	1174	1326	1395	1369	1384	1205	1073	978	875
15:15	44.8	6.5	1143	1341	1374	1370	1399	1250	1129	1002	884
15:30	44.8	8.0	1176	1345	1369	1386	1422	1248	1166	1049	904
15:45	44.7	8.2	1149	1357	1397	1409	1393	1226	1137	1041	900
16:00	44.8	8.2	1198	1348	1392	1371	1413	1247	1171	1080	957
16:15	44.8	8.2	1208	1321	1339	1289	1296	1135	1033	914	794
16:30	44.7	8.3	1122	1330	1342	1305	1316	1159	1063	976	840
16:45	44.7	8.2	1186	1329	1345	1307	1363	1179	1088	1013	912
17:00	44.7	8.2	1169	1333	1344	1282	1226	1057	979	888	784
17:15	44.8	8.3	1135	1313	1325	1306	1360	1164	1092	1005	896
17:30	44.8	8.3	1137	1339	1356	1323	1376	1196	1128	1041	932
17:45	44.8	8.2	1187	1336	1341	1315	1383	1209	1114	1023	911
18:00	44.7	8.3	1191	1335	1337	1302	1342	1148	1050	973	871
18:15	44.7	8.2	1156	1343	1352	1311	1325	1169	1079	997	899
18:30	44.7	8.2	1212	1307	1328	1302	1284	1099	999	928	834
18:45	44.7	8.2	1172	1308	1346	1325	1314	1144	1045	955	845
19:00	44.7	8.2	1157	1294	1308	1292	1354	1177	1108	1033	931
19:15	44.7	8.2	1153	1309	1328	1307	1352	1180	1120	1032	912
19:30	44.7	8.2	1166	1311	1343	1324	1383	1200	1145	1062	945
19:45	44.7	8.2	1144	1304	1338	1313	1344	1182	1109	1037	943

Time (Min:Sec)	Room Gas Flow	Window Gas Flow	T/C 1	T/C 2	T/C 3	T/C 4	T/C 5	T/C 6	T/C 7	T/C 8	T/C 9
20:00	44.7	8.2	1134	1318	1336	1304	1336	1175	1112	1025	919
20:15	44.7	9.2	1177	1325	1364	1326	1337	1160	1122	1046	936
20:30	44.8	11.0	1171	1331	1349	1329	1371	1186	1107	1014	904
20:45	44.8	11.2	1160	1343	1346	1328	1408	1241	1137	1053	929
21:00	44.8	11.2	1193	1341	1390	1395	1451	1269	1166	1080	964
21:15	44.7	11.3	1178	1330	1360	1371	1434	1265	1186	1096	962
21:30	44.7	11.1	1182	1332	1357	1398	1454	1280	1188	1121	994
21:45	44.7	11.1	1146	1329	1339	1334	1391	1217	1134	1067	977
22:00	44.7	11.1	1130	1334	1367	1380	1434	1265	1175	1102	1001
22:15	44.7	11.2	1161	1320	1336	1333	1355	1209	1126	1054	946
22:30	44.7	11.2	1164	1344	1351	1346	1388	1232	1139	1083	982
22:45	44.7	11.3	1172	1325	1340	1334	1375	1222	1135	1066	971
23:00	44.7	11.2	1188	1342	1357	1355	1391	1210	1128	1040	922
23:15	44.7	11.1	1193	1307	1340	1347	1413	1247	1175	1074	936
23:30	44.7	11.2	1178	1319	1352	1352	1402	1214	1140	1039	937
23:45	44.7	11.2	1182	1301	1324	1325	1400	1227	1157	1068	961
24:00	44.7	11.2	1130	1319	1334	1330	1393	1222	1161	1095	968
24:15	44.7	11.2	1182	1306	1318	1306	1359	1218	1153	1070	958
24:30	44.7	11.2	1204	1321	1327	1320	1386	1229	1163	1074	962
24:45	44.7	11.2	1181	1310	1331	1327	1326	1172	1086	1009	904
25:00	44.7	11.2	1216	1325	1345	1363	1395	1227	1142	1056	941
25:15	46.0	12.9	1187	1320	1341	1341	1402	1232	1153	1056	957
25:30	48.4	15.6	1215	1323	1371	1389	1438	1285	1197	1090	970
25:45	48.7	15.9	1252	1303	1314	1314	1404	1249	1175	1076	973
26:00	48.5	15.9	1215	1317	1321	1337	1431	1275	1208	1142	1041
26:15	48.7	15.9	1233	1349	1346	1353	1422	1277	1198	1121	1020
26:30	48.6	15.9	1267	1333	1334	1334	1428	1288	1201	1122	1016
26:45	48.6	15.9	1251	1375	1363	1374	1449	1297	1209	1133	1027
27:00	48.6	15.9	1242	1364	1364	1370	1442	1307	1237	1178	1080
27:15	48.7	15.9	1259	1360	1396	1422	1470	1321	1229	1159	1070
27:30	48.7	15.9	1269	1345	1375	1379	1479	1314	1233	1157	1052
27:45	48.7	15.8	1262	1366	1410	1442	1545	1385	1294	1189	1064
28:00	48.5	15.9	1192	1419	1453	1476	1532	1357	1255	1172	1063
28:15	48.7	15.9	1250	1431	1467	1489	1530	1374	1289	1203	1085
28:30	48.6	16.0	1267	1415	1425	1438	1495	1362	1274	1202	1084
28:45	48.5	15.9	1282	1384	1401	1418	1489	1354	1279	1178	1054
29:00	48.6	15.9	1295	1459	1442	1468	1499	1363	1265	1172	1055
29:15	48.7	15.9	1273	1543	1522	1569	1581	1431	1320	1216	1005
29:30	48.7	15.9	1272	1550	1513	1579	1568	1433	1323	1225	1023
29:45	48.6	15.9	1290	1672	1586	1642	1574	1445	1345	1231	1024
30:00	43.5	14.1	1222	1653	1466	1494	1356	1255	1140	1059	936

Time (Min:Sec)	T/C 10	T/C 11	T/C 12	T/C 13	T/C 14	T/C 15	T/C 16	T/C 17	T/C 18	T/C 19	T/C 20
00:00	76	76	75	73	70	73	72	69	66	66	67
00:15	251	250	211	211	89	126	135	83	66	66	67
00:30	315	315	272	250	106	183	177	105	66	66	67
00:45	342	334	292	275	106	193	183	105	66	66	69
01:00	330	326	293	270	102	200	192	111	67	66	71
01:15	341	332	284	260	107	223	197	118	67	67	73
01:30	366	358	311	290	108	208	197	113	67	67	76
01:45	379	374	327	310	114	223	193	109	68	68	80
02:00	347	335	296	275	114	218	214	112	69	68	83
02:15	376	361	318	297	105	208	210	108	69	69	86
02:30	387	377	327	306	113	210	223	116	70	70	90
02:45	362	356	311	280	112	220	219	124	71	70	93
03:00	364	348	305	278	110	236	224	128	72	72	96
03:15	368	355	311	286	112	229	243	131	73	72	100
03:30	390	381	329	301	114	215	252	137	74	73	105
03:45	389	375	334	310	118	244	250	121	75	74	109
04:00	395	381	333	309	126	248	252	114	76	75	115
04:15	364	345	300	279	131	248	246	123	77	76	119
04:30	369	358	313	295	118	258	236	117	78	77	125
04:45	401	389	340	313	124	249	244	124	79	78	130
05:00	373	362	320	293	130	259	248	118	80	79	136
05:15	489	460	389	359	126	269	265	124	82	81	142
05:30	514	489	415	379	135	303	312	118	83	82	148
05:45	502	469	404	378	145	302	320	132	84	84	155
06:00	525	513	440	413	142	310	308	156	86	86	161
06:15	527	507	438	403	134	312	314	152	88	88	168
06:30	488	483	418	390	131	317	341	149	89	90	175
06:45	525	504	434	400	138	317	349	143	91	91	181
07:00	509	499	434	406	129	317	348	138	92	93	188
07:15	544	514	440	405	139	329	352	138	94	94	195
07:30	586	548	456	425	124	316	304	144	95	96	203
07:45	568	555	470	427	136	327	309	139	97	98	209
08:00	582	565	485	448	134	327	315	135	99	100	216
08:15	563	544	476	439	143	342	303	130	100	101	222
08:30	598	575	483	434	143	345	310	139	101	103	229
08:45	604	582	506	470	138	320	299	130	103	105	235
09:00	592	559	478	429	124	305	338	127	104	106	242
09:15	572	543	469	435	148	305	329	150	105	107	246
09:30	615	573	498	460	134	314	329	140	106	109	251
09:45	602	568	496	460	138	308	353	144	108	110	256

Time (Min:Sec)	T/C 10	T/C 11	T/C 12	T/C 13	T/C 14	T/C 15	T/C 16	T/C 17	T/C 18	T/C 19	T/C 20
10:00	606	582	505	467	148	325	334	148	109	111	261
10:15	617	591	520	473	134	334	337	142	110	113	266
10:30	656	616	541	502	128	343	347	137	111	115	271
10:45	693	648	562	528	132	349	348	146	113	116	277
11:00	693	669	582	534	132	350	354	138	113	117	281
11:15	705	660	564	528	134	347	333	134	115	117	283
11:30	652	612	524	482	141	350	343	145	115	119	277
11:45	668	621	547	510	134	332	351	130	116	119	272
12:00	708	681	574	526	139	334	364	133	117	119	265
12:15	671	634	549	503	137	351	378	139	118	120	263
12:30	704	665	565	516	136	314	371	150	118	120	266
12:45	664	630	553	511	136	312	387	150	119	120	261
13:00	689	646	566	533	135	339	356	152	119	119	267
13:15	697	644	553	515	149	334	366	142	121	119	280
13:30	723	662	569	528	153	353	372	148	122	119	288
13:45	722	679	574	515	151	329	378	161	123	121	296
14:00	739	667	577	508	153	385	380	149	124	123	305
14:15	747	688	603	562	143	348	381	161	125	124	313
14:30	762	703	603	547	138	358	387	148	125	126	318
14:45	771	716	599	533	131	341	397	148	126	128	326
15:00	783	753	644	582	144	325	319	155	126	128	339
15:15	774	717	630	586	138	364	355	144	126	131	349
15:30	781	735	637	595	153	345	341	155	127	132	363
15:45	802	747	642	579	156	386	362	142	127	133	373
16:00	845	780	645	595	163	368	358	157	128	134	380
16:15	705	643	559	512	158	395	350	143	130	135	383
16:30	753	706	609	555	150	398	350	143	130	136	377
16:45	821	790	670	619	137	360	358	152	131	137	372
17:00	702	667	581	527	142	391	345	151	131	138	371
17:15	799	748	641	582	140	356	333	149	132	139	375
17:30	814	742	619	561	144	404	323	160	133	140	363
17:45	798	774	660	591	149	381	362	146	133	142	347
18:00	782	725	626	571	147	374	350	146	134	142	341
18:15	802	742	640	582	136	353	370	152	136	143	344
18:30	753	718	634	586	150	369	355	147	136	144	350
18:45	752	695	612	556	161	407	334	149	137	144	360
19:00	839	795	689	628	152	382	339	146	138	145	368
19:15	823	774	671	603	152	385	369	164	139	145	377
19:30	837	808	706	653	145	369	343	148	142	146	397
19:45	838	788	691	636	168	382	338	140	142	147	409

Time (Min:Sec)	T/C 10	T/C 11	T/C 12	T/C 13	T/C 14	T/C 15	T/C 16	T/C 17	T/C 18	T/C 19	T/C 20
20:00	838	803	701	639	147	366	323	146	143	147	412
20:15	848	808	698	639	142	382	358	155	143	149	411
20:30	802	752	662	599	157	419	367	157	144	150	413
20:45	827	796	697	645	154	385	384	159	145	150	417
21:00	868	819	714	640	151	395	351	158	146	151	421
21:15	847	793	688	632	152	387	324	146	146	153	426
21:30	886	831	716	645	147	394	371	153	147	154	431
21:45	878	824	709	647	151	393	346	149	147	154	435
22:00	912	866	752	676	144	402	356	151	147	155	440
22:15	842	798	699	645	158	381	328	140	149	155	445
22:30	872	820	698	639	154	379	342	154	149	156	451
22:45	867	829	723	653	145	394	317	141	151	156	455
23:00	816	746	651	582	143	421	331	138	150	158	459
23:15	846	809	698	634	139	387	354	146	152	156	463
23:30	847	799	713	642	146	415	378	148	155	158	468
23:45	855	819	712	633	149	403	349	157	157	159	473
24:00	866	819	702	640	143	340	348	160	159	160	479
24:15	856	819	710	645	148	356	355	154	160	160	485
24:30	853	812	708	637	157	399	345	158	160	160	491
24:45	810	768	674	612	151	407	372	155	160	160	497
25:00	838	774	676	623	154	400	369	150	161	161	503
25:15	862	835	730	663	169	421	376	162	161	161	508
25:30	877	831	739	683	169	412	392	158	161	161	514
25:45	876	830	728	654	162	424	385	163	163	162	516
26:00	953	920	814	738	157	398	360	163	165	163	520
26:15	922	892	785	723	161	408	387	169	166	162	530
26:30	910	872	761	681	175	387	405	166	168	164	542
26:45	912	825	716	664	168	413	373	149	170	166	553
27:00	977	928	808	740	156	361	384	158	171	168	561
27:15	979	921	808	734	147	404	396	165	173	169	568
27:30	945	880	773	699	159	427	359	160	174	171	575
27:45	956	911	801	731	155	421	366	166	176	173	584
28:00	947	889	779	709	160	392	394	171	177	175	594
28:15	986	933	814	751	162	377	392	175	178	177	603
28:30	967	905	787	714	171	428	383	182	181	179	618
28:45	952	892	771	690	168	432	387	177	182	182	647
29:00	930	876	768	696	158	385	389	171	186	184	677
29:15	971	890	768	690	147	386	428	179	188	186	711
29:30	980	918	803	736	159	400	416	190	190	188	742
29:45	967	917	799	728	168	391	441	189	191	189	769
30:00	841	785	702	627	162	405	367	163	191	189	765

Time (Min:Sec)	T/C 21	T/C 22	T/C 23	T/C 24	T/C 25	T/C 26	T/C 27	T/C 28	T/C 29	T/C 30	T/C 31
00:00	68	67	66	66	66	67	67	67	67	67	67
00:15	68	67	66	66	66	67	67	67	67	67	67
00:30	68	68	67	66	67	67	67	67	67	67	67
00:45	68	70	68	66	67	67	67	67	68	67	67
01:00	68	72	69	66	68	68	67	67	68	67	68
01:15	68	73	71	66	69	69	67	68	69	67	69
01:30	69	75	73	66	71	70	67	69	71	67	71
01:45	69	78	75	66	73	72	67	70	72	67	72
02:00	70	80	77	67	75	73	67	72	73	68	72
02:15	71	83	80	67	77	74	67	73	74	68	73
02:30	72	86	82	67	79	76	67	74	75	68	74
02:45	73	90	85	67	82	78	67	75	77	68	75
03:00	74	93	88	67	84	79	68	76	78	68	76
03:15	76	96	90	68	87	81	68	77	79	68	78
03:30	77	100	93	68	90	83	68	77	81	69	79
03:45	79	104	96	69	92	85	68	77	82	69	80
04:00	81	107	100	69	95	86	69	78	83	69	82
04:15	83	110	103	70	97	89	69	78	84	70	83
04:30	85	114	106	70	99	91	70	79	85	70	84
04:45	87	119	109	71	102	92	70	79	86	71	86
05:00	89	123	112	72	105	94	71	80	88	71	87
05:15	92	128	115	73	107	96	71	81	89	72	89
05:30	94	130	118	74	110	97	72	83	91	72	89
05:45	97	134	122	74	113	100	73	85	92	73	91
06:00	100	140	125	75	116	102	73	86	94	73	92
06:15	103	145	129	76	119	104	74	87	96	74	94
06:30	106	152	134	78	122	106	75	88	98	75	96
06:45	110	157	138	79	126	108	75	90	100	76	98
07:00	113	163	142	80	129	111	76	91	102	76	99
07:15	117	170	147	81	133	113	77	93	103	77	101
07:30	121	177	151	83	136	115	78	95	106	78	102
07:45	124	181	156	84	140	117	79	97	108	79	103
08:00	128	187	160	86	144	120	80	97	110	80	105
08:15	132	191	165	87	148	122	81	99	112	81	106
08:30	136	196	169	89	151	124	82	102	113	82	108
08:45	139	202	174	91	154	127	84	104	115	83	109
09:00	143	208	179	93	158	130	85	107	116	84	111
09:15	147	214	184	95	161	133	86	108	119	86	113
09:30	151	221	189	97	164	134	88	111	121	87	114
09:45	155	228	193	99	168	136	89	113	123	88	116

Time (Min:Sec)	T/C 21	T/C 22	T/C 23	T/C 24	T/C 25	T/C 26	T/C 27	T/C 28	T/C 29	T/C 30	T/C 31
10:00	159	233	198	101	170	138	90	116	125	89	118
10:15	162	240	202	103	173	140	92	119	127	91	120
10:30	166	241	207	105	178	142	93	122	128	92	121
10:45	170	249	212	108	181	144	95	125	132	93	123
11:00	174	253	217	110	181	147	96	130	134	94	125
11:15	178	257	221	112	186	149	98	132	137	96	127
11:30	181	262	226	114	188	151	99	137	139	97	129
11:45	185	265	231	117	188	154	101	142	141	99	131
12:00	189	270	234	119	189	157	103	149	144	100	133
12:15	193	274	238	121	194	159	105	151	146	101	135
12:30	197	280	243	124	195	162	106	156	148	103	137
12:45	201	284	247	126	198	165	108	156	150	104	139
13:00	205	287	251	129	200	166	110	162	153	106	141
13:15	209	291	254	131	204	169	112	164	155	107	143
13:30	213	295	258	134	207	172	114	166	157	109	146
13:45	217	298	261	136	213	174	116	171	160	110	148
14:00	221	299	265	139	214	177	118	174	162	112	151
14:15	225	303	268	141	216	180	120	176	164	113	154
14:30	229	304	270	144	214	181	122	180	166	115	157
14:45	233	310	274	147	216	184	124	183	168	116	159
15:00	237	315	279	149	219	186	126	187	172	118	161
15:15	241	321	281	152	225	190	128	192	174	119	164
15:30	246	324	283	154	229	192	130	195	177	121	167
15:45	251	327	288	157	231	195	132	198	178	123	169
16:00	255	331	292	160	235	198	134	203	180	124	172
16:15	259	333	296	163	242	201	136	209	184	126	177
16:30	263	338	300	166	241	204	138	212	186	127	180
16:45	266	342	305	169	240	206	140	217	189	129	183
17:00	270	346	306	171	244	209	142	219	191	130	185
17:15	274	347	310	174	242	211	145	223	193	132	189
17:30	277	355	313	177	238	213	147	228	195	134	192
17:45	280	356	317	180	238	216	149	228	199	135	196
18:00	280	360	319	183	244	218	151	231	200	137	199
18:15	282	362	323	185	242	221	153	234	201	138	200
18:30	284	365	327	188	246	222	155	237	203	140	206
18:45	286	362	328	191	249	223	157	239	204	141	206
19:00	288	361	337	194	256	225	159	242	207	143	208
19:15	290	376	339	196	259	227	161	244	209	145	210
19:30	292	379	342	198	270	229	164	243	211	146	208
19:45	294	379	347	200	274	233	166	245	213	147	210

Time (Min:Sec)	T/C 21	T/C 22	T/C 23	T/C 24	T/C 25	T/C 26	T/C 27	T/C 28	T/C 29	T/C 30	T/C 31
20:00	296	384	348	201	279	234	168	248	216	149	210
20:15	298	386	352	202	283	237	170	249	218	150	215
20:30	300	384	354	204	289	239	172	249	219	152	216
20:45	302	384	354	206	292	241	174	251	220	153	219
21:00	305	385	355	208	297	243	176	252	221	154	221
21:15	307	389	357	211	302	249	178	256	224	155	223
21:30	309	390	357	213	304	250	180	264	225	156	222
21:45	311	392	330	216	310	253	182	268	227	158	222
22:00	313	397	311	219	315	256	184	271	228	159	224
22:15	316	402	315	221	319	257	186	272	231	160	227
22:30	319	407	328	224	320	259	188	273	232	161	223
22:45	322	407	339	226	323	262	190	269	233	162	227
23:00	325	407	348	229	329	264	191	269	235	163	223
23:15	329	409	355	231	335	266	193	267	237	164	226
23:30	332	398	360	233	340	268	195	265	239	165	224
23:45	337	380	363	235	346	271	197	265	240	166	227
24:00	341	380	367	237	352	275	198	267	243	168	225
24:15	345	375	368	239	352	276	200	265	245	169	222
24:30	349	372	371	241	356	279	201	267	247	170	219
24:45	354	384	374	242	359	281	202	267	247	171	221
25:00	362	391	377	244	359	284	203	269	248	172	220
25:15	369	399	380	245	361	283	204	265	249	173	220
25:30	375	411	382	247	358	286	205	267	250	174	215
25:45	379	413	385	249	359	287	206	261	253	175	213
26:00	383	417	387	251	365	287	208	260	253	176	210
26:15	388	413	389	253	368	291	209	263	255	178	213
26:30	393	419	391	255	369	293	211	267	259	179	213
26:45	399	421	393	257	372	293	212	271	260	180	210
27:00	402	420	395	260	376	297	214	274	263	181	209
27:15	405	403	397	262	380	294	215	275	265	182	208
27:30	408	400	398	264	380	293	217	274	267	183	207
27:45	412	384	400	266	383	296	218	275	268	184	205
28:00	416	382	402	268	384	294	220	279	269	186	206
28:15	421	383	404	270	387	297	221	284	270	187	208
28:30	427	388	406	271	388	300	223	281	271	188	209
28:45	437	409	410	273	389	299	225	277	273	188	211
29:00	449	451	413	274	392	302	227	285	274	190	215
29:15	458	455	415	276	393	303	229	287	275	191	212
29:30	474	453	416	277	396	277	232	284	278	192	215
29:45	481	459	418	279	396	270	234	283	277	194	216
30:00	472	465	420	280	397	269	236	281	279	195	213

Time (Min:Sec)	T/C 32	T/C 33	T/C 34	T/C 35	T/C 36	T/C 37	T/C 38	T/C 39	T/C 40	Room T/C 41	Room T/C 42
00:00	65	66	67	66	67	66	66	68	68	133	126
00:15	65	66	67	66	67	66	66	68	68	853	657
00:30	65	67	67	67	67	66	66	68	68	1082	978
00:45	65	67	67	67	67	66	67	69	68	1108	1062
01:00	65	67	67	67	68	66	67	69	68	1118	1033
01:15	65	68	67	68	69	66	68	69	69	1169	1061
01:30	65	69	68	68	70	66	68	69	69	1161	1126
01:45	65	69	68	69	70	66	69	70	70	1162	1083
02:00	65	70	68	69	72	66	70	70	70	1168	1101
02:15	65	71	69	70	72	66	70	70	71	1177	1129
02:30	66	71	69	71	73	66	71	71	71	1237	1135
02:45	66	72	70	71	74	66	71	71	72	1220	1147
03:00	66	72	70	72	76	66	72	71	73	1191	1147
03:15	66	73	70	73	77	66	73	72	74	1236	1167
03:30	66	73	71	74	78	66	73	72	75	1261	1194
03:45	66	74	71	74	80	66	74	73	76	1290	1197
04:00	66	74	71	75	81	67	75	73	77	1248	1197
04:15	66	75	72	76	82	67	75	74	78	1261	1190
04:30	66	76	72	76	83	67	76	74	79	1292	1205
04:45	66	76	73	77	84	67	76	75	80	1270	1210
05:00	66	77	73	78	85	67	77	75	81	1281	1214
05:15	67	78	74	79	86	67	78	76	82	1257	1223
05:30	67	78	74	80	87	67	78	76	83	1294	1224
05:45	67	79	75	81	88	67	79	76	84	1313	1248
06:00	67	80	75	82	90	68	79	77	85	1326	1238
06:15	67	81	76	83	92	68	80	78	86	1365	1251
06:30	68	82	77	84	93	68	81	78	88	1357	1235
06:45	68	83	77	85	95	68	82	79	89	1386	1264
07:00	68	84	78	86	96	69	83	79	90	1354	1272
07:15	68	85	79	88	98	69	84	80	91	1367	1279
07:30	69	86	80	89	99	69	85	81	92	1358	1311
07:45	69	87	80	90	102	70	86	81	94	1374	1305
08:00	69	88	81	91	103	70	87	82	95	1373	1339
08:15	70	89	81	93	105	70	88	83	96	1367	1340
08:30	70	90	82	94	106	71	89	83	97	1389	1311
08:45	71	91	83	95	108	71	90	84	98	1370	1328
09:00	71	92	84	97	110	72	91	84	98	1384	1322
09:15	72	93	84	97	111	72	92	85	99	1370	1317
09:30	72	94	85	99	112	73	94	85	100	1362	1341
09:45	73	95	86	100	114	73	95	86	102	1354	1333

Time (Min:Sec)	T/C 32	T/C 33	T/C 34	T/C 35	T/C 36	T/C 37	T/C 38	T/C 39	T/C 40	Room T/C 41	Room T/C 42
10:00	73	96	86	101	115	74	96	86	102	1364	1333
10:15	74	97	87	102	119	74	97	87	103	1415	1320
10:30	75	98	87	103	120	75	98	88	105	1445	1445
10:45	75	99	88	104	123	75	99	88	105	1470	1444
11:00	76	101	88	105	124	76	101	89	106	1517	1443
11:15	76	102	89	107	126	76	102	90	107	1494	1448
11:30	77	103	90	107	128	77	103	90	108	1492	1439
11:45	78	104	91	108	131	78	104	91	110	1520	1439
12:00	79	105	91	110	135	78	105	91	111	1504	1466
12:15	79	106	92	111	139	79	107	92	112	1505	1454
12:30	80	107	93	112	147	79	108	93	113	1542	1465
12:45	81	108	93	113	148	80	109	94	115	1544	1468
13:00	82	109	94	114	152	81	110	94	116	1533	1469
13:15	82	110	94	115	155	81	112	95	117	1535	1498
13:30	83	111	95	116	158	82	113	96	117	1542	1478
13:45	84	112	96	117	165	83	114	96	119	1530	1481
14:00	85	113	96	118	166	83	115	97	120	1564	1483
14:15	86	113	97	119	171	84	116	98	122	1542	1496
14:30	87	115	98	120	173	85	118	99	123	1555	1490
14:45	88	116	99	121	175	86	119	100	124	1558	1503
15:00	89	117	99	122	177	87	120	101	125	1589	1499
15:15	90	118	100	124	183	87	121	101	126	1584	1479
15:30	91	119	100	124	188	88	122	102	127	1566	1506
15:45	92	120	101	126	191	89	124	103	128	1586	1517
16:00	93	121	102	127	197	90	125	103	130	1570	1499
16:15	94	122	102	128	201	91	126	104	131	1567	1491
16:30	95	123	103	128	204	92	127	105	132	1567	1504
16:45	96	124	104	129	207	93	128	106	133	1554	1493
17:00	97	125	105	131	210	94	130	106	134	1572	1496
17:15	98	126	105	132	214	95	131	107	134	1578	1513
17:30	99	127	106	132	217	95	132	108	136	1552	1538
17:45	100	128	107	133	220	96	134	109	137	1575	1525
18:00	101	128	107	134	221	97	135	109	138	1566	1520
18:15	102	129	108	135	221	98	136	110	139	1559	1516
18:30	103	130	109	136	222	99	138	111	141	1588	1549
18:45	104	131	109	137	225	100	140	112	141	1563	1527
19:00	105	132	110	137	224	101	141	113	143	1570	1517
19:15	106	133	111	139	220	102	142	113	144	1561	1501
19:30	107	134	112	139	218	103	143	114	145	1600	1511
19:45	108	135	112	140	219	103	144	115	146	1573	1526

Time (Min:Sec)	T/C 32	T/C 33	T/C 34	T/C 35	T/C 36	T/C 37	T/C 38	T/C 39	T/C 40	Room T/C 41	Room T/C 42
20:00	109	136	113	141	221	104	145	116	147	1586	1517
20:15	110	137	114	142	217	105	147	116	148	1580	1524
20:30	111	139	114	143	220	106	147	117	149	1591	1516
20:45	111	140	115	143	221	107	149	118	150	1561	1542
21:00	112	141	116	144	225	108	150	119	151	1578	1525
21:15	113	142	116	145	228	109	152	120	152	1617	1539
21:30	114	144	117	146	223	109	153	120	153	1576	1528
21:45	115	145	118	148	224	110	154	121	154	1577	1543
22:00	116	146	118	148	224	111	156	122	155	1579	1527
22:15	116	147	119	149	225	112	157	123	157	1591	1545
22:30	117	149	120	150	226	112	159	124	157	1587	1529
22:45	118	150	120	152	227	113	161	124	158	1593	1525
23:00	119	152	121	152	229	114	162	125	160	1608	1516
23:15	120	154	122	153	229	115	163	126	161	1600	1528
23:30	121	155	123	155	225	115	164	127	161	1583	1524
23:45	122	156	124	155	222	116	166	128	162	1596	1513
24:00	123	158	125	156	218	117	167	128	163	1591	1520
24:15	124	160	126	157	222	118	169	129	164	1587	1524
24:30	125	161	127	157	219	118	172	130	165	1627	1545
24:45	125	162	128	159	216	119	173	131	166	1620	1516
25:00	126	163	128	159	216	119	173	131	167	1579	1518
25:15	127	165	129	160	215	120	175	132	168	1655	1537
25:30	128	166	130	160	209	120	177	133	169	1638	1621
25:45	129	167	131	161	210	121	179	134	170	1651	1566
26:00	130	168	132	162	211	122	178	135	171	1642	1588
26:15	131	170	133	163	211	122	182	136	172	1657	1590
26:30	132	171	134	164	209	123	181	137	173	1684	1592
26:45	133	173	135	165	208	124	183	137	175	1663	1591
27:00	133	173	136	166	207	124	187	138	176	1667	1641
27:15	134	174	137	167	206	125	189	139	177	1650	1611
27:30	135	175	138	167	205	126	194	140	178	1686	1617
27:45	136	177	138	168	204	126	194	141	179	1668	1592
28:00	137	178	140	169	205	127	198	142	181	1661	1608
28:15	138	179	140	172	204	128	202	143	182	1668	1621
28:30	139	180	141	173	206	128	200	143	184	1655	1608
28:45	140	181	142	174	207	129	200	144	185	1686	1600
29:00	141	182	143	176	207	130	204	145	186	1662	1624
29:15	142	182	144	177	206	131	204	146	187	1667	1640
29:30	143	184	145	179	206	132	207	147	188	1678	1656
29:45	143	184	146	181	207	134	210	148	189	1661	1611
30:00	144	186	147	182	208	135	214	148	191	1640	1587

Time (Min:Sec)	Room T/C 43	Room T/C 44	Room T/C 45	T/C 46	T/ C 47	T/C 48	T/C 49	T/C 50	T/C 51	T/C 52	T/C 53
00:00	137	146	129	122	123	112	66	65	65	67	66
00:15	731	685	540	376	601	342	66	66	66	67	66
00:30	1039	969	776	718	949	661	66	66	65	67	66
00:45	1062	1008	881	867	1018	818	67	66	65	67	66
01:00	1074	1026	909	935	1038	882	66	66	65	66	66
01:15	1127	1038	965	967	1051	932	66	65	65	66	66
01:30	1150	1033	1000	999	1078	958	66	65	65	66	66
01:45	1149	1047	999	1015	1090	969	66	66	65	67	66
02:00	1156	1058	1000	1061	1107	979	67	66	65	67	66
02:15	1175	1061	1027	1083	1148	1002	67	66	66	67	66
02:30	1198	1075	1051	1149	1189	1028	67	65	66	67	66
02:45	1186	1070	1056	1139	1195	1061	67	66	66	67	67
03:00	1206	1084	1048	1132	1192	1078	66	65	66	67	67
03:15	1212	1083	1078	1118	1185	1111	66	65	66	67	67
03:30	1230	1087	1095	1142	1169	1109	67	65	66	67	67
03:45	1228	1096	1109	1149	1197	1110	66	65	66	67	66
04:00	1257	1113	1099	1145	1193	1104	66	65	66	67	66
04:15	1253	1124	1092	1154	1207	1104	66	66	65	67	66
04:30	1254	1121	1101	1166	1201	1111	66	66	65	67	66
04:45	1265	1125	1108	1168	1235	1113	66	66	65	67	66
05:00	1252	1147	1103	1165	1204	1110	66	66	65	67	66
05:15	1241	1134	1108	1169	1222	1120	66	66	66	67	66
05:30	1275	1151	1121	1192	1232	1137	66	66	66	67	67
05:45	1299	1152	1133	1201	1228	1140	66	66	66	67	66
06:00	1272	1150	1122	1201	1232	1141	66	66	66	67	66
06:15	1308	1150	1165	1234	1264	1158	67	65	66	67	67
06:30	1320	1166	1167	1249	1274	1171	67	66	66	67	67
06:45	1333	1167	1170	1247	1271	1175	67	66	66	67	67
07:00	1332	1184	1169	1258	1290	1170	67	65	67	67	67
07:15	1341	1186	1187	1244	1276	1182	67	66	67	67	67
07:30	1358	1204	1177	1271	1275	1188	67	66	67	67	67
07:45	1311	1221	1170	1277	1292	1183	67	66	67	67	68
08:00	1329	1225	1173	1269	1287	1202	66	66	67	67	68
08:15	1326	1237	1171	1272	1316	1204	66	66	67	67	68
08:30	1320	1262	1175	1275	1309	1207	66	66	67	67	67
08:45	1315	1267	1169	1272	1282	1191	67	66	67	67	68
09:00	1312	1253	1169	1268	1278	1194	67	66	67	68	68
09:15	1342	1240	1181	1283	1315	1205	67	66	67	68	68
09:30	1336	1239	1187	1274	1297	1203	67	67	67	68	68
09:45	1323	1233	1181	1279	1300	1198	67	67	67	68	68

Time (Min:Sec)	Room T/C 43	Room T/C 44	Room T/C 45	T/C 46	T/ C 47	T/C 48	T/C 49	T/C 50	T/C 51	T/C 52	T/C 53
10:00	1342	1220	1192	1277	1296	1202	67	67	67	68	68
10:15	1369	1279	1188	1297	1336	1212	68	67	67	68	68
10:30	1452	1326	1245	1352	1394	1260	68	67	68	68	68
10:45	1426	1318	1263	1366	1392	1301	68	67	68	68	68
11:00	1465	1336	1269	1385	1432	1307	69	67	67	68	69
11:15	1480	1332	1288	1393	1422	1319	69	67	66	68	69
11:30	1496	1360	1289	1409	1409	1319	69	67	66	68	69
11:45	1483	1356	1293	1411	1428	1329	69	67	66	68	69
12:00	1495	1346	1300	1395	1413	1337	69	67	66	68	69
12:15	1484	1364	1298	1420	1462	1336	69	67	67	68	69
12:30	1509	1368	1318	1435	1434	1340	69	67	67	68	70
12:45	1502	1372	1311	1440	1453	1349	68	67	67	68	70
13:00	1506	1366	1319	1448	1456	1350	69	67	68	68	70
13:15	1514	1378	1323	1437	1437	1359	68	67	68	68	70
13:30	1524	1396	1317	1435	1443	1356	69	68	68	68	70
13:45	1525	1385	1334	1439	1460	1361	69	68	68	68	70
14:00	1503	1382	1333	1449	1455	1365	69	68	68	68	70
14:15	1507	1395	1335	1473	1486	1374	70	68	68	68	71
14:30	1511	1374	1338	1459	1501	1378	70	68	68	68	71
14:45	1517	1397	1339	1453	1455	1374	70	68	68	68	71
15:00	1544	1393	1350	1473	1475	1388	70	68	68	69	71
15:15	1515	1403	1333	1460	1474	1380	70	68	69	69	71
15:30	1535	1394	1353	1464	1481	1389	71	68	68	69	71
15:45	1519	1400	1356	1474	1494	1404	71	68	69	69	71
16:00	1542	1394	1357	1501	1488	1395	70	68	69	69	71
16:15	1539	1404	1354	1483	1449	1400	70	69	69	69	71
16:30	1537	1398	1360	1480	1473	1394	71	69	69	69	72
16:45	1542	1397	1361	1483	1465	1390	70	69	69	69	72
17:00	1534	1396	1364	1476	1466	1392	70	69	70	69	72
17:15	1552	1407	1365	1485	1478	1400	71	69	69	69	72
17:30	1556	1392	1381	1496	1493	1406	71	69	69	69	72
17:45	1553	1405	1375	1490	1489	1403	71	69	70	69	72
18:00	1551	1413	1375	1491	1505	1411	71	69	69	69	72
18:15	1543	1389	1376	1512	1521	1414	71	70	70	69	73
18:30	1563	1403	1386	1516	1516	1410	72	70	69	69	73
18:45	1564	1404	1375	1492	1478	1413	72	70	69	69	73
19:00	1566	1409	1381	1489	1492	1419	71	70	70	69	73
19:15	1557	1412	1372	1501	1517	1409	72	70	70	69	73
19:30	1537	1421	1374	1493	1501	1418	71	70	70	69	73
19:45	1555	1418	1384	1491	1495	1416	73	70	70	69	73

Time (Min:Sec)	Room T/C 43	Room T/C 44	Room T/C 45	T/C 46	T/ C 47	T/C 48	T/C 49	T/C 50	T/C 51	T/C 52	T/C 53
20:00	1557	1412	1384	1504	1507	1416	73	71	70	69	74
20:15	1541	1411	1380	1496	1501	1415	73	70	70	69	74
20:30	1559	1413	1378	1516	1517	1424	73	71	71	69	74
20:45	1562	1406	1388	1522	1526	1426	73	71	71	69	74
21:00	1553	1424	1384	1514	1507	1429	74	71	70	69	74
21:15	1536	1424	1382	1508	1499	1423	73	71	72	69	74
21:30	1548	1414	1388	1522	1514	1430	74	71	71	70	74
21:45	1544	1404	1390	1529	1514	1421	74	72	71	70	75
22:00	1568	1419	1390	1502	1509	1426	73	72	71	70	75
22:15	1539	1428	1388	1506	1488	1426	74	72	72	70	75
22:30	1561	1423	1392	1504	1520	1429	76	72	71	70	75
22:45	1563	1421	1394	1512	1500	1434	74	72	71	70	75
23:00	1567	1435	1396	1532	1516	1431	75	72	71	70	75
23:15	1588	1455	1399	1501	1494	1437	74	72	71	70	75
23:30	1561	1435	1394	1503	1487	1435	74	72	72	70	75
23:45	1548	1445	1380	1516	1507	1436	75	72	72	70	75
24:00	1553	1434	1393	1510	1505	1435	76	72	72	70	75
24:15	1579	1436	1403	1508	1508	1446	76	73	72	70	76
24:30	1566	1429	1408	1516	1512	1445	76	73	72	70	76
24:45	1564	1453	1403	1526	1516	1437	75	73	72	70	76
25:00	1562	1426	1392	1516	1513	1444	76	73	73	70	76
25:15	1604	1484	1409	1522	1543	1458	77	74	73	71	76
25:30	1615	1471	1428	1556	1561	1486	76	74	73	70	76
25:45	1633	1476	1439	1574	1534	1492	77	74	73	71	77
26:00	1626	1478	1442	1570	1569	1497	77	74	73	71	77
26:15	1626	1496	1441	1574	1579	1502	76	74	73	71	77
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27:45	1618	1495	1456	1572	1562	1514	78	75	74	71	78
28:00	1672	1482	1472	1593	1576	1510	78	75	74	71	78
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00:30	66
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Time (Min:Sec)	T/C 54
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19:45	71

Time (Min:Sec)	T/C 54
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20:30	71
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Appendix C

Photographs

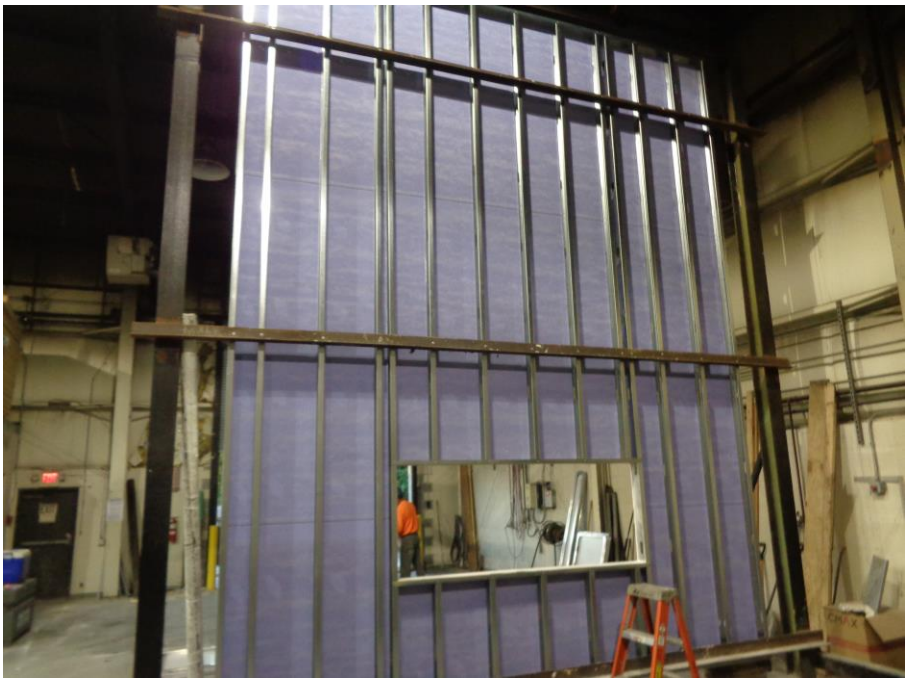


Photo No. 1
Core Wall Construction

Photo No. 2
Installation of Dupont™ Tyvek® CommercialWrap®

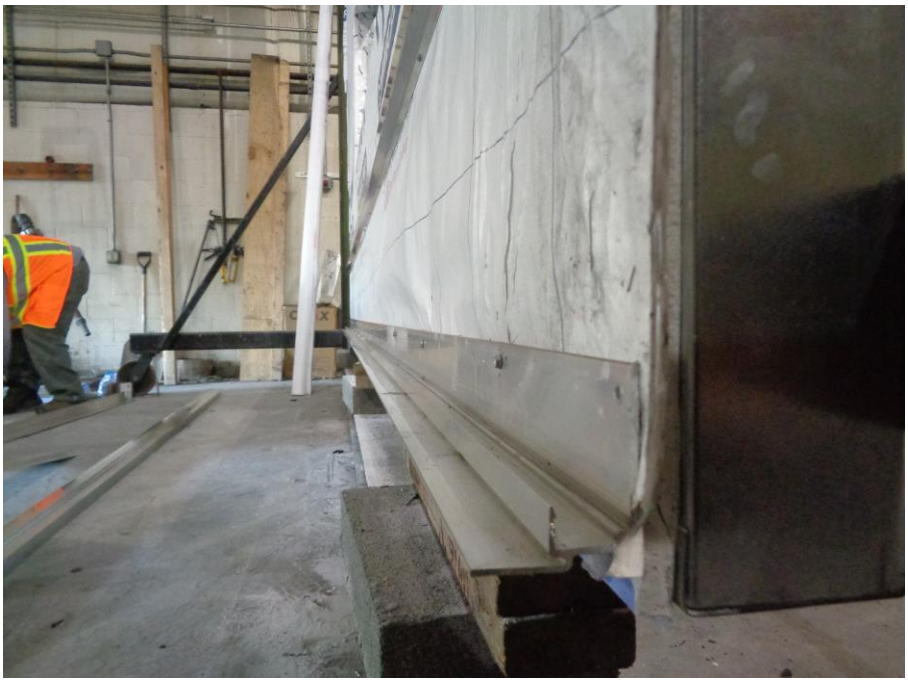


Photo No. 3
Installation of Bamco DX-5400 Extrusion

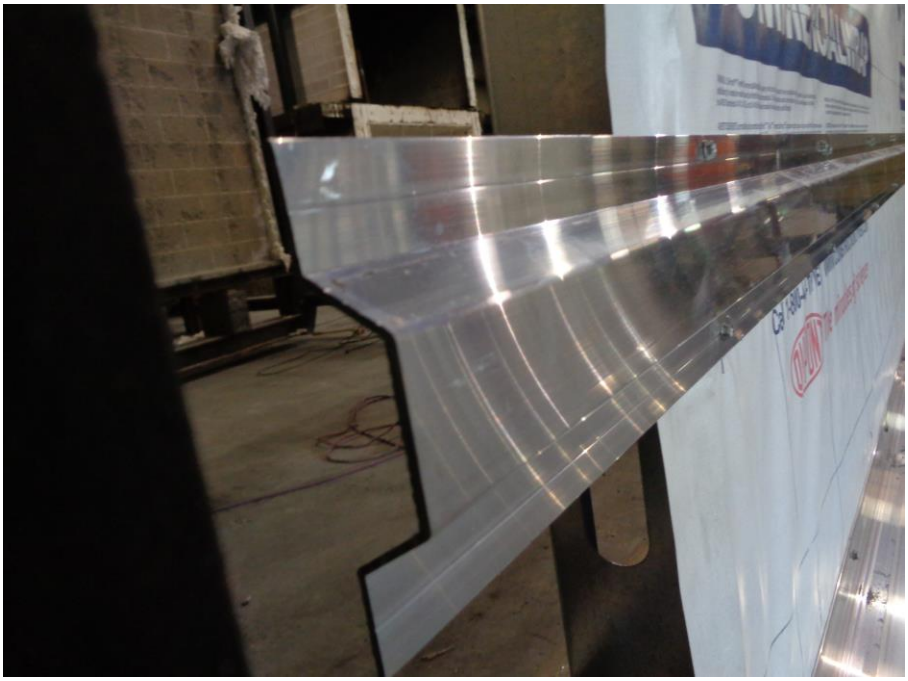


Photo No. 4
Installation of Hat Channel

Photo No. 5
Panel Installation at the Window Opening

Photo No. 6
Wall Profile

Photo No. 7
Window Opening Flashing

Photo No. 8
Complete Assembly (Pre-test)

Photo No. 9
Interior First Story (Pre-test)

Photo No. 10
Interior Second Story (Pre-test)

Photo No. 11
Ignition of the Room Burner

Photo No. 12
Panels Warping

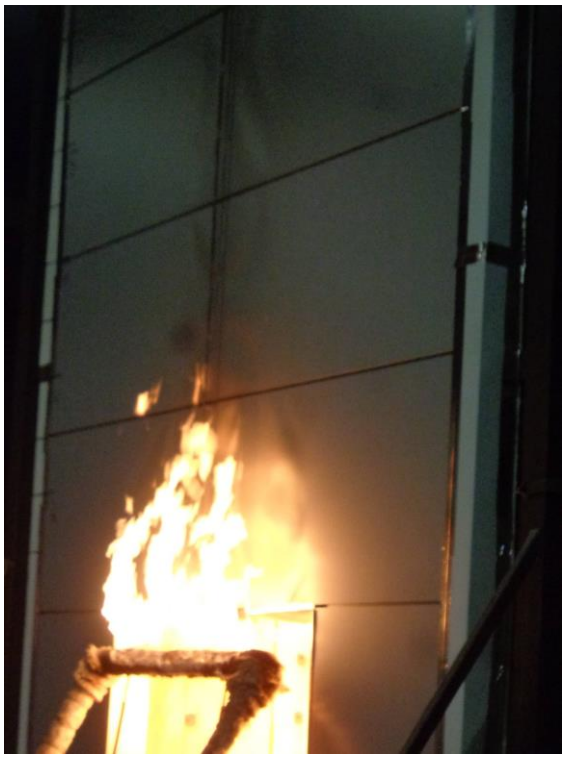


Photo No. 13
Ignition of the Window Opening Burner

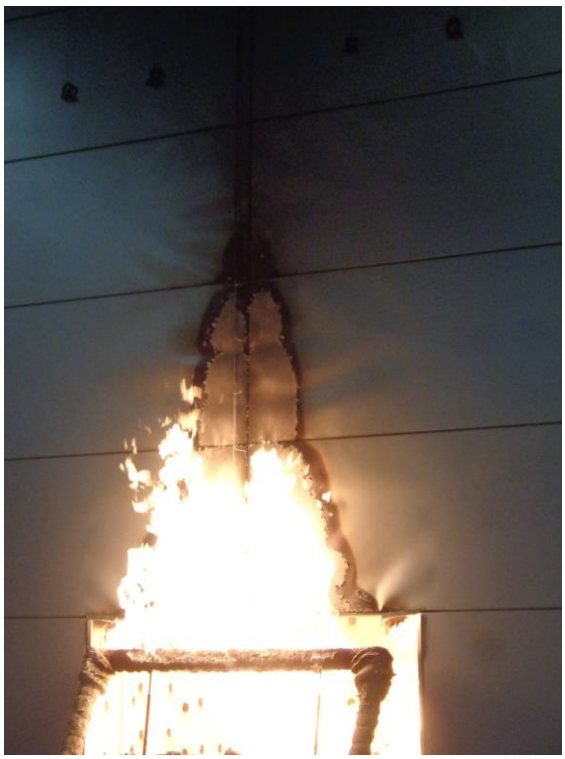


Photo No. 14
Panel Facing Blistering

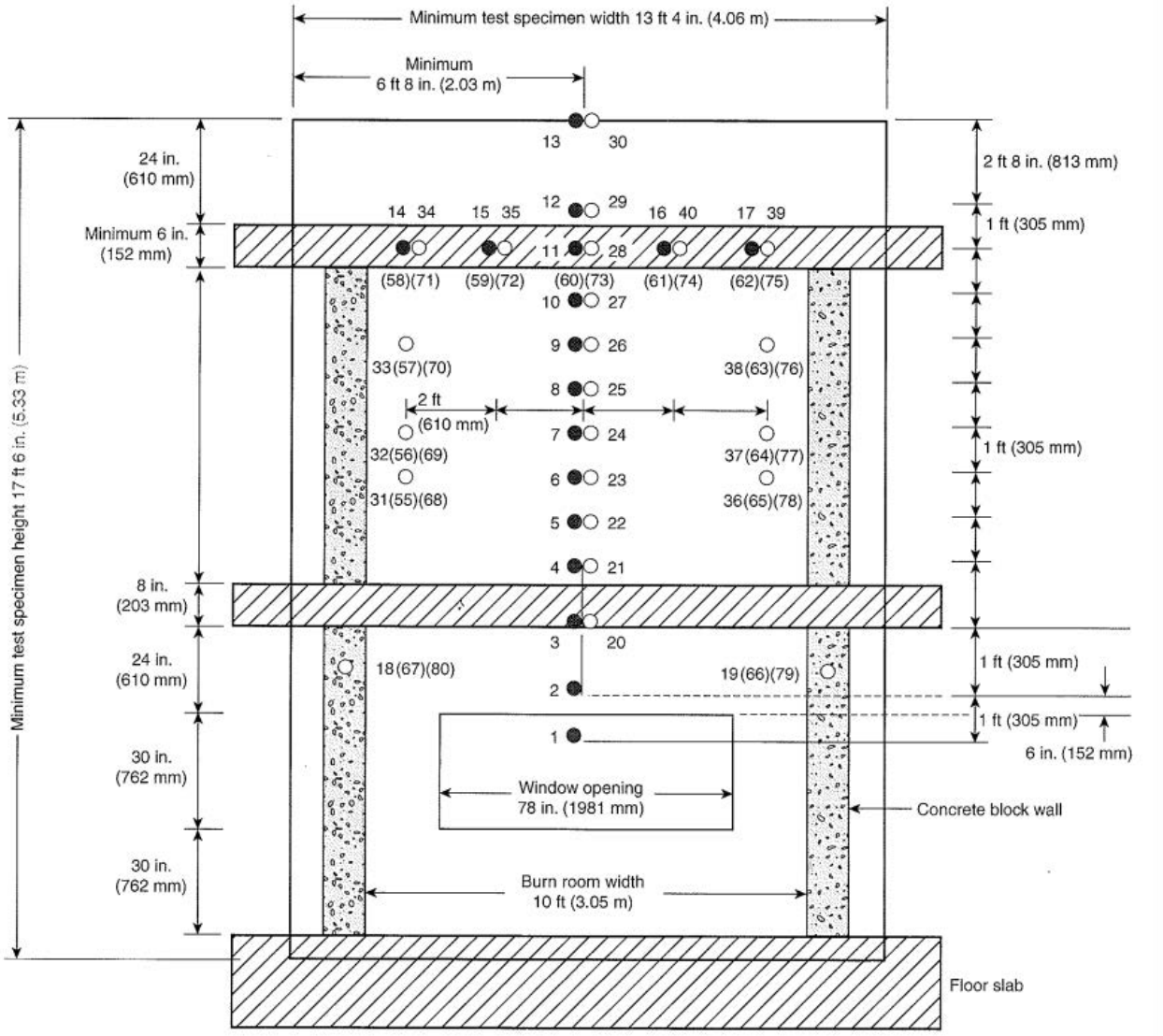
Photo No. 15
Burners Extinguished

Photo No. 16
Complete Assembly (Post-test)

Photo No. 17
Panels Removed (Post-test)

Appendix C

Drawings



● Thermocouples — 1 in. (25 mm) from exterior wall surface

○ Thermocouples — In the wall cavity air space or the insulation, or both, as shown in Figure 6.1(b) Details A through I.

( ) Thermocouples — Additional thermocouples in the insulation or the stud cavity, or both, where required for the test specimen construction being tested, as shown in Figure 6.1(b) Details C through I.

FIGURE 6.1(a) Front View of Test Specimen Superimposed over Test Apparatus Thermocouple Locations.

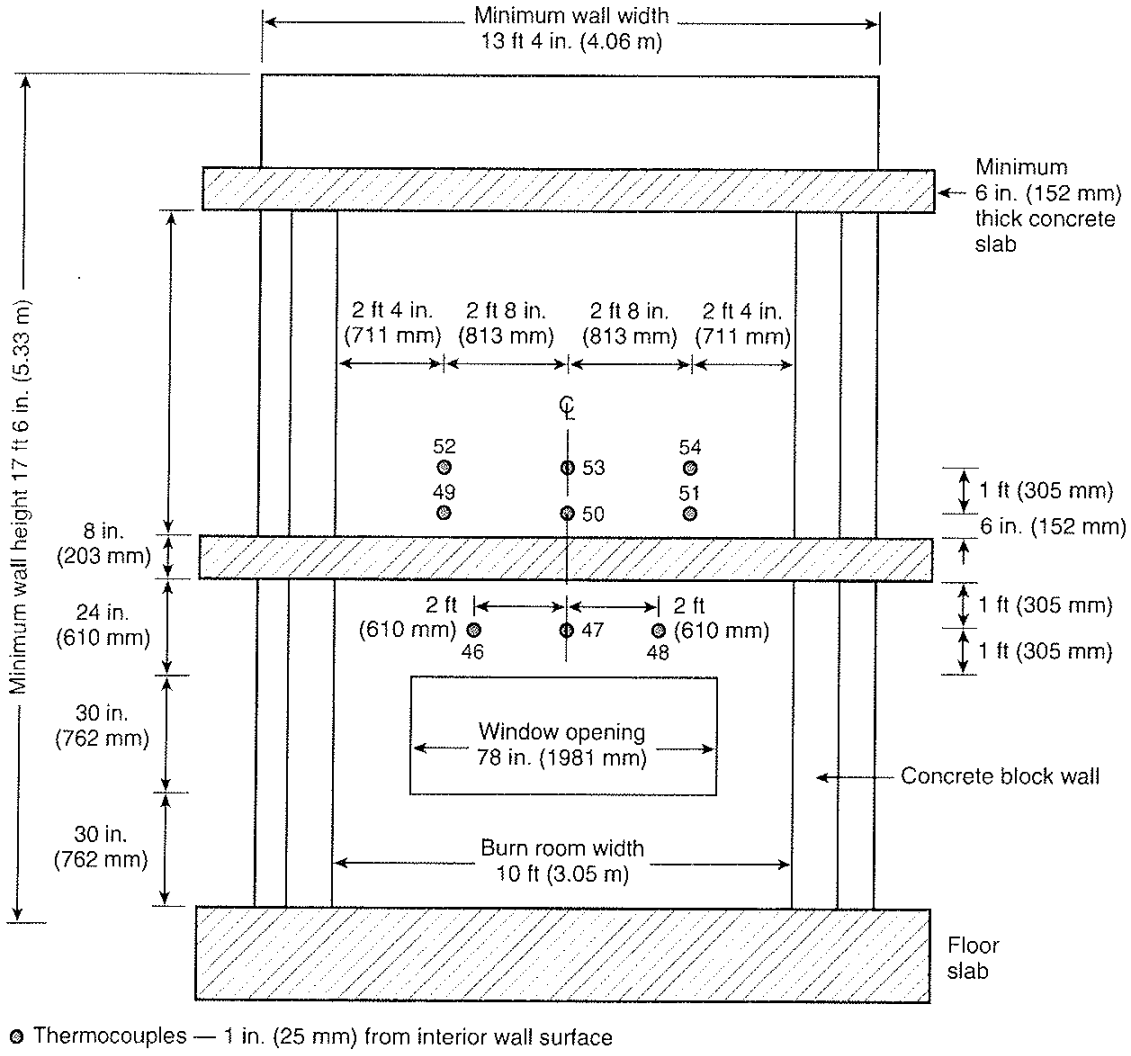


FIGURE 6.1(c) Interior View of the Test Specimen. Instrumentation arrangement.

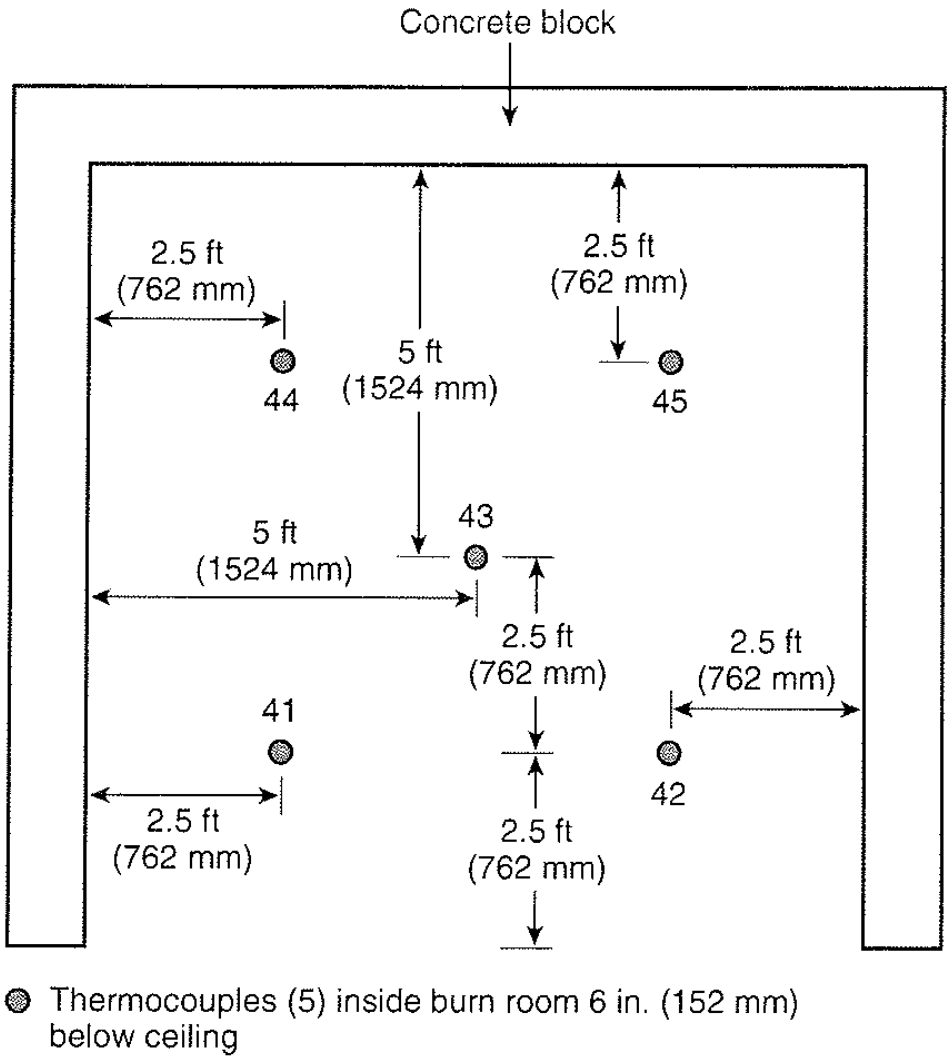
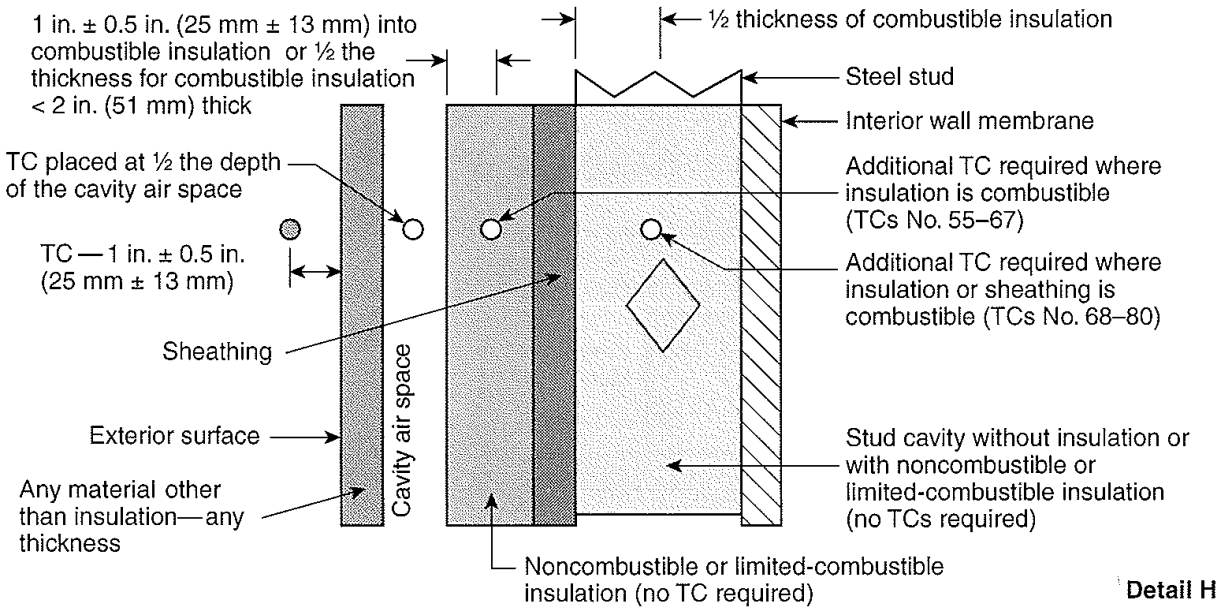


FIGURE 6.1(d) Plan View — First-Story Test Room. Instrumentation arrangement.


1 in. ± 0.5 in. (25 mm ± 13 mm) into combustible insulation or ½ the thickness for combustible insulation < 2 in. (51 mm) thick
½ thickness of combustible insulation
Steel stud
Interior wall membrane
TC placed at ½ the depth of the cavity air space
Additional TC required where insulation is combustible (TCs No. 55–67)
TC — 1 in. ± 0.5 in. (25 mm ± 13 mm)
Additional TC required where insulation or sheathing is combustible (TCs No. 68–80)
Sheathing
Cavity air space
Exterior surface
Stud cavity without insulation or with noncombustible or limited-combustible insulation (no TCs required)
Any material other than insulation—any thickness
Noncombustible or limited-combustible insulation (no TC required)

Detail H

FABLOGIC
FABRICATED BY BAMCO INC.

30 Backeland Avenue, Middlesex New Jersey 08846
PHONE: (732) 302-9999 FAX: (732) 302-9994 WWW.BAMCO.COM

D-500 COMPOSITE PANEL SYSTEM

STRUCTURAL ALIGNMENT

VERIFICATION OF SUBSTRATE / ARCHITECTURAL
IT IS IMPORTANT THAT THE SUBSTRUCTURE IS INSTALLED CORRECTLY. IF THE FRAMING (EVEN SOLID SUBSTRATE) HAS EXCESSIVE VARIATION FROM THE PLANE OF THE WALL, IT CAN CAUSE UNDUE STRESS ON THE WALL PANELS, JOINTS AND CONNECTIONS. THE MAXIMUM DEVIATION OF THE PLANE OF THE SUBSTRUCTURE SHOULD NOT EXCEED 1/8" IN ANY 10'-0" LENGTH, HORIZONTALLY OR VERTICALLY. SUBSTRUCTURE TRANSITION AREAS SUCH AS CORNERS AND SOFFITS SHALL BE WITHIN 1/8" OF THE THEORETICAL GIRT PLANE.

PANEL INSTALLATION

1. INSTALL THE COMPOSITE ALUMINUM PANEL WALL SYSTEM IN ACCORDANCE WITH THE APPROVED ERECTION DRAWINGS AND INSTRUCTIONS.
2. ALL PANELS MUST BE INSTALLED WITH PROFILE ATTACHMENT EXTRUSIONS SHOWN ON ERECTION DRAWINGS.
3. PANEL RETENTION - CARE MUST BE EXERCISED TO MAINTAIN UNIFORM JOINTS ON EACH ELEVATION. USE SPACERS FOR UNIFORM 1/4" JOINTS.
4. PROTECT PANELS FROM ABUSE BY OTHER TRADES. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THE WALL PANELS FROM WET CEMENT, PLASTER AND PAINTING OPERATIONS. BY NO MEANS MAY ANY OF THE COMPOSITE ALUMINUM PANELS OR RELATED ITEMS BE MOVED OR RELOCATED BY ANY TRADE OTHER THAN BAMCO INC. WITHOUT NOTICE.

PANEL FABRICATION TOLERANCES: 1/16"
PANEL ERECTION TOLERANCES: 1/8" IN 10'-0"

PANEL TECHNICAL DATA

A COMPOSITE ALUMINUM PANEL (C.A.P.) IS TWO SHEETS OF .020 (NOMINAL) GAGE ALUMINUM CONTAINING A LOW DENSITY POLYMETH LENE CORE	THICKNESS	4mm
	WEIGHT (Lb/Ft²)	1.12

PROJECT SPECIFICATIONS

MANUFACTURER	PANEL COLOR
ALMAXCO	TO BE SELECTED
PANEL JOINERY	JOINERY COLOR
C.A.P. REVEAL	TO MATCH PANEL
PANEL TYPE	
FIRE RATED CORE	

THESE SHOP DRAWINGS ARE BASED ON ARCHITECTURAL DRAWINGS.
DATED: 09/17/2010 REVISION:

CUSTOMER NOTES

THESE DRAWINGS ARE BAMCO'S INTERPRETATION OF OUR CONTRACT. ALL MATERIALS WILL BE RELEASED FOR FABRICATION BASED ON AN APPROVED SET OF THESE DRAWINGS.

BAMCO SHALL NOT BE RESPONSIBLE FOR DISCREPANCIES BETWEEN FIELD CONDITIONS AND THESE DRAWINGS IF THEY ARE NOT BROUGHT TO BAMCO'S ATTENTION ON APPROVALS.

STANDARD EXTRUSIONS

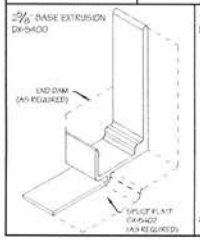
ALL EXTRUSIONS ARE SUPPLIED IN A MILL FINISH UNLESS OTHERWISE SPECIFIED.

PERIMETER EXTRUSION DX-5400

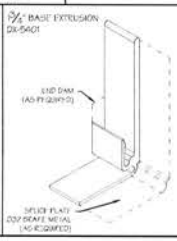
"T" EXTRUSION DX-5200 - 1/2" REVEAL

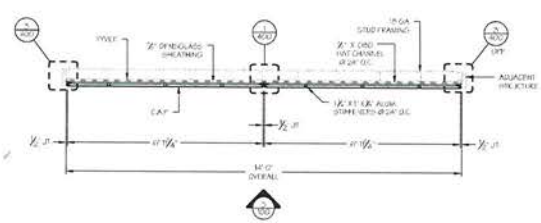
TERMINATION EXTRUSION DX-5300

5/8" BASE EXTRUSION DX-5400

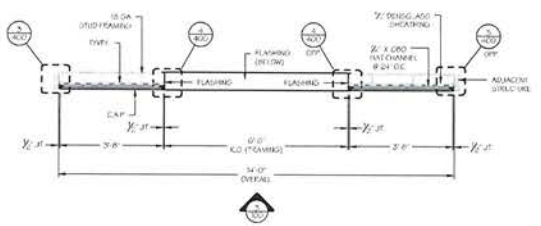


5/8" BASE EXTRUSION DX-5401

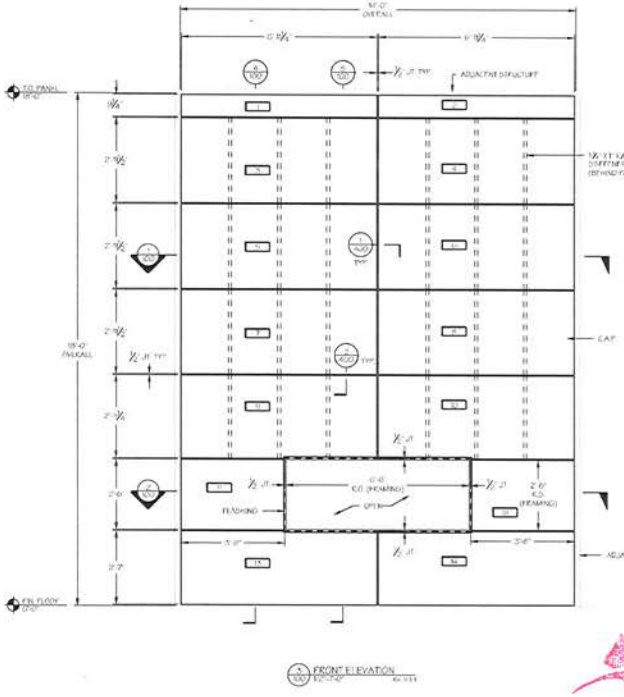




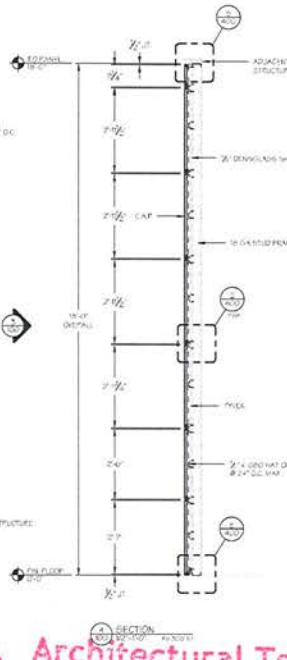
1/100 FLOOR PLAN



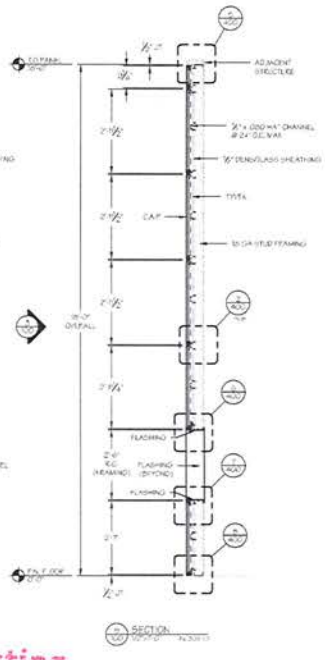
1/100 FLOOR PLAN



1/100 FRONT ELEVATION



1/100 SECTION



1/100 SECTION

FLASHING

ALL FLASHING IS SUPPLIED IN 10'-0" LENGTHS	(#1) CLOSURE TRIM
FLASHING GAGE: .040 ALUMINUM	
FLASHING FINISH: SMOOTH	
FLASHING COLOR: MILL	

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # G3361.01

Date 11-15-11 Tech SDG

GENERAL NOTES

1. C.A.P. = COMPOSITE ALUMINUM PANEL
2. "B.O." = BY OTHERS
3. WHEN USING METALLIC FINISHES, ALL PANELS MUST BE RUN IN THE SAME DIRECTION. METALLIC FINISHES PRODUCE A GRAIN ON THE PANEL THAT ONCE EXPOSED TO SUNLIGHT MAY CHANGE THE APPEARANCE DEPENDING ON THE PANEL DIRECTION.
4. ALL DIMENSIONS MUST BE VERIFIED IN THE FIELD PRIOR TO PANEL FABRICATION.

DRAWING LIST

100 - PLANS, ELEVATIONS AND SECTIONS
400 - DETAILS

DRAWING STATUS

CONSTRUCTION STATUS

REV.	DATE	DESCRIPTION
	(09.09.10)	50% SUBMITTAL
1	(09.21.10)	DIMENSIONS FOR FRAMING, NO CHANGES
		REVISED BY:
		REVISED BY:
		REVISED BY:
		REVISED BY:
		REVISED BY:
		REVISED BY:
		REVISED BY:
		REVISED BY:
		REVISED BY:

Project:
D-500 (NFPA 285)

PLANS

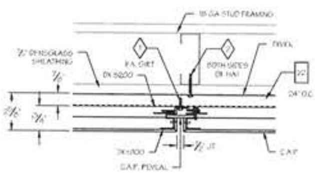
BAMCO Project No.

Drawn By: NH
Checked By: JB
Scale: AS NOTED
Project Manager:

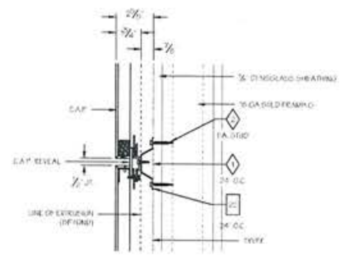
General Contractor:

Architect:

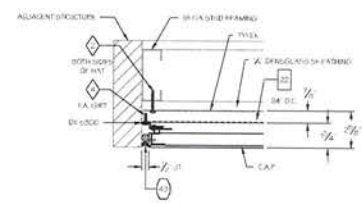
Drawing No.
100



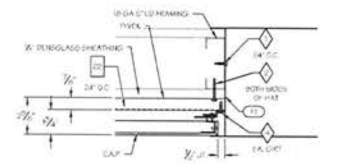
1 TYP. VERTICAL JOINT



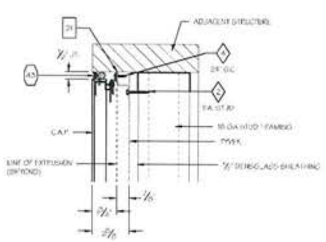
2 TYP. HORIZONTAIL JOINT



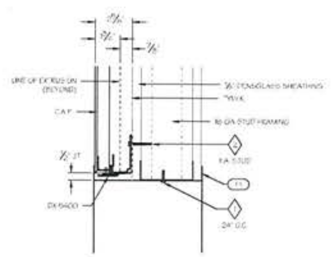
3 TERMINATION DETAIL



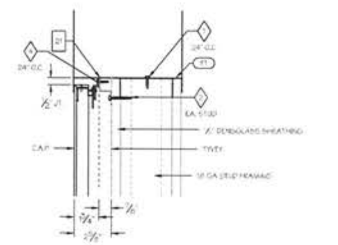
4 TERMINATION DETAIL @ OPENING



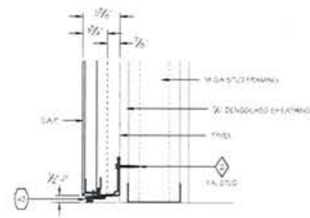
5 TERMINATION DETAIL



6 TERMINATION DETAIL @ OPENING



7 TERMINATION DETAIL @ OPENING



8 BASE DETAIL

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3	[illegible]	23	
4	[illegible]	24	
5	[illegible]	25	
6	[illegible]	26	
7	[illegible]	27	
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11	[illegible]	31	
12	[illegible]	32	
13	[illegible]	33	
14	POP RIVET	34	
15		35	
16		ACCESSORY INDEX	
17		41	1/2" BLACK SILICONE GASKET
18		42	[illegible] BLACK SILICONE GASKET
19		43	BACKER ROD AND SEALANT
20		44	
		45	

General Notes:

REV.	DATE	DESCRIPTION
		1ST SUBMITTAL
1		NO CHANGES

BAMCO inc.

30 Baekeland Avenue
Middlesex, NJ 08846

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www.bamcoinc.org

Project: D-500 (NFPA 285)

DETAILS

BAMCO Project No:

Drawn By: NH

Checked By: JB

Scale: AS NOTED

Spec. Section:

General Contractor:

Architect:

Drawing No: 400

2 of 2

REVISION	DRAWING STATUS
1	2nd SUBMITTAL - CONSTRUCTION STATUS

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # G3361.01

Date 11-15-16 Tech SDL