CANNONDESIGN

SUBMITTAL IDENTIFICATION SHEET

To be completed by Contractor/CM

WEBSTER UNIVERSITY ISB
PROJECT NAME

8274 BIG BEND BLVD
ADDRESS

NUMBER

WEBSTER UNIVERSITY
OWNER

CANNON DESIGN
ARCHITECT / ENGINEER

DEVIN D GATES
SUBMITTED BY

074646-001
CONTRACTOR / CM SUBMITTAL NO.

CANNON DESIGN SUBMITTAL NO.

DRAWING / DETAIL REFERENCE

074646
SPECIFICATION SECTION / PARAGRAPH

MANUFACTURER / SUPPLIER

ITEM / PRODUCT ID

REQUIRED DATE

PRIORITY

CRITICAL

ITEM BEING SUBMITTED (check only one)

- ○ Shop Drawings
- ○ Samples (_____ copies)
- ○ LEED Submittal
- ○ Certification / Qualifications
- ◉ Record Documents
- ○ Product Data
- ○ Coordination Drawing
- ○ Calculations
- ○ Schedules
- ○ O&M Manuals
- ○ Other _____

ITEM BEING SUBMITTED FOR (check only one)

◉ Action ○ Information Only ○ Record

REMARKS OR DEVIATIONS

CONTRACTOR / CM CERTIFICATION
(SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)

PARIC

PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

By:
Devin D. Gates

DEVIN D GATES — 9/19/16
REVIEWED BY — DATE

To be completed by Reviewer

07 4646-001
CANNON DESIGN SUBMITTAL NUMBER

9/19/16
RECEIVED DATE

- ◉ A. No Exceptions Taken
  No further review of submittal is required.
- ○ B. Make Corrections Noted
  Incorporate corrections in work; resubmission is not required.
- ○ C. Revise and Resubmit
  Revise as noted, and resubmit for review.
- ○ D. Rejected
  Submittal is not in compliance with Contract Documents; provide new submittal.
- ○ E. For Record / Information Only
  Submittal was reviewed for Record / Information purposes only.
- ○ F. Not Required for Review
  Submittal is not required by Contract Documents and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be affected thereby. This review is null and void if submittal deviates from contract documents and does not indicate or note deviations.

A/E COMMENTS ○ See attached sheet(s) for additional comments

Kathy Williams — 09/22/16
REVIEWED BY — DATE

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oduct Data Submittal

Spec. Section:	074646 – Fiber Cement Wall Panels
Project:	Webster University Interdisciplinary Science Bldg.
Location:	Webster Groves, MO

Composite Material Manufacturer:	EQUITONE – Maryville, TN
Panel Fabricator:	Universe Corp.; 3333 Foerster Rd.; St. Louis, MO
Panel Customer:	Kuenz Heating & Sheet Metal – St. Charles, MO
Panel Installer:	Kuenz Heating & Sheet Metal – St. Charles, MO

Index of Data

1. EQUITONE—U7000 Test Report
2. EQUITONE—U7000 DC System Details
3. EQUITONE Product Brochure

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Architectural Testing

NFPA 285 TEST REPORT

Report No.: F3115.02-121-24
Test Date: December 4, 2015

Rendered to:

EQUITONE
Maryville, Tennessee

WALL SYSTEM: Exterior Non-loadbearing Wall Assembly
CLADDING PANELS: Equitone Natura Exterior Panels

This report contains in its entirety:

Cover Page:	1 page
Report Body:	9 pages
Graphical Data:	6 pages
Numerical Data:	20 pages
Photographs:	7 pages
Drawings:	15 pages

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1.0 Report Issued To: Equitone
1731 Fred Lawson Drive
Maryville, Tennessee 37801

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 System

4.2 Cladding Panels: Equitone Natura Exterior 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: 12/4/2015

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 that were acquired and assembled by Intertek personnel.

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, 2012*

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4.0 Project Summary: (Continued)

4.8 List of Official Observers:

Name	Company
Bobby O'Neill	Etex Group
Randy Wallace	Universe Corp.
Jim Warren	Universe Corp.
Mike Latta	Universe Corp.
Matthew Freeborn	Intertek-ATI
Ethan Grove	Intertek-ATI
Scott Gingrich	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 21, 2015. 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	34.7	-0.2	0.9	0.9	0.9
5:00-10:00	34.9	3.9	1.8	1.7	1.8
10:00-15:00	42.1	5.3	2.2	2.1	2.2
15:00-20:00	42.8	8.0	2.7	2.7	2.6
20:00-25:00	42.8	10.8	2.9	3.3	3.0
25:00-30:00	46.6	15.4	3.1	3.6	3.4

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	1043	1093	600	702	652	605	505	485
5:00-10:00	1216	1219	824	949	970	937	826	774
10:00-15:00	1356	1362	925	1043	1067	1076	936	899
15:00-20:00	1460	1449	993	1110	1136	1150	1000	958
20:00-25:00	1481	1480	1012	1128	1166	1197	1057	994
25:00-30:00	1549	1549	1045	1166	1194	1250	1124	1062

Intertek-ATI's NFPA 285 ISMA apparatus meets the calibration requirements.

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6.0 Test Specimen Description:

Interior Cladding:

The interior wall was clad with National Gypsum 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 feet long, 3-5/8 inch deep, 18 gauge galvanized steel studs fastened to 14 feet length, 18 gauge galvanized steel track every 24 inches on center. The studs were connected to the track with #6 x 1/2 inch long self-drilling screws. 4 lbs./ft.^{3} density Johns Manville MinWool® Safing pieces were friction fit into each stud cavity placed at each 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 made from 18 gauge galvanized steel track was centered on the vertical centerline of the wall assembly with the finished sill of the opening 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. After the CCW 705 installation, 18 gauge galvanized steel flashing was placed at the window opening header and jambs. The flashing consisted of a 4” x 3” L-bend and a 9 inch return after a 180 degree bend. The 4 inch leg was fastened to each vertical framing member through the exterior surface with ¼” diameter x 1 inch long self-drilling, hex head fasteners. The 9 inch return was fastened to the window opening perimeter with #10 x 1 inch long self-drilling, flat head fasteners. Once the flashing was installed, Equitone Natura Panel section lined the window opening perimeter. The panel sections were fastened to the flashing and window opening perimeter framing with A4/A4 Façade Stainless Rivets.

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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. Sheathing sizes were 4 feet x 6 feet and 4 feet x 8 feet. The gypsum was fastened to the framing members with #6 x 1-5/8 inch type W bugle head fasteners spaced every 8 inches along the perimeter and every 12 inches in the field.

Air/Vapor Barrier:

Carlisle Coatings and Waterproofing CCW-702LV membrane adhesive was applied over the full surface of the exterior sheathing with a medium nap roller. Application rate was verified per manufacturer's installation instructions. After the membrane adhesive was applied, Carlisle Coatings and Waterproofing CCW-705 Air and Vapor Barrier was applied vertically over the full exterior surface of the assembly. A 3 inch overlap was utilized for each row.

Exterior Insulation:

After installation of the vertical rail system, 16 inch wide, 48 inch long, and 2 inch thick Roxul CavityRock® MD was compressed between each vertical rail over the full area of the assembly. A single insulation retaining pin was used in each insulation batt to keep it in position.

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7.0 Test Specimen Description: (Continued)

Exterior Cladding:

Prior to the insulation installation, 2 inch wide with 2 inch legs, 1/8 inch thick aluminum Z-girts were placed vertically over the full height of the assembly. A 1/4 inch wide shim was placed behind all girts at each fastener location. The girts were fastened to each vertical framing member with 1/4 inch diameter x 2 inch long self-drilling, hex head fasteners spaced every 24 inches. Once the vertical girts were attached, horizontal Universe 7000 aluminum extrusions were fastened to the vertical aluminum Z-girts. The Universe Corporation's Universe 7000 Attachment system utilized Universe 7000 Panel Support Zees at the assembly header and sill, window opening header and sill, and panel mid-heights. The Panel Support Zees were fastened to the vertical Z-girts with. At each horizontal panel joint, Universe 7000 aluminum Hanger Rail Extrusions were placed over 3/4 inch shims and fastened into each vertical aluminum Z-girt every 24 inches with 1/4 inch diameter x 2 inch long self-drilling, hex head fasteners. 8 mm Equitone Natura Fiber Cement panels were then installed over the extrusions over the full exterior surface of the assembly and held in place with A4/A4 Façade Stainless Rivets. 18 gauge thick aluminum L trim pieces with a 2 inch leg and a 3/8 inch were placed with the 3/8 inch leg facing the wall interior, behind all vertical panel joints and were held in place be panel compression once the panels were attached. Rivet locations were specified 1-1/4 inches above and below horizontal joints, 3 inches in from each vertical joint. All horizontal and vertical panel gaps were 3/8 inches. The configuration did not include a vertical joint over the window opening and in the area of the flame plume.

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7.0 Instrumentation and Test Procedure:

7.1 Instrumentation: Wall assembly was instrumented with thermocouples in accordance with figures 6.1 of NFPA 285 test method. 18-gauge Type "K" TCs were used in the burn room and 20-gauge Type "K" was used on exterior façade and cavity air space. The window burner was positioned in the center of the opening and 3 in. off the exterior face of the wall assembly. Position of the window burner was determined by calibration of the ISMA on February 21, 2015.

7.2 Test Procedure: Testing was performed on 12/4/2015 in accordance with NFPA 285 test method. Ambient conditions were 61°F and 38% 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.

7.3 Test Results: The test was performed at 8:42 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.
01:52	Ignition of the interior, first story gypsum.
05:00	Ignition of the window burner.
16:00	First panel above the window opening header cracking within the area of the flame plume left of the assembly centerline.
19:00	Ignition at the window opening header.
20:00	Flames evident behind the first panel above the window opening header.
21:15	Second panel above the window opening header racking within the area of the flame plume.
22:00	Flames evident behind the second panel above the window opening header.
23:50	Flames emitting from the
30:00	The burners were extinguished.
30:01	Flaming continues at the window opening header.
40:00	The test was terminated.

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7.0 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 not 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 the 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

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.

Air/Vapor Carrier/Exterior Sheathing:
Charring/melting of the CCW-705 was evident up to 6 feet above the window opening header. Charring did not extend laterally beyond the area of the flame plume.

Exterior Insulation:
Discoloration of the insulation was evident from the window opening header to the assembly header. Visible charring was evident up to 8 feet above the window opening header. Charring did not extend beyond the vertical planes of the window opening jambs.

Exterior Cladding:
Charring was evident up to 11 feet above the window opening header. The first 2 panels above the window opening were cracked.

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

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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.

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For INTERTEK-ATI:

Ethan Grove	Matthew Freeborn
Technician – Fire Testing	Manager – Fire Testing

EJG:ddr

Attachments (pages): This report is complete only when all attachments listed are included.
- Appendix-A: Graphical Data (6)
- Appendix-B: Numerical Data (20)
- Appendix-C: Photographs (7)
- Appendix-D: Drawings (15)

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Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	12/11/2015	N/A	Original Report Issue

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

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Appendix A

Graphs

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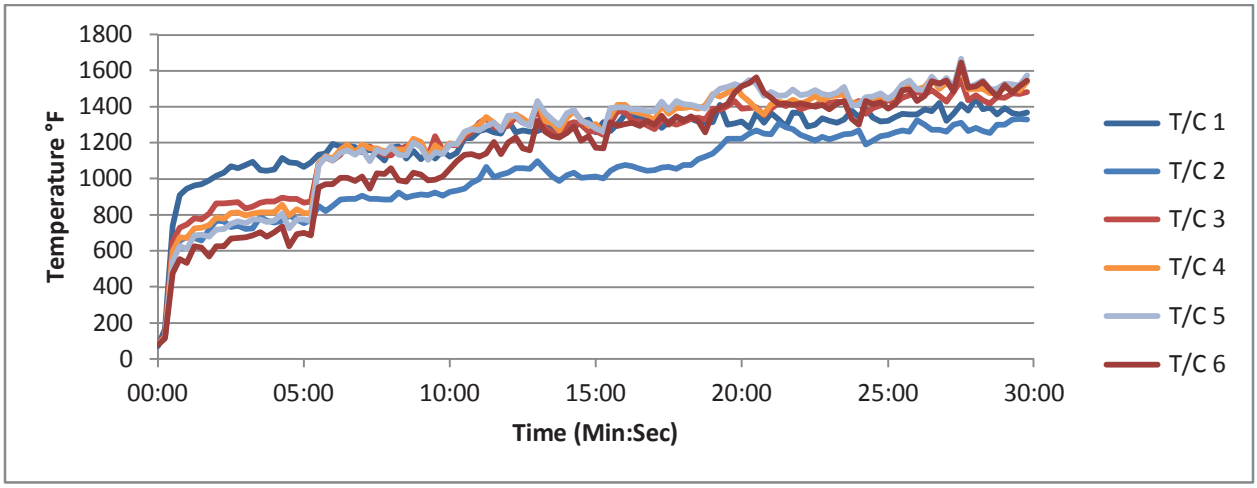
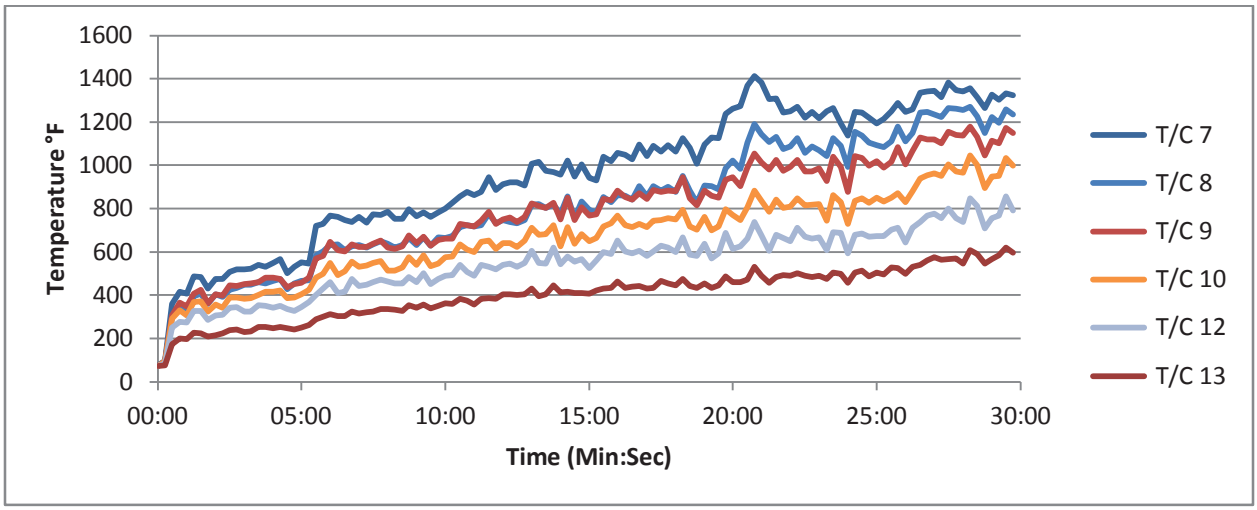


Graph No. 1
Assembly Centerline (Assembly Exterior)



Graph No. 2
Assembly Centerline (Assembly Exterior)

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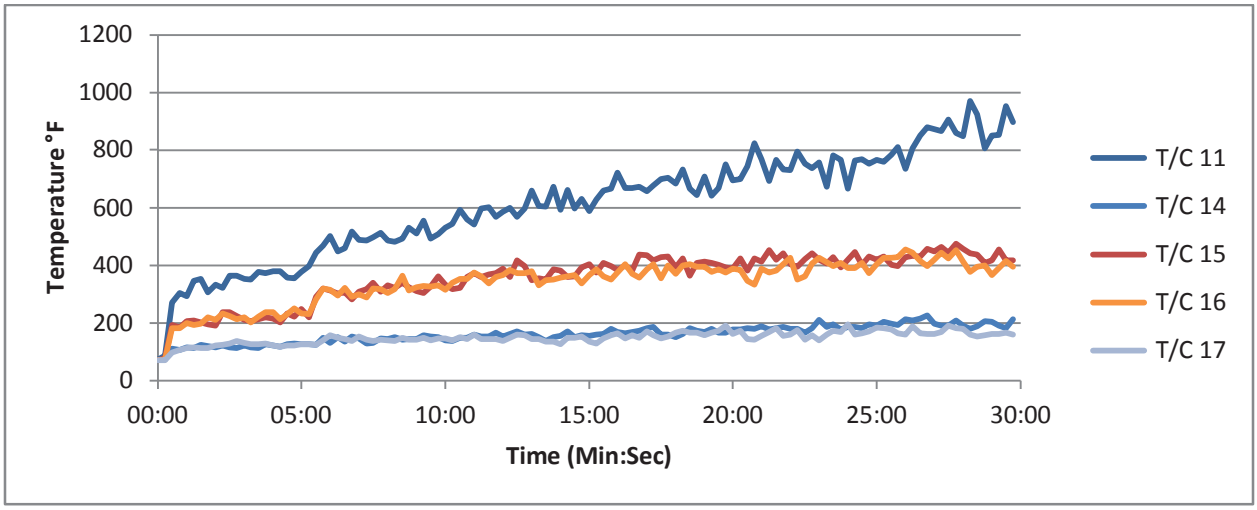
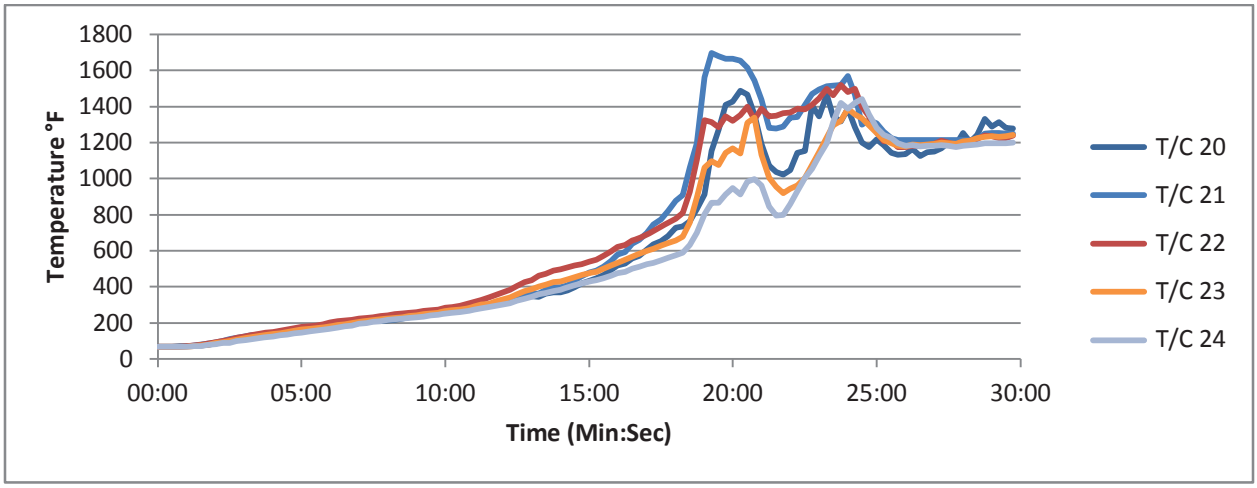


Graph No. 3
10 ft. above the Window Opening Header (Assembly Exterior)



Graph No. 4
Assembly Centerline (Air Cavity Space)

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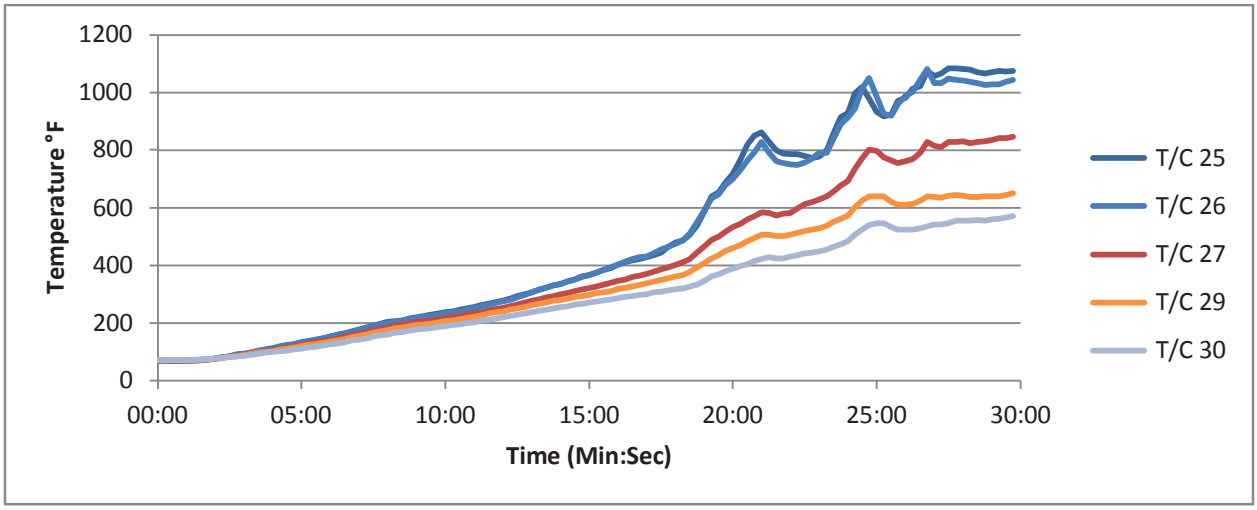
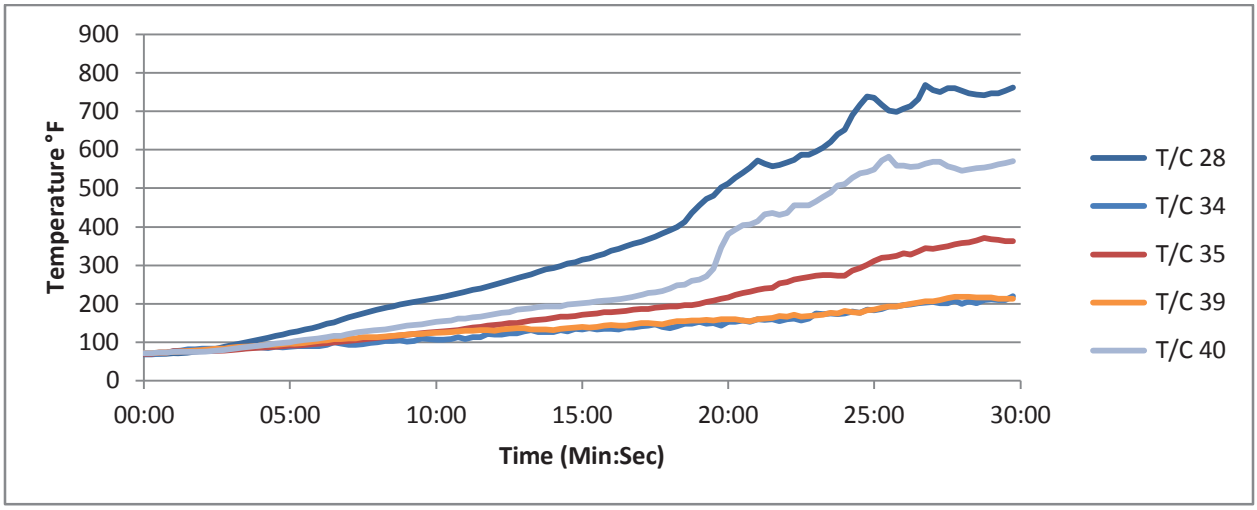


Graph No. 5
Assembly Centerline (Air Cavity Space)



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

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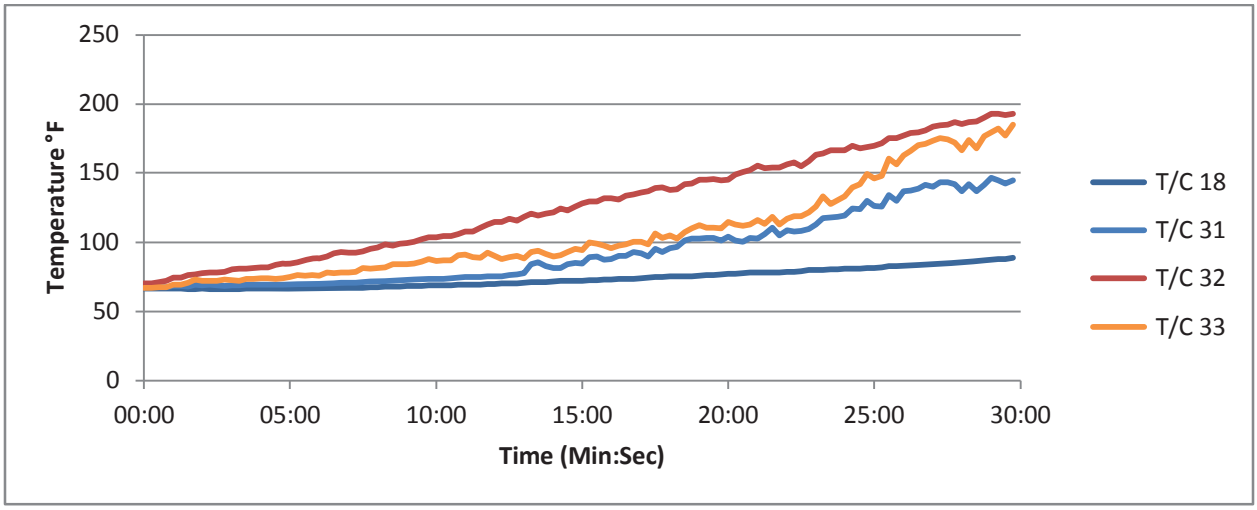
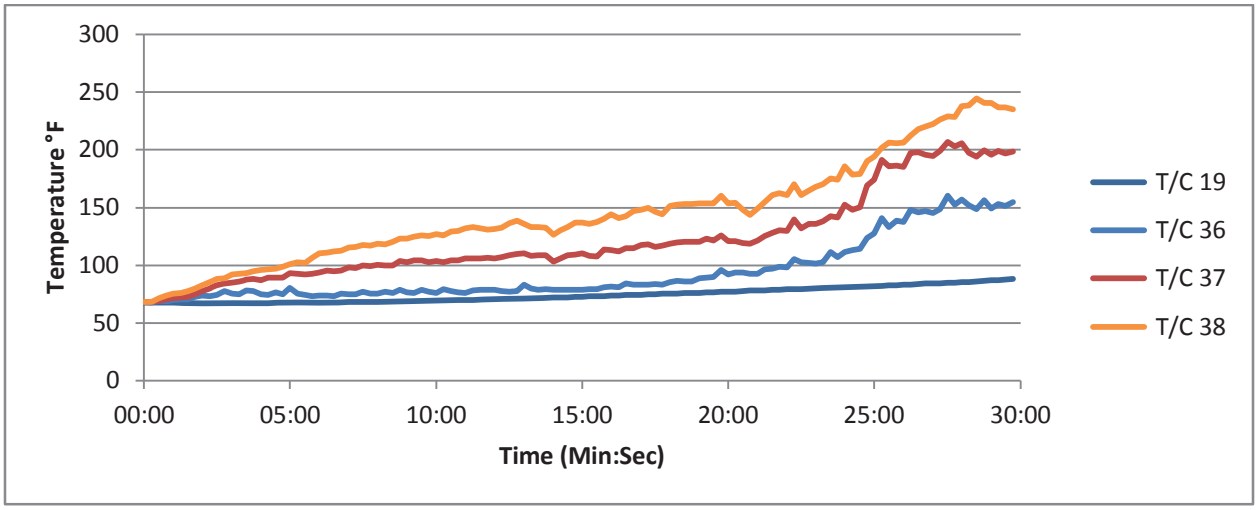


Graph No. 7
Left of Assembly Centerline (Air Cavity Space)



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

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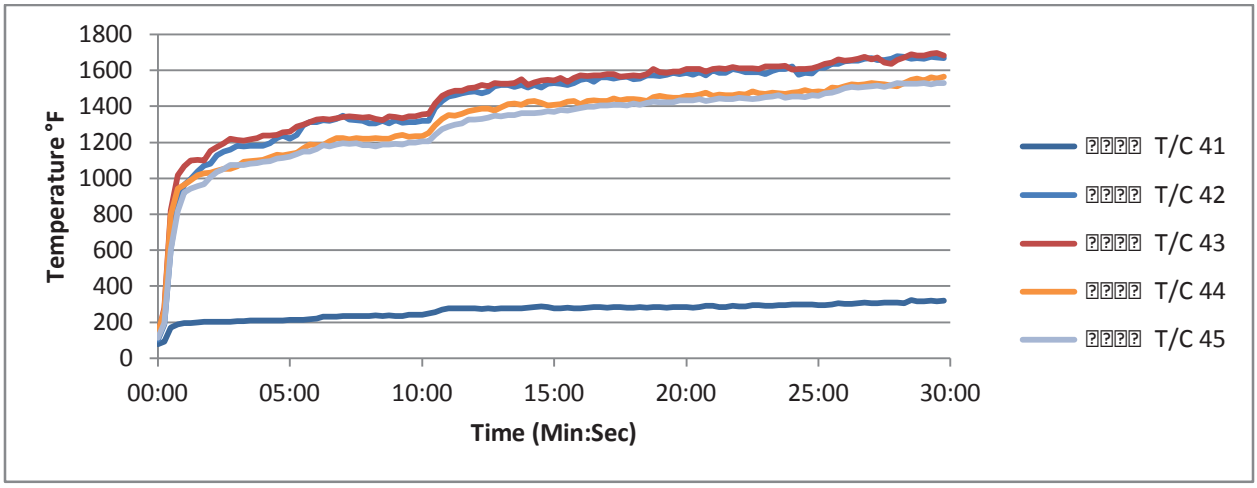
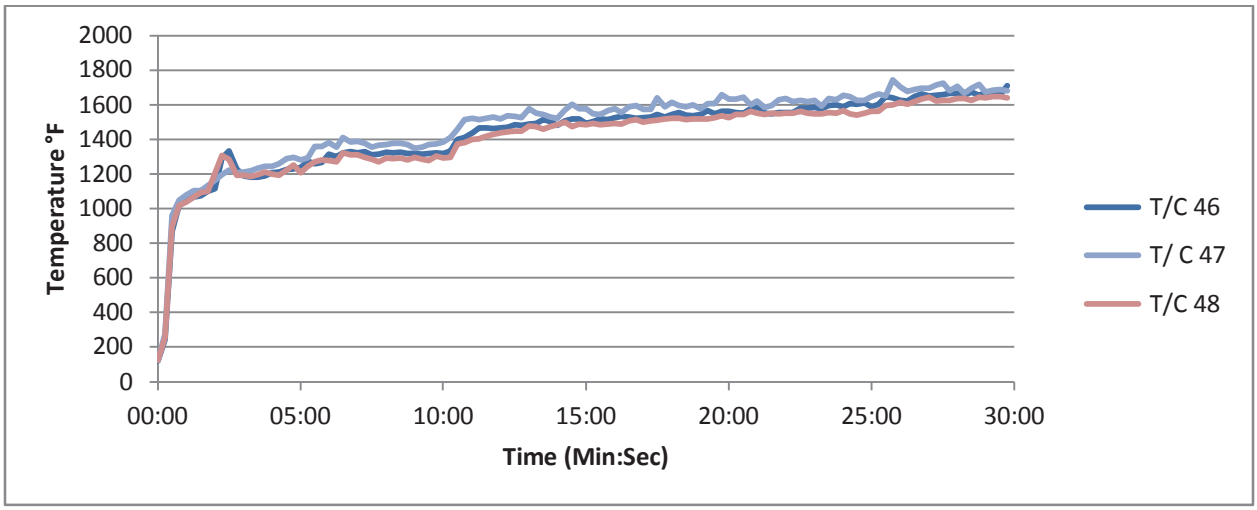


Graph No. 12
First-story Test Room Ceiling



Graph No. 13
First-story Interior Wall Surface

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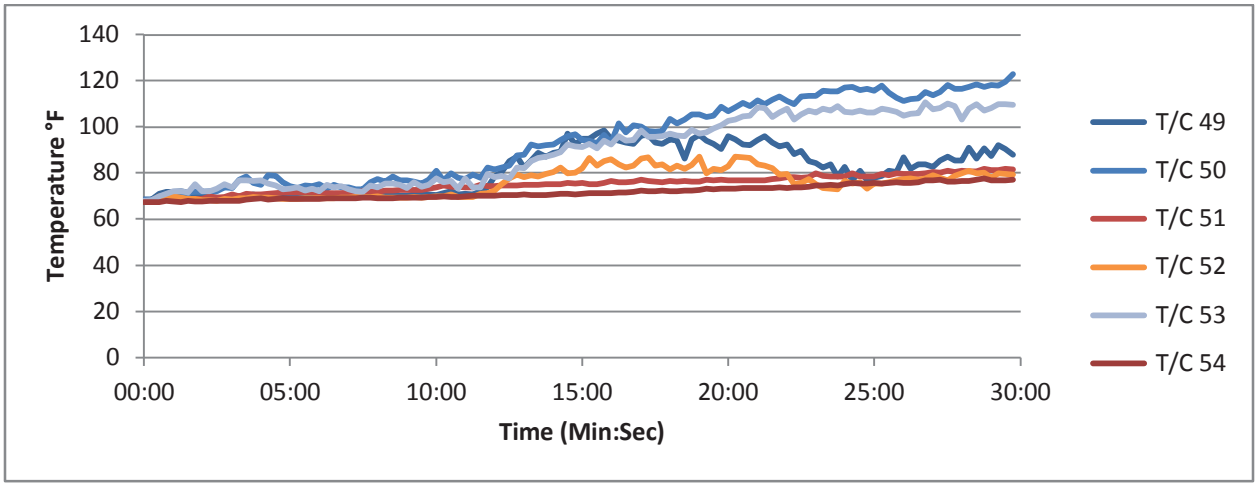

Graph No. 14
Second-story Interior Wall Surface

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Appendix B

Numerical Data

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T?? ? ?M??:????	???? ??? ???	? ??d?? ??? ???	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?0	0?0	69	93	88	83	79	78	76	75	75
00:15	11?0	0?0	166	125	131	122	117	114	97	93	94
00:30	35?0	0?0	739	579	650	598	541	477	359	298	305
00:45	36?0	0?0	908	655	728	674	626	553	415	346	364
01:00	36?3	0?0	945	674	747	670	611	533	407	338	346
01:15	36?4	0?0	960	672	780	727	685	625	487	395	408
01:30	36?4	0?0	971	655	775	728	690	620	483	406	425
01:45	36?4	0?0	992	715	806	742	676	570	429	360	362
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02:15	36?4	0?0	1032	761	861	778	721	624	474	392	397
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03:00	36?3	0?0	1075	720	836	797	755	675	520	447	451
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03:30	36?4	0?0	1046	788	867	816	776	704	541	460	460
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04:00	36?3	0?0	1052	757	872	815	768	703	548	466	481
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06:30	36?4	4?5	1183	887	1187	1188	1158	1005	745	608	602
06:45	36?4	4?5	1176	887	1142	1145	1135	987	738	627	635
07:00	36?4	4?5	1146	904	1167	1191	1160	1013	761	630	621
07:15	36?4	4?4	1161	888	1179	1166	1095	946	735	621	622
07:30	36?4	4?4	1139	887	1149	1167	1160	1031	772	635	639
07:45	36?3	4?4	1101	882	1134	1152	1141	1027	770	649	653
08:00	36?4	4?4	1173	883	1129	1166	1179	1060	785	638	620
08:15	36?4	4?4	1180	924	1166	1160	1133	991	752	619	612
08:30	36?3	4?4	1111	893	1178	1161	1132	982	752	630	624
08:45	36?4	4?4	1155	906	1194	1222	1201	1034	799	664	674
09:00	36?4	4?4	1106	912	1199	1203	1176	1022	764	632	640
09:15	36?3	4?4	1149	908	1120	1115	1105	993	781	666	671
09:30	36?3	4?4	1112	923	1237	1184	1149	995	761	629	629
09:45	36?3	4?4	1152	906	1156	1157	1137	1014	783	666	655

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T[illegible] [illegible] M[illegible]:[illegible]	[illegible] [illegible] [illegible]	[illegible] [illegible] [illegible]	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[illegible]	4[illegible]	1122	926	1185	1199	1191	1057	801	665	660
10:15	36[illegible]	4[illegible]	1144	932	1187	1190	1196	1097	826	673	662
10:30	41[illegible]	5[illegible]	1226	947	1232	1251	1261	1132	856	715	730
10:45	45[illegible]	5[illegible]	1224	977	1255	1273	1274	1136	878	724	723
11:00	44[illegible]	5[illegible]	1264	999	1308	1299	1267	1125	862	717	717
11:15	44[illegible]	5[illegible]	1275	1064	1335	1342	1291	1138	876	722	743
11:30	44[illegible]	5[illegible]	1255	1009	1285	1313	1312	1203	946	776	785
11:45	44[illegible]	5[illegible]	1249	1022	1282	1274	1267	1136	885	732	729
12:00	44[illegible]	5[illegible]	1324	1032	1293	1329	1350	1200	914	747	749
12:15	44[illegible]	5[illegible]	1258	1057	1342	1356	1350	1229	922	738	760
12:30	45[illegible]	5[illegible]	1266	1058	1310	1336	1311	1170	922	733	737
12:45	44[illegible]	5[illegible]	1259	1054	1305	1303	1291	1158	906	747	761
13:00	44[illegible]	5[illegible]	1264	1099	1382	1424	1431	1323	1006	817	823
13:15	44[illegible]	5[illegible]	1282	1052	1281	1323	1364	1261	1015	820	813
13:30	44[illegible]	5[illegible]	1280	1013	1257	1306	1329	1236	975	802	804
13:45	44[illegible]	5[illegible]	1272	987	1230	1269	1297	1227	969	818	826
14:00	44[illegible]	5[illegible]	1277	1017	1298	1339	1364	1252	956	775	751
14:15	44[illegible]	5[illegible]	1285	1033	1312	1375	1382	1289	1022	857	849
14:30	44[illegible]	5[illegible]	1313	1006	1300	1329	1321	1211	949	756	747
14:45	44[illegible]	5[illegible]	1326	1009	1260	1294	1308	1238	1005	834	805
15:00	44[illegible]	5[illegible]	1257	1013	1263	1305	1276	1173	943	794	768
15:15	44[illegible]	6[illegible]	1315	1000	1242	1259	1262	1166	930	781	774
15:30	44[illegible]	7[illegible]	1265	1044	1307	1352	1394	1315	1040	852	844
15:45	44[illegible]	8[illegible]	1303	1067	1375	1409	1398	1292	1019	828	838
16:00	44[illegible]	8[illegible]	1355	1074	1369	1408	1396	1303	1057	861	882
16:15	44[illegible]	8[illegible]	1346	1070	1322	1374	1386	1311	1047	859	853
16:30	44[illegible]	8[illegible]	1344	1054	1318	1362	1384	1292	1028	842	842
16:45	44[illegible]	8[illegible]	1319	1043	1297	1353	1377	1324	1096	904	871
17:00	44[illegible]	8[illegible]	1324	1047	1274	1324	1376	1302	1041	856	844
17:15	44[illegible]	8[illegible]	1280	1061	1329	1406	1426	1349	1089	905	884
17:30	44[illegible]	8[illegible]	1315	1064	1314	1360	1381	1299	1064	883	877
17:45	44[illegible]	8[illegible]	1344	1055	1300	1394	1431	1347	1092	899	884
18:00	44[illegible]	8[illegible]	1327	1075	1314	1393	1415	1321	1063	878	879
18:15	44[illegible]	8[illegible]	1331	1075	1332	1400	1412	1347	1126	950	944
18:30	44[illegible]	8[illegible]	1316	1109	1337	1389	1400	1322	1080	883	847
18:45	44[illegible]	8[illegible]	1310	1122	1328	1406	1388	1257	1007	827	813
19:00	44[illegible]	8[illegible]	1312	1140	1389	1471	1465	1367	1096	907	882
19:15	44[illegible]	8[illegible]	1410	1174	1380	1455	1501	1395	1128	903	858
19:30	44[illegible]	8[illegible]	1303	1221	1403	1479	1510	1415	1127	889	851
19:45	44[illegible]	8[illegible]	1308	1222	1430	1526	1525	1476	1237	988	934

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T?? ? ?M??:????	???? ???????	? ?d?? ???????	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	447	84	1317	1221	1389	1464	1512	1514	1262	1023	945
20:15	447	84	1280	1249	1391	1427	1548	1533	1274	983	902
20:30	446	104	1363	1266	1396	1388	1527	1562	1368	1103	989
20:45	446	114	1310	1251	1353	1358	1462	1477	1412	1191	1055
21:00	446	114	1363	1245	1388	1414	1482	1450	1382	1144	1012
21:15	446	114	1326	1308	1420	1428	1460	1414	1305	1107	979
21:30	446	113	1289	1286	1402	1418	1465	1420	1309	1130	1025
21:45	446	113	1366	1274	1424	1441	1496	1409	1243	1074	973
22:00	447	113	1362	1242	1386	1420	1464	1419	1250	1086	992
22:15	446	113	1287	1228	1400	1430	1471	1412	1270	1126	1024
22:30	446	113	1302	1210	1405	1459	1491	1400	1219	1057	971
22:45	446	113	1334	1231	1424	1433	1471	1410	1247	1086	971
23:00	447	113	1322	1218	1419	1459	1464	1386	1216	1071	987
23:15	447	114	1311	1233	1428	1464	1476	1417	1249	1043	927
23:30	447	113	1328	1244	1424	1467	1510	1432	1264	1126	1040
23:45	447	113	1377	1248	1412	1421	1405	1332	1194	1091	992
24:00	447	112	1344	1267	1432	1424	1412	1298	1137	992	878
24:15	446	113	1389	1190	1359	1415	1451	1431	1246	1154	1041
24:30	446	113	1339	1214	1390	1433	1458	1415	1243	1139	1035
24:45	446	113	1316	1236	1407	1449	1474	1424	1220	1103	998
25:00	446	113	1320	1244	1438	1448	1443	1390	1195	1093	1019
25:15	449	119	1344	1260	1416	1456	1475	1415	1213	1084	990
25:30	473	149	1361	1266	1448	1495	1525	1493	1251	1110	1017
25:45	486	160	1357	1261	1463	1528	1544	1494	1288	1179	1083
26:00	486	160	1357	1323	1480	1496	1494	1431	1246	1110	1003
26:15	486	160	1386	1299	1465	1510	1492	1460	1258	1149	1066
26:30	485	160	1373	1272	1490	1558	1568	1542	1334	1243	1129
26:45	485	160	1421	1272	1461	1499	1521	1527	1341	1248	1118
27:00	485	160	1319	1261	1427	1531	1558	1547	1345	1235	1120
27:15	485	159	1358	1300	1480	1511	1508	1487	1313	1222	1102
27:30	485	159	1413	1311	1549	1619	1667	1644	1382	1263	1156
27:45	485	159	1377	1264	1435	1493	1510	1506	1348	1262	1141
28:00	485	160	1445	1283	1463	1501	1524	1513	1341	1256	1138
28:15	485	160	1386	1265	1435	1498	1544	1535	1356	1271	1179
28:30	486	159	1395	1252	1416	1473	1496	1494	1314	1227	1132
28:45	484	160	1357	1300	1451	1484	1499	1458	1264	1148	1047
29:00	486	160	1392	1301	1450	1504	1530	1522	1327	1224	1114
29:15	485	160	1365	1329	1474	1519	1523	1477	1301	1195	1102
29:30	486	161	1357	1331	1471	1491	1515	1512	1332	1257	1172
29:45	484	160	1366	1327	1481	1538	1574	1546	1323	1236	1148

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T[illegible] [illegible] M[illegible]:[illegible]	[illegible] [illegible]	[illegible] [illegible]	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
30:00	485	159	1404	1347	1483	1530	1557	1525	1331	1220	1118

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T?? ? ?M??:????	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	75	75	74	73	71	73	71	72	67	68	68
00:15	92	87	85	75	74	80	74	72	67	68	68
00:30	290	273	250	172	111	193	181	98	67	68	69
00:45	331	304	277	200	107	185	181	107	67	67	72
01:00	306	292	273	198	117	207	201	114	66	67	72
01:15	367	345	328	225	115	208	193	117	66	67	72
01:30	372	354	326	222	124	204	199	114	66	67	74
01:45	324	305	285	208	120	197	219	114	66	67	79
02:00	356	335	305	216	117	192	211	121	66	67	86
02:15	342	323	310	223	122	237	232	124	66	67	92
02:30	390	365	343	239	117	238	225	131	66	67	100
02:45	389	366	345	240	115	225	215	137	66	67	106
03:00	382	354	324	228	122	212	220	132	66	67	113
03:15	386	352	325	232	116	207	202	128	66	67	118
03:30	400	378	352	252	115	213	221	128	66	67	123
03:45	415	373	349	253	126	220	237	129	66	67	128
04:00	415	380	343	247	121	215	237	121	66	67	134
04:15	420	381	352	254	118	203	213	118	67	67	142
04:30	386	359	337	247	128	233	232	121	67	67	149
04:45	389	357	328	241	129	222	251	121	67	68	156
05:00	404	378	346	249	128	248	233	128	67	68	164
05:15	424	398	367	262	127	220	230	126	67	68	167
05:30	481	444	401	288	124	291	283	125	67	68	170
05:45	497	469	432	301	148	319	319	139	67	68	173
06:00	550	503	460	313	133	314	314	158	67	68	179
06:15	493	449	408	302	151	303	296	149	67	68	181
06:30	510	460	416	302	134	308	323	146	67	68	183
06:45	556	517	473	324	153	282	291	138	67	68	190
07:00	532	489	444	315	147	309	300	153	67	68	198
07:15	537	485	447	320	130	316	289	143	67	68	204
07:30	548	498	459	324	133	341	319	138	67	68	210
07:45	559	513	472	337	147	309	317	143	68	68	211
08:00	514	487	463	335	146	331	305	141	68	68	212
08:15	513	483	455	334	151	322	317	138	68	68	214
08:30	528	493	455	327	143	341	366	149	68	69	224
08:45	576	532	483	353	145	324	313	143	68	69	231
09:00	541	511	461	343	145	312	325	143	68	69	236
09:15	584	555	500	356	159	304	329	149	68	69	242
09:30	535	493	451	340	153	326	326	142	69	69	245
09:45	546	509	475	349	150	361	331	147	69	69	251

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T?? ? ?M??:????	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	574	531	490	363	141	333	316	147	69	69	262
10:15	579	544	492	359	137	317	340	140	69	70	266
10:30	633	593	541	383	149	322	353	151	69	70	272
10:45	612	560	508	373	148	358	354	145	69	70	281
11:00	600	543	488	356	162	372	377	160	69	70	285
11:15	647	597	540	382	155	360	361	145	70	70	292
11:30	652	602	532	386	154	369	338	146	70	70	296
11:45	614	569	519	384	168	372	360	146	70	70	300
12:00	640	587	540	404	153	389	368	138	70	71	309
12:15	639	599	546	405	163	360	384	149	70	71	321
12:30	623	569	531	402	172	418	373	160	71	71	328
12:45	651	598	550	404	160	397	373	159	71	71	343
13:00	711	660	606	430	162	350	380	145	71	71	346
13:15	677	608	548	395	150	356	331	144	71	71	345
13:30	681	604	545	404	138	351	350	135	71	71	362
13:45	723	673	619	444	150	385	352	134	71	72	367
14:00	625	593	542	413	156	382	357	127	72	72	368
14:15	714	662	579	417	171	360	362	148	72	72	380
14:30	639	596	554	410	152	361	368	149	72	72	399
14:45	681	630	565	410	159	394	339	155	72	73	418
15:00	649	589	524	406	157	405	367	135	72	73	432
15:15	663	628	559	420	161	375	387	130	73	73	447
15:30	717	660	599	431	162	409	362	147	73	73	465
15:45	732	667	590	434	179	399	351	158	73	73	495
16:00	766	721	652	463	169	384	376	164	73	74	517
16:15	725	670	603	432	163	400	404	147	74	74	528
16:30	713	670	592	440	171	383	370	158	74	74	557
16:45	730	674	605	441	175	439	358	149	74	74	571
17:00	714	657	580	431	183	435	386	173	74	74	606
17:15	743	679	603	434	186	416	405	159	74	75	635
17:30	747	699	629	466	161	429	356	146	75	75	652
17:45	755	704	620	453	160	431	400	153	75	75	681
18:00	749	685	598	444	151	393	370	168	75	75	727
18:15	795	734	668	474	163	424	400	174	75	76	736
18:30	716	665	588	441	183	365	405	168	75	76	761
18:45	703	644	582	432	173	409	397	166	76	76	830
19:00	762	708	638	454	170	412	395	159	76	76	914
19:15	701	642	571	434	181	410	378	166	76	76	1154
19:30	718	668	593	444	166	403	385	175	77	77	1270
19:45	798	749	686	487	168	395	375	191	77	77	1411

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T?? ? ?M??:????	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	769	693	613	461	177	390	390	163	77	77	1425
20:15	747	701	626	461	178	424	384	173	77	77	1486
20:30	805	745	662	472	183	383	346	146	78	78	1468
20:45	882	824	738	531	180	424	332	143	78	78	1355
21:00	835	769	676	489	189	412	390	156	78	78	1194
21:15	786	692	606	456	177	454	376	170	78	78	1071
21:30	841	767	678	483	181	420	383	184	78	79	1036
21:45	804	734	663	491	187	441	405	155	78	79	1022
22:00	809	731	648	489	180	406	426	161	79	79	1046
22:15	848	794	713	501	179	396	352	176	79	79	1144
22:30	814	752	669	491	168	423	363	143	79	80	1155
22:45	817	737	660	484	181	440	407	158	80	80	1405
23:00	821	757	668	490	212	420	425	142	80	80	1347
23:15	743	673	609	473	187	408	411	160	80	80	1465
23:30	863	782	689	505	195	427	397	175	80	80	1347
23:45	828	767	688	499	178	394	409	170	80	81	1318
24:00	728	667	592	457	187	420	391	197	81	81	1388
24:15	836	763	677	503	188	447	392	162	81	81	1284
24:30	847	769	686	513	184	403	408	165	81	81	1201
24:45	827	754	669	485	195	429	374	173	81	82	1176
25:00	849	766	672	504	191	421	405	185	82	82	1219
25:15	833	759	672	496	205	431	426	183	82	82	1185
25:30	851	784	701	527	198	402	427	177	83	83	1142
25:45	870	810	711	524	192	398	428	164	83	83	1131
26:00	829	735	644	497	214	428	455	161	83	83	1136
26:15	880	806	712	531	208	434	444	189	83	83	1163
26:30	939	850	739	540	216	431	415	165	84	84	1125
26:45	953	879	768	561	228	456	398	163	84	84	1146
27:00	963	873	776	574	198	450	421	163	84	84	1150
27:15	950	865	756	564	190	465	443	170	85	85	1169
27:30	1003	905	799	568	190	443	424	191	85	85	1198
27:45	970	857	757	568	210	477	453	183	85	85	1190
28:00	967	849	737	547	191	458	412	180	86	85	1254
28:15	1046	969	846	608	179	441	377	160	86	86	1205
28:30	1001	923	811	591	189	439	397	152	87	86	1242
28:45	895	805	707	545	206	409	398	158	87	87	1332
29:00	948	851	756	566	203	419	366	162	87	87	1287
29:15	952	853	767	584	190	455	392	163	88	87	1312
29:30	1032	952	856	621	183	417	414	165	88	88	1283
29:45	999	897	791	595	214	416	396	160	89	88	1277

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T□□ □ □M□□:□□□□	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
30:00	972	887	792	592	204	417	425	172	89	88	1350

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T?? ? ?M??:????	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	69	68	68	68	69	70	71	72	73	67
00:15	68	69	68	68	68	69	70	71	72	73	67
00:30	69	69	68	68	68	69	70	71	71	73	68
00:45	70	70	68	68	69	69	70	71	72	73	68
01:00	72	73	70	69	69	69	70	71	72	73	69
01:15	75	76	73	71	70	70	71	71	72	73	69
01:30	80	80	76	73	71	72	72	73	73	74	68
01:45	85	85	80	77	73	74	74	75	75	76	69
02:00	92	92	87	82	76	77	77	77	77	78	69
02:15	99	100	93	87	80	81	80	81	80	80	69
02:30	108	107	100	92	84	85	83	84	83	82	69
02:45	116	116	108	98	90	90	88	88	86	85	69
03:00	122	123	113	103	93	94	91	92	90	88	69
03:15	130	130	120	108	97	99	95	96	93	91	69
03:30	134	137	126	114	102	104	99	100	97	94	69
03:45	139	144	132	119	108	109	103	104	101	97	69
04:00	142	150	137	125	112	114	107	108	104	100	69
04:15	151	156	142	130	117	119	112	112	108	103	69
04:30	156	163	149	135	122	124	116	117	112	106	69
04:45	163	169	154	141	127	128	120	120	116	110	70
05:00	172	176	162	147	132	133	125	125	120	113	70
05:15	175	180	165	151	138	138	129	129	124	116	70
05:30	179	186	170	156	143	142	133	133	127	119	70
05:45	183	193	175	161	147	147	137	137	131	123	70
06:00	188	202	182	167	152	152	142	142	136	127	70
06:15	191	209	189	174	159	158	147	147	141	131	70
06:30	194	212	191	180	165	164	152	152	145	135	71
06:45	200	218	198	186	171	170	158	158	151	140	71
07:00	208	223	204	194	179	176	164	164	156	144	71
07:15	215	228	210	199	185	183	170	169	161	149	71
07:30	220	232	215	206	192	189	175	174	166	153	71
07:45	223	237	219	210	198	194	180	180	172	158	72
08:00	224	243	223	215	203	200	186	185	176	162	72
08:15	226	247	227	219	207	204	191	189	181	166	72
08:30	233	252	232	223	211	209	195	193	185	170	72
08:45	240	256	238	228	216	213	199	197	189	174	73
09:00	246	260	242	231	220	217	203	201	192	177	73
09:15	250	265	246	236	225	221	207	204	196	180	73
09:30	252	269	251	240	229	225	211	208	200	184	74
09:45	259	274	256	244	233	229	214	211	203	187	74

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T?? ? ?M??:????	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	272	283	264	250	238	233	218	215	207	190	74
10:15	274	289	268	254	241	237	222	219	211	193	74
10:30	280	295	273	258	246	242	226	222	214	197	74
10:45	287	305	281	265	251	247	230	226	218	200	74
11:00	294	314	290	272	256	252	234	231	223	204	75
11:15	300	327	300	280	262	257	239	236	228	208	75
11:30	301	340	306	286	267	263	244	240	232	212	75
11:45	307	353	318	294	273	269	248	244	236	216	75
12:00	318	369	329	301	279	275	253	249	241	220	76
12:15	327	383	341	310	285	281	258	255	246	225	76
12:30	337	405	359	323	292	289	264	261	251	230	76
12:45	354	424	374	335	300	298	271	266	256	234	77
13:00	360	438	386	344	307	306	277	272	261	238	78
13:15	362	460	400	357	315	314	282	277	266	243	84
13:30	383	473	412	366	322	322	288	283	271	247	86
13:45	396	489	424	377	330	330	294	289	276	252	83
14:00	396	495	428	384	336	336	299	292	280	256	82
14:15	409	506	440	396	344	344	304	298	285	259	81
14:30	436	518	454	407	351	352	311	304	290	264	84
14:45	456	524	463	418	359	361	316	309	294	268	85
15:00	479	540	476	428	367	368	322	314	299	271	85
15:15	488	548	483	436	375	375	327	318	303	275	89
15:30	511	572	501	448	383	385	333	324	308	278	90
15:45	542	595	518	462	392	394	339	330	312	282	87
16:00	580	621	533	475	402	404	347	338	318	286	88
16:15	593	633	548	484	410	413	352	342	323	290	90
16:30	639	657	568	499	418	422	359	349	328	293	90
16:45	661	672	581	509	422	428	365	356	333	298	93
17:00	700	689	600	523	428	433	371	361	338	302	92
17:15	746	711	612	533	435	442	378	368	344	305	90
17:30	774	732	627	547	446	454	386	374	350	309	95
17:45	819	755	642	562	464	464	393	383	356	314	93
18:00	877	779	658	576	479	475	402	391	362	317	96
18:15	910	810	679	588	487	487	410	398	368	321	97
18:30	1062	925	756	632	506	511	423	412	378	327	101
18:45	1196	1103	893	698	536	549	444	435	393	335	103
19:00	1562	1326	1063	802	588	592	466	456	409	346	103
19:15	1695	1312	1096	864	638	632	489	472	425	361	103
19:30	1679	1284	1075	865	654	647	501	480	436	370	103
19:45	1666	1344	1142	913	688	679	517	503	451	381	102

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T?? ? ?M??:????	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	1666	1322	1168	947	718	699	533	512	460	388	104
20:15	1655	1351	1140	911	766	730	546	527	471	398	102
20:30	1615	1399	1308	983	818	764	561	541	483	406	100
20:45	1544	1328	1337	999	851	793	571	554	495	415	103
21:00	1437	1387	1133	962	861	828	585	573	507	423	103
21:15	1281	1346	1003	845	827	791	582	564	507	427	106
21:30	1277	1351	954	795	798	761	573	557	503	425	111
21:45	1287	1362	920	799	788	756	578	561	503	426	105
22:00	1339	1366	944	860	785	751	582	567	508	431	109
22:15	1343	1389	961	929	785	747	597	573	512	435	108
22:30	1410	1383	1006	1006	779	757	613	587	521	442	109
22:45	1469	1410	1074	1055	772	769	618	587	524	445	109
23:00	1495	1446	1146	1125	778	791	630	596	530	448	113
23:15	1511	1497	1228	1197	799	791	639	605	537	456	118
23:30	1517	1463	1295	1313	854	838	656	621	549	464	118
23:45	1518	1521	1320	1421	915	891	677	641	563	474	118
24:00	1570	1480	1390	1387	928	912	692	652	574	485	119
24:15	1467	1497	1355	1419	997	942	734	690	602	507	124
24:30	1301	1398	1334	1440	1019	1011	771	718	623	524	124
24:45	1325	1346	1296	1356	979	1050	802	739	640	540	130
25:00	1307	1256	1254	1280	932	984	797	735	641	546	127
25:15	1261	1207	1215	1242	918	924	775	716	639	548	126
25:30	1226	1209	1197	1223	922	920	765	703	619	533	134
25:45	1214	1176	1182	1196	968	959	754	698	610	523	130
26:00	1213	1174	1177	1182	980	987	760	708	612	524	137
26:15	1214	1181	1188	1186	1011	1001	768	713	614	523	138
26:30	1213	1183	1185	1179	1020	1043	789	732	624	529	138
26:45	1213	1186	1188	1181	1073	1082	828	769	641	537	142
27:00	1213	1192	1192	1182	1057	1034	814	755	637	542	140
27:15	1213	1210	1199	1185	1066	1033	811	750	634	543	143
27:30	1213	1200	1197	1182	1083	1048	826	760	643	547	143
27:45	1213	1185	1193	1177	1084	1044	828	760	644	553	142
28:00	1216	1200	1208	1184	1081	1040	830	754	643	554	137
28:15	1215	1210	1210	1185	1078	1037	823	747	637	554	142
28:30	1222	1220	1223	1189	1071	1033	828	744	637	557	137
28:45	1250	1239	1232	1196	1065	1024	829	742	638	557	141
29:00	1253	1235	1236	1198	1071	1028	835	747	640	560	147
29:15	1254	1225	1233	1197	1073	1029	840	748	640	563	145
29:30	1250	1226	1234	1197	1072	1037	841	754	644	566	143
29:45	1251	1239	1242	1200	1075	1043	847	762	649	571	144

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T?? ? ?M??:????	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
30:00	1274	1274	1271	1217	1075	1043	854	765	653	575	149

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T?? ? ?M??:????	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	???? T/C 41	???? T/C 42
00:00	71	67	68	70	68	68	68	72	71	78	104
00:15	70	67	68	70	68	68	68	72	71	92	190
00:30	71	68	70	73	69	69	72	73	73	172	611
00:45	72	68	72	74	69	70	74	74	73	190	864
01:00	75	70	77	77	70	71	75	75	74	196	967
01:15	75	69	78	77	70	72	76	76	75	197	998
01:30	76	71	82	76	70	73	78	76	74	200	1042
01:45	77	73	82	76	73	75	80	78	74	203	1072
02:00	78	72	84	76	74	78	83	80	75	203	1084
02:15	78	72	83	77	73	80	85	82	76	202	1129
02:30	78	73	83	78	74	83	88	83	78	204	1151
02:45	79	73	84	79	78	85	89	85	80	203	1160
03:00	80	73	85	80	76	85	92	86	83	207	1183
03:15	81	72	84	82	75	86	93	89	85	207	1179
03:30	81	74	86	83	78	88	93	89	87	210	1183
03:45	81	74	87	84	77	88	95	90	89	209	1182
04:00	82	74	87	86	75	87	96	92	91	210	1182
04:15	82	74	86	87	75	89	97	93	93	209	1195
04:30	84	74	88	89	76	90	97	94	96	210	1226
04:45	85	74	87	90	75	89	99	95	98	211	1240
05:00	85	75	90	91	81	93	101	96	100	215	1222
05:15	86	77	90	92	75	93	103	97	104	215	1245
05:30	87	76	91	93	74	92	102	98	106	215	1296
05:45	88	76	91	95	73	92	107	102	108	217	1316
06:00	88	76	91	96	73	94	110	104	110	222	1314
06:15	90	78	94	98	74	95	111	105	113	230	1326
06:30	92	78	100	100	73	95	112	108	116	232	1321
06:45	93	78	97	102	75	95	113	108	117	234	1331
07:00	92	78	93	103	75	98	115	110	121	236	1352
07:15	93	79	94	105	75	98	116	111	125	237	1328
07:30	93	82	97	106	77	100	118	113	128	235	1324
07:45	95	81	98	109	76	99	117	113	130	237	1319
08:00	97	82	100	112	75	101	119	113	132	236	1307
08:15	98	82	102	114	77	100	118	116	133	239	1309
08:30	98	85	102	116	76	100	120	117	136	237	1318
08:45	99	84	105	118	79	103	123	119	139	238	1307
09:00	100	84	102	119	77	103	123	120	143	237	1324
09:15	100	85	104	121	76	104	125	122	144	237	1311
09:30	102	86	110	123	79	104	126	122	147	242	1316
09:45	104	88	108	126	77	103	126	124	150	242	1315

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T?? ? ?M??:????	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	???? T/C 41	???? T/C 42
10:00	104	86	107	127	76	104	127	125	153	244	1322
10:15	105	87	107	129	80	102	126	125	154	249	1323
10:30	105	87	109	130	77	104	129	126	157	258	1391
10:45	106	91	113	132	77	104	130	129	161	271	1432
11:00	108	91	109	135	76	106	132	130	162	275	1457
11:15	108	89	113	137	78	106	133	131	165	280	1466
11:30	111	89	114	139	79	106	132	131	167	278	1472
11:45	113	92	121	143	79	106	131	131	170	277	1480
12:00	115	90	120	145	78	106	132	131	173	275	1485
12:15	115	88	120	146	78	107	133	133	176	272	1474
12:30	117	89	123	150	77	109	137	135	177	276	1486
12:45	116	90	123	150	78	110	139	137	184	275	1512
13:00	118	89	127	153	83	110	136	136	186	277	1517
13:15	121	93	132	156	80	108	133	133	188	276	1518
13:30	119	94	126	158	79	109	133	133	191	278	1511
13:45	121	92	126	161	79	109	132	134	193	276	1519
14:00	121	90	127	164	79	103	126	132	193	281	1505
14:15	124	91	131	166	79	106	130	134	193	285	1522
14:30	123	93	128	167	79	109	133	137	197	288	1506
14:45	126	96	134	168	79	109	137	139	199	285	1529
15:00	128	94	134	171	79	110	137	140	202	279	1530
15:15	130	100	137	173	79	108	136	139	202	279	1528
15:30	129	99	133	175	79	108	137	140	206	281	1522
15:45	132	98	135	178	81	114	140	143	207	278	1530
16:00	132	96	135	178	81	113	144	144	210	279	1550
16:15	131	98	133	179	81	112	141	143	211	284	1555
16:30	134	99	138	182	84	115	142	144	214	286	1537
16:45	135	100	139	184	83	115	147	147	217	286	1562
17:00	136	100	141	186	83	118	148	150	223	283	1560
17:15	137	99	143	187	83	118	150	150	227	285	1555
17:30	139	106	146	189	83	116	146	149	230	287	1562
17:45	140	103	140	191	83	117	144	147	233	282	1564
18:00	138	105	136	192	85	119	152	152	240	282	1554
18:15	138	103	142	192	86	120	153	154	247	285	1557
18:30	142	108	148	196	86	120	153	155	250	282	1573
18:45	142	110	149	197	86	121	153	157	259	285	1575
19:00	145	112	152	199	89	120	153	156	262	287	1571
19:15	145	111	148	205	89	123	153	158	271	282	1579
19:30	146	111	149	208	90	122	154	157	291	286	1586
19:45	145	110	143	214	96	126	160	160	346	287	1582

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T?? ? ?M??:????	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	???? T/C 41	???? T/C 42
20:00	145	115	153	216	92	121	154	160	380	287	1589
20:15	149	113	152	224	94	121	154	160	393	284	1579
20:30	151	112	156	228	94	119	148	156	403	286	1592
20:45	152	113	152	231	93	118	144	155	405	290	1576
21:00	155	116	161	236	93	121	149	159	414	292	1602
21:15	154	114	158	239	96	125	154	161	432	287	1590
21:30	154	119	159	241	97	128	161	164	437	287	1587
21:45	154	113	155	253	98	130	162	167	431	290	1608
22:00	156	117	160	257	98	130	161	166	436	289	1601
22:15	158	119	162	262	105	140	170	171	456	289	1591
22:30	155	119	157	266	102	132	161	166	457	295	1593
22:45	159	122	162	269	102	136	165	167	456	295	1592
23:00	163	126	175	272	101	136	168	169	465	291	1581
23:15	165	133	173	274	103	138	170	172	477	291	1600
23:30	167	128	175	275	111	143	175	176	489	293	1609
23:45	167	131	173	272	107	142	174	175	508	294	1608
24:00	167	133	176	273	111	153	186	182	511	298	1624
24:15	170	140	180	285	113	148	178	178	528	301	1579
24:30	168	142	177	293	114	150	179	176	540	297	1588
24:45	169	149	184	302	124	169	190	183	543	298	1584
25:00	170	146	184	311	127	174	194	185	549	295	1615
25:15	172	148	186	319	141	191	202	190	573	296	1615
25:30	175	161	193	321	133	186	206	192	582	301	1638
25:45	175	156	193	324	138	186	206	194	560	308	1636
26:00	177	163	196	330	137	185	206	196	559	305	1651
26:15	179	166	198	327	148	197	213	199	556	305	1653
26:30	180	170	201	336	146	198	218	204	557	307	1655
26:45	181	171	203	344	147	196	220	206	564	310	1668
27:00	184	173	204	343	145	195	223	206	568	308	1668
27:15	184	175	202	347	149	199	226	210	569	307	1658
27:30	185	174	201	349	161	207	229	215	557	312	1661
27:45	187	172	207	354	153	203	229	218	553	312	1665
28:00	185	167	199	358	157	206	238	218	546	311	1681
28:15	187	174	206	359	152	197	239	218	550	308	1679
28:30	187	168	202	365	149	194	244	217	553	324	1667
28:45	190	177	210	370	156	199	241	217	554	316	1670
29:00	193	179	212	367	149	196	241	216	558	317	1668
29:15	193	182	210	365	153	199	237	213	562	318	1674
29:30	192	177	210	363	152	197	237	212	566	316	1673
29:45	193	185	219	362	155	199	235	213	571	323	1672

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T[illegible] [illegible] M[illegible]:[illegible]	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	[illegible] T/C 41	[illegible] T/C 42
30:00	196	185	218	361	156	202	237	215	575	320	1679

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T?? ? ?M??:????	???? T/C 43	???? T/C 44	???? 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	T/C 54
00:00	129	140	114	121	125	123	69	69	68	68	68	67
00:15	281	267	194	243	276	255	69	69	68	68	68	67
00:30	822	797	602	868	958	896	71	69	69	70	70	67
00:45	1021	945	817	1019	1049	1017	72	70	68	70	71	68
01:00	1067	967	923	1044	1076	1038	72	70	69	70	72	67
01:15	1097	989	946	1065	1104	1067	72	71	68	69	72	67
01:30	1103	1018	958	1076	1105	1094	72	71	69	69	72	68
01:45	1101	1027	968	1101	1133	1099	71	72	69	69	75	68
02:00	1154	1031	1006	1113	1165	1203	71	72	69	68	72	68
02:15	1176	1043	1037	1292	1198	1308	70	72	70	68	72	68
02:30	1197	1054	1051	1334	1220	1285	69	72	69	68	73	68
02:45	1221	1056	1076	1230	1208	1192	69	74	69	69	75	68
03:00	1216	1069	1073	1190	1211	1194	70	74	71	69	74	68
03:15	1210	1091	1072	1182	1220	1184	70	77	70	69	77	68
03:30	1219	1095	1082	1182	1234	1197	70	79	71	69	77	68
03:45	1224	1098	1084	1187	1242	1210	71	76	71	70	76	69
04:00	1239	1104	1091	1209	1244	1198	70	75	71	69	77	69
04:15	1239	1117	1094	1210	1257	1191	70	79	71	69	76	69
04:30	1244	1132	1110	1226	1289	1221	70	79	71	69	74	69
04:45	1258	1131	1113	1228	1297	1252	70	76	71	69	73	69
05:00	1262	1135	1121	1238	1280	1206	70	74	71	69	73	69
05:15	1288	1143	1135	1273	1290	1243	70	73	71	69	74	69
05:30	1299	1165	1147	1260	1360	1268	70	75	71	69	72	69
05:45	1316	1189	1150	1266	1360	1281	70	75	71	69	73	69
06:00	1329	1186	1165	1313	1381	1276	70	75	71	69	72	69
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06:30	1327	1207	1177	1322	1412	1322	70	75	71	69	74	69
06:45	1336	1222	1189	1330	1385	1310	71	74	71	69	74	69
07:00	1340	1222	1196	1322	1389	1309	71	74	72	69	73	69
07:15	1347	1217	1193	1329	1376	1295	71	73	72	69	72	69
07:30	1341	1223	1194	1312	1354	1286	70	73	72	69	72	69
07:45	1339	1220	1185	1313	1368	1271	71	76	72	69	74	69
08:00	1342	1222	1186	1326	1369	1293	71	78	72	70	74	69
08:15	1331	1224	1178	1322	1376	1287	70	76	72	69	75	69
08:30	1323	1221	1187	1327	1378	1292	71	79	72	69	75	69
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T?? ? ?M??:????	???? T/C 43	???? T/C 44	???? 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	T/C 54
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T?? ? ?M??:????	???? T/C 43	???? T/C 44	???? 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	T/C 54
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T?? ? ?M??:????	???? T/C 43	???? T/C 44	???? 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	T/C 54
30:00	1687	1562	1526	1697	1722	1636	90	122	81	81	114	77

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Appendix C

Photographs

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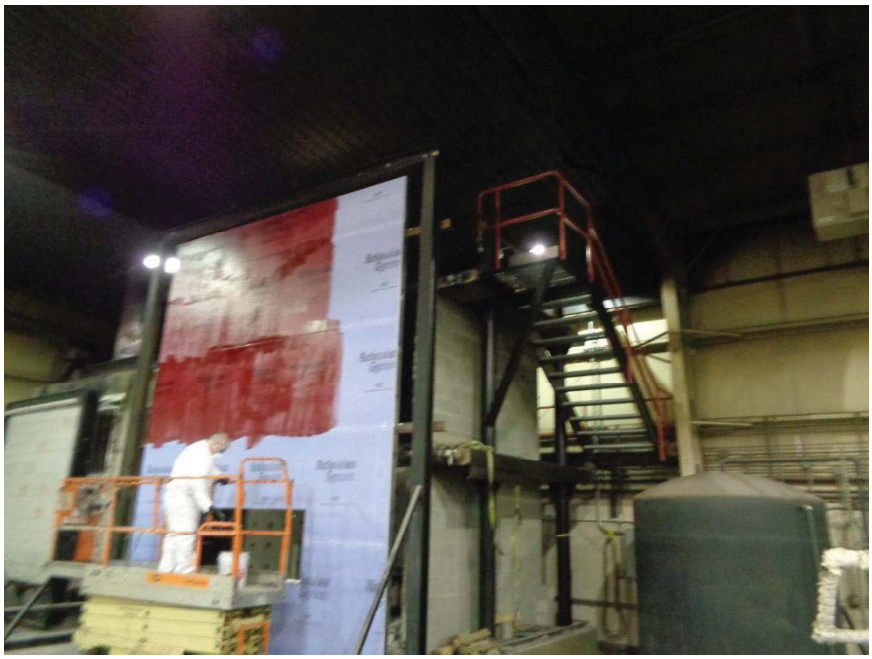

Photo No. 1
Application of CCW-702LV Over Completed Core Wall

Photo No. 2
Installation of the CCW-705

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Photo No. 3
Installation of Window Opening Flashing and Vertical Girts

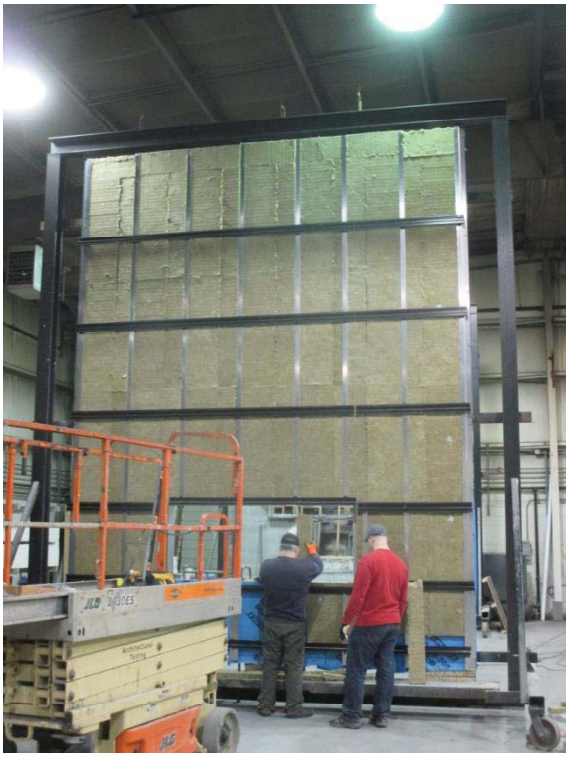

Photo No. 4
Installation of Insulation and Horizontal Extrusions

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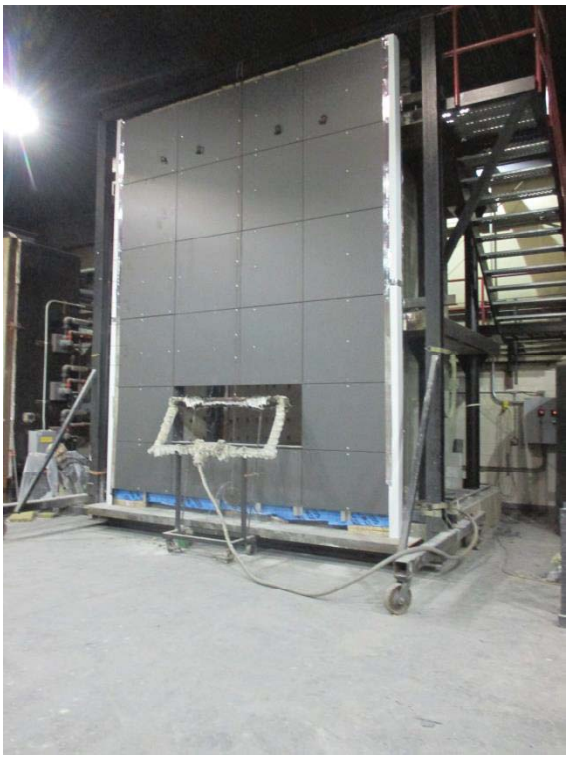

Photo No. 5
Panel Installation

Photo No. 6
Interior First Story (Pre-test)

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Photo No. 7
Interior Second Story (Pre-test)

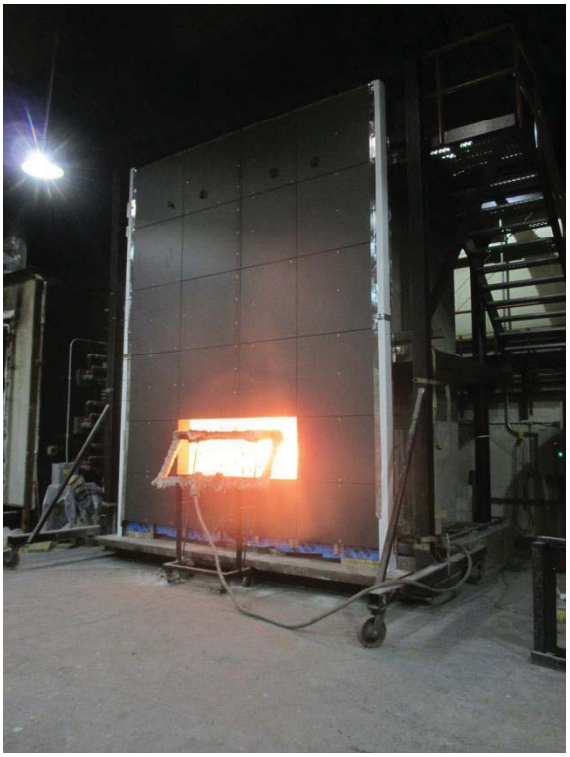

Photo No. 8
Ignition of the Room Burner

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Photo No. 9
Ignition of the Window Opening Burner

Photo No. 10
Panel Cracking

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Photo No. 11
Burners Extinguished

Photo No. 12
Burn Pattern of Exterior Panels (Post-test)

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Photo No. 13
Burn Pattern of Insulation After Exterior Cladding Panels Removed (Post-test)

Photo No. 14
Burn Pattern of A/V Barrier After Exterior Insulation Removed (Post-test)

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Appendix C

Drawings

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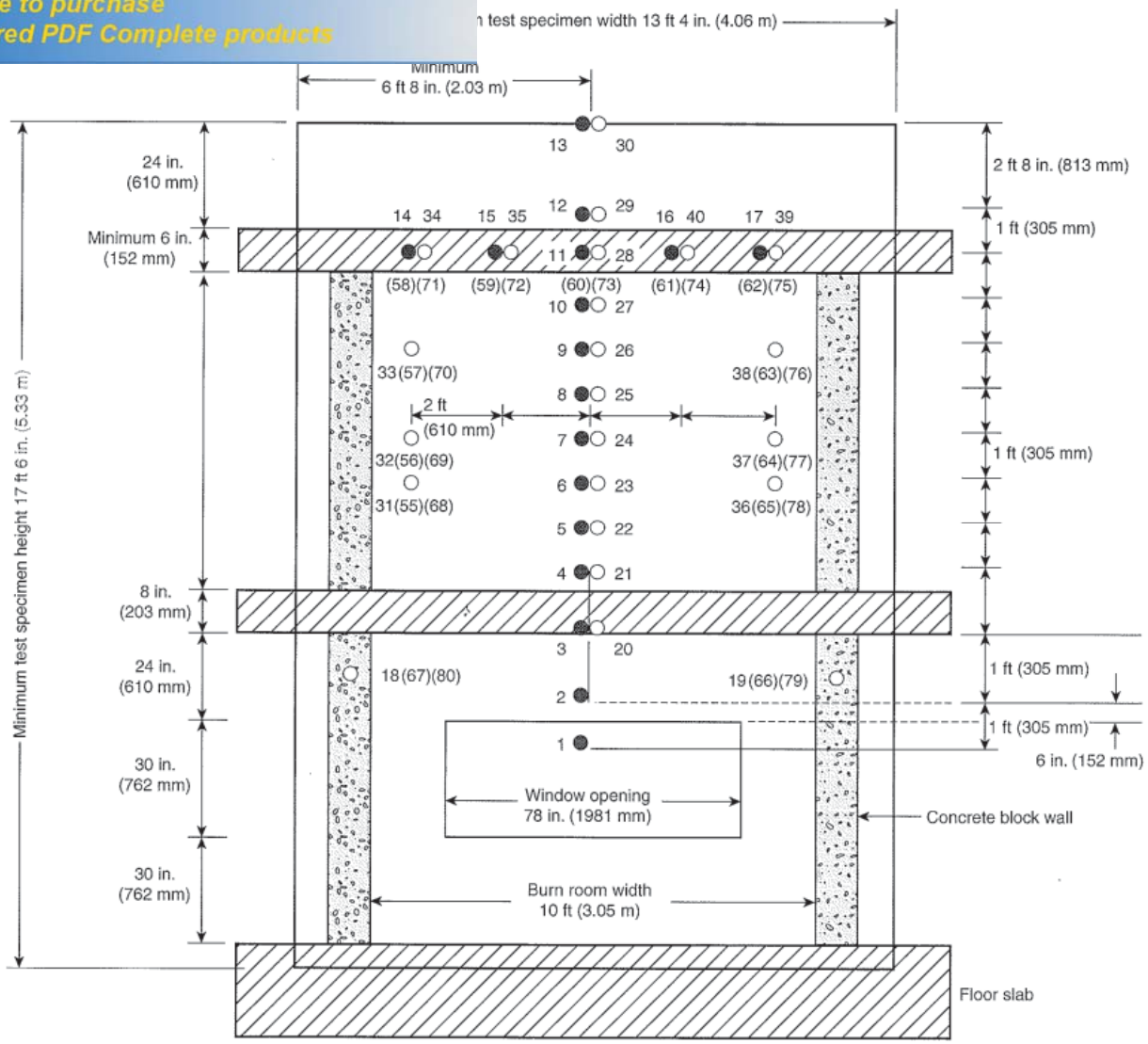

● Thermocouples — 1 in. (25 mm) from exterior wall surface

○ 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.

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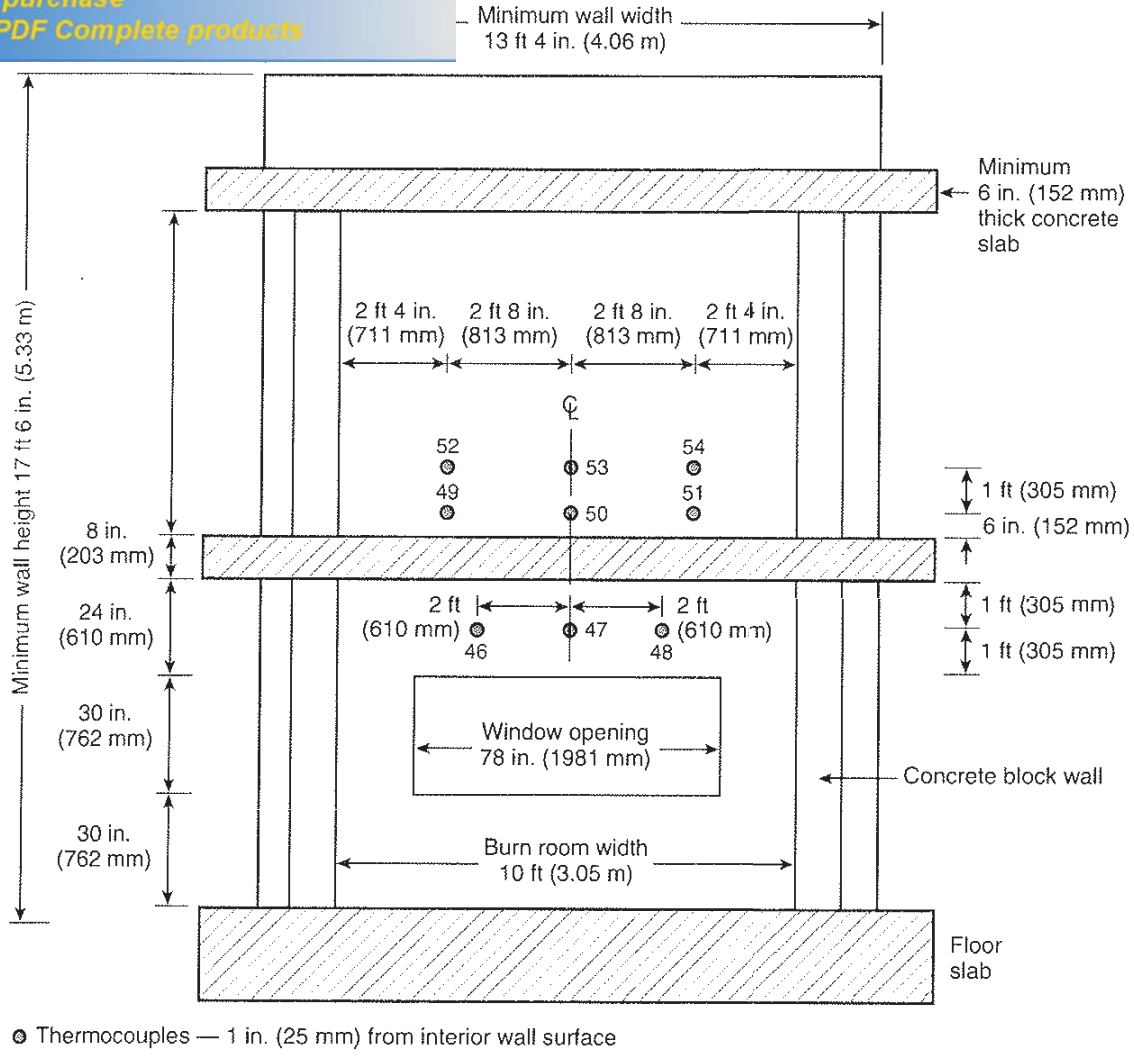

FIGURE 6.1(c) Interior View of the Test Specimen. Instrumentation arrangement.

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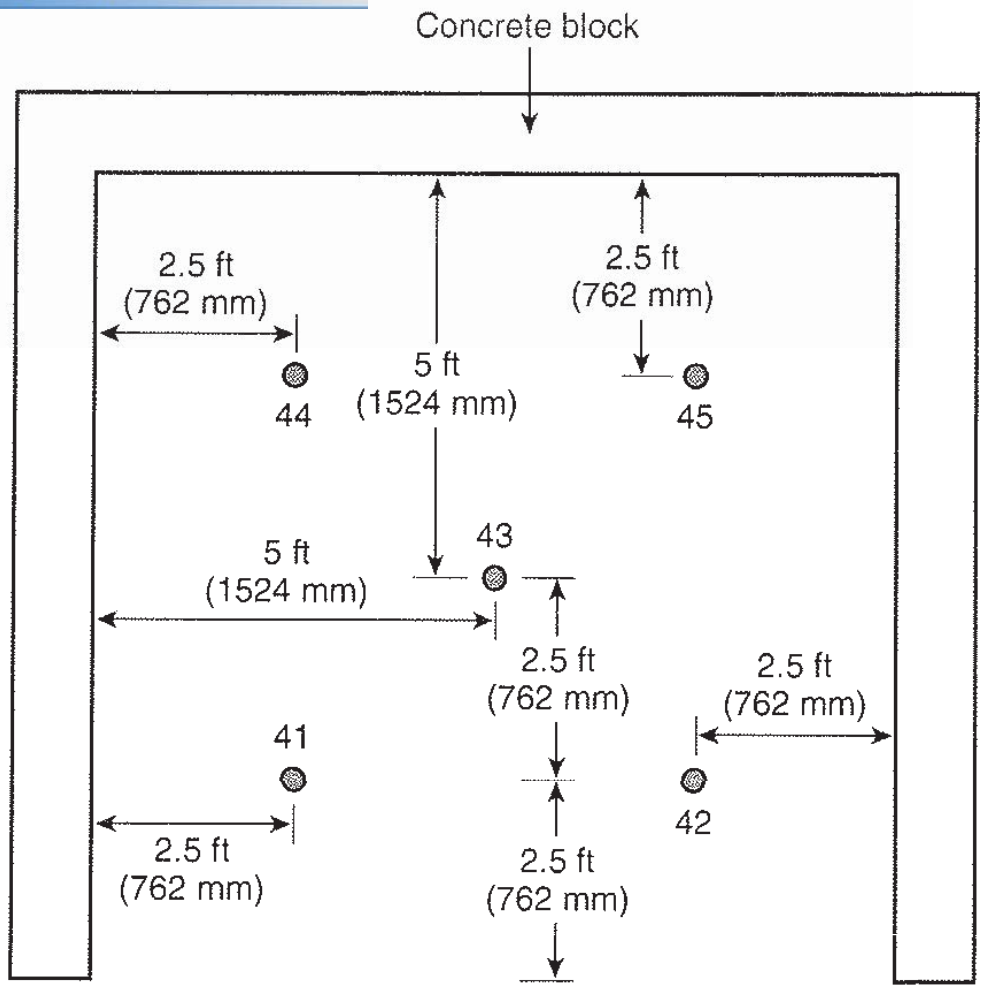

FIGURE 6.1(d) Plan View — First-Story Test Room. Instrumentation arrangement.

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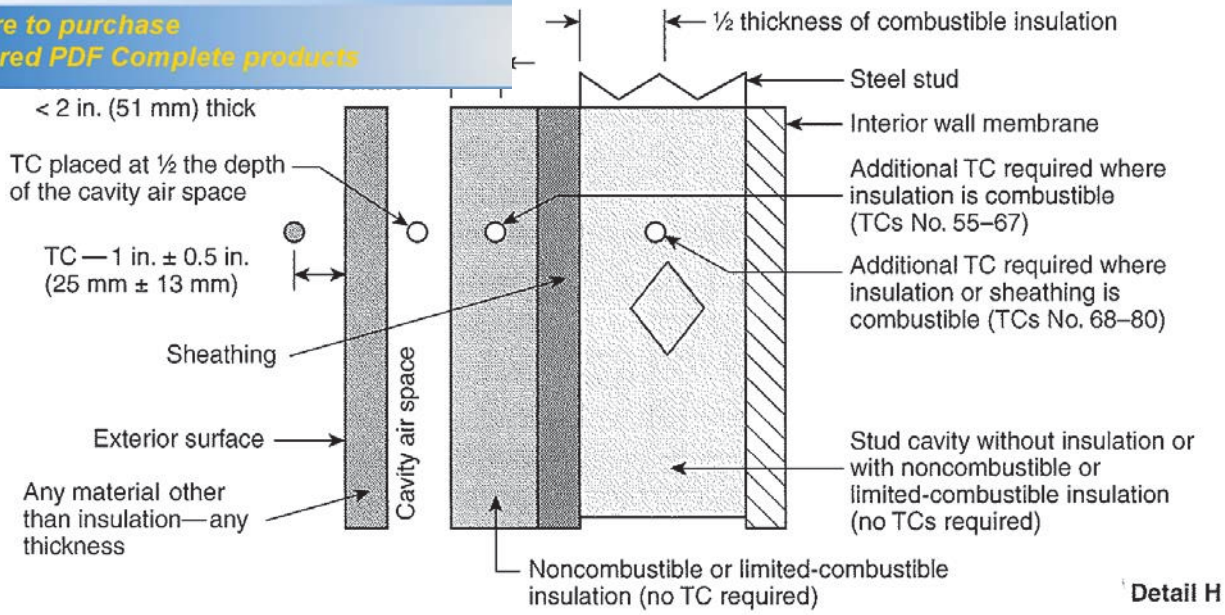

Detail H

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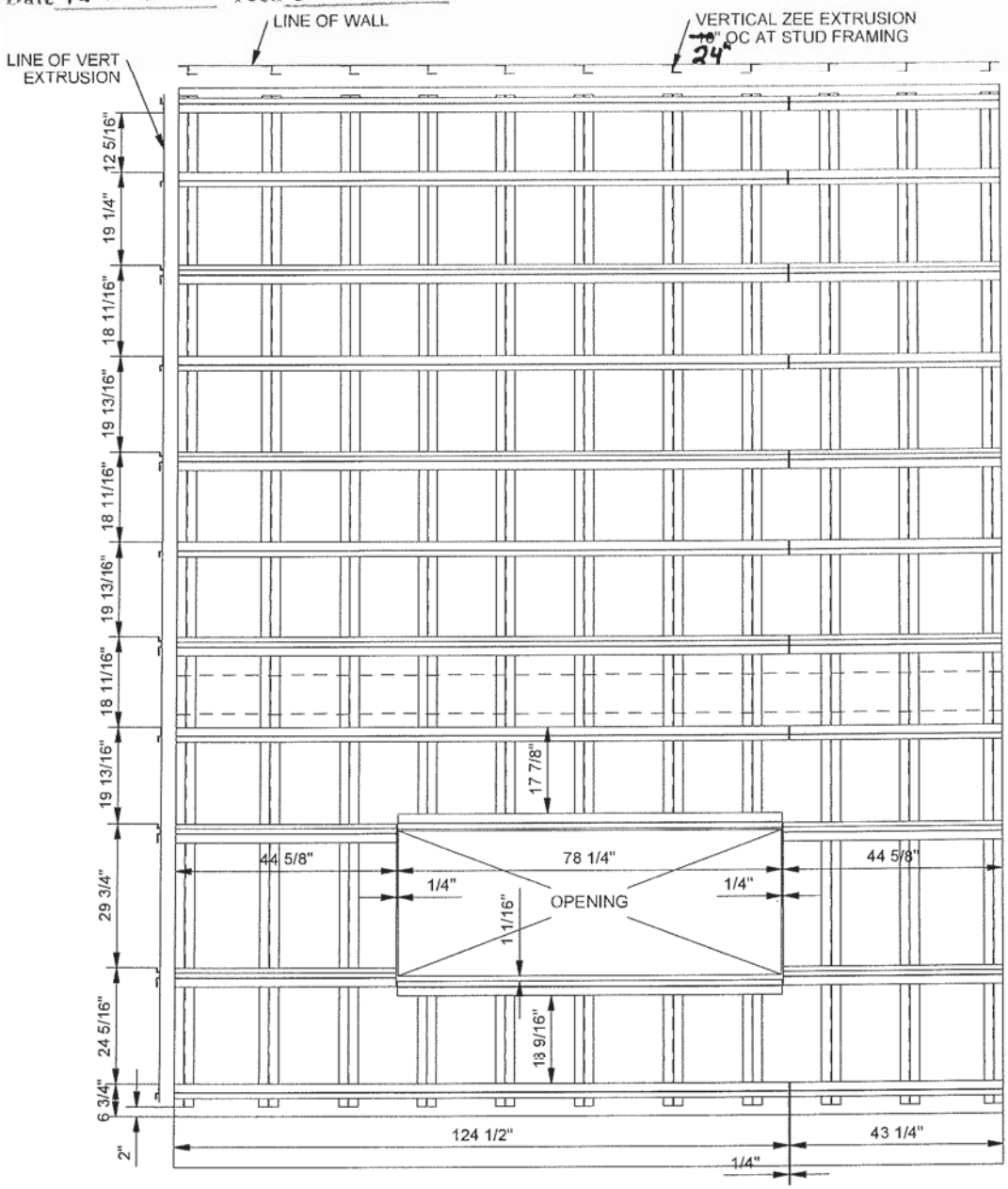
SCALE: N.T.S.

Test sample complies with these details.
Deviations are noted.

Report # F3115.02

Date 12-11-15 Tech E6



SUB-FRAMING LAYOUT

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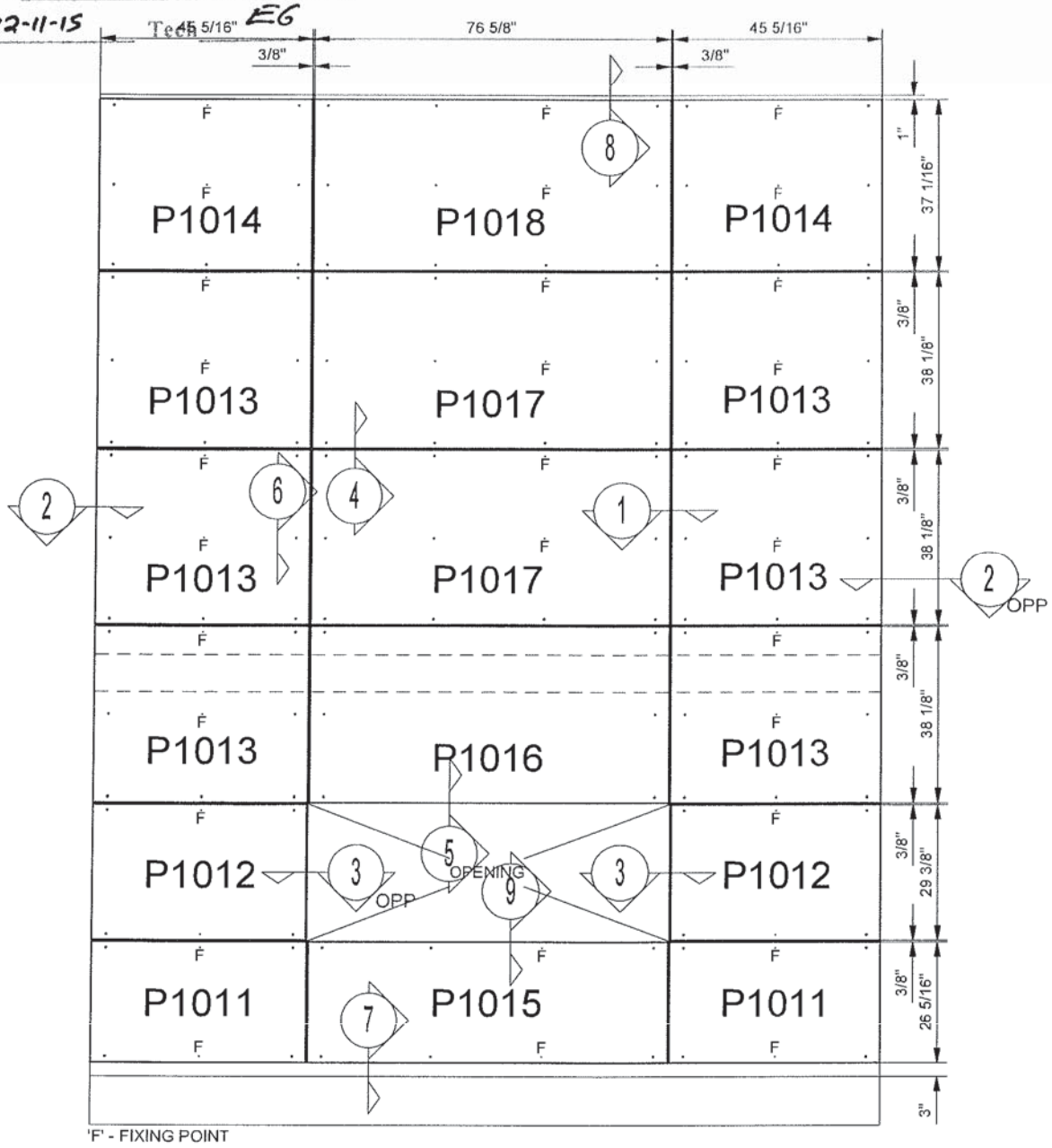
Report # F3115.02

Date 12-11-15 Tech EG



'F' - FIXING POINT

PANEL LAYOUT

ADDITIONAL PANELS SENT FOR WINDOW RETURNS

WINDOW HEAD AND SILL - P1020

WINDOW JAMBS - P1019

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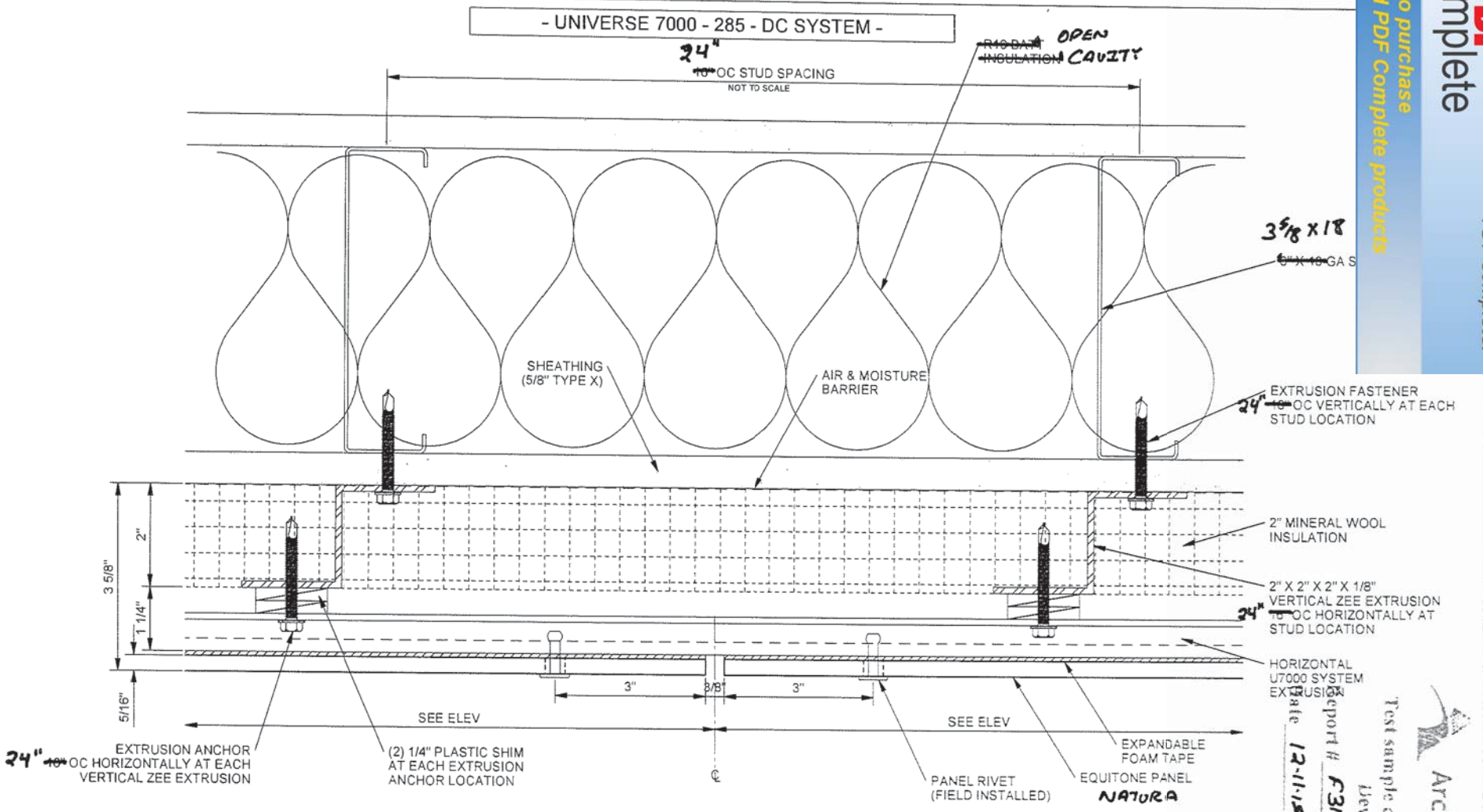

1 VERTICAL JOINT DETAIL
SCALE: NOT TO SCALE

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Architectural Testing
Test sample complies with these details. Deviations are noted.
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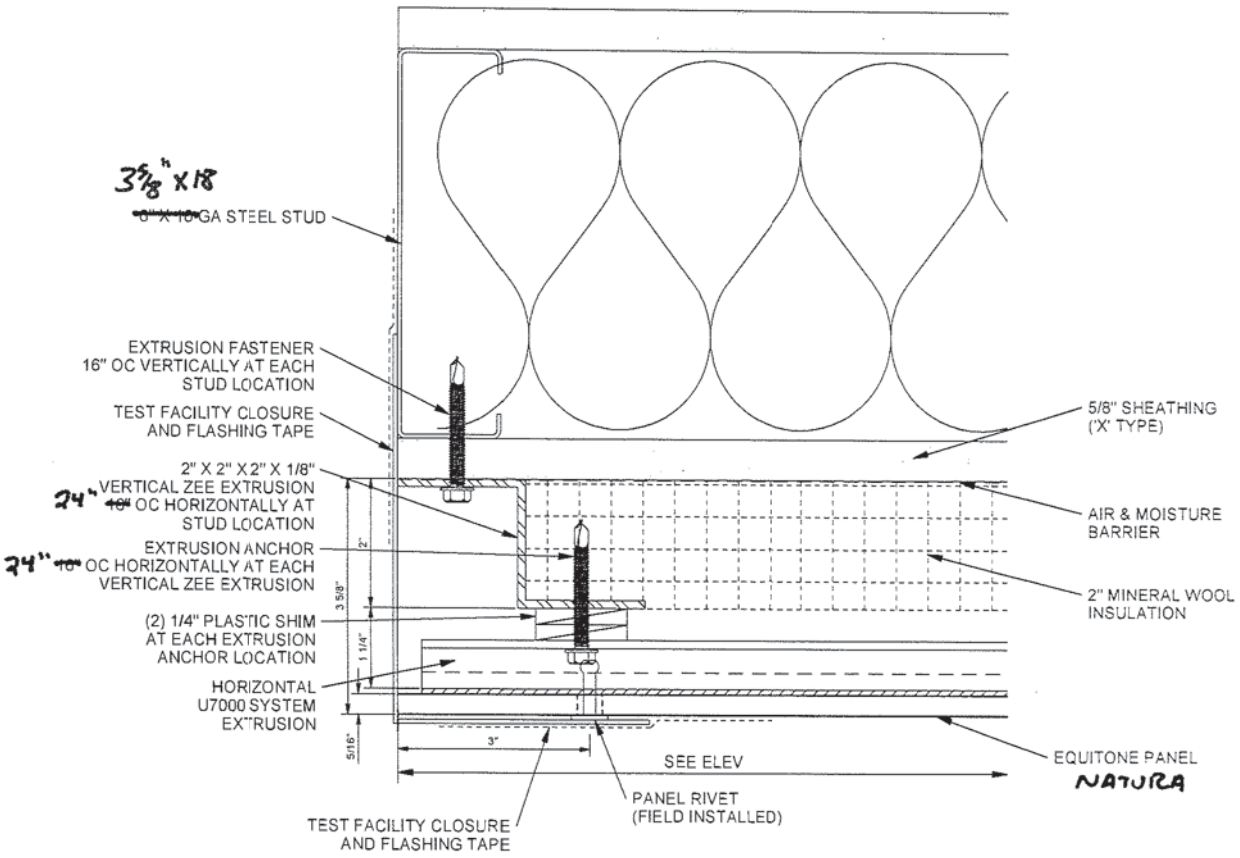

2 END OF WALL
SCALE: NOT TO SCALE

UNIVERSE CORPORATION- ST. LOUIS, MISSOURI

Architectural Testing

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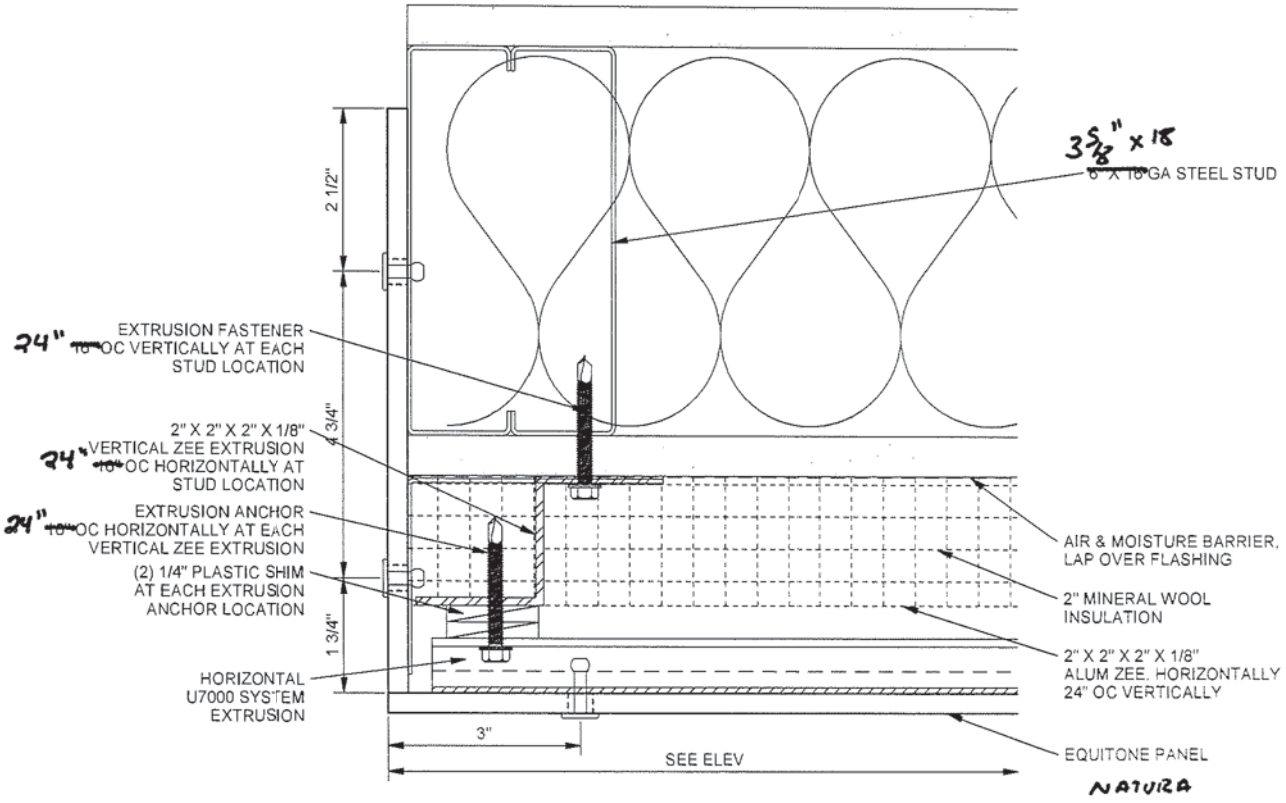

3 WINDOW JAMB DETAIL
SCALE: NOT TO SCALE

UNIVERSE CORPORATION- ST. LOUIS, MISSOURI

Architectural Testing

Test sample complies with these details.
Deviations are noted.

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Date 12-11-15 Tech EG

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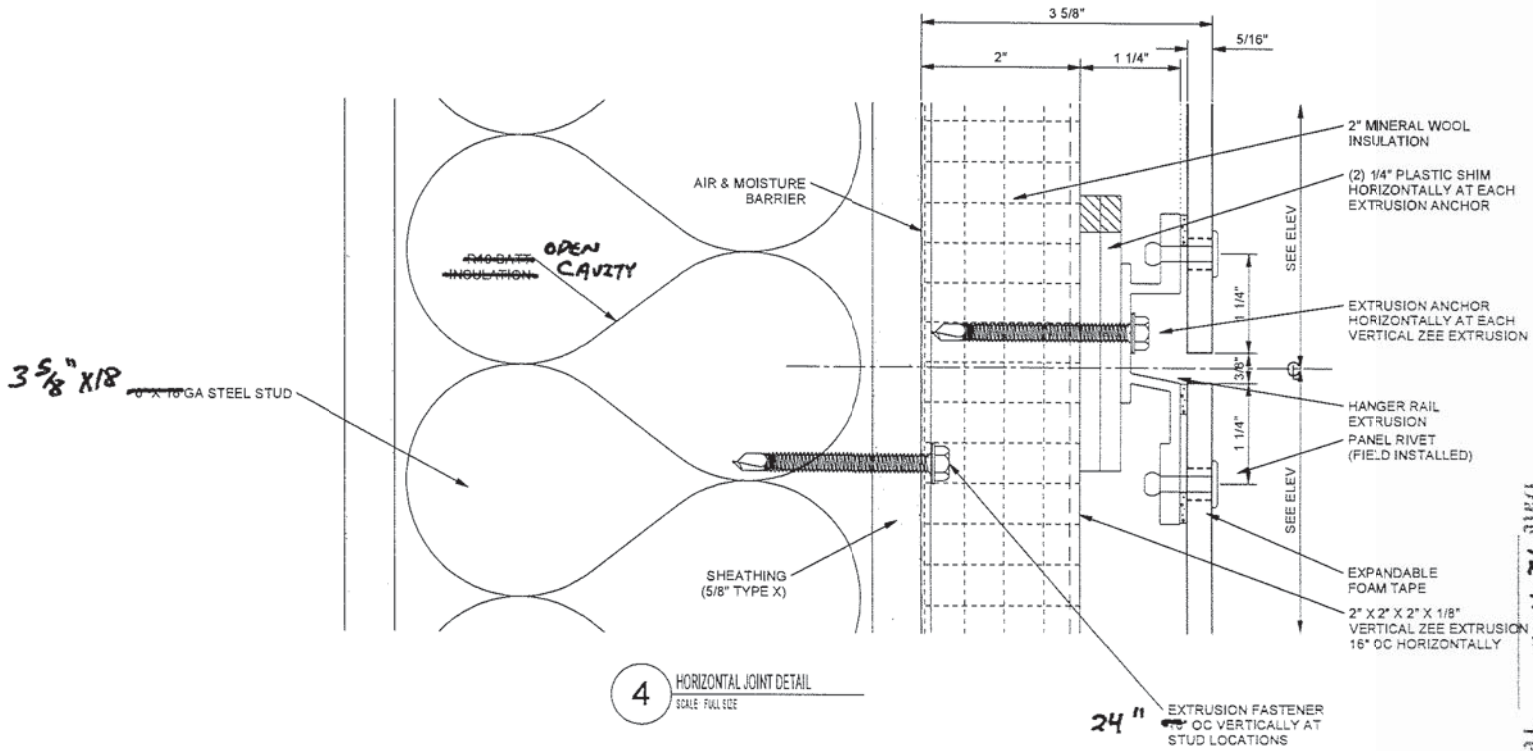

4 HORIZONTAL JOINT DETAIL
SCALE: FULL SIZE

Architectural Testing
Test sample complies with these details.
Deviations are noted.
Report # F3115.02
Date 12-11-15 Tech

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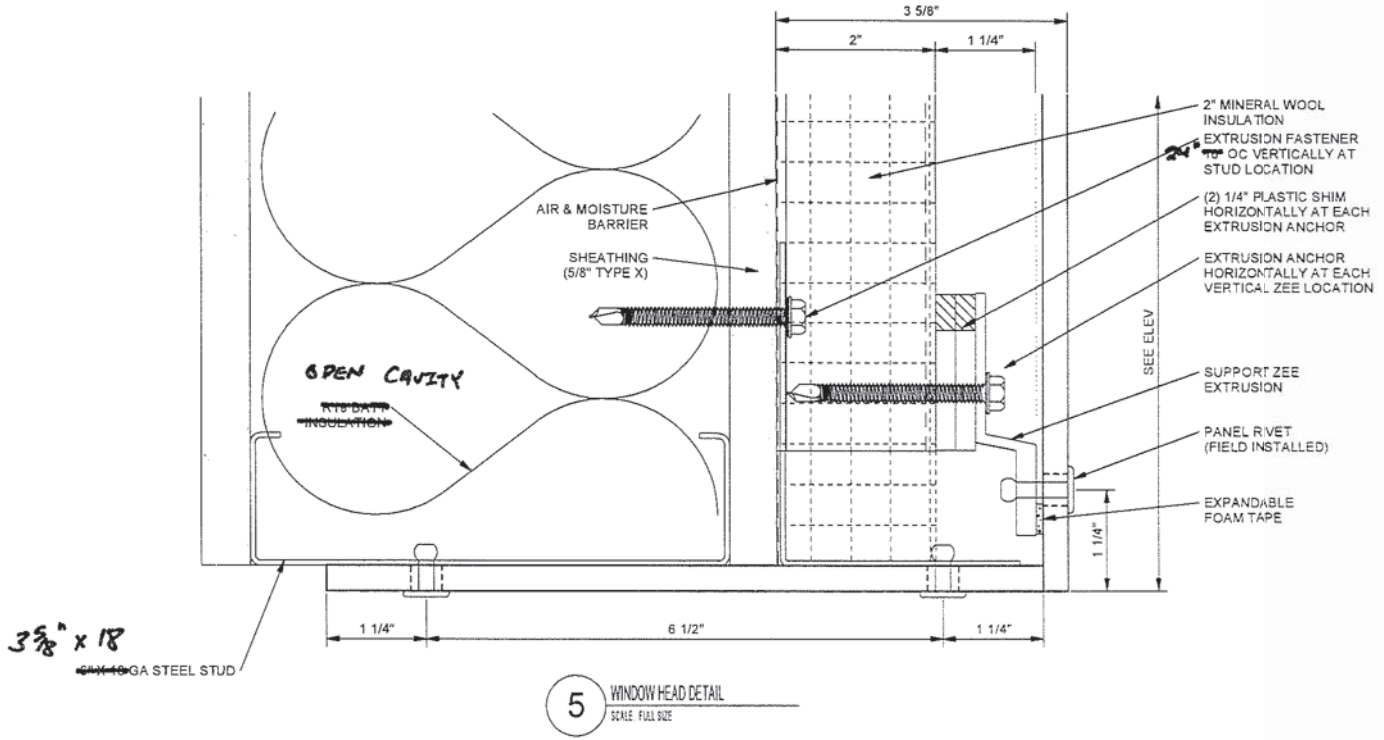

5 WINDOW HEAD DETAIL
SCALE: FULL SIZE

Architectural Testing
Test sample complies with these details.
Deviations are noted.
Report # F3115.02
Date 12-11-15 Tech EG

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Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # F-3115.02

Date 12-16-15 Tech ES

6 INTERMEDIATE HORIZONTAL RAIL DETAIL
SCALE: FULL SIZE

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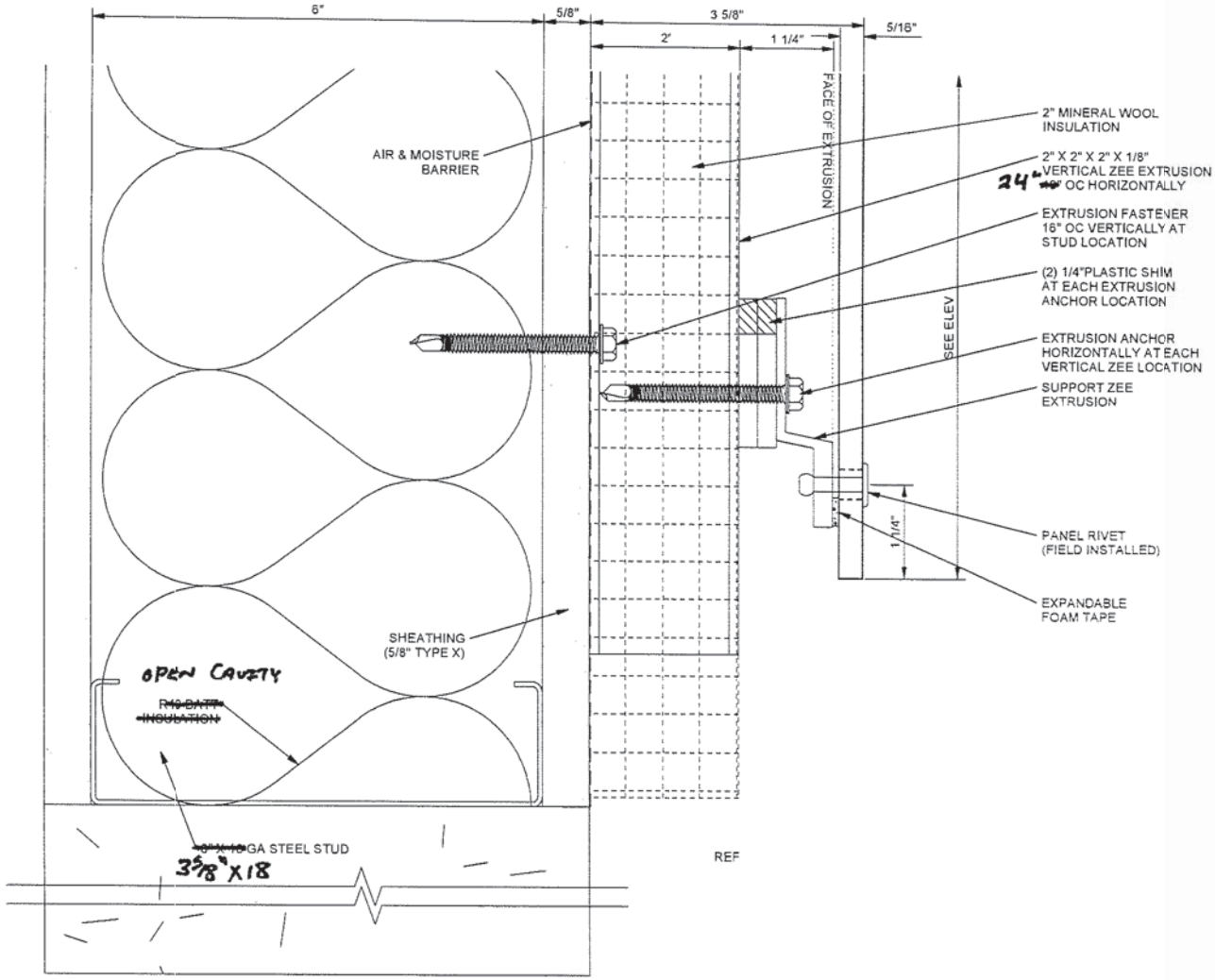

7 BASE OF WALL
SCALE N.T.S.

UNIVERSE CORPORATION- ST. LOUIS, MISSOURI

Architectural Testing

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Deviations are noted.

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Date 12-11-15 Tech EG

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Architectural Testing

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Report # E3115.02

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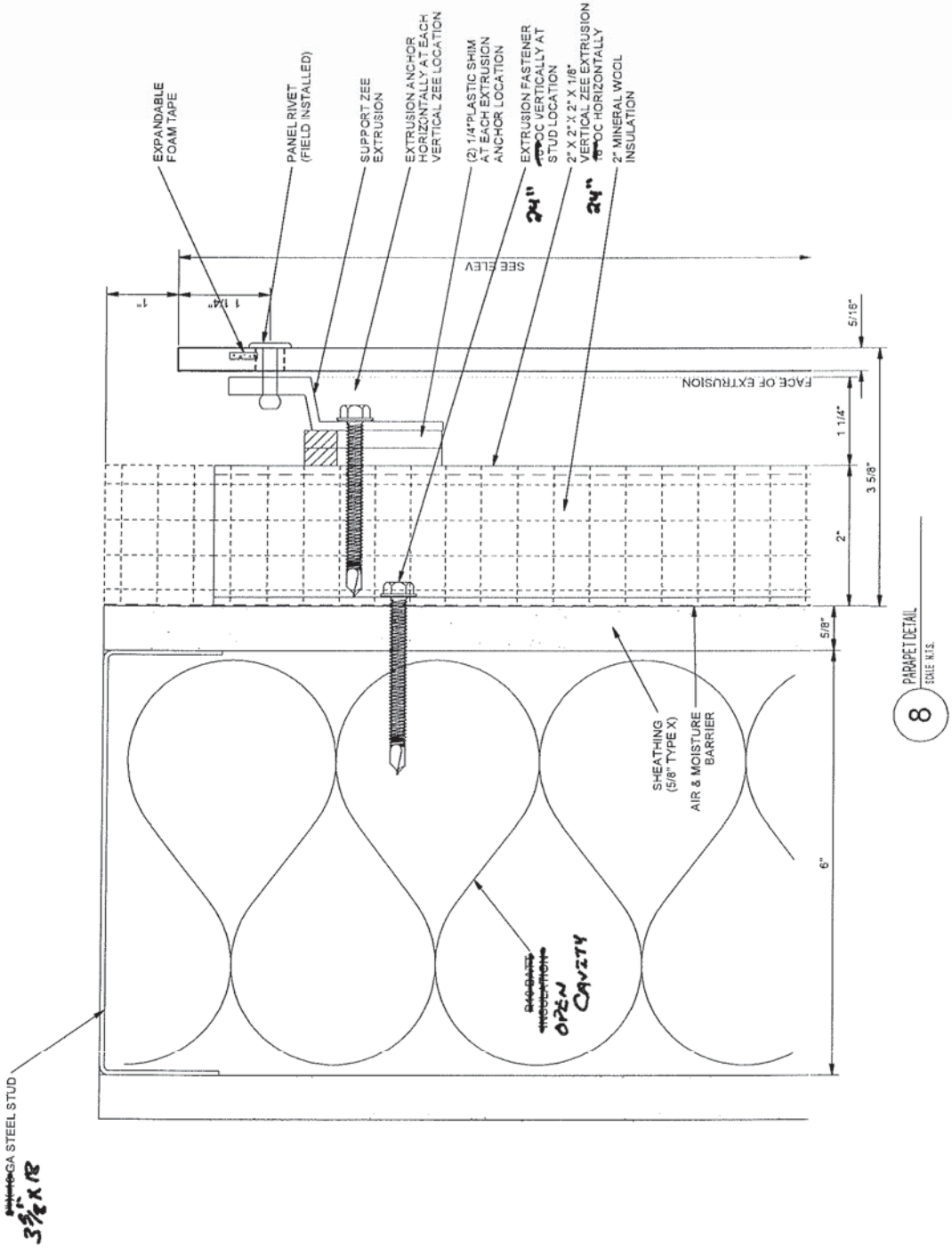

8 PARAPET DETAIL
SCALE: N.T.S.

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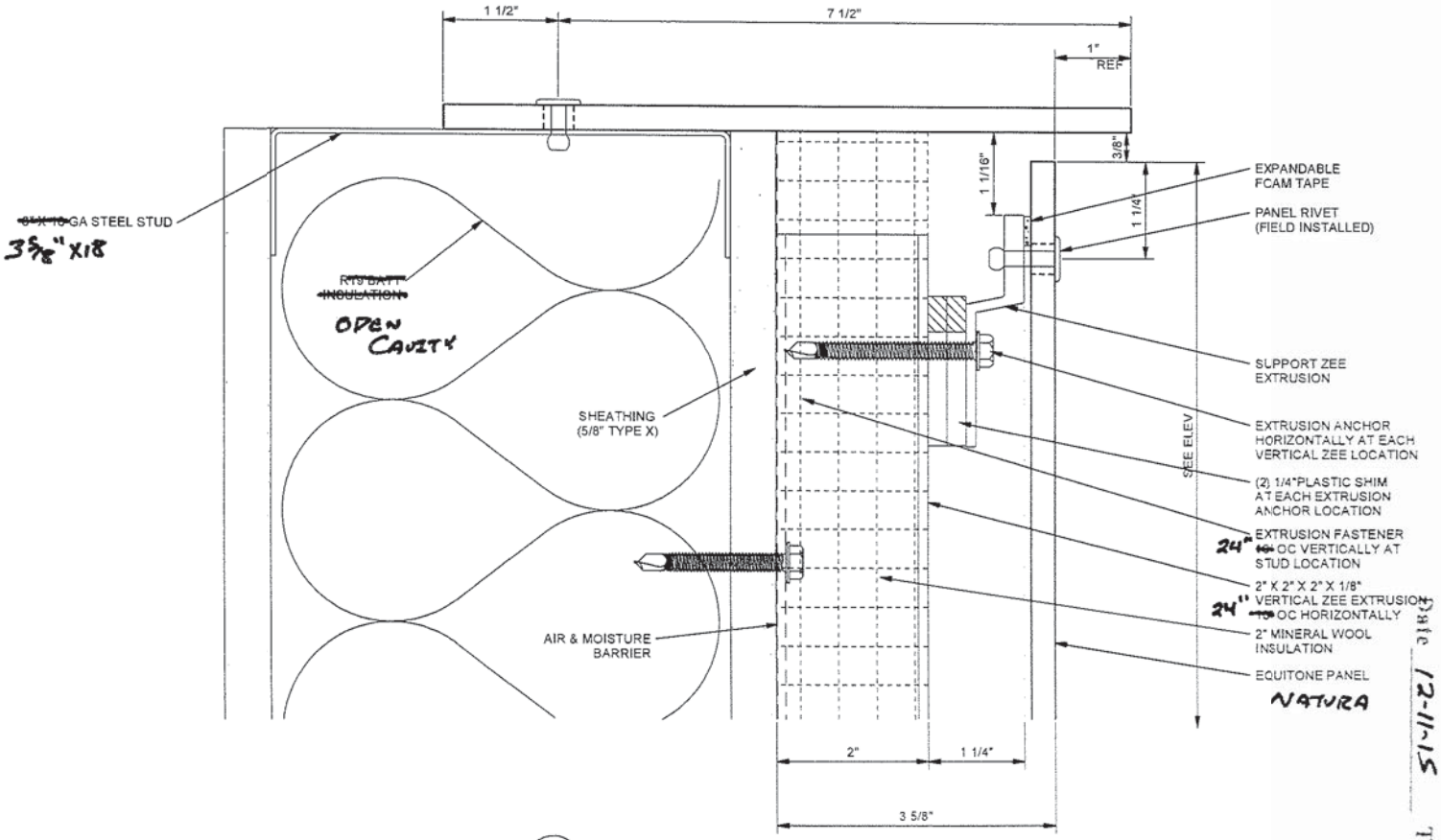

9 WINDOW SILL DETAIL
SCALE: FULL SIZE

Architectural Testing
Test sample complies with these details.
Deviations are noted.
Report # FC315.02
Date 12-11-15 Tech EG

UNIVERSE CORPORATION- ST. LOUIS, MISSOURI

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