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FIRE TEST REPORT: SOUTH SHORE IRON WORKS "INTEGRITY" WALL

CLIENT/MFG: South Shore Iron Works, Inc.
407 West 109th St.
Chicago, IL 60628

PRODUCT: South Shore Iron Works "Integrity Wall"

STANDARD TESTED TO: ASTM E 119-10b
Standard Test Method for Fire Tests of Building
Construction and Materials

FIRE TEST ENDURANCE RATING: 2 Hour Wall with two 5/8" Type X gypsum wallboard on
inside and one 5/8" Glassroc on the outside

REPORT NO.: GL 94211

TEST DATE: July 25, 2011

REPORT DATE: July 30, 2011

REPORT PREPARED BY: GUARDIAN FIRE TESTING LABORATORIES, INC
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Guardian Fire Testing Lab Location:
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Abstract

This report describes the two-hour successful Fire Endurance Test for South Shore Iron Works "Integrity" wall which was tested in accordance with ASTM E 119-10b, Standard Test Methods for Fire Tests of Building Construction and Materials.

The wall consisted of South Shore Iron Works Tubular Load Bearing Steel Studs, one layer of 5/8" Glasroc sheathing Type X on the outer side and 2 layers of 5/8" SCX gypsum wallboard on the inner side. The gypsum wallboard was applied horizontally and vertically. 2" thick, 8 pound density mineral wool insulation was in the stud cavity. The steel studs were 24" on center.

The load bearing capacity was determined by the recording of the steel studs' temperatures during the test. The average steel temperature did not exceed 1,000°F as per the test standard. The high steel temperature was 446°F at 2 hours test time.

The wall system met the fire endurance requirements for a two-hour rating as per the ASTM E 119-10b test standard.

The vertical test wall was sectioned into 3 different test wall sections:

- East: Type X Glasroc had 2 coats of ForceField FireGuard E 84 on its exposed face;
- Center: Type X on its exposed face had one coat of ForceField FireGuard E 84 on its exposed face;
- West: Type X Glasroc exterior surface.

All 3 sections achieved a 2-hour fire rating.

2. General

- 2.1 Units of measurement used in this test are English: inches, feet and Fahrenheit.
- 2.2 The testing was conducted by Guardian Fire Testing Laboratories, Inc. with Guardian's testing equipment in the laboratory facilities of Guardian in accordance with the test standard ASTM E 119-10b edition.

3. Performance

This report presents the results of a fire test of a fire wall system as per ASTM E 119-10b. This report contains a description of the material evaluated, procedures used and the test results. The results listed apply only to the specimens tested, in the manner tested.

3.1 Procedure:

The furnace test wall is 5 feet wide by 8 feet high.

The fire wall is directional with 5/8" type X Glasroc on the outer side of the wall.

The temperatures on the unexposed side of the wall did not exceed the allowable limits.

A drawing of the wall construction is attached.

4 Construction

4.1 General:

The following is a detailed account of the construction of the South Shore Iron Works Integrity Wall. See attached drawings.

- 4.1.1 The wall tubular studs, T beam header and track, an all-welded system, is 6" wide. It consists of a "T" steel section 6" wide x 8" high. The bottom track is 6" wide, 16 gauge steel with 1" legs. The studs are 2" x 2" 16 gauge steel tubes spaced 2" apart with a 2" tube horizontal stabilizer in the center at mid height.
- 4.1.2 Mineral wool batts, 8 pounds per cubic foot weight, 2 inches thick, 2 feet wide by 4 feet long were installed into the steel studs via friction fit.
- 4.1.3 5/8 inch type SCX gypsum wallboard, 1st layer, was installed horizontally. The face layer was installed vertically.

4.1 General (cont'd.)

4.1.3 (cont'd)

The wallboard 1st layer was fastened to the tubular steel with 1-1/4 inch long self-drilling, self tapping screws, 24 inches on center. The 2nd layer was fastened with 1-7/8" screws, 8 " on center.

4.1.4 2 inch wide fiberglass joint tape, self sticking, was applied to the wallboard joints on the unexposed side which is the inner side.

4.1.5 One coat of setting type wallboard joint compound, Dura Bond 90, was applied to the joints but not to the screw heads on the unexposed side.

4.1.6 Mineral wool batts, 8 pounds per cubic feet weight, 2 inches thick, 22" wide by 4 feet long were installed in the wall..

5 Fire Endurance Test

5.1 Conditions of Acceptance

5.1.1 The wall system withstood the fire endurance test without passage of flame or gases hot enough to ignite cotton waste for a period equal to that for which classification is desired.

5.1.2 Transmission of heat through the wall or partition during the fire endurance test shall not have been such as to raise the temperature on its unexposed surface more than 250°F above its ambient temperature of 87°F.

6 Control and Conduct of Fire Test

6.1 The furnace control followed the test standard limits.

6.2 The furnace pressure was maintained slightly higher than atmospheric at the top of the furnace. The pressure gauge at a 48 inch high location remained at 0.01 inches of water.

6.3 The fire test was continued for 2 hours and 5 minutes.

7 Fire Test Instrumentation

Furnace Temperatures:

Thermocouples were equally spaced in the furnace. The temperatures are shown on the attached chart.

Unexposed Surface Temperatures:

9 thermocouples were placed on the unexposed face of the wall. Three T/Cs were placed at the top, center and bottom of the east, center and west sections of the unexposed surface of the test specimen. Refer to chart on page 9 of this report.

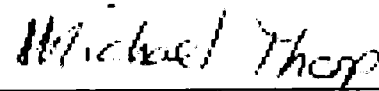
8 Load bearing temperatures were recorded at 1 point on each of 2 steel tubular stud locations. The average temperatures did not exceed 1000 ° F, and a single T/C temperature high was 446° F.

9 Test Temperatures, Observations and Test Photos are attached.

- 10.1 South Shore Iron Works' "Integrity" wall, as a load bearing wall, successfully withstood the 2-hour fire endurance test as per the test standard, ASTM E-119b in all 3 tested sections.
- 10.2 This wall system also receives a 2-hour fire endurance rating.

Test Conducted and Reported by:

Test Witnessed By:



R. Joseph Pearson
Fire Testing Engineer

Michael Thorp
Fire Testing Technician

Uncertainty Measurement in Guardian's fire testing is less than 1% as per ASTM E 2536-06.

This test is accredited and meets the requirements of ISO/IEC 17025 as verified by ANSI/ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation Report AT1247.

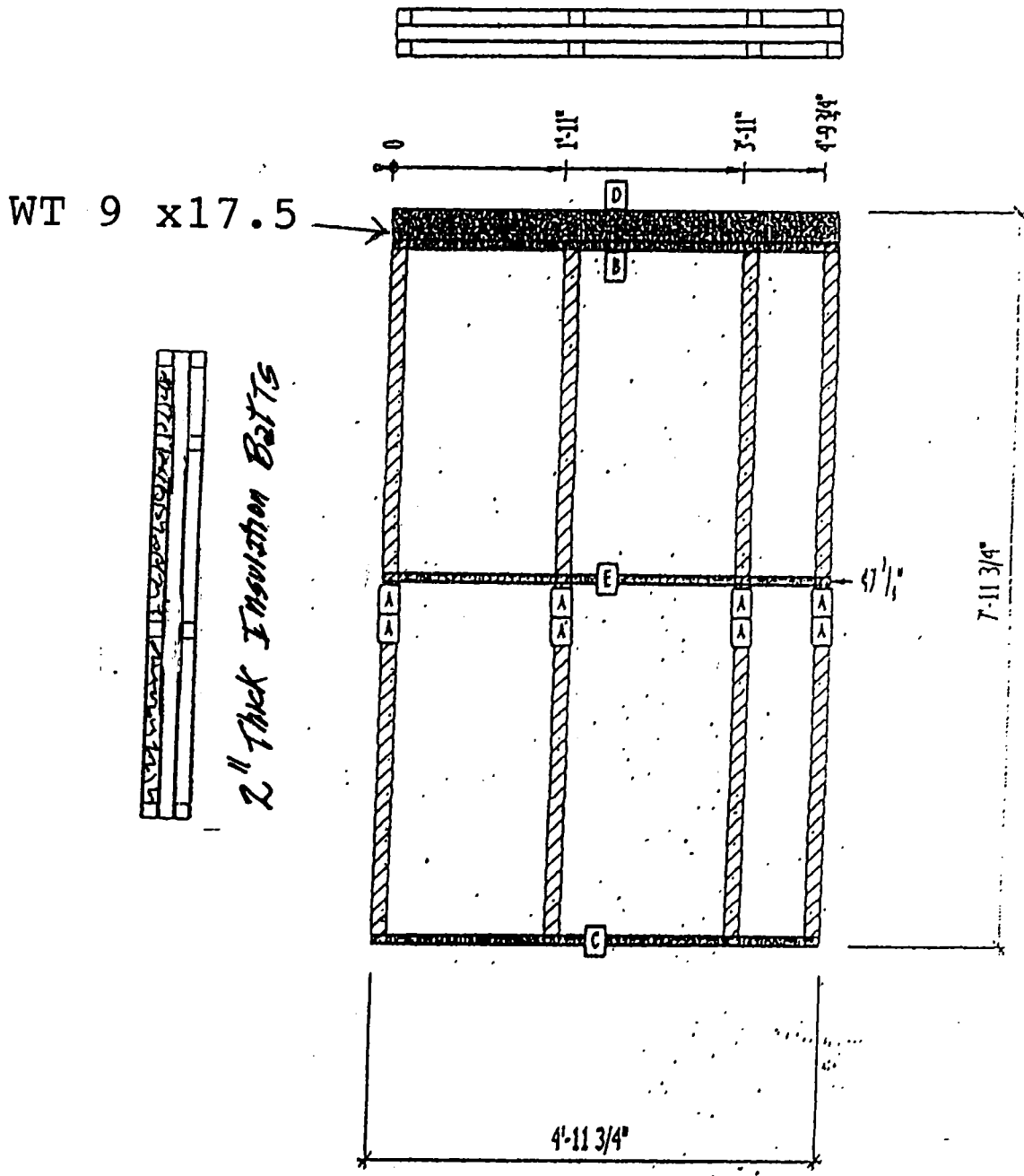
Guardian also is accredited as an Inspection Agency per ISO 17020 through ANSI/ASQ National Accreditation Board/ACLASS, Report 1547.

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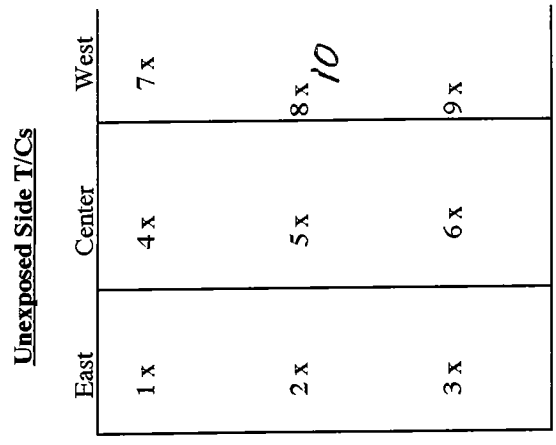
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DRAWING OF WALL CONSTRUCTION



South Shore Iron Works "Integrity" Wall: Unexposed Surface Temperatures

Time Min.	Unexposed Behind 2 coat area . east			Unexposed Behind 1 coat area, center			Unexposed Behind uncoated area, west			Avg. Ambient		
	1	2	3	4	5	6	7	8	9		10	
0	82	83	81	83	83	81	83	84	85		83	76
5	82	84	82	84	83	81	83	85	83		83	82
10	83	83	82	85	84	82	84	83	84		83	83
15	87	86	84	88	88	84	87	--	86		86	84
20	94	94	89	95	95	89	95	--	94		93	85
25	105	103	96	109	105	95	105	--	85*		103	86
30	117	114	103	115	113	102	115	--	85*		116	87
35	123	120	108	120	117	108	120	--	86*		118	86
40	125	121	111	122	118	111	121	--	85*		118	87
45	126	122	113	123	119	113	121	--	86*		120	86
50	127	123	114	125	121	115	121	--	86*		121	85
55	129	125	117	128	124	120	123	--	86*		124	87
60	133	126	121	132	128	119	126	--	109		124	86
65	138	129	125	136	133	123	129	--	122		129	87
70	142	134	130	141	138	124	133	132	131		134	87
75	148	140	138	145	140	132	137	132	132		138	84
80	151	145	142	147	144	133	138	--	133	137**	141	84
85	153	148	146	147	147	134	140	--	137	142	144	85
90	154	149	147	147	148	174	141	--	138	143	149	84
95	154	151	148	148	147	132	140	--	142	147	145	85
100	153	149	147	148	147	146	143	--	145	148	147	85
105	153	149	146	149	147	141	143	--	146	150	147	85
110	152	150	144	150	147	√209	147	--	148	152	155	85
115	152	146	144	151	147	144	149	--	150	155	149	84
120	153	147	146	153	148	147	152	--	149	158	150	87
125	153	145	145	153	148	146	152	--	152	159	150	86
	High 153			High 209			High 159					



*T/C # 9 had detached from wall assembly between 15 and 55 minutes---reattached at 55 minutes---avg. did not include that

** T/C # 10 replaced T/C # 8 at #8 location at 80 minutes. T/C #8 stopped reading between 15 and 70 minutes.

Temperature Recorder calibration date: 7/12/11

Test Observations: There were no changes to the unexposed side during the entire test time.

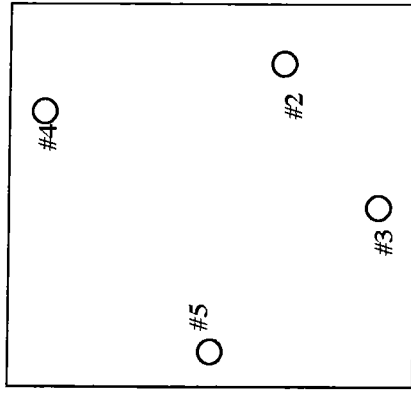
After Test Notes: The fire side Glasroc type X was in place.

South Shore Iron Works "Integrity" Wall: Furnace & Steel Stud Temperatures

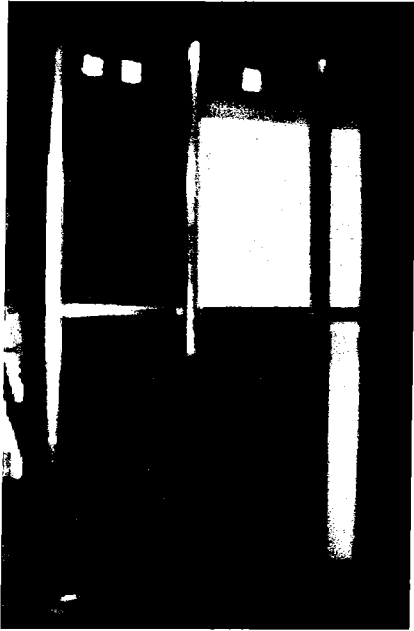
Time Min.	Amb.	Furnace Temperatures					Steel Stud Temperatures					Furnace Pressure
		1	2	3	4	5	6	7	8	9		
0	76	78	79	79	79	77	79					
5	82	949	1078	1068	1226	78	79					0.00
10	83	1104	1131	1201	1312	105	110					0.01
15	84	1186	1157	1357	1480	127	139					0.01
20	85	1268	1223	1414	1553	144	155					0.01
25	86	1330	1289	1448	1585	154	162					0.01
30	87	1382	1361	1492	1620	153	161					0.01
35	86	1441	1416	1513	1650	151	157					0.01
40	87	1490	1556	1554	1640	148	159					0.01
45	86	1549	1698	1585	1576	154	164					0.01
50	85	1648	1766	1600	1600	158	172					0.01
55	87	1737	1806	1630	1620	175	189					0.01
60	86	1724	1820	1636	1638	201	216					0.01
65	86	1743	1832	1648	1659	230	246					0.01
70	87	1701	1835	1643	1640	259	271					0.01
75	84	1702	1834	1636	1658	293	299					0.01
80	84	1762	1834	1645	1655	318	322					0.01
85	85	1740	1832	1650	1658	331	342					0.01
90	84	1760	1844	1652	1660	344	360					0.01
95	85	1748	1842	1644	1647	358	381					0.01
100	85	1723	1843	1643	1651	372	399					0.01
105	85	1730	1829	1641	1647	383	412					0.01
110	86	1738	1827	1647	1644	394	425					0.01
115	84	1738	1844	1632	1642	402	435					0.01
120	87	1770	1841	1642	1657	411	446					0.01
125	86	1713	1812	1634	1642	419	454					0.01

1.25 minutes: gas off, test terminated

Temperature recorder calibration date: 7/12/11



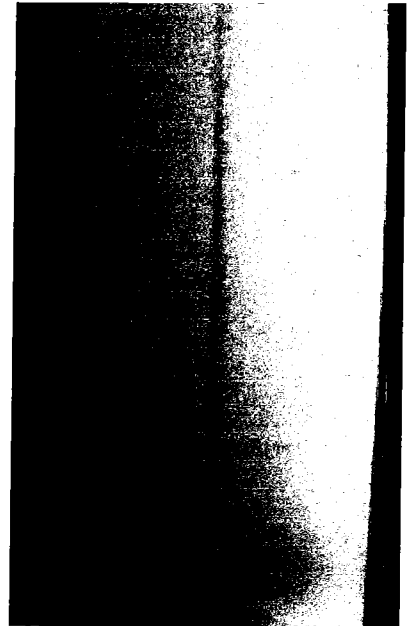
Furnace T/Cs



Installing insulation



installing 1st layer of 5/8" gypsum board
type SCX unexposed side



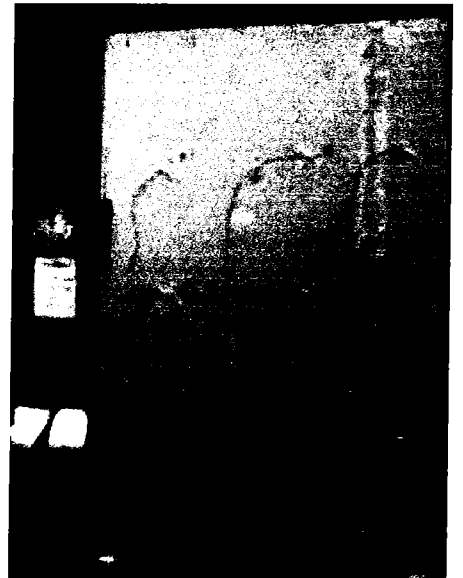
exposed face



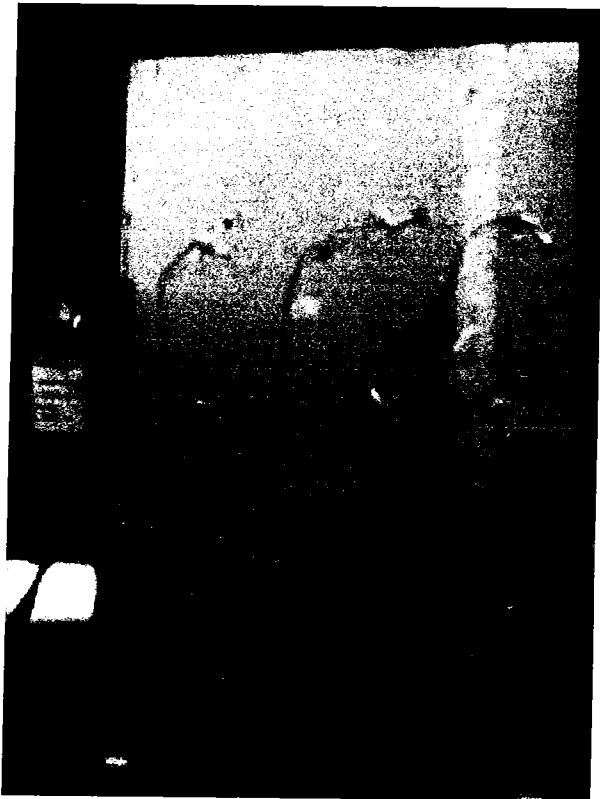
Before test: unexposed side



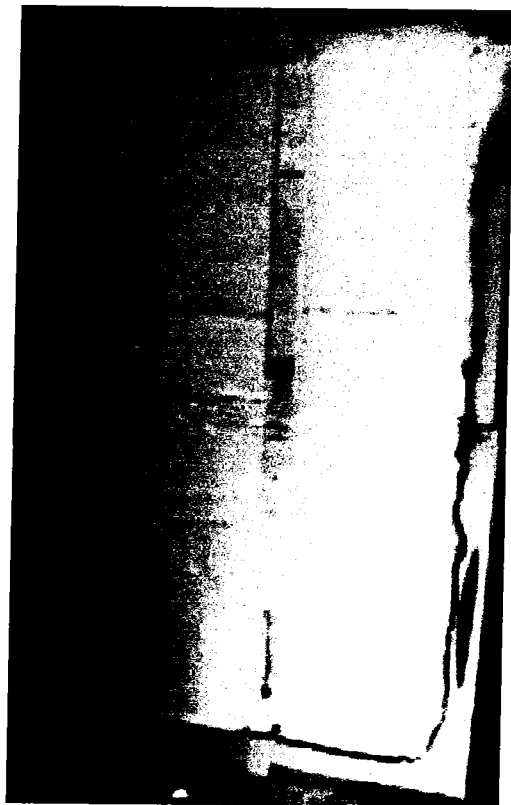
installing T/Cs on unexposed face



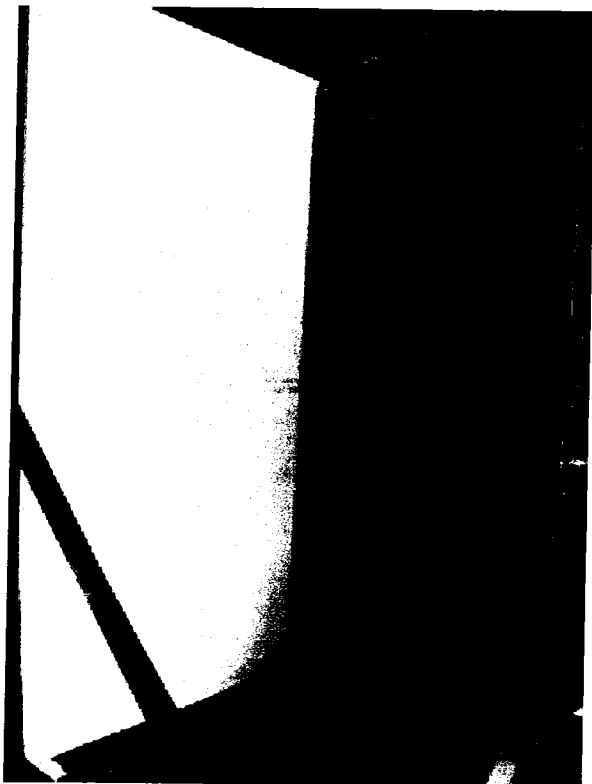
Test Start: unexposed surface



60 Minutes: unexposed side



After 2-hour test: exposed side: all board is in place



After 2-hour test: exposed surface removing fact layer;
base layer in good condition



After test: unexposed board removed;
showing insulation still in place