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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 With 2 Layers of Glas Roc and 2 layers 5/8 Type X Gypsum Wallboard
STANDARD TESTED TO:	ASTM E 119-08a Standard Test Method for Fire Tests of Building Construction and Materials
FIRE TEST ENDURANCE RATING:	3 Hours
REPORT NO.:	GL 87609
REPORT DATE:	October 22, 2009
TEST DATE:	October 15, 2009
REPORT PREPARED BY:	GUARDIAN FIRE TESTING LABORATORIES, INC 15 Wenonah Terrace (office) Tonawanda, NY 14150 Guardian Fire Testing Lab Location: 474 Hinman Ave. Buffalo, NY 14216

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Abstract

This report describes the three-hour successful Fire Endurance Test for South Shore Iron Works Integrity Wall which was tested in accordance with ASTM E 119-08a, Standard Test Methods for Fire Tests of Building Construction and Materials.

The wall consisted of South Shore Iron Works Tubular Load Bearing Steel Studs, two layers of 5/8" Certainteed Glas Roc Board on fire side, 2" thick, 8 pound density wool insulation and 2 layers of 5/8" type X gypsum wallboard on the unexposed side. The steel studs were 24" on center and the wallboard was applied vertically and horizontally.

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 º F as per the test standard.

The wall system met the fire endurance requirements for a one-hour rating as per the ASTM E 119-08a test standard.

We checked the ASTM Directory and ASTM E-119-08a is the latest edition of E-119.

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 119-08a edition.

3. Performance

This report presents the results of a fire test of a fire wall system as per ASTM E 119-08a . 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 2 layers of 5/8" Certainteed GlasRoc on the fire side and 2 layers of 5/8" Type X gypsum wallboard on the unexposed side with 2" of mineral wool batts in the stud cavirty.

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, tubular header and track, an all-welded system, is 6" wide. It consists of a 6" wide by 4" high by 3/16" thick steel tube header. The bottom track is 6" wide, 16 gauge steel with 1" legs. The studs are 2" x 2" by 1/8" 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. Additional insulation batts, 2 inches thick by 6 inches wide by 4 feet long, were placed between the stud tubes centered on the tubes.

4.1.3 2 layers of 5/8" Glas Roc was installed with one layer horizontal and one layer vertical on the fire side and 2 layers of 5/8" Type X gypsum wallboard on the unexposed lside, base layer horizontal and face layer vertical.

4.1 General (cont'd.)

4.1.3 (cont'd)
The wallboard and Glas Roc were fastened to the tubular steel with 1 5/8 inch long self-drilling, self tapping screws, 8 inches on center.

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

4.1.5 One coat of setting type wallboard joint compound, Dura Bond 90, was applied to the joints and the screw heads on the unexposed side.

4.1.6 Mineral wool batts, 8 pounds per cubic feet weight, 2 inches thick, 2 feet wide by 4 feet long was installed in the wall, and 6 inch wide batts were placed between the stud tubes centered on the tubes.

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 250ºF above its initial temperature of 59ºF.

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 0.0 inches of water.

6.3 The fire test was continued for 3 hours and 5 minutes.

7 <u>Fire Test Instrumentation</u>

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

Unexposed Surface Temperatures:
5 thermocouples were placed on the unexposed face of the wall. One was placed in the center of the test wall, 2 were over stud locations and 2 were in the field. The high temperature was 137º F. Temperatures are shown on the attached chart**.**

8 <u>Load bearing temperatures</u> were recorded at 4 points on each of 2 steel tubular stud locations. The average temperatures did not exceed 1100 º F, and a single T/C temperature high was 1175º F.

9 <u>Test Temperatures, Observations and Test Photos are attached.</u>

10 Conclusion

10.1 South Shore Iron Works' Integrity Wall, as a load bearing wall with 2 layers of 5/8" Glas Roc on the fire side and 2 layers of 5/8" Type X gypsum wallboard on the unexposed side, successfully withstood the 3 hour fire endurance test as per the test standard, ASTM E 119-08a.

10.2 This wall system also receives a 3-hour fire endurance rating.

GUARDIAN FIRE TESTING LABORATORIES, INC.

Test Performed and Reported by:

R. Joseph Pearson
Fire Testing Engineer

Report Reviewed by:

Dr. Lalit Kumar, P.E.
President

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 and as a Product Certification Agency per ISO 17020 and ISO Guide 65 through IAS, Report AA 713 and PCA 104

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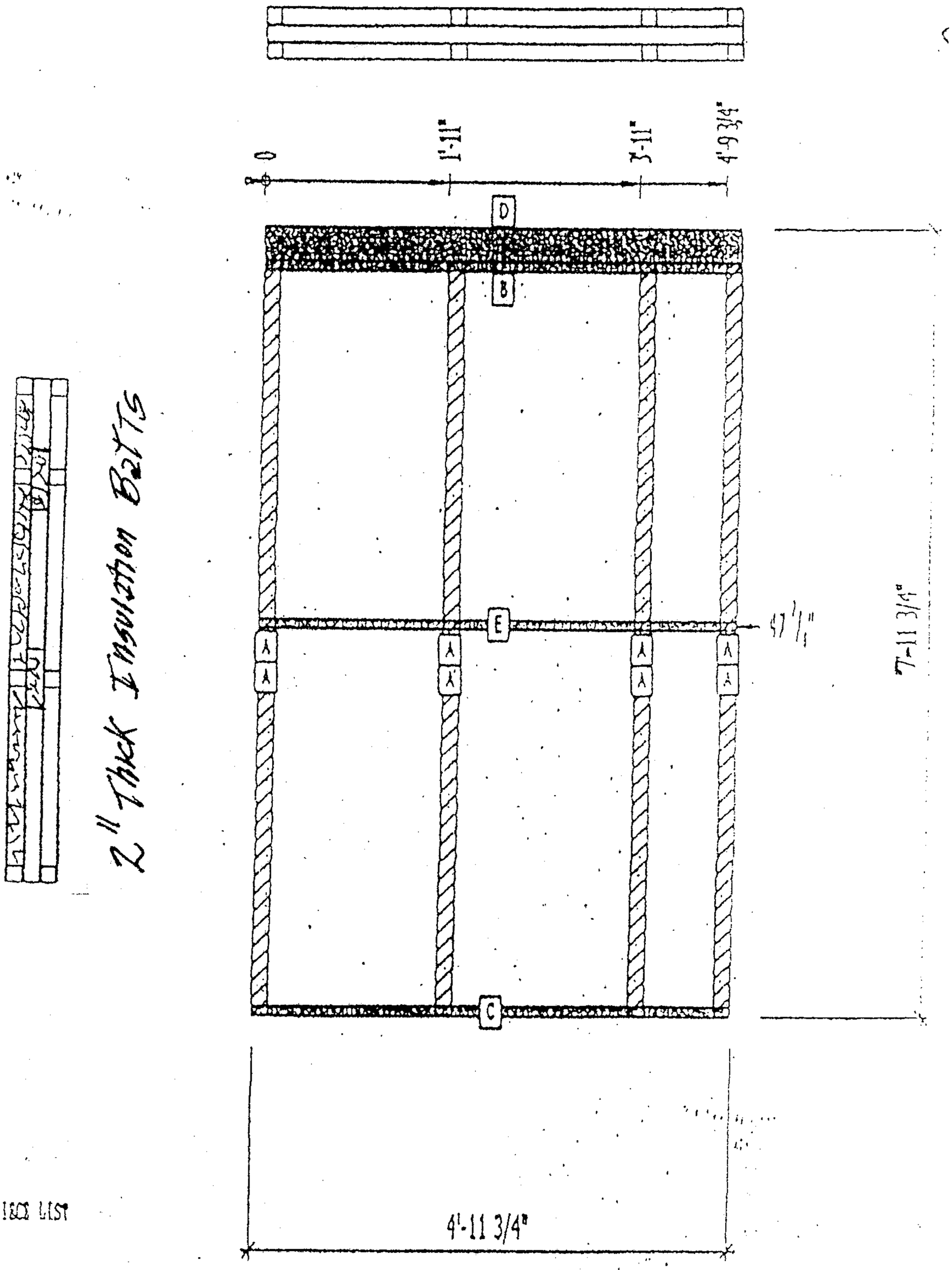
Drawing of Wall Construction

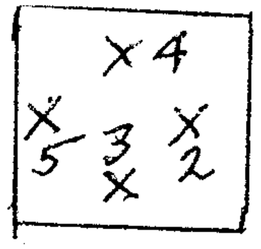


2" Thick Insulation Batts

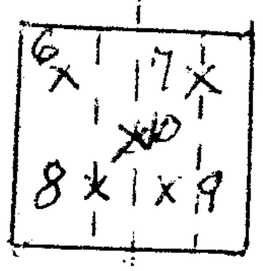
PIECE LIST

LABEL	QTY	SIZE	LENGTH USE
A	8	2x2x16GA	7'-7 1/2" STUD
B	1	600T125-54	4'-11 3/4" TOP TRACK
C	1	600T125-54	4'-11 3/4" BOTTOM TRACK
D	1	6x4x.1875	4'-11 3/4" TOP STUD
E	1	2x1x16GA	4'-11 5/8" HORIZONTAL BRACING

Integrity Wall



South Shore Iron Works Integrity Wall



MINUTES	AMBIENT	FURNACE				FURNACE AVERAGE	TARGET	UNEXPOSED SURFACE				
TIME	1	2	3	4	5	6	7	8	9	10	11	12
	1	2	3	4	5	—	—	6	7	8	9	10
0	58	51	51	51	51		60	57	57	55	56	57
5	61	1059	944	1070	1069	1036	1000	58	58	55	56	58
10	58	1045	990	1072	1052	1040	1300	58	58	55	56	58
15	58	1267	1274	1225	1197	1241	1399	58	58	55	56	58
20	58	1333	1344	1300	1261	1310	1462	58	59	55	56	58
25	58	1385	1427	1334	1306	1362	1510	60	56	57	5700	60
30	58	1426	1466	1385	1338	1402	1550	62	61	57	59	62
35	58	1513	1574	1461	1395	1486	1594	67	63	60	61	65
40	61	1541	1611	1495	1430	1520	1613	72	67	63	65	70
45	61	1580	1643	1572	1456	1550	1638	79	71	66	68	76
50	56	1631	1662	1563	1491	1587	1661	86	76	71	71	82
55	53	1642	1699	1569	1506	1604	1681	95	81	76	75	90
60	58	1653	1694	1584	1520	1613	1700	102	85	81	78	97
1:05	60	1667	1693	1593	1537	1623	1718	110	90	87	82	105
10	59	1670	1739	1604	1548	1640	1735	116	95	93	85	111
15	58	1683	1729	1613	1556	1645	1750	118	97	96	87	113
20	58	1682	1730	1621	1581	1654	1765	116	99	97	88	111
25	58	1693	1750	1624	1583	1662	1779	112	99	98	88	109
30	58	1663	1700	1614	1599	1644	1792	110	98	97	88	107
35	58	1695	1740	1628	1608	1668	1804	109	97	96	88	108
40	59	1681	1713	1617	1622	1658	1815	110	97	96	89	109
45	59	1653	1707	1635	1621	1654	1826	112	99	98	91	112
50	59	1666	1703	1638	1631	1660	1835	116	100	100	95	117
55	59	1678	1734	1639	1642	1674	1843	122	103	104	99	123
2:00	60	1648	1728	1648	1643	1667	1850	127	107	107	106	127
10	60	1647	1740	1643	1640	1668	1862	135	114	118	113	134
20	60	1655	1741	1650	1657	1676	1875	137	120	125	118	135
30	62	1651	1740	1648	1650	1666	1888	137	125	130	122	135
40	62	1686	1747	1648	1661	1686	1900	136	126	135	124	134
50	62	1666	1741	1647	1681	1689	1912	135	128	137	127	134
3:00	67	1678	1757	1652	1679	1692	1925	134	127	137	128	135

LIMIT TEMP - 250°F + AMBIENT = 310°F

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South Shore Iron Works Load Bearing Stud Temperatures

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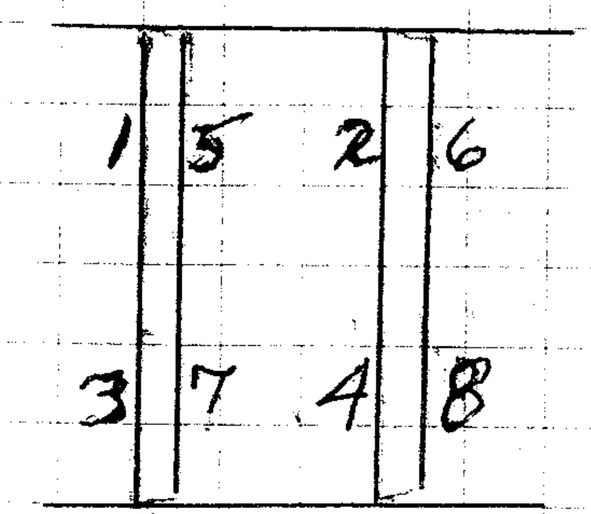
Glas Roc
EXTERIOR WALL

T/C #

TIME	1	2	3	4	5	6	7	8	9 AVG.	10
0 1	50	49	48	48	53	54	54	54	51	
10 2	64	63	63	62	55	54	54	54	59	
20 3	125	125	122	120	64	60	61	58	92	
30 4	176	173	173	168	89	83	87	79	129	
40 5	195	193	192	188	121	113	120	108	154	
50 6	203	201	209	200	152	140	148	135	174	
1:00 7	230	220	237	221	168	159	165	155	194	
10 8	262	248	279	248	170	165	168	161	213	
20 9	358	317	417	337	154	151	154	149	255	
30 10	486	414	568	463	153	149	152	146	316	
40 11	639	547	754	619	169	157	158	158	400	
50 12	782	673	929	769	187	171	173	169	482	
2:00 13	943	806	1051	925	230	206	210	196	571	
10 14	1060	946	1096	1025	247	243	250	240	638	
20 15	1099	1046	1121	1061	280	270	286	276	680	
30 16	1120	1078	1139	1083	307	289	308	294	702	
40 17	1133	1094	1153	1099	318	300	320	303	715	
50 18	1144	1105	1165	1112	327	310	333	313	726	
3:00 19	1152	1113	1175	1123	340	319	346	324	737	
20										

T/C Locations



FIRESIDE

1 ☐ 3	2 ☐ 4
5 ☐ 7	6 ☐ 8

Temp. Limit: Avg. Shall not exceed 1100°F

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South Shore Iron Works Unexposed Side Temperature Data
High Temperature in ºF: T/C#

The highest temperatures at 3 hours:

T/C#	Location	Temperature ºF
1	ambient	62
8	left lower, over stud	135
10	center	135
7	upper right, over stud	128
9	lower right	128
6	upper left	137

Failure temperature was 310ºF

The highest temperatures on the steel studs:

1	1152
2	1113
3	1175
4	1123
5	340
6	319
7	346
8	324
Average	737

Test Observations

There were no visable changes to the unexposed side.
Fire side: The color changed to glowing orange after 30 minutes of test time, and the Glas Roc stayed in place

Before test: side to be exposed

back of exposed side

unexposed side

Completed unexposed side

10:00

60:00

120:00

180:00

After test: exposed side

After test: exposed side

After test: showing back of unexposed side