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FIRE TEST REPORT: 1-Hour Floor/Ceiling Assembly with 2 x 6 Wood Joists, 16" O.C.,
3/4" TruFlor O.S.B., 6" Fiberglass Insulation, 1/2" Regular
Gypsum Wallboard Ceiling Coated With 25-mil Thick Intumescent
Coating, ForceField Fireguard E-84.

CLIENT/MFG: Shield Industries, Inc.
131 Smokehill Lane
Woodstock, GA 30168

MODEL, NAME & NUMBER: ForceField FireGuard E-84 Intumescent Coating,

STANDARDS TESTED TO: ASTM E-119-10a Floor/Ceiling; NFPA 251; UL 263, Small Scale
Test; CAN/ULC-S-101-07 With No Load Capacity.

REPORT NO: GL60911

TEST DATE: 1/20/11

REPORT DATE: 2/1/11

TEST RESULTS: Test met the intent of the test standard for a 1-hour fire rating with no load.

**TEST PERFORMED AND
REPORT PREPARED BY:** GUARDIAN FIRE TESTING LABORATORIES, INC.
480 Hinman Ave.
Buffalo, NY 14216-1019

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Abstract

This report describes the results obtained when the 1/2" regular gypsum wallboard ceiling was coated with a 25-mil thickness intumescent coating: ForceField Fireguard E-84.

The ceiling assembly consisted of:

2" x 6" wood joists, spaced 16" O.C. and 2" x 6" wood rim headers;
6" thick R-13 Fiberglass insulation;
3/4" OSB flooring
1/2" regular gypsum wallboard;

The assembly was built to a small scale.

There was no load on the assembly.

The test standards used were: ASTM E-119, ULC-S-101, and NFPA 251.

The test was terminated at 1 hour.

The high temperature on the unexposed side of the assembly was 201°F.

1. General

Units of measurement used in this test are English: inches, feet and temperature degrees Fahrenheit.

The testing was conducted by Guardian Fire Testing Laboratories personnel at Guardian's fire testing lab at 480 Hinman Ave., Buffalo, NY. The assembly was constructed by Shield Industries personnel.

Guardian is an ISO 17025:2005 accredited fire testing laboratory.

2. Performance

This report presents the results of a floor/ceiling assembly fire test conducted according to ASTM E-119 and ULC-S-101. 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. This assembly went 1 hour.

2.1 Construction

The test assembly was constructed using the following materials:

- a. Wood floor joists and headers—2" x 6", spaced 16" O.C.;
- b. floor--3/4" TruFlor oriented strand board (O.S.B.);
- c. 1 layer of 1/2" regular gypsum wallboard;
- d. 6" thick R-13 fiberglass insulation between the joists;
- e. 25-mil thickness of ForceField Fireguard E-84 Intumescent Coating.

2.2 Assembling

- 2.2a Wood joists were spaced 16" on center with a rim header, nailed together with 10d common nails.
- 2.2b The O.S.B was placed on top of the joists on the unexposed side and was fastened with 1-5/8" screws. The test assembly was 4 feet x 4 feet.
- 2.2c 6" thick R-13 fiberglass insulation was installed between the joists.
- 2.2d 1 layer of 1/2" regular gypsum wallboard was attached to the joists and headers with 1-5/8" screws 8" O.C.
- 2.2e 25-mil thick coating of intumescent coating on the face of the 1/2" regular gypsum wallboard.

3. Fire Endurance Test

- 3.1 The ASTM E-119 Tibor Harmathy design horizontal furnace was used for the fire endurance test.
- 3.2 Five thermocouples were placed on the unexposed surface of the assembly at the approximate center and four at the approximate center of its quarter sections.
- 3.3 The test unit was placed on the top surface of the horizontal furnace.
- 3.4 The furnace was ignited, and the temperature curve complied with the standard. The furnace average temperature was within 10% for the first hour.
- 3.5 The furnace was shut off at 1 hour.
- 3.6 The unit was left on the furnace to cool down.

3. Fire Endurance Test (continued)

- 3.7 Test observations are attached to this report.
- 3.8 Visual records, test photos are attached to this report.
- 3.9 Furnace temperatures are attached.

4. Conclusions

The 25-mil thickness of Forcefield Fireguard E-84 Intumescent coating applied to the face of the 1/2" regular gypsum wallboard ceiling with 2" x 6" wood floor joists, 6' fiberglass insulation and 3/4" TruFlor O.S.B. flooring enabled the system to obtain a 1-hour fire rating.

The test time went 59 minutes and 40 seconds before burn-through occurred. Test time is rounded to the nearest minute, giving the system a 60-minute rating.

The high unexposed temperature at 55 minutes was 201°F with an allowable single high temperature of 374°F. The high average temperature at 55 minutes was 143°F with an allowable high average temperature of 301°F. Therefore the allowable average unexposed surface temperature could have risen another 157°F.

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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The laboratory's test report does not constitute or imply product certification, approval or endorsement by this laboratory.

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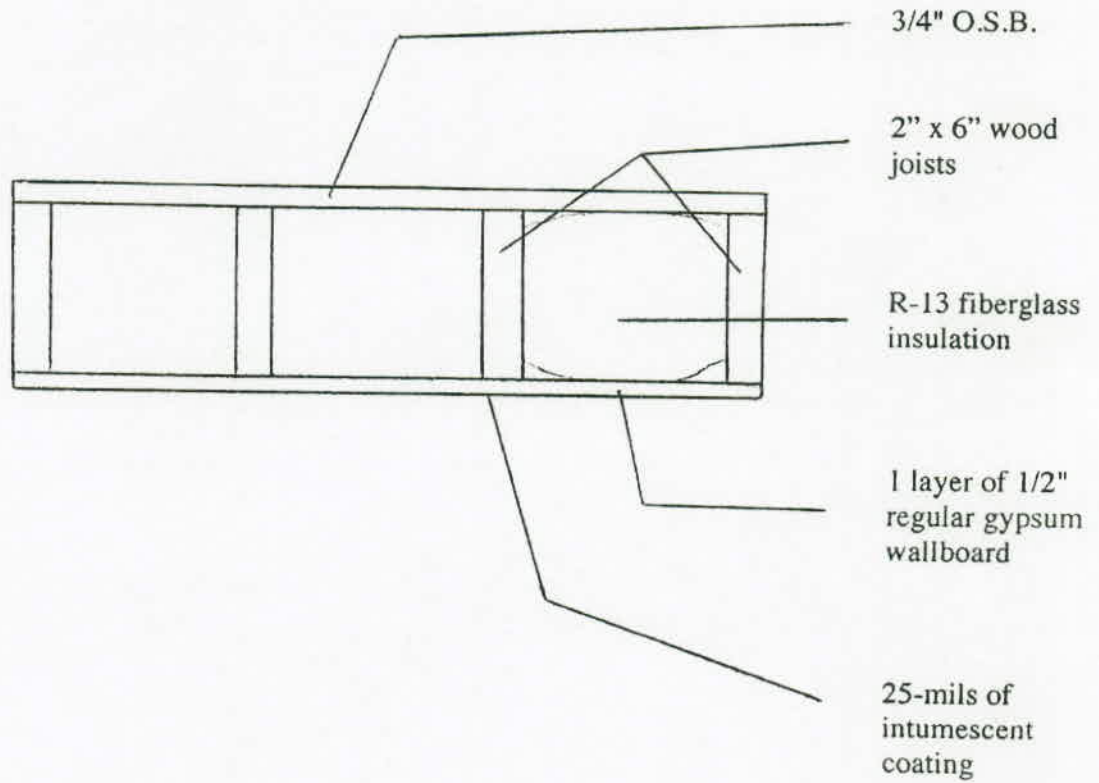
716 835 6880: Fax: 716 835 5682
716 877 2760

email: gftli@earthlink.net

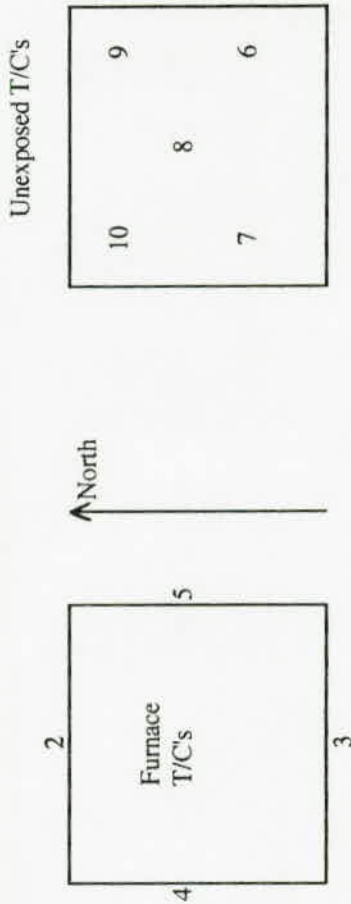
website www.firetesting.com

Assembly Drawing

Cross Sectional View



Shield Industries ForceField FireGuard E-84 Coating, 25 mil thickness
 Start Time of Day: 8:54 a.m. Date: 1/120/11



Time minutes	Furnace Temperatures °F					Furnace Average	Unexposed Temperatures °F					Unexposed Average
	1 Ambient	2	3	4	5		6	7	8	9	10	
0	59	42	41	42	41	42	49	49	54	52	53	51
5	1082	998	1165	1101	1027	1073	54	55	56	53	54	54
10	56	1371	1341	1399	1324	1358	64	61	61	56	57	60
15	57	1240	1171	1283	1144	1209	68	64	65	57	58	62
20	57	1502	1533	1558	1564	1539	81	73	73	72	65	73
25	55	1452	1534	1469	1516	1493	88	79	78	67	69	76
30	58	1526	1579	1544	1566	1552	96	86	87	75	74	84
35	57	1602	1688	1664	1644	1649	103	95	93	82	79	90
40	58	1670	1648	1728	1661	1689	108	101	97	85	81	94
45	58	1534	1535	1597	1534	1550	109	98	95	88	85	95
50	57	1788	1853	1771	1849	1815	116	106	186	91	90	117
55	65	1547	1532	1552	1533	1541	139	201	168	101	105	143
60	65	1515	1578	1514	1597	1588	146	197	100	172	97	142

Omega Thermocouple readouts calibrated by: J & M Calibration Date: 7/9/2010

Test Observations

<u>Test Time Minutes</u>	<u>Observation- FireGuard E-84</u> <u>thickness of coating: 25 mil</u>
0:00	Test start time of day 8:54 am, gas on
0:03	Intumescing, bubbling and charring
0:07	Entire surface intumesced
0:15	No change
0:20	No change
0:25	No change
0:30	Piece of intumescent coating fell off at #7-10 T/C area
0:32	Crackling and popping sounds
0:34	Pieces of intumescent coating fell off at #8 and #6 T/C area
0:37	Pieces of intumescent coating fell off at #9 and #6 T/C area
0:43	Crackling sounds
0:48	T/C #8 steam-vapor
0:55	Steam vapor and crackling sounds
0:58	Unexposed surface- char-brown marks on near #8 T/C
0:59	Unexposed surface- embers near #8 T/C
0:59:40	Unexposed surface- Flaming, test terminated.

After Test Notes

Flaming extinguished.

Test time is rounded to the nearest minute, therefore test time is 60 minutes.



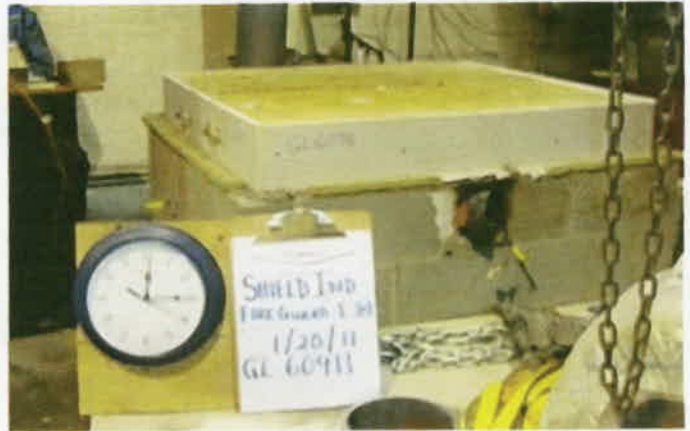
Before test: test sample ceiling, side to be exposed



unexposed side, floor



Gas On



00:15



00:35



00:45



00:56



01:00



After test: unexposed side; 01:01



After test: exposed side