

CLIENT: **FOAMCO, LLC.**
5539 Ruffin Rd.
San Diego, CA 92123
Attn: Josh DeGano

Test Report No:	TJ1503-R	Date:	October 25, 2013
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SUBJECT: Flammability Testing to NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth – 2011 Edition.

PRODUCT EVALUATED: Client refers to samples received as “**Faux Beams by FOAMCo**”. This project was entered into our receiving system on 9/11/13 in good condition.

TEST REQUESTED: Flammability Testing to NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth* – 2011 Edition and 2006 IBC Section 803.2.1 / 2009 IBC Section 803.1.2 / NFPA 101, and *Life Safety Code*, 2009 Edition, Section 10.2.3.7.2, and 2009 IRC 316.6. The referenced procedure was used to generate this report and data obtained from the test.

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

TEST DATE: October 4, 2012

CONCLUSION: Currently, there are no acceptance criteria listed in NFPA 286. Based on the test results herein, the test room COMPLIES with NFPA 101; Life Safety Code, 2009 Edition, Section 10.2.3.7.2., 2006, 2009, and 2012 IBC Section 803.1.2, and 2006, 2009, and 2012 IRC 316.6.

CERTIFICATION: The tests reported here were conducted under the continuous direct supervision of QAI Laboratories Inc., Tulsa, OK. No revisions of this report will be allowed after 90 days of the original report issue.

REVISION: The verbiage in the fourth paragraph on the second page was changed per client request to more accurately describe the method used for installation.

**SIGNED FOR AND ON BEHALF OF
QAI LABORATORIES, INC.**



David Bauchmoyer
Test Technician



J. Brian McDonald
Operations Manager



Test Sample Description:

QAI Laboratories, Inc. conducted testing for FOAMCo, LLC on “Faux Beams by FOAMCo” to evaluate heat release and flame spread properties when subjected to specific ignition conditions. These beams consisted of an Expanded Polystyrene (EPS) core with a gypsum based coating. Testing was conducted in accordance with NFPA 286, 2011 Edition. This testing was performed on October 4, 2013.

Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

The test room was built on September 26th, 2013 by QAI Laboratory personnel prior to the application of the test sample. The three walls consisted of 2 x 4 wood studs, spaced 24 inches on center. The ceiling was constructed using 2 x 4 wood joists, spaced 24 inches on center, running perpendicular to the side walls. The interior ceiling and walls were covered with 5/8” thick, Type X gypsum board. The final interior dimensions were 8 feet high, 8 feet wide and 12 feet deep.

On September 27th, 2013, representatives from QAI Laboratories installed the faux beams to the ceiling of the room with the manufacturer’s recommended adhesive along with installation instructions from the client. The beams measured a nominal 8.5 inches by 8.5 inches by 8 feet long. The beams were spaced 35 inches on center (providing approximately 25 inches between the beams), with the first beam flush against the 8 feet by 8 feet wall, installed perpendicular to the 12 feet long wall. This room was placed into a conditioning room with conditions that meet the requirement of this standard for at least 48 hours prior to testing.

The temperature of the test chamber prior to test was 76°F (24°C) and the relative humidity was 56%.

Ignition Source:

The ignition source for the test is a gas burner with a nominal 12 by 12 inch orifice, filled with a minimum 4 inch layer of Ottawa sand. The top surface of the burner through which the gas is applied is positioned 12 inches above the floor. The burner enclosure was placed 1 inch away from each wall in the test corner, opposite the door.

Burner Gas Flow:

CP Grade Propane was used for burner supply gas. A calibrated mass flow meter (Asset A300110, due for calibration 3/28/14) was used to meter flow to the burner. The 40 kW 5 minute exposure flowed 27 l/min Propane and the 160 kW exposure flowed 108 l/min Propane. These numbers were based upon the following constant: 1.485 kW min/l.

Compartment Geometry:

The interior dimensions of the floor of the fire test room, when the specimens are in place, measures 8 by 12 feet. The finished ceiling is 8 feet +/- 0.5 inches above the floor. The four walls are right angles defining the compartment. The compartment contains a 30 +/- 0.25 by 80 +/- 0.25 inch doorway in the center of one of the 8 by 8 foot walls. No other openings were present to provide ventilation.

Heat Release Rate Information:

All Heat Release Rate information obtained during this test utilized oxygen consumption calorimetry. The equation used for calculation is as follows:

$$\dot{q} = E * 1.10 * C \sqrt{\left[\frac{\Delta p}{T_e} \right]} * \left[\frac{(X_{O_2}^{A^*} - X_{O_2}^A)}{1 + \phi + (\alpha - 1)} \right]$$

Thermocouple Placement:

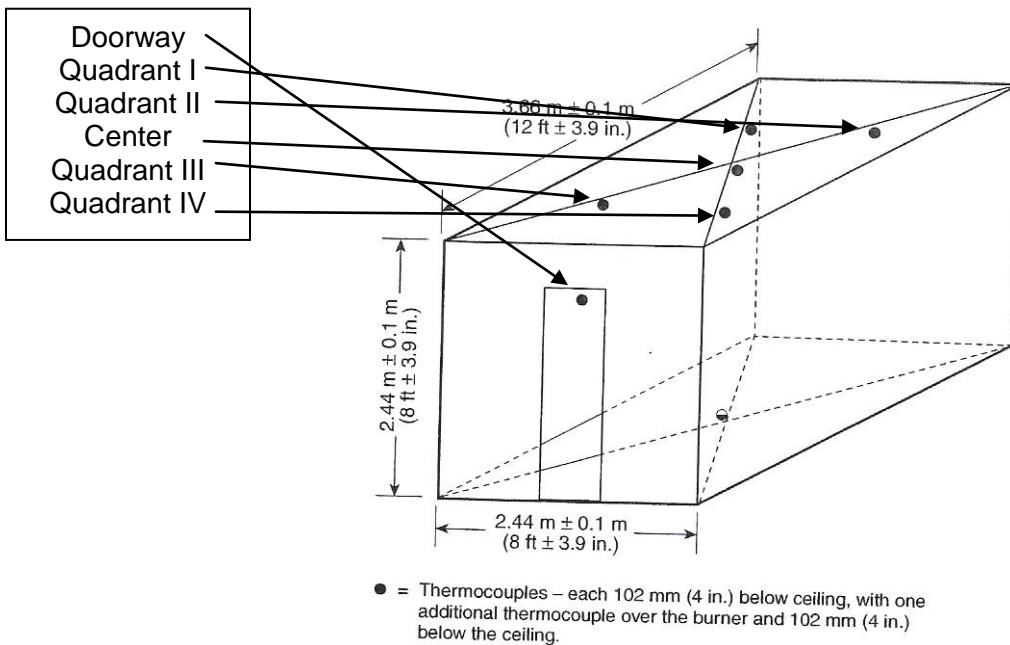


FIGURE 1. Thermocouple Locations



VISUAL OBSERVATIONS and DISCUSSIONS OF PERFORMANCE:

- 0:00:00 – Sand diffusion burner lit to 40 kW flame
- 0:01:00 – No contribution of flame or smoke from beams on ceiling
- 0:02:00 – No contribution of flame or smoke from beams on ceiling
- 0:03:00 – No contribution of flame or smoke from beams on ceiling
- 0:04:00 – No contribution of flame or smoke from beams on ceiling
- 0:05:00 – Sand diffusion burner increased to 160 kW flame
- 0:06:00 – No contribution of flame or smoke from beams on ceiling
- 0:08:00 – Very minor smoke showing, no flame or major smoke from test sample
- 0:10:00 – No change in conditions above
- 0:12:00 – Some very minor flaming activity noted in the corner of ignition
- 0:13:00 – The coating appears to be breaking away only slightly on the beam in ignition corner.
- 0:14:00 – A piece of gypsum coating fell away from test sample resulting in flame and smoke increase
- 0:15:00 – NFPA 286 test complete, flames immediately self-extinguish after gas shut off

Flame Spread and Discussion: *(video record on file)*

Flame spread of the sample was minimal. Only slight and negligible contribution from the test sample was noted around flames from burner. At approximately 14 minutes into test, a section of the gypsum coating fell away. The resulting fire was specific to melted EPS sample being exposed to flame. Flames did not reach the extremities of the test module and flashover, as defined in the specified test designation, did not occur.

Smoke Density:

A peak duct smoke value of 77% (23% obscured) and a Peak Smoke Release Rate was measured to be 0.20 m²/s 15 minutes after ignition.

The smoke obscuration reading was taken in the center of a 16 inch diameter duct.

Heat Flux Information:

The heat flux gauge registered a peak Heat Flux of 4.8 kW/m² at 15:00 min into test.

CHARRING MEASUREMENT:

All charring as a result of testing this assembly was limited to the corner of the burner placement. Only the beam directly exposed to flames had damage. At about 14 minutes into test, the gypsum based coating fell away from the test sample exposing the EPS core to fire. About 2 feet of the EPS had melted out of the assembly by test end. The rest of the ceiling and sample showed only dark discoloration due to soot deposition and evidence of slight melting of wall covering.



FLASHOVER POTENTIAL:

In Section 1.3.1 of NFPA 286, the definition of flashover is an event where any two of the following conditions have been attained:

- Heat Release Rate exceeds 1 MW
- Heat Flux at the floor exceeds 20 kW/m²
- Average upper layer temperature exceeds 600°C (1112°F)
- Flames exit doorway
- Autoignition of a paper target on the floor occurs

For purposes these test results, the following compares the standard's definition of flashover with actual test results for comparison purposes:

- Peak Heat Release Rate of 248 kW
- Heat Flux at floor – Peak of 4.8 kW/m²
- Average upper average temperature – 626°F (330°C)
- Flames did not exit doorway
- Both paper targets undamaged during test

LIFE SAFETY CODE:

From NFPA 101, Section 10.2.3.7.2, and 2009 IBC 803.1.2.1, the following conditions shall be met when using the test protocol of NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution Wall and Ceiling Interior Finish to Room Fire Growth:

- Flames shall not spread to the ceiling during the 40 kW flame exposure.
- During the 160 kW flame exposure, the following criteria shall be met:
 - Flames shall not spread to the outer extremities of the sample of the 8 ft x 12 ft wall
 - Flashover shall not occur
- The peak heat release rate throughout the test shall not exceed 800 kW.
- The total smoke released shall not exceed 1000 m²



RESULTS:

Temperature vs. Time Chart:

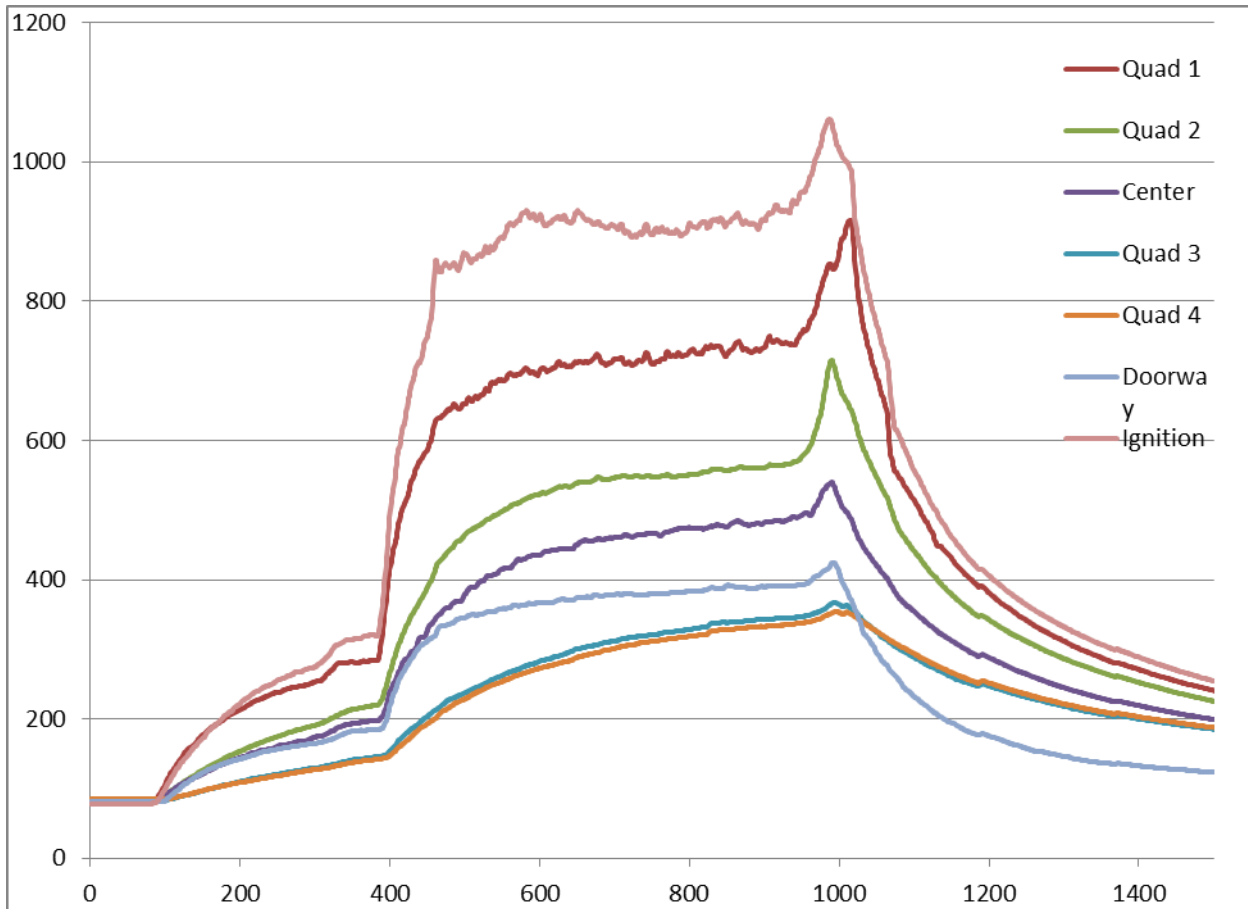


FIGURE 2. Temperature vs. Time

Maximum Peak Temperatures:

Doorway	424°F (218°C)
Center	540°F (282°C)
Quadrant I	916°F (491°C)
Quadrant II	715°F (379°C)
Ignition	1062°F (572°C)
Quadrant III	367°F (186°C)
Quadrant IV	394°F (572°C)

PEAK AVERAGE UPPER LAYER TEMP – 626°F (330°C)



Heat Release Rate vs. Time Chart:

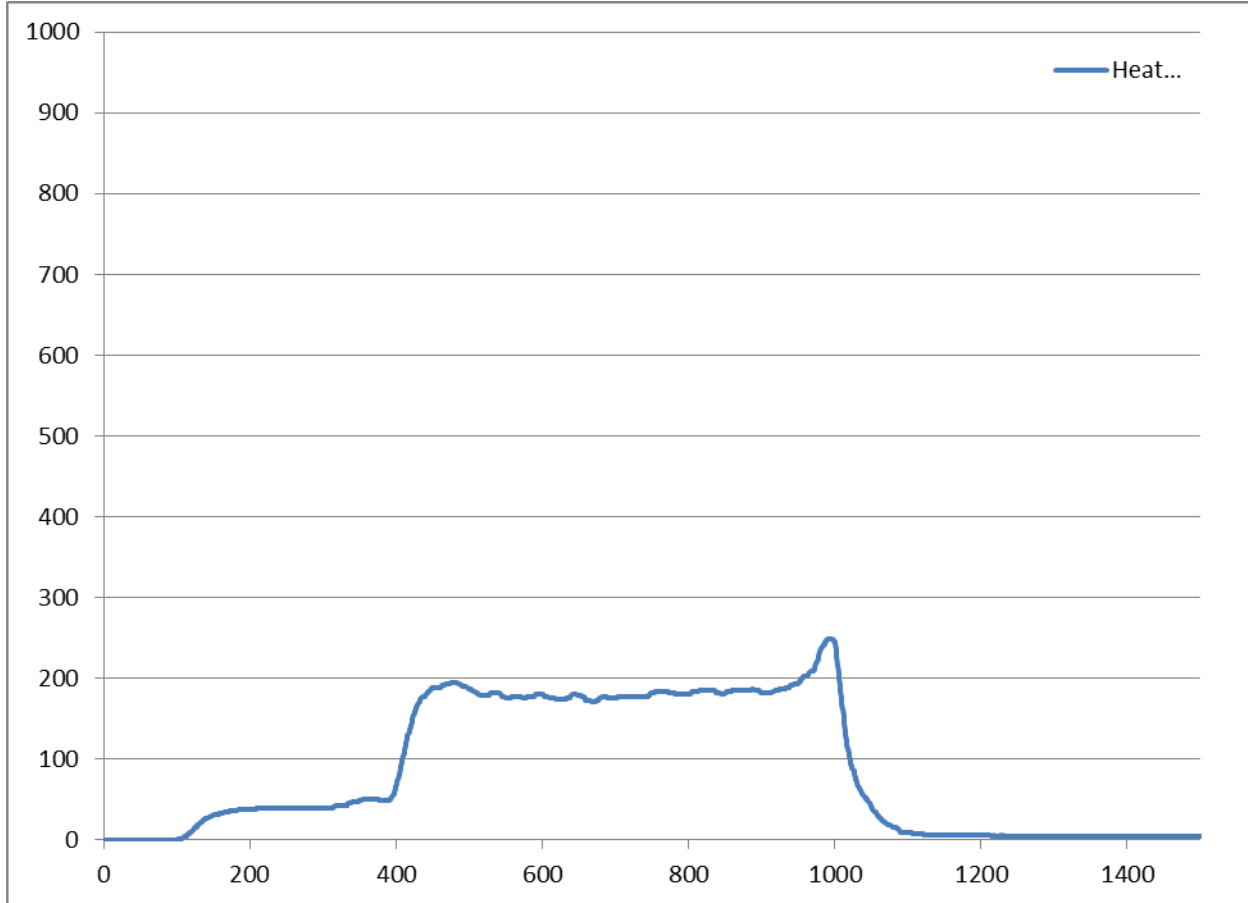


FIGURE 3. Heat Release Rate vs. Time

Numerical Values:

0-5 min average (kW)	40.4
5-15 min average (kW)	183.1
Peak Heat Release Rate	248 kW @ 15:00
Total Heat Released During 15 min Test	137.8



Smoke Obscuration and Smoke Release Rate:

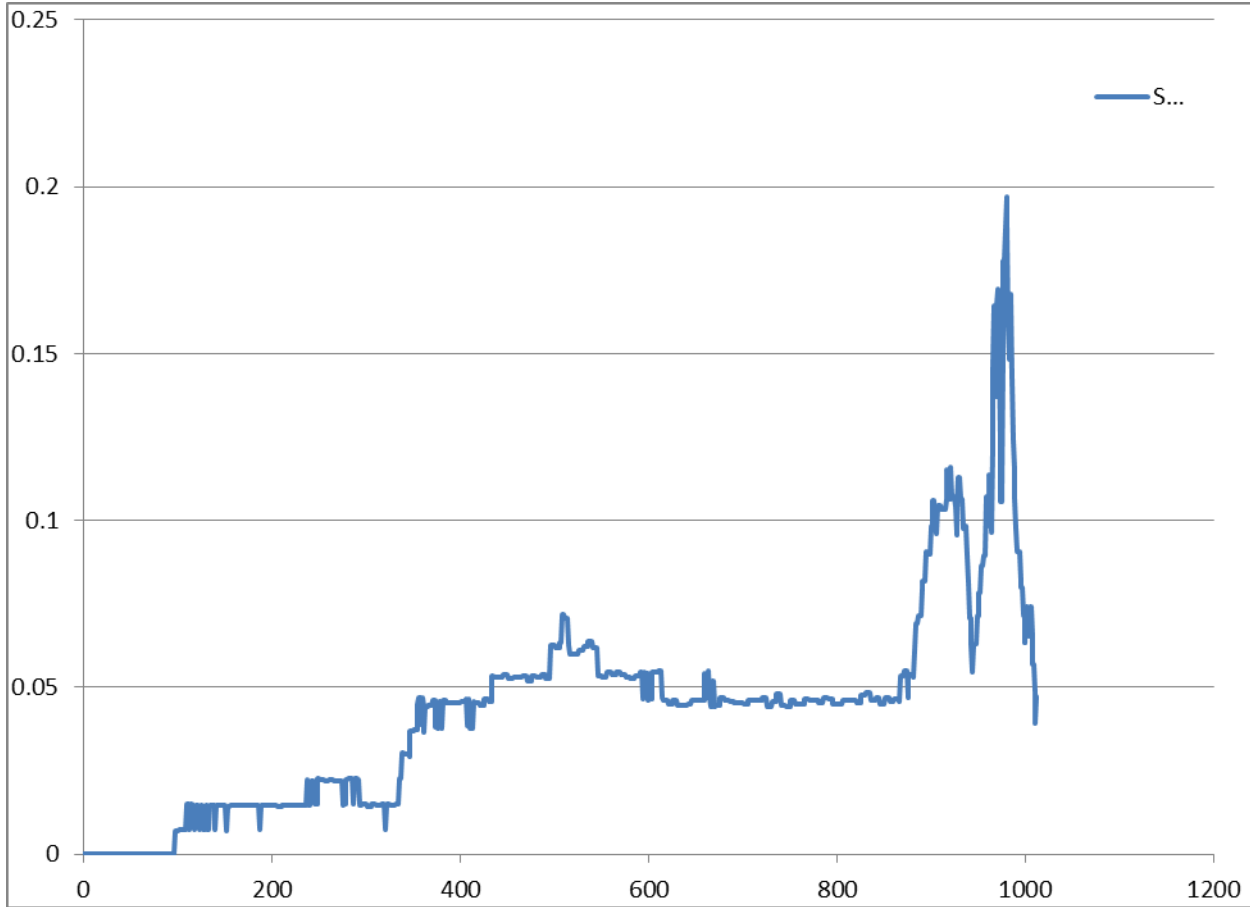


FIGURE 4. Smoke Release Rate vs. Time

Numerical Values:

0-5 min average (m²/s)	0.02
5-15 min average (m²/s)	0.06
Peak Smoke Release Rate	0.20 m²/s @ 15:00
Total Smoke Released	42.4
Peak Obscuration	23%

PHOTO: BEFORE TEST



Sign



Overall



Ignition Corner



Overall

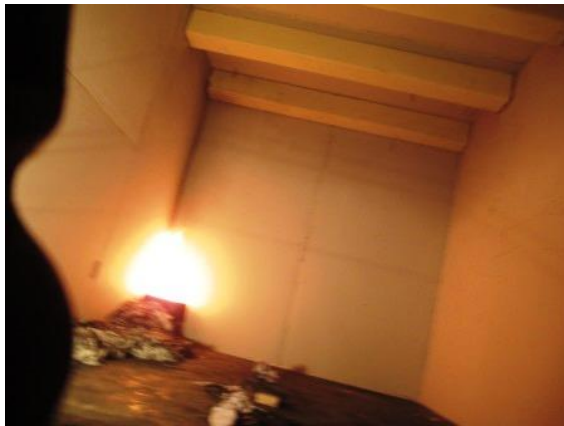
PHOTOS: DURING TEST



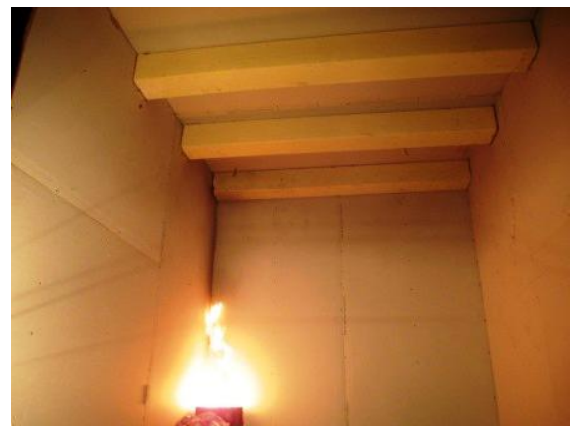
Test Start



2 Minutes In



3 Minutes In



At 5 minutes

PHOTO: DURING TEST (Cont.)



6 Minutes In



9 Minutes In



13 Minutes In



15 Minutes In

PHOTO: AFTER TEST



Photos Immediately After Test

END OF REPORT