

CLIENT: **PREMIUM SPRAY PRODUCTS**
1255 Kennestone Cir. STE 200
Marietta, GA 30066
Attn: Dave Mulkey

Test Report No:	TJ0709-2	Date:	September 12, 2012
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SUBJECT: Room Corner Burn – Spray Applied Foam, AC377 Appendix X Requirements.

PRODUCT EVALUATED: Client refers to samples received as “**Foamsulate™ 210 Series, 2lb Spray Foam - Unscarfed**” manufactured by Premium Spray Products. This project was entered into our receiving system on 7/18/12 in good condition.

TEST REQUESTED: Flammability Testing to ICC-ES AC377 Appendix X, Approved June 2009 acceptance criteria for spray-applied foam plastic insulation using NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth – 2011 Edition. The referenced procedure was used to generate this report and data obtained from the test.

TEST DATE: August 30, 2012

RESULTS: Results can be found on the following pages.

CONCLUSION: ICC-ES AC377 Appendix X pass / fail criteria require the assembly to meet or surpass 4:18 min:sec. The assembly tested met the requirements.

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.



Greg Ertel
Test Technician

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



J. Brian McDonald
Operations Manager



Test Sample Description:

QAI Laboratories, Inc. conducted testing for Premium Spray Products using Foamsulate™ 210, 2lb Density Spray Foam to evaluate heat release and flame spread properties when subjected to specific ignition conditions. Testing was conducted in accordance with AC 377, Appendix X (November 2, 2010) which references NFPA 286, 2011 Edition. This testing was performed on January 13, 2012.

The test foam reported in this document was not sampled by QAI or its representatives.

The test room was built by QAI Laboratory personnel prior to the application of the test sample. The three walls of the test specimen consisted of 2 x 8 wood studs, spaced 24 inches on center. The ceiling was constructed using 2 x 12 wood joists, spaced 24 inches on center, running parallel (as per the standard) to the side walls. The exterior of the studs and joists 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.

Between July 31 and August 1, 2012, Premium Spray Products representatives sprayed the stud cavities with 7 ¼ inches of Foamsulate™ 210, 2lb Spray Foam. The joist cavities were filled with 11 ¼ inches of Foamsulate™ 210, 2lb Spray Foam, spray foam insulation.

The test room in question was not scarfed prior to testing. Scarfed, for purposes of this test report, means the removal of the foam's top most skin layer by means of shaving or grinding of the foam surface after installation.

The temperature of the test chamber prior to test was 79.8°F (27°C) and the relative humidity was 50.1%.

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 as per AC377 Appendix X from the side wall and back 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 2/23/13) was used to meter flow to the burner. The 40 kW 5 minute exposure flowed 27 l/min Propane. These numbers were based upon the following constant: 1.485 kW min/l.

Compartment Geometry:

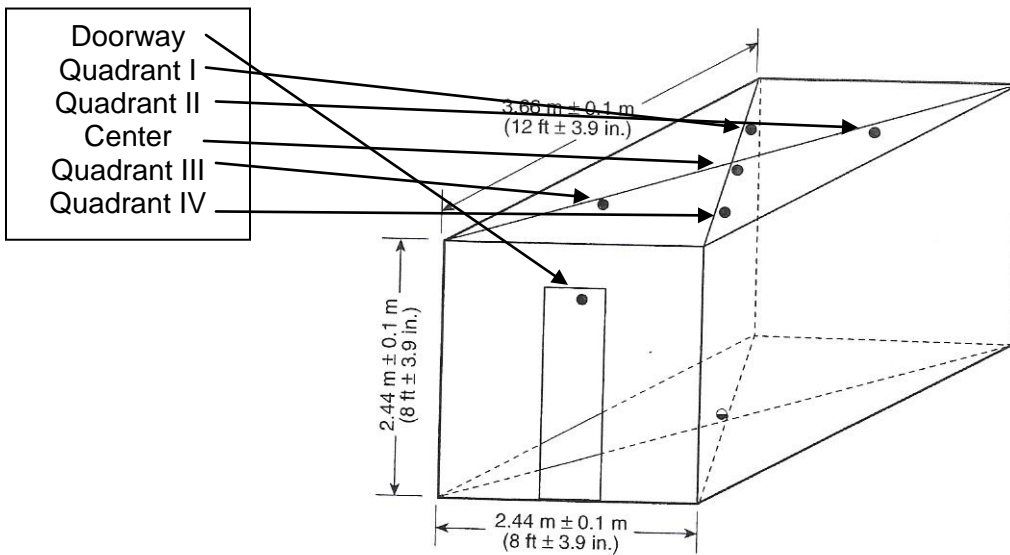
The interior dimensions of the floor of the fire test room, when the specimens are in place, measures 8 by 12 feet. The finished ceiling is 8 feet +/- 0.5 inches above the floor. The four walls are right angles defining the compartment. The compartment contains a 30 +/- 0.25 by 80 +/- 0.25 inch doorway 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:

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

Thermocouple Placement:



● = Thermocouples – each 102 mm (4 in.) below ceiling, with one additional thermocouple over the burner and 102 mm (4 in.) below the ceiling.

FIGURE 1. Thermocouple Locations



VISUAL OBSERVATIONS and DISCUSSIONS OF PERFORMANCE:

- 0:00:00 – Sand diffusion burner lit to 40 kW flame
- 0:01:00 – Flames at or close to ceiling, black smoke noted
- 0:03:00 – Flames decreasing, smoke layer lightening in color and decreasing in density
- 0:04:00 – Flame level steady, smoke layer same, light in color
- 0:04:18 – Overall test concluded, once gas flow was terminated, some residual flame lasted approx. 1 minute. Flames about 12 inches high on ignition wall close to burner

Flame Spread and Charring Measurement Discussion:

Flame spread of sample was limited to an approximate 1 1/2 foot wide on back wall, 1 1/2 foot wide on side wall and 8 foot height. Some black discoloration was noted on the ceiling approximately 6 feet in a semicircle around the test ignition corner. Flames did not reach the extremities of the test cell during test and flashover, as defined in the specified test designation, did not occur.

Smoke Density:

A peak duct smoke obscuration value of 35.4% (64.6 % blocked) and a Smoke Release Rate was 0.425 m²/sec was measured 1 minute 00 seconds after ignition.

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

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
- Average upper layer temperature exceeds 600°C (1112°F)
- Flames exit doorway

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 160 kW
- Average upper average temperature – 268°F (131°C)
- Flames did not exit doorway



RESULTS:

Temperature vs. Time Chart:

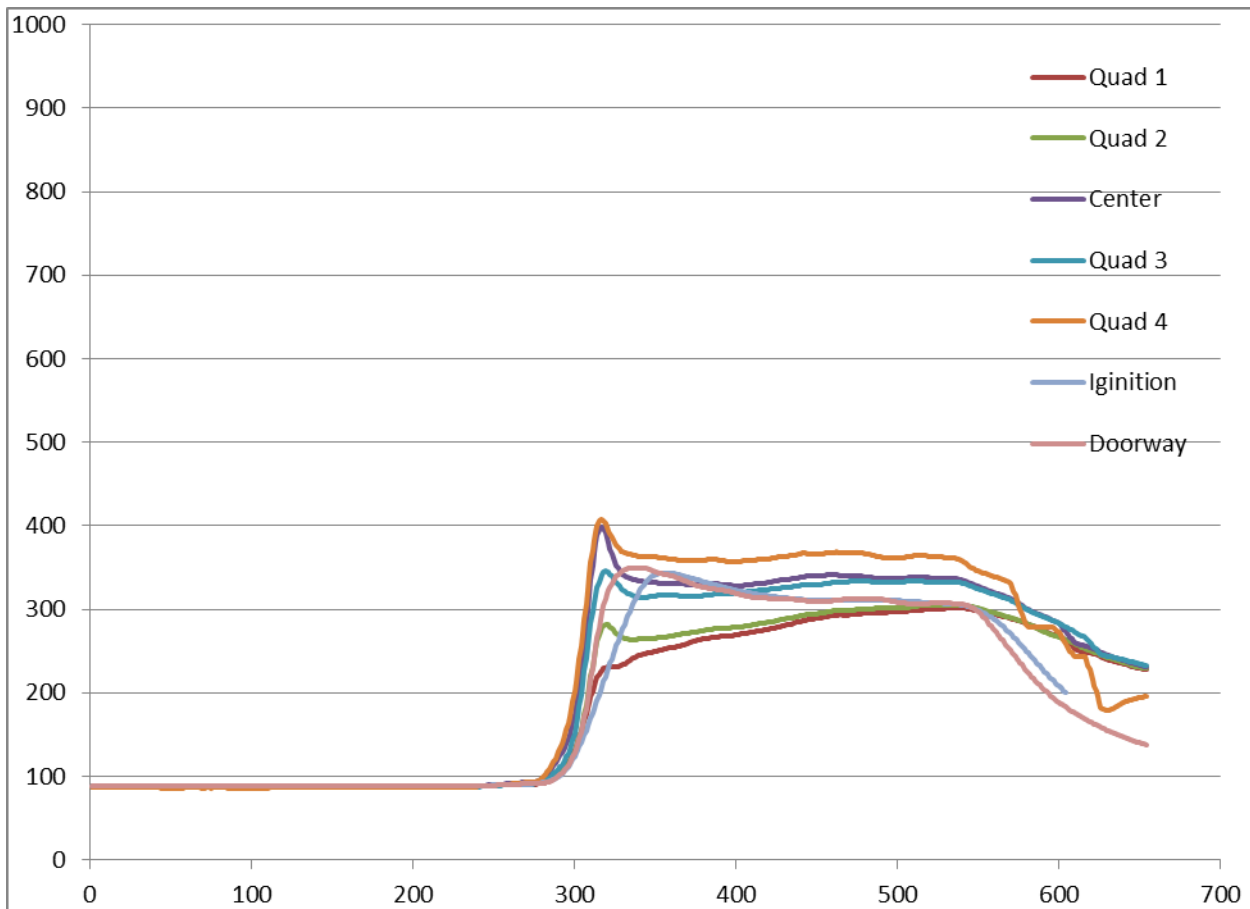


FIGURE 2. Temperature vs. Time

Maximum Peak Temperatures:

Doorway	343°F (173°C)
Center	398°F (203°C)
Quadrant I	302°F (150°C)
Quadrant II	305°F (152°C)
Quadrant III	345°F (174°C)
Quadrant IV	407°F (208°C)
Ignition	325°F (163°C)

AVERAGE UPPER LAYER TEMP – 263°F (128°C)



Heat Release Rate vs. Time Chart:

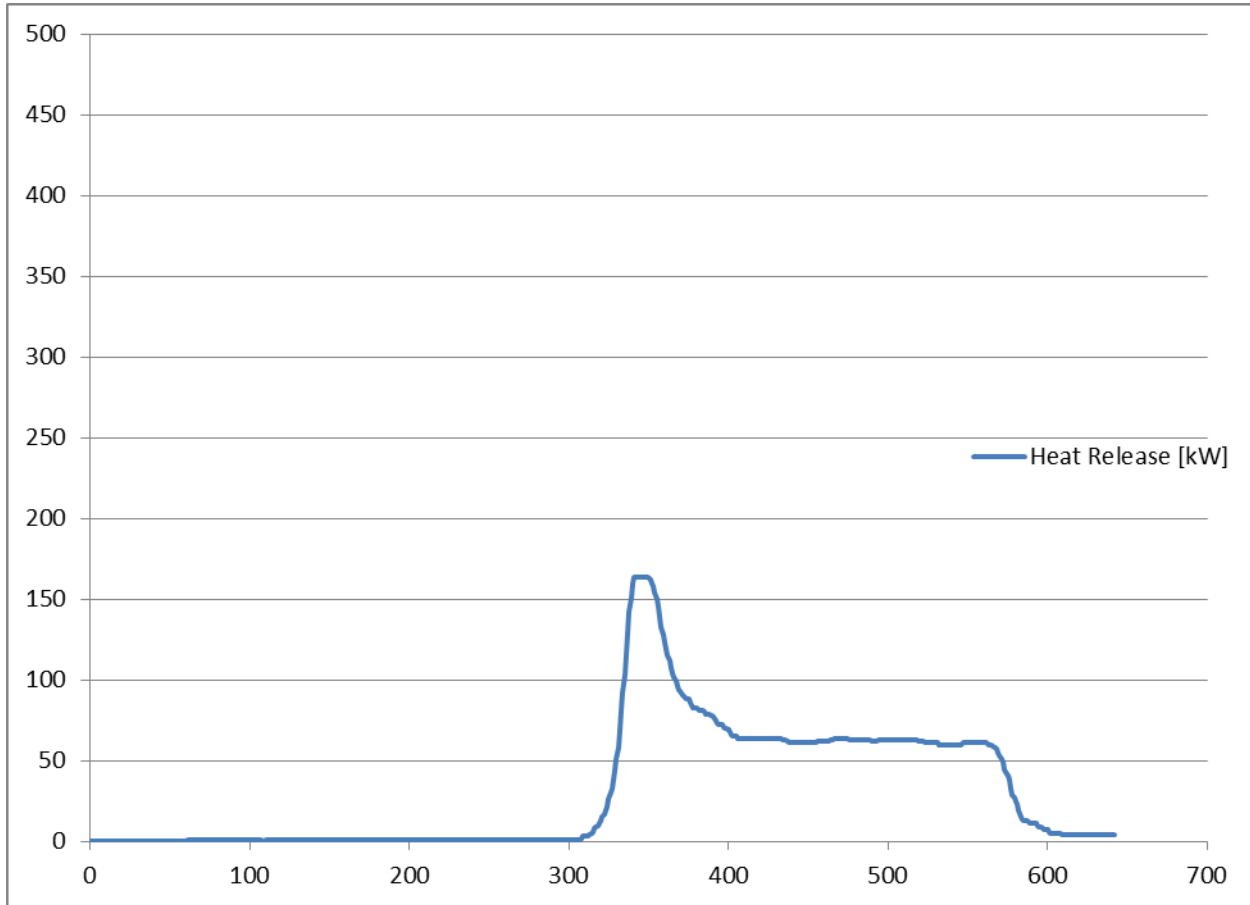


FIGURE 3. Heat Release Rate vs. Time

Numeric Values:

0-5 min average	33.6 kW
Peak Heat Release Rate	160 kW @ 00:37
Total Heat Released During 5 min Test	19.7 MJ

PHOTOS: BEFORE



Ignition Corner Prior to Testing



Opposite Corner Prior to Testing

PHOTOS: BEFORE TEST



Overall

PHOTOS: DURING TEST



At Test Start



1 Minute Into Test



Test Photo at 3 minutes



Test Photo at 4 minutes

PHOTO: AFTER



Immediately Prior to Conclusion of Test

End of Report