+TEST REPORT

REPORT NUMBER: 101132815SAT-016B
ORIGINAL ISSUE DATE: July 3, 2013
REVISED DATE: N/A

EVALUATION CENTER
Intertek Testing Services NA Inc.
16015 Shady Falls Rd.
Elmendorf, TX 78112

RENDERED TO
Icynene, Inc.
6747 Campobello Road
Mississauga, ON L5N 2L7
Canada

PRODUCT EVALUATED: Icynene MD-C-200v3, 2.0 pound closed cell, foam covered with 24 wet mils of DC 315
EVALUATION PROPERTY: Heat Release, Flame Spread

Report of testing Icynene MD-C-200v3, 2.0 pound closed cell, foam covered with 24 wet mils of DC 315 for compliance with the applicable requirements of the following criteria: *NFPA 286 (2011 Edition) Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth, and 2006 IBC Section 803.2.1. / 2009 IBC Section 803.1.2 and Section 2603.9 / 2012 IBC Section 803.1.2 and Section 2603.10 Special approval for Thermal Barrier Alternatives*

1 Table of Contents

2 Introduction

Intertek Testing Services NA (Intertek) has conducted testing for Icynene, Inc on Icynene MD-C-200v3, 2.0 pound closed cell, foam covered with 24 wet (16 dry) mils of DC 315. Testing was performed to evaluate heat release and flame spread properties when subjected to specific ignition conditions. Testing was conducted in accordance with NFPA 286 (2011 Edition) Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth, and 2006 IBC Section 803.2.1. / 2009 IBC Section 803.1.2 and Section 2603.9 / 2012 IBC Section 803.1.2 and Section 2603.10 Special approval for Thermal Barrier Alternatives. This evaluation was performed on July 3, 2013.

3 Test Samples

3.1. SAMPLE SELECTION

Samples were submitted to Intertek directly from the client. Samples were taken by Intertek representative Troy Bronstad during the application for testing. Samples were received at the Evaluation Center on June 11, 2013. The sample was assigned Intertek ID#SAT1306111325.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The three walls of the test specimen consisted of 2 x 6 studs, spaced 16” o.c. The ceiling was constructed using 2 x 10 joists, spaced 16” o.c., running perpendicular 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.

The stud cavities were filled with 8 inches of MD-C-200v3, 2.0 pound closed cell, foam. The joist cavities were filled with 14 inches of MD-C-200v3, 2.0 pound closed cell, foam. The foam was untrimmed.

The back corners of the room are applied so that they meet the criteria per Figure X3 in AC377. Then 24 wet mils of DC 315 was applied to the walls and ceiling. The calculated dry film thickness was 16 mils. The measured density of the foam was 2.89pcf.

4 Testing and Evaluation Methods

This standard describes a method for determining the contribution of textile wall and ceiling coverings to room fire growth during specified fire exposure conditions. This method is not intended to evaluate the fire endurance of assemblies, nor is it able to evaluate the effect of fires originating within the wall assembly. The method is not intended for the evaluation of floor finishes.

This method is to be used to evaluate the flammability characteristics of finish wall and ceiling coverings when such materials constitute the exposed interior surfaces of buildings. This test method does not apply to fabric covered less than ceiling height, freestanding, prefabricated panel furniture systems or demountable, relocatable, full-height partitions used in open building interiors. Freestanding panel furniture systems include all freestanding panels that provide visual and/or acoustical separation and are intended to be used to divide space and may support components to form complete work stations.

This fire test measures certain fire performance characteristics of finish wall and ceiling covering materials in an enclosure under specified fire exposure conditions. It determines the extent to which the finish covering materials may contribute to fire growth in a room and the potential for fire spread beyond the room under the particular conditions simulated. The test indicates the maximum extent of fire growth in a room, the rate of heat release, and if they occur, the time to flashover and the time to flame extension beyond the doorway following flashover. It does not measure the fire growth in, or the contribution of, the room contents. Time to flashover is defined herein as either the time when the radiant flux onto the floor reaches 20 kW/m^2 or the temperature of the upper air reaches 600°C. A pair of crumpled single sheets of newspaper is placed on the floor 2 feet out from the center of the rear wall and front walls to determine flashover. The spontaneous ignition of this newspaper provides the visual indication of flashover.

The potential for spread of fire to other objects in the room, remote from the ignition source, is evaluated by measurements of:

1. The total heat flux incident on the center of the floor.
2. A characteristic upper-level gas temperature in the room.
3. Instantaneous net peak rate of heat release.

The potential for the spread of fire to objects outside the room of origin is evaluated by the measurement of the total heat release of the fire.

TEST EQUIPMENT AND INSTRUMENTATION

IGNITION SOURCE

The ignition source for the test is a gas burner with a nominal 12- by 12-inch porous top surface of a refractory material. The burner used at this laboratory is 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 is placed in contact with both walls in the corner of the room opposite from the door.

The gas supply to the burner is C.P. grade propane (99 percent purity). The burner is capable of producing a gross heat output of 40±1 kW for five minutes followed by a 160±5 kW for ten minutes. The flow rate is metered throughout the test. The design of the burner controls is such that when one quarter-turn ball valve is opened, the flow of gas to the burner produces 40 kW and when a second quarter-turn valve is opened the combined flow produces 160 kW.

COMPARTMENT GEOMETRY AND CONSTRUCTION

The interior dimensions of the floor of the fire room, when the specimens are in place, measures 8 feet, by 12 feet. The finished ceiling is 8 feet ± 0.5 inches above the floor. The four walls are at 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' walls. No other openings are present to allow ventilation.

PROCEDURE

SUMMARY OF METHOD
A calibration test is run within 30 days of testing any material as specified in the standard. All instrumentation is zeroed, spanned and calibrated prior to testing. The specimen is installed and the diffusion burner is placed. The collection hood exhaust duct blower is turned on and an initial flow is established. The gas sampling pump is turned on and the flow rate is adjusted. When all instruments are reading steady state conditions, the computer data acquisition system and video equipment is started. Ambient data is taken then the burner is ignited at a fuel flow rate that is known to produce 40 kW of heat output. This level is maintained for five minutes at which time the fuel flow is increased to the 160 kW level for a 10-minute period. During the burn period, all temperature, heat release and heat flux data is being recorded every 6 seconds. At the end of the fifteen minute burn period, the burner is shut off and all instrument readings are stopped. Post test observations are made and this concludes the test.

All damage is documented after the test is over, using descriptions, photographs and drawings, as is appropriate.

4.1. TEST STANDARD

NFPA 286 (2011 Edition) Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth, and 2006 IBC Section 803.2.1. / 2009 IBC Section 803.1.2 and Section 2603.9 / 2012 IBC Section 803.1.2 and Section 2603.10 Special approval for Thermal Barrier Alternatives

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

FIRE TESTS
The test was started at 10:00 a.m. on July 3, 2013. The ambient temperature was 86°F with a relative humidity of 36%. The data acquisition system was started and the burner was ignited. Events during the test are described below:

TIME (min:sec)	OBSERVATION
0:00	Ignition of burner. Heat output set to 40 kW.
0:15	Discoloration of the paint on the wall surface
0:45	Light smoke
2:00	Charring to 4ft above burner
3:00	No change
5:00	Increase gas flow to 160kW
5:15	Paint falling off ceiling in corner above burner

6:12	Paint pealing 3ft back wall
6:38	Paint pealing 4ft back wall
7:42	Paint pealing 7ft side wall burner side
8:00	Paint pealing 4ft side wall opposite burner
9:00	Char falling from ceiling
10:36	Intermittent flaming at 6ft in corner above burner
12:00	No change
13:00	Heavy charring 4ft horizontally on ceiling
13:33	Big piece of char falls 4ft back wall
14:00	No change
15:00	Gas off

During the 40kW exposure, flames did not spread to the ceiling;
During the 160 kW exposure, flames on the *interior finish* did not spread to the outer extremity of the sample on any wall or ceiling,
Flashover, as defined in NFPA 286, did not occur,
The peak rate of heat release throughout the NFPA 286 test did not exceed 800kW
The total smoke released throughout the NFPA 286 test did not exceed 1,000 m^2

6 Conclusion

NFPA 286 does not publish pass/fail criteria. One must consult the codes to determine pass fail.

This specimen **met** the criteria set forth in the 2006 IBC Section 803.2.1 / 2009 IBC Section 803.1.2 / 2012 IBC Section 803.1.2

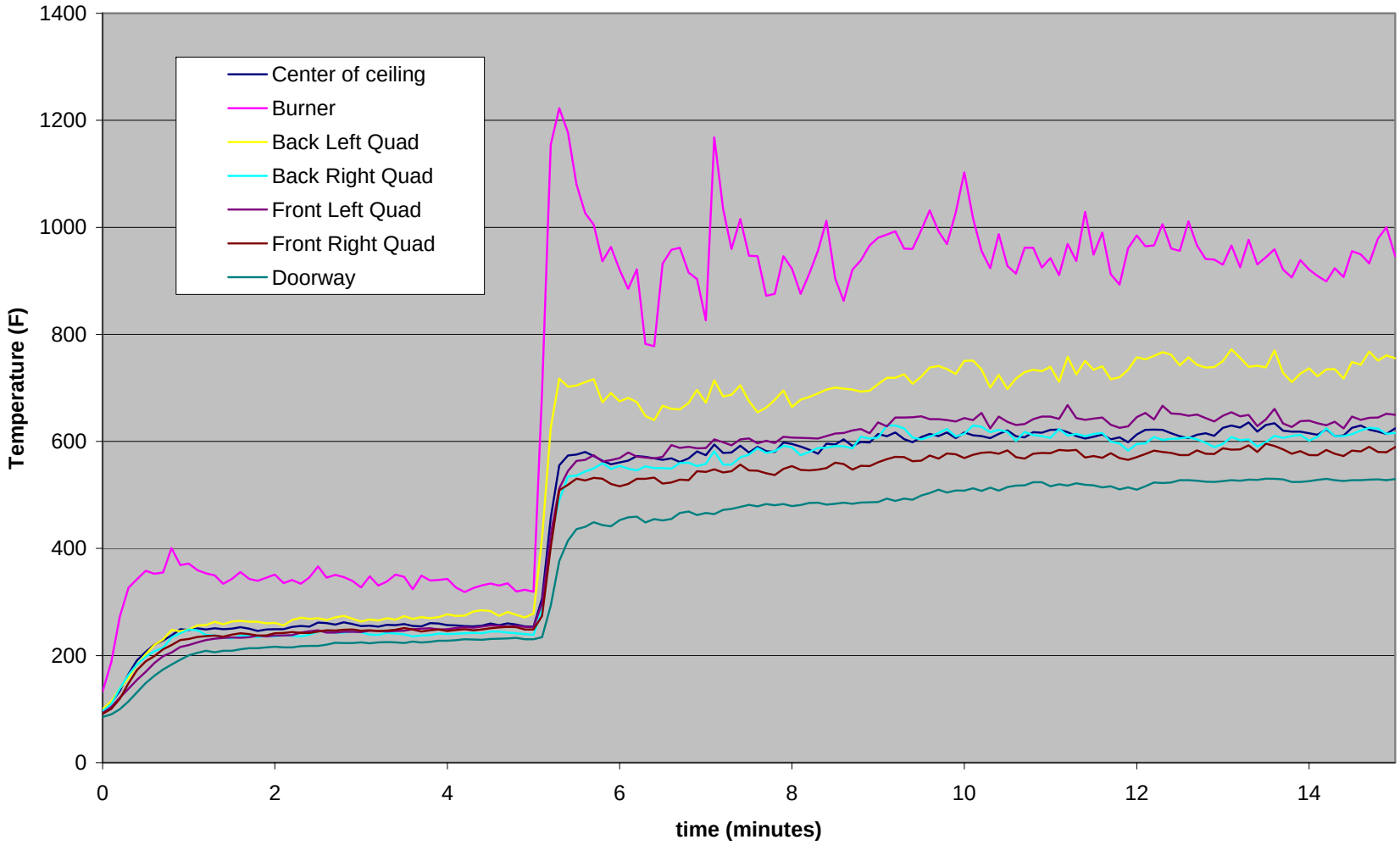
INTERTEK TESTING SERVICES NA

Reported by: _____
Troy G. Bronstad
Senior Associate Engineer

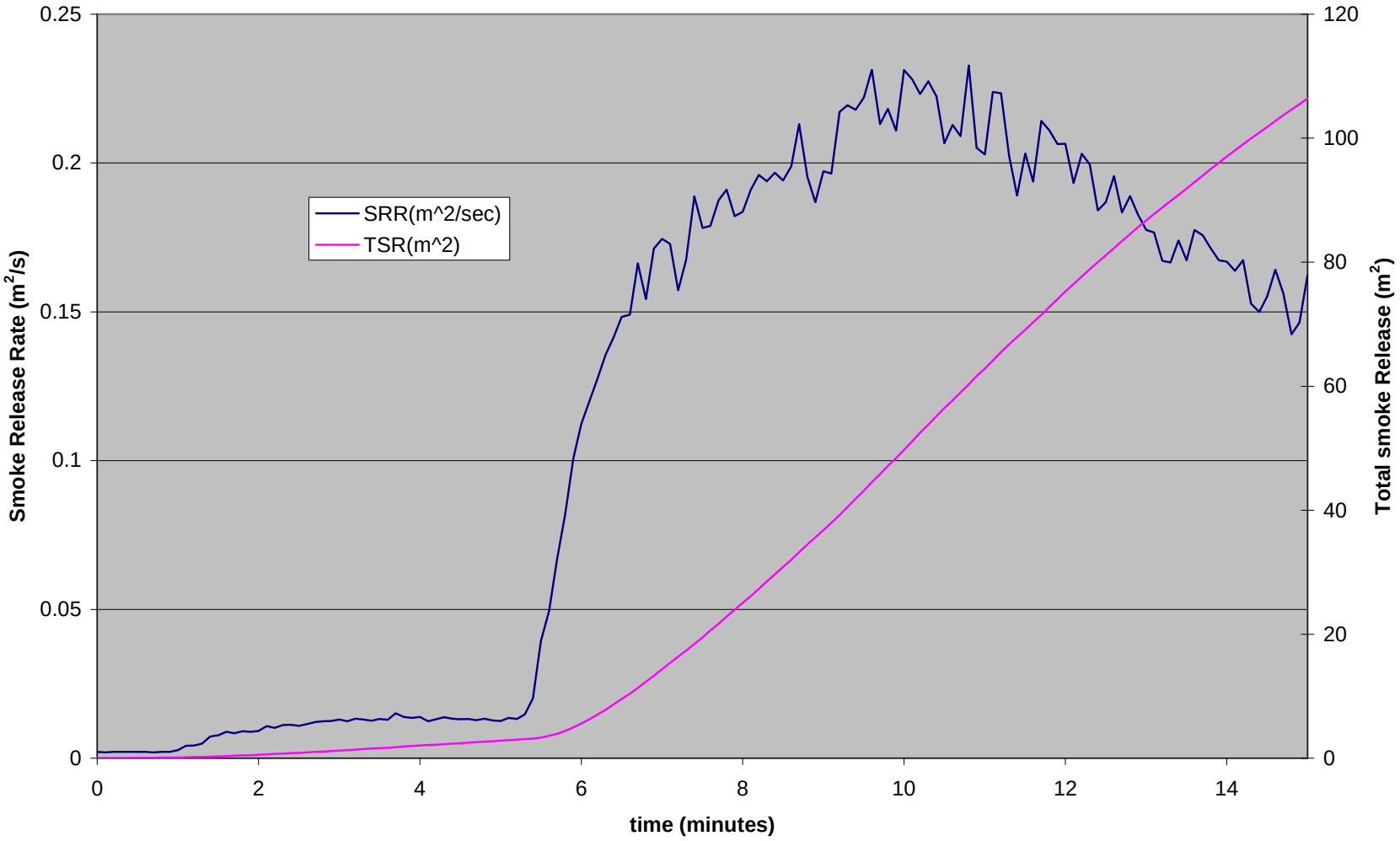
Reviewed by: _____
Joseph Zatopek
Engineering Team Leader, Fire Resistance

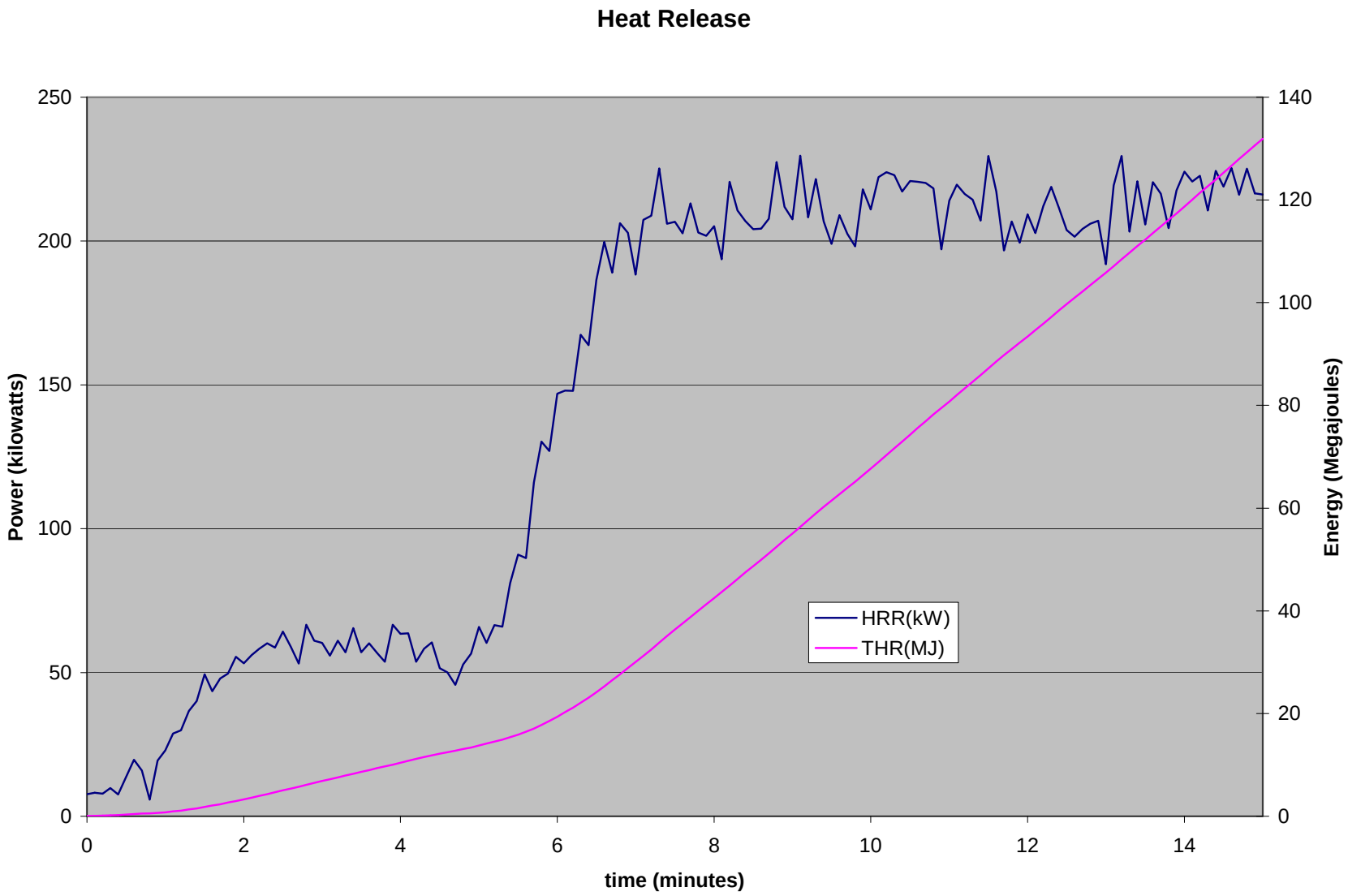
APPENDIX A
Test Data

Thermocouple Data

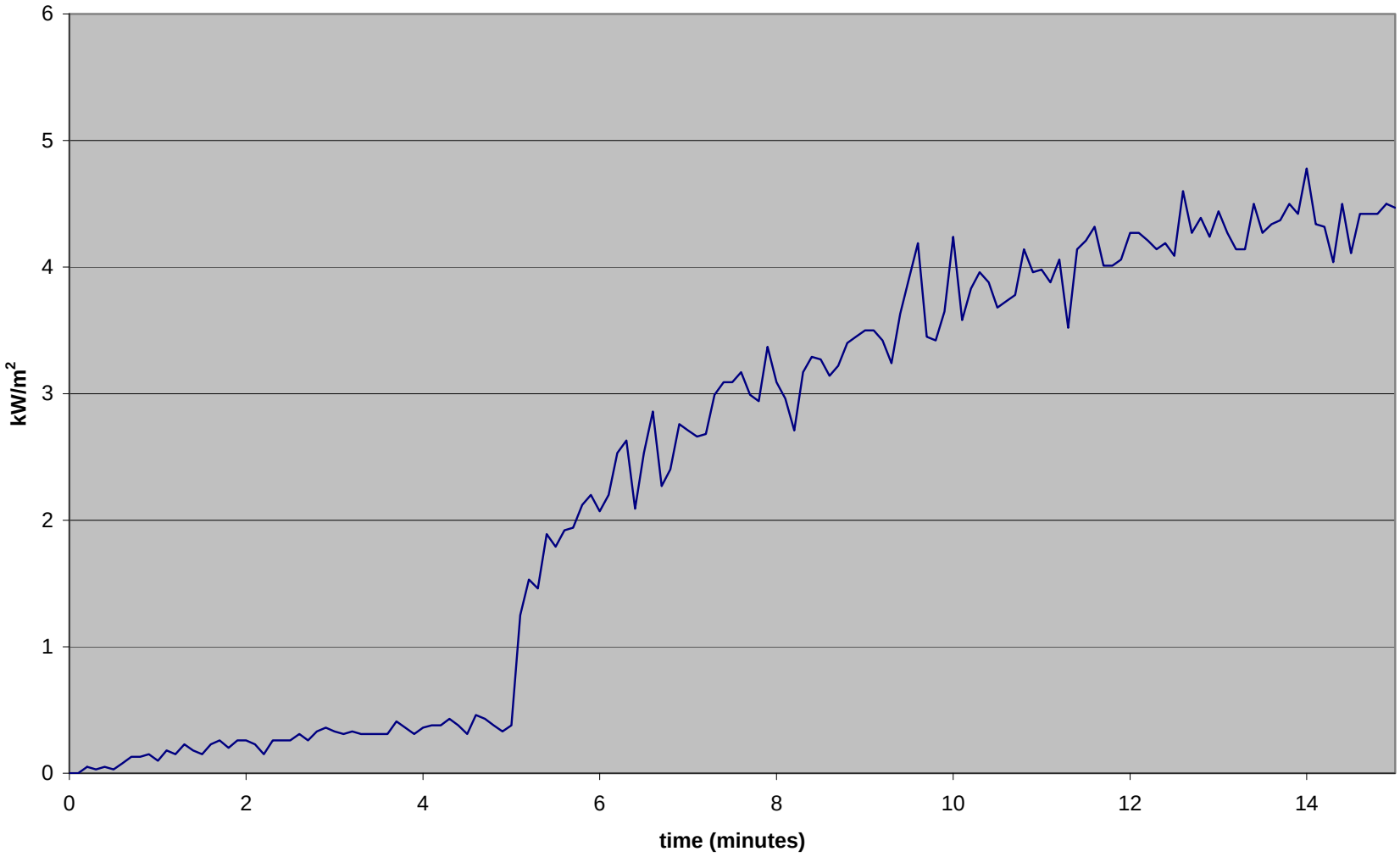


Smoke Release




Heat Release
250
200
150
100
50
0
140
120
100
80
60
40
20
0
0
2
4
6
8
10
12
14
Power (kilowatts)
Energy (Megajoules)
time (minutes)
HRR(kW)
THR(MJ)

Radiant Heat



APPENDIX B
Photographs

Pre-test photo

Test photo

Test photo

Test photo

Test photo

Test photo

Test photo

Gas off

Post test picture

Post test photo

LAST PAGE OF TEST REPORT

REVISION SUMMARY

DATE	SUMMARY
July 3, 2013	First issue. No revisions.