TEST REPORT

REPORT NUMBER: 100203684SAT-001A
ORIGINAL ISSUE DATE: June 10, 2010
REVISED DATE: N/A

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

RENDERED TO
TPR2 Corporation
161 Interstate Lane
Waterbury, CT 06705

PRODUCT EVALUATED: SEALECTION® 500 open cell ½ pound spray foam and 17 wet mils of TPR2 IB 4 Intumescent coating
EVALUATION PROPERTY: Heat Release, Flame Spread

Report of testing SEALECTION® 500 open cell ½ pound spray foam and 17 wet mils of TPR2 4, for compliance with the applicable requirements of the following criteria: ICC-ES AC377 Appendix X, Approved June, 2009.

1 Table of Contents

2 Introduction

Intertek Testing Services NA (Intertek) has conducted testing for TPR2 Corporation on SEALECTION® 500 open cell spray foam and 17 wet mils of TPR2 IB 4 to evaluate heat release and flame spread properties when subjected to specific ignition conditions. Testing was conducted in accordance with ICC-ES AC 377 Appendix X Section X2.1, Approved June 2009. This evaluation was performed on June 10, 2010.

3 Test Samples

3.1. SAMPLE SELECTION

The subject test specimen is a traceable sample selected from the manufacturer's facility. Intertek selected the specimen and has verified the composition, manufacturing techniques and quality assurance procedures.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The test specimen consisted of three walls with 2x10 studs, 24 inches o.c. and 2x12 joists, 24 inches o.c. The joist ran the 12 ft length of the room (front to back).The exterior of the room was covered with 5/8 Type X gypsum wallboard. The final interior dimensions were 8 feet high, 8 feet wide and 12 feet deep.

The stud cavities were filled with 9 ½ inches of SEALECTION® 500 open cell ½ pound spray foam and 11 ½ inches of SEALECTION® 500 open cell ½ pound spray foam in the ceiling with17 wet mils of TPR2 IB 4 on walls and ceiling .

4 Testing and Evaluation Methods

This standard describes a method for determining the contribution of spray foamed plastic 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.

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 further noted by a pair of crumpled single sheets of newspaper placed on the floor 2 feet out from the center of the rear wall and front walls to determine flashover per the NFPA 286 method. 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.
4. Projection of flames out the doorway.

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, and the burner enclosure is located such that the edge of the diffusion surface is located as per Figure X3 in AC377 in either back 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, or failure 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

ICC-ES AC377 Appendix X, Approved June 2009 acceptance criteria for spray-applied foam plastic insulation.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

FIRE TESTS
The test was started at 2:15 p.m. on June 10, 2010. The ambient temperature was 86°F with a relative humidity of 52%. 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.
0:08	Discoloration
0:18	Light smoke
0:35	Ignition
0:48	Increase in smoke
1:00	Flame tips 5ft vertically in corner
2:50	Flame tips 4ft vertically in corner
4:18	No change
4:50	Gas off/ test terminated per client's request

Test Data

Criteria	Time (min:sec)
Heat Release Rate >1000kW	Did not exceed
Heat Flux >20KW/m^2	Did not exceed
Average ceiling temperature > 600°C (1112°F)	Did not exceed
Flames out the door	Did not occur
Average of the above	0:00

6 Conclusions

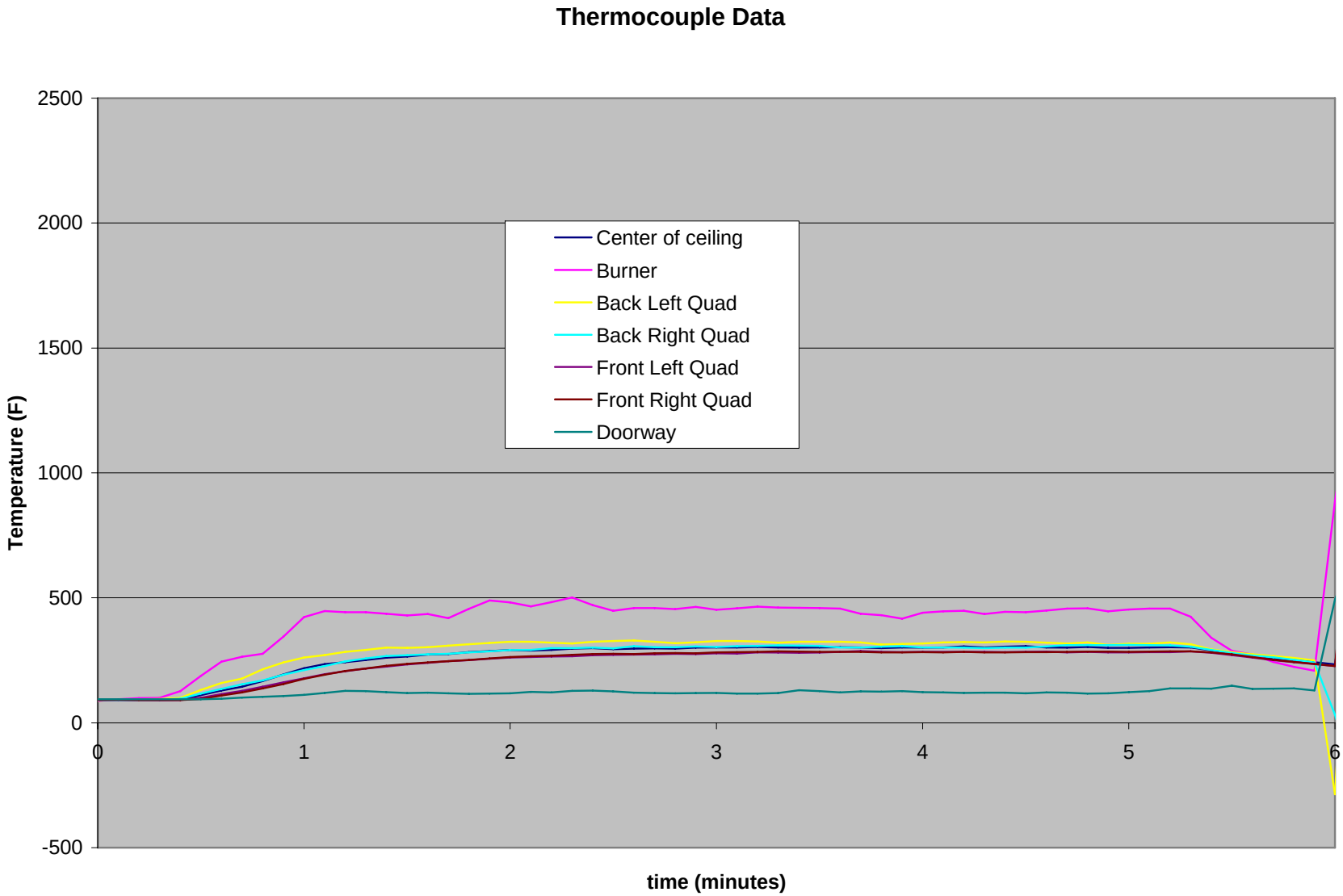
ICC-ES AC377 Appendix X pass/fail criteria require the assembly to meet or surpass 4:18 min:sec. This assembly **met** the requirements.

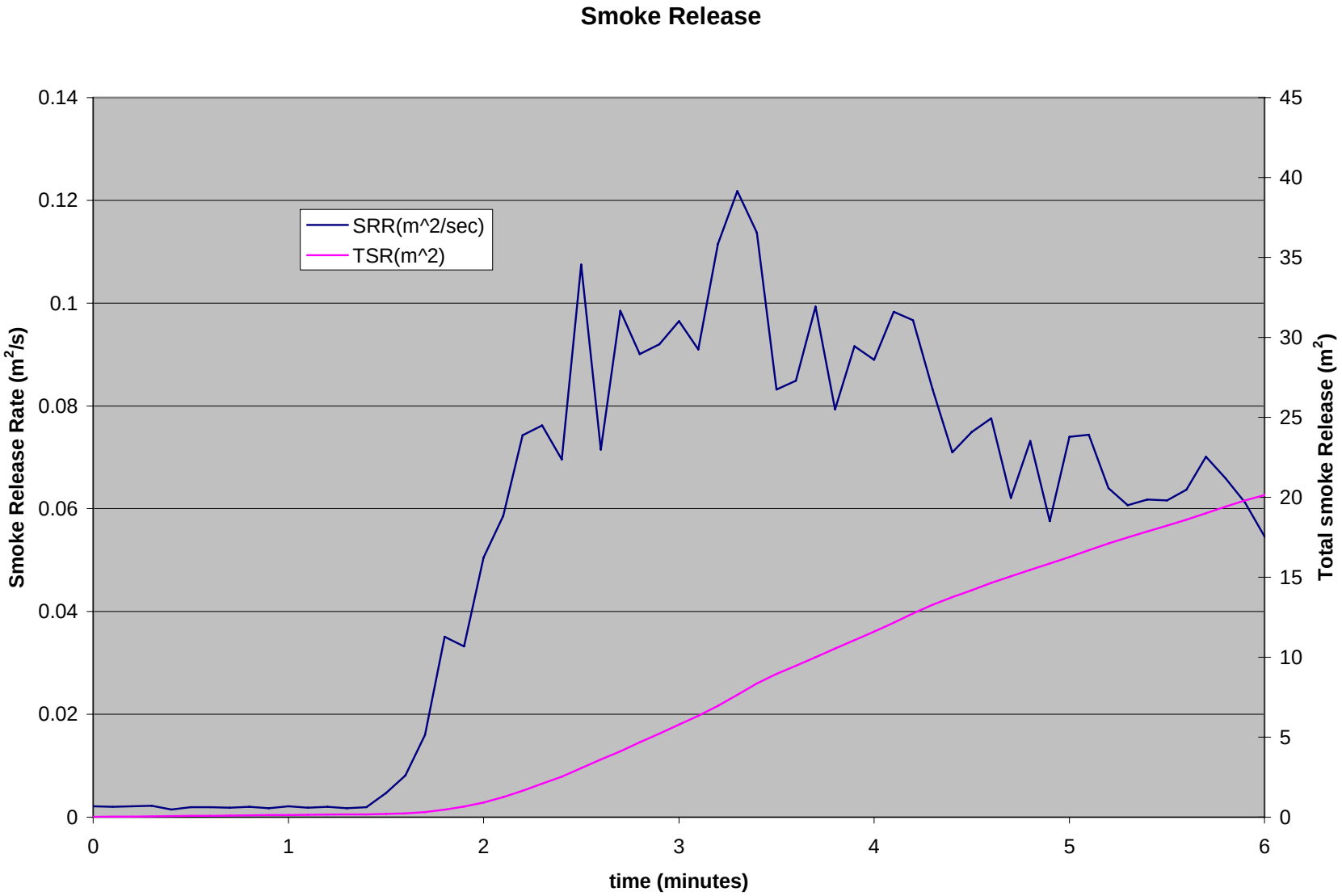
INTERTEK TESTING SERVICES NA

Reported by: _____
Troy G. Bronstad
Senior Associate Engineer

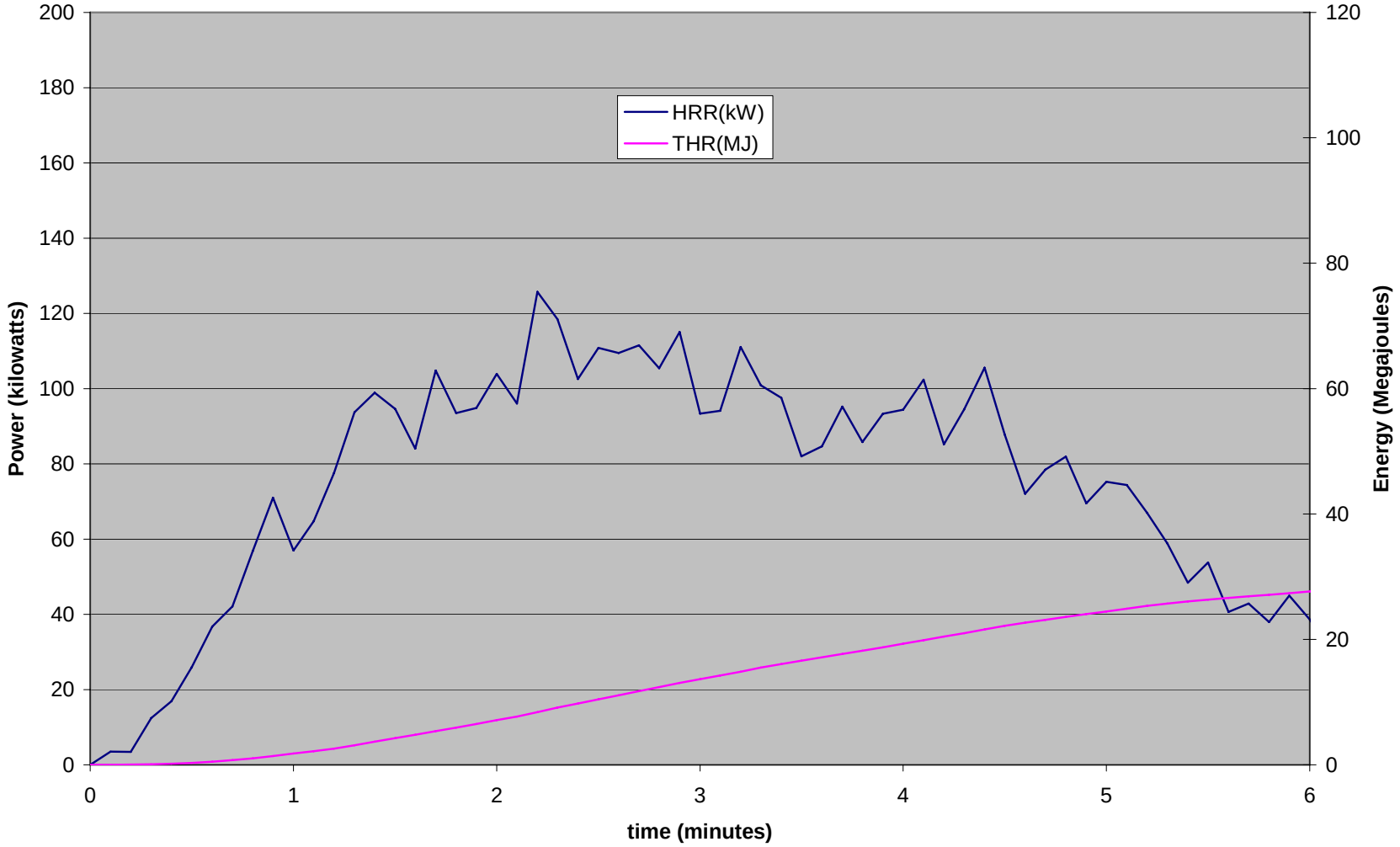
Reviewed by: _____
C. Anthony Peñaloza
Engineering Team Leader

APPENDIX A
Test Data

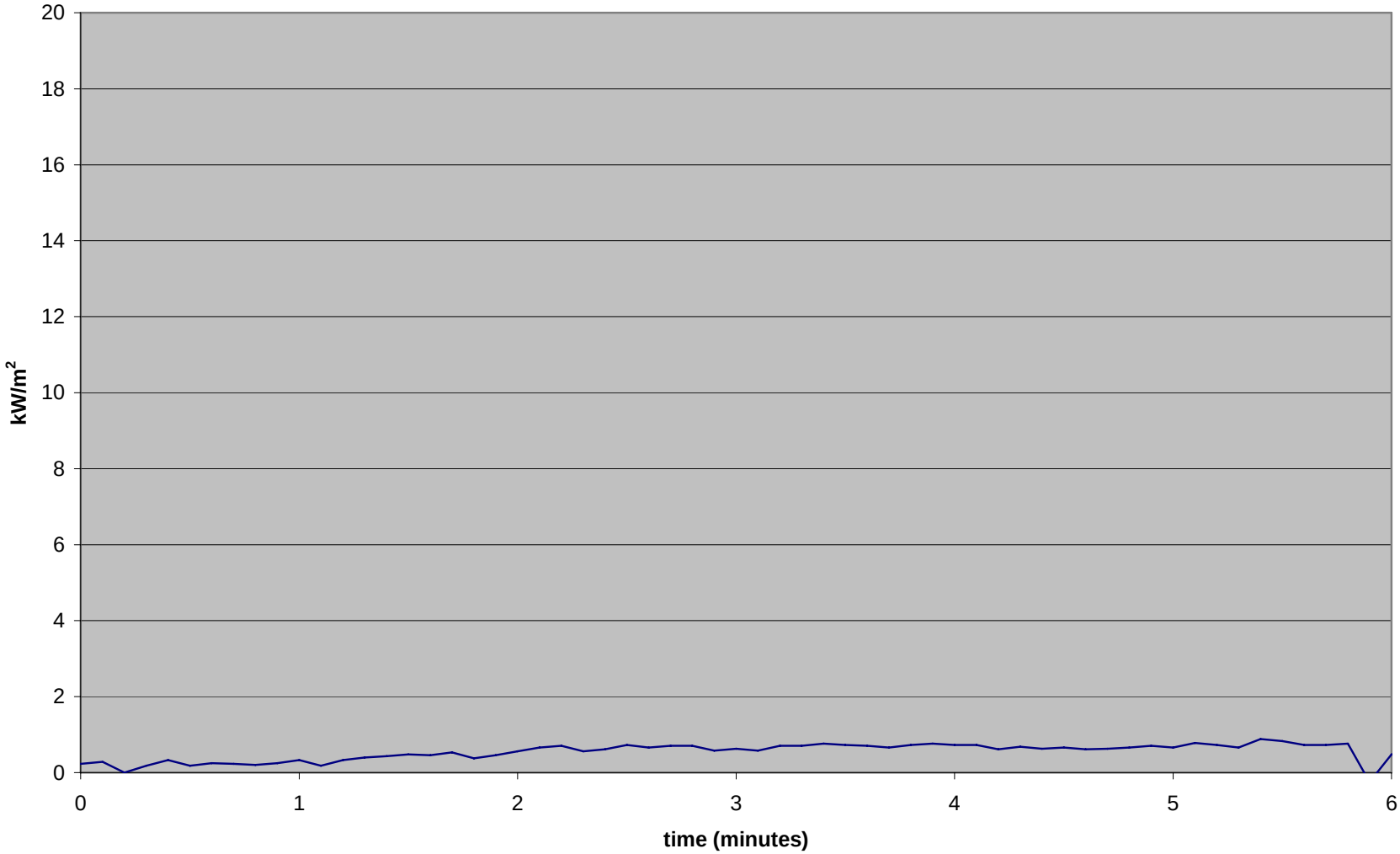

Thermocouple Data
2500
2000
1500
1000
500
0
-500
Temperature (F)
0
1
2
3
4
5
6
time (minutes)
Center of ceiling
Burner
Back Left Quad
Back Right Quad
Front Left Quad
Front Right Quad
Doorway


Smoke Release
SRR(m^2/sec)
TSR(m^2)
Smoke Release Rate (m²/s)
Total smoke Release (m²)
time (minutes)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
45
40
35
30
25
20
15
10
5
0
0
1
2
3
4
5
6

Heat Release

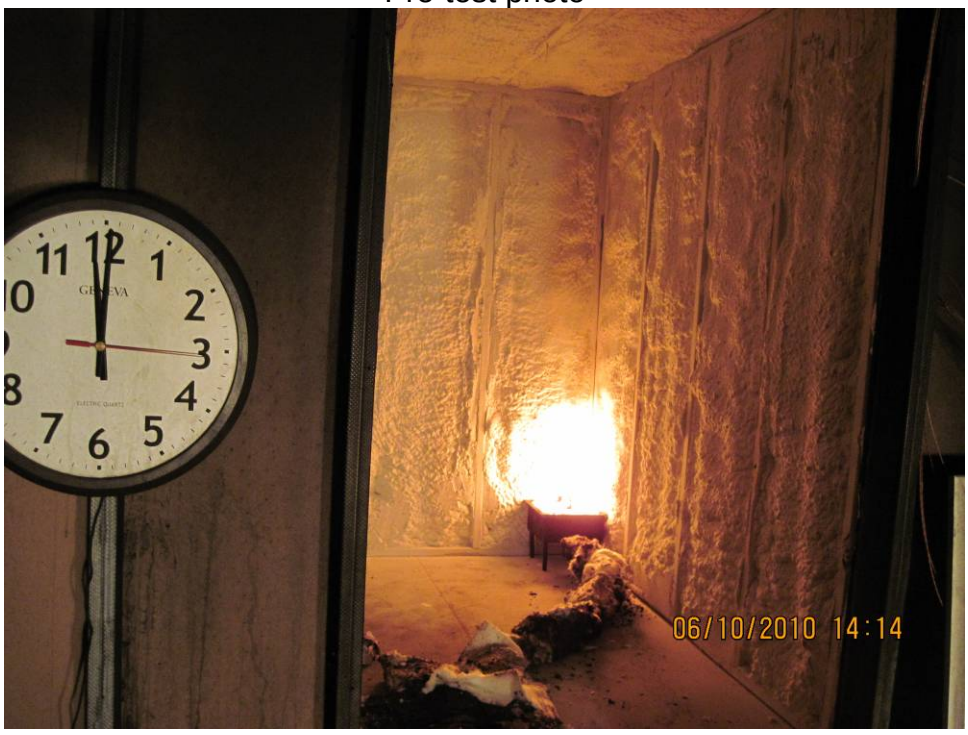


Radiant Heat



APPENDIX B
Photographs

Pre-test photo



Start of test

Test photo.

.Test photo

Gas off

Post test picture

LAST PAGE OF TEST REPORT

REVISION SUMMARY

DATE	SUMMARY
June 10, 2010	First issue. No revisions.