TEST REPORT

REPORT NUMBER: 3128748SAT-002
ORIGINAL ISSUE DATE: March 29, 2008
REVISED DATE: N/A

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

RENDERED TO

La Polla Industries, Inc.
15402 Vantage Parkway East, Ste. 322
Houston, TX 77032

PRODUCT EVALUATED: FL 2000
EVALUATION PROPERTY: Heat Release, Flame Spread

Report of testing FL 2000 for compliance with the applicable requirements of the following criteria: NFPA 286 and IBC 803.2.1.

1 Table of Contents

2 Introduction

Intertek Testing Services NA (Intertek) has conducted testing for La Polla Industries, Inc., on FL 2000, to evaluate heat release and flame spread properties when subjected to specific ignition conditions. Testing was conducted in accordance with NFPA 286. This evaluation was performed on March 24, 2008.

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. Sample production was witnessed on November 27, 2007.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The test specimen consisted of three walls and a ceiling constructed of 2x4 studs and joists. The 2.0 pcf foam was sprayed onto the walls on the exterior side to a depth of 12 inches. The interior (fire side) consisted of 1/2 inch gypsum drywall, which was taped and floated to an airtight condition.

Final interior dimensions were 8 feet high, 8 feet wide and 12 feet deep.

See Photos in Appendix B for a visual depiction of the description.

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. Demountable, relocatable, full-height

partitions include demountable, relocatable, full-height partitions that fill the space between the finished floor and the finished ceiling.

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 are 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, and the burner enclosure is located such that the edge of the diffusion surface is located 1 inch from both walls in the left 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 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 7 feet, 3 inch by 11 feet 9 1/2 inch. 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-foot walls. No other openings are present to allow ventilation. The test room is lined with 5/8" type X gypsum wallboard.

TOTAL HEAT FLUX GAUGE

A gauge shall be mounted a maximum of 2 inches above the floor surface, facing upward in the geometric center of the test room. The gauge shall be of the Gardon type, with a flat black surface, and a 180-degree view angle. In operation, it shall be maintained at a constant temperature (within ± 5% °F) above the dew point by water supplied at a temperature from 120° to 150°F.

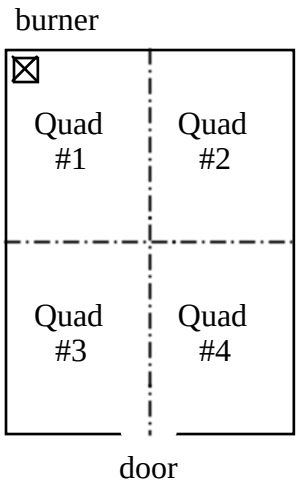
THERMOCOUPLES

Bare chromel-alumel thermocouples 20 mil in diameter (24 GA. Type K, Chromel-Alumel, Special Limits of Error: ±1.1°C, purchased with Lot Traceability and with 5-point calibrations at each end of the Lot Purchase), with electrically welded thermo-junctions shall be used at each required location. The thermocouple wires, within 0.5 inches of the thermo-junction, shall be run along expected isotherms to minimize conduction errors. The insulation between the wires shall be stable to at least 2000°F or the wires shall be separated.

THERMOCOUPLE LOCATIONS

LOCATION	DESCRIPTION OF PLACEMENT
DOORWAY	A thermocouple is located in the interior plane of the door opening on the door centerline, 4 inches down from the top.
ROOM	Thermocouples are located 4 inches below the ceiling at the center of the ceiling, the center of each of the four ceiling quadrants and directly over the center of the ignition burner.
HOOD EXHAUST DUCT	One pair of thermocouples is placed in the duct 9 duct diameters downstream of the entrance to the horizontal duct.

The placement of the Quadrant Thermocouples is as shown in the drawing below. All plots and data tables follow this format.



Room Quadrant Thermocouple Locations (Plan View)

CANOPY AND EXHAUST DUCT

A hood is installed immediately adjacent to the door of the fire room. The bottom of the hood is level with the top surface of the room. The face dimensions of the hood are 10- by 10-feet, with a depth of 3.5 feet. The hood feeds into a plenum having a 3- by 3-foot cross section and a height of 3 feet. The exhaust duct connected to the plenum is 24 inches in diameter, horizontal, and has a circular aperture of 16 inches at its entrance.

DUCT GAS VELOCITY

A bi-directional probe is used to measure gas velocity in the duct. The probe consists of a short stainless steel cylinder 1.75 inches long and 0.875 inches inside diameter, with a solid diaphragm in the center. The pressure taps on either side of the diaphragm support the probe. The axis of the probe is along the center line of the duct, 9 duct diameters downstream from the

entrance. The pressure taps are connected to a pressure transducer capable of resolving pressure differences of 0.001 inches W.C.

OXYGEN MEASUREMENTS

A stainless steel gas sampling tube is located 10 duct diameters downstream from the entrance to the duct at the geometric center of the duct ±1/2 inch to obtain a continuously flowing sample for determining the oxygen concentration of the exhaust gas as a function of time. The oxygen content of the duct exhaust gas is determined by an oxygen analyzer with a relative accuracy of ±0.001% in the concentration range from 0 to 21% oxygen. The signal from the oxygen analyzer is within 5% of its final value within 30 seconds following a step change in the composition of the gas stream flowing past the sampling tube inlet.

PHOTOGRAPHIC RECORDS

Digital color photographs and DV video taping are both used to record and document the test. Care is taken to position the photographic equipment so as to not interfere with the smooth flow of air into the test room.

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.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

FIRE TESTS
The test was started at 1:40 pm on March 24, 2008. The ambient temperature was 68°F with a relative humidity of 24%. 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. The gypsum paper facing immediately began to smolder and burn.
5:00	Burner output increased to 160 kW. The walls began to make popping sounds.
9:30	Bubbling noises were heard.
15:00	Test terminated.

The paper targets did not spontaneously ignite due to flash-over conditions.

Post Test Observations:

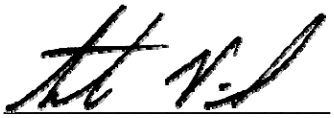
There was some charring on the gypsum wallboard adjacent to the propane burner. A destructive examination of the walls revealed that the foam was melted and charred ¼ to ½ inch deep in the area immediately adjacent to the burner.

6 Conclusion

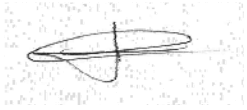
The sample submitted, installed, and tested as described in this report displayed low levels of heat release, and low upper level temperatures. The heat flux on the floor did not reach flashover levels. The sample did not spread flames to the ceiling during the 40 kW exposure. The flames did spread to the extremities of the right 12-foot wall, and the rear 8 ft wall during the test. The sample did not exhibit flashover conditions during the test. 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 2003 IBC Section 803.2.1

INTERTEK TESTING SERVICES NA

Reported by: 

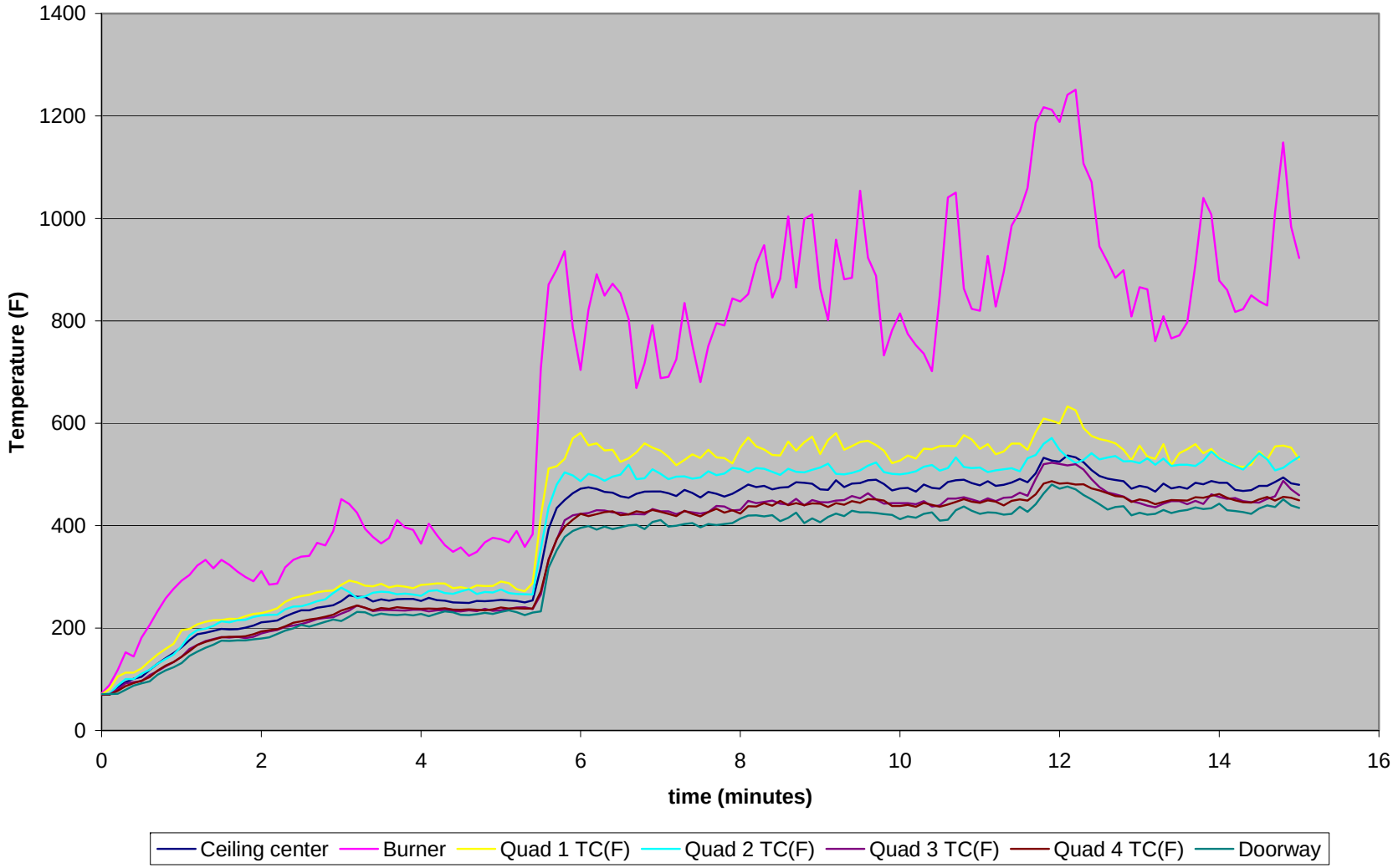
C. Anthony Peñaloza
Flammability Testing Team Leader

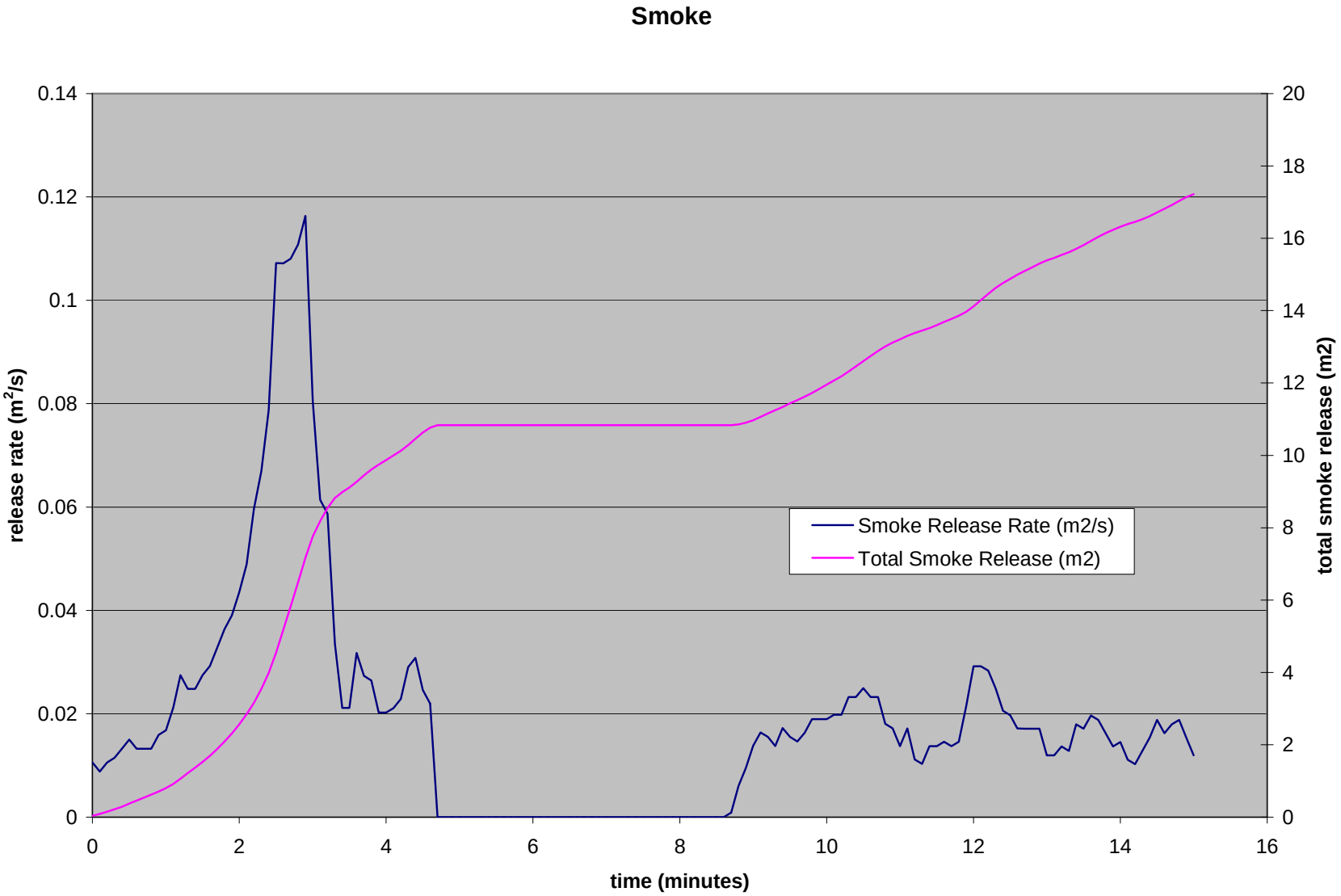
Reviewed by: 

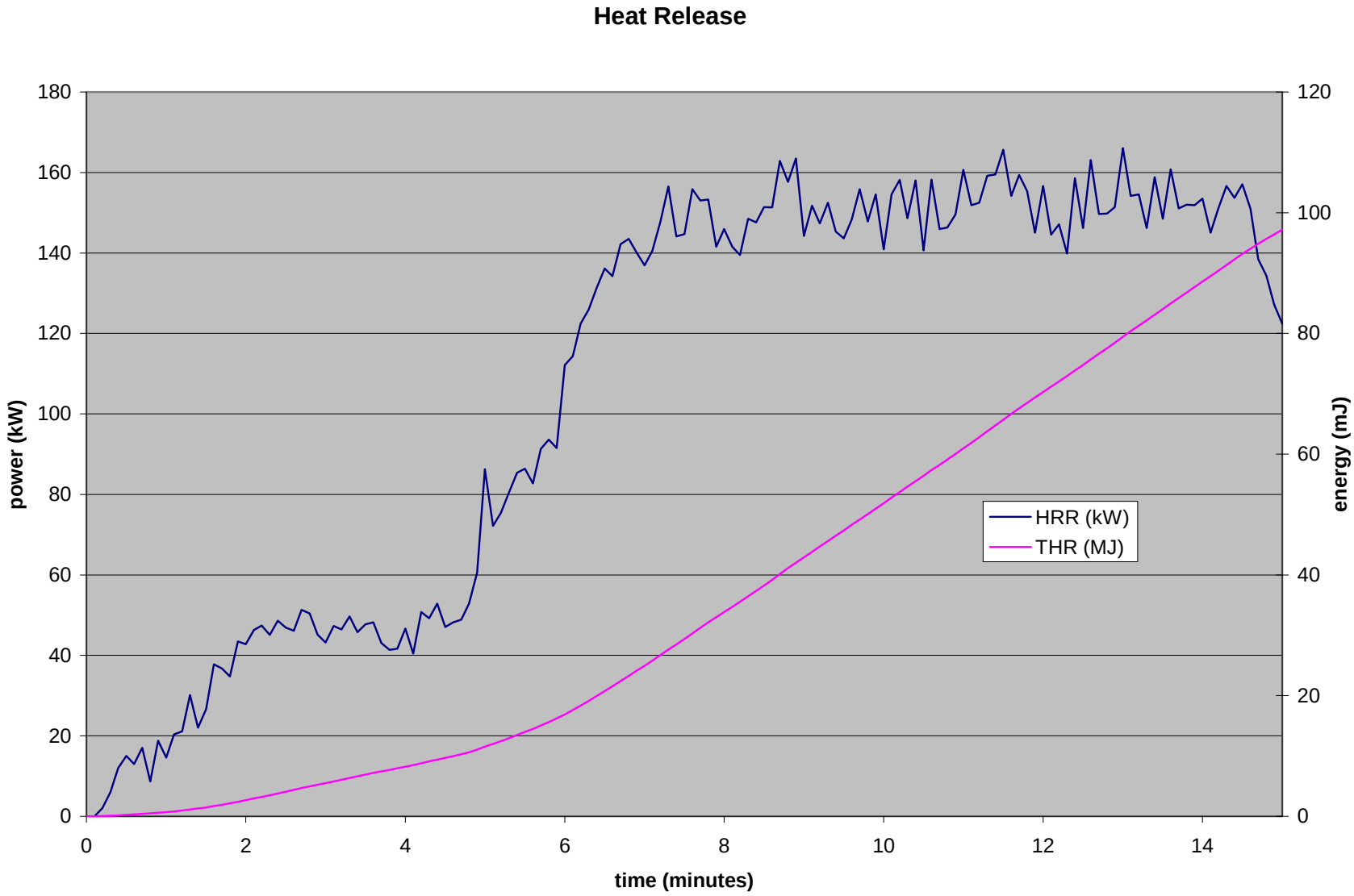
Javier . Trevino
Senior Project Engineer

APPENDIX A
Test Data

Thermocouple Data




Smoke
release rate (m²/s)
total smoke release (m2)
time (minutes)
Smoke Release Rate (m2/s)
Total Smoke Release (m2)
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0
2
4
6
8
10
12
14
16
18
20


Heat Release
power (kW)
energy (mJ)
time (minutes)
HRR (kW)
THR (MJ)
0
20
40
60
80
100
120
140
160
180
0
2
4
6
8
10
12
14

APPENDIX B

Photographs

Pre-test photo

Pre-test photo

Pre-test photo

Pre-test photo

Pre-test photo

Pre-test photo

Pre-test photo

Start of test

160 kW

Post Test

Post-test damage beneath gypsum wall.

LAST PAGE OF TEST REPORT

REVISION SUMMARY

DATE	SUMMARY
March 29, 2008	First issue. No revisions.