

CLIENT: Madrid Acoustic's
7800 Industry Avenue
Pico Rivera, CA 90660

Test Report Number : TUL1148-R1	Date: November 13, 2024
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SUBJECT: Room Corner Burn – NFPA 286 Requirements for evaluating use with an alternate thermal barrier.

PRODUCT EVALUATED: Client refers to samples received as “Madrid Acoustic Panels”.

TEST REQUESTED: NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth – 2015 Edition as required by the 2021 International Building Code, Section 803 - Wall and Ceiling Finishes.

AUTHORIZATION: Testing was authorized by Daniel Valentin per QAI proposal 24MB07241R1 signed September 3, 2024.

TEST DATE: Thursday, October 31, 2024

SAMPLING DETAIL: The components of the test assembly were provided by the client except for the core wall components that were acquired and assembled by QAI personnel. The sample components arrived at QAI Laboratories on October 1st, 2024.

CONCLUSION: The Madrid Acoustic Panels COMPLIES with the requirements as set forth in the 2021 version of the International Building Code Section 803.1.1.1 and NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth – 2015 Edition.

Prepared By



Cody Smith
Project Specialist 1

**Signed for and on behalf of
QAI Laboratories, Inc.**

Anthony Penalosa
Sr Engineer / Project Manager

Test Sample Description:

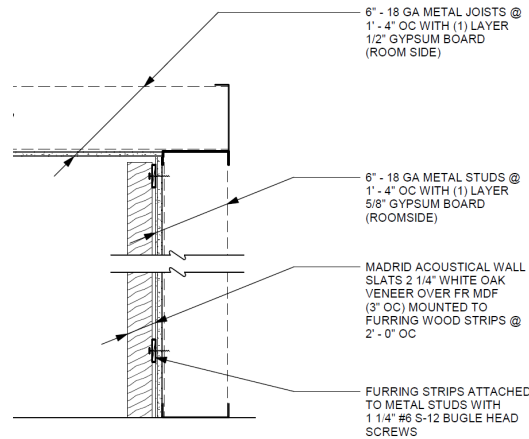
QAI Laboratories, Inc. conducted testing for Madrid Acoustic's on Madrid Acoustic Panels, to evaluate heat release and flame spread properties when subjected to specific ignition conditions. Testing was conducted in accordance with NFPA 286.

The test room was built by QAI Laboratory personnel prior to the application of the test sample. The three walls that held the test specimen consisted of 2" x 6" 18 gauge steel studs, spaced 16 inches on center. The ceiling was constructed using 1/2" x 4' x 12' gypsum board. The exterior of the studs and joists were covered with 5/8" thick, Type X gypsum board.

QAI personel installed the interior of the room consisting of Madrid Acoustic Panels attached to the gypsum using 1 1/4" long #6 type S-12 bugle head screws. The final interior dimensions were 8 feet high, 8 feet wide and 12 feet deep complying with NFPA 286. (See mock-up detail below)

The test room module was placed into a conditioning room for a minimum 48 hours at 70 F and 50% relative humidity prior to testing.

The temperature of the test chamber at time of testing to NFPA 286 was 70°F (21°C) with 70% relative humidity.



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.

Burner Gas Flow:

CP Grade Propane was used for burner supply gas. A calibrated mass flow meter (Asset A300749, due for calibration 12/18/24) was used to meter flow to the burner. The 40 kW 5 minute exposure flowed 27 L/min of Propane and the 160 kW exposure flowed 108 L/min Propane. These numbers were based upon the following constant: 1.485 kW L/min.

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 +/- 0.7 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:

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



Visual Observations and Discussion of Performance:

- 0:00:34 - Ignition of sample 2 feet above sample with light smoke
- 0:02:00 - Flames 3 feet above burner
- 0:05:00 - Sand diffusion burner increased to 160 kW flame
- 0:07:15 - Ignition on the top of back right panel above burner with heavy grey smoke
- 0:11:50 - Delamination of sample in back right corner of wall
- 0:15:00 - Test concluded

Flame Spread and Charring:

Flame spread of the sample was minimal. Only slight and negligible contribution from the test sample was noted around flames from burner for the first 5 minutes of test. From that point forward there was no significant contribution of material to the intensity of flaming. Flames did not reach the extremities of the test module and flashover, as defined in the specified test designation, did not occur.

All charring as a result of testing this assembly was limited to the corner of the burner placement and directly above the burner on the ceiling. There was a "V" pattern of char in the corner of ignition that went up to the ceiling, starting at the burner and ending up charring a section measuring approximately four feet in both directions to the ceiling. The ceiling itself was black with char and soot deposition as was each of the three walls measuring approximately 2 feet down from the ceiling.

TEST REQUIREMENTS 2021 INTERNATIONAL BUILDING CODE, SECTION 2603.9 SPECIAL APPROVAL:

As referenced by 2021 International Building Code Section 2603.9, per Section 803.1.1.1 requires the following criteria when evaluation is conducted following NFPA 286:

- During the 40 kW exposure, flames shall not spread to the ceiling.
- The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
- The peak heat release rate throughout the test shall not exceed 800 kW.
- The total smoke released throughout the test shall not exceed 1000 m2.
- Flashover as defined by NFPA 286 shall not occur, as outlined below
 - ~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

Test Results:

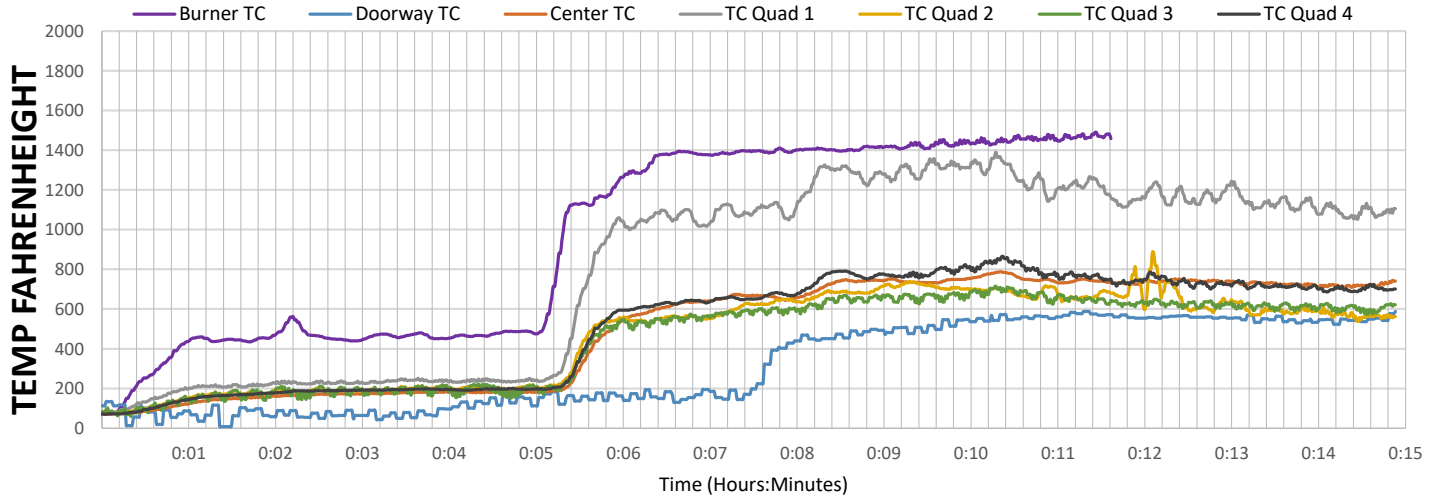
The following summarizes results achieved during evaluation of the Madrid Acoustic Panel room described in this report to NFPA 286

CRITERIA	Result	PASS / FAIL
40 kW Exposure Flames Reach Ceiling	Did not occur	PASS
During NFPA 286 testing, flames reach outer room extremities	Did not occur	PASS
Peak Heat Release Rate ≤ 1 MW	368 kW	PASS
Heat Flux Floor ≤ 20 kW/m ²	3.6283	PASS
Average Upper Temperature ≤ 600°C (1,112 °F)	847.04°F (453 °C)	PASS
Flames Exit Doorway	Did not occur	PASS
Ignition of paper targets	Did not occur	PASS
Peak Heat Release Rate ≤ 800 kW	368 kW	PASS
Total Smoke Production ≤ 1,000 m ²	84.6	PASS

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Thermocouple Data:

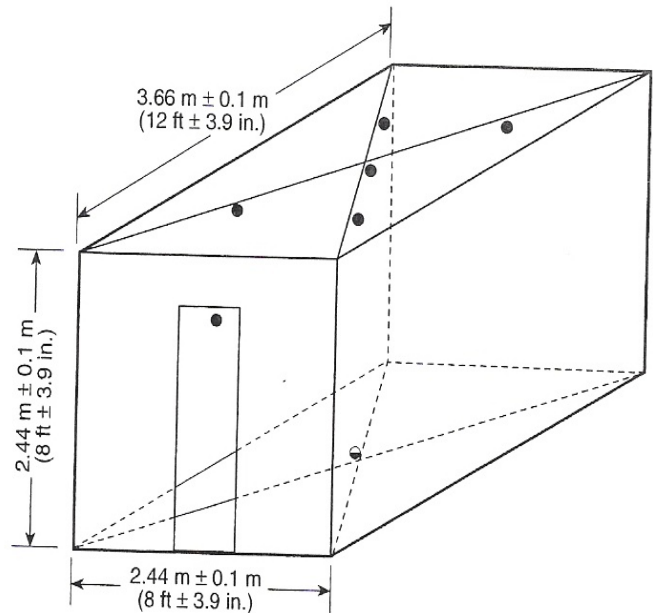
THERMOCOUPLE TEMPERATURE'S



Maximum Peak Thermocouple Temperatures Achieved:

Ignition	1419.8°F (771 °C)
Doorway	587.84°F (309 °C)
Center	748.4°F (398 °C)
Quadrant 1	1326.2°F (719 °C)
Quadrant 2	699.8°F (371 °C)
Quadrant 3	669.2°F (354 °C)
Quadrant 4	791.6°F (422 °C)

Average Peak Upper Layer Temperature:	847.04°F (453 °C)
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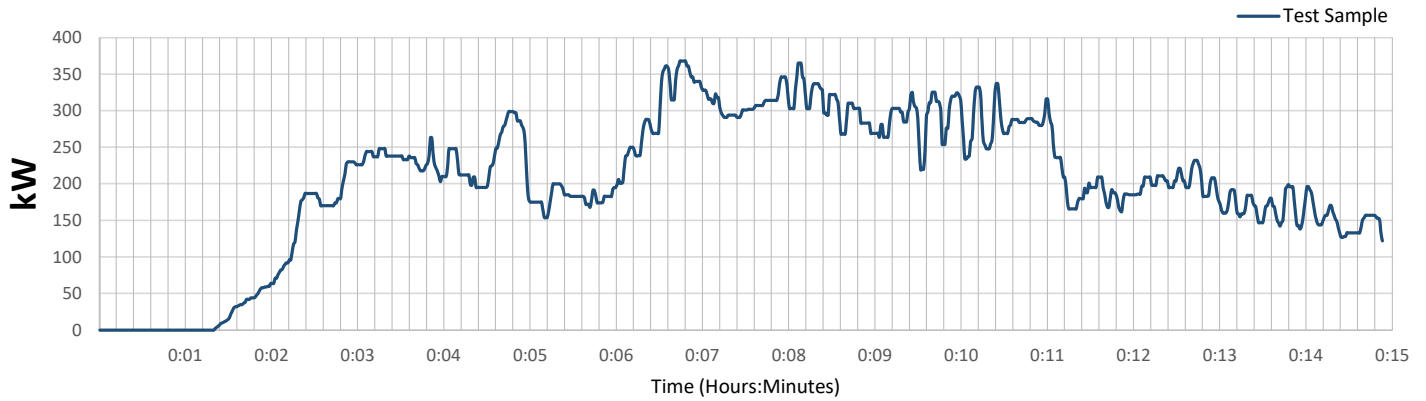


● = Thermocouples – each 102 mm (4 in.) below ceiling, with one additional thermocouple over the burner and 102 mm (4 in.) below the ceiling.

Figure 1. Thermocouple Locations

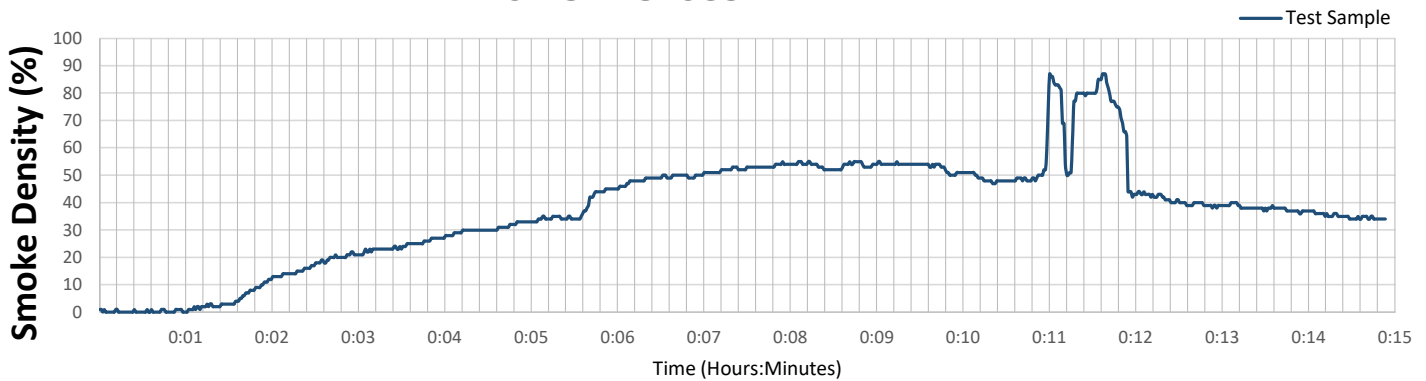


HEAT RELEASE RATE DATA



0-15 min average	203 kW
Peak Heat Release Rate	368 kW at 06:47
Total Heat Released During Test	183 MJ

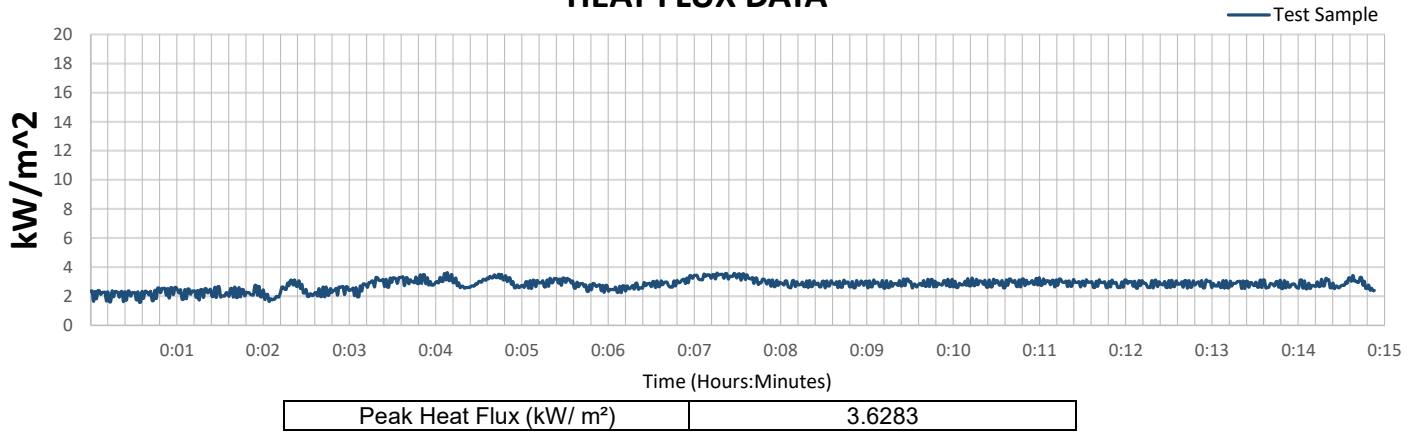
SMOKE OBSCURITY DATA



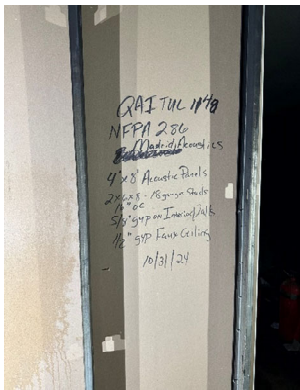
0-15 min average (m ² /s)	0.1
Peak Smoke Release Rate	0.42 (m ² /s) at 11:39
Total Smoke Released (m ²)	84.6
Peak Obscuration	87%
Optical Density (L/m)	2.18 (L/m)

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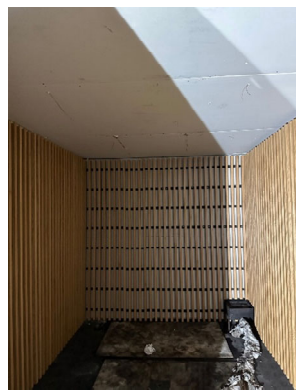
HEAT FLUX DATA



Photos: During Test



Information Sign



Before Test



First Minute of Test



Fourth Minute of Test



Fifth Minute of Test



Eighth Minute of Test



Fifteenth Minute of Test



End of Test

REVISION HISTORY:

R1 - 11/13/2024 - C.S.
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