

CLIENT: M-Fire Suppression Inc.
19807 Hamilton Ave.
Gardena, CA 90502

Test Report Number : RJ5401F-2-Rev1	Original Date: April 13, 2017
	Revised Date: February 8, 2021

SAMPLE ID: The client identified the following test material as:
4 boards of 2' x 12" x 12' #2 Douglas fir hand sprayed with AAF31 for full coverage. Sample was sprayed with 10 oz of AAF31 on 46 sq ft. This equates to 590 sq ft/gallon.

SAMPLING DETAIL QAI representative Jason Friedrich witnessed the application of the coatings at the Client's facility located in Carlsbad, CA on April 7, 2017.

DATE OF RECEIPT: Samples were received at QAI facilities on: April 12, 2017

TESTING PERIOD: April 12, 2017 through April 12, 2017

AUTHORIZATION: Testing was authorized under proposal 17MB03301 signed March 30, 2017

TEST REQUESTED Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM E2768-11 "Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test). This method is similar to UBC No. 8-1 and SFM 12-7A-5 per Chapter 7A of the 2015 California Building Code, Ignition-Resistant Material 30 minute test.

TEST RESULTS: Flame Spread Smoke Developed

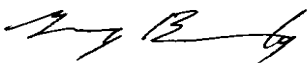
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** A maximum flame spread of 6.5 feet was observed during the 30 minute test.*

CONCLUSION: When tested in accordance to ASTM E2768-11 the tested material resulted in a Class 'A' during the first 10 minutes of the test with a maximum flame spread under 10.5 feet during the 30-minute exposure, the product meets the above specification for Ignition Resistant Material. Detailed test results are presented in the subsequent pages of this report

Prepared By



Gregory Banasky
Senior Fire Technician

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



Brian Ortega
Senior Analyst / Fire Technology

SCOPE: This fire-test-response standard (ASTM E2768-11) used for the comparative surface burning behavior of building materials is applicable to exposed surfaces such as walls and ceilings. The test is conducted with the specimen in the ceiling position with the surface to be evaluated exposed face down to the ignition source. The material, product, or assembly shall be capable of being mounted in the test position during the test. Thus, the specimen shall either be self-supporting by its own structural quality, held in place by added supports along the test surface, or secured from the back side. The purpose of this test method is to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed index are reported. However, there is not necessarily a relationship between these two measurements.

USE: The use of supporting materials on the underside of the test specimen has the ability to lower the flame spread index from those which might be obtained if the specimen could be tested without such support. These test results do not necessarily relate to indices obtained by testing materials without such support.

Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place.

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire-hazard or fire-risk assessment of the materials, products, or assemblies under actual fire conditions.

PROCEDURE: The test is conducted in accordance with ASTM E84-15b. A brief overview of the method is as follows: The test specimen, a material between 20 and 24 inches in width by 24 feet +/- 12 inches in length is loaded onto the water cooled ledge of the fire test chamber. The fire test chamber is a rectangular horizontal duct with a removable lid. The inside dimensions are 17 3/4 inches +/- 1/4" wide by 12 inches +/- 1/2" deep by 25 feet long. The sides and base of the chamber are lined with an insulated firebrick with pressure tight observation windows down one side for a technician to observe flame progression during the duration of the 10-minute test period. The chamber lid is lowered into test position with non combustible concrete board placed between the specimen and chamber lid. A draft of 240 feet per minute which is maintained inside the test chamber throughout the test period by the means of an electronic fan afterburner and an electronically controlled damper door system located downstream of the test chamber in the exhaust ducting. The test is started when the test flame is ignited at the front of the test chamber. An electronic photocell system located in the exhaust system downstream from the test chamber is used to plot the smoke developed for use in calculating the smoke developed index while a technician plots the flame spread distance used in determining the flame spread index. The test is run for the 10 minute duration to determine the Flame Spread and Smoke Developed Index then the test is continued for an additional 20 minute period with Maximum flame spread recorded.



CONDITIONS OF CLASSIFICATION:

13.1 The test method has the following conditions of classification for a material or product to be classified as Meeting the requirements of this standard:

- 13.1.1 The flame spread index shall be 25 or less as determined for the initial 10 min test period,
- 13.1.2 The flame front shall not progress more than 10.5 ft (3.2 m) beyond the centerline of the burners at any time during the 30 min test period. This is considered evidence of no significant progressive combustion in this test method.

CBC 2015-IGNITION-RESISTANT MATERIAL.

A type of building material that resists ignition or sustained flaming combustion sufficiently so as to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with wildfire exposure of burning embers and small flames, as prescribed in Section 703A and SFM Standard 12-7A-5, Ignition-Resistant Material.

PREPARATION AND CONDITIONING:

The sample Material was delivered to QAI in (4) 11 1/2" wide by 12 foot long specimens that were stacked end to end to conform to the chamber dimensions.

ASTM E2768 TEST RESULTS:

MOUNTING METHOD:

Samples were Stacked end to end to meet the 24 foot requirement and were supported by 1/4" metal rods.

CLIENT:	M-Fire Suppression Inc.	DATE:	4/12/2017
SAMPLE ID:	4 boards of 2' x 12" x 12' #2 Douglas fir hand sprayed with 10 ounces of AAF31 for full coverage.		
SAMPLE IGNITION:		01:06	Minutes / Seconds
MAX FLAME FRONT:		6.5	Feet
TIME TO MAXIMUM SPREAD:		15:00	Minutes / Seconds
TEST DURATION:	30 minutes, 00 seconds		
SUMMARY:	FLAME SPREAD:	5	<i>7 Unrounded</i>
	SMOKE DEVELOPED:	50	<i>49 Unrounded</i>

OBSERVATIONS:

Sample ignition was noted at 1:06. A maximum flame front of 6.5 feet from the center line of the burners was recorded at 55:00.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	54
Red Oak Smoke Area (%A*Min):	152
Total Fuel Burned (ft³)	50.2



SUMMARY OF ASTM E84 RESULTS:

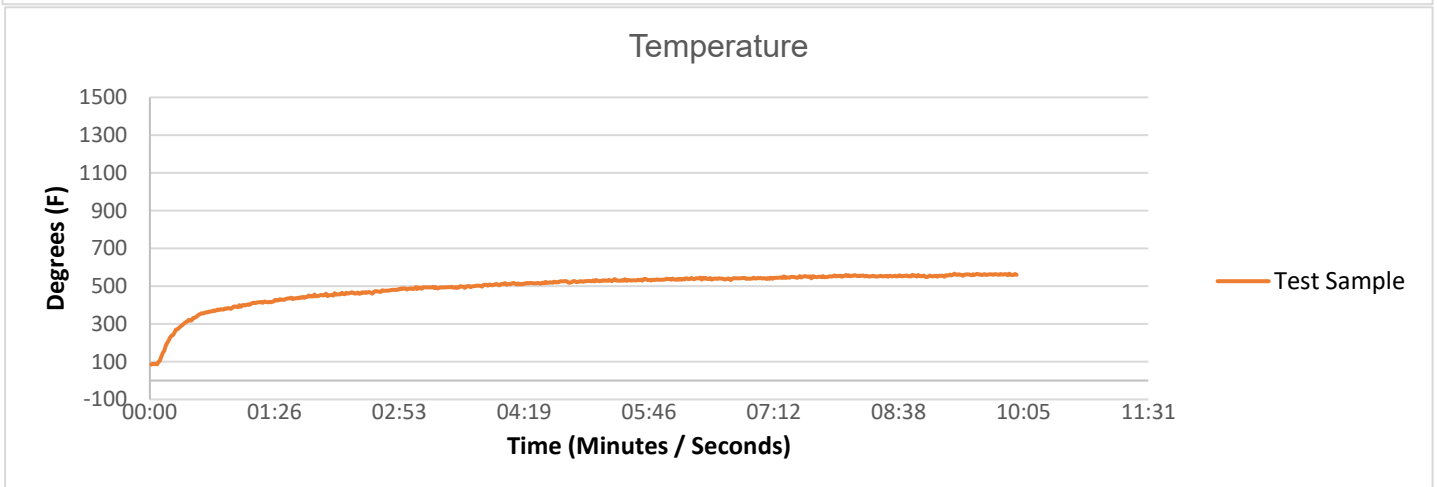
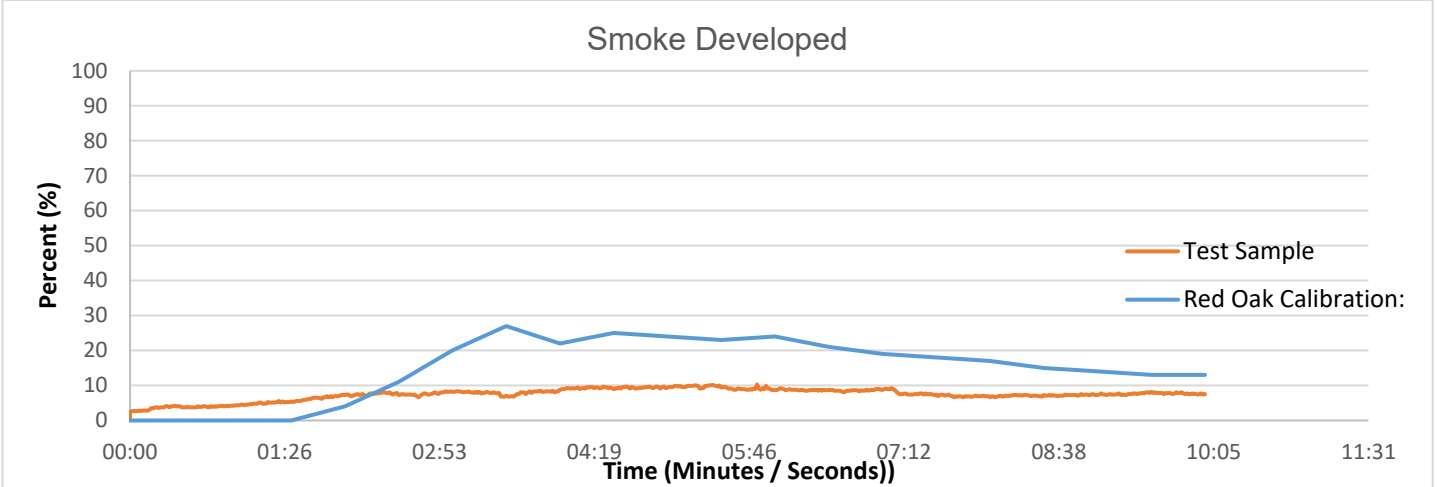
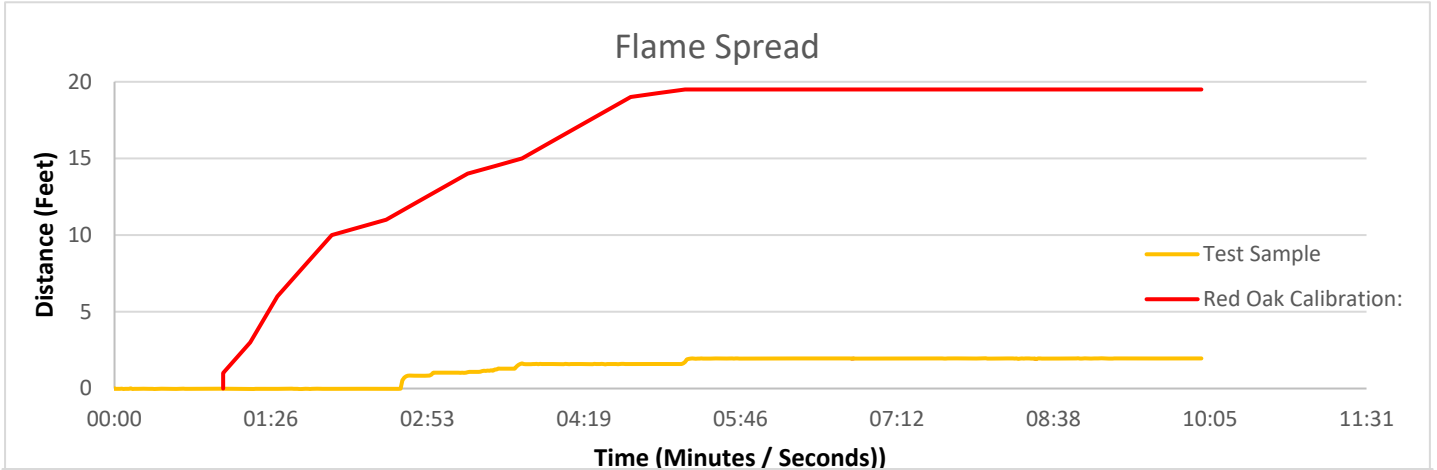
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.
3. California Building Code, 2015 Edition, Chapter 7A, Section 703A.



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APPENDIX

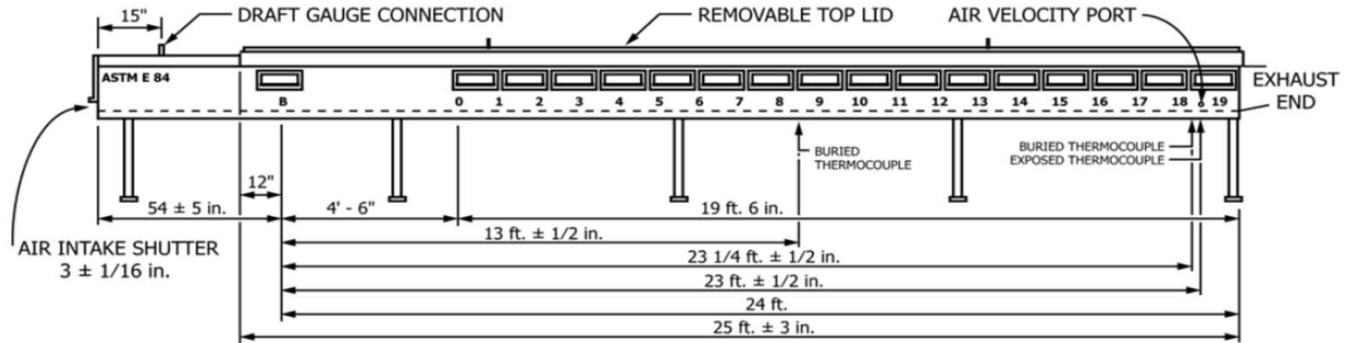


Diagram 1. Test Chamber side view showing critical dimensions.

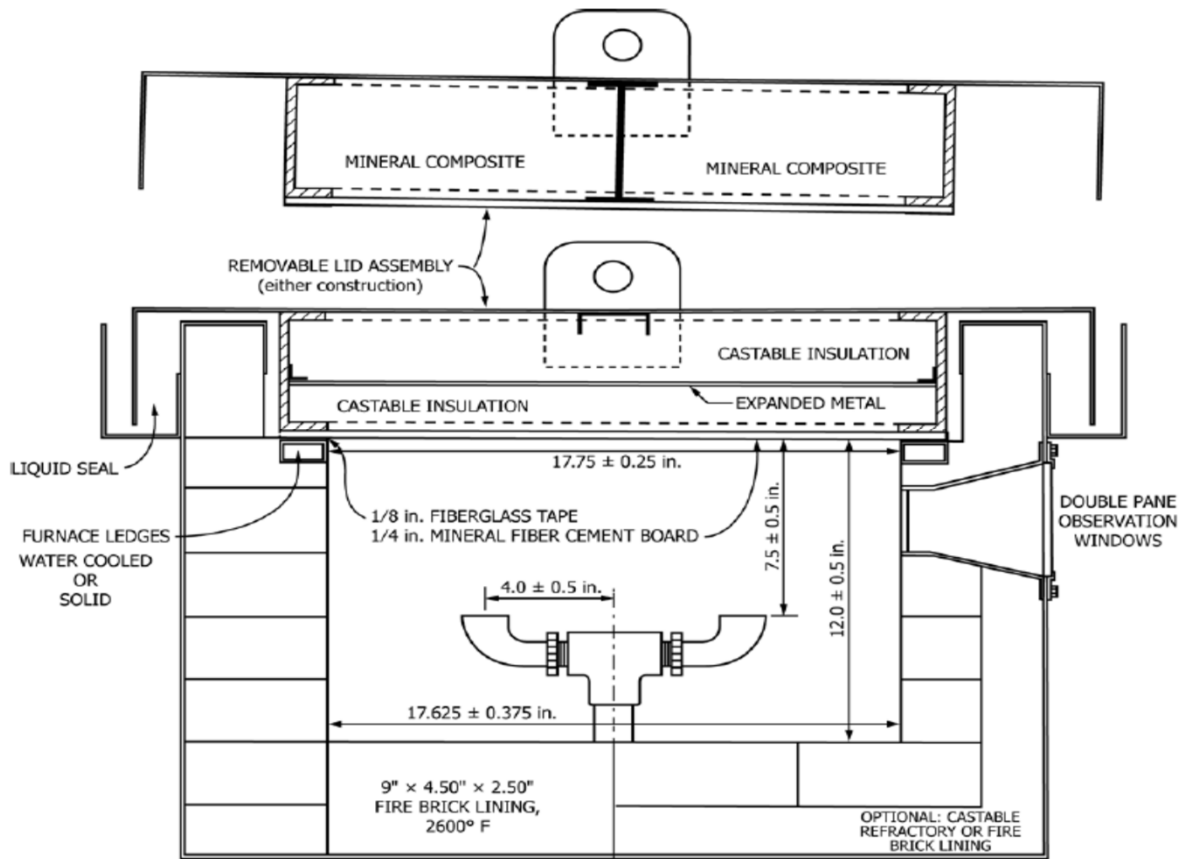


Diagram 2. Test Chamber looking down chamber showing critical dimensions.

APPENDIX:



Photo 1. Test Material in chamber.

Rev. 1 - Dated February 8, 2021: Sample ID revised to better describe the quantity of Doug-Fir boards used in testing and the company address was updated to their current location.

<<<END OF TEST REPORT>>>