Evacuation Slide Test Method

The Revised Test Method used for The Evacuation Slide Test

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Activities

The Revised Test Method of Evacuation Slide:

Power Input of the heater used for the tests

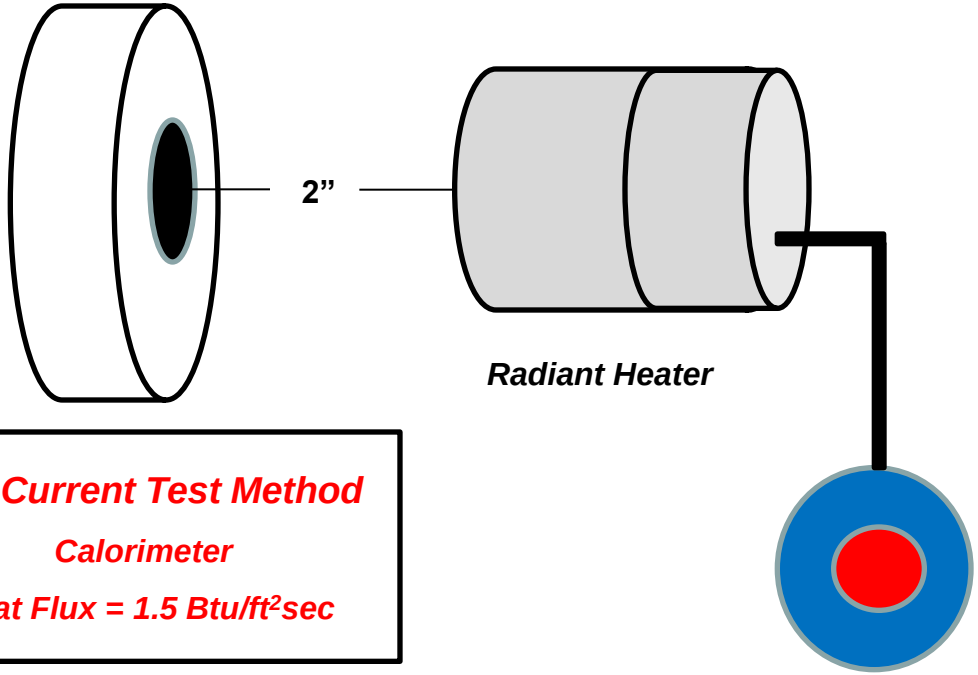
2 different part number Heaters were used to heat the slide test samples

The Slide Tests

- Calibration Tests of the each heater to determine the Power Input of the heater
- 2 different materials were tested. three tests on each material
- Test Results of three Tests

The Revised Test Method

Power Input of the Radiant Heater Vs. Heat Flux of the Calorimeter



The Current Test Method

Calorimeter

Heat Flux = 1.5 Btu/ft²sec

The Revised Test Method

Voltage Transformer

Power Input = 428 +/- 5 Watts

Radiant Heater (part #68086038000) with Coil-to-face distance of 1.5 inches

Radiant Heater (part #68086040400) with coil-to-face distance of 1.75 inches

The Revised Test Method will replace The Current Test Method for the evacuation slide test:

The Current Test Method had several issues such as:

- ***Different Manufactures calibrate transducers differently resulting in different calibration data.***
- ***Dust on surface of the calorimeter may cause improper heat flux reading,***
- ***Continuous measurement of the heater output is not possible during the test,***
- ***The use of heat flux transducer is time consuming (lengthy time for transducer to reach steady state),***
- ***Heat flux transducer is required to be recalibrated each year due the aging of the black velvet paint on the surface of the device***

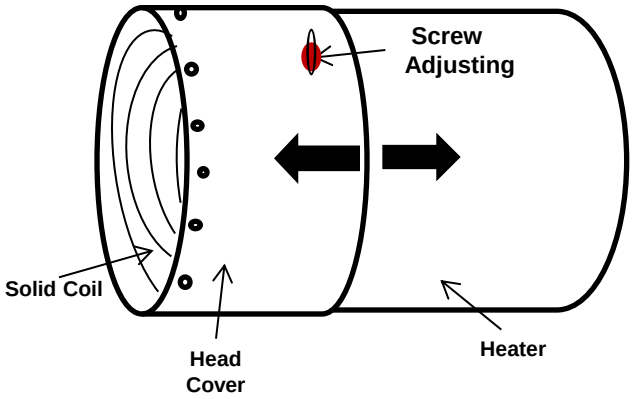
Two different Heaters were used for the test

Heater: ***part # 68086038000, 1.5-inch coil-to-face distance.***

Heater: ***part # 68086040400, 1.75-inch coil-to-face distance.***

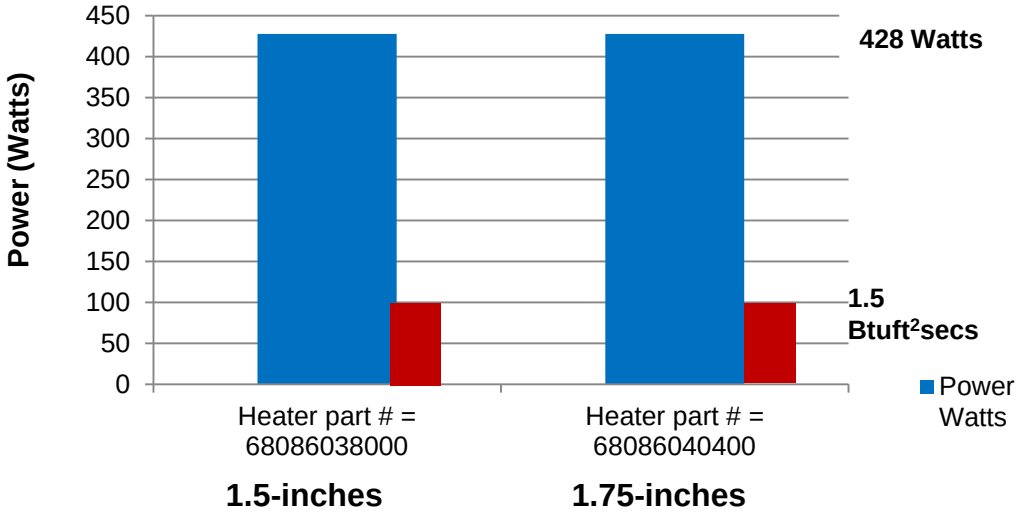
The Revised Test Method

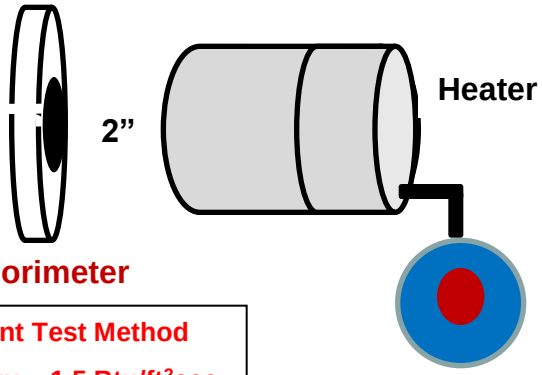
Depth of Coil of The Heater could be changed if the depth of coil of the heater required for the test is different



Open the screw on the heater, and adjust the head cover until the distance of the coil from the face of the Heater is 1.5” if using the heater with (Part #=68086038000) and 1.75” if using heater with (Part #= 68086040400)

Test Results of Power Input vs. Heat Flux Output of Radiant Heaters





Current Test Method

Heat Flux = 1.5 Btu/ft²sec

The Revised Test Method Voltage Transformer

Power Input = 428 +/- 5 Watts

Test #	Radiant Heater #	Furnace Type	Power Input (watts)	Heat Flux Output (Btu/ft²sec)	Distance of Calorimeter placed in front of the radiant heater	Coil-to-face distance (inches)
1	FAA Heater 1	Solid Coil Part #=68086038000	425 to 435	1.48 - 1.50	2 inches	1.5
2	FAA Heater 1	Solid Coil Part # =68086038000	426 to 434	1.48 - 1.52	2 inches	1.5
3	FAA Heater 1	Solid Coil Part # =68086038000	426	1.49	2 inches	1.5
7	FAA Heater 2	Solid Coil Part # =68086040400	424 - 426	1.49 - 1.51	2 inches	1.75
8	FAA Heater 2	Solid Coil Part # =68086040400	428 - 434	1.48 - 1.52	2 inches	1.75
9	FAA Heater 2	Solid Coil Part # =68086040400	427 - 428	1.48 - 1.49	2 inches	1.75

Test Test Procedure of The Revised Test Method

Calibration:

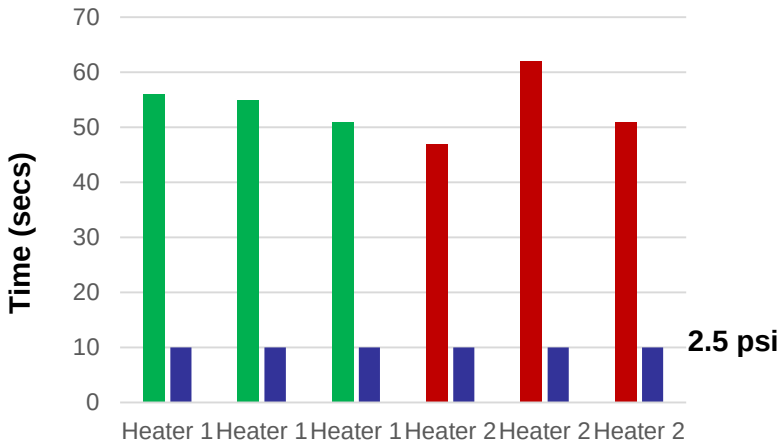
1. ***Start the radiant heater and other required instrumentation and allow 30 to 45 minutes for warm up***
2. ***Adjust the transformer voltage to produce a input power to the furnace of 428+/- 5 watts***
3. ***Do not turn off the radiant heater. Use this radiant heat setting for the test.***

Test Procedure:

1. ***Pressurize the cylinder with test sample to the normal operating pressure. Ensure that the test sample holds pressure for at least 3 minutes before the test.***
2. ***Check the center expanded surface of the test sample that is 2 inches in front of the center of the heater***
3. ***Recheck to ensure the input power to the furnace between 428 + / - 5 watts in the monitor***
4. ***Rotate the pressure cylinder with the test sample in front of the radiant heater and simultaneously start the timer.***
5. ***Record time (in seconds) to the first observed pressure loss.***
6. ***Each sample must maintain the correct pressure for a minimum of 180 seconds to pass the test.***
7. ***Repeat the complete Calibration and Test Procedure for each test sample.***

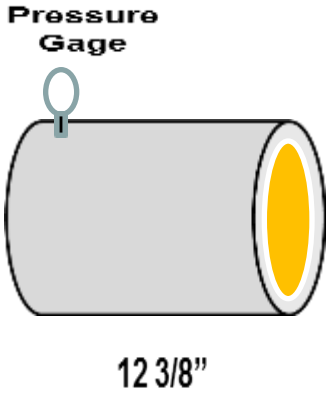
Test Requirement: A minimum of three specimens must be tested. At least 80% of the test samples must maintain the correct pressure for a minimum of 180 seconds

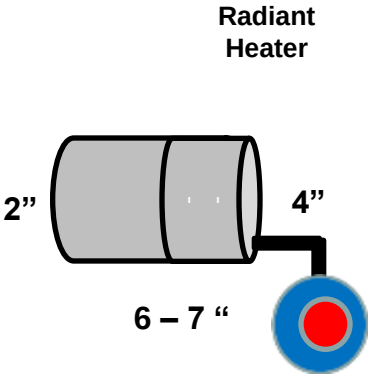
Mustard/Mustard Material Test Results



Part # = 68086038300

Part # = 68086040400

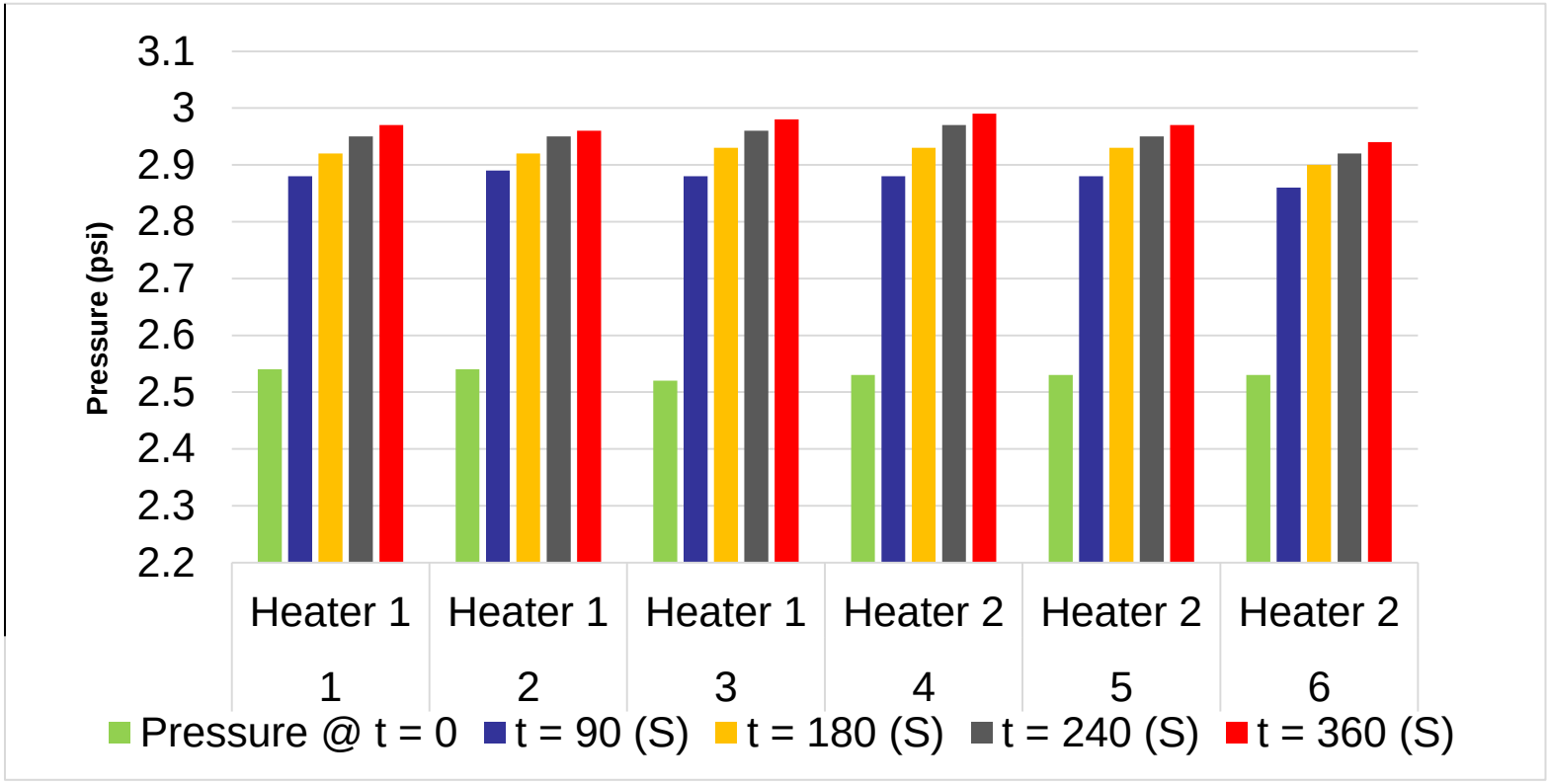




Voltage Transformer
Power Input: 428 +\ - 5 watts

Test #	*Lab #*	*Furnace type*	*Coil-to-face distance (inches)*	*Material*	*Power input (Watts)*	*Pressure at 0 sec*	*Pass / Fail*
1	*FAA Heater 1*	*Solid Coil Heater (68086038000)*	*1.5*	*Mustard/Mustard*	*430*	*2.52*	*56 sec*
2	*FAA Heater 1*	*Solid Coil Heater (68086038000)*	*1.5*	*Mustard/Mustard*	*430*	*2.53*	*55 sec*
3	*FAA Heater 1*	*Solid Coil Heater (68086038000)*	*1.5*	*Mustard/Mustard*	*433*	*2.52*	*51 Sec*
4	*FAA Heater 2*	*Solid Coil Heater (68086040400)*	*1.75*	*Mustard/Mustard*	*426*	*2.54*	*47 sec*
5	*FAA Heater 2*	*Solid Coil Heater (68086040400)*	*1.75*	*Mustard/Mustard*	*426*	*2.53*	*62 sec*
6	*FAA Heater 2*	*Solid Coil Heater (68086040400)*	*1.75*	*Mustard/Mustard*	*427*	*2.53*	*51 sec*

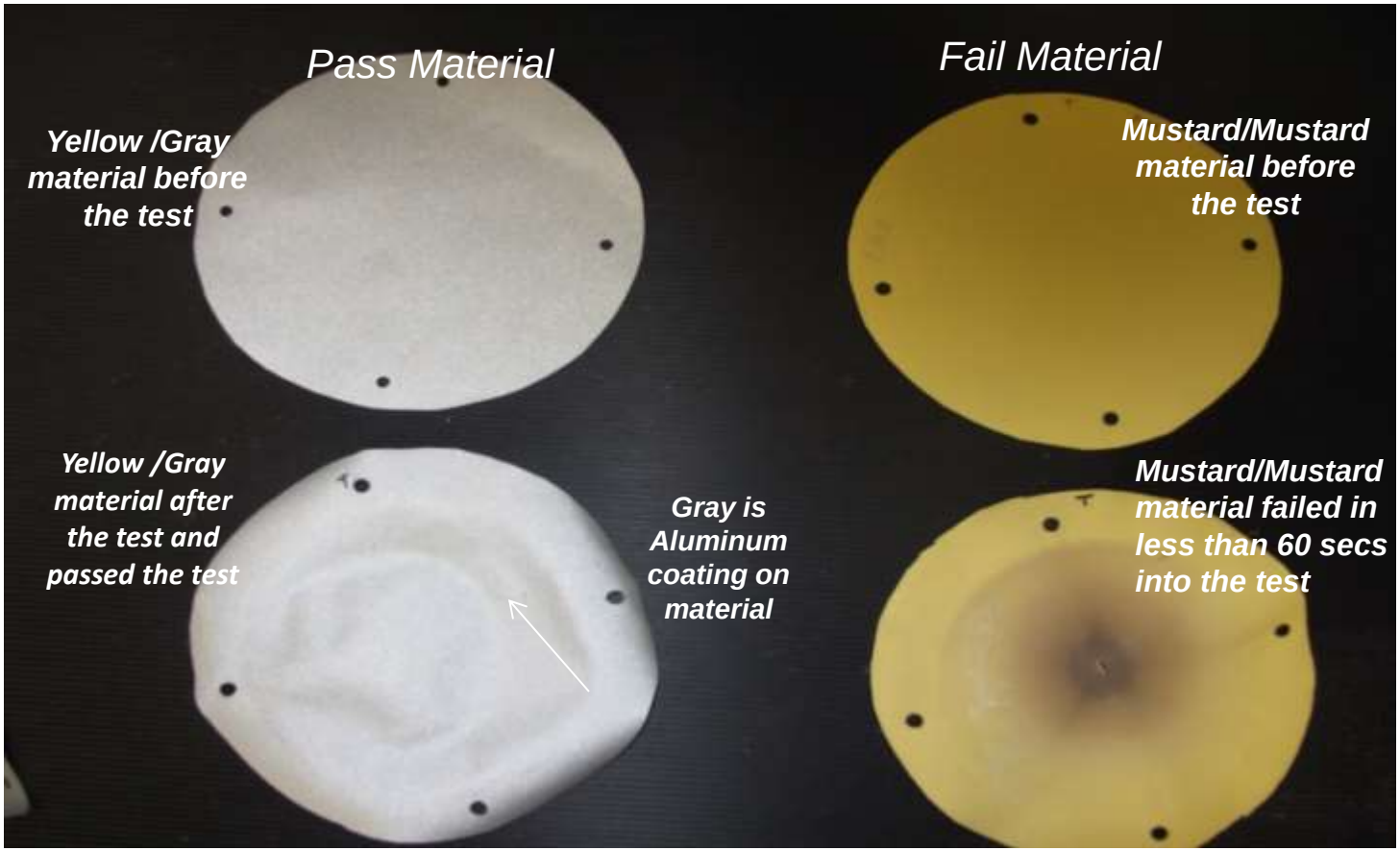
Yellow/ Gray Material Test Results
Gray Side facing the heater



Part # = 68086038300

Part # = 68086040400

Passed and Failed Materials



Yellow/Gray Material	***A single ply , polyurethane coated, not quite square woven, nylon fabric, gray side is the fine aluminum flake mixed into the polyurethane raw material***
Mustard/ Mustard Material	***Two ply with neoprene coated with nylon fabric***

Conclusion

The Mustard/Mustard material failed the test when using two radiant heaters (one with part #68086038000 and the other one radiant heater with part #68086040400 for the tests).

The Yellow/Yellow material passed the test when using two radiant heaters (one with part # 68086038000 and the other one radiant heater with part #68086040400) for the tests.

The test results of the Evacuation Slide Materials using Revised Test Method are the same as those using The Current Test Method

The Revised Test Method

The advantages of controlling the output of the heater by controlling electrical power input for the slide test were experienced as:

- ***AC voltage and the current of the heater will be measured and recorded and transformed to the power input using the computerized data system***
- ***The Power input will be calibrated and achieved in a mater of seconds***
- ***The Power will be observed on the monitor and adjust it during the test***
- ***There is no need to recalibrate the power input,***
- ***A lot of time will be saved for the test with elimination of the test calibration of the heat flux from the Heater required by the current test method***

Future Work

Round Robin 6 will be conducted by participants using The Revised Test Method