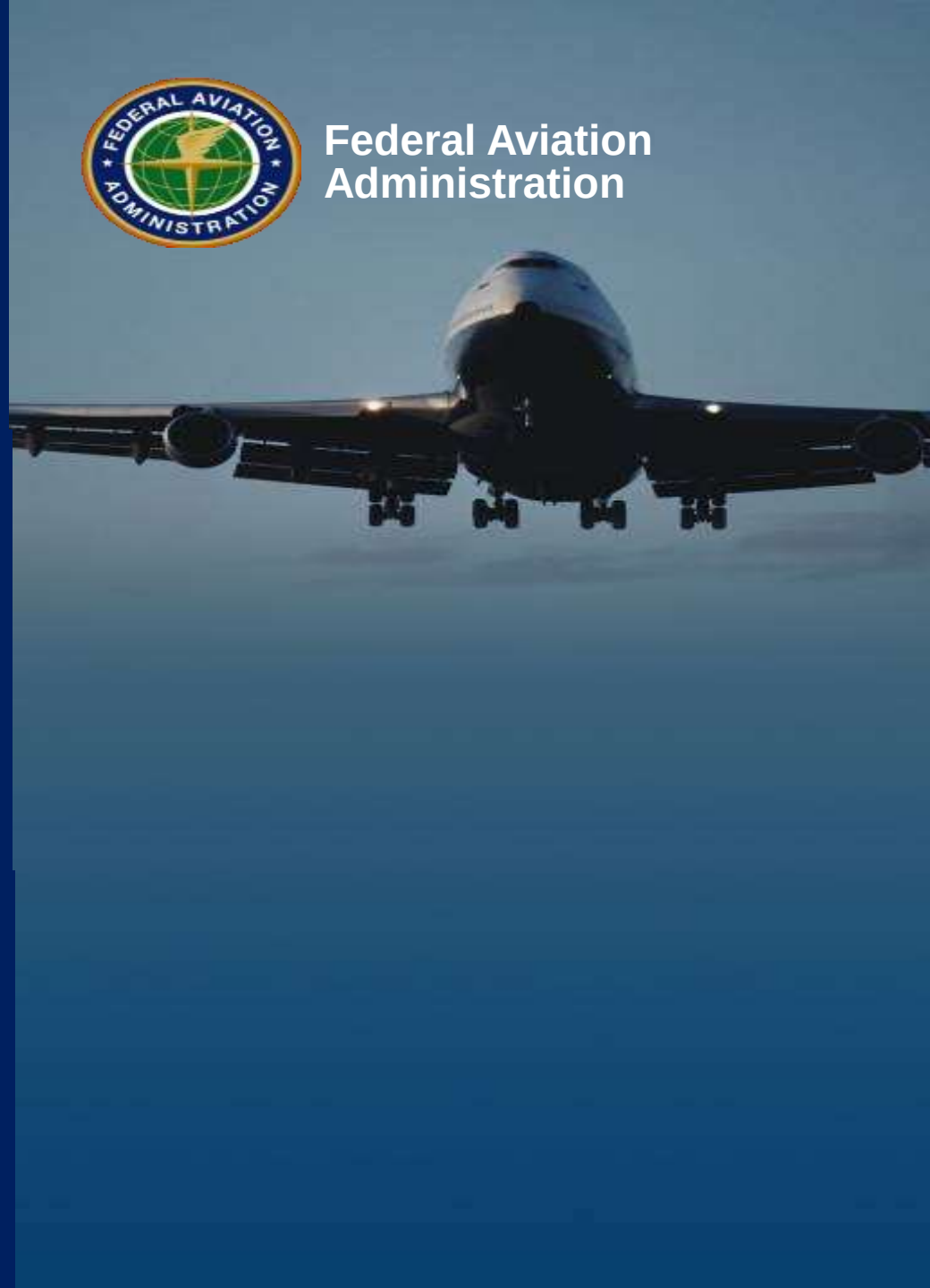
Evacuation Slide Test

Comparison Tests of Power Inputs between Two Power Controllers for The Slide Tests



Tim Marker (for Dung Do)
Fire Safety Branch
FAA Wm. J. Hughes Technical Center
Atlantic City International Airport, NJ 08405

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Activities

Tests were run to calibrate 2 Heaters and to evaluate the Powerstat Variable Autotransformer (VR) and The Keysight AC 6802A Power Controller (ACP) as Power Control Methods to the heaters for the Evacuation Slide Test Method

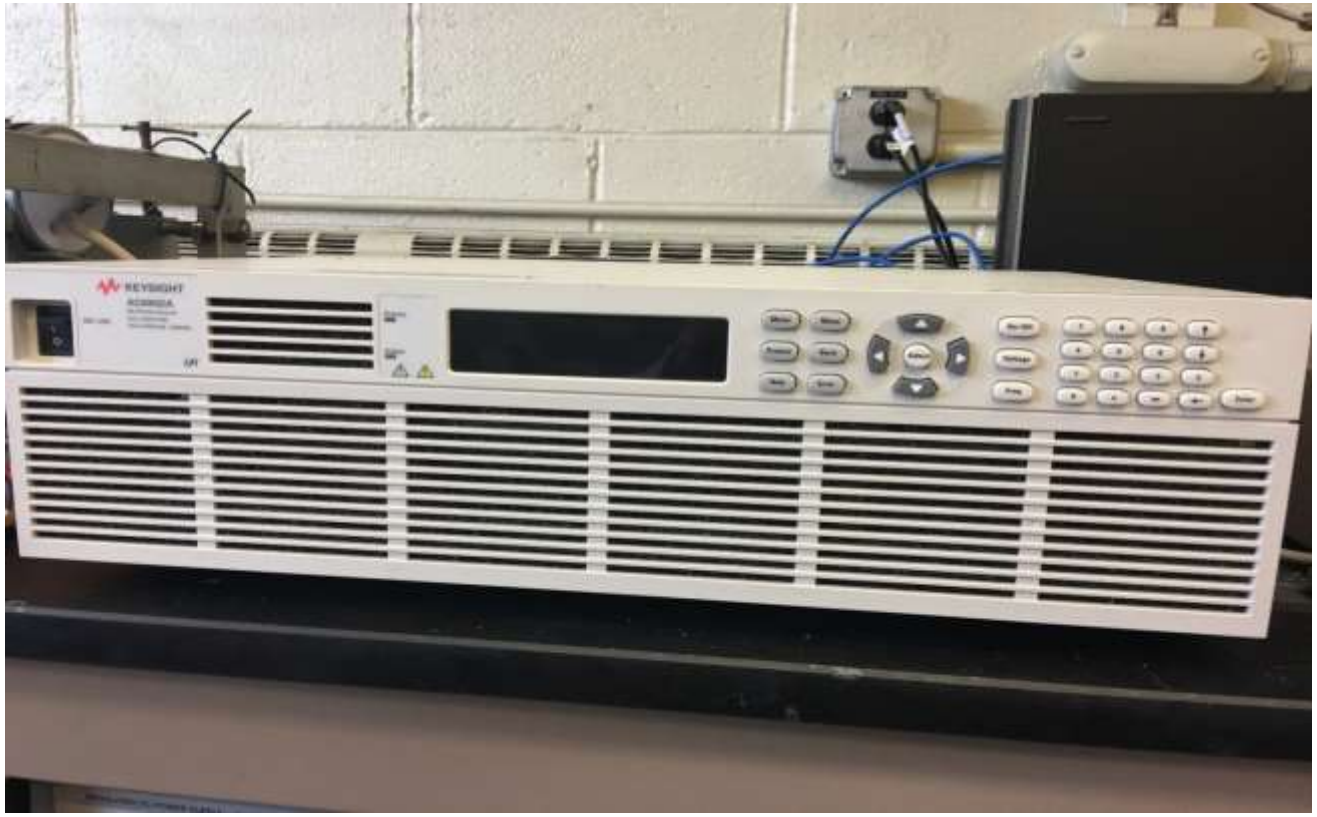
2 heaters were used for the Calibration Tests and tests on evac slide materials

- ***H1 = Part # 38000 . H2 = Part # 40400***

- ***3 materials were tested , 3 Tests of each material.***

2 AC Power Controllers were used for The Power Input of Heaters

Keysight AC 6802A Power Controller



Powerstat Variable Autotransformer

2 Radiant Heaters were used for the Tests, either using one of two for Testing

2 Radiant Heaters were identified as:

- ***One with solid coil, part # 68086038000, 1.5-inch coil-to-face distance.***
- ***One with solid coil, part # 68086040400, 1.625-inch coil-to-face distance.***

Calibration Tests of 2 Heaters : The Power Input between The Voltage Regulator and The AC Power controllers

Calibration Test Results of 2 Heaters

Power Controller Sources	Calorimeter #	Heater # 1 (38000) Distance from the coil to the opening of the heater is 1.50 inches		Heater # 2 (40400) Distance from the coil to the opening of the heater is 1.625 inches	
		Power Input	Heat Flux ($Btu ft^2 sec$)	Power	Heat Flux ($Btu ft^2 sec$)
Powerstat Variable Autotransformer	Calorimeter # 1	427 to 438	1.48 to 1.53	428 to 440	1.49 to 1.52
	Calorimeter # 2	426 to 438	1.47 to 1.52	429 to 440	1.47 to 1.52
Keysight AC 6802A Power Controller	Calorimeter # 1	426 to 440	1.49 to 1.53	430 to 439	1.47 to 1.49
	Calorimeter # 2	428 to 440	1.47 to 1.52	429 to 440	1.48 to 1.51

The Power Input of the Heater will be 435 +/- 3 Watts that will be chosen for the slide test

Yellow/Gray Test Results Using 2 Power Control Methods

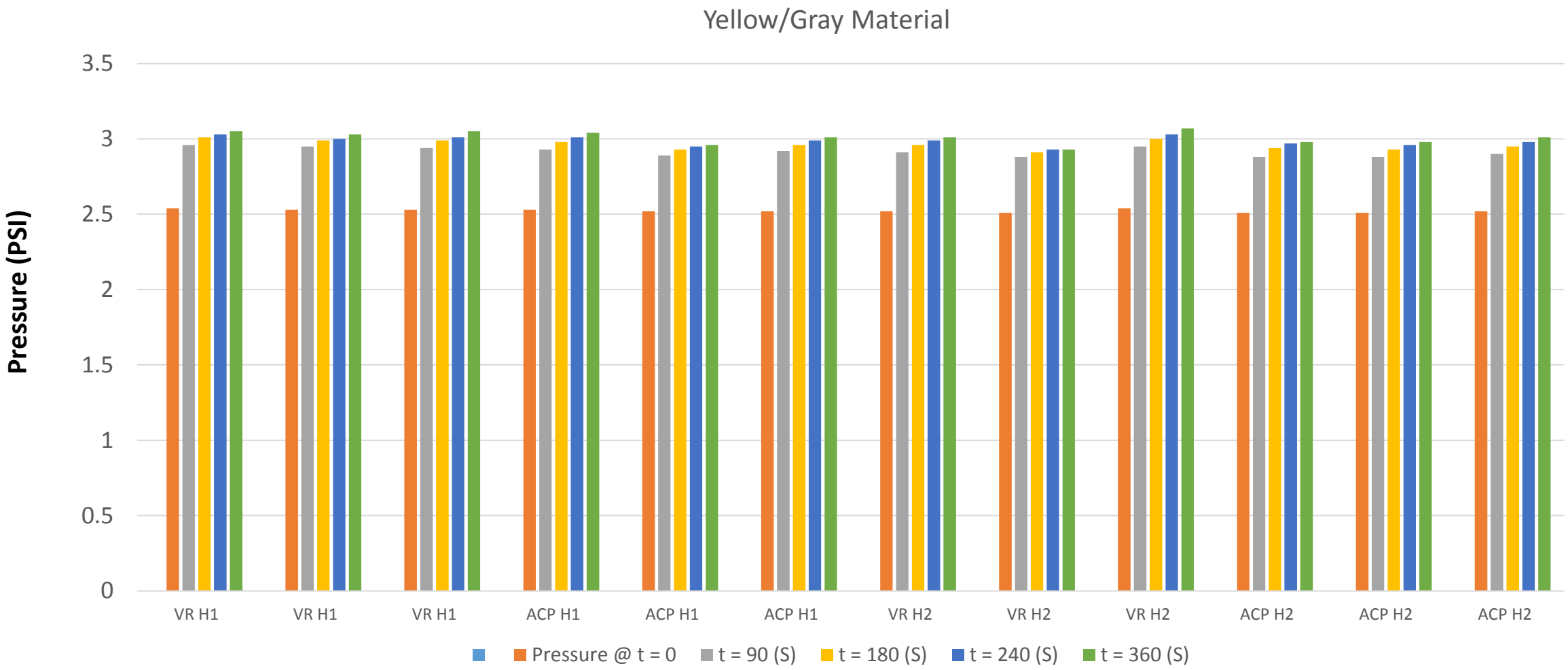


Table 1: Test Results of The Yellow/Gray Material

Test #	Heater	Power controller	Material	Starting pressure (PSI)	Pressure at 90 seconds (PSI)	Pressure at 180 seconds (PSI)	Pressure at 240 seconds (PSI)	Pressure at 300 seconds (PSI)	Pass / Fail
1	1	Variable Autotransformer	Yellow/Gray	2.54	2.96	3.01	3.03	3.05	Pass
2	1	Variable Autotransformer	Yellow/Gray	2.53	2.95	2.99	3	3.03	Pass
3	1	Variable Autotransformer	Yellow/Gray	2.53	2.94	2.99	3.01	3.05	Pass
4	1	AC Power Controller	Yellow/Gray	2.53	2.93	2.98	3.01	3.04	Pass
5	1	AC Power Controller	Yellow/Gray	2.52	2.89	2.93	2.95	2.96	Pass
6	1	AC Power Controller	Yellow/Gray	2.52	2.92	2.96	2.99	3.01	Pass
7	2	Variable Autotransformer	Yellow/Gray	2.52	2.91	2.96	2.99	3.01	Pass
8	2	Variable Autotransformer	Yellow/Gray	2.51	2.88	2.91	2.93	2.93	Pass
9	2	Variable Autotransformer	Yellow/Gray	2.54	2.95	3	3.03	3.07	Pass
10	2	AC Power Controller	Yellow/Gray	2.51	2.88	2.94	2.97	2.98	Pass
11	2	AC Power Controller	Yellow/Gray	2.51	2.88	2.93	2.96	2.98	Pass
12	2	AC Power Controller	Yellow/Gray	2.52	2.9	2.95	2.98	3.01	Pass

Blue/Gray Material Test Results Using 2 Power Control Methods

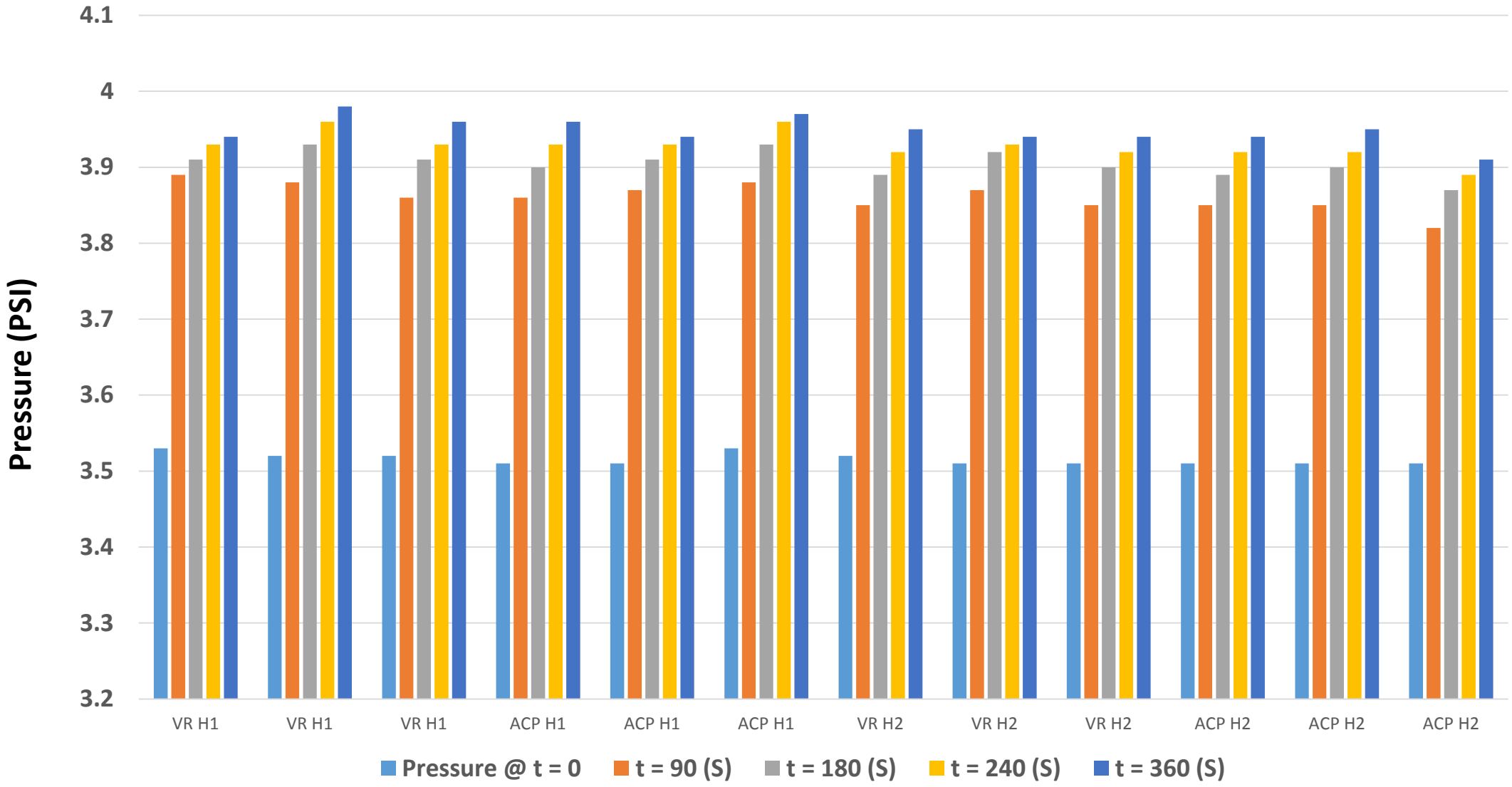
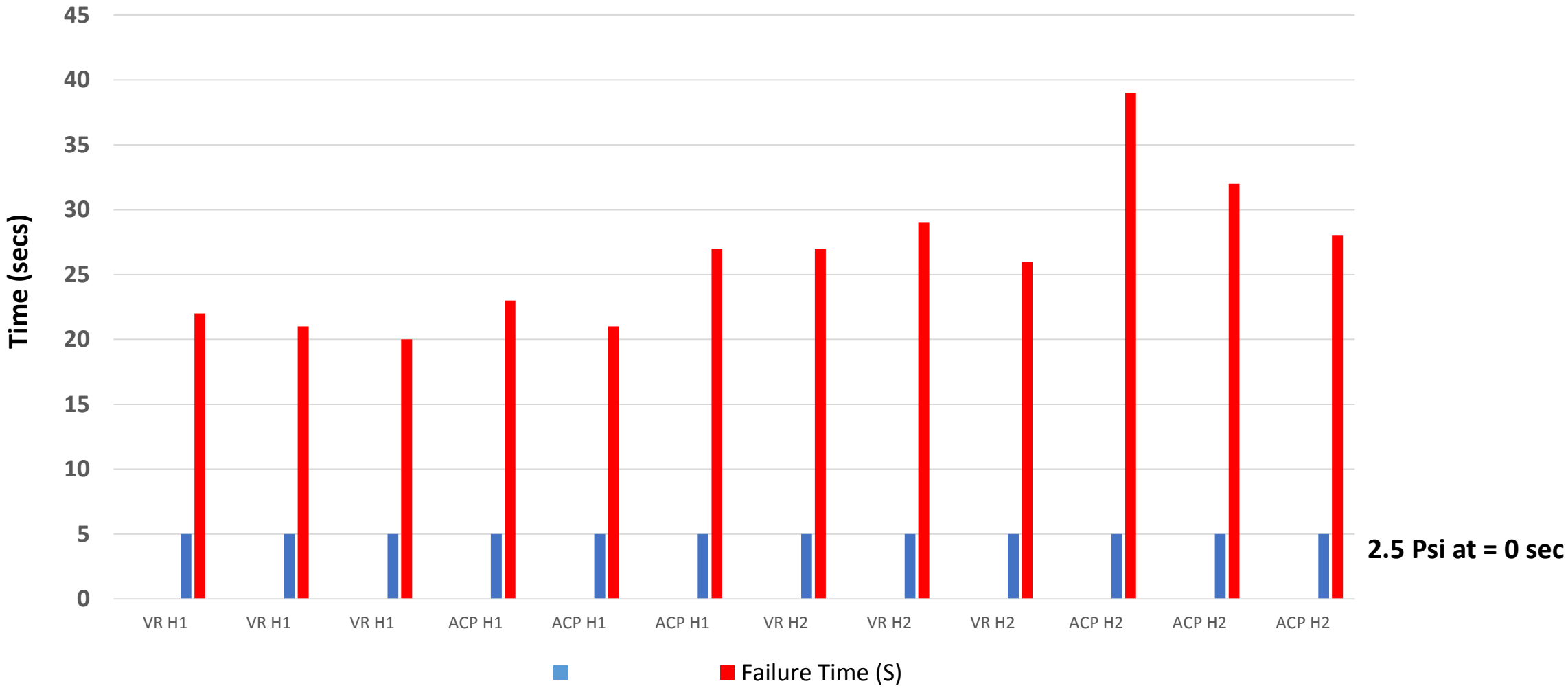


Table 2: Test Results of The Blue/Gray Material

Test #	Heater	Power controller	Material	Starting pressure (PSI)	Pressure at 90 seconds (PSI)	Pressure at 180 seconds (PSI)	Pressure at 240 seconds (PSI)	Pressure at 300 seconds (PSI)	Pass / Fail
1	1	Variable Autotransformer	Blue/Gray	3.53	3.89	3.91	3.93	3.94	Pass
2	1	Variable Autotransformer	Blue/Gray	3.52	3.88	3.93	3.96	3.98	Pass
3	1	Variable Autotransformer	Blue/Gray	3.52	3.86	3.91	3.93	3.96	Pass
4	1	AC Power Controller	Blue/Gray	3.51	3.86	3.9	3.93	3.96	Pass
5	1	AC Power Controller	Blue/Gray	3.51	3.87	3.91	3.93	3.94	Pass
6	1	AC Power Controller	Blue/Gray	3.53	3.88	3.93	3.96	3.97	Pass
7	2	Variable Autotransformer	Blue/Gray	3.52	3.85	3.89	3.92	3.95	Pass
8	2	Variable Autotransformer	Blue/Gray	3.51	3.87	3.92	3.93	3.94	Pass
9	2	Variable Autotransformer	Blue/Gray	3.51	3.85	3.9	3.92	3.94	Pass
10	2	AC Power Controller	Blue/Gray	3.51	3.85	3.89	3.92	3.94	Pass
11	2	AC Power Controller	Blue/Gray	3.51	3.85	3.9	3.92	3.95	Pass
12	2	AC Power Controller	Blue/Gray	3.51	3.82	3.87	3.89	3.91	Pass

Mustard/Mustard Material Test Results Using 2 Power Control Methods



2.5 Psi at = 0 sec

Table 3: The Test *Results* of The Mustard/Mustard Material

Test #	Heater	Power controller	Material	Starting Pressure (PSI)	Pressure at 90 secs (PSI)	Past /Fail
1	1	Variable Autotransformer	Mustard/Mustard	2.53		Failed at 22 secs
2	1	Variable Autotransformer	Mustard/Mustard	2.52		Failed at 21 secs
3	1	Variable Autotransformer	Mustard/Mustard	2.52		Failed at 20 secs
4	1	AC Power Controller	Mustard/Mustard	2.52		Failed at 23 secs
5	1	AC Power Controller	Mustard/Mustard	2.52		Failed at 21 secs
6	1	AC Power Controller	Mustard/Mustard	2.52		Failed at 27 secs
7	2	Variable Autotransformer	Mustard/Mustard	2.54		Failed at 27 secs
8	2	Variable Autotransformer	Mustard/Mustard	2.52		Failed at 29 secs
9	2	Variable Autotransformer	Mustard/Mustard	2.54		Failed at26 secs
10	2	AC Power Controller	Mustard/Mustard	2.54		Failed at 39 secs
11	2	AC Power Controller	Mustard/Mustard	2.53		Failed at 32 secs
12	2	AC Power Controller	Mustard/Mustard	2.5		Failed at 28 secs

Findings

The power input to the heater was set using The AC Power Controller (ACPC), which remained unchanged throughout the tests. The Operator doesn't need to check the power input on a monitor (automatic)

The power input to the heater may fluctuate when using the Variable Autotransformer (VR). The Operator must check the power input on the monitor during the test (manual)

The power input to the heater was programmed quickly and powered up in matter of seconds when using the AC Power Controller (ACPC)

It took some more time to achieve the power input to the heater when using the Variable Autotransformer (VR)

Conclusion

The Mustard/Mustard material failed the test when using the Variable Autotransformer (VR) and AC Power Controller (ACPC) .

The Yellow/Gray material with Gray side facing to the radiant heat passed the test when using the Variable Autotransformer (VR) and the AC Power Controller (ACPC).

The Blue/Gray material with Gray side facing to the radiant heat passed the test when using the Variable Autotransformer (VR) and the AC Power Controller (ACPC).

The Variable Autotransformer (VR) and the AC Power Controller (ACPC) were capable of being used for the tests

The radiant heater with part # 68086038000 and the radiant heater with part # 68086040400 could be accepted to be used for the slide tests.

Picture of the new AC Power Controller

Test Procedure for Variable Autotransformer and AC Power Controller

Calibration:

- ***Start the radiant heater and other required instrumentation and allow 30 to 45 minutes for warm up***
- ***Adjust the transformer voltage to produce an input power to the furnace in the range of 435 +/- 3 watts.***

Test Procedure:

- ***Place the center expanded surface of the test specimen 2 inches in front of the center of the furnace***
- ***Pressurize the cylinder with test specimen to the normal operating pressure. Rotate the pressure cylinder with the test specimen in front of the radiant heat furnace and simultaneously start the timer.***
- ***Record time (in seconds) to the first observed pressure loss.***
- ***Each specimen must maintain the correct pressure for a minimum of 180 seconds to pass the test.***

- ***Note: 2 solid coil Heaters are acceptable to be used as Radiant Heat that are :***
- ***Heater: (part # 68086038000) , the distance from the coil to the face of furnace must be 1.50 inches***
- ***Heater (part # = 68086040400), the distance from the coil to the face of furnace must be 1.625 inches***