

Slide Evacuation Test Method TSO C69A

Dung Do

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**Federal Aviation
Administration**



Slide Evacuation Test Method

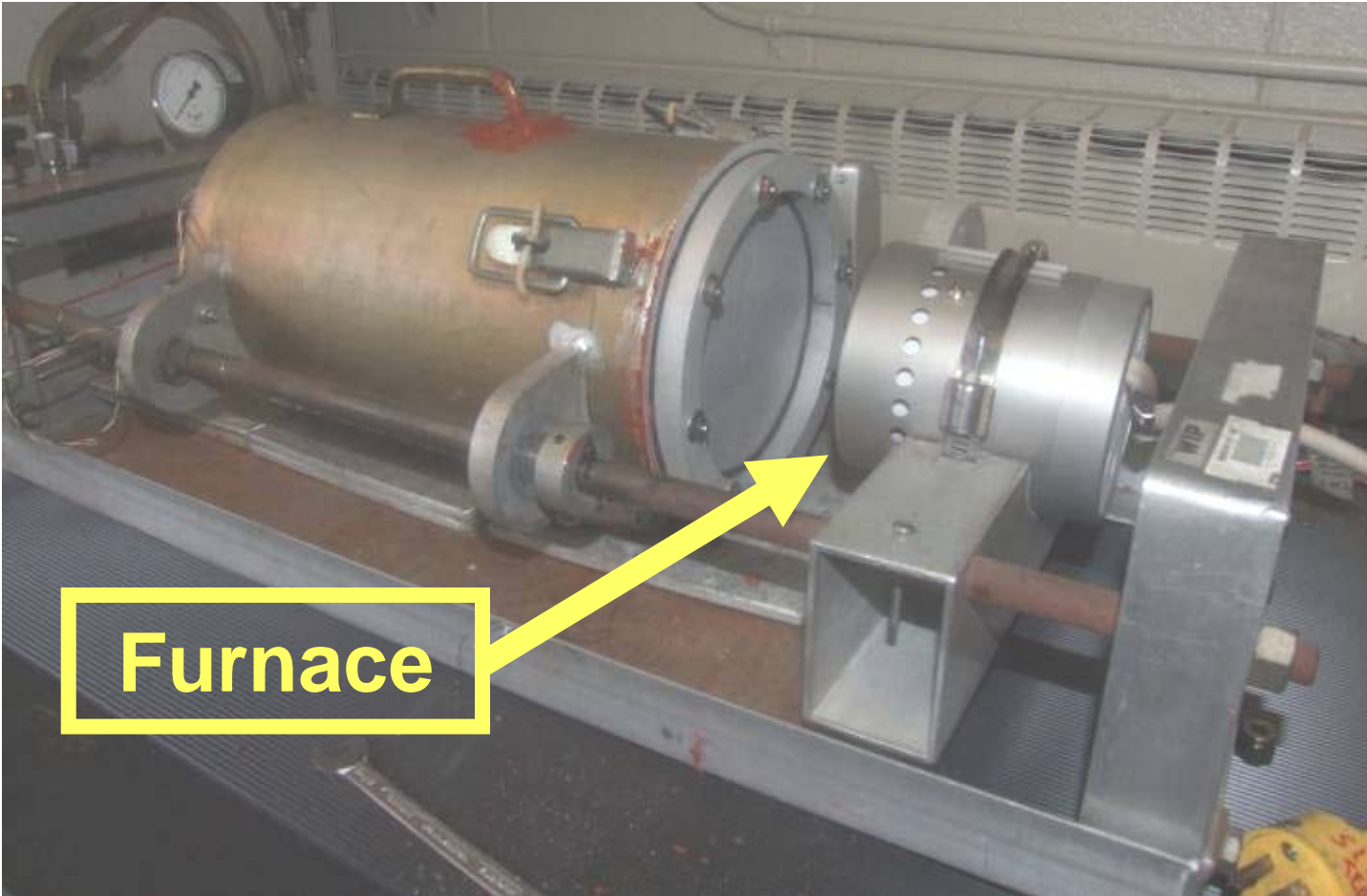
- Furnance Study

- For Review:

- As mentioned in Georgia, the furnace used in this test has changed over the years.
 - Early versions used a wire coil and recent versions use either a “new” wire coil or a solid coil.



Slide Evacuation Test Apparatus



Slide Evacuation Test Furnace



**Original
Wire Coil**

**Recent
Wire Coil**

Solid Coil

Slide Evacuation Test Method

- Calorimeter Study:
 - One of the participating labs sent their calorimeter to the Tech Center for recalibration due to questionable data.
 - This calorimeter was then installed in the FAA's test equipment, a series of tests were run, and the resulting data was compared to data obtained using the FAA calorimeter.



Slide Evacuation Test Method

- Calorimeter Study:
 - Results with FAA Calorimeter:

Test #	Furnace Type	Material Gray faces to the heat	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	New Version Solid Coil	Yellow/Gray	2.50	2.88	2.97	3.02	3.07	Pass
2	New Version Solid Coil	Yellow/Gray	2.50	2.93	3.00	3.03	3.06	Pass
3	New Version Solid Coil	Yellow/Gray	2.50	2.91	2.97	3.01	3.05	Pass
5	New Version Solid Coil	Yellow/Gray	2.50	2.88	2.93	2.96	2.99	Pass
6	New Version Solid Coil	Yellow/Gray	2.50	2.91	2.97	3.01	3.03	Pass

7	New Version Solid Coil	Blue/Gray	3.50	3.84	3.90	3.93	3.96	Pass
8	New Version Solid Coil	Blue/Gray	3.50	3.86	3.92	3.95	3.99	Pass
9	New Version Solid Coil	Blue/Gray	3.50	3.84	3.90	3.92	3.96	Pass
10	New Version Solid Coil	Blue/Gray	3.50	3.88	3.94	3.97	4.02	Pass

Test #	Furnace Type	Material	Starting pressure (PSI)	Comment –Time to Failure	Pass / Fail
11	New Version Solid Coil	Mustard/Mustard	2.5	Pressure loss at 42 seconds	Fail
12	New Version Solid Coil	Mustard/Mustard	2.5	Pressure loss at 36 seconds	Fail
13	New Version Solid coil	Mustard/ Mustard	2.5	Pressure loss at 28 seconds	Fail
14	New Version Solid Coil	Mustard/ Mustard	2.5	Pressure loss at 38 seconds	Fail
15	New Version Solid Coil	Mustard/Mustard	2.5	Pressure loss at 59 seconds	Fail
16	New Version Solid Coil	Mustard/ Mustard	2.5	Pressure Loss at 42 seconds	Fail

Slide Evacuation Test Method

- Calorimeter Study:
 - Results with Lab’s Calorimeter:

Test #	Furnace Type	Material Gray faces to the heat	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
17	New Version Solid Coil	Yellow/Gray	2.50	2.93	2.99	3.02	3.06	Pass
18	New Version Solid Coil	Yellow/Gray	2.50	2.89	2.96	2.98	2.98	Pass
19	New Version Solid Coil	Yellow/Gray	2.51	2.90	2.97	3.00	3.05	Pass
20	New Version Solid Coil	Yellow/Gray	2.50	2.88	2.95	2.99	3.04	Pass
21	New Version Solid Coil	Yellow/Gray	2.50	2.89	2.95	2.99	3.02	Pass

22	New Version Solid Coil	Blue/Gray	3.50	3.85	3.92	3.95	4.00	Pass
23	New Version Solid Coil	Blue/Gray	3.50	3.86	3.91	3.95	3.98	Pass
24	New Version Solid Coil	Blue/Gray	3.50	3.85	3.92	3.96	3.99	Pass
25	New Version Solid Coil	Blue/Gray	3.50	3.85	3.91	3.96	4.00	Pass
26	New Version Solid Coil	Blue/Gray	3.50	3.85	3.90	3.95	3.98	Pass

Test #	Furnace Type	Material	Starting Pressure (PSI)	Pass/Fail	Comment –Time to Failure
27	New Version Solid Coil	Mustard/Mustard	2.5	Fail	Pressure loss at 42 seconds
28	New Version Solid Coil	Mustard/Mustard	2.5	Fail	Pressure loss at 31 seconds
29	New Version Solid coil	Mustard/ Mustard	2.5	Fail	Pressure loss at 36 seconds
30	New Version Solid Coil	Mustard/ Mustard	2.5	Fail	Pressure loss at 30 seconds
31	New Version Solid Coil	Mustard/Mustard	2.5	Fail	Pressure loss at 61 seconds
32	New Version Solid Coil	Mustard/ Mustard	2.5	Fail	Pressure loss at 32 seconds

Slide Evacuation Test Round Robin

- Results with FAA Test Equipment:

Test #	Furnace Type	Material Gray faces to the heat	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	New Version Solid Coil	Yellow/Gray	2.50	2.88	2.97	3.02	3.07	Pass
2	New Version Solid Coil	Yellow/Gray	2.50	2.93	3.00	3.03	3.06	Pass
3	New Version Solid Coil	Yellow/Gray	2.50	2.91	2.97	3.01	3.05	Pass
5	New Version Solid Coil	Yellow/Gray	2.50	2.88	2.93	2.96	2.99	Pass
6	New Version Solid Coil	Yellow/Gray	2.50	2.91	2.97	3.01	3.03	Pass

7	New Version Solid Coil	Blue/Gray	3.50	3.84	3.90	3.93	3.96	Pass
8	New Version Solid Coil	Blue/Gray	3.50	3.86	3.92	3.95	3.99	Pass
9	New Version Solid Coil	Blue/Gray	3.50	3.84	3.90	3.92	3.96	Pass
10	New Version Solid Coil	Blue/Gray	3.50	3.88	3.94	3.97	4.02	Pass

Test #	Furnace Type	Material	Starting pressure (PSI)	Comment –Time to Failure	Pass / Fail
11	New Version Solid Coil	Mustard/Mustard	2.5	Pressure loss at 42 seconds	Fail
12	New Version Solid Coil	Mustard/Mustard	2.5	Pressure loss at 36 seconds	Fail
13	New Version Solid coil	Mustard/ Mustard	2.5	Pressure loss at 28 seconds	Fail
14	New Version Solid Coil	Mustard/ Mustard	2.5	Pressure loss at 38 seconds	Fail
15	New Version Solid Coil	Mustard/Mustard	2.5	Pressure loss at 59 seconds	Fail
16	New Version Solid Coil	Mustard/ Mustard	2.5	Pressure Loss at 42 seconds	Fail

Slide Evacuation Test Round Robin

- Results from Participating Lab:

Test #	Furnace Type	Material	Starting pressure	300 seconds	Pass/Fail
1	New Version Solid Coil	Yellow/Gray	2.50	No pressure loss	Pass
2	New Version Solid Coil	Yellow/Gray	2.50	No pressure loss	Pass
3	New Version Solid Coil	Yellow/Gray	2.50	No pressure loss	Pass

4	New Version Solid Coil	Blue/Gray	3.50	No pressure loss	Pass
5	New Version Solid Coil	Blue/Gray	3.50	No pressure loss	Pass
6	New Version Solid Coil	Blue/Gray	3.50	No pressure loss	Pass

7	New Version Solid Coil	<u>Mustard Mustard</u>	2.50	Pressure loss at 32 seconds	Fail
8	New Version Solid Coil	<u>Mustard Mustard</u>	2.50	Pressure loss at 43.6 seconds	Fail
9	New Version Solid Coil	<u>Mustard Mustard</u>	2.50	Pressure loss at 31.1 seconds	Fail
10	New Version Solid Coil	<u>Mustard Mustard</u>	2.50	Pressure loss at 33 seconds	Fail

Task Group Discussion

- Discuss possible changes to TSO C69c and the Materials Fire Test Handbook
- Development of new tools to ensure the proper centering of both the cylinder and positioning of the calorimeter
- Development of a plate to install in to the slide bar. The distance from the plate to the cylinder would be the same distance from the cylinder to the furnace. This plate would be necessary as the furnace is too hot during the test.
- Discuss test requirements which include test duration and pass/fail criteria.

