

Recent Developments with the Radiant Panel and Controller used in CFR 25.856a

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The 6th Triennial Fire & Cabin Safety Research Conference

Tropicana Casino Resort; Atlantic City, NJ

October 25 – 28, 2010



**Federal Aviation
Administration**



Background of Thermal Acoustical Insulation Rule

- Requests from industry (via International Aircraft Materials Fire Test Working Group) to reevaluate the then mandated test method, the 12-second Vertical Bunsen burner test.
- Prior incidents in China, Italy, Copenhagen, US, and others.
- Swiss Air MD-11 Accident (Sept. 1998).
- These requests and incidents lead to the development of Thermal/Acoustical Insulation Flammability Test with a Compliance date of September 2005.
- This standard utilizes a radiant heat source and a small pilot flame ignition source.



Electric Radiant Panel Test Chamber



Recent Developments with the Radiant
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Electric Radiant Panel Heat Source



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Electric Radiant Panel Video



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Observed Irregularities

- In October 2009, two new electric panels were acquired.
 - Both panels required a very high setpoint temperature to achieve a proper heatflux at the zero position.
 - The 3-position check was irregular.
- Both panels were returned to the manufacturer who informed us that they had to replace emitter strips on both panels.
- Around this time, three other labs informed us of the same type of problem.



Electric Panel

- The Radiant Panel used in the Thermal/Acoustical Insulation Test specified in CFR 25.856a is no longer assembled and tested by Watlow.
- This information was previously announced at the International Aircraft Materials Fire Test Working Group meeting sponsored by Boeing in Renton, Washington, March, 2010
- Power Modules, Inc (PMI) in Norristown, Pennsylvania now fabricates and tests the electric radiant panel used in this test.
- The Technical Center received the first panel fabricated by PMI in May of this year
- The FAA panel is wired to run on 208 volts/3-phase

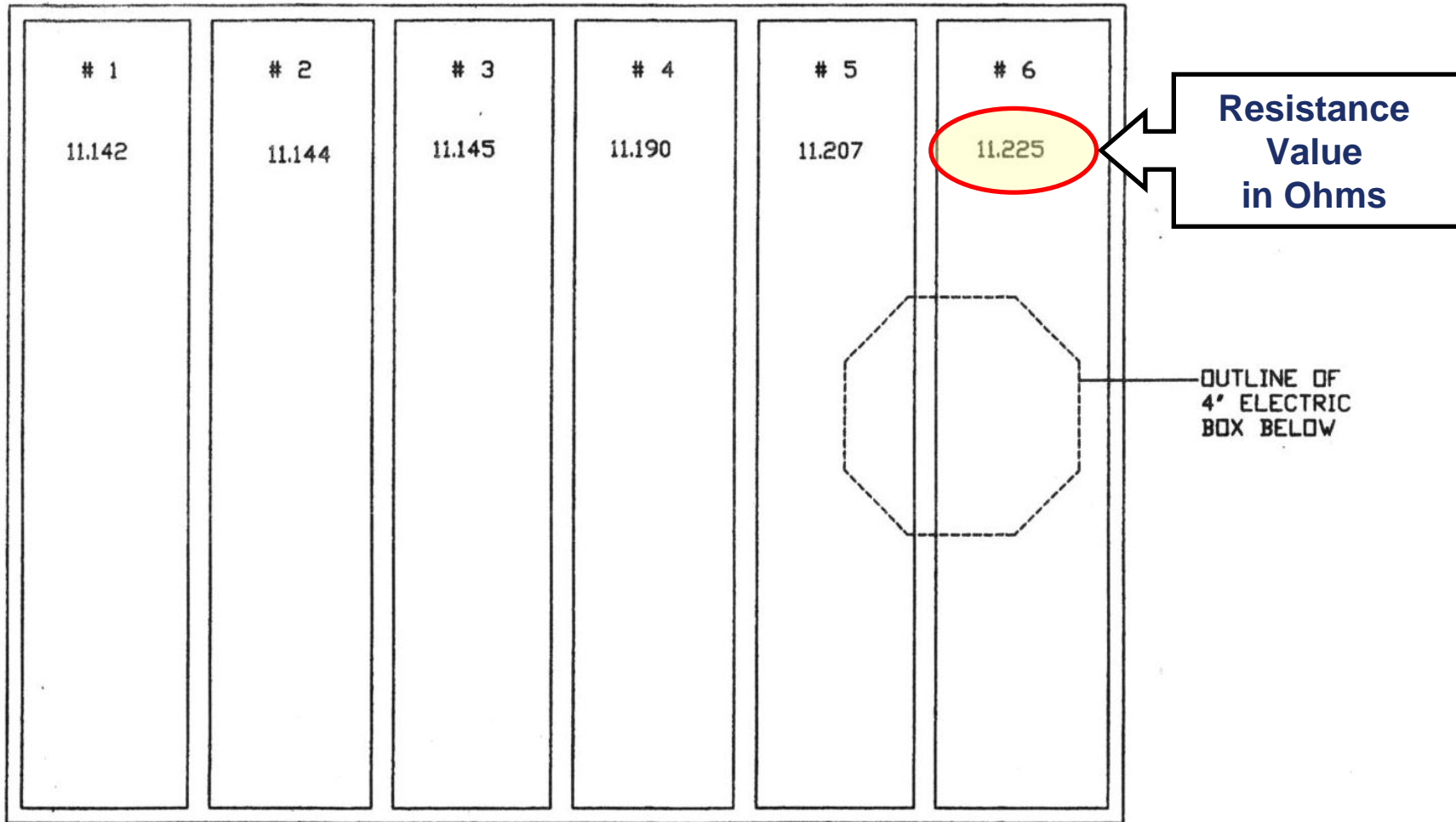


New Electric Panel Information

- The electric panel is capable of running at all voltages
- The panel is now shipped with a Resistance Data Sheet:
 - Shows the resistance across the first 3 emitter strips is very tight
 - Because of the tight resistance, there is consistency in the heat flux emitted from the panel
 - Depicts electric “box” placed at the “cold” end of the panel
 - It is always best to locate the terminal box away from the heat, i.e. the propane igniter



New Electric Panel Information: *Emitter Strip Resistance Diagram*



New Panel Testing

- For evaluation, the panel received in May from PMI was sent to three labs who also run 208 volts/3-phase.
- Each lab was asked to install the panel, determine the set point, and record the internal temperature of the chamber.
- Except for Lab D, all labs had a set point within 16°F of each other.
- The “tightness” of the resistance of the first three emitter strips correlates to the set point remaining within a close range of each other in 3 of the 4 labs.
- The Technical Center is currently asking other labs that run 208/3-phase to participate in this study.

Lab	Set Point	Chamber Temp
A	1062°F	354°F
B	1078°F	377°F
C	1068°F	356°F
D	1172°F	604°F

New Controller

- The Series 93 Controller by Watlow was discontinued earlier this year.
- This is the controller that all of the “*Radiant Panel People*” have.
- The Watlow EZ-Zone has replaced the Series 93.
- The FAA Technical Center has been using the EZ-Zone for approximately 18 months.



New Controller

- Findings
 - The Tech Center has found the EZ-Zone controller’s sensor provides considerably quicker response rates than the Series 93.
 - The sampling rate of the EZ-Zone prevents over and under shoots.
 - The observed “recovery” rate upon pulling out the drawer (“upsetting” the chamber) is much faster than the Series 93.
 - The EZ-Zone also provides a USB interface providing a computer-based interface to configure and control it.
 - The Series 93 Controller is still acceptable for this test and it is not necessary to purchase an EZ-Zone controller until your controller needs to be replaced.



Future Work/Conclusions

- Sending the new panel to additional labs that run 208 volts/3 Phase for Setpoint and temperature check.
- Initial work/experience with the first panel we have received from PMI has been very good and we will continue to monitor its performance.
- Due to the limited exposure/experience we and other participating labs have with this “new” electric radiant panel, we request that all labs share their 3-position check values and internal chamber temperature with the Tech Center. This would be when a lab purchases a new panel from PMI.

