

# OSU Guidance Document Development

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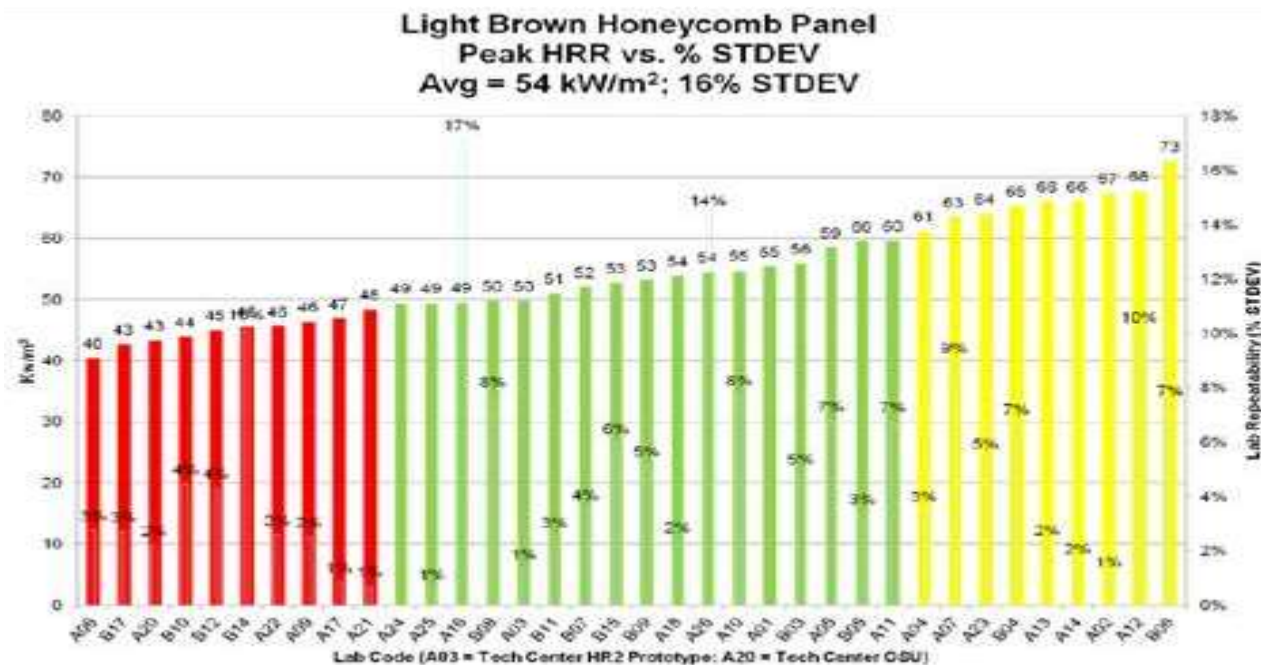
# OSU Guidance Document Development

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- Current Developments
  - Operations / Maintenance section
  - Boeing success – weekly standard coupons
- Next Steps
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# OSU Guidance Document Development

## Background

- Collaborative effort of Fire Test Forum OSU Task Group
- Document to provide commonality on previously unaddressed, misunderstood, and/or unspecified parts of OSU specifications
- Goal is to reduce variation between test labs
  - Shift to or stay in the center of green



# OSU Guidance Document Development

## Methodology

- Joint meeting by Boeing and MarlinEngineering to evaluate Mike's list
- List grouped into three (3) distinct sections
  1. Manufacturing – MarlinEngineering
  2. Installation – MarlinEngineering / Boeing
  3. Operations / Maintenance – Boeing / MarlinEngineering

# Current Developments

## Operations / Maintenance Section

- Drafted by Boeing
- Includes:
  - Daily checklist to reset machines
  - Weekly tasks to check machine performance
  - Monthly thorough inspection
    - Clean unit
    - Verify distances and sizes of critical test parts
    - Inspect, replace gaskets and insulation
    - Conduct wet test meter methane gas calibration

# Operations / Maintenance

## Daily Startup Checklist – Cold Start

1. Ensure methane gas bottle is charged ( $\geq 250$  psi)
2. Clean upper chimney and inner walls with brush
3. Brush off air mixing plate and verify position in upper chimney
4. Brush soot and contaminants from thermocouples using a soft-bristled brush. Properly position thermocouples and ensure wires are separated. Use a poke-yoke to assist with thermocouple positioning.
5. Clean upper pilot tube using wire brush
6. Verify lower and upper pilot position
7. Vacuum test and holding chamber
8. Visually check that air holes in floor of chamber are clear
9. Clean window and mirror
10. Check position of diamond
11. Ensure holding chamber doors close completely around sample insertion rod
12. Check condition of sample holders, visually check wires on holders.
13. Turn on supply air and set to 85 ft<sup>3</sup>/min
- 14. Power on unit. Allow unit to equilibrate (approximately 1.5 hours)**

# Operations / Maintenance

## Daily Startup Checklist - Hot Start / Calibration

1. Check condition of calorimeters in calibration apparatus for possible damage. Ensure calorimeters are flush with the frame of the holder
2. Insert calibration apparatus in holding chamber and turn on water circulator for heat flux gauges
3. **Calibrate center and corner heat flux (daily)**
  1. Insert calibration apparatus and condition calorimeters in holding chamber for 60 seconds
  2. Insert calorimeter in testing chamber for 15 seconds
  3. Record average heat flux of last 5 seconds of insertion
  4. Measure heat flux three (3) times for center – record average
  5. Measure heat flux of all four corners once – record average
4. Record power output to achieve desired heat flux density
5. Record thermopile output at heat flux density
6. Ignite lower and upper pilots
7. Record thermopile output with pilots lit
8. **Burn sacrificial panel**

# Operations / Maintenance

## Weekly Machine Health Check

- Perform five (5) runs of standard coupons weekly to assess the overall unit after completing daily checklist
- Conduct periodic trend analysis of standard coupons measurements
- Pinpoint potential issues and resolve if possible

## Standard Coupons

- Currently developing standard coupons that produces 55/55 measures for a better indicator of machine health
  - Combination of transfer tapes (adhesive thickness, width) and aluminum (thickness)

## Standard coupons construction examples

- **Aluminum with 3M transfer tape**
  - 3M 950 Adhesive Transfer Tapes with Adhesive 300 (6" wide rolls)
  - 0.060" Aluminum
- **Schneller honeycomb panels**



# Operations / Maintenance

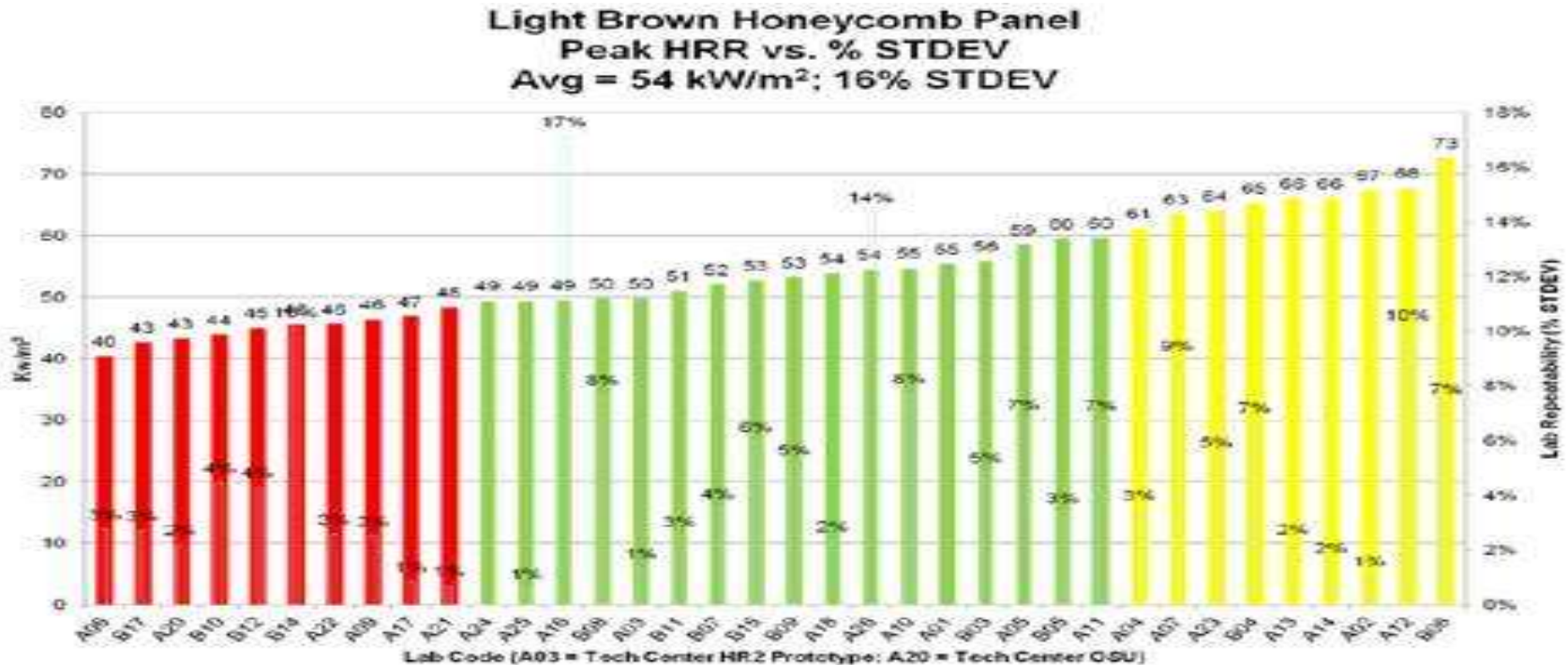
## Monthly Maintenance Checklist

- Verify distance travelled by coupon in the chamber
- Verify the inner doors seal completely around the sample insertion rod, adjust as needed
- Inspect seal of outer doors and – replace as needed
- Inspect seal of maintenance hatch – replace as needed
- Visually inspect condition of insulation – replace as needed
- Clean environmental chamber floor pan (120 holes) and ream with #28 drill
- Clean the T-bar calibration burner, ream holes with a #32 drill
- Inspect thermocouple wires and thermocouple bead sizes
- Visually inspect global wires – replace as needed
- Remove and inspect upper pilot burner, ream holes with #59 drill
- Clean upper air distribution plate and ream with #26 drill
- Remove and clean lower pilot burner tube
- **Conduct wet test meter methane calibration**

# Operations / Maintenance

## Current Boeing Results – Peak

- 3 Boeing OSU test units are in the **center of green** for light brown honeycomb panel
  - 720 total runs, over 18 months
- Average individual unit result within 3% of average



# Next Steps

## **Operation and Maintenance**

- Detailed maintenance schedule and potential repairs

## **Draft sections for Manufacturing and Installation**

- MarlinEngineering and Boeing
- Contributions from OSU Task Group

## **Continue development activities to improve machine performance**

- Voltage stabilization with Power Conditioner
- Standardizing Air Flow Split

# Contacts

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