# ENERGY STAR Laboratory Grade R/F Webinar

April 15, 2014

Bryan Berringer, U.S. Department of Energy
Christopher Kent, U.S. Environmental Protection Agency

ENERGY STAR Program

# Webinar Details

- Webinar slides and related materials will be available on the Laboratory Grade R/F Web page:
  - www.energystar.gov/newspecs
  - *Follow link to "Version 1.0 is in Development" under "Laboratory Grade Refrigerators and Freezers"*

- Audio provided via teleconference:

  **Call in:** +1 (877) 423-6338 (U.S.)
  +1 (571) 281-2578 (International)
  **Code:** 436598#

  - Phone lines will remain open during discussion
  - Please mute line unless speaking
  - Press *6 to mute and *6 to un-mute your line

# Introductions

- **Christopher Kent**
  U.S. Environmental Protection Agency
- **Bryan Berringer**
  U.S. Department of Energy
- **John Clinger**
  ICF International
- **Kurt Klinke**
  Navigant Consulting

# Written Comments

In addition to making verbal comments during today's call, stakeholders are encouraged to submit written comments to labgraderefrigeration@energystar.gov.

| Comment Deadline |
| --- |
| April 25, 2014 |

# Webinar Objectives

- Review changes from Draft 2 to Final Draft Test Method

# Agenda

1. Final Draft Test Method Updates
2. Next Steps

# Final Draft Test Method Overview

- Final Draft Test Method published on March 17, 2014
  - Comments due on April 25, 2014

- The Final Draft contains three primary changes, based on stakeholder feedback and additional data analysis:
  - Steady-state Requirements
  - Weighting of Temperature Measurement Devices (TMDs)
  - Door Opening requirements

# Steady-State Requirements

- Draft 2 Proposal:
  - Increased Steady-State tolerance to ± 0.5 °C

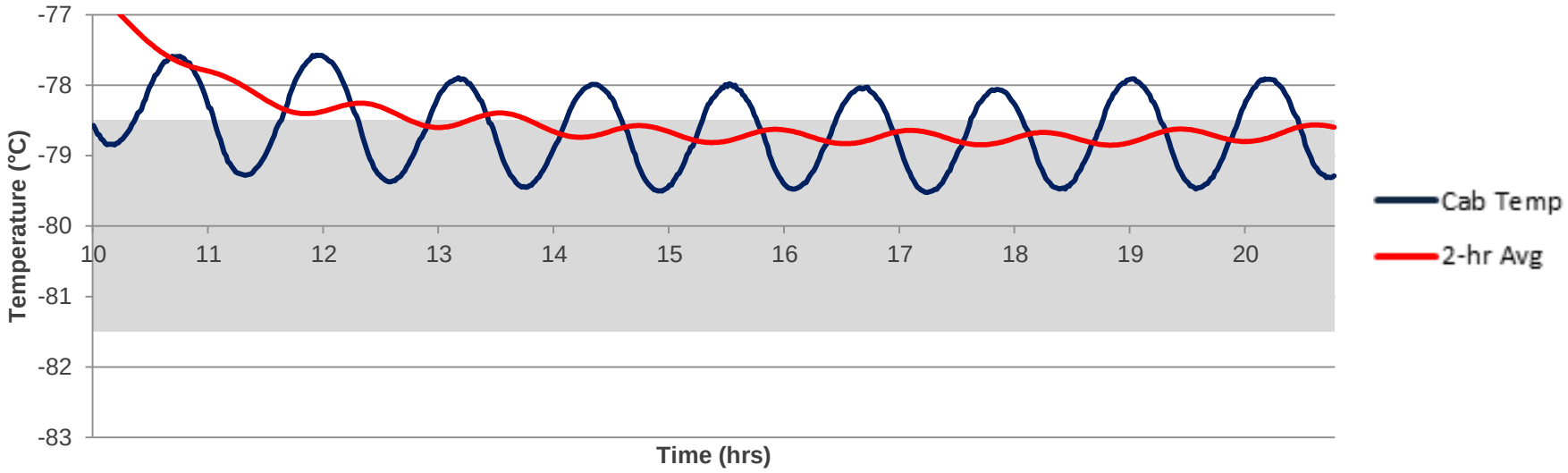
- Stakeholder Feedback:
  - Steady-State tolerance still too stringent
  - Steady-State requirements represent an unnecessary performance requirement
  - Steady-State requirements very hard to meet using un-weighted TMDs

# Steady-State Requirements

- Final Draft Proposal:
  - Replace Steady-State requirements with a Pull Down period
  - Pull Down Period Requirements
    - UUTs shall be operated until the average Cabinet Temperature measured during each of two at least 2-hour periods separated by at least three hours lies within ranges specified in Table 1

- Rationale:
  - Ensures unit is operating at the correct temperature
  - Allows for fluctuation in temperature

# Pull Down Requirements




- This graph compares the Cabinet Temperature (instantaneous average of all measured temps) vs. the 2-hr Average (average of all measured temps for the previous 2-hr period) during a pull down period during DOE Testing
- While Cabinet Temperature fluctuates outside of Table 1 tolerances, the 2-hr Average stays within the tolerances satisfying the Pull Down Requirements

# TMD Weighting

- Draft 2 Proposal:
  - Test using un-weighted, bare TMDs
  - Report Stability and Uniformity for a 3-hour period without any door openings

- Stakeholder Feedback:
  - Stability and Uniformity should be measured and reported using weighted TMDs

# TMD Weighting

- Final Draft Proposal:
  - Test using weighted TMDs
    - TMD shall be placed in at least a 10 mL vial filled with a sponge material saturated with a solution of 50/50 ± 2% glycol/water.
  - Report Stability and Uniformity during two 3-hour periods, one with door openings and one without any door openings

# TMD Weighting

- Rationale:
  - Aligns with  other current industry test procedures
    - Weighting requirements mirror ASHRAE 72
  - Provides more valuable information to users
    - Measured values representative of a sample's temperature
  - Reduces burden of meeting Pull Down Requirements
    - Using weighted TMDs reduces measured temperature fluctuations

# Door Opening Requirements

- Draft 2 Proposal:
  - For Freezers and ULTs – Open a door once per hour for eight consecutive hours
  - Specified a method for choosing which doors to open for UUTs with multiple inner and outer doors
- Stakeholder Feedback:
  - Comments again varied widely regarding door openings
- Based on feedback, DOE performed further analysis

# Door Opening Requirements

- In 2013, DOE performed a separate technology demonstration on ULTs
  - Data was measured and recorded for seven units currently in use at labs
  - Data measured included
    - Number of door openings (DO) per day
    - Total energy consumption

# Door Opening Requirements

- For each unit DOE calculated
  - Average DO per workday (not including weekends)
  - Average DO time per workday
  - Average increase in daily workday energy consumption

| Unit # | Avg DO/day | Avg DO Time/Day (min:sec) | % Increase |
|---|---|---|---|
| 1 | 2.5 | 00:51.6 | 2.4% |
| 2 | 3.0 | 01:13.7 | 2.5% |
| 3 | 4.2 | 02:33.4 | 10.3% |
| 4 | 3.1 | 02:04.7 | 3.6% |
| 5 | 6.0 | 02:48.2 | 4.0% |
| 6 | 6.3 | 02:02.7 | 5.4% |
| 7 | 7.8 | 03:26.6 | 4.8% |

# Door Opening Requirements

- DOE's analysis shows:
  - DOs occur during normal workdays but at a lower rate than originally thought
  - DOs result in an increase in daily energy consumption
  - Energy increase did not vary consistently with respect to number of DOs or total DO time per day
    - DOs affect units differently
    - Using another method as a proxy for door openings, such as increasing the external temperature, is not likely to accurately reflect impacts of door openings

# Door Opening Requirements

- Final Draft Proposal:
  - For Freezers and ULTs – Open a door once per hour for six consecutive hours
    - Reduced from once per hour for eight consecutive hours

- Rationale:
  - DOs occur during normal operation and affect energy consumption
  - Including DOs will show energy consumption variation across different unit types

# Additional Comments

## Additional Comments?

**Written Comments are due by April 25, 2014**

# Agenda

1. Final Draft Test Method Updates
2. Next Steps

# Open Comment

- EPA would now like to open up the line for any general comments from stakeholders.

# Test Method Development Timeline

| | |
|---|---|
| Final Draft Version 1.0 Test Method to stakeholders | March 2014 |
| Final Draft Version 1.0 Test Method comments due | April 2014 |
| Final Version 1.0 Test Method | Summer 2014 |

# Written Comments

In addition to making verbal comments during today's call, stakeholders are encouraged to submit written comments to labgraderefrigeration@energystar.gov.

| Comment Deadline |
| --- |
| April 25, 2014 |

# Contact Information

Please send any additional comments to labgraderefrigeration@energystar.gov or contact:


**Bryan Berringer**
DOE ENERGY STAR Program
Bryan.Berringer@ee.doe.gov

**Kurt Klinke**
Navigant Consulting, Inc.
Kurt.Klinke@navigant.com

**Christopher Kent**
EPA ENERGY STAR Program
Kent.Christopher@epa.gov

**John Clinger**
ICF International
John.Clinger@icfi.com