



ENERGY STAR[®] Lab Grade RF

Version 2.0 Draft 1 Specification

Stakeholder Meeting

August 28, 2023

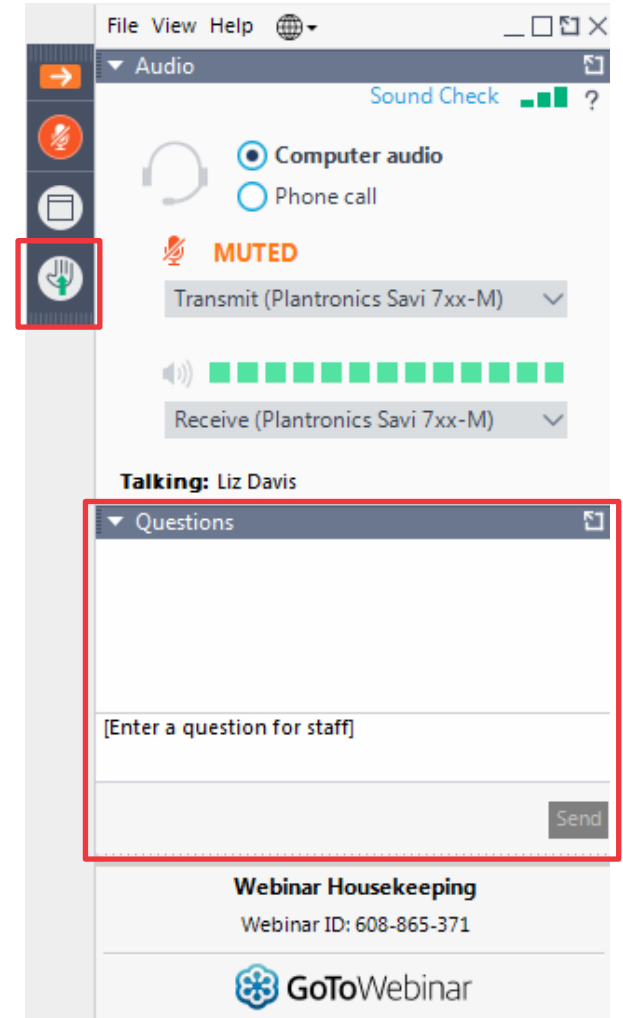




Webinar Participation

- Please mute yourself when you are not speaking (use local mute or dial *6)
- Feel free to ask questions at any time

Submit written comments to
labgraderefrigeration@energystar.gov
by **September 18, 2023**





Meeting Agenda

1. Introductions

2. Definitions

- Set Point Temperatures (NSF/ANSI 456 – 2021a)
- Maximum Peak Variance

3. Proposed Certification Criteria

4. Testing Considerations: Air vs. Liquid Cooled Models

5. Timeline and Next Steps



Introductions

Ryan Fogle, EPA

Fogle.Ryan@epa.gov

John Clinger, ICF

John.Clinger@icf.com

Annie Williams, ICF

Annie.Williams@icf.com

ENERGY STAR Specification Development Process





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- **Set Point Temperatures (ANSI/NSF 456 – 2021a)**
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Definitions: Set Point Temperatures (ANSI/NSF 456 – 2021a)

- EPA investigated the latest ANSI/NSF 456 – 2021a standard and has aligned Draft 1, Version 2.0 set point temperatures accordingly.

Product Type	V1.1 Set Point Temperatures (°C)	V2.0 Proposed Set Point Temperatures (°C)*
	between	between
Lab Grade Refrigerators	0 °C and 12 °C	2 °C and 8°C
Lab Grade Freezers	-40 °C and 0 °C	-50 °C and -15 °C

* Source: ANSI/NSF 456 – 2021a



Definitions: Maximum Peak Variance

- Peak Variance: The difference between the maximum and minimum temperatures measured across all Temperature Measurement Devices (TMD) over the course of a given measurement period.

	General Purpose	High Performance
Refrigerators	$\geq 6\text{ }^{\circ}\text{C}$	$< 6\text{ }^{\circ}\text{C}$
Freezers	$\geq 10\text{ }^{\circ}\text{C}$	$< 10\text{ }^{\circ}\text{C}$

- EPA received feedback during the data assembly process suggesting to remove or amend the peak variation requirement which differentiates General Purpose from High Performance models.
- Without relevant data to analyze, EPA will maintain the current categorization of General Purpose and High Performance models.
 - Need data on the behavior of products during door opening phases when products are recovering to ensure samples are not adversely impacted. We assume this data exists for NSF to have made this change, but EPA would need access to similar data before considering a change to related requirements.



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Proposed Certification Criteria: Summary

- New volume bins and MDEC equations for all product types.
- Increasing stringency:

	Version 1.1 Pass Counts	Proposed Version 2.0 Pass Counts
Refrigerators	105 unique models	29 unique models
Freezers	50 unique models	11 unique models

- Note that these values were obtained from a version of the QPL where all duplicate models were removed. Therefore, unique model counts are listed above.



Proposed Certification Criteria: Summary

- General Purpose Refrigerators and Freezers:
 - Due to a lack of data within the General Purpose sub-categories, EPA proposes to align General Purpose levels with the Version 5.0 Commercial Grade RF specification's levels.
 - Solid door, Commercial RF equations stand as the proposed Version 2.0 General Purpose Maximum Daily Energy Consumption (MDEC) levels.
 - It should be noted that the derived Commercial RF equations have been rounded to two decimal places.
 - This decision is justified by similarity in the hardware and design of Commercial Grade and Laboratory Grade refrigeration products.

Proposed Certification Criteria: General Purpose Refrigerators

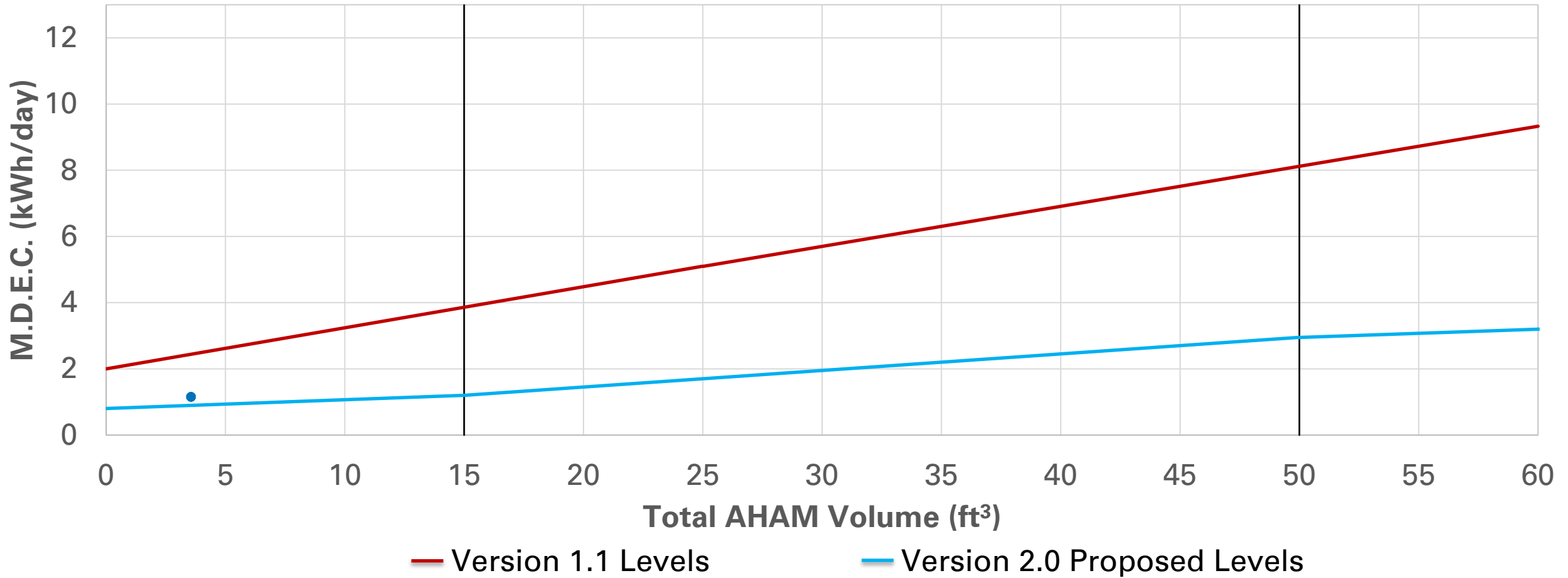
- New bins and Maximum Daily Energy Consumption (M.D.E.C.) equations:

Total AHAM Volume (ft ³)	M.D.E.C. (kWh/day)
$0 < V < 15$	$\leq 0.03V + 0.80$
$15 \leq V < 50$	$\leq 0.05V + 0.45$
$50 \leq V$	$\leq 0.03V + 1.70$

V = AHAM volume, in cubic feet (ft³)



Proposed Certification Criteria: General Purpose Refrigerators



Proposed Certification Criteria: High Performance Refrigerators

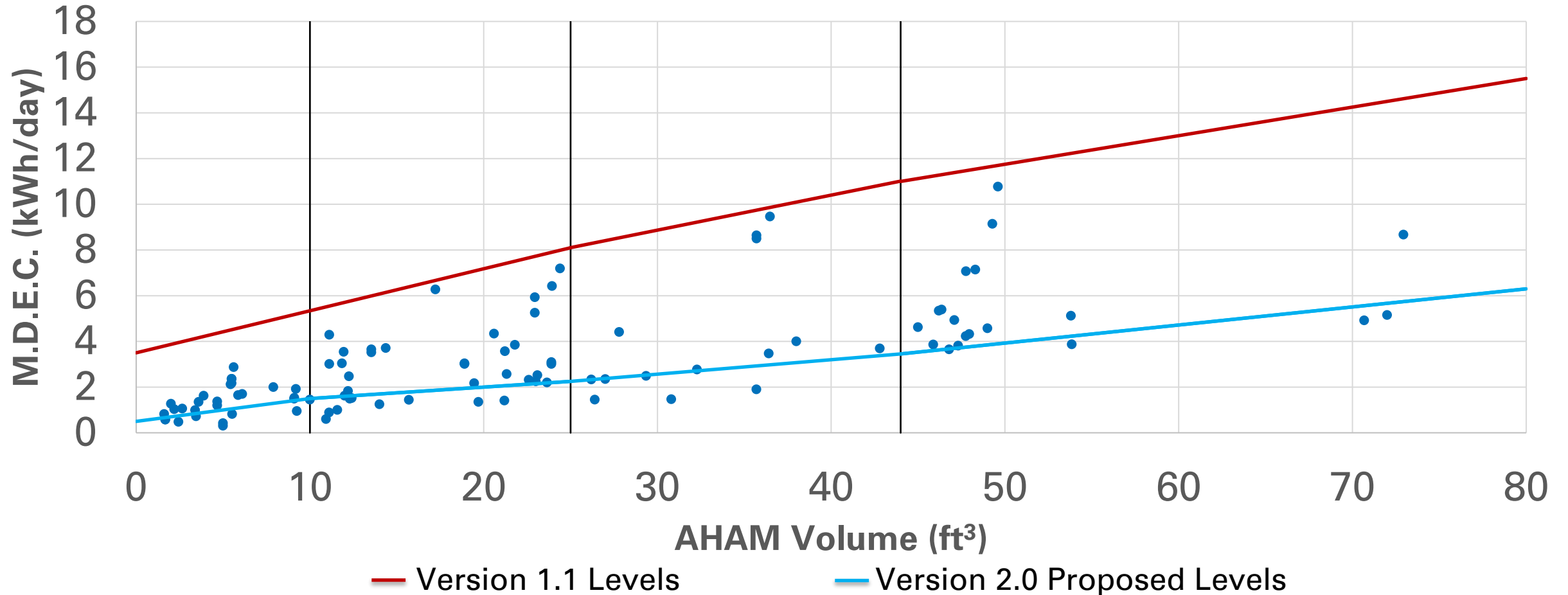
- New bins and Maximum Daily Energy Consumption (M.D.E.C.) equations:

Total AHAM Volume (ft ³)	M.D.E.C. (kWh/day)
$0 < V < 10$	$\leq 0.1V + 0.5$
$10 \leq V < 25$	$\leq 0.05V + 1.0$
$25 \leq V < 44$	$\leq 0.06V + 0.7$
$44 \leq V$	$\leq 0.08V + 0.3$

V = AHAM volume, in cubic feet (ft³)



Proposed Certification Criteria: High Performance Refrigerators





Proposed Certification Criteria: General Purpose Freezers

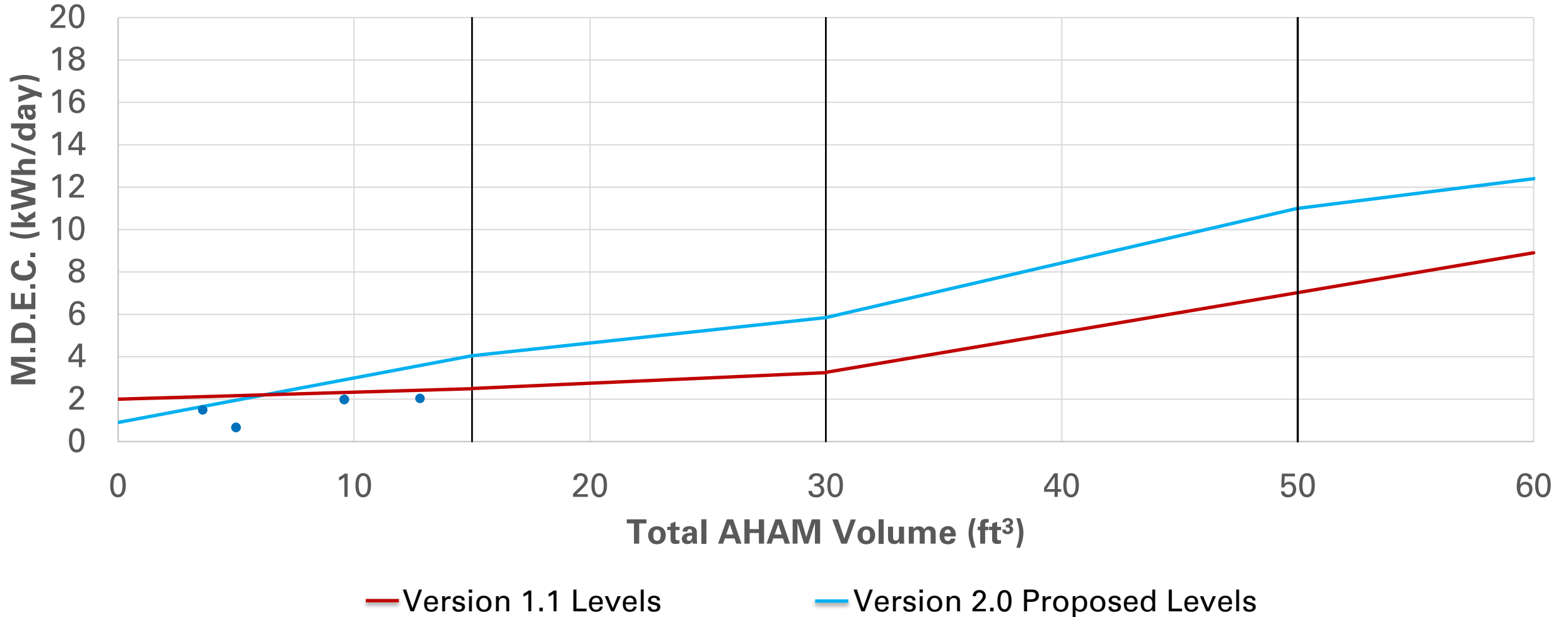
- New Maximum Daily Energy Consumption (M.D.E.C.) equations:

Total AHAM Volume (ft ³)	M.D.E.C. (kWh/day)
$0 < V < 15$	$\leq 0.21V + 0.90$
$15 \leq V < 30$	$\leq 0.12V + 2.25$
$30 \leq V < 50$	$\leq 0.17V - 2.14$
$50 \leq V$	$\leq 0.14V + 4.00$

V = AHAM volume, in cubic feet (ft³)



Proposed Certification Criteria: General Purpose Freezers





Proposed Certification Criteria: High Performance Freezers

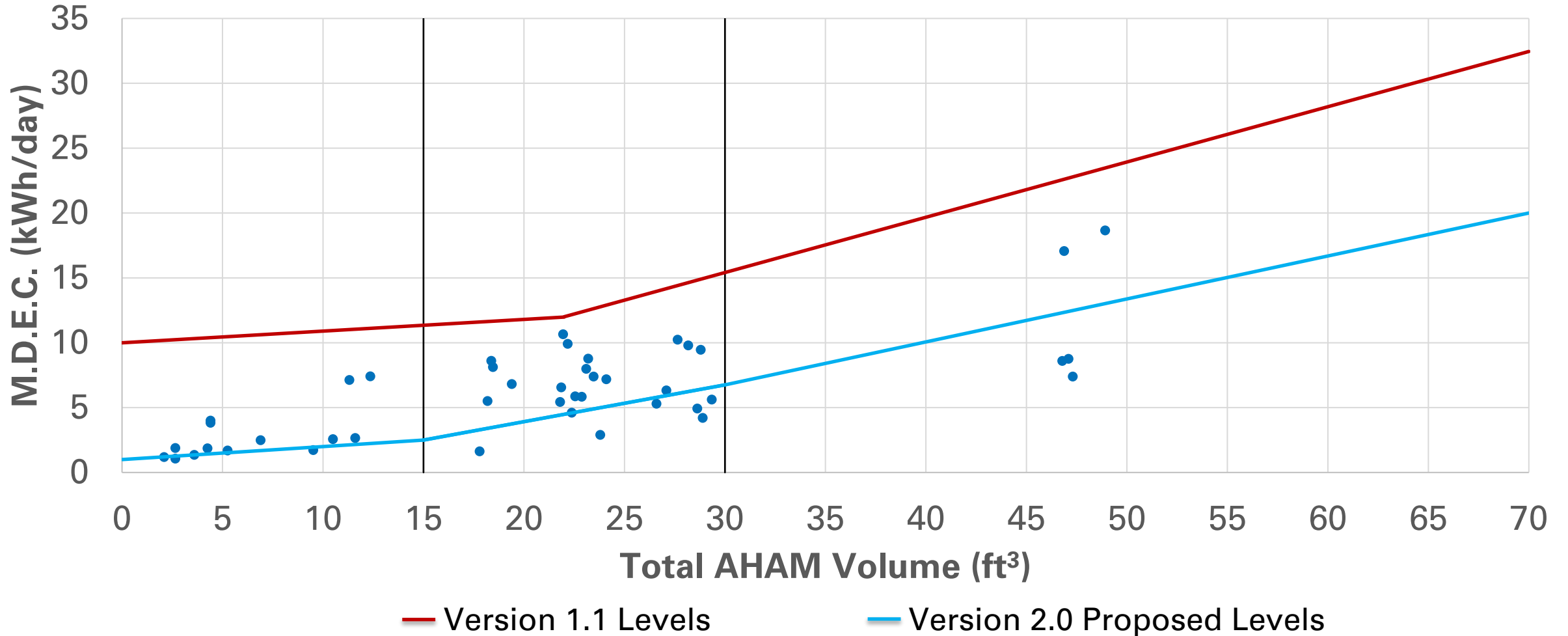
- New bins and Maximum Daily Energy Consumption (M.D.E.C.) equations:

Total AHAM Volume (ft ³)	M.D.E.C. (kWh/day)
$0 < V < 15$	$\leq 0.1V + 1.0$
$15 \leq V < 30$	$\leq 0.28V - 1.8$
$30 \leq V$	$\leq 0.33V - 3.19$

V = AHAM volume, in cubic feet (ft³)



Proposed Certification Criteria: High Performance Freezers





Proposed Certification Criteria: ULTs

- New Maximum Daily Energy Consumption (M.D.E.C.) constant:

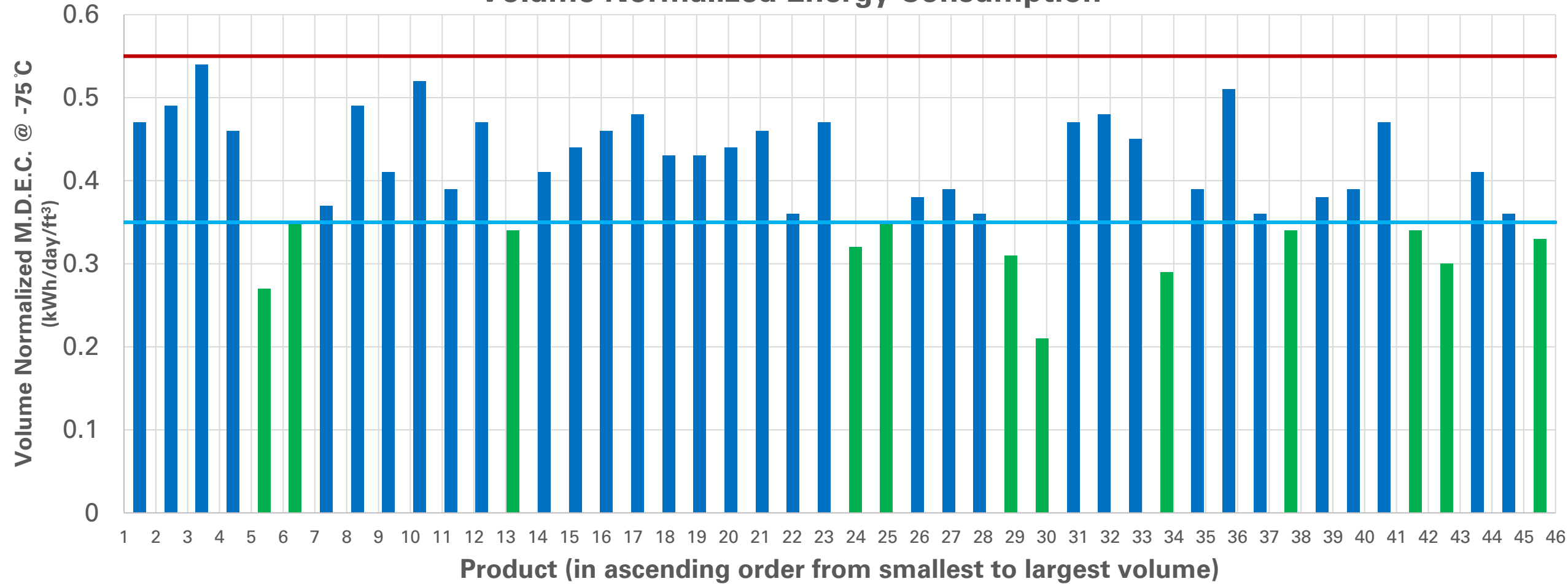
Total AHAM Volume (ft ³)	M.D.E.C. (kWh/day/ft ³)
$0 < V$	≤ 0.35

V = AHAM volume, in cubic feet (ft³)



Proposed Certification Criteria: ULTs

Volume Normalized Energy Consumption





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Testing Considerations: Air vs. Liquid Cooled Models

- EPA has included new language in Section 4.2.3 of the specification to eliminate confusion surrounding air and liquid cooling operations, as well as to ensure the model is its most energy consumptive configuration for testing.
- Section 4.2.3 states that:
 - A model capable of both air and liquid cooling shall be tested in air cooled configuration for certification.
 - Air cooling is assumed to be the less efficient configuration when compared to liquid cooling.
 - A model only capable of liquid cooling may be tested in liquid cooled operation for certification.
 - For these models, it should be reported in the QPX that the model is a liquid cooled only product.



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Current Timeline: Lab Grade

- Draft 1 specification released – August 21, 2023
- Draft 1 specification webinar – August 28, 2023
- Draft 1 specification written comments due – September 18, 2023
- Draft 2 specification release – Q4 2023
- Final Draft specification release – Q4 2023/Q1 2024
- Final Version specification release –Q1 2024



Thank you!

Ryan Fogle

Fogle.Ryan@epa.gov

202-343-9153

Annie Williams

Annie.Williams@icf.com

703-236-5492

John Clinger

John.Clinger@icf.com

215-967-9407

Bryan Berringer

Bryan.Berringer@ee.doe.gov

202-586-0371

Stakeholders are encouraged to provide additional data and/or written comments for consideration to

labgraderefrigeration@energystar.gov

by **September 18, 2023.**



Questions?