



# **ENERGY STAR®**

## **Residential Water Heaters**

### **Draft 1 Version 3.1**

**Stakeholder Webinar and Discussion**

**Abigail Daken, U.S. EPA**

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## Webinar Audio Access

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# Webinar Participation



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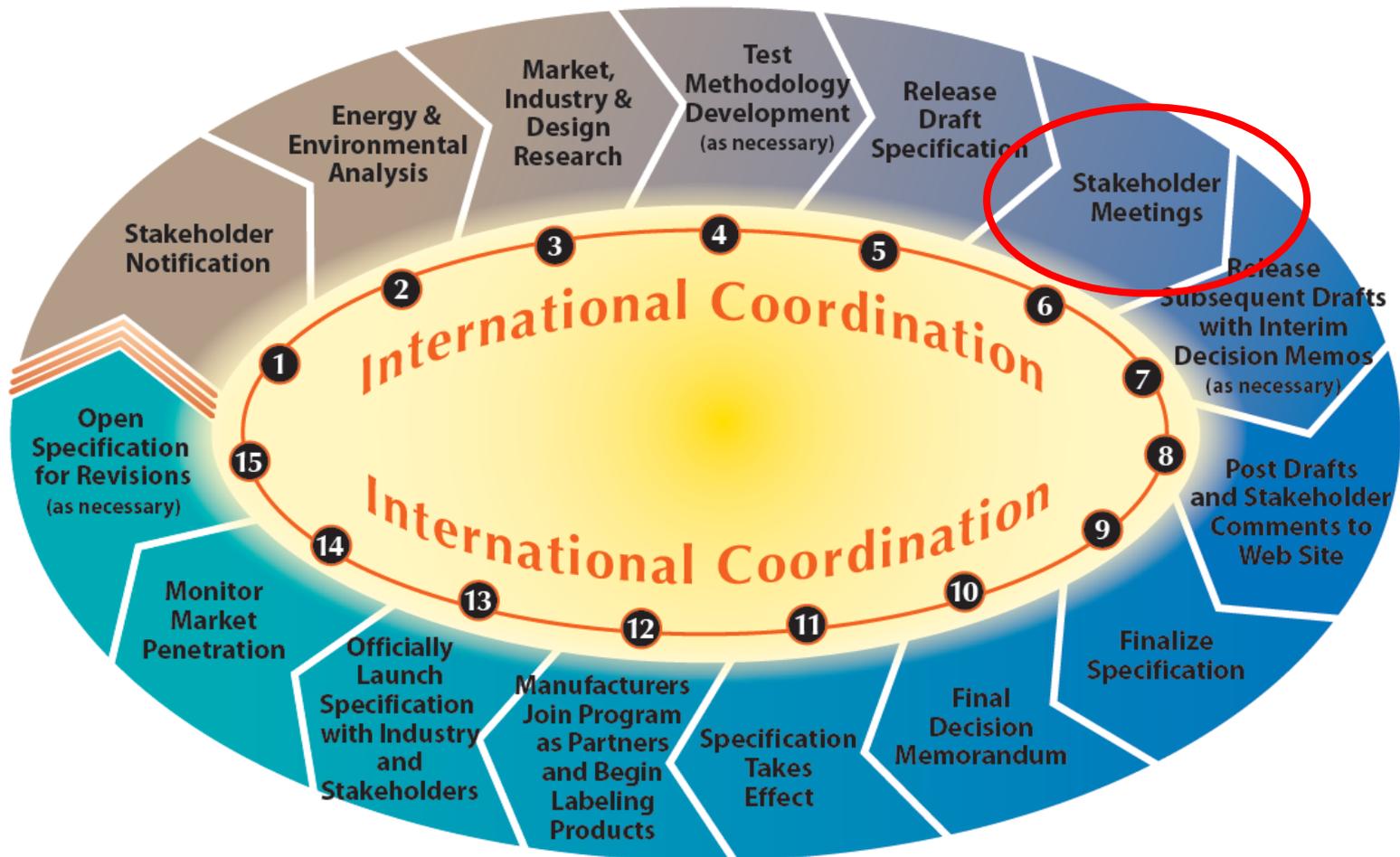
# Agenda

- 1** Introduction
- 2** Scope and Definitions
- 3** Energy Efficiency Criteria
- 4** Test Methods and Sampling
- 5** Next Steps
- 6** Discussion



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# Specification Development Cycle





## Important Process Elements

- Consistency
- Transparency
- Inclusiveness
- Responsiveness
- Clarity



## Driver for Revision: Adoption of UEF Metric

- Federal Mathematical Conversion – Final Rule
  - DOE finalized its mathematical conversion (EF → UEF) on December 29, 2016
  - Manufacturers can use mathematical conversion to report energy use and efficiency to DOE from December 29, 2016 until December 29, 2017
  - On and after June 12, 2017, water heater manufacturers have to report UEF data for EnergyGuide labelling
- EPA to add UEF metric and test procedures
  - EPA is adopting UEF in this revision while retaining EF
  - Products certified with UEF do not need to report EF
  - New products can be certified with UEF without removing any product certified to EF from the ENERGY STAR Qualified Products List



## Minimizing Disruption

- Seek a smooth transition now to avoid additional burden and disruption
- Low market penetration for all categories except gas instantaneous
  - Possibility of unified gas-fired levels in next specification revision requires keeping gas instantaneous levels constant now
- EPA will consider a full revision in 2019 or 2020
  - Market will have responded to new standards and metric
  - Tested UEF data will be available



## Dot Revision, Not a Full Revision

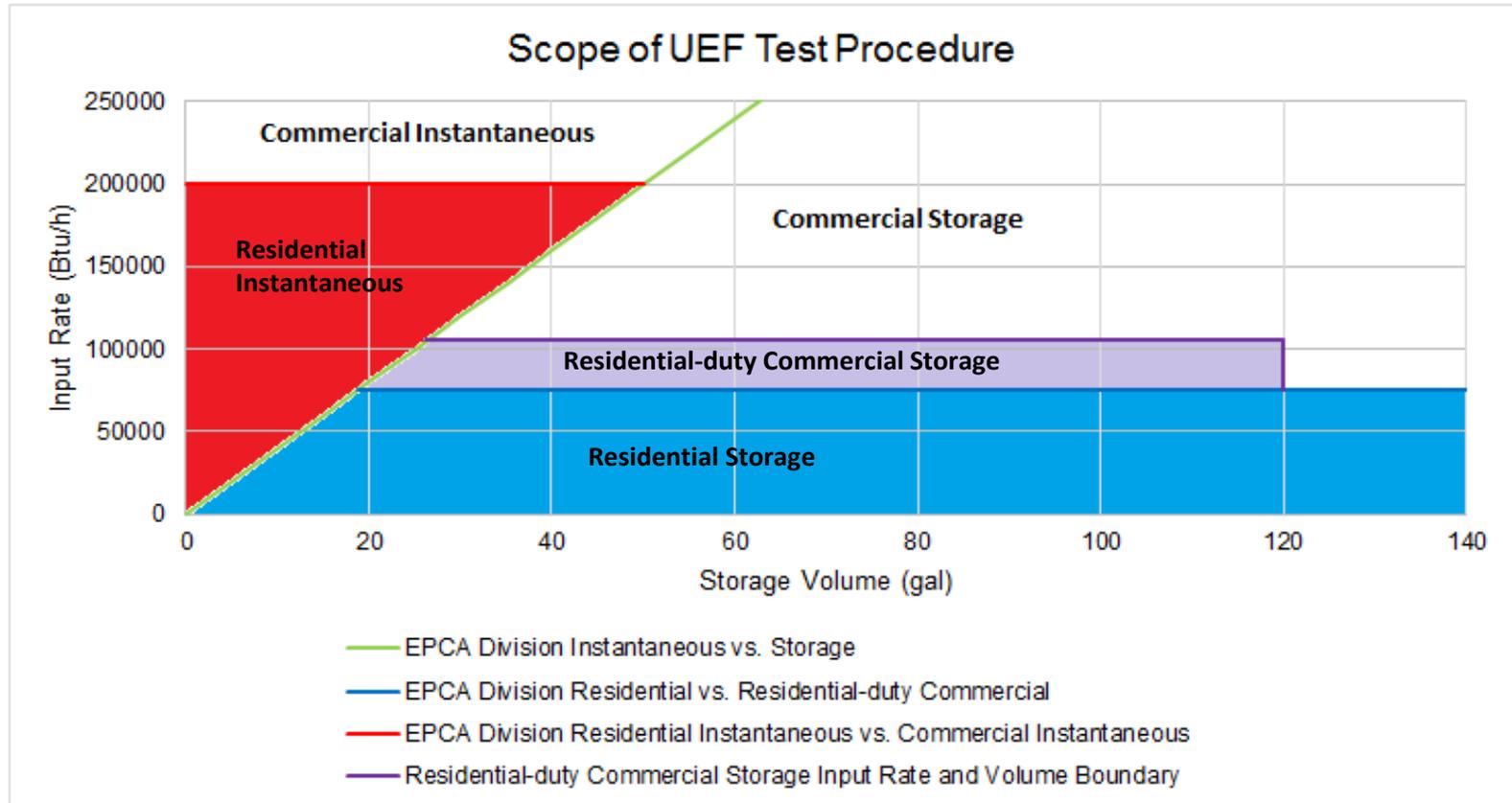
- Typical for metric changes
- Does not affect certification of current products; eligibility requirements include both metrics
- A single table with both would be confusing, because of terms that are redefined
- Solution: Appendix A
  - Definitions and requirements applicable to water heaters certifying using UEF
  - Those in Appendix A supersede the rest of the specification
  - If not superseded, requirements in the rest of the specification apply to water heaters certified via UEF



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# Scope of UEF Test Procedure





## Scope of ENERGY STAR Specification

- Scope is essentially the same
  - Electric, gas-fired storage, gas-fired instantaneous, and gas-fired storage residential-duty commercial water heaters can certify with UEF
  - It is possible to test and certify instantaneous products with storage volumes between 2 and 20 gallons and storage products with storage volumes less than 20 gallons
  - Minor differences in scope between “Light-duty EPACT” and “Residential-duty Commercial”



## Definitions

- Updated definitions based on the current 10 CFR part 430 for:
  - Gas-fired Storage
  - Gas-fired Instantaneous
  - First Hour Rating
  - Maximum GPM
- New definitions based on the current 10 CFR parts 430 and 431 for:
  - Gas-fired Storage Residential-duty Commercial
  - Uniform Energy Factor



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## Performance Criteria: Overview

- Performance criteria in terms of EF, Thermal Efficiency, and Standby Loss are retained → No products removed from the Qualified Products List
- Performance criteria for solar water heaters are unchanged
- UEF performance criteria proposed for electric, gas-fired storage and instantaneous, and gas-fired storage residential-duty commercial
  - Translated directly from current EF requirements with no change in stringency



# Performance Criteria: Electric Storage

Criteria		ENERGY STAR Requirements
Uniform Energy Factor	≤ 55 gallons	UEF ≥ 2.00
	> 55 gallons	UEF ≥ 2.16
First Hour Rating		FHR ≥ 46 gallons per hour
Warranty		Warranty ≥ 6 years on sealed system
Safety		UL 174 and UL 1995
Lower Compressor Cut-Off Temperature (Reporting Requirement Only)		Report ambient temperature below which the compressor cuts off and electric resistance only operation begins



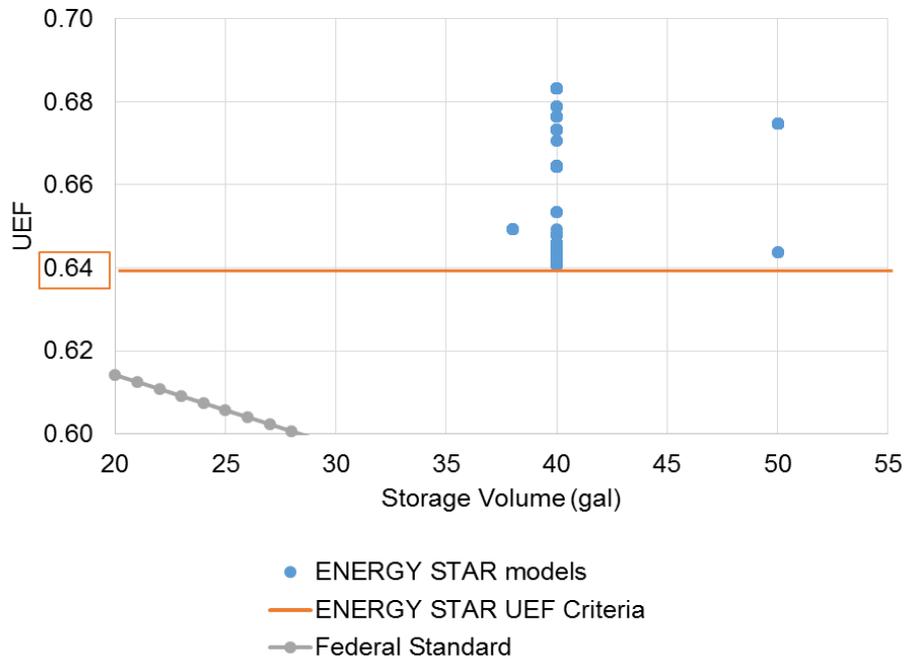
## Performance Criteria: Gas-fired Storage

Criteria		ENERGY STAR Requirements
Uniform Energy Factor	≤ 55 gallons	Medium Draw Pattern UEF ≥ 0.64 High Draw Pattern UEF ≥ 0.68
	> 55 gallons	Medium Draw Pattern UEF ≥ 0.78 High Draw Pattern UEF ≥ 0.80
First Hour Rating		FHR ≥ 67 gallons per hour
Warranty		Warranty ≥ 6 years on system (including parts)
Safety		ANSI Z21.10.1/CSA 4.1

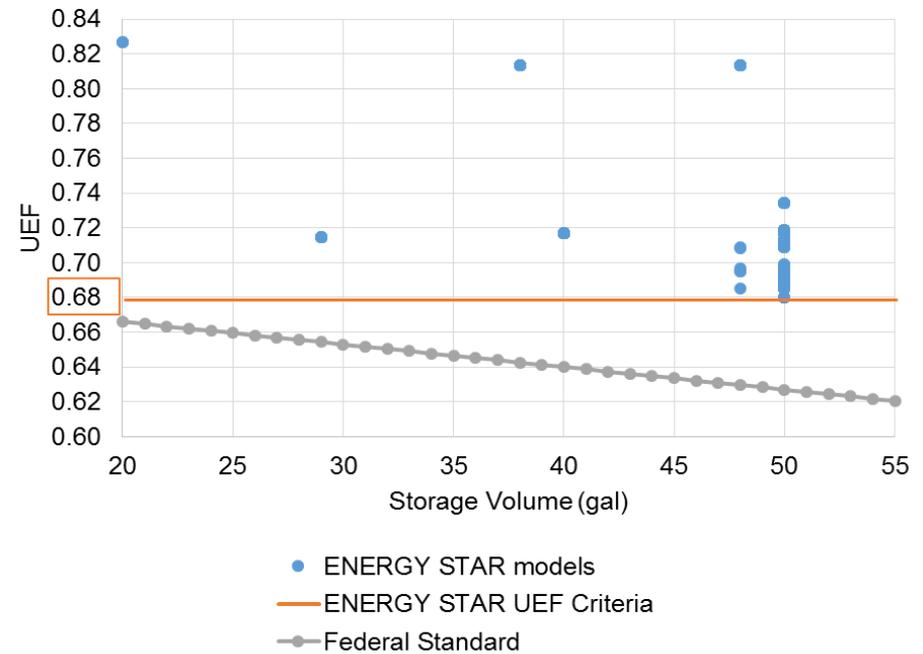


# Supporting Data: Gas-fired Storage

≤ 55 Gallon Medium Draw Pattern



≤ 55 Gallon High Draw Pattern





# Performance Criteria: Gas-fired Instantaneous

Criteria	ENERGY STAR Requirements
Uniform Energy Factor	UEF $\geq$ 0.87
Maximum Gallons Per Minute	Max GPM $\geq$ 2.9 over a 67°F rise
Warranty	Warranty $\geq$ 6 years on heat exchanger and $\geq$ 5 years on parts
Safety	ANSI Z21.10.3/CSA 4.3



# Performance Criteria: Gas-fired Storage Residential-duty Commercial

Criteria	ENERGY STAR Requirements
Uniform Energy Factor	UEF $\geq$ 0.80
Warranty	Warranty $\geq$ 6 years on system
Safety	ANSI Z21.10.3/CSA 4.3



## Optional: Critical Fault Alarm Reporting

- Definition of a Critical Fault Alarm added
  - An audible alarm or push notification (e.g. email, text, alert from an app) that the water heater is experiencing a fault that must be addressed immediately (such as a leak), or any condition indicating the water heater is likely to stop functioning within 4 weeks.
- Reporting only, and optional → *not* required to earn the ENERGY STAR
- Included because it potentially addresses emergency replacement
  - Critical barrier to adoption of high efficiency water heaters
  - A strong customer benefit
- The product finder will include products that have this feature, if it is reported



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## Test Method: Overview

- Test method references updated to reflect the appropriate versions
  - EF testing: 10 CFR parts 200 to 499 edition revised as of January 1, 2014. Abridged version titled “Historical Water Heaters Test Method” supplied by EPA
  - UEF testing: Current CFR
    - 10 CFR 430, Subpart B, Appendix E
    - 10 CFR 431, Subpart G



## Sampling and Verification Testing

- Sampling requirements are the same for all water heaters, no matter the metric
- Sampling language updated to most current for ENERGY STAR – the meaning remains the same
- UEF ratings derived via DOE's mathematical conversion rather than testing may also be used for certification to ENERGY STAR through December 29, 2017
  - Products certified with UEF will be verified pursuant to UEF testing whether the certified UEF value was originally reported from a UEF test or from an EF value that was converted to UEF



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## Next Steps

- Draft comment deadline is **April 24, 2017**
- Finalize Version 3.1 as soon as possible, and certainly by June 12, 2017.
  - Manufacturers can certify products to UEF upon finalization
- EPA expects to revise the specification more thoroughly in 2019 or 2020 when the market has responded to the change in metrics
- See “Considerations for Future Revisions” section
  - Added to aid transparency and predictability



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## Discussion

- Open to comments and questions
- Please raise your hand in the webinar control panel or write in a question
- The slides will be posted online later today
  - Slides, draft specification, and all other related materials can be found on EPA's Residential Water Heater [product development webpage](#)



## Written Comments

- In addition to making verbal comments during today's meeting, stakeholders are strongly encouraged to submit written comments and data.
  - *Comments will be displayed for public viewing unless otherwise specified by the commenter.*
- Please send all comments to:  
[WaterHeaters@energystar.gov](mailto:WaterHeaters@energystar.gov)

**Comment Deadline**

**April 24, 2017**



## Contact Information

Abigail Daken, EPA

[Daken.Abigail@epa.gov](mailto:Daken.Abigail@epa.gov)

202-343-9375

Catherine Rivest, DOE

[Catherine.Rivest@ee.doe.gov](mailto:Catherine.Rivest@ee.doe.gov)

202-586-7335

Jacob Bayus, ICF

[Jacob.Bayus@icf.com](mailto:Jacob.Bayus@icf.com)

202-791-8871