

MEMORANDUM

Dear Committee Members:

After the circulation of votes, the final ballot results are as follows on the attached ballot matrix:

- 29 Members Eligible to Vote
- 5 Ballots were not received for Technical Merit by the Final Closing Date of May 26, 2017
- 6 Ballots were not received for Emergency Nature by the Final Closing Date of May 26, 2017

Technical Merit

- 17 Affirmative
- 5 Negative
- 2 Abstain

According to Section 5-4 of the Regulations Governing Committee Projects, the final results of the TIA # 004-15 ballot achieved the necessary three-fourths majority for affirmative vote (17) on Technical Merit (29 eligible - 5 not returned - 2 abstain = 22 x 75% = 16.5 or **17**).

Emergency Nature

- 16 Affirmative
- 5 Negative
- 2 Abstain

According to Section 5-4 of the Regulations Governing Committee Projects, the final results of the TIA # 004-15 ballot achieved the necessary three-fourths majority for affirmative vote (16) on Emergency Nature (29 eligible - 6 not returned - 2 abstain = 21 x 75% = 15.75 or **16**).

Please feel free to contact me by phone at (909) 230-5535 or by email at enrique.gonzalez@iapmo.org, if you have questions.

Regards,

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**2015 Uniform Plumbing Code
TIA # 004-15
Final Ballot Results**

Ballot Name:	EMERGENCY NATURE UPC TIA # 004-15
Ballot Status:	Ballot has closed.
Members Eligible to Vote:	29
Vote Summary	
Option	Count
Affirmative	16
Negative	5
Abstain	2
Did not vote	6
Voter Name	Vote
Pape, Thomas	Affirmative
Ballanco, Julius	Affirmative
LeVan, William	Affirmative
Feehan, Pennie	Affirmative
Trafton, April	Affirmative
Chang, Ian	Affirmative
Surrena, Donald	Affirmative
Brown, Jeremy	Affirmative
Ribbs, Phil	Affirmative
Cudahy, Michael	Affirmative
Scarano, Anthony	Affirmative
Stack, Jim	Affirmative
Sigler, Matt	Affirmative
Nielsen, John	Affirmative
Carroll, Marguerite	Affirmative
Campbell, Philip	Affirmative
Soskin, Laurence	Negative w/comment
Barbato, Domenico	Negative w/comment
Adler, Bob	Negative w/comment
Berger, Donald	Negative w/comment
Aguilar, Sarah	Negative w/comment
Summers, Don	Abstain w/comment
Mann, David	Abstain w/comment
Tabakh, Amir	Did not vote
Rodio, Arnold	Did not vote
Salberg, Martin	Did not vote
Daniels, Dan	Did not vote
Bloice, Sylvanus	Did not vote
Fischer, John	Did not vote

Ballot Name:	TECHNICAL MERIT UPC TIA # 004-15
Ballot Status:	Ballot has closed.
Members Eligible to Vote:	29
Vote Summary	
Option	Count
Affirmative	17
Negative	5
Abstain	2
Did not vote	5
Voter Name	Vote
Pape, Thomas	Affirmative
Ballanco, Julius	Affirmative
LeVan, William	Affirmative
Feehan, Pennie	Affirmative
Chang, Ian	Affirmative
Surrena, Donald	Affirmative
Brown, Jeremy	Affirmative
Rodio, Arnold	Affirmative
Ribbs, Phil	Affirmative
Berger, Donald	Affirmative
Cudahy, Michael	Affirmative
Scarano, Anthony	Affirmative
Stack, Jim	Affirmative
Sigler, Matt	Affirmative
Nielsen, John	Affirmative
Carroll, Marguerite	Affirmative
Campbell, Philip	Affirmative
Soskin, Laurence	Negative w/comment
Barbato, Domenico	Negative w/comment
Adler, Bob	Negative w/comment
Trafton, April	Negative w/comment
Aguilar, Sarah	Negative w/comment
Summers, Don	Abstain w/comment
Mann, David	Abstain w/comment
Tabakh, Amir	Did not vote
Salberg, Martin	Did not vote
Daniels, Dan	Did not vote
Bloice, Sylvanus	Did not vote
Fischer, John	Did not vote

UNIFORM PLUMBING CODE TIA FORM - 2015

Reference Code Section: Chapter 5, Table 501.1(1)

Submitter Name: Frank Stanonik
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Proposed language for TIA:
 Revise Table 501.1(1) as follows:

TABLE 501.1(1) FIRST HOUR RATING¹

Number of Bathrooms	1 to 1.5			2 to 2.5				3 to 3.5			
	1	2	3	2	3	4	5	3	4	5	6
Number of Bedrooms											
First Hour Rating, ² Gallons	42 <u>38</u>	54 <u>49</u>	54 <u>49</u>	54 <u>49</u>	67 <u>62</u>	67 <u>62</u>	80 <u>74</u>	67 <u>62</u>	80 <u>74</u>	80 <u>74</u>	80 <u>74</u>

For SI units: 1 gallon = 3.785 L

Notes:

- 1 The first hour rating is found on the “Energy Guide” label.
- 2 Solar water heaters shall be sized to meet the appropriate first hour rating as shown in the table.

Substantiation:

Technical Merit:

The U.S. Department of Energy has significantly revised the test procedures for measuring the efficiency of residential water heaters. Those revisions include changes to the method for determining the First Hour Rating (FHR) of all residential storage water heaters. Manufacturers will be required to display the revised First Hour Ratings starting in June 2017. The general effect of the revised method is a FHR that is lower than the previous value determined for a given model. As a result, the First Hour Rating requirements in the table noted above must be edited to reflect the new procedure for determining the FHR.

The revised DOE test procedure can be found at the following link: https://www.ecfr.gov/cgi-bin/text-idx?SID=80dfa785ea350ebeee184bb0ae03e7f0&mc=true&node=ap10.3.430_127.e&rqn=div9.

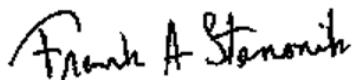
Also attached is the December 29, 2016 final rule that provided conversion factors to adjust existing ratings to the new test procedure. The table on page 96232 shows the conversion factors for the first hour ratings of the various types of water heaters.

Emergency nature:

If these changes are not made to the Uniform Plumbing Code, products that met the current requirements and which have not changed in their design or input rating will no longer comply with the table. Also, the table, if unchanged, will drive contractors to select larger, higher cost water heaters, which are oversized to meet the needs of the applications. Those selections will not be the most cost-effective, efficient choice for the consumer. If the table is unchanged, the revised DOE method for measuring FHR will make the table more restrictive.

No additional training should be required.

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Submitter signature (required):

Date: April 12, 2017

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PART 429—CERTIFICATION, COMPLIANCE, AND ENFORCEMENT FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT

■ 1. The authority citation for part 429 continues to read as follows:

Authority: 42 U.S.C. 6291–6317; 28 U.S.C. 2461 note.

■ 2. Section 429.17 is revised to read as follows:

§ 429.17 Water heaters.

(a) *Determination of represented value.* (1) As of July 13, 2015, manufacturers must determine the represented value for each new basic model of water heater by applying an alternative efficiency determination method (AEDM) in accordance with 10 CFR 429.70 or by testing for the uniform energy factor, in conjunction with the applicable sampling provisions as follows:

(i) If the represented value is determined through testing, the general requirements of 10 CFR 429.11 are applicable; and

(ii) For each basic model selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of the energy consumption or other measure of energy use of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and, \bar{x} is the sample mean; n is the number of samples; and x_i is the i th sample;

Or,

(2) The upper 95-percent confidence limit (UCL) of the true mean divided by 1.10, where

$$UCL = \bar{x} + t_{.95} \left(\frac{s}{\sqrt{n}} \right)$$

And \bar{x} is the sample mean; s is the sample standard deviation; n is the number of samples; and $t_{0.95}$ is the t statistic for a 95-percent one-tailed confidence interval with $n-1$ degrees of freedom (from Appendix A).

(B) Any represented value of energy efficiency or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and, \bar{x} is the sample mean; n is the number of samples; and x_i is the i th sample;

Or,

(2) The lower 95-percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{.95} \left(\frac{s}{\sqrt{n}} \right)$$

And \bar{x} is the sample mean; s is the sample standard deviation; n is the number of samples; and $t_{0.95}$ is the t statistic for a 95-percent one-tailed confidence interval with $n-1$ degrees of freedom (from Appendix A).

(C) Any represented value of the rated storage volume must be equal to the mean of the measured storage volumes of all the units within the sample.

(D) Any represented value of first-hour rating or maximum gallons per minute (GPM) must be equal to the mean of the measured first-hour ratings

or measured maximum GPM ratings, respectively, of all the units within the sample.

(2) For basic models initially certified before July 13, 2015 (using either the energy factor test procedure contained in appendix E to subpart B of 10 CFR part 430 of the January 1, 2015 edition of the Code of Federal Regulations or the thermal efficiency and standby loss test procedures contained in 10 CFR 431.106 of the January 1, 2015 edition of the Code of Federal Regulations, in conjunction with applicable sampling provisions), manufacturers must:

(i) Determine the represented value for each basic model by applying an AEDM in accordance with 10 CFR 429.70 or by testing for the uniform energy factor, in conjunction with the applicable sampling provisions of paragraph (a)(1) of this section; or

(ii) Calculate the uniform energy factor for each test sample by applying the following mathematical conversion factors to test data previously obtained through testing according to appendix E to subpart B of 10 CFR part 430 of the January 1, 2015 edition of the Code of Federal Regulations or the thermal efficiency and standby loss test procedures contained in 10 CFR 431.106 of the January 1, 2015, edition of the Code of Federal Regulations.

Represented values of uniform energy factor, first-hour rating, and maximum GPM rating based on a calculation using this mathematical conversion factor must be determined using the applicable sampling provisions in paragraphs (a)(1)(i) and (ii) of this section.

(A) Calculate the New First Hour Rating (New FHR) or New Max Gallons per Minute (New Max GPM), as applicable, using the equations presented in the table in this paragraph.

Product class	Distinguishing criteria	Conversion factor*
Consumer Gas-fired Water Heater	Non-Condensing, Standard and Low NO _x .	New FHR = 7.9592 + 0.8752 × FHR _p .
	Non-Condensing, Ultra-Low NO _x ..	New FHR = 25.0680 + 0.6535 × FHR _p .
	Condensing	New FHR = 1.0570 × FHR _p .
Consumer Oil-fired Water Heater ...	N/A	New FHR = 0.9102 × FHR _p .
Consumer Electric Water Heater ...	Electric Resistance	New FHR = 9.2827 + 0.8092 × FHR _p .
	Heat Pump	New FHR = -4.2705 + 0.9947 × FHR _p .
Tabletop Water Heater	N/A	New FHR = 41.5127 + 0.1989 × FHR _p .
Instantaneous Gas-fired Water Heater.	N/A	New Max GPM = 1.1461 × Max GPM _p .
Instantaneous Electric Water Heater.	N/A	New Max GPM = 1.1461 × Max GPM _p .
Grid-Enabled Water Heater	N/A	New FHR = 9.2827 + 0.8092 × FHR _p .
Residential-Duty Commercial Gas-fired Water Heater.	N/A	New FHR = -35.8233 + 0.4649 × V _m + 160.5089 × E _t .
Residential-Duty Commercial Oil-fired Water Heater.	N/A	New FHR = -35.8233 + 0.4649 × V _m + 160.5089 × E _t .

Product class	Distinguishing criteria	Conversion factor *
Residential-Duty Commercial Electric Instantaneous Water Heater.	N/A	New Max GPM = 0.0146 + 0.0295 × Q.

FHR_p = prior first-hour rating.
 Max GPM_p = prior maximum GPM rating.
 Q = nameplate input rate, in kBtu/h.
 E_t = thermal efficiency rating.
 V_m = measured storage volume in gallons.

(B) Determine the applicable draw pattern as follows:

(1) For consumer gas-fired water heaters, consumer oil-fired water heaters, consumer electric water heaters,

tabletop water heaters, grid-enabled water heaters, residential-duty commercial gas water heaters, residential-duty commercial oil-fired

water heaters: Use the New FHR (as defined in paragraph (a)(2)(ii)(A) of this section) to select the applicable draw pattern from the table in this paragraph:

New FHR greater than or equal to:	and new FHR less than:	Draw pattern
0 gallons	18 gallons	Very Small. Low. Medium. High.
18 gallons	51 gallons	
51 gallons	75 gallons	
75 gallons	No upper limit	

(2) For instantaneous gas-fired water heaters, instantaneous electric water heaters, and residential-duty

commercial electric instantaneous water heaters: Use New Max GPM (as defined in paragraph (a)(2)(ii)(A) of this section)

to select the applicable draw pattern from the table in this paragraph:

New max GPM greater than or equal to:	And new max GPM rating less than:	Draw pattern
0 gallons/minute	1.7 gallons/minute	Very Small. Low. Medium. High.
1.7 gallons/minute	2.8 gallons/minute	
2.8 gallons/minute	4 gallons/minute	
4 gallons/minute	No upper limit	

(C) For consumer electric heat pump water heaters, use the draw pattern to determine the applicable drawn volume (DV) from the table in this paragraph:

Draw pattern	DV
Very Small	10 gallons.
Low	38 gallons.
Medium	55 gallons.

Draw pattern	DV
High	84 gallons.

(D) For each class besides consumer electric heat pump water heaters, use the applicable equation to calculate: UEF_{WHAM} (for consumer storage water heaters-except heat pumps), UEF_{model}

(for consumer instantaneous water heaters), UEF_{rd} (for residential-duty commercial storage water heaters), and UEF_{rd, model} (for residential-duty commercial electric instantaneous water heaters) as follows:

(1) For consumer storage water heaters (except consumer electric heat pump water heaters):

$$UEF_{WHAM} = \left[\frac{1}{\eta_r} + \left(\frac{1}{EF} - \frac{1}{\eta_r} \right) \left(\frac{a P \eta_r - b}{c P \eta_r - d} \right) \right]^{-1}$$

Where a, b, c, and d are coefficients based on the applicable draw pattern as

specified in the table below; EF is the energy factor; η_r is the recovery

efficiency in decimal form; and P is the input rate in Btu/h.

Draw pattern	a	b	c	d
Very Small	0.250266	57.5	0.039864	67.5
Low	0.065860	57.5	0.039864	67.5
Medium	0.045503	57.5	0.039864	67.5
High	0.029794	57.5	0.039864	67.5

(2) For consumer instantaneous water heaters:

$$UEF_{model} = \frac{\eta_r}{1 + A\eta_r}$$

Where η_r is the recovery efficiency expressed in decimal form and A is dependent upon the applicable draw

pattern and fuel type as specified in the table in this paragraph.

Draw pattern	A	
	Electric	Gas
Very Small	0.003819	0.026915
Low	0.001549	0.010917
Medium	0.001186	0.008362
High	0.000785	0.005534

(3) For residential-duty commercial storage water heaters:

$$UEF_{rd} = \left[\frac{1}{E_t} + F * SL \left(G - \frac{1}{P E_t} \right) \right]^{-1}$$

Where P is the input rate in Btu/h; E_t is the thermal efficiency; SL is the

standby loss in Btu/h; and F and G are coefficients as specified in the table in

this paragraph based on the applicable draw pattern.

Draw pattern	F	G
Very Small	0.821429	0.0043520
Low	0.821429	0.0011450
Medium	0.821429	0.0007914
High	0.821429	0.0005181

(4) For residential-duty commercial electric instantaneous water heaters:

$$UEF_{rd,model} = \frac{E_t}{1 + AE_t}$$

Where E_t is the thermal efficiency expressed in decimal form and A is dependent upon the applicable draw pattern, as specified in the table in this paragraph.

Draw pattern	A
Very Small	0.003819
Low	0.001549
Medium	0.001186
High	0.000785

(E) Calculate the “New UEF” (*i.e.*, the converted UEF) using the applicable equation in the table in this paragraph.

Product class	Distinguishing criteria	Conversion factor
Consumer Gas-fired Water Heater	Non-Condensing, Standard and Low NO _x	New UEF = -0.0002 + 0.9858 × UEF _{WHAM} .
	Non-Condensing, Ultra-Low NO _x	New UEF = 0.0746 + 0.8653 × UEF _{WHAM} .
	Condensing	New UEF = 0.4242 + 0.4641 × UEF _{WHAM} .
Consumer Oil-fired Water Heater	N/A	New UEF = -0.0033 + 0.9528 × UEF _{WHAM} .
Consumer Electric Water Heater	Electric Resistance	New UEF = 0.4774 + 0.4740 × UEF _{WHAM} .
	Heat Pump	New UEF = 0.1513 + 0.8407 × EF + 0.0043 × DV.
Tabletop Water Heater	N/A	New UEF = -0.3305 + 1.3983 × UEF _{WHAM} .
Instantaneous Gas-fired Water Heater	N/A	New UEF = 0.1006 + 0.8622 × UEF _{model} .
Instantaneous Electric Water Heater	N/A	New UEF = 0.9847 × UEF _{model} .
Grid-Enabled Water Heater	N/A	New UEF = 0.4774 + 0.4740 × UEF _{WHAM} .
Residential-Duty Commercial Gas-fired Water Heater.	N/A	New UEF = -0.0022 + 1.0002 × UEF _{rd} .
Residential-Duty Commercial Oil-fired Water Heater.	N/A	New UEF = -0.0022 + 1.0002 × UEF _{rd} .

Product class	Distinguishing criteria	Conversion factor
Residential-Duty Commercial Electric Instantaneous Water Heater.	N/A	New UEF = UEF _{rd, model} .

New UEF = converted UEF.
EF = Energy Factor.

(b) *Certification reports.* (1) The requirements of 10 CFR 429.12 apply; and

(2) Pursuant to 10 CFR 429.12(b)(13), a certification report must include the following public, product-specific information:

(i) For storage-type water heater basic models previously certified for energy factor pursuant to § 429.17(a) of the January 1, 2015 edition of the Code of Federal Regulations, and for which uniform energy factor is calculated pursuant to 10 CFR 429.17(a)(2)(ii): The energy factor (EF, rounded to the nearest 0.01), the uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the uniform energy factor test procedure first-hour rating in gallons (gal, rounded to the nearest 1 gal) as determined under paragraph (a)(2)(ii)(A) of this section, the previously certified first-hour rating under the energy factor test procedure in gallons (gal, rounded to the nearest 1 gal), and the recovery efficiency in percent (% , rounded to the nearest 1%);

(ii) For storage-type water heater basic models rated pursuant to 10 CFR 429.17(a)(1) or 10 CFR 429.17(a)(2)(i): The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the first-hour rating in gallons (gal, rounded to the nearest 1 gal), and the recovery efficiency in percent (% , rounded to the nearest 1%);

(iii) For instantaneous-type water heater basic models previously certified for energy factor pursuant to § 429.17(a) of the January 1, 2015 edition of the Code of Federal Regulations, and for which uniform energy factor is calculated pursuant to 10 CFR 429.17(a)(2)(ii): The energy factor (EF, rounded to the nearest 0.01), the uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the uniform energy factor test procedure maximum gallons per minute (gpm, rounded to the nearest 0.1 gpm) as determined under paragraph (a)(2)(ii)(A) of this section, the previously certified maximum gallons per minute (gpm, rounded to the nearest 0.1 gpm) under the energy factor test procedure, and the recovery efficiency in percent (% , rounded to the nearest 1%);

(iv) For instantaneous-type water heater basic models rated pursuant to 10 CFR 429.17(a)(1) or 10 CFR

429.17(a)(2)(i): The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the maximum gallons per minute (gpm, rounded to the nearest 0.1 gpm), and the recovery efficiency in percent (% , rounded to the nearest 1%);

(v) For grid-enabled water heater basic models previously certified for energy factor pursuant to 10 CFR 429.17(a) of the January 1, 2015 edition of the Code of Federal Regulations, and for which uniform energy factor is calculated pursuant to 10 CFR 429.17(a)(2)(ii): The energy factor (EF, rounded to the nearest 0.01), the uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the uniform energy factor test procedure first-hour rating in gallons (gal, rounded to the nearest 1 gal) as determined under paragraph (a)(2)(ii)(A) of this section, the previously certified first-hour rating under the energy factor test procedure in gallons (gal, rounded to the nearest 1 gal), the recovery efficiency in percent (% , rounded to the nearest 1%), a declaration that the model is a grid-enabled water heater, whether it is equipped at the point of manufacture with an activation lock, and whether it bears a permanent label applied by the manufacturer that advises purchasers and end-users of the intended and appropriate use of the product; and

(vi) For grid-enabled water heater basic models rated pursuant to 10 CFR 429.17(a)(1) or 10 CFR 429.17(a)(2)(i): The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the first-hour rating in gallons (gal, rounded to the nearest 1 gal), and the recovery efficiency in percent (% , rounded to the nearest 1%), a declaration that the model is a grid-enabled water heater, whether it is equipped at the point of manufacture with an activation lock, and whether it bears a permanent label applied by the manufacturer that advises purchasers and end-users of the intended and appropriate use of the product.

■ 3. Section 429.17 is further revised, effective December 29, 2017, to read as follows:

§ 429.17 Water heaters.

(a) *Determination of represented value.* (1) Manufacturers must determine the represented value for each water heater by applying an AEDM in accordance with 10 CFR 429.70 or by testing for the uniform energy factor, in conjunction with the applicable sampling provisions as follows:

(i) If the represented value is determined through testing, the general requirements of 10 CFR 429.11 are applicable; and

(ii) For each basic model selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—

(A) Any represented value of the estimated annual operating cost or other measure of energy consumption of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and, \bar{x} is the sample mean; n is the number of samples; and x_i is the *i*th sample;

Or,

(2) The upper 95-percent confidence limit (UCL) of the true mean divided by 1.10, where:

$$UCL = \bar{x} + t_{.95} \left(\frac{s}{\sqrt{n}} \right)$$

And \bar{x} is the sample mean; s is the sample standard deviation; n is the number of samples; and $t_{.95}$ is the t statistic for a 95-percent one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(B) Any represented value of the uniform energy factor, or other measure of energy consumption of a basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(1) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and, \bar{x} is the sample mean; n is the number of samples; and x_i is the i th sample;

Or,

(2) The lower 95-percent confidence limit (LCL) of the true mean divided by 0.90, where:

$$LCL = \bar{x} - t_{.95} \left(\frac{s}{\sqrt{n}} \right)$$

And \bar{x} is the sample mean; s is the sample standard deviation; n is the number of samples; and $t_{0.95}$ is the t statistic for a 95-percent one-tailed confidence interval with $n-1$ degrees of freedom (from Appendix A).

(C) Any represented value of the rated storage volume must be equal to the mean of the measured storage volumes of all the units within the sample.

(D) Any represented value of first-hour rating or maximum gallons per minute (GPM) must be equal to the mean of the measured first-hour ratings or measured maximum GPM ratings, respectively, of all the units within the sample.

(b) *Certification reports.* (1) The requirements of 10 CFR 429.12 are applicable to water heaters; and

(2) Pursuant to 10 CFR 429.12(b)(13), a certification report shall include the following public, product-specific information:

(i) For storage-type water heater basic models: The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (rounded to the nearest 1 gal), the first-hour rating in gallons (gal, rounded to the nearest 1 gal), and the recovery efficiency in percent (% , rounded to the nearest 1%);

(ii) For instantaneous-type water heater basic models: The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the maximum gallons per minute (gpm, rounded to the nearest 0.1 gpm), and the recovery efficiency in percent (% , rounded to the nearest 1%); and

(iii) For grid-enabled water heater basic models: The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the first-hour rating in gallons (gal, rounded to the nearest 1 gal), the recovery efficiency in percent (% , rounded to the nearest 1%), a declaration that the model is a grid-enabled water heater, whether it is equipped at the point of manufacture with an activation lock, and whether it bears a permanent label applied by the manufacturer that advises purchasers and end-users of the

intended and appropriate use of the product.

■ 4. Section 429.44 is amended by adding paragraph (d) to read as follows:

§ 429.44 Commercial water heating equipment.

* * * * *

(d) *Certification reports for residential-duty commercial water heaters.* (1) The requirements of § 429.12 apply; and

(2) Pursuant to § 429.12(b)(13), a certification report must include the following public, equipment-specific information:

(i) Residential-duty commercial gas-fired and oil-fired storage water heaters previously certified for thermal efficiency and standby loss pursuant to 10 CFR 429.44(b) of the January 1, 2015 edition of the Code of Federal Regulations, and for which uniform energy factor is calculated pursuant to 10 CFR 429.17(a)(2)(ii): The thermal efficiency in percent (%), the standby loss in British thermal units per hour (Btu/h), the uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal), and the nameplate input rate in Btu/h.

(ii) Residential-duty commercial gas-fired and oil-fired storage water heaters rated for uniform energy factor pursuant to 10 CFR 429.17(a)(2)(i): The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (rounded to the nearest 1 gal), the first-hour rating in gallons (gal, rounded to the nearest 1 gal), and the recovery efficiency in percent (% , rounded to the nearest 1%).

(iii) Residential-duty commercial electric instantaneous water heaters previously certified for thermal efficiency and standby loss pursuant to 10 CFR 429.44(b) of the January 1, 2015 edition of the Code of Federal Regulations, and for which uniform energy factor is calculated pursuant to 10 CFR 429.17(a)(2)(ii): The thermal efficiency in percent (%), the standby loss in British thermal units per hour (Btu/h), the uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal), and the nameplate input rate in kilowatts (kW).

(iv) Residential-duty commercial electric instantaneous water heaters rated for uniform energy factor pursuant to 10 CFR 429.17(a)(2)(i): The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the maximum gallons per minute (gpm, rounded to the nearest 0.1 gpm), and the recovery efficiency in percent (% , rounded to the nearest 1%).

* * * * *

■ 5. Section 429.44 is further revised, effective December 29, 2017, by revising paragraph (d)(2) to read as follows:

§ 429.44 Commercial water heating equipment.

* * * * *

(d) * * *

(2) Pursuant to § 429.12(b)(13), a certification report for equipment must include the following public, equipment-specific information:

(i) Residential-duty commercial gas-fired and oil-fired storage water heaters: The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the first-hour rating in gallons (gal, rounded to the nearest 1 gal), and the recovery efficiency in percent (% , rounded to the nearest 1%).

(ii) Residential-duty commercial electric instantaneous water heaters: The uniform energy factor (UEF, rounded to the nearest 0.01), the rated storage volume in gallons (gal, rounded to the nearest 1 gal), the maximum gallons per minute (gpm, rounded to the nearest 0.1 gpm), and the recovery efficiency in percent (% , rounded to the nearest 1%).

* * * * *

■ 6. Section 429.134 is amended by revising paragraph (d)(2) to read as follows:

§ 429.134 Product-specific enforcement provisions.

* * * * *

(d) * * *

(2) *Verification of rated storage volume.* The storage volume of the basic model will be measured pursuant to the test requirements of appendix E to subpart B of 10 CFR part 430 for each unit tested. The mean of the measured values will be compared to the rated storage volume as certified by the manufacturer. The rated value will be considered valid only if the measurement is within 3 percent of the certified rating.

(i) If the rated storage volume is found to be within 3 percent of the mean of the measured value of storage volume, then the rated value will be used as the basis for calculation of the required uniform energy factor for the basic model.

(ii) If the rated storage volume is found to vary more than 3 percent from the mean of the measured values, then the mean of the measured values will be used as the basis for calculation of the required uniform energy factor for the basic model.

* * * * *

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

■ 7. The authority citation for part 430 continues to read as follows:

Authority: 42 U.S.C. 6291–6309; 28 U.S.C. 2461 note.

■ 8. Section 430.23 is amended by revising paragraph (e) to read as follows:

§ 430.23 Test procedures for the measurement of energy and water consumption.

* * * * *

(e) *Water heaters.* (1) For water heaters tested using energy factor and for which uniform energy factor is determined using the conversion factors in accordance with 10 CFR 429.17(a)(2):

(i) The estimated annual operating cost is calculated as—

(A) For a gas-fired or oil-fired water heater, the product of the annual energy consumption, determined according to section 6.3.7 or 6.4.4 of appendix E of this subpart, times the representative average unit cost of gas or oil, as appropriate, in dollars per Btu as provided by the Secretary. Round the resulting product to the nearest dollar per year.

(B) For an electric water heater, the product of the annual energy consumption, determined according to section 6.3.7 or 6.4.4 of appendix E of this subpart, times the representative average unit cost of electricity in dollars per kilowatt-hour as provided by the Secretary, divided by 3412 Btu per kilowatt-hour. Round the resulting product to the nearest dollar per year.

(ii) For an individual unit, determine the tested energy factor in accordance with section 6.1.7 or 6.2.4 of appendix E to subpart B of 10 CFR part 430 of the January 1, 2015 edition of the Code of Federal Regulations, and round the

value to the nearest 0.01. Determine the converted uniform energy factor in accordance with 10 CFR 429.17(a)(2), and round the value to the nearest 0.01.

(2) For water heaters tested using uniform energy factor:

(i) The estimated annual operating cost is calculated as:

(A) For a gas-fired or oil-fired water heater, the sum of: The product of the annual gas or oil energy consumption, determined according to section 6.3.9 or 6.4.6 of appendix E of this subpart, times the representative average unit cost of gas or oil, as appropriate, in dollars per Btu as provided by the Secretary; plus the product of the annual electric energy consumption, determined according to section 6.3.8 or 6.4.5 of appendix E of this subpart, times the representative average unit cost of electricity in dollars per kilowatt-hour as provided by the Secretary. Round the resulting sum to the nearest dollar per year.

(B) For an electric water heater, the product of the annual energy consumption, determined according to section 6.3.7 or 6.4.4 of appendix E of this subpart, times the representative average unit cost of electricity in dollars per kilowatt-hour as provided by the Secretary. Round the resulting product to the nearest dollar per year.

(ii) For an individual unit, determine the tested uniform energy factor in accordance with section 6.3.6 or 6.4.3 of appendix E of this subpart, and round the value to the nearest 0.01.

* * * * *

■ 9. Section 430.23 paragraph (e) is further revised, effective December 29, 2017, to read as follows:

§ 430.23 Test procedures for the measurement of energy and water consumption.

* * * * *

(e) *Water heaters.* (1) The estimated annual operating cost is calculated as:

(i) For a gas-fired or oil-fired water heater, the sum of: The product of the annual gas or oil energy consumption, determined according to section 6.3.9 or 6.4.6 of appendix E of this subpart, times the representative average unit cost of gas or oil, as appropriate, in dollars per Btu as provided by the Secretary; plus the product of the annual electric energy consumption, determined according to section 6.3.8 or 6.4.5 of appendix E of this subpart, times the representative average unit cost of electricity in dollars per kilowatt-hour as provided by the Secretary. Round the resulting sum to the nearest dollar per year.

(ii) For an electric water heater, the product of the annual energy consumption, determined according to section 6.3.7 or 6.4.4 of appendix E of this subpart, times the representative average unit cost of electricity in dollars per kilowatt-hour as provided by the Secretary. Round the resulting product to the nearest dollar per year.

(2) For an individual unit, determine the tested uniform energy factor in accordance with section 6.3.6 or 6.4.3 of appendix E of this subpart, and round the value to the nearest 0.01.

* * * * *

■ 10. Section 430.32 is amended by revising paragraph (d) to read as follows:

§ 430.32 Energy and water conservation standards and their compliance dates.

* * * * *

(d) *Water heaters.* The uniform energy factor of water heaters shall not be less than the following:

Product class	Rated storage volume and input rating (if applicable)	Draw pattern	Uniform energy factor
Gas-fired Storage Water Heater	≥20 gal and ≤55 gal	Very Small	0.3456 – (0.0020 × V _r)
		Low	0.5982 – (0.0019 × V _r)
		Medium	0.6483 – (0.0017 × V _r)
	>55 gal and ≤100 gal	High	0.6920 – (0.0013 × V _r)
		Very Small	0.6470 – (0.0006 × V _r)
		Low	0.7689 – (0.0005 × V _r)
Oil-fired Storage Water Heater	≤50 gal	Medium	0.7897 – (0.0004 × V _r)
		High	0.8072 – (0.0003 × V _r)
		Very Small	0.2509 – (0.0012 × V _r)
Electric Storage Water Heaters	≤50 gal	Low	0.5330 – (0.0016 × V _r)
		Medium	0.6078 – (0.0016 × V _r)
		High	0.6815 – (0.0014 × V _r)
	≥20 gal and ≤55 gal	Very Small	0.8808 – (0.0008 × V _r)
		Low	0.9254 – (0.0003 × V _r)
		Medium	0.9307 – (0.0002 × V _r)
>55 gal and ≤120 gal	High	0.9349 – (0.0001 × V _r)	
	Very Small	1.9236 – (0.0011 × V _r)	
		Low	2.0440 – (0.0011 × V _r)

Product class	Rated storage volume and input rating (if applicable)	Draw pattern	Uniform energy factor
Tabletop Water Heater	≥20 gal and ≤120 gal	Medium	2.1171 – (0.0011 × V _r)
		High	2.2418 – (0.0011 × V _r)
		Very Small	0.6323 – (0.0058 × V _r)
		Low	0.9188 – (0.0031 × V _r)
		Medium	0.9577 – (0.0023 × V _r)
Instantaneous Gas-fired Water Heater.	<2 gal and >50,000 Btu/h	High	0.9884 – (0.0016 × V _r)
		Very Small	0.80
		Low	0.81
		Medium	0.81
		High	0.81
Instantaneous Electric Water Heater	<2 gal	Very Small	0.91
		Low	0.91
		Medium	0.91
		High	0.92
		Very Small	1.0136 – (0.0028 × V _r)
Grid-Enabled Water Heater	>75 gal	Low	0.9984 – (0.0014 × V _r)
		Medium	0.9853 – (0.0010 × V _r)
		High	0.9720 – (0.0007 × V _r)

* V_r is the Rated Storage Volume (in gallons), as determined pursuant to 10 CFR 429.17.

* * * * *

PART 431—ENERGY EFFICIENCY PROGRAM FOR CERTAIN COMMERCIAL AND INDUSTRIAL EQUIPMENT

■ 11. The authority citation for part 431 continues to read as follows:

Authority: 42 U.S.C. 6291–6317; 28 U.S.C. 2461 note.

■ 12. Section 431.110 is revised to read as follows:

§ 431.110 Energy conservation standards and their effective dates.

(a) Each commercial storage water heater, instantaneous water heater, unfired hot water storage tank and hot water supply boiler (excluding residential-duty commercial water heaters) must meet the applicable

energy conservation standard level(s) as specified in the table in this paragraph. Any packaged boiler that provides service water that meets the definition of “commercial packaged boiler” in subpart E of this part, but does not meet the definition of “hot water supply boiler” in subpart G, must meet the requirements that apply to it under subpart E.

Equipment category	Size	Energy conservation standard ^a		
		Maximum standby loss ^c (equipment manufactured on and after October 29, 2003) ^b	Minimum thermal efficiency (equipment manufactured on and after October 29, 2003 and before October 9, 2015) ^b (%)	Minimum thermal efficiency (equipment manufactured on and after October 9, 2015) ^b (%)
Electric storage water heaters	All	0.30 + 27/V _m (%/hr)	N/A	N/A
Gas-fired storage water heaters	≤155,000 Btu/hr	Q/800 + 110(V _r) ^{1/2} (Btu/hr)	80	80
	>155,000 Btu/hr	Q/800 + 110(V _r) ^{1/2} (Btu/hr)	80	80
Oil-fired storage water heaters	≤155,000 Btu/hr	Q/800 + 110(V _r) ^{1/2} (Btu/hr)	78	80
	>155,000 Btu/hr	Q/800 + 110(V _r) ^{1/2} (Btu/hr)	78	80
Gas-fired instantaneous water heaters and hot water supply boilers.	<10 gal	N/A	80	80
	≥10 gal	Q/800 + 110(V _r) ^{1/2} (Btu/hr)	80	80
Oil-fired instantaneous water heaters and hot water supply boilers.	<10 gal	N/A	80	80
	≥10 gal	Q/800 + 110(V _r) ^{1/2} (Btu/hr)	78	78
Equipment category	Size	Minimum thermal insulation		
Unfired hot water storage tank	All	R–12.5		

^a V_m is the measured storage volume (in gallons), and V_r is the rated volume (in gallons). Q is the nameplate input rate in Btu/hr.

^b For hot water supply boilers with a capacity of less than 10 gallons: (1) The standards are mandatory for products manufactured on and after October 21, 2005, and (2) products manufactured prior to that date, and on or after October 23, 2003, must meet either the standards listed in this table or the applicable standards in subpart E of this part for a “commercial packaged boiler.”

^c Water heaters and hot water supply boilers having more than 140 gallons of storage capacity need not meet the standby loss requirement if: (1) The tank surface area is thermally insulated to R–12.5 or more; (2) a standing pilot light is not used; and (3) for gas or oil-fired storage water heaters, they have a fire damper or fan-assisted combustion.

(b) Each residential-duty commercial water heater must meet the applicable energy conservation standard level(s) as follows:

Product class	Specifications ^a	Draw pattern	Uniform energy factor ^b
Gas-fired Storage	>75 kBtu/hr and ≤105 kBtu/hr and ≤120 gal.	Very Small	0.2674 – (0.0009 × V _r)
		Low	0.5362 – (0.0012 × V _r)
		Medium	0.6002 – (0.0011 × V _r)
		High	0.6597 – (0.0009 × V _r)
Oil-fired Storage	>105 kBtu/hr and ≤140 kBtu/hr and ≤120 gal.	Very Small	0.2932 – (0.0015 × V _r)
		Low	0.5596 – (0.0018 × V _r)
		Medium	0.6194 – (0.0016 × V _r)
		High	0.6740 – (0.0013 × V _r)
Electric Instantaneous	>12 kW and ≤58.6 kW and ≤2 gal ...	Very Small	0.80
		Low	0.80
		Medium	0.80
		High	0.80

^a Additionally, to be classified as a residential-duty commercial water heater, a commercial water heater must meet the following conditions: (1) if the water heater requires electricity, it must use a single-phase external power supply; and (2) the water heater must not be designed to heat water to temperatures greater than 180 °F.

^b V_r is the rated storage volume (in gallons), as determined pursuant to 10 CFR 429.44.

[FR Doc. 2016–29994 Filed 12–28–16; 8:45 am]

BILLING CODE 6450–01–P