



[6450-01-P]

**DEPARTMENT OF ENERGY**

[Case Number 2019-006; EERE-2019-BT-WAV-0020]

**Energy Conservation Program: Petition for Waiver of Bradford White Corporation from the Department of Energy Consumer Water Heaters Test Procedure and Grant of Interim Waiver**

**AGENCY:** Office of Energy Efficiency and Renewable Energy, Department of Energy.

**ACTION:** Notice of petition for waiver and grant of an interim waiver, and request for comments.

**SUMMARY:** This document announces receipt of and publishes a petition for waiver from Bradford White Corporation (“BWC”), which seeks a waiver for a specified consumer water heater basic model from the U.S. Department of Energy (“DOE”) test procedure used for determining the efficiency of consumer water heaters. BWC asserts that for that identified basic model, application of the calculation specified in the DOE test procedure to determine recovery efficiency yields an “artificially high” value that in turn results in a lower overall uniform energy factor value. Consequently, BWC seeks to use an alternate test procedure to address issues involved in testing the basic model identified in its petition. More specifically, BWC has requested that DOE waive the equation for calculating recovery efficiency of the consumer gas-fired storage water heater basic model for which the first occurrence of the main burner cutting out (“cut-out”) occurs during a draw. Instead, BWC requests that the recovery efficiency for this water heater be calculated using a revised recovery efficiency equation that accounts for the first

cut-out occurring during a draw. For the reasons discussed in this document, DOE grants BWC an interim waiver from the DOE's consumer water heater test procedure for the basic model listed in the interim waiver, subject to use of the alternate test procedure as set forth in the Interim Waiver Order. DOE solicits comments, data, and information concerning BWC's petition, its suggested alternate test procedure, and the alternate test procedure in the Interim Waiver Order so as to inform its final decision on BWC's waiver request.

**DATES:** Written comments and information will be accepted on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].**

**ADDRESSES:** Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at <http://www.regulations.gov>. Alternatively, interested persons may submit comments, identified by case number "2019-006" and Docket number "EERE-2019-BT-WAV-0020," by any of the following methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.
- *E-mail:* [Bradford2019WAV0020@ee.doe.gov](mailto:Bradford2019WAV0020@ee.doe.gov). Include Case No. 2019-006 in the subject line of the message.
- *Postal Mail:* Appliance and Equipment Standards Program, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, Mailstop EE-5B, Petition for Waiver Case No. 2019-006, 1000 Independence Avenue, SW., Washington, DC 20585-0121. If possible, please submit all items on a compact disc ("CD"), in which case it is not necessary to include printed copies.

- *Hand Delivery/Courier:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, 950 L’Enfant Plaza, SW., 6<sup>th</sup> floor, Washington, DC, 20024. Telephone: (202) 287-1445. If possible, please submit all items on a “CD”, in which case it is not necessary to include printed copies.

No telefacsimilies (faxes) will be accepted. For detailed instructions on submitting comments and additional information on this process, see section V of this document.

*Docket:* The docket, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at <http://www.regulations.gov>. All documents in the docket are listed in the <http://www.regulations.gov> index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

The docket webpage can be found at <https://www.regulations.gov/docket?D=EERE-2019-BT-WAV-0020>. The docket webpage contains instruction on how to access all documents, including public comments, in the docket. See section V for information on how to submit comments through <http://www.regulations.gov>.

**FOR FURTHER INFORMATION CONTACT:** Ms. Lucy deButts, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, Mailstop EE-5B, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) 287-1604. E-mail: [AS\\_Waiver\\_Request@ee.doe.gov](mailto:AS_Waiver_Request@ee.doe.gov).

Mr. Eric Stas, U.S. Department of Energy, Office of the General Counsel, Mail Stop GC-33, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585-0103.

Telephone: (202) 586-5827. E-mail: *Eric.Stas@hq.doe.gov*.

## **SUPPLEMENTARY INFORMATION:**

### **I. Background and Authority**

The Energy Policy and Conservation Act, as amended (“EPCA”),<sup>1</sup> authorizes the U.S. Department of Energy (“DOE”) to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317) Title III, Part B<sup>2</sup> of EPCA established the Energy Conservation Program for Consumer Products Other Than Automobiles, which sets forth a variety of provisions designed to improve energy efficiency for certain types of consumer products. These products include consumer water heaters, the focus of this document. (42 U.S.C. 6292(a)(4))

The energy conservation program under EPCA consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA include definitions (42 U.S.C. 6291), test procedures (42 U.S.C. 6293), labeling provisions (42 U.S.C. 6294), energy conservation standards (42 U.S.C. 6295), and the authority to require information and reports from manufacturers (42 U.S.C. 6296).

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<sup>1</sup> All references to EPCA in this document refer to the statute as amended through America’s Water Infrastructure Act of 2018, Public Law 115-270 (Oct. 23, 2018).

<sup>2</sup> For editorial reasons, upon codification in the U.S. Code, Part B was redesignated as Part A.

The Federal testing requirements consist of test procedures that manufacturers of covered products must use as the basis for: (1) certifying to DOE that their products comply with the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6295(s)), and (2) making representations about the efficiency of that product (42 U.S.C. 6293(c)). Similarly, DOE must use these test procedures to determine whether the product complies with relevant standards promulgated under EPCA. (42 U.S.C. 6295(s))

Under 42 U.S.C. 6293, EPCA sets forth the criteria and procedures DOE is required to follow when prescribing or amending test procedures for covered products. EPCA requires that any test procedures prescribed or amended under this section must be reasonably designed to produce test results which reflect the energy efficiency, energy use, or estimated annual operating cost of a covered product during a representative average use cycle or period of use and requires that test procedures not be unduly burdensome to conduct. (42 U.S.C. 6293(b)(3)) The test procedure for consumer water heaters is contained in the Code of Federal Regulations (“CFR”) at 10 CFR part 430, subpart B, appendix E, *Uniform Test Method for Measuring the Energy Consumption of Water Heaters*.

Under 10 CFR 430.27, any interested person may submit a petition for waiver from DOE’s test procedure requirements. DOE will grant a waiver from the test procedure requirements if DOE determines either that the basic model for which the waiver was requested contains a design characteristic that prevents testing of the basic model according to the prescribed test procedures, or that the prescribed test procedures evaluate the basic model in a manner so unrepresentative of its true energy consumption characteristics as to provide

materially inaccurate comparative data. 10 CFR 430.27(f)(2). A petitioner must include in its petition any alternate test procedures known to the petitioner to evaluate the basic model in a manner representative of its energy consumption characteristics. 10 CFR 430.27(b)(1)(iii). DOE may grant the waiver subject to conditions, including adherence to alternate test procedures. 10 CFR 430.27(f)(2).

As soon as practicable after the granting of any waiver, DOE will publish in the *Federal Register* a notice of proposed rulemaking to amend its regulations so as to eliminate any need for the continuation of such waiver. 10 CFR 430.27(l). As soon thereafter as practicable, DOE will publish in the *Federal Register* a final rule to that effect. *Id.*

The waiver process also provides that DOE may grant an interim waiver if it appears likely that the underlying petition for waiver will be granted and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination on the underlying petition for waiver. 10 CFR 430.27(e)(2). Within one year of issuance of an interim waiver, DOE will either: (i) publish in the *Federal Register* a determination on the petition for waiver; or (ii) publish in the *Federal Register* a new or amended test procedure that addresses the issues presented in the waiver. 10 CFR 430.27(h)(1).

When DOE amends the test procedure to address the issues presented in a waiver, the waiver will automatically terminate on the date on which use of that test procedure is required to demonstrate compliance. 10 CFR 430.27(h)(2).

## **II. Bradford White Corporation’s Petition for Waiver and Application for Interim Waiver**

On July 3, 2019, BWC filed a petition for waiver and a petition for interim waiver from the test procedure for consumer water heaters set forth at 10 CFR part 430, subpart B, appendix E.<sup>3</sup> The test procedure for water heaters includes a 24-hour Simulated Use Test (SUT) which consists of a series of hot water draws and standby periods during which the energy consumption of the water heater is measured. For storage-type water heaters, as the stored hot water loses heat through hot water draws and standby losses, the heat source (*e.g.*, the burner, heat pump, electric heating element) will turn on or “cut-in” to heat water within the tank as needed to maintain the setpoint temperature of the thermostat. Once the thermostat is satisfied, the heat source will turn off or “cut-out.” The time during which the heat source is on is referred to as a “recovery period” because the water heater is recovering the heat lost from the stored water. The first recovery period of the 24-hour SUT is used to calculate the “recovery efficiency” of the water heater, which impacts the overall measure of efficiency (*i.e.*, the uniform energy factor (UEF)). BWC stated that for gas and heat pump storage-type consumer water heaters for which the first cut-out of the 24-hour SUT occurs in the middle of one of the draws, the use of average water temperatures in the DOE test procedure calculation for recovery efficiency artificially inflates the calculated energy delivered from the system. BWC asserted that this yields an

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<sup>3</sup> The specific basic model for which the petition applies is the consumer water heater basic model RG2PV50S\*N. Although BWC initially included 50 consumer water heater basic models in its July 3, 2019 petition for waiver, BWC later limited the request to include only the RG2PV50S\*N basic model via email correspondence on July 30, 2019. This email correspondence is included in the docket at: <https://www.regulations.gov/docket?D=EERE-2019-BT-WAV-0020>.

artificially higher recovery efficiency and results in a lower overall UEF. In support of its waiver request, BWC submitted test data for an individual model based on the platform of the basic model for which BWC seeks a waiver.

BWC also requests an interim waiver from the existing DOE test procedure. DOE will grant an interim waiver if it appears likely that the petition for waiver will be granted and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination of the petition for waiver. *See* 10 CFR 430.27(e)(2).

Based on the assertions made in support of the petition, absent an interim waiver, DOE has initially determined that the DOE test procedure yields unrepresentative results for a consumer water heater that completes the first recovery in the middle of a draw. Specifically, calculating the energy delivered during the first recovery period by using the total mass and average water temperatures across multiple draws to determine the energy delivered yields a higher recovery efficiency for those units for which the first cut-out of the 24-hour SUT occurs during a hot water draw. This in turn would result in a lower overall UEF that is not representative of its true energy efficiency.

### **III. Requested Alternate Test Procedure**

EPCA requires that manufacturers use DOE test procedures when making representations about the energy consumption and energy consumption costs of covered products. (42 U.S.C. 6293(c)) Consistency is important when making representations about the energy efficiency of products, including when demonstrating compliance with applicable DOE energy conservation standards. Pursuant to its regulations at 10 CFR 430.27, and after consideration of public

comments on the petition, DOE may establish in a subsequent Decision and Order an alternate test procedure for the basic model addressed by the interim waiver.

BWC seeks to use an alternate test procedure to test and rate one consumer water heater basic model. Specifically, BWC seeks to test the affected consumer water heater basic model according to the DOE test procedure at 10 CFR part 430, subpart B, appendix E, except that the recovery efficiency equation in section 6.3.2 would be replaced with an alternate equation as shown below. Instead of calculating the recovery efficiency using the total mass of hot water drawn and average water temperature rise across all draws that occur until the end of the first recovery period as is done in the DOE test procedure, the requested alternate recovery efficiency equation computes the energy delivered during the first recovery using the mass of hot water drawn and water temperature rise for each draw individually and sums them. As submitted by BWC, the alternative test procedure would replace the equation in section 6.3.2 of Appendix E with the following equation for determining recovery efficiency,  $\eta_r$ :

$$\eta_r = \sum_{i=1}^{N_r} \frac{m_i * C_{pi} * (\bar{T}_{del,i} - \bar{T}_{in,i})}{Q_r} + \frac{V_{st} \rho_2 C_{p2} (\bar{T}_{max,1} - \bar{T}_0)}{Q_r}$$

Where:

$N_r$  = number of draws that the first recovery period occurred during.

First Recovery Period: is defined by when the main burner of a storage water heater is lit and raising the temperature of the stored water until cut-out; in the case the cut-out\* occurs during a subsequent draw, the first recovery period is to include the time until the draw of water from the tank stops.

$m_i$  = Mass of draw i.

$C_{pi}$  = Average Specific heat of draw  $i$ .

\*If after the first cut-out occurs during a subsequent draw, a subsequent cut-in occurs prior to the draw completion, the first recovery period is to include the time until the subsequent cut-out occurs, prior to another draw.

Based on the Federal test procedure DOE understands the remaining variables in the equation submitted by BWC to be as follows:

$\bar{T}_{del,i}$  = average water outlet temperature measured during  $i$ th draw of the first recovery period, °F ( °C).

$\bar{T}_{in,i}$  = average water inlet temperature measured during the  $i$ th draw of the first recovery period, °F ( °C).

$V_{st}$  = as defined in section 6.3.1.

$\rho_2$  = density of stored hot water evaluated at  $(\bar{T}_{max,1} + \bar{T}_o)/2$ , lb/gal (kg/L).

$C_{p2}$  = specific heat of stored hot water evaluated at  $(\bar{T}_{max,1} + \bar{T}_o)/2$ , Btu/(lb· °F) (kJ/(kg· °C)).

$\bar{T}_{max,1}$  = maximum mean tank temperature recorded after cut-out following the first recovery of the 24-hour simulated use test, °F ( °C).

$\bar{T}_o$  = maximum mean tank temperature recorded prior to the first draw of the 24-hour simulated-use test, °F ( °C).

$Q_r$  = Energy consumption of water heater from the beginning of the test to the end of the first recovery period.

#### **IV. Grant of an Interim Waiver**

DOE has reviewed BWC's application for an interim waiver, the alternate test procedure requested by BWC, and confidential test data submitted by BWC, as well as test data from prior

DOE testing of consumer water heaters. For the specified consumer water heater basic model, BWC's suggested calculation for recovery efficiency, which uses a summation of measurements for each individual draw rather than average values to determine the energy in the delivered hot water during the first recovery period, results in a more accurate calculation of recovery efficiency when the first cut-out occurs during a draw, and avoids artificial inflating of the recovery efficiency (resulting in a lower UEF value) that occurs under the calculation in DOE's current test procedure.

BWC's petition for waiver suggests that this issue may not occur for every individual model within a basic model designation. DOE has modified the suggested alternate test procedure to specify that the alternate calculation applies only if during testing the first cut-out of the 24-hour SUT occurs during a hot water draw.

Based on DOE's review of the alternate test procedure suggested by BWC, as modified by DOE, it appears to allow for the accurate measurement of efficiency of the specified basic model, while alleviating the testing problems associated with BWC's implementation of water heating testing for this basic model. Consequently, DOE has determined that BWC's petition for waiver will likely be granted. Furthermore, DOE has determined that it is desirable for public policy reasons to grant BWC immediate relief pending a determination of the petition for waiver.

For the reasons stated, DOE has granted an interim waiver to BWC for the specified consumer water heater basic model in BWC's petition. Therefore, DOE has issued an **Order** stating:

(1) BWC must test and rate the following consumer water heater basic model with the alternate test procedure set forth in paragraph (2).

Brand	Basic Model
BRADFORD WHITE, JETGLAS	RG2PV50S*N

(2) The alternate test procedure for the BWC basic model referenced in paragraph (1) of this Order is the test procedure for consumer water heaters prescribed by DOE at 10 CFR part 430, subpart B, appendix E, except for equation 6.3.2, as detailed below. All other requirements of appendix E and DOE’s regulations remain applicable. The changes to section 6.3.2 of Appendix E read as follows:

6.3.2 *Recovery Efficiency.*

6.3.2.1 Except as provided in section 6.3.2.2 of this Appendix, the recovery efficiency for gas storage-type water heaters,  $\eta_r$ , is computed as:

$$\eta_r = \left( \frac{M_1 * C_{p1} * (\bar{T}_{del,1} - \bar{T}_{in,1})}{Q_r} + \frac{V_{st} * \rho_2 * C_{p2} (\bar{T}_{max,1} - \bar{T}_0)}{Q_r} \right)$$

Where:

$M_1$  = total mass removed from the start of the 24-hour simulated-use test to the end of the first recovery period, lb (kg), or, if the volume of water is being measured,

$$M_1 = V_1 \rho_1$$

Where:

$V_1$  = total volume removed from the start of the 24-hour simulated-use test to the end of the first recovery period, gal (L).

$\rho_1$  = density of the water at the water temperature measured at the point where the flow volume is measured, lb/gal (kg/L).

$Cp_1$  = specific heat of the withdrawn water evaluated at  $(\bar{T}_{del,1} + \bar{T}_{in,1})/2$ , Btu/(lb· °F) (kJ/(kg· °C))

$\bar{T}_{del,1}$  = average water outlet temperature measured during the draws from the start of the 24-hour simulated-use test to the end of the first recovery period, °F ( °C).

$\bar{T}_{in,1}$  = average water inlet temperature measured during the draws from the start of the 24-hour simulated-use test to the end of the first recovery period, °F ( °C).

$V_{st}$  = as defined in section 6.3.1.

$\rho_2$  = density of stored hot water evaluated at  $(\bar{T}_{max,1} + \bar{T}_o)/2$ , lb/gal (kg/L).

$Cp_2$  = specific heat of stored hot water evaluated at  $(\bar{T}_{max,1} + \bar{T}_o)/2$ , Btu/(lb· °F) (kJ/(kg· °C)).

$\bar{T}_{max,1}$  = maximum mean tank temperature recorded after cut-out following the first recovery of the 24-hour simulated use test, °F ( °C).

$\bar{T}_o$  = maximum mean tank temperature recorded prior to the first draw of the 24-hour simulated-use test, °F ( °C).

$Q_r$  = the total energy used by the water heater between cut-out prior to the first draw and cut-out following the first recovery period, including auxiliary energy such as pilot lights, pumps, fans, etc., Btu (kJ). (Electrical auxiliary energy shall be converted to thermal energy using the following conversion: 1 kWh = 3412 Btu.)

6.3.2.2 For gas storage-type water heaters, if the first cut-out occurs during a draw, the recovery efficiency,  $\eta_r$ , is computed as:

$$\eta_r = \sum_{i=1}^{N_r} \frac{m_i * C_{pi} * (\bar{T}_{del,i} - \bar{T}_{in,i})}{Q_r} + \frac{V_{st}\rho_2 C_{p2}(\bar{T}_{max,1} - \bar{T}_0)}{Q_r}$$

Where:

$N_r$  = number of draws occurring during the first recovery period. The first recovery period is defined by the time when the main burner of a storage water heater is lit (“cut-in”) and continues during the temperature rise of the stored water until the main burner cuts-off (“cut-out”); if the cut-out occurs during a subsequent draw, the first recovery period includes the time until the draw of water from the tank stops. If, after the first cut-out occurs but during a subsequent draw, a subsequent cut-in occurs prior to the draw completion, the first recovery period includes the time until the subsequent cut-out occurs, prior to another draw.

$m_i$  = mass of draw  $i$ .

$C_{pi}$  = average specific heat of draw  $i$ .

$\bar{T}_{del,i}$  = average water outlet temperature measured during  $i$ th draw of the first recovery period, °F ( °C).

$\bar{T}_{in,i}$  = average water inlet temperature measured during the  $i$ th draw of the first recovery period, °F ( °C).

$V_{st}$  = as defined in section 6.3.1.

$\rho_2$  = density of stored hot water evaluated at  $(\bar{T}_{max,1} + \bar{T}_0)/2$ , lb/gal (kg/L).

$C_{p2}$  = specific heat of stored hot water evaluated at  $(\bar{T}_{max,1} + \bar{T}_0)/2$ , Btu/(lb· °F) (kJ/(kg· °C)).

$\bar{T}_{max,1}$  = maximum mean tank temperature recorded after cut-out following the first recovery of the 24-hour simulated use test, °F ( °C).

$\bar{T}_0$  = maximum mean tank temperature recorded prior to the first draw of the 24-hour simulated-use test, °F ( °C).

$Q_r$  = energy consumption of water heater from the beginning of the test to the end of the first recovery period.

(3) *Representations.* BWC must make representations about the efficiency of the basic model listed in paragraph (1) for compliance, marketing, or other purposes only to the extent that the basic model has been tested in accordance with the provisions in this alternate test procedure and such representations fairly disclose the results of such testing.

(4) This interim waiver shall remain in effect according to the provisions of 10 CFR 430.27.

(5) This interim waiver is issued to BWC on the condition that information and test data provided by BWC are valid. DOE may rescind or modify this waiver at any time if it determines the factual basis underlying the petition for waiver is incorrect, or the results from the alternate test procedure are unrepresentative of a basic model's true energy consumption characteristics.

10 CFR 430.27(k)(1). Likewise, BWC may request that DOE rescind or modify the interim waiver if BWC discovers an error in the information provided to DOE as part of its petition, determines that the interim waiver is no longer needed, or for other appropriate reasons. 10 CFR 430.27(k)(2).

(6) BWC remains obligated to fulfill any certification requirements set forth at 10 CFR part 429.

DOE makes decisions on waivers and interim waivers for only those basic models specifically set out in the petition, not future models that may be manufactured by the petitioner. BWC may submit a new or amended petition for waiver and application for an interim waiver, as appropriate, for additional basic models of consumer water heaters. Alternatively, if appropriate, BWC may request that DOE extend the scope of a waiver or an interim waiver to include

additional basic models employing the same technology as the basic model(s) set forth in the original petition consistent with 10 CFR 430.27(g).

## V. Request for Comments

DOE is publishing BWC's petition for waiver in its entirety as originally submitted, pursuant to 10 CFR 430.27(b)(1)(iv), absent any confidential business information.<sup>4</sup> The petition includes a suggested alternate test procedure, as specified in section III of this document, to determine the efficiency of BWC's specified consumer water heater, which DOE modified slightly in the grant of an interim waiver as discussed in section IV of this document. DOE may consider including the alternate procedure specified in the Interim Waiver Order in a subsequent Decision and Order.

DOE invites all interested parties to submit in writing by [**INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER***], comments and information on all aspects of the petition, including the alternate test procedure. Pursuant to 10 CFR 430.27(d), any person submitting written comments to DOE must also send a copy of such comments to the petitioner. The contact information for the petitioner is Eric Truskoski, *etruskoski@bradfordwhite.com*, 725 Talamore Dr., Ambler, PA 19002.

Submitting comments via <http://www.regulations.gov>. The <http://www.regulations.gov> webpage will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact

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<sup>4</sup> DOE is publishing the July 3, 2019 petition for waiver as initially submitted by BWC, including the list of basic models in Attachment 1 that BWC included in its petition for waiver. In subsequent email correspondence on July 30, 2019, BWC limited the petition to include only the RG2PV50S\*N basic model. This email correspondence is included in the docket at: <https://www.regulations.gov/docket?D=EERE-2019-BT-WAV-0020>.

information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment cannot be processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to <http://www.regulations.gov> information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (“CBI”)). Comments submitted through <http://www.regulations.gov> cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through <http://www.regulations.gov> before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that <http://www.regulations.gov> provides after you have successfully uploaded your comment.

Submitting comments via email, hand delivery/courier, or postal mail. Comments and documents submitted via email, hand delivery/courier, or postal mail also will be posted to <http://www.regulations.gov>. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information on a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. If you submit via postal mail or hand delivery/courier, please provide all items on a CD, if feasible, in which case it is not necessary to submit printed copies. No telefacsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, written in English, and free of any defects or viruses. Documents should not contain special characters or any form of encryption, and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery/courier two well-marked copies: one copy of the document marked “confidential” including all the information believed to be confidential, and one copy of the document marked “non-confidential” with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Factors of interest to DOE when evaluating requests to treat submitted information as confidential include: (1) a description of the items; (2) whether and why such items are customarily treated as confidential within the industry; (3) whether the information is generally known by or available from other sources; (4) whether the information has previously been made available to others without obligation concerning its confidentiality; (5) an explanation of the competitive injury to the submitting person which would result from public disclosure; (6) when such information might lose its confidential character due to the passage of time, and (7) why disclosure of the information would be contrary to the public interest.

It is DOE’s policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

Signed in Washington, DC, on September 23, 2019.

**Alexander N. Fitzsimmons,**

*Acting Deputy Assistant Secretary*  
*for Energy Efficiency,*  
*Energy Efficiency and Renewable Energy.*

July 3, 2019

U.S. Department of Energy  
Building Technologies Program,  
MS EE-2J Test Procedure Waivers  
1000 Independence Ave, SW  
Washington, DC 20585-0121

Re: Waiver for Test Procedure for Residential Water Heaters

To Whom It May Concern:

Pursuant to the provisions of 10 C.F.R. § 430.27(m), Bradford White Corporation (BWC) is hereby applying for a waiver of the test procedure for calculating the recovery efficiency of residential gas and heat pump storage-type water heaters with a rated storage volume greater than or equal to two gallons, 10 C.F.R. §430, Subpart B, Appendix E, Section 6.3.2. The calculation of the recovery efficiency is used as part of the 24-hour Simulated Use Test (SUT) used to calculate the efficiency, in terms of Uniform Energy Factor (UEF), for residential water heaters.

**Basic Models for this Waiver Petition**

The basic models that BWC is respectfully requesting a waiver, including in the interim are listed in Attachment 1. This is for both the “BRADFORD WHITE” and “JETGLAS” brand names.

**Basis for Requested Waiver**

When the first cut-out during the SUT occurs in the middle of one of the draws, the averaging of these temperatures artificially inflates the calculated energy delivered from the system, which yields an artificially higher calculated recovery efficiency. With an artificially higher recovery efficiency, the resulting UEF is lower. This means that a manufacturer that has a product, as an unintended result of its design, that completes its recovery in the middle of a draw would be disadvantaged versus a competitor that has a similarly designed product but completes its first cut-out between draws, which will result in less units sold.

The manner in which a product initiates a recovery and completes its recovery is dependent on a multitude of factors including but not limited to: storage volume; input; diptube length; diptube design; tank construction/geometry; thermostat placement; and thermostat differential. It is difficult to ascertain which one or more of these design characteristics would result in the

product completing its recovery while a draw is occurring. Regardless, the resulting manner that a product recovers from a water draw should not penalize one product over another.

#### **List of Manufacturers**

The list of manufacturers of all other basic models of residential gas, oil, and heat pump storage- type water heaters with a rated storage volume greater than or equal to two gallons marketed in the United States known to BWC is included as Attachment 2.

#### **Proposed Alternative Test Procedure**

BWC has reviewed the alternate equation, included as Attachment 3, for calculating recovery efficiency of residential gas, oil, and heat pump storage-type water heaters with a rated storage volume greater than or equal to two gallons with the Air-Conditioning, Heating, & Refrigeration Institute (AHRI), and other interested parties, and believes it provides a more accurate calculation of recovery efficiency. The proposed equation accounts for a recovery that could end in the middle of any draw or in between draws.

Furthermore, ASHRAE Standard Project Committee 118.2 has reviewed this equation and included it in the most recent draft of their standard, Method of Testing for Rating Residential Water Heaters. This draft will shortly be sent out for public review and comment. We respectfully request DOE grant a waiver to use this alternative equation in lieu of the procedure specified in the current DOE efficiency test procedure.

#### **Interim Waiver Request**

Bradford White Corporation also petitions for an interim waiver to allow us to use the equation shown in Attachment 3 to calculate the recovery efficiency of the identified basic models. We believe it is in both our interest and DOE's interest to have an interim test procedure, which provides a more accurate calculation of the recovery efficiency of the identified basic models.

If BWC is not granted an interim waiver, BWC will continue to be put at a competitive advantage where the resulting UEF will be lower (for the reasons highlighted above) than a similarly designed competitive model, which will result in less units sold.

Respectfully submitted,

Bradford White Corporation

/s/Eric Truskoski

Eric Truskoski

Director of Government and Regulatory Affairs

Attachments:

1. List of basic models manufactured by Bradford White Corporation.
2. List of manufacturers of residential gas and heat pump storage-type water heaters with a rated storage volume greater than or equal to two gallons
3. Alternative recovery efficiency calculation

[ORIGINAL LIST SUBMITTED BY BRADFORD WHITE CORPORATION]

Attachment 1 - List of basic models manufactured by Bradford White Corporation

Brand Names	Model Number
"BRADFORD WHITE" and "JETGLAS"	RC2PV50H*N
"BRADFORD WHITE" and "JETGLAS"	RE2H50S*_*****
"BRADFORD WHITE" and "JETGLAS"	RE2H80T*_*****
"BRADFORD WHITE" and "JETGLAS"	RG130T*N
"BRADFORD WHITE" and "JETGLAS"	RG140T*N
"BRADFORD WHITE" and "JETGLAS"	RG150T*N
"BRADFORD WHITE" and "JETGLAS"	RG1D30T*N
"BRADFORD WHITE" and "JETGLAS"	RG1D40S*N
"BRADFORD WHITE" and "JETGLAS"	RG1D40T*N
"BRADFORD WHITE" and "JETGLAS"	RG1D50T*N
"BRADFORD WHITE" and "JETGLAS"	RG1PV40S*N
"BRADFORD WHITE" and "JETGLAS"	RG1PV50S*N
"BRADFORD WHITE" and "JETGLAS"	RG1PV55H*N
"BRADFORD WHITE" and "JETGLAS"	RG2100H*N
"BRADFORD WHITE" and "JETGLAS"	RG230S*N
"BRADFORD WHITE" and "JETGLAS"	RG230T*N
"BRADFORD WHITE" and "JETGLAS"	RG240S*N
"BRADFORD WHITE" and "JETGLAS"	RG240T*N
"BRADFORD WHITE" and "JETGLAS"	RG250H*N
"BRADFORD WHITE" and "JETGLAS"	RG250L*N
"BRADFORD WHITE" and "JETGLAS"	RG250S*N
"BRADFORD WHITE" and "JETGLAS"	RG250T*N
"BRADFORD WHITE" and "JETGLAS"	RG255H*N
"BRADFORD WHITE" and "JETGLAS"	RG275H*N
"BRADFORD WHITE" and "JETGLAS"	RG2D40S*N
"BRADFORD WHITE" and "JETGLAS"	RG2D50S*N
"BRADFORD WHITE" and "JETGLAS"	RG2DV40S*N-***
"BRADFORD WHITE" and "JETGLAS"	RG2DV50H*N-***
"BRADFORD WHITE" and "JETGLAS"	RG2DV50S*N-***
"BRADFORD WHITE" and "JETGLAS"	RG2DVMH30T*N
"BRADFORD WHITE" and "JETGLAS"	RG2DVMH40T*N
"BRADFORD WHITE" and "JETGLAS"	RG2F40S*N
"BRADFORD WHITE" and "JETGLAS"	RG2F50S*N
"BRADFORD WHITE" and "JETGLAS"	RG2MH30T*N
"BRADFORD WHITE" and "JETGLAS"	RG2MH40T*N
"BRADFORD WHITE" and "JETGLAS"	RG2PDV40S*N
"BRADFORD WHITE" and "JETGLAS"	RG2PDV50H*N
"BRADFORD WHITE" and "JETGLAS"	RG2PDV50S*N
"BRADFORD WHITE" and "JETGLAS"	RG2PDV75H*N

"BRADFORD WHITE" and "JETGLAS"	RG2PV40S*N
"BRADFORD WHITE" and "JETGLAS"	RG2PV40T*N
"BRADFORD WHITE" and "JETGLAS"	RG2PV50H*N
"BRADFORD WHITE" and "JETGLAS"	RG2PV50S*N
"BRADFORD WHITE" and "JETGLAS"	RG2PV50T*N
"BRADFORD WHITE" and "JETGLAS"	RG2PV75H*N
"BRADFORD WHITE" and "JETGLAS"	URG250H*N
"BRADFORD WHITE" and "JETGLAS"	URG2DV50H*N-***
"BRADFORD WHITE" and "JETGLAS"	URG2DV50S*N-***
"BRADFORD WHITE" and "JETGLAS"	URG2PDV50H*N
"BRADFORD WHITE" and "JETGLAS"	URG2PV50H*N

Attachment 2 – List of manufacturers of residential gas, oil, and heat pump storage-type water heaters with a rated storage volume greater than or equal to two gallons

Company:

- A. O. Smith Corporation
- Rheem Sales Company, Inc.
- Bock Water Heaters, Inc.
- GIANT Factories, Inc.
- Bradford White Corp.
- HTP Comfort Solutions LLC
- Rinnai America Corporation
- Vesta DS, Inc.
- Vaughn Thermal Corporation
- GD Midea Heating & Ventilating Equipment Co., Ltd.

### Attachment 3 – Alternative Recovery Efficiency Equation

How the current calculation is written:

$$\eta_r = \left( \frac{M_1 * C_{p1} * (\bar{T}_{del,1} - \bar{T}_{in,1})}{Q_r} + \frac{V_{st} * \rho_2 * C_{p2} (\bar{T}_{max,1} - \bar{T}_0)}{Q_r} \right)$$

Where this calculation falls short is when our first cut-out occurs into or through subsequent draws. The definition of  $T_{del,1}$  and  $T_{in,1}$  are currently defined as the “average water temperature measured during the Draws from the start of the 24 hour simulated-use test to the end of the first recovery period, °F, (°C).”

Our Proposal:

We would like to propose the calculation below to avoid inflating the energy delivered that the averaging causes

$$\eta_r = \sum_{i=1}^{N_r} \frac{m_i * C_{pi} * (\bar{T}_{del,i} - \bar{T}_{in,i})}{Q_r} + \frac{V_{st} \rho_2 C_{p2} (\bar{T}_{max,1} - \bar{T}_0)}{Q_r}$$

$N_r$  = number of draws that the first recovery period occurred during.

**First Recovery Period:** is defined by when the main burner of a storage water heater is lit and raising the temperature of the stored water until cut-out; in the case the cut-out\* occurs during a subsequent draw, the first recovery period is to include the time until the draw of water from the tank stops.

$m_i$  = Mass of draw i.

$C_{pi}$  = Average Specific heat of draw i.

$Q_r$  = Energy consumption of water heater from the beginning of the test to the end of the first recovery period

For example, if  $N_r = 2$

$$\eta_r = \left( \frac{mass_1 * C_{p1} * (\bar{T}_{del,1} - \bar{T}_{in,1})}{Q_r} + \frac{mass_2 * C_{p2} * (\bar{T}_{del,2} - \bar{T}_{in,2})}{Q_r} + \frac{V_{st} * \rho_2 * C_{p2} (\bar{T}_{max,1} - \bar{T}_0)}{Q_r} \right)$$

\*If after the first cut-out occurs during a subsequent draw, a subsequent cut-in occurs prior to the draw completion, the first recovery period is to include the time until the subsequent cut-out occurs, prior to another draw.

[FR Doc. 2019-21935 Filed: 10/7/2019 8:45 am; Publication Date: 10/8/2019]