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The following is a draft U.S. Department of Energy (DOE or the Department) guidance document related to the test procedure for consumer water heaters. This draft guidance document represents the Department's interpretation of its existing regulations and is exempt from the notice and comment requirements of the Administrative Procedure Act. See 5 U.S.C. § 553(b)(A). Nonetheless, the Department is accepting comments and suggestions from the public until **November 28, 2015**. Comments and suggestions should be provided in WordPerfect, Microsoft Word, PDF, or text file format by sending an email to WaterHeaterGuidance2015GUID0018@ee.doe.gov. Please also include the docket number EERE-2015-BT-GUID-0018. At the end of the comment period, this draft guidance document may be adopted, revised, or withdrawn.

Q: How should the water supply line be set up when testing a consumer storage-type water heater?

A: The current test procedure for consumer water heaters is specified at [10 CFR 430.23\(e\)](#) and [10 CFR Part 430, Subpart B, Appendix E](#). This test procedure was recently updated in July 2015 and specifies testing conditions and a method of test for determining the first-hour rating and uniform energy factor (UEF) of consumer storage-type water heaters ("UEF test procedure"). DOE's previous test method, which specified a test method for determining the first-hour rating and the energy factor (EF) of consumer storage-type water heaters, can be found in the [2014 version of the CFR at 10 CFR Part 430, Subpart B, Appendix E](#) ("EF test procedure"). This guidance applies to testing conducted under both test methods. All section numbers refer to the respective version of Part 430, Subpart B, Appendix E.

Section 2.3 of Appendix E of both the UEF and EF test procedures requires that the temperature of the water being supplied to the water heater be maintained at 58 °F ± 2 °F (14.4 °C ± 1.1 °C) throughout the test. Section 4.2 of Appendix E of both test procedures instructs the entity conducting testing to connect the water heater to a water supply capable of delivering water at conditions as specified in section 2.3 (i.e., at 58 °F ± 2 °F). Section 6.4.6 of the UEF test procedure and section 4.3 of the EF test procedure include seven figures showing the piping configurations for different types of water heaters, and section 4.3 of both test procedures requires the inlet and outlet piping connections to be configured in a manner consistent with the applicable figure. Among other requirements, each figure specifies the location of the inlet temperature sensor and requires that the test setup include a pressure gauge, expansion tank, check valve, and water supply installed in a location upstream of the inlet temperature

sensor (although the exact locations are not specified and are left to the discretion of the entity doing testing).

During a test, the first measurement of the inlet water temperature occurs at 15 seconds after draw initiation for the first-hour rating test (as stated in section 5.3.3.3 in the UEF test procedure and 5.1.4.3 in the EF test procedure), at 5 seconds after draw initiation for the simulated-use test in the UEF test procedure (as stated in section 5.4.2), and at 15 seconds after draw initiation for the simulated-use test in the EF test procedure (as stated in section 5.1.5). At the time of the first reading, the inlet water temperature should be at $58\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$, as required by section 2.3 of both the UEF and EF test procedures. During normal operation of a consumer storage-type water heater, it is possible that water heated by the water heater can expand into the supply water line and expansion tank due to the thermal expansion of the water within the tank as it is heated. If there is heated water in the supply line and a draw is initiated, then the water temperature at the inlet temperature sensor could be higher than $58\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$ at the time of the first specified measurement. As a result, in order to achieve the required inlet temperature the entity conducting testing may need to alter slightly the test setup shown in the figures in section 6.4.6 (UEF test procedure) or 4.3 (EF test procedure) to sufficiently reduce the temperature of the water in the supply line so that the test condition of $58\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$ is met. The inlet test condition of $58\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$ must be met in order for the test to be valid; any heated water (greater than $58\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$) that may have expanded into the water supply line and/or expansion tank may not be used.

This guidance document clarifies that the test setup specified in the applicable figure in section 6.4.6 (UEF test procedure) or section 4.3 (EF test procedure) does not need to be matched exactly, but rather as stated in section 4.3 of both test procedures, the setup should be configured in a manner “consistent with” the applicable figure. The requirements in section 4.3 and the figures in section 6.4.6 (UEF test procedure) and section 4.3 (EF test procedure) are sufficiently flexible to allow the test facility discretion to adjust various elements of the test setup, such as the location of components for which a location is not specified (e.g., expansion tank), or by adding components not shown in the figures, as needed to ensure that the supply water conditions contained in section 2.3 and 4.2 are met during the test.