

Appliance Standards Awareness Project
Northwest Energy Efficiency Alliance

January 8, 2025

Ms. Julia Hegarty
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-5B
1000 Independence Avenue SW, Washington, DC 20585

RE: Docket Number EERE-2024-BT-DET-0012: Notice of Tentative Determination on Test Procedures for Commercial Warm Air Furnaces

Dear Ms. Hegarty:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP) and the Northwest Energy Efficiency Alliance (NEEA) on the notice of tentative determination (NOTD) for test procedures for commercial warm air furnaces (CWAFFs). 89 Fed. Reg 104859 (December 26, 2024). We appreciate the opportunity to provide input to the Department.

We agree with DOE's tentative determination that the industry test procedure for CWAFFs is not reasonably designed to measure energy efficiency during a representative average use cycle. The industry test procedure for CWAFFs referenced in ASHRAE Standard 90.1-2022¹ measures thermal efficiency (TE), which captures flue losses during steady-state operation at the maximum firing rate. However, DOE has demonstrated that a representative average use cycle should also include impacts from jacket losses and operation at a reduced firing rate (i.e. part-load operation). In the NOTD, DOE explains that a CWAFF just meeting the DOE standard for gas-fired equipment, with a TE of 81%, could have a measured efficiency ranging from 77.5-82% according to DOE's modified test procedure.² This range in efficiency corresponds to a significant difference in energy consumption. Furthermore, as outlined below, the amended test procedure in the June 2023 final rule is more representative of field conditions. Therefore, the industry test procedure is likely resulting in an inaccurate ranking of equipment in the market in terms of energy use and operating cost. In addition, purchasers of this equipment do not currently have representative ratings to make informed equipment selections, and manufacturers are not able to appropriately differentiate their better performing equipment.

¹ For gas-fired CWAFFs, CSA/ANSI Z21.47-2021, Gas-fired central furnaces; for oil-fired CWAFFs, Underwriters Laboratories (UL) 727-2018, "Standard for Safety Oil-Fired Central Furnaces."

² In a June 2023 final rule, DOE established the thermal efficiency two (TE2) metric, which incorporates the impacts of jacket losses and part-load operation. Testing to the updated test procedure in Appendix B would not be required until the compliance date of any amended energy conservation standards based on TE2. The final rule also updated Appendix A to reference the industry test procedures referenced in ASHRAE 90.1-2022.

- *Jacket losses.* The more heat that is lost through the cabinet, the less efficient a CWF is at providing useful heat to the conditioned space. A typical CWF installation is outdoors (as part of a rooftop unit), where there can be large differences between the internal cabinet temperature and ambient air temperature; these significant energy losses are not captured in the industry test procedure. DOE notes the precedent that the test procedure for consumer furnaces accounts for jacket losses.³
- *Part-load operation.* As DOE notes, the majority of CWFs have two or more heating stages. Furthermore, modeling conducted by NEEA found that CWFs spend between about 30% and 75% of the time operating in a firing mode in low-fire mode.⁴ The modified DOE test procedure incorporates operating hours at the part-load condition, while the industry test procedure fails to capture that CWFs spend a significant amount of time operating in low-fire mode. Furthermore, the reduced firing rate may increase or decrease the efficiency of a given unit⁵, and therefore, it is important to capture the part-load operation in the test procedure.

Thank you for considering these comments.



Rachel Margolis
Senior Technical Advocacy Associate
Appliance Standards Awareness Project



Nicole Dunbar, PE
Codes & Standards Engineer
Northwest Energy Efficiency Alliance

3

<https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-430/subpart-B/appendix-Appendix%20N%20to%20Subpart%20B%20of%20Part%20430> ; The jacket loss factor non-zero for isolated combustion system installations and outdoor installations.

⁴ 88 Fed. Reg. 36226 (June 2, 2023).

⁵

https://www.energy.gov/sites/default/files/2024-12/cwaf-tp-notd.pdf?utm_medium=email&utm_source=govdelivery. p. 20.