

Appliance Standards Awareness Project
National Consumer Law Center
New York State Energy Research and Development Authority

June 4, 2024

Mr. Lucas Adin
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-2J
1000 Independence Avenue SW, Washington, DC 20585

RE: Docket Number EERE-2022-BT-TP-0028: Notice of Proposed Rulemaking on Test Procedures for Central Air Conditioners and Heat Pumps

Dear Mr. Adin:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), the National Consumer Law Center, on behalf of its low-income clients (NCLC), and the New York State Energy Research and Development Authority (NYSERDA) on the notice of proposed rulemaking for test procedures for central air conditioners (CACs) and heat pumps. 89 Fed. Reg 24206 (April 5, 2024). We appreciate the opportunity to provide input to the Department.

We encourage DOE to finalize this rulemaking as soon as possible. DOE has proposed updates to the existing Appendix M1 (“M1”) as well as the establishment of a new Appendix M2 (“M2”). The proposed updates to M1, which improve representativeness but should not impact measured efficiency, include the incorporation of issues raised in existing test procedure waivers and the addition of product-specific enforcement provisions (i.e., cut-in and cut-out temperature validation for heat pumps, and a variable capacity controls verification procedure [CVP]). We encourage DOE to promptly issue the test procedure final rule so that the updates to M1 can subsequently take effect (180 days after the publication of the rule in the Federal Register).

We encourage DOE to allow manufacturers to make optional representations based on the new efficiency metrics in M2 before M2 is required to be used. M2 introduces new efficiency metrics, SCORE (seasonal cooling and off-cycle rated efficiency) and SHORE (seasonal heating and off-cycle rated efficiency) metrics. We think that there is value in manufacturers being able to make optional representations of performance based on the new SCORE and SHORE metrics before the compliance date of any potential amended standards. In part, such optional representations could provide a dataset that may assist the Department in determining an appropriate crosswalk of the current efficiency metrics (SEER2/HSPF2) to the new metrics (SCORE/SHORE) in support of a future standards rulemaking.

We support setting tolerances on the capacity and EER2/COP2 as determined by the CVP, and encourage DOE to continue to evaluate the appropriate values for these tolerances. In Section § 429.134(4)(iii)(B)-(D) of the proposed regulatory language, DOE defines the capacity and EER2/COP2 tolerances for the minimum and full load intervals of the CVP. If one or more of the capacity/EER2/COP2

values are out-of-tolerance, DOE would re-run the tests (if the controls permit), or recalculate the efficiency metrics by interpolation. These tolerances will help ensure that the fixed settings during the regulatory tests are reasonably representative of operation under native controls. However, we encourage DOE to continue to evaluate the specific tolerances and whether they could be tightened to achieve improved representativeness.

We encourage DOE to reevaluate the adjustment to the measured power for certification tests with no CVP interval. In Section § 429.134(4)(v)(B), DOE proposes to adjust power measurements by multiplying by “the ratio of the efficiency measured during the CVP test interval divided by the efficiency measured during the certification test (for the corresponding CVP interval).” It is not clear to us that it is appropriate to apply a ratio of EER2 (or COP2), because it presumes the ratio of capacities is 1. However, the ratio of capacities may not be equal to 1 because the capacities measured at the Afull, H3full, and H4full CVP intervals are permitted to vary within 6% of the regulatory capacity. For instance, if the measured capacity for the Afull CVP interval is 6% less than the regulatory capacity, this ratio would be 0.94. We encourage DOE to instead consider adjusting the power by multiplying by the ratio of powers, for instance, $P_{B,Full} = P_{B,Full,certification} * (P_{CVP,A,full} / P_{CVP,A,full,certification})$.

We encourage DOE to include all central heat pumps in the scope of the enforcement verification of cut-in and cut-out temperatures. Section § 429.134(3)(i)-(ii) of the proposed regulatory text states that “cut-out and cut-in temperatures may be verified” for central heat pumps. However, given the discussion in the NOPR, we are unsure if DOE’s intention is to limit such verification to cold climate heat pumps. In the NOPR, DOE explicitly names cold climate heat pumps as the subject of the proposed enforcement provisions to verify the cut-in and cut-out temperatures.¹ We understand the importance of these values for cold climate heat pumps, as they appear in the proposed definition (“compressor cut-out and cut-in temperatures are specified to be less than 5 °F”). However, we also understand that the cut-out (t_{off}) and cut-in (t_{in}) temperatures will be used to calculate the resistance heating component of the seasonal heating metric for all heat pumps. Therefore, we think that it is important to allow the verification of specified cut-in and cut-out temperatures for all central heat pumps.

DOE also mentions that the Department would consider a potential requirement for certification of cut-out and cut-in temperatures in a separate rulemaking. We think that the reporting and certification of the compressor cut-out and cut-in temperatures will both help promote adherence to the (optional) cold climate definition as claimed by manufacturers and help DOE determine the appropriateness of the calculation of the seasonal heating metric. We therefore strongly support adopting a requirement for manufacturers to report and certify cut-in and cut-out temperatures for all heat pumps as part of a separate rulemaking.^{2,3}

¹“DOE is proposing that for assessment and enforcement testing of CHP models, the cut-out and cut-in temperatures may be verified using the method in appendix J and that if this method is conducted, the cut-in and cut-out temperatures determined using this method will be used to calculate the relevant heating metric for purposes of compliance.” 89 Fed. Reg. 24243.

² There are several instances in the NOPR where DOE refers to the appendix regarding the cut-out and cut-in temperatures as Appendix K. However, we believe the Department intended to refer to Appendix J (Determination of Cut in and Cut out temperatures – Normative).

³ DOE explains that the Department is “proposing to require appendix K of the AHRI 210/240–202X Draft to support enforcement associated with testing conducted in accordance with appendix M1, and to require appendix K of the AHRI 1600–202X Draft to support enforcement associated with testing conducted in accordance with appendix M2. However, in § 439(1.1) (p) this appendix (appropriately referred to as Appendix J) is listed as “inapplicable.” 89 Fed. Reg. 24226 and 24264.

We support the proposed provisions for outdoor units with no match (OUWNM). In the NOPR, DOE proposes to clarify that any outdoor unit designed for use with any banned refrigerant under EPA regulations as of January 1, 2026 would be deemed an outdoor unit with no match. We agree with DOE that this clarifying definition will help ensure representative ratings and that the proposed definition is consistent with DOE’s intent in the June 2016 final rule.

We encourage DOE to adopt provisions for the re-rating and re-certifying of equipment similar to those for VRFs. In Section§ 429.134(4)(iv) of the proposed regulatory text, DOE describes “valid” regulatory test mode settings. That is, if the tolerances for capacity and EER2/COP2 are met, then “the certified override instructions for the compressor and indoor fan, as specified by the manufacturer, shall be deemed valid, and the efficiency metrics...shall be determined based on these certification tests with no adjustments determined based on the CVP results.” However, Section§ 429.134(4)(v)(A) and (B) state that for any CVP test for which the capacity or EER2/COP2 tolerances are not met, the certification tests must be conducted again using the compressor speed determined in the corresponding CVP test (if the controls permit) or the certification test results must be adjusted based on the results of the CVP. The recalculated efficiency metrics are then used to determine compliance with the standards.

We are concerned about the scenario in which a recalculated efficiency metric is compliant, but lower than the value certified to DOE. In this case, while the model would be compliant with the standards, its efficiency rating may be misleading to consumers and the estimated average energy cost reported on FTC labeling will be incorrect. Therefore, we encourage DOE to consider including a re-rate and re-certify provision, similar to that for VRFs. In the 2022 Final Rule for VRFs, DOE specifies that “if a manufacturer has knowledge that any of its certified operational settings for critical parameters to be controlled during IEER tests...are invalid according to the results of a controls verification procedure...then the manufacturer must re-rate and re-certify using valid operational settings for critical parameters for all affected basic models.”⁴ We encourage DOE to adopt similar language, specifying that a re-rate and re-certify is required if at least one of the CVP tests is out of tolerance.

We encourage DOE to consider further improvements in the next update to the test procedure. While we believe that the proposed test procedure updates will significantly improve representativeness, future updates could build on these to further ensure that ratings are representative of field performance. Specifically, we encourage DOE to consider the following additional improvements:

- Adopting load-based testing provisions as an integral part of the regulatory tests. While we agree that it is likely not appropriate to adopt a load-based testing approach for the regulatory tests in the current test procedure update, we encourage DOE to continue to consider such an approach. As DOE notes, there is currently limited information on the repeatability and reproducibility of load-based testing; however, we understand that such test data is forthcoming.⁵ A clear limitation of the proposed CVP is that, as an enforcement provision, manufacturers will not be required to conduct the CVP in determining ratings. Adopting some form of load-based testing for the regulatory tests would help ensure that all certified ratings are more representative of field performance.

⁴ <https://www.govinfo.gov/content/pkg/FR-2022-10-20/pdf/2022-22511.pdf> 87 Fed. Reg. 63894.

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<https://neea.org/product-council-documents/heat-pump-rating-representativeness-project-update-nea-product-council>

- Better capturing defrost control strategies. We acknowledge the improvements made to the treatment of defrost in M2 compared to M1.⁶ However, the proposal assigns differing credits in a “good,” “better,” “best” framework, with true differentiation between controls still not captured. We encourage DOE to collect information about defrost mechanisms and continue to consider how defrost impacts may be better represented, including the use of resistance heat during defrost.
- Better capturing resistance auxiliary heat operation. The bin calculation method presumes that the heat pump operates to provide as much capacity as possible, with resistance heat added to meet the remaining load. However, system control logic will ultimately determine the relative operation of the heat sources, which may not fit with this presumption. Since the addition of more resistance heat than necessary results in lower efficiency in the field, we think that it will be important to more carefully consider this aspect of the test procedure.⁷

Thank you for considering these comments.

Sincerely,



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National Consumer Law Center
(On behalf of its low-income clients)



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⁶The proposed test procedure includes two debits for defrost heat and overrun beyond the termination of a defrost and maintains the demand defrost credit of 3%.

⁷This could be accomplished in many ways, including an approach similar to the debit/credit approach proposed for defrost, which adjusts the calculated SHORE.