Appliance Standards Awareness Project
American Council for an Energy-Efficient Economy
National Consumer Law Center, on behalf of its low-income clients
Natural Resources Defense Council
Northwest Energy Efficiency Alliance

January 5, 2024

Dr. Carl Shapiro
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–2019–BT–STD–0043/RIN 1904–AE61: Notice of Proposed Rulemaking for Energy Conservation Standards for Dehumidifiers

Dear Dr. Shapiro:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), National Consumer Law Center, on behalf of its low-income clients (NCLC), Natural Resources Defense Council (NRDC), and Northwest Energy Efficiency Alliance (NEEA) on the notice of proposed rulemaking (NOPR) for energy conservation standards for dehumidifiers. 88 Fed. Reg. 76510 (November 6, 2023). We appreciate the opportunity to provide input to the Department.

DOE has proposed strong efficiency standards for dehumidifiers, which would provide energy savings of 0.3 quads and net present value savings of up to $2.6 billion over 30 years of sales.[1] However, we believe that greater cost-effective savings may be possible. For portable dehumidifiers, we encourage DOE to evaluate and consider adopting levels equivalent to the proposed standards plus the addition of the highest-efficiency single-speed compressors. Additionally, for at least the smaller portable dehumidifier product classes (PCs 1 and 2), DOE's analysis should consider the highest-efficiency compressors available on the market rather than limiting improved compressor efficiency to that observed in the teardown sample. The Department should also investigate whether higher-efficiency compressors that are used in large portable units can be employed in similar-sized whole-home units to further increase efficiency. Finally, DOE should consider investigating whether an equation-based approach for smaller portable dehumidifiers would be appropriate.

We encourage DOE to evaluate and consider adopting levels equivalent to the proposed standards plus the addition of design options that could lead to greater cost-effective savings. In the NOPR, DOE evaluated several technology options for dehumidifiers, including increased compressor efficiency and improved fan motor efficiency with ECM blower motors. As shown in Figure 1,[2] some efficiency levels incorporated multiple technology options, and the max-tech efficiency level for each product class included the most-efficient single-speed compressor that was observed in DOE's teardown sample for

[1] 88 Fed. Reg. 76512.
[2] https://www.regulations.gov/document/EERE-2019-BT-STD-0043-0029. Slide 18.

that class. While we appreciate that DOE included a new intermediate efficiency level in its analysis in response to comments on the preliminary analysis, we believe that the optimization of these different design options could provide greater cost-effective savings. In particular, for portable dehumidifiers, DOE should consider the proposed standard level plus the addition of the highest-efficiency single-speed compressors, which we expect would have a relatively low incremental cost.

Figure 1. Technology options analyzed at each efficiency level for dehumidifiers

	Portable Dehumidifiers			Whole-home Dehumidifiers	
EL	PC 1 <= 25 pt/day	PC 2 25.01-50 pt/day	PC 3 > 50 pt/day	PC 4 <= 8 cu. ft.	PC 5 > 8 cu. ft.
1	Intermediate Compressor Efficiency Increase	Intermediate Compressor Efficiency Increase	Intermediate Compressor Efficiency Increase	ENERGY STAR Compressor Efficiency Increase + ECM Blower	Intermediate Compressor Efficiency Increase + Heat Exchanger Size
2	ENERGY STAR Compressor Efficiency Increase	ENERGY STAR Compressor Efficiency Increase	ENERGY STAR Compressor Efficiency Increase	Max Available† Compressor Efficiency Increase + ECM Blower + Heat Exchanger Size	ENERGY STAR/Max Available Compressor Efficiency Increase + Heat Exchanger Size
3	Max Available Compressor Efficiency Increase	Max Available Compressor Efficiency Increase	Max Available Compressor Efficiency Increase + ECM Blower	Max-Tech Max Compressor Efficiency + ECM Blower + Heat Exchanger Size	Intermediate Compressor Efficiency Increase + ECM Blower + Heat Exchanger Size
4	Intermediate Compressor Efficiency Increase + ECM Blower	Intermediate Compressor Efficiency Increase + ECM Blower	Max-Tech Max Compressor Efficiency + ECM Blower + Heat Exchanger Size		Max-Tech Max Compressor Efficiency + ECM Blower + Heat Exchanger Size
5	Max-Tech Max Compressor Efficiency + ECM Blower + Heat Exchanger Size	Max-Tech Max Compressor Efficiency + ECM Blower + Heat Exchanger Size			

† Maximum available efficiency level excluding products that implement patented technology.

DOE should consider the highest-efficiency compressors available on the market. In the preliminary analysis, the max-tech efficiency levels for all product classes corresponded to products with the highest-efficiency single-speed compressors on the market that are designed for operation with R-32. In comments on the preliminary analysis, one manufacturer expressed concern about the availability of high-efficiency compressors for low-volume product categories (e.g., whole-home units),[3] and in response, for the NOPR, DOE limited the improved compressor efficiency for each product class to the highest-efficiency compressor that was observed in the teardown sample for that class.[4] This resulted in lower max-tech integrated energy factors (IEFs) for all product classes in comparison to the preliminary analysis (e.g., for PC 2, which makes up more than two-thirds of the market, the max-tech level in the NOPR is 14% lower than the max-tech level in the preliminary analysis).[5] However, in both the 2016 Final Rule for dehumidifier standards and the 2023 Final Rule for room air conditioner standards, DOE considered the highest-efficiency compressors available on the market.[6] At a minimum, for high-volume product classes (i.e., PCs 1 and 2), where we would expect more widely available compressor options, DOE's analysis should consider the highest-efficiency compressors on the market that are designed for operation with R-32.

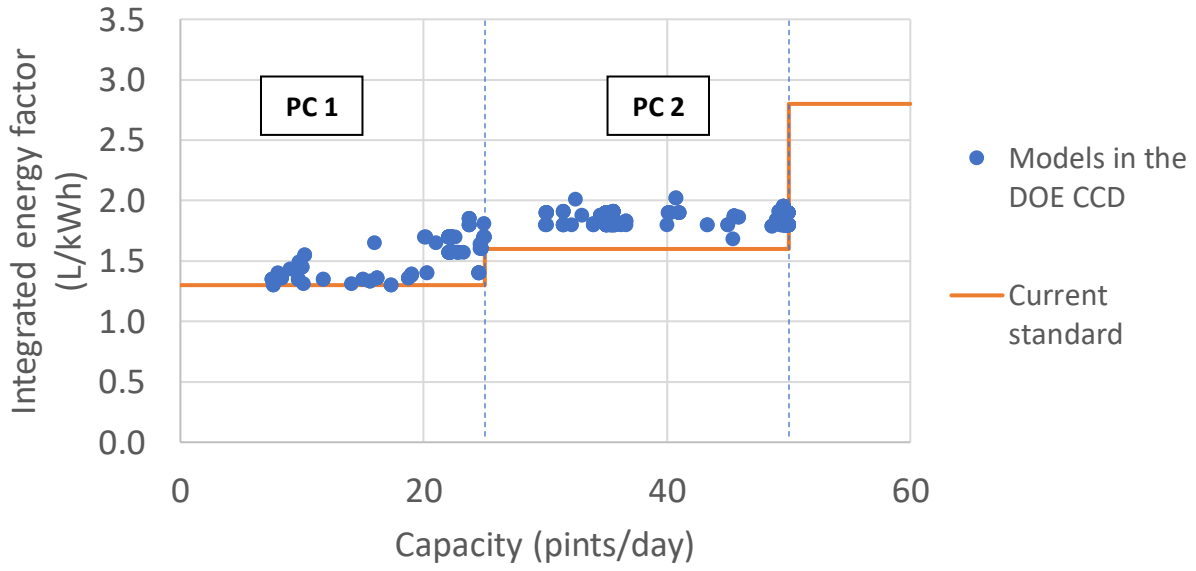
DOE should investigate whether there are technologies being employed in large portable units that could be employed in similar-sized whole-home units. We reviewed the DOE Certification Compliance

[3] https://www.regulations.gov/comment/EERE-2019-BT-STD-0043-0020.
[4] 88 Fed. Reg. 76526.
[5] DOE evaluated a max-tech IEF of 2.77 L/kWh in the preliminary analysis and 2.38 L/kWh in the NOPR analysis.
[6] 81 Fed. Reg. 38353. (June 13, 2016); 88 Fed. Reg. 34314 (May 26, 2023).

Database (CCD) and found that models in PCs 3 and 4 had similar capacities (i.e., greater than 50 pints/day and less than 105 pints/day). However, the IEFs evaluated for PC 3 were considerably higher than for PC 4. For example, the IEFs at max-tech for PCs 3 and 4 are 3.67 L/kWh and 2.39 L/kWh, respectively. Thus, we encourage DOE to investigate whether there are technologies being employed in PC 3 units that could also be used in PC 4 units. In the NOPR analysis, DOE modeled intermediate efficiency levels by increasing compressor efficiency based on teardown observations within each product class. However, only three whole-home units were torn down for the NOPR analysis, out of which only one unit was in PC 4;[7] we are concerned that this is not representative of the potential for higher-efficiency compressors to improve efficiency for whole-home dehumidifiers in PC 4. DOE should therefore consider evaluating higher-efficiency compressors that are available across product classes for these whole-home units.

DOE should investigate whether an equation-based approach would be appropriate for portable dehumidifiers with capacities up to 50 pints per day. Currently, all portable dehumidifiers within a given product class are subject to the same efficiency standard, regardless of capacity. This structure effectively creates a stepwise function with a sizeable jump in minimum efficiency when moving from one product class to another. We understand that the jump in efficiency from PC 2 to PC 3 may be due to the efficiency increases associated with air-to-air heat exchangers, which may not be incorporated in portable units up to 50 pints/day because they can adversely impact consumer utility.[8] However, Figure 2, which shows the efficiencies of available models in PCs 1 and 2 , suggests that a jump in efficiency between PC 1 and PC 2 may be unnecessary. We believe that combining Product Classes 1 and 2 and establishing an equation-based standard as a function of capacity may better reflect the relationship between capacity and efficiency. We encourage DOE to consider such an approach.

Figure 2. Efficiencies of portable dehumidifiers in PCs 1 and 2 in the DOE CCD[9]



[7] https://www.regulations.gov/document/EERE-2019-BT-STD-0043-0023. pp. 5-14,5-15.
[8] https://www.regulations.gov/document/EERE-2019-BT-STD-0043-0023. pp. 4-2,4-3.
[9] Models in the DOE CCD as of 12/14/23.

Thank you for considering these comments.

Sincerely,

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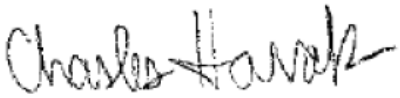

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