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February 28, 2020

Ms. Abigail Daken
Manager, ENERGY STAR HVAC Program
United States Environmental Protection Agency
Washington, DC 20460
(Sent via email to CAC-ASHP@energystar.gov)

Re: AHRI-HRAI Comments to ENERGY STAR® Central Air Conditioner and Heat Pump (CAC/HP) specification Draft 2 Version 6.0

Dear Ms. Daken,

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) (collectively, the "Joint Commenters") are submitting these comments in response to the United States Environmental Protection Agency (EPA) ENERGY STAR® Central Air Conditioner and Heat Pump (CAC/HP) specification Draft 2 Version 6.0, issued on January 23, 2020.

While the Joint Commenters appreciate EPA responding to industry concerns with the timing proposed in Draft 1, but due to the stringency of levels and numerous prescriptive measures required to meet Draft 2, industry can no longer support the ENERGY STAR® program for CAC/HP. Draft 2 will dramatically narrow qualifying products with stringent levels and prescriptive requirements so burdensome that only the top-of-the-line products would meet the specification. The Joint Commenters find that so few manufacturers will participate, the cost of products meeting the specification will be out of reach for most consumers, that the program will be rendered ineffective. Draft 2 implements all the features of the ENERGY STAR Most Efficient category which raises the bar for the base program and is out of sync with ENERGY STAR's Strategic Vision and Guiding Principles of the program.[1] The Most Efficient category identifies the most highly efficient products in the marketplace and is intended to "complement the base ENERGY STAR program, identifying for a set of early adopter consumers and energy efficiency program sponsors, the most energy efficient of the ENERGY STAR certified products."[2] The Guiding Principles acknowledge that, "it is typically possible to achieve the necessary balance among principles by selecting efficiency levels

[1] ENERGY STAR® Products Program Strategic Vision and Guiding Principles, May 2012, https://www.energystar.gov/ia/partners/prod_development/downloads/ENERGY_STAR_Strategic_Vision_and_Guiding_Principles.pdf?0a0a-3f14
[2] Ibid

reflective of the top 25 percent of models available on the market when the specification goes into effect." By EPA's own estimates, the 2018 estimated market penetration for combined CAC/HP is 34%, with CAC at 29% and HP at 43% penetration.[3] These data indicate that the current program is working, and it does not require a complete overhaul. AHRI data indicate the market penetration to be well below the EPA estimates for combined CAC/HP and CAC at the current level of 15 SEER but the Joint Commenters believe the current program strikes the appropriate balance of stringency and manufacturer burden to be successful.

Given the current success of a program predicated on meeting reasonable performance requirements that consumers can afford, the Joint Commenters suggest removing the prescriptive requirements, as outlined below, and adopting the recommended levels to continue a program grounded in the Guiding Principles, or sunset the program on December 31, 2022. The Joint Commenters estimate that no more than two percent of products offered today would meet the levels and prescriptive requirements presented in Draft 2. Conversely, adopting the levels proposed by the Joint Commenters, and connected criteria as optional will ensure a program that recognizes energy-saving products as intended by the ENERGY STAR program.

Effective Date

The Joint Commenters can support an effective date of January 1, 2023, provided that the specification will be reflective of the top 25 percent of models available on the market when the specification goes into effect and prescriptive requirements are removed. Below, the Joint Commenters will present a proposal which we believe meets these goals. Industry is also supportive of ENERGY STAR Canada adopting industry's proposal with a January 1, 2023 effective date; however, we acknowledge that Natural Resources Canada (NRCan) has not proposed harmonizing with the U.S. Department of Energy (DOE) on the Appendix M1 metrics. If Canada chooses to diverge from the U.S. on regulated metrics, the Canadian ENERGY STAR program for CAC/HP will also be in jeopardy. The burden of conflicting national energy efficiency standards will reduce industry participation in voluntary market-based programs.

While the Joint Commenters understand EPA's desire to bring complying products to market in advance of 2023, we are concerned that early compliance will introduce significant market confusion and certain aspects are not possible with the required Appendix M test procedure. In Appendix M, the only products that are permitted to conduct 5°F test for HSPF are triple-capacity northern HPs. During the negotiated rulemaking, AHRI requested that variable-speed heat pumps be permitted to optionally test at 5°F; however, DOE did not support this request and decided not to make the changes in this final rule.[4]

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[3] ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2018 Summary

[4] "Energy Conservation Program: Test Procedures for Central Air Conditioners and Heat Pumps (Final Rule)." Federal Register 82:101 (May 26, 2017) p. 1444. Available from:

EPA also acknowledges in Draft 2 that any product complying early would need to be retested to Appendix M1 to the 2.0 metrics and recertified prior the January 1, 2023, to remain in the program. This would be unduly burdensome. Given the narrow range of products that could comply early, the burden of recertification, and the possibility for market confusion, the Joint Commenters do not support this proposal and recommend EPA remove the option for early compliance.

Definitions

AHRI and HRAI support EPA's amended definitions to align with Appendix M1 and appreciate that the specification throughout has been amended to refer to central air conditioners and heat pumps (CAC/HP), rather than the previous term, air-source heat pump. We do suggest clarification of the definition of Connected CAC/HP System (CCS), specifically Figure 1, which shows items for a "communication link" through an open standard protocol. This diagram adds an unnecessary specification that is not included in the definition. Indeed, the definition of CCS does not restrict the connection to an outside service to be through an open protocol, which is correct. Several communicating thermostats connect to manufacturer cloud applications, not through an open protocol. These products certainly should meet the CCS definition. The Joint Commentators recommend revising Figure 1 to remove the open standard protocol requirement. Additionally, products implementing communication through CTA-2045A should be considered as a CCS for purposes of this specification.

Regional Identification

The Joint Commenters do not support proliferation of regional-specific performance requirements and strongly recommends that the EPA not proceed with regional requirements. Manufacturers discourage regional specifications because it makes harmonizing between ENERGY STAR and other energy efficiency specifications difficult and will reduce available compliant products and participation in the program.

The Joint Commenters are also staunchly against labeling for all the various combinations of products. Draft 2 contains conflicting proposals regarding labeling. In line 143 of page 5, Draft 2 cites, "There is no requirement that a physical label be installed on the unit itself;" however, earlier in the document, there is a discussion of a modified ENERGY STAR certification mark designating proposal for heat pumps meeting Cold Climate requirements with "ENERGY STAR Cold Climate."

The Joint Commenters are not supportive of physical labels, much less multiple physical labels. All product information should be communicated in product literature.

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http://www.ahrinet.org/App_Content/ahri/files/MEMBER-CONTENT/ADVOCACY/REGULATORY/01.05.17-Final_rule.pdf; Accessed: 2/14/2020

Cold Climate Recognition

AHRI and HRAI remain opposed to the proposal to differentiate cold climate performance as a percentage of heating capacity at 5°F. We also remain opposed to the hybrid test procedure created by requiring that the capacity of a given unit as measured under the conditions defined by Appendix M1 at 5°F, divided by the heating capacity as measured per Appendix M at 47°F, expressed as a percentage, that would be necessary for early compliance. While we appreciate the reduction of the percent heating capacity threshold from 80 to 70-percent, we remain opposed to the establishment of an arbitrary level to demonstrate low ambient performance and we question if it is appropriate to set the same level for early compliance. In future versions, or in the Most Efficient specification, EPA should be aware that a two-stage compressor typically runs at approximately 45 to 55-percent of the rated $H1_2$ capacity. In Appendix M1, $H1_2$ is optional for variable speed systems and will be conducted at the maximum compressor speed that the system controls for 17°F operation. For variable speed equipment the specification should be clarified as manufacturers currently publish the high speed rated capacity $H1_2$ and not the required $H1_N$ which is used to calculate the load line of the building. At this time, the Joint Commenters do not support cold climate recognition in v6.0.

The Joint Commenters are concerned about the impact of the introduction of the controls verification procedure (CVP) to confirm that the settings used/performance for the low ambient test point at 5° F are achieved by the native controls operating as they would in a customer's home without a procedure to follow. During the February 11th stakeholder meeting, DOE presented the concept of CVP, that is intended for validation purposes only, not for ratings. The CVP would allow for native controls testing to validate COP and heat capacity at 5°F. At the stakeholder meeting, DOE contractors asserted that commercial VRF products more complex than the residential products within the scope of this specification and a heating CVP will be less burdensome than the recently added appendix to AHRI Standard 1230. While residential products may generally be less complex than their commercial counterparts, without a procedure in hand, the Joint Commenters are unable to evaluate the impact of the burden. There are many questions as the CVP proposed is for heating only which is very different from the JIS 8616 procedure reviewed at ASRAC VRF WG. The procedure adopted into AHRI Standard 1230 is still being evaluated for tolerances and took many months to develop including tests conducted by manufactures to access. Industry is concerned that it may not be possible to adequately assess the impact of an unknown, unvetted procedure if EPA intends to finalize v6.0 by Q2 2020.

For example, during the development of this specification, in the limited draft proposal, EPA introduced concepts based on a test procedure being developed for demand response, AHRI Standard 1380, which EPA was a part of, yet there were corrections needed in revised specification, which was a month-long process. The Joint Commenters appreciate EPA offering to schedule a public meeting after the release of the procedure and look forward to participating. Ultimately, due to the general concern that this specification is overly prescriptive and the CVP is not available, the Joint Commenters recommend not pursuing a CVP in v6.0.

Moderate and Hot Climates

The Joint Commenters are also opposed to the proposal to differentiate moderate and hot climate performance as well as any accompanying labeling requirements.

Performance Criteria and levels

The Joint Commenters do not support the EPA's proposal for increased levels. Based on AHRI's review of 2018 and 2019 sales, approximately 5-percent of split system CACs would meet the proposed 17.0 SEER level. Even fewer single package CACs would meet the proposed level. When HSPF and EER levels are taken into account, the sales drop dramatically across all products. This is also before one considers the prescriptive features included in Draft 2.

To achieve the Guiding Principles, EPA should select efficiency levels reflective of the top 25 percent of models available on the market when the specification goes into effect. Based on AHRI's data review, the Joint Commenters recommend setting the following levels:

Split AC	
SEER (SEER2)	EER (EER2)
16.0 (15.2)	13.0 (12.0)

Package AC/HP		
SEER (EER2)	HSPF (HSPF2)	EER (EER2)
15.0 (14.3)	8.2 (7.0)	12.0 (11.0)

HP		
SEER (SEER2)	HSPF (HSFP2)	EER (EER2)
16.0 (15.2)	9.0 (7.8)	13.0 (12.0)

The Joint Commenters anticipate that fewer than 20 percent of the market will meet the above proposal as of January 1, 2023; however, there will still be robust manufacturer participation. We are still considering proposing different levels for ductless products.

Staged and Variable Capacity

The Joint Commenters are strongly opposed to EPA's proposal to require at least two stages of capacity for a unit to be recognized as ENERGY STAR. The ENERGY STAR base program should be based on performance criteria using federally required metrics. We do not support mixing design requirements and performance requirements.

EPA should not impose both performance standards and a prescriptive "design requirement" (the "Staged or Variable Capacity Requirement") on air-conditioning and heat pump equipment. Doing so is overly prescriptive, prevents manufacturers from meeting applicable performance standards in the most efficient way possible, and inhibits innovation. Moreover, it directly contradicts EPCA statutory provisions, which limit efficiency standards for a given product to a performance standard or a "design requirement."[5]

[5] 42 USC 6291(6)

Furthermore, EPCA enumerates specified products for which a design standard can be established and does *not* include central air conditioners.[6]

Even if Energy Star is voluntary, EPA should not now promulgate voluntary standards that are grossly inconsistent with the expressed will of Congress and the rulemaking of DOE (the agency with principal jurisdiction over applicable energy conservation standards). For central air conditioning systems, Congress has specified government should not seek to micro-manage equipment engineering, and EPA must not now attempt such micromanagement by mandating variable capacity requirements in addition to heightened performance standards.

Installation Capabilities

The base ENERGY STAR program should be based on performance aligned with Federal metrics and avoid prescriptive requirement. While these requirements may be acceptable for the ENERGY STAR Most Efficiency Program, they are not appropriate and will not advance energy savings. The extra sensors and controls required to meet these capabilities significantly increase product cost, making an ENERGY STAR product out of reach for mid- and low-income families. These requirements will also potentially eliminate the opportunity to list a loose coil match as the "brains" of the system likely resides with the AC or furnace. It is also unclear how EPA intends to validate compliance with these capabilities. The Joint Commenters acknowledge diagnostics is currently on the "most efficient" specification and recommend installation capabilities remain there. The Joint Commenters cannot support v6.0 with installation capabilities.

Connected Criteria

The Joint Commenters appreciate EPA's intent to align more closely with AHRI Standard 1380 on optional connected criteria for this product category. We have several suggestions to improve on this further. AHRI and HRAI are concerned with EPA's proposal for Energy Reporting. The Technical Committee (TC) responsible for drafting AHRI Standard 1380 considered including requirements for the product measure or estimate instantaneous power draw in current conditions via a communication link to energy management systems and other consumer authorized devices, services, or applications; however, the TC ultimately decided to remove it with the rationale that compressor operation includes periods of higher instantaneous power draw during normal functioning AHRI noted this concern during the February 11th stakeholder meeting and requested EPA remove this feature. Also, during the February 11th stakeholder meeting, EPA asked stakeholders to consider what sort of energy reporting might help drive consumer behavior to make real time energy saving choices and noted it might be useful for consumers to understand the consumption of energy use during cooling. Additionally, EPA pondered the time period of energy reporting that would be useful and consumer notification, specifically, how consumers would be notified, and would the

[6] See 42 USC 6291(6)(B) and DOE's finding at 71 FR 59,208 that establishing "both a performance standard and a design requirement is beyond the scope of the Department's legal authority" and that design requirements cannot be specified for categories of products such as central air-conditioning).

reported information still be relevant. While these are interesting questions, there is not sufficient data to justify including energy reporting in the specification. Perhaps these questions would be better addressed, after research, in the Most Efficiency Specification.

The Joint Commenters support AHRI 1380 as the pathway for grid connectivity and also supports maintaining connected criteria as optional.

The Joint Commenters suggest additional consideration be given to the Utility Peak Load Price Signal. As written, it is unclear if the logic needed to determine when to shed load based on pricing is completed within or outside of the HVAC equipment. Additional conversation on this topic would be appreciated to ensure that the products respond appropriately and perhaps for calculation to be developed for a consistent approach.

Test Method

The Joint Commenters support the test method reference update to refer to the 2023 Federal test method for CAC/HP units, 10 CFR part 430 Subpart B, Appendix M1. Appendix M test method is no longer needed if compliance prior to January 1, 2023, is removed as requested.

Energy Star Data Package

AHRI and HRAI question EPA's use of different product lifetimes in its analysis. On the third tab of the Energy Star Data Package, Savings Analysis, Table 4, EPA uses the lifetime of 24.9 years for CAC and 16.4 years for HP, referencing the DOE Technical Support Document (TSD).[7] However, EPA has selected product lifetimes from different regions, cherry-picking the best cases to support the desired economic outcome for v6.0: CAC using the lifetime from the hot-dry climate and HP using the lifetime for the Northern region. EPA should use the National Average for both CAC and HP.

Despite using the most favorable product lifetimes, EPA's analysis shows an incredibly long consumer payback for several product categories in the 4th tab, Table 6: Simple Payback. Split system CAC have a payback of 13.1 years, and the cold climate split system HP has an estimated simple payback of 16.2 years, only 0.2 years shorter than the product's best-case average lifetime. Indeed, using the cold climate lifetime for the analysis would lead to 43-percent of equipment being retired before the consumer would achieve payback for the purchase. In the three other regions the average lifetime for the product is no more than 15.3 years. We also note that there is no differentiation between ductless single-head and traditional ducted products, which could skew results and has the potential to eliminate traditional systems from the program. In future drafts, we recommend analyzing ductless and ducted products separately.

[7] U.S. Department of Energy, TECHNICAL SUPPORT DOCUMENT: ENERGY EFFICIENCY PROGRAM FOR CONSUMER PRODUCTS: Residential Central Air Conditioners and Heat Pumps. August, 2015.

Conclusion

The Joint Commenters recommend EPA make the significant revisions we have suggested to maintain an effective program that aligns with the program's Guiding Principles, or sunset the program on December 31, 2022.

We appreciate the opportunity to provide these comments and look forward to reviewing a third draft. If you have any questions regarding this submission, please do not hesitate to contact Laura Petrillo-Groh, lpetrillo-groh@ahrinet.org.

Sincerely,

Sandy MacLeod

HRAI
President and CEO

Laura Petrillo-Groh

AHRI
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