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Ms. Abigail Daken
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United States Environmental Protection Agency
Washington, DC 20460

Submitted via e-mail: LCHVAC@energystar.gov

Re: EPA ENERGY STAR Program Requirements, Product Specifications for Light Commercial HVAC – Draft Version 4.0

Lennox International Inc. (Lennox) hereby submits comments on the *United States Environmental Protection Agency ENERGY STAR Program Requirements, Product Specifications for Light Commercial HVAC – Draft Version 4.0* as published by the EPA on November 1, 2021.

Lennox is a leading provider of climate-control solutions for heating, air conditioning, and refrigeration markets. Lennox is a publicly traded company that has thousands of employees, and it manufactures equipment addressed by the EPA ENERGY STAR Light Commercial HVAC program criteria.

A. General Comments.

Lennox believes the EPA ENERGY STAR program can effectively promote increased energy efficiency for Commercial HVAC products. This can be accomplished by maintaining a program that is not burdensome to administer combined with *reasonable specifications for energy performance criteria that consider impacts to Commercial HVAC consumers, contractors, distributors, and manufacturers*. Further, *the ENERGY STAR program should be nationally based* and work to unify energy program approaches across jurisdictions to increase the success of efficiency programs.

The EPA should base the primary criteria for the ENERGY STAR Light Commercial HVAC (LC HVAC) program on the federally mandated energy efficiency metrics, be consistent across product similar types and agnostic of the technology employed. This will allow manufacturers to find the most innovative and cost-effective solutions for increased energy efficiency. The EPA should avoid additional prescriptive requirements which add cost and limit future innovation by driving manufacturers to meet a specification rather than finding the most effective solutions. This approach will promote products that perform above baseline efficiency levels and provide cost-effective energy savings to a broader base of consumers aligned with the ENERGY STAR Guiding Principles.

Although Lennox produces many highly efficient LC HVAC products and supports the EPA ENERGY STAR efforts to recognize and promote high efficiency products, Lennox does not support the Version 4.0 Draft specification as proposed.

The DOE minimum efficiency standards significantly increase on January 1, 2023. The implementation of these standards increases the minimum efficiency level approximately 15% over the current levels which were implemented in 2018. The ENERGY STAR LC HVAC 4.0 specification is proposing to set efficiency levels 15% to over 30% above the 2023 DOE minimum efficiency standards. This will effectively set the base ENERGY STAR specifications at ultra-high efficiency (most efficient) performance levels. Lennox finds this inconsistent with the ENERGY STAR Guiding Principles as these premium products will not be affordable for typical Commercial consumers and will significantly narrow the ENERGY STAR product availability.

Lennox strongly recommends that the EPA set reasonable energy performance specification aligned with its Guiding Principles to encourage manufacturer and market participation in programs that will encourage Commercial consumers to purchase products above the DOE minimum standard, saving additional energy. Lennox specific recommendations are outlined below and summarized in Table 1. This approach will promote products that perform above baseline efficiency levels and provide cost-effective energy savings to a broader base of consumers aligned with the ENERGY STAR Guiding Principles.

Lennox further recommends that any changes to the ENERGY STAR Light Commercial HVAC criteria be coordinated with the Consortium for Energy Efficiency (CEE). CEE is the leading consortium of efficiency program administrators across the United States and Canada. CEE members work to unify energy program approaches across jurisdictions to increase the success of efficiency programs. Lennox finds that having one set of specifications that can be promoted by all efficiency programs in the US and Canada makes it easier for contractors, distributors, and manufacturers to engage and hence allows for a larger impact on the market for enhanced energy efficient products.

B. Specific Issues regarding the Draft Version 4.0 Proposal

- 1. EPA proposes to reintroduce air-cooled, three-phase units with a cooling capacity below 65,000 Btu/h to the scope of this specification based on manufacturer feedback indicating that the market would be best served by an ENERGY STAR specification that offers certification to these products.*

Lennox supports the reintroduction of small products with capacity below 65,000 Btu/h. Reintroduction of these products coupled with effective market programs will help move Commercial consumers to higher efficiency equipment. In addition, it would bring cohesiveness to the Energy Star program by inclusion of a significant LC HVAC category. Lennox recommends setting the efficiency levels aligned with the Residential ENERGY STAR specification at 16 SEER – 12.0 EER. This level would also rationalize capacity tier recommendations as outlined in Table 1.

2. *EPA is revising the Light Commercial HVAC specification due to: 1) new federal minimum standards that will go into effect on January 1, 2023, for commercial air conditioners and heat pumps; and 2) broad availability of products meeting ENERGY STAR Light Commercial HVAC Version 3.1 criteria in the marketplace. To continue to recognize the most energy-efficient products available, EPA proposes updated requirements for Light Commercial CUACs and CUHPs as presented in Table 1 and Table 2, respectively.*

Lennox does not support the Version 4.0 Draft specification as proposed. The DOE minimum efficiency standards significantly increase in stringency in January 2023. The implementation of these standards increases the minimum efficiency level approximately 15% over the current levels which were implemented in 2018. The ENERGY STAR LC HVAC 4.0 specification is proposing to set efficiency levels 15% to over 30% above the 2023 DOE minimum efficiency standards. This will effectively set the base ENERGY STAR specifications at ultra-high efficiency (most efficient) levels. Lennox finds this inconsistent with the ENERGY STAR Guiding Principles as products will not be affordable for typical Commercial consumers and will significantly narrow the ENERGY STAR products available. In addition, the levels proposed are not rational as they increase in efficiency as the product capacity increases inconsistent with;

- DOE minimum standard levels which decrease as capacity increases.
- Fundamental Engineering principles as size constraints increase as capacity increases, limiting efficiency.

Lennox strongly recommends that the EPA set reasonable energy performance specification aligned with it Guiding Principles to encourage manufacturer and market participation in programs that will encourage Commercial consumers to purchase products above the DOE minimum standard, saving additional energy. Lennox specific recommendations are outlined below and summarized in Table 1.

Table 1 – Lennox Recommended Criteria for Certified Light Commercial Air Conditions and Heat Pumps				
Equipment Category	Rated Cooling Capacity	Sub-Category	Heating Type	Minimum Energy Efficiency Criteria
Small Commercial Split and Single Package Air Conditioners and Heat Pumps (Air-Cooled)	≤65,000 Btu/h	AC	Electric Resistance Heating or No Heating	12.0 EER; 16 SEER
			All Other Types of Heating	12.0 EER; 16 SEER
		HP	Electric Resistance Heating or No Heating	12.0 EER; 16.0 SEER; 8.2 HSPF
			All Other Types of Heating	12.0 EER; 16.0 SEER; 8.2 HSPF
Small Commercial Split and Single Package Air Conditioners and Heat Pumps (Air-Cooled)	≥ 65,000 Btu/h and ≤ 135,000 Btu/h	AC	Electric Resistance Heating or No Heating	12.2 EER; 15.7 IEER
			All Other Types of Heating	12.0 EER; 15.5 IEER
		HP	Electric Resistance Heating or No Heating	11.8 EER; 15.3 IEER; 3.5 COP ⁴⁷ ; 2.4 COP ¹⁷
			All Other Types of Heating	11.6 EER; 15.3 IEER; 3.5 COP ⁴⁷ ; 2.4 COP ¹⁷
Large Commercial Split and Single Package Air Conditioners and Heat Pumps (Air-Cooled)	≥ 135,000 Btu/h and ≤ 240,000 Btu/h	AC	Electric Resistance Heating or No Heating	12.2 EER; 15.0 IEER
			All Other Types of Heating	12.0 EER; 15.0 IEER
		HP	Electric Resistance Heating or No Heating	10.9 EER; 14.5 IEER; 3.4 COP ⁴⁷ ; 2.1 COP ¹⁷
			All Other Types of Heating	10.7 EER; 14.5 IEER; 3.4 COP ⁴⁷ ; 2.1 COP ¹⁷

Further, the ENERGY STAR program should focus its primary efficiency criteria for products with cooling capacity $\geq 65,000$ and $<240,000$ btu/h on the DOE mandated IEER and COP efficiency metrics. While EER is a consideration in many markets, the EER test point is already included in the IEER total calculation and is 2% of the total load nationally. The ENERGY STAR criteria should maintain reasonable EER levels that consider peak load but also allow for innovation to meet increasingly stringent IEER levels.

Given the significant increase in DOE minimum efficiency levels, the market efficiency range will be condensed considerably. Lennox foresees that incentive specifications from CEE will likely condense from a 3-Tier approach to a 2-Tier approach. As ENERGY STAR considers the LC HVAC specification it is critical that the EPA coordinate with CEE. Having one set of specifications that can be promoted by all efficiency programs in the US and Canada makes it easier for contractors, distributors, and manufacturers to engage and hence allows for a larger impact on the market for enhanced energy efficient products.

3. *The EER, SEER, and HSPF requirements proposed for Very Small products with cooling capacities below 65,000 btu/h are intended to be aligned with the respective CEE Tier 2 for each type of equipment.*

Lennox recommends setting the efficiency levels aligned with CEE Tier 2 and the Residential ENERGY STAR specification at 16 SEER – 12.0 EER. This level would also rationalize capacity tier recommendations outlined in Table 1.

4. *EPA recognizes that there is a growing market for Light Commercial HVAC products that perform well in colder climates and proposes a separate set of requirements tailored to recognize those units capable of doing so. The proposed criteria are presented in*

Table 4 above. Under this proposal, EPA would identify those models meeting Cold Climate requirements with a modified ENERGY STAR certification mark designating those units as “ENERGY STAR Cold Climate.”

Lennox understands the need to generally improve heat pump performance to broaden potential market applications, but Lennox does not support separate Cold Climate criteria as there is insufficient market volume to support. AHRI market data indicates the current market for Commercial Unitary Air Conditioning products with cooling capacity $\geq 65,000$ and $<240,000$ btu/h to be 89% air conditioners (gas/electric and electric/electric) and 11% heat pump. While the market penetration of heat pumps is increasing, there is not sufficient volume to justify separate climate specific products.

5. *In setting criteria for products with a cooling capacity $\geq 65,000$ and $<240,000$ btu/h, EPA had a choice to highlight those that stand out by maintaining capacity at lower temperatures (as indicated by 17°F rated capacity/ 47°F rated capacity) versus those with higher COP at 17°F. EPA believes capacity maintenance to be critical for two reasons: (1) if models cannot maintain enough operating capacity at lower temperatures, they are more likely to be supplemented by gas or less efficient resistive-electric heat; and (2) an undersized unit without backup may run constantly if unsupported at very low temperatures and may yet still be incapable of providing desired comfort levels. However, EPA has included an alternate proposal (see Appendix A: Alternate Proposal for ENERGY STAR Cold Climate) that instead focuses on COP, in the hopes that stakeholders could comment on both options at once.*

To promote expanded heat pump application, the ability to maintain capacity versus the building load is a much more important criteria compared to COP efficiency. The ability to maintain capacity at lower ambient temperature condition versus the full load heating capacity (47F) the reduces the need and use of supplemental heat sources. As compared to supplemental electric heat any COP greater than 1.0 provides efficiency benefits so the ability to maintain capacity versus the building load at currently typical COP levels is of significant benefit.

6. *EPA proposes the requirements outlined in Section 3.C for Gas/Electric Package Units to incentivize the use of multi-capacity heating technologies that are known to increase heating efficiency and to promote efficiency gains for a major component of these products that is otherwise not addressed by this specification.*

Lennox recommends that the EPA avoid prescriptive technology requirements and focus the LC HVAC on performance criteria. Lennox and most of the industry provide products with multi-capacity gas heat through staged or variable capacity. These products are driven by market needs but they do not increase the efficiency of the gas furnace as stated by EPA. Lennox recommends the LC HVAC specification be performance based and prescriptive multi-capacity requirements should be avoided by the EPA

The DOE 2023 81% AFUE minimum standard for Gas/Electric Package units is set at the maximum level that can be economically justified. Further increases in efficiency result in condensate in the heat exchanger which is corrosive and introduce significant reliability challenges particularly in outdoor applications.

7. *EPA proposes the additional requirement regarding refrigerant types as outlined in Section 3.D to align with refrigerant type reporting requirements recently added to other ENERGY STAR specifications.*

Refrigerant type for Commercial HVAC products is known for the specific products and regulated through separate EPA sector controls outside of the ENERGY STAR program. While refrigerant type is reported to AHRI for certain product categories, unless there is a specific use of refrigerant type for the ENERGY STAR program which was not stated, Lennox recommends not to expand reporting requirements as proposed.

In conclusion, Lennox recommends ENERGY STAR criteria should be performance based using DOE required metrics and performance criteria be nationally based and set at reasonable thresholds that average Commercial consumers can afford. Lennox supports inclusion of small LC HVAC products in the ENERGY STAR program. Further ENERGY STAR should coordinate levels with CEE to unify energy program approaches across jurisdictions to increase the success of efficiency programs. Lennox remains engaged to further the effort of the EPA regarding the ENERGY STAR program for LC HVAC products and is available for further discussion regarding.

Please feel free to contact us with any further questions.

Sincerely,



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