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December 13, 2021

Ms. Abigail Daken
Manager, Energy Star® HVAC Program
United States Environmental Protection Agency
Washington DC, 20460
(Sent via email to: lchvac@energystar.gov)

RE: Carrier Comments on Draft 1 Version of ENERGY STAR® Program Requirements Product Specification for Light Commercial HVAC

Dear Ms. Daken,

Carrier provides fire safety, security, building automation, heating, ventilation, air conditioning and refrigeration systems and services to promote integrated, high performance buildings that are safer, smarter, and more sustainable. Carrier is the founder of the modern HVAC industry and operates across the globe. Our range of products includes unitary residential and commercials products, including ducted and ductless, transport refrigeration products, chillers, and HVAC building services.

Inclusion of Three-Phase Product <65,000 btu/h
Carrier supports the inclusion of three-phase equipment <65,000 btu/h in the light commercial specification. Carrier suggests the test method referenced in Table 7 be updated. Three-phase equipment <65,000 btu/h cannot be tested using AHRI 210/240 – 2023 to determine SEER and HSPF metrics. These tests were removed in that version of the standard to align with Appendix M1. The proper standard for this equipment is AHRI 210/240 – 2017 with Addendum 1 which aligns with DOE Appendix M.

Minimum Efficiency Criteria
To ensure the Environmental Protection Agency (EPA) selects efficiency levels reflective of the top 25% of models available on the market, Carrier recommends several changes to the minimum efficiency criteria proposed in draft 1. In Table 1, the IEER of small CUAC is 19.9 (electric resistance/none) or 19.6 for all other heating section types. This is nearly 35% more efficient than the 2023 DOE

minimum efficiency standard. Likewise, the IEER of large CUAC is 18.5 (electric resistance/none) or 18.2 for all other heating section types, which represents a 30% increase in efficiency over the 2023 minimum standard. These increases will require the use of complex technology to achieve efficiency. This could reduce the number of available products on the market, lead to higher capital outlay, and reduced return on investment for customers. To avoid this potential outcome, Carrier recommends the IEER of small CUAC should be 18.0 (electric resistance/none) and 17.8 for all other heating section types. For large CUAC 17.0 (electric resistance/none) and 16.8 for all other types.

In table 2, the IEER for large CUHP is 17.3 (electric resistance/none) and 17.0 for all other heating section types. Comparatively, the IEER for small CUHP is 16.0 (electric resistance/none) and 15.7 IEER for all other types. Typically, the IEER of equipment decreases as the capacity of the equipment increases. Recognizing this general trend, DOE set the 2023 minimum IEER efficiency for large CUHP at 13.5 (electric resistance/none) and 13.3 IEER for all other types compared to 14.1 (electric resistance/none) and 13.9 IEER for all other types of small CUHP. Carrier recommends EPA set the IEER criteria for large CUHP using the same increase as small CUHP, which would be 15.3 (electric resistance/none) and 15.1 for all other types.

Lastly, the difference between the IEER and EER criteria of electric resistance (or no heating sections) compared to the IEER and EER of all other heating sections is 0.3 and 0.4 in table 1 and 2 for each equipment type. ASHRAE 90.1, DOE minimum efficiency criteria, and Californica Energy Commission's Title 24 all use a difference of 0.2. Carrier recommends EPA align with this common difference by lowering the IEER and EER of the equipment with electric resistance heating sections to within 0.2 of all other heating sections. This will avoid the need for product redesign, which otherwise could severely limit the amount of compliant product available on the market.

Cold Climate Heat Pump Criteria

In draft 1, EPA provided two alternative proposals: one that prioritized capability of equipment to maintain capacity at lower ambient temperatures and an alternative that prioritized the equipment's efficiency at lower ambient temperatures. EPA chose to prioritize capacity because they concluded that without adequate capacity the overall energy used can be higher due to operation of less efficient supplemental heat. Additionally, the comfort of occupants of the building could also be impacted negatively. Carrier agrees with EPA's conclusions and recommends the criteria in Table 4 is maintained without changes.

Additionally, draft 1 proposes the gas furnace section of gas/electric package units must have a minimum of three distinct stages or be variable speed to be certified for ENERGY STAR®. Carrier strongly urges EPA to reconsider this requirement. Having multiple stages does not increase the gas efficiency because combustion efficiency is adjusted to ensure proper operation. The purpose of this feature is to provide better comfort to building occupants. Additionally, there is little if any products on the market that meet this requirement, meaning ENERGY STAR® certified equipment will largely consist of all electric units. While this appears to be beneficial for meeting greenhouse gas reduction goals, Carrier fears the opposite will occur because a significant amount of electric supplemental heat will be needed to meet customer comfort expectations in cold climates. This type of supplemental heat is expensive for the consumer and a significant increase in peak demand for utilities, which often leads to increased greenhouse gases emissions from electricity production. For these reasons, Carrier recommends eliminating this requirement.

However, if EPA is convinced a requirement of this type is necessary to meet its objectives, Carrier suggests modifying to recognize the benefits of heat pumps with gas supplemental heat (dual fuel heat pump). Carrier believes these products play an important role in the transition to all electric systems in cold climates. EPA could modify this requirement to be that a gas/electric unit must have a minimum of three stages of heat; with heat pump operation being counted as one of the three stages. Carrier believes this could accelerate greenhouse gas reduction by increasing heat pump usage in cold climates. Because the unit would operate as a heat pump for much of the operating hours, it greatly reduces gas usage over a conventional system and avoids large increases in peak electricity demand when ambient temperatures would require electric resistance supplemental heat in a traditional heat pump.

Effective Date

While Carrier is concerned the limited time between the final criteria and a January 1, 2023 effective date will limit the amount of product on the market for a period, Carrier supports this effective date because it aligns with DOE.

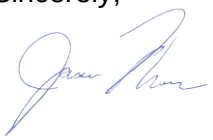
Section 6 – Considerations for Future Revisions

Generally, we are in support for all future considerations listed. Carrier requests EPA to work closely with manufacturers in these revisions. Specifically, automatic fault detection and diagnostics is a complicated requirement because of the technology required and, in some cases, unique customer systems. This is an area that EPA and manufacturers have common goals and should work closely together.

Closing

Thank you for consideration of this input. Again, Carrier supports the Energy Star® program and shares this input for the purposes of helping EPA maintain a strong program that incentivizes consumers to choose efficient products. If you have any questions regarding this submission, or wish to discuss further, please do not hesitate to contact me.

Sincerely,



Jason Thomas
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Carrier

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