Appliance Standards Awareness Project
American Council for an Energy-Efficient Economy
Natural Resources Defense Council

February 22, 2021

Dr. Stephanie Johnson
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-5B
1000 Independence Avenue SW
Washington, DC 20585

RE: Docket Number EERE–2019–BT–TP–0027/RIN 1904-AE80: Request for Information for Test Procedures for Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps

Dear Dr. Johnson:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), and Natural Resources Defense Council (NRDC) on the request for information (RFI) for test procedures for packaged terminal air conditioners (PTACs) and packaged terminal heat pumps (PTHPs). 85 Fed. Reg. 78967 (December 8, 2020). We appreciate the opportunity to provide input to the Department.

In summary, we encourage DOE to incorporate in the test procedure the additional energy use associated with PTACs and PTHPs that provide "makeup air" so that the test procedure is representative for these units. We also encourage DOE to shift to efficiency metrics that reflect annual energy consumption. As part of the consideration of new metrics, we encourage DOE to investigate a load-based test procedure, which would better represent how both single-speed and variable-speed units perform in the field. Finally, we encourage DOE to capture performance at lower ambient temperatures, including defrost performance, in the heating efficiency metric, which could ultimately lead to significant energy savings in cold climates.

We encourage DOE to incorporate the additional energy use associated with PTACs and PTHPs that provide makeup air. DOE notes in the RFI that over the past five years, several manufacturers have introduced PTAC and PTHP models that introduce dehumidified outdoor air to the conditioned space.[1] However, the current test procedure does not measure the additional energy use associated with this makeup air. We understand that demand for these makeup air units may be increasing. For example, GE Appliances states that their makeup air PTACs were "designed to help the hospitality industry meet demanding building code regulations,"[2] and Friedrich states that "by introducing makeup air directly into the guestroom, rooftop central fresh air systems can be considerably downsized," which "greatly reduces the cost and complexity of hotel design and construction."[3] We encourage DOE to incorporate

[1] 85 Fed. Reg. 78969.
[2] https://pressroom.geappliances.com/news/meet-the-new-zoneline-makeup-air-ptac.
[3] http://www.ucompinc.com/wp-content/themes/united/images/2018/02/Friedrich-2018-FreshAire-PTAC-Brochure-Rev.1.pdf.

the additional energy use associated with PTACs and PTHPs that provide makeup air so that the test procedure is representative for these units.

We encourage DOE to shift to efficiency metrics that reflect annual energy consumption, including any fan operation when the compressor is off. DOE notes in the RFI that over the past five years, several PTAC and PTHP models have been introduced to the market that incorporate variable-speed compressors.[4] However, the current test procedure measures only full-load efficiency, which means that the potential efficiency gains associated with variable-speed compressors are not being captured. The current test procedure is also failing to capture additional technology options that can improve part-load performance such as variable-speed fans and electronic expansion valves. More broadly, since PTACs and PTHPs rarely (if ever) operate at full load in the field, the current full-load efficiency ratings are not providing good information to consumers. In addition, the current test procedure does not capture any fan energy use when the compressor is off.

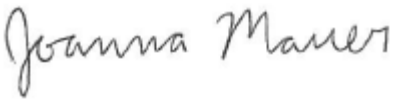
As part of the consideration of metrics that reflect annual energy consumption, we encourage DOE to investigate a load-based test procedure. Test procedures for other equipment types that capture part-load performance do so in a way that does not reflect actual operation in the field. For example, part-load testing for variable-speed residential central air conditioners and heat pumps involves fixing the compressor speeds, which does not capture the potentially significant impact of a unit's control strategy for adjusting the compressor speeds in response to varying conditions. Similarly, other test procedures that capture cycling losses do not reflect the actual cycling behavior of units under varying conditions. A load-based test for PTACs and PTHPs would provide a realistic representation of how all units perform in the field, including capturing the impact of cycling losses, the potential benefits of variable-speed operation, and the importance of control strategies.

We encourage DOE to capture performance at lower ambient temperatures, including defrost performance, in the heating efficiency metric. The current test procedure for PTHPs involves testing heating performance (COP) at an outdoor dry-bulb temperature of 47°F. The test procedure thus fails to capture heating performance at cold temperatures, including defrost performance. We understand that PTHPs typically include backup electric resistance heating, which is used when the heat pump cannot meet the heating load. By testing PTHPs only at 47°F, the test procedure does not differentiate the ability of equipment to maintain good heating capacity using the heat pump cycle at low ambient temperatures. For example, we understand that many PTHPs may be designed to shut off the heat pump cycle and switch to electric resistance heating at an outdoor temperature of around 40°F. Yet the efficiency impact of this design relative to a unit that continues to use the heat pump cycle at much lower ambient temperatures is not captured at all in the current test procedure. In addition, since the current test procedure does not capture defrost, it fails to differentiate the performance of different defrost strategies. Capturing performance at lower ambient temperatures, including defrost performance, would provide better information to consumers and could ultimately provide significant energy savings in cold climates.

Thank you for considering these comments.

Sincerely,

[4] 85 Fed. Reg. 78969.



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