

# ENERGY STAR® Test Method to Determine Room Air Conditioner Heating Mode Performance Final Draft Stakeholder Comment Response Matrix

Topic	Comment	EPA Response
Cut-In/Cut-Out Air Temperatures	<p>One stakeholder states that the EPA should require both the cut-in/cut-out outdoor air temperatures and the temperature of the air delivered by the unit at those temperatures to ensure that room heat pumps are providing adequate comfort to consumers at temperatures where they have represented performance.</p> <p>Two stakeholders recommend that the EPA should require reporting of the cut-in and cut-out temperatures.</p>	<p>The test method measures unit performance in terms of the amount of heating delivered to a room in Btu/h and the efficiency of the heating delivered to the consumer. The temperature of the air delivered to the indoor room is not relevant to the direct measurement of performance for the test method. Requiring a specific air temperature could be considered by the EPA in a future ENERGY STAR specification.</p> <p>The EPA will consider addressing reporting requirements related to the cut-in and cut-out temperatures in the ENERGY STAR specification, but certification of these temperatures is not applicable to the test procedure.</p>
Bin-Hour Weightings	<p>One stakeholder states that the bin-hour weightings used for the test procedure should reflect how cold climate room heat pumps will typically be used, which is distinct from the climates in which room heat pumps currently on the market are used. The current bin-hour weightings overrepresent operation between 17F and 47F.</p>	<p>The bin-hour weightings were developed from a national perspective in an effort to create a seasonal metric representative of average use. While new Type 3 and Type 4 room heat pumps might be more commonly used in colder climates, these units are too new to draw concrete conclusions about their typical use case at this time. The EPA and DOE will continue to monitor the development of the room heat pump market and will consider revisions to the bin-hour weightings in the future, as warranted.</p>
Certification	<p>One stakeholder states that the EPA should explicitly state in the test procedure that certified values may be based on testing of one or more units, and that manufacturers may rate units conservatively to account for test variance.</p>	<p>This test method provides instructions for measuring seasonal room heat pump capacity and efficiency at various temperatures. Instructions regarding certification requirements are the domain of individual specifications, such as the ENERGY STAR specification.</p>
Controls	<p>Two stakeholders indicate that the description of the RH_CVP is confusing and recommended the EPA revise or delete parts of this section.</p> <p>One of these stakeholders also indicates that the EPA should require manufacturers to certify that the temperature at which compressor operation stops cannot be altered by consumers. This would ensure that heat pumps are providing the efficient heat represented by the certified efficiency.</p>	<p>The EPA edited this section for clarity in the final test procedure.</p> <p>The EPA will consider addressing compressor operation in the ENERGY STAR specification, but certification of compressor operation is not applicable to the test procedure.</p>
Defrost Efficiency	<p>One stakeholder recommends that the EPA should review defrost-related seasonal heating efficiency adjustment factors from AHRI's Draft Standard 1600-202x for potential future inclusion in the test procedure.</p>	<p>The EPA will consider including defrost efficiency adjustment factors in future versions of the test procedure once AHRI finalizes the standard.</p>
Corrections	<p>Three stakeholders pointed out several editorial issues for EPA to fix in the final test procedure.</p>	<p>The EPA has corrected these errors.</p>
Electric Resistance Heat	<p>One stakeholder shares that the use of electric resistance heat to satisfy setpoint changes remains a concern and recommends it to be included in the test procedure as it is not captured during static testing and is not captured by the RH_CVP procedure.</p>	<p>The test method accounts for unnecessary use of electric resistance heat as much as possible. The seasonal metric accounts for resistance heat use at temperatures where the compressor is locked out, and the RH_CVP attempts to account for scenarios when the resistance heater would be used to meet the thermostat setpoint unnecessarily. Measuring any other resistance heat misuse would require a truly dynamic test that could simulate how a unit would react to changing conditions and setpoints in the field – such a test has not yet been shown to be repeatable and reproducible and so cannot be included in the test method.</p>
ENERGY STAR Specification	<p>One stakeholder urges the EPA to act quickly to set ENERGY STAR criteria for Room ACs with heating mode so that these units can become eligible for Home Electrification and Appliance Rebates (HEAR) as soon as possible.</p>	<p>The EPA is aware of the need to develop ENERGY STAR criteria for Room ACs with heating mode to allow eligibility for HEAR and plans to work with stakeholders to propose criteria.</p>
Heat Pump Classifications	<p>One stakeholder recommends that the EPA combine the Type 1 and Type 2 classifications for heat pumps, as the use of active or passive defrost is not important when distinguishing types of room heat pump. Products with active defrost should be able to operate down to 17F. The stakeholder states that the EPA's proposed Type 2 classification would create a product class that should not exist and would provide unnecessary product differentiation.</p>	<p>This test method does not constitute the EPA's endorsement of any particular product type. The test method must be able to create results for all types of room heat pumps that may be developed. Types 1 and 2 are delineated in the test method because units with and without active defrost necessitate different test methods, as the cut-in/cut-out test cannot be conducted on units without active defrost. Any opinion about whether a Type 2 room heat pump should have different requirements will be addressed in individual specifications, such as ENERGY STAR.</p>
Meltwater Management Energy Use	<p>One stakeholder states that the energy use of crankcase heaters, drain pan heaters, and other meltwater management methods should be measured by the test method. A simplified method that applies an efficiency penalty based on power draw measurements would help to better represent the energy used by meltwater management.</p>	<p>Deriving repeatable, reproduceable, and representative measurements of the power draw of crankcase heaters, drain pan heaters, and other (unspecified) meltwater management methods would require determining the conditions that trigger each of these components and then assessing the power draw of the unit compared to the power draw of the unit with those components disabled. While possible, such a measurement would add considerable complexity to the test procedure. There are significant unknowns regarding the prevalence of these components and how best to measure their power. This issue requires more study and data before it can be addressed in the test procedure.</p>

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Noise Level Test	One stakeholder recommends that the EPA include noise testing as part of any new ENERGY STAR criteria.	The EPA will consider addressing noise levels in the ENERGY STAR specification, but product criteria is not applicable to the test procedure.
Test Requirements	One stakeholder recommends requiring defrost testing for all variable speed heat pumps, as the current alternative calculation for units that do not conduct the optional defrost test is not sufficiently punitive to encourage the development of efficient defrost methods.	<p>The DOE/EPA's analysis of available variable-speed room heat pumps and variable-speed mini-splits found that the calculations from the draft final could result in lower HEERs for units that conduct the optional H<sub>2,int</sub> test than if those units had opted not to conduct the H<sub>2,int</sub> test. As the calculation using H<sub>2,int</sub> test data is more representative of typical RHP performance than the full/low speed approximation used to calculate HEER when the test is not conducted, the DOE/EPA are adopting a correction factor of 0.95 in the final HEER equation for units that do not conduct the optional H<sub>2,int</sub> test rather than requiring this defrost test for all Type 3 and Type 4 variable-speed units, which would increase their test burden. This factor corrects the approximation used to calculate performance for units that do not conduct the H<sub>2,int</sub> test and was chosen to ensure that the calculation approach represents a conservative approach for calculating HEER as compared to conducting the H<sub>2,int</sub> test for all units analyzed by the DOE/EPA. This may encourage more units to be tested and could contribute to the development of more efficient defrost methods.</p> <p>The EPA reached out to manufacturers developing room heat pumps to discuss this change and received generally supportive feedback for maintaining this defrost test as optional and addressing the HEER discrepancy by including a 0.95 correction factor in the Final Test Method.</p>