

**INTERPRETATION IC 90.1-2013-2 OF  
ANSI/ASHRAE/IES STANDARD 90.1-2013  
Energy Standard for Buildings Except Low-Rise Residential Buildings**

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**Reference:** This request for interpretation refers to the requirements presented in ANSI/ASHRAE/IES Standard 90.1-2013, Sections G3.1.2.1 and G3.1.2.10 and Tables 6.8.1-2 through 6.8.1-4, relating to baseline fan power used to determine minimum efficiency EER, SEER, COP, and HSPF.

**Background:** In Section G3.1.2.1 it states that “All HVAC equipment in the baseline building shall be modeled at the minimum efficiency levels, both part load and full load, in accordance with Section 6.4. Chillers shall use Path A efficiencies as shown in Table 6.8.1-3 where efficiency ratings include supply fan energy, the efficiency rating shall be adjusted to remove the supply fan energy. ... EER, SEER, COP, and HSPF shall be at AHRI test conditions. Fan energy shall be modeled separately according to Section G3.1.2.10.”

Table 6.8.1-1, 2 and 4 stipulate the minimum efficiencies (EER, SEER, COP and HSPF) of the baseline building packaged DX equipment; however they do not indicate the fan power used to determine the minimum efficiencies. The related AHRI standards stipulate the “Test Procedure” used to determine the equipment efficiencies. However, reviewing *Performance Rating for Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment ANSI/AHRI 340/360-2007* page 6 it states “Standard Ratings of units which do not have indoor air-circulating fans furnished as part of the model, i.e. split systems with indoor coil alone, shall be established by subtracting 1250 Btu/h per 1000 cfm [775 W/m<sup>3</sup>/s] from the total cooling capacity, and by adding the same amount to the heating capacity. Total power input for both the heating and cooling shall be increased by 365 W per 1000 scfm [226 W/m<sup>3</sup>/s] of indoor air circulated.” The 365 W per 1000 scfm value is repeated throughout *Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment ANSI/AHRI 210/240 -2008* as well for rating units without an indoor circulating fan. There is no other reference to the amount of fan power used in the efficiency calculations since it is dependent on the rest are dependent on the actual fan.

In Section G3.1.2.10 System Fan Power for Systems 3 through 8, and 11, 12, and 13 include a pressure credit (the A factor) based on the proposed design conditions. Therefore, if the baseline system fan power, including fan pressure credits, was used to determine the ANSI/AHRI minimum efficiency fan power and thus the cooling- or heating-only efficiency rating of the equipment, as the baseline fan power increased the cooling efficiency would also increase, creating a more stringent and variable baseline target that does not appear to reflect the intent of establishing baseline efficiencies based on ANSI/AHRI standards.

**Interpretation:** Since the fan power used to determine the baseline system minimum efficiency is not explicitly defined by ASHRAE/IES Standard 90.1-2013, the user should apply the ANSI/AHRI metric of 365 W per 1000 scfm to determine the fan energy that is included in efficiency ratings of packaged DX equipment that include supply fan energy. This ANSI/AHRI fan power shall be used to calculate baseline packaged equipment efficiency ratings to determine the modeled baseline EER, SEER, COP and HSPF for heating and cooling performance, exclusive of fan energy. The baseline ventilation/circulation fan power shall then be determined according to Section G3.1.2.10, including fan pressure credits.

**Question:** Is this interpretation correct?

**Answer:** No

**Comments:** The AHRI standards that are referenced by the Standard 90.1 include supply fan power in the calculation of the packaged EER value. Appendix G does not use split systems in the baseline building that do not have a supply fan included in the EER thus the 365W/1000scfm fan power does not apply to Appendix G. The equations in G3.1.2.1 remove this fan power from the packaged equipment efficiency rating based on industry standard. Section G3.1.2.10 must be used to calculate the fan power for the corresponding system in the baseline building.