INTERPRETATION IC 90.1-2022-5 OF
ANSI/ASHRAE/IES STANDARD 90.1-2022
Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings

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Request from: Armin Hauer, ebm-papst Inc., 110 Hyde Road, Farmington, CT 06032.

Reference: This request for interpretation refers to ANSI/ASHRAE/IES Standard 90.1-2022, Section 6.5.3.1.3, regarding AMCA Standard 208.

Background: Each operating point of a fan can be characterized with a flowrate, a fan static pressure and fan total pressure.

ASHRAE/IES Standard 90.1-2022 Section 6.5.3.1.3 requires that a fan shall be selected in such a way that its fan energy index at the highest design airflow of the air system meets a certain minimum. This standard specifies that the fan energy index shall be calculated per AMCA standard 208.

When a fan has both a fan static pressure and a fan total pressure rating, FEI can be calculated for each pressure basis. Refer to AMCA 208 Section 5.2.1.1 Equation 5.3 for total pressure versus Section 5.2.1.2 equation 5.4 for static pressure.

However, AMCA Standard 208 in normative Annex A permits just one FEI, dependent on the specific application of the fan:

> "For fans that are installed with an outlet duct, system pressures are typically calculated in terms of total pressure. Both the static and velocity pressures at the outlet of the fan contribute to overcome system losses. For these fans, the FEI calculation is based on the fan total pressure. However, for fans that are installed without outlet ducts (free outlet), the velocity pressure at the fan discharge is immediately dissipated, and only the fan static pressure can be used to overcome system losses. For these fans, the FEI calculation is based on the fan static pressure."

The statements in AMCA Standard 208 Annex A about total pressure versus static match the August 2015 ASHRAE Journal Article entitled "Selecting Fans for Minimum Energy Consumption" by M. Brendel, PhD., Member ASHRAE. The article clearly distinguishes applications of fans with outlets directly connected to ductwork versus fans that are connected to outlet plenums, miscellaneous other air system devices, or not connected at all.

Interpretation: The Fan Energy Index is to be applied according to AMCA 208, including using the appropriate pressure basis (total or static) for the application (fan ducted outlet or fan free outlet).

Question: Is this interpretation correct?

Answer: Yes