INTERPRETATION IC 90.1-2001-7 OF
ANSI/ASHRAE/IESNA STANDARD 90.1-2001
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/IESNA Standard 90.1-2001, Section 6.3.6.1, Exhaust Air Energy Recovery.

Background: Section 6.3.6.1 requires energy recovery with at least 50% effectiveness for supply fan systems over 5,000 cfm and 70% outside air. The energy recovery effectiveness is explicitly defined in terms of enthalpy differences. This apparently restricts such systems to enthalpy wheels. However, the ASHRAE 90.1-1999 User's Manual regarding this section (page 6-74) states, "For sensible heat exchangers, the designer may replace enthalpy with dry bulb temperature [in the equation] to calculate recovery effectiveness." This suggests the standard allows run-around coils and other sensible-only heat recovery technologies.

Question: Was the intent of this section in the standard to require energy recovery systems with "total" (enthalpic) effectiveness of at least 50%, or to allow systems with "sensible" effectiveness of at least 50%?

Answer: The intent of the standard is to require energy recovery systems that provide an energy recovery effectiveness of at least 50%, based on the enthalpy difference between outside and return air conditions.

Comment: The standard's energy recovery performance requirement may be met using any energy recovery technology; it is not limited to enthalpy wheels that directly achieve both sensible and latent heat recovery. Using a winter heat recovery example, if a sensible-only energy recovery technology is applied, its sensible effectiveness must be sufficient to achieve a dry-bulb temperature rise in the outside air as it passes through the recovery device so that the supply air leaving the device has achieved and enthalpy rise of at least 50% of the outside air, return air enthalpy difference. In practice, this means that if a sensible-only recovery technology is used, its sensible efficiency may have to be greater than 50% in order to achieve the required 50% total (or enthalpic) energy recovery effectiveness.

However, for summer outside air cooling, sensible energy recovery devices may only meet the 50% total energy recovery requirement in cool dry summer climates. In most warm and hot climates, both dry and humid, a total energy, enthalpy recovery device will be required to meet the performance requirement of the standard.