INTERPRETATION IC 62.1-2016-6 OF
ANSI/ASHRAE STANDARD 62.1-2016
VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY

Approved: February 14, 2019

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Reference: This request for interpretation refers to the requirements presented in ANSI/ASHRAE Standard 62.1-2016, Section 6.2.2.2, regarding zone ventilation effectiveness.

Background: Certain room air distribution strategies involve the use of thermal displacement induction terminals. These terminals utilize a series of small nozzles through which ducted ventilation air is injected at a relatively high velocity in order to induce room air through a cooling coil within the terminal where sensible heat is removed. It is then mixed with the ventilation air and the cool air mixture is discharged at a very low velocity (displacement manner) into the room, then relies on natural convection plumes from space convection heat sources to deliver it to return inlets located above the occupied zone at which point it is removed from the room. Such a room air distribution method is awarded an enhanced zone ventilation effectiveness of 1.2 according to Table 6.2.2.2 of Standard 62.1. Often two to five of these terminals are employed in a classroom due to their large supply outlet area requirements.

Certain ones (of these two to five terminals) may also be employed to heat the recirculated room air during a demand for space heating. When operating in this mode, ventilation air is ducted to all of the terminals some 5 to 10°F cooler than the room. The supply air mixture of the terminals employed for heating is discharged 10 to 20°F above the room air temperature. The remaining terminals do not employ heating provisions so their supply air mixture remains typically 3 to 6°F cooler than the room temperature.

Interpretation: During cooling operation, when all of the ventilation air is delivered in a displacement fashion, the zone ventilation effectiveness is 1.2. During heating operation, the percentage of ventilation air delivered above room temperature is assigned a 0.7 zone ventilation effectiveness (floor supply of warm air with a high sidewall or ceiling return) while the remaining outside air delivered below room temperature maintains the 1.2 zone ventilation effectiveness award for displacement ventilation as defined in Table 6.2.2.2.

For example, if 50% of the outside air is delivered in a displacement fashion (below the room temperature) and 50% is delivered above room temperature, the overall zone ventilation effectiveness would be calculated as:

$$E_z = (0.5 \times 1.2) + (0.5 \times 0.7) = 0.95$$

Thus, the ventilation airflow would need to be increased accordingly during occupied heating operation.

Question: Is this interpretation correct?

Answer: No.

Comments: Standard 62.1 does not make provisions for calculating E_z based on zones under compound conditions. The zone that has heated air supplied at the floor must use an E_z of 0.7 throughout the zone for the heating design condition. If a separate zone can be identified where the conditions for an E_z of 1.2 are met during heating operation then that zone could be designed thusly. The committee is considering an addendum which would permit calculation of E_z for more complicated systems and control strategies.