INTERPRETATION IC 62-2001-30 OF
ANSI/ASHRAE STANDARD 62-2001
VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY

TRANSFER TO 62-2001 APPROVED: January 12, 2002

Originally issued as interpretation of Standard 62-1989 (IC 62-1989-21) on June 26, 1995, but transferred to Standard 62-1999 (62-1999-28) on August 14, 2000, and subsequently to Standard 62-2001. Since no changes were made to the relevant sections of Standard 62-2001, no revisions were made to the interpretation as part of this transfer.

Request from: Gren Yuill, Ph.D, Professor, Department of Architectural Engineering, College of Engineering, The Pennsylvania State University, 104 Engineering "A" Bldg., University Park, PA 16802-1416

References. This request refers to Ventilation Rate Procedure in Standard 62-2001, particularly 6.1.3.1 Multiple Spaces Method.

Background. Mr. Yuill's letter indicates that he considers the requirements in 6.1.3.1 to be unambiguous, but is requesting this interpretation because others are interpreting it differently in referencing 62-1989 in proposed building energy design codes. Mr. Yuill's letter gives the following 1-A and 2-A as his interpretations and 1-B and 2-B as the interpretations of others:

1-A (Yuill interpretation): The outdoor air required by each space and specified in Table 2 must be delivered to that space, applying the Multiple Spaces Equation (6-1) to account for the effect of other rooms served by the same air supply system that may be receiving more than their specified amounts of outdoor air.

1-B (Alternative interpretation): The outdoor air required to be delivered to a building by an air supply system may be calculated by adding up the amount of outdoor air required to meet the requirements of Table 2 in each space served by that system, even if the percentage of outdoor air required may differ from space to space.

2-A (Yuill interpretation): If a variable air volume system is used, the system must be designed so that it will deliver the required amount of outdoor air to each space it serves not only under the conditions that prevail on the cooling design day, but under the full range of weather and load conditions that can be expected, and under the range of space ventilation rates and system airflows that the system will deliver to meet those loads.

2-B (Alternative interpretation): If the variable volume system delivers the required amount of outdoor air under the cooling design conditions, it need not be designed to do so under other operating conditions that may be expected to occur in the building.

Assuming that the answers to 1-A and 2-A are YES, Dr. Yuill's letter postulates the following two example variable air volume (VAV) system design approaches:

VAV System Design Approach No. 1: Assume that each VAV box will close to its minimum position at some time when the room is fully occupied. Find the critical space with the highest required outdoor air fraction, Z, when its VAV box is fully turned down. Find the building's uncorrected outdoor air fraction, X, with all the other VA V boxes at their minimum settings. Use the Multiple Spaces Equation to find the fraction, and thus the absolute amount, of outdoor air required. Repeat this calculation with all the other VAV boxes at their maximum settings. Choose the result that gives the higher outdoor air flow and design the air supply system to always deliver at least this amount.

VAV System Design Approach No. 2: Use a building energy analysis computer program to simulate the hour-by-hour operation of the building with a year of realistic weather data. Determine the flow rate through each VAV box in each hour, and use this data with assumed occupant densities and the Multiple Spaces Equation to find the amount of outdoor air required in each hour. Design an air supply system that never delivers less outdoor air than the highest of these air requirements.

Question 1. Is Dr. Yuill's interpretation 1-A correct?

Answer 1. Yes.

Comment. The intent of 62-89 is to have the outside air requirements listed in Table 2 designed to be delivered to these spaces based upon the best estimate of occupancy at the time of design. However, the impact of Eq. 6-1 on overall system outside air rates will be minimized if (a) supply air to critical spaces is increased using fan-powered boxes transferring air from a common return air plenum for example, or (b) for rooms that are particularly densely occupied such as conference rooms, when exhaust or transfer fans are used to allow air transferred from adjacent spaces to meet part of the supply air requirement, as allowed by subclause 6.1.3.1.

Question 2. Is Dr. Yuill's interpretation 2-A correct?

Answer 2. Yes.

Comment. The corrected outdoor air flow rate must be calculated for the most critical case. This outdoor air flow rate may be supplied at all times. Less air may be supplied when conditions are less critical provided the flow is recalculated based on those conditions (e.g., lower occupancy).

Question 3. Does VAV System Design Approach No. 1 satisfy Standard 62-1989?

Answer 3. Yes.

Comment. This is not the only acceptable system design approach.

Question 4. Does VAV System Design Approach No. 2 satisfy Standard 62-1989?

Answer 4. Yes.

Comment. This is not the only acceptable system design approach.