INTERPRETATION IC 62.1-2010-6 OF
ANSI/ASHRAE STANDARD 62.1-2010
VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY

Approved: January 18, 2014

Request from: Travis English (Travis.R.English@kp.org), Kaiser Permanente, 1800 Harrision Street, Oakland, CA 94612.

Reference: This request for interpretation refers to the requirements presented in ANSI/ASHRAE Standard 62.1-2010, Section 2.3, regarding additional requirements for health care facilities.

Background: Healthcare buildings account for roughly 4.5% of commercial building footprint in the US [1]. And, for healthcare buildings, designers calculate outdoor air (OA) ventilation using the air change per hour (ACH) rates in ASHRAE Standard 170 (S170) Table 7.1.

In the remaining commercial buildings, engineers calculate outdoor air ventilation rates using the ventilation rate procedure (VRP) of ASHRAE Standard 62.1 (S62.1). The VRP requires a per person component, a per square foot component, and a consideration of ventilation distribution effectiveness.

The following is a comparison of ER waiting room cases, using both methodologies. For the S62.1 comparison, the waiting room is calculated as a "reception area", in a commercial office environment.

1. Case 1: A 300 square foot, low-density waiting room is designed with fixed seating for 10 people (30 square foot per person). The ceiling is 13 ft high, to create a feeling of space for the occupants.
2. Case 2: A 300 square foot, low-density waiting room is designed with fixed seating for 10 people (30 square foot per person). The ceiling is 7 ft 6 in high, based on structural constraints.
3. Case 3: A 300 square foot, high-density waiting room is designed with fixed seating for 20 people (30 square foot per person). The ceiling is 13 ft high, to create a feeling of space for the occupants.
4. Case 4: A 300 square foot, high-density waiting room is designed with fixed seating for 20 people (30 square foot per person). The ceiling is 7 ft 6 in high, based on structural constraints.

Calculations for each are shown in **Table 1** below

Table 1 – Calculation of outside air flow rates

Case	#People	Sq.Ft.	Ceiling ht. (ft)	ACH Reqd	OA (S170)	Rp	Ra	Ez	OA (S62)

Case 1	10	300	13	2	130	5	0.06	0.9	75.6
Case 2	10	300	7.5	2	75	5	0.06	0.9	75.6
Case 3	20	300	13	2	130	5	0.06	0.9	131.1
Case 4	20	300	7.5	2	75	5	0.06	0.9	131.1

Resultant outside air flows, in ACH, are shown in **Figure 1** below. Air change per hour is constant using S170. ACH rate increases from case 1 to case 4 using S62.1.

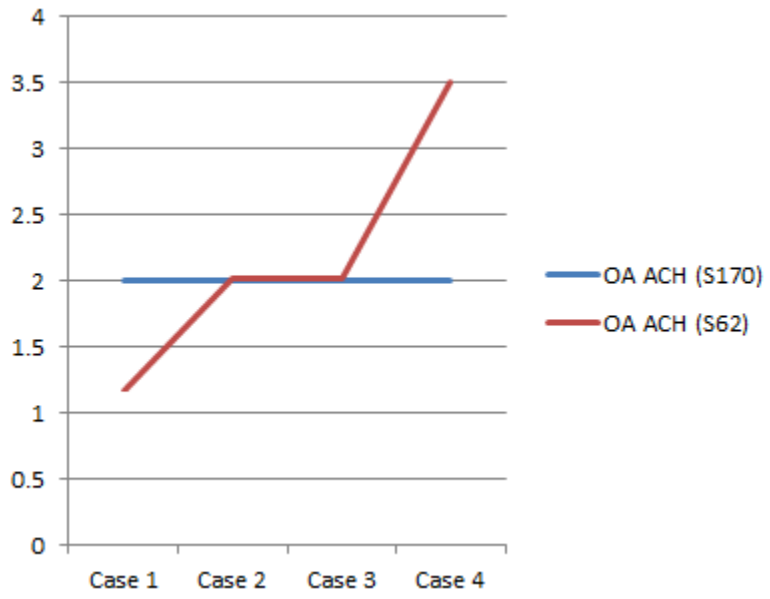

Figure 1 – Outside air ACH of all cases, using both standards.

Resultant outside air flows, in cfm per person, are shown in **Figure 2** below. Cfm per person is fairly constant using S62.1. It decreases from case 1 to case 4 using 170.

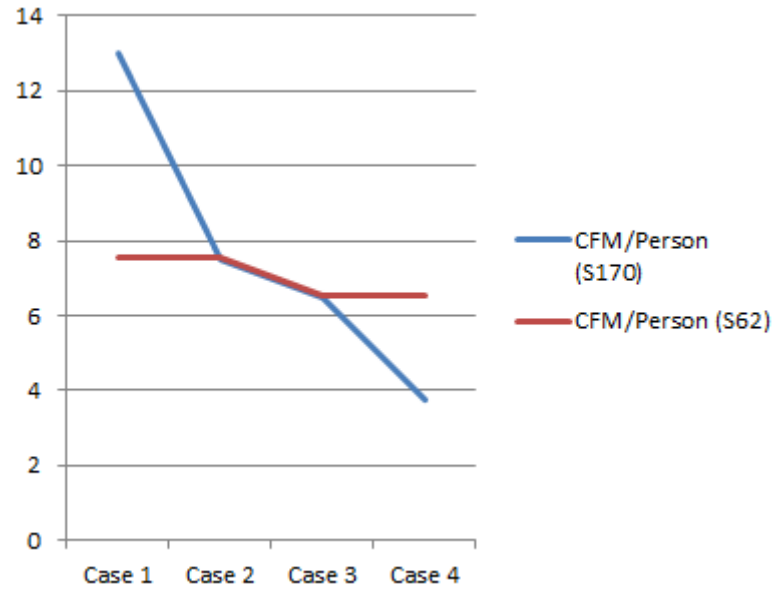

Figure 2 – Cfm per person of all cases, using both standards.

The percent difference in cfm per person required by each standard is shown in **Figure 3** below. For cases 2 and 3, the standards are aligned. Using S170, case 1 requires *72% more outside* air than S62.1, This will increase energy use and the need for humidity control in the space. Using S170, case 4 requires *43% less outside air* than S62.1. The fully occupied room would not have minimumaly acceptable indoor air quality, as defined by S62.1.

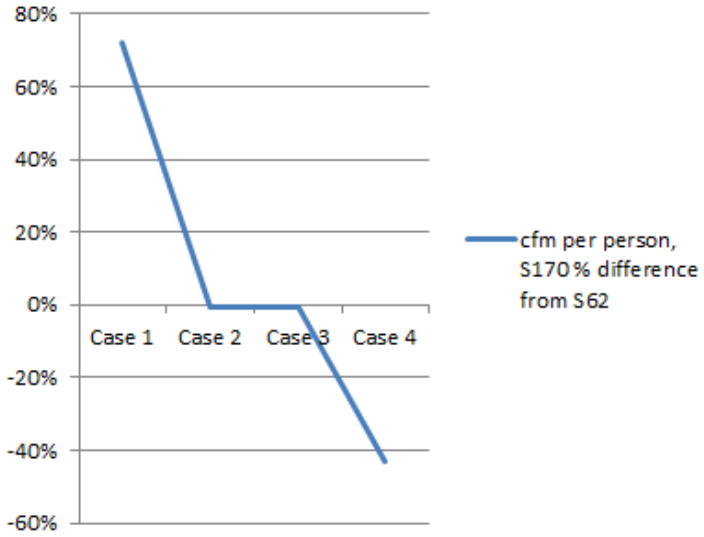

Figure 3 – Percent difference between S170 and S62 outside air cfm per person

If designers considered both S62.1 and S170 in the space, and chose the highest of the two, case 4 could be mitigated. However, an "ER Waiting Room" has no entry in the S62.1 VRP tables. S170 does not require designers to run dual calculations, nor would it be common practice to do so.

Please Note: A substantively similar RFI has been submitted to S170

References:
[1] – CBECS. 2003. Overview of Commercial Buildings. Energy Information Administration

Interpretation: Standard 62.1 asserts in health care facilities, outside air in ER and radiology waiting rooms may be determined entirely by volume **(**i.e. wherein occupancy has no bearing) though doing so may lead to over ventilation (increased mold risk) or under ventilation (unacceptable indoor air).

Question: Is this interpretation correct?

Answer: No.

Comments: Compliance with Standard 62.1 requires that no less than the ventilation air specified therein be provided (as well as meeting all other requirements of the Standard). Standard 170 contains requirements which are more specific to the spaces in question and meeting the Standard 170 requirements may be appropriate in many cases. If compliance with both standards is required, than the supplied ventilation must be no less than the larger of the two ventilation rates specified by the two standards.