ADDENDA

ANSI/ASHRAE/ASHE Addendum k to
ANSI/ASHRAE/ASHE Standard 170-2017

Ventilation of Health Care Facilities

Approved by ASHRAE and the American National Standards Institute on July 31, 2020, and by the American Society for Healthcare Engineering on July 28, 2020.

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 ISSN 1041-2336

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FOREWORD

Addendum k accomplishes different objectives related to Table 9.1. Note that Table 9.1 entries were originally separated from Table 7.1 by Addendum n. Addendum k

- *includes Table 9.1 requirements for unoccupied turndown of the spaces with input gathered from the First Public Review of 2013 Addendum i and 2017 Addendum p;*
- *reorganizes several existing Table 9.1 space entries into revised subheadings to better correlate with FGI;*
- *clarifies and corrects table footnote sequencing that was erroneously included in Addendum n;*
- *revises design temperature ranges and design relative humidity for several spaces; and*
- *revises other table entries as noted.*

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum k to Standard 170-2017

Revise Section 9, including Table 9-1, as shown. The remainder of Section 9 is unchanged. (Refer to Addendum n to Standard 170-2017.)

9. SPACE VENTILATION—RESIDENT HEALTH, CARE, AND SUPPORT SPACES

[. . .]

9.1 General Requirements. The following general requirements shall apply for space ventilation:

a. Spaces shall be ventilated according to Table 9.1.
   1. Design of the ventilation system shall provide air movement that is generally from clean to less clean areas. If any form of variable-air-volume or load-shedding system is used for energy conservation, it shall not compromise the pressure balancing relationships or the minimum air changes required by the table.
   2. The ventilation requirements in this Table are intended to provide for comfort as well as for asepsis and odor control in spaces of a residential health, care, or support facility that directly affect resident care. For spaces not specifically listed here, ventilation requirements shall be that of functionally equivalent spaces in the Table. If no functionally equivalent spaces exist in the Table, ventilation requirements shall be obtained from ANSI/ASHRAE Standard 62.1 (ASHRAE [2016] in Informative Appendix B) or ANSI/ASHRAE Standard 62.2 (ASHRAE [2016] in Informative Appendix B). Where spaces with prescribed rates in both Standard 62.1 or Standard 62.2 and Table 9.1 of this standard exist, the higher of the two air change rates shall be used.
   3. For design purposes, the minimum number of total air changes indicated shall be either supplied for positive pressure rooms or exhausted for negative pressure rooms. Spaces that are required in Table 9.1 to be at a negative pressure relationship and are not required to be exhausted shall utilize the supply airflow rate to compute the minimum total air changes per hour required. Except where indicated by a "No" in the "Unoccupied Turndown" column, ~~For spaces that require a positive or negative pressure relationship,~~ the number of air changes shall be permitted to ~~can~~ be reduced and temperature and design relative humidity altered when the space is unoccupied, provided that the required pressure relationship to adjoining spaces is maintained while the space is unoccupied and that the minimum number of air changes, temperature and design relative humidity indicated ~~is~~ are re-established anytime the space becomes occupied. Controls intended to switch the required pressure relationships between

spaces from positive to negative, and vice versa, shall not be permitted. Air change rates in excess of the minimum values are expected in some cases in order to maintain room temperature and design relative humidity conditions based upon the space cooling or heating load.

4. The entire minimum outdoor air changes per hour required by Table 9.1 for the space shall meet the filtration requirements of Section 6.4 and Table 9.1.
5. For spaces where Table 9.1 permits air to be recirculated by room units, the portion of the minimum total air changes per hour required for a space that is greater than the minimum outdoor air changes per hour required component may be provided by recirculating room HVAC units. Such recirculating room HVAC units shall
   i. not receive nonfiltered, nonconditioned outdoor air;
   ii. serve only a single space, and
   iii. provide, as a minimum, ~~MERV 6~~ the manufacturer's recommended filter for airflow passing over any surface that is designed to condense water. This filter shall be located upstream of any such cold surface, so that all of the air passing over the cold surface is filtered.
6. For air-handling systems serving multiple spaces, system minimum outdoor air quantity shall be calculated utilizing one of the following methods:
   i. System minimum outdoor air quantity for an air-handling system shall be calculated as the sum of the individual space requirements as defined by this standard.
   ii. System minimum outdoor air quantity shall be calculated by the Ventilation Rate Procedure (multiple zone formula) of ASHRAE Standard 62.1.[1] The minimum outdoor air change rate listed in this standard shall be interpreted as the V_{oz} (zone outdoor airflow) for purposes of this calculation.

b. Air filtration for spaces shall comply with Section 6.4 and Table 9.1.
c. Supply air outlets for spaces shall comply with Table 6.7.2.
d. In AII rooms, heating with supply air or radiant panels that meet the requirements of Section 6.5.3 shall be provided.

9.2 Additional Room-Specific Requirements

9.2.1 Airborne Infection Isolation (AII) Rooms. Ventilation for AII rooms shall meet the following requirements whenever an infectious ~~patient~~ resident occupies the room:

a. Each AII room shall comply with requirements of Tables 6.4, 6.7.2, and 9.1. AII rooms shall have a permanently installed device and/or mechanism to constantly monitor the differential air pressure between the room (when occupied by residents with a suspected airborne infectious disease) and the corridor, whether or not there is an anteroom. A local visual means shall be provided to indicate whenever negative differential pressure is not maintained.
b. All air from the AII room shall be exhausted directly to the outdoors.

   Exception to 9.2.1(b): AII rooms that are retrofitted from standard resident rooms from which it is impractical to exhaust directly outdoors may be provided with recirculated air from the room's exhaust on the condition that the air first passes through a HEPA filter.

c. All exhaust air from the AII rooms, associated anterooms, and associated toilet rooms shall be discharged directly to the outdoors without mixing with exhaust air from any other non-AII room or exhaust system.
d. Exhaust air grilles or registers in the resident room shall be located directly above the resident bed on the ceiling or on the wall near the head of the bed unless it can be demonstrated that such a location is not practical.
e. The room envelope shall be sealed to provide a minimum differential pressure of 0.01 in. wc (2.5 Pa) across the envelope.
f. Differential pressure between AII rooms and adjacent spaces that are not AII rooms shall be a minimum of –0.01 in. wc (–2.5 Pa). Spaces such as the toilet room and the anteroom (if present) that are directly associated with the AII room and open directly into the AII room are not required to be designed with a minimum pressure difference from the AII room but are still required to maintain the pressure relationships to adjacent areas specified in Table 9.1.
g. When an anteroom is provided, the pressure relationships shall be as follows: (1) the AII room shall be at a negative pressure with respect to the anteroom, and (2) the anteroom shall be at a negative pressure with respect to the corridor.

Table 9.1 Design Parameters for Residential Health, Care, and Support-Specific Spaces

Function of Space	Pressure Relationship to Adjacent Areas ~~(f)~~(d)	Minimum Outdoor ach	Minimum Total ach	All Room Air Exhausted Directly to Outdoors ~~(j)~~(f)	Air Recirculated by Means of Room Units (a)	Unoccupied Turndown	Minimum Filter Efficiencies ~~(m)~~(i)	Design Relative Humidity ~~(k)~~(g), %	Design Temperature ~~(l)~~(h), °F/°C
RESIDENTIAL HEALTH									
NURSING HOMES									
AII room ~~(c)~~(b)	Negative	2	12	Yes	No	Yes	13/NR	Max 60	70–75~~8~~/21–24~~9~~
AII anteroom ~~(c)~~(b)	~~(c)~~ Negative	NR	10	Yes	No	Yes	13/NR	~~NR~~ Max 60	~~NR~~70-78/21-29
Occupational therapy	NR	2	6	NR	NR	Yes	13/NR	NR	70–75~~8~~/21–24~~9~~
Physical therapy	Negative	2	6	NR	NR	Yes	13/NR	NR	70–75~~8~~/21–24~~9~~
Resident ~~gathering~~living/activity/dining	NR	4	4	NR	NR	Yes	13/NR	~~NR~~ Max 60	70–75~~8~~/21–24~~9~~
Resident room	NR	2	2	NR	NR	Yes	13/NR	~~NR~~ Max 60	70–75~~8~~/21–24~~9~~
Resident ~~unit~~ corridor	NR	NR	4	NR	NR	Yes	13/NR	NR	~~NR~~70–78/21–29
Toilet/bathing room	Negative	NR	10	Yes	No	No	13/NR	NR	70–75~~8~~/21–24~~9~~
HOSPICE FACILITIES									
AII room (c)	Negative	2	12	Yes	No	Yes	13/NR	Max 60	70–75/21–24
AII anteroom (c)	(e)	NR	10	Yes	No	Yes	13/NR	~~NR~~ Max 60	NR
Resident room	NR	2	2	NR	NR	Yes	13/NR	~~NR~~ Max 60	70–75/21–24
Resident ~~unit~~ corridor	NR	NR	4	NR	NR	Yes	13/NR	NR	NR
Toilet/bathing room	Negative	NR	10	Yes	No	Yes	13/NR	NR	70–75/21–24
RESIDENTIAL CARE AND SUPPORT									
ASSISTED LIVING FACILITIES									
Resident ~~gathering~~living/activity/dining	NR	NR	NR	NR	NR	Yes	7/NR	NR	NR
Resident room	NR	NR	NR	NR	NR	Yes	7/NR	NR	~~NR~~70–78/21–29
Resident ~~unit~~ corridor	NR	NR	NR	NR	NR	Yes	7/NR	NR	NR
Toilet/bathing room	NR	NR	NR	NR	NR	Yes	7/NR	NR	NR
~~RADIOLOGY~~									
~~X-ray (diagnostic and treatment)~~	~~NR~~	~~2~~	~~6~~	~~NR~~	~~NR~~		~~13/NR~~	~~Max 60~~	~~72–78/22–26~~
SERVICE									
Clean linen storage	Positive	NR	2	NR	NR	No	7/NR	NR	72–78/22–26
Dietary storage	NR	NR	2	NR	No	No	7/NR	NR	72–78/22–26
Food preparation center ~~(i)~~(e)	NR	2	10	NR	No	Yes	7/NR	NR	72–78/22–26

Note: NR = No requirement

Table 9.1 Design Parameters for Residential Health, Care, and Support-Specific Spaces

Function of Space	Pressure Relationship to Adjacent Areas ~~(f)~~(d)	Minimum Outdoor ach	Minimum Total ach	All Room Air Exhausted Directly to Outdoors ~~(j)~~(f)	Air Recirculated by Means of Room Units (a)	Unoccupied Turndown	Minimum Filter Efficiencies ~~(m)~~(i)	Design Relative Humidity ~~(k)~~(g), %	Design Temperature ~~(l)~~(h), °F/°C
Hair salon	Negative	NR	10	Yes	NR	Yes	7/NR	NR	70–78/21–29
~~Janitor's closet~~	~~Negative~~	~~NR~~	~~10~~	~~Yes~~	~~No~~		~~7/NR~~	~~NR~~	
Laundry, ~~general~~ central and personal	Negative	2	10	Yes	No	No	7/NR	NR	NR
Linen and trash chute room	Negative	NR	10	Yes	No	No	7/NR	NR	NR
Medication room	NR	2	4	NR	NR	Yes	7/NR	Max 60	70–75/21–24
Soiled linen sorting and storage	Negative	NR	10	Yes	No	No	7/NR	NR	NR
Warewashing	Negative	NR	10	Yes	No	Yes	7/NR	NR	NR
SUPPORT SPACES									
Clean utility	Positive	2	4	NR	NR	No	7/NR	NR	NR
Environmental services room (j)	Negative	NR	10	Yes	NR	No	7/NR	NR	NR
Hazardous ~~material~~waste storage	Negative	2	10	Yes	No	No	7/NR	NR	NR
Soiled utility or soiled holding	Negative	2	10	Yes	No	No	7/NR	NR	NR

Note: NR = No requirement

Normative Notes for Table 9.1:

a. Except where indicated by a "No" in this column, recirculating room HVAC units (with heating or cooling coils) are acceptable for providing that portion of the minimum total air changes per hour that is permitted by Section 9.1 (subparagraph [a][5]). Because of the cleaning difficulty and potential for buildup of contamination, recirculating room units shall not be used in areas marked "No." Recirculating devices with high-efficiency particulate air (HEPA) filters shall be permitted in existing facilities as interim, supplemental environmental controls to meet requirements for the control of airborne infectious agents. The design of either portable or fixed systems should prevent stagnation and short circuiting of airflow. The design of such systems shall also allow for easy access for scheduled preventative maintenance and cleaning.

~~b. Not used.~~

~~c~~b. The AII room described in this standard shall be used for isolating the airborne spread of infectious diseases, such as measles, varicella, or tuberculosis. Supplemental recirculating devices using HEPA filters shall be permitted in the AII room to increase the equivalent room air exchanges; however, the minimum outdoor air changes of Table 9.1 are still required. When the AII room is not used for airborne infection isolation, the pressure relationship to adjacent areas, when measured with the door closed, shall remain unchanged, and the minimum total air change rate shall be 6 ach.

~~d~~c. ~~See Section 9.2 and its subsections for pressure relationship requirements.~~Applicable for central air-handling systems only.

~~e~~d. If pressure-monitoring device alarms are installed, allowances shall be made to prevent nuisance alarms. Short-term excursions from required pressure relationships shall be allowed while doors are moving or temporarily open. Simple visual methods, such as smoke trail, ball-in-tube, or flutterstrip, shall be permitted for verification of airflow direction.

~~f. Not used.~~

~~g. Not used.~~

~~h~~e. Minimum total air changes per hour (ach) shall be that required to provide proper makeup air to kitchen exhaust systems as specified in ANSI/ASHRAE Standard 154 [10]. In some cases, excess exfiltration or infiltration to or from exit corridors compromises the exit corridor restrictions of NFPA 90A [11], the pressure requirements of NFPA 96 [12], or the maximum defined in the table. During operation, a reduction to the number of air changes to any extent required for odor control shall be permitted when the space is not in use.

~~i~~f. In some areas with potential contamination and/or odor problems, exhaust air shall be discharged directly to the outdoors and not recirculated to other areas. Individual circumstances may require special consideration for air exhausted to the outdoors. To satisfy exhaust needs, constant replacement air from the outdoors is necessary when the system is in operation.

~~j~~g. The RH ranges listed are the minimum and/or maximum allowable at any point within the design temperature range required for that space.

~~k~~h. Systems shall be capable of maintaining the rooms within the range during normal operation. Lower or higher temperature shall be permitted when ~~patients'~~ residents' comfort and/or medical conditions require those conditions.

~~l~~i. Table entries are the minimum filter efficiencies required for the space. Refer to Section 6.4 of this document for further clarification of filtration requirements. The first table entry is the minimum filter efficiency for Filter Bank No. 1. The second table entry (after the slash) is the minimum filter efficiency for Filter Bank No. 2. The minimum efficiency reporting value (MERV) is based on the method of testing described in ANSI/ASHRAE Standard 52.2 (***Informative Note:*** ASHRAE [2012] in Appendix B).

j. Environmental services room includes janitor's and housekeeping closets.

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ASHRAE · 1791 Tullie Circle NE · Atlanta, GA 30329 · www.ashrae.org

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