ADDENDA

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

Ventilation of Health Care Facilities

Approved by ASHRAE Standard Committee on January 20, 2018; by the ASHRAE Board of Directors on January 24, 2018; by the American Society for Healthcare Engineering on November 28, 2017; and by the American National Standards Institute on March 3, 2020.

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 ISSN 1041-2336

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FOREWORD

Addendum n continues the process of reorganizing the standard into three components—Hospital, Outpatient, and Residential Health, Care, and Support—in alignment with the FGI Guidelines' transition to three separate standards. The intent is not to create additional requirements for outpatient or residential facilities but to separate these from hospital requirements and thus eliminate confusion over which requirements apply to which occupancies. The end result will be clarification of a lower level of requirements for outpatient and residential health facilities by separating these from the higher requirement of inpatient facilities.

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 n to Standard 170-2017

Revise the following lines of the Table of Contents as shown. The remainder of the TOC is unchanged.

7. Space Ventilation~~—Hospital Spaces~~Inpatient Spaces X

9. Space Ventilation~~—Nursing Home Spaces~~Residential Health, Care, and Support Spaces X

Revise Section 3 as shown. The remainder of Section 3 is unchanged.

health care facility: an inpatient, outpatient, or residential health, care, and support facility.

outpatient: a patient whose stay at the health care facility does not meet the standard's definition of "inpatient."

resident: a person living and receiving health, care, and/or support services in a nursing home, hospice facility, or assisted-living facility.

resident care area: an area used primarily for the provision of health and/or care services to residents. ***Informative Note:*** Resident care and service include, but are not limited to activities, personal care, food service, and medication administration.

residential care and support facilities: category of facilities in which services such as assistance with activities of daily living (ADL) and/or instrumental activities of daily living (IADL) are provided to residents. For the purposes of this standard, these are assisted-living facilities.

residential health facilities: category of facilities in which long-term health services are provided. For the purposes of this standard, these are nursing homes and hospice facilities.

Revise Section 4 as shown. The remainder of Section 4 is unchanged.

4.1.2.2.2 Space Alterations. Alterations to spaces listed in Table 6.4 shall comply with the requirements of Sections 6.7, 7, 8, and 9, applicable to those specific portions of the building and its systems that are being altered. Any alteration to existing ~~health~~ patient or resident care space in a building that will continue to treat patients during construction shall comply with Sections 10.1, 10.3, 10.4, and 10.5.

[. . .]

4.7 Space Planning. In a building that contains spaces programmed for inpatient use as well as spaces programmed for outpatient use, the inpatient care spaces shall be designed solely for inpatient use and the outpatient care spaces shall be designed solely for outpatient use. Individual spaces that are dual programmed for either inpatient use or outpatient use shall meet the design requirements for inpatient use of the space.

Revise Section 6 as shown. The remainder of Section 6 is unchanged.

6. SYSTEMS AND EQUIPMENT

6.1 Utilities

6.1.1 Ventilation Upon Loss of Electrical Power. The space ventilation and pressure relationship requirements of Tables 7.1, 8.1, and 9.1 shall be maintained for the following spaces, even in the event of loss of normal electrical power:

a. AII rooms
b. PE rooms (inpatient only)
c. Operating rooms, including delivery rooms (Caesarean) (inpatient and outpatient only)

Informative Note: For further information, see NFPA (2015) in Informative Appendix B.

6.1.2 Heating and Cooling Sources

6.1.2.1 Provide heat sources and essential accessories in number and arrangement sufficient to accommodate the facility needs (reserve capacity), even when any one of the heat sources or essential accessories is not operating due to a breakdown or routine maintenance. The capacity of the remaining source or sources shall be sufficient to provide for domestic hot water, sterilization, and dietary purposes and to provide heating for operating, delivery, birthing, labor, recovery, emergency, intensive care, nursery, resident care areas, and inpatient/resident rooms. Fuel sufficient to support the owner's facility operation plan upon loss of fuel service shall be provided on site.

Exception to 6.1.2.1: Reserve capacity is not required if the ASHRAE 99% heating dry-bulb temperature for the facility is greater than or equal to 25°F (–4°C).

6.1.2.2 Inpatient and Residential Health Care Spaces. For central cooling systems greater than 400 tons (1407 kW) peak cooling load, the number and arrangement of cooling sources and essential accessories shall be sufficient to support the owner's facility operation plan upon a breakdown or routine maintenance of any one of the cooling sources.

[. . .]

6.3 Outdoor Air Intakes and Exhaust Discharges

6.3.1 Outdoor Air Intakes

6.3.1.1 General. Outdoor air intakes for AHUs shall be located a minimum of 25 ft (8 m) from cooling towers and all exhaust and vent discharges. Outdoor air intakes shall be located such that the bottom of the air intake is at least 6 ft (2 m) above grade. New facilities with moderate-to-high risk of natural or man-made extraordinary incidents shall locate air intakes away from public access. All intakes shall be designed to prevent the entrainment of wind-driven rain, shall contain features for draining away precipitation, and shall be equipped with a birdscreen of mesh no smaller than 0.5 in. (13 mm).

Exception to 6.3.1.1: For gas-fired, packaged rooftop units, the separation distance of the unit's outdoor air intake from its flue may be less than 25 ft (8 m). The separation distance shall be greater than or equal to the distance prescribed in ANSI/ASHRAE Standard 62.1, Table 5.5.1, "Air Intake Minimum Separation Distance [1].

6.3.1.2 Relief Air. Relief air is exempt from the 25 ft (8 m) separation requirement. Relief air is defined as the Class 1 air that could be returned to the air-handling unit from the occupied spaces but is being discharged to the outdoors to maintain building pressurization (such as during air-side economizer operation).

Informative Note: For more information, see ASHRAE Standard 62.1 (ASHRAE 201~~0~~6) in Appendix B.

Revise Tables 6.4 and 6.7.2 as shown. The remainder of the tables is unchanged.

Table 6.4 Minimum Filter Efficiencies

Space Designation (According to Function)	Filter Bank No. 1 (MERV)[a]	Filter Bank No. 2 (MERV)[a]
[. . .]	[. . .]	[. . .]
~~All other outpatient spaces~~	~~7~~	~~NR~~
~~Nursing facilities~~	~~13~~	~~NR~~
~~Resident care, treatment, and support areas in inpatient hospice facilities~~	~~13~~	~~NR~~
~~Resident care, treatment, and support areas in assisted living facilities~~	~~7~~	~~NR~~

[. . .]

Table 6.7.2 Supply Air Outlets

Space Designation (According to Function)	Supply Air Outlet Classification[a]
[. . .]	
Single-bed patient or resident rooms[c]	Group A, Group D, or Group E
All other patient care or resident care spaces	Group A or Group E

Notes:

[. . .]

c. Air distribution systems using Group D diffusers shall meet the following requirements:
1. The system shall be designed according to "Design Guidelines" in Chapter 7 of *ASHRAE System Performance Evaluation and Design Guidelines for Displacement Ventilation*.[11]
2. The supply diffuser shall be located where it cannot be permanently blocked (e.g., opposite the foot of the bed.)
3. The room return/exhaust grille shall be located in the ceiling, approximately above the head of the patient or resident bed.
4. The transfer grille to the toilet room shall be located above the occupied zone.

6.3.1.3 Roof Locations. Intakes on top of buildings shall be located with the bottom of the air intake a minimum of 3 ft (1 m) above roof level.

6.3.1.4 Areaways. In the case of an areaway, the bottom of the air intake opening shall be at least 6 ft (2 m) above grade. The bottom of the air intake opening from the areaway into the building shall be at least 3 ft (1 m) above the bottom of the areaway.

Informative Note: See Appendix A, Figure A-3.

Exception to 6.3.1.4: Equipment serving nonsurgical spaces designed solely for outpatient or residential health, care, and support use shall not be required to comply with Sections 6.3.1.1, 6.3.1.2, 6.3.1.3, or 6.3.1.4, provided the equipment complies with ANSI/ASHRAE Standard 62.1-1, Table 5.5.1.

[. . .]

6.4 Filtration. Filter banks shall be provided in accordance with Tables 6.4, 8.1, and 9.1. Each filter bank with an efficiency of greater than MERV 12 shall be provided with an installed manometer or differential pressure measuring device that is readily accessible and provides a reading of differential static pressure across the filter to indicate when the filter needs to be changed. All of the air provided to a space shall be filtered in accordance with Table 6.4, except as otherwise indicated in Sections 7.1, 8.1, and 9.1 for spaces that allow recirculating HVAC room units.

Informative Note: For more information, see CDC (2003) in Informative Appendix B.

[. . .]

6.6 Humidifiers. When outdoor humidity and internal moisture sources are not sufficient to meet the requirements of Tables 7.1, 8.1, or 9.1, humidification shall be provided by means of the facility air-handling systems. Steam or adiabatic high-pressure water-atomizing humidifiers shall be used.

6.7 Air Distribution Systems

6.7.1 General. General. Maintain the pressure relationships required in Tables 7.1, 8.1, and 9.1 in all modes of HVAC system operation, except as noted in the tables. Spaces that have required pressure relationships shall be served by fully ducted return systems or fully ducted exhaust systems. The following additional surgery and critical-care patient care areas that do not require a pressure relationship to adjacent areas shall also be served by fully ducted return or exhaust systems: recovery rooms, critical and intensive care areas, intermediate care areas, and wound intensive care units (burn units). In inpatient facilities, patient care areas shall use ducted systems for return and exhaust air. Where space pressure relationships are required, the air distribution system design shall maintain them, taking into account recommended maximum filter loading, heating-season lower airflow operation, and cooling-season higher airflow operation. Airstream surfaces of the air distribution system downstream of Filter

Bank No. 2, shall comply with ANSI/ASHRAE Standard 62.1, Section 5.4 [1]. The air distribution system shall be provided with access doors, panels, or other means to allow convenient access for inspection and cleaning.

6.7.2 Air Distribution Devices. All air distribution devices shall meet the following requirements:

a. Surfaces of air distribution devices shall be suitable for cleaning. Supply air outlets in accordance with Table 6.7.2 shall be used.

[. . .]

6.8 Energy Recovery Systems

6.8.1 General. Energy recovery systems shall be located upstream of Filter Bank No. 2. If energy recovery systems are used, the systems shall not allow for any amount of cross-contamination of exhaust air back to the supply airstream via purge, leakage, carryover, or transfer except as allowed in Section 6.8.3.

Exception to 6.8.1: Energy recovery systems that comply with the leakage and carryover limitations of ANSI/ASHRAE Standard 62.1[1] shall be permitted in residential health, care, and support facilities.

[. . .]

6.8.3 Energy Recovery Systems with Leakage Potential. If energy recovery systems with leakage potential are used, they shall be arranged to minimize the potential to transfer exhaust air directly back into the supply airstream. Energy recovery systems with leakage potential shall be designed to have no more than 5% of the total supply airstream consisting of exhaust air. Energy recovery systems with leakage potential shall not be used from these exhaust airstream sources: ER waiting rooms, triage, ER decontamination, radiology waiting rooms, darkroom, bronchoscopy sputum collection and pentamidine administration, laboratory fume hood and other directly ducted laboratory equipment exhaust, waste anesthesia gas disposal, autopsy, nonrefrigerated body holding, endoscope cleaning, central medical and surgical supply soiled or decontamination room, laundry general, hazardous material storage, dialyzer reprocessing room, nuclear medicine hot lab, nuclear medicine treatment room, and any other space identified by the AHJ or the infection control risk assessment (ICRA) team.

Exception to 6.8.3: Energy recovery systems that comply with the leakage and carryover limitations of ANSI/ASHRAE Standard 62.1[1] shall be permitted in all nonsurgical spaces designed solely for outpatient use.

Revise Section 7 as shown. The remainder of Section 7 is unchanged.

7. SPACE VENTILATION—~~HOSPITAL SPACES~~INPATIENT SPACES

The ventilation requirements of this standard are minimums that provide control of environmental comfort, asepsis, and odor in ~~hospital health care facilities~~ inpatient spaces. However, because they are minimum requirements and because of the diversity of the population and variations in susceptibility and sensitivity, these requirements do not provide assured protection from discomfort, airborne transmission of contagions, and odors.

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

[. . .]

2. The ventilation ~~rates~~ requirements in this table are intended to provide for comfort as well as for asepsis and odor control in spaces of a health care facility that directly affect patient care. ~~Ventilation rates f~~For spaces not ~~specified~~ 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 [1]. Where spaces with prescribed rates in both Standard 62.1 and Table 7.1 of this standard exist, the higher of the two air change rates shall be used.

[. . .]

e. In a building that contains a mixture of spaces programmed for outpatient care as well as spaces programmed for inpatient care, the outpatient care spaces shall be designed in accordance with Table 8.1, and the inpatient care spaces shall be designed in accordance with Table 7.1.

Revise Section 8 as shown. Only changes are shown in underline and strikethrough.

8. SPACE VENTILATION—OUTPATIENT SPACES

The ventilation requirements of this standard are minimums that provide control of environmental comfort, asepsis, and odor in outpatient ~~health care facilities~~ spaces. However, because they are minimum requirements and because of the diversity of the population and variations in susceptibility and sensitivity, these requirements do not provide assured protection from discomfort, airborne transmission of contagions, and odors.

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

a. Spaces shall be ventilated according to Table 8.1.
   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 ~~rates~~ requirements in this table are intended to provide for comfort as well as for asepsis and odor control in spaces of a health care facility that directly affect patient care. ~~Ventilation rates f~~For spaces not ~~specified~~ 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 [1]. Where spaces with prescribed rates in both Standard 62.1 and Table 8.1 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 8.1 to be at a negative pressure relationship and that are not required to be exhausted shall use the supply airflow rate to compute the minimum total air changes per hour required. For spaces that require a positive or negative pressure relationship, the number of air changes can be reduced 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 indicated is reestablished 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 humidity conditions based on the space cooling or heating load.
4. The entire minimum outdoor air changes per hour required by Table 8.1 for the space shall meet the filtration requirements of Section ~~6.4~~ 8.1.
5. For spaces where Table 8.1 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 a minimum MERV 6 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 using 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 ~~6.4~~ 8.1.
c. Supply air outlets for spaces shall comply with Table 6.7.2.
d. In AII rooms~~, protective environment rooms, wound intensive care units (burn units),~~ and operating and procedure rooms, heating with supply air or radiant panels that meet the requirements of Section 6.5.3 shall be provided.
e. In a building that contains a mixture of spaces programmed for outpatient care as well as spaces programmed for inpatient care, the outpatient care spaces shall be designed in accordance with Table 8.1, and the inpatient care spaces shall be designed in accordance with Table 7.1.

8.2 Additional Room-Specific Requirements

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

a. Each AII room shall comply with requirements of Tables 6.4, 6.7.2, and 8.1. AII rooms shall have a permanently installed device and/or mechanism to constantly monitor the differential air pressure between the room (when occupied by patients 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 8.2.1(b): AII rooms that are retrofitted from standard patient 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 patient room shall be located directly above the patient 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. of water (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. of water (–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 8.1.
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 ante-

room shall be at a negative pressure with respect to the corridor.

8.2.2 Protective Environment (PE) Rooms. Ventilation for PE rooms shall meet the following requirements:

a. The room envelope shall be sealed to provide a minimum differential pressure of 0.01 in. wc (2.5 Pa) across the envelope.

b. Each PE room shall comply with the requirements of Tables 6.4, 6.7.2, and 7.1. PE rooms shall have a permanently installed device and/or mechanism to constantly monitor the differential air pressure between the room and the corridor when occupied by patients requiring a protective environment regardless of whether there is an anteroom. A local visual means shall be provided to indicate whenever positive differential pressure is not maintained.

c. Air distribution patterns within the protective environment room shall conform to the following:

   1. Supply air diffusers shall be above the patient bed unless it can be demonstrated that such a location is not practical. Diffuser design shall limit air velocity at the patient bed to reduce patient discomfort. (See ASHRAE Standard 55 [2013] in Informative Appendix B.)

   2. Return/exhaust grilles or registers shall be located near the patient room door.

d. Differential pressure between PE rooms and adjacent spaces that are not PE 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 PE room and open directly into the PE room are not required to be designed with a minimum pressure difference from the PE room but are still required to maintain the pressure relationships to adjacent areas specified in Table 7.1.

e. PE rooms retrofitted from standard patient rooms may be ventilated with recirculated air, provided that air first passes through a HEPA filter and the room complies with parts "a" through "d" of Section 7.2.2.

f. When an anteroom is provided, the pressure relationships shall be as follows: (1) the PE room shall be at a positive pressure with respect to the anteroom and (2) the anteroom shall be at a positive pressure with respect to the corridor.

8.2.3 Combination Airborne Infectious Isolation/Protective Environment (AII/PE) Rooms. Ventilation for AII/PE rooms shall meet the following requirements:

a. Supply air diffusers shall be located above the patient bed.

b. Exhaust grilles or registers shall be located near the patient room door.

c. The pressure relationship to adjacent areas for the required anteroom shall be one of the following:

   1. The anteroom shall be at a positive pressure with respect to both the AII/PE room and the corridor or common space.

   2. The anteroom shall be at a negative pressure with respect to both the AII/PE room and the corridor or common space.

d. AII/PE rooms shall have two permanently installed devices and/or mechanisms to constantly monitor the differential air pressure. One device and/or mechanism shall monitor the pressure differential between the AII/PE room and the anteroom. The second device and/or mechanism shall monitor the pressure differential between the anteroom and the corridor or common space. For each device and/or mechanism, a local visual means shall be provided to indicate whenever differential pressure is not maintained.

Delete Table 8.1 and notes, and add a new Table 8.1 and notes as shown.

Table 8.1 Design Parameters for Outpatient-Specific Spaces

Function of Space (f)	Pressure Relationship to Adjacent Areas (n)	Minimum Outdoor ach	Minimum Total ach	All Room Air Exhausted Directly to Outdoors (j)	Air Recirculated by Means of Room Units (a)	Minimum Filter Efficiencies (c)	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
COMMON SPACES IN OUTPATIENT FACILITIES								
AII anteroom (i) (3.1–3.4.3)	(e)	NR	10	Yes	No	7/NR	NR	NR
AII room (i) (3.1–3.4.2)	Negative	2	12	Yes	No	7/NR	Max 60	70–75/21–24
Bronchoscopy, sputum collection, and pentamidine administration (n)	Negative	2	12	Yes	No	7/NR	NR	68-73/20-23
Clean supply storage (3.1–3.6.9)	Positive	2	4	NR	NR	7/NR	Max 60	72–78/22–26
Emergency waiting rooms	Negative	2	12	Yes (q)	NR	7/NR	Max. 65	70-75/21-24
Environmental services room (3.1–5.5.1)	Negative	NR	10	Yes	No	7/NR	NR	NR
General-purpose examination/observation room (3.1–3.2.2)	NR	2	4	NR	NR	7/NR	Max 60	70–75/21–24
Laboratory testing/work area if in a separate dedicated room (3.1–4.1.2)	Negative	2	6	Yes	NR	7/NR	NR	70–75/21–24
Medical waste holding spaces (3.1–5.4.1.3)	Negative	2	10	Yes	No	7/NR	NR	NR
Medication preparation room programmed to compound sterile preparations (b) (3.1–3.6.6.2)	Positive	2	4	NR	NR	7/ HEPA (s)	NR	NR
Soiled holding room (3.1–3.6.10)	Negative	2	6	Yes	No	7/NR	NR	72–78/22–26
Special-purpose examination room (3.1–3.2.3)	NR	2	6	NR	NR	7/NR	Max 60	70–75/21–24
SPACES SPECIFIC TO PARTICULAR OUTPATIENT FACILITIES						7/NR		
Cancer treatment area (p) (3.6–3.2)	NR	2	6	NR	NR	7/NR	Max 60	70–75/21–24
Diagnostic imaging waiting area (3.5–6.1.3.2) (g)	Negative	2	12	Yes (q), (r)	NR	7/NR	Max 60	70–75/21–24
ECT procedure room (p) (3.11–3.3.2.2)	NR	2	4	NR	NR	7/NR	Max 60	70–75/21–24
Endoscopy procedure room (h) (3.9–3.2.2)	NR	2	6	NR	No	7/NR	Max 60	68–73/20–23
Freestanding urgent care facility procedure room (3.5–3.2.2)	Positive	2	6	NR	No	7/NR	NR	70–75/21–24
Instrument processing room (3.9–5.1)	Negative	2	10	Yes	No	7/NR	NR	NR
Office-based procedure room (p) (3.8–3.1)	NR	2	4	NR	NR	7/NR	Max 60	70–75/21–24
Outpatient surgical facility operating room (m), (o) (3.7–3.3)	Positive	4	20	NR	No	7/14	20–60	68–75/20–24
Outpatient surgical facility procedure room (o), (d) (3.7–3.2)	Positive	3	15	NR	No	7/NR	20–60	70–75/21–24
Postoperative recovery area (3.7–3.4.3)	NR	2	6	NR	No	7/NR	Max 60	70–75/21–24
Postprocedure recovery area (u) (3.9–3.3)	NR	2	2	NR	NR	7/NR	Max 60	70–75/21–24
Preprocedure patient care area (t) (3.9–3.3)	NR	2	2	NR	NR	7/NR	Max 60	70–75/21–24

Note: NR = no requirement

Normative Notes for Table 8.1:

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 8.1 (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. Pharmacy compounding areas may have additional air change, differential pressure, and filtering requirements beyond the minimum of this table, depending on the type of pharmacy, the regulatory requirements (which may include adoption of USP 797), the associated level of risk of the work, and the equipment used in the spaces. ***Informative Note:*** See USP (2012) in Appendix B.

c. 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:*** See ASHRAE [2012] in Appendix B.

d. Pressure relationships need not be maintained when the room is unoccupied.

e. See Section 8.2 and its subsections for pressure relationship requirements.

f. Parenthetic notations following a space name are paragraph references to the 2014 Facility Guidelines Institute document *Guidelines for Design and Construction of Hospitals and Outpatient Facilities* (***Informative Note:*** FGI [2014]). These FGI paragraph references are provided to the user of the standard to aid in the application of design requirements.

g. These ventilation requirements only apply to urgent care facility waiting areas where the ICRA determines that the diagnostic imaging waiting area requires special consideration to reduce the risk of airborne infection transmission. If the ICRA does not have these special consideration provisions then the ventilation requirements shall meet the provisions of ANSI/ASHRAE Standard 62.1[1].

h. If the planned space is designated in the organization's operational plan to be used for both bronchoscopy and gastrointestinal endoscopy, the design parameters for "bronchoscopy, sputum collection, and pentamidine administration" shall be used.

i. 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 8.1 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.

j. 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.

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

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

m. National Institute for Occupational Safety and Health (NIOSH) criteria documents [10] regarding occupational exposure to waste anesthetic gases and vapors and control of occupational exposure to nitrous oxide indicate a need for both local exhaust (scavenging) systems and general ventilation of the areas in which the respective gases are used. Refer to NFPA 99[11] for other requirements.

n. 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.

o. Surgeons or surgical procedures may require room temperatures, ventilation rates, humidity ranges, and/or air distribution methods that exceed the minimum indicated ranges.

p. Treatment rooms used for bronchoscopy shall be treated as bronchoscopy rooms. Treatment rooms used for procedures with nitrous oxide shall contain provisions for exhausting anesthetic waste gases.

q. In a recirculating ventilation system, HEPA filters shall be permitted instead of exhausting the air from these spaces to the outdoors, provided that the return air passes through the HEPA filters before it is introduced into any other spaces. The entire minimum total air changes per hour of recirculating airflow shall pass through HEPA filters. When these areas are open to larger, nonwaiting spaces, the exhaust air volume shall be calculated based on the seating area of the waiting area. ***Informative Note:*** The intent here is to not require the volume calculation to include a very large space (e.g., an atrium) just because a waiting area opens onto it.

r. The requirement that all room air be exhausted directly to outdoors applies only to radiology waiting rooms programmed to hold patients who are waiting for chest x-rays for diagnosis of respiratory disease.

s. As an alternative to the requirement for HEPA filters in Filter Bank No. 2, MERV-14 rated filters may be used in Filter Bank No. 2 if a tertiary terminal HEPA filter is provided for this space. High-efficiency particulate air (HEPA) filters are those filters that remove at least 99.97% of 0.3 micron-sized particles at the rated flow in accordance with the testing methods of IEST RP-CC001.3 ***Informative Note:*** See IEST [2005] in Appendix B.

t. If anesthetic gases are administered in the area, the minimum total air changes shall be increased to 6.

u. If anesthetic gases are used during the preceding procedure, the minimum total air changes shall be increased to 6.

~~**8.3 Critical Care Units**~~

~~**8.3.1 Wound Intensive Care Units (Burn Units).** Burn unit patient rooms that require humidifiers to comply with Table 7.1 shall be provided with individual humidity control.~~

8.3 8.4 Surgery Rooms

8.3.1 8.4.1 Operating Rooms, Operating/Surgical Cystoscopic Rooms, and Caesarean Delivery Rooms. These rooms shall be maintained at a positive pressure with respect to all adjoining spaces at all times. A pressure differential shall be maintained at a value of at least +0.01 in. wc (2.5 Pa). Each room shall have individual temperature control. These rooms shall be provided with a primary supply diffuser array that is designed as follows:

a. The airflow shall be unidirectional, downwards, and the average velocity of the diffusers shall be 25 to 35 cfm/ft^2 (127 to 178 L/s/m^2). The diffusers shall be concentrated to provide an airflow pattern over the patient and surgical team. ***Informative Note:*** For more information, see Memarzadeh and Manning (2002) and Memarzadeh and Jiang (2004) in Appendix B.
b. The coverage area of the primary supply diffuser array shall extend a minimum of 12 in. (305 mm) beyond the footprint of the surgical table on each side. Within the portion of the primary supply diffuser array that consists of an area encompassing 12 in. (305 mm) on each side of the footprint of the surgical table, no more than 30% of this portion of the primary supply diffuser array area shall be used for nondiffuser uses such as lights, gas columns, equipment booms, access panels, sprinklers, etc.

Additional supply diffusers shall be permitted within the room, outside of the primary supply diffuser array, to provide additional ventilation to the operating room to achieve the environmental requirements of Table 8.1 that relate to temperature, humidity, or a portion of the required air change rates.

The room shall be provided with at least two low sidewall return or exhaust grilles spaced at opposite corners or as far apart as possible, with the bottom of these grilles installed approximately 8 in. (203 mm) above the floor.

Exception to ~~8.4.1~~ 8.3.1: In addition to the required low return (or exhaust) air grilles, such grilles may be placed high on the walls.

8.3.2 ~~8.4.2~~ Sterilization Rooms. Steam that escapes from a steam sterilizer shall be exhausted using an exhaust hood or other suitable means. Ethylene oxide that escapes from a gas sterilizer shall be exhausted using an exhaust hood or other suitable means.

8.3.3 ~~8.4.3~~ Imaging Procedure Rooms. If invasive procedures occur in this type of room, ventilation shall be provided in accordance with the ventilation requirements for procedure rooms. If anesthetic gases are administered, ventilation shall be provided in accordance with the ventilation requirements for operating rooms.

8.4 ~~8.5~~ Support Spaces

~~**8.5.1 Morgue and Autopsy Rooms.** Ventilation for morgue and autopsy rooms shall meet the following requirements:~~

~~a. Low sidewall exhaust grilles shall be provided unless exhaust air is removed through an autopsy table designed for this purpose.~~
~~b. All exhaust air from autopsy, nonrefrigerated body holding, and morgue rooms shall be discharged directly to the outdoors without mixing with air from any other room or exhaust system.~~
~~c. Differential pressure between morgue and autopsy rooms and any adjacent spaces that have other functions shall be a minimum of –0.01 in. wc (–2.5 Pa).~~

8.4.1 Nonrefrigerated Body-Holding Rooms. Ventilation for nonrefrigerated body-holding rooms shall meet the following requirements:

a. All exhaust air from nonrefrigerated body holding rooms shall be discharged directly to the outdoors without mixing with air from any other room or exhaust system.

8.4.2 ~~8.5.2~~ Bronchoscopy

a. Differential pressure between bronchoscopy procedure and sputum induction rooms and any adjacent spaces that have other functions shall be a minimum of –0.01 in. of water (–2.5Pa).
b. Local exhaust shall be provided for sputum collection procedures.

8.5 ~~8.6~~ Psychiatric Patient Areas. All exposed equipment located with these spaces shall have enclosures with rounded corners and tamper-resistant fasteners. With the exception of HVAC room recirculating units, equipment shall be arranged such that maintenance personnel are not required to enter patient-care spaces for service.

Revise Section 9 as shown. Only changes are shown in underline and strikethrough.

9. SPACE VENTILATION ~~NURSING HOME SPACES~~ RESIDENT HEALTH, CARE, AND SUPPORT SPACES

The ventilation requirements of this standard are minimums that provide control of environmental comfort, asepsis, and odor in ~~nursing home health care facilities~~ resident care areas. However, because they are minimum requirements and because of the diversity of the population and variations in susceptibility and sensitivity, these requirements do not provide assured protection from discomfort, airborne transmission of contagions, and odors.

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 compro-

mise the pressure balancing relationships or the minimum air changes required by the table.

2. The ventilation ~~rates~~ requirements in this table are intended to provide for comfort as well as for asepsis and odor control in spaces of a health care facility that directly affect ~~patient~~ resident care. ~~Ventilation rates f~~For spaces not ~~specified~~ 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 [1] or ANSI/ASHRAE Standard 62.2[XX]. 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 that are not required to be exhausted shall use the supply airflow rate to compute the minimum total air changes per hour required. For spaces that require a positive or negative pressure relationship, the number of air changes can be reduced 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 indicated is reestablished 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 humidity conditions based on 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 using 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, ~~protective environment rooms, wound intensive-care units (burn units), and operating and procedure 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 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 ~~patients~~ 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 ~~patient~~ 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 ~~patient~~ resident room shall be located directly above the ~~patient~~ 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. of water (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. of water (–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.

9.2.2 Protective Environment (PE) Rooms. Ventilation for PE rooms shall meet the following requirements:

a. The room envelope shall be sealed to provide a minimum differential pressure of 0.01 in. wc (2.5 Pa) across the envelope.
b. Each PE room shall comply with the requirements of Tables 6.4, 6.7.2, and 7.1. PE rooms shall have a permanently installed device and/or mechanism to constantly monitor the differential air pressure between the room and the corridor when occupied by patients requiring a protective environment regardless of whether there is an anteroom. A local visual means shall be provided to indicate whenever positive differential pressure is not maintained.
c. Air distribution patterns within the protective environment room shall conform to the following:
    1. Supply air diffusers shall be above the patient bed unless it can be demonstrated that such a location is not practical. Diffuser design shall limit air velocity at the patient bed to reduce patient discomfort. (See ASHRAE Standard 55 [2013] in Informative Appendix B.)
    2. Return/exhaust grilles or registers shall be located near the patient room door.
d. Differential pressure between PE rooms and adjacent spaces that are not PE 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 PE room and open directly into the PE room are not required to be designed with a minimum pressure difference from the PE room but are still required to maintain the pressure relationships to adjacent areas specified in Table 7.1.
e. PE rooms retrofitted from standard patient rooms may be ventilated with recirculated air, provided that air first passes through a HEPA filter and the room complies with parts "a" through "d" of Section 7.2.2.
f. When an anteroom is provided, the pressure relationships shall be as follows: (1) the PE room shall be at a positive pressure with respect to the anteroom and (2) the anteroom shall be at a positive pressure with respect to the corridor.

9.2.3 Combination Airborne Infectious Isolation/Protective Environment (AII/PE) Rooms. Ventilation for AII/PE rooms shall meet the following requirements:

a. Supply air diffusers shall be located above the patient bed.
b. Exhaust grilles or registers shall be located near the patient room door.
c. The pressure relationship to adjacent areas for the required anteroom shall be one of the following:
    1. The anteroom shall be at a positive pressure with respect to both the AII/PE room and the corridor or common space.
    2. The anteroom shall be at a negative pressure with respect to both the AII/PE room and the corridor or common space.
d. AII/PE rooms shall have two permanently installed devices and/or mechanisms to constantly monitor the differential air pressure. One device and/or mechanism shall monitor the pressure differential between the AII/PE room and the anteroom. The second device and/or mechanism shall monitor the pressure differential between the anteroom and the corridor or common space. For each device and/or mechanism, a local visual means shall be provided to indicate whenever differential pressure is not maintained.

9.3 Critical Care Units

9.3.1 Wound Intensive Care Units (Burn Units). Burn unit patient rooms that require humidifiers to comply with Table 7.1 shall be provided with individual humidity control.

9.4 Surgery Rooms

9.4.1 Operating Rooms, Operating/Surgical Cystoscopic Rooms, and Caesarean Delivery Rooms. These rooms shall be maintained at a positive pressure with respect to all adjoining spaces at all times. A pressure differential shall be maintained at a value of at least +0.01 in. wc (2.5 Pa). Each room shall have individual temperature control. These rooms shall be provided with a primary supply diffuser array that is designed as follows:

a. The airflow shall be unidirectional, downwards, and the average velocity of the diffusers shall be 25 to 35 cfm/ft^2 (127 to 178 L/s/m^2). The diffusers shall be concentrated to provide an airflow pattern over the patient and surgical team. ***Informative Note:*** For further information, see Memarzadeh and Manning [2002] and Memarzadeh and Jiang [2004] in Informative Appendix B.
b. The coverage area of the primary supply diffuser array shall extend a minimum of 12 in. (305 mm) beyond the footprint of the surgical table on each side. Within the portion of the primary supply diffuser array that consist of an area encompassing 12 in. (305 mm) on either side of the footprint of the surgical table, no more than 30% of this portion of the primary supply diffuser array area shall be used for nondiffuser uses such as lights, gas columns, equipment booms, access panels, sprinklers, etc.

Additional supply diffusers shall be permitted within the room, outside of the primary supply diffuser array, to provide additional ventilation to the operating room to achieve the environmental requirements of Table 7.1 relating to temperature, humidity, or a portion of the require air rates.

The room shall be provided with at least two low sidewall return or exhaust grilles spaced at opposite corners or as far apart as possible, with the bottom of these grilles installed approximately 8 in. (203 mm) above the floor.

Exception: In addition to the required low return (or exhaust) air grilles, such grilles may be placed high on the walls.

9.4.2 Sterilization Rooms. Steam that escapes from a steam sterilizer shall be exhausted using an exhaust hood or other suitable means. Ethylene oxide that escapes from a gas sterilizer shall be exhausted using an exhaust hood or other suitable means.

9.4.3 Imaging Procedure Rooms. If invasive procedures occur in this type of room, ventilation shall be provided in accordance with the ventilation requirements for procedure rooms. If anesthetic gases are administered, ventilation shall be provided in accordance with the ventilation requirements for operating rooms.

9.5 Support Spaces

9.5.1 Morgue and Autopsy Rooms. Ventilation for morgue and autopsy rooms shall meet the following requirements:

a. Low sidewall exhaust grilles shall be provided unless exhaust air is removed through an autopsy table designed for this purpose.
b. All exhaust air from autopsy, nonrefrigerated body holding, and morgue rooms shall be discharged directly to the outdoors without mixing with air from any other room or exhaust system.
c. Differential pressure between morgue and autopsy rooms and any adjacent spaces that have other functions shall be a minimum of −0.01 in. wc (−2.5 Pa).

9.5.2 Bronchoscopy

a. Differential pressure between bronchoscopy procedure and sputum induction rooms and any adjacent spaces that have other functions shall be a minimum of −0.01 in. wc (−2.5Pa).
b. Local exhaust shall be provided for sputum collection procedures.

9.6 Psychiatric Patient Areas. All exposed equipment located with these spaces shall have enclosures with rounded corners and tamper resistant fasteners. With the exception of HVAC room recirculating units, equipment shall be arranged such that maintenance personnel are not required to enter patient care spaces for service.

Delete Table 9.1 and notes, and add a new Table 9.1 and notes as shown.

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

Function of Space	Pressure Relationship to Adjacent Areas (f)	Minimum Outdoor ach	Minimum Total ach	All Room Air Exhausted Directly to Outdoors (j)	Air Recirculated by Means of Room Units (a)	Minimum Filter Efficiencies (m)	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
NURSING HOMES								
AII room (c)	Negative	2	12	Yes	No	13/NR	Max 60	70–75/21–24
AII anteroom (c)	(e)	NR	10	Yes	No	13/NR	NR	NR
Occupational therapy	NR	2	6	NR	NR	13/NR	NR	70–75/21–24
Physical therapy	Negative	2	6	NR	NR	13/NR	NR	70–75/21–24
Resident gathering/activity/dining	NR	4	4	NR	NR	13/NR	NR	70–75/21–24
Resident room	NR	2	2	NR	NR	13/NR	NR	70–75/21–24
Resident unit corridor	NR	NR	4	NR	NR	13/NR	NR	NR
Toilet/bathing room	Negative	NR	10	Yes	No	13/NR	NR	70–75/21–24
ASSISTED LIVING FACILITIES								
Resident gathering/activity/dining	NR	NR	NR	NR	NR	7/NR	NR	NR
Resident room	NR	NR	NR	NR	NR	7/NR	NR	NR
Resident unit corridor	NR	NR	NR	NR	NR	7/NR	NR	NR
Toilet/bathing room	NR	NR	NR	NR	NR	7/NR	NR	NR
HOSPICE FACILITIES								
AII room (c)	Negative	2	12	Yes	No	13/NR	Max 60	70–75/21–24
AII anteroom (c)	(e)	NR	10	Yes	No	13/NR	NR	NR
Resident room	NR	2	2	NR	NR	13/NR	NR	70–75/21–24
Resident unit corridor	NR	NR	4	NR	NR	13/NR	NR	NR
Toilet/bathing room	Negative	NR	10	Yes	No	13/NR	NR	70–75/21–24
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	7/NR	NR	72–78/22–26
Dietary storage	NR	NR	2	NR	No	7/NR	NR	72–78/22–26
Food preparation center (i)	NR	2	10	NR	No	7/NR	NR	72–78/22–26
Janitor's closet	Negative	NR	10	Yes	No	7/NR	NR	
Laundry, general	Negative	2	10	Yes	No	7/NR	NR	
Linen and trash chute room	Negative	NR	10	Yes	No	7/NR	NR	
Soiled linen sorting and storage	Negative	NR	10	Yes	No	7/NR	NR	
Warewashing	Negative	NR	10	Yes	No	7/NR	NR	
SUPPORT SPACE								
Clean utility	Positive	2	4	NR	NR	7/NR	NR	
Hazardous material storage	Negative	2	10	Yes	No	7/NR	NR	
Soiled utility or soiled holding	Negative	2	10	Yes	No	7/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. 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. See Section 9.2 and its subsections for pressure relationship requirements.

e. 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. 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[7]. In some cases, excess exfiltration or infiltration to or from exit corridors compromises the exit corridor restrictions of NFPA 90A[8], the pressure requirements of NFPA 96[9], 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. 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. The RH ranges listed are the minimum and/or maximum allowable at any point within the design temperature range required for that space.

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

l. 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).

Revise Section 10 as shown. The remainder of Section 10 is unchanged.

10. PLANNING, CONSTRUCTION, AND SYSTEM STARTUP

Facilities without operating rooms, that consist of spaces designed solely for outpatient or residential health, care, and support use, need only comply with Sections 10.1, 10.2, and 10.3 of this subsection.

Revise Section 11 as shown. The remainder of Section 11 is unchanged.

11. NORMATIVE REFERENCES

1. ASHRAE. ~~2010~~2016. ANSI/ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality*. Atlanta: ASHRAE.

XX. ASHRAE. 2016. ANSI/ASHRAE Standard 62.2, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*. Atlanta: ASHRAE.

Add a new informative reference and revise existing reference in Informative Appendix B as shown. The remainder of Informative Appendix B is unchanged.

ASHRAE. 201~~0b~~6a. ANSI/ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality*. Atlanta: ASHRAE.

ASHRAE. 2016b. ANSI/ASHRAE Standard 62.2, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*. Atlanta: ASHRAE.

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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About ASHRAE

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