BSR/ASHRAE/ASHE Addendum a
to ANSI/ASHRAE/ASHE Standard 170-2017

Public Review Draft

Proposed Addendum a to Standard 170-2017, Ventilation of Health Care Facilities

First Public Review (June 2019)
(Draft shows Proposed Changes to Current Standard)

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ASHRAE, 1791 Tullie Circle, NE, Atlanta GA 30329-2305

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FOREWORD

This proposed addendum clarifies filtration requirements on a space by space basis. The filtration levels designated, and their rational basis are included in Informative Appendix C, Table C-1.

In brief, this proposed addendum:

a. *Revises requirements for filters in the body of the standard, removes Table 6.4, and adds filter efficiencies by space to table 7-1, 8-1, and 9-1.*
b. *Adds Informative Appendix C: Recommended Filter Efficiencies by Space Type*

This change to filter requirements is expected to have no impact to employee, patient or occupant safety. The change is expected to have a mostly positive cost impact, offering first, operating, and energy cost savings in many spaces. Some room filter requirements are increased, which represent added costs in those locations.

The name and number of spaces in table 7-1 are being modified in addendum "p", which includes a similar format of space by space filter assignments. The filter assignments here supersede, or replace those, those shown in "p". New spaces added in "p" are included here.

The name and number of spaces in tables 8-1 and 9-1 are based on addendum "n", which was previously out for public review in 2017 and waiting on final publication.

[Note to Reviewers: This addendum makes proposed changes to the current standard, including the changes from addendum "n". Changes are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]

Addendum a to 170-2017

Modify Section 6.4 as follows:

6.4 Filtration. Filtration of mechanically supplied air shall be provided as follows: ~~Filter banks shall be provided in accordance with Table 6.4. 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. (For further information, see CDC [2003] in Informative Appendix B.) All of the air provided to a space shall be filtered in accordance with Table 6.4, except as otherwise indicated in Section 7.1 for spaces that allow recirculating HVAC room units.~~

a. Particulate matter filters, minimum MERV-A-8, shall be provided upstream of the first heat exchanger surface of any air-conditioning system that combines return air from multiple rooms or introduces outdoor air.
b. Outdoor air shall be filtered in accordance with Tables 7.1, 8.1, or 9.1.
c. Air supplied from equipment serving multiple or different spaces shall be filtered in accordance with Tables 7.1, 8.1, or 9.1.
d. Air recirculated within a room shall be filtered in accordance with Tables 7.1, 8.1, or 9.1 or section 7.1.a.5, 8.1.a.5, or 9.1.a.5.
e. The design shall include all necessary provisions to prevent moisture accumulating on filters located downstream of cooling coils and humidifiers.
f. Minimum filter requirements shall meet the equivalent MERV-A rating when tested in accordance with Appendix J of ANSI/ASHRAE Standard 52.2.
g. Any HEPA filter or filter MERV-A-14 or higher shall have sealing interface surfaces.
h. 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 (IEST [2005] in informative Appendix B).
i. For spaces that do not permit air recirculated by means of room units and have a minimum filter efficiency of MERV-A-14 or HEPA in accordance with table 7.1, 8.1, or 9.1, the minimum filter requirement listed in table 7.1, 8.1, or 9.1 shall be installed downstream of all wet air cooling coils and the supply fan.

~~TABLE 6.4 Minimum Filter Efficiencies~~

~~Space Designation (According to Function)~~	~~Filter Bank No. 1 (MERV)[a]~~	~~Filter Bank No. 2 (MERV)[a]~~
~~Operating rooms; inpatient and ambulatory diagnostic and therapeutic radiology; inpatient delivery and recovery spaces~~	~~7~~	~~14~~
~~Inpatient care, treatment, and diagnosis, and those spaces providing direct service or clean supplies and clean processing (except as noted below); AII (rooms)~~	~~7~~	~~14~~
~~Protective environment (PE) rooms~~	~~7~~	~~HEPA[c,d]~~
~~Laboratory work areas, procedure rooms, and associated semirestricted spaces~~	~~13[b]~~	~~NR~~
~~Administrative; bulk storage; soiled holding spaces; food preparation spaces; and laundries~~	~~7~~	~~NR~~
~~Psychiatric hospitals~~	~~7~~	~~NR~~

~~NR = not required~~
~~***Notes:***~~
~~a. The minimum efficiency reporting value (MERV) is based on the method of testing described in ANSI/ASHRAE Standard 52.2, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size* ([ASHRAE 2012] in Informative Appendix B).~~
~~b. Additional prefilters may be used to reduce maintenance for filters with efficiencies higher than MERV 7.~~

~~c. As an alternative, MERV-A 14 rated filters may be used in Filter Bank No. 2 if a tertiary terminal HEPA filter is provided for these spaces.~~
~~d. 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 (IEST [2005] in Informative Appendix B).~~

~~**6.4.1 First Filtration Bank.** Filter Bank No. 1 shall be placed upstream of the heating and cooling coils such that all mixed air is filtered.~~

~~**6.4.2 Second Filtration Bank.** Filter Bank No. 2 shall be installed downstream of all wet-air cooling coils and the supply fan. All second filter banks shall have sealing interface surfaces.~~

6.4.3~~1~~1 Filter Bank Blank-Off Panels. Filter bank blank-off panels shall be permanently attached to the filter bank frame, constructed of rigid materials, and have sealing surfaces equal to or greater than the filter media installed within the filter bank frame.

6.4.4~~2~~2 Filter Frames. Filter frames shall be durable and proportioned to provide an airtight fit with the enclosing ductwork. All joints between filter segments and enclosing ductwork shall have gaskets or seals to provide a positive seal against air leakage.

Modify Section 6.7.1 as follows:

6.7.1 General. Maintain the pressure relationships required in required in Tables 7.1, 8.1, and 9.1 in all modes of HVAC system operation, except as noted in the table. …. Airstream surfaces of the air distribution system ~~downstream of Filter Bank No. 2~~ shall comply with Section 5.4 of ANSI/ ASHRAE Standard 62.1.[12] …

Modify Section 6.8.1 as follows:

6.8.1 General. Energy recovery systems shall be located upstream of filters required by section 6.4 ~~Filter Bank No. 2~~. If energy recovery systems are utilized, 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.

Modify Section 6.9 (c) as follows:

6.9 Insulation and Duct Lining

c. For spaces requiring a minimum MERV-A-14 or higher filter, d~~D~~uct lining shall not be used in ductwork located downstream of filters ~~Filter Bank No. 2~~. Duct lining that is impervious, or with an impervious cover, may be allowed in terminal units, sound attenuators, and air distribution devices downstream of filters ~~Filter Bank No. 2~~. This lining and cover shall be factory installed.

Modify Section 7.1 (a) 5. (iii) as follows:

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

a. Spaces shall be ventilated according to Table 7.1.

5. For spaces where Table 7.1 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~~ A-8 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.

Modify Table 7.1 as follows:

TABLE 7.1 Design Parameters – Hospital Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
SURGERY AND CRITICAL CARE								
Operating room (m), (o)	Positive	4	20	NR	No	MERV-A-16 (gg)	20–60	68–75/20–24
Operating/surgical cystoscopic rooms, (m), (o)	Positive	4	20	NR	No	MERV-A-16	20–60	68–75/20–24
Delivery room (Caesarean) (m), (o)	Positive	4	20	NR	No	MERV-A-16	20–60	68–75/20–24
Substerile service area	NR	2	6	NR	No	MERV-A-8, (ff)	NR	NR
Recovery room	NR	2	6	NR	No	MERV-A-8	20–60	70–75/21–24
Critical and intensive care	NR	2	6	NR	No	MERV-A-14	30–60	70–75/21–24
Intermediate care (s)	NR	2	6	NR	NR	MERV-A-14	max 60	70–75/21–24
Wound intensive care (burn unit)	Positive	2	6	NR	No	HEPA	40–60	70–75/21–24
Newborn intensive care	Positive	2	6	NR	No	MERV-A-14	30–60	72–78/22–26
Treatment room (p)	NR	2	6	NR	NR	MERV-A-8	20–60	70–75/21–24
Trauma room (crisis or shock) (c)	Positive	3	15	NR	No	MERV-A-14	20–60	70–75/21–24
Medical/anesthesia gas storage (r)	Negative	NR	8	Yes	NR	MERV-A-8	NR	NR
Laser eye room	Positive	3	15	NR	No	MERV-A-14	20–60	70–75/21–24
Emergency Department public waiting area	Negative	2	12	Yes (q)	NR	MERV-A-8	max 65	70–75/21–24
Triage	Negative	2	12	Yes (q)	NR	MERV-A-8	max 60	70–75/21–24
ER decontamination	Negative	2	12	Yes	No	MERV-A-14	NR	NR
Radiology waiting rooms	Negative	2	12	Yes (q), (w)	NR	MERV-A-8	max 60	70–75/21–24
Procedure room (o), (d)	Positive	3	15	NR	No	MERV-A-14	20–60	70–75/21–24
Emergency department exam/treatment room (p)	NR	2	6	NR	NR	MERV-A-14	max 60	70–75/21–24
INPATIENT NURSING								
Patient room	NR	2	4(y)	NR	NR	MERV-A-14	max 60	70–75/21–24
Nourishment area or room	NR	NR	2	NR	NR	MERV-A-8	NR	NR
Toilet room	Negative	NR	10	Yes	No	MERV-A-8	NR	NR
Newborn nursery suite	NR	2	6	NR	No	MERV-A-14	30–60	72–78/22–26
Continued care nursery	NR	2	6	NR	No	MERV-A-14	30-60	72-78/22-26
Protective environment room (t)	Positive	2	12	NR	No	HEPA	max 60	70–75/21–24
AII room (u)	Negative	2	12	Yes	No	MERV-A-14	max 60	70–75/21–24
Combination AII/PE room	Positive	2	12	Yes	No	HEPA	Max 60	70-75/21-24
AII anteroom (u)	(e)	NR	10	Yes	No	MERV-A-8	NR	NR
PE anteroom (t)	(e)	NR	10	NR	No	HEPA	NR	NR

Note: NR = no requirement

TABLE 7.1 Design Parameters – Hospital Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Combination AII/PE anteroom	(e)	NR	10	Yes	No	HEPA	NR	NR
Labor/delivery/recovery/postpartum (LDRP) (s)	NR	2	6	NR	NR	MERV-A-14	max 60	70–75/21–24
Labor/delivery/recovery (LDR) (s)	NR	2	6	NR	NR	MERV-A-14	max 60	70–75/21–24
Patient Corridor	NR	NR	2	NR	NR	MERV-A-14	NR	NR
NURSING FACILITY								
Resident room	NR	2	2	NR	NR	MERV-A-14	NR	70–75/21–24
Resident gathering/activity/dining	NR	4	4	NR	NR	MERV-A-8	NR	70–75/21–24
Resident unit corridor	NR	NR	4	NR	NR	MERV-A-8	NR	NR
Physical therapy	Negative	2	6	NR	NR	MERV-A-8	NR	70–75/21–24
Occupational therapy	NR	2	6	NR	NR	MERV-A-8	NR	70–75/21–24
Bathing room	Negative	NR	10	Yes	No	MERV-A-8	NR	70–75/21–24
RADIOLOGY								
X-ray (diagnostic and treatment)	NR	2	6	NR	NR	MERV-A-8	max 60	72–78/22–26
X-ray (surgery/critical care and catheterization)	Positive	3	15	NR	No	MERV-A-14	max 60	70–75/21–24
Darkroom (g)	Negative	2	10	Yes	No	MERV-A-8	NR	NR
DIAGNOSTIC AND TREATMENT								
Bronchoscopy, sputum collection, and pentamidine administration	Negative	2	12	Yes	No	MERV-A-14	NR	68–73/20–23
Laboratory work area, general (f), (v)	Negative	2	6	NR	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, bacteriology (f), (v)	Negative	2	6	Yes	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, biochemistry (f), (v)	Negative	2	6	Yes	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, cytology (f), (v)	Negative	2	6	Yes	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, glasswashing (f)	Negative	2	10	Yes	NR	MERV-A-8	NR	NR
Laboratory work area, histology (f), (v)	Negative	2	6	Yes	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, microbiology (f), (v)	Negative	2	6	Yes	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, nuclear medicine (f), (v)	Negative	2	6	Yes	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, pathology (f), (v)	Negative	2	6	Yes	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, serology (f), (v)	Negative	2	6	Yes	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, sterilizing (f)	Negative	2	10	Yes	NR	MERV-A-8	NR	70–75/21–24
Laboratory work area, media transfer (f), (v)	Positive	2	4	NR	NR	MERV-A-8	NR	70–75/21–24
Nonrefrigerated body-holding room (h)	Negative	NR	10	Yes	No	MERV-A-8	NR	70–75/21–24

Note: NR = no requirement

TABLE 7.1 Design Parameters – Hospital Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Autopsy room	Negative	2	12	Yes	No	MERV-A-8	NR	68–75/20–24
Pharmacy(b)	Positive	2	4	NR	NR	MERV-A-8	NR	NR
ECT procedure room	NR	2	4	NR	NR	MERV-A-8	max 60	72-78/22-26
General examination room	NR	2	4	NR	NR	MERV-A-8	max 60	70-75/21-24
Special examination room (aa)	NR	2	6	NR	NR	MERV-A-14 (hh)	max 60	70–75/21–24
Medication room	NR	2	4	NR	NR	MERV-A-8	max 60	70–75/21–24
Gastrointestinal endoscopy procedure room (x)	NR	2	6	NR	No	MERV-A-8	20–60	68–73/20–23
Endoscope cleaning	Negative	2	10	Yes	No	MERV-A-8	NR	NR
Treatment room	NR	2	6	NR	NR	MERV-A-8	max 60	70–75/21–24
Hydrotherapy	Negative	2	6	NR	NR	MERV-A-8	NR	72–80/22–27
Physical therapy	Negative	2	6	NR	NR	MERV-A-8	Max 65	72–80/22–27
Dialysis treatment area	NR	2	6	NR	NR	MERV-A-8	NR	72-78/22-26
Dialyzer reprocessing room	Negative	NR	10	Yes	No	MERV-A-8	NR	NR
Nuclear medicine hot lab	Negative	NR	6	Yes	No	MERV-A-8	NR	70-75/21-24
Nuclear medicine treatment room	Negative	2	6	Yes	NR	MERV-A-14	NR	70-75/21-24
STERILIZING								
Sterilizer equipment room	Negative	NR	10	Yes	No	MERV-A-8	NR	NR
STERILE PROCESSING DEPARTMENT (z)								
Decontamination room	Negative	2	6	Yes	No	MERV-A-8	NR	60–73/16–23
Clean workroom	Positive	2	4	NR	No	MERV-A-8, (ff)	max 60	68–73/20–23
Sterile storage room	Positive	2	4	NR	NR	MERV-A-8, (ff)	max 60	max 75/24
SERVICE								
Food preparation center (i)	NR	2	10	NR	No	MERV-A-8	NR	72–78/22–26
Warewashing	Negative	NR	10	Yes	No	MERV-A-8	NR	NR
Dietary storage	NR	NR	2	NR	No	MERV-A-8	NR	72–78/22–26
Laundry, general	Negative	2	10	Yes	No	MERV-A-8	NR	NR
Soiled linen sorting and storage	Negative	NR	10	Yes	No	MERV-A-8	NR	NR
Clean linen storage	Positive	NR	2	NR	NR	MERV-A-8	NR	72–78/22–26
Linen and trash chute room	Negative	NR	10	Yes	No	MERV-A-8	NR	NR
Bedpan room	Negative	NR	10	Yes	No	MERV-A-8	NR	NR

Note: NR = no requirement

TABLE 7.1 Design Parameters

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Bathroom	Negative	NR	10	Yes	No	MERV-A-8	NR	72–78/22–26
Janitor's closet	Negative	NR	10	Yes	No	MERV-A-8	NR	NR
SUPPORT SPACE								
Soiled workroom or soiled holding	Negative	2	10	Yes	No	MERV-A-8	NR	NR
Clean workroom or clean holding	Positive	2	4	NR	NR	MERV-A-8	NR	NR
Hazardous material storage	Negative	2	10	Yes	No	MERV-A-8	NR	NR

Note: NR = no requirement

Normative Notes for Table 7.1:

…

b. Pharmacy compounding areas may have additional air change, and 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 (see USP [2012] in Informative Appendix B), and the equipment utilized in the spaces. Minimum efficiency of filters for any space where compounding occurs shall be determined by the applicable USP standard (USP 795, USP 797, or USP 800).

…

ff. Minimum MERV-A-14 filters shall be required for spaces where sterile equipment is packed into sterile packages. Spaces where sterile products are stored but not packed shall not be required to have MERV-A-14 filters.

gg. See also section 7.4.1.c.

hh. A minimum MERV-A-8 filter may be utilized for this space in lieu of a minimum MERV-A-14 filter if all room air is exhausted directly to the outdoors and the pressure relationship to adjacent areas is kept negative. If a filter rated less than MERV-A-14 is utilized the space shall be considered "Negative" with regards to the table and must comply with all other requirements for negative spaces within the standard.

The following spaces are added to Table 7.1 in Addendum p. Modify as shown below.

TABLE 7.1 Design Parameters

Function of Space	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)	Unoccupied Turndown	Minimum Filter Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Seclusion room (2.1-2.4.3)	NR	2	4 (y)	NR	NR	Yes	~~8/NR~~MERV-A-14	Max 60	70-75/21-24
Nursery Workroom (2.2-2.12.6.3)	NR	2	6	NR	No	Yes	~~8/14~~MERV-A-8	Max 60	72-78/22-26
Interventional and intraoperative MRI procedure room (2.2-3.5.2)	Positive	3	15	NR	No	Yes	~~8/14~~ MERV-A-14	max 60	70–75/21–24

Normative Notes for Table 7.1:

…

bb. 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, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size* ([ASHRAE 2012] in Informative Appendix B).

Modify Section 7.2.2 as follows:

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

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.

3. HEPA filters shall be located in the air terminal device.

EXCEPTION to 7.2.2.c: For common systems serving more than one protective environment space and where more than 75% of airflow serves protective environment spaces, HEPA filters may be located in the air handling unit in a position downstream of all cooling and heating equipment.

Modify Section 7.4.1 as follows:

7.4.1 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:

…
c. In operating rooms designated for orthopedic procedures, transplants, neuro-surgery, or dedicated burn unit procedures, HEPA filters shall be provided and located in the air terminal device.

EXCEPTION 1 to 7.4.1.c: For common systems serving more than one HEPA-filtered operating rooms space and where more than 75% of airflow serves HEPA-filtered operating rooms, HEPA filters may be located in the air handling unit in a position downstream of all cooling and heating equipment.

EXCEPTION 2 to 7.4.1.c: If HEPA filters are provided for operating rooms in excess of the requirements of Table 7-1, they shall not be required to be in the air terminal device.

Modify Section 8.1 (a) 5. (iii) as follows:

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

a. Spaces shall be ventilated according to Table 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~~ A-8 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.

Modify Table 8.1 as follows:

TABLE 8.1 Design Parameters – Outpatient Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
COMMON SPACES IN OUTPATIENT FACILITIES								
General Purpose Examination/Observation Room (3.1-3.2.2)	NR	2	4	NR	NR	~~7/NR~~MERV-A-8	max 60	70–75/21–24
Special Purpose Examination Room (x) (3.1-3.2.3)	NR	2	6	NR	NR	~~7/NR~~MERV-A-14 (w)	max 60	70–75/21–24
AII Room (i) (3.1-3.4.2)	Negative	2	12	Yes	No	~~7/NR~~MERV-A-8	max 60	70–75/21–24
AII Anteroom (i) (3.1-3.4.3)	(e)	NR	10	Yes	No	~~7/NR~~MERV-A-8	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)~~MERV-A-8	NR	NR
Clean Supply Storage (3.1-3.6.9)	Positive	2	4	NR	NR	~~7/NR~~MERV-A-8	max 60	72–78/22–26
Soiled Holding Room (3.1-3.6.10)	Negative	2	6	Yes	No	~~7/NR~~MERV-A-8	NR	72–78/22–26
Laboratory Testing/Work Area if in a separate dedicated room (3.1-4.1.2)	Negative	2	6	Yes	NR	~~7/NR~~MERV-A-8	NR	70–75/21–24
Medical Waste Holding Spaces (3.1-5.4.1.3)	Negative	2	10	Yes	No	~~7/NR~~MERV-A-8	NR	NR
Environmental Services Room (3.1-5.5.1)	Negative	NR	10	Yes	No	~~7/NR~~MERV-8-A	NR	NR
Bronchoscopy, sputum collection, and pentamidine administration (n)	Negative	2	12	Yes	No	~~7/NR~~MERV-A-14	NR	68-73/20-23
Emergency waiting rooms	Negative	2	12	Yes (q)	NR	~~7/NR~~MERV-A-8	Max. 65	70-75/21-24
SPACES SPECIFIC TO PARTICULAR OUTPATIENT FACILITIES								
Freestanding Urgent Care Facility Procedure Room (3.5-3.2.2)	Positive	2	6	NR	No	~~7/NR~~MERV-A-8	NR	70–75/21–24
Diagnostic Imaging Waiting Area (3.5-6.1.3.2) (g)	Negative	2	12	Yes (q), (r)	NR	~~7/NR~~MERV-A-8	max 60	70–75/21–24
Cancer Treatment Area (p) (3.6-3.2)	NR	2	6	NR	NR	~~7/NR~~MERV-A-8	max 60	70–75/21–24

Outpatient Surgical Facility Procedure Room (o),(d) (3.7-3.2)	Positive	3	15	NR	No	~~7/NR~~MERV-A-14	20–60	70–75/21–24
Outpatient Surgical Facility Operating Room (m), (o) (3.7-3.3)	Positive	4	20	NR	No	~~7/14~~MERV-A-16 (v)	20–60	68–75/20–24
Postoperative Recovery Area (3.7-3.4.3)	NR	2	6	NR	No	~~7/NR~~MERV-A-8	max 60	70–75/21–24

Note: NR = no requirement

TABLE 8.1 Design Parameters – Outpatient Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Office-Based Procedure Room (p) (3.8-3.1)	NR	2	4	NR	NR	~~7/NR~~MERV-A-8	max 60	70–75/21–24
Endoscopy Procedure Room (h) (3.9-3.2.2)	NR	2	6	NR	No	~~7/NR~~MERV-A-8	max 60	68–73/20–23
Pre-Procedure Patient Care Area (t) (3.9-3.3)	NR	2	2	NR	NR	~~7/NR~~MERV-A-8	max 60	70–75/21–24
Post-Procedure Recovery Area (u) (3.9-3.3)	NR	2	2	NR	NR	~~7/NR~~MERV-A-8	max 60	70–75/21–24
Instrument Processing Room (3.9-5.1)	Negative	2	10	Yes	No	~~7/NR~~MERV-A-8, (s)	NR	NR
ECT Procedure Room (p) (3.11-3.3.2.2)	NR	2	4	NR	NR	~~7/NR~~MERV-A-8	max 60	70–75/21–24

Note: NR = no requirement

Normative Notes for Table 8.1:

…

b. Pharmacy compounding areas may have additional air change, and 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 (see USP [2012] in Informative Appendix B), and the equipment utilized in the spaces. Minimum efficiency of filters for any space where compounding occurs shall be determined by the applicable USP standard (USP 795, USP 797, or USP 800).

…

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 (IEST [2005] in Informative Appendix B).~~ Minimum MERV-A-14 filters shall be required for spaces where sterile equipment is packed into sterile packages. Spaces where sterile products are stored but not packed shall not be required to have MERV-A-14 filters.

…

v. See also section 8.4.1.c.
w. A minimum MERV-A-8 filter may be utilized for this space in lieu of a minimum MERV-A-14 filter if all room air is exhausted directly to the outdoors and the pressure relationship to adjacent areas is kept negative. If a filter rated less than MERV-A-14 is utilized the space shall be considered "Negative" with regards to the table and must comply with all other requirements for negative spaces within the standard.
x. Examination rooms programmed for use by patients with undiagnosed gastrointestinal symptoms, undiagnosed respiratory symptoms, or undiagnosed skin symptoms.

Modify Section 8.2.2 as follows:

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

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.

3. HEPA filters shall be located in the air terminal device.

EXCEPTION to 8.2.2.c: For common systems serving more than one protective environment space and where more than 75% of airflow serves protective environment spaces, HEPA filters may be located in the air handling unit in a position downstream of all cooling and heating equipment.

Modify Section 8.4.1 as follows:

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:

…
c. In operating rooms designated for orthopedic procedures, transplants, neuro-surgery, or dedicated burn unit procedures, HEPA filters shall be provided and located in the air terminal device.

EXCEPTION 1 to 8.4.1.c: For common systems serving more than one HEPA-filtered operating rooms space and where more than 75% of airflow serves HEPA-filtered operating rooms, HEPA filters may be located in the air handling unit in a position downstream of all cooling and heating equipment.

EXCEPTION 2 to 8.4.1.c: If HEPA filters are provided for operating rooms in excess of the requirements of Table 7-1, they shall not be required to be in the air terminal device.

Modify Table 9.1 as follows:

TABLE 9.1 Design Parameters- Nursing Home Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
NURSING HOMES								
AII room (c)	Negative	2	12	Yes	No	~~13/NR~~MERV-A-14	max 60	70–75/21–24
AII anteroom (c)	(e)	NR	10	Yes	No	~~13/NR~~MERV-A-8	NR	NR
Resident room	NR	2	2	NR	NR	~~13/NR~~MERV-A-14	NR	70–75/21–24
Resident gathering/activity/dining	NR	4	4	NR	NR	~~13/NR~~MERV-A-8	NR	70–75/21–24
Resident unit corridor	NR	NR	4	NR	NR	~~13/NR~~MERV-A-8	NR	NR
Physical therapy	Negative	2	6	NR	NR	~~13/NR~~MERV-A-8	NR	70–75/21–24
Occupational therapy	NR	2	6	NR	NR	~~13/NR~~MERV-A-8	NR	70–75/21–24
Toilet/Bathing room	Negative	NR	10	Yes	No	~~13/NR~~MERV-A-8	NR	70–75/21–24
ASSISTED LIVING FACILITIES								
Resident room	NR	NR	NR	NR	NR	~~7/NR~~MERV-A-8	NR	NR
Resident gathering/activity/dining	NR	NR	NR	NR	NR	~~7/NR~~MERV-A-8	NR	NR
Resident unit corridor	NR	NR	NR	NR	NR	~~7/NR~~MERV-A-8	NR	NR
Toilet/Bathing room	NR	NR	NR	NR	NR	~~7/NR~~MERV-A-8	NR	NR
HOSPICE FACILITIES								
AII room (c)	Negative	2	12	Yes	No	~~13/NR~~MERV-A-14	max 60	70–75/21–24
AII anteroom (c)	(e)	NR	10	Yes	No	~~13/NR~~MERV-A-8	NR	NR
Resident room	NR	2	2	NR	NR	~~13/NR~~MERV-A-8	NR	70–75/21–24

Resident unit corridor	NR	NR	4	NR	NR	~~13/NR~~MERV-A-8	NR	NR
Toilet/Bathing room	Negative	NR	10	Yes	No	~~13/NR~~MERV-A-8	NR	70–75/21–24
RADIOLOGY								
X-ray (diagnostic and treatment)	NR	2	6	NR	NR	~~7/NR~~MERV-A-8	max 60	72–78/22–26
SERVICE								
Food preparation center (i)	NR	2	10	NR	No	~~7/NR~~MERV-A-8	NR	72–78/22–26
Warewashing	Negative	NR	10	Yes	No	~~7/NR~~MERV-A-8	NR	
Dietary storage	NR	NR	2	NR	No	~~7/NR~~MERV-A-8	NR	72–78/22–26
Laundry, general	Negative	2	10	Yes	No	~~7/NR~~MERV-A-8	NR	
Soiled linen sorting and storage	Negative	NR	10	Yes	No	~~7/NR~~MERV-A-8	NR	
Clean linen storage	Positive	NR	2	NR	NR	MERV-A-8	NR	72–78/22–26

Note: NR = no requirement

TABLE 9.1 Design Parameters- Nursing Home Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Linen and trash chute room	Negative	NR	10	Yes	No	~~7/NR~~MERV-A-8	NR	
Janitor's closet	Negative	NR	10	Yes	No	~~7/NR~~MERV-A-8	NR	
SUPPORT SPACES								
Soiled utility or soiled holding	Negative	2	10	Yes	No	~~7/NR~~MERV-A-8	NR	
Clean utility	Positive	2	4	NR	NR	~~7/NR~~MERV-A-8,(g)	NR	
Hazardous material storage	Negative	2	10	Yes	No	~~7/NR~~MERV-A-8	NR	

Note: NR = no requirement

Normative Notes for Table 9.1:

…

g. ~~not used~~ Minimum MERV-A-14 filters shall be required for spaces where sterile equipment is packed into sterile packages. Spaces where sterile products are stored but not packed shall not be required to have MERV-A-14 filters.

…

m. 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, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size* ([ASHRAE 2012] in Informative Appendix B.

Modify Section 11 as follows:

11. NORMATIVE REFERENCES

14. ISO. 2016. ISO 16890-1 *Air filters for general ventilation -- Part 1: Technical specifications, requirements and classification system based upon particulate matter efficiency (ePM).* International Organization for Standardization

Modify Informative Appendix A as follows:

A1. O&M IN HEALTH CARE FACILITIES

The following operations and maintenance procedures are recommended for health care facilities.

A1.1 Operating Rooms

a. Each operating room should be tested for positive pressure semi-annually or on an effective preventative maintenance schedule.

~~b. When HEPA filters are present within the diffuser of operating rooms, the filter should be replaced based on pressure drop.~~

b~~e~~. Operating and caesarean delivery room ventilation systems shall operate at all times, except during maintenance and conditions requiring shutdown by the building's fire alarm system.

A1.2 Protective Environment (PE) Rooms. PE rooms should remain under positive pressure with respect to all adjoining rooms whenever an immunocompromised patient is present. PE rooms should be tested for positive pressure daily when an immunocompromised patient is present. ~~When HEPA filters are present within the diffuser of protective environment rooms, the filter should be replaced based on pressure drop.~~

A1.3 Airborne Infection Isolation (AII) Rooms. AII rooms should remain under negative pressure relative to all adjoining rooms whenever an infectious patient is present. They should be tested for negative pressure daily whenever an infectious patient is present.

A1.4 Filters. F~~inal f~~ilters and filter frames should be visually inspected for pressure drop and for bypass monthly. ~~Filters should be replaced based on pressure drop with filters that provide the efficiencies specified in Table 6.4.~~ All filters and air cleaning devices shall be replaced or maintained per manufacturer recommendations.

Modify Informative Appendix B as follows:

INFORMATIVE APPENDIX B
INFORMATIVE REFERENCES AND BIBLIOGRAPHY

…

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

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

Add Informative Appendix C.

C1. RECOMMENDED FILTER EFFICIENCIES BY SPACE TYPE

Spaces in Table 7-1 of this standard have filter efficiencies assigned based on Table C-1. This table is provided here for information, to allow users to understand the intent of the filter assignments and make engineering judgments on spaces not specifically named in the standard.

Table C-1: Recommended Filter Efficiencies by Space Type

Level	Space Category	Filter Efficiency Recommendations (1), (2)
I	- Primarily exhausted space (e.g. restrooms, janitor's rooms) - Any-human occupied space - Any room, inpatient or outpatient, where a patient stays less than 6 hours including waiting rooms. - Laboratories - Resident rooms in assisted living or hospice - Storage of packaged sterile material, clean linen, or pharmaceuticals (3) - Treatment rooms, Endoscopy procedure room - Dirty side of decontamination process	MERV8 (equivalent to ASHRAE 62.1 or Standard 62.2)
II	- Inpatient spaces, including Medical-Surgical, Airborne Isolation (4) -Special exam room for suspect airborne cases, emergency department exam rooms (5) - Resident room in a skilled nursing area - Workroom for packing of sterile materials - CT or MRI Procedure, Interventional radiology (including biopsy), or bronchoscopy - ER Procedure or Trauma Room	MERV14 (6)(7)
III	- Operating Room (8)	MERV16 (6)
IV	- Operating Room designated for orthopedic, transplants, neuro-surgery, or dedicated burn unit procedures - Protective environments, including burn units	HEPA

Notes

(1) Where listed, MERV rating is assumed to be non-degrading (e.g. MERV-A)
(2) Transfer air due to differences in pressure between spaces may be unfiltered.
(3) Pharmacy compounding spaces are not covered in this table. Follow <USP>795, <USP> 797, or <USP> 800 as applicable.
(4) Does not include recirculated air. Air recirculated in an Airborne Isolation room requires HEPA filters.
(5) Air from spaces where suspected airborne cases may be treated or examined should be filtered at level II prior to re-circulation to other spaces. If exhausted, supply air filtration may be level I.
(6) Minimum MERV rating of the highest efficiency filter in the air stream.
(7) Filter efficiency if supply air is used; Not intended to exclude natural ventilation if otherwise allowed.
(8) An optional risk assessment, with the user group may indicate a need to increase from Level III to Level IV.

NOTE TO REVIEWER: Addenda N (previously proposed to 2013 version) and Addendum P also affect portions of Tables 7.1, 8.1, and 9.1 changed by this proposal. The following shows how Tables 7.1, 8.1, and 9.1 will appear combined with Addenda N and P. This is provided for reference only and not for comment.

TABLES BEGIN ON THE FOLLOWING PAGE

TABLE 7.1 Design Parameters for Inpatient Spaces

Function of Space (dd)	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)	Unoccupied Turndown	Minimum Filter Efficiencies	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
NURSING UNITS AND OTHER PATIENT CARE AREAS									
Operating room (2.2-3.3.2) (m), (o)	Positive	4	20	NR	No	Yes	MERV-A-16 (gg)	20–60	68–75/20–24
Operating/surgical cystoscopic rooms, (m), (o)	Positive	4	20	NR	No	Yes	MERV-A-16	20–60	68–75/20–24
Cesarean delivery room (2.2-2.11.9) (m), (o)	Positive	4	20	NR	No	Yes	MERV-A-16	20–60	68–75/20–24
Sterile processing room (2.2-3.3.6.13)	NR	2	6	NR	No	Yes	MERV-A-8, (ff)	NR	NR
Phase I PACU and Phase II recovery (2.2-3.3.4.3 & 2.2-3.3.4.4)	NR	2	6	NR	No	Yes	MERV-A-8	20–60	70–75/21–24
Critical care patient care station (2.2-2.6.2)	NR	2	6	NR	No	Yes	MERV-A-14	30–60	70–75/21–24
Intermediate care patient room (2.2-2.5.2) (s)	NR	2	6	NR	NR	Yes	MERV-A-14	max 60	70–75/21–24
Wound intensive care (burn unit)	NR	2	6	NR	No	Yes	HEPA	40–60	70–75/21–24
Neonatal intensive care (2.2-2.10.2)	Positive	2	6	NR	No	Yes	MERV-A-14	30–60	72–78/22–26
Treatment room (p)	NR	2	6	NR	NR	Yes	MERV-A-8	20–60	70–75/21–24
Emergency department Trauma/resuscitation room (2.2-3.1.3.3(6)) (c)	Positive	3	15	NR	No	Yes	MERV-A-14	20–60	70–75/21–24
Medical/anesthesia gas storage (r) (2.2-3.3.6.11 (3))	Negative	NR	8	Yes	NR	No	MERV-A-8	NR	NR
Laser eye room	Positive	3	15	NR	No	Yes	MERV-A-14	20–60	70–75/21–24
Emergency Department public waiting area (2.2-3.1.3.4)	Negative	2	12	Yes (q)	NR	Yes (ee)	MERV-A-8	max 65	70–75/21–24
Emergency service Triage area (2.2-3.1.3.3)	Negative	2	12	Yes (q)	NR	Yes	MERV-A-8	max 60	70–75/21–24
Emergency department human decontamination (2.2-3.1.3.6 (8)	Negative	2	12	Yes	No	Yes	MERV-A-14	NR	NR
Radiology waiting rooms	Negative	2	12	Yes (q), (w)	NR	Yes (ee)	MERV-A-8	max 60	70–75/21–24
Procedure room (3.7-3.2) (o), (d)	Positive	3	15	NR	No	Yes	MERV-A-14	20–60	70–75/21–24
Emergency department exam/treatment room (2.2-3.1.3.6) (p)	NR	2	6	NR	NR	Yes	MERV-A-14	max 60	70–75/21–24
Patient room (2.1-2.2)	NR	2	4(y)	NR	NR	Yes	MERV-A-14	max 60	70–75/21–24
Seclusion room (2.1-2.4.3)	NR	2	4 (y)	NR	NR	Yes	MERV-A-14	max 60	70–75/21–24
Nourishment area or room (2.1-2.6.7)	NR	NR	2	NR	NR	Yes	MERV-A-8	NR	NR

Note: NR = no requirement

TABLE 7.1 Design Parameters for Inpatient Spaces

Function of Space (dd)	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)	Unoccupied Turndown	Minimum Filter Efficiencies	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Patient toilet room (2.1-2.2.6)	Negative	NR	10	Yes	No	Yes	MERV-A-8	NR	NR
Newborn nursery (2.2-2.12.3.1)	NR	2	6	NR	No	Yes	MERV-A-14	30–60	72–78/22–26
Continued care nursery (2.2-2.12.3.3)	NR	2	6	NR	No	Yes	MERV-A-14	30-60	72-78/22-26
Nursery workroom (2.2-2.12.6.3)	NR	2	6	NR	No	Yes	MERV-A-8	max 60	72-78/22-26
Protective environment room (t) (2.2-2.2.4.4)	Positive	2	12	NR	No	No	HEPA	max 60	70–75/21–24
AII room (u) (2.1-2.4.2)	Negative	2	12	Yes	No	Yes	MERV-A-14	max 60	70–75/21–24
Combination AII/PE room (2.2-2.2.4.5)	Positive	2	12	Yes	No	No	HEPA	Max 60	70-75/21-24
AII anteroom (u) (2.1-2.4.2.3)	(e)	NR	10	Yes	No	Yes	MERV-A-8	NR	NR
PE anteroom (t)	(e)	NR	10	NR	No	No	HEPA	NR	NR
Combination AII/PE anteroom (2.2-2.2.4.5)	(e)	NR	10	Yes	No	No	HEPA	NR	NR
Labor/delivery/recovery/postpartum (LDRP) (2.2-2.11.3) (s)	NR	2	6	NR	NR	Yes	MERV-A-14	max 60	70–75/21–24
Labor/delivery/recovery (LDR) (2.2-2.11.3) (s)	NR	2	6	NR	NR	Yes	MERV-A-14	max 60	70–75/21–24
Patient Care Area Corridor	NR	NR	2	NR	NR	Yes	MERV-A-14	NR	NR
DIAGNOSTIC AND TREATMENT									
Imaging (diagnostic and treatment)	NR	2	6	NR	NR	Yes	MERV-A-8	max 60	72–78/22–26
Interventional imaging procedure room (2.2-3.5.2)	Positive	3	15	NR	No	Yes	MERV-A-14	max 60	70–75/21–24
Interventional and intraoperative MRI procedure room (2.2-3.5.2)	Positive	3	15	NR	No	Yes	MERV-A-14	max 60	70–75/21–24
Nuclear medicine procedure room (2.2-3.6.1)	Negative	2	6	Yes	NR	Yes	MERV-A-14	NR	70–75/21–24
Darkroom (2.2-3.6.6) (g)	Negative	2	10	Yes	No	No	MERV-A-8	NR	NR
Bronchoscopy, sputum collection, and pentamidine administration	Negative	2	12	Yes	No	Yes	MERV-A-14	NR	68–73/20–23
ECT procedure room (2.5-3.4.2.2)	NR	2	4	NR	NR	Yes	MERV-A-8	max 60	72–78/22–26
General examination room	NR	2	4	NR	NR	Yes	MERV-A-8	max 60	70–75/21–24
Special examination room (aa)	NR	2	6	NR	NR	Yes	MERV-A-14	max 60	70–75/21–24
Medication room	NR	2	4	NR	NR	Yes	MERV-A-8	max 60	70–75/21–24

Note: NR = no requirement

TABLE 7.1 Design Parameters for Inpatient Spaces

Function of Space (dd)	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)	Unoccupied Turndown	Minimum Filter Efficiencies	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Gastrointestinal endoscopy procedure room (x)	NR	2	6	NR	No	Yes	MERV-A-8	20–60	68–73/20–23
Endoscope cleaning	Negative	2	10	Yes	No	No	MERV-A-8	NR	NR
Treatment room	NR	2	6	NR	NR	Yes	MERV-A-8	max 60	70–75/21–24
Hydrotherapy	Negative	2	6	NR	NR	Yes	MERV-A-8	NR	72–80/22–27
Physical therapy	Negative	2	6	NR	NR	Yes	MERV-A-8	Max 65	72–80/22–27
Dialysis treatment area	NR	2	6	NR	NR	Yes	MERV-A-8	NR	72-78/22-26
Dialyzer reprocessing room	Negative	NR	10	Yes	No	Yes	MERV-A-8	NR	NR
Nuclear medicine hot lab	Negative	NR	6	Yes	No	Yes	MERV-A-8	NR	70-75/21-24
PATIENT SUPPORT FACILITIES									
Laboratory Work Area, general (f), (v)	Negative	2	6	NR	NR	Yes	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, bacteriology (f), (v)	Negative	2	6	Yes	NR	Yes	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, biochemistry (f), (v)	Negative	2	6	Yes	NR	Yes	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, cytology (f), (v)	Negative	2	6	Yes	NR	Yes	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, glasswashing (f)	Negative	2	10	Yes	NR	Yes	MERV-A-8	NR	NR
Laboratory Work Area, histology (f), (v)	Negative	2	6	Yes	NR	Yes	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, microbiology (f), (v)	Negative	2	6	Yes	NR	Yes	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, nuclear medicine (f), (v)	Negative	2	6	Yes	NR	Yes	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, pathology (f), (v)	Negative	2	6	Yes	NR	No	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, serology (f), (v)	Negative	2	6	Yes	NR	Yes	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, sterilizing (f),	Negative	2	10	Yes	NR	Yes	MERV-A-8	NR	70–75/21–24
Laboratory Work Area, media transfer (f), (v)	Positive	2	4	NR	NR	Yes	MERV-A-8	NR	70–75/21–24
Pharmacy Services: Pharmacy Areas (b) (2.1-4.2.2)	Positive	2	4	NR	NR	Yes	MERV-A-8	max 60 ~~NR~~	70–75/21–24 ~~NR~~
Food preparation areas (i) (2.1-4.3.2)	NR	2	10	NR	No	Yes	MERV-A-8	NR	72–78/22–26
Warewashing (2.1-4.3.4)	Negative	NR	10	Yes	No	Yes	MERV-A-8	NR	NR
Food and supply storage (2.1-4.3.8.11)	NR	NR	2	NR	No	No	MERV-A-8	NR	72–78/22–26

Note: NR = no requirement

TABLE 7.1 Design Parameters for Inpatient Spaces

Function of Space (dd)	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)	Unoccupied Turndown	Minimum Filter Efficiencies	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Bedpan room	Negative	NR	10	Yes	No	No	MERV-A-8	NR	NR
Toilet room (2.1-4.3.9.1)	Negative	NR	10	Yes	No	Yes	MERV-A-8	NR	NR
Environmental services room (2.1-4.3.8.12)	Negative	NR	10	Yes	No	No	MERV-A-8	NR	NR
GENERAL SUPPORT FACILITIES: STERILE PROCESSING									
Soiled Workroom/Decontamination Room (z) (2.1-5.1.3)	Negative	2	6	Yes	No	No	MERV-A-8	NR	60-73/16-23
Clean Assembly/workroom (z) (2.1-5.1.2)	Positive	2	4	NR	No	No	MERV-A-8, (ff)	max 60	68–73/20-23
Sterile storage room (Clean/sterile medical/surgical supplies) (z) (2.1-5.1.4.1)	Positive	2	4	NR	NR	No	MERV-A-8, (ff)	max 60	Max 75/24
OTHER GENERAL SUPPORT FACILITIES									
Laundry processing room (2.1-5.2.2(2))	Negative	2	10	Yes	No	No	MERV-A-8	NR	NR
Clean linen storage room (2.1-5.2.3.2)	Positive	NR	2	NR	NR	No	MERV-A-8	NR	72–78/22–26
Toilet (2.1-5.2.4.1)	Negative	NR	10	Yes	No	Yes	MERV-A-8	NR	NR
Regulated waste holding spaces (2.1-5.4.1.3)	Negative	NR	10	Yes	No	No	MERV-A-8	NR	NR
Linen and refuse chute room (2.1-5.4.1.4)	Negative	NR	10	Yes	No	No	MERV-A-8	NR	NR
Nonrefrigerated body-holding room (h)	Negative	NR	10	Yes	No	No	MERV-A-8	NR	70–75/21–24
Autopsy room (2.1-5.7.2.2)	Negative	2	12	Yes	No	No	MERV-A-8	NR	68–75/20–24
Hazardous material storage	Negative	2	10	Yes	No	No	MERV-A-8	NR	NR
SUPPORT AREAS FOR NURSING UNITS AND OTHER PATIENT CARE AREAS									
Soiled workroom or soiled holding (2.1-2.6.10)	Negative	2	10	Yes	No	Yes	MERV-A-8	NR	NR
Clean workroom (2.1-2.6.9.1)	Positive	2	NR	NR	NR	Yes	MERV-A-8, (ff)	NR	NR
Clean supply room (2.1-2.6.9.2)	Positive	NR	NR	NR	NR	Yes	MERV-A-8, (ff)	NR	NR

Note: NR = no requirement

Notes for Table 7.1:

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 7.1 (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 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 and differential pressure 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 (see USP [2012] in Informative Appendix B), and the equipment utilized in the spaces. Minimum efficiency of filters for any space where compounding occurs shall be determined by the applicable USP standard (USP 795, USP 797, or USP 800).

c. The term *trauma/resuscitation room* as used herein is a first-aid room and/or emergency room used for general initial treatment of accident victims. The operating room within the trauma center that is routinely used for emergency surgery is considered to be an operating room by this standard.

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

e. See Section 7.2 and its subsections for pressure-relationship requirements.

f. Higher ventilation rates above the total ach listed shall be used when dictated by the laboratory program requirements and the hazard level of the potential contaminants in each laboratory work area. Lower total ach ventilation rates shall be permitted when a Hazardous Assessment performed as part of an effective Laboratory Ventilation Management Plan per the ANSI/AIHA/ASSE Z9.5, *Laboratory Ventilation Standard*[13] determines that either: (a) acceptable exposure concentrations in the Laboratory Work Area can be achieved with a lower minimum total ach ventilation rate than is listed in Table 7.1, or (b) a demand control approach with active sensing of contaminants or appropriate surrogates is used as described in Chapter 16 of the *ASHRAE Handbook – HVAC Application*, Chapter 16, "Laboratories" (see ASHRAE [2015] in Informative Appendix B).

g. All air need not be exhausted if darkroom equipment has a scavenging exhaust duct attached and meets ventilation standards regarding NIOSH, OSHA, and local employee exposure limits.[2, 3]

h. A nonrefrigerated body-holding room is applicable only to facilities that do not perform autopsies on-site and use the space for short periods while waiting for the body to be transferred.

i. 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.[4] In some cases, excess exfiltration or infiltration to or from exit corridors compromises the exit corridor restrictions of NFPA 90A,[5] the pressure requirements of NFPA 96,[6] 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.

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 regarding occupational exposure to waste anesthetic gases and vapors, and control of occupational exposure to nitrous oxide[7] indicate a need for both local exhaust (scavenging) systems and general ventilation of the areas in which the respective gases are utilized. Refer to NFPA 99 for other requirements.[8]

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. (***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. See NFPA 99 for further requirements[8].
s. For intermediate care, labor/delivery/recovery rooms, and labor/delivery/recovery/postpartum rooms, four total ach shall be permitted when supplemental heating and/or cooling systems (radiant heating and cooling, baseboard heating, etc.) are used.
t. The protective environment airflow design specifications protect the patient from common environmental airborne infectious microbes (i.e., *Aspergillus* spores). Recirculation HEPA filters shall be permitted to increase the equivalent room air exchanges; however, the outdoor air changes are still required. Constant-volume airflow is required for consistent ventilation for the protected environment. The pressure relationship to adjacent areas shall remain unchanged if the PE room is utilized as a normal patient room.
u. 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 7.1 are still required. AII rooms that are retrofitted from standard patient rooms from which it is impractical to exhaust directly outdoors may be recirculated with air from the AII room, provided that air first passes through a HEPA filter. When the AII room is not utilized 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 4 ach. Turndown of minimum air changes for the AII anteroom shall be based around the utilization of the associated AII room(s).
v. Room temperature ranges that exceed the minimum indicated range shall be permitted if required by the laboratory program or laboratory equipment.
w. The requirement that all room air is 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.
x. If the planned space is designated in the organization's operational plan to be utilized for both bronchoscopy and gastrointestinal endoscopy, the design parameters for "bronchoscopy, sputum collection, and pentamidine administration" shall be used.
y. For single-bed patient rooms using Group D diffusers, a minimum of six total ach shall be provided and calculated based on the volume from finished floor to 6 ft (1.83 m) above the floor.
z. See AAMI Standard ST79[14] for additional information for these spaces.
aa. Examination rooms programmed for use by patients with undiagnosed gastrointestinal symptoms, undiagnosed respiratory symptoms, or undiagnosed skin symptoms.
bb. 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 minimum efficiency reporting value (MERV) is based on the method of testing described in ANSI/ASHRAE Standard 52.2, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size* ([ASHRAE 2012] in Informative Appendix B).

cc. 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 (IEST [2005] in Informative Appendix B).

dd. Parenthetic notations following a Space name are paragraph references to the FGI Guidelines for Design and Construction of Hospitals and Outpatient Facilities. These paragraph references are provided to the User of the Standard to aid in the application of design requirements.

ee. Include time-delay controls such that turndown does not occur for the first 20 minutes after the space becomes occupied

ff. Minimum MERV-A-14 filters shall be required for spaces where sterile equipment is packed into sterile packages. Spaces where sterile products are stored but not packed shall not be required to have MERV-A-14 filters.

gg. See also section 7.4.1.c.

hh. A minimum MERV-A-8 filter may be utilized for this space in lieu of a minimum MERV-A-14 filter if all room air is exhausted directly to the outdoors and the pressure relationship to adjacent areas is kept negative. If a filter rated less than MERV-A-14 is utilized the space shall be considered “Negative” with regards to the table and must comply with all other requirements for negative spaces within the standard.

TABLE 8.1 Design Parameters – Outpatient Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
COMMON SPACES IN OUTPATIENT FACILITIES								
General Purpose Examination/Observation Room (3.1-3.2.2)	NR	2	4	NR	NR	MERV-A-8	max 60	70–75/21–24
Special Purpose Examination Room (x) (3.1-3.2.3)	NR	2	6	NR	NR	MERV-A-14 (w)	max 60	70–75/21–24
AII Room (i) (3.1-3.4.2)	Negative	2	12	Yes	No	MERV-A-8	max 60	70–75/21–24
AII Anteroom (i) (3.1-3.4.3)	(e)	NR	10	Yes	No	MERV-A-8	NR	NR
Medication Preparation Room programmed to compound sterile preparations (b) (3.1-3.6.6.2)	Positive	2	4	NR	NR	MERV-A-8	NR	NR
Clean Supply Storage (3.1-3.6.9)	Positive	2	4	NR	NR	MERV-A-8	max 60	72–78/22–26
Soiled Holding Room (3.1-3.6.10)	Negative	2	6	Yes	No	MERV-A-8	NR	72–78/22–26
Laboratory Testing/Work Area if in a separate dedicated room (3.1-4.1.2)	Negative	2	6	Yes	NR	MERV-A-8	NR	70–75/21–24
Medical Waste Holding Spaces (3.1-5.4.1.3)	Negative	2	10	Yes	No	MERV-A-8	NR	NR
Environmental Services Room (3.1-5.5.1)	Negative	NR	10	Yes	No	MERV-A-8	NR	NR
Bronchoscopy, sputum collection, and pentamidine administration (n)	Negative	2	12	Yes	No	MERV-A-14	NR	68-73/20-23
Emergency waiting rooms	Negative	2	12	Yes (q)	NR	MERV-A-8	Max. 65	70-75/21-24
SPACES SPECIFIC TO PARTICULAR OUTPATIENT FACILITIES								
Freestanding Urgent Care Facility Procedure Room (3.5-3.2.2)	Positive	2	6	NR	No	MERV-A-8	NR	70–75/21–24
Diagnostic Imaging Waiting Area (3.5-6.1.3.2) (g)	Negative	2	12	Yes (q), (r)	NR	MERV-A-8	max 60	70–75/21–24
Cancer Treatment Area (p) (3.6-3.2)	NR	2	6	NR	NR	MERV-A-8	max 60	70–75/21–24
Outpatient Surgical Facility Procedure Room (o),(d) (3.7-3.2)	Positive	3	15	NR	No	MERV-A-14	20–60	70–75/21–24
Outpatient Surgical Facility Operating Room (m), (o) (3.7-3.3)	Positive	4	20	NR	No	MERV-A-16 (v)	20–60	68–75/20–24
Postoperative Recovery Area (3.7-3.4.3)	NR	2	6	NR	No	MERV-A-8	max 60	70–75/21–24

Note: NR = no requirement

TABLE 8.1 Design Parameters – Outpatient Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Office-Based Procedure Room (p) (3.8-3.1)	NR	2	4	NR	NR	MERV-A-8	max 60	70–75/21–24
Endoscopy Procedure Room (h) (3.9-3.2.2)	NR	2	6	NR	No	MERV-A-8	max 60	68–73/20–23
Pre-Procedure Patient Care Area (t) (3.9-3.3)	NR	2	2	NR	NR	MERV-A-8	max 60	70–75/21–24
Post-Procedure Recovery Area (u) (3.9-3.3)	NR	2	2	NR	NR	MERV-A-8	max 60	70–75/21–24
Instrument Processing Room (3.9-5.1)	Negative	2	10	Yes	No	MERV-A-8 (s)	NR	NR
ECT Procedure Room (p) (3.11-3.3.2.2)	NR	2	4	NR	NR	MERV-A-8	max 60	70–75/21–24

Note: NR = no requirement

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 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 and differential pressure 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 (see USP [2012] in Informative Appendix B), and the equipment utilized in the spaces. Minimum efficiency of filters for any space where compounding occurs shall be determined by the applicable USP standard (USP 795, USP 797, or USP 800).

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, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size ([ASHRAE 2012] in Informative 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 Facility Guidelines Institute document: Guidelines for Design and Construction of Hospitals and Outpatient Facilities – 2014 Edition. 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.

h. If the planned space is designated in the organization's operational plan to be utilized 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 utilized 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 regarding occupational exposure to waste anesthetic gases and vapors, and control of occupational exposure to nitrous oxide7 indicate a need for both local exhaust (scavenging) systems and general ventilation of the areas in which the respective gases are utilized. Refer to NFPA 99 for other requirements.8
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. (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 is 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. Minimum MERV-A-14 filters shall be required for spaces where sterile equipment is packed into sterile packages. Spaces where sterile products are stored but not packed shall not be required to have MERV-A-14 filters.
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.
v. See also section 8.4.1.c.
w. A minimum MERV-A-8 filter may be utilized for this space in lieu of a minimum MERV-A-14 filter if all room air is exhausted directly to the outdoors and the pressure relationship to adjacent areas is kept negative. If a filter rated less than MERV-A-14 is utilized the space shall be considered "Negative" with regards to the table and must comply with all other requirements for negative spaces within the standard.
x. Examination rooms programmed for use by patients with undiagnosed gastrointestinal symptoms, undiagnosed respiratory symptoms, or undiagnosed skin symptoms.

TABLE 9.1 Design Parameters- Nursing Home Spaces

Function of Space	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 Efficiency	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
NURSING HOMES								
AII room (c)	Negative	2	12	Yes	No	MERV-A-14	max 60	70–75/21–24
AII anteroom (c)	(e)	NR	10	Yes	No	MERV-A-8	NR	NR
Resident room	NR	2	2	NR	NR	MERV-A-14	NR	70–75/21–24
Resident gathering/activity/dining	NR	4	4	NR	NR	MERV-A-8	NR	70–75/21–24
Resident unit corridor	NR	NR	4	NR	NR	MERV-A-8	NR	NR
Physical therapy	Negative	2	6	NR	NR	MERV-A-8	NR	70–75/21–24
Occupational therapy	NR	2	6	NR	NR	MERV-A-8	NR	70–75/21–24
Toilet/Bathing room	Negative	NR	10	Yes	No	MERV-A-8	NR	70–75/21–24
ASSISTED LIVING FACILITIES								
Resident room	NR	NR	NR	NR	NR	MERV-A-8	NR	NR
Resident gathering/activity/dining	NR	NR	NR	NR	NR	MERV-A-8	NR	NR
Resident unit corridor	NR	NR	NR	NR	NR	MERV-A-8	NR	NR
Toilet/Bathing room	NR	NR	NR	NR	NR	MERV-A-8	NR	NR
HOSPICE FACILITIES								
AII room (c)	Negative	2	12	Yes	No	MERV-A-14	max 60	70–75/21–24
AII anteroom (c)	(e)	NR	10	Yes	No	MERV-A-8	NR	NR
Resident room	NR	2	2	NR	NR	MERV-A-8	NR	70–75/21–24
Resident unit corridor	NR	NR	4	NR	NR	MERV-A-8	NR	NR
Toilet/Bathing room	Negative	NR	10	Yes	No	MERV-A-8	NR	70–75/21–24
RADIOLOGY								
X-ray (diagnostic and treatment)	NR	2	6	NR	NR	MERV-A-8	max 60	72–78/22–26
SERVICE								
Food preparation center (i)	NR	2	10	NR	No	MERV-A-8	NR	72–78/22–26
Warewashing	Negative	NR	10	Yes	No	MERV-A-8	NR	
Dietary storage	NR	NR	2	NR	No	MERV-A-8	NR	72–78/22–26
Laundry, general	Negative	2	10	Yes	No	MERV-A-8	NR	
Soiled linen sorting and storage	Negative	NR	10	Yes	No	MERV-A-8	NR	
Clean linen storage	Positive	NR	2	NR	NR	MERV-A-8	NR	72–78/22–26

Note: NR = no requirement

TABLE 9.1 Design Parameters- Nursing Home Spaces

Function of Space	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 Efficiency (n)	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Linen and trash chute room	Negative	NR	10	Yes	No	MERV-A-8	NR	
Janitor's closet	Negative	NR	10	Yes	No	MERV-A-8	NR	
SUPPORT SPACES								
Soiled utility or soiled holding	Negative	2	10	Yes	No	MERV-A-8	NR	
Clean utility	Positive	2	4	NR	NR	MERV-A-8, (g)	NR	
Hazardous material storage	Negative	2	10	Yes	No	MERV-A-8	NR	

Note: NR = no requirement

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 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. AII rooms that are retrofitted from standard resident rooms from which it is impractical to exhaust directly outdoors may be recirculated with air from the AII room, provided that air first passes through a HEPA filter. When the AII room is not utilized 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.

e. See Section 9.2 and its subsections for pressure-relationship requirements.

f. 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.

g. Minimum MERV-A-14 filters shall be required for spaces where sterile equipment is packed into sterile packages. Spaces where sterile products are stored but not packed shall not be required to have MERV-A-14 filters.

h. not used.

i. 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.[4] In some cases, excess exfiltration or infiltration to or from exit corridors compromises the exit corridor restrictions of NFPA 90A,[5] the pressure requirements of NFPA 96,[6] 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.
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. 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 minimum efficiency reporting value (MERV) is based on the method of testing described in ANSI/ASHRAE Standard 52.2, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size* ([ASHRAE 2012] in Informative Appendix B.