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The following pages contain supplementary information for the following articles in the June 2025 issue of ASHRAE Journal:

Mapping Space Types Across ASHRAE Standards 62.1, 170, & 241

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Complete 62.1 Mapping Table:

Standard 62.1-2022 Table 6-1		***Standard 241-2023 Table 5-1***		
Occupancy Group	**Occupancy Category**	***Category***	***ECAi /p***	**Note**
Animal Facilities	Animal exam room (veterinary office)	Office	30	A
Animal Facilities	Animal imaging (MRI/CT/PET)	Office	30	A
Animal Facilities	Animal operating rooms	Office	30	A
Animal Facilities	Animal postoperative recovery room	Office	30	A
Animal Facilities	Animal preparation rooms	Office	30	A
Animal Facilities	Animal procedure room	Office	30	A
Animal Facilities	Animal surgery scrub	Office	30	A
Animal Facilities	Large-animal holding room	Office	30	A
Animal Facilities	Necropsy	Office	30	A
Animal Facilities	Small-animal-cage room (static cages)	Office	30	A
Animal Facilities	Small-animal-cage room (ventilated cages)	Office	30	A
Correctional Facilities	Booking/waiting	Dayroom	40	
Correctional Facilities	Cell	Cell	30	
Correctional Facilities	Dayroom	Dayroom	40	
Correctional Facilities	Guard stations	Office	30	
Educational Facilities	Art classroom	Classroom	40	
Educational Facilities	Classrooms (ages 5–8)	Classroom	40	
Educational Facilities	Classrooms (age 9 plus)	Classroom	40	
Educational Facilities	Computer lab	Classroom	40	
Educational Facilities	Corridors (ages 5+)	Not applicable	0	B
Educational Facilities	Daycare sickroom	Exam room	40	
Educational Facilities	Daycare (through age 4)	Classroom	40	
Educational Facilities	Lecture classroom	Classroom	40	
Educational Facilities	Lecture hall (fixed seats)	Lecture hall	50	
Educational Facilities	Libraries	Classroom	40	

Educational Facilities	Media center	Classroom	40	
Educational Facilities	Multiuse assembly	Auditorium	50	
Educational Facilities	Music/theater/	Auditorium	50	C
	/dance	Gym	80	C
Educational Facilities	Science laboratories	Classroom	40	
Educational Facilities	University/college laboratories	Classroom	40	
Educational Facilities	Wood/metal shop	Classroom	40	
Food and Beverage Service	Bars, cocktail lounges	Food and beverage facilities	60	
Food and Beverage Service	Cafeteria/fast-food dining	Food and beverage facilities	60	
Food and Beverage Service	Kitchen (cooking)	Food and beverage facilities	60	
Food and Beverage Service	Restaurant dining rooms	Food and beverage facilities	60	
General	Break rooms (General)	Office	30	
General	Coffee stations	Office	30	
General	Conference/meeting	Office	30	
General	Corridors	Not applicable	0	B
General	Occupiable storage rooms for liquids or gels	Office	30	
Hotels, Motels, Resorts, Dormitories	Barracks sleeping areas	Dwelling unit	30	
Hotels, Motels, Resorts, Dormitories	Bedroom/living room	Dwelling unit	30	
Hotels, Motels, Resorts, Dormitories	Laundry rooms, central	Common space	50	
Hotels, Motels, Resorts, Dormitories	Laundry rooms within dwelling units	Common space	50	
Hotels, Motels, Resorts, Dormitories	Lobbies/prefunction	Common space	50	
Hotels, Motels, Resorts, Dormitories	Multipurpose assembly	Common space	50	
Miscellaneous Spaces	Banks or bank lobbies	Retail	40	
Miscellaneous Spaces	Bank vaults/safe deposit	Office	30	
Miscellaneous Spaces	Computer (not printing)	Office	30	
Miscellaneous Spaces	Freezer and refrigerated spaces (<50°F [10°C])	Sorting, packing, light assembly	20	
Miscellaneous Spaces	Manufacturing where hazardous materials are not used	Manufacturing	50	
Miscellaneous Spaces	Manufacturing where hazardous materials are used (excludes heavy industrial and chemical processes)	Manufacturing	50	
Miscellaneous Spaces	Pharmacy (prep. area)	Retail	40	
Miscellaneous Spaces	Photo studios	Retail	40	
Miscellaneous Spaces	Shipping/receiving	Sorting, packing, light assembly	20	

Miscellaneous Spaces	Sorting, packing, light assembly	Sorting, packing, light assembly	20	
Miscellaneous Spaces	Telephone closets	Not applicable	0	D
Miscellaneous Spaces	Transportation waiting	Transportation Waiting	60	
Miscellaneous Spaces	Warehouses	Warehouse	20	
Office Buildings	Main entry lobbies	Lobbies	50	
Office Buildings	Occupiable storage rooms for dry materials	Office	30	
Office Buildings	Office	Office	30	
Office Buildings	Reception areas	Office	30	
Office Buildings	Telephone/data entry	Office	30	
Public Assembly Spaces	Auditorium seating area	Auditorium	50	
Public Assembly Spaces	Courtrooms	Auditorium	50	
Public Assembly Spaces	Legislative chambers	Convention	60	
Public Assembly Spaces	Lobbies	Lobbies	50	
Public Assembly Spaces	Museums (children's)	Museum	60	
Public Assembly Spaces	Museums/galleries	Museum	60	
Public Assembly Spaces	Places of religious worship	Place of Religious Worship	50	
Residential	Common corridors	-	-	E
Retail	Sales (except as below)	Retail	40	
Retail	Barbershop	Retail	40	
Retail	Beauty and nail salons	Retail	40	
Retail	Coin-operated laundries	Retail	40	
Retail	Mall common areas	Retail	40	
Retail	Pet shops (animal areas)	Retail	40	
Retail	Supermarket	Retail	40	
Retail	Bowling alley (seating)	Retail	40	
Sports and Entertainment	Disco/dance floors	Gym	80	
Sports and Entertainment	Gambling casinos	Convention	60	
Sports and Entertainment	Game arcades	Convention	60	
Sports and Entertainment	Gym, sports arena (play area)	Gym	80	
Sports and Entertainment	Health club/aerobics room	Gym	80	
Sports and Entertainment	Health club/weight rooms	Gym	80	
Sports and Entertainment	Spectator areas	Spectator area	50	

Sports and Entertainment	Stages, studios	Gym	80	
Sports and Entertainment	Swimming (pool & deck)	Gym	80	

Notes:

A. Standard 241's ventilation rates are based on human-to-human infection risk, not animal-to-human transmission, making the specified rates suitable for office spaces.
B. No ECAi requirement for this transient space.
C. 62.1 lists music, theater, and dance as a single space type, but occupant activity levels are expected to be higher for a dance space.
D. Not an occupiable space. 62.1's minimum ventilation rate for this space type is 0 cfm.
E. 241 does not currently have a space type appropriate for residential corridors, which may be part of a multifamily building's ventilation system.

Validation of a Temperature Controlled Airflow Ventilation System

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Supplemental Background Information for: Validation of a Temperature-Controlled Air Flow Ventilation System during Scripted Mock Procedures and Live Surgical Cases

Surgical site infections (SSI) continue to be a substantial cause of extended hospital stays, increased readmission after surgery and death in the US and Europe with over 150,000 SSIs per year (1–3). Roughly 20% of SSIs are caused by microbes that enter the open surgical site either by direct contact with a contaminated surface or through the air (4). SSIs are also the most expensive healthcare acquired infection (HAI) (5–8). It is widely accepted that microbiological contamination in the Operating Room (OR) contributes to SSI (9–16). It is also widely accepted that the major contributor to airborne bacterial contamination is the people in the space, who shed bacteria carrying squames (17–27). Over 60 years of evidence supports the correlation between airborne contamination and surgical site infection. With infection sensitive surgeries, such as total hip and knee arthroplasty expected to grow exponentially over the next several decades as are the comorbidities of patients as life expectancy increases (28, 29). Therefore, finding new pathways to reduction of infection is imperative.

In addition to the prevention of SSIs within the sterile field, the perimeter of the room is also important. Back instrument tables are often staged in the perimeter and can be subject to contamination outside the footprint of the sterile field. Furthermore, there is concern for the OR team, such as the anesthesiologist and circulating nurses, who spend substantial time in the periphery of the room and can be exposed to contaminants washed away from the sterile field, such as surgical smoke, anesthetic waste gasses or infectious agents like Tuberculosis or SARS. In fact, during the first phases of the Covid-19 pandemic, surgeons were hesitant to perform procedures because of the

inadequacy of conventional operating room ventilation in managing airborne contamination both inside and outside the sterile field (30).

Innovative technologies exist that reduce airborne microbiological contamination. In the US, the general modern concept of OR air delivery requires supply air from the ceiling to flow down over the surgical field, essentially bathing the patient in clean, filtered air and washing the contaminants away from the surgical team and patient to the perimeter of the room, and out low wall returns. These systems rely on supplying the air at a certain velocity and maintaining a forced air speed until it reaches the sterile field. Most of these systems do not address the perimeter of the room and we have found consistently, that the air in the periphery is dirtier than the air within the sterile field (30–36). In Europe, technology using Temperature Controlled Air Flow (TcAF) has become widely accepted as best practice for reduction of contamination both inside the sterile field and at the periphery of the room. TcAF aims to control airborne microbiological contamination by using temperature gradients to provide cool air over the sterile field and warmer air outside the sterile field. The temperature differential is typically 1.5-3^{0}C cooler. The cooler supplied air falls from the delivery device in the ceiling faster toward the surgical table assisted by gravity and reaches its maximum velocity at the breathing zone of the OR staff thereby effectively washing contamination away from the sterile field and into the periphery of the OR. Then the downward flow of warmer air outside the sterile field assists with the suppression of re-entrained contamination and the exit of the air out the low wall returns (11, 36). This technology was installed in several locations on the eastern coast of the United States in 2023.

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