2022 California Mechanical Code

Part 4

Humidifiers

320.0 Air Conditioning and Heating Systems.
320.1 Requirements for Hospitals and Optional Services Provided in Correctional Treatment Centers. [OSHPD 1, 1R, 4 & 5]

320.1.1 *The systems shall be designed to provide the temperatures and relative humidity for sensitive areas or rooms shown in Table 4-A. When outdoor humidity and internal moisture sources are not sufficient to meet the requirements of sensitive areas or rooms in Table 4-A, humidification shall be provided by means of the healthcare facility air-handling systems. Temperature shall be individually controlled for each operating and delivery room. Burn unit patient rooms that require humidifiers to comply with the requirements of sensitive areas or rooms in Table 4-A shall be provided with individual humidity control. ~~All~~ ~~h~~Humidifiers shall be of the ~~use~~ dry steam or adiabatic atomizing type. Adiabatic atomizing humidifiers shall comply with the water treatment requirements in accordance with ASHRAE 170. Humidifiers shall be located within air handling systems or ductwork to avoid moisture accumulation in downstream components, including filters and insulation.*

Mechanical Schedules

323.0 Mechanical Equipment Schedules. [OSHPD 1,1R, 2, 4 & 5]

Mechanical equipment schedules in the construction documents shall clearly indicate which equipment will be powered by essential power ~~or~~ and which equipment includes the appropriate special seismic certifications.

Generator Exhaust

324.0 Diesel-Powered Emergency Generators. [OSHPD 1, 1R, 2, 3, 4 & 5]

The minimum horizontal separation distance between diesel-powered emergency electrical generator exhaust outlets and operable doors, windows and intake openings shall be 30 feet. The minimum horizontal distance from the generator exhaust to a property line shall be 15 feet (4.57 m) or per the requirements of the local AHJ, whichever is greater.

SNF Alternate Power

325.0 Alternate Source of Power for Safe Temperatures. [OSHPD 2]

Mechanical equipment required to maintain a safe temperature for residents shall be powered by an alternate source of power per California Electrical Code Section 517.1. The safe temperature shall be between 71- 81°F.

See OSHPD PIN 74 and the A6 Advisory Guide relating to alternate power for skilled nursing facilities

Exhaust Systems

407.1.2 *Fans serving exhaust systems shall be located at the discharge end of the system. Ductwork within the building shall be under negative pressure. The ventilation rates shown in Table 4-A shall be considered as minimum acceptable rates and shall not be construed as precluding the use of higher ventilation rates if they are required to meet design conditions.*

Variable Air Volume

407.5.1.3 *Spaces with pressure requirements per Table 4-A shall utilize ~~Variable air volume for return or exhaust air shall be accomplished by utilizing~~ an automatic modulating damper in the return or exhaust air for each ~~zone~~space. The damper will modulate from full open to minimum position in conjunction with the supply air VAV terminal ~~boxes~~equipment.*

Diffusers

420.0 Air Distribution Devices. [For OSHPD 1, 2, 3, 4 & 5] *All air distribution devices and supply air outlets shall meet the requirements of ASHRAE 170-2013, Section 6.7.2 and Table 6.7.2.*

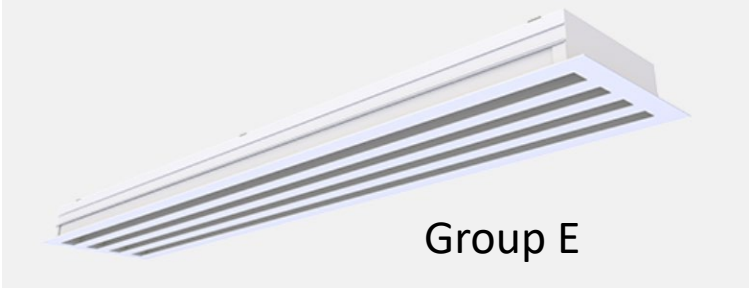
TABLE 6.7.2 Supply Air Outlets

Space Designation (According to Function)	**Supply Air Outlet Classification[a]**
Operating rooms[b], Procedure rooms	Supply diffusers within the primary supply diffuser array: Group E, nonaspirating Additional supply diffusers within the room: Group E
Protective environment (PE) rooms	Group E, nonaspirating
Wound intensive-care units (burn units)	Group E, nonaspirating
Trauma rooms (crisis or shock)	Group E, nonaspirating
AII rooms	Group A or Group E
Single-bed patient rooms[c]	Group A, Group D, or Group E
All other patient-care spaces	Group A or Group E
All other spaces	No requirement

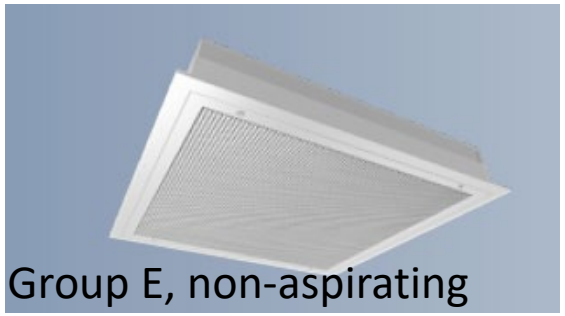
Diffusers

- **Group A**: Mounted in or near the ceiling, projecting air horizontally (e.g., Square Plaque Diffuser)
- **Group B**: Mounted in or near the floor, projecting air vertically in a linear jet (e.g., floor-mounted Linear Bar Grille)
- **Group C**: Mounted in or near the floor, projecting air vertically in a spreading jet (e.g., Modular Floor Diffuser with a twist pattern)
- **Group D**: Mounted in or near the floor, projecting air horizontally (e.g., Displacement Flow Diffuser)
- **Group E**: Mounted in or near the ceiling, projecting air vertically downward (e.g., Linear Slot Diffuser, non-aspirating)

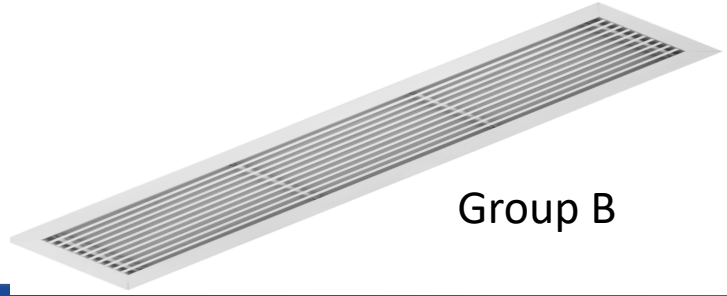
Group A



Group E

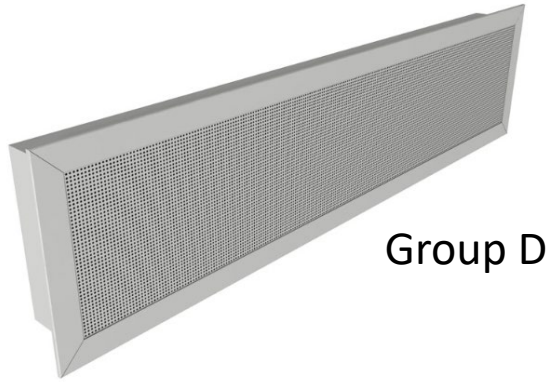


Group E, non-aspirating



Group B

Group C



Group D

TABLE 4-A
PRESSURE RELATIONSHIP AND VENTILATION REQUIREMENTS FOR GENERAL ACUTE CARE HOSPITALS, SKILLED NURSING FACILITIES, INTERMEDIATE CARE FACILITIES, CORRECTIONAL TREATMENT CENTERS, OUTPATIENT FACILITIES, AND LICENSED CLINICS

FUNCTION OR SPACE	PRESSURE RELATIONSHIP TO ADJACENT AREAS (f) (n)	MINIMUM OUTDOOR ACH	MINIMUM TOTAL ACH	ALL ROOM AIR EXHAUSTED DIRECTLY TO OUTDOORS (j)	AIR RECIRCULATED BY MEANS OF ROOM UNITS (a)	DESIGN RELATIVE HUMIDITY(k), %	DESIGN TEMPERATURE (l),°F/°C
...							
Airborne infection isolation treatment/exam room	Negative	2	12	Yes	No	~~NR~~max60	~~NR~~70-75/21-24
Angiography room	Positive	3	15	NR	~~NR~~No	max 60	70-75/21-24
…							
Blood draw/phlebotomy	NR	2	6	NR	NR	NR	~~NR~~70-75/21-24
…							
Cardiac catheterization lab	Positive	3	15	NR	No	Max 60	70-75/21-24
Class 1 imaging	NR	2	6	NR	NR	Max 60	72-78/22-26
Class 2 imaging (d),(p)	Positive	3	15	NR	No	Max 60	70-75/21-24
Class 3 imaging (m), (o)	Positive	4	20	NR	No	20-60	68-75/20-24
…							
Critical and intensive care (ac)	NR	2	6	NR	No	30-60	70-75/21-24
CT Scan	NR	2	6	NR	NR	max60	~~NR~~70-75/21-24
…							
Electroconvulsive therapy procedure room	Positive	3	15	NR	~~NR~~No	~~NR~~20-60	~~NR~~70-75/21-24
…							

TABLE 4-B
FILTER EFFICIENCIES FOR CENTRAL VENTILATION AND AIR-CONDITIONING SYSTEMS IN GENERAL ACUTE CARE HOSPITALS, ACUTE PSYCHIATRIC HOSPITALS, OUTPATIENT FACILITIES AND LICENSED CLINICS[1]

AREA DESIGNATION	MINIMUM NUMBER OF FILTER BANKS	FILTER EFFICIENCY % FILTER BANK (MINIMUM EFFICIENCY REPORTING VALUE MERV)5		
		NO. 1[1]	NO. 2[1]	NO. 3[1]
Orthopedic operating room, bone marrow transplant operating room, organ transplant operating room, NICU formula preparation room, NICU treatment area/room	3	30%	90%	99.97%[3]
		(8)	(14)	(17)
Protective environment rooms	3	30%	90%	99.97%[4]
		(8)	(14)	(17)
Operating room, Operating/surgical cystoscopic room, Cesarean operating Room, Class 3 imaging, Hybrid operating room	2	30%	95%	—
		(8)	(16)	—
Angiography; cardiac catheterization labs; ~~operating rooms~~; interventional imaging procedure rooms; delivery rooms, nurseries; patient care, treatment, cystoscopy, ~~cesarean operating room~~, diagnostic, and related areas; airborne infection isolation rooms; areas providing direct patient service or clean supplies such as sterile and clean processes, and patient area corridors	2	30%	90%	—
		(8)	(14)	—
…				
Administrative, med staff support areas, bulk storage, soiled holding areas, food preparation areas, public cafeterias, and laundries	1[2]	~~30~~80%	—	—
		(~~8~~13)	—	—
Psychiatric hospitals intended for the care and treatment of inpatients who do not require acute medical services	1[2]	~~30~~80%	—	—
		(~~8~~13)	—	—

Air Balance

407.3 Air Balance.

407.3.1 *The ventilation systems shall be designed and balanced to provide the general air balance relationship to adjacent areas, shown in Table 4-A. The ventilation systems shall be balanced in accordance with the latest edition of standards published by the Associated Air Balance Council (AABC), the National Environmental Balancing Bureau (NEBB), or the Testing, Adjusting and Balancing Bureau (TABB).*

Air Balance standards allow for a 10% tolerance from design airflow

Air Balance

TABLE 4-A (continued)
PRESSURE RELATIONSHIP AND VENTILATION REQUIREMENTS FOR GENERAL ACUTE CARE HOSPITALS, SKILLED NURSING FACILITIES, INTERMEDIATE CARE FACILITIES, CORRECTIONAL TREATMENT CENTERS, OUTPATIENT FACILITIES, AND LICENSED CLINICS

f. *For operating rooms, cardiac catheterization labs, angiography rooms, cystoscopy rooms, delivery rooms, cesarean operating rooms, newborn intensive care, and nurseries* ***provide approximately 15% excess supply air to the room or noncompliant excess supply air to maintain an appropriate positive air balance*** *based on the room tightness and number of doors. For all rooms not listed in this footnote or not listed in Section 322.0 requiring either a positive or negative air balance,* ***provide approximately 10% differential cfm between supply and return/exhaust airflow but not less than 25 cfm differential shall be provided regardless of room size****. Room function, size, and tightness may be considered when determining the differential airflow required.* ***Where continuous directional control is not required, variations between supply cfm and return or exhaust cfm shall be minimized*** *in accordance with Section 407.4.1.3.*

The air balance will need to maintain the minimum airflow differentials required per CMC Table 4A for pressurized rooms. The 10% balance tolerance permitted by the balancing standard may create a noncompliant pressure relationship. Where the measured airflows are verified to be within +/-10% of the approved plans, the final air balance figures may not guarantee compliance with the required minimum pressure differential.

A procedure room with a design of 1000cfm supply airflow and 900cfm return airflow could measure in the air balance report at 910cfm supply (-10%) and 990cfm return (+10%) and be within the specified air balance tolerance.

The design of 100cfm positive pressure is not met as the measured value provides 80cfm negative pressure.

AIIR (Airborne Infection Isolation Room)

416.0 Alarms – Airborne Infection Isolation Rooms and Protective Environment Rooms. [OSHPD 1, 2, 3, 4& 5]

416.1 *An alarm system which is based on static pressure control, volumetric control, or directional flow measurement shall be provided for each isolation room. The alarm system shall consist of a* ***display monitor located on the corridor wall near the door to the room*** *and a* ***visual and audible alarm which annunciates at the room and at a nurses' station*** *or other suitable location that will provide responsible surveillance. A time delay shall be provided to allow for routine openings of doors. The* ***alarm shall annunciate when the supply, return, or exhaust fans are interrupted or when the minimum required pressure differential per ASHRAE 170 between the airborne infection isolation room and corridor*** *or between the* ***protective environment room and corridor*** *is not being met during closed door conditions.*

416.4 *Prior to acceptance of the rooms, the alarm system shall be tested and operated to demonstrate to the owner or designated representative that the installation and performance of the system conforms to design intent.*

The air balance report will need to provide a pressure differential test to show required pressurization is met.

AIIR – ASHRAE 170 7.2.1

ASHRAE 170 -2013
7.2.1 Airborne Infection Isolation (AII) Rooms.

f. Differential pressure between AII rooms and adjacent spaces that are not AII rooms shall be a minimum of (neg) **-.01 in. wc** (- 2.5 Pa). Spaces such as the toilet room and the anteroom (if present) that are directly associated with the AII room and open directly into the All room are not required to be designed with a minimum pressure difference from the All room but are still required to maintain the pressure relationships to adjacent areas…

g. When an anteroom is provided, the pressure relationships shall be as follows: (I) **the All 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**.

2022 California Plumbing Code Part 5

Handwashing Fixtures

210.0 – H –

Handwashing Fixture [OSHPD 1, 2, 3, 4 & 5]. *Handwashing fixtures consist of faucet, trim and lavatory as described:*

(1) Faucets and Trim

a. Handwashing fixtures used by medical and nursing staff, patients, and food handlers shall have fittings such that all controls can be operated without the use of hands.

i. Wrist or elbow blades shall be permitted unless otherwise noted in Table 4-2.

ii. Blade handles used for this purpose shall be at least 4 inches (102 mm) in length.

b. Sensor operated fixtures shall be capable of functioning during loss of normal power.

c. Faucets shall not be equipped with an aerator but may be equipped with a non-aerating laminar flow device.

*d. Faucets shall be equipped with **gooseneck spouts**. A gooseneck spout shall be deck or fixture-mounted so the discharge point of the spout return is at least 10 inches (25.4 mm) above the bottom of the basin. The water shall not flow directly from the spout into the drain. The gooseneck spout shall have a 180+/-5 degree return with a **constant radius** and the outlet pointing vertically down.*

Drainage Piping

310.0 Prohibited Fittings and Practices.

…

310.9 [OSHPD 1, 2, 3, 4 & 5] Drainage piping *over operating and delivery rooms, nurseries, food preparation centers, food-serving facilities, food storage areas, compounding ante and buffer rooms and other sensitive areas shall be kept to a minimum and shall not be exposed. Special precautions shall be taken to protect these areas from possible leakage from necessary overhead drainage piping systems. Piping over switchboards, panel boards, and motor control centers are subject to restrictions of the California Electrical Code where applicable.*

Essential Power

321.0 Essential Plumbing Provisions. [OSHPD 1, 2, 3 (Surgical Clinics), 4 & 5]

During periods of power outages essential electrical power shall be provided for the following equipment:

(1) Domestic water booster pumps.

(2) Domestic hot water circulating pumps.

(3) Sewage ejector pumps.

(4) Sump pumps and drainage pumps.

(5) Domestic water heating equipment and their controls.

(6) Fuel pumps.

(7) Grease removal devices requiring electrical power

(8) Domestic hot water high temperature alarm.

Domestic Hot Water

613.0 [OSHPD 1, 1R, 2, 3, 4 & 5] Domestic Hot-Water Distribution Systems for Health Facilities and Clinics.

…

613.2 At least two pieces *of hot-water-heating equipment shall be provided to supply hot water for dishwashing and minimum patient services such as handwashing and bathing. The arrangement of water-heating equipment shall be based on the* ***capacity and capability of the equipment to provide the required hot water during periods of breakdown or maintenance of any one water heater****. Booster heaters for 125°F to 180°F (52°C to 82°C) water are acceptable as a second piece of equipment for dishwashing. Where storage tanks are separate from the water heater, at least* ***two independent storage tanks shall be provided****.*

Exception: *A single piece of hot-water-heating equipment shall be permitted, subject to the Authority Having Jurisdiction, for primary care and non-specialty clinics where the equipment is limited to the service of handwashing fixtures.*

Domestic Hot Water Piping - Legionella

613.0 [OSHPD 1, 1R, 2, 3, 4 & 5] Domestic Hot-Water Distribution Systems for Health Facilities and Clinics.

613.6 *Hot-water distribution system serving patient care areas shall be under constant mechanical recirculation to provide continuous hot water at each hot water outlet. Non-recirculated* ***fixture branch piping shall not exceed 25 feet*** *(7.62 meters) in length.* ***Dead-end piping*** *(risers with no flow, branches with no fixture)* ***shall not be installed****. In renovation projects,* ***dead-end piping shall be removed in the area of renovation****. Empty risers, mains, and branches installed for future use shall be permitted.*

Dialysis

614.0 Dialysis Water-Distribution Systems.

614.1 [OSHPD 1, 1R, 2, 3, 4 & 5] *Dialysis water feedlines shall be PVC (polyvinyl chloride), glass, stainless steel, PEX, or PVDF (polyvinylidene fluoride), or other material deemed acceptable by AAMI RD 62 and sized to provide a minimum velocity of 1.5 feet per second (0.46 m/s). The piping shall be a singleloop system with or without recirculation. Branches to dialysis machines shall be 1/4 inch (6.4 mm) inside dimension and take off from the bottom of the main feedline. Branch lines may be PFA (perfluoroalkoxy).*