REVISION RECORD
FOR THE STATE OF CALIFORNIA
ERRATA

January 1, 2026

2025 Title 24, Part 4, California Mechanical Code

General Information:

1. The date of this erratum is for identification purposes only. See the History Note Appendix on the backside or accompanying page.

2. This erratum is issued by the California Building Standards Commission to correct non-substantive printing errors or omissions in the 2025 California Mechanical Code, California Code of Regulations, Title 24, Part 4. Instructions are provided below.

3. Health and Safety Code Section 18938.5 establishes that only building standards in effect at the time of the application for a building permit may be applied to the project plans and construction. This rule applies to both adoptions of building standards for Title 24 by the California Building Standards Commission, and local adoptions and ordinances imposing building standards. An erratum to Title 24 is a non-regulatory correction because of a printing error or omission that does not differ substantively from the official adoption by the California Building Standards Commission. Accordingly, the corrected code text provided by this erratum may be applied on and after the stated effective date.

4. You may wish to retain the superseded material with this revision record so that the prior wording of any section can be easily ascertained.

Title 24, Part 4

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PREFACE

This document is Part 4 of thirteen parts of the official triennial compilation and publication of the adoptions, amendments and repeal of administrative regulations to *California Code of Regulations, Title 24*, also referred to as the *California Building Standards Code*. This part is known as the *California Mechanical Code*.

The *California Building Standards Code* is published in its entirety every three years by order of the California legislature, with supplements published in intervening years. The California legislature delegated authority to various state agencies, boards, commissions and departments to create building regulations to implement the State's statutes. These building regulations, or standards, have the same force of law, and take effect 180 days after their publication unless otherwise stipulated. The *California Building Standards Code* applies to occupancies in the State of California as annotated.

A city, county, or city and county may establish more restrictive building standards reasonably necessary because of local climatic, geological or topographical conditions. Findings of the local condition(s) and the adopted local building standard(s) must generally be filed with the California Building Standards Commission (or other filing if indicated) to become effective, and may not be effective sooner than the effective date of this edition of the *California Building Standards Code*. Local building standards that were adopted and applicable to previous editions of the *California Building Standards Code* do not apply to this edition without appropriate adoption and the required filing.

Should you find publication (e.g., typographical) errors or inconsistencies in this code or wish to offer comments toward improving its format, please address your comments to:

California Building Standards Commission
2525 Natomas Park Drive, Suite 130
Sacramento, CA 95833-2936
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Web Page: www.dgs.ca.gov/bsc
Email: cbsc@dgs.ca.gov

ACKNOWLEDGEMENTS

The 2025 California Building Standards Code (Code) was developed through the outstanding collaborative efforts of the Department of Housing and Community Development, Division of the State Architect, Office of the State Fire Marshal, Department of Health Care Access and Information, California Energy Commission, California Department of Public Health, California State Lands Commission, Board of State and Community Corrections, Department of Water Resources, State Historical Building Safety Board, Department of Consumer Affairs, State Librarian, Department of Food and Agriculture, and the California Building Standards Commission (Commission).

This collaborative effort included the assistance of the Commission's Code Advisory Committees and many other volunteers who worked tirelessly to assist the Commission in the production of this Code.

Governor Gavin Newsom

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For questions on California state agency amendments, please refer to the contact list on page iv.

California Code of Regulations Title 24

California State Agency Contact List

The following state agencies may propose building standards for buildings, structures and applications under their authority for publication in Title 24. Notice of such proposals may be requested from each agency. See Sections 1.2 through 1.14 of the California Building Code (Part 2, T24) for detailed information on the regulatory authority of most state agencies summarized below. Note [agency acronyms] shown in banners/Matrix Adoption Tables in T24.

Board of State & Community Corrections [BSCC]
bscc.ca.gov BSCC-Mail@bscc.ca.gov
(916) 445-5073 *Local Detention Facilities*

Building Standards Commission [BSC, BSC-CG]
dgs.ca.gov/bsc cbsc@dgs.ca.gov
(916) 263-0916 *State Buildings including UC & CSU, Nonresidential Green Building Standards*

Department of Consumer Affairs Boards/Bureaus:

Acupuncture Board [CA]
acupuncture.ca.gov AcuPolicy@dca.ca.gov
(916) 515-5200 *Acupuncture Offices*

Board of Pharmacy [CA]
pharmacy.ca.gov
(916) 518-3100 *Pharmacies*

Board of Barbering & Cosmetology [CA]
barbercosmo.ca.gov barbercosmo@dca.ca.gov
(916) 574-7570 *Barber, Cosmetology & Electrolysis Establishments*

Bureau of Household Goods & Services [CA]
bhgs.dca.gov
(916) 999-2041 *Insulation Testing*

Structural Pest Control Board [CA]
pestboard.ca.gov pestboard@dca.ca.gov
(800) 737-8188 *Structural Pest Control Locations*

Veterinary Medical Board [CA]
vmb.ca.gov vmb@dca.ca.gov
(916) 515-5220 *Veterinary Facilities*

Department of Food & Agriculture [AGR]
cdfa.ca.gov
(916) 900-5004 *Rendering & Collection Centers*
(916) 900-5064 *Meat & Poultry Packing Plants*
(916) 900-5008 *Milk & Dairy Food Safety*

Department of Health Care Access and Information
Office of Statewide Hospital Planning and Development [OSHPD 1, 1R, 2, 3, 4, 5, 6]
hcai.ca.gov regsunit@hcai.ca.gov
(916) 440-8300 *Hospital Standards, Skilled Nursing Facility Standards & Clinic Standards*

Department of Public Health [DPH]
cdph.ca.gov (Recreational Health)
(916) 449-5661 *Food Establishments, Organized Camps, Public Swimming Pools*

Department of Housing and Community Development [HCD 1, 2, 1-AC]
hcd.ca.gov Title24@hcd.ca.gov
(800) 952-8356
Option 5 > Option 2 *State Housing Law: including Housing Accessibility, Hotels/Motels, Apartments/Condominiums, Dormitories, Single-Family Dwellings, ADUs, Permanent Structures in Mobile Home Parks*
Option 5 > Option 4 *Factory-Built Housing*
Option 5 > Option 5 *Employee Housing*

Department of Water Resources [DWR]
water.ca.gov DWRwebcomment@water.ca.gov
(916) 653-5791 *Plumbing for Recycled Water, Floodplain Construction*

Division of the State Architect
dgs.ca.gov/dsa
(916) 445-8100

Access Compliance [DSA-AC]
(916) 445-5827 DSAaccess@dgs.ca.gov
Access for Persons with Disabilities

Structural Safety [DSA-SS, DSA-SS/CC]
Public Schools & Community Colleges, State Essential Services Buildings

State Historical Building Safety Board [SHBSB]
(916) 445-7627 shbsb@dgs.ca.gov
Historical Building Rehabilitation, Preservation, Restoration or Relocation

CHAPTER 2
DEFINITIONS

201.0 General.

201.1 Applicability. For the purpose of this code, the following terms have the meanings indicated in this chapter.

No attempt is made to define ordinary words, which are used in accordance with their established dictionary meanings, except where a word has been used loosely, and it is necessary to define its meaning as used in this code to avoid misunderstanding.

202.0 Definition of Terms.

202.1 General. The definitions of terms are arranged alphabetically according to the first word of the term.

203.0 – A –

Absorption Unit. An absorption refrigeration system that has been factory-assembled and tested prior to its installation.

Accepted Engineering Practice. That which conforms to technical or scientific-based principles, test, or standards that are accepted by the engineering profession.

Access Panel. A closure device used to cover an opening into a duct, an enclosure, equipment, or an appurtenance. [NFPA 96:3.3.1]

Accessible. Where applied to a device, appliance, or equipment, "accessible" means having access thereto, but which first may require the removal of an access panel, door, or similar obstruction.

Accessible, Readily. Having a direct access without the necessity of removing a panel, door, or similar obstruction.

Accessory Dwelling Unit. [HCD 1 & HCD 2] *An attached or detached residential dwelling unit that provides complete independent living facilities for one or more persons and is located on a lot with a proposed or existing primary residence. Accessory dwelling units shall include permanent provisions for living, sleeping, eating, cooking, and sanitation on the same parcel as the single-family or multifamily dwelling is or will be situated. (See Government Code Section 66313)*

Air, Class 1. Air with low contaminant concentration, low sensory-irritation intensity, and inoffensive odor. [ASHRAE 62.1:5.18.1]

Air, Class 2. Air with moderate contaminant concentration, mild sensory-irritation intensity, or mildly offensive odors. Class 2 air also includes air that is not necessarily harmful or objectionable, but that is inappropriate for transfer or recirculation to spaces used for different purposes. [ASHRAE 62.1:5.18.1]

Air, Class 3. Air with significant contaminant concentration, significant sensory-irritation intensity, or offensive odor. [ASHRAE 62.1:5.18.1]

Air, Class 4. Air with highly objectionable fumes or gases or with potentially dangerous particles, bioaerosols, or gases, at concentrations high enough to be considered as harmful. [ASHRAE 62.1:5.18.1]

Air, Combustion. See Combustion Air.

Air, Conditioned. Air that has been treated to achieve a desired level of temperature, humidity, or cleanliness.

Air, Dilution. Air that enters a draft hood or draft regulator and mixes with the flue gases. [NFPA 54:3.3.2.2]

Air, Exhaust. Air being removed from any space or piece of equipment and conveyed directly to the atmosphere by means of openings or ducts.

Air, Makeup. Air that is provided to replace air being exhausted.

Air, Outside. Air from outside the building intentionally conveyed by openings or ducts to rooms or to conditioning equipment.

Air, Relief. [OSHPD 1, 2, 3, 4 & 5] *Air being exhausted directly from a building or a return duct system which is not contaminated by odors or other contaminants and could otherwise be used as return air if not exhausted from the building.*

Air, Recirculated. Air that is removed from a conditioned space or zone and reused as supply air.

Air, Return. Air from the conditioned space or zone that is returned through ducts or plenums to the conditioning equipment for reconditioning.

Air, Supply. Air being conveyed to a conditioned space or zone through ducts or plenums from a heat exchanger of a heating, cooling, absorption, or evaporative cooling system.

Air, Transfer. Air that is relocated from one conditioned space or zone to another space through ducts, plenums, or transfer grills.

Air Dispersion Systems. Materials intended for use in air handling systems in exposed locations operating under positive pressure.

Air Exfiltration. Leakage of air from a conditioned space(s) to an unconditioned space(s) or to the outdoors through openings in the building envelope, often attributable to wind pressure, stack pressure, or positive pressurization of the building. Also known as air leakage.

Air-Handling Unit. A blower or fan used for the purpose of distributing supply air to a room, space, zone, or area.

Air Infiltration. Leakage of outdoor air or air from an unconditioned space(s) into a conditioned space(s) through openings in the building envelope, often attributable to wind pressure, stack pressure, or negative pressurization of the building. Also known as air leakage.

Air Intakes. An opening in a building's envelope whose purpose is to allow outside air to be drawn into the structure to

replace inside air that is removed by exhaust systems or to improve the quality of the inside air by providing a source of air having a lower concentration of odors, suspended particles, or heating content. [NFPA 96:3.3.2]

Air-Moving System. A system designed to provide heating, cooling, or ventilation in which one or more air-handling units are used to supply air to a common space or are drawing air from a common plenum or space.

Air Pollution Control Devices. Equipment and devices used for the purpose of cleaning air passing through them or by them in such a manner as to reduce or remove the impurities contained therein. [NFPA 96:3.3.3]

Air Terminal Device. [OSHPD 1, 2, 3, 4 & 5] *Any device (e.g., grille, register, diffuser) placed in an opening to a room, through which controlled air enters or leaves. Component of the air-distribution system which has the purpose of achieving the predetermined movement of air into or from a treated space.*

Anchors. See Supports.

Anodeless Riser. An assembly of steel-cased plastic pipe used to make the transition between plastic piping installed underground and metallic piping installed aboveground. [NFPA 54:3.3.3]

Appliance. A device that utilizes fuel or electricity as an energy source to produce light, heat, power, refrigeration, or air conditioning. This definition also includes vented decorative appliances and electric storage or tankless water heaters.

Appliance, Closed Combustion Solid-Fuel-Burning. A heat-producing appliance that employs a combustion chamber that has no openings other than the flue collar, fuel-charging door, and adjustable openings provided to control the amount of combustion air that enters the combustion chamber.

Appliance, Direct Vent. Appliances that are constructed and installed so that all air for combustion is derived directly from the outdoors and all flue gases are discharged to the outdoors. [NFPA 54:3.3.4.2]

Appliance, Electric Heating. A device that produces heat energy to create a warm environment by the application of electric power to resistance elements, refrigerant compressors, or dissimilar material junctions.

Appliance, Fan-Assisted Combustion System. An appliance equipped with an integral mechanical means to either draw or force products of combustion through the combustion chamber or heat exchanger. [NFPA 54:3.3.95.2]

Appliance, Low-Heat. A fuel-burning appliance that produces a continuous flue gas temperature, at the point of entrance to the flue, of not more than 1000°F (538°C).

Appliance, Medium-Heat. A fuel-burning appliance that produces a continuous flue gas temperature, at the point of entrance to the flue, of more than 1000°F (538°C) and less than 2000°F (1093°C).

Appliance, Portable Heating. A heating appliance designed for environmental heating that may have a self-contained fuel supply and is not secured or attached to a building by any means other than by a factory-installed power supply cord.

Appliance, Vented. An appliance designed and installed in such a manner that all products of combustion are conveyed directly from the appliance to the outdoor atmosphere through an approved chimney or vent system.

Appliance Categorized Vent Diameter/Area. The minimum vent diameter/area permissible for Category I appliances to maintain a nonpositive vent static pressure when tested in accordance with nationally recognized standards. [NFPA 54:3.3.5]

Appliance Flue Outlet. The opening or openings in a cooking device where vapors, combustion gases, or both leave the cooking device. [NFPA 96:3.3.4] There might or might not be ductwork attached to this opening.

Appliance Fuel Connector. An assembly of listed semirigid or flexible tubing and fittings to carry fuel between a fuel-piping outlet and a fuel-burning appliance.

Approved. Acceptable to the Authority Having Jurisdiction.

Exception: [HCD 1 & HCD 2] *"Approved" means meeting the approval of the Enforcing Agency, except as otherwise provided by law, when used in connection with any system, material, type of construction, fixture or appliance as the result of investigations and tests conducted by the agency, or by reason of accepted principles or tests by national authorities, or technical, health, or scientific organizations or agencies.*

Notes:

(1) See Health and Safety Code Section 17920 for "Approved" as applied to residential construction and buildings or structures accessory thereto, as referenced in Sections 1.8.2.1.1 and 1.8.2.1.2.

(2) See Health and Safety Code Section 17921.1 for "Approved" as applied to the use of hotplates in residential construction referenced in Sections 1.8.2.1.1 and 1.8.2.1.2.

(3) See Health and Safety Code Section 19966 for "Approved" as applied to Factory-Built Housing as referenced in Sections 1.8.2.1.1 and 1.8.2.1.2.

(4) See Health and Safety Code Section 18201 for "Approved" as applied to Mobilehome Parks as referenced in Section 1.8.2.1.3.

(5) See Health and Safety Code Section 18862.1 for "Approved" as applied to Special Occupancy Parks as referenced in Section 1.8.2.1.3.

Approved Testing Agency. An organization primarily established for purposes of testing to approved standards and approved by the Authority Having Jurisdiction. approved by the Authority Having Jurisdiction. ***[HCD 1 & HCD 2]*** *"Approved Testing Agency" is any agency which is determined by the Enforcing Agency, except as otherwise provided by statute, to have adequate personnel and expertise to carry out the testing of systems, materials, and various types of construction, fixtures or appliances.*

TABLE 4-A (continued)
PRESSURE RELATIONSHIP AND VENTILATION REQUIREMENTS FOR GENERAL ACUTE CARE HOSPITALS, SKILLED NURSING FACILITIES, INTERMEDIATE CARE FACILITIES, OUTPATIENT FACILITIES, LICENSED CLINICS, CORRECTIONAL TREATMENT CENTERS, AND ACUTE PSYCHIATRIC HOSPITALS [OSHPD 1, 2, 3, 4 & 5]

Function of Space (ee)	Pressure Relationship *(d)*(n)	Minimum Outdoor ach	Minimum Total ach	Exhausted Directly to Outdoors (j)	Recirculated Room Units (a)	Unoccupied Turndown	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Operating/surgical cystoscopic rooms *(1224.15.2.2.1)* (m), (o)	Positive	4	20	NR	No	Yes	20-60	68-75/20-24
Patient care area corridor *(1224.4.7)*	NR	NR	2	NR	NR	Yes	NR	NR
Patient room *(1224.14.1)*	NR	2	4 (y)	NR	NR	Yes	Max 60	70-75/21-24
Patient bedroom, *behavioral* room *(1224.30.1/1228.14.1)*	NR	2	2	NR	NR	Yes	NR	NR
Patient holding preparation (1224.16.2)	*NR*	*2*	*6*	*NR*	*No*	*Yes*	*NR*	*70-75/21-24*
Patient toilet room *(1224.4.4.8)*	Negative	NR	10	Yes	No	Yes (ff)	NR	NR
Pediatric playroom (1224.30.3.1)	*NR*	*2*	*6*	*NR*	*NR*	*Yes*	*NR*	*70-75/21-24*
Post-anesthesia care unit and recovery (1224.16.3)	NR	2	6	NR	No	Yes	20-60	70-75/21-24
Procedure room *(1224.4.4.1.4)* (o)	Positive	3	15	NR	No	Yes	20-60	70-75/21-24
Protective environment room *(1224.14.4)* (t)	Positive	2	12	NR	No	No	Max 60	70-75/21-24
Protective environment anteroom *(1224.14.4.3)* (t)	(e)	NR	10	NR	No	No	NR	NR
Radiology waiting rooms *(1224.18)*	Negative	2	12	Yes (q),(w)	NR	Yes (ff)	Max 60	70-75/21-24
Recreation/activity room (1224.31.1.11/1224.35.1)	*NR*	*2*	*6*	*NR*	*NR*	*Yes*	*NR*	*70-75/21-24*
Seclusion room *(1224.4.4.1.5/1228.14.5)*	NR	2	*6*	NR	NR	Yes	Max 60	70-75/21-24
Semi-restricted corridor (1224.15.1)	*NR*	*2*	*4*	*NR*	*NR*	*No*	*NR*	*NR*
Sterile processing room *(1224.15.3.3)*	NR	2	6	NR	No	Yes	NR	NR
Treatment room *(1224.4.4.1.2)* (p)	NR	2	6	NR	NR	Yes	20-60	70-75/21-24
Waiting area primary care clinic	*Negative*	*2*	*12*	*Yes (q)*	*No*	*No*	*Max 60*	*70-75/21-24*
Wound intensive care (burn unit) *(1224.29.1)*	Positive	2	6	NR	No	Yes	40-60	70-75/21-24
DIAGNOSTIC AND TREATMENT								
Bronchoscopy, sputum collection, and pentamidine administration *(1224.39.3)* (n), (x)	Negative	2	12	Yes	No	Yes	NR	68-73/20-23
Cancer treatment area *(1224.39.4)*	NR	2	6	NR	NR	Yes	Max 60	70-75/21-24
Class 1 imaging room *(1224.18)*	NR	2	6	NR	NR	Yes	Max 60	72-78/22-26
CT Scan (1224.18.3)	*NR*	*2*	*6*	*NR*	*NR*	*Yes*	*Max 60*	*70-75/21-24*
Fluoroscopy room (1224.18.1)	*Negative*	*2*	*6*	*Yes*	*No*	*Yes*	*NR*	*70-75/21-24*
MRI room (1224.18.4)	*NR*	*2*	*6*	*NR*	*NR*	*Yes*	*NR*	*70-75/21-24*
Negative-pressure x-ray room	*Negative*	*2*	*12*	*Yes*	*No*	*Yes*	*Max 60*	*72-78/22-26*
Class 2 imaging room *(1224.18.1/1224.28.4)* (p)	Positive	3	15	NR	No	Yes	Max 60	70-75/21-24

TABLE 4-A (continued)
PRESSURE RELATIONSHIP AND VENTILATION REQUIREMENTS FOR GENERAL ACUTE CARE HOSPITALS, SKILLED NURSING FACILITIES, INTERMEDIATE CARE FACILITIES, OUTPATIENT FACILITIES, LICENSED CLINICS, CORRECTIONAL TREATMENT CENTERS, AND ACUTE PSYCHIATRIC HOSPITALS [OSHPD 1, 2, 3, 4 & 5]

Function of Space (ee)	Pressure Relationship *(d)*(n)	Minimum Outdoor ach	Minimum Total ach	Exhausted Directly to Outdoors (j)	Recirculated Room Units (a)	Unoccupied Turndown	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Angiography room (1224.18.2)	*Positive*	*3*	*15*	*NR*	*No*	*Yes*	*Max 60*	*70-75/21-24*
Cardiac catheterization lab (1224.28.2)	*Positive*	*3*	*15*	*NR*	*No*	*Yes*	*Max 60*	*70-75/21-24*
Electroconvulsive therapy procedure room *(1224.28.6)*	*Positive*	*3*	*15*	*NR*	*No*	Yes	*20-60*	*70-75/21-24*
Interventional imaging procedure room (1224.28.4)	*Positive*	*5*	*15*	*NR*	*No*	*Yes*	*20-60*	*70-75/21-24*
Class 3 imaging room *(1224.28.5/1224.18.1)* (m), (o)	Positive	4	20	NR	No	Yes	20-60	68-75/21-24
Hybrid operating room (1224.28.5) (m), (n), (o)	*Positive*	*4*	*20*	*NR*	*No*	*Yes*	*20-60*	*68-75/20-24*
Dental treatment *(1226.6.1.3)*	NR	2	3	NR	NR	Yes	NR	70–75/21–24
Dialysis treatment area *(1224.36.2.3)*	NR	2	6	NR	NR	Yes	NR	72-78/22-26
Dialyzer reprocessing room *(1224.36.2.12)*	Negative	NR	10(bb)	Yes	No	Yes (ff)	NR	NR
Gastrointestinal endoscopy procedure room *(1224.39.3)* (x)	NR	2	6	NR	No	Yes	20-60	68-73/20-23
General examination room *(1224.4.4.1.1)*	NR	2	4	NR	NR	Yes	Max 60	70-75/21-24
Hydrotherapy *(1224.35)*	Negative	2	6	NR	NR	Yes	NR	72-80/22-27
Instrument processing room *(1224.39.3.2)*	Negative	2	10	Yes	No	No	NR	NR
Medication *preparation* room *(1224.4.4.1)*	NR	2	4	NR	NR	Yes	Max 60	70-75/21-24
Nuclear medicine (Gamma, PET, SPECT) (1224.34.1.2)	*Negative*	*2*	*6*	*Yes*	*No*	*No*	*NR*	*70-75/21-24*
Nuclear medicine hot lab *(1224.34.1.3)*	Negative	NR	6	Yes	No	Yes (ff)	NR	70-75/21-24
Speech therapy room *(1224.35.4)*	NR	2	2	NR	NR	Yes	NR	70-75/21-24
Physical therapy *(1224.35.2)*	Negative	2	6	NR	NR	Yes	Max 65	72-80/22-27
Occupational therapy *(1224.35.3)*	NR	2	6	NR	NR	Yes	NR	70-75/21-24
Special examination room *(g)*	NR	2	6	NR	NR	Yes	Max 60	70-75/21-24
Ultrasound (1224.18.5)	*NR*	*2*	*6*	*NR*	*NR*	*Yes*	*Max 60*	*72-78/22-26*
SUPPORT *SERVICES*								
Blood bank/tissue storage (1224.17.2.4)	*NR*	*2*	*6*	*NR*	*NR*	*Yes*	*NR*	*NR*
Blood draw/phlebotomy (1224.17.3)	*NR*	*2*	*6*	*NR*	*NR*	*Yes*	*NR*	*70-75/21-24*
Housekeeping (1224.4.15)	Negative	NR	10	Yes	No	No	NR	NR
Food and supply storage *(1224.20.2.3)*	NR	NR	2	NR	No	No	NR	72-78/22-26
Food preparation areas *(1224.20.2.5)* (i)	NR	2	10	NR	No	Yes	NR	72-78/22-26

TABLE 4-A (continued)
PRESSURE RELATIONSHIP AND VENTILATION REQUIREMENTS FOR GENERAL ACUTE CARE HOSPITALS, SKILLED NURSING FACILITIES, INTERMEDIATE CARE FACILITIES, OUTPATIENT FACILITIES, LICENSED CLINICS, CORRECTIONAL TREATMENT CENTERS, AND ACUTE PSYCHIATRIC HOSPITALS [OSHPD 1, 2, 3, 4 & 5]

Function of Space (ee)	Pressure Relationship *(d)*(n)	Minimum Outdoor ach	Minimum Total ach	Exhausted Directly to Outdoors (j)	Recirculated Room Units (a)	Unoccupied Turndown	Design Relative Humidity (k), %	Design Temperature (l), °F/°C
Dietary storage *(1225.4.2.2.10)*	NR	NR	2	NR	No	No	NR	72-78/22-26
Food preparation center *(1225.4.2.2.3)* (i)	NR	2	10	NR	No	Yes	NR	72-78/22-26
Hair salon *(1225.6)*	Negative	NR	10	Yes	NR	Yes	NR	70-78/21-29
Laundry, central and personal *(1225.4.7/1225.5.2.5.7)*	Negative	2	10	Yes	No	No	NR	NR
Linen and trash chute room *(1225.4.7)*	Negative	NR	10	Yes	No	No	NR	NR
Medication *preparation* room *(1225.4.1.1.1)*	NR	2	4	NR	NR	Yes	Max 60	70-75/21-24
Soiled linen sorting and storage *(1225.4.7)*	Negative	NR	10	Yes	No	No	NR	NR
Unsterile supply (1225.4.5.2.4)	*NR*	*2*	*2*	*NR*	*NR*	*No*	*NR*	*NR*
Warewashing *(1225.4.2.2.7)*	Negative	NR	10	Yes	No	Yes	NR	NR
SUPPORT SPACE								
Clean utility *room (1225.4.1.3.1)*	Positive	2	4	NR	NR	No	NR	NR
Hazardous waste storage *(1225)*	Negative	2	10	Yes	No	No	NR	NR
Housekeeping room *(1225.4.6)* (j)	Negative	NR	10	Yes	NR	No	NR	NR
Soiled utility*/workroom* or soiled holding *(1225.4.1.3.2)*	Negative	2	10	Yes	No	No	NR	NR

Informative Notes: (1) NR = no requirement

Table 4-A is based on ASHRAE Standard 170-2021, "Ventilation of Healthcare Facilities," Table 7-1, 8-1, 8-2 and 9-1 with amendments, and it is used with expressed written permission from ASHRAE. **Copyright notice for ASHRAE Standards** ©ASHRAE, www.ashrae.org. 2021 ASHRAE Standard-170.

Notes for Table 4-A:

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 *407.4.5*. Because of the cleaning difficulty and potential for buildup of contamination, recirculating room units shall not be used in areas marked "No." Recirculating devices with high-efficiency particulate air (HEPA) filters shall be permitted in existing facilities as interim, supplemental environmental controls to meet requirements for the control of airborne infectious agents. The design of either portable or fixed systems should prevent stagnation and short circuiting of airflow. The design of such systems shall also allow for easy access for scheduled preventative maintenance and cleaning.

b. *Additional air change, ISO class, continuous pressure monitoring and filtering requirements for compounding areas shall comply with California Board of Pharmacy regulations Title 16 §1735 & §1751, and USP <797> & <800>. Air supplied to the compounding buffer room and ante room must be introduced through 99.97% minimum HEPA filters located in the ceiling. At least 15 air changes per hour (ACPH) shall be provided to nonhazardous drug (non-HD) compounding buffer rooms through the ceiling. The HEPA filtered air from the PEC in the non-HD buffer room, when added to the HVAC-supplied HEPA filtered air, shall increase the total HEPA-filtered ACPH to at least 30. If the PEC is used to meet the minimum total ACPH requirements, the PEC must not be turned off except for maintenance. All hazardous drug (HD) compounding areas and PECs shall be externally vented. For both hazardous and non-hazardous compounding, minimum air changes shall be met under dynamic operating conditions as defined by USP. Returns and exhaust grilles shall be mounted low on the wall unless a visual smoke study demonstrates dilution of particles and sweeping out of particles from the entire room. One return/exhaust should be placed near the refrigerator compressor. Anteroom shall have a minimum pressure differential of +0.02 inches water column in relation to the adjacent, non-compounding spaces. Non-HD buffer room shall have a pressure differential of +0.02 to +0.05 inches water column in relation to the anteroom. HD buffer room shall have a pressure differential of -0.01 to -0.03 inches water column in relation to the anteroom.*

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

d. *For operating rooms, cardiac catheterization labs, angiography rooms, cystoscopy rooms, delivery rooms, cesarean operating rooms, newborn intensive care, and class 3 imaging provide approximately 15% excess supply air to the room or a sufficient quantity of 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 407.4.2.* ||

e. See Section *414.0 and 416.0* for AII ventilation requirements, including pressure relationship requirements, and Section *415.0 and 416.0* for PE ventilation requirements, including 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 hazard assessment, performed as part of an effective laboratory ventilation management plan per AIHA/ASSE Z9.5 3, determines that either (1) acceptable exposure concentrations in the laboratory work area can be achieved with a lower minimum total ach ventilation rate than is listed in Table *4-A* or (2) a demand control approach with active sensing of contaminants or appropriate surrogates is used as described in ASHRAE Handbook—HVAC Applications10, Chapter 16, "Laboratories."

g. *Examination rooms programmed for use by patients with undiagnosed gastrointestinal symptoms, undiagnosed respiratory symptoms, or undiagnosed skin symptoms.*

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 Section 511.3. Commercial cooking areas shall be designed to prevent odors from entering patient spaces.*

j. *Where the "exhaust directly to Outdoors" column is marked yes, all* exhaust air shall be discharged directly to the outdoors and not recirculated to other areas. *Recirculation room units may be provided where the column is marked yes provided air is not recirculated to other areas.* To satisfy exhaust needs, constant replacement air from the outdoors is necessary when the system is in operation.

k. The relative humidity (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 occupants' comfort and/or medical conditions require those conditions.

m. National Institute for Occupational Safety and Health (NIOSH) criteria documents 11 regarding occupational exposure to waste anesthetic gases and vapors and control of occupational exposure to nitrous oxide indicate a need for both local exhaust (scavenging) systems and general ventilation of the areas in which the respective gases are used. (***Informative Note:*** Refer to NFPA 99 [*2024*] for other requirements.)

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

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

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

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

r. Exhaust rate shall meet or exceed local requirements.

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). *The anteroom shall have negative air pressure in relation to the protective environment room. A door louver, transfer grille, or other acceptable means may be provided to allow for airflow from the protective environment room to the anteroom. The protective environment room shall have positive pressure in relation to the anteroom and adjoining toilet room.* 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 protective environment (PE) room is used as a normal patient room. Rooms with reversible airflow provisions for the purpose of switching between PE and AII functions shall not be permitted.

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. *The airborne infection isolation room shall have negative pressure in relation to the anteroom, and the adjoining toilet room shall have negative pressure in relation to the airborne infection isolation room.* Supplemental recirculating devices using HEPA filters shall be permitted to recirculate air within the AII room to increase the equivalent room air exchanges; however, the minimum outdoor air changes of Table 7-1 are still required. When the AII room is not used for airborne infection isolation, the pressure relationship to adjacent areas, when measured with the door closed, shall remain unchanged.

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 be exhausted directly to outdoors applies only to radiology waiting rooms programmed to hold patients who are waiting for chest x-rays for diagnosis of respiratory disease.

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

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[12] for additional information for these spaces.

aa. *Nurse station pressure relationship and ventilation requirements shall match the area in which it is located.*

bb. Lower total ach ventilation rates shall be permitted when use of the ASHRAE Standard 62.1 1, Section 6.5, "Exhaust Ventilation," Performance Compliance Path determines that concentration of the contaminants of concern is lower than the corresponding concentration of interest. In addition to other contaminants of concern required by Standard 62,1 Section 6.5.2, the following contaminants of concern shall be considered for the space and maintained not greater than the concentration level indicated: hydrogen peroxide 1 ppm; glutaraldehyde 0.05 ppm; ethyl alcohol 1000 ppm; isopropyl alcohol 400 ppm. (**Informative Note:** Listed concentrations of interest were determined by ACGIH [2001]; see Informative Appendix E.)

cc. *HD segregated compounding area shall have a differential pressure of -0.01 to -0.03 inches water column in relation to adjacent areas and a minimum of 12 air changes per hour.*

dd. *The requirements for the non-HD segregated compounding area shall meet the minimum requirements for the room which it is located.*

ee. ***Informative Note:*** Parenthetic notations following a space name are references to the relevant *California Building Code sections from Chapter 12*. These paragraph references are provided to the user to aid in the application of design requirements. *Functions from 1225, 1226, 1227, or 1228 not specifically identified in the table can refer to the appropriate section from 1224.*

ff. If this space uses unoccupied turndown it shall include time-delay controls such that turndown does not occur for the first 20 minutes after the space becomes unoccupied. (***Informative Note:*** The 20 minute delay approximates the time required for 90% reduction in airborne contamination at 6 ach, assuming perfect mixing.)

gg. *Intensive care patient rooms that contain a modular toilet/sink combination unit within the room shall be provided with a minimum of 75 cfm (35.4 Lis) of exhaust directly over the modular toilet/sink combination unit.*

TABLE 4-B
FILTER EFFICIENCIES FOR CENTRAL VENTILATION AND AIR-CONDITIONING SYSTEMS IN GENERAL ACUTE CARE HOSPITALS, OUTPATIENT FACILITIES, LICENSED CLINICS AND ACUTE PSYCHIATRIC HOSPITALS[1] [OSHPD 1, 3 & 5]

AREA DESIGNATION	MINIMUM NUMBER OF FILTER BANKS	FILTER EFFICIENCY % FILTER LOCATION (MINIMUM EFFICIENCY REPORTING VALUE MERV)[6]		
		NO. 1[1]	NO. 2[1]	A.T.D.[2]
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%[4]
		(8)	(14)	HEPA[3]
Protective environment rooms	3	30%	90%	99.97%[5]
		(8)	(14)	HEPA[3]
Operating room, operating/surgical cystoscopic room, cesarean operating room, class 3 imaging, hybrid operating room	2	30%	95%	—
		(8)	(16)	—
Angiography; cardiac catheterization labs class 1 and 2 imaging; interventional imaging procedure rooms; delivery rooms, nurseries; patient care, treatment, exam, cystoscopy, 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)	—
Laboratories	2	30%	80%	—
		(8)	(13)	—
Administrative, med staff support areas, bulk storage, soiled holding areas, food preparation areas, public cafeterias, and laundries	1[7]	80%	—	—
		(13)	—	—
Psychiatric hospitals intended for the care and treatment of inpatients who do not require acute medical services	1[7]	80%	—	—
		(13)	—	—

1 Based on ASHRAE 52.2.
2 A.T.D. – Air terminal device serving the room or space.
3 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.
4 HEPA filters shall be located in the air terminal device of the room served.
5 HEPA filters shall be located in the air terminal device of the room served. HEPA filters shall be permitted to be located in the air handling unit subject to the exception in ASHRAE 170, Section 7.2.2(c). HEPA filter installation shall be designed and equipped to permit safe removal, disposal and replacement of filters.
6 The numbers in parentheses represent MERV rating based on ASHRAE 52.2.
7 Additional prefilters with a minimum efficiency of MERV 8 may be used to reduce maintenance for filters.

TABLE 4-C
FILTER EFFICIENCIES FOR CENTRAL VENTILATION AND AIR-CONDITIONING SYSTEMS IN SKILLED NURSING FACILITIES, INTERMEDIATE CARE FACILITIES AND CORRECTIONAL TREATMENT CENTERS[1] [OSHPD 2 & 4]

AREA DESIGNATION	MINIMUM NUMBER OF FILTER BANKS	FILTER EFFICIENCY % FILTER BANK (MINIMUM EFFICIENCY REPORTING VALUE MERV)[3]	
		NO. 1[1]	NO. 2[1]
All areas for inpatient care, treatment and/or diagnosis, and those areas providing direct service or cleaning supplies	2	30%	80%
		(8)	(13)
Administrative, bulk storage, soiled holding, laundries and food prep areas	1[4]	80%[2]	—
		(13)	—

1 Based on ASHRAE 52.2.
2 Filters are not required for evaporative coolers serving laundries.
3 The numbers in parentheses represent MERV rating based on ASHRAE 52.2.
4 Additional prefilters with a minimum efficiency of MERV 8 may be used to reduce maintenance for filters.

TABLE 402.1
MINIMUM VENTILATION RATES IN BREATHING ZONE
[ASHRAE 62.1: TABLE 6-1]

Note: *Ventilation air supply requirements for occupancies regulated by the California Energy Commission are found in the California Energy Code.*

OCCUPANCY CATEGORY	PEOPLE OUTDOOR Air Rate R_p (CFM/person)	AREA OUTDOOR Air Rate R_a (CFM/ft^2)	DEFAULT OCCUPANT DENSITY (people/1000 ft^2)	AIR CLASS
ANIMAL FACILITIES				
Animal exam room (veterinary office)	10	0.12	20	2
Animal imaging (MRI/CT/PET)	10	0.18	20	3
Animal operating rooms	10	0.18	20	3
Animal postoperative recovery room	10	0.18	20	3
Animal preparation rooms	10	0.18	20	3
Animal procedure room	10	0.18	20	3
Animal surgery scrub	10	0.18	20	3
Large-animal holding room	10	0.18	20	3
Necropsy	10	0.18	20	3
Small-animal-cage room (static cages)	10	0.18	20	3
Small-animal-cage room (ventilated cages)	10	0.18	20	3
CORRECTIONAL FACILITIES				
Booking/waiting	7.5	0.06	50	2
Cell	5	0.12	25	2
Day room	5	0.06	30	1
Guard stations	5	0.06	15	1
EDUCATIONAL FACILITIES				
Art classroom	10	0.18	20	2
Classrooms (ages 5 to 8)	10	0.12	25	1
Classrooms (age 9 plus)	10	0.12	35	1
Computer lab	10	0.12	25	1
Daycare sickroom	10	0.18	25	3
Daycare (through age 4)	10	0.18	25	2
Lecture classroom	7.5	0.06	65	1
Lecture hall (fixed seats)	7.5	0.06	150	1
Libraries	5	0.12	10	–
Media center	10	0.12	25	1
Multi-use assembly	7.5	0.06	100	1
Music/theater/dance	10	0.06	35	1
Science laboratories	10	0.18	25	2
University/college laboratories	10	0.18	25	2
Wood/metal shop	10	0.18	20	2
FOOD AND BEVERAGE SERVICE				
Bars, cocktail lounges	7.5	0.18	100	2
Cafeteria/fast-food dining	7.5	0.18	100	2
Kitchen (cooking)	7.5	0.12	20	2
Restaurant dining rooms	7.5	0.18	70	2
GENERAL				
Break rooms	5	0.06	25	1
Coffee stations	5	0.06	20	1
Conference/meeting	5	0.06	50	1
Corridors	–	0.06	–	1
Occupiable storage rooms for liquids or gels	5	0.12	2	2
HOTELS, MOTELS, RESORTS, DORMITORIES				
Barracks sleeping areas	5	0.06	20	1
Bedroom/living room	5	0.06	10	1
Laundry rooms, central	5	0.12	10	2
Laundry rooms within dwelling units	5	0.12	10	1
Lobbies/prefunction	7.5	0.06	30	1
Multipurpose assembly	5	0.06	120	1

TABLE 1102.3 (continued)
REFRIGERANT GROUPS, PROPERTIES, AND ALLOWABLE QUANTITIES[7]
[ASHRAE 34: TABLE 4-1, TABLE 4-2]

REFRIGERANT	CHEMICAL FORMULA	CHEMICAL NAME[1] (COMPOSITION FOR BLENDS)	SAFETY GROUP	OEL[2] (ppm)	RCL (lb/Mcf)	LFL[8] (lb/Mcf)
R-423A	zeotrope	R-134a/227ea (52.5/47.5)	A1	1000	19	—
R-424A[6]	zeotrope	R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	A1	990	6.2	—
R-425A	zeotrope	R-32/134a/227ea (18.5/69.5/12.0)	A1	1000	16	—
R-426A[6]	zeotrope	R-125/134a/600/601a (5.1/93.0/1.3/0.6)	A1	990	5.2	—
R427A	zeotrope	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	A1	1000	18	—
R428A	zeotrope	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	A1	1000	23	—
R-429A	zeotrope	R-E170/152a/600a (60.0/10.0/30.0)	A3	1000	0.81	3.2
R-430A	zeotrope	R-152a/600a (76.0/24.0)	A3	1000	1.3	5.2
R-431A	zeotrope	R-290/152a (71.0/29.0)	A3	1000	0.68	2.7
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	A3	550	0.13	2.4
R-433A	zeotrope	R-1270/290 (30.0/70.0)	A3	760	0.34	2.4
R-433B	zeotrope	R-1270/290 (5.0/95.0)	A3	950	0.39	2.0
R-433C	zeotrope	R-1270/290 (25.0/75.0)	A3	790	0.41	2.0
R-434A	zeotrope	R-125/143a/134a/600a (63.2/18.0/16.0/2.8)	A1	1000	20	—
R-435A	zeotrope	R-E170/152a (80.0/20.0)	A3	1000	1.1	4.3
R-436A	zeotrope	R-290/600a (56.0/44.0)	A3	1000	0.50	2.0
R-436B	zeotrope	R-290/600a (52.0/48.0)	A3	1000	0.51	2.0
R-436C	zeotrope	R-290/600a (95.0/5.0)	A3	1000	0.57	2.3
R-437A	zeotrope	R-125/134a/600/601 (19.5/78.5/1.4/0.6)	A1	990	5.1	—
R-438A	zeotrope	R-32/125/134a/600/601a (8.5/45.0/44.2/1.7/0.6)	A1	990	4.9	—
R-439A	zeotrope	R-32/125/600a (50.0/47.0/3.0)	A2	1000	4.7	18.9
R-440A	zeotrope	R-290/134a/152a (0.6/1.6/97.8)	A2	1000	1.9	7.8[11]
R-441A	zeotrope	R-170/290/600a/600 (3.1/54.8/6.0/36.1)	A3	1000	0.39	2.0
R-442A	zeotrope	R-32/125/134a/152a/227ea (31.0/31.0/30.0/3.0/5.0)	A1	1000	21	—
R-443A	zeotrope	R-1270/290/600a (55.0/40.0/5.0)	A3	640	0.19	2.2
R-444A	zeotrope	R-32/152a/1234ze(E) (12.0/5.0/83.0)	A2L	850	5.0	19.9
R-444B	zeotrope	R-32/152a/1234ze(E) (41.5/10.0/48.5)	A2L	930	4.3	17.3
R-445A	zeotrope	R-744/134a/1234ze (E) (6.0/9.0/85.0)	A2L	930	5.4	21.6
R-446A	zeotrope	R-32/1234ze(E)/600 (68.0/29.0/3.0)	A2L	960	3.7	14.8
R-447A	zeotrope	R-32/125/1234ze(E) (68.0/3.5/28.5)	A2L	960	5.2	20.6
R-447B	zeotrope	R-32/125/1234ze(E) (68.0/8.0/24.0)	A2L	970	4.8	19.5
R-448A	zeotrope	R-32/125/1234yf/134a/1234ze(E) (26.0/26.0/20.0/21.0/7.0)	A1	860	24	—
R-448B	—	R-32/125/1234yf/134a/1234ze(E) (21.0/21.0/20.0/31.0/7.0)	A1	850	22.0	—
R-449A	zeotrope	R-32 /125 /1234yf /134a (24.3/24.7/25.3/25.7)	A1	840	23	—
R-449B	zeotrope	R-32/125/1234yf/134a (25.2/24.3/23.2/27.3)	A1	850	23	—
R-449C	zeotrope	R-32/125/1234yf/134a (20.0/20.0/31.0/29.0)	A1	800	23	—
R-450A	zeotrope	R-134a/1234ze(E) (42.0/58.0)	A1	880	20	—

TABLE 1102.3 (continued)
REFRIGERANT GROUPS, PROPERTIES, AND ALLOWABLE QUANTITIES[7]
[ASHRAE 34: TABLE 4-1, TABLE 4-2]

REFRIGERANT	CHEMICAL FORMULA	CHEMICAL NAME[1] (COMPOSITION FOR BLENDS)	SAFETY GROUP	OEL[2] (ppm)	RCL (lb/Mcf)	LFL[8] (lb/Mcf)
R-451A	zeotrope	R-1234yf/134a (89.8/10.2)	A2L	530	5.3	21.3
R-451B	zeotrope	R-1234yf/134a (88.8/11.2)	A2L	530	5.0	21.3
R-452A	zeotrope	R-32/125/1234yf (11.0/59.0/30.0)	A1	790	27	—
R-452B	zeotrope	R-32/125/1234yf (67.0/7.0/26.0)	A2L	870	4.8	19.3
R-452C	zeotrope	R-32/125/1234yf (12.5/61.0/26.5)	A1	810	27	—
R-453A	zeotrope	R-32/125/134a/227ea/600/601a (20.0/20.0/53.8/5.0/0.6/0.6)	A1	1000	7.8	—
R-454A	zeotrope	R-32/1234yf (35.0/65.0)	A2L	690	4.4	17.5
R-454B	zeotrope	R-32/1234yf (68.9/31.1)	A2L	850	4.6	18.5
R-454C	zeotrope	R-32/1234yf (21.5/78.5)	A2L	620	4.6	18.2
R-455A	zeotrope	R-744/32/1234yf (3.0/21.5/75.5)	A2L	650	6.8	26.9
R-456A	zeotrope	R-32/134a/1234ze(E) (6.0/45.0/49.0)	A1	900	20	—
R-457A	zeotrope	R-32/1234yf/152a (18.0/70.0/12.0)	A2L	650	3.4	13.5
R-457B	zeotrope	R-32/1234yf/152a (35.0/55.0/10.0)	A2L	730	3.7	14.9
R-458A	zeotrope	R-32/125/134a/227ea/236fa (20.5/4.0/61.4/13.5/0.6)	A1	1000	18	—
R-459A	zeotrope	R-32/1234yf/1234ze(E) (68.0/26.0/6.0)	A2L	870	4.3	17.4
R-459B	zeotrope	R-32/1234yf/1234ze(E) (21.0/69.0/10.0)	A2L	640	5.8	23.3
R-460A	zeotrope	R-32/125/134a/1234ze(E) (12.0/52.0/14.0/22.0)	A1	950	24	—
R-460B	zeotrope	R-32/125/134a/1234ze(E) (28.0/25.0/20.0/27.0)	A1	950	25	—
R-460C	zeotrope	R-32/125/134a/1234ze(E) (2.5/2.5/46.0/49.0)	A1	900	20	—
R-461A	zeotrope	R-125/143a/134a/227ea/600a (55.0/5.0/32.0/5.0/3.0)	A1	1000	17	—
R-462A	zeotrope	R-32/125/143a/134a/600 (9.0/42.0/2.0/44.0/3.0)	A2	1000	3.9	16.6[9]
R-463A	zeotrope	R-744/32/125/1234yf/134a (6.0/36.0/30.0/14.0/14.0)	A1	990	19	—
R-464A	zeotrope	R-32/125/1234ze(E)/227ea (27.0/27.0/40.0/6.0)	A1	930	27	—
R-465A	zeotrope	R-32/290/1234yf (21.0/7.9/71.1)	A2	660	2.5	10.0
R-466A	zeotrope	R-32/125/13I1 (49.0/11.5/39.5)	A1	860	6.2	—
R-467A	zeotrope	R-32/125/134a/600a (22.0/5.0/72.4/0.6)	A2L	1000	6.7	—
R-468A	zeotrope	R-1132a/32/1234yf (3.5/21.5/75.0)	A2L	610	4.1	—
R-468B	—	R-1132a/32/1234yf (6.0/13.0/81.0)	A2L	570	4.4	—
R-468C	—	R-1132a/32/1234yf (6.0/42.0/52.0)	A2L	710	4.3	—
R-469A	zeotrope	R-744/R-32/R-125 (35.0/32.5/32.5)	A1	1600	8	—
R-470A	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	1100	17	—
R-470B	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/11.5/11.5/3.0/57.0/7.0)	A1	1100	16	—
R-471A	zeotrope	R-1234ze(E)/227ea/1336mzz(E) (78.7/4.3/17.0)	A1	710	9.7	—

HISTORY NOTE APPENDIX

2025 CALIFORNIA MECHANICAL CODE
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 4

HISTORY:

For prior code history, see the History Note Appendix to the California Mechanical Code, 2022 Triennial Edition, effective January 1, 2023.

1. *(BSC 01/24, DSA-SS 01/24, DSA-SS 01/24 CWoRE, HCD 02/24, OSHPD 01/24, SFM 01/24) Adoption by reference the 2024 Uniform Mechanical Code with necessary amendments to become the 2025 California Mechanical Code, and repeal of the 2021 edition of the Uniform Mechanical Code. Effective on January 1, 2026.*
2. *Erratum to correct editorial errors in the Preface and corrections to Chapters 2, 4, and Table 1102.3, in Chapter 11, effective January 1, 2026.*