MECHANICAL 101 FOR OSHPD 3 CLINICS

2013 California Mechanical Code
2013 California Plumbing Code

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Mechanical 101

- **2013 CMC Chapter 3 General Requirements**
  - *325.0 Air Conditioning and Heating Systems*
    - *325.3 Requirements for Outpatient Facilities and Licensed Clinics. [For OSHPD 3]*
      - *325.3.1 The system shall be designed to provide the temperature and humidities for sensitive areas for rooms shown in Table 325.0.*

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TABLE 325.0
HEATING, COOLING, AND RELATIVE HUMIDITY REQUIREMENTS FOR SENSITIVE AREAS OR ROOMS

Area or Rooms Designation	TEMPERATURE RANGE[1,2] °F	RELATIVE HUMIDITY[1,3] Percent
Operating room	68-75	20-60
Cystoscopy	68-75	20-60
Cardiac catheterization lab	70-75	max 60
Trauma/cardiac room	70-75	20-60
Delivery room, Caesarean operating room	68-75	20-60
Gastrointestinal endoscopy procedure room	68-73	20-60
Post-Anesthesia Care Unit	70-75	30-60
Newborn nursery	72-78	30-60
Newborn Intensive-care nursery unit	70-75	30-60
Intensive care[4]	70-75	30-60
Burn Unit	70-75	40-60

1 Thermostats and humidistat shall be either locally resetable and of the non-locking type or remotely resetable and of the locking type.

2 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.

3 The ranges listed are the minimum and maximum limits where control is specifically needed.

4 Types of intensive care service spaces are listed in the California Building Code.

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- **2013 CMC Chapter 3 General Requirements**
  - *326.0 Essential Mechanical Provisions. [OSHPD 1, 2, 3 (Surgical Clinics only) & 4] During periods of power outages essential electrical power shall be provided for the following equipment:*
    - *326.1 (Does not apply to OSHPD 3 surgical clinic.) All heating equipment necessary to maintain a minimum temperature of 60°F (15.6°) in patient areas which are not specified in Table 325.0*
    - *326.2 All heating equipment necessary to maintain the minimum temperatures for sensitive areas as specified in Table 325.0.*
    - *326.3 Equipment necessary for humidification of the areas listed in Table 325.0.*
    - *326.4 All supply, return, and exhaust fans required to maintain the positive and negative air balances as required in Table 4-A.*
    - *326.5 All control components and control systems necessary for the normal operation of equipment required to have essential electrical power.*
    - *326.6 Alarms for airborne infection isolation rooms and protective environment rooms.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 401.0 General
    - 401.1 Applicability. This chapter contains requirements for ventilation air supply, exhaust, and makeup air requirements for occupiable spaces within a building. *[OSHPD 1, 2, 3 & 4] See Sections 404.0 through 418.0. [SFM] Air filters shall comply with all requirements of Part 12, Title 24, Chapter 12- 71, SFM Standard 12-71-1.*
  - 402.0 Ventilation Air. *[Not permitted for OSHPD 1, 2, 3 & 4]*
    - 402.1 General Requirements. *[Not permitted for OSHPD 1, 2, 3 & 4]* Occupiable spaces listed in Table 402.1 shall be designed to have ventilation (outdoor) air for occupants in accordance with this chapter. *Ventilation air supply requirements for occupancies regulated by the California Energy Commission are found in the California Energy Code.*
  - *403.0 Ventilation Rates. [Not permitted for OSHPD 1, 2, 3 & 4]*

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- **2013 CMC Chapter 4 Ventilation Air Supply**

  - *405.0 Evaporative Cooling System for Health Care Facilities.[For OSHPD 1, 2, 3 & 4] Direct evaporative cooling systems where the air directly contacts the wetted surface or spray shall be limited in health facilities to nonpatient areas such as laundry rooms, food preparation areas, and boiler or machinery rooms. Similar rooms with high heating-producing equipment will be considered when specifically approved by the enforcing agency. The evaporative pads shall be a synthetic type. Filters shall be required in accordance with Tables 4-B and 4-C except utility rooms, i.e.: boiler or machinery rooms.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 407.0 Ventilation System Details. [OSHPD 1, 2, 3 & 4]
    - *407.1 General.*
      - *407.1.1 All supply-air, return air, and exhaust-air systems shall be mechanically operated and such systems for areas listed in Table 4-A shall be operated continuously. Natural ventilation through windows or other openings such as louvers will be considered as supplemental to the required mechanical ventilation systems.*
      - *Exceptions:*
      - *(1) Natural ventilation shall not be used in airborne infection isolation rooms and protective environment rooms.*
      - *2) The number of air changes may be reduced to 25 percent of the indicated value in Table 4-A, when the room is unoccupied, if provisions are made to ensure the following:*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 407.0 Ventilation System Details. [OSHPD 1, 2, 3 & 4]
    - *(1) The number of air changes per hour indicated is reestablished whenever the space is occupied.*
    - *(2) The pressure relationship with the surrounding rooms is maintained when the air changes per hour are reduced. In areas requiring no continuous directional control as identified in accordance with Table 4-A, ventilation systems may be shut down when the space is unoccupied and ventilation is not otherwise required. Ventilation shall not be reduced in rooms specifically used for airborne infection control, such as waiting rooms, triage rooms, corridors, reception areas, areas adjacent to waiting areas, airborne infection isolation rooms, negative pressure exam room, negative pressure x-ray treatment rooms, and protective environment rooms. All operating and delivery rooms shall maintain a minimum of six air changes per hour of total air when not in use.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**

  - 407.0 Ventilation System Details. [OSHPD 1, 2, 3 & 4]

    407.1.2 Fans serving exhaust systems shall be located at the discharge end of the system. 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.

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 407.0 Ventilation System Details. [OSHPD 1, 2, 3 & 4]
    - *407.2 Outdoor Air Intakes and Exhaust Outlets.*
      - *407.2.1 Outdoor Air Intakes. Outdoor air intakes shall be located at least 25 feet (7.62 m) from exhaust outlets of ventilating systems, combustion equipment stacks, medical-surgical vacuum systems, cooling towers, and areas that may collect vehicular exhaust or other noxious fumes. Plumbing vents shall be located in relation to outdoor air intakes per California Plumbing Code. The bottom of outdoor air intakes shall be located as high as practicable, but not less than 10 feet (3048 mm) above ground level. If installed above the roof, they shall be located 18 inches (457 mm) above roof level or 3 feet (914 mm) above a flat roof where heavy snowfall is anticipated.*
      - *Exceptions:*
      - *1) These dimensions may be reduced if it is demonstrated by the submission of details and calculations that location of intakes with respect to exhausts and their orientation, or the use of special filters, provides equal performance.*
      - *(2) The requirements regarding the bottom of outdoor air intakes and installation through the roof do not apply to skilled nursing facilities, intermediate-care facilities or nonsensitive areas in correctional treatment centers.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 407.0 Ventilation System Details. [OSHPD 1, 2, 3 & 4]
    - *407.2 Outdoor Air Intakes and Exhaust Outlets.*
      - *407.2.2 Exhaust Outlets. Exhaust outlets shall be located a minimum of 10 feet (3048 mm) above adjoining grade and 10 feet (3048 mm) from doors, occupied areas, and operable windows.*
      - *Exception: Airborne infection isolation rooms shall comply with Section 414.1.*
      - *407.2.3 Relief Air Discharge. Building relief air discharge shall discharge at least 10 feet (3048 mm) from any outside air intake.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 407.0 Ventilation System Details. [OSHPD 1, 2, 3 & 4]
    - *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).*
    - *407.3.2 Where the variation in static pressure drop across filters is a significant portion of the total pressure drop, static pressure or pressure differential controls or constant volume devices may be required to ensure the maintenance of air balance relationships shown in Table 4-A regardless of filter loading.*
    - *Exception: This section does not pertain to skilled nursing facilities, intermediate-care facilities and nonsensitive areas in correctional treatment centers, except for airborne infection isolation rooms and protective environment rooms.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 407.4 Air Circulation.
    - *407.4.1 Design of the ventilation system shall provide air movement that is generally from clean to less clean areas.*
    - *407.4.1.1 Air supplied to operating rooms, cesarean operating rooms, cardiac catheterization labs, cystoscopy rooms, delivery rooms, and nurseries shall be delivered at or near the ceiling of the area served. In theses areas and in morgues and autopsy rooms all air removed from the area shall be removed near floor level. Exhaust or recirculation inlets shall be located not less than 3 inches (76 mm) nor more than 8 inches (203 mm) above the finished floor, except in morgues and autopsy rooms where all of the exhaust air is removed through an autopsy table designed for this purpose. At least two exhaust or recirculation air inlets shall be used in all cardiac catheterization labs, cystoscopy rooms, operating rooms, and delivery rooms and shall be located not less than 3 inches (76 mm) nor more than 8 inches (203 mm) above the finished floor.*
    - *Exception: For airborne infection isolation rooms and protective environment rooms, see Sections 414.0 and 415.0.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 407.4 Air Circulation.
    - *407.4.1.3 Corridors shall not be used to convey supply, return, or exhaust air to or from any room if the corridor is required to be of fire resistive construction per the California Building Code.*
    - *Exceptions:*
    - *(1) Mechanically exhausted toilet rooms of 50 square feet (4.7 m2) or less and small rooms of 30 square feet (2.79 m2) or less such as janitor closets, housekeeping rooms, and electrical or telephone closets opening directly onto corridor.*
    - *(2) Air transfer caused by pressure differentials in rooms required to have a positive or negative air balance by Table 4-A.*

    - *407.4.1.4 No space above a ceiling may be utilized as an outside-air, relief-air, supply-air, exhaust-air, or return-air plenum.*
    - *Exception: Designs specifically approved by the enforcing agency.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 407.4 Air Circulation.
    - *407.4.1.5 Air from a patient room, exam room, treatment room shall not be transferred to another similar room without first having passed through air filters as required by Table 4-B or Table 4-C.*
    - *407.4.1.6 Supply outlets and return and exhaust air inlets shall be located to prevent short-circuiting.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
- ***407.5 Variable Air Volume.***
- ***407.5.1 Variable Air Volume Systems (VAV).*** *Variable air volume systems subjecting the patient to a fluctuating air movement are not acceptable for airborne infection isolation rooms, protective environment rooms or those critically sensitive areas listed in Table 325.0. For nonsensitive areas, variable air volume systems meeting the following criteria can be considered:*
- ***407.5.1.1*** *The VAV system shall comply with code requirements for outside air, total air, and pressure relationship through the full range of operation from minimum to maximum.*
- ***407.5.1.2*** *The central return or exhaust fan shall be controlled to accomplish the variable air volume requirements of the individual rooms served by the fan as described in Section 407.5.1.3.*
- ***407.5.1.3*** *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. The damper will modulate from full open to minimum position in conjunction with the supply air VAV terminal box.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 408.0 Filters. [OSHPD 1, 2, 3 & 4]
    - *408.1.1 A filter gauge shall be installed across each filter bank serving central air systems. The gauge shall be red lined or a filter alarm light installed to signal when the recommended maximum static pressure drop has been reached.*
    - *408.1.5 Filter bank No. 1 shall be located upstream of the air-conditioning equipment. Filter bank No. 2 and filter bank No. 3 shall be located downstream of the supply fan and all cooling and humidification equipment with efficiencies as indicated in Table 4-B or Table 4-C.*
      - *Exception: Dry steam-type humidifiers for local room humidity control may be installed in the supply air duct downstream of the final filter bank where designs are specifically approved by the enforcing agency.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 408.0 Filters. [OSHPD 1, 2, 3 & 4]
    - *408.2 Filters for Hospitals.*
      - *408.2.2 Noncentral recirculating air systems providing cooling to high heat producing equipment located in nonsensitive areas shall have a filter with 30 percent average efficiency based on ASHRAE 52.2-2007 or a minimum efficiency reporting value (MERV) of 8 based on ASHRAE 52.2-2007.*
      - *408.2.4 Noncentral recirculating air handling systems, for example, through-the-wall units, fan coil units, and heat pumps may be utilized for single patient rooms of one or more beds. Filtration for these units shall have a minimum weight arrestance value of 50 percent, based on ASHRAE 52.2-2007 or a minimum efficiency reporting value (MERV) of 1, based on ASHRAE 52.2- 2007. The air ventilation system providing the minimum air changes of outdoor air shall comply with Table 4-B. These units may be used as recirculating units only. All outdoor air requirements shall be met by a separate central air handling systems.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
- 408.0 Filters. [OSHPD 1, 2, 3 & 4]
  - ***408.4 Filters for Outpatient Facilities.***
  - ***408.4.1*** *The air ventilation systems shall comply with code requirements of this section for outpatient facilities and shall have filter bank efficiencies as listed in Table 4-B.*
  - ***408.4.2*** *Noncentral air systems serving individual rooms shall comply with Table 4-B.*

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	3	30%	90%	99.97%[3]
		(8)	(14)	(17)
Protective environment rooms	3	30%	90%	99.97%[4]
		(8)	(14)	(17)
Angiography; cardiac catheterization labs; operating 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	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	30%	—	—
		(8)	—	—

1 *Based on ASHRAE 52.2-2007.*

2 *Based on DOP test in accordance with MIL-STD-282 or based on ASHRAE 52.2-2007.*

3 *HEPA filters at air outlet or other locations when approved by the Authority Having Jurisdiction.*

4 *HEPA filter located in the supply duct which serves the positive-pressure isolation room or rooms may serve more than one supply outlet and more than one positive-pressure isolation room. HEPA filter or a filter with minimum efficiency reporting value (MERV) of 17 installation shall be designed and equipped to permit safe removal, disposal and replacement of filters.*

5 *The numbers in parentheses represent MERV rating based on ASHRAE 52.2-2007.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 410.0 Laboratory Ventilating Systems and Hoods. [OSHPD 1, 2, 3 & 4]
    - *410.0 Laboratory Ventilating Systems and Hoods. [OSHPD 1, 2, 3 & 4]*
      - *410.1 Laboratory Ventilating Systems. Laboratory ventilating systems shall comply with NFPA 99, as required by Section 1224.4.6.4 of the California Building Code.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 411.0 Kitchen and Dining Areas. [OSHPD 1, 2, 3 & 4]
    - *411.1 The air from dining areas may be used to ventilate the food preparation areas only after it has passed through a filter with at least an 80 percent average efficiency based on ASHRAE 52.2-2007 or a minimum efficiency reporting value (MERV) of 13, based on ASHRAE 52.2-2007.*
    - *Exception: For skilled nursing facilities, intermediate care facilities and correctional treatment centers, the air from dining area may be used to ventilate food preparation areas only after it has passed through a filter with a 50 percent average efficiency based on ASHRAE 52.2-2007 or a minimum efficiency reporting value (MERV) of 10, based on ASHRAE 52.2-2007.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 414.0 Airborne Infection Isolations Rooms. [OSHPD 1, 2, 3 & 4]
  - *414.1 Exhaust Systems. A separate, dedicated exhaust system shall be provided for airborne infection isolation rooms. The dedicated system may serve more than one airborne infection isolation room, adjoining toilet room and anteroom. The exhaust ducts shall be identified by appropriate labeling with the words "Caution Airborne Infection Isolation Rooms Exhaust" or similar terminology. Such labeling shall be in a manner which is not readily removable and shall appear on the exhaust duct at intervals of not more than 20 feet (6096 mm) and at least once near each room and each story traversed by the exhaust system. Exhaust fans shall comply with Section 407.1.2. The discharge from exhaust fans shall be located above the roof and shall be located a minimum of 25 feet (7620 mm) from areas that may be occupied, doors, operable windows, outdoor air intakes, or other openings into the building. The exhaust fan discharge shall be labeled in a manner which readily identifies the precautions which should be observed. To ensure that the airborne contaminates do not reenter the building, one of the following shall be provided:*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 414.0 Airborne Infection Isolations Rooms. [OSHPD 1, 2, 3 & 4]
    - *414.1.1 Exhaust discharge from fan shall extend at least 7 feet (2134 mm) above the roof and discharge vertically upward. Self-draining stacks or equivalent shall be used for rain protection. Rain caps which divert the exhaust toward the roof shall be prohibited.*
    - *414.1.2 Exhaust shall discharge above roof level and through an accessible HEPA filter. The HEPA filter shall be located upstream of the exhaust fan and have a minimum efficiency of 99.97 percent based on the DOP method in accordance with Mil-Std. 282 or a minimum efficiency reporting value (MERV) of 17, based on ASHRAE 52.2-2007. Filter gage shall be installed across the filter. For maintenance of air balance relationship, see Section 407.3.2. The 25-foot (7620 mm) dimension required by Section 414.1 may be reduced when a 99.97 percent HEPA filter or a minimum efficiency reporting value (MERV) of 17, based on ASHRAE 52.2-2007 is used and the reduced dimension is specifically approved by the enforcing agency.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 415.0 Protective Environment Rooms. [OSHPD 1, 2, 3 & 4]
  - *415.1 Air Distribution. The supply outlets and exhaust and return inlets shall be located to provide airflow patterns that prevent stagnation of the air and eliminate short circuiting of the supply to the exhaust or return. Supply air shall be delivered at or near the ceiling and near the patient's bed. All exhaust or return registers shall be located near the entrance to the protective environment room and not less than 3 inches (76 mm) nor more than 8 inches (203 mm) above the finished floor.*
  - *Exception: For correctional treatment centers, the location and design of the supply outlets and exhaust or return inlets shall not compromise the safety, security, and protection of staff, inmates and property.*

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- **2013 CMC Chapter 4 Ventilation Air Supply**
  - 416.0 Alarms – Airborne Infection Isolation Rooms and Protective Environment Rooms. [OSHPD 1, 2, 3 & 4]
  - *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 surveil-lance. 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 and when one of the following conditions is not being met during closed door conditions:*
    - *(1) When the minimum air quantity difference of 75 cfm(35.4 L/s) required by Table 4-A is not being maintained; or*
    - *(2) When a minimum pressure differential of 0.001 inch (0.003 kPa) of water and a minimum inward (outward for protective environment rooms) air velocity of 100 feet per minute (0.508 m/s) is not being maintained at the air transfer opening required by Table 4-A.*

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

A	B	C	D	E	F
			CONDITIONED AIR NOT 100% O.S.A		
AREA DESIGNATION	AIR BALANCE RELATIONSHIP TO ADJACENT AREAS[8]	MINIMUM AIR CHANGES IF 100% O.S.A.	MINIMUM AIR CHANGES OF OUTDOOR AIR PER HOUR	MINIMUM TOTAL AIR CHANGES PER HOUR	ALL AIR EXHAUSTED DIRECTLY TO OUTDOORS
Operating room, cardiac catherization lab and cystoscopy	*P*[7]	*12*	*5*	*20*	—
Patient holding preparation[1]	*NR*	*6*	*2*	*6*	—
Delivery room, cesarean operating room	*P*	*12*	*5*	*20*	—
Newborn/well baby nursery	*P*	*6*	*2*	*6*	—
Post anesthesia care unit	*NR*	*6*	*2*	*6*	*Yes*
Intensive care service spaces, acute respiratory - care service spaces, burn service spaces, coronary - care service spaces, pediatric intensive - care service spaces[9]	*P*	*6*	*2*	*6*	—
Newborn intensive care	*P*	*6*	*2*	*6*	—
Emergency department[1]					
Waiting area	*N*	*12*	*2*	*12*	*Yes*[2]
Operating room	*P*	*12*	*5*	*20*	—
Treatment room	*NR*	*6*	*2*	*6*	—
Trauma Room[3]	*P*	*12*	*5*	*20*	—
Triage	*N*	*12*	*2*	*12*	*Yes*
Patient room	*NR*	*2*	*2*	*6*	—
Dialysis treatment room	*NR*	*6*	*2*	*6*	—
Dialyzer reprocessing room	*N*	—	—	*10*	*Yes*
IV Prep. room	*P*	*6*	*2*	*6*	—
Blood draw/phlebotomy	*NR*	*6*	*2*	*6*	—

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- **2013 CMC Chapter 5 Exhaust Systems**
  - 504.0 Environmental Air Ducts.
    - 504.1 Makeup and Exhaust-Air Ducts. Environmental air ducts not regulated by other provisions of this code shall be in accordance with this section. Ducts shall be airtight as approved by the Authority Having Jurisdiction, and shall comply with the provisions of Chapter 6. Exhaust ducts under positive pressure shall not extend into or through ducts or plenums. Exhaust ducts shall terminate outside the building and shall be equipped with back-draft dampers. *[OSHPD 1, 2 & 4] Exception: Back-draft dampers are not required when the exhaust fan must operate continuously.* Environmental air ducts that have an alternate function as a part of an approved smoke-control system do not require design as Class 1 product-conveying ducts.

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- **2013 CMC Chapter 6 Duct Systems**
  - 602.0 Material.
    - 602.3 Factory-Made Air Ducts. Factory-made air ducts shall be approved for the use intended or shall be in accordance with the requirements of the referenced standard for air ducts in Chapter 17. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other identification indicating compliance with the referenced standard for air ducts in Chapter 17 and its class designation. These ducts shall be listed and shall be installed in accordance with the terms of their listing.
      - *602.3.1 Flexible Ducts. [OSHPD 1, 2, 3 & 4] In hospital building projects and all other health-care facilities, including clinics and correctional treatment centers, flexible ducts of not more than 10 feet (3048 mm) in length may be used to connect supply, return or exhaust-air terminal devices to rigid duct systems. Where constant volume, variable volume or mixing boxes are utilized, flexible duct of not more than 10 feet (3048 mm), may be used on the inlet side for alignment. An internal impervious liner shall be provided to isolate insulation material from conditioned air.*

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- **2013 CMC Chapter 6 Duct Systems**
  - 604.0 Insulation of Ducts.
    - 604.1 General. Supply-air ducts, return-air ducts, and plenums of a heating or cooling system shall be insulated to achieve the minimum thermal (R) value in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible. *[OSHPD 1, 2, 3 & 4] Cold air ducts shall be insulated wherever necessary or to prevent condensation.*
    - *604.2 [OSHPD 1, 2, 3 (surgical clinics) & 4] Thermal acoustical lining materials shall not be installed within ducts, terminal boxes, sound traps, and other in-duct systems serving areas such as operating, cesarean operating rooms, delivery rooms, post anesthesia care units, cystoscopy, cardiac cath labs, nurseries, intensive care units, newborn intensive care units, and airborne infection Isolation rooms unless terminal filters with 90 percent average efficiency based on ASHRAE Standard 52.2 or minimum efficiency rating value (MERV) of 14 are installed downstream of the duct lining.*
    - *604.3 [OSHPD 1, 2 & 4] Thermal or acoustical lining materials shall not be installed within ducts which are downstream of the 99.97 percent high-efficiency particulate air (HEPA) filter or with minimum efficiency rating value (MERV) of 17 required in Section 408.2.1 for protective environment rooms.*

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- **2013 CMC Chapter 6 Duct Systems**
  - 606.0 Ventilating Ceilings.
    - *606.1 General. Perforated ceilings shall be permitted to be used for air supply within the limitations of this section. Exit corridors, where required to be of fire-resistive construction by the building code, shall not have ventilating ceilings.*
      - *606.1.1 [OSHPD 1, 2, 3 & 4] Ventilating ceilings are not permitted in health facilities.*

Plumbing 101

- **2013 CPC Chapter 2 Definitions**
- **210.0 – H –**
- ***Handwashing Fixture [OSHPD 1, 2, 3 & 4].*** *Handwash fixtures consist of faucet, trim and sink as described:*
- *(1) Faucets and Trim*
- *a. Hand washing fixtures used by medical and nursing staff, patients, and food handlers shall be trimmed with valves that can be operated without the use of hands.*
  - *i. Wrist or elbow blades shall be permitted where allowed per 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. If deck-mounted manual temperature controls are used they shall use wrist blades at least 4 inches (102 mm) in length.*
- *e. Faucets shall be equipped with gooseneck spouts. A gooseneck spout is a deck or fixture-mounted spout so the discharge point of the spout return is at least 5 inches (127 mm) above the fixture rim.*

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- **2013 CPC Chapter 2 Definitions**
- **210.0 – H –**
- ***Handwashing Fixture [OSHPD 1, 2, 3 & 4].*** *Handwash fixtures consist of faucet, trim and sink as described:*
- *(2) Sinks*
- *a. Sinks in hand-washing fixtures shall be designed and*
- *installed to prevent splashing outside of the sink.*
- *b. Sinks shall have well-fitted and sealed basins to prevent*
- *water leaks onto or into the cabinetry or wall spaces.*
- *c. Design of sinks and cabinetry shall not permit storage*
- *beneath the sink basin.*

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- **2013 CPC Chapter 3 General Requirements**
  - 310.0 Prohibited Fittings and Practices.
    - *310.9 [OSHPD 1, 2, 3 & 4] Drainage piping over operating and delivery rooms, nurseries, food preparation centers, food-serving facilities, food storage areas, 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.*
    - *310.10 [OSHPD 1, 3 & 4] Floor drains shall not be installed in operating and delivery rooms. Floor drains with self-priming traps may be installed in cystoscopic rooms.*

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- **2013 CPC Chapter 3 General Requirements**

- 318.0 Hangers and Supports

  - ***313.8 [OSHPD 1, 2, 3 & 4]*** *Refer to Title 24, Part 2 of the California Building Code for seismic anchorage and bracing requirements and accommodations for building displacements.*

Plumbing 101

- **2013 CPC Chapter 4 Plumbing Fixtures And Fixture Fittings**

- **403.3 Urinals.** Urinals shall have an average water consumption not to exceed 0.5 gallons (2 L) of water per flush.

  - **403.3.1 Nonwater Urinals.** ***[Not adopted for OSHPD 1, 2, 3, & 4]*** Nonwater urinals shall be listed and comply with the applicable standards referenced in Table 1401.1. Nonwater urinals shall have a barrier liquid sealant to maintain a trap seal. Nonwater urinals shall permit the uninhibited flow of waste through the urinal to the sanitary drainage system. Nonwater urinals shall be cleaned and maintained in accordance with the manufacturer's instructions after installation. Where nonwater urinals are installed they shall have a water distribution line roughin to the urinal location to allow for the installation of an approved backflow prevention device in the event of a retrofit. *For additional information, see Health and Safety Code Section 17921.4.*

Plumbing 101

- **2013 CPC Chapter 4 Plumbing Fixtures And Fixture Fittings**
  - 422.0 Minimum Number of Required Fixtures.
    - 422.1 Fixture Count. Plumbing fixtures shall be provided for the type of building occupancy and in the minimum number shown in Table 422.1 *[OSHPD 1, 2, 3 & 4] and Table 4-2.* The total occupant load and occupancy classification shall be determined in accordance with *Occupant Load Factor Table A*. Occupancy classification not shown in Table 422.1 shall be considered separately by the Authority Having Jurisdiction. The minimum number of fixtures shall be calculated at 50 percent male and 50 percent female based on the total occupant load. Where information submitted indicates a difference in distribution of the sexes such information shall be used in order to determine the number of fixtures for each sex. Once the occupancy load and occupancy are determined, Table 422.1 shall be applied to determine the minimum number of plumbing fixtures required. Where applying the fixture ratios in Table 422.1 results in fractional numbers, such numbers shall be rounded to the next whole number. For multiple occupancies, fractional numbers shall be first summed and then rounded to the next whole number.

SPACE	HANDWASHING FIXTURE	SCRUB SINKS[3]	TOILETS	BATHTUBS OR SHOWERS	SERVICE SINKS[1]	CLINIC SINKS
Staff Toilet - Female	*1*[2]		*1:1-15*			
Exam and treatment rooms	*1*					
Housekeeping room[1]					*1*	
Laboratories	*1*[15]					
Laundry soiled linen, receiving, holding and sorting	*1*					
Medicine preparation room	*1*[19]					
Morgue and Autopsy	*1*					
Nourishment area	*1+1*[2]					
Nuclear Medicine room	*1*					
Mold room	*1*					
Patient room	*1*					
Patient toilet and bath facilities[13]	*1*[2]		*1:4 beds*	*1:12*[16]		
Central bathing facility[16]			*1*	*1*		
Administration Center or Nurses' Stations[27]	*1*		*1*[12]			
Newborn/well baby nursery	*1:6 bassinets*[33]					
Workroom	*1*[33]					
Gastrointestinal endoscopy procedure room	*1*[33]					
Pediatric and Adolescent Unit toilet room	*1*[2,26]		*1*[26]			
Pharmacy	*1*[25]					
Staff Toilet - Male	*1*[2]		*1:1-15*			

Plumbing 101

- **2013 CPC Chapter 4 Plumbing Fixtures And Fixture Fittings**
  - 422.2 Separate Facilities. Separate toilet facilities shall be provided for each sex.
    - *422.2.1 [OSHPD 1, 2, 3 & 4] Separate toilet facilities shall be provided for the use of patients, staff personnel and visitors.*
    - *Exception for Primary Care Clinics only: Where a facility contains no more than three examination and/or treatment rooms, the patient toilet shall be permitted to serve waiting areas.*

Plumbing 101

- **2013 CPC Chapter 6 Water Supply And Distribution**
  - 604.0 Materials.
    - 604.1 Pipe, Tube, and Fittings. Pipe, tube, fittings, solvent cements, thread sealants, solders, and flux used in potable water systems intended to supply drinking water shall be in accordance with the requirements of NSF 61.
    - Materials used in the water supply system, except valves and similar devices, shall be of a like material, except where otherwise approved by the Authority Having Jurisdiction.
    - ***Exception:*** *[**OSHPD 1, 2, 3 & 4**] Use of CPVC is not permitted for applications under authority of the Office of Statewide Health Planning and Development.*

Plumbing 101

- **2013 CPC Chapter 6 Water Supply And Distribution**
  - 604.0 Materials.
    - *604.1.2 PEX. All installations of PEX pipe where it is the initial plumbing piping installed in new construction shall be flushed twice over a period of at least one week. The pipe system shall be first flushed for at least 10 minutes and then filled and allowed to stand for no less than 1 week, after which all the branches of the pipe system must be flushed long enough to fully empty the contained volume. This provision shall not apply to the installation of PEX pipe where it replaces an existing pipe system of any material.*

TABLE 604.1
MATERIALS FOR BUILDING SUPPLY AND WATER DISTRIBUTION PIPING AND FITTINGS

MATERIAL	BUILDING SUPPLY PIPE AND FITTINGS	WATER DISTRIBUTION PIPE AND FITTINGS	REFERENCED STANDARD(S) PIPE	REFERENCED STANDARD(S) FITTINGS
Asbestos-Cement	X[1]	—	ASTM C 296	—
Brass	X	X	ASTM B 43, ASTM B 135	—
Copper	X	X	ASTM B 42, ASTM B 75, ASTM B 88, ASTM B 251, ASTM B 302, ASTM B 447	ASME B16.15, ASME B16.18, ASME B16.22, ASME B16.26
CPVC	X	X	ASTM D 2846, ASTM F 441, ASTM F 442	ASTM D 2846, ASTM F 437, ASTM F 438, ASTM F 439, ASTM F 1970
Ductile-Iron	X	X	AWWA C151	ASME B16.4, AWWA C110, AWWA C153
Galvanized Steel	X	X	ASTM A 53	—
Malleable Iron	X	X	—	ASME B16.3
PE	X[1]	—	ASTM D 2239, ASTM D 2737, ASTM D 3035, AWWA C901, CSA B137.1	ASTM D 2609, ASTM D 2683, ASTM D 3261, ASTM F 1055, CSA B137.1
PE-AL-PE	X	X	ASTM F 1282, CSA B137.9	ASTM F 1282, ASTM F 1974, CSA B137.9
PE-RT	X	X	ASTM F 2769	ASTM F 1807, ASTM F 2098, ASTM F 2159; ASTM F 2735, ASTM F 2769
PEX[2, 3]	X	X	ASTM F 876, ASTM F 877, CSA B137.5, AWWA C904[1]	ASSE 1061, ASTM F 877, ASTM F 1807, ASTM F 1960, ASTM F 1961, ASTM F 2080, ASTM F 2159, ASTM F 2735, CSA B137.5
PEX-AL-PEX[4]	X	X	ASTM F 1281, CSA B137.10, ASTM F 2262	ASTM F 1281, ASTM F 1974, ASTM F 2434, CSA B137.10
PP	X	X	ASTM F 2389, CSA B137.11	ASTM F 2389, CSA B137.11
PVC	X[1]	—	ASTM D 1785, ASTM D 2241, AWWA C900	ASTM D 2464, ASTM D 2466, ASTM D 2467, ASTM F 1970
Stainless Steel	X	X	ASTM A 269, ASTM A 312	—

[1] For Building Supply or cold-water applications.

[2] *When PEX tubing is placed in soil and is used in potable water systems intended to supply drinking water to fixtures or appliances, the tubing or piping shall be sleeved with a material approved for potable water use in soil or other material that is impermeable to solvents or petroleum products.*

[3] *PEX tubing shall meet or exceed the requirements of ASTM F876-08 or an equivalent or more stringent standard when used in continuously recirculating hot water systems and the PEX tubing is exposed to the hot water 100% of the time.*

[4] ***[For BSC, DSA-SS, DSA-SS/CC & HCD]*** *The use of PEX-AL-PEX in potable water supply systems is not adopted.*

Plumbing 101

- **2013 CPC Chapter 6 Water Supply And Distribution**
  - 605.0 Joints and Connections.
    - 605.3.3.2 *[Not permitted for OSHPD 1, 2, 3, & 4]* Pressed Fittings. Pressed fittings for copper pipe or tubing shall have an elastomeric O-ring that forms the joint. The pipe or tubing shall be fully inserted into the fitting, and the pipe or tubing marked at the shoulder of the fitting. Pipe or tubing shall be cut square, chamfered, and reamed to full inside diameter. The fitting alignment shall be checked against the mark on the pipe or tubing to ensure the pipe or tubing is inserted into the fitting. The joint shall be pressed using the tool recommended by the manufacturer.
    - See Table 604.1

Plumbing 101

- **2013 CPC Chapter 6 Water Supply And Distribution**
  - 605.0 Joints and Connections.
    - 605.10 PEX Plastic Tubing and Joints. PEX plastic tubing and fitting joining methods shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.10.1 and Section 605.10.2. All PEX pipe installed in California must provide at least 30-day UV protection. *[OSHPD 1, 2, 3, & 4] Installation and use of PEX tubing shall be in accordance with manufacturer's standards. PEX piping shall not be used for any application that would result in noncompliance with any provisions of the California Building Standards Code.*
      - 605.10.1 Fittings. Fittings for PEX tubing shall comply with the applicable standards referenced in Table 604.1. PEX tubing in accordance with ASTM F 876 shall be marked with the applicable standard designation for the fittings specified for use with the tubing. Brass fittings used with PEX tubing shall meet or exceed NSF 14- 2009 standards to prevent dezincification and stress crack corrosion. *[OSHPD 1, 2, 3, & 4] Installation and use of PEX tubing shall be in accordance with manufacturer's standards. PEX piping shall not be used for any application that would result in noncompliance with any provisions of the California Building Standards Code.*

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- **2013 CPC Chapter 6 Water Supply And Distribution**
  - **605.16 Dielectric Unions.** Dielectric unions where installed at points of connection where there is a dissimilarity of metals shall be in accordance with ASSE 1079.
  - ***[HCD 1 & HCD 2, OSHPD 1, 2, 3 & 4]*** *Dielectric unions shall be used at all points of connection where there is a dissimilarity of metals.*
  - ***606.0 Valves.***
    - ***606.8 [OSHPD 1, 2, 3, & 4]*** *Each riser or branch shall be provided with an accessible sectionalizing valve in hot-and cold-water systems to permit servicing or replacement of piping or equipment. Stop valves shall be provided at each fixture.*

Plumbing 101

- **2013 CPC Chapter 6 Water Supply And Distribution**
  - 609.0 Installation, Testing, Unions, and Location.
    - 609.9 Disinfection of Potable Water System. New or repaired potable water systems shall be disinfected prior to use where required by the Authority Having Jurisdiction. *[OSHPD 1, 2, 3 & 4] Prior to utilization of newly constructed or altered potable water piping systems, all affected potable water piping shall be dis-infected using procedures prescribed in California Plumbing Code Sections 609.9(1) through 609.9(4).* The method to be followed shall be that prescribed by the Health Authority or, in case no method is prescribed by it, the following:

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- **2013 CPC Chapter 6 Water Supply And Distribution**
  - 613.0 [OSHPD 1, 2, 3 & 4] 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. 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.*
    - *613.3 Instantaneous heaters are permitted for supplying hot water to handwashing and bathing fixtures if a continuous mechanical recirculation system is also provided.*
    - *613.5 Temperature control valves shall be provided to automatically regulate the temperature of hot water delivered to plumbing fixtures used by patients to a range of 105°F (41°C) minimum to 120°F (49°C) maximum. High temperature alarm set at 125°F (52°C) shall be provided. The audible/visual device for the high temperature alarm shall annunciate at a continuously occupied location.*

Plumbing 101

- **2013 CPC Chapter 6 Water Supply And Distribution**
  - 613.0 [OSHPD 1, 2, 3 & 4] 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.*
    - *613.7 At fixtures where water exceeding 125°F (52°C) is accessible to patients or personnel, warning signs in letters at least 2 inches (51 mm) high shall be posted above the fixtures.*
    - *613.8 Sectionalizing valves shall be provided as required by Section 606.8.*

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- **2013 CPC Chapter 6 Water Supply And Distribution**
  - 614.0 Dialysis Water-Distribution Systems.
    - *614.1 [OSHPD 1, 2, 3, & 4] Dialysis water feedlines shall be PVC (polyvinyl chloride), glass, stainless steel, or PVDF (polyvinylidene fluoride) 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 ¼ inch (6.4 mm) inside dimension and take off from the bottom of the main feedline.*
    - *614.2 All piping for multistation or central dialysis units shall be rigid where possible. All piping and tubing shall be in a neat arrangement. The placement of piping or tubing on the floor is not permitted.*
    - *614.6 A continuous audible alarm shall sound at the nurses' station and remote equipment rooms when the minimum velocity is not maintained, or if backwashing or flushing is attempted while one or more stations are in operation.*
    - *614.8 A diagram of all piping as installed shall be posted at the nurses' station and equipment room of all multistation or central dialysis units.*

Plumbing 101

- **2013 CPC Chapter 7 SANITARY DRAINAGE**
  - *701.0 Materials.*
    - 701.1 Drainage Piping. Materials for drainage piping shall be in accordance with one of the referenced standards in Table 701.1 except that:
    - (1) No galvanized wrought-iron or galvanized steel pipe shall be used underground and shall be kept not less than 6 inches (152 mm) aboveground.
    - (2) ABS and PVC DWV piping installations shall be installed in accordance with applicable standards referenced in Table 1401.1. Except for individual single-family dwelling units, materials exposed within ducts or plenums shall have a flame-spread index of a maximum of 25 and a smoke-developed index of a maximum 50, where tested in accordance with ASTM E 84 and UL 723.
    - *(b) **[OSHPD 1, 2, 3 & 4]** ABS and PVC installations are not allowed.*

TABLE 701.1
MATERIALS FOR DRAIN, WASTE, VENT PIPE AND FITTINGS

MATERIAL	UNDERGROUND DRAIN, WASTE, VENT PIPE AND FITTINGS	ABOVEGROUND DRAIN, WASTE, VENT PIPE AND FITTINGS	BUILDING SEWER PIPE AND FITTINGS	REFERENCED STANDARD(S) PIPE	REFERENCED STANDARD(S) FITTINGS
ABS (Schedule 40)	X	X	X	ASTM D 1527, ASTM D 2661, ASTM D 2680*, ASTM F 628	ASTM D 2661, ASTM D 2680*
Asbestos-Cement	—	—	X	ASTM C 14*, ASTM C 428*	—
Brass	—	X	—	ASTM B 43	—
Cast-Iron	X	X	X	ASTM A 74, ASTM A 888, CISPI 301	ASME B16.12, ASTM A 74, ASTM A 888, CISPI 301
Co-Extruded ABS (Schedule 40)	X	X	X	ASTM F 1488	ASTM D 2661, ASTM D 2680*
Co-Extruded PVC (Schedule 40)	X	X	X	ASTM F 891, ASTM F 1488	ASTM D 2665, ASTM F 794*, ASTM F 1866
Copper (Type DWV)	X	X	X	ASTM B 75, ASTM B 251, ASTM B 302, ASTM B 306	ASME B16.23, ASME B16.29
Galvanized Malleable Iron	—	X	—	—	ASME B16.3
Galvanized Steel	—	X	—	ASTM A 53	—
Polyethylene	—	—	X	ASTM F 714	ASTM D 2683, ASTM D 3261, ASTM F 1055, ASTM F 2206
PVC (Schedule 40)	X	X	X	ASTM D 1785, ASTM D 2665, ASTM F 794*	ASTM D 2665, ASTM F 794*, ASTM F 1866
Stainless Steel 304	—	X	—	ASME A112.3.1	ASME A112.3.1
Stainless Steel 316L	X	X	X	ASME A112.3.1	ASME A112.3.1
Vitrified Clay (Extra strength)	—	—	X	ASTM C 700	ASTM C 700

* For building sewer applications.

Plumbing 101

- **2013 CPC Chapter 9 VENTS**
  - 903.0 Materials.
    - *903.1.3 [OSHPD 1, 2, 3 & 4] ABS and PVC installations are not allowed.*
  - 906.0 Vent Termination.
    - 906.2 Clearance. Each vent shall terminate not less than 10 feet (3048 mm) from, or not less than 3 feet (914 mm) above, an openable window, door, opening, air intake, or vent shaft, or not less than 3 feet (914 mm) in every direction from a lot line, alley and street excepted.
      - *906.2.1 [OSHPD 1, 2, 3 & 4] Each vent pipe shall terminate not less than twenty-five (25) feet (7620 mm) from any air intake or vent shaft.*

Plumbing 101

- **2013 CPC Chapter 11 STORM DRAINAGE**
  - 1101.0 General.
    - 1101.1 Where Required. Roofs, paved areas, yards, courts, courtyards, vent shafts, light wells, or similar areas having rainwater, shall be drained into a separate storm sewer system, or into a combined sewer system where a separate storm sewer system is not available, or to some other place of disposal satisfactory to the Authority Having Jurisdiction. In the case of one- and two-family dwellings, storm water shall be permitted to be discharged on flat areas, such as streets or lawns, so long as the storm water shall flow away from the building and away from adjoining property, and shall not create a nuisance.
    - 1101.2 Storm Water Drainage to Sanitary Sewer Prohibited. Storm water shall not be drained into sewers intended for sanitary drainage.
      - *1101.3.2 [OSHPD 1, 2 , 3, & 4] ABS and PVC installations are not allowed.*

Plumbing 101

- **2013 CPC Chapter 13 HEALTH CARE FACILITIES AND MEDICAL GAS AND VACUUM SYSTEMS**
  - 1301.2 Health Care Facilities. This chapter applies to the special fixtures and systems in health care facilities and to the special plumbing requirements for such facilities. Other plumbing in such facilities shall comply with other applicable sections of this code. [OSHPD 1, 2, 3 & 4] Medical gas systems for health care facilities that are regulated by OSHPD (hospitals, skilled nursing facilities, and intermediate care facilities, licensed clinics, and correctional treatment centers) shall be in accordance with NFPA 99- 2005, Standard for Health Care Facilities. See California Building Code Table 1224.2 for location and number of station outlets for oxygen, vacuum, and medical air.

Thank You