

**REVISION RECORD
FOR THE STATE OF CALIFORNIA
ERRATA**

January 1, 2011

2010 Title 24, Part 5, California Plumbing Code

PLEASE NOTE: The date of this supplement is for identification purposes only. See the History Note Appendix.

It is suggested that the section number, as well as the page number be checked when inserting this material and removing the superseded material. In case of doubt, rely on the section numbers rather than the page numbers because the section numbers must run consecutively.

It is further suggested that the superseded material be retained with this revision record sheet so that the prior wording of any section can be easily ascertained. Please keep the removed pages with this revision page for future reference.

NOTE

Due to the fact that the application date for a building permit establishes the California Building Standards Code provisions that are effective at the local level, which apply to the plans, specifications, and construction for that permit, it is strongly recommended that the removed pages be retained for historical reference.

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California Code of Regulations Title 24

California Agency Information Contact List

California Energy Commission

Energy Hotline.....(800) 772-3300
or (916) 654-5106
Building Efficiency Standards
Appliance Efficiency Standards
Compliance Manual/Forms

California State Lands Commission

Marine Oil Terminals.....(562) 499-6317

California State Library

Resources and Information.....(916) 654-0261
Government Publication Section.....(916) 654-0069

Corrections Standards Authority

Local Adult Jail Standards.....(916) 324-1914
Local Juvenile Facility Standards.....(916) 324-1914

Department of Consumer Affairs – Acupuncture Board

Office Standards(916) 445-3021

Department of Consumer Affairs – Board of Pharmacy

Pharmacy Standards(916) 574-7900

Department of Consumer Affairs – Bureau of Barbering and Cosmetology

Barber and Beauty Shop and
College Standards(916) 574-7570
(800) 952-5210

Department of Consumer Affairs – Bureau of Home Furnishings and Thermal Insulation

Insulation Testing Standards.....(916) 574-2041

Department of Consumer Affairs – Structural Pest Control Board

Structural Standards.....(800) 737-8188
(916) 561-8708

Department of Consumer Affairs – Veterinary Medical Board

Veterinary Hospital Standards(916) 263-2610

Department of Food and Agriculture

Meat & Poultry Packing Plant
Standards(916) 654-1447
Dairy Standards(916) 654-1447

Department of Public Health

Organized Camps Standards.....(916) 449-5661
Public Swimming Pools Standards.....(916) 449-5693
Asbestos Standards.....(510) 620-2874

Department of Housing and Community Development

Residential – Hotels, Motels,
Apartments, Single-Family Dwellings... (916) 445-9471
Permanent Structures in Mobilehome
and Special Occupancy Parks.....(916) 445-9471
Factory-Built Housing, Manufactured
Housing and Commercial Modular(916) 445-3338
Mobile Homes – Permits & Inspections
Northern Region.....(916) 255-2501
Southern Region.....(951) 782-4420
Employee Housing Standards.....(916) 445-9471

Department of Water Resources

Gray Water Installations Standards(916) 651-9667

Division of the State Architect – Access Compliance

Access Compliance Standards.....(916) 445-8100

Division of the State Architect – Structural Safety

Public Schools Standards(916) 445-8100
Essential Services Building Standards... (916) 445-8100
Community College Standards.....(916) 445-8100

Division of the State Architect – State Historical Building Safety Board

Alternative Building Standards(916) 445-8100

Office of Statewide Health Planning and Development

Hospital Standards.....(916) 440-8356
Skilled Nursing Facility Standards.....(916) 440-8356
Clinic Standards.....(916) 440-8356
Permits.....(916) 440-8356

Office of the State Fire Marshal

Code Development and Analysis(916) 445-8200
Fire Safety Standards.....(916) 445-8200
Fireplace Standards.....(916) 445-8200
Day Care Centers Standards.....(916) 445-8200
Exit Standards.....(916) 445-8200

Revised: February 24, 2010

UPC FOREWORD

Not Adopted by The State of California

The advantages of a uniform plumbing code adopted by various local jurisdictions has long been recognized. Disorder in the industry as a result of widely divergent plumbing practices and the use of many different, often conflicting, plumbing codes by local jurisdictions influenced the Western Plumbing Officials Association (now the International Association of Plumbing and Mechanical Officials [IAPMO]) to form a committee of plumbing inspectors, master and journeyman plumbers, and sanitary and mechanical engineers, assisted by public utility companies and the plumbing industry to create a basic plumbing document for general use. The product of this effort, the first edition of the *Uniform Plumbing Code*[®] (UPC[®]) was officially adopted by IAPMO in 1945. The widespread use of this code over the past five decades by jurisdictions throughout the United States and internationally is testament to its merit.

With the publication of the 2003 Edition of the *Uniform Plumbing Code*[®], another significant milestone was reached. For the first time in the history of the United States, a plumbing code was developed through a true consensus process. The 2009 edition represents the most current approaches in the plumbing field and is the second edition developed under the ANSI consensus process. Contributions to the content of the code were made by every segment of the built industry, including such diverse interests as consumers, enforcing authorities, installers/maintainers, insurance, labor, manufacturers, research/standards/testing laboratories, special experts, and users.

The UPC is designed to provide consumers with safe and sanitary plumbing systems while, at the same time, allowing latitude for innovation and new technologies. The public at large is encouraged and invited to participate in IAPMO's open consensus code development process. This code is updated every three years. A code development timeline and other relevant information is available at IAPMO's website at www.iapmo.org.

The *Uniform Plumbing Code*[®] is dedicated to all those who, in working to achieve "the ultimate plumbing code," have unselfishly devoted their time, effort, and personal funds to create and maintain this, the finest plumbing code in existence today.

The 2009 *Uniform Plumbing Code*[®] is supported by the American Society of Sanitary Engineering (ASSE), the Mechanical Contractors Association of America (MCAA), the Plumbing-Heating-Cooling Contractors National Association (PHCC-NA), the United Association (UA), and the World Plumbing Council (WPC). The presence of these logos, while reflecting support, does not imply any ownership of the copyright to the UPC, which is held exclusively by IAPMO. Further, the logos of these associations indicates the support of IAPMO's open, consensus process being used to develop IAPMO's codes and standards.

The addresses of the organizations are as follows:

ASSE – 901 Canterbury Road, Suite A • Westlake, OH 44145-7201 • (440) 835-3040

MCAA – 1385 Piccard Drive • Rockville, MD 20850 • (301) 869-5800

PHCC-NA – PO Box 6808 • Falls Church, VA 22046 • (800) 533-7694

UA – 901 Massachusetts Avenue NW • Washington, DC 20001 • (202) 628-5823

WPC – WPC Secretary • c/o Mechanical Contractors Association of Alberta

#204 2725-12 St. NE Calgary • Alberta T2E 7J2, Canada • +1-40-325-072-37

P.O.Box 2005 • Marmion, Wester Australia 6020 • +61-8-9448-0430

Code changes made to the original amalgamated code are marked in the margins as follows.

← An arrow denotes a deletion | A vertical line denotes a change

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HOW TO DISTINGUISH MODEL CODE LANGUAGE FROM CALIFORNIA AMENDMENTS

To distinguish between model code language and incorporated California amendments, including exclusive California standards, California amendments will appear in italics. Symbols indicate the status of code changes as follows:

- [SFM]** This symbol following a section leader identifies which state agency(s) have amended a section of model code. For a complete listing of state agencies, refer to the Application Sections within Chapter 1, Division I.

- ||** This symbol indicates that a change has been made to a California amendment.

- |** This symbol indicates that a change has been made to IAPMO model language.

- >** This symbol indicates deletion of California language.

- This symbol indicates IAPMO deletion of IAPMO language.

To learn more about the use of this code refer to pages xxiv and xxv. Training materials on the application and use of this code are available at the website of the California Building Standards Commission <http://www.bsc.ca.gov/default.htm>

If there is an "X" under a particular state agency's acronym on this row, it means that particular state agency is adopting only specific model code or state-amended sections within this chapter. There will be an "X" in the column under the agency's acronym, as well as an "X" by each section that the agency has adopted.

Example:

**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE
CHAPTER 1 - ADMINISTRATION**

Adopting Agency	BSC	SFM	HCD			DSA			OSHPD				CSA	DPH	AGR	DWR	CA
			1	2	1/AC	AC	SS	SS/CC	1	2	3	4					
Adopt Entire CA Chapter	X																
Adopt Entire Chapter as amended (amended sections listed below)																	
Adopt only those sections that are listed below																	
Chapter/Section																	
101																	
102																	

SAMPLE

Legend of Acronyms of Adopting State Agencies

- BSC California Building Standards Commission (see Section 1.2)
- SFM Office of the State Fire Marshal (see Section 1.11)
- HCD 1 Department of Housing and Community Development (see Section 1.8.2.1.1)
- HCD 2 Department of Housing and Community Development (see Section 1.8.2.1.3)
- HCD 1/AC Department of Housing and Community Development (see Section 1.8.2.1.2)
- DSA-AC Division of the State Architect-Access Compliance (see Section 1.9.1)
- DSA-SS Division of the State Architect-Structural Safety (see Section 1.9.2)
- DSA-SS/CC Division of the State Architect-Structural Safety/Community Colleges (see Section 1.9.2.2)
- OSHPD 1 Office of Statewide Health Planning and Development (see Section 1.10.1)
- OSHPD 2 Office of Statewide Health Planning and Development (see Section 1.10.2)
- OSHPD 3 Office of Statewide Health Planning and Development (see Section 1.10.3)
- OSHPD 4 Office of Statewide Health Planning and Development (see Section 1.10.4)
- CSA Corrections Standards Authority (see Section 1.3)
- DPH Department of Public Health (see Section 1.7)
- AGR Department of Food and Agriculture (see Section 1.6)
- CEC California Energy Commission (see Section 100 in Part 2, the California Energy Code)
- CA Department of Consumer Affairs (see Section 1.4):
 - Board of Barbering and Cosmetology
 - Board of Examiners in Veterinary Medicine
 - Board of Pharmacy
 - Acupuncture Board
 - Bureau of Home Furnishings
 - Structural Pest Control Board
- SL State Library (see Section 1.12)
- SLC State Lands Commission (see Section 1.14)
- DWR Department of Water Resources (see Section 1.12 of Chapter 1 of the California Plumbing Code in Part 2 of Title 24)

The state agencies are available to answer questions about their adoptions. Contact information is provided on page v of this code.

1.1.8 City, County, or City and County Amendments, Additions or Deletions. The provisions of this code do not limit the authority of city, county, or city and county governments to establish more restrictive and reasonably necessary differences to the provisions contained in this code pursuant to complying with Section 1.1.8.1. The effective date of amendments, additions, or deletions to this code by city, county, or city and county filed pursuant to Section 1.1.8.1 shall be the date filed. However, in no case shall the amendments, additions or deletions to this code be effective any sooner than the effective date of this code.

Local modifications shall comply with Health and Safety Code Section 18941.5 for Building Standards Law, Health and Safety Code Section 17958 for State Housing Law or Health and Safety Code Section 13869.7 for Fire Protection Districts.

1.1.8.1 Findings and Filings.

1. The city, county, or city and county shall make express findings for each amendment, addition or deletion based upon climatic, topographical, or geological conditions.

Exception: Hazardous building ordinances and programs mitigating unreinforced masonry buildings.

2. The city, county, or city and county shall file the amendments, additions or deletions expressly marked and identified as to the applicable findings. Cities, counties, cities and counties, and fire departments shall file the amendments, additions or deletions, and the findings with the California Building Standards Commission at 2525 Natomas Park Drive, Suite 130, Sacramento, CA 95833.
3. Findings prepared by fire protection districts shall be ratified by the local city, county, or city and county and filed with the California Department of Housing and Community Development, Division of Codes and Standards, P.O. Box 1407, Sacramento, CA 95812-1407 or 1800 3rd Street, Room 260, Sacramento, CA 95811.

1.1.9 Effective Date of this Code. Only those standards approved by the California Building Standards Commission that are effective at the time an application for building permit is submitted shall apply to the plans and specifications for, and to the construction performed under, that permit. For the effective dates of the provisions contained in this code, see the History Note page of this code.

1.1.10 Availability of Codes. At least one complete copy each of Titles 8, 19, 20, 24, and 25 with all revisions shall be maintained in the office of the building official responsible for the administration and enforcement of this code. Each state department concerned and each city, county, or city and county shall have an up-to-date copy of the code available for public inspection. See Health and Safety Code Section 18942 (d)(1) and (2).

1.1.11 Format. This part fundamentally adopts the Uniform Plumbing Code by reference on a chapter-by-chapter basis. Such adoption is reflected in the Matrix Adoption Table of each chapter of this part. When the Matrix Adoption Tables make no reference to a specific chapter of the Uniform Plumbing Code, such chapter of the Uniform Plumbing Code is not adopted as a portion of this code.

1.1.12 Validity. If any chapter, section, subsection, sentence, clause or phrase of this code is for any reason held to be unconstitutional, contrary to statute, exceeding the authority of the state as stipulated by statutes or otherwise inoperative, such decision shall not affect the validity of the remaining portion of this code.

1.2.0 Building Standards Commission.

1.2.1 Specific scope of application of the agency responsible for enforcement, the enforcement agency, and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

1. State Buildings for All Occupancies.

Application – State buildings (all occupancies), including buildings constructed by the Trustees of the California State University and the Regents of the University of California where no state agency has the authority to adopt building standards applicable to such buildings.

Enforcing Agency – State or local agency specified by the applicable provisions of law.

Authority Cited – Health and Safety Code Section 18934.5.

Reference – Health and Safety Code, Division 13, Part 2.5, commencing with Section 18901.

2. University of California, California State Universities, and California Community Colleges.

Application – Standards for lighting for parking lots and primary campus walkways at the University of California, California State Universities, and California Community Colleges.

Enforcing Agency – State or local agency specified by the applicable provisions of law.

Authority Cited – Government Code Section 14617.

Reference – Government Code Section 14617.

3. Existing State-Owned Buildings, including those owned by the University of California and by the California State University – Building seismic retrofit standards including abating falling hazards of structural and nonstructural components and strengthening of building structures. See also Division of the State Architect.

Enforcing Agency – State or local agency specified by the applicable provisions of law.

Authority Cited – Government Code Section 16600.

References – Government Code Sections 16600 through 16604.

4. Unreinforced Masonry Bearing Wall Buildings.

Application – Minimum seismic strengthening standards for buildings specified in Appendix Chapter 1 of the California Code for Building Conservation, except for buildings subject to building standards adopted pursuant to Part 1.5 (commencing with Section 17910).

Enforcing Agency – State or local agency specified by the applicable provisions of law.

Authority Cited – Health and Safety Code Section 18934.6.

References – Health and Safety Code Sections 18901 through 18949.

1.2.2 Alternative Materials, Design, and Methods of Construction and Equipment.

The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability, and safety.

1.2.2.1 Research Reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

1.2.2.2 Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the building official shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the building official shall approve the testing procedures. Tests shall be performed by an approved agency. Reports of such tests shall be retained by the building official for the period required for retention of public records.

1.2.3 Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this section will be identified in the Matrix Adoption Tables under the acronym BSC.

1.3.0 Corrections Standards Authority.

1.3.1 Specific scope of application of the agency responsible for enforcement, the enforcement agency, and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

Application – Local detention facilities.

Enforcing Agency – Corrections Standards Authority.

Authority Cited – Penal Code Section 6030; Welfare and Institutions Code Sections 210 and 885.

References – Penal Code Section 6030; Welfare and Institutions Code Sections 210 and 885.

1.3.2 Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this section will be identified in the Matrix Adoption Tables under the acronym CSA.

1.4.0 Department of Consumer Affairs.

1.4.1 Specific scope of application of the agency responsible for enforcement, the enforcement agency, and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

Board of Barbering and Cosmetology.

Application – Any establishment or mobile unit where barbering, cosmetology, or electrolysis is being performed.

Enforcing Agency – State or local agency specified by applicable provisions of law.

Authority Cited – Business and Professions Code Section 7312.

References – Business and Professions Code Sections 7303, 7303.1, 7312, and 7313.

1.4.2 Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this section will be identified in the Matrix Adoption Tables under the acronym CA.

1.5.0 Reserved for California Energy Commission.

1.6.0 Department of Food and Agriculture.

1.6.1 Specific scope of application of the agency responsible for enforcement, the enforcement agency, and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

Application – Dairies and places of meat and poultry inspection.

Enforcing Agency – Department of Food and Agriculture.

Authority Cited – Food and Agricultural Code Sections 18735, 18960, 19384, 33481, and 33731.

References – Food and Agricultural Code Sections 18735, 18960, 19384, 33481, and 33731.

1.6.2. Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this section will be identified in the Matrix Adoption Tables under the acronym AGR.

1.7.0 Department of Public Health.

1.7.1 Specific scope of application of the agency responsible for enforcement, the enforcement agency, and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

Department of Public Health.

Application – Commissaries serving mobile food preparation units, food establishments, and organized camps.

Enforcing Agency – Department of Health Services and local health agency.

Authority Cited – Health and Safety Code Sections 18897.2, 110065, 113710, and 131200.

References – Health and Safety Code Sections 18897.2, 18897.4, 18897.7, 110065, 113705, 113710, and 131200.

1.7.2. Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this section will be identified in the Matrix Adoption Tables under the acronym DPH.

1.8.0 Department of Housing and Community Development. [HCD]

1.8.1 Purpose. The purpose of this code is to establish minimum requirements to protect the health, safety, and general welfare of the occupants and the public by governing the erection, construction, reconstruction, enlargement, conversion, alteration, repair, moving, removal, demolition, sanitation, ventilation, and maintenance or use of plumbing equipment or systems.

1.8.2 Authority and Abbreviations.

1.8.2.1 General. The Department of Housing and Community Development is authorized by law to promulgate and adopt building standards and regulations for several types of building applications. These applications are grouped and identified by abbreviation in the Matrix Adoption Tables to show which model code sections and amendments are applicable to each application. The applications under the authority of the Department of Housing and Community Development are listed in Sections 1.8.2.1.1 through 1.8.2.1.3.

1.8.2.1.1 Housing Construction.

Application – Hotels, motels, lodging houses, apartment houses, dwellings, dormitories, condominiums, shelters for homeless persons, congregate residences, employee housing, factory built housing, and other types of dwellings containing sleeping accommodations with or without common toilet or cooking facilities including accessory buildings, facilities, and uses thereto. Sections of this code which pertain to applications listed in this section are identified in the Matrix Adoption Table using the abbreviation “HCD 1”.

Enforcing Agency – Local building department or the Department of Housing and Community Development.

Authority Cited – Health and Safety Code Sections 17040, 17050, 17920.9, 17921, 17921.3, 17921.6, 17921.10, 17922, 17922.6, 17922.12, 17927, 17928, 17959.6, 18300, 18552, 18554, 18620, 18630, 18640, 18670, 18690, 18691, 18865, 18871.3, 18871.4, 18873, 18873.1, 18873.2, 18873.3, 18873.4, 18873.5, 18938.3, 18944.11, and 19990; and Government Code Section 12955.1.

References – Health and Safety Code Sections 17000 through 17062.5, 17910 through 17995.5, 18200 through 18700, 18860 through 18874, and

19960 through 19997; and Government Code Sections 12955.1 and 12955.1.1.

1.8.2.1.2 Housing Accessibility.

Application – Covered multifamily dwellings as defined in Chapter 11A of the California Code of Regulations, Title 24, Part 2, also known as the California Building Code (CBC) including but not limited to lodging houses, dormitories, timeshares, condominiums, shelters for homeless persons, congregate residences, apartment houses, dwellings, employee housing, factory-built housing, and other types of dwellings containing sleeping accommodations with or without common toilet or cooking facilities.

Sections of this code identified in the Matrix Adoption Table by the abbreviation “HCD 1-AC” require specific accommodations for “PERSONS WITH DISABILITIES” as defined in Chapter 11A of the CBC. The application of such provisions shall be in conjunction with other requirements of this code and apply only to newly constructed “COVERED MULTIFAMILY DWELLINGS” as defined in Chapter 11A of the CBC. “HCD 1-AC” applications include, but are not limited to, the following:

1. All newly-constructed “COVERED MULTIFAMILY DWELLINGS” as defined in Chapter 11A of the CBC.
2. New “COMMON USE AREAS” as defined in Chapter 11A of the CBC serving existing covered multifamily dwellings.
3. Additions to existing buildings, where the addition alone meets the definition of “COVERED MULTIFAMILY DWELLINGS” as defined in Chapter 11A of the CBC.
4. Common use areas serving covered multifamily dwellings.
5. Where any portion of a building’s exterior is preserved, but the interior of the building is removed, including all structural portions of floors and ceilings, the building is considered a new building for determining the application of CBC, Chapter 11A.

HCD 1-AC building standards generally do not apply to public use areas or public accommodations such as hotels and motels. Public use areas, public accommodations and housing which is publicly funded as defined in Chapter 2 of the CBC are subject to the Division of the State Architect (DSA-AC) and are referenced in Section 1.9.1.

Enforcing Agency – Local building department or the Department of Housing and Community Development.

Authority Cited – Health and Safety Code Sections 17040, 17050, 17920.9, 17921, 17921.3, 17921.6, 17921.10, 17922, 17922.6, 17922.12, 17927, 17928, 17959.6, 18300, 18552, 18554, 18620, 18630, 18640, 18670, 18690, 18691, 18865, 18871.3, 18871.4, 18873, 18873.1, 18873.2, 18873.3, 18873.4, 18873.5, 18938.3, 18944.11, and 19990; and Government Code Section 12955.1.

References – Health and Safety Code Sections 17000 through 17062.5, 17910 through 17995.5, 18200 through 18700, 18860 through 18874, and 19960 through 19997; and Government Code Sections 12955.1 and 12955.1.1.

1.8.2.1.3 Permanent Buildings in Mobilehome Parks and Special Occupancy Parks.

Application – Permanent buildings, and permanent accessory buildings or structures, constructed within mobilehome parks and special occupancy parks that are under the control and ownership of the park operator. Sections of this code which pertain to applications listed in this section are identified in the Matrix Adoption Table using the abbreviation “HCD 2”.

Enforcing Agency – Local building department or other local agency responsible for the enforcement of Health and Safety Code Division 13, Part 2.1, commencing with Section 18200 for mobilehome parks and Health and Safety Code, Division 13, Part 2.3, commencing with Section 18860 for special occupancy parks; or the Department of Housing and Community Development.

Authority Cited – Health and Safety Code Sections 17040, 17050, 17920.9, 17921, 17921.3, 17921.6, 17921.10, 17922, 17922.6, 17922.12, 17927, 17928, 17959.6, 18300, 18552, 18554, 18620, 18630, 18640, 18670, 18690, 18691, 18865, 18871.3, 18871.4, 18873, 18873.1, 18873.2, 18873.3, 18873.4, 18873.5, 18938.3, 18944.11, and 19990; and Government Code Section 12955.1.

References – Health and Safety Code Sections 17000 through 17062.5, 17910 through 17995.5, 18200 through 18700, 18860 through 18874, and 19960 through 19997; and Government Code Sections 12955.1 and 12955.1.1.

1.8.3 Local Enforcing Agency.

1.8.3.1 Duties and Powers. The building department of every city, county or city and county shall enforce all the provisions of law, this code, and the other rules and regulations promulgated by the Department of Housing and Community Development pertaining to the installation, erection, construction, reconstruction, movement, enlargement, conversion, alteration, repair, removal, demolition, or arrangement of apartment houses, hotels, motels, lodging houses and dwellings, including accessory buildings, facilities, and uses thereto.

The provisions regulating the erection and construction of dwellings and appurtenant structures shall not apply to existing structures as to which construction is commenced or approved prior to the effective date of these regulations. Requirements relating to use, maintenance and occupancy shall apply to all dwellings and appurtenant structures approved for construction or constructed before or after the effective date of this code.

For additional information regarding the use and occupancy of existing buildings and appurtenant struc-

tures, see California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 1, commencing with Section 1.

1.8.3.2 Laws, Rules, and Regulations. Other than the building standards contained in this code, and notwithstanding other provisions of law, the statutory authority and location of the laws, rules, and regulations to be enforced by local enforcing agencies are listed by statute in Sections 1.8.3.2.1 through 1.8.3.2.5 below:

1.8.3.2.1 State Housing Law. Refer to the State Housing Law, California Health and Safety Code, Division 13, Part 1.5, commencing with Section 17910 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 1, commencing with Section 1, for the erection, construction, reconstruction, movement, enlargement, conversion, alteration, repair, removal, demolition, or arrangement of apartment houses, hotels, motels, lodging houses and dwellings, including accessory buildings, facilities, and uses thereto.

1.8.3.2.2 Mobilehome Parks Act. Refer to the Mobilehome Parks Act, California Health and Safety Code, Division 13, Part 2.1, commencing with Section 18200 and California Code of Regulations, Title 25, Division 1, Chapter 2, commencing with Section 1000 for mobilehome park administrative and enforcement authority, permits, plans, fees, violations, inspections, and penalties both within and outside mobilehome parks.

Exception: Mobilehome parks where the Department of Housing and Community Development is the enforcing agency.

1.8.3.2.3 Special Occupancy Parks Act. Refer to the Special Occupancy Parks Act, California Health and Safety Code, Division 13, Part 2.3, commencing with Section 18860 and California Code of Regulations, Title 25, Division 1, Chapter 2.2, commencing with Section 2000 for special occupancy park administrative and enforcement authority, permits, fees, violations, inspections, and penalties both within and outside of special occupancy parks.

Exception: Special occupancy parks where the Department of Housing and Community Development is the enforcing agency.

1.8.3.2.4 Employee Housing Act. Refer to the Employee Housing Act, California Health and Safety Code, Division 13, Part 1, commencing with Section 17000 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 3, commencing with Section 600 for employee housing administrative and enforcement authority, permits, fees, violations, inspections, and penalties.

1.8.3.2.5 Factory-Built Housing Law. Refer to the Factory-Built Housing Law, California Health and Safety Code, Division 13, Part 6 commencing with Section 19960 and California Code of Regulations, Title 25, Division 1, Chapter 3, Subchapter 1, commencing with Section 3000 for factory-built housing

administrative and enforcement authority, permits, fees, violations, inspections, and penalties.

1.8.4 Permits, Fees, Applications, and Inspections.

1.8.4.1 Permits. A written construction permit shall be obtained from the enforcing agency prior to the erection, construction, reconstruction, installation, relocation, or alteration of any plumbing system.

Exceptions:

1. Work exempt from permits as specified in Chapter 1, Administration, Division II, Sections 103.1.2.1 and 103.1.2.2 of this code.
2. Changes, alterations, or repairs of a minor nature not affecting structural features, egress, sanitation, safety, or accessibility as determined by the enforcing agency.

Exemptions from permit requirements shall not be deemed to grant authorization for any work to be done in any manner in violation of other provisions of law or this code.

1.8.4.2 Fees. Subject to other provisions of law, the governing body of any city, county, or city and county may prescribe fees to defray the cost of enforcement of rules and regulations promulgated by the Department of Housing and Community Development. The amount of the fees shall not exceed the amount reasonably necessary to administer or process permits, certificates, forms, or other documents, or to defray the costs of enforcement. For additional information, see State Housing Law, Health and Safety Code, Division 13, Part 1.5, Section 17951 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 1, Article 3, commencing with Section 6.

1.8.4.3 Plan Review and Time Limitations. Subject to other provisions of law, provisions related to plan checking, prohibition of excessive delays, and contracting with or employment of private parties to perform plan checking are set forth in the State Housing Law, Health and Safety Code Section 17960.1, and for employee housing, in Health and Safety Code Section 17021.

1.8.4.3.1 Retention of Plans. The building department of every city, county, or city and county shall maintain an official copy, microfilm, or electronic or other type of photographic copy of the plans of every building, during the life of the building, for which the department issued a building permit.

Exceptions:

1. Single or multiple dwellings not more than two stories and basement in height.
2. Garages and other structures appurtenant to buildings listed in Exception 1.
3. Farm or ranch buildings appurtenant to buildings listed in Exception 1.
4. Any one-story building where the span between bearing walls does not exceed 25 feet (7620 mm), except a steel frame or concrete building.

All plans for common interest developments as defined in Section 1351 of the Cali-

fornia Civil Code shall be retained. For additional information regarding plan retention and reproduction of plans by an enforcing agency, see Health and Safety Code Sections 19850 through 19852.

1.8.4.4 Inspections. Construction or work for which a permit is required shall be subject to inspection by the building official and such construction or work shall remain accessible and exposed for inspection purposes until approved. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or other regulations of the Department of Housing and Community Development.

1.8.5 Right of Entry for Enforcement.

1.8.5.1 General. Subject to other provisions of law, officers and agents of the enforcing agency may enter and inspect public and private properties to secure compliance with the rules and regulations promulgated by the Department of Housing and Community Development. For limitations and additional information regarding enforcement, see the following:

1. For applications subject to State Housing Law as referenced in Section 1.8.3.2.1 of this code, refer to Health and Safety Code, Division 13, Part 1.5, commencing with Section 17910 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 1, commencing with Section 1.
2. For applications subject to the Mobilehome Parks Act as referenced in Section 1.8.3.2.2 of this code, refer to Health and Safety Code, Division 13, Part 2.1, commencing with Section 18200 and California Code of Regulations, Title 25, Division 1, Chapter 2, commencing with Section 1000.
3. For applications subject to the Special Occupancy Parks Act as referenced in Section 1.8.3.2.3 of this code, refer to Health and Safety Code Division 13, Part 2.3, commencing with Section 18860 and California Code of Regulations, Title 25, Division 1, Chapter 2.2, commencing with Section 2000.
4. For applications subject to the Employee Housing Act as referenced in Section 1.8.3.2.4 of this code, refer to Health and Safety Code, Division 13, Part 1, commencing with Section 17000 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 3, commencing with Section 600.
5. For applications subject to the Factory-Built Housing Law as referenced in Section 1.8.3.2.5 of this code, refer to Health and Safety Code, Division 13, Part 6, commencing with Section 19960 and California Code of Regulations, Title 25, Division 1, Chapter 3, Subchapter 1, commencing with Section 3000.

1.8.6 Local Modification by Ordinance or Regulation.

1.8.6.1 General. Subject to other provisions of law, a city, county or city and county may make changes to the provisions adopted by the Department of Housing and Community Development. If any city, county, or city and county does not amend, add, or repeal by local ordinances or regulations the provisions published in this code or other reg-

ulations promulgated by the Department of Housing and Community Development, those provisions shall be applicable and shall become effective 180 days after publication by the California Building Standards Commission. Amendments, additions, and deletions to this code adopted by a city, county or city and county pursuant to California Health and Safety Code Sections 17958.5, 17958.7, and 18941.5, together with all applicable portions of this code, shall also become effective 180 days after publication of the California Building Standards Code by the California Building Standards Commission.

1.8.6.2 Findings, Filings, and Rejections of Local Modifications. Prior to making any modifications or establishing more restrictive building standards, the governing body shall make express findings and filings, as required by California Health and Safety Code Section 17958.7, showing that such modifications are reasonably necessary due to local climatic, geological, or topographical conditions. No modification shall become effective or operative unless the following requirements are met:

1. The express findings shall be made available as a public record.
2. A copy of the modification and express finding, each document marked to cross-reference the other, shall be filed with the California Building Standards Commission for a city, county, or a city and county, and with the Department of Housing and Community Development for fire protection districts.
3. The California Building Standards Commission has not rejected the modification or change.

Nothing in this section shall limit the authority of fire protection districts pursuant to California Health and Safety Code Section 13869.7(a).

1.8.7 Alternate Materials, Designs, Tests, and Methods of Construction.

1.8.7.1 General. The provisions of this code as adopted by the Department of Housing and Community Development are not intended to prevent the use of any alternate material, appliance, installation, device, arrangement, design, or method of construction not specifically prescribed by this code. Consideration and approval of alternates shall comply with Section 1.8.7.2 for local building departments and Section 1.8.7.3 for the Department of Housing and Community Development.

1.8.7.2 Local Building Departments. The building department of any city, county, or city and county may approve alternates for use in the erection, construction, reconstruction, movement, enlargement, conversion, alteration, repair, removal, demolition, or arrangement of an apartment house, hotel, motel, lodging house, or dwelling or an accessory structure, except for the following:

1. Structures located in mobilehome parks as defined in California Health and Safety Code Section 18214.
2. Structures located in special occupancy parks as defined in California Health and Safety Code Section 18862.43.

3. Factory-built housing as defined in California Health and Safety Code Section 19971.

1.8.7.2.1 Approval of Alternates. The consideration and approval of alternates by a local building department shall comply with the following procedures and limitations:

1. The approval shall be granted on a case-by-case basis.
2. Evidence shall be submitted to substantiate claims that the proposed alternate, in performance, safety, and protection of life and health, conforms to, or is at least equivalent to, the standards contained in this code and other rules and regulations promulgated by the Department of Housing and Community Development.
3. The local building department may require tests performed by an approved testing agency at the expense of the owner or owner’s agent as proof of compliance.
4. If the proposed alternate is related to accessibility in covered multifamily dwellings or facilities serving “COVERED MULTIFAMILY DWELLINGS” as defined in Chapter 11A of the CBC, the proposed alternate must also meet the threshold set for “EQUIVALENT FACILITATION” as defined in Chapter 11A of the CBC.

For additional information regarding approval of alternates by a local building department pursuant to the State Housing Law, see California Health and Safety Code Section 17951(e) and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 1.

1.8.7.3 Department of Housing and Community Development. The Department of Housing and Community Development may approve alternates for use in the erection, construction, reconstruction, movement, enlargement, conversion, alteration, repair, removal, or demolition of an apartment house, hotel, motel, lodging house, dwelling, or an accessory thereto. The consideration and approval of alternates shall comply with the following:

1. The department may require tests at the expense of the owner or owner’s agent to substantiate compliance with the California Building Standards Code.
2. The approved alternate shall, for its intended purpose, be at least equivalent in performance and safety to the materials, designs, tests, or methods of construction prescribed by this code.

1.8.8 Appeals Board.

1.8.8.1 General. Every city, county, or city and county shall establish a local appeals board and a housing appeals board. The local appeals board and housing appeals board shall each be comprised of at least five voting members who shall serve at the pleasure of the city, county or city and county. Appointees shall not be employees of the jurisdiction and shall be qualified and specifically knowledgeable in the California Building Standards Codes and applicable local ordinances.

1.8.8.2 Definitions. The following terms shall for the purposes of this section have the meaning shown.

Housing Appeals Board. The board or agency of a city, county or city and county which is authorized by the governing body of the city, county, or city and county to hear appeals regarding the requirements of the city, county, or city and county relating to the use, maintenance, and change of occupancy of buildings and structures, including requirements governing alteration, additions, repair, demolition, and moving. In any area in which there is no such board or agency, "housing appeals board" means the local appeals board having jurisdiction over the area.

Local Appeals Board. The board or agency of a city, county, or city and county which is authorized by the governing body of the city, county, or city and county to hear appeals regarding the building requirements of the city, county, or city and county. In any area in which there is no such board or agency, "local appeals board" means the governing body of the city, county, or city and county having jurisdiction over the area.

1.8.8.3 Appeals. Except as otherwise provided by law, any person, firm, or corporation adversely affected by a decision, order, or determination by a city, county, or city and county relating to the application of building standards published in the California Building Standards Code, or any other applicable rule or regulation adopted by the Department of Housing and Community Development, or any lawfully enacted ordinance by a city, county, or city and county, may appeal the issue for resolution to the local appeals board or housing appeals board as appropriate.

The local appeals board shall hear appeals relating to new building construction and the housing appeals board shall hear appeals relating to existing buildings.

1.8.9 Unsafe Buildings or Structures.

1.8.9.1 Authority to Enforce. Subject to other provisions of law, the administration, enforcement, actions, proceedings, abatement, violations, and penalties for unsafe buildings and structures are contained in the following statutes and regulations:

1. For applications subject to State Housing Law as referenced in Section 1.8.3.2.1 of this code, refer to Health and Safety Code, Division 13, Part 1.5, commencing with Section 17910 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 1, commencing with Section 1.
2. For applications subject to the Mobilehome Parks Act as referenced in Section 1.8.3.2.2 of this code, refer to Health and Safety Code, Division 13, Part 2.1, commencing with Section 18200 and California Code of Regulations, Title 25, Division 1, Chapter 2, commencing with Section 1000.
3. For applications subject to the Special Occupancy Parks Act as referenced in Section 1.8.3.2.3 of this code, refer to Health and Safety Code, Division 13, Part 2.3, commencing with Section 18860 and California Code of Regulations, Title 25, Division 1, Chapter 2.2, commencing with Section 2000.

4. For applications subject to the Employee Housing Act as referenced in Section 1.8.3.2.4 of this code, refer to Health and Safety Code, Division 13, Part 1, commencing with Section 17000 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 3, commencing with Section 600.
5. For applications subject to the Factory-Built Housing Law as referenced in Section 1.8.3.2.5 of this code, refer to Health and Safety Code, Division 13, Part 6, commencing with Section 19960 and California Code of Regulations, Title 25, Division 1, Chapter 3, Subchapter 1, commencing with Section 3000.

1.8.9.2 Actions and Proceedings. Subject to other provisions of law, punishments, penalties, and fines for violations of building standards are contained in the following statutes and regulations:

1. For applications subject to the State Housing Law as referenced in Section 1.8.3.2.1 of this code, refer to Health and Safety Code, Division 13, Part 1.5, commencing with Section 17910 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 1, commencing with Section 1.
2. For applications subject to the Mobilehome Parks Act as referenced in Section 1.8.3.2.2 of this code, refer to Health and Safety Code, Division 13, Part 2.1, commencing with Section 18200 and California Code of Regulations, Title 25, Division 1, Chapter 2, commencing with Section 1000.
3. For applications subject to the Special Occupancy Parks Act as referenced in Section 1.8.3.2.3. of this code, refer to Health and Safety Code, Division 13, Part 2.3, commencing with Section 18860 and California Code of Regulations, Title 25, Division 1, Chapter 2.2, commencing with Section 2000.
4. For applications subject to the Employee Housing Act as referenced in Section 1.8.3.2.4 of this code, refer to Health and Safety Code, Division 13, Part 1, commencing with Section 17000 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 3, commencing with Section 600.
5. For applications subject to the Factory-Built Housing Law as referenced in Section 1.8.3.2.5 of this code, refer to Health and Safety Code, Division 13, Part 6, commencing with Section 19960 and California Code of Regulations, Title 25, Division 1, Chapter 3, Subchapter 1, commencing with Section 3000.

1.8.10 Other Building Regulations.

1.8.10.1 Existing Structures. Notwithstanding other provisions of law, the replacement, retention, and extension of original materials and the use of original methods of construction for any existing building or accessory structure, or portions thereof, shall be permitted. For additional information, see California Health and Safety Code Sections 17912 and 17958.8.

1.8.10.2 Moved Structures. Subject to the requirements of California Health and Safety Code Sections 17922.3 and 17958.9, local ordinances or regulations relating to a moved residential or accessory structure shall, after

July 1, 1978, permit the retention of existing materials and methods of construction so long as the structure does not become or continue to be a substandard building.

Note:

Authority Cited – Health and Safety Code Sections 17040, 17050, 17920.9, 17921, 17921.3, 17921.6, 17921.10, 17922, 17922.6, 17922.12, 17927, 17928, 17959.6, 18300, 18552, 18554, 18620, 18630, 18640, 18670, 18690, 18691, 18865, 18871.3, 18871.4, 18873, 18873.1, 18873.2, 18873.3, 18873.4, 18873.5, 18938.3, 18944.11, and 19990; and Government Code Section 12955.1.

References – Health and Safety Code Sections 17000 through 17062.5, 17910 through 17995.5, 18200 through 18700, 18860 through 18874, and 19960 through 19997; and Government Code Sections 12955.1 and 12955.1.1.

1.9.0 Division of the State Architect.

1.9.1 Division of the State Architect – Access Compliance.

Note: For applications listed in Section 1.9.1 of the California Building Code, regulated by the Division of the State Architect – Access Compliance see California Code of Regulations, Title 24, Part 2 (California Building Code), Chapter 1 (Division 1 California Administration) under authority cited by Government Code Section 4450 and in reference cited by Government Code Sections 4450 through 4461, 12955.1, and Health and Safety Code Sections 18949.1, 19952 through 19959.

1.9.1.1 Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this Subsection 1.9.1 will be identified in the Matrix Adoption Tables under the acronym DSA AC.

1.9.2 Division of the State Architect – Structural Safety.

1.9.2.1 DSA-SS (Division of the State Architect – Structural Safety).

Application – Public elementary and secondary schools, community college buildings, and state-owned or state-leased essential services buildings.

Enforcing Agency – (Division of the State Architect – Structural Safety) (DSA-SS).

The Division of the State Architect has been delegated the responsibility and authority by the Department of General Services to review and approve the design and observe the construction of public elementary and secondary schools, community colleges, and state-owned or state-leased essential services buildings.

Authority Cited – Education Code Section 17310 and 81142, and Health and Safety Code Section 16022.

References – Education Code Sections 17280 through 17317 and 81130 through 81147, and Health and Safety Code Sections 16000 through 16023.

1.9.2.1.1 Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this Subsection 1.9.2 will be identified in the Matrix Adoption Tables under the acronym DSA SS.

1.9.2.2 DSA-SS/CC (Division of the State Architect – Structural Safety/Community Colleges).

Application – Community Colleges.

The Division of the State Architect has been delegated the authority by the Department of General Services to promulgate alternate building standards for application to community colleges, which a community college may elect to use in lieu of standards promulgated by DSA-SS in accordance with Section 1.9.2.1. Refer to Title 24, Part 2, Section 1.9.2.2.

Enforcing Agency – Division of the State Architect – Structural Safety/Community Colleges (DSA-SS/CC).

The Division of the State Architect has been delegated the authority by the Department of General Services to review and approve the design and oversee construction of community colleges electing to use the alternative building standards as provided in this section.

Authority Cited – Education Code Section 81053.

References – Education Code Sections 81052, 81053, and 81130 through 81147.

1.9.2.2.1 Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this Subsection 1.9.2.2 will be identified in the Matrix Adoption Tables under the acronym DSA SS/CC.

1.10.0 Office of Statewide Health Planning and Development.

1.10.1 OSHPD 1. Specific scope of application of the agency responsible for enforcement, enforcement agency, specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

OSHPD 1

Application – General acute-care hospitals and acute psychiatric hospitals, excluding distinct part units or distinct part freestanding buildings providing skilled nursing or intermediate-care services. For Structural Regulations: Skilled nursing facilities and/or intermediate-care facilities except those skilled nursing facilities and intermediate-care facilities of single story, Type V, wood or light steel-frame construction.

Enforcing Agency – Office of Statewide Health Planning and Development (OSHPD). The office shall enforce the Division of the State Architect access compliance regulations and the regulations of the Office of the State Fire Marshal for the above stated facility types.

1.10.1.1 Applicable Administrative Standards.

1. Title 24, Part 1, California Code of Regulations: Chapters 6 and 7.
2. Title 24, Part 2, California Code of Regulations: Sections 1.1.0 and 1.10.0, Chapter I, Division I and Sections 101-117, Chapter I, Division II.

1.10.1.2 Applicable Building Standards. California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 9, 10, and 11.

Authority Cited – Health and Safety Code Sections 127010, 127015, 1275, and 129850.

References – Health and Safety Code Sections 19958, 127010, 127015, 129680, 1275, and 129675 through 130070.

1.10.1.3 Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this Subsection 1.10.1 will be identified in the Matrix Adoption Tables under the acronym OSHPD 1.

1.10.2 OSHPD 2. Specific scope of application of the agency responsible for enforcement, enforcement agency, specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

OSHPD 2

Application – Skilled nursing facilities and intermediate-care facilities, including distinct part skilled nursing and intermediate-care services on a general acute-care or acute psychiatric hospital license, provided either in a rate unit or a freestanding building. For Structural Regulations: Single-story, Type V skilled nursing facility and/or intermediate-care facilities utilizing wood or light steel-frame construction.

Enforcing Agency – Office of Statewide Health Planning and Development (OSHPD). The office shall also enforce the Division of the State Architect access compliance regulations and the regulations of the Office of the State Fire Marshal for the above stated facility type.

1.10.2.1 Applicable Administrative Standards.

1. Title 24, Part 1, California Code of Regulations: Chapter 7.
2. Title 24, Part 2, California Code of Regulations: Sections 1.1.0 and 1.10.0, Chapter 1, Division I and Sections 101-117, Chapter 1, Division II.

1.10.2.2 Applicable Building Standards. California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 9, 10, and 11.

Authority Cited – Health and Safety Code Sections 127010, 127015, 1275, and 129850.

References – Health and Safety Code Sections 127010, 127015, 1275, and 129680.

1.10.2.3 Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this Subsection 1.10.2 will be identified in the Matrix Adoption Tables under the acronym OSHPD 2.

1.10.3 OSHPD 3. Specific scope of application of the agency responsible for enforcement, enforcement agency, specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

OSHPD 3

Application – Licensed clinics and any freestanding building under a hospital license where outpatient clinical services are provided.

Enforcing Agency – Local building department.

1.10.3.1 Applicable Administrative Standards.

1. Title 24, Part 1, California Code of Regulations: Chapter 7.

2. Title 24, Part 2, California Code of Regulations: Sections 1.1.0 and 1.10.0, Chapter 1, Division I and Sections 101-117, Chapter 1, Division II.

1.10.3.2 Applicable Building Standards. California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 9, 10, and 11.

Authority Cited – Health and Safety Code Sections 127010, 127015, and 1226.

References – Health and Safety Code Sections 127010, 127015, 129885, and 1226, Government Code Section 54350, and State Constitution Article 11, Section 7.

1.10.3.3 Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this Subsection 1.10.3 will be identified in the Matrix Adoption Tables under the acronym OSHPD 3.

1.10.4 OSHPD 4. Specific scope of application of the agency responsible for enforcement, enforcement agency, specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

OSHPD 4

Application – Correctional Treatment Centers.

Enforcing Agency – Office of Statewide Health Planning and Development (OSHPD). The office shall also enforce the Division of the State Architect access compliance regulations and the regulations of the Office of the State Fire Marshal for the above stated facility types.

1.10.4.1 Applicable Administrative Standards.

1. Title 24, Part 1, California Code of Regulations: Chapter 7.
2. Title 24, Part 2, California Code of Regulations: Sections 1.1.0 and 1.10.0, Chapter 1, Division I and Sections 101-117, Chapter 1, Division II.

1.10.4.2 Applicable Building Standards. California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 9, 10 and 11.

Authority Cited – Health and Safety Code Sections 127010, 127015, and 129790.

References – Health and Safety Code Sections 127010, 127015, 1275, and 129675 through 130070.

1.10.4.3. Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this Subsection 1.10.4 will be identified in the Matrix Adoption Tables under the acronym OSHPD 4.

1.11.0 Office of the State Fire Marshal.

1.11.1 SFM-Office of the State Fire Marshal. Specific scope of application of the agency responsible for enforcement, the enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

Application:

Institutional, Educational, or any Similar Occupancy. Any building or structure used or intended for use as an asylum,

jail, mental hospital, hospital, sanitarium, home for the aged, children's nursery, children's home, school, or any similar occupancy of any capacity.

Authority Cited – Health and Safety Code Section 13143.

Reference – Health and Safety Code Section 13143.

Assembly or Similar Place of Assemblage. Any theater, dance-hall, skating rink, auditorium, assembly hall, meeting hall, nightclub, fair building, or similar place of assemblage where 50 or more persons may gather together in a building, room or structure for the purpose of amusement, entertainment, instruction, deliberation, worship, drinking or dining, awaiting transportation, or education.

Authority Cited – Health and Safety Code Section 13143.

Reference – Health and Safety Code Section 13143.

Small Family Day-Care Homes.

Authority Cited – Health and Safety Code Sections 1597.45, 1597.54, 13143, and 17921.

Reference – Health and Safety Code Section 13143.

Large Family Day-Care Homes.

Authority Cited – Health and Safety Code Sections 1597.46, 1597.54, and 17921.

Reference – Health and Safety Code Section 13143.

Residential Facilities and Residential Facilities for the Elderly.

Authority Cited – Health and Safety Code Section 13133.

Reference – Health and Safety Code Section 13143.

Any State Institution or Other State-Owned or State-Occupied Building.

Authority Cited – Health and Safety Code Section 13108.

Reference – Health and Safety Code Section 13143.

High-Rise Structures.

Authority Cited – Health and Safety Code Section 13211.

Reference – Health and Safety Code Section 13143.

Motion Picture Production Studios.

Authority Cited – Health and Safety Code Section 13143.1.

Reference – Health and Safety Code Section 13143.

Organized Camps.

Authority Cited – Health and Safety Code Section 18897.3.

Reference – Health and Safety Code Section 13143.

Residential.

All hotels, motels, lodging houses, apartment houses and dwellings, including congregate residences and buildings and structures accessory thereto. Multiple-story structures existing on January 1, 1975, let for human habitation, including and limited to, hotels, motels, apartment houses, less than 75

feet (22 860 mm) above the lowest floor level having building access, wherein rooms used for sleeping are let above the ground floor.

Authority Cited – Health and Safety Code Sections 13143.2 and 17921.

Reference – Health and Safety Code Section 13143.

Residential Care Facilities.

Certified family-care homes, out-of-home placement facilities, halfway houses, drug and/or alcohol rehabilitation facilities, and any building or structure used or intended for use as a home or institution for the housing of any person of any age when such person is referred to or placed within such home or institution for protective social care and supervision services by any governmental agency.

Authority Cited – Health and Safety Code Section 13143.6.

Reference – Health and Safety Code Section 13143. **||**

Tents, Awnings, or Other Fabric Enclosures Used in Connection with Any Occupancy.

Authority Cited – Health and Safety Code Section 13116.

Reference – Health and Safety Code Section 13143.

Fire Alarm Devices, Equipment, and Systems in Connection with Any Occupancy.

Authority Cited – Health and Safety Code Section 13114.

Reference – Health and Safety Code Section 13143. **||**

Hazardous Materials.

Authority Cited – Health and Safety Code Section 13143.9.

Reference – Health and Safety Code Section 13143. **||**

Flammable and Combustible Liquids. **Authority Cited** – Health and Safety Code Section 13143.6.

Reference – Health and Safety Code Section 13143. **||**

Public School Automatic Fire Detection, Alarm, and Sprinkler Systems.

Authority Cited – Health and Safety Code Section 13143 and California Education Code Article 7.5, Sections 17074.50, 17074.52, and 17074.54.

References – Government Code Section 11152.5, Health and Safety Code Section 13143 and California Education Code Chapter 12.5, Leroy F. Greene School Facilities Act of 1998, Article 1.

Wildland-Urban Interface Fire Area.

Authority Cited – Health and Safety Code Sections 13143, 13108.5(a), and 18949.2(b) and (c); and Government Code Section 51189.

References – Health and Safety Code Sections 13143, Government Code Sections 51176, 51177, 51178, and 51179; and Public Resources Code Sections 4201 through 4204.

1.11.2 Duties and Powers of the Enforcing Agency.

1.11.2.1 Enforcement.

1.11.2.1.1 The responsibility for enforcement of building standards adopted by the State Fire Marshal and published in the California Building Standards Code relating to fire and panic safety and other regulations of the State Fire Marshal shall except as provided in Section 1.11.2.1.2 be as follows:

1. The city, county, or city and county, with jurisdiction in the area affected by the standard or regulation shall delegate the enforcement of the building standards relating to fire and panic safety and other regulations of the State Fire Marshal as they relate to Group R-3 occupancies, as described in Section 310.1 of Part 2 of the California Building Standards Code, to either of the following:
 - 1.1. The chief of the fire authority of the city, county, or city and county or an authorized representative.
 - 1.2. The chief building official of the city, county, or city and county, or an authorized representative.
2. The chief of any city or county fire department or of any fire protection district, and authorized representatives, shall enforce within the jurisdiction the building standards and other regulations of the State Fire Marshal, except those described in Item 1 or 4.
3. The State Fire Marshal shall have authority to enforce the building standards and other regulations of the State Fire Marshal in areas outside of corporate cities and districts providing fire protection services.
4. The State Fire Marshal shall have authority to enforce the building standards and other regulations of the State Fire Marshal in corporate cities and districts providing fire-protection services on request of the chief fire official or the governing body.
5. Any fee charged pursuant to the enforcement authority of this section shall not exceed the estimated reasonable cost of providing the service for which the fee is charged pursuant to Section 66014 of the Government Code.

1.11.2.1.2 Pursuant to Health and Safety Code Section 13108, and except as otherwise provided in this section, building standards adopted by the State Fire Marshal published in the California Building Standards Code relating to fire and panic safety shall be enforced by the State Fire Marshal in all state-owned buildings, state-occupied buildings, and state institutions throughout the state. Upon the written request of the chief fire official of any city, county, or fire-protection district, the State Fire Marshal may authorize such chief fire official and his or her

authorized representatives, in their geographical area of responsibility, to make fire-prevention inspections of state-owned or state-occupied buildings, other than state institutions, for the purpose of enforcing the regulations relating to fire and panic safety adopted by the State Fire Marshal pursuant to this section and building standards relating to fire and panic safety published in the California Building Standards Code. Authorization from the State Fire Marshal shall be limited to those fire departments or fire districts which maintain a fire-prevention bureau staffed by paid personnel.

Pursuant to Health and Safety Code Section 13108, any requirement or order made by any chief fire official who is authorized by the State Fire Marshal to make fire-prevention inspections of state-owned or state-occupied buildings, other than state institutions, may be appealed to the State Fire Marshal. The State Fire Marshal shall, upon receiving an appeal and subject to the provisions of Chapter 5 (commencing with Section 18945) of Part 2.5 of Division 13 of the Health and Safety Code, determine if the requirement or order made is reasonably consistent with the fire and panic safety regulations adopted by the State Fire Marshal and building standards relating to fire and panic safety published in the California Building Code.

Any person may request a code interpretation from the State Fire Marshal relative to the intent of any regulation or provision adopted by the State Fire Marshal. When the request relates to a specific project, occupancy or building, the State Fire Marshal shall review the issue with the appropriate local enforcing agency prior to rendering such code interpretation.

1.11.2.1.3 Pursuant to Health and Safety Code Section 13112, any person who violates any order, rule or regulation of the State Fire Marshal is guilty of a misdemeanor punishable by a fine of not less than \$100.00 or more than \$500.00, or by imprisonment for not less than six months, or by both. A person is guilty of a separate offense each day during which he or she commits, continues, or permits a violation of any provision of, or any order, rule or regulation of, the State Fire Marshal as contained in this code.

Any inspection authority who, in the exercise of his or her authority as a deputy State Fire Marshal, causes any legal complaints to be filed or any arrest to be made shall notify the State Fire Marshal immediately following such action.

1.11.2.2 Right of Entry. The fire chief of any city, county, or fire-protection district, or such person's authorized representative, may enter any state institution or any other state-owned or state-occupied building for the purpose of preparing a fire-suppression preplanning program or for the purpose of investigating any fire in a state-occupied building.

The State Fire Marshal, his or her deputies or salaried assistants, the chief of any city or county fire department or fire-protection district and his or her authorized representatives may enter any building or premises not used for dwelling purposes at any reasonable hour for the purpose of enforcing this chapter. The owner, lessee, manager, or operator of any such building or premises shall permit the State Fire Marshal, his or her deputies or salaried assistants and the chief of any city or county fire department or fire-protection district and his or her authorized representatives to enter and inspect them at the time and for the purpose stated in this section.

1.11.2.3 More Restrictive Fire and Panic Safety Building Standards.

1.11.2.3.1 Any fire-protection district organized pursuant to Health and Safety Code Part 2.7 (commencing with Section 13800) of Division 12 may adopt building standards relating to fire and panic safety that are more stringent than those building standards adopted by the State Fire Marshal and contained in the California Building Standards Code. For these purposes, the district board shall be deemed a legislative body and the district shall be deemed a local agency. Any changes or modifications that are more stringent than the requirements published in the California Building Standards Code relating to fire and panic safety shall be subject to Section 1.1.8.1.

1.11.2.3.2 Any fire protection district that proposes to adopt an ordinance pursuant to this section shall, not less than 30 days prior to noticing a proposed ordinance for public hearing, provide a copy of that ordinance, together with the adopted findings made pursuant to Section 1.11.2.3.1, to the city, county, or city and county where the ordinance will apply. The city, county, or city and county may provide the district with written comments, which shall become part of the fire-protection district's public hearing record.

1.11.2.3.3 The fire-protection district shall transmit the adopted ordinance to the city, county, or city and county where the ordinance will apply. The legislative body of the city, county, or city and county may ratify, modify or deny an adopted ordinance and transmit its determination to the district within 15 days of the determination. Any modification or denial of an adopted ordinance shall include a written statement describing the reasons for any modifications or denial. No ordinance adopted by the district shall be effective until ratification by the city, county, or city and county where the ordinance will apply. Upon ratification of an adopted ordinance, the city, county, or city and county shall file a copy of the findings of the district, and any findings of the city, county, or city and county together with the adopted ordinance expressly marked and identified to which each finding refers, in accordance with Section 1.1.8.1(3).

1.11.2.4 Request for Alternate Means of Protection.

Requests for approval to use an alternative material, assembly or materials, equipment, method of construction, method of installation of equipment, or means of protection shall be made in writing to the enforcing agency by the owner or the owner's authorized representative and shall be accompanied by a full statement of the conditions. Sufficient evidence or proof shall be submitted to substantiate any claim that may be made regarding its conformance. The enforcing agency may require tests and the submission of a test report from an approved testing organization as set forth in Title 19, California Code of Regulation, to substantiate the equivalency of the proposed alternative means of protection.

When a request for alternate means of protection involves hazardous materials, the Authority Having Jurisdiction may consider implementation of the findings and recommendations identified in a Risk Management Plan (RMP) developed in accordance with Title 19, Division 2, Chapter 4.5, Article 3.

Approval of a request for use of an alternative material, assembly of materials, equipment, method of construction, method of installation of equipment, or means of protection made pursuant to these provisions shall be limited to the particular case covered by request and shall not be construed as establishing any precedent for any future request.

1.11.2.5 Appeals. When a request for an alternate means of protection has been denied by the enforcing agency, the applicant may file a written appeal to the State Fire Marshal for consideration of the applicant's proposal. In considering such appeal, the State Fire Marshal may seek the advice of the State Board of Fire Services. The State Fire Marshal shall, after considering all of the facts presented, including any recommendations of the State Board of Fire Services, determine if the proposal is for the purposes intended, at least equivalent to that specified in these regulations in quality, strength, effectiveness, fire resistance, durability, and safety, and shall transmit such findings and any recommendations to the applicant and to the enforcing agency.

1.11.3 Construction Documents. In addition to the provisions of this Section, see Title 24, Part 2, California Building Code, Appendix Chapter 1, Section 106 for additional requirements.

1.11.3.1 Public Schools. Plans and specifications for the construction, alteration or addition to any building owned, leased or rented by any public school district shall be submitted to the Division of the State Architect.

1.11.3.2 Movable Walls and Partitions. Plans or diagrams shall be submitted to the enforcing agency for approval before the installation of, or rearrangement of, any movable wall or partition in any occupancy. Approval shall be granted only if there is no increase in the fire hazard.

1.11.3.3 New Construction High-Rise Buildings.

1. Complete plans or specifications, or both, shall be prepared covering all work required to comply with new construction high-rise buildings. Such plans

and specifications shall be submitted to the enforcing agency having jurisdiction.

2. All plans and specifications shall be prepared under the responsible charge of an architect or a civil or structural engineer authorized by law to develop construction plans and specifications, or by both such architect and engineer. Plans and specifications shall be prepared by an engineer duly qualified in that branch of engineering necessary to perform such services. Administration of the work of construction shall be under the charge of the responsible architect or engineer except that where plans and specifications involve alterations or repairs, such work of construction may be administered by an engineer duly qualified to perform such services and holding a valid certificate under Chapter 7 (commencing with Section 65700) of Division 3 of the Business and Professions Code for performance of services in that branch of engineering in which said plans, specifications and estimates and work of construction are applicable.

This section shall not be construed as preventing the design of fire-extinguishing systems by persons holding a C-16 license issued pursuant to Division 3, Chapter 9, Business and Professions Code. In such instances, however, the responsibility charge of this section shall prevail.

1.11.3.4 Existing High-Rise Buildings.

1. Complete plans or specifications, or both, shall be prepared covering all work required by Section 3412 for existing high-rise buildings. Such plans or specifications shall be submitted to the enforcing agency having jurisdiction.
2. When new construction is required to conform with the provisions of these regulations, complete plans or specifications, or both, shall be prepared in accordance with the provisions of this subsection. As used in this section "new construction" is not intended to include repairs, replacements or minor alterations which do not disrupt or appreciably add to or affect the structural aspects of the building.

1.11.3.5 Retention of Plans. Refer to Building Standards Law, Health and Safety Code Sections 19850 and 19851, for permanent retention of plans.

1.11.4 Fees.

1.11.4.1 Other Fees. Pursuant to Health and Safety Code Section 13146.2, a city, county, or district which inspects a hotel, motel, lodging house, or apartment house may charge and collect a fee for the inspection from the owner of the structure in an amount, as determined by the city, county, or district, sufficient to pay its costs of that inspection.

1.11.4.2 Large Family Day Care. Pursuant to Health and Safety Code Section 1597.46, Large Family Day-Care Homes, the local government shall process any required permit as economically as possible, and fees charged for review shall not exceed the costs of the review and permit process.

1.11.4.3 High-Rise. Pursuant to Health and Safety Code Section 13217, High-Rise Structure Inspection: Fees and Costs, a local agency which inspects a high-rise structure pursuant to Health and Safety Code Section 13217 may charge and collect a fee for the inspection from the owner of the high-rise structure in an amount, as determined by the local agency, sufficient to pay its costs of that inspection.

1.11.4.4 Fire Clearance Preinspection. Pursuant to Health and Safety Code Section 13235, Fire Clearance Preinspection, Fee; upon receipt of a request from a prospective licensee of a community care facility, as defined in Section 1502, of a residential-care facility for the elderly, as defined in Section 1569.2, or of a child day-care facility, as defined in Section 1596.750, the local fire enforcing agency, as defined in Section 13244, or State Fire Marshal, whichever has primary jurisdiction, shall conduct a preinspection of the facility prior to the final fire clearance approval. At the time of the preinspection, the primary fire enforcing agency shall price consultation and interpretation of the fire safety regulations and shall notify the prospective licensee of the facility in writing of the specific fire safety regulations which shall be enforced in order to obtain fire clearance approval. A fee of not more than \$50.00 may be charged for the preinspection of a facility with a capacity to serve 25 or fewer persons. A fee of not more than \$100.00 may be charged for a preinspection of a facility with a capacity to serve 26 or more persons.

1.11.4.5 Care Facilities. The primary fire enforcing agency shall complete the final fire clearance inspection for a community care facility, residential-care facility for the elderly, or child day-care facility within 30 days of receipt of the request for the final inspection, or as of the date the prospective facility requests the final preclearance inspection by the State Department of Social Services, whichever is later.

Pursuant to Health and Safety Code Section 13235, a preinspection fee of not more than \$50 may be charged for a facility with a capacity to serve 25 or less clients. A fee of not more than \$100 may be charged for a preinspection of a facility with a capacity to serve 26 or more clients.

Pursuant to Health and Safety Code Section 13131.5, a reasonable final inspection fee, not to exceed the actual cost of inspection services necessary to complete a final inspection may be charged for occupancies classified as residential care facilities for the elderly (RCFE).

Pursuant to Health and Safety Code Section 1569.84, neither the State Fire Marshal nor any local public entity shall charge any fee for enforcing fire inspection regulations pursuant to state law or regulation or local ordinance, with respect to residential-care facilities for the elderly (RCFE) which service six or fewer persons.

1.11.4.6 Requests of the Office of the State Fire Marshal. Whenever a local Authority Having Jurisdiction requests that the State Fire Marshal perform plan review and/or inspection services related to a building permit, the applicable fees for such shall be payable to the Office of the State Fire Marshal.

1.11.5 Inspections. Work performed subject to the provisions of this code shall comply with the inspection requirements of Title 24, Part 2, California Building Standards Code, Sections 109.1, 109.3, 109.3.4, 109.3.5, 109.3.6, 109.3.8, 109.3.9, 109.3.10, 109.5, and 109.6 as adopted by the Office of the State Fire Marshal.

1.11.5.1 Existing Group I-1 or R occupancies. Licensed 24-hour care in a Group I-1 or R occupancy in existence and originally classified under previously adopted state codes shall be reinspected under the appropriate previous code, provided there is no change in the use or character which would place the facility in a different occupancy group.

1.11.6 Certificate of Occupancy. A Certificate of Occupancy shall be issued as specified in Title 24, Part 2, California Building Code, Section 111.

Exception: Group R-3 and Group U Occupancies.

1.11.7 Temporary Structures and Uses. See Title 24, Part 2, California Building Code, Section 107.

1.11.8 Service Utilities. See Title 24, Part 2, California Building Code, Section 112.

1.11.9 Stop Work Order. See Title 24, Part 2, California Building Code, Section 115.

1.11.10 Unsafe Buildings, Structures, and Equipment. See Title 24, Part 2, California Building Code, Section 116.

1.11.11. Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this section will be identified in the Matrix Adoption Tables under the acronym SFM.

1.12.0 Reserved for the State Librarian.

1.13.0 Department of Water Resources (DWR).

DWR-Department of Water Resources.

Application – Construction, installation, or alteration of graywater systems for subsurface irrigation and other safe uses.

Enforcing Agency – Local building department or the Department of Water Resources.

Authority Cited – Water Code Sections 14875 through 14877.3.

References – Water Code Sections 14875 through 14877.3.

1.13.1. Adopting Agency Identification.

The provisions of this code applicable to buildings identified in this section will be identified in the Matrix Adoption Tables under the acronym DWR.

1.14.0 Reserved for the State Lands Commission.

314.5 Piping, fixtures, appliances, and appurtenances shall be adequately supported in accordance with this code, the manufacturer's installation instructions, and as required by the Authority Having Jurisdiction.

314.6 Hanger rod sizes shall be no smaller than those shown in Table 3-1.

314.7 Gas piping shall be supported by metal straps or hooks at intervals not to exceed those shown in Table 12-3.

**TABLE 3-1
HANGER ROD SIZES**

PIPE AND TUBE SIZE		ROD SIZE	
(inches)	mm	(inches)	mm
½ – 4	15 – 100	¾	9.5
5 – 8	125 – 200	½	12.7
10 – 12	250 – 300	⅝	15.9

315.0 Trenching, Excavation, and Backfill.

315.1 Trenches deeper than the footing of any building or structure and paralleling the same shall be not less than 45 degrees (0.79 rad) therefrom, or as approved per Section 301.0 of this code.

315.2 Tunneling and driving shall be permitted to be done in yards, courts, or driveways of any building site. Where sufficient depth is available to permit, tunnels shall be permitted to be used between open-cut trenches. Tunnels shall have a clear height of two (2) feet (610 mm) above the pipe and shall be limited in length to one-half (½) the depth of the trench, with a maximum length of eight (8) feet (2438 mm). When pipes are driven, the drive pipe shall be not less than one (1) size larger than the pipe to be laid.

315.3 Open Trenches. Excavations required to be made for the installation of a building drainage system or any part thereof, within the walls of a building, shall be open trench work and shall be kept open until the piping has been inspected, tested, and accepted.

315.4 Excavations shall be completely backfilled as soon after inspection as practicable. Adequate precaution shall be taken to ensure proper compactness of backfill around piping without damage to such piping. Trenches shall be backfilled in thin layers to twelve (12) inches (305 mm) above the top of the piping with clean earth, which shall not contain stones, boulders, cinderfill, frozen earth, construction debris, or other materials that would damage or break the piping or cause corrosive action. Mechanical devices such as bulldozers, graders, etc., shall be permitted to then be used to complete backfill to grade. Fill shall be properly compacted. Suitable precautions shall be taken to ensure permanent stability for pipe laid in filled or made ground.

316.0 Joints and Connections.

316.1 Types of Joints.

316.1.1 Threaded Joints. Threads on iron pipe size (IPS) pipe and fittings shall be standard taper pipe threads in accordance with standards listed in Table 14-1. Threads on tubing shall be approved types. Threads

on plastic pipe shall be factory cut or molded. Threaded plastic pipe shall be Schedule 80 minimum wall thickness. Tubing threads shall conform to fine tubing thread standards. When a pipe joint material is used, it shall be applied only on male threads, and such materials shall be approved types, insoluble in water and nontoxic. Cleanout plugs and caps shall be lubricated with water-insoluble, nonhardening material or tape. Thread tape or thread lubricants and sealants specifically intended for use with plastics shall be used on plastic threads. Conventional pipe thread compounds, putty, linseed-oil-based products, and unknown lubricants and sealants shall not be used on plastic threads.

316.1.2 Wiped Joints. Joints in lead pipe or fittings or between lead pipe or fittings and brass or copper pipe, ferrules, solder nipples, or traps shall be full-wiped joints. Wiped joints shall have an exposed surface on each side of a joint not less than three-fourths (¾) inch (19.1 mm) and not less than as thick as the material being joined. Wall or floor flange lead-wiped joints shall be made by using a lead ring or flange placed behind the joint at the wall or floor. Joints between lead pipe and cast-iron, steel, or wrought iron shall be made by means of a caulking ferrule or soldering nipple.

316.1.3 Soldered Joints. Joints in copper tubing shall be made by the appropriate use of approved copper or copper alloy fittings. Surfaces to be joined by soldering shall be cleaned bright by manual or mechanical means.

The joints shall be properly fluxed with an approved-type flux and made up with approved solder. Solder and fluxes shall be manufactured to approved standards. Solders and fluxes with a lead content that exceeds two-tenths (0.02) of one (1) percent shall be prohibited in piping systems used to convey potable water.

316.1.4 Flared Joints. Flared joints for soft copper tubing shall be made with fittings meeting approved standards. The tubing shall be reamed to the full inside diameter, re-sized to round, and expanded with a proper flaring tool.

316.1.5 Flexible Compression Factory-Fabricated Joints. Where pipe is joined by means of flexible compression joints, such joints shall conform to approved standards and shall not be considered as slip joints.

316.1.6 Solvent Cement Plastic Pipe Joints. Plastic pipe and fittings designed to be joined by solvent cementing shall comply with applicable standards referenced in Table 14-1. |

ABS pipe and fittings shall be cleaned and then joined with solvent cement(s).

CPVC pipe and fittings shall be cleaned and then joined with listed primer(s) and solvent cement(s).

Exceptions:

- (1) Listed solvent cements that do not require the use of primer shall be permitted for use with CPVC pipe and fittings, manufactured in accordance with ASTM D2846, one-half (½) inch (15 mm) through two (2) inches (50 mm) in diameter.

(2) **[HCD 1 & HCD 2]** *Low VOC One-Step Cement that does not require the use of primer shall be utilized with CPVC pipe and fittings, manufactured in accordance with ASTM D 2846, Standard for Chlorinated Poly Plastic Hot- and Cold-Water Distribution Systems, 1/2 inch through 2 inches in diameter.*

PVC pipe and fittings shall be cleaned and joined with primer(s) and solvent cement(s).

A solvent cement transition joint between ABS and PVC building drain and building sewer shall be made using a listed transition solvent cement.

[HCD 1 & HCD 2] *Plastic pipe and fittings joined with solvent cement shall utilize Low VOC primer(s), if a primer is required, and Low VOC solvent cement(s) as defined in Section 214.*

316.1.7 Brazing and Welding. Brazing and welding shall conform to the applicable standard(s) in Table 14-1. Only brazing alloys having a liquid temperature above 1000°F (538°C) shall be used. Brazing on medical gas systems shall be performed by certified installers meeting the requirements of ASME *Boiler and Pressure Vessel Code*, Section IX, Welding and Brazing Qualifications, or AWS B2.2, *Standard for Brazing Procedure and Performance Qualifications*.

316.1.8 [Not permitted for OSHPD 1, 2, 3 & 4] Pressure-Lock-Type Connection. This is a mechanical connection that depends on an internal retention device to prevent pipe or tubing separation. Connection is made by inserting the pipe or tubing into the fitting to a prescribed depth.

316.1.9 [Not permitted for OSHPD 1, 2, 3 & 4] Pressed Fitting. This is a mechanical connection for joining copper tubing that uses a crimping tool to affix the O-ring seal copper or copper alloy fitting to the tubing. The tubing shall be inserted into the fitting, and the crimp shall be made using the tool recommended by the manufacturer.

316.1.10 Push-fit Fitting. A mechanical fitting where the connection is assembled by pushing the tube or pipe into the fitting and is sealed with an “O” ring.

316.1.11 Heat Fusion Weld Joints. This type of joint is used in some thermoplastic systems to connect pipe to fittings or pipe lengths directly to one another (butt-fusion). This method of joining pipe to fittings includes socket-fusion, electro-fusion, and saddle-fusion. This method of welding involves the application of heat and pressure to the components, allowing them to fuse together forming a bond between the pipe and fitting.

316.2 Special Joints.

316.2.1 Copper Tubing to Screw Pipe Joints. Joints from copper tubing to threaded pipe shall be made by the use of brass adapter fittings. The joint between the copper tubing and the fitting shall be a soldered brazed flared, or pressed joint and the connection between the threaded pipe and the fitting shall be made with a standard pipe size screw joint. Solder shall conform to the requirements of Section 316.1.3. Braze joints shall conform to the requirements of

Section 316.1.7. Flared joints shall conform to the requirements of Section 316.1.4. Pressed joints shall conform to the requirements of 316.1.9.

316.2.2 Unions. Approved unions shall be permitted to be used in drainage piping when accessibly located in the trap seal or between a fixture and its trap in the vent system, except underground or in wet vents, at any point in the water supply system, and in gas piping as permitted by Section 1211.3.2(4).

316.2.3 Plastic Pipe to Other Materials. When connecting plastic pipe to other types of piping, only approved types of fittings and adapters designed for the specific transition intended shall be used.

316.2.4 Dielectric Unions. [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.*

316.3 Flanged Fixture Connections.

316.3.1 Fixture connections between drainage pipes and water closets, floor outlet service sinks and urinals shall be made by means of approved brass, hard lead, ABS, PVC, or iron flanges caulked, soldered, solvent cemented; rubber compression gaskets; or screwed to the drainage pipe. The connection shall be bolted with an approved gasket, washer, or setting compound between the fixture and the connection. The bottom of the flange shall be set on an approved firm base.

316.3.2 Closet bends or stubs shall be cut off so as to present a smooth surface even with the top of the closet ring before rough inspection is called.

316.3.3 Wall-mounted water closet fixtures shall be securely bolted to an approved carrier fitting. The connecting pipe between the carrier fitting and the fixture shall be an approved material and designed to accommodate an adequately sized gasket. Gasket material shall be neoprene, felt, or similar approved types.

316.4 Prohibited Joints and Connections.

316.4.1 Drainage System. Any fitting or connection that has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area that offers an obstruction to flow through the drain shall be prohibited.

316.4.2 No fitting or connection that offers abnormal obstruction to flow shall be used. The enlargement of a three (3) inch (80 mm) closet bend or stub to four (4) inches (100 mm) shall not be considered an obstruction.

317.0 Increases and Reducers.

Where different sizes of pipes and fittings are to be connected, the proper size increasers or reducers or reducing fittings shall be used between the two sizes. Brass or cast-iron body cleanouts shall not be used as a reducer or adapter from cast-iron drainage pipe to iron pipe size (IPS) pipe.

318.0 Food-Handling Establishments.

Food or drink shall not be stored, prepared, or displayed beneath soil or drain pipes, unless those areas are protected

building within a horizontal distance of ten (10) feet (3.0 m). [See Figure 5-1.] [NFPA 54:12.6.2.1]

510.5.2.2 A chimney for a medium-heat appliance shall extend at least ten (10) feet (3.0 m) exceeding any portion of any building within twenty-five (25) feet (7.6 m). [NFPA 54:12.6.2.2]

510.5.2.3 A chimney shall extend at least five (5) feet (1.5 m) above the highest connected appliance draft hood outlet or flue collar. [NFPA 54:12.6.2.3]

510.5.2.4 Decorative shrouds shall not be installed at the termination of factory-built chimneys except where such shrouds are listed and labeled for use with the specific factory-built chimney system and are installed in accordance with manufacturer's installation instructions. [NFPA 54:12.6.2.4]

510.5.3 Size of Chimneys. The effective area of a chimney venting system serving listed gas appliances with draft hoods, Category I appliances, and other appliances listed for use with Type B vents shall be in accordance with one of the following methods [NFPA 54:12.6.3.1]:

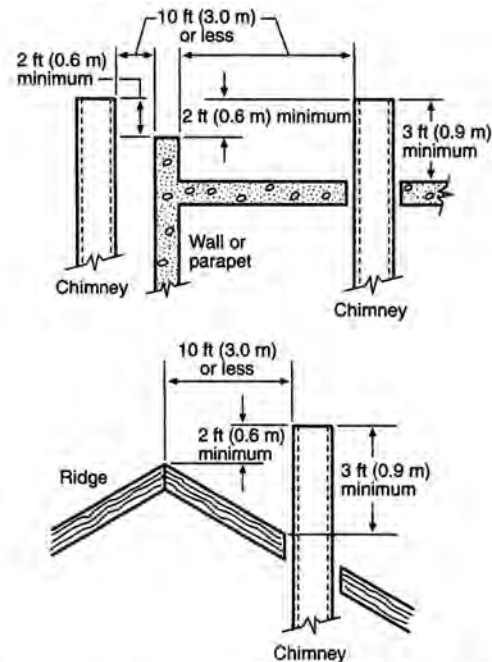
- (1) This chapter and NFPA 54: Chapter 13. [NFPA 54:12.6.3.1(1)]
- (2) For sizing an individual chimney venting system for a single appliance with a draft hood, the effective areas of the vent connector and chimney flue shall be not less than the area of the appliance flue collar or draft hood outlet or exceeding seven (7) times the draft hood outlet area. [NFPA 54:12.6.3.1(2)]
- (3) For sizing a chimney venting system connected to two (2) appliances with draft hoods, the effective area of the chimney flue shall be not less than the area of the larger draft hood outlet plus 50 percent of the area of the smaller draft hood outlet, or exceeding seven (7) times the smallest draft hood outlet area. [NFPA 54:12.6.3.1(3)]
- (4) Other approved engineering methods. [NFPA 54:12.6.3.1(5)]
- (5) Chimney venting systems using mechanical draft shall be sized in accordance with approved engineering methods. [NFPA 54:12.6.3.1(4)]

510.5.4 Inspection of Chimneys.

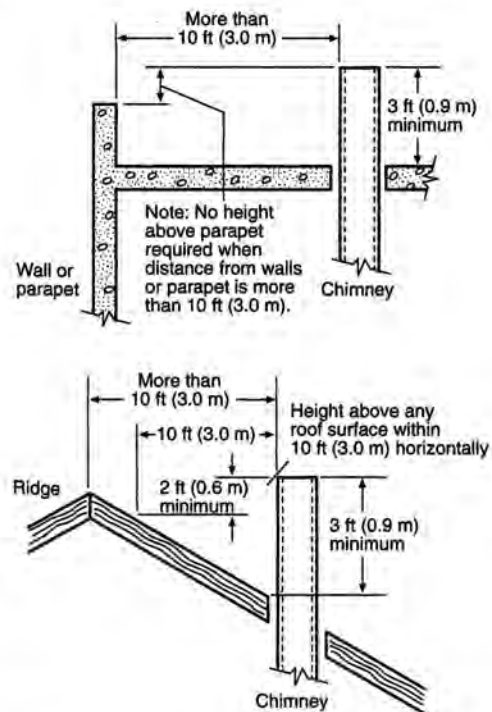
(A) Before replacing an existing appliance or connecting a vent connector to a chimney, the chimney passageway shall be examined to ascertain that it is clear and free of obstructions and shall be cleaned if previously used for venting solid- or liquid-fuel-burning appliances or fireplaces. [NFPA 54:12.6.4.1]

(B) Chimneys shall be lined in accordance with NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel Burning Appliances*. [NFPA 54-09:12.6.4.2]

Exception: Existing chimneys shall be permitted to have their use continued where an appliance is replaced by an appliance of similar type, input rating, and efficiency, where the chimney complies with 510.5.4, and the sizing of the chimney is in accordance with 510.5.3.



(a) Termination 10 ft (3.0 m) or Less from Ridge, Wall, or Parapet



(b) Termination More Than 10 ft (3.0 m) from Ridge, Wall, or Parapet

FIGURE 5-1 TYPICAL TERMINATION LOCATIONS FOR CHIMNEYS AND SINGLE-WALL METAL PIPES SERVING RESIDENTIAL-TYPE AND LOW-HEAT APPLIANCE [NFPA 54: FIGURE 12.6.2.1]

WATER HEATERS

(C) Cleanouts shall be examined to determine that they will remain tightly closed when not in use. [NFPA 54:12.6.4.3]

(D) When inspection reveals that an existing chimney is not safe for the intended application, it shall be repaired, rebuilt, lined, relined, or replaced with a vent or chimney to conform to NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel-Burning Appliances*, and shall be suitable for the appliances to be attached. [NFPA 54:12.6.4.4]

510.5.5 Chimney Serving Appliances Burning Other Fuels.

510.5.5.1 Gas utilization appliances shall not be connected to a chimney flue serving a separate appliance designed to burn solid fuel. [NFPA 54:12.6.5.1]

510.5.5.2 Where one (1) chimney serves gas utilization appliances and liquid fuel-burning appliances, the appliance shall be connected through separate openings or shall be connected through a single opening where joined by a suitable fitting located as close as practical to the chimney. Where two (2) or more openings are provided into one (1) chimney flue, they shall be at different levels. Where the gas utilization appliance is automatically controlled, it shall be equipped with a safety shutoff device. [NFPA 54:12.6.5.2]

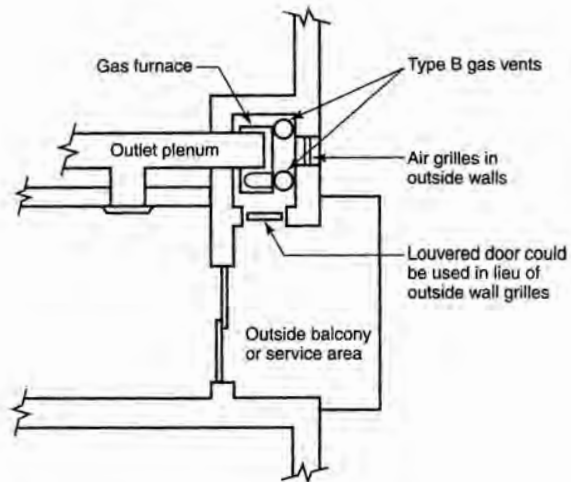
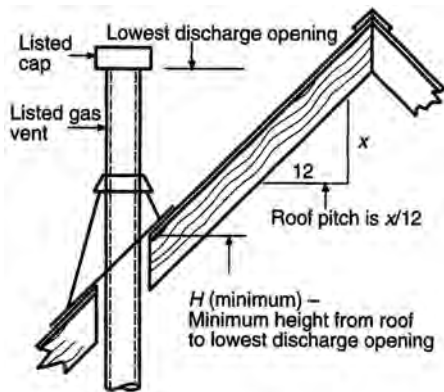


FIGURE 5-3 PLAN VIEW OF PRACTICAL SEPARATION METHOD FOR MULTISTORY GAS VENTING.
[NFPA 54: FIGURE 12.7.4.2]

TABLE 5-2
TYPE OF VENTING SYSTEM TO BE USED
[NFPA 54: Table 12.5.1]

APPLIANCES	TYPE OF VENTING SYSTEM
Listed Category I appliances	Type B gas vent (510.6)
Listed appliances equipped with draft hood	Chimney (510.5)
Appliances listed for Type B gas vent	Single-wall metal pipe (510.7) Listed chimney lining system for gas venting (510.5.1.3) Special gas vent listed for this appliance (510.4.4)
Listed vented wall furnaces	Type B-W gas vent (510.6, 510.6.2.2)
Category II appliances	As specified or furnished by manufacturers of listed appliance (510.4.2, 510.4.4)
Category III appliances	
Category IV appliances	
Incinerators, outdoors	Single-wall metal pipe (510.7, 510.7.3)
Incinerators, indoors	Chimney (510.5)
Appliances that can be converted to use of solid fuel	
Unlisted combination gas- and oil-burning appliances	
Combination gas- and solid-fuel-burning appliances	
Appliances listed for use with chimneys only	Type L vent (510.6) or chimney (510.5)
Unlisted appliances	
Listed combination gas- and oil-burning appliances	Chimney [UMC 907.2(3)]
Decorative appliance in vented fireplace	Single-wall metal pipe (510.7, NFPA 54:10.25.3)
Gas-fired toilets	See 510.2.5
Direct-vent appliances	See 510.2.6
Appliances with integral vent	



ROOF PITCH	H(minimum) ft.	m
Flat to 1/12	1.0	0.30
Over 1/12 to 2/12	1.25	0.38
Over 2/12 to 3/12	1.5	0.46
Over 3/12 to 4/12	2.0	0.61
Over 4/12 to 5/12	2.5	0.76
Over 5/12 to 6/12	3.25	0.99
Over 6/12 to 7/12	4.0	1.22
Over 7/12 to 8/12	5.0	1.52
Over 8/12 to 9/12	6.0	1.83
Over 9/12 to 10/12	7.0	2.13
Over 10/12 to 11/12	7.5	2.27
Over 11/12 to 12/12	8.0	2.44

FIGURE 5-2 GAS VENT TERMINATION LOCATIONS FOR LISTED CAPS 12 INCH (300 MM) OR LESS IN SIZE NOT LESS THAN 8 FEET (2.4 m) FROM A VERTICAL WALL
[NFPA 54: FIGURE 12.7.2 AND TABLE 12.7.2]

510.7.3.3 An approved cap or roof assembly shall be attached to the terminus of a single-wall metal pipe. [Also see Section 510.7.4.4.] [NFPA 54:12.8.3(3)]

510.7.4 Installation with Appliances Permitted by 510.4.1.

510.7.4.1 Prohibited Use. Single-wall metal pipe shall not be used as a vent in dwellings and residential occupancies. [NFPA 54-09:12.8.4.1]

510.7.4.2 Single-wall metal pipe shall be used only for runs directly from the space in which the gas utilization appliance is located through the roof or exterior wall to the outer air. A pipe passing through a roof shall extend without interruption through the roof flashing, roof jacket, or roof thimble. [NFPA 54:12.8.4.1]

510.7.4.3 Single-wall metal pipe shall not originate in any unoccupied attic or concealed space and shall not pass through any attic, inside wall, concealed space, or floor. For the installation of a single-wall metal pipe through an exterior combustible wall, see Section 510.7.4.6. [NFPA 54:12.8.4.2]

510.7.4.4 Single-wall metal pipe used for venting an incinerator shall be exposed and readily examinable for its full length and shall have suitable clearances maintained. [NFPA 54:12.8.4.3]

510.7.4.5 Minimum clearances from single-wall metal pipe to combustible material shall be in accordance with Table 5-3. Reduced clearances from single-wall metal pipe to combustible material shall be as specified for vent connectors in Table 5-4. [NFPA 54:12.8.4.4]

510.7.4.6 Single-wall metal pipe shall not pass through a combustible exterior wall unless guarded at the point of passage by a ventilated metal thimble not smaller than the following [NFPA 54:12.11.14.2]:

- (1) For listed appliances equipped with draft hoods and appliances listed for use with Type B gas vents, the thimble shall be at a minimum four

(4) inches (100 mm) larger in diameter than the metal pipe. Where there is a run of at least six (6) feet (1.8 m) of metal pipe in the opening between the draft hood outlet and the thimble, the thimble shall be a minimum two (2) inches (50 mm) larger in diameter than the metal pipe.

- (2) For unlisted appliances having draft hoods, the thimble shall be a minimum six (6) inches (150 mm) larger in diameter than the metal pipe.
- (3) For residential and low-heat appliances, the thimble shall be a minimum twelve (12) inches (300 mm) larger in diameter than the metal pipe.

Exception: In lieu of thimble protection, combustible material in the wall shall be removed a sufficient distance from the metal pipe to provide the specified clearance from such metal pipe to combustible material. Any material used to close up such opening shall be noncombustible.

510.7.4.7 Where a single-wall metal pipe passes through a roof constructed of combustible material, a noncombustible, nonventilating thimble shall be used at the point of passage. The thimble shall extend not less than eighteen (18) inches (460 mm) above and six (6) inches (150 mm) below the roof with the annular space open at the bottom and closed only at the top. The thimble shall be sized in accordance with Section 510.7.4.6. [NFPA 54:12.8.4.5]

510.7.5 Size of Single-Wall Metal Pipe. Single-wall metal piping shall comply with the following requirements [NFPA 54:12.8.5]:

510.7.5.1 A venting system of a single-wall metal pipe shall be sized in accordance with one of the following methods and the gas appliance manufacturer's instructions [NFPA 54:12.8.5(1)]:

- (1) For a draft-hood-equipped appliance, in accordance with this chapter. [NFPA 54:12.8.5(1)(a)]

**TABLE 5-3
CLEARANCE FOR CONNECTORS [NFPA 54: TABLE 12.8.4.4]**

MINIMUM DISTANCE FROM COMBUSTIBLE MATERIAL				
APPLIANCE	LISTED TYPE B GAS VENT MATERIAL	LISTED TYPE L VENT MATERIAL	SINGLE-WALL METAL PIPE	FACTORY-BUILT CHIMNEY SECTIONS
Listed appliances with draft hoods and appliances listed for use with Type B gas vents	As listed	As listed	6 in.	As listed
Residential boilers and furnaces with listed gas conversion burner and with draft hood	6 in.	6 in.	9 in.	As listed
Residential appliances listed for use with Type L vents	Not permitted	As listed	9 in.	As listed
Listed gas-fired toilets	Not permitted	As listed	As listed	As listed
Unlisted residential appliances with draft hood	Not permitted	6 in.	9 in.	As listed
Residential and low-heat appliances other than those above	Not permitted	9 in.	18 in.	As listed
Medium-heat appliances	Not permitted	Not permitted	36 in.	As listed

For SI units, 1 in. = 25.4 mm.

Note: These clearances shall apply unless the listing of an appliance or connector specifies clearances, in which case the listed clearances shall apply.

WATER HEATERS

**TABLE 5-4
REDUCTION OF CLEARANCES WITH SPECIFIED FORMS OF PROTECTION [NFPA 54: TABLE 10.2.3(b)]**

WHERE THE REQUIRED CLEARANCE WITH NO PROTECTION FROM APPLIANCE, VENT CONNECTOR, OR SINGLE-WALL METAL PIPE IS:										
	36 in.		18 in.		12 in.		9 in.		6 in.	
ALLOWABLE CLEARANCES WITH SPECIFIED PROTECTION (in.)										
TYPE OF PROTECTION APPLIED TO AND COVERING SURFACES OF COMBUSTIBLE MATERIAL WITHIN THE DISTANCE SPECIFIED AS THE REQUIRED CLEARANCE WITH NO PROTECTION [SEE FIGURES 5-4 THROUGH 5-6]	USE COLUMN 1 FOR CLEARANCE ABOVE APPLIANCE OR HORIZONTAL CONNECTOR. COLUMN 2 FOR CLEARANCES FROM APPLIANCES, VERTICAL CONNECTOR, AND SINGLE-WALL METAL PIPE									
	ABOVE COLUMN 1	SIDES AND REAR COLUMN 2	ABOVE COLUMN 1	SIDES AND REAR COLUMN 2	ABOVE COLUMN 1	SIDES AND REAR COLUMN 2	ABOVE COLUMN 1	SIDES AND REAR COLUMN 2	ABOVE COLUMN 1	SIDES AND REAR COLUMN 2
(1) 3½ in. thick masonry wall without ventilated air space	--	24	--	12	--	9	--	6	--	5
(2) ½ in. insulation board over 1 in. glass fiber or mineral wool batts	24	18	12	9	9	6	6	5	4	3
(3) 0.024 sheet metal over 1 in. glass fiber or mineral wool batts reinforced with wire on rear face with ventilated air space	18	12	9	6	6	4	5	3	3	3
(4) 3½ in. thick masonry wall with ventilated air space	--	12	--	6	--	6	--	6	--	6
(5) 0.024 sheet metal with ventilated air space	18	12	9	6	6	4	5	3	3	2
(6) ½ in. thick insulation board with ventilated air space	18	12	9	6	6	4	5	3	3	3
(7) 0.024 sheet metal with ventilated air space over 0.024 sheet metal with ventilated air space	18	12	9	6	6	4	5	3	3	3
(8) 1 in. glass fiber or mineral wool batts sandwiched between two sheets 0.024 sheet metal with ventilated air space	18	12	9	6	6	4	5	3	3	3

For SI units, 1 in. = 25.4 mm.

Notes:

- ¹ Reduction of clearances from combustible materials shall not interfere with combustion air, draft hood clearance and relief, and accessibility of servicing.
- ² Clearances shall be measured from the outer surface of the combustible material to the nearest point on the surface of the appliance, disregarding any intervening protection applied to the combustible material.
- ³ Spacers and ties shall be of noncombustible material. No spacer or tie shall be used directly opposite the appliance or connector.
- ⁴ Where clearance reduction systems use a ventilated air space, adequate provision for air circulation shall be provided as described. [See Figure 5-5 and Figure 5-6.]
- ⁵ There shall be at least one (1) in. (25 mm) between clearance reduction systems and combustible walls and ceilings for reduction systems using a ventilated air space.
- ⁶ Where a wall protector is mounted on a single flat wall away from corners, it shall have a minimum one (1) inch (25 mm) air gap. To provide adequate air circulation, the bottom and top edges, or only the side and top edges, or edges shall be left open.
- ⁷ Mineral wool batts (blanket or board) shall have a minimum density of eight (8) lb./ft.³ (128 kg/m³) and a minimum melting point of 1500°F (816°C).
- ⁸ Insulation material used as part of a clearance reduction system shall have a thermal conductivity of 1.0 Btu in./ft²/h-°F (0.144 W/m-K) or less.
- ⁹ There shall be at least (1) inch (25 mm) between the appliance and the protector. In no case shall the clearance between the appliance and the combustible surface be reduced below that allowed in this table.
- ¹⁰ Clearances and thicknesses are minimum; larger clearances and thicknesses are acceptable.
- ¹¹ Listed single-wall connectors shall be installed in accordance with the terms of their listing and the manufacturer’s instructions.

CHAPTER 6

WATER SUPPLY AND DISTRIBUTION

601.0 Hot and Cold Water Required.

601.1 Except where not deemed necessary for safety or sanitation by the Authority Having Jurisdiction, each plumbing fixture shall be provided with an adequate supply of potable running water piped thereto in an approved manner, so arranged as to flush and keep it in a clean and sanitary condition without danger of backflow or cross-connection. Water closets and urinals shall be flushed by means of an approved flush tank or flushometer valve.

Exceptions:

- (1) **[HCD 1, HCD 2 and DWR]** Listed fixtures that do not require water for their operation and are not connected to the water supply.
- (2) **[HCD 1 & HCD 2]** For limited-density owner-built rural dwellings, potable water shall be available to the dwelling site, although such water need not be pressurized. Where water is not piped from a well, spring, cistern or other source, there shall be a minimum reserve of 50 gallons (189 L) of potable water available. Where water delivery is pressurized, piping shall be installed in accordance with the provisions of this chapter.
- (3) **[HCD 1 & HCD 2]** Where deemed not necessary for safety or sanitation by the Enforcing Agency.
- (4) **[HCD 1 & HCD 2]** Recycled water or treated graywater may be allowed as specified in Chapter 16 Part II of this code.
- (5) **[DWR]** Where a public agency requires a building to use recycled water to flush water closets and urinals in accordance with California Water Code 13554.

In occupancies where plumbing fixtures are installed for private use, hot water shall be required for bathing, washing, laundry, cooking purposes, dishwashing or maintenance. In occupancies where plumbing fixtures are installed for public use, hot water shall be required for bathing and washing purposes. This requirement shall not supersede the requirements for individual temperature control limitations for public lavatories, bathtubs, whirlpool bathtubs and shower control valves.

601.2 Identification of a Potable and Nonpotable Water System. In buildings where potable water and nonpotable water systems are installed, each system shall be clearly identified in accordance with Sections 601.2.1 through 601.2.4.

601.2.1 Potable Water. Green background with white lettering.

601.2.2 Color and Information. Each system shall be identified with a colored pipe or band and coded with paints, wraps and materials compatible with the piping.

Except as required in Sections 1610.0 and 1617.0, non-potable water systems shall have a yellow background with black uppercase lettering, with the words "CAUTION: NON-POTABLE WATER, DO NOT DRINK." Each nonpotable system shall be identified to designate

the liquid being conveyed, and the direction of normal flow shall be clearly shown. The minimum size of the letters and length of the color field shall conform to Table 6-1. **[HCD 1 & HCD 2]** An international symbol of a glass in a circle with a slash through it shall be provided similar to that shown in Figure 6-1 for all non-potable water systems.

The background color and required information shall be indicated every twenty (20) feet (6,096 mm) but not less than once per room, and shall be visible from the floor level.

TABLE 6-1
MINIMUM LENGTH OF COLOR FIELD AND SIZE OF LETTERS

OUTSIDE DIAMETER OF PIPE OR COVERING		MINIMUM LENGTH OF COLOR FIELD		MINIMUM SIZE OF LETTERS	
inches	(mm)	inches	(mm)	inches	(mm)
½ to 1¼	(15 to 32)	8	(203)	½	(12.7)
1½ to 2	(40 to 50)	8	(203)	¾	(19.1)
2½ to 6	(65 to 150)	12	(305)	1¼	(32)
8 to 10	(200 to 250)	24	(610)	2½	(64)
Over 10	(Over 250)	32	(813)	3½	(89)

601.2.3 Fixtures. Where vacuum breakers or backflow preventers are installed with fixtures listed in Table 14-1, identification of the discharge side shall be permitted to be omitted.

601.2.4 Outlets. Each outlet on the nonpotable water line that is used for special purposes shall be posted with black uppercase lettering as follows: "CAUTION: NON-POTABLE WATER, DO NOT DRINK."



FIGURE 6-1
INTERNATIONAL SYMBOL

601.3 Faucets and diverters shall be connected to the water distribution system so that hot water corresponds to the left side of the fittings.

601.4 [HCD 1 & HCD 2] All sources for drinking water shall be maintained in a clean and sanitary condition. Drinking fountains and portable water dispensers shall not be located in toilet rooms.

601.5 [CA] Schools of Cosmetology and Cosmetological Establishments.

**TABLE 6-2
BACKFLOW PREVENTION DEVICES, ASSEMBLIES AND METHODS**

DEVICE, ASSEMBLY, OR METHOD ¹	APPLICABLE STANDARDS	DEGREE OF HAZARD				INSTALLATION ^{2,3}
		POLLUTION (LOW HAZARD)		CONTAMINATION (HIGH HAZARD)		
		BACK-SIPHONAGE	BACK-PRESSURE	BACK-SIPHONAGE	BACK-PRESSURE	
Airgap	ASME A112.1.2	X		X		See Table 6-3 in this chapter.
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	ASME A112.1.3	X		X		Air gap fitting is a device with an internal air gap and typical installation includes plumbing fixtures, appliances and appurtenances. The critical level shall not be installed below the flood level rim.
Atmospheric-type vacuum breaker (consists of a body, checking member and atmospheric port)	ASSE 1001 or CSA B 64.1.1	X		X		Upright position. No valve downstream. Minimum of six (6) inches (152 mm) or listed distance above all downstream piping and flood-level rim of receptor. ^{4,5}
Antisiphon fill valve (ball-cocks) for gravity water closet flush tanks and urinal tanks	ASSE 1002 or CSA B 125.3	X		X		Installation on gravity water closet flush tank and urinal tanks with the fill valve installed with the critical level not less than 1 inch above the opening of the overflow pipe. ^{4,5}
Vacuum breaker wall hydrants, hose bibbs, frost resistant, automatic draining type	ASSE 1019 or CSA B 64.2.1.1	X		X		Installation includes wall hydrants and hose bibbs. Such devices are not for use under continuous pressure conditions (means of shut-off downstream of device is prohibited). ^{4,5}
Backflow preventer for Carbonated Beverage Dispensers (two independent check valves with a vent to the atmosphere)	ASSE 1022	X				Installation includes carbonated beverage machines or dispensers. These devices operate under intermittent or continuous pressure conditions.
Spill-Resistant Pressure-Type Backflow Prevention Assembly (single check valve with air inlet vent and means of field testing)	ASSE 1056	X		X		Upright position. Minimum of six (6) inches (152 mm) or listed distance above all downstream piping and flood-level rim of receptor. ⁵
Double Check Valve Backflow Prevention Assembly (two independent check valves and means of field testing)	ASSE 1015; AWWA C510; CSA B 64.5 or CSA B 64.5.1	X	X			Horizontal unless otherwise listed. Requires one (1) foot (305 mm) clearance at bottom for maintenance. May need platform/ladder for test and repair. Does not discharge water.
	ASSE 1048	X	X			Horizontal unless otherwise listed. Requires one (1) foot (305 mm) clearance at bottom for maintenance. May need platform/ladder for test and repair. Does not discharge water. Installation includes a fire protection system and is designed to operate under continuous pressure conditions.
Pressure Vacuum Breaker Backflow Prevention Assembly (loaded air inlet valve, internally loaded check valve and means of field testing)	ASSE 1020 or CSA B 64.1.2	X		X		Upright position. May have valves downstream. Minimum of twelve (12) inches (305 mm) above all downstream piping and flood-level rim of receptor. May discharge water.
Reduced Pressure Principle Backflow Prevention Assembly (two independently acting loaded check valves, a pressure relief valve and means of field testing)	ASSE 1047	X	X	X	X	Horizontal unless otherwise listed. Requires one (1) foot (305 mm) minimum clearance at bottom for maintenance. May need platform/ladder for test and repair. May discharge water. Installation includes a fire protection system and is designed to operate under continuous pressure conditions.
	ASSE 1013; AWWA C511; CSA B 64.4 or CSA B 64.4.1	X	X	X	X	Horizontal unless otherwise listed. Requires one (1) foot (305 mm) minimum clearance at bottom for maintenance. May need platform/ladder for test and repair. May discharge water.

¹ See description of devices and assemblies in this chapter.

² Installation in pit or vault requires previous approval by the Authority Having Jurisdiction.

³ Refer to general and specific requirement for installation.

⁴ Not to be subjected to operating pressure for more than twelve (12) hours in any twenty-four (24) hour period.

⁵ For deck-mounted and equipment-mounted vacuum breaker, see Section 603.4.15.

Inch	mm
1/2	15
3/4	20
1	25

**TABLE 6-5
WATER SUPPLY FIXTURE UNITS (WSFU) AND MINIMUM FIXTURE BRANCH PIPE SIZES³**

APPLIANCES, APPURTENANCES OR FIXTURES ²	MINIMUM FIXTURE BRANCH PIPE SIZE ^{1,4}	PRIVATE	PUBLIC	ASSEMBLY ⁶
Bathtub or Combination Bath/Shower (fill)	1/2	4.0	4.0	
3/4" Bathtub Fill Valve	3/4	10.0	10.0	
Bidet	1/2	1.0		
Clothes washer	1/2	4.0	4.0	
Dental Unit, cuspidor	1/2		1.0	
Dishwasher	1/2	1.5	1.5	
Drinking Fountain or Water Cooler	1/2	0.5	0.5	0.75
Hose Bibb	1/2	2.5	2.5	
Hose Bibb, each additional ⁸	1/2	1.0	1.0	
Lavatory	1/2	1.0	1.0	1.0
Lawn Sprinkler, each head ⁵		1.0	1.0	
Mobile Home, each (minimum) ⁹		12.0		
Sinks				
Bar	1/2	1.0	2.0	
Clinic Faucet	1/2		3.0	
Clinic Flushometer Valve with or without faucet	1		8.0	
Kitchen	1/2	1.5	1.5	
Laundry	1/2	1.5	1.5	
Service or Mop Basin	1/2	1.5	3.0	
Washup, each set of faucets	1/2		2.0	
Shower, per head	1/2	2.0	2.0	
Urinal, 1.0 GPF Flushometer Valve	3/4	See Footnote ⁷		
Urinal, greater than 1.0 GPF Flushometer Valve	3/4	See Footnote ⁷		
Urinal, flush tank	1/2	2.0	2.0	3.0
Wash Fountain, circular spray	3/4		4.0	
Water Closet, 1.6 GPF Gravity Tank	1/2	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Tank	1/2	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Valve	1	See Footnote ⁷		
Water Closet, greater than 1.6 GPF Gravity Tank	1/2	3.0	5.5	7.0
Water Closet, greater than 1.6 GPF Flushometer Valve	1	See Footnote ⁷		

Notes:

- ¹ Size of the cold branch pipe, or both the hot and cold branch pipes.
- ² Appliances, Appurtenances or Fixtures not included in this Table may be sized by reference to fixtures having a similar flow rate and frequency of use.
- ³ The listed fixture unit values represent their load on their cold water service. The separate cold water and hot water fixture unit value for fixtures having both hot and cold water connections may each be taken as three-quarter (3/4) of the listed total value of the fixture.
- ⁴ The listed minimum supply branch pipe sizes for individual fixtures are the nominal (I.D.) pipe size.
- ⁵ For fixtures or supply connections likely to impose continuous flow demands, determine the required flow in gallons per minute (GPM), and add it separately to the demand (in GPM) for the distribution system or portions thereof.
- ⁶ Assembly [Public Use (See Table 4-1)].
- ⁷ When sizing flushometer systems, see Section 610.10.
- ⁸ Reduced fixture unit loading for additional hose bibbs is to be used only when sizing total building demand and for pipe sizing when more than one (1) hose bibb is supplied by a segment of water-distributing pipe. The fixture branch to each hose bibb shall be sized on the basis of two and one-half (2.5) fixture units.
- ⁹ [HCD 2] For water supply fixture unit values related to mobilehome parks in all parts of the State of California, see California Code of Regulations, Title 25, Division 1, Chapter 2, Article 5, Section 1278. For water supply fixture unit values related to special occupancy parks in all parts of the State of California, see California Code of Regulations, Title 25, Division 1, Chapter 2.2, Article 5, Section 2278.

**TABLE 6-6
FIXTURE UNIT TABLE FOR DETERMINING WATER PIPE AND METER SIZES**

Inch	mm
1/2	15
3/4	20
1	25
1 1/4	32
1 1/2	40
2	50
2 1/2	65

METER AND STREET SERVICE, INCHES	BUILDING SUPPLY AND BRANCHES, INCHES	MAXIMUM ALLOWABLE LENGTH IN FEET (meters)														
		40 (12)	60 (18)	80 (24)	100 (30)	150 (46)	200 (61)	250 (76)	300 (91)	400 (122)	500 (152)	600 (183)	700 (213)	800 (244)	900 (274)	1000 (305)
Pressure Range – 30 to 45 psi (207 to 310 kPa)**																
3/4	1/2***	6	5	4	3	2	1	1	1	0	0	0	0	0	0	0
3/4	3/4	16	16	14	12	9	6	5	5	4	4	3	2	2	2	1
3/4	1	29	25	23	21	17	15	13	12	10	8	6	6	6	6	6
1	1	36	31	27	25	20	17	15	13	12	10	8	6	6	6	6
3/4	1 1/4	36	33	31	28	24	23	21	19	17	16	13	12	12	11	11
1	1 1/4	54	47	42	38	32	28	25	23	19	17	14	12	12	11	11
1 1/2	1 1/4	78	68	57	48	38	32	28	25	21	18	15	12	12	11	11
1	1 1/2	85	84	79	65	56	48	43	38	32	28	26	22	21	20	20
1 1/2	1 1/2	150	124	105	91	70	57	49	45	36	31	26	23	21	20	20
2	1 1/2	151	129	129	110	80	64	53	46	38	32	27	23	21	20	20
1	2	85	85	85	85	85	85	82	80	66	61	57	52	49	46	43
1 1/2	2	220	205	190	176	155	138	127	120	104	85	70	61	57	54	51
2	2	370	327	292	265	217	185	164	147	124	96	70	61	57	54	51
2	2 1/2	445	418	390	370	330	300	280	265	240	220	198	175	158	143	133
Pressure Range – 46 to 60 psi (317 to 414 kPa)**																
3/4	1/2***	7	7	6	5	4	3	2	2	1	1	1	0	0	0	0
3/4	3/4	20	20	19	17	14	11	9	8	6	5	4	4	3	3	3
3/4	1	39	39	36	33	28	23	21	19	17	14	12	10	9	8	8
1	1	39	39	39	36	30	25	23	20	18	15	12	10	9	8	8
3/4	1 1/4	39	39	39	39	39	39	34	32	27	25	22	19	19	17	16
1	1 1/4	78	78	76	67	52	44	39	36	30	27	24	20	19	17	16
1 1/2	1 1/4	78	78	78	78	66	52	44	39	33	29	24	20	19	17	16
1	1 1/2	85	85	85	85	85	85	80	67	55	49	41	37	34	32	30
1 1/2	1 1/2	151	151	151	151	128	105	90	78	62	52	42	38	35	32	30
2	1 1/2	151	151	151	151	150	117	98	84	67	55	42	38	35	32	30
1	2	85	85	85	85	85	85	85	85	85	85	85	85	85	85	83
1 1/2	2	370	370	340	318	272	240	220	198	170	150	135	123	110	102	94
2	2	370	370	370	370	368	318	280	250	205	165	142	123	110	102	94
2	2 1/2	654	640	610	580	535	500	470	440	400	365	335	315	285	267	250
Pressure Range – Over 60 psi (414 kPa)**																
3/4	1/2***	7	7	7	6	5	4	3	3	2	1	1	1	1	1	0
3/4	3/4	20	20	20	20	17	13	11	10	8	7	6	6	5	4	4
3/4	1	39	39	39	39	35	30	27	24	21	17	14	13	12	12	11
1	1	39	39	39	39	38	32	29	26	22	18	14	13	12	12	11
3/4	1 1/4	39	39	39	39	39	39	39	39	34	28	26	25	23	22	21
1	1 1/4	78	78	78	78	74	62	53	47	39	31	26	25	23	22	21
1 1/2	1 1/4	78	78	78	78	78	74	65	54	43	34	26	25	23	22	21
1	1 1/2	85	85	85	85	85	85	85	85	81	64	51	48	46	43	40
1 1/2	1 1/2	151	151	151	151	151	151	130	113	88	73	51	51	46	43	40
2	1 1/2	151	151	151	151	151	151	142	122	98	82	64	51	46	43	40
1	2	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
1 1/2	2	370	370	370	370	360	335	305	282	244	212	187	172	153	141	129
2	2	370	370	370	370	370	370	370	340	288	245	204	172	153	141	129
2	2 1/2	654	654	654	654	654	650	610	570	510	460	430	404	380	356	329

** Available static pressure after head loss.

*** Building supply, not less than three-quarter (3/4) inch (20 mm) nominal size.

Inch	mm
1¼	32
1½	40
2	51
2½	65
3	80

**TABLE 7-3
DRAINAGE FIXTURE UNIT VALUES (DFU)**

PLUMBING APPLIANCE, APPURTENANCE, OR FIXTURE	MINIMUM SIZE TRAP AND TRAP ARM ⁷	PRIVATE	PUBLIC	ASSEMBLY ⁸
Bathtub or Combination Bath/Shower	1½	2.0	2.0	
Bidet	1¼	1.0		
Bidet	1½	2.0		
Clothes Washer, domestic, standpipe ⁵	2	3.0	3.0	3.0
Dental Unit, cuspidor	1¼		1.0	1.0
Dishwasher, domestic, with independent drain ²	1½	2.0	2.0	2.0
Drinking Fountain or Water Cooler	1¼	0.5	0.5	1.0
Food-Waste-Grinder, commercial	2		3.0	3.0
Floor Drain, emergency	2		0.0	0.0
Floor Drain (for additional sizes see Section 702)	2	2.0	2.0	2.0
Shower, single-head trap	2	2.0	2.0	2.0
Multi-head, each additional	2	1.0	1.0	1.0
Lavatory, single	1¼	1.0	1.0	1.0
Lavatory, in sets of two or three	1½	2.0	2.0	2.0
Washfountain	1½		2.0	2.0
Washfountain	2		3.0	3.0
Mobile Home, trap ⁹	3	12.0		
Receptor, indirect waste ^{1,3}	1½		See footnote ^{1,3}	
Receptor, indirect waste ^{1,4}	2		See footnote ^{1,4}	
Receptor, indirect waste ¹	3		See footnote ¹	
Sinks				
Bar	1½	1.0		
Bar ²	1½		2.0	2.0
Clinical	3		6.0	6.0
Commercial with food waste ²	1½		3.0	3.0
Special Purpose ²	1½	2.0	3.0	3.0
Special Purpose	2	3.0	4.0	4.0
Special Purpose	3		6.0	6.0
Kitchen, domestic ²	1½	2.0	2.0	
(with or without food-waste grinder and/or dishwasher)				
Laundry ²	1½	2.0	2.0	2.0
(with or without discharge from a clothes washer)				
Service or Mop Basin	2		3.0	3.0
Service or Mop Basin	3		3.0	3.0
Service, flushing rim	3		6.0	6.0
Wash, each set of faucets			2.0	2.0
Urinal, integral trap 1.0 GPF ²	2	2.0	2.0	5.0
Urinal, integral trap greater than 1.0 GPF	2	2.0	2.0	6.0
Urinal, exposed trap ²	1½	2.0	2.0	5.0
Water Closet, 1.6 GPF Gravity Tank ⁶	3	3.0	4.0	6.0
Water Closet, 1.6 GPF Flushometer Tank ⁶	3	3.0	4.0	6.0
Water Closet, 1.6 GPF Flushometer Valve ⁶	3	3.0	4.0	6.0
Water Closet, greater than 1.6 GPF Gravity Tank ⁶	3	4.0	6.0	8.0
Water Closet, greater than 1.6 GPF Flushometer Valve ⁶	3	4.0	6.0	8.0

¹ Indirect waste receptors shall be sized based on the total drainage capacity of the fixtures that drain therein to, in accordance with Table 7-4.

² Provide a two (2) inch (51 mm) minimum drain.

³ For refrigerators, coffee urns, water stations, and similar low demands.

⁴ For commercial sinks, dishwashers, and similar moderate or heavy demands.

⁵ Buildings having a clothes-washing area with clothes washers in a battery of three (3) or more clothes washers shall be rated at six (6) fixture units each for purposes of sizing common horizontal and vertical drainage piping.

⁶ Water closets shall be computed as six (6) fixture units when determining septic tank sizes based on Appendix K of this code.

⁷ Trap sizes shall not be increased to the point where the fixture discharge may be inadequate to maintain their self-scouring properties.

⁸ Assembly [Public Use (See Table 4-1)].

⁹ [HCD 2] For drainage fixture unit values related to mobilehome parks in all parts of the State of California, see California Code of Regulations, Title 25, Division 1, Chapter 2, Article 5, Section 1268. For drainage fixture unit values related to special occupancy parks in all parts of the State of California, see California Code of Regulations, Title 25, Division 1, Chapter 2.2, Article 5, Section 2268.

703.2 Table 7-5 shows the maximum number of fixture units allowed on any vertical or horizontal drainage pipe, building drain, or building sewer of a given size; the maximum number of fixture units allowed on any branch interval of a given size; and the maximum length (in feet and meters) of any vertical drainage pipe of a given size.

703.3 For alternate method of sizing drainage piping, see Appendix L.

704.0 Fixture Connections (Drainage).

704.1 Drainage piping shall be provided with approved inlet fittings for fixture connections, correctly located according to the size and type of fixture proposed to be connected.

704.2 Two (2) fixtures set back-to-back, or side-by-side, within the distance allowed between a trap and its vent shall be permitted to be served by a single vertical drainage pipe provided that each fixture wastes separately into an approved double-fixture fitting having inlet openings at the same level.

704.3 Pot sinks, scullery sinks, dishwashing sinks, silverware sinks, commercial dishwashing machines, silverware-washing machines, and other similar fixtures shall be connected directly to the drainage system. A floor drain shall be provided adjacent to the fixture, and the fixture shall be connected on the sewer side of the floor drain trap, provided that no other drainage line is connected between the floor drain waste connection and the fixture drain. The fixture and floor drain shall be trapped and vented as required by this code.

705.0 Joints and Connections.

705.1 Types of Joints.

705.1.1 Caulked Joints. Caulked joints for cast-iron bell-and-spigot soil pipe and other similar joints shall be firmly packed with oakum or hemp and filled with molten lead to a depth of not less than one (1) inch (25.4 mm). The lead shall be caulked thoroughly at the inside and outside edges of the joint. After caulking, the finished joint shall not exceed one-eighth (1/8) inch (3.2 mm) below the rim of the hub. No paint, varnish, or other coatings shall be permitted on the joining material until after the joint has been tested and approved. Caulked joints in cast-iron bell-and-spigot water piping shall be made with nontoxic materials.

705.1.2 Cement Mortar Joints. Except for repairs and connections to existing lines constructed with such joints, cement mortar joints shall be prohibited on building sewers.

705.1.3 Burned Lead Joints. Burned (welded) lead joints shall be lapped, and the lead shall be fused together to form a uniform weld not less than as thick as the lead being joined.

705.1.4 Asbestos Cement Sewer Pipe Joints. Joints in asbestos cement pipe shall be a sleeve coupling of the same composition as the pipe or of other approved materials, and sealed with rubber rings or joined by an approved-type compression coupling. Joints between asbestos cement pipe and other approved pipe shall be made by means of an approved adapter coupling.

**TABLE 7-5
MAXIMUM UNIT LOADING AND MAXIMUM LENGTH OF DRAINAGE AND VENT PIPING**

SIZE OF PIPE, inches (mm)	1/4 (32)	1/2 (40)	2 (50)	2 1/2 (65)	3 (80)	4 (100)	5 (125)	6 (150)	8 (200)	10 (250)	12 (300)
Maximum Units Drainage Piping¹											
Vertical	1	2 ²	16 ³	32 ³	48 ⁴	256	600	1380	3600	5600	8400
Horizontal	1	1	8 ³	14 ³	35 ⁴	216 ⁵	428 ⁵	720 ⁵	2640 ⁵	4680 ⁵	8200 ⁵
Maximum Length Drainage Piping											
Vertical, feet (m)	45 (14)	65 (20)	85 (26)	148 (45)	212 (65)	300 (91)	390 (119)	510 (155)	750 (228)		
Horizontal (unlimited)											
Vent Piping											
Horizontal and Vertical											
Maximum Units	1	8 ³	24	48	84	256	600	1380	3600		
Maximum Lengths, feet (m)	45 (14)	60 (18)	120 (37)	180 (55)	212 (65)	300 (91)	390 (119)	510 (155)	750 (229)		

¹ Excluding trap arm.

² Except sinks, urinals, and dishwashers – exceeding one (1) fixture unit.

³ Except six-unit traps or water closets.

⁴ Only four (4) water closets or six-unit traps allowed on any vertical pipe or stack; and not to exceed three (3) water closets or six-unit traps on any horizontal branch or drain.

⁵ Based on one-fourth (1/4) inch per foot (20.8 mm/m) slope. For one-eighth (1/8) inch per foot (10.4 mm/m) slope, multiply horizontal fixture units by a factor of eight-tenths (0.8).

Note: The diameter of an individual vent shall be not less than one and one-fourth (1 1/4) inches (32 mm) nor less than one-half (1/2) the diameter of the drain to which it is connected. Fixture unit load values for drainage and vent piping shall be computed from Tables 7-3 and 7-4. Not to exceed one-third (1/3) of the total permitted length of any vent may be installed in a horizontal position. When vents are increased one (1) pipe size for their entire length, the maximum length limitations specified in this table do not apply. This table complies with the requirements of Section 901.2.

705.1.5 Packing Additives Prohibited. The addition of leak-sealing additives to joint packing shall be prohibited.

705.1.6 Molded Rubber Coupling Joints. When pipe is joined by means of molded rubber coupling joints, such joints shall conform to approved standards and shall not be considered as slip joints. When required, appropriate rubber bushings shall be used to allow for any difference in piping material diameters.

705.1.7 Elastomeric Gasketed and Rubber-Ring Joints. Elastomeric gasketed and rubber-ring joints shall comply with the applicable standards referenced in Table 14-1.

Exception: [HCD 1 & HCD 2] Compliance with an approved nationally recognized installation standard complying with Section 310.4 of this code and approved by the Enforcing Agency is acceptable.

705.1.8 Shielded Coupling Joints. When piping systems are joined by means of shielded couplings, such couplings shall conform to approved standards and shall not be considered as slip joints.

705.1.9 Hubless Cast-Iron Pipe Joints. Joints for hubless cast-iron soil pipe and fittings shall conform to applicable standards referenced in Table 14-1 and shall not be considered as slip joints.

Exception: [HCD 1 & HCD 2] Compliance with an approved nationally recognized installation standard complying with Section 310.4 of this code and approved by the Enforcing Agency is acceptable.

705.2 Use of Joints.

705.2.1 Clay and Sewer Pipe. Joints in vitrified clay pipe or between such pipe and metal pipe shall be made as provided in Sections 316.1.5, 705.1.6, 705.1.7, or 705.1.8.

705.2.2 Cast-Iron Pipe. Joints in cast-iron pipe shall be made as provided in Sections 316.1.2, 316.1.5, 705.1.1, 705.1.8, or 705.1.9.

705.2.3 Screw Pipe to Cast-Iron. Joints between wrought iron, steel, brass, or copper pipe and cast-iron pipe shall be either caulked or threaded joints made as provided in Section 316.1.1 or 705.1.1, or shall be made with approved adapter fittings.

705.2.4 Lead to Cast-Iron, Wrought-Iron, or Steel. Joints between lead and cast-iron, wrought-iron, or steel pipe shall be made by means of wiped joints to a caulking ferrule, soldering nipple, or bushing as provided in Section 316.1.2.

705.2.5 ABS and PVC Pipe. [HCD 1 & HCD 2] Joints in ABS and PVC pipe shall be made as provided in Section 316.1.6 of this code.

705.3 Special Joints.

705.3.1 Slip Joints. In fixture drains and traps, slip joints of approved materials shall be permitted to be used in accordance with their approvals.

705.3.2 Expansion Joints. Expansion joints shall be accessible, except when in vent piping or drainage stacks, and shall be permitted to be used where necessary to provide for expansion and contraction of the pipes.

705.3.3 Ground Joint, Flared, or Ferrule Connections. Brass or copper ground joint, flared, or ferrule-type connections that allow adjustment of tubing, but provide a rigid joint when made up, shall not be considered as slip joints.

706.0 Changes in Direction of Drainage Flow.

706.1 Changes in direction of drainage piping shall be made by the appropriate use of approved fittings and shall be of the angles presented by a one-sixteenth ($\frac{1}{16}$) bend, one-eighth ($\frac{1}{8}$) bend, or one-sixth ($\frac{1}{6}$) bend, or other approved fittings of equivalent sweep.

706.2 Horizontal drainage lines, connecting with a vertical stack, shall enter through 45 degree (0.79 rad) wye branches, 60 degree (1.05 rad) wye branches, combination wye and one-eighth ($\frac{1}{8}$) bend branches, sanitary tee or sanitary tapped tee branches, or other approved fittings of equivalent sweep. No fitting having more than one (1) inlet at the same level shall be used unless such fitting is constructed so that the discharge from one (1) inlet cannot readily enter any other inlet. Double sanitary tees shall be permitted to be used when the barrel of the fitting is not less than two (2) pipe sizes larger than the largest inlet, (pipe sizes recognized for this purpose are 2 in., 2½ in., 3 in., 3½ in., 4 in., 4½ in., 5 in., 6 in., etc.) (50, 65, 80, 90, 100, 115, 125, 150 mm, etc.).

706.3 Horizontal drainage lines connecting with other horizontal drainage lines shall enter through 45 degree (0.79 rad) wye branches, combination wye and one-eighth ($\frac{1}{8}$) bend branches, or other approved fittings of equivalent sweep.

706.4 Vertical drainage lines connecting with horizontal drainage lines shall enter through 45 degree (0.79 rad) wye branches, combination wye and one-eighth ($\frac{1}{8}$) bend branches, or other approved fittings of equivalent sweep. Branches or offsets of 60 degrees (1.05 rad) shall be permitted to be used only when installed in a true vertical position.

707.0 Cleanouts.

707.1 Each cleanout fitting for cast-iron pipe shall consist of a cast-iron or brass body and an approved plug. Each cleanout for galvanized wrought-iron, galvanized steel, copper, or brass pipe shall consist of a brass plug as specified in Table 7-6, or a standard weight brass cap, or an approved ABS or PVC plastic plug, or an approved stainless steel cleanout or plug. Plugs shall have raised square heads or approved countersunk rectangular slots.

707.2 Each cleanout fitting and each cleanout plug or cap shall be of an approved type.

707.3 Cleanouts shall be designed to be gas and water-tight.

707.4 Each horizontal drainage pipe shall be provided with a cleanout at its upper terminal, and each run of piping, that is more than one-hundred (100) feet (30,480 mm) in total developed length, shall be provided with a cleanout for each one-hundred (100) feet (30,480 mm), or fraction thereof, in length of such piping. An additional cleanout shall be provided in a drainage line for each aggregate horizontal change of direction exceeding 135 degrees (2.36 rad).

Exceptions:

- (1) Cleanouts shall be permitted to be omitted on a horizontal drain line less than five (5) feet (1,524 mm) in length unless such line is serving sinks or urinals.
- (2) Cleanouts shall be permitted to be omitted on any horizontal drainage pipe installed on a slope of 72 degrees (1.26 rad) or less from the vertical angle (one-fifth (1/5) bend).
- (3) Excepting the building drain and its horizontal branches, a cleanout shall not be required on any pipe or piping that is above the floor level of the lowest floor of the building.
- (4) An approved type of two-way cleanout fitting, installed inside the building wall near the connection between the building drain and the building sewer or installed outside of a building at the lower end of a building drain and extended to grade, shall be permitted to be substituted for an upper terminal cleanout.

707.5 Each cleanout shall be installed so that it opens to allow cleaning in the direction of flow of the soil or waste or at right angles thereto and, except in the case of wye branch and end-of-line cleanouts, shall be installed vertically above the flow line of the pipe.

707.6 Each cleanout extension shall be considered as drainage piping and each 90 degree (1.6 rad) cleanout extension shall be extended from a wye-type fitting or other approved fitting of equivalent sweep.

707.7 Each cleanout for an interceptor shall be outside of such interceptor.

707.8 Each cleanout, unless installed under an approved cover plate, shall be above grade, readily accessible, and so located as to serve the purpose for which it is intended. Cleanouts located under cover plates shall be so installed as to provide the clearances and accessibility required by this section.

707.9 Each cleanout in piping two (2) inches (50 mm) or less in size shall be so installed that there is a clearance of not less than twelve (12) inches (305 mm) in front of the cleanout. Cleanouts in piping exceeding two (2) inches (50 mm) shall have a clearance of not less than eighteen (18) inches (457 mm) in front of the cleanout. Cleanouts in under-floor piping shall be extended to or above the finished floor or shall be extended outside the building when there is less than eighteen (18) inches (457 mm) vertical overall, allowing for obstructions such as ducts, beams, and piping, and thirty (30) inches (762 mm) horizontal clearance from the means of access to such cleanout. No under-floor cleanout shall be located exceeding twenty (20) feet (6,096 mm) from an access door, trap door, or crawl hole.

707.10 Cleanout fittings shall be not less in size than those given in Table 7-6.

707.11 Cleanouts shall be provided for pressure drainage systems as classified under Section 710.7.

707.12 Countersunk cleanout plugs shall be installed where raised heads cause a hazard.

707.13 When a hubless blind plug is used for a required cleanout, the complete coupling and plug shall be accessible for removal or replacement.

**TABLE 7-6
CLEANOUTS**

SIZE OF PIPE (inches)	SIZE OF CLEANOUT (inches)	THREADS (per inches)
1½	1½	11½
2	1½	11½
2½	2½	8
3	2½	8
4 & larger	3½	8

**TABLE 7-6
CLEANOUTS (Metric)**

SIZE OF PIPE (mm)	SIZE OF CLEANOUT (mm)	THREADS (per 25.4 mm)
40	40	11½
50	40	11½
65	65	8
80	65	8
100 & larger	90	8

707.14 Cleanouts for trap arms shall be installed in accordance with Section 1002.3.

708.0 Grade of Horizontal Drainage Piping.

Horizontal drainage piping shall be run in practical alignment and a uniform slope of not less than one-fourth (¼) inch per foot (20.8 mm/m) or 2 percent toward the point of disposal provided that, where it is impractical due to the depth of the street sewer, to the structural features, or to the arrangement of any building or structure to obtain a slope of one-fourth (¼) of an inch per foot (20.8 mm/m) or 2 percent, any such pipe or piping four (4) inches (100 mm) or larger in diameter may have a slope of not less than one-eighth (1/8) of an inch per foot (10.4 mm/m) or 1 percent, when first approved by the Authority Having Jurisdiction.

709.0 Gravity Drainage Required.

Wherever practicable, plumbing fixtures shall be drained to the public sewer or private sewage disposal system by gravity.

710.0 Drainage of Fixtures Located Below the Next Upstream Manhole or Below the Main Sewer Level.

710.1 Where a fixture is installed on a floor level that is lower than the next upstream manhole cover of the public or private sewer, serving such drainage piping, shall be protected from backflow of sewage by installing an approved type of backwater valve. Fixtures on floor levels above such elevation shall not discharge through the backwater valve. Cleanouts for drains that pass through a backwater valve shall be clearly identified with a permanent label stating “backwater valve downstream”.

710.2 Drainage piping serving fixtures that are located below the crown level of the main sewer shall discharge into an approved water-tight sump or receiving tank, so located as to receive the sewage or wastes by gravity. From such sump or

CHAPTER 10

TRAPS AND INTERCEPTORS

1001.0 Traps Required.

1001.1 Each plumbing fixture, excepting those having integral traps or as permitted in Section 1001.2, shall be separately trapped by an approved type of water seal trap. Not more than one (1) trap shall be permitted on a trap arm.

1001.2 One (1) trap shall be permitted to serve a set of not more than three (3) single compartment sinks or laundry tubs of the same depth or three (3) lavatories immediately adjacent to each other and in the same room if the waste outlets are not more than thirty (30) inches (762 mm) apart and the trap is centrally located when three (3) compartments are installed.

1001.3 No food waste disposal unit shall be installed with any set of restaurant, commercial, or industrial sinks served by a single trap; each such food waste disposal unit shall be connected to a separate trap. Each domestic clothes washer and each laundry tub shall be connected to a separate and independent trap, except that a trap serving a laundry tub shall be permitted to also receive the waste from a clothes washer set adjacent thereto. No clothes washer or laundry tub shall be connected to any trap for a kitchen sink.

1001.4 The vertical distance between a fixture outlet and the trap weir shall be as short as practicable, but in no case shall the tailpiece from any fixture exceed twenty-four (24) inches (610 mm) in length.

1002.0 Traps Protected by Vent Pipes.

1002.1 Each plumbing fixture trap, except as otherwise provided in this code, shall be protected against siphonage, back-pressure, and air circulation shall be assured throughout all parts of the drainage system by means of a vent pipe installed in accordance with the requirements of this code.

1002.2 Each fixture trap shall have a protecting vent so located that the developed length of the trap arm from the trap weir to the inner edge of the vent shall be within the distance

given in Table 10-1, but in no case less than two (2) times the diameter of the trap arm.

1002.3 A trap arm shall be permitted to change direction without the use of a cleanout when such change of direction does not exceed 90 degrees (1.6 rad). All horizontal changes in direction of trap arms shall comply with Section 706.3.

Exception: For trap arms three (3) inches (80 mm) in diameter and larger, the change of direction shall not exceed 135 degrees (2.36 rad) without the use of a cleanout.

1002.4 The vent pipe opening from a soil or waste pipe, except for water closets and similar fixtures, shall not be below the weir of the trap.

1003.0 Traps — Described.

1003.1 Each trap, except for traps within an interceptor or similar device shall be self-cleaning. Traps for bathtubs, showers, lavatories, sinks, laundry tubs, floor drains, urinals, drinking fountains, dental units, and similar fixtures shall be of standard design, weight and shall be of ABS, cast brass, cast iron, lead, PP, PVC, or other approved material. An exposed and readily accessible drawn-brass tubing trap, not less than 17 B & S Gauge (0.045 inch) (1.1 mm), shall be permitted to be used on fixtures discharging domestic sewage.

Exceptions:

- (1) Drawn-brass tubing traps shall not be used for urinals. Each trap shall have the manufacturer's name stamped legibly in the metal of the trap, and each tubing trap shall have the gauge of the tubing in addition to the manufacturer's name. Every trap shall have a smooth and uniform interior waterway.
- (2) *[HCD 1 & HCD 2] Non-water supplied urinals conforming to ASME A112.19.19-2006, Standard for Vitreous China Nonwater Urinals, or reference standards in Table 14-1 for non-vitreous ceramic or plastic urinal fixtures.*

1003.2 A maximum of one (1) approved slip joint fitting shall be permitted to be used on the outlet side of a trap, and no

TABLE 10-1
HORIZONTAL LENGTHS OF TRAP ARMS
(EXCEPT FOR WATER CLOSETS AND SIMILAR FIXTURES)*

TRAP ARM PIPE DIAMETER	DISTANCE TRAP TO VENT MINIMUM	LENGTH MAXIMUM	TRAP ARM PIPE DIAMETER	DISTANCE TRAP TO VENT MINIMUM	LENGTH MAXIMUM
1¼"	2½"	30" (2'-6")	32 mm	64 mm	762 mm
1½"	3"	42" (3'-6")	40 mm	76 mm	1,067 mm
2"	4"	60" (5'-0")	50 mm	102 mm	1,524 mm
3"	6"	72" (6'-0")	80 mm	152 mm	1,829 mm
4"	8"	120" (10'-0")	100 mm	203 mm	3,048 mm
Exceeding 4"	2 x Diameter	120" (10'-0")	Exceeding 100 mm	2x Diameter	3,048 mm

Maintain one-fourth (¼) inch per foot slope (20.8 mm/m)

*The developed length between the trap of a water closet or similar fixture (measured from the top of the closet flange to the inner edge of the vent) and its vent shall not exceed six (6) feet (1,829 mm).

TRAPS AND INTERCEPTORS

tubing trap shall be installed without a listed tubing trap adapter. Listed plastic trap adapters shall be permitted to be used to connect listed metal tubing traps.

1003.3 The size (nominal diameter) of a trap for a given fixture shall be sufficient to drain the fixture rapidly, but in no case less than nor more than one (1) pipe size larger than given in Table 7-3. The trap shall be the same size as the trap arm to which it is connected.

1004.0 Traps — Prohibited.

No form of trap that depends for its seal upon the action of movable parts shall be used. No trap that has concealed interior partitions, except those of plastic, glass, or similar corrosion-resisting material, shall be used. "S" traps, bell traps, and crown-vented traps shall be prohibited. No fixture shall be double trapped. Drum and bottle traps shall be installed only for special conditions. No trap shall be installed without a vent, except as otherwise provided in this code.

1004.1 Bladders, check valves or any other type of devices with moveable parts shall be prohibited to serve as a trap.

1005.0 Trap Seals.

Each fixture trap shall have a liquid seal of not less than two (2) inches (51 mm) and not more than four (4) inches (102 mm), except where a deeper seal is found necessary by the Authority Having Jurisdiction. Traps shall be set true with respect to their liquid seals and, where necessary, they shall be protected from freezing.

1006.0 Floor Drain Traps.

Floor drains shall connect into a trap so constructed that it can be readily cleaned and of a size to serve efficiently the purpose for which it is intended. The drain inlet shall be so located that it is at all times in full view. When subject to reverse flow of sewage or liquid waste, such drains shall be equipped with an approved backwater valve.

1007.0 Trap Seal Protection.

Floor drain or similar traps directly connected to the drainage system and subject to infrequent use shall be protected with a trap seal primer, except where not deemed necessary for safety or sanitation by the Authority Having Jurisdiction. Trap seal primers shall be accessible for maintenance.

1008.0 Building Traps.

Building traps shall not be installed except where required by the Authority Having Jurisdiction. Each building trap when installed shall be provided with a cleanout and with a relieving vent or fresh-air intake on the inlet side of the trap, which need not be larger than one-half the diameter of the drain to which it connects. Such relieving vent or fresh-air intake shall be carried above grade and terminate in a screened outlet located outside the building.

1009.0 Industrial Interceptors (Clarifiers) and Separators.

1009.1 When Required. Interceptors (clarifiers) (including grease, oil, sand interceptors [clarifiers], etc.) shall be required by the Authority Having Jurisdiction when they are necessary for the proper handling of liquid wastes containing grease, flammable wastes, sand, solids, acid or alkaline substances, or other ingredients harmful to the building drainage system, the public or private sewer, or to public or private sewage disposal.

1009.2 Approval. The size, type, and location of each interceptor (clarifier) or separator shall be approved by the Authority Having Jurisdiction. Except where otherwise specifically permitted, no wastes other than those requiring treatment or separation shall be discharged into any interceptor (clarifier).

1009.3 Design. Interceptors (clarifiers) for sand and similar heavy solids shall be so designed and located as to be readily accessible for cleaning and shall have a water seal of not less than six (6) inches (152 mm).

1009.4 Relief Vent. Interceptors (clarifiers) shall be so designed that they will not become air-bound if closed covers are used. Each interceptor (clarifier) shall be properly vented.

1009.5 Location. Each interceptor (clarifier) cover shall be readily accessible for servicing and maintaining the interceptor (clarifier) in working and operating condition. The use of ladders or the removal of bulky equipment in order to service interceptors (clarifiers) shall constitute a violation of accessibility. Location of all interceptors (clarifiers) shall be shown on the approved building plan.

1009.6 Maintenance of Interceptors. Interceptors shall be maintained in efficient operating condition by periodic removal of accumulated grease, scum, oil, or other floating substances and solids deposited in the interceptor.

1009.7 Discharge. The waste pipe from oil and sand interceptors shall discharge as approved by the Authority Having Jurisdiction.

1010.0 Slaughterhouses, Packing Establishments, etc.

Every fish, fowl, and animal slaughterhouse or establishment; every fish, fowl, and meat packing or curing establishment; every soap factory, tallow-rendering, fat-rendering, and hide-curing establishment shall be connected to and shall drain or discharge into an approved grease interceptor (clarifier).

1010.1 [AGR] Meat and Poultry Processing Plants.

1010.1.1 Drainage and Plumbing Systems. Drainage and plumbing systems shall meet the requirements of Section 724.0.

1010.1.1.1 Each floor drain shall be equipped with a deep-seal trap.

1010.1.2 The plumbing shall be installed so as to prevent sewage from backing up and flooding the floor.

Exception: Floor drains in areas not regularly washed down will be acceptable with deep-seal traps, provided

that such drains are connected to secondary drainage systems discharging into a safe sink or basin (air gap) that is properly trapped and vented, and that such drains accomplish the objectives and intent of this section.

1010.1.3 Interceptor traps which are connected with the sewer system shall not be near any edible products department or in any area where products are unloaded from or loaded into vehicles. To facilitate cleaning, such traps shall have inclined bottoms and be provided with suitable covers.

1010.2 [AGR] Collection Centers and Facilities. All drains shall be properly installed with adequate deep-sealed traps of the conventional "P," "U" or "S" type and vents.

1010.3 [AGR] Horse Meat and Pet Food Establishments. There shall be an efficient drainage and plumbing system for the establishment and premises. All drains and gutters shall be installed with traps and vents approved by the Department.

1010.4 [AGR] Draining and Plumbing. There shall be an efficient drainage and plumbing system for the plant and premises.

1010.4.1 Drainage and Gutters. All drains and gutters shall be properly installed with approved traps and vents. The drainage and plumbing system must permit the quick runoff of all water from plant buildings, and of surface water around the plant on the premises, and all such water shall be disposed of in such a manner as to prevent a nuisance or health hazard.

1010.4.2 Sewage and Plant Waste. The sewer system have adequate slope and capacity to remove readily all waste from the various processing operations and to minimize, or if possible, prevent stoppage and surcharging of the system. When the sewage disposal system is a private system which is required to be approved by a state or local health authority, the applicant shall furnish the administrator a letter from the proper health authority indicating that the sewage disposal system is acceptable to such authority.

1011.0 Minimum Requirements for Auto Wash Racks.

Every private or public wash rack and/or floor or slab used for cleaning machinery or machine parts shall be adequately protected against storm or surface water and shall drain or discharge into an approved interceptor (clarifier).

1012.0 Commercial and Industrial Laundries.

Laundry equipment in commercial and industrial buildings that does not have integral strainers shall discharge into an interceptor having a wire basket or similar device that is removable for cleaning and that will prevent passage into the drainage system of solids one-half (½) inch (12.7 mm) or larger in maximum dimension, such as string, rags, buttons, or other solid materials detrimental to the public sewerage system.

1013.0 Bottling Establishments.

Bottling plants shall discharge their process wastes into an interceptor that will provide for the separation of broken glass

or other solids, before discharging liquid wastes into the drainage system.

1014.0 Grease Interceptors.

1014.1 Where it is determined by the Authority Having Jurisdiction that waste pretreatment is required, an approved type of grease interceptor(s) complying with the provisions of this section shall be correctly sized and properly installed in grease waste line(s) leading from sinks and drains, such as floor drains, floor sinks and other fixtures or equipment in serving establishments such as restaurants, cafes, lunch counters, cafeterias, bars and clubs, hotels, hospitals, sanitariums, factory or school kitchens, or other establishments where grease is introduced into the drainage or sewage system in quantities that can effect line stoppage or hinder sewage treatment or private sewage disposal. Any combination of hydro-mechanical, gravity grease interceptors and engineered systems shall be allowed in order to meet this code and other applicable requirements of the Authority Having Jurisdiction when space or existing physical constraints of existing buildings necessitate such installations. A grease interceptor shall not be required for individual dwelling units or for any private living quarters. Water closets, urinals, and other plumbing fixtures conveying human waste shall not drain into or through the grease interceptor.

1014.1A [OSHPD 1, 2, 3 & 4] The Authority Having Jurisdiction the individual official, board, department or agency authorized to administer and enforce the sewage treatment system in the area of the location of the health facility.

1014.1B [OSHPD 1, 2, 3 & 4] Grease traps shall not be installed in food preparation area of the kitchens.

1014.1C [OSHPD 1, 2, 3 & 4] Grease interceptors shall be installed outside of the kitchen area in location affording ease of maintenance and servicing.

1014.1.1 Each fixture discharging into a grease interceptor shall be individually trapped and vented in an approved manner.

1014.1.2 All grease interceptors shall be maintained in efficient operating condition by periodic removal of the accumulated grease and latent material. No such collected grease shall be introduced into any drainage piping or public or private sewer. If the Authority Having Jurisdiction determines that a grease interceptor is not being properly cleaned or maintained, the Authority Having Jurisdiction shall have the authority to mandate the installation of additional equipment or devices and to mandate a maintenance program.

1014.1.3 Food Waste Disposal Units and Dishwashers. Unless specifically required or permitted by the Authority Having Jurisdiction, no food waste disposal unit or dishwasher shall be connected to or discharge into any grease interceptor. Commercial food waste disposers shall be permitted to discharge directly into the building's drainage system.

1014.2 Hydromechanical Grease Interceptors.

1014.2.1 Plumbing fixtures or equipment connected to a Type A and B hydromechanical grease interceptor shall discharge through an approved type of vented flow control installed in a readily accessible and visible location. Flow control devices shall be designed and installed so that the total flow through such device or devices shall at no time be greater than the rated flow of the connected grease interceptor. No flow control device having adjustable or removable parts shall be approved. The vented flow control device shall be located such that no system vent shall be between the flow control and the grease interceptor inlet. The vent or air inlet of the flow control device shall connect with the sanitary drainage vent system, as elsewhere required by this code, or shall terminate through the roof of the building, and shall not terminate to the free atmosphere inside the building.

Exception: Listed grease interceptors with integral flow controls or restricting devices shall be installed in an accessible location in accordance with the manufacturers' instructions.

1014.2.2 The total capacity in gallons (L) of fixtures discharging into any hydromechanical grease interceptor shall not exceed two and one-half (2½) times the certified GPM (L/m) flow rate of the interceptor as per Table 10-2.

For the purpose of this section, the term "fixture" shall mean and include each plumbing fixture, appliance, apparatus, or other equipment required to be connected to

or discharged into a grease interceptor by any provision of this section.

1014.2.3 A vent shall be installed downstream of hydro-mechanical grease interceptors in accordance with the requirements of this code.

1014.3 Gravity Grease Interceptors. Required gravity grease interceptors shall comply with the provisions of Sections 1014.3.1 through 1014.3.7.

1014.3.1 General. The provisions of this section shall apply to the design, construction, installation, and testing of commercial kitchen gravity grease interceptors.

1014.3.2 Waste Discharge Requirements.

1014.3.2.1 Waste discharge in establishments from fixtures and equipment which contain grease, including but not limited to, scullery sinks, pot and pan sinks, dishwashers, soup kettles, and floor drains located in areas where grease-containing materials exist, shall be permitted to be drained into the sanitary waste through the interceptor when approved by the Authority Having Jurisdiction.

1014.3.2.2 Toilets, urinals, and other similar fixtures shall not drain through the interceptor.

1014.3.2.3 All waste shall enter the interceptor through the inlet pipe only.

1014.3.3 Design.

1014.3.3.1 Gravity Interceptors shall be constructed in accordance with the applicable standard in Table 14-1 or the design approved by the Authority Having Jurisdiction.

**TABLE 10-2
HYDROMECHANICAL INTERCEPTOR SIZING USING GRAVITY FLOW RATES¹**

DIAMETER OF GREASE WASTE PIPE	MAXIMUM FULL PIPE FLOW (GPM) ²	SIZE OF GREASE INTERCEPTOR	
		ONE-MINUTE DRAINAGE PERIOD (GPM)	TWO-MINUTE DRAINAGE PERIOD (GPM)
2"	20	20	10
3"	60	75	35
4"	125	150	75
5"	230	250	125
6"	375	500	250

¹ For interceptor sizing by fixture capacity see the example below.

² ¼" (.240) slope per foot based on Manning's formula with friction factor N = 0.012

**EXAMPLE FOR SIZING
HYDROMECHANICAL INTERCEPTOR(S) USING FIXTURE CAPACITY**

Step 1: Determine the flow rate from each fixture.

[Length] X [Width] X [Depth] / [231] = Gallons X [.75 fill factor] / [Drain Period (1 min or 2 min)]

Step 2: Calculate the total load from all fixtures that discharge into the interceptor.

FIXTURES	COMPARTMENTS	LOAD (gallons)	SIZE OF GREASE INTERCEPTOR ONE-MINUTE DRAINAGE PERIOD (gpm)	TWO-MINUTE DRAINAGE PERIOD (gpm)
Compartment size				
24"x 24"x 12"	2	44.9		
Hydrant		3		
Rated Appliance		2		
		49.9	50	25

1109.2 Methods of Testing Storm Drainage Systems. Except for outside leaders and perforated or open-jointed drain tile, the piping of storm drain systems shall be tested upon completion of the rough piping installation by water or air, except that plastic pipe shall not be tested with air, and proved tight. The Authority Having Jurisdiction shall be permitted to require the removal of any cleanout plugs to ascertain whether the pressure has reached parts of the system. One (1) of the following test methods shall be used:

1109.2.1 Water Test. After piping has been installed, the water test shall be applied to the drainage system, either to the entire system or to sections. If the test is applied to the entire system, all openings in the piping shall be tightly closed except for the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except for the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than a ten (10) foot (3,048 mm) head of water. In testing successive sections, not less than the upper ten (10) feet (3,048 mm) of the next preceding section shall be tested so that no joint of pipe in the building (except the uppermost ten (10) feet (3,048 mm) of a roof drainage system, which shall be filled with water to the flood level of the uppermost roof drain) shall have been submitted to a test of less than a ten (10) foot (3,048 mm) head of water. The

water shall be kept in the system or in the portion under test for not less than fifteen (15) minutes before inspection starts; the system shall then be tight at all points.

1109.2.2 Air Test. The air test shall be made by attaching an air compressor testing apparatus to any suitable opening after closing other inlets and outlets to the system, forcing air into the system until there is a uniform gauge pressure of five (5) psi (34.5 kPa) or sufficient pressure to balance a column of mercury ten (10) inches (254 mm) in height. This pressure shall be held without introduction of additional air for a period of not less than fifteen (15) minutes.

1109.2.3 Exceptions. When circumstances exist that make air and water tests described in Sections 1109.2.1 and 1109.2.2 above impractical, see Section 103.5.3.3.

**TABLE 11-1
SIZING ROOF DRAINS, LEADERS, AND VERTICAL RAINWATER PIPING^{2, 3}**

Size of Drain, Leader or Pipe, Flow Inches gpm ¹		MAXIMUM ALLOWABLE HORIZONTAL PROJECTED ROOF AREAS SQUARE FEET AT VARIOUS RAINFALL RATES											
		1 in./h	2 in./h	3 in./h	4 in./h	5 in./h	6 in./h	7 in./h	8 in./h	9 in./h	10 in./h	11 in./h	12 in./h
2	30	2,880	1,440	960	720	575	480	410	360	320	290	260	240
3	92	8,800	4,400	2,930	2,200	1,760	1,470	1,260	1,100	980	880	800	730
4	192	18,400	9,200	6,130	4,600	3,680	3,070	2,630	2,300	2,045	1,840	1,675	1,530
5	360	34,600	17,300	11,530	8,650	6,920	5,765	4,945	4,325	3,845	3,460	3,145	2,880
6	563	54,000	27,000	17,995	13,500	10,800	9,000	7,715	6,750	6,000	5,400	4,910	4,500
8	1208	116,000	58,000	38,660	29,000	23,200	19,315	16,570	14,500	12,890	11,600	10,545	9,600

**TABLE 11-1 (Metric)
SIZING ROOF DRAINS, LEADERS, AND VERTICAL RAINWATER PIPING^{2, 3}**

Size of Drain, Leader Pipe, Flow mm L/s ¹		MAXIMUM ALLOWABLE HORIZONTAL PROJECTED ROOF AREAS OR SQUARE METERS AT VARIOUS RAINFALL RATES											
		25 mm/h	50 mm/h	75 mm/h	100 mm/h	125 mm/h	150 mm/h	175 mm/h	200 mm/h	225 mm/h	250 mm/h	275 mm/h	300 mm/h
50	1.2	267.6	133.8	89.2	66.9	53.4	44.6	38.1	33.4	29.7	26.9	24.2	22.3
80	5.8	817.5	408.8	272.2	204.4	163.5	136.6	117.1	102.2	91.0	81.8	74.3	67.8
100	12.1	1,709.4	854.7	569.5	427.3	341.8	285.2	244.3	213.7	190.0	170.9	155.6	142.1
125	22.7	3,214.3	1,607.2	1,071.1	803.6	642.9	535.6	459.4	401.8	357.2	321.4	292.2	267.6
150	35.5	5,016.6	2,508.3	1,671.7	1,254.2	1,003.3	836.1	716.7	627.1	557.4	501.7	456.1	418.1
200	76.2	10,776.4	5,388.2	3,591.5	2,694.1	2,155.3	1,794.4	1,539.4	1,347.1	1,197.5	1,077.6	979.6	897.4

Notes:

- Maximum discharge capacity, gpm (L/s) with approximately 1³/₄ inch (44 mm) head of water at the drain.
- For rainfall rates other than those listed, determine the allowable roof area by dividing the area given in the 1-inch/hour (25 mm/hour) column by the desired rainfall rate.
- Vertical piping may be round, square, or rectangular. Square pipe shall be sized to enclose its equivalent roundpipe. Rectangular pipe shall have not less than the same cross-sectional area as its equivalent round pipe, except that the ratio of its side dimensions shall not exceed 3 to 1.

STORM DRAINAGE

**TABLE 11-2
SIZING OF HORIZONTAL RAINWATER PIPING^{1, 2}**

SIZE OF PIPE, Inches	FLOW AT 1/8 in./ft. SLOPE, gpm	MAXIMUM ALLOWABLE HORIZONTAL PROJECTED ROOF AREAS SQUARE FEET AT VARIOUS RAINFALL RATES					
		1 in./h	2 in./h	3 in./h	4 in./h	5 in./h	6 in./h
3	34	3,288	1,644	1,096	822	657	548
4	78	7,520	3,760	2,506	1,880	1,504	1,253
5	139	13,360	6,680	4,453	3,340	2,672	2,227
6	222	21,400	10,700	7,133	5,350	4,280	3,566
8	478	46,000	23,000	15,330	11,500	9,200	7,670
10	860	82,800	41,400	27,600	20,700	16,580	13,800
12	1,384	133,200	66,600	44,400	33,300	26,650	22,200
15	2,473	238,000	119,000	79,333	59,500	47,600	39,650

SIZE OF PIPE, Inches	FLOW AT 1/4 in./ft. SLOPE, gpm	MAXIMUM ALLOWABLE HORIZONTAL PROJECTED ROOF AREAS SQUARE FEET AT VARIOUS RAINFALL RATES					
		1 in./h	2 in./h	3 in./h	4 in./h	5 in./h	6 in./h
3	48	4,640	2,320	1,546	1,160	928	773
4	110	10,600	5,300	3,533	2,650	2,120	1,766
5	196	18,880	9,440	6,293	4,720	3,776	3,146
6	314	30,200	15,100	10,066	7,550	6,040	5,033
8	677	65,200	32,600	21,733	16,300	13,040	10,866
10	1,214	116,800	58,400	38,950	29,200	23,350	19,450
12	1,953	188,000	94,000	62,600	47,000	37,600	31,350
15	3,491	336,000	168,000	112,000	84,000	67,250	56,000

SIZE OF PIPE, Inches	FLOW AT 1/2 in./ft. SLOPE, gpm	MAXIMUM ALLOWABLE HORIZONTAL PROJECTED ROOF AREAS SQUARE FEET AT VARIOUS RAINFALL RATES					
		1 in./h	2 in./h	3 in./h	4 in./h	5 in./h	6 in./h
3	68	6,576	3,288	2,192	1,644	1,310	1,096
4	156	15,040	7,520	5,010	3,760	3,010	2,500
5	278	26,720	13,360	8,900	6,680	5,320	4,450
6	445	42,800	21,400	14,267	10,700	8,580	7,140
8	956	92,000	46,000	30,650	23,000	18,400	15,320
10	1,721	165,600	82,800	55,200	41,400	33,150	27,600
12	2,768	266,400	133,200	88,800	66,600	53,200	44,400
15	4,946	476,000	238,000	158,700	119,000	95,200	79,300

Notes:

¹ The sizing data for horizontal piping are based on the pipes flowing full.

² For rainfall rates other than those listed, determine the allowable roof area by dividing the area given in the one (1) inch/hour (25 mm/hour) column by the desired rainfall rate.

- (1) ASTM B 88, *Standard Specification for Seamless Copper Water Tube*, (Types K or L).
- (2) ASTM B 280, *Standard Specification for Seamless Copper Tubing for Air Conditioning and Refrigeration Field Service* (Copper ACR tube).
- (3) ASTM B 819, *Standard Specification for Seamless Copper Tube for medical Gas Systems*, (Types K or L). [NFPA 99:5.1.3.5.13.4]

The compressor air intake shall be located outdoors above roof level, at a minimum distance not less than of ten (10) feet (3,050 mm) from any door, window, exhaust, other intake, or opening in the building and a distance of not less than twenty (20) feet (6,100 mm) above ground. [NFPA 99:5.1.3.5.13.2]

If an air source equal to or better than outside air (e.g., air already filtered for use in operating room ventilating systems) is available, it shall be permitted to be used for the medical air compressors with the following provisions:

- (1) This alternate source of supply air shall be available on a continuous twenty-four (24) hours-per-day, seven (7) days-per-week basis.
- (2) Ventilating systems having fans with motors or drive belts located in the air stream shall not be used as a source of medical air intake. [NFPA 99:5.1.3.5.13.3]

Air intakes for separate compressors shall be permitted to be joined together to one (1) common intake where the following conditions are met:

- (1) The common intake is sized to minimize back pressure in accordance with the manufacturer's recommendations.
- (2) Each compressor can be isolated by manual or check valve, blind flange, or tube cap to prevent open inlet piping when compressors are removed from service and consequent backflow of room air into the other compressor(s). [NFPA 99:5.1.3.5.13.5]

1325.3.1 Each medical air compressor shall have an isolation valve installed so that shutting off or failure of the largest unit will not affect the operation of the other unit(s).

1325.4 Drains shall be installed on dryers, aftercoolers, separators, and receivers.

1325.5 Medical air receivers shall be provided with proper valves to allow the flow of compressed air to enter and exit out of separator receiver ports during normal operation and allow the receiver to be by-passed during service, without shutting down the medical air system. [NFPA 99:5.1.3.5.11.4]

1325.6 Medical Air Receivers. Receivers for medical air shall meet the following requirements:

- (1) Be made of corrosion-resistant materials or otherwise be made corrosion resistant.
- (2) Comply with Section VIII, Unfired Pressure Vessels, of the ASME *Boiler and Pressure Vessel Code*.
- (3) Be equipped with a pressure-relief valve, automatic drain, manual drain, sight glass, and pressure indicator.
- (4) Be of a capacity sufficient to prevent the compressor from short cycling. [NFPA 99:5.1.3.5.6]

Piping within compressor systems upstream of the source shutoff valve shall comply with Sections 1316.0 and 1319.0, except that stainless steel shall be permitted to be used as a piping material.

1326.0 Medical Vacuum Pump System.

The vacuum plant shall be installed in a well-lit, ventilated, and clean location with ample accessibility. The location shall be provided with drainage facilities. The vacuum plant, when installed as a source, shall be located separately from other medical vacuum system sources, and shall be readily accessible for maintenance.

1326.1 Medical–surgical vacuum sources shall consist of the following:

- (1) Two (2) or more vacuum pumps sufficient to serve the peak calculated demand with the largest single vacuum pump out of service.
- (2) An automatic means to prevent backflow from any on-cycle vacuum pumps through any off-cycle vacuum pumps.
- (3) A shutoff valve or other isolation means to isolate each vacuum pump from the centrally piped system and other vacuum pumps for maintenance or repair without loss of vacuum in the system.
- (4) A vacuum receiver.
- (5) Piping between the vacuum pump(s), discharge(s), receiver(s), and the vacuum source shutoff valve shall be in accordance with Section 1316.3, except that stainless, galvanized, or black steel pipe shall be permitted to be used.
- (6) Except as defined in NFPA 99:5.1.3.6.1.2(1) through NFPA 99:5.1.3.6.1.2(5), materials and devices used between the medical vacuum exhaust and the medical vacuum source shall be permitted to be of any design or construction appropriate for the service, as determined by the manufacturer. [NFPA 99 5.1.3.6.1.2(1), (2), (3), (4), (5), (6)]

1326.1.1 Additional pumps shall automatically activate when the pumps in operation are incapable of adequately maintaining the required vacuum.

Automatic or manual alternation of pumps shall allow division of operating time. If automatic alternation of pumps is not provided, the facility staff shall arrange a schedule for manual alternation. [NFPA 99:5.1.3.6.6.1, 5.1.3.6.6.2]

1326.2 The medical–surgical vacuum pumps shall exhaust in a manner and location that will minimize the hazards of noise and contamination to the facility and its environment.

The exhaust shall be located as follows:

- (1) Outdoors.
- (2) Not less than ten (10) feet (3,050 mm) from any door, window, air intake, or other openings in buildings.
- (3) At a level different from air intakes.

- (4) Where prevailing winds, adjacent buildings, topography, or other influences that would not divert the exhaust into occupied areas or prevent dispersion of the exhaust.

The end of the exhaust shall be turned down and screened or otherwise be protected against the entry of vermin, debris, or precipitation by screening fabricated or composed of a non-corroding material.

The exhaust shall be piped of materials approved for medical–surgical vacuum piping under Section 1316.3 (Vacuum tubes).

The exhaust shall be free of dips and loops that might trap condensate or oil. Where such low points are unavoidable, a drip leg and valved drain shall be installed. [NFPA 99:5.1.3.6.7.1 - 5.1.3.6.7.5]

1326.2.1 Vacuum exhausts from multiple pumps shall be permitted to be joined together to one (1) common exhaust where the following conditions are met:

- (1) The common exhaust is sized to minimize back-pressure in accordance with the pump manufacturer's recommendations.
- (2) Each pump can be isolated by manual or check valve, blind flange, or tube cap to prevent open exhaust piping when pumps are removed for service and consequent flow of exhaust air into the room. [NFPA 99:5.1.3.6.7.6]

1326.3 Receivers for vacuum shall meet the following requirements:

- (1) Be made of ferrous and/or nonferrous materials.
- (2) Comply with Section VIII, Unfired Pressure Vessels, of the ASME *Boiler and Pressure Vessel Code*.
- (3) Be capable of withstanding a gauge pressure of sixty (60) psi (415 kPa) and twenty-nine and nine-tenths (29.9) inch (760 mm) gauge HgV.
- (4) Be equipped with a manual drain.
- (5) Be of a capacity based on the technology of the pumps. [NFPA 99:5.1.3.6.3]

1326.4 Piping between vacuum pumps, discharges, receivers, and the vacuum main line valve shall be in accordance with Section 1316.3, except that stainless, galvanized, or black steel pipe shall be permitted to be used. [NFPA 99:5.1.3.6.1.2(5)]

1326.5 Drains shall be installed and terminate in an approved location.

1327.0 Testing and Inspection.

1327.1 Inspection and testing shall be performed on new piped gas systems, additions, renovations, temporary installations, or repaired systems, to ensure the facility, by a documented procedure, that the applicable provisions of this document have been adhered to and system integrity has been achieved or maintained. [NFPA 99:5.1.12.1.1.]

1327.1.1 Tests and inspections required by this section shall not be interpreted to conflict with the requirements of NFPA 99, *Standard for Health Care Facilities*. Final certification or verification shall require the completion of tests and inspections required by Sections 4-3.4.1.1,

4-3.4.1.2, and 4-3.4.1.3 of NFPA 99, *Standard for Health Care Facilities*. For requirements of the portions of medical gas and medical vacuum systems testing and inspection not addressed in this chapter or medical gas and medical vacuum systems testing and inspection beyond the scope of this chapter, refer to NFPA 99, *Standard for Health Care Facilities*.

1327.2 Systems that are breached and components that are subject to additions, renovations, or replacement (e.g., new gas sources: bulk, manifolds, compressors, dryers, alarms) shall be inspected and appropriately tested. [NFPA 99:5.1.12.1.3]

1327.2.1 Systems shall be deemed breached at the point of pipeline intrusion by physical separation, by system component removal, replacement, or addition.

Breached portions of the systems subject to inspection and testing shall be confined to only the specific altered zone and components in the immediate zone or area that is located upstream for vacuum systems and downstream for pressure gases at the point or area of intrusion. [NFPA 99:5.1.12.1.4, 5.1.12.1.5]

1327.3 Advance Notice. It shall be the duty of the person doing the work authorized by the permit to notify the Authority Having Jurisdiction, orally or in writing, that said work is ready for inspection. Such notification shall be given not less than twenty-four (24) hours before the work is to be inspected.

1327.4 Responsibility. The equipment, material, and labor necessary for inspection and testing shall be furnished by the permit holder or by the person who is requiring the inspection.

1327.5 Testing. The test shall be conducted in the presence of the Authority Having Jurisdiction or a duly appointed representative.

1327.6 Retesting. If the Authority Having Jurisdiction finds that the work does not pass tests, necessary corrections shall be made and the work shall then be resubmitted for test or inspection.

1327.7 Initial Pressure Test – Piped Gas Systems. Before attachment of system components (e.g., pressure-actuating switches for alarms, manifolds, pressure gauges, or pressure-relief valves), but after installation of the station outlets and inlets, with test caps in place, each section of the piping system shall be subjected to a test pressure of one and one-half (1½) times the working pressure [minimum one-hundred and fifty (150) psig (1 Mpa gauge)] with oil-free dry nitrogen. This test pressure shall be maintained until each joint has been examined for leakage by means of soapy water or other equally effective means of leak detection safe for use with oxygen. The source shutoff valve shall be closed. Leaks, if any, shall be located, repaired, and retested in accordance with this paragraph. [NFPA 99:5.1.12.2.3.7]

1327.8 Cross-Connection Test – Piped Gas Systems. It shall be determined that no cross-connections exist between the various medical gas and vacuum piping systems. [NFPA 99:5.1.12.2.4]

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
ASTM C 700-2007a	Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated	Piping, Non-Metallic	Table 7-1, 701.1, 701.2, 1102.5.2
ASTM C 1053-2000 (R2005)	Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications (Note 1)	Piping, Non- Metallic	811.2
ASTM C 1173-2006	Flexible Transition Couplings for Underground Piping Systems	Joints	705.1.4, 705.1.6
ASTM C 1277-2006	Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings	Joints	705.1.8, 705.1.9
ASTM C 1440-2007	Thermoplastic Elastomeric (TPE) Gasket Materials for Drain, Waste, and Vent (DWV), Sewer, Sanitary and Storm Plumbing Systems	Joints	705.1.4, 705.1.6
ASTM C 1460-2004	Shielded Transition Couplings for Use with Dissimilar DWV Pipe and Fittings Above Ground	Joints	705.1.8, 705.1.9
ASTM C 1461-2007	Mechanical Couplings Using Thermoplastic Elastomeric (TPE) Gaskets for Joining Drain, Waste, and Vent (DWV); Sewer; Sanitary; and Storm Plumbing Systems for Above and Below Ground Use	Joints	705.1.4, 705.1.6, 705.1.7, 705.1.8, 705.1.9
ASTM C 1540-2004	Heavy Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings	Joints	705.1.8, 705.1.9
ASTM D 1527-1999 (R2005)*	Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedule 40 and 80	Piping, Plastic	Table 7-1, 701.1, 1102.1, 1102.2.1
ASTM D 1784-2007	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds	Miscellaneous	301.0
ASTM D 1785-2006*	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120	Piping, Plastic	Table 3-2, Table 6-4, 604.1, Table 7-1, 701.1, 903.1, 1101.3, 1102.1, 1102.2.1
ASTM D 1869-1995 (R2005) ^{e1}	Rubber O-rings for Asbestos-Cement Pipe	Joints	705.1.4
ASTM D 2104-2003*	Polyethylene (PE) Plastic Pipe, Schedule 40	Piping, Plastic	604.1
ASTM D 2235-2004*	Solvent Cement for Acrylonitrile- Butadiene-Styrene (ABS) Plastic Pipe and Fittings	Joints	316.1.6
ASTM D 2239-2003*	Polyethylene (PE) Plastic Pipe, (SDR-PR) Based on Controlled Inside Diameter	Piping, Plastic	Table 6-4, 604.1
ASTM D 2241-2005*	Poly(Vinyl Chloride) (PVC) Pressure- Rated Pipe (SDR Series)	Piping, Plastic	Table 6-4, 604.1
ASTM D 2321-2005*	Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications	Piping, Plastic	701.1
ASTM D 2447-2003*	Polyethylene (PE) Plastic Pipe, Schedule 40 and 80 Based on Outside Diameter	Piping, Plastic	604.1
ASTM D 2464-2006*	Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80 (Note 1)	Fittings	Table 6-4, 604.1
ASTM D 2466-2006*	Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40 (Note 1)	Fittings	Table 6-4, 604.1
ASTM D 2467-2006*	Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80 (Note 1)	Fittings	Table 6-4, 604.1
ASTM D 2513-2007b*	Thermoplastic Gas Pressure Pipe Tubing and Fittings (Note 1)	Piping, Plastic	1209.5.4, 1209.5.4.2, 1209.5.9(B), 1211.1.7(B)
ASTM D 2517-2006*	Reinforced Epoxy Resin Gas Pressure Pipe and Fittings	Piping, Plastic	301.0
ASTM D 2564-2004 ^{e1} *	Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems	Joints	316.1.6

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
ASTM D 2609-2002*	Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe (Note 1)	Joints	Table 6-4, 604.1
ASTM D 2657-2007*	Heat Fusion Joining of Polyolefin Pipe Fittings (Note 1)	Joints	301.0
ASTM D 2661-2006*	Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings (Note 1)	Piping, Plastic	Table 7-1, 701.1, 701.2, 707.1, 903.1, 1101.3, 1102.4
ASTM D 2665-2008*	Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	Piping, Plastic	Table 7-1, 701.1, 701.2, 707.1, 903.1, 1101.3, 1102.4
ASTM D 2672-1996a (R2003)*	Joints for IPS PVC Pipe Using Solvent Cement	Joints	316.1.6
ASTM D 2680-2001*	Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping	Piping, Plastic	Table 7-1, 701.1, 1102.4
ASTM D 2683-2004*	Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing	Fittings	Table 6-4, 604.1
ASTM D 2729-2003*	Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings (Note 1)	Piping, Plastic	1102.5, 1611.1
ASTM D 2737-2003*	Polyethylene (PE) Plastic Tubing	Piping, Plastic	Table 6-4, 604.1
ASTM D 2751-2005*	Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings (Note 1)	Piping, Plastic	1102.5, 1611.0
ASTM D 2774-2004 ^{e1} *	Underground Installation of Thermoplastic Pressure Piping	Piping, Plastic	301.0
ASTM D 2846-2006*	Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems	Piping, Plastic	Table 6-4, 604.1
ASTM D 2855-1996 (R2002)*	Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings	Joints	316.1.6
ASTM D 2996-2001 (R2007) ^{e1} *	Filament-Wound “Fiberglass” (Glass-Fiber- Reinforced Thermosetting Resin) Pipe	Piping, Plastic	301.0
ASTM D 3034-2006*	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings	Piping, Plastic	301.0
ASTM D 3035- 2006*	Polyethylene (PE) Plastic Pipe (DR-PR) (Based on Controlled Outside Diameter)	Piping, Plastic	Table 6-4, 604.1, 1611.1
ASTM D 3122-1995 (R2002)*	Solvent Cements for Styrene-Rubber (SR) Plastic Pipe and Fittings	Joints	301.0
ASTM D 3138-2004*	Solvent Cements for Transition Joints, Acrylonitrile-Butadiene- Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Non-Pressure Piping Components	Joints	316.1.6
ASTM D 3139-1998 (R2005)*	Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	Joints	316.1.5
ASTM D 3212-1996a (R2003) ^{e1} *	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals	Joints	705.1.7
ASTM D 3261-2003*	Butt Heat Fusion Polyethylene (PE) Plastic Fitting for Polyethylene (PE) Plastic Pipe and Tubing	Fittings	Table 6-4, 604.1
ASTM D 3311-2006a*	Drain, Waste, and Vent (DWV) Plastic Fittings Patterns (Note 1)	Miscellaneous	701.2
ASTM D 3965-2005*	Rigid Acrylonitrile-Butadiene-Styrene (ABS) Materials for Pipe and Fittings	Miscellaneous	701.1, 701.2, 903.1
ASTM D 4068-2001*	Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane	Fixtures	411.8
ASTM D 4101-2007*	Polypropylene Injection and Extrusion Materials	Miscellaneous	811.1

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
CSA B64.4-2007	Reduced Pressure Principle Backflow Preventers (RP)	Backflow Protection	Table 6-2, 603.1, 603.2.7, 603.4.6, 603.4.6.2, 603.4.6.3, 603.4.6.4, 603.4.16.2, 603.4.16.3, 603.4.18, 603.4.20
CSA B64.4.1-2001 (R2006)	Reduced Pressure Principle Backflow Preventers for Fire Systems (RPF)	Backflow Protection	Table 6-2, 603.1, 603.2.7, 603.4.6, 603.4.6.2, 603.4.6.3, 603.4.6.4, 603.4.16.2, 603.4.16.3, 603.4.18, 603.4.20
CSA B64.5-2001 (R2006)	Double Check Valve (DVCA) Backflow Preventers	Backflow Protection	Table 6-2, 603.1, 603.2.4, 603.4.8, 603.4.16.1
CSA B64.5.1-2001 (R2006)	Double Check Valve Backflow Preventers for Fire Systems (DVCAF)	Backflow Protection	Table 6-2, 603.1, 603.2.4, 603.4.8, 603.4.16.1
CSA B64.7-2001	Laboratory Faucet Vacuum Breakers (LFVB)	Backflow Protection	603.1, 603.4.17
CSA B79-2005	Floor Drains, Area Drains, Shower Drains, and Cleanouts for Residential Construction	DWV Components	401.1
CSA B125.3-2005	Plumbing Fittings	Valves	413.1, 414.5, 416.3, Table 6-2
CSA B128.1-2006/B128.2-2006	Design and Installation of Non-Potable Water Systems/Maintenance and Field Testing of Non-Potable Water Systems (Note 1)	Miscellaneous	301.0
CSA B137.1-2005	Polyethylene (PE) Pipe, Tubing, and Fittings for Cold Water Pressure Services	Piping, Plastic	Table 6-4, 604.1
CSA B137.5-2005	Cross linked Polyethylene (PEX) Tubing Systems for Pressure Applications	Piping, Plastic	Table 6-4, 604.1, 604.11, 604.11.1
CSA B137.9-2005	Polyethylene/Aluminum/Polyethylene Composite Pressure-Pipe Systems	Piping, Plastic	Table 6-4, 604.1, 604.13, 604.13.1
CSA B137.10-2005	Cross linked Polyethylene/Aluminum/Cross linked Polyethylene Composite Pressure-Pipe Systems	Piping, Plastic	Table 6-4, 604.1, 604.13, 604.13.1
CSA B181.3-2006	Polyolefin Laboratory Drainage Systems	Piping, Plastic	811.2
CSA B242-2005	Groove and Shoulder Type Mechanical Pipe Couplings	Fittings	301.0
CSA B356-2000 (R2005)	Water Pressure Reducing Valves for Domestic Water Supply Systems	Valves	608.2, 608.4
CSA G401-2007	Corrugated Steel Pipe Products	Miscellaneous	301.0
CSA LC1-2005	Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST) (same as CSA 6.26)	Fuel Gas	1209.5.3.4
CSA LC3-2000*	Appliance Stands and Drain Pans	Miscellaneous	508.4
CSA LC4-2007	Press-Connect Copper and Copper Alloy Fittings for Use in Fuel Gas Distribution Systems (same as CSA 6.32)	Fuel Gas	1209.5.8.2
CSA Z21.5.1-2006*	Gas Clothes Dryers -Volume I- Type 1 Clothes Dryers (same as CSA 7.1)	Fuel Gas	507.1.1.2, 507.1.1.3
CSA Z21.5.2a-2006*	Gas Clothes Dryers -Volume 2- Type 2 Clothes Dryers (same as CSA 7.2)	Fuel Gas	507.1.1.3

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
CSA Z21.10.1b-2006*	Gas Water Heaters – Volume I – Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less (same as CSA 4.1)	Appliances	501.0
CSA Z21.10.3a-2007*	Gas Water Heaters – Volume III, Storage, with Input Ratings Above 75,000 BTu per Hour, Circulating and Instantaneous (same as CSA 4.3)	Appliances	501.0
CSA Z21.12b-1994* (R2000)	Draft Hoods	Appliances	510.12.1
CSA Z21.13b-2007*	Gas-Fired Low-Pressure Steam and Hot-Water Boilers	Appliances	501.0
CSA Z21.15b-2006*	Manually Operated Gas Valves for Appliances, Appliance Connector, Valves, and Hose End Valves (same as CSA 9.1)	Valves	1211.11, 1212.5
CSA Z21.22b-2001 (R2003)*	Relief Valves for Hot Water Supply Systems (same as CSA 4.4)	Valves	608.4, 608.7
CSA Z21.24-2006*	Connectors for Gas Appliances (same as CSA 6.10)	Appliances	1212.2
CSA Z21.40.1a-1997 (R2002)*	Quick Connect Devices for Use With Gas Fuel (same as CSA 2.91)	Joints	1212.6
CSA Z21.41a-2005*	Quick-Disconnect Devices for Use with Gas Fuel Appliances (same as CSA 6.9)	Joints	1212.6
CSA Z21.47a-2007*	Gas-Fired Central Furnaces (same as CSA 2.3)	Fuel Gas	501.0
CSA Z21.56-2006*	Gas-Fired Pool Heaters (same as CSA 4.7)	Swimming Pools and Spas	USPSHTC
CSA Z21.69b-2006*	Connectors for Movable Gas Appliances (same as CSA 6.16)	Appliances	1212.4
CSA Z21.80a-2005*	Line Pressure Regulators (same as CSA 6.22)	Fuel Gas	1209.7.2, 1209.7.5 (A,1)
CSA Z21.81a-2007	Cylinder Connection Devices (same as CSA 6.25)	Fuel Gas	1209.5
CSA Z21.86b-2007*	Vented Gas-Fired Space-Heating Appliances (same as CSA 2.32)	Appliances	501.0
CSA Z83.11-2006*	Gas Food Service Equipment (same as CSA 1.8)	Fuel Gas	501.0
CSA Z317.1-1999 (R2002)*	Special Requirements for Plumbing Installations in Health Care Facilities.	Miscellaneous	1301.0
FCI 74-1-1991	Spring Loaded Lift Disc Check Valve	Valves	301.0
IAPMO IGC 154-2006a	Tub/Shower Enclosures with Factory-Installed Fittings, Shower Panel, Shower Door, and Threshold Assemblies	Fixtures	401.1
IAPMO IGC 157-2007	Ball Valves	Valves	301.0
IAPMO IGC 172-2005	Glass Lavatories and Sinks	Fixtures	401.1
IAPMO IGC 193-2006	Safety Plates and Plate Straps	Miscellaneous	301.0
IAPMO IGC 194-2004a	Copper Alloy or Aluminum Alloy Sinks and Lavatories	Fixtures	401.1
IAPMO IGC 217-2007	Metallic Bathtubs, Shower Pans, and Whirlpool Bathtubs	Fixtures	401.1
IAPMO IGC 226-2006a	Drinking Water Fountains With or Without Chiller or Heater	Fixtures	401.1
IAPMO PS 23-2006a	Dishwasher Drain Air Gaps	Backflow Protection	Table 6-2, 603.1, 807.4
IAPMO PS 25-2002	Metallic Fittings for Joining Polyethylene Pipe for Water Service and Yard Piping	Joints	603.1
IAPMO PS 33-2007a	Flexible PVC Hose for Pools, Hot Tubs, Spas and Jetted Bathtub	Miscellaneous	414.3
IAPMO PS 34-2003	Encasement Sleeve for Potable Water Pipe and Tubing	Piping	313.10.1
IAPMO PS 36-1990	Lead Free Sealing Compounds for Threaded Joints	Joints	316.1.1, 705.2.3
IAPMO PS 37-1990	Black Plastic PVC or PE Pressure- Sensitive Corrosion Preventive Tape	Miscellaneous	313.5, 1211.1.3, 1211.2.1
IAPMO PS 42-1996	Pipe Alignment and Secondary Support Systems	Miscellaneous	314.2, 314.5
IAPMO PS 43-2007	Cushioned Bathtubs and Whirlpool Bathtub Appliances	Fixtures	401.1, 414.0

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
IAPMO PS 46-2006a	Field-Fabricated Tiling Kits	Miscellaneous	Table 4-1 (Note 10), 411.5
IAPMO PS 50-2005	Flush Valves with Dual Flush Devices For Water Closets or Water Closet Tank with an Integral Flush Valves with a Dual Flush Device	Fixtures	410.1, 410.3
IAPMO PS 51-1998	Plastic and Metallic Expansion Joints	Joints	705.3.2, 1101.4, 1209.11
IAPMO PS 52-2006	Sumps and Sewage Ejector Tanks with or without a Pump	DWV Components	710.8, 1101.5.3
IAPMO PS 53-1992	Grooved Mechanical Pipe Couplings and Grooved End Fittings	Joints	301.0
IAPMO PS 54-2006	Metallic and Plastic Utility Boxes	Miscellaneous	301.0
IAPMO PS 55-1992	Bathwaste Strainer Drains	Fixtures	404.1
IAPMO PS 57-2002	PVC Hydraulically Actuated Diaphragm Type Water Control Valves	Valves	301.0
IAPMO PS 59-1992	Septic Effluent and Waste Water Diverter Valves	DWV Components	301.0
IAPMO PS 60-1996	Sewage Holding Tank Containing Sewage Ejector Pump for Direct Mounted Water Closet	DWV Components	710.13
IAPMO PS 61-2006a	Fabricated Stainless Steel Water Closets or Urinals	Fixtures	401.1, 402.1, 402.2, 410.0, 410.4
IAPMO PS 63-2005	Plastic Leaching Chambers	DWV Components	301.0
IAPMO PS 64-2007	Pipe Flashings	Miscellaneous	313.8, 906.5
IAPMO PS 65-2002	Airgap Units for Water Conditioning Equipment Installation	Backflow Protection	603.1, 611.2
IAPMO PS 66-2000	Dielectric Waterway Fittings	Fittings	508.1
IAPMO PS 67-1993	Early-Closure Replacement Flappers or Early-Closure Replacement Flapper With Mechanical Assemblies	Fixtures	401.1
IAPMO PS 69-2006	Bathwaste and Overflow Assemblies with Tub Filler Spout	Piping, Plastic	403.0
IAPMO PS 72-2007	Valves with Atmospheric Vacuum Breakers	Valves	603.1
IAPMO PS 73-1993	Dental Vacuum Pumps	Miscellaneous	603.4.18
IAPMO PS 76-1995	Ballcock or Flushometer Valve Tailpiece Trap Primers and Trap Primer Receptors/Adapters	DWV Components	1007.0
IAPMO PS 79-2005	Multiport Electronic Trap Primer	DWV Components	1007.0
IAPMO PS 80-2007	Clarifiers	DWV Components	1009.1
IAPMO PS 81-2006	Precast Concrete Seepage Pit Liners and Covers	DWV Components	301.0
IAPMO PS 82-1995	Fiberglass (Glass Fiber Reinforced Thermosetting Resin) Fittings	Fittings	301.0
IAPMO PS 85-1995	Tools for Mechanically Formed Tee Connections in Copper Tubing	Miscellaneous	606.1.3
IAPMO PS 86-1995	Rainwater Diverter Valve for Non-Roofed Area Slabs	DWV Components	301.0
IAPMO PS 87-1995	Diverter and Shutoff Valves for Pool/Spas	Valves	USPSHTC
IAPMO PS 88-2002	Pre-Pressurized Potable Water Tanks	Miscellaneous	301.0
IAPMO PS 89-1995	Soaking and Hydrotherapy (Whirlpool) Bathtubs with Hydraulic Seatlift	Fixtures	414.0
IAPMO PS 90-2006	Elastomeric Test Caps/Cleanout Caps	DWV Components	707.2
IAPMO PS 91-2005a	Plastic Stabilizers for Use with Plastic Closet Bends	Piping, Plastic	314.5
IAPMO PS 92-2003	Heat Exchangers	Miscellaneous	502.11, 603.4.4, Appendix L 3.0

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
IAPMO PS 93-2004a	Water Closets with Spray, Water Closet Seats with Spray and Other Devices with Spray for Water Closets Supplied with Hot and Cold Water	Fixtures	408.2
IAPMO PS 94-2001a	P-Trap, Supply Stop, and Riser Insulated Protector	Miscellaneous	313.0
IAPMO PS 95-2001	Drain, Waste, and Vent Hangers and Plastic Pipe Support Hooks Piping	Fixtures	314.4
IAPMO PS 96-2002	Passive Direct Solar Water Heaters	Miscellaneous	USEC
IAPMO PS 98-1996	Prefabricated Fiberglass Church Baptisteries	Fixtures	406.1
IAPMO PS 99-2007	Terrazzo, Marble, Concrete, Granite, and Slate Plumbing Fixtures	Fixtures	406.3
IAPMO PS 100-1996	Porous Filter Protector for Subdrain Weep Holes	DWV Components	301.0
IAPMO PS 101-1997	Suction Relief Valves	Valves	414.4
IAPMO PS 104-1997	Pressure Relief Connection for Dispensing Equipment	Valves	301.0
IAPMO PS 105-1997	Polyethylene Distribution Boxes	DWV Components	Appendix K 6
IAPMO PS 106-2006	Prefabricated, Tileable Shower Receptors	Fixtures	411.5, 411.8
IAPMO PS 107-1998	Aramid Reinforced Rubber Hose for Use in Non-Potable Water Radiant Heating and Snow Melting	Piping, Plastic	UMC
IAPMO PS 108-1998	Restaurant Fire Suppression Systems	Appliances	603.4.16.1
IAPMO PS 110-2006a	PVC Cold Water Compression Fittings	Fittings	604.1
IAPMO PS 111-1999	PVC Cold Water Gripper Fittings	Fittings	604.1
IAPMO PS 112-1999	PVC Plastic Valves for Cold Water Distribution Systems Outside a Building and CPVC Plastic Valves for Hot and Cold Water Distribution Systems	Valves	605.0
IAPMO PS 113-1999 ^{e1}	Hydraulically Powered Household Food Waster Disposers	Appliances	301.0
IAPMO PS 114-1999 ^{e1}	Remote, Floor Box Industrial Water Supply, Air Supply, Drainage	Miscellaneous	301.0
IAPMO PS 115-2007	Hot Water On-Demand or Automatic Activated Hot Water Pumping Systems	Miscellaneous	301.0
IAPMO PS 116-1999	Hot Water Circulating Devices Which Do Not Use a Pump	Miscellaneous	301.0
IAPMO PS 117-2006	Copper and Copper Alloy Fittings with Press-Type or Nail-Type Connections For Installation on Copper Tubing	Fittings	604.1
IAPMO PS 119-2006	Water Energized Sump Pump	Miscellaneous	1101.5.3
IAPMO Z124.1.2-2005*	Plastic Bathtub and Shower Units	Fixtures	401.1, 414.0
IAPMO Z124.3-2005*	Plastic Lavatories	Fixtures	401.1
IAPMO Z124.4-2006*	Plastic Water Closet Bowls and Tanks	Fixtures	401.1
IAPMO Z124.5-2006*	Plastic Toilet (Water Closet) Seats	Fixtures	408.2
IAPMO Z124.6-2006*	Plastic Sinks	Fixtures	401.1
IAPMO Z124.7-1997*	Prefabricated Plastic Spa Shells	Fixtures	401.1, 414.0
IAPMO Z124.8-1990*	Plastic Bathtub Liners	Fixtures	401.1, 414.0
IAPMO Z124.9-2004*	Plastic Urinal Fixtures (Note 1)	Fixtures	401.1
IAPMO Z1000-2007	Prefabricated Septic Tanks	DWV Components	Appendix K 5 (N)
IAPMO Z1001-2007	Prefabricated Gravity Grease Interceptors	Fixtures	1014.3.4.1
ICC A117.1-2003*	Accessible and Usable Buildings and Facilities	Miscellaneous	Table 4-1, 413.0
ISEA Z358.1-2004*	Emergency Eyewash and Shower Equipment	Miscellaneous	402.5
ISO Guide 65-1996	General Requirements for Bodies Operating Product Certification Systems	Certification	301.0
MSS SP-25-1998*	Standard Marking System for Valves, Fittings, Flanges, and Unions	Miscellaneous	301.1.2

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
MSS SP-42-2004*	Class 150 Corrosion Resistant Gate, Globe, Angle, and Check Valves with Flanged and Butt Weld Ends	Piping, Ferrous	301.0
MSS SP-44-2006*	Steel Pipeline Flanges	Fittings	301.0
MSS SP-58-2002*	Pipe Hangers and Supports – Materials, Design, and Manufacture	Miscellaneous	1211.2.6(A), 1318.8
MSS SP-67-2002a*	Butterfly Valves	Valves	301.0
MSS SP-69-2003*	Pipe Hangers and Supports - Selection and Application	Miscellaneous	301.0, 1318.8
MSS SP-70-2006*	Gray Iron Gate Valves, Flanged and Threaded Ends	Valves	301.0
MSS SP-71-2005*	Gray Iron Swing Check Valves, Flanged and Threaded Ends	Valves	301.0
MSS SP-72-1999*	Ball Valves with Flanged or Butt-Welding Ends for General Service	Valves	301.0
MSS SP-78-2005a*	Gray Iron Plug Valves, Flanged and Threaded Ends	Valves	301.0
MSS SP-80-2003*	Bronze Gate, Globe, Angle, and Check Valves	Valves	301.0
MSS SP-83-2006*	Class 3000 Steel Pipe Unions Socket Welding and Threaded	Joints	301.0
MSS SP-89-2003*	Pipe Hangers and Supports - Fabrication and Installation Practices	Miscellaneous	1211.2.6, 1318.8
MSS SP-104-2003*	Wrought Copper Solder Joint Pressure Fittings	Fittings	316.1.3
MSS SP-106-2003*	Cast Copper Alloy Flanges and Flanged Fittings Class 125, 150, and 300	Fittings	301.0
MSS SP-109-1997 (R2006)*	Welded Fabricated Copper Solder Joint Pressure Fittings	Fittings	316.1.3
MSS SP-123-1998 (R2006)*	Non-Ferrous Threaded and Solder-Joint Unions for Use with Copper Water Tube	Joints	316.1.3
NFPA 13R-2007*	Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height	Miscellaneous	301.0
NFPA 13D-2007*	Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes	Miscellaneous	301.0
NFPA 31-2006*	Installation of Oil-Burning Equipment	Miscellaneous	506.3, 1202.0
NFPA 54/Z223.1-2006*	National Fuel Gas Code (same as ANSI Z 223.1)	Fuel Gas	Chapter 5, Chapter 12
NFPA 58-2004*	Liquefied Petroleum Gas Code	Fuel Gas	1209.5.9(D), 1213.0, 1209.5.4.4
NFPA 85-2007*	Boiler and Combustion Systems Hazards Code	Appliances	506.4.1
NFPA 99- 2005*	Health Care Facilities	Piping	Chapter 13
NFPA 99C-2005*	Gas and Vacuum Systems	Piping	320.0, Chapter 13
NFPA 130-2007*	Fixed Guideway Transit and Passenger Rail Systems	Miscellaneous	301.0
NFPA 211-2006*	Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances	Miscellaneous	508.6.2, 510.5.1.1, 510.5.1.2, 510.5.1.3, 510.5.4
NFPA 502-2008*	Road Tunnels, Bridges, and Other Limited Access Highways	Miscellaneous	301.0
NSF 2-2007	Food Equipment Appliances	Appliances	301.0
NSF 3-2007*	Commercial Warewashing Equipment	Appliances	401.1

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
NSF 4-2007e	Commercial Cooking, Rethermalization, and Powered Hot Food Holding and Transport Equipment	Appliances	301.0
NSF 5-2005*	Water Heaters, Hot Water Supply Boilers, and Heat Recovery Equipment	Appliances	301.0
NSF 12-2005*	Automatic Ice Making Equipment	Appliances	401.0
NSF 14-2007*	Plastic Piping System Components and Related Materials	Piping, Plastic	301.1.1, 604.1, 701.1, 701.2, 903.1, 1102.1, 1102.2, 1102.3, 1102.4
NSF 18-2007*	Manual Food and Beverage Dispensing Equipment	Appliances	603.4.12
NSF 29-2007*	Detergent and Chemical Feeders for Commercial Spray-Type Dishwashing Machines	Appliances	401.1
NSF 40-2005*	Residential Wastewater Treatment Systems	DWV Components	305.2, 713.2, 713.6
NSF 41-2005*	Non-Liquid Saturated Treatment Systems	DWV Components	305.2, 713.2, 713.6
NSF 42-2007e*	Drinking Water Treatment Units–Aesthetic Effects	Appliances	610.2, 611.1
NSF 44-2007*	Residential Cation Exchange Water Softeners	Appliances	610.2, 611.1
NSF 46-2007*	Evaluation of Components and Devices Used in Wastewater Treatment Systems	DWV Components	713.2, 713.6
NSF 53-2007a*	Drinking Water Treatment Units–Health Effects	Appliances	610.2, 611.1
NSF 55-2007	Ultraviolet Microbiological Water Treatment Systems	Appliances	301.0
NSF 58-2007*	Reverse-Osmosis Drinking Water Treatment Systems	Appliances	603.4.13, 611.1, 611.2, 611.3
NSF 61-2007a*	Drinking Water System Components– Health Effects	Miscellaneous	401.3, 604.1, 605.1, 611.3
NSF 62-2007*	Drinking Water Distillation Systems	Appliances	611.1
NSF 169-2007	Special Purpose Food Equipment and Devices	Appliances	301.0
PDI G-101-2007	Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data	Fixtures	1014.1, 1014.2.1
PDI-WH 201-2006	Water Hammer Arresters	Miscellaneous, Water Supply Component	609.10
PSAI Z4.1-1986 (R2005)*	Sanitation In Places of Employment - Minimum Requirements	Miscellaneous	Table 4-1 (Note 6)
SAE J 512-1997	Automotive Tube Fittings	Fittings	301.0
SAE J 1670-2005	Type F Clamps for Plumbing Applications	Joints	301.0
TCNA A118.10-2005*	Load, Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations	Fixtures	411.5, 411.8
TCNA A137.1-1988*	Ceramic Tile (surfaces)	Miscellaneous	411.5, 411.8
UL 70-2001	Septic Tanks, Bituminous Coated Metal	DWV Components	Appendix K-5 (M)
UL 80-2007*	Steel Tanks for Oil-Burner Fuel	Miscellaneous	506.3, 1202.0
UL 103-2001*	Factory-Built Chimneys for Residential Type and Building Heating Appliances (with revisions through June 30, 2006)	Miscellaneous	502.3, 510.5.1.1
UL 125-2007*	Valves for Anhydrous Ammonia and LP-Gas (Other than Safety Relief with revisions through September 17, 2001)	Valves	1211.5(6), 1211.5.2

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
UL 132-2007*	Safety Relief Valves for Anhydrous Ammonia and LP-Gas (with revisions through November 15, 2002)	Valves	1211.5(6), 1211.5.2
UL 144-1999*	LP-Gas Regulators (with revisions through January 18, 2002)	Valves	1209.7
UL 174-2004*	Household Electric Storage Tank Water Heaters (with revisions through May 19, 2006)	Appliances	501.0, 506.1, 506.2
UL 252-2003*	Compressed Gas Regulators	Valves	1209.7
UL 263-2003*	Fire Tests of Building Construction and Materials	Miscellaneous	1505.3, 1506.3
UL 296-2003*	Oil Burners (with revisions through February 24, 2006)	Appliances	1202.0
UL 343-1997	Pumps for Oil-Burning Appliances (with revisions through May 4, 2006)	Pumps	1202.0
UL 352-2006	Constant-Level Oil Valves	Valves	1202.0
UL 378-2006	Draft Equipment	Miscellaneous	510.3, 510.3.4
UL 399-1993*	Drinking-Water Coolers (with revisions through March 3, 2006)	Appliances	301.0, 401.1
UL 404-2005	Gauges, Indicating Pressure for Compressed Gas Service	Fuel Gas	301.0
UL 429-1999	Electrically Operated Valves	Valves	301.0
UL 430-2004*	Waste Disposers (with revisions through May 9, 2006)	Appliances	401.1, 404.4, 1014.1.3
UL 441-1996*	Gas Vents (with revisions through August 9, 2006)	Fuel Gas	510.6
UL 443-2006	Steel Auxiliary Tanks for Oil-Burner Fuel	Miscellaneous	506.3, 1202.0
UL 499-2005*	Electric Heating Appliances (with revisions through March 31, 2006)	Appliances	506.1
UL 536-1997*	Flexible Metallic Hose	Fuel Gas	1212.1
UL 563-1995*	Ice Makers (with revisions through February 27, 2006)	Appliances	1305.0
UL 565-1998	Liquid-Level Gauges and Indicators for Anhydrous Ammonia and LP-Gas	Miscellaneous	1211.5(6), 1211.5.2
UL 569-1995*	Pigtails and Flexible Hose Connectors for LP-Gas (with revisions through January 31, 2001)	Fuel Gas	1212.0
UL 723-2008*	Test for Surface Burning Characteristics of Building Materials (with revisions through May 27, 2005)	Miscellaneous	701.1.2, 903.1.2, 1101.3
UL 726-1995	Oil-Fired Boiler Assemblies (with revisions through March 8, 2006)	Appliances	506.0
UL 732-1995*	Oil-Fired Storage Tank Water Heaters (with revisions through February 3, 2005)	Appliances	506.0
UL 749-1997*	Household Dishwashers (with revisions through March 31, 2003)	Appliances	401.1, 404.4
UL 778-2002*	Motor-Operated Water Pumps (with revisions through February 1, 2006)	Pumps	301.0, 401.1
UL 834-2004*	Heating, Water Supply, and Power Boilers—Electric (with revisions through March 30, 2006)	Appliances	506.0
UL 921-2006*	Commercial Dishwashers	Appliances	301.1.1, 401.1
UL 959-2001*	Medium Heat Appliance Factory Built Chimneys (with revisions through September 29, 2006)	Appliances	510.5
UL 1081-1997	Swimming Pool Pumps, Filters, and Chlorinators	Swimming Pools and Spas	USPSHTC
UL 1206-2003*	Electric Commercial Clothes Washing Equipment	Appliances	301.1.1
UL 1261-2001*	Electric Water Heaters for Pools and Tubs	Appliances	USPSHTC
UL 1331-2005	Station Inlets and Outlets	Miscellaneous	1310.15, 1310.16
UL 1453-2004*	Electric Booster and Commercial Storage Tank Water Heaters (with revisions through May 19, 2006)	Appliances	501.0, 506.0

REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
UL 1469-2006	Strength of Body and Hydraulic Pressure Loss Testing of Backflow Special Check Valves	Valves	603.1
UL 1479-2003	Fire Tests of Through-Penetration Firestops	Miscellaneous	1504.2, 1504.3, 1505.3, 1506.3
UL 1951-1994*	Electric Plumbing Accessories (with revisions through October 22, 2003)	Miscellaneous	301.0
UL 2157-1997	Electric Clothes Washing Machines and Extractors	Appliances	301.0
WQA S-300-2000	Point-of-Use Low Pressure Reverse Osmosis Drinking Water Systems	Appliances	603.4.13

Notes:* ANSI Approved

- 1 Although this standard is referenced in Table 14-1, some of the pipe, tubing, fittings, valves, or fixtures included in the standard are not acceptable for use under the provisions of the California Plumbing Code.
- 2 See Section 316.1.3 for restriction.
- 3 Alloy C85200 for cleanout plugs.
- 4 Limited to domestic sewage.
- 5 Type II only.
- 6 ASSE 1066 is not intended to limit the maximum outlet temperature at point of use.
- 7 See Section 315.0 for trenching, excavation, and backfilling requirements when installing building drains and sewers. Engineers may wish to consult ASTM D2321 when preparing plans and specifications for sewer mains or specific projects.

APPENDIX K

PRIVATE SEWAGE DISPOSAL SYSTEMS

K 1.0 Private Sewage Disposal – General.

(A) Where permitted by Section 713.0, the building sewer shall be permitted to be connected to a private sewage disposal system complying with the provisions of this appendix. The type of system shall be determined on the basis of location, soil porosity, and groundwater level, and shall be designed to receive all sewage from the property. The system, except as otherwise approved, shall consist of a septic tank with effluent discharging into a subsurface disposal field, into one (1) or more seepage pits, or into a combination of subsurface disposal field and seepage pits. The Authority Having Jurisdiction shall be permitted to grant exceptions to the provisions of this appendix for permitted structures that have been destroyed due to fire or natural disaster and that cannot be reconstructed in compliance with these provisions provided that such exceptions are the minimum necessary.

(B) Where the quantity or quality of the sewage is such that the above system cannot be expected to function satisfactorily for commercial, agricultural, and industrial plumbing systems; for installations where appreciable amounts of industrial or indigestible wastes are produced; for occupancies producing abnormal quantities of sewage or liquid waste; or when grease interceptors are required by other parts of this code, the method of sewage treatment and disposal shall be first approved by the Authority Having Jurisdiction. Special sewage disposal systems for minor, limited, or temporary uses shall be first approved by the Authority Having Jurisdiction.

(C) Disposal systems shall be designed to utilize the most porous or absorptive portions of the soil formation. Where the groundwater level extends to within twelve (12) feet (3,658 mm) or less of the ground surface or where the upper soil is porous and the underlying stratum is rock or impervious soil, a septic tank and disposal field system shall be installed.

(D) Disposal systems shall be located outside of flood hazard areas.

Exception: Where suitable sites outside of flood hazard areas are not available, disposal systems shall be permitted to be located in flood hazard areas on sites where the effects of inundation under conditions of the design flood are minimized.

(E) All private sewage disposal systems shall be so designed that additional seepage pits or subsurface drain fields, equivalent to not less than one-hundred (100) percent of the required original system, shall be permitted to be installed where the original system cannot absorb all the sewage. No division of the lot or erection of structures on the lot shall be made if such division or structure impairs the usefulness of the one-hundred (100) percent expansion area.

(F) No property shall be improved in excess of its capacity to properly absorb sewage effluent by the means provided in this code.

Exception: The Authority Having Jurisdiction shall be permitted to, at its discretion, approve an alternate system.

(G) No private sewage disposal system, or part thereof, shall be located in any lot other than the lot that is the site of the building or structure served by such private sewage disposal system, nor shall any private sewage disposal system or part thereof be located at any point having less than the minimum distances indicated in Table K-1.

Nothing contained in this code shall be construed to prohibit the use of all or part of an abutting lot to provide additional space for a private sewage disposal system or part thereof when proper cause, transfer of ownership, or change of boundary not in violation of other requirements has been first established to the satisfaction of the Authority Having Jurisdiction. The instrument recording such action shall constitute an agreement with the Authority Having Jurisdiction, which shall clearly state and show that the areas so joined or used shall be maintained as a unit during the time they are so used. Such agreement shall be recorded in the office of the County Recorder as part of the conditions of ownership of said properties and shall be binding on all heirs, successors, and assigns to such properties. A copy of the instrument recording such proceedings shall be filed with the Authority Having Jurisdiction.

(H) When there is insufficient lot area or improper soil conditions for adequate sewage disposal for the building or land use proposed, and the Authority Having Jurisdiction so finds, no building permit shall be issued and no private sewage disposal shall be permitted. Where space or soil conditions are critical, no building permit shall be issued until engineering data and test reports satisfactory to the Authority Having Jurisdiction have been submitted and approved.

(I) Nothing contained in this appendix shall be construed to prevent the Authority Having Jurisdiction from requiring compliance with additional requirements than those contained herein, where such additional requirements are essential to maintain a safe and sanitary condition.

(J) Alternate systems shall be permitted to be used only by special permission of the Authority Having Jurisdiction after being satisfied of their adequacy. This authorization is based on extensive field and test data from conditions similar to those at the proposed site, or require such additional data as necessary to provide assurance that the alternate system will produce continuous and long-range results at the proposed site, not less than equivalent to systems which are specifically authorized.

PRIVATE SEWAGE DISPOSAL SYSTEMS

If demonstration systems are to be considered for installation, conditions for installation, maintenance, and monitoring at each such site shall first be established by the Authority Having Jurisdiction.

Approved aerobic systems shall be permitted to be substituted for conventional septic tanks provided the Authority Having Jurisdiction is satisfied that such systems will produce results not less than equivalent to septic tanks, whether their aeration systems are operating or not.

K 2.0 Capacity of Septic Tanks.

The liquid capacity of all septic tanks shall conform to Tables K-2 and K-3 as determined by the number of bedrooms or apartment units in dwelling occupancies and the estimated waste/sewage design flow rate or the number of plumbing fixture units as determined from Table 7-3 of this Code, whichever is greater in other building occupancies. The capacity of any one (1) septic tank and its drainage system shall be limited by the soil structure classification in Table K-4, and as specified in Table K-5.

K 3.0 Area of Disposal Fields and Seepage Pits.

The minimum effective absorption area in disposal fields in square feet (m²), and in seepage pits in square feet (m²) of sidewall, shall be predicated on the required septic tank capacity in gallons (liters) and/or estimated waste/sewage flow rate, whichever is greater, and shall conform to Table K-4 as determined for the type of soil found in the excavation, and shall be as follows:

- (1) When disposal fields are installed, a minimum of one-hundred and fifty (150) square feet (14 m²) of trench bottom shall be provided for each system exclusive of any hard pan, rock, clay, or other impervious formations. Sidewall area in excess of the required twelve (12) inches (305 mm) and a maximum of thirty-six (36) inches (914 mm) below the leach line shall be permitted to be added to the trench bottom area when computing absorption areas.
- (2) Where leaching beds are permitted in lieu of trenches, the area of each such bed shall be not less than fifty (50) percent greater than the tabular requirements for trenches. Perimeter sidewall area in excess of the required twelve (12) inches (305 mm) and a maximum of thirty-six (36) inches (914 mm) below the leach line shall be permitted to be added to the trench bottom area when computing absorption areas.
- (3) No excavation for a leach line or leach bed shall be located within five (5) feet (1,524 mm) of the water table nor to a depth where sewage may contaminate the underground water stratum that is usable for domestic purposes.

Exception: In areas where the records or data indicate that the groundwaters are grossly degraded, the five (5) foot (1,524 mm) separation requirement shall be permitted to be reduced by the Authority Having Jurisdiction. The applicant shall supply evidence of groundwater depth to the satisfaction of the Authority Having Jurisdiction.

- (4) The minimum effective absorption area in any seepage pit shall be calculated as the excavated sidewall area below the inlet exclusive of any hardpan, rock, clay, or other impervious formations. The minimum required area of porous formation shall be provided in one (1) or more seepage pits. No excavation shall extend within ten (10) feet (3,048 mm) of the water table nor to a depth where sewage contaminate underground water stratum that is usable for domestic purposes.

Exception: In areas where the records or data indicate that the groundwaters are grossly degraded, the ten (10) foot (3,048 mm) separation requirement shall be permitted to be reduced by the Authority Having Jurisdiction.

The applicant shall supply evidence of groundwater depth to the satisfaction of the Authority Having Jurisdiction.

- (5) Leaching chambers shall be sized on the bottom absorption area (nominal unit width) in square feet. The required area shall be calculated using Table K-4 with a 0.70 multiplier.

K 4.0 Percolation Test.

- (A) Wherever practicable, disposal field and seepage pit sizes shall be computed from Table K-4. Seepage pit sizes shall be computed by percolation tests, unless use of Table K-4 is approved by the Authority Having Jurisdiction.
- (B) In order to determine the absorption qualities of seepage pits and of questionable soils other than those listed in Table K-4, the proposed site shall be subjected to percolation tests acceptable to the Authority Having Jurisdiction.
- (C) When a percolation test is required, no private disposal system shall be permitted to serve a building if that test shows the absorption capacity of the soil is less than 0.83 gallons per square foot (33.8 L/m²) or more than 5.12 gallons per square foot (208 L/m²) of leaching area per 24 hours. If the percolation test shows an absorption rate greater than 5.12 gallons per square foot (208 L/m²) per 24 hours, a private disposal system shall be permitted if the site does not overlie groundwaters protected for drinking water supplies, a minimum thickness of two (2) feet (610 mm) of the native soil below the entire proposed system is replaced by loamy sand, and the system design is based on percolation tests made in the loamy sand.

K 5.0 Septic Tank Construction.

- (A) Plans for all septic tanks shall be submitted to the Authority Having Jurisdiction for approval. Such plans shall show all dimensions, reinforcing, structural calculations, and such other pertinent data as required.
- (B) Septic tank design shall be such as to produce a clarified effluent consistent with accepted standards and shall provide adequate space for sludge and scum accumulations.
- (C) Septic tanks shall be constructed of solid durable materials not subject to excessive corrosion or decay and shall be watertight.

Unlawful installation
 or connection 602.0
 Valves 605.0
 Treatment units 603.4.13, 611.0
 Water closets 225.0, 316.3, 402.2,
 402.2.1, 402.2.2, 403.0,
 404.1, 405.1, 407.5, 408.0,
 601.1, 603.4.1-3, 610.3,
 910.7, Tables 6-5, 7-3
 Water-conserving fixtures and fittings 402.0
 Water hammer arrestors 225.0, 609.10
 Water heaters:
 Access 509.3, 509.4
 Clearances 505.3
 Combustion air for 507.0
 Connectors 604.13.2, 604.14
 Definition 502.15
 Gas 508.0
 Inspection 504.2
 Location 505.1, 508.14,
 508.15, 508.16
 Oil-burning and other 506.0
 Pressure-limiting devices 505.4
 Pressure-relief valve 505.6, 608.3-6
 Protection 505.4-6, 508.2,
 508.8, 508.10
 Relief valve 508.5
 Temperature-limiting devices 505.5, 505.6
 Vents 510.0
 Waterproofing:
 Fixture setting 407.2
 Flashings 313.8, 906.5
 Openings 313.8
 Water-sealed traps see Traps
 Water softener 610.2
 Water test:
 Building sewers 103.5, 723.0
 Plumbing, drainage, and
 vent system 103.5, 712.2
 Water treatment device see Water Conditioning
 Weep holes, sub-drain of
 shower stalls 411.8
 Weight of flashing, lead 701.3, 906.6
 Weights and quality of materials 301.0, 604.0,
 701.0, 906.6
 Welded lead joints 316.1.7, 705.1.3

Welder, pipe, definition 225.0
 Welding or brazing joints 316.1.7, 705.1.3
 Well, distance from sewage
 disposal 721.1, Table 7-7
 Wet vent 225.0, 316.2.2, 908.0, 910.6
 Whirlpool bathtubs 225.0, 414.0
 Window, termination of vents
 from 906.2
 Wiped joints 316.1.2, 705.2.4
 Wooden sinks and
 tile wash trays or sinks 405.3
 Work, concealed 103.5.1-2, 504.2,
 1204.3, 1211.3,
 Work, existing 101.4-5, 207.0
 Work, exposed,
 where required 504.2, 1204.3, 1211.3
 Workmanship 310.0, 609.1, 1209.5.5, 1315.0
 Wrapping of pipe 609.3.1
 Wrought iron (galvanized) 316.1.2, 604.5,
 604.6, 701.1.1
 705.2.3-4, 707.1,
 903.1, Table 6-4
 Wye connections 404.4, 706.0,
 707.5, 707.6,
 710.4, 719.4,
 907.2, 909.0

- X -

X-ray darkrooms 811.8

- Y -

Yoke vent 227.0, 907.0

- Z -

Zinc alloy die cast components 406.4

HISTORY NOTE APPENDIX

California Plumbing Code (Title 24, Part 5, California Code of Regulations)

For prior history, see the History Note Appendix to the California Plumbing Code, 2007 Triennial Edition effective January 1, 2008.

1. (BSC 05/09, DSA-AC 03/09, DSA-SS 04/09, HCD 03/09, OSHPD 02/09, SFM 02/09) Adoption by reference of the 2009 Uniform Plumbing Code (UPC) with necessary state amendments and repeal of the 2006 edition of the UPC. Effective on January 1, 2011.

II *2. Erratum to correct errors and omissions.*