

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

**July 1, 2021**

**2019 Title 24, Part 5, California Plumbing Code**

**General Information:**

1. The date of this supplement is for identification purposes only. See the History Note Appendix on the backside or accompanying page.
2. This supplement is issued by the California Building Standards Commission in order to provide new and/or replacement pages containing recently adopted provisions for California Code of Regulations, Title 24, Part 5, the 2019 California Plumbing Code. Instructions are provided below.
3. Health and Safety Code Section 18938.5 establishes that only building standards in effect at the time of the application for a building permit may be applied to the project plans and construction. This rule applies to both adoptions of building standards for Title 24 by the California Building Standards Commission, and local adoptions and ordinances imposing building standards. The new building standards provided with the enclosed blue supplement pages must not be enforced before the effective date.
4. Not all code text on the enclosed blue supplement pages is a new building standard. New, amended, or repealed building standards are identified by margin symbols. An explanation of margin symbols is provided in the code before the Table of Contents.
5. You may wish to retain the superseded material with this revision record so that the prior wording of any section can be easily ascertained.

**Title 24, Part 5**

**Remove Existing Pages**

iii – vi  
xxv – xxxviii  
xli – xlii  
5 – 6  
9 – 14  
29 – 36  
39 – 56  
63 – 66  
71 – 78  
133 – 154  
171 – 176  
195 – 198  
209 – 212  
277 – 282

**Insert Blue-Colored Pages**

iii – vi  
xxv – xxxviii  
xli – xlii  
5 – 6  
9 – 14  
29 – 36  
39 – 56  
63 – 66  
71 – 78  
133 – 154  
171 – 176  
195 – 198  
209 – 212  
277 – 282

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

**July 1, 2021**

**2019 Title 24, Part 5, California Plumbing Code**

**Remove Existing Pages**

311 – 314  
319 – 322  
329 – 332  
483 – 484  
491 – 494  
499 – 500  
507 – 508

**Insert Blue-Colored Pages**

311 – 314  
319 – 322  
329 – 332  
483 – 484  
491 – 494  
499 – 500  
507 – 508

## PREFACE

This document is Part 5 of thirteen parts of the official triennial compilation and publication of the adoptions, amendments and repeal of administrative regulations to *California Code of Regulations, Title 24*, also referred to as the *California Building Standards Code*. Part 5 is known as the *California Plumbing Code* and incorporates, by adoption, the 2018 edition of the *Uniform Plumbing Code* of the International Association of Plumbing and Mechanical Officials with the California amendments.

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

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

California Building Standards Commission  
2525 Natomas Park Drive, Suite 130  
Sacramento, CA 95833-2936  
Phone: (916) 263-0916  
Web Page: [www.dgs.ca.gov/bsc](http://www.dgs.ca.gov/bsc)  
Email: [cbsc@dgs.ca.gov](mailto:cbsc@dgs.ca.gov)

## ACKNOWLEDGEMENTS

The 2019 *California Plumbing Code* (Code) was developed through the outstanding collaborative efforts of the Department of Housing and Community Development, Division of State Architect, Office of the State Fire Marshal, Office of Statewide Health Planning and Development, California Energy Commission, California Department of Public Health, California State Lands Commission, Board of State and Community Corrections, The Department of Water Resources, The State Historical Building Safety Board, and the California Building Standards Commission (Commission).

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

*Governor Edmund G. Brown Jr.*

*Members of the Building Standards Commission*  
*Secretary Marybel Batjer – Chair*  
*Steven Winkel – Vice-Chair*

<i>Rajesh Patel</i>	<i>Juvilyn Alegre</i>
<i>Elley Klausbruckner</i>	<i>Erick Mikiten</i>
<i>Larry Booth</i>	<i>Kent Sasaki</i>
<i>Peter Santillan</i>	

*Mia Marvelli – Executive Director*  
*Michael L. Nearman – Deputy Executive Director*

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

## California Code of Regulations Title 24

### California Agency Information Contact List

The following state agencies may propose building standards for publication in Title 24. Request notice of such activity with each agency of interest. See Sections 1.2.0 through 1.14.0 of the California Building Code (Part 2 of Title 24) for more detailed information on the regulatory jurisdiction of each state agency.

#### **Board of State and Community Corrections**

www.bscc.ca.gov .....(916) 445-5073  
Local Adult and Juvenile  
Detention Facility Standards

#### **California Building Standards Commission**

www.dgs.ca.gov/bsc .....(916) 263-0916  
State Buildings including UC and  
CSU Buildings, Parking Lot and Walkway  
Lighting, Green Building Standards  
for Non-residential Buildings

#### **California Energy Commission**

www.energy.ca.gov .....**Energy Hotline** (800) 772-3300  
Building Efficiency Standards  
Appliance Efficiency Standards  
Compliance Manual/Forms

#### **California State Lands Commission**

www.slc.ca.gov .....(562) 499-6312  
Marine Oil Terminals Standards

#### **California State Library**

www.library.ca.gov .....(916) 323-9843

#### **Department of Consumer Affairs:**

##### ***Acupuncture Board***

www.acupuncture.ca.gov .....(916) 515-5200  
Office Standards

##### ***Board of Pharmacy***

www.pharmacy.ca.gov .....(916) 518-3100  
Pharmacy Standards

##### ***Bureau of Barbering and Cosmetology***

www.barbercosmo.ca.gov .....(800) 952-5210  
Barber and Beauty Shop,  
and College Standards

##### ***Bureau of Household Goods and Services***

www.bhgs.dca.ca.gov .....(916) 999-2041  
Insulation Testing Standards

##### ***Structural Pest Control Board***

www.pestboard.ca.gov .....(800) 737-8188  
Structural Standards

##### ***Veterinary Medical Board***

www.vmb.ca.gov .....(916) 515-5220  
Veterinary Hospital Standards

#### **Department of Food and Agriculture**

www.cdffa.ca.gov .....(916) 900-5004  
Meat & Poultry Packing Plant Standards

.....(916) 900-5008  
Rendering & Collection Center Standards, Dairy Standards

#### **Department of Housing and Community Development**

www.hcd.ca.gov .....(800) 952-8356  
Residential - Hotels, Motels, Apartments,  
Single-Family Dwellings; and  
Permanent Structures in Mobilehome &  
Special Occupancy Parks

.....(916) 445-3338  
Factory-Built Housing, Manufactured Housing &  
Commercial Modular

Mobilehome - Permits & Inspections  
Northern Region - (916) 255-2501  
Southern Region - (951) 782-4420

.....(800) 952-8356  
Employee Housing Standards

#### **Department of Public Health**

www.dph.ca.gov .....(916) 449-5661  
Organized Camps Standards  
Public Swimming Pools Standards

#### **Department of Water Resources**

www.water.ca.gov .....(916) 651-7025  
Recycled Water Building Standards

#### **Division of the State Architect**

www.dgs.ca.gov/dsa .....(916) 445-8100

##### ***Access Compliance***

##### ***Fire and Life Safety***

##### ***Structural Safety***

Public Schools Standards  
Essential Services Building Standards  
Community College Standards

##### ***State Historical Building Safety Board***

www.dgs.ca.gov .....(916) 445-8100  
Historical Rehabilitation, Preservation,  
Restoration or Relocation Standards

**California Code of Regulations Title 24**  
**California Agency Information Contact List (continued)**

**Office of Statewide Health Planning and Development**

*www.oshpd.ca.gov*.....(916) 440-8300  
*Hospital Standards*  
*Skilled Nursing Facility Standards &*  
*Clinic Standards*

**Office of the State Fire Marshal**

*www.osfm.fire.ca.gov* .....(916) 568-3800  
*Code Development and Analysis*  
*Fire Safety Standards*

# How to Distinguish Between Model Code Language and California Amendments

To distinguish between model code language and the incorporated California amendments, including exclusive California standards, California amendments will appear in italic font print.

**[BSC]** This is an example of a state agency acronym used to identify an adoption or amendment by the agency. The acronyms will appear at California Amendments and in the Matrix Adoption Tables. Sections 1.2.0 through 1.14.0 in Chapter 1, Division 1 of this code, explain the used acronyms, the application of state agency adoptions to building occupancies or building features, the enforcement agency as designated by state law (may be the state adopting agency or local building or fire official), the authority in state law for the state agency to make the adoption, and the specific state law being implemented by the agency's adoption. The following acronyms are used in Title 24 to identify the state adopting agency making an adoption.

## Legend of Acronyms of Adopting State Agencies

BSC	California Building Standards Commission (see Section 1.2.0)
BSC-CG	California Building Standards Commission-CALGreen (see Section 1.2.3)
BSCC	Board of State and Community Corrections (see Section 1.3.0)
SFM	Office of the State Fire Marshal (see Section 1.11.0)
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 1R	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)
OSHPD 5	Office of Statewide Health Planning and Development (see Section 1.10.5)
DPH	Department of Public Health (see Section 1.7.0)
AGR	Department of Food and Agriculture (see Section 1.6.0)
CEC	California Energy Commission (see Section 100 in Part 6, the California Energy Code)
CA	Department of Consumer Affairs (see Section 1.6.0): Board of Barbering and Cosmetology Board of Examiners in Veterinary Medicine Board of Pharmacy Acupuncture Board Bureau of Household Goods and Services
SPCB	Structural Pest Control Board
SL	State Library (see Section 1.12.0)
SLC	State Lands Commission (see Section 1.14.0)
DWR	Department of Water Resources (see Section 1.13.0 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 iv of this code.

To learn more about the use of this code refer to the following pages. Training materials on the application and use of this code are available at the website of the California Building Standards Commission [www.dgs.ca.gov/bsc](http://www.dgs.ca.gov/bsc).

# TABLE OF CONTENTS

<b>CHAPTER 1</b>	<b>DIVISION I</b>		
	<b>CALIFORNIA ADMINISTRATION . . . . 1</b>		
1.1.0	General . . . . . 3	1.8.8	Appeals Board . . . . . 11
1.1.1	Title . . . . . 3	1.8.9	Unsafe Buildings or Structures . . . 11
1.1.2	Purpose . . . . . 3	1.8.10	Other Building Regulations . . . . . 12
1.1.3	Scope . . . . . 3	1.9.0	Division of the State Architect . . . . 12
1.1.4	Appendices . . . . . 4	1.9.1	Division of the State Architect – Access Compliance . . . . . 12
1.1.5	Referenced Codes . . . . . 4	1.9.2	Division of the State Architect – Structural Safety . . . . . 12
1.1.6	Non-Building Standards, Orders, and Regulations . . . . . 4	1.10.0	Office of Statewide Health Planning and Development . . . . . 13
1.1.7	Order of Precedence and Use . . . . 4	1.10.1	OSHPD 1 and OSHPD 1R . . . . . 13
1.1.8	City, County, or City and County Amendments, Additions or Deletions . . . . . 4	1.10.2	OSHPD 2 . . . . . 13
1.1.9	Effective Date of this Code . . . . . 5	1.10.3	OSHPD 3 . . . . . 13
1.1.10	Availability of Codes . . . . . 5	1.10.4	OSHPD 4 . . . . . 14
1.1.11	Format . . . . . 5	1.10.5	OSHPD 5 . . . . . 14
1.1.12	Validity . . . . . 5	1.11.0	Office of the State Fire Marshal . . . 14
1.2.0	Building Standards Commission . . . 5	1.11.1	SFM-Office of the State Fire Marshal . . . . . 14
1.2.1	BSC . . . . . 5	1.11.2	Duties and Powers of the Enforcing Agency . . . . . 15
1.2.2	BSC-CG . . . . . 6	1.11.3	Construction Documents . . . . . 17
1.2.3	Alternate Materials, Design, and Methods of Construction and Equipment . . . . . 6	1.11.4	Fees . . . . . 18
1.3.0	Board of State and Community Corrections . . . . . 6	1.11.5	Inspections . . . . . 18
1.3.2	Adopting Agency Identification . . . . 6	1.11.6	Certificate of Occupancy . . . . . 18
1.4.0	Department of Consumer Affairs . . . 7	1.11.7	Temporary Structures and Uses . . 18
1.4.2	Adopting Agency Identification . . . . 7	1.11.8	Service Utilities . . . . . 19
1.5.0	Reserved for California Energy Commission . . . . . 7	1.11.9	Stop Work Order . . . . . 19
1.6.0	Department of Food and Agriculture . . . . . 7	1.11.10	Unsafe Buildings, Structures, and Equipment . . . . . 19
1.6.2	Adopting Agency Identification . . . . 7	1.11.11	Adopting Agency Identification . . . 19
1.7.0	Department of Public Health . . . . . 7	1.12.0	Reserved for the State Librarian . . 19
1.7.2	Adopting Agency Identification . . . . 7	1.13.0	Department of Water Resources (DWR) . . . . . 19
1.8.0	Department of Housing and Community Development . . . . . 7	1.13.1	Application . . . . . 19
1.8.1	Purpose . . . . . 7	1.13.2	Adopting Agency Identification . . . 19
1.8.2	Authority and Abbreviations . . . . . 7	1.14.0	Reserved for the State Lands Commission . . . . . 19
1.8.3	Local Enforcing Agency . . . . . 8		
1.8.4	Permits, Fees, Applications, and Inspections . . . . . 9	<b>CHAPTER 1</b>	<b>DIVISION II</b>
1.8.5	Right of Entry for Enforcement . . . . 10	101.0	<b>ADMINISTRATION . . . . . 21</b>
1.8.6	Local Modification by Ordinance or Regulation . . . . . 10	101.1	General . . . . . 21
1.8.7	Alternate Materials, Designs, Tests, and Methods of Construction . . . . . 10	101.2	Title . . . . . 21
		101.3	Scope . . . . . 21
		101.4	Purpose . . . . . 21
		101.5	Unconstitutional . . . . . 21
		102.0	Validity . . . . . 21
			Applicability . . . . . 21

102.1	Conflicts Between Codes . . . . .	21	301.4	Flood Hazard Areas . . . . .	47
102.2	Existing Installations . . . . .	21	301.5	Alternative Engineered Design . . .	48
102.3	Maintenance . . . . .	21	301.6	<i>One- and Two-Family Dwellings</i> . . .	48
102.4	Additions, Alterations, Renovations, or Repairs . . . . .	21	301.7	<i>OSHPD 1R</i> . . . . .	48
102.5	Health and Safety . . . . .	21	302.0	Iron Pipe Size (IPS) Pipe . . . . .	48
102.6	Changes in Building Occupancy . .	21	302.1	General . . . . .	48
102.7	Moved Structures . . . . .	21	303.0	Disposal of Liquid Waste . . . . .	48
102.8	Appendices . . . . .	21	303.1	General . . . . .	48
103.0	Duties and Powers of the Authority Having Jurisdiction . . . .	22	304.0	Connections to Plumbing System Required . . . . .	48
103.1	General . . . . .	22	304.1	General . . . . .	48
103.2	Liability . . . . .	22	305.0	Damage to Drainage System or Public Sewer . . . . .	48
103.3	Applications and Permits . . . . .	22	305.1	Unlawful Practices . . . . .	48
103.4	Right of Entry . . . . .	22	306.0	Industrial Wastes . . . . .	49
104.0	Permits . . . . .	22	306.1	Detrimental Wastes . . . . .	49
104.1	Permits Required . . . . .	22	306.2	Safe Discharge . . . . .	49
104.2	Exempt Work . . . . .	22	307.0	Location . . . . .	49
104.3	Application for Permit . . . . .	22	307.1	System . . . . .	49
104.4	Permit Issuance . . . . .	23	307.2	Ownership . . . . .	49
104.5	Fees . . . . .	24	308.0	Improper Location . . . . .	49
105.0	Inspections and Testing . . . . .	24	308.1	General . . . . .	49
105.1	General . . . . .	24	309.0	Workmanship . . . . .	49
105.2	Required Inspections . . . . .	24	309.1	Engineering Practices . . . . .	49
105.3	Testing of Systems . . . . .	25	309.2	Concealing Imperfections . . . . .	49
105.4	Connection to Service Utilities . . .	25	309.3	Burred Ends . . . . .	49
106.0	Violations and Penalties . . . . .	25	309.4	Installation Practices . . . . .	49
106.1	General . . . . .	25	309.5	Sound Transmission . . . . .	49
106.2	Notices of Correction or Violation . .	25	310.0	Prohibited Fittings and Practices . . . . .	49
106.3	Penalties . . . . .	25	310.1	Fittings . . . . .	49
106.4	Stop Orders . . . . .	26	310.2	Drainage and Vent Piping . . . . .	49
106.5	Authority to Disconnect Utilities in Emergencies . . . . .	26	310.3	Waste Connection . . . . .	49
106.6	Authority to Condemn . . . . .	26	310.4	Use of Vent and Waste Pipes . . .	49
107.0	Board of Appeals . . . . .	26	310.5	Obstruction of Flow . . . . .	49
107.1	General . . . . .	26	310.6	Dissimilar Metals . . . . .	49
107.2	Limitations of Authority . . . . .	26	310.7	Direction of Flow . . . . .	49
Table 104.5	Plumbing Permit Fees . . . . .	27	310.8	Screwed Fittings . . . . .	49
			310.12	<i>Services/Systems and Utilities</i> . . .	50
			310.13	<i>Telephone and Data Equipment Rooms</i> . . . . .	50
<b>CHAPTER 2</b>	<b>DEFINITIONS . . . . .</b>	<b>29</b>	311.0	Independent Systems . . . . .	50
201.0	General . . . . .	31	311.1	General . . . . .	50
201.1	Applicability . . . . .	31	312.0	Protection of Piping, Materials, and Structures . . . . .	50
202.0	Definition of Terms . . . . .	31		General . . . . .	50
202.1	General . . . . .	31	312.1	General . . . . .	50
<b>CHAPTER 3</b>	<b>GENERAL REGULATIONS . . . . .</b>	<b>45</b>	312.2	Installation . . . . .	50
301.0	General . . . . .	47	312.3	Building Sewer and Drainage Piping . . . . .	50
301.1	Applicability . . . . .	47	312.4	Corrosion, Erosion, and Mechanical Damage . . . . .	50
301.2	Minimum Standards . . . . .	47	312.5	Protectively Coated Pipe . . . . .	50
301.3	Alternate Materials and Methods of Construction Equivalency . . . . .	47			



312.6	Freezing Protection . . . . .	50	401.1	Applicability . . . . .	57
312.7	Fire-Resistant Construction . . . . .	50	401.2	Quality of Fixtures . . . . .	57
312.8	Waterproofing of Openings . . . . .	50	401.3	<i>Water-Conserving Fixtures and Fittings</i> . . . . .	57
312.9	Steel Nail Plates . . . . .	50	402.0	Installation . . . . .	57
312.10	Sleeves . . . . .	50	402.1	Cleaning . . . . .	57
312.11	Structural Members . . . . .	50	402.2	Joints . . . . .	57
312.12	Rodentproofing . . . . .	50	402.3	Securing Fixtures . . . . .	57
313.0	Hangers and Supports . . . . .	51	402.4	Wall-Hung Fixtures . . . . .	57
313.1	General . . . . .	51	402.5	Setting . . . . .	57
313.2	Material . . . . .	51	402.6	Flanged Fixture Connections . . . . .	57
313.3	Suspended Piping . . . . .	51	402.7	Supply Fittings . . . . .	58
313.4	Alignment . . . . .	51	402.8	Installation . . . . .	58
313.5	Underground Installation . . . . .	51	402.9	Design and Installation of Plumbing Fixtures . . . . .	58
313.6	Hanger Rod Sizes . . . . .	51	402.10	Slip Joint Connections . . . . .	58
Table 313.6	Hanger Rod Sizes . . . . .	51	402.11	Future Fixtures . . . . .	58
313.7	Gas Piping . . . . .	51	403.0	Accessible Plumbing Facilities . . . . .	58
314.0	Trenching, Excavation, and Backfill . . . . .	51	403.1	General . . . . .	58
314.1	Trenches . . . . .	51	403.2	Fixtures and Fixture Fittings for Persons with Disabilities . . . . .	58
314.2	Tunneling and Driving . . . . .	51	403.3	Exposed Pipes and Surfaces . . . . .	58
314.3	Open Trenches . . . . .	51	404.0	Waste Fittings and Overflows . . . . .	58
314.4	Excavations . . . . .	51	404.1	Waste Fittings . . . . .	58
315.0	Joints and Connections . . . . .	51	404.2	Overflows . . . . .	58
315.1	Unions . . . . .	51	405.0	Prohibited Fixtures . . . . .	58
315.2	Prohibited Joints and Connections . . . . .	51	405.1	Prohibited Water Closets . . . . .	58
316.0	Increases and Reducers . . . . .	52	405.2	Prohibited Urinals . . . . .	58
316.1	General . . . . .	52	405.3	Miscellaneous Fixtures . . . . .	58
317.0	Food-Handling Establishments . . . . .	52	406.0	Special Fixtures and Specialties . . . . .	58
317.1	General . . . . .	52	406.1	Water and Waste Connections . . . . .	58
Table 313.3	Hangers and Supports . . . . .	52	406.2	Special Use Sinks . . . . .	59
318.0	Test Gauges . . . . .	53	406.3	Special Use Fixtures . . . . .	59
318.1	General . . . . .	53	406.4	Zinc Alloy Components . . . . .	59
318.2	Pressure Tests (10 psi or less) . . . . .	53	407.0	Lavatories . . . . .	59
318.3	Pressure Tests (greater than 10 psi to 100 psi) . . . . .	53	407.1	Application . . . . .	59
318.4	Pressure Tests (exceeding 100 psi) . . . . .	53	407.2	Water Consumption . . . . .	59
318.5	Pressure Range . . . . .	53	407.3	Limitation of Hot Water Temperature for Public Lavatories . . . . .	59
319.0	Medical Gas and Vacuum Systems . . . . .	53	407.4	Transient Public Lavatories . . . . .	59
319.1	General . . . . .	53	407.5	Waste Outlet . . . . .	59
320.0	Rehabilitation of Piping Systems . . . . .	53	407.6	Overflow . . . . .	59
320.1	General . . . . .	53	408.0	Showers . . . . .	59
321.0	<i>Essential Plumbing Provisions</i> . . . . .	53	408.1	Application . . . . .	59
322.0	<i>Psychiatric Services</i> . . . . .	53	408.2	Water Consumption . . . . .	59
323.0	<i>Plumbing Equipment Schedules</i> . . . . .	53	408.3	Individual Shower and Tub-Shower Combination Control Valves . . . . .	59
<b>CHAPTER 4</b>	<b>PLUMBING FIXTURES AND FIXTURE FITTINGS . . . . .</b>	<b>55</b>	408.4	Waste Outlet . . . . .	60
401.0	General . . . . .	57			

408.5	Finished Curb or Threshold . . . . .	60	416.2	Water Supply . . . . .	63
408.6	Shower Compartments . . . . .	60	416.3	Installation . . . . .	63
408.7	Lining for Showers and Receptors . . . . .	60	416.4	Location . . . . .	63
408.8	Public Shower Floors . . . . .	61	416.5	Drain . . . . .	63
408.9	Location of Valves and Heads . . . . .	61	417.0	Faucets and Fixture Fittings . . . . .	63
408.10	Water Supply Riser . . . . .	61	417.1	Application . . . . .	63
409.0	Bathtubs and Whirlpool Bathtubs . . . . .	61	417.2	Deck Mounted Bath/Shower Valves . . . . .	64
409.1	Application . . . . .	61	417.3	Handheld Showers . . . . .	64
409.2	Waste Outlet . . . . .	61	417.4	Faucets and Fixture Fittings with Hose Connected Outlets . . . . .	64
409.3	Overflow . . . . .	61	417.5	Separate Controls for Hot and Cold Water . . . . .	64
409.4	Limitation of Hot Water in Bathtubs and Whirlpool Bathtubs . . . . .	61	418.0	Floor Drains . . . . .	64
409.5	Backflow Protection . . . . .	61	418.1	Application . . . . .	64
409.6	Installation and Access . . . . .	61	418.2	Strainer . . . . .	64
410.0	Bidets . . . . .	61	418.3	Location of Floor Drains . . . . .	64
410.1	Application . . . . .	61	418.4	Food Storage Areas . . . . .	64
410.2	Backflow Protection . . . . .	61	418.5	Floor Slope . . . . .	64
410.3	Limitation of Water Temperature in Bidets . . . . .	61	419.0	Food Waste Disposers . . . . .	64
411.0	Water Closets . . . . .	61	419.1	Application . . . . .	64
411.1	Application . . . . .	61	419.2	Drainage Connection . . . . .	64
411.2	Water Consumption . . . . .	62	419.3	Water Supply . . . . .	64
411.3	Water Closet Seats . . . . .	62	420.0	Sinks . . . . .	64
411.4	Personal Hygiene Devices . . . . .	62	420.1	Application . . . . .	64
412.0	Urinals . . . . .	62	420.2	Water Consumption . . . . .	64
412.1	Application . . . . .	62	420.3	Pre-Rinse Spray Valve . . . . .	65
412.2	Backflow Protection . . . . .	62	420.4	Waste Outlet . . . . .	65
413.0	Flushing Devices . . . . .	62	421.0	Floor Sinks . . . . .	65
413.1	Where Required . . . . .	62	421.1	Application . . . . .	65
413.2	Flushometer Valves . . . . .	62	421.2	Strainers . . . . .	65
413.3	Flush Tanks . . . . .	63	422.0	Minimum Number of Required Fixtures . . . . .	65
413.4	Water Supply for Flush Tanks . . . . .	63	422.1	Fixture Count . . . . .	65
413.5	Overflows in Flush Tanks . . . . .	63	422.2	Separate Facilities . . . . .	65
414.0	Dishwashing Machines . . . . .	63	422.3	Fixture Requirements for Special Occupancies . . . . .	65
414.1	Application . . . . .	63	422.4	Toilet Facilities Serving Employees and Customers . . . . .	65
414.2	Backflow Protection . . . . .	63	422.5	Toilet Facilities for Workers . . . . .	66
414.3	Drainage Connection . . . . .	63	422.6	<i>Cosmetology</i> . . . . .	66
415.0	Drinking Fountains . . . . .	63	422.7	<i>Cosmetology Establishments</i> . . . . .	66
415.1	Application . . . . .	63	422.8	<i>Commissaries Serving Mobile Food Preparation Units</i> . . . . .	66
415.2	Drinking Fountain Alternatives . . . . .	63	422.9	<i>Employee Lavatories in Food Establishments</i> . . . . .	66
415.3	Drainage Connection . . . . .	63	Table 422.1	Minimum Plumbing Facilities . . . . .	67
415.4	Location . . . . .	63	Table A	Occupant Load Factor . . . . .	72
416.0	Emergency Eyewash and Shower Equipment . . . . .	63	Table 4-1	Occupant Load Factor [BSC] . . . . .	73
416.1	Application . . . . .	63	Table 4-2	Minimum Plumbing Facilities . . . . .	74

<b>CHAPTER 5</b>	<b>WATER HEATERS</b>	<b>79</b>		
501.0	General	.81	507.8	Safety Shutoff Devices for Unlisted LP-Gas Appliance Used Indoors .86
501.1	Applicability	.81	507.9	Use of Air or Oxygen Under Pressure .86
Table 501.1(1)	Water Heaters	.81	507.10	Protection of Gas Appliances from Fumes or Gases other than Products of Combustion .86
502.0	Permits	.81	507.11	Process Air .86
502.1	General	.81	507.12	Flammable Vapors .86
503.0	Inspection	.81	507.13	Installation in Residential Garages .87
503.1	Inspection of Chimneys or Vents	.81	507.14	Installation in Commercial Garages .87
503.2	Final Water Heater Inspection	.81	507.15	Installation in Aircraft Hangars .87
504.0	Water Heater Requirements	.81	507.16	Venting of Flue Gases .87
504.1	Location	.81	507.17	Extra Device or Attachment .87
504.2	Vent	.81	507.18	Adequate Capacity of Piping .87
504.3	Clearance	.81	507.19	Avoiding Strain on Gas Piping .87
Table 501.1(2)	First Hour Rating	.81	507.20	Gas Appliance Pressure Regulators .87
504.4	Pressure-Limiting Devices	.82	507.21	Venting of Gas Appliance Pressure Regulators .87
504.5	Temperature-Limiting Devices	.82	507.22	Bleed Lines for Diaphragm-Type Valves .87
504.6	Temperature, Pressure, and Vacuum Relief Devices	.82	507.23	Combination of Appliances and Equipment .88
505.0	Oil-Burning and Other Water Heaters	.82	507.24	Installation Instructions .88
505.1	Water Heaters	.82	507.25	Protection of Outdoor Appliances .88
505.2	Safety Devices	.82	507.26	Accessibility for Service .88
505.3	Oil-Fired Water Heaters	.82	507.27	Clearance to Combustible Materials .88
505.4	Indirect-Fired Water Heaters	.82	508.0	Appliances on Roofs .88
506.0	Air for Combustion and Ventilation	.82	508.1	General .88
506.1	General	.82	508.2	Installation of Appliances on Roofs .88
506.2	Indoor Combustion Air	.82	508.3	Appliances on Roofs .88
506.3	Indoor Opening Size and Location	.83	508.4	Appliances in Attics and Under-Floor Spaces .88
506.4	Outdoor Combustion Air	.83	509.0	Venting of Appliances .89
506.5	Combination Indoor and Outdoor Combustion Air	.85	509.1	Listing .89
506.6	Engineered Installations	.85	509.2	Connection to Venting Systems .89
506.7	Mechanical Combustion Air Supply	.85	509.3	Design and Construction .89
506.8	Louvers, Grilles, and Screens	.85	509.4	Type of Venting System to be Used .90
506.9	Combustion Air Ducts	.85	Table 509.4	Type of Venting System to be Used .90
507.0	Appliance and Equipment Installation Requirements	.86	509.5	Masonry, Metal, and Factory-Built Chimneys .91
507.1	Dielectric Insulator	.86	509.6	Gas Vents .92
507.2	Seismic Provisions	.86		
507.3	Appliance Support	.86		
507.4	Ground Support	.86		
507.5	Drainage Pan	.86		
507.6	Added or Converted Equipment or Appliances	.86		
507.7	Types of Gases	.86		

Table 509.6.1	Roof Slope Heights	93
509.7	Single-Wall Metal Pipe	95
Table 509.7.3.4(1)	Clearance for Connectors	95
Table 509.7.3.4(2)	Reduction of Clearances with Specified Forms of Protection	97
509.8	Through-the-Wall Vent Termination	98
509.9	Condensation Drain	99
509.10	Vent Connectors for Category I Appliances	99
Table 509.10.1.3	Minimum Thickness for Galvanized Steel Vent Connectors for Low-Heat Appliances	100
Table 509.10.1.4	Minimum Thickness for Steel Vent Connectors for Medium-Heat Appliances	100
509.11	Vent Connectors for Category II, Category III, and Category IV Appliances	101
509.12	Draft Hoods and Draft Controls	101
509.13	Manually Operated Dampers	102
509.14	Automatically Operated Vent Dampers	102
509.15	Obstructions	102
510.0	Sizing of Category I Venting Systems	102
510.1	Single Appliance Vent Table 510.1.2(1) through Table 510.1.2(6)	102
510.2	Multiple Appliance Vent Table 510.2(1) through Table 510.2(9)	103
Table 510.2.1	Vent Connector Maximum Length	104
Table 510.1.2(1)	Type B Double-Wall Gas Vent	108
Table 510.1.2(2)	Type B Double-Wall Gas Vent	111
Table 510.1.2(3)	Masonry Chimney	113
Table 510.1.2(4)	Masonry Chimney	115
Table 510.1.2(5)	Single-Wall Metal Pipe or Type B Asbestos-Cement Vent	117
Table 510.1.2(6)	Exterior Masonry Chimney	118
Table 510.2(1)	Type B Double-Wall Vent	119
Table 510.2(2)	Type B Double-Wall Vent	123
Table 510.2(3)	Masonry Chimney	125
Table 510.2(4)	Masonry Chimney	127
Table 510.2(5)	Single-Wall Metal Pipe or Type B Asbestos-Cement Vent	129
Table 510.2(6)	Exterior Masonry Chimney	129
Table 510.2(7)	Exterior Masonry Chimney	130
Table 510.2(8)	Exterior Masonry Chimney	131
Table 510.2(9)	Exterior Masonry Chimney	132

**CHAPTER 6**

601.0	General	135
601.1	Applicability	135
601.2	Hot and Cold Water Required	135
601.3	Identification of a Potable and Nonpotable Water System	135
Table 601.3.2	Minimum Length of Color Field and Size of Letters	136
601.4	<i>Schools of Cosmetology and Cosmetological Establishments</i>	136
601.5	<i>Meat and Poultry Processing Plants</i>	136
601.6	<i>Collection Centers and Facilities</i>	136
601.7	<i>Renderers</i>	137
601.8	<i>Horse Meat and Pet Food Establishments</i>	137
602.0	Unlawful Connections	137
602.1	Prohibited Installation	137
602.2	Cross-Contamination	137
602.3	Backflow Prevention	137
602.4	Approval by Authority	137
603.0	Cross-Connection Control	137
603.1	General	137
603.2	Approval of Devices or Assemblies	137
603.3	Backflow Prevention Devices, Assemblies, and Methods	137
Table 603.2	Backflow Prevention Devices, Assemblies, and Methods	138
603.4	General Requirements	140
Table 603.3.1	Minimum Air Gaps for Water Distribution	140
603.5	Specific Requirements	141
604.0	Materials	143
604.1	Pipe, Tube, and Fittings	143
Table 604.1	Materials for Building Supply and Water Distribution Piping and Fittings	144
604.2	Lead Content	145
604.3	Copper or Copper Alloy Tube	145
604.4	Hard-Drawn Copper or Copper Alloy Tubing	145
604.5	Flexible Connectors	146
604.6	Cast-Iron Fittings	146
604.7	Malleable Iron Fittings	146
604.8	Previously Used Piping and Tubing	146
604.9	Epoxy Coating	146
604.10	Plastic Materials	146
604.11	Solder	146

**WATER SUPPLY AND DISTRIBUTION**

133	General	135
135	Applicability	135
135	Hot and Cold Water Required	135
135	Identification of a Potable and Nonpotable Water System	135
136	Minimum Length of Color Field and Size of Letters	136
136	<i>Schools of Cosmetology and Cosmetological Establishments</i>	136
136	<i>Meat and Poultry Processing Plants</i>	136
136	<i>Collection Centers and Facilities</i>	136
137	<i>Renderers</i>	137
137	<i>Horse Meat and Pet Food Establishments</i>	137
137	Unlawful Connections	137
137	Prohibited Installation	137
137	Cross-Contamination	137
137	Backflow Prevention	137
137	Approval by Authority	137
137	Cross-Connection Control	137
137	General	137
137	Approval of Devices or Assemblies	137
137	Backflow Prevention Devices, Assemblies, and Methods	137
138	Backflow Prevention Devices, Assemblies, and Methods	138
140	General Requirements	140
140	Minimum Air Gaps for Water Distribution	140
141	Specific Requirements	141
143	Materials	143
143	Pipe, Tube, and Fittings	143
144	Materials for Building Supply and Water Distribution Piping and Fittings	144
145	Lead Content	145
145	Copper or Copper Alloy Tube	145
145	Hard-Drawn Copper or Copper Alloy Tubing	145
146	Flexible Connectors	146
146	Cast-Iron Fittings	146
146	Malleable Iron Fittings	146
146	Previously Used Piping and Tubing	146
146	Epoxy Coating	146
146	Plastic Materials	146
146	Solder	146

604.12	Flexible Corrugated Connectors . . .146	608.4	Pressure Relief Valves . . . . .151
604.13	Water Heater Connectors . . . . .146	608.5	Discharge Piping . . . . .151
605.0	Joints and Connections . . . . .146	608.6	Water-Heating Devices . . . . .152
605.1	Copper or Copper Alloy Pipe, Tubing, and Joints . . . . .146	608.7	Vacuum Relief Valves . . . . .152
605.2	CPVC Plastic Pipe and Joints . . .147	609.0	Installation, Testing, Unions, and Location . . . . .152
605.3	CPVC/AL/CPVC Plastic Pipe and Joints . . . . .147	609.1	Installation . . . . .152
605.4	Ductile Iron Pipe and Joints . . . .148	609.2	Trenches . . . . .152
605.5	Galvanized Steel Pipe and Joints . . . . .148	609.3	Under Concrete Slab . . . . .152
605.6	PE Plastic Pipe/Tubing and Joints . . . . .148	609.4	Testing . . . . .152
605.7	PE-AL-PE Plastic Pipe/Tubing and Joints . . . . .148	609.5	Unions . . . . .152
605.8	PE-RT . . . . .149	609.6	Location . . . . .152
605.9	PEX Plastic Tubing and Joints . . .149	609.7	Abutting Lot . . . . .152
605.10	PEX-AL-PEX Plastic Tubing and Joints . . . . .149	609.8	Low-Pressure Cutoff Required on Booster Pumps for Water Distribution Systems . . . . .153
605.11	Polypropylene (PP) Piping and Joints . . . . .149	609.9	Disinfection of Potable Water System . . . . .153
605.12	PVC Plastic Pipe and Joints . . . .149	609.10	Water Hammer . . . . .153
605.13	Stainless Steel Pipe and Joints . .150	609.11	Pipe Insulation . . . . .153
605.14	Slip Joints . . . . .150	610.0	Size of Potable Water Piping . . .153
605.15	Dielectric Unions . . . . .150	610.1	Size . . . . .153
605.16	Joints Between Various Materials . . . . .150	610.2	Pressure Loss . . . . .153
606.0	Valves . . . . .150	610.3	Quantity of Water . . . . .153
606.1	General . . . . .150	610.4	Sizing Water Supply and Distribution Systems . . . . .153
606.2	Fullway Valve . . . . .150	Table 610.3	Water Supply Fixture Units (WSFU) and Minimum Fixture Branch Pipe Sizes . . . . .154
606.3	Multidwelling Units . . . . .150	Table 610.4	Fixture Unit Table for Determining Water Pipe and Meter Sizes . . . . .155
606.4	Multiple Openings . . . . .150	610.5	Sizing per Appendices A and C . . . . .156
606.5	Control Valve . . . . .150	610.6	Friction and Pressure Loss . . . .156
606.6	Accessible . . . . .151	610.7	Conditions for Using Table 610.4 . . . . .156
606.7	Multiple Fixtures . . . . .151	610.8	Size of Meter and Building Supply Pipe Using Table 610.4 . .156
607.0	Potable Water Supply Tanks . . .151	610.9	Size of Branches . . . . .156
607.1	General . . . . .151	610.10	Sizing for Flushometer Valves . .156
607.2	Potable Water Tanks . . . . .151	Table 610.10	Flushometer Fixture Units for Water Sizing Using Table 610.3 . . . . .156
607.3	Venting . . . . .151	610.11	Sizing Systems for Flushometer Tanks . . . . .157
607.4	Overflow . . . . .151	610.12	Sizing for Velocity . . . . .157
607.5	Valves . . . . .151	610.13	Exceptions . . . . .157
608.0	Water Pressure, Pressure Regulators, Pressure Relief Valves, and Vacuum Relief Valves . . . . .151	611.0	Drinking Water Treatment Units . . . . .157
608.1	Inadequate Water Pressure . . . .151	611.1	Application . . . . .157
608.2	Excessive Water Pressure . . . .151		
608.3	Expansion Tanks, and Combination Temperature and Pressure-Relief Valves . . . .151		

611.2	Air Gap Discharge	157	701.1	Applicability	175
611.3	Connection Tubing	157	701.2	Drainage Piping	175
611.4	Sizing of Residential Softeners	157	701.3	Drainage Fittings	175
612.0	Residential Fire Sprinkler Systems	157	701.4	Continuous Wastes	175
612.1	Where Required	157	701.5	Lead	175
Table 611.4	Sizing of Residential Water Softeners	158	701.6	Caulking Ferrules	175
612.2	Types of Systems	158	701.7	Soldering Bushings	175
612.3	Sprinklers	158	Table 701.6	Caulking Ferrules	175
Table 612.3.3.1	Locations Where Intermediate Temperature Sprinklers are Required	159	Table 701.7	Soldering Bushings	175
612.4	Sprinkler Piping System	159	702.0	Fixture Unit Equivalents	175
Table 612.3.6	Minimum Separation from Obstruction	160	702.1	Trap Size	175
612.5	Sprinkler Piping Design	161	Table 701.2	Materials for Drain, Waste, Vent Pipe and Fittings	176
Table 612.5.3.2(1)	Water Service Pressure Loss ( $PL_{WS}$ )	162	Table 702.1	Drainage Fixture Unit Values (DFU)	177
Table 612.5.3.2(2)	Minimum Water Meter Pressure Loss ( $PL_m$ )	163	702.2	Intermittent Flow	178
612.6	Instructions and Signs	163	702.3	Continuous Flow	178
612.7	Inspection and Testing	163	Table 702.2(1)	Maximum Drainage Fixture Units for a Trap and Trap Arm	178
Table 612.5.3.2(3)	Elevation Loss ( $PL_e$ )	164	Table 702.2(2)	Discharge Capacity in Gallons Per Minute for Intermittent Flow Only	178
Table 612.5.3.2(4)	Allowable Pipe Length for $\frac{3}{4}$ Inch Type M Copper Water Tubing	165	703.0	Size of Drainage Piping	178
Table 612.5.3.2(5)	Allowable Pipe Length for 1 Inch Type M Copper Water Tubing	166	703.1	Minimum Size	178
Table 612.5.3.2(6)	Allowable Pipe Length for $\frac{3}{4}$ Inch IPS CPVC Pipe	167	703.2	Maximum Number of Fixture Units	178
Table 612.5.3.2(7)	Allowable Pipe Length for 1 Inch IPS CPVC Pipe	168	703.3	Sizing per Appendix C	178
Table 612.5.3.2(8)	Allowable Pipe Length for $\frac{3}{4}$ Inch PEX Tubing	169	704.0	Fixture Connections (Drainage)	178
Table 612.5.3.2(9)	Allowable Pipe Length for 1 Inch PEX Tubing	170	704.1	Inlet Fittings	178
613.0	<i>Domestic Hot-Water Distribution Systems for Health Facilities and Clinics</i>	171	704.2	Single Vertical Drainage Pipe	178
Table 613.1	<i>Hot Water Use</i>	171	704.3	Commercial Sinks	178
614.0	<i>Dialysis Water-Distribution Systems</i>	171	705.0	Joints and Connections	178
615.0	<i>Identification of Potable and Nonpotable Water Lines</i>	171	705.1	ABS and ABS Co-Extruded Plastic Pipe and Joints	178
615.1	<i>Uses Not Permitted</i>	171	705.2	Cast-Iron Pipe and Joints	178
615.4	<i>Emergency Water Supply</i>	172	Table 703.2	Maximum Unit Loading and Maximum Length of Drainage and Vent Piping	179
<b>CHAPTER 7</b>	<b>SANITARY DRAINAGE</b>	<b>173</b>	705.3	Copper or Copper Alloy Pipe (DWV) and Joints	179
<b>PART I</b>	<b>Drainage Systems</b>	<b>175</b>	705.4	Galvanized Steel Pipe and Joints	180
701.0	General	175	705.5	Polyethylene (PE) Sewer Pipe	180
			705.6	PVC and PVC Co-Extruded Plastic Pipe and Joining Methods	180
			705.7	Stainless Steel Pipe and Joints	181
			705.8	Vitrified Clay Pipe and Joints	181
			705.9	Special Joints	181
			705.10	Joints Between Various Materials	181

706.0	Changes in Direction of Drainage Flow . . . . .	181	712.0	Testing . . . . .	184
706.1	Approved Fittings . . . . .	181	712.1	Media . . . . .	184
706.2	Horizontal to Vertical . . . . .	181	712.2	Water Test . . . . .	184
706.3	Horizontal to Horizontal . . . . .	181	712.3	Air Test . . . . .	184
706.4	Vertical to Horizontal . . . . .	181	<b>PART II</b>	<b>Building Sewers</b> . . . . .	184
707.0	Cleanouts . . . . .	182	713.0	Sewer Required . . . . .	184
707.1	Plug . . . . .	182	713.1	Where Required . . . . .	184
Table 707.1	Cleanouts . . . . .	182	713.2	Private Sewage Disposal System . . . . .	184
707.2	Approved . . . . .	182	713.3	Public Sewer . . . . .	184
707.3	Watertight and Gastight . . . . .	182	713.4	Public Sewer Availability . . . . .	184
707.4	Location . . . . .	182	713.5	Permit . . . . .	185
707.5	Cleaning . . . . .	182	713.6	Lot . . . . .	185
707.6	Extension . . . . .	182	713.7	Installation . . . . .	185
707.7	Interceptor . . . . .	182	714.0	Damage to Public Sewer or Private Sewage Disposal System . . . . .	185
707.8	Access . . . . .	182	714.1	Unlawful Practices . . . . .	185
707.9	Clearance . . . . .	182	714.2	Prohibited Water Discharge . . . . .	185
707.10	Fittings . . . . .	182	714.3	Prohibited Sewer Connection . . . . .	185
707.11	Pressure Drainage Systems . . . . .	182	714.4	Commercial Food Waste Disposer . . . . .	185
707.12	Countersunk Cleanout Plugs . . . . .	182	714.5	Tanks . . . . .	185
707.13	Hubless Blind Plugs . . . . .	182	715.0	Building Sewer Materials . . . . .	185
707.14	Trap Arms . . . . .	182	715.1	Materials . . . . .	185
708.0	Grade of Horizontal Drainage Piping . . . . .	182	715.2	Joining Methods and Materials . . . . .	185
708.1	General . . . . .	182	715.3	Existing Sewers . . . . .	185
709.0	Gravity Drainage Required . . . . .	183	716.0	Markings . . . . .	185
709.1	General . . . . .	183	716.1	General . . . . .	185
710.0	Drainage of Fixtures Located Below the Next Upstream Manhole or Below the Main Sewer Level . . . . .	183	717.0	Size of Building Sewers . . . . .	185
710.1	Backflow Protection . . . . .	183	717.1	General . . . . .	185
710.2	Sewage Discharge . . . . .	183	717.2	<i>Meat and Poultry Processing Plants</i> . . . . .	185
710.3	Sewage Ejector and Pumps . . . . .	183	Table 717.1	Maximum/Minimum Fixture Unit Loading on Building Sewer Piping . . . . .	185
710.4	Discharge Line . . . . .	183	718.0	Grade, Support, and Protection of Building Sewers . . . . .	185
710.5	Size of Building Drains and Sewers . . . . .	183	718.1	Slope . . . . .	185
710.6	Backwater Valves . . . . .	183	718.2	Support . . . . .	186
710.7	Drainage and Venting Systems . . . . .	183	718.3	Protection from Damage . . . . .	186
710.8	Sump and Receiving Tank Construction . . . . .	183	719.0	Cleanouts. . . . .	186
710.9	Alarm . . . . .	183	719.1	Locations . . . . .	186
710.10	Sump and Receiving Tank Covers and Vents . . . . .	183	719.2	No Additional Cleanouts . . . . .	186
710.11	Air Tanks . . . . .	184	719.3	Building Sewer Cleanouts . . . . .	186
710.12	Grinder Pump Ejector . . . . .	184	719.4	Cleaning . . . . .	186
710.13	Macerating Toilet Systems and Pumped Waste Systems . . . . .	184	719.5	Access . . . . .	186
711.0	Suds Relief . . . . .	184	719.6	Manholes . . . . .	186
711.1	General . . . . .	184	720.0	Sewer and Water Pipes . . . . .	186

720.1	General . . . . .	186	807.2	Undiluted Condensate Waste . . . . .	192
721.0	Location . . . . .	186	807.3	Domestic Dishwashing Machine . . . . .	192
721.1	Building Sewer . . . . .	186	808.0	Cooling Water . . . . .	192
Table 721.1	Minimum Horizontal Distance Required from Building Sewer . . . . .	186	808.1	General . . . . .	192
721.2	Abutting Lot . . . . .	187	809.0	Drinking Fountains . . . . .	192
722.0	Abandoned Sewers and Sewage Disposal Facilities . . . . .	187	809.1	General . . . . .	192
722.1	Building (House) Sewer . . . . .	187	810.0	Steam and Hot Water Drainage Condensers and Sumps . . . . .	192
722.2	Cesspools, Septic Tanks, and Seepage Pits . . . . .	187	810.1	High-Temperature Discharge . . . . .	192
722.3	Filling . . . . .	187	Table 810.1	Pipe Connections in Blowoff Condensers and Sumps . . . . .	193
722.4	Ownership . . . . .	187	810.2	Sumps, Condensers, and Intercepting Tanks . . . . .	193
722.5	Disposal Facilities . . . . .	187	810.3	Cleaning . . . . .	193
723.0	Building Sewer Test . . . . .	187	810.4	Strainers . . . . .	193
723.1	General . . . . .	187	810.4	Chemical Wastes . . . . .	193
724.0	<i>Meat and Poultry Processing Plant Drainage . . . . .</i>	187	811.0	Pretreatment . . . . .	193
725.0	<i>Collection Center and Facilities Drainage . . . . .</i>	187	811.1	Waste and Vent Pipes . . . . .	193
726.0	<i>Drainage and Plumbing, General . . . . .</i>	187	811.2	Joining Materials . . . . .	193
727.0	<i>Emergency Sanitary Drainage . . . . .</i>	187	811.3	Access . . . . .	193
<b>CHAPTER 8</b>	<b>INDIRECT WASTES . . . . .</b>	<b>189</b>	811.4	Permanent Record . . . . .	193
801.0	General . . . . .	191	811.5	Chemical Vent . . . . .	193
801.1	Applicability . . . . .	191	811.6	Discharge . . . . .	193
801.2	Air Gap or Air Break Required . . . . .	191	811.7	Diluted Chemicals . . . . .	193
801.3	Food and Beverage Handling Establishments . . . . .	191	811.8	Clear Water Wastes . . . . .	193
801.4	Bar and Fountain Sink Traps . . . . .	191	812.0	General . . . . .	193
801.5	Connections from Water Distribution System . . . . .	191	812.1	Swimming Pools . . . . .	193
801.6	Sterilizers . . . . .	191	813.0	General . . . . .	193
801.7	Drip or Drainage Outlets . . . . .	191	813.1	Condensate Waste and Control . . . . .	193
802.0	Approvals . . . . .	191	813.1	Condensate Disposal . . . . .	193
802.1	General . . . . .	191	814.0	Condensate Control . . . . .	194
803.0	Indirect Waste Piping . . . . .	191	814.3	Condensate Waste Pipe Material and Sizing . . . . .	194
803.1	Materials . . . . .	191	Table 814.3	Minimum Condensate Pipe Size . . . . .	194
803.2	Copper and Copper Alloys . . . . .	191	814.4	Appliance Condensate Drains . . . . .	194
803.3	Pipe Size and Length . . . . .	191	814.5	Point of Discharge . . . . .	194
804.0	Indirect Waste Receptors . . . . .	192	814.6	Condensate Waste from Air-Conditioning Coils . . . . .	194
804.1	Standpipe Receptors . . . . .	192	814.7	Plastic Fittings . . . . .	194
805.0	Pressure Drainage Connections . . . . .	192	<b>CHAPTER 9</b>	<b>VENTS . . . . .</b>	<b>195</b>
805.1	General . . . . .	192	901.0	General . . . . .	197
806.0	Sterile Equipment . . . . .	192	901.1	Applicability . . . . .	197
806.1	General . . . . .	192	901.2	Vents Required . . . . .	197
807.0	Appliances . . . . .	192	901.3	Trap Seal Protection . . . . .	197
807.1	Non-Classed Apparatus . . . . .	192	902.0	Vents Not Required . . . . .	197
			902.1	Interceptor . . . . .	197



902.2	Bars, Soda Fountains, and Counter . . . . .	197	911.3	Slope and Size of Horizontal Branch . . . . .	200
903.0	Materials . . . . .	197	911.4	Relief Vent . . . . .	200
903.1	Applicable Standards . . . . .	197	911.5	Additional Fixtures . . . . .	200
903.2	Use of Copper or Copper Alloy Tubing . . . . .	197	912.0	Engineered Vent System . . . . .	200
903.3	Changes in Direction . . . . .	197	912.1	General . . . . .	200
904.0	Size of Vents . . . . .	197	912.2	Minimum Requirements . . . . .	200
904.1	Size . . . . .	197			
904.2	Length . . . . .	197	<b>CHAPTER 10</b>	<b>TRAPS AND INTERCEPTORS . . . . .</b>	<b>201</b>
905.0	Vent Pipe Grades and Connections . . . . .	198	1001.0	General . . . . .	203
905.1	Grade . . . . .	198	1001.1	Applicability . . . . .	203
905.2	Horizontal Drainage Pipe . . . . .	198	1001.2	Where Required . . . . .	203
905.3	Vent Pipe Rise . . . . .	198	1002.0	Traps Protected by Vent Pipes . . . . .	203
905.4	Roof Termination . . . . .	198	1002.1	Vent Pipes . . . . .	203
905.5	Location of Opening . . . . .	198	1002.2	Fixture Traps . . . . .	203
905.6	Common Vertical Pipe . . . . .	198	Table 1002.2	Horizontal Lengths of Trap Arms . . . . .	203
906.0	Vent Termination . . . . .	198	1002.3	Change of Direction . . . . .	203
906.1	Roof Termination . . . . .	198	1002.4	Vent Pipe Opening . . . . .	203
906.2	Clearance . . . . .	198	1003.0	Traps — Described . . . . .	203
906.3	Use of Roof . . . . .	198	1003.1	General Requirements . . . . .	203
906.4	Outdoor Installations . . . . .	198	1003.2	Slip Joint Fittings . . . . .	203
906.5	Joints . . . . .	198	1003.3	Size . . . . .	203
906.6	Lead . . . . .	198	1004.0	Traps . . . . .	203
906.7	Frost or Snow Closure . . . . .	198	1004.1	Prohibited . . . . .	203
907.0	Vent Stacks and Relief Vents . . . . .	198	1004.2	Movable Parts . . . . .	204
907.1	Drainage Stack . . . . .	198	1005.0	Trap Seals . . . . .	204
907.2	Yoke Vent . . . . .	198	1005.1	General . . . . .	204
908.0	Wet Venting . . . . .	198	1006.0	Floor Drain Traps . . . . .	204
908.1	Vertical Wet Venting . . . . .	198	1006.1	General . . . . .	204
908.2	Horizontal Wet Venting for a Bathroom Group . . . . .	199	1007.0	Trap Seal Protection . . . . .	204
909.0	Special Venting for Island Fixtures . . . . .	199	1007.1	General . . . . .	204
909.1	General . . . . .	199	1007.2	Trap Seal Primers . . . . .	204
910.0	Combination Waste and Vent Systems . . . . .	199	1008.0	Building Traps . . . . .	204
910.1	Where Permitted . . . . .	199	1008.1	General . . . . .	204
910.2	Approval . . . . .	199	1009.0	Interceptors (Clarifiers) and Separators . . . . .	204
910.3	Vents . . . . .	199	1009.1	Where Required . . . . .	204
910.4	Size . . . . .	199	1009.2	Approval . . . . .	204
910.5	Vertical Waste Pipe . . . . .	199	1009.3	Design . . . . .	204
910.6	Cleanouts . . . . .	199	1009.4	Relief Vent . . . . .	204
910.7	Fixtures . . . . .	199	1009.5	Location . . . . .	204
911.0	Circuit Venting . . . . .	200	1009.6	Maintenance of Interceptors . . . . .	204
911.1	Circuit Vent Permitted . . . . .	200	1009.7	Discharge . . . . .	204
911.2	Vent Size and Connection . . . . .	200	1010.0	Slaughterhouses, Packing Establishments, etc . . . . .	204
			1010.1	General . . . . .	204

1010.2	<i>Meat and Poultry Processing Plants</i> . . . . .	204	1101.5	Expansion Joints Required	. . . . .	211
1010.3	<i>Collection Centers and Facilities</i> . . . . .	205	1101.6	Subsoil Drains	. . . . .	211
1010.4	<i>Horse Meat and Pet Food Establishments</i> . . . . .	205	1101.7	Building Subdrains	. . . . .	212
1010.5	<i>Draining and Plumbing</i> . . . . .	205	1101.8	Areaway Drains	. . . . .	212
1011.0	Minimum Requirements for Auto Wash Racks . . . . .	205	1101.9	Window Areaway Drains	. . . . .	212
1011.1	General . . . . .	205	1101.10	Filling Stations and Motor Vehicle Washing Establishments . . . . .	212	
1012.0	Commercial and Industrial Laundries . . . . .	205	1101.11	Paved Areas . . . . .	212	
1012.1	General . . . . .	205	1101.12	Roof Drainage . . . . .	212	
1013.0	Bottling Establishments . . . . .	205	1101.13	Cleanouts . . . . .	213	
1013.1	General . . . . .	205	1101.14	Rainwater Sumps . . . . .	213	
1014.0	Grease Interceptors . . . . .	205	1101.15	Traps on Storm Drains and Leaders . . . . .	213	
1014.1	General . . . . .	205	1101.16	Leaders, Conductors, and Connections . . . . .	213	
1014.2	Hydromechanical Grease Interceptors . . . . .	205	1102.0	Roof Drains . . . . .	213	
Table 1014.2.1	Hydromechanical Grease Interceptor Sizing Using Gravity Flow Rates . . . . .	206	1102.1	Applications . . . . .	213	
1014.3	Gravity Grease Interceptors . . . . .	206	1102.2	Dome Strainers Required . . . . .	213	
Table 1014.3.6	Gravity Grease Interceptor Sizing . . . . .	207	1102.3	Roof Drain Flashings . . . . .	213	
1015.0	FOG (Fats, Oils, and Greases) Disposal System . . . . .	207	1103.0	Size of Leaders, Conductors, and Storm Drains . . . . .	213	
1015.1	Purpose . . . . .	207	1103.1	Vertical Conductors and Leaders . . . . .	213	
1015.2	Components, Materials, and Equipment . . . . .	207	1103.2	Size of Horizontal Storm Drains and Sewers . . . . .	213	
1015.3	Sizing and Installation . . . . .	207	1103.3	Size of Roof Gutters . . . . .	213	
1015.4	Performance . . . . .	207	1103.4	Side Walls Draining onto a Roof . . . . .	213	
1016.0	Sand Interceptors . . . . .	207	1104.0	Values for Continuous Flow . . . . .	214	
1016.1	Discharge . . . . .	207	1104.1	General . . . . .	214	
1016.2	Authority Having Jurisdiction . . . . .	208	1105.0	Controlled-Flow Roof Drainage . . . . .	214	
1016.3	Construction and Size . . . . .	208	1105.1	Application . . . . .	214	
1016.4	Separate Use . . . . .	208	Table 1105.1(1)	Controlled-Flow Maximum Roof Water Depth . . . . .	214	
1017.0	Oil and Flammable Liquid Interceptors . . . . .	208	Table 1105.1(2)	Distance of Scupper Bottoms Above Roof . . . . .	214	
1017.1	Interceptors Required . . . . .	208	1105.2	Setback Roofs . . . . .	215	
1017.2	Design of Interceptors . . . . .	208	1106.0	Engineered Storm Drainage System . . . . .	215	
<b>CHAPTER 11</b>	<b>STORM DRAINAGE</b> . . . . .	<b>209</b>	1106.1	General . . . . .	215	
1101.0	General . . . . .	211	1106.2	Siphonic Roof Drainage Systems . . . . .	215	
1101.1	Applicability . . . . .	211	1106.3	Siphonic Roof Drains . . . . .	215	
1101.2	Where Required . . . . .	211	1107.0	Testing . . . . .	215	
1101.3	Storm Water Drainage to Sanitary Sewer Prohibited . . . . .	211	1107.1	Testing Required . . . . .	215	
1101.4	Material Uses . . . . .	211	1107.2	Methods of Testing Storm Drainage Systems . . . . .	215	
Table 1101.4.6	Materials for Subsoil Drain Pipe and Fittings . . . . .	211	Table 1103.1	Sizing Roof Drains, Leaders, and Vertical Rainwater Piping . . . . .	216	

Table 1103.2	Sizing of Horizontal Rainwater Piping . . . . .	217	1208.10	Pressure Limitation Requirements . . . . .	227
Table 1103.3	Size of Gutters . . . . .	218	1208.11	Backpressure Protection . . . . .	227
<b>CHAPTER 12</b>	<b>FUEL GAS PIPING . . . . .</b>	<b>219</b>	1208.12	Low-Pressure Protection . . . . .	228
1201.0	General . . . . .	221	1208.13	Shutoff Valves . . . . .	228
1201.1	Applicability . . . . .	221	1208.14	Expansion and Flexibility . . . . .	228
1202.0	Coverage of Piping System . . . . .	221	1209.0	Excess Flow Valve . . . . .	228
1202.1	General . . . . .	221	1209.1	General . . . . .	228
1202.2	Piping System Requirements . . . . .	221	1210.0	Gas Piping Installation . . . . .	228
1202.3	Applications . . . . .	221	1210.1	Piping Underground . . . . .	228
1203.0	Inspection . . . . .	221	1210.2	Installation of Piping . . . . .	229
1203.1	Inspection Notification . . . . .	221	Table 1210.2.4.1	Support of Piping . . . . .	230
1203.2	Excavation . . . . .	221	1210.3	Concealed Piping in Buildings . . . . .	230
1203.3	Type of Inspections . . . . .	221	1210.4	Piping in Vertical Chases . . . . .	231
1203.4	Inspection Waived . . . . .	222	1210.5	Gas Pipe Turns . . . . .	231
1204.0	Certificate of Inspection . . . . .	222	1210.6	Drips and Sediment Traps . . . . .	231
1204.1	Issuance . . . . .	222	1210.7	Outlets . . . . .	231
1204.2	Gas Supplier . . . . .	222	1210.8	Branch Pipe Connection . . . . .	232
1204.3	Unlawful . . . . .	222	1210.9	Manual Gas Shutoff Valves . . . . .	232
1205.0	Authority to Render Gas Service . . . . .	222	1210.10	Prohibited Devices . . . . .	232
1205.1	Authorized Personnel . . . . .	222	1210.11	Systems Containing Gas-Air Mixtures Outside the Flammable Range . . . . .	232
1205.2	Outlets . . . . .	222	1210.12	Systems Containing Flammable Gas-Air Mixtures . . . . .	232
1206.0	Authority to Disconnect . . . . .	222	1211.0	Electrical Bonding and Grounding . . . . .	233
1206.1	Disconnection . . . . .	222	1211.1	Pipe and Tubing other than CSST . . . . .	233
1206.2	Notice . . . . .	222	1211.2	Bonding of CSST Gas Piping . . . . .	233
1206.3	Capped Outlets . . . . .	222	1211.3	Prohibited Use . . . . .	234
1207.0	Temporary Use of Gas . . . . .	222	1211.4	Lightning Protection System . . . . .	234
1207.1	General . . . . .	222	1211.5	Electrical Circuits . . . . .	234
1208.0	Gas Piping System Design, Materials, and Components . . . . .	222	1211.6	Electrical Connections . . . . .	234
1208.1	Installation of Piping System . . . . .	222	1211.7	<i>Earthquake-Actuated Gas Shutoff Valves</i> . . . . .	234
1208.2	Provision for Location of Point of Delivery . . . . .	222	1212.0	Appliance and Equipment Connections to Building Piping . . . . .	234
1208.3	Interconnections Between Gas Piping Systems . . . . .	222	1212.1	Connecting Appliances and Equipment . . . . .	234
1208.4	Sizing of Gas Piping Systems . . . . .	222	1212.2	Suspended Low-Intensity Infrared Tube Heaters . . . . .	234
Table 1208.4.1	Approximate Gas Input for Typical Appliances . . . . .	223	1212.3	Use of Nonmetallic Gas Hose Connectors . . . . .	234
1208.5	Maximum Design Operating Pressure . . . . .	223	1212.4	Injection (Bunsen) Burners . . . . .	234
1208.6	Acceptable Piping Materials and Joining Methods . . . . .	223	1212.5	Connection of Portable and Mobile Industrial Gas Appliances . . . . .	235
Table 1208.6.10.2	Specifications for Threading Metallic Pipe . . . . .	225	1212.6	Appliance Shutoff Valves and Connections . . . . .	235
1208.7	Gas Meters . . . . .	226	1212.7	Quick-Disconnect Devices . . . . .	235
1208.8	Gas Pressure Regulators . . . . .	226			
1208.9	Overpressure Protection Devices . . . . .	227			

1212.8	Gas Convenience Outlets . . . . .	.235
1212.9	Sediment Trap . . . . .	.235
1212.10	Installation of Piping . . . . .	.235
1212.11	Liquefied Petroleum Gas Facilities and Piping . . . . .	.235
1213.0	Pressure Testing, Inspection, and Purging . . . . .	.235
1213.1	Piping Installations . . . . .	.235
1213.2	Test Preparation . . . . .	.236
1213.3	Test Pressure . . . . .	.236
1213.4	Detection of Leaks and Defects . .	.236
1213.5	Piping System Leak Test . . . . .	.236
1213.6	Purging Requirements . . . . .	.236
Table 1213.6.1	Size and Length of Piping . . . . .	.237
1214.0	Required Gas Supply . . . . .	.238
1214.1	General . . . . .	.238
1214.2	Volume . . . . .	.238
1214.3	Gas Appliances . . . . .	.238
1214.4	Size of Piping Outlets . . . . .	.238
1215.0	Required Gas Piping Size . . . . .	.238
1215.1	Pipe Sizing Methods . . . . .	.238
1215.2	Tables for Sizing Gas Piping Systems . . . . .	.238
1215.3	Sizing Equations . . . . .	.238
Table 1215.3	<i>Cr</i> and <i>Y</i> for Natural Gas and Undiluted Propane at Standard Conditions . . . . .	.239
1215.4	Sizing of Piping Sections . . . . .	.239
1215.5	Engineering Methods . . . . .	.239
1215.6	Variable Gas Pressure . . . . .	.239
Table 1215.2(1)	Schedule 40 Metallic Pipe . . . . .	.241
Table 1215.2(2)	Schedule 40 Metallic Pipe . . . . .	.242
Table 1215.2(3)	Schedule 40 Metallic Pipe . . . . .	.243
Table 1215.2(4)	Schedule 40 Metallic Pipe . . . . .	.244
Table 1215.2(5)	Schedule 40 Metallic Pipe . . . . .	.245
Table 1215.2(6)	Schedule 40 Metallic Pipe . . . . .	.246
Table 1215.2(7)	Semi-Rigid Copper Tubing . . . . .	.247
Table 1215.2(8)	Semi-Rigid Copper Tubing . . . . .	.248
Table 1215.2(9)	Semi-Rigid Copper Tubing . . . . .	.249
Table 1215.2(10)	Semi-Rigid Copper Tubing . . . . .	.250
Table 1215.2(11)	Semi-Rigid Copper Tubing . . . . .	.251
Table 1215.2(12)	Semi-Rigid Copper Tubing . . . . .	.252
Table 1215.2(13)	Semi-Rigid Copper Tubing . . . . .	.253
Table 1215.2(14)	Corrugated Stainless Steel Tubing (CSST) . . . . .	.254
Table 1215.2(15)	Corrugated Stainless Steel Tubing (CSST) . . . . .	.255
Table 1215.2(16)	Corrugated Stainless Steel Tubing (CSST) . . . . .	.256

Table 1215.2(17)	Corrugated Stainless Steel Tubing (CSST) . . . . .	.257
Table 1215.2(18)	Corrugated Stainless Steel Tubing (CSST) . . . . .	.258
Table 1215.2(19)	Polyethylene Plastic Pipe . . . . .	.259
Table 1215.2(20)	Polyethylene Plastic Pipe . . . . .	.260
Table 1215.2(21)	Polyethylene Plastic Pipe . . . . .	.261
Table 1215.2(22)	Polyethylene Plastic Tubing . . . .	.262
Table 1215.2(23)	Polyethylene Plastic Tubing . . . .	.262
Table 1215.2(24)	Schedule 40 Metallic Pipe . . . . .	.263
Table 1215.2(25)	Schedule 40 Metallic Pipe . . . . .	.264
Table 1215.2(26)	Schedule 40 Metallic Pipe . . . . .	.265
Table 1215.2(27)	Schedule 40 Metallic Pipe . . . . .	.266
Table 1215.2(28)	Semi-Rigid Copper Tubing . . . . .	.267
Table 1215.2(29)	Semi-Rigid Copper Tubing . . . . .	.268
Table 1215.2(30)	Semi-Rigid Copper Tubing . . . . .	.269
Table 1215.2(31)	Corrugated Stainless Steel Tubing (CSST) . . . . .	.270
Table 1215.2(32)	Corrugated Stainless Steel Tubing (CSST) . . . . .	.271
Table 1215.2(33)	Corrugated Stainless Steel Tubing (CSST) . . . . .	.272
Table 1215.2(34)	Polyethylene Plastic Pipe . . . . .	.273
Table 1215.2(35)	Polyethylene Plastic Pipe . . . . .	.274
Table 1215.2(36)	Polyethylene Plastic Tubing . . . . .	.276

**CHAPTER 13**

**HEALTH CARE FACILITIES AND  
MEDICAL GAS AND MEDICAL  
VACUUM SYSTEMS . . . . .277**

**PART I**

1301.0	General . . . . .	.279
1301.1	Applicability . . . . .	.279
1301.2	Where Not Applicable . . . . .	.279
1301.3	Conflict of Requirements . . . . .	.279
1301.4	Terms . . . . .	.279
1301.5	Where Required . . . . .	.279
1301.6	Existing Systems . . . . .	.279
1302.0	Design Requirements . . . . .	.279
1302.1	Building System Risk Categories . . . . .	.279
1302.2	Patient Care Spaces . . . . .	.279
1302.3	Anesthesia . . . . .	.279
1302.4	Wet Procedure Locations . . . . .	.279
1303.0	Health Care Facilities . . . . .	.279
1303.1	Drinking Fountain Control Valves . . . . .	.279
1303.2	Psychiatric Patient Rooms . . . . .	.279
1303.3	Locations for Ice Storage . . . . .	.279
1303.4	Sterilizers and Bedpan Steamers . . . . .	.279

1404.0	Combustible Piping Installations . . . . .	305	1502.3	Cross-Connection Inspection and Testing . . . . .	311
1404.1	General Requirements . . . . .	305	1502.4	Separation Requirements . . . . .	312
1404.2	Fire-Resistance Rating . . . . .	305	1502.5	Abandonment . . . . .	312
1404.3	Firestop Systems . . . . .	305	1502.6	Sizing . . . . .	312
1404.4	Connections . . . . .	305	1503.0	Gray Water Systems . . . . .	312
1404.5	Insulation and Coverings . . . . .	305	1503.1	General . . . . .	312
1404.6	Sleeves . . . . .	305	1503.2	System Requirements . . . . .	313
1405.0	Noncombustible Piping Installations . . . . .	305	1503.3	Connections to Potable and Reclaimed (Recycled) Water Systems . . . . .	313
1405.1	General Requirements . . . . .	305	1503.4	Location . . . . .	314
1405.2	Fire-Resistance Rating . . . . .	305	1503.5	Plot Plan Submission . . . . .	314
1405.3	Firestop Systems . . . . .	305	1503.6	Prohibited Location . . . . .	314
1405.4	Connections . . . . .	305	1503.7	Drawings and Specifications . . . . .	314
1405.5	Unshielded Couplings . . . . .	306	Table 1503.4	Location of Gray Water System . . . . .	314
1405.6	Sleeves . . . . .	306	1503.8	Procedure for Estimating Gray Water Discharge . . . . .	315
1405.7	Insulation and Coverings . . . . .	306	1503.9	Gray Water System Components . . . . .	315
1406.0	Required Inspection . . . . .	306	1504.0	Subsurface Irrigation System Zones . . . . .	316
1406.1	General . . . . .	306	1504.1	General . . . . .	316
1406.2	Examination . . . . .	306	1504.2	Required Area of Subsurface Irrigation Fields, Subsoil Irrigation Fields, and Mulch Basins . . . . .	316
1406.3	Penetrations . . . . .	306	Table 1504.2	Design of Six Typical Soils . . . . .	316
1406.4	Field Installations . . . . .	306	1504.3	Determination of Maximum Absorption Capacity . . . . .	316
<b>CHAPTER 15</b>	<b>ALTERNATE WATER SOURCES FOR NONPOTABLE APPLICATIONS . . . . .</b>	<b>307</b>	1504.4	Groundwater Level . . . . .	316
1501.0	General . . . . .	309	1504.5	<i>Irrigation, Disposal Field and Mulch Basin Construction.</i> . . . .	317
1501.1	Applicability . . . . .	309	Table 1504.5	Subsurface Irrigation Design Criteria for Six Typical Soils . . . . .	317
1501.2	System Design . . . . .	309	Table 1504.5.3	Subsoil Irrigation Field Construction . . . . .	318
1501.3	Permit . . . . .	309	1504.6	<i>Reserved</i> . . . . .	318
1501.4	Component Identification . . . . .	309	1504.7	<i>Reserved</i> . . . . .	318
1501.5	Maintenance and Inspection . . . . .	309	1504.8	Gray Water System Color and Marking Information . . . . .	318
Table 1501.5	Recommended Minimum Alternate Water Source Testing, Inspection, and Maintenance Frequency . . . . .	309	1504.9	Other Collection and Distribution Systems . . . . .	318
1501.6	Operation and Maintenance Manual . . . . .	310	1504.10	Testing . . . . .	318
1501.7	Minimum Water Quality Requirements . . . . .	310	1504.11	Maintenance . . . . .	318
1501.8	Material Compatibility . . . . .	310	1505.0	Recycled Water Supply Systems in Buildings . . . . .	318
1501.9	<i>Signage</i> . . . . .	310	1505.1	General . . . . .	318
1501.10	System Controls . . . . .	310	1505.2	Permit . . . . .	319
1502.0	Inspection and Testing . . . . .	310	1505.3	System Changes . . . . .	319
1502.1	General . . . . .	310			
1502.2	Supply System Inspection and Test . . . . .	311			

1505.4	Connections to Potable or Reclaimed (Recycled) Water Supply Systems . . . . .	319	1601.5	Maintenance and Inspection . . . . .	327
1505.5	Initial Cross-Connection Test . . . . .	319	Table 1601.5	Minimum Alternate Water Source Testing, Inspection, and Maintenance Frequency . . . . .	327
1505.6	Recycled Water Supply System Materials . . . . .	319	1601.6	Operation and Maintenance Manual . . . . .	327
1505.7	Recycled Water Supply System Color and Marking Information . . . . .	319	1601.7	Minimum Water Quality Requirements . . . . .	328
1505.8	Valves . . . . .	319	1602.0	Nonpotable Rainwater Catchment Systems . . . . .	328
1505.9	Hose Bibbs . . . . .	320	1602.1	General . . . . .	328
1505.10	Required Appurtenances . . . . .	320	1602.2	Plumbing Plan Submission . . . . .	328
1505.11	Pipe Separation in Trenches . . . . .	320	1602.3	System Changes . . . . .	328
1505.12	Signage . . . . .	320	1602.4	Connections to Potable or Reclaimed (Recycled) Water Systems . . . . .	328
1505.13	Inspection and Testing . . . . .	320	1602.5	Initial Cross-Connection Test . . . . .	328
1505.14	<i>Minimum Water Quality Requirements for Reclaimed (Recycled) Water . . . . .</i>	322	1602.6	Sizing . . . . .	328
1505.15	<i>Maintenance and Inspection . . . . .</i>	322	1602.7	Rainwater Catchment System Materials . . . . .	328
1506.0	On-Site Treated Nonpotable Gray Water Systems . . . . .	322	1602.8	Rainwater Catchment System Color and Marking Information . . . . .	328
1506.1	General . . . . .	322	1602.9	Design and Installation . . . . .	328
1506.2	Plumbing Plan Submission . . . . .	322	1603.0	Rainwater Storage Tanks . . . . .	329
1506.3	System Changes . . . . .	322	1603.1	General . . . . .	329
1506.4	Connections to Potable or Reclaimed (Recycled) Water Systems . . . . .	322	1603.2	Construction . . . . .	329
1506.5	Initial Cross-Connection Test . . . . .	322	Table 1602.9.6	Minimum Water Quality . . . . .	329
1506.6	On-Site Treated Nonpotable Gray Water System Materials . . . . .	322	1603.3	Location . . . . .	330
Table 1505.15	<i>Minimum Reclaimed (Recycled) Water Source Testing, Inspection, and Maintenance Frequency . . . . .</i>	322	1603.4	Above Grade . . . . .	330
1506.7	On-Site Treated Nonpotable Gray Water Devices and Systems . . . . .	323	1603.5	Below Grade . . . . .	330
1506.8	On-Site Treated Nonpotable Gray Water System Color and Marking Information . . . . .	323	1603.6	Drainage and Overflow . . . . .	330
1506.9	Design and Installation . . . . .	323	1603.7	Opening and Access Protection . . . . .	330
1506.10	Valves . . . . .	323	1603.8	Marking . . . . .	330
1506.11	Signs . . . . .	323	1603.9	Storage Tank Venting . . . . .	330
1506.12	Inspection and Testing . . . . .	323	1603.10	Pumps . . . . .	330
<b>CHAPTER 16</b>	<b>NONPOTABLE RAINWATER CATCHMENT SYSTEMS . . . . .</b>	<b>325</b>	1603.11	Roof Drains . . . . .	330
1601.0	General . . . . .	327	1603.12	Water Quality Devices and Equipment . . . . .	330
1601.1	Applicability . . . . .	327	1603.13	Freeze Protection . . . . .	330
1601.2	System Design . . . . .	327	1603.14	Debris Removal . . . . .	330
1601.3	Permit . . . . .	327	1603.15	Required Filters . . . . .	330
1601.4	Component Identification . . . . .	327	1603.16	Roof Gutters . . . . .	330
			1604.0	Signs . . . . .	330
			1604.1	General . . . . .	330
			1604.2	Commercial, Industrial, Institutional and Residential Restroom Signs . . . . .	331
			1604.3	Equipment Room Signs . . . . .	331
			1605.0	Inspection and Testing . . . . .	331

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 278180, Sacramento, CA 95827-8180 or 9342 Tech Center Dr., Suite 500, Sacramento, CA 95826.

**1.1.8.2 Locally Adopted Energy Standards – California Energy Code, Part 6.** In addition to the provisions of Section 1.1.8.1 of this part, the provisions of this section apply to cities, counties, and cities and counties amending adopted energy standards affecting buildings and structures subject to the California Energy Code, Part 6.

Applicable provisions of Public Resources Code Section 25402.1 and applicable provisions of Chapter 10 of the California Administrative Code, Part 1 apply to local amendment of energy standards adopted by the California Energy Commission.

**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.

**Exceptions:**

- (1) [HCD 1 & HCD 2] Retroactive permits issued in accordance with Health and Safety Code Section 17958.12.
- (2) [HCD 1 & HCD 2] Plans approved by the Department of Housing and Community Development or a Department-approved design approval agency for factory-built housing as defined by Health and Safety Code Section 19971. Approved plans, pursuant to the California Code of Regulations, Title 25, Division 1, Chapter 3, Subchapter 1, Article 3, Section 3048 remain valid for a period of 36 months from the date of plan approval.

**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 (e)(1) and (2).

**1.1.11 Format.** This part fundamentally adopts the Uniform Plumbing Code by reference on a chapter-by-chapter basis. When a specific chapter of the Uniform Plumbing Code is not printed in the code and is marked “Reserved”, such chapter of the Uniform Plumbing Code is not adopted as a portion of this code. When a specific chapter of the Uniform Plumbing Code is marked “Not Adopted by the State of California” but appears in the code, it may be available for adoption by local ordinance.

**Note:** Matrix Adoption Tables at the front of each chapter may aid the code user in determining which chapter or sections within a chapter are applicable to buildings under the authority of a specific state agency, but they are not to be considered regulatory.

**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 BSC.** 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 (CSU) and the Regents of the University of California (UC) 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 the California Existing Building Code, 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 18934.7.

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

**1.2.1.1 State Building.** For purposes of this code, a “state building” is a structure for which a state agency or state entity has authority to construct, alter, enlarge, replace, repair or demolish.

**1.2.1.2 Enforcement.** [CSU, UC, Judicial Council and California Department of Corrections and Rehabilitation] state agencies or state entities authorized to construct state buildings may appoint a building official who is responsible to the agency for enforcement of the provisions of the California Building Standards Code.

**Exception:** State buildings regulated by other sections of this code remain the enforcement responsibility of the designated entities.

**1.2.1.3 Enforcement, Reserved for DGS.**

**1.2.1.4 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.

- 1.2.2 BSC-CG.** 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. **Green Building Standards for Nonresidential Occupancies.**

**Application** – All occupancies where no other state agency has the authority to adopt green building standards applicable to those occupancies.

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

**Authority Cited** – Health and Safety Code Sections 18930.5, 18938 and 18940.5.

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

2. **Graywater Systems for Nonresidential Occupancies.**

**Application** – The construction, installation, and alteration of graywater systems for indoor and outdoor uses in nonresidential occupancies.

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

**Authority Cited** – Health & Safety Code Section 18941.8.

**Reference** – Health & Safety Code Section 18941.8.

**1.2.3 Alternate 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.

**1.2.3.1 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.

**1.2.3.2 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.

- 1.3.0 Board of State and Community Corrections.**

**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** – Board of State and Community Corrections.

**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 BSCC.



**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 apartments, condominiums, 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, Section 104.2 items (1)-(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.
3. Retroactive permits issued in accordance with Health and Safety Code Section 17958.12.

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 4100 of the California 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 regulations promulgated by the Department of Housing and Community Development, those provisions shall be appli-

cable 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 apartments, condominiums, hotels, motels, lodging houses, dwellings, or accessory structures, 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 2 of the California Building Code, the proposed alternate must also meet the threshold set for equivalent facilitation as defined in Chapter 2 of the California Building Code.*

*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 apartments, condominiums, hotels, motels, lodging houses, dwellings, or accessory structures thereto, and permanent buildings in mobilehome parks and special occupancy parks. 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 process to hear and decide appeals of orders, decisions, and determinations made by the enforcing agency relative to the application and interpretation of this code and other regulations governing construction use, maintenance and change of occupancy. The governing body of any city, county, or city and county may establish a local appeals board and a housing appeals board to serve this purpose. Members of the appeals board(s) shall not be employees of the enforcing agency and shall*

*be knowledgeable in the applicable building codes, regulations and ordinances as determined by the governing body of the city, county, or city and county.*

*Where no such appeals boards or agencies have been established, the governing body of the city, county, or city and county shall serve as the local appeals board or housing appeals board as specified in California Health and Safety Code Sections 17920.5 and 17920.6.*

**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 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. For enforcement related to accessory dwelling units, see Health and Safety Code Section 17980.12, operative until January 1, 2035.*
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 in accordance with the provisions of this code and the California Existing Building Code, as adopted by the Department of Housing and Community Development. For additional information, see California Health and Safety Code Sections 17912, 17920.3, 17922 and 17958.8.*

**1.8.10.2 Moved Structures.** *Subject to the requirements of California Health and Safety Code Sections 17922, 17922.3 and 17958.9, local ordinances or regulations relating to a moved residential building or accessory structure thereto, shall permit the replacement, retention, and extension of original materials and the use of original 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, 17921.5, 17921.6, 17921.10, 17922, 17922.6, 17922.12, 17922.14, 17926, 17927, 17928, 17958.12, 18300, 18552, 18554, 18620, 18630, 18640, 18670, 18690, 18691, 18865, 18871.3, 18871.4, 18873, 18873.1 through 18873.5, 18938.3, 18941.15, 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; Civil Code Sections 1101.4, 1101.5 and 1954.201 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:** *Buildings or facilities where accessibility is required for applications listed in California Code of Regulations, Title 24, Part 2 (California Building Code), Chapter 1, Section 1.9.1 regulated by the Division of the State Architect–Access Compliance shall comply with Title 24, Part 2, Chapter 11A or 11B, as applicable under authority cited by CA Government Code Section 4450 and in reference cited by CA Government Code Sections 4450 through 4461, 12955.1(c), and CA 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 oversee 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 1.9.2.1 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 and observe the 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 and OSHPD 1R.** 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 and OSHPD 1R**

**Application** – [OSHPD 1] General acute care hospital buildings. [OSHPD 1R] Non-conforming hospital SPC or freestanding buildings that have been removed from acute care service.

**Enforcing Agency** – Office of Statewide Health Planning and Development (OSHPD). The office shall enforce the Division of the State Architect access com-

pliance 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 1, Division I, and as indicated in the adoption matrix for Chapter 1, Division II.

**1.10.1.2 Applicable Building Standards.** California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 6, 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, and OSHPD 1R.

**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 facility buildings.

**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 as indicated in the adoption matrix for Chapter 1, Division II.

**1.10.2.2 Applicable Building Standards.** California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 6, 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 as indicated in the adoption matrix for Chapter 1, Division II.

**1.10.3.2 Applicable Building Standards.** California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 6, 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 Sub-section 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 as indicated in the adoption matrix for Chapter 1, Division II.

**1.10.4.2 Applicable Building Standards.** California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 6, 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 Sub-section 1.10.4 will be identified in the Matrix Adoption Tables under the acronym OSHPD 4.

**1.10.5 OSHPD 5.** Specific scope of application of the agency responsible for enforcement, enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

**OSHPD 5**

**Application** – Acute psychiatric hospital buildings.

**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.

**1.10.5.1 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 as indicated in the adoption matrix for Chapter 1, Division II.

**1.10.5.2 Applicable Building Standards.** California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 6, 9, 10 and 11.

**Authority Cited** – Health and Safety Code Sections 1275 and 129850.

**References** – Health and Safety Code Sections 129680, 1275 and 129675 through 130070.

**1.10.5.3 Adopting Agency Identification.** The provisions of this code applicable to buildings identified in this Sub-section 1.10.5 will be identified in the Matrix Adoption Tables under the Acronym OSHPD 5.

**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, dancehall, 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.

**CALIFORNIA PLUMBING CODE. MATRIX ADOPTION TABLE  
CHAPTER 2 - DEFINITIONS**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4								
Adopt Entire Chapter			X								X											
Adopt Entire Chapter as amended (amended sections listed below)	X			X	X	X		X	X	X		X	X	X	X							
Adopt only those sections that are listed below		X															X	X				
Chapter/Section																						
203.0				X	X			X	X													
204.0				X	X																	
205.0	X	X		X		X											X					
206.0	X	X		X	X	X												X				
207.0	X	X		X	X	X																
208.0																	X					
209.0	X	X		X																		
210.0										X		X	X	X	X							
211.0	X	X		X																		
214.0				X	X																	
215.0	X	X		X																		
216.0				X	X																	
217.0	X	X		X																		
220.0	X	X		X														X				
221.0	X	X		X						X		X	X	X	X							
222.0	X	X		X						X		X	X	X	X							
223.0	X	X		X													X					
225.0				X																		

*This state agency does not adopt sections identified with the following symbol: †*

*The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.0.*





## CHAPTER 2

### DEFINITIONS

#### 201.0 General.

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

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

#### 202.0 Definition of Terms.

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

#### 203.0 – A –

**ABS.** Acrylonitrile-butadiene-styrene.

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

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

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

**Accessory Dwelling Unit. [HCD 1 & HCD 2]** *An attached or detached residential dwelling unit that provides complete independent living facilities for one or more persons and is located on a lot with a proposed or existing primary residence. Accessory dwelling units shall include permanent provisions for living, sleeping, eating, cooking, and sanitation on the same parcel as the single-family or multifamily dwelling is or will be situated. (See Government Code Section 65852.2.)*

**Air Break.** A physical separation which may be a low inlet into the indirect waste receptor from the fixture, appliance, or device indirectly connected.

**Air Gap, Drainage.** The unobstructed vertical distance through the free atmosphere between the lowest opening from a pipe, plumbing fixture, appliance, or appurtenance conveying waste to the flood-level rim of the receptor.

**Air Gap, Water Distribution.** The unobstructed vertical distance through the free atmosphere between the lowest opening from a pipe or faucet conveying potable water to the flood-level rim of a tank, vat, or fixture.

**Alternate Water Source.** Nonpotable source of water that includes but not limited to gray water, on-site treated nonpotable water, rainwater, and reclaimed (recycled) water.

**Alternate Water Source.** *Nonpotable source of water that includes but is not limited to gray water, on-site treated nonpotable gray water, rainwater, and reclaimed (recycled) water.*

**Anchors.** See Supports.

**Appliance.** A device that utilizes an energy source to produce light, heat, power, refrigeration, air conditioning, or compressed fuel gas. This definition also shall include a vented decorative appliance.

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

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

**Appliance Categorized Vent Diameter/Area.** The minimum vent diameter/area permissible for Category I appliances to maintain a nonpositive vent static pressure when tested in accordance with nationally recognized standards. [NFPA 54:3.3.6]

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

**Approved.** Acceptable to the Authority Having Jurisdiction.

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

#### Notes:

1. See Health and Safety Code Section 17920 for “Approved” as applied to residential construction and buildings or structures accessory thereto as referenced in Section 1.8.2.
2. See Health and Safety Code Section 17921.1 for “Approved” as applied to the use of the hotplates in residential construction as referenced in Section 1.8.2.
3. See Health and Safety Code 19966 for “Approved” as applied to Factory-Built Housing as referenced in Section 1.8.3.2.5.
4. See Health and Safety Code Section 18201 for “Approved” as applied to Mobilehome Parks as referenced in Section 1.8.2.
5. See Health and Safety Code Section 18862.1 for “Approved” as applied to Special Occupancy Parks as referenced in Section 1.8.2.

**Approved Testing Agency.** An organization primarily established for purposes of testing to approved standards and approved by the Authority Having Jurisdiction.

**[HCD 1 & HCD 2]** *“Approved Testing Agency” is any agency which is determined by the enforcing agency, except as otherwise provided by statute, to have adequate personnel*

## DEFINITIONS

*and expertise to carry out the testing of systems, materials, and construction fixtures or appliances.*

**Area Drain.** A receptor designed to collect surface or storm water from an open area.

**Aspirator.** A fitting or device supplied with water or other fluid under positive pressure that passes through an integral orifice or constriction, causing a vacuum.

**Authority Having Jurisdiction.** The organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, installations, or procedures. The Authority Having Jurisdiction shall be a federal, state, local, or other regional department or an individual such as a plumbing official, mechanical official, labor department official, health department official, building official, or others having statutory authority. In the absence of statutory authority, the Authority Having Jurisdiction may be some other responsible party. This definition shall include the Authority Having Jurisdiction's duly authorized representative.

**[HCD 1 & HCD 2]** *"Authority Having Jurisdiction" shall mean "Enforcing Agency" as defined in Section 207.0 of this code.*

### 204.0 – B –

**Backflow.** The flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from sources other than its intended source. See Backpressure Backflow and Backsiphonage.

**Backflow Connection.** An arrangement whereby backflow can occur.

**Backflow Preventer.** A backflow prevention device, an assembly, or another method to prevent backflow into the potable water system.

**Backpressure Backflow.** Backflow due to an increased pressure above the supply pressure, which may be due to pumps, boilers, gravity, or other sources of pressure.

**Backsiphonage.** The flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel into a water supply pipe due to a pressure less than atmospheric in such pipe. See Backflow.

**Backwater Valve.** A device installed in a drainage system to prevent reverse flow.

**Bathroom.** A room equipped with a shower, bathtub, or combination bath/shower.

**Bathroom, Half.** A room equipped with only a water closet and lavatory.

**Bathroom Group.** Any combination of fixtures, not to exceed one water closet, two lavatories, either one bathtub or one combination bath/shower, and one shower, and may include a bidet and an emergency floor drain.

**Battery of Fixtures.** A group of two or more similar, adjacent fixtures that discharge into a common horizontal waste or soil branch.

**Bedpan Steamer.** A fixture that is used to sterilize bedpans by way of steam.

**Boiler Blowoff.** An outlet on a boiler to permit emptying or discharge of sediment.

**Bonding Conductor or Jumper.** A reliable conductor to ensure the required electrical conductivity between metal parts required to be electrically connected. [NFPA 70:100(I)]

**Bottle Filling Station.** A plumbing fixture connected to the potable water distribution system and sanitary drainage system that is designed and intended for filling personal use drinking water bottles or containers not less than 10 inches (254 mm) in height. Such fixtures can be separate from or integral to a drinking fountain and can incorporate a water filter and a cooling system for chilling the drinking water.

**Branch.** A part of the piping system other than a main, riser, or stack.

**Branch, Fixture.** See Fixture Branch.

**Branch, Horizontal.** See Horizontal Branch.

**Branch Vent.** A vent connecting one or more individual vents with a vent stack or stack vent.

**Building.** A structure built, erected, and framed of component structural parts designed for the housing, shelter, enclosure, or support of persons, animals, or property of any kind.

**Exceptions: [HCD 1 & HCD 2]** *"BUILDING" shall not include the following:*

1. *Any mobilehome as defined in Health and Safety Code Section 18008.*
2. *Any manufactured home as defined in Health and Safety Code Section 18007.*
3. *Any commercial modular as defined in Health and Safety Code Section 18001.8 or any special purpose commercial modular as defined in Section 18012.5.*
4. *Any recreational vehicle as defined in Health and Safety Code Section 18010.*
5. *Any multifamily manufactured home as defined in Health and Safety Code Section 18008.7.*

*For additional information, see Health and Safety Code Section 18908.*

**Building Drain.** That part of the lowest piping of a drainage system that receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer beginning 2 feet (610 mm) outside the building wall.

**Building Drain (Sanitary).** A building drain that conveys sewage only.

**Building Drain (Storm).** A building drain that conveys storm water or another drainage, but no sewage.

**Building Sewer.** That part of the horizontal piping of a drainage system that extends from the end of the building drain and that receives the discharge of the building drain and conveys it to a public sewer, private sewer, private sewage disposal system, or another point of disposal.

**Building Sewer (Combined).** A building sewer that conveys both sewage and storm water or other drainage.

**Building Sewer (Sanitary).** A building sewer that conveys sewage only.

**Building Sewer (Storm).** A building sewer that conveys storm water or another drainage, but no sewage.

**Building Subdrain.** That portion of a drainage system that does not drain by gravity into the building sewer.

**Building Supply.** The pipe is carrying potable water from the water meter or another source of water supply to a building or other point of use or distribution on the lot.

## 205.0

## – C –

**Category 1.** Activities, systems, or equipment whose failure is likely to cause major injury or death to patients, staff, or visitors. [NFPA 99:3.3.146.1]

**Category 2.** Activities, systems, or equipment whose failure is likely to cause minor injury to patients, staff, or visitors. [NFPA 99:3.3.146.2]

**Category 3.** Activities, systems, or equipment whose failure is not likely to cause injury to patients, staff, or visitors, but can cause discomfort. [NFPA 99:3.3.146.3]

**Category 3 Vacuum System.** A Category 3 vacuum distribution system that can be either a wet system designed to remove liquid, air-gas, or solids from the treated area; or a dry system designed to trap liquids and solids before the service inlet and to accommodate air-gas only through the service inlet. [NFPA 99:3.3.21]

**Category 4.** Activities, systems, or equipment whose failure would have no impact on patient care. [NFPA 99:3.3.146.4]

**Certified Backflow Assembly Tester.** A person who has shown competence to test and maintain backflow assemblies to the satisfaction of the Authority Having Jurisdiction.

**Cesspool.** A lined excavation in the ground that receives the discharge of a drainage system or part thereof, so designed as to retain the organic matter and solids discharging therein but permitting the liquids to seep through the bottom and sides.

**Chemical Waste.** See Special Wastes.

**Chimney.** One or more passageways, vertical or nearly so, for conveying flue or vent gases to the outdoors. [NFPA 54:3.3.18]

**Chimney, Factory-Built.** A chimney composed of listed factory-built components assembled in accordance with the manufacturer's installation instructions to form the completed chimney. [NFPA 54:3.3.18.2]

**Chimney, Masonry.** A field-constructed chimney of solid masonry units, bricks, stones, listed masonry chimney units, or reinforced portland cement concrete, lined with suitable chimney flue liners. [NFPA 54:3.3.18.3]

**Chimney, Metal.** A chimney constructed of metal with a minimum thickness not less than 0.127 inches (3.23 mm) (No. 10 manufacturer's standard gauge) steel sheet.

#### Chimney Classifications:

**Chimney, High-Heat Appliance-Type.** A factory-built, masonry, or metal chimney suitable for removing the products of combustion from fuel-burning high-heat appliances producing combustion gases in excess of 2000°F (1093°C), measured at the appliance flue outlet.

**Chimney, Low-Heat Appliance-Type.** A factory-built, masonry, or metal chimney suitable for removing the products of combustion from fuel-burning low-heat appliances producing combustion gases not in excess of

1000°F (538°C) under normal operating conditions, but capable of producing combustion gases of 1400°F (760°C) during intermittent forced firing for periods up to one hour. Temperatures are measured at the appliance flue outlet.

**Chimney, Medium-Heat Appliance-Type.** A factory-built, masonry, or metal chimney suitable for removing the products of combustion from fuel-burning medium-heat appliances producing combustion gases, not in excess of 2000°F (1093°C), measured at the appliance flue outlet.

**Chimney, Residential Appliance-Type.** A factory-built or masonry chimney suitable for removing products of combustion from residential-type appliances producing combustion gases, not in excess of 1000°F (538°C), measured at the appliance flue outlet. Factory-built Type HT chimneys have high-temperature thermal shock resistance.

**Clarifier.** See Interceptor (Clarifier).

**Clear Water Waste.** Cooling water and condensate drainage from refrigeration and air-conditioning equipment; cooled condensate from steam heating systems, and cooled boiler blowdown water.

**Clinical Sink.** A fixture that has the same flushing and cleansing characteristics of a water closet that is used to receive the wastes from a bedpan. Also, known as a bedpan washer.

**Clothes Washer System [HCD 1].** A gray water system utilizing only a single domestic clothes washing machine in a one- or two-family dwelling.

**Coastal High Hazard Areas.** An area within the flood hazard area that is subject to high-velocity wave action, and shown on a Flood Insurance Rate Map or other flood hazard map as Zone V, VO, VE or V1-30.

**Code.** A standard that is an extensive compilation of provisions covering broad subject matter or that is suitable for adoption into law independently of other codes and standards.

**Combination Temperature and Pressure-Relief Valve.** A relief valve that actuates when a set temperature, pressure, or both is reached. Also, known as a T&P Valve.

**Combination Thermostatic/Pressure Balancing Valve.** A mixing valve that senses outlet temperature and incoming hot and cold water pressure and compensates for fluctuations in incoming hot and cold water temperatures, pressures, or both to stabilize outlet temperatures.

**Combination Waste and Vent System.** A specially designed system of waste piping embodying the horizontal wet venting of one or more sinks or floor drains using a common waste and vent pipe adequately sized to provide free movement of air above the flow line of the drain.

**Combined Building Sewer.** See Building Sewer (Combined).

**Combustible Material.** A material that, in the form in which it is used and under the conditions anticipated, will ignite and burn; a material that does not meet the definition of noncombustible. [NFPA 54:3.3.64.1]

**Commissaries Serving Mobile Food Preparation Units [DPH].** A food establishment in which food, containers, equipment or supplies are stored or handled for use in vehicles, mobile food preparation units, food carts or vending machines.

## DEFINITIONS

**Common.** That part of a plumbing system that is so designed and installed as to serve more than one appliance, fixture, building, or system.

**Complex System [BSC-CG, HCD 1].** *Gray water systems that discharge over 250 gallons (947 L) per day.*

**Condensate.** The liquid phase produced by condensation of a gas or vapor.

**Conductor.** A pipe inside the building that conveys storm water from the roof to a storm drain, combined building sewer, or other approved point of disposal.

**Confined Space.** A room or space having a volume less than 50 cubic feet per 1000 British thermal units per hour (Btu/h) (4.83 m<sup>3</sup>/kW) of the aggregate input rating of all fuel-burning appliances installed in that space.

**Construction Documents.** Plans, specifications, written, graphic, and pictorial documents prepared or assembled for describing the design, location, and physical characteristics of the elements of a project necessary for obtaining a permit.

**Contamination.** An impairment of the quality of the potable water that creates an actual hazard to the public health through poisoning or the spread of disease by sewage, industrial fluids, or waste. Also, defined as High Hazard.

**Continuous Vent.** A vertical vent that is a continuation of the drain to which it connects.

**Continuous Waste.** A drain is connecting the compartments of a set of fixtures to a trap or connecting other permitted fixtures to a common trap.

**Copper Alloy.** A homogenous mixture of two or more metals in which copper is the primary component, such as brass and bronze.

**Covered Multifamily Dwellings [HCD 1-AC].** *See Section 1.8.2.1.2.*

**CPVC.** Chlorinated Polyvinyl Chloride.

**Critical Care Area.** A room or space in which failure of equipment or a system is likely to cause major injury or death to patients or caregivers (Category 1). [NFPA 99:3.3.28]

**Critical Level.** The critical level (C-L or C/L) marking on a backflow prevention device or vacuum breaker is a point conforming to approved standards and established by the testing laboratory (usually stamped on the device by the manufacturer) that determines the minimum elevation above the flood-level rim of the fixture or receptor served at which the device may be installed. Where a backflow prevention device does not bear a critical level marking, the bottom of the vacuum breaker, combination valve, or the bottom of such approved device shall constitute the critical level.

**Cross-Connection.** A connection or arrangement, physical or otherwise, between a potable water supply system and a plumbing fixture or a tank, receptor, equipment, or device, through which it may be possible for nonpotable, used, unclean, polluted, and contaminated water, or other substances to enter into a part of such potable water system under any condition.

## 206.0

## – D –

**Debris Excluder.** A device installed on the rainwater catchment conveyance system to prevent the accumulation of leaves, needles, or other debris in the system.

**Department [HCD 1, HCD 2 and HCD 1-AC].** *“Department” means the Department of Housing and Community Development.*

**Department Having Jurisdiction.** The Authority Having Jurisdiction, including any other law enforcement agency affected by a provision of this code, whether such agency is specifically named or not.

**[HCD 1 & HCD 2]** *“Department Having Jurisdiction” shall mean “Enforcing Agency” as defined in Section 207.0 of this code.*

**Design Flood Elevation.** The elevation of the “design flood,” including wave height, relative to the datum specified on the community’s legally designated flood hazard map. In areas designated as Zone AO, the design flood elevation is the elevation of the highest existing grade of the building’s perimeter plus the depth number (in feet) specified on the flood hazard map. In areas designated as Zone AO where a depth number is not specified on the map, the depth number is taken as being equal to 2 feet (610 mm).

**Developed Length.** The length along the centerline of a pipe and fittings.

**Diameter.** Unless specifically stated, “diameter” is the nominal diameter as designated commercially.

**Direct-Vent Appliances.** Appliances that are constructed and installed so that all air for combustion is derived directly from the outdoors and all flue gases are discharged to the outdoors. [NFPA 54:3.3.5.3]

**Disinfected Tertiary Recycled Water [DWR].** *Filtered and subsequently disinfected wastewater that meets the approved method of treatment and minimum level of water quality specified in California Code of Regulations, Title 22, Division 4, Chapter 3 for the purpose of direct beneficial use.*

**Disposal Field [BSC-CG & HCD 1].** *An intended destination for gray water, including but not limited to, a mulch basin or receiving landscape feature, gray water leach field, or other approved method of disposal.*

**Domestic Sewage.** The liquid and water-borne wastes derived from the ordinary living processes, free from industrial wastes, and of such character as to permit satisfactory disposal, without special treatment, into the public sewer or by means of a private sewage disposal system.

**Downspout.** The rain leader from the roof to the building storm drain, combined building sewer, or other means of disposal located outside of the building. See Conductor and Leader.

**Drain.** A pipe that carries waste or waterborne wastes in a building drainage system.

**Drainage System.** Includes all the piping within public or private premises that conveys sewage, storm water, or other liquid wastes to a legal point of disposal, but does not include the mains of a public sewer system or a public sewage treatment or disposal plant.

**Drinking Fountain.** A plumbing fixture connected to the potable water distribution system and sanitary drainage system that provides drinking water in a flowing stream so that the user can consume water directly from the fixture without the use of accessories. Drinking fountains should also incorporate a bottle filling station and can incorporate a water filter and a cooling system for chilling the drinking water.

**Dry Vent.** A vent that does not receive the discharge of any sewage or waste.

**Durham System.** Soil or waste system in which all piping is threaded pipe, tubing, or other such rigid construction, using recessed drainage fittings to correspond to the types of piping.

## 207.0

## – E –

**Effective Ground-Fault Current Path.** An intentionally constructed, low-impedance electrically conductive path designed and intended to carry current under ground-fault conditions from the point of a ground fault on a wiring system to the electrical supply source and that facilitates the operation of the overcurrent protective device or ground-fault detectors on high-impedance grounded systems. [NFPA 54:3.3.34]

**Effective Opening.** The minimum cross-sectional area at the point of water supply discharge measured or expressed in terms of (1) diameter of a circle or (2) where the opening is not circular, the diameter of a circle of equivalent cross-sectional area. (This applies to an air gap).

**Enforcing Agency [BSC, BSC-CG, HCD 1, HCD 2, and HCD 1-AC].** “Enforcing Agency” is the designated department or agency as specified by statute or regulation.

**Essentially Nontoxic Transfer Fluid.** Essentially nontoxic at practically nontoxic, Toxicity Rating Class 1 (reference “Clinical Toxicology of Commercial Products” by Gosselin, Smith, Hodge, & Braddock).

**Exam Room Sink.** A sink used in the patient exam room of a medical or dental office with a primary purpose of the washing of hands.

**Excess Flow Valve (EFV).** A valve designed to activate when the fuel gas passing through it exceeds a prescribed flow rate. [NFPA 54:3.3.99.3]

**Existing Work.** A plumbing system or any part thereof that has been installed prior to the effective date of this code.

**Expansion Joint.** A fitting or arrangement of pipe and fittings that permit the contraction and expansion of a piping system.

## 208.0

## – F –

**F Rating.** The time period that the penetration firestop system limits the spread of fire through the penetration, where tested in accordance with ASTM E814 or UL 1479.

**Fixture Branch.** A water supply pipe between the fixture supply pipe and the water distribution pipe.

**Fixture Drain.** The drain from the trap of a fixture to the junction of that drain with any other drain pipe.

**Fixture Fitting.** A device that controls and guides the flow of water.

**Fixture Supply.** A water supply pipe is connecting the fixture with the fixture branch.

**Fixture Unit.** A quantity in terms of which the load-producing effects on the plumbing system of different kinds of plumbing fixtures are expressed on some arbitrarily chosen scale.

**Flammable Vapor or Fumes.** The concentration of flammable constituents in the air that exceeds 25 percent of its lower flammability limit (LFL).

**Flood Hazard Area.** The greater of the following two areas:

- (1) The area within a floodplain subject to a 1 percent or greater chance of flooding in any given year.
- (2) The area designated as a flood hazard area on a community’s flood hazard map, or otherwise legally designated.

**Flood Level.** See Flooded.

**Flood-Level Rim.** The top edge of a receptor from which water overflows.

**Flooded.** A fixture is flooded where the liquid therein rises to the flood-level rim.

**Flue Collar.** That portion of an appliance designed for the attachment of a draft hood, vent connector, or venting system. [NFPA 54:3.3.44]

**Flush Tank.** A tank located above or integral with water closets, urinals, or similar fixtures for the purpose of flushing the usable portion of the fixture.

**Flush Valve.** A valve located at the bottom of a tank for flushing water closets and similar fixtures.

**Flushometer Tank.** A tank integrated within an air accumulator vessel that is designed to discharge a predetermined quantity of water to fixtures for flushing purposes.

**Flushometer Valve.** A valve that discharges a predetermined quantity of water to fixtures for flushing purposes and is actuated by direct water pressure.

**FOG Disposal System.** A grease interceptor that reduces nonpetroleum fats, oils, and grease (FOG) in the effluent by separation, mass, and volume reduction.

**Food Establishment [DPH].** Any room, building, place or portion thereof, maintained, used or operated for purpose of storing, preparing, serving, packaging, transporting, salving or otherwise handling food at the retail level.

**Fuel Gas.** Natural, manufactured liquefied petroleum, or a mixture of these.

## 209.0

## – G –

**Gang or Group Shower.** Two or more showers in a common area.

**Gas Piping.** An installation of pipe, valves, or fittings that are used to convey fuel gas, installed on a premise or in a building, but shall not include:

- (1) A portion of the service piping.

## DEFINITIONS

- (2) An approved piping connection 6 feet (1829 mm) or less in length between an existing gas outlet and a gas appliance in the same room with the outlet.

**Gas Piping System.** An arrangement of gas piping or regulators after the point of delivery and each arrangement of gas piping serving a building, structure, or premises, whether individually metered or not.

**Governing Body.** The person or persons who have the overall legal responsibility for the operation of a health care facility. [NFPA 99:3.3.62]

**Grade.** The slope or fall of a line of pipe in reference to a horizontal plane. In drainage, it is usually expressed as the fall in a fraction of an inch (mm) or percentage slope per foot (meter) length of pipe.

**Gravity Grease Interceptor.** A plumbing appurtenance or appliance that is installed in a sanitary drainage system to intercept nonpetroleum fats, oils, and greases (FOG) from a wastewater discharge and is identified by volume, 30 minute retention time, baffle(s), not less than two compartments, a total volume of not less than 300 gallons (1135 L), and gravity separation. [These interceptors comply with the requirements of Chapter 10 or are designed by a registered design professional.] Gravity grease interceptors are generally installed outside.

**Graywater [BSC-CG & HCD 1].** Pursuant to Health and Safety Code Section 17922.12, "graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers.

**Note:** For the purpose of applying the standards contained in this code, "Graywater" as defined above, has the same meaning as "gray water", "grey water", and "greywater".

**Gray Water System [BSC-CG].** A system designed to collect gray water to be treated on-site for reuse or distribution to an irrigation or disposal field. A gray water system may include, on-site treated nonpotable water devices or equipment, tanks, valves, filters, pumps or other appurtenances along with piping and receiving landscape.

**Gray Water System [HCD 1].** A system designed to collect gray water on-site for reuse or distribution to an irrigation or disposal field. A gray water system may include, on-site treated nonpotable water devices or equipment, tanks, valves, filters, pumps or other appurtenances along with piping and receiving landscape.

**Grease Interceptor.** A plumbing appurtenance or appliance that is installed in a sanitary drainage system to intercept nonpetroleum fats, oil, and greases (FOG) from a wastewater discharge.

**Grease Removal Device (GRD).** A hydromechanical grease interceptor that automatically, mechanically removes non-petro-

leum fats, oils and grease (FOG) from the interceptor, the control of which are either automatic or manually initiated.

**Grounding Electrode.** A conducting object through which a direct connection to earth is established. [NFPA 70:100(I)]

## 210.0

– H –

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

### (1) Faucets and Trim

- a. Handwashing fixtures used by medical and nursing staff, patients, and food handlers shall have fittings such that all controls can be operated without the use of hands.
  - i. Wrist or elbow blades shall be permitted unless otherwise noted in Table 4-2.
  - ii. Blade handles used for this purpose shall be at least 4 inches (102 mm) in length.
- b. Sensor operated fixtures shall be capable of functioning during loss of normal power.
- c. Faucets shall not be equipped with an aerator but may be equipped with a non-aerating laminar flow device.
- d. Faucets shall be equipped with gooseneck spouts. A gooseneck spout shall be deck or fixture-mounted so the discharge point of the spout return is at least 10 inches (25.4 mm) above the bottom of the basin. The water shall not flow directly from the spout into the drain. The gooseneck spout shall have a 180 degree return with a constant radius and the outlet pointing vertically down.
- e. Faucets shall be equipped with gooseneck spouts. A gooseneck spout is a deck or fixture-mounted spout so the discharge point of the spout return is at least 5 inches (127 mm) above the fixture rim.

### (2) Lavatory

- a. Shall be designed and installed to prevent splashing outside of the lavatory.
- b. Shall be well-fitted and sealed to prevent water leaks onto or into the cabinetry or wall spaces.
- c. Design of lavatories and cabinetry shall not permit storage beneath the fixture basin.
- d. Shall be constructed of nonporous material.

**Hangers.** See Supports.

**Heat-Fusion Weld Joints.** A joint used in some thermoplastic systems to connect the 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.

**High Hazard.** See Contamination.

**Horizontal Branch.** A drain pipe extending laterally from soil or waste stack or building drain with or without vertical

to 490 g/L for CPVC Cement, 510 g/L for PVC Cement, and 325 g/L for ABS Cement, as determined by the South Coast Air Quality Management District's Laboratory Methods of Analysis for Enforcement Samples, Method 316A.

**Low VOC Primer [HCD 1 & HCD 2].** Primer with a volatile organic compound (VOC) content of less than or equal to 550 g/L, as determined by the South Coast Air Quality Management District's Laboratory Methods of Analysis for Enforcement Samples, Method 316A.

## 215.0 – M –

**Macerating Toilet System.** A system comprised of a sump with macerating pump and with connections for a water closet and other plumbing fixtures, which is designed to accept, grind and pump wastes to an approved point of discharge.

**Main.** The principal artery of a system of continuous piping to which branches may be connected.

**Main Sewer.** See Public Sewer.

**Main Vent.** The principal artery of the venting system to which vent branches may be connected.

**May.** A permissive term.

**Medical Air.** For the purposes of this code, medical air is air supplied from cylinders, bulk containers, or medical air compressors, or reconstituted from oxygen USP and oil-free, dry nitrogen NF. [NFPA 99:3.3.96]

**Medical Gas.** A patient medical gas or medical support gas. [NFPA 99:3.3.99]

**Manifold.** A device for connecting the outlets of one or more gas cylinders to the central piping system for that specific gas. [NFPA 99:3.3.93]

**Medical Gas System.** An assembly of equipment and piping for the distribution of nonflammable medical gases such as oxygen, nitrous oxide, compressed air, carbon dioxide, and helium. [NFPA 99:3.3.100]

**Medical Support Gas.** Nitrogen or instrument air used for any medical support purpose (e.g., to remove excess moisture from instruments before further processing, or to operate medical-surgical tools, air-driven booms, pendants, or similar applications) and, if appropriate to the procedures, used in laboratories and are not respired as part of any treatment. Medical support gas falls under the general requirements for medical gases. [NFPA 99:3.3.101]

**Medical-Surgical Vacuum.** A method used to provide a source of drainage, aspiration, and suction in order to remove body fluids from patients. [NFPA 99:3.3.102]

**Medical-Surgical Vacuum System.** An assembly of central vacuum-producing equipment and a network of piping for patient suction in medical, medical-surgical, and waste anesthetic gas disposal (WAGD) applications. [NFPA 99:3.3.103]

**Meter.** An instrument or device for recording the quantity of a product passing through a particular outlet. (See Water Code Section 516 for additional details.)

**Mobile Home Park Sewer.** That part of the horizontal piping of a drainage system that begins 2 feet (610 mm) downstream from the last mobile home site and conveys it to a

public sewer, private sewer, private sewage disposal system, or other point of disposal.

**Mulch.** Organic materials, such as wood chips and fines, tree bark chips, and pine needles that are used in a mulch basin to conceal gray water outlets and permit the infiltration of gray water.

**Mulch Basin [BSC-CG & HCD 1].** A subsurface type of irrigation or disposal field filled with mulch or other approved permeable material of sufficient depth, length, and width to prevent ponding or runoff. A mulch basin may include a basin around a tree, a trough along a row of plants, or other shapes necessary for irrigation or disposal.

## 216.0 – N –

**Nitrogen, NF.** Nitrogen complying as a minimum, with nitrogen NF. [NFPA 99:3.3.109.1]

**Nonwater Supplied Urinal [HCD 1].** A plumbing fixture which does not require water supply and is designed to receive and convey the uninhibited flow of liquid waste to the gravity drainage system.

**Nuisance.** Includes, but is not limited to:

- (1) A public nuisance known at common law or in equity jurisprudence.
- (2) Where work regulated by this code is dangerous to human life or is detrimental to health and property.
- (3) Inadequate or unsafe water supply or sewage disposal system.

**[HCD 1 & HCD 2]** "Nuisance" shall mean any nuisance as defined in Health and Safety Code Section 17920(l).

### Notes:

1. For applications subject to the Mobilehome Parks Act as referenced in Section 1.8.3.2.2 of this code, refer to California Code of Regulations, Title 25, Division 1, Chapter 2 for the definition of "Nuisance".
2. For applications subject to the Special Occupancy Parks Act as referenced in Section 1.8.3.2.3 of this code, refer to California Code of Regulations, Title 25, Division 1, Chapter 2.2 for the definition of "Nuisance".

## 217.0 – O –

**Offset.** A combination of elbows or bends in a line of piping that brings one section of the pipe out of line but into a line parallel with the other section.

**Oil Interceptor.** See Interceptor (Clarifier).

**On-Site Treated Nonpotable Water [BSC-CG & HCD 1].** Nonpotable water that has been collected, treated, and intended to be used on-site and is suitable for direct beneficial use. Sources for on-site treated nonpotable water include, but are not limited to, gray water; rainwater; stormwater; reclaimed (recycled) water; cooling tower blow-down water; and foundation drainage.

## 218.0 – P –

**Patient Care Space.** Any space of a health care facility wherein patients are intended to be examined or treated. [NFPA 99:3.3.127]

## DEFINITIONS

**Category 1 Space.** Space in which failure of equipment or a system is likely to cause major injury or death of patients, staff, or visitors. [NFPA 99:3.3.127.1]

**Category 2 Space.** Space in which failure of equipment or a system is likely to cause minor injury to patients, staff, or visitors. [NFPA 99:3.3.127.2]

**Category 3 Space.** Space in which the failure of equipment or a system is not likely to cause injury to patients, staff, or visitors but can cause discomfort. [NFPA 99:3.3.127.3]

**Category 4 Space.** Space in which failure of equipment or a system is not likely to have a physical impact on patient care. [NFPA 99:3.3.127.4]

**Patient Medical Gas.** Piped gases such as oxygen, nitrous oxide, helium, carbon dioxide, and medical air that are used in the application of human respiration and the calibration of medical devices used for human respiration. [NFPA 99:3.3.131]

**PB.** Polybutylene.

**PE.** Polyethylene.

**PE-AL-PE.** Polyethylene-aluminum-polyethylene.

**PE-RT.** Polyethylene of raised temperature.

**Penetration Firestop System.** A specific assemblage of field-assembled materials, or a factory-made device, which has been tested to a standard test method and, when installed properly on penetrating piping materials, is capable of maintaining the fire-resistance rating of assemblies penetrated.

**Person.** A natural person, his heirs, executor, administrators, or assigns and shall also include a firm, corporation, municipal or quasi-municipal corporation, or governmental agency. The singular includes the plural, male includes female.

**PEX.** Cross-linked polyethylene.

**PEX-AL-PEX.** Cross-linked polyethylene-aluminum-cross-linked polyethylene.

**Pipe.** A cylindrical conduit or conductor is conforming to the dimensions commonly known as “pipe size.”

**Plumbing.** The business, trade, or work having to do with the installation, removal, alteration, or repair of plumbing systems or parts thereof.

**Plumbing Appliance.** A special class of device or equipment that is intended to perform a special plumbing function. Its operation, control, or both may be dependent upon one or more energized components, such as motors, controls, heating elements, or pressure- or temperature-sensing elements. Such device or equipment may operate automatically through one or more of the following actions: a time cycle, a temperature range, a pressure range, a measured volume or weight; or the device or equipment may be manually adjusted or controlled by the user or operator.

**Plumbing Appurtenance.** A manufactured device, a pre-fabricated assembly, or an on-the-job assembly of component parts that is an adjunct to the basic piping system and plumbing fixtures. An appurtenance demands no additional water supply, nor does it add a discharge load to a fixture or the drainage system. It performs some useful function in the operation, maintenance, servicing, economy, or safety of the plumbing system.

**Plumbing Fixture.** An approved type installed receptacle, device or appliance that is supplied with water or that receives liquid or liquid-borne wastes and discharges such wastes into the drainage system to which it may be directly or indirectly connected. Industrial or commercial tanks, vats, and similar processing equipment are not plumbing fixtures, but may be connected to or discharged into approved traps or plumbing fixtures where and as otherwise provided for elsewhere in this code.

**Plumbing Official.** See Authority Having Jurisdiction.

**Plumbing System.** Includes all potable water, alternate water sources, building supply, and distribution pipes; all plumbing fixtures and traps; all drainage and vent pipes; and all building drains and building sewers, including their respective joints and connections, devices, receptors, and appurtenances within the property lines of the premises and shall include potable water piping, potable water treating or using equipment, medical gas and medical vacuum systems, liquid and fuel gas piping, and water heaters and vents for same.

**Plumbing Vent.** A pipe provided to ventilate a plumbing system, to prevent trap siphonage and backpressure, or to equalize the air pressure within the drainage system.

**Plumbing Vent System.** A pipe or pipes installed to provide a flow of air to or from a drainage system or to provide a circulation of air within such system to protect trap seals from siphonage and backpressure.

**Pollution.** An impairment of the quality of the potable water to the degree that does not create a hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such potable water for domestic use. Also, defined as “Low Hazard.”

**Potable Water.** Water that is satisfactory for drinking, culinary, and domestic purposes and that meets the requirements of the Health Authority Having Jurisdiction.

**PP.** Polypropylene.

**Pressure.** The normal force exerted by a homogeneous liquid or gas, per unit of area, on the wall of the container.

**Residual Pressure.** The pressure available at the fixture or water outlet after allowance is made for pressure drop due to friction loss, head, meter, and other losses in the system during maximum demand periods.

**Static Pressure.** The pressure is existing without any flow.

**Pressure-Balancing Valve.** A mixing valve that senses incoming hot and cold water pressures and compensates for fluctuations in either to stabilize outlet temperature.

**Pressure-Lock-Type Connection.** A mechanical connection that depends on an internal retention device to prevent pipe or tubing separation. The connection is made by inserting the pipe or tubing into the fitting to a prescribed depth.

**Private or Private Use.** Applies to plumbing fixtures in residences and apartments, to private bathrooms in hotels and hospitals, and to restrooms in commercial establishments where the fixtures are intended for the use of a family or an individual.



**Private Sewage Disposal System.** A septic tank with the effluent discharging into a subsurface disposal field, into one or more seepage pits, or into a combination of subsurface disposal field and seepage pit or of such other facilities as may be permitted under the procedures set forth elsewhere in this code.

**Private Sewer.** A building sewer that receives the discharge from more than one building drain and conveys it to a public sewer, private sewage disposal system, or another point of disposal.

**Proportioning System for Medical Air USP.** A central supply that produces medical air (USP) reconstituted from oxygen USP and nitrogen NF by means of a mixer or blender. [NFPA 99:3.3.96.1]

**Public or Public Use.** Applies to plumbing fixtures that are not defined as private or private use.

**Public Sewer.** A common sewer directly controlled by public authority.

**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.

**PVC.** Polyvinyl Chloride.

**PVDF.** Polyvinylidene Fluoride.

## 219.0 – Q –

**Quick-Disconnect Device.** A hand-operated device that provides a means for connecting and disconnecting a hose to a water supply, and that is equipped with a means to shut off the water supply when the device is disconnected.

**Quick-Disconnect Device (Fuel Gas).** A hand-operated device that provides a means for connecting and disconnecting an appliance or an appliance connector to a gas supply, and that is equipped with an automatic means to shut off the gas supply when the device is disconnected. [NFPA 54:3.3.28.3]

## 220.0 – R –

**Rainwater [BSC-CG & HCD 1].** *Precipitation on any public or private parcel that has not entered an offsite storm drain system or channel, a flood control channel, or any other stream channel, and has not previously been put to beneficial use.*

**Rainwater Catchment System [BSC-CG & HCD 1].** *A facility designed to capture, retain, and store rainwater flowing off a building, parking lot, or any other manmade impervious surface for subsequent onsite use. Rainwater catchment system is also known as “Rainwater Harvesting System” or “Rainwater Capture System.”*

**Rainwater Storage Tank.** The central component of the rainwater catchment system. Also, known as a cistern or rain barrel.

**Receptor.** An approved plumbing fixture or device of such material, shape, and capacity as to adequately receive the discharge from indirect waste pipes, so constructed and located as to be readily cleaned.

**Receiving Landscape [BSC-CG & HCD 1].** *Includes features such as soil, basins, swales, mulch, and plants.*

**Reclaimed (Recycled) Water [BSC-CG, HCD 1 & DWR].** *Nonpotable water that meets California State Water Resources Control Board statewide uniform criteria for disinfected tertiary recycled water. Reclaimed (recycled) water is also known as “recycled water” or “reclaimed water”.*

**Recycled Water Supply System. [DWR]** *The building supply pipe, the water distribution pipes, and the necessary connecting pipes, fittings, control valves, backflow prevention devices, and all appurtenances carrying or supplying reclaimed (recycled) water in or adjacent to the building or within the premises.*

**Registered Design Professional.** An individual who is registered or licensed by the laws of the state to perform such design work in the jurisdiction.

**Regulating Equipment.** Includes valves and controls used in a plumbing system that is required to be accessible or readily accessible.

**Relief Vent.** A vent, the primary function of which is to provide circulation of air between drainage and vent systems or to act as an auxiliary vent on a specially designed system.

**Remote Outlet.** Where used for sizing water piping, it is the furthest outlet dimension, measuring from the meter, either the developed length of the cold-water piping or through the water heater to the furthest outlet on the hot-water piping.

**Rim.** See Flood-Level Rim.

**Riser.** A water supply pipe that extends vertically one full story or more to convey water to branches or fixtures.

**Roof Drain.** A drain installed to receive water collecting on the surface of a roof and to discharge it into a leader, downspout, or conductor.

**Roof Washer.** A device or method for removal of sediment and debris from a collection surface by diverting initial rainfall from entry into the cistern(s). Also, known as a first flush device.

**Roughing-In.** The installation of all parts of the plumbing system that can be completed prior to the installation of fixtures. This includes drainage, water supply, gas piping, vent piping, and the necessary fixture supports.

## 221.0 – S –

**Sand Interceptor.** See Interceptor (Clarifier).

**Scavenging.** Evacuation of exhaled mixtures of oxygen and nitrous oxide. [NFPA 99:3.3.147]

**Scrub Sink [OSHPD 1, 2, 3, 4 & 5].** *Is a sink used to wash and scrub the hands and arms during the septic preparation for surgery and equipped with a supply spout and controls as required for a handwashing fixture. Sensor operated fixtures shall be capable of functioning during loss of normal power.*

**SDR.** An abbreviation for “standard dimensional ratio,” which is the specific ratio of the average specified outside diameter to the minimum wall thickness for outside controlled diameter plastic pipe.

## DEFINITIONS

**Seam, Welded.** See Joint, Welded.

**Seepage Pit.** A lined excavation in the ground which receives the discharge of a septic tank so designed as to permit the effluent from the septic tank to seep through its bottom and sides.

**Septic Tank.** A watertight receptacle that receives the discharge of a drainage system or part thereof, designed and constructed so as to retain solids, digest organic matter through a period of detention, and allow the liquids to discharge into the soil outside of the tank through a system of open joint piping or a seepage pit meeting the requirements of this code.

**Service Piping.** The piping and equipment between the street gas main and the gas piping system inlet that is installed by, and is under the control and maintenance of, the serving gas supplier.

**Sewage.** Liquid waste containing animal or vegetable matter in suspension or solution and that may include liquids containing chemicals in solution.

**Sewage Ejector.** A device for lifting sewage by entraining it on a high-velocity jet stream, air, or water.

**Sewage Pump.** A permanently installed mechanical device, other than an ejector, for removing sewage or liquid waste from a sump.

**Shall.** Indicates a mandatory requirement.

**Shielded Coupling.** An approved elastomeric sealing gasket with an approved outer shield and a tightening mechanism.

**Shock Arrester.** See Water Hammer Arrester.

**Should.** Indicates a recommendation or that which is advised but not required.

→ **Simple System [BSC & HCD 1].** *A gray water system serving one-and two-family dwellings, townhouses, or other occupancies with a discharge of 250 gallons (947 L) per day or less. Simple systems exceed a clothes washer system.*

**Size and Type of Tubing.** See Diameter.

**Slip Joint.** An adjustable tubing connection, consisting of a compression nut, a friction ring, and a compression washer, designed to fit a threaded adapter fitting or a standard taper pipe thread.

**Slope.** See Grade.

**Soil Pipe.** A pipe that conveys the discharge of water closets, urinals, clinical sinks, or fixtures having similar functions of collection and removal of domestic sewage, with or without the discharge from other fixtures to the building drain or building sewer.

**Special Wastes.** Wastes that require some special method of handling, such as the use of indirect waste piping and receptors, corrosion-resistant piping, sand, oil or grease interceptors, condensers, or other pretreatment facilities.

**Stack.** The vertical main of a system of soil, waste, or vent piping extending through one or more stories.

**Stack Vent.** The extension of soil or waste stacks above the highest horizontal drain connected to the stack.

**Standard.** A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adop-

tion into law. Nonmandatory provisions shall be located in an appendix, footnote, or fine print note and are not to be considered a part of the requirements of a standard.

**Standard Cubic Feet per Minute (SCFM).** Volumetric flow rate of gas in units of standard cubic feet per minute. [NFPA 99:3.3.156]

**Station Inlet.** An inlet point in a piped medical/surgical vacuum distribution system at which the user makes connections and disconnections. [NFPA 99:3.3.157]

**Station Outlet.** An outlet point in a piped medical gas distribution system at which the user makes connections and disconnections. [NFPA 99:3.3.158]

**Sterilizer.** A piece of equipment that disinfects instruments and equipment by way of heat.

**Storm Drain.** See Building Drain (Storm).

**Storm Sewer.** A sewer used for conveying rainwater, surface water, condensate, cooling water, or similar liquid wastes.

**Submeter.** *A secondary device beyond a meter that measures water consumption of an individual rental unit within a multiunit residential structure or mixed-use residential and commercial structure. (See Civil Code Section 1954.202(g) and Water Code Section 517 for additional details.)*

**Subsoil Drain.** A drain that collects subsurface or seepage water and conveys it to a place of disposal.

**Subsoil Irrigation Field.** Gray water irrigation field installed in a trench within the layer of soil below the topsoil. This system is typically used for irrigation of deep rooted plants.

**Subsurface Irrigation Field.** Gray water irrigation field installed below finished grade within the topsoil.

**Sump.** An approved tank or pit that receives sewage or liquid waste and which is located below the normal grade of the gravity system and which must be emptied by mechanical means.

**Supports.** Supports, hangers, and anchors are devices for properly supporting and securing pipe, fixtures, and equipment.

**Surge Tank.** A reservoir to modify the fluctuation in flow rates to allow for uniform distribution of gray water to the points of irrigation.

## 222.0

## – T –

**T Rating.** The time period that the penetration firestop system, including the penetrating item, limits the maximum temperature rise of 325°F (181°C) above its initial temperature through the penetration on the nonfire side, where tested in accordance with ASTM E814 or UL 1479.

**Tailpiece.** The pipe or tubing that connects the outlet of a plumbing fixture to a trap.

**Testing Agency [HCD 1].** See “Approved Testing Agency”.

**Thermostatic (Temperature Control) Valve.** A mixing valve that senses outlet temperature and compensates for fluctuations in incoming hot or cold water temperatures.

**Toilet [OSHPD 1, 2, 3, 4 & 5].** *A fixture within a toilet room which is used for defecation or urination.*

**Toilet Facility.** A room or space containing not less than one lavatory and one water closet.

**|| Toilet Room [OSHPD 1, 2, 3, 4 & 5].** *A room within or on the premises containing water closets, urinals, and other required facilities.*

**Transition Gas Riser.** A listed or approved section or sections of pipe and fittings used to convey fuel gas and installed in a gas piping system to provide a transition from below-ground to above-ground.

**Trap.** A fitting or device so designed and constructed as to provide, where properly vented, a liquid seal that will prevent the back passage of air without materially affecting the flow of sewage or wastewater through it.

**Trap Arm.** Those portions of a fixture drain between a trap and the vent.

**Trap Primer.** A device and system of piping that maintains a water seal in a remote trap.

**Trap Seal.** The vertical distance between the crown weir and the top dip of the trap.

**Crown Weir (Trap Weir).** The lowest point in the cross-section of the horizontal waterway at the exit of the trap.

**Top Dip (of the trap).** The highest point in the internal cross-section of the trap at the lowest part of the bend (inverted siphon). By contrast, the bottom dip is the lowest point in the internal cross-section.

**Treated Gray Water [HCD 1].** *Nonpotable water meeting the definition of “gray water” collected and treated on-site suitable for direct beneficial use.*

## 223.0 – U –

**Unsanitary.** See Insanitary.

**UPC [HCD 1].** *“UPC” is the latest edition of the Uniform Plumbing Code, published by the International Association of Plumbing and Mechanical Officials.*

**Urinal, Hybrid.** A urinal that conveys waste into the drainage system without the use of water for flushing and automatically performs a drain-cleansing action after a pre-determined amount of time.

**User Outlet.** See Station Outlet.

## 224.0 – V –

**Vacuum.** A pressure less than that exerted by the atmosphere.

**Vacuum Breaker.** See Backflow Preventer.

**Vacuum Relief Valve.** A device that prevents excessive vacuum in a pressure vessel.

**Vacuum System-Level 1.** A system consisting of central vacuum-producing equipment with pressure and operating controls, shutoff valves, alarm warning systems, gauges, and a network of piping extending to and terminating with suitable station inlets at locations where patient suction could be required.

**Valve, Isolation.** A valve that isolates one piece of equipment from another.

**Valve, Pressure-Relief.** A pressure-actuated valve held closed by a spring or other means and designed automatically to relieve pressure in excess of its setting.

**Valve, Riser.** A valve at the base of a vertical riser that isolates that riser.

**Valve, Service.** A valve is serving horizontal piping extending from a riser to a station outlet or inlet.

**Valve, Source.** A single valve at the source that controls a number of units that makes up the source.

**Valve, Zone.** A valve that controls the gas or vacuum to a particular area.

**Vent.** See Plumbing Vent; Dry Vent; Wet Vent.

**Vent Connector, Gas.** That portion of a gas venting system that connects a listed gas appliance to a gas vent and is installed within the space or area in which the appliance is located.

**Vent Offset.** An arrangement of two or more fittings and pipe installed for the purpose of locating a vertical section of the vent pipe in a different but parallel plane with respect to an adjacent section of a vertical vent pipe. [NFPA 54:3.3.102]

**Vent Pipe.** See Plumbing Vent.

**Vent Stack.** The vertical vent pipe installed primarily for the purpose of providing circulation of air to and from any part of the drainage system.

**Vent System.** See Plumbing Vent System.

**Vented Flow Control Device.** A device installed upstream from the hydromechanical grease interceptor having an orifice that controls the rate of flow through the interceptor, and an air intake (vent) downstream from the orifice, which allows air to be drawn into the flow stream.

**Venting System.** A continuous open passageway from the flue collar or draft hood of an appliance to the outdoors for the purpose of removing flue or vent gases. [NFPA 54:3.3.95.7]

**Vent, Gases.** A listed factory-made vent pipe and vent fittings for conveying flue gases to the outdoors.

**Type B Gas Vent.** A factory-made gas vent listed by a nationally recognized testing agency for venting listed or approved appliances equipped to burn only gas.

**Type BW Gas Vent.** A factory-made gas vent listed by a nationally recognized testing agency for venting listed or approved gas-fired vented wall furnaces.

**Type L Gas Vent.** A venting system consisting of listed vent piping and fittings for use with oil-burning appliances listed for use with Type L or with listed gas appliances.

**Vertical Pipe.** A pipe or fitting that is installed in a vertical position or that makes an angle of not more than 45 degrees (0.79 rad) with the vertical.

## 225.0 – W –

**Wall-Hung Water Closet.** A water closet installed in such a way that no part of the water closet touches the floor.

**Waste.** See Liquid Waste and Industrial Waste.

**Waste Pipe.** A pipe that conveys only liquid waste, free of fecal matter.

## DEFINITIONS

**Water Closet [HCD 1].** “Water Closet” is a plumbing fixture (which may be used for both solids and liquids) in which the waste matter is removed by flushing with water.

**Water-Conditioning or Treating Device.** A device that conditions or treats a water supply to change its chemical content or remove suspended solids by filtration.

**Water Distribution Pipe.** In a building or premises, a pipe that conveys potable water from the building supply pipe to the plumbing fixtures and other water outlets.

**Water Hammer Arrestor.** A device designed to provide protection against hydraulic shock in the building water supply system.

**Water Heater or Hot Water Heating Boiler.** An appliance designed primarily to supply hot water for domestic or commercial purposes and equipped with automatic controls limiting water temperature to a maximum of 210°F (99°C).

**Water Main (Street Main).** A water supply pipe for public or community use.

**Water Supply System.** The building supply pipe, the water distribution pipes, and the necessary connecting pipes, fittings, control valves, backflow prevention devices, and all appurtenances carrying or supplying potable water in or adjacent to the building or premises.

**Water/Wastewater Utility.** A public or private entity which may treat, deliver or do both functions to reclaimed (recycled) water, potable water, or both to wholesale or retail customers.

**Welder, Pipe.** A person who specializes in the welding of pipes and holds a valid certificate of competency from a recognized testing laboratory, based on the requirements of the ASME Boiler and Pressure Vessels code, Section IX.

**Wet Procedure Locations.** The area in a patient care space where a procedure is performed that is normally subject to wet conditions while patients are present, including standing fluids on the floor or drenching of the work area, either of which condition is intimate to the patient or staff. [NFPA 99:3.3.171]

**Wet Vent.** A vent that also serves as a drain.

**Whirlpool Bathtub.** A bathtub fixture equipped and fitted with a circulating piping system designed to accept, circulate, and discharge bathtub water upon each use.

**226.0**                                **– X –**

No definitions.

**227.0**                                **– Y –**

**Yoke Vent.** A pipe connecting upward from soil or waste stack to a vent stack to prevent pressure changes in the stacks.

**228.0**                                **– Z –**

No definitions.

**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE  
CHAPTER 3 - GENERAL REGULATIONS**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4								
Adopt Entire Chapter	X																					
Adopt Entire Chapter as amended (amended sections listed below)			X	X	X			X	X	X	X	X	X	X								
Adopt only those sections that are listed below																						
Chapter/Section																						
301.3				X																		
301.3.1				†	†																	
301.3.1.1				†	†																	
301.3.1.2				†	†																	
301.4.1								X	X													
301.6				X																		
301.7											X											
303.1 <i>Exception</i>				X																		
304.1 <i>Exception</i>				X																		
310.9										X	X	X	X	X								
310.10										X		X	X	X								
310.11			X																			
310.12										X	X		X	X								
310.13										X			X	X								
311.1 <i>Note</i>				X	X																	
312.2				X	X			X	X													
312.7			X	X	X			X	X													
312.11								X	X													
313.8										X	X	X	X	X								
319.0										X	X	X	X	X								
321.0										X	X	X	X	X								
322.0										X	X		X	X								
323.0										X	X	X	X	X								

*This state agency does not adopt sections identified with the following symbol: †*

*The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.0.*



# CHAPTER 3

## GENERAL REGULATIONS

### 301.0 General.

**301.1 Applicability.** This chapter shall govern the general requirements, not specific to other chapters, for the installation of plumbing systems.

**301.2 Minimum Standards.** Pipe, pipe fittings, traps, fixtures, material, and devices used in a plumbing system shall be listed (third-party certified) by a listing agency (accredited conformity assessment body) as complying with the approved applicable recognized standards referenced in this code, and shall be free from defects. Unless otherwise provided for in this code, materials, fixtures, or devices used or entering into the construction of plumbing systems, or parts thereof shall be submitted to the Authority Having Jurisdiction for approval.

**301.2.1 Marking.** Each length of pipe and each pipe fitting, trap, fixture, material, and device used in a plumbing system shall have cast, stamped, or indelibly marked on it any markings required by the applicable referenced standards and listing agency, and the manufacturer's mark or name, which shall readily identify the manufacturer to the end user of the product. Where required by the approved standard that applies, the product shall be marked with the weight and the quality of the product. Materials and devices used or entering into the construction of plumbing and drainage systems, or parts thereof shall be marked and identified in a manner satisfactory to the Authority Having Jurisdiction. Such marking shall be done by the manufacturer. Field markings shall not be acceptable.

**Exception:** Markings shall not be required on nipples created from cutting and threading of approved pipe.

**301.2.2 Standards.** Standards listed or referred to in this chapter or other chapters cover materials that will conform to the requirements of this code, where used in accordance with the limitations imposed in this or other chapters thereof and their listing. Where a standard covers materials of various grades, weights, quality, or configurations, the portion of the listed standard that is applicable shall be used. Design and materials for special conditions or materials not provided for herein shall be permitted to be used by special permission of the Authority Having Jurisdiction after the Authority Having Jurisdiction has been satisfied as to their adequacy. A list of plumbing standards that appear in specific sections of this code is referenced in Table 1701.1. Standards referenced in Table 1701.1 shall be applied as indicated in the applicable referenced section. A list of additional standards, publications, practices, and guides that are not referenced in specific sections of this code appear in Table 1701.2. The documents indicated in Table 1701.2 shall be permitted in accordance with Section 301.3. An IAPMO Installation Standard is referenced in Appendix I for the convenience of the users of this code. It is not considered as a part of this code unless formally adopted as such by the Authority Having Jurisdiction.

**301.2.3 Plastic Pipe, Plastic Pipe Fittings, and Components.** Plastic pipe, plastic pipe fittings, and components other than those for gas shall comply with NSF 14.

**301.2.4 Cast-Iron Soil Pipe, Fittings, and Hubless Couplings.** Cast-iron soil pipe, fittings, and hubless couplings shall be third party certified in accordance with ASTM C1277 and CISPI 310 for couplings and ASTM A888, ASTM A74, and CISPI 301 for pipes and fittings.

**301.2.5 Existing Buildings.** In existing buildings or premises in which plumbing installations are to be altered, repaired, or renovated, the Authority Having Jurisdiction has discretionary powers to permit deviation from the provisions of this code, provided that such proposal to deviate is first submitted for proper determination in order that health and safety requirements, as they pertain to plumbing, shall be observed.

**301.3 Alternate Materials and Methods of Construction Equivalency.** Nothing in this code is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this code. Technical documentation shall be submitted to the Authority Having Jurisdiction to demonstrate equivalency prior to installation. The Authority Having Jurisdiction shall have the authority to approve or disapprove the system, method, or device for the intended purpose. **[HCD 1]** (See Section 1.8.7)

However, the exercise of this discretionary approval by the Authority Having Jurisdiction shall have no effect beyond the jurisdictional boundaries of said Authority Having Jurisdiction. An alternate material or method of construction so approved shall not be considered as in accordance with the requirements, intent, or both of this code for a purpose other than that granted by the Authority Having Jurisdiction where the submitted data does not prove equivalency.

**301.3.1 Testing.** The Authority Having Jurisdiction shall have the authority to require tests, as proof of equivalency.

**301.3.1.1 Tests.** Tests shall be made in accordance with approved or applicable standards, by an approved testing agency at the expense of the applicant. In the absence of such standards, the Authority Having Jurisdiction shall have the authority to specify the test procedure.

**301.3.1.2 Request by Authority Having Jurisdiction.** The Authority Having Jurisdiction shall have the authority to require tests to be made or repeated where there is reason to believe that a material or device no longer is in accordance with the requirements on which its approval was based.

**301.4 Flood Hazard Areas.** Plumbing systems shall be located above the elevation in accordance with the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher.

**Exception:** Plumbing systems shall be permitted to be located below the elevation in accordance with the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher, provided that the systems are designed and installed to prevent water from entering or accumulating within their components, and the systems are constructed to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to such elevation.

**301.4.1 Coastal High Hazard Areas.** Plumbing systems in buildings located in coastal high hazard areas shall be in accordance with the requirements of Section 301.4, and plumbing systems, pipes, and fixtures shall not be mounted on or penetrate through walls that are intended to breakaway under flood loads in accordance with the *California Building Code* or *California Residential Code*.

**301.5 Alternative Engineered Design.** An alternative engineered design shall comply with the intent of the provisions of this code and shall provide an equivalent level of quality, strength, effectiveness, fire resistance, durability, and safety. Material, equipment, or components shall be designed and installed in accordance with the manufacturer's installation instructions.

**301.5.1 Permit Application.** The registered design professional shall indicate on the design documents that the plumbing system, or parts thereof, is an alternative engineered design so that it is noted on the construction permit application. The permit and permanent permit records shall indicate that an alternative engineered design was part of the approved installation.

**301.5.2 Technical Data.** The registered design professional shall submit sufficient technical data to substantiate the proposed alternative engineered design and to prove that the performance meets the intent of this code.

**301.5.3 Design Documents.** The registered design professional shall provide two complete sets of signed and sealed design documents for the alternative engineered design for submittal to the Authority Having Jurisdiction. The design documents shall include floor plans and a riser diagram of the work. Where appropriate, the design documents shall indicate the direction of flow, pipe sizes, grade of horizontal piping, loading, and location of fixtures and appliances.

**301.5.4 Design Approval.** An approval of an alternative engineered design shall be at the discretion of the Authority Having Jurisdiction. The exercise of this discretionary approval by the Authority Having Jurisdiction shall have no effect beyond the jurisdictional boundaries of said Authority Having Jurisdiction. An alternative engineered design so approved shall not be considered as in accordance with the requirements, intent, or both of this code for a purpose other than that granted by the Authority Having Jurisdiction.

**301.5.5 Design Review.** The Authority Having Jurisdiction shall have the authority to require testing of the alternative engineered design in accordance with Section 301.3.1, including the authority to require an independent review of the design documents by a registered

design professional selected by the Authority Having Jurisdiction and at the expense of the applicant.

**301.5.6 Inspection and Testing.** The alternative engineered design shall be tested and inspected in accordance with the submitted testing and inspection plan and the requirements of this code.

**301.6 One- and Two-Family Dwellings. [HCD 1]** *The provisions contained in this code shall not apply to one and two-family dwelling private sewage disposal systems and minimum plumbing facilities when alternate facilities or installations have been approved by the local health authority, provided that such alternative facilities or installations provide substantially equivalent or greater protection to health and safety.*

**301.7 OSHPD 1R [OSHPD 1R].** *For OSHPD 1R, refer to Section 309 of the California Existing Building Code for general requirements.*

### 302.0 Iron Pipe Size (IPS) Pipe.

**302.1 General.** Iron, steel, copper, and copper alloy pipe shall be standard-weight iron pipe size (IPS) pipe.

### 303.0 Disposal of Liquid Waste.

**303.1 General.** It shall be unlawful for a person to cause, suffer, or permit the disposal of sewage, human excrement, or other liquid wastes, in a place or manner, except through and by means of an approved drainage system, installed and maintained in accordance with the provisions of this code.

**Exception: [HCD 1]** *Limited-density owner-built rural dwellings. A water closet shall not be required when an alternate system is provided and has been approved by the local health official. Where an alternative to the water closet is installed, a system for the disposal or treatment of graywater shall be provided to the dwelling. Graywater systems shall be designed according to water availability, use and discharge. The design, use and maintenance standards of such systems shall be the prerogative of the local health official.*

### 304.0 Connections to Plumbing System Required.

**304.1 General.** Plumbing fixtures, drains, appurtenances, and appliances, used to receive or discharge liquid wastes or sewage, shall be connected properly to the drainage system of the building or premises, in accordance with the requirements of this code.

**Exception: [HCD 1]** *Limited-density owner-built rural dwellings. Where conventional plumbing, in all or in part, is installed within the structure, it shall be installed in accordance with the provisions of this code. Alternative materials and methods shall be permitted provided that the design complies with the intent of the code, and that such alternatives shall perform to protect health and safety for the intended purpose.*

### 305.0 Damage to Drainage System or Public Sewer.

**305.1 Unlawful Practices.** It shall be unlawful for a person to deposit, by any means whatsoever, into a plumbing fixture, floor drain, interceptor, sump, receptor, or device, which



is connected to a drainage system, public sewer, private sewer, septic tank, or cesspool, any ashes; cinders; solids; rags; inflammable, poisonous, or explosive liquids or gases; oils; grease; or any other thing whatsoever that is capable of causing damage to the drainage system or public sewer.

### 306.0 Industrial Wastes.

**306.1 Detrimental Wastes.** Wastes detrimental to the public sewer system or detrimental to the functioning of the sewage treatment plant shall be treated and disposed of as found necessary and directed by the Authority Having Jurisdiction.

**306.2 Safe Discharge.** Sewage or other waste from a plumbing system that is capable of being deleterious to surface or subsurface waters shall not be discharged into the ground or a waterway unless it has first been rendered safe by some acceptable form of treatment in accordance with the Authority Having Jurisdiction.

### 307.0 Location.

**307.1 System.** Except as otherwise provided in this code, no plumbing system, drainage system, building sewer, private sewage disposal system, or parts thereof shall be located in a lot other than the lot that is the site of the building, structure, or premises served by such facilities.

**307.2 Ownership.** No subdivision, sale, or transfer of ownership of existing property shall be made in such manner that the area, clearance, and access requirements of this code are decreased.

### 308.0 Improper Location.

**308.1 General.** Piping, fixtures, or equipment shall not be so located as to interfere with the normal use thereof or with the normal operation and use of windows, doors, or other required facilities.

### 309.0 Workmanship.

**309.1 Engineering Practices.** Design, construction, and workmanship shall be in accordance with accepted engineering practices and shall be of such character as to secure the results sought to be obtained by this code.

**309.2 Concealing Imperfections.** It is unlawful to conceal cracks, holes, or other imperfections in materials by welding, brazing, or soldering or by using therein or thereon paint, wax, tar, solvent cement, or other leak-sealing or repair agent.

**309.3 Burred Ends.** Burred ends of pipe and tubing shall be reamed to the full bore of the pipe or tube, and chips shall be removed.

**309.4 Installation Practices.** Plumbing systems shall be installed in a workmanlike manner which is in accordance with this code, applicable standards, and the manufacturer's installation instructions. All materials shall be installed so as not to adversely affect the systems and equipment or the structure of the building, and in compliance with all laws and

other provisions of this code. All plumbing systems shall be in accordance with construction documents approved by the Authority Having Jurisdiction.

**309.5 Sound Transmission.** Plumbing piping systems shall be designed and installed in conformance with sound limitations as required in the *California Building Code*.

### 310.0 Prohibited Fittings and Practices.

**310.1 Fittings.** No double hub fitting, single or double tee branch, single or double tapped tee branch, side inlet quarter bend, running thread, band, or saddle shall be used as a drainage fitting, except that a double hub sanitary tapped tee shall be permitted to be used on a vertical line as a fixture connection.

**310.2 Drainage and Vent Piping.** No drainage or vent piping shall be drilled and tapped for the purpose of making connections thereto, and no cast-iron soil pipe shall be threaded.

**310.3 Waste Connection.** No waste connection shall be made to a closet bend or stub of a water closet or similar fixture.

**310.4 Use of Vent and Waste Pipes.** Except as hereinafter provided in Section 908.0 through Section 911.0, no vent pipe shall be used as a soil or waste pipe, nor shall a soil or waste pipe be used as a vent. Also, single-stack drainage and venting systems with unvented branch lines are prohibited.

**310.5 Obstruction of Flow.** No fitting, fixture and piping connection, appliance, device, or method of installation that obstructs or retards the flow of water, wastes, sewage, or air in the drainage or venting systems, in an amount exceeding the normal frictional resistance to flow, shall be used unless it is indicated as acceptable in this code or is approved in accordance with Section 301.2 of this code. The enlargement of a 3 inch (80 mm) closet bend or stub to 4 inches (100 mm) shall not be considered an obstruction.

**310.6 Dissimilar Metals.** Except for necessary valves, where intermembering or mixing of dissimilar metals occurs, the point of connection shall be confined to exposed or accessible locations.

**310.7 Direction of Flow.** Valves, pipes, and fittings shall be installed in correct relationship to the direction of flow.

**310.8 Screwed Fittings.** Screwed fittings shall be ABS, cast-iron, copper, copper alloy, malleable iron, PVC, steel, or other approved materials. Threads shall be tapped out of solid metal or molded in solid ABS or PVC.

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

**310.10 [OSHPD 1, 3, 4 & 5]** Floor drains, waste traps, sanitary drainage cleanouts and handwashing fixtures shall not be installed in operating and delivery rooms. Floor drains with self-priming traps may be installed in cystoscopic rooms. Floor drains shall not be installed in compounding buffer or ante rooms.

**310.11 [SFM]** For applications listed in Section 1.11.0 regulated by the Office of the State Fire Marshal, plastic piping shall not be exposed as a portion of the interior room finish in a building or structure if the piping has a flame-spread rating exceeding 75 when tested in accordance with ASTM E84-77a, "Test for Surface Burning Characteristics of Building Materials."

**310.12 [OSHPD 1, 2, 4 & 5] Services/Systems and Utilities.** Refer to Sections 1224.4.1, 1225.2.1 and 1228.4.1.1, California Building Code.

**310.13 Telephone and Data Equipment Rooms [OSHPD 1, 4 & 5].** Where telecommunications service entrance rooms, technology equipment centers, or technology distribution rooms are provided in accordance with Section 1224.5 of the California Building Code, plumbing equipment and fixtures that are not directly related to the support of the room shall not be installed in or pass through the room.

### 311.0 Independent Systems.

**311.1 General.** The drainage system of each new building and new work installed in an existing building shall be separate and independent from that of any other building, and, where available, every building shall have an independent connection with a public or private sewer.

**Exception:** Where one building stands in the rear of another building on an interior lot, and no private sewer is available or can be constructed to the rear building through an adjoining court, yard, or driveway, the building drain from the front building shall be permitted to be extended to the rear building.

**Note:** Accessory dwelling units are not required to have independent service utility (drainage) connections provided they meet the specific requirements in Government Code Section 65852.2.

### 312.0 Protection of Piping, Materials, and Structures.

**312.1 General.** Piping passing under or through walls shall be protected from breakage. Piping passing through or under cinders or other corrosive materials shall be protected from external corrosion in an approved manner. Approved provisions shall be made for expansion of hot water piping. Voids around piping passing through concrete floors on the ground shall be sealed.

**312.2 Installation.** Piping in connection with a plumbing system shall be so installed that piping or connections will not be subject to undue strains or stresses, and provisions shall be made for expansion, contraction, and structural settlement. No plumbing piping shall be directly embedded in concrete or masonry. No structural member shall be seriously weakened or impaired by cutting, notching, or otherwise, as defined in the California Building Code or California Residential Code.

**312.3 Building Sewer and Drainage Piping.** No building sewer or other drainage piping or part thereof, constructed of materials other than those approved for use under or within

a building, shall be installed under or within 2 feet (610 mm) of a building or structure, or less than 1 foot (305 mm) below the surface of the ground.

**312.4 Corrosion, Erosion, and Mechanical Damage.** Piping subject to corrosion, erosion, or mechanical damage shall be protected in an approved manner.

**312.5 Protectively Coated Pipe.** Protectively coated pipe or tubing shall be inspected and tested, and a visible void, damage, or imperfection to the pipe coating shall be repaired in an approved manner.

**312.6 Freezing Protection.** No water, soil, or waste pipe shall be installed or permitted outside of a building, in attics or crawl spaces, or in an exterior wall unless, where necessary, adequate provision is made to protect such pipe from freezing.

**312.7 Fire-Resistant Construction.** Piping penetrations of fire-resistance-rated walls, partitions, floors, floor/ceiling assemblies, roof/ceiling assemblies, or shaft enclosures shall be protected in accordance with the requirements of the California Building Code or California Residential Code.

**312.8 Waterproofing of Openings.** Joints at the roof around pipes, ducts, or other appurtenances shall be made watertight by the use of lead, copper, galvanized iron, or other approved flashings or flashing material. Exterior wall openings shall be made watertight. Counterflashing shall not restrict the required internal cross-sectional area of the vent.

**312.9 Steel Nail Plates.** Plastic and copper or copper alloy piping penetrating framing members to within 1 inch (25.4 mm) of the exposed framing shall be protected by steel nail plates not less than No. 18 gauge (0.0478 inches) (1.2 mm) in thickness. The steel nail plate shall extend along the framing member not less than 1½ inches (38 mm) beyond the outside diameter of the pipe or tubing.

**Exception:** See Section 1210.3.3.

**312.10 Sleeves.** Sleeves shall be provided to protect piping through concrete and masonry walls, and concrete floors.

**Exception:** Sleeves shall not be required where openings are drilled or bored.

**312.10.1 Building Loads.** Piping through concrete or masonry walls shall not be subject to a load from building construction.

**312.10.2 Exterior Walls.** In exterior walls, annular space between sleeves and pipes shall be sealed and made watertight, as approved by the Authority Having Jurisdiction. A penetration through fire-resistive construction shall be in accordance with Section 312.7.

**312.10.3 Firewalls.** A pipe sleeve through a firewall shall have space around the pipe completely sealed with an approved fire-resistive material in accordance with other codes.

**312.11 Structural Members.** A structural member weakened or impaired by cutting, notching, or otherwise shall be reinforced, repaired, or replaced so as to be left in a safe structural condition in accordance with the requirements of the California Building Code or California Residential Code.

**312.12 Rodentproofing.** Strainer plates on drain inlets shall be designed and installed so that no opening exceeds ½ of an inch (12.7 mm) in the least dimension.

**312.12.1 Meter Boxes.** Meter boxes shall be constructed in such a manner as to restrict rodents or vermin from entering a building by following the service pipes from the box into the building.

**312.12.2 Metal Collars.** In or on buildings where openings have been made in walls, floors, or ceilings for the passage of pipes, such openings shall be closed and protected by the installation of approved metal collars securely fastened to the adjoining structure.

**312.12.3 Tub Waste Openings.** Tub waste openings in framed construction to crawl spaces at or below the first floor shall be protected by the installation of approved metal collars or metal screen securely fastened to the adjoining structure with no opening exceeding 1/2 of an inch (12.7 mm) in the least dimension.



**313.0 Hangers and Supports.**

**313.1 General.** Piping, fixtures, appliances, and appurtenances shall be supported in accordance with this code, the manufacturer’s installation instructions, and in accordance with the Authority Having Jurisdiction.

**313.2 Material.** Hangers and anchors shall be of sufficient strength to support the weight of the pipe and its contents. Piping shall be isolated from incompatible materials.

**313.3 Suspended Piping.** Suspended piping shall be supported at intervals not to exceed those shown in Table 313.3.

**313.4 Alignment.** Piping shall be supported in such a manner as to maintain its alignment and prevent sagging.

**313.5 Underground Installation.** Piping in the ground shall be laid on a firm bed for its entire length; where other support is otherwise provided, it shall be approved in accordance with Section 301.2.

**313.6 Hanger Rod Sizes.** Hanger rod sizes shall be not smaller than those shown in Table 313.6.

**TABLE 313.6  
HANGER ROD SIZES**

PIPE AND TUBE SIZE (inches)	ROD SIZE (inches)
1/2 – 4	3/8
5 – 8	1/2
10 – 12	5/8

For SI units: 1 inch = 25.4 mm

**313.7 Gas Piping.** Gas piping shall be supported by metal straps or hooks at intervals not to exceed those shown in Table 1210.2.4.1.

**|| 313.8 [OSHPD 1, 2, 3, 4 & 5]** Refer to Title 24, Part 2 of the California Building Code for seismic anchorage and bracing requirements and accommodations for building displacements.

**314.0 Trenching, Excavation, and Backfill.**

**314.1 Trenches.** Trenches deeper than the footing of a building or structure, and paralleling the same, shall be

located not less than 45 degrees (0.79 rad) from the bottom exterior edge of the footing, or as approved in accordance with Section 301.0.

**314.2 Tunneling and Driving.** Tunneling and driving shall be permitted to be done in yards, courts, or driveways of a 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 2 feet (610 mm) above the pipe and shall be limited in length to one-half the depth of the trench, with a maximum length of 8 feet (2438 mm). Where pipes are driven, the drive pipe shall be not less than one size larger than the pipe to be laid.

**314.3 Open Trenches.** Excavations required to be made for the installation of a building drainage system or 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.

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

Underground thermoplastic pipe and fittings for sewers and other gravity flow applications shall be installed in accordance with this code and Section 314.4.1.

**314.4.1 Installation of Thermoplastic Pipe and Fittings.** Trench width for thermoplastic sewer pipe shall be not less than 1.25 times the outside diameter of the piping plus 12 inches (305 mm) or the outside diameter of the piping plus not less than 16 inches (406 mm). Thermoplastic piping shall be bedded in not less than 4 inches (102 mm) of granular fill supporting the piping. The backfill for thermoplastic piping shall be compacted along the sides of the piping in 6 inch (152 mm) layers and continue to not less than 12 inches (305 mm) above the piping. Compaction shall be not less than an 85 percent standard proctor density.

**315.0 Joints and Connections.**

**315.1 Unions.** Approved unions shall be permitted to be used in drainage piping where 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 1212.5.1.

**315.2 Prohibited Joints and Connections.** A 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.

**GENERAL REGULATIONS**

**316.0 Increases and Reducers.**

**316.1 General.** 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. Copper alloy 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.

**317.0 Food-Handling Establishments.**

**317.1 General.** Food or drink shall not be stored, prepared, or displayed beneath soil or drain pipes unless those areas are protected against leakage or condensation from such pipes reaching the food or drink as described below. Where building design requires that soil or drain pipes be located over such areas, the installation shall be made with the least possible number of

**TABLE 313.3  
HANGERS AND SUPPORTS**

MATERIALS	TYPES OF JOINTS	HORIZONTAL	VERTICAL
Cast	Lead and Oakum	5 feet, except 10 feet where 10 foot lengths are installed <sup>1, 2, 3</sup>	Base and each floor, not to exceed 15 feet
	Compression Gasket	Every other joint, unless over 4 feet then support each joint <sup>1, 2, 3</sup>	Base and each floor, not to exceed 15 feet
Cast-Iron Hubless	Shielded Coupling	Every other joint, unless over 4 feet then support each joint <sup>1,2,3,4</sup>	Base and each floor, not to exceed 15 feet
Copper & Copper Alloys	Soldered, Brazed, Threaded, or Mechanical	1½ inches and smaller, 6 feet; 2 inches and larger, 10 feet	Each floor, not to exceed 10 feet <sup>5</sup>
Steel Pipe for Water or DWV	Threaded or Welded	¾ inch and smaller, 10 feet; 1 inch and larger, 12 feet	Every other floor, not to exceed 25 feet <sup>5</sup>
Steel Pipe for Gas	Threaded or Welded	½ inch, 6 feet; ¾ inch and 1 inch, 8 feet; 1¼ inches and larger, 10 feet	½ inch, 6 feet; ¾ inch and 1 inch, 8 feet; 1¼ inches every floor level
Schedule 40 PVC and ABS DWV	Solvent Cemented	All sizes, 4 feet; allow for expansion every 30 feet <sup>3</sup>	Base and each floor; provide mid-story guides; provide for expansion every 30 feet
CPVC	Solvent Cemented	1 inch and smaller, 3 feet; 1¼ inches and larger, 4 feet	Base and each floor; provide mid-story guides
CPVC-AL-CPVC	Solvent Cemented	½ inch, 5 feet; ¾ inch, 65 inches; 1 inch, 6 feet	Base and each floor; provide mid-story guide
Lead	Wiped or Burned	Continuous Support	Not to exceed 4 feet
Steel	Mechanical	In accordance with standards acceptable to the Authority Having Jurisdiction	
PEX	Cold Expansion, Insert and Compression	1 inch and smaller, 32 inches; 1¼ inches and larger, 4 feet	Base and each floor; provide mid-story guides
PEX-AL-PEX	Metal Insert and Metal Compression	½ inch } ¾ inch } All sizes 98 inches 1 inch }	Base and each floor; provide mid-story guides
PE-AL-PE	Metal Insert and Metal Compression	½ inch } ¾ inch } All sizes 98 inches 1 inch }	Base and each floor; provide mid-story guides
PE-RT	Insert and Compression	1 inch and smaller, 32 inches; 1¼ inches and larger, 4 feet	Base and each floor; provide mid-story guides
Polypropylene (PP)	Fusion weld (socket, butt, saddle, electrofusion), threaded (metal threads only), or mechanical	1 inch and smaller, 32 inches; 1¼ inches and larger, 4 feet	Base and each floor; provide mid-story guides

For SI units: 1 inch = 25.4 mm, 1 foot = 304.8 mm

**Notes:**

- <sup>1</sup> Support adjacent to joint, not to exceed 18 inches (457 mm).
- <sup>2</sup> Brace not to exceed 40 foot (12 192 mm) intervals to prevent horizontal movement.
- <sup>3</sup> Support at each horizontal branch connection.
- <sup>4</sup> Hangers shall not be placed on the coupling.
- <sup>5</sup> Vertical water lines shall be permitted to be supported in accordance with recognized engineering principles with regard to expansion and contraction, where first approved by the Authority Having Jurisdiction.

joints and shall be installed to connect to the nearest adequately sized vertical stack with the provisions as follows:

- (1) Openings through floors over such areas shall be sealed watertight to the floor construction.
- (2) Floor and shower drains installed above such areas shall be equipped with integral seepage pans.
- (3) Soil or drain pipes shall be of an approved material as listed in Table 1701.1 and Section 701.2. Materials shall comply with established standards. Cleanouts shall be extended through the floor construction above.
- (4) Piping subject to operation at temperatures that will form condensation on the exterior of the pipe shall be thermally insulated.
- (5) Where pipes are installed in ceilings above such areas, the ceiling shall be of the removable type or shall be provided with access panels to form a ready access for inspection of piping.

### **318.0 Test Gauges.**

**318.1 General.** Tests in accordance with this code, which are performed utilizing dial gauges, shall be limited to gauges having the following pressure graduations or incrementations.

**318.2 Pressure Tests (10 psi or less).** Required pressure tests of 10 pounds-force per square inch (psi) (69 kPa) or less shall be performed with gauges of 0.10 psi (0.69 kPa) incrementation or less.

**318.3 Pressure Tests (greater than 10 psi to 100 psi).** Required pressure tests exceeding 10 psi (69 kPa) but less than or equal to 100 psi (689 kPa) shall be performed with gauges of 1 psi (7 kPa) incrementation or less.

**318.4 Pressure Tests (exceeding 100 psi).** Required pressure tests exceeding 100 psi (689 kPa) shall be performed with gauges incremented for 2 percent or less of the required test pressure.

**318.5 Pressure Range.** Test gauges shall have a pressure range not exceeding twice the test pressure applied.

### **|| 319.0 [Not permitted for OSHPD 1, 2, 3, 4 & 5] Medical Gas and Vacuum Systems.**

**319.1 General.** Such piping shall be in accordance with the requirements of Chapter 13. The Authority Having Jurisdiction shall require evidence of the competency of the installers and verifiers.

### **320.0 Rehabilitation of Piping Systems.**

**320.1 General.** Where pressure piping systems are rehabilitated using an epoxy lining system, it shall be in accordance with ASTM F2831.

### **|| 321.0 Essential Plumbing Provisions. [OSHPD 1, 2, 3 (surgical clinics), 4 & 5] During periods of power outages essential electrical power shall be provided for the following equipment:**

- (1) Domestic water booster pumps.
- (2) Domestic hot water circulating pumps.

- (3) Sewage ejector pumps.
- (4) Sump pumps and drainage pumps.
- (5) Domestic water heating equipment and their controls.
- (6) Fuel pumps.
- (7) Grease removal devices requiring electrical power.

**322.0 Psychiatric Services [OSHPD 1, 2, 4 & 5].** For || projects associated with provision of psychiatric services in acute psychiatric hospitals, general acute care hospitals, and special treatment program service units in skilled nursing facilities, special design considerations for injury and suicide prevention shall be given to shower, bath, toilet, and sink plumbing fixtures. Shower heads shall be of flush-mounted design to minimize anchor points.

**323.0 Plumbing Equipment Schedules. [OSHPD 1, 2, 3, 4 & 5]** Plumbing equipment schedules shall clearly indicate which equipment will be on essential power or appropriate special seismic certifications. ||



**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE  
CHAPTER 4 - PLUMBING FIXTURES AND FIXTURE FITTINGS**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4								
Adopt Entire Chapter											X											
Adopt Entire Chapter as amended (amended sections listed below)	X			X	X			X	X	X		X	X	X	X		X	X			X	
Adopt only those sections that are listed below		X				X	X									X						
Chapter/Section																						
Note Under Title							X															
401.3	X			X				X	X	X		X	X	X								
403.1						X																
403.2						X																
403.3						X																
407.2				X																		
407.2.1				X																		
407.2.2				X																		
407.2.3				X	X																	
407.2.4				X																		
407.2.4.1		X						X	X													
408.2				X																		
408.2.1		X						X	X													
408.2.2		X						X	X													
408.5								X	X													
408.6 & Exception 1				X		X																
411.2				X	X			X	X													
411.2.2				X	X																	
411.2.2.1		X						X	X													X
411.2.3				X	X																	
411.2.4		X						X	X													X
412.1				X	X			X	X													
412.1.1		X						X	X													
412.1.2		X						X	X													
412.1.3		X		X	X			X	X													
412.1.3.1		X																				
413.2										X		X	X	X	X							
415.1				X																		
417.1.1		X						X	X													
417.1.2		X						X	X													
420.2.1		X		X				X	X													
420.2.2				X																		
420.3.1		X		X	X			X	X													
422.1								X	X	X		X	X	X	X							

**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE**  
**CHAPTER 4 - PLUMBING FIXTURES AND FIXTURE FITTINGS (continued)**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4								
Adopt Entire Chapter											X											
Adopt Entire Chapter as amended (amended sections listed below)	X			X	X			X	X	X		X	X	X	X		X	X			X	
Adopt only those sections that are listed below		X				X	X									X						
Chapter/Section																						
422.1 Exception	X																					
Table 422.1	X			X	X	X	X	X	X	X	X	X	X	X								
422.1.2							X															
422.1.3										X	X	X	X	X								
422.2				†	†																	
422.2 Exceptions										†	†	†	†	†								
422.3.1 & Exception										X	X	X	X	X								
422.4				†	†					†	†	†	†	†								
422.5				†	†																	
422.6																						X
422.7																						X
422.8																	X					
422.9																	X					
Table A							X	X														
Table 4-1	X																					
Table 4-2										X	X	X	X	X								
Table 4-3	X																X					
Table 4-4	X																X					

This state agency does not adopt sections identified with the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.0.



accessible for repair. Flushometer valves shall not be used where the water pressure is insufficient to operate them properly. Where the valve is operated, it shall complete the cycle of operation automatically, opening fully, and closing positively under the line water pressure. Each flushometer shall be provided with a means for regulating the flow through it.

|| **[OSPHD 1, 2, 3, 4 & 5]** *Sensor operated flush valves shall be capable of functioning during loss of normal power.*

**413.3 Flush Tanks.** Flush tanks for manual flushing shall be equipped with a flush valve that complies with ASME A112.19.5/CSA B45.15 and an antisiphon fill valve (ballcock) that complies with ASSE 1002/ASME A112.1002/CSA B125.12 and installed in accordance with Section 603.5.2.

**413.4 Water Supply for Flush Tanks.** An adequate quantity of water shall be provided to flush and clean the fixture served. The water supply for flushing tanks and flushometer tanks equipped for manual flushing shall be controlled by a float valve or other automatic device designed to refill the tank after each discharge and to shut completely off the water flow to the tank where the tank is filled to operational capacity. Provision shall be made to automatically supply water to the fixture to refill the trap seal after each flushing.

**413.5 Overflows in Flush Tanks.** Flush tanks shall be provided with overflows discharging into the water closet or urinal connected thereto. Overflows supplied as original parts with the fixture shall be of sufficient size to prevent tank flooding at the maximum rate at which the tank is supplied with water under normal operating conditions and where installed in accordance with the manufacturer's installation instructions.

#### **414.0 Dishwashing Machines.**

**414.1 Application.** Domestic dishwashing machines shall comply with UL 749. Commercial dishwashing machines shall comply with NSF 3 and UL 921.

**414.2 Backflow Protection.** The water supply connection to a commercial dishwashing machine shall be protected by an air gap or a backflow prevention device in accordance with Section 603.3.2, Section 603.3.5, Section 603.3.6, or that complies with ASSE 1004.

**414.3 Drainage Connection.** Domestic dishwashing machines shall discharge indirectly through an air gap fitting in accordance with Section 807.3 into a waste receptor, a wye branch fitting on the tailpiece of a kitchen sink, or dishwasher connection of a food waste disposer. Commercial dishwashing machines shall discharge indirectly through an air break or direct connection. The indirect discharge for commercial dishwashing machines shall be in accordance with Section 807.1, and the direct discharge shall be in accordance with Section 704.3.

#### **415.0 Drinking Fountains.**

**415.1 Application.** Drinking fountains shall be self-closing and comply with ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, or ASME A112.19.3/CSA B45.4. Drinking fountains shall also comply with NSF 61. Permanently installed electric water coolers shall also comply with

UL 399. **[HCD 1]** *Drinking fountains shall be installed and so regulated that a jet of water extending at least 2 inches (51 mm) in height from the water orifice shall be constantly available. The orifice shall not be accessible to the mouth of the drinker nor subject to immersion.*

**415.2 Drinking Fountain Alternatives.** Where food is consumed indoors, water stations shall be permitted to be substituted for drinking fountains. Bottle filling stations shall be permitted to be substituted for drinking fountains up to 50 percent of the requirements for drinking fountains. Drinking fountains shall not be required for an occupant load of 30 or less.

**415.3 Drainage Connection.** Drinking fountains shall be permitted to discharge directly into the drainage system or indirectly through an air break in accordance with Section 809.1.

**415.4 Location.** Drinking fountains shall not be installed in toilet rooms.

#### **416.0 Emergency Eyewash and Shower Equipment.**

**416.1 Application.** Emergency eyewash and shower equipment shall comply with ISEA Z358.1.

**416.2 Water Supply.** Emergency eyewash and shower equipment shall not be limited in the water supply flow rates. Where hot and cold water is supplied to an emergency shower or eyewash station, the temperature of the water supply shall be controlled by a temperature actuated mixing valve complying with ASSE 1071. The flow rate, discharge pattern, and temperature of flushing fluids shall be provided in accordance with ISEA Z358.1.

**416.3 Installation.** Emergency eyewash and shower equipment shall be installed in accordance with the manufacturer's installation instructions.

**416.4 Location.** Emergency eyewash and shower equipment shall be located on the same level as the hazard and accessible for immediate use. The path of travel shall be free of obstructions and shall be clearly identified with signage.

**416.5 Drain.** A drain shall not be required for emergency eyewash or shower equipment. Where a drain is provided, the discharge shall be in accordance with Section 811.0.

#### **417.0 Faucets and Fixture Fittings.**

**417.1 Application.** Faucets and fixture fittings shall comply with ASME A112.18.1/CSA B125.1. Fixture fittings covered under the scope of NSF 61 shall comply with the requirements of NSF 61.

**417.1.1 Wash Fountains [BSC-CG, DSA-SS & DSA-SS/CC].** *Wash fountains shall have a maximum flow rate of not more than 1.8 gallons (6.81 L) per minute/20 [rim space (inches) at 60 psi] in compliance with Chapter 5, Division 5.3 of the California Green Building Standards Code (CALGreen).*

**417.1.2 Metering Faucets for Wash Fountains [BSC-CG, DSA-SS & DSA-SS/CC].** *Metering faucets for wash fountains shall have a maximum flow rate of not more than*

0.20 gallons (0.76 L) per cycle/20 [rim space (inches) at 60 psi] in compliance with Chapter 5, Division 5.3 of the California Green Building Standards Code (CALGreen).

**417.2 Deck Mounted Bath/Shower Valves.** Deck mounted bath/shower transfer valves with integral backflow protection shall comply with ASME A112.18.1/CSA B125.1. This shall include handheld showers, and other bathing appliances mounted on the deck of bathtubs or other bathing appliances that incorporate a hose or pull out feature.

**417.3 Handheld Showers.** Handheld showers shall comply with ASME A112.18.1/CSA B125.1. Handheld showers with integral backflow protection shall comply with ASME A112.18.1/CSA B125.1 or shall have a backflow prevention device that complies with ASME A112.18.3 or ASSE 1014.

**417.4 Faucets and Fixture Fittings with Hose Connected Outlets.** Faucets and fixture fittings with pull out spout shall comply with ASME A112.18.1/CSA B125.1. Faucets and fixture fittings with pull out spouts with integral backflow protection shall comply with ASME A112.18.1/CSA B125.1 or shall have a backflow preventer device that complies with ASME A112.18.3.

**417.5 Separate Controls for Hot and Cold Water.** Where two separate handles control the hot and cold water, the left-hand control of the faucet where facing the fixture fitting outlet shall control the hot water. Faucets and diverters shall be connected to the water distribution system so that hot water corresponds to the left side of the fixture fitting.

Single-handle mixing valves installed in showers and tub-shower combinations shall have the flow of hot water corresponding to the markings on the fixture fitting.

**418.0 Floor Drains.**

**418.1 Application.** Floor drains shall comply with ASME A112.3.1, ASME A112.6.3, or CSA B79.

**418.2 Strainer.** Floor drains shall be considered plumbing fixtures and each such drain shall be provided with an approved-type strainer having a waterway equivalent to the area of the tailpiece. Floor drains shall be of an approved type and shall provide a watertight joint on the floor.

**418.3 Location of Floor Drains.** Floor drains shall be installed in the following areas:

- (1) Toilet rooms containing two or more water closets or a combination of one water closet and one urinal, except in a dwelling unit.
- (2) Commercial kitchens and in accordance with Section 704.3.
- (3) Laundry rooms in commercial buildings and common laundry facilities in multi-family dwelling buildings.
- (4) Boiler rooms.

**418.4 Food Storage Areas.** Where drains are provided in storerooms, walk-in freezers, walk-in coolers, refrigerated equipment, or other locations where food is stored, such drains shall have indirect waste piping. Separate waste pipes shall be run from each food storage area, each with an indirect connection to the building sanitary drainage system.

Traps shall be provided in accordance with Section 801.3.2 of this code and shall be vented.

Indirect drains shall be permitted to be located in freezers or other spaces where freezing temperatures are maintained, provided that traps, where supplied, shall be located where the seal will not freeze. Otherwise, the floor of the freezer shall be sloped to a floor drain located outside of the storage compartment.

**418.5 Floor Slope.** Floors shall be sloped to floor drains.

**419.0 Food Waste Disposers.**

**419.1 Application.** Food waste disposal units shall comply with UL 430. Residential food waste disposers shall also comply with ASSE 1008.

**419.2 Drainage Connection.** Approved wye or other directional-type branch fittings shall be installed in continuous wastes connecting or receiving the discharge from a food waste disposer. No dishwasher drain shall be connected to a sink tailpiece, continuous waste, or trap on the discharge side of a food waste disposer.

**419.3 Water Supply.** A cold water supply shall be provided for food waste disposers. Such connection to the water supply shall be protected by an air gap or backflow prevention device in accordance with Section 603.2.

**420.0 Sinks.**

**420.1 Application.** Sinks shall comply with ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, CSA B45.5/IAPMO Z124, CSA B45.8/IAPMO Z403, or CSA B45.12/IAPMO Z402. Moveable sink systems shall comply with ASME A112.19.12.

**420.2 Water Consumption.** Sink faucets shall have a maximum flow rate of not more than 2.2 gpm at 60 psi (8.3 L/m at 414 kPa).

**Exceptions:**

- (1) Clinical sinks
- (2) Laundry trays
- (3) Service sinks

**420.2.1 Kitchen Faucets [BSC-CG, DSA-SS & DSA-SS/CC].** Kitchen faucets shall have a maximum flow rate of not more than 1.8 gallons (6.81 L) per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons (8.3 L) per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons (6.81 L) per minute at 60 psi in compliance with Chapter 5, Division 5.3 of the California Green Building Standards Code (CALGreen).

**420.2.2 Kitchen Faucets [HCD 1].** The maximum flow rate of kitchen faucets shall not exceed 1.8 gallons (6.81 L) per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons (8.32 L) per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons (6.81 L) per minute at 60 psi in compliance with Chapter 4, Division 4.3 or Chapter 5, Division 5.3 of the California Green Building Standards Code (CALGreen), as applicable.

**Note:** Where faucets meeting the maximum flow rate of 1.8 gpm (6.81 L) are unavailable, aerators or other means may be used to achieve reduction.

**420.3 Pre-Rinse Spray Valve.** Commercial food service pre-rinse spray valves shall have a maximum flow rate of 1.6 gallons per minute (gpm) at 60 pounds-force per square inch (psi) (6.0 L/m at 414 kPa) and shall be equipped with an integral automatic shutoff.

**420.3.1 Pre-Rinse Spray Valves. [BSC-CG, DSA-SS, HCD 1 & HCD 2]** When installed, shall meet the requirements in the California Code of Regulations, Title 20 (Appliance Efficiency Regulations), Section 1605.1(h)(4) Table H-2, Section 1605.3(h)(4)(A), and Section 1607(d)(7), and shall be equipped with an integral automatic shutoff.

**FOR REFERENCE ONLY:** The following table and code section have been reprinted from the California Code of Regulations, Title 20 (Appliance Efficiency Regulations), Section 1605.1(h)(4) and Section 1605.3(h)(4)(A).

**TABLE H-2  
STANDARDS FOR COMMERCIAL PRE-RINSE SPRAY VALVES  
MANUFACTURED ON OR AFTER JANUARY 28, 2019.**

PRODUCT CLASS (spray force in ounce force (ozf))	MAXIMUM FLOW RATE (gpm)
Product Class 1 (≤ 5.0 ozf)	1.00
Product Class 2 (> 5.0 ozf and ≤ 8.0 ozf)	1.20
Product Class 3 (> 8.0 ozf)	1.28

Title 20 Section 1605.3(h)(4)(A): Commercial pre-rinse spray valves manufactured on or after January 1, 2006, shall have a minimum spray force of not less than 4.0 ounces-force (ozf) [113 grams-force (gf)].

**420.4 Waste Outlet.** Kitchen and laundry sinks shall have a waste outlet and fixture tailpiece not less than 1½ inches (40 mm) in diameter. Service sinks shall have a waste outlet and fixture tailpiece not less than 2 inches (50 mm) in diameter. Fixture tailpieces shall be constructed from the materials specified in Section 701.2 for drainage piping. Waste outlets shall be provided with an approved strainer.

**421.0 Floor Sinks.**

**421.1 Application.** Floor sinks shall comply with ASME A112.6.7.

**421.2 Strainers.** The waste outlet of a floor sink shall be provided with an approved strainer or grate that is removable and accessible.

**422.0 Minimum Number of Required Fixtures.**

**422.1 Fixture Count.** Plumbing fixtures shall be provided for the type of building occupancy and in the minimum number shown in Table 422.1 [OSHPD 1, 2, 3, 4 & 5] and Tables

4-2 and Table 4-3. The total occupant load and occupancy classification shall be determined in accordance with the California Building Code [DSA-SS & DSA-SS/CC] or Occupant Load Factor Table A. Occupancy classification not shown in Table 422.1 shall be considered separately by the Authority Having Jurisdiction.

**Exception: [BSC]** Using occupancy classification, described as function of space, determine occupant load factor from Table 4-1 Occupant Load Factor, of this chapter.

The minimum number of fixtures shall be calculated at 50 percent male and 50 percent female based on the total occupant load. Where information submitted indicates a difference in the distribution of the sexes such information shall be used to determine the number of fixtures for each sex. Once the occupancy load and occupancy are determined, Table 422.1 shall be applied to determine the minimum number of plumbing fixtures required. Where applying the fixture ratios in Table 422.1 results in fractional numbers, such numbers shall be rounded to the next whole number. For multiple occupancies, fractional numbers shall be first summed and then rounded to the next whole number.

**422.1.1 Family or Assisted-Use Toilet and Bathing Facilities.** Where family or assisted-use toilet and bathing rooms are required, in applicable building regulations, the facilities shall be installed in accordance with those regulations.

**422.1.2 [DSA-AC]** Effective January 1, 1990, in new construction and those existing facilities which occupancy type are listed in Tables 422.1 and 4-4 for public use, which apply for permit to undertake construction, structural alterations, repairs or improvement which exceed 50 percent of the square footage of the entire facility, shall install water closets, urinals, lavatories and drinking fountains as stipulated in Tables 422.1 and 4-4 for public use. Community and/or municipal parks with a bleacher capacity not exceeding 500 seats shall be exempt from the requirements of this section and Tables 422.1 and 4-4. Each bathroom shall comply with Part 2, Chapter 11A and 11B of the California Building Code.

**422.1.3 [OSHPD 1, 2, 3, 4 & 5]** OSHPD facilities shall also comply with requirements of the California Building Code, Chapters 1224, 1225, 1226, 1227 and 1228 in addition to total occupant load and occupancy classification for determination of minimum number of fixtures.

**422.2 Separate Facilities.** Separate toilet facilities shall be provided for each sex.

**Exceptions: [Not adopted for OSHPD 1, 2, 3, 4 & 5]**

- (1) Residential installations.
- (2) In occupancies with a total occupant load of 10 or less, including customers and employees, one toilet facility, designed for use by no more than one person at a time, shall be permitted for use by both sexes.
- (3) In business and mercantile occupancies with a total occupant load of 50 or less including customers and employees, one toilet facility, designed for use by no more than one person at a time, shall be permitted for use by both sexes.

**422.2.1 Single Use Toilet Facilities.** Single use toilet facilities and family or assisted use toilet facilities shall be identified with signage indicating use by either sex.

» **422.2.2 Family or Assisted-Use Toilet Facilities.** Where a separate toilet facility is required for each sex, and each toilet facility is required to have only one water closet, two family or assisted-use toilet facilities shall be permitted in place of the required separate toilet facilities.

**422.3 Fixture Requirements for Special Occupancies.** Additional fixtures shall be permitted to be required where unusual environmental conditions or referenced activities are encountered. In food preparation areas, fixture requirements shall be permitted to be dictated by health codes.

|| **422.3.1 [OSHPD 1, 2, 3, 4 & 5] Separate toilet facilities shall be provided for the use of patients, staff personnel and visitors.**

**Exception for Primary Care Clinics Only:** *Where a facility contains no more than three examination and/or treatment rooms, the patient toilet shall be permitted to serve waiting areas.*

**422.4 Toilet Facilities Serving Employees and Customers [Not adopted for OSHPD 1, 2, 3, 4 & 5].** Each building or structure shall be provided with toilet facilities for employees and customers. Requirements for customers and employees shall be permitted to be met with a single set of restrooms accessible to both groups.

Required toilet facilities for employees and customers located in shopping malls or centers shall be permitted to be met by providing a centrally located toilet facility accessible to several stores. The maximum travel distance from entry to any store to the toilet facility shall not exceed 300 feet (91 440 mm).

Required toilet facilities for employees and customers in other than shopping malls or centers shall have a maximum travel distance not to exceed 500 feet (152 m).

**422.4.1 Access to Toilet Facilities.** In multi-story buildings, accessibility to the required toilet facilities shall not exceed one vertical story. Access to the required toilet facilities for customers shall not pass through areas designated as for employee use only such as kitchens, food preparation areas, storage rooms, closets, or similar spaces. Toilet facilities accessible only to private offices shall not be counted to determine compliance with this section.

**422.5 Toilet Facilities for Workers.** Toilet facilities shall be provided and maintained in a sanitary condition for the use of workers during construction.

**422.6 [CA] Cosmetology.** *Each school shall provide public toilet rooms for each sex on the licensed premises in accordance with the California Plumbing Code, Table 422.1.*

**422.7 [CA] Cosmetology Establishments.** *Each establishment where hairdressing services are performed shall provide at least one public toilet room located on the premises in accordance with the California Plumbing Code, Table 422.1.*

**422.8 [DPH] Commissaries Serving Mobile Food Preparation Units.** *Commissaries serving mobile food preparation units shall have at least one hose bib. The hose bib shall be supplied with hot and cold water and be provided with a single spout, a backflow-preventer device and shall be located on the premises of the establishment.*

**422.9 [DPH] Employee Lavatories in Food Establishments.** *Employee lavatories installed in food establishments shall be equipped with an approved single spout capable of providing tempered (100°F - 115°F) (37.8°C - 46.1°C) running water.*

**Note:** *This requirement applies only to commissaries serving mobile food preparation units.*

**TABLE 422.1  
MINIMUM PLUMBING FACILITIES<sup>1</sup> (continued)**

TYPE OF OCCUPANCY <sup>2</sup>	WATER CLOSETS (FIXTURES PER PERSON) <sup>3</sup>		URINALS (FIXTURES PER PERSON) <sup>4</sup>	LAVATORIES (FIXTURES PER PERSON) <sup>5, 6</sup>		BATHTUBS OR SHOWERS (FIXTURES PER PERSON)	DRINKING FOUNTAINS/FACILITIES (FIXTURES PER PERSON)	OTHER
	Male	Female		Male	Female			
<b>R-4</b> Residential occupancy (residential care or assisted living)	Male 1 per 10	Female 1 per 8	—	Male 1 per 12	Female 1 per 12	1 per 8	1 per 150	1 service sink or laundry tray
	Add 1 fixture for each additional 25 males and 1 fixture for each additional 20 females.			Add 1 fixture for each additional 20 males and 1 fixture for each additional 15 females.				
<b>S-1, S-2</b> Storage occupancy-storage of goods, warehouse, aircraft hanger, food products, appliances	Male 1: 1-100 2: 101-200 3: 201-400	Female 1: 1-100 2: 101-200 3: 201-400	—	Male 1: 1-200 2: 201-400 3: 401-750	Female 1: 1-200 2: 201-400 3: 401-750	—	1: 1-250 2: 251-500 3: 501-750	1 service sink or laundry tray
	Over 400, add 1 fixture for each additional 500 males and 1 fixture for each additional 150 females.			Over 750, add 1 fixture for each additional 500 persons.			Over 750, add 1 fixture for each additional 500 persons.	

**Notes:**

- <sup>1</sup> The figures shown are based upon one fixture being the minimum required for the number of persons indicated or any fraction thereof.
- <sup>2</sup> A restaurant is defined as a business that sells food to be consumed on the premises.
  - a. The number of occupants for a drive-in restaurant shall be considered as equal to the number of parking stalls.
  - b. Handwashing facilities shall be available in the kitchen for employees.
- <sup>3</sup> The total number of required water closets for females shall be not less than the total number of required water closets and urinals for males. **[BSC]** This requirement shall not apply when single occupancy toilet facilities are provided for each sex in an A or E occupancy with an occupant load of less than 50.
  - a. The required urinal shall be permitted to be omitted or
  - b. If installed, the urinal shall not require a second water closet to be provided for the female.
- <sup>4</sup> For each urinal added in excess of the minimum required, one water closet shall be permitted to be deducted. The number of water closets shall not be reduced to less than two-thirds of the minimum requirement.
- <sup>5</sup> Group lavatories that are 24 lineal inches (610 mm) of wash sink or 18 inches (457 mm) of a circular basin, where provided with water outlets for such space, shall be considered equivalent to one lavatory.
- <sup>6</sup> Metering or self-closing faucets shall be installed on lavatories intended to serve the transient public.
- ||** <sup>7</sup> **[BSC, DSA-AC, DSA-SS, DSA-SS/CC, HCD 1 & HCD 2, OSHPD 1, 2, 3, 4 & 5]** In accordance with Sections 1.8.7 and 301.3, the Authority Having Jurisdiction may approve alternative design criteria when determining the minimum number of plumbing fixtures.

**TABLE A  
OCCUPANT LOAD FACTOR:  
[DSA-SS & DSA-SS/CC]**

II

OCCUPANCY* **	OCCUPANT LOAD FACTOR (square feet)
<b>Group A</b> 1. Auditoriums, convention halls, dance floors, lodge rooms, stadiums, and casinos (where no fixed seating is provided). (Where fixed seating is provided use one-half the number of fixed seating.) 2. Conference rooms, dining rooms, drinking establishments, exhibit rooms, gymnasiums, lounges, stages, and similar uses, including restaurants classified as Group B occupancies. 3. Worship places; principal assembly area, educational and activity unit (where no fixed seating is provided). (Where fixed seating is provided use one-half the number of fixed seating.)	15   30   30
<b>Group B</b> Office or public buildings (area accessible to the public)	200
<b>Group E</b> Schools for day care, elementary, secondary	50
<b>Educational Facilities Other than Group E</b> Colleges, universities, adult centers, etc.	50
<b>Group F</b> Workshops, foundries and similar establishments	2,000
<b>Group H</b> Hazardous materials fabrication and storage	2,000
<b>Group I</b> Hospital general use area, health care facilities	200
<b>Group M</b> Retail or wholesale stores	200
<b>Group R</b> Congregate residence, Group R-1	200
<b>Group S</b> Warehouse	5,000

\* Any uses not specifically listed shall be based on similar uses listed in this table.

\*\* For building or space with mixed occupancies, use appropriate occupancy group for each area (for example, a school may have an "A" occupancy for the gymnasium, a "B" occupancy for the office, an "E" occupancy for the classrooms, etc.). Accessory areas may be excluded (for example: hallway, restroom, stair enclosure).

**TABLE 4-1  
OCCUPANT LOAD FACTOR:  
[BSC]**

FUNCTION OF SPACE* **	OCCUPANT LOAD FACTOR (square feet)
<b>Assembly - without fixed seats</b> <i>Auditorium, convention and dance hall, lodge, stage, indoor sport/spectator event, worship, arcade, gaming (standing space)</i>	11
<i>Waiting, terminal (portable seating space)</i>	15
<i>Conference, dining/drinking, lounge (portable seating/table space)</i>	30
<i>Gallery, museum, exhibit (standing space)</i>	30
<b>Assembly – with fixed seats</b>	<i>See CBC 1004.6 Use 50% of the fixed seating value</i>
<b>Business</b> <i>(office, sales/soliciting, administration, food processing, courtroom, ambulatory clinic)</i>	150 <i>See CBC 1004.8</i>
<b>Dormitory</b>	50
<b>Day care</b>	35
<b>Education</b> <i>(classroom)</i> <i>Through 12th grade</i>	30
<b>Education</b> <i>(classroom)</i> <i>Beyond 12<sup>th</sup> grade</i>	50
<b>Exercise</b> <i>(fitness)</i>	50
<b>Industrial</b> <i>(fabrication, foundry, workshop, component assembly, repair)</i>	500
<b>Kitchen/food prep</b> <i>(commercial)</i>	50
<b>Laboratory</b> <i>Educational</i>	50
<b>Laboratory</b> <i>Non-educational</i>	100
<b>Library</b>	50
<b>Mercantile</b> <i>(wholesale, retail)</i>	100
<b>Mall building</b> <i>(covered/open)</i>	<i>See CBC 402.8.2</i>
<b>Residential</b> <i>(long term: central toilet facilities)</i>	200
<b>Warehouse</b> <i>Storage portions</i>	4000
<b>Warehouse</b> <i>Distribution portions (selecting, processing, packing, receiving, shipping)</i>	500

\* Any uses not specifically listed shall be based on similar uses listed in this table.

\*\* For a building or space with mixed occupancies, use appropriate occupancy group for each area (for example, a school may have an “A” occupancy for the gymnasium, a “B” occupancy for the office, an “E” occupancy for the classrooms, etc.). Accessory areas such as, but not limited to, hallways/corridors, stairways, ramps, toilet rooms, mechanical rooms, closets and fixed equipment, may be excluded.

PLUMBING FIXTURES AND FIXTURE FITTINGS

TABLE 4-2  
[OSHPD 1, 2, 3, 4 & 5]<sup>24</sup> MINIMUM PLUMBING FACILITIES

SPACE	HANDWASHING FIXTURE	SCRUB SINKS <sup>3</sup>	TOILETS	BATHTUBS OR SHOWERS	SERVICE SINKS <sup>1</sup>	CLINIC SINKS
<b>Administration Lobby</b>						
Public Toilet - Male	1 <sup>2</sup>		1			
Public Toilet - Female	1 <sup>2</sup>		1			
Airborne infection isolation room	1					
Airborne infection isolation treatment/exam room	1					
Airborne infection isolation anteroom	1 <sup>20</sup>					
Airborne infection isolation toilet room	1 <sup>2</sup>		1 <sup>5</sup>	1 <sup>5</sup>		
Cardiac Catheterization procedure room		1 <sup>4, 33</sup>				
Central Sterile Supply	1 <sup>15</sup>					
<b>Cesarean/Delivery Service Space</b>						
Labor Rooms	1 <sup>33</sup>		1 <sup>9</sup>	1 <sup>9</sup>		
Recovery Room	1 <sup>33</sup>					1
Drug distribution station	1					
Cesarean operating room		2 <sup>10, 33</sup>				
Delivery room		1 <sup>10, 33</sup>				
<b>Staff lounge</b>						
Staff Toilet - Male	1 <sup>2</sup>		1:1-15			
Staff Toilet - Female	1 <sup>2</sup>		1:1-15			
LDR or LDRP room	1 <sup>33</sup>		1	1		
<b>Waiting area/room</b>						
Public Toilet - Male	1 <sup>2</sup>		1			
Public Toilet - Female	1 <sup>2</sup>		1			
Clinical Laboratory Service Space <sup>11</sup>	1					
<b>Dietetic Service Space</b>					1	
Kitchen	1 <sup>33</sup>					
Food serving area	1 <sup>33</sup>					
Food Preparation	1 <sup>33</sup>					
Dietary Staff Toilet - Male	1 <sup>2</sup>		1:1-15			
Dietary Staff Toilet - Female	1 <sup>2</sup>		1:1-15			
<b>Emergency Service</b>	1					
Open plan	1:4 cubicles		1			
Observation unit(s)	1:4 cubicles		1:6 beds			
Trauma/Cardiac, Emergency surgery, Cystoscopy, Cast Room		1 <sup>4,33</sup>				
<b>Intensive Care Units<sup>7</sup></b>					1	1
Open plan	1:3 beds <sup>33</sup>					
Patient rooms <sup>28</sup>	1 <sup>33</sup>					
Newborn Intensive Care Unit (NICU)	1:4 bassinets <sup>17, 33</sup>				1	1
Treatment area/room	1					
Control station	1 <sup>33</sup>					
<b>Staff lounge</b>						
Staff Toilet - Male	1 <sup>2</sup>		1:1-15			
Staff Toilet - Female	1 <sup>2</sup>		1:1-15			



**TABLE 4-2**  
**[OSHPD 1, 2, 3, 4 & 5]<sup>24</sup> MINIMUM PLUMBING FACILITIES (continued)**

SPACE	HANDWASHING FIXTURE	SCRUB SINKS <sup>3</sup>	TOILETS	BATHTUBS OR SHOWERS	SERVICE SINKS <sup>1</sup>	CLINIC SINKS
<b>Employee dressing rooms and lockers</b>						
Staff Toilet - Male	1 <sup>2</sup>		1:1-15			
Staff Toilet - Female	1 <sup>2</sup>		1:1-15			
Exam and treatment rooms	1					
Housekeeping room <sup>1</sup>					1	
Laboratories	1 <sup>15</sup>					
Laundry soiled linen, receiving, holding and sorting	1					
Medicine preparation room	1 <sup>19</sup>					
<b>Morgue and Autopsy</b>	1					
Nourishment area	1+ 1 <sup>2</sup>					
Nuclear Medicine room	1					
Mold room	1					
Patient room	1					
Patient toilet and bath facilities <sup>13</sup>	1 <sup>2</sup>		1:4 beds	1:12 <sup>16</sup>		
Central bathing facility <sup>16</sup>	1		1	1		
Special bathing facility <sup>16</sup>				1		
Nurse Station <sup>27</sup>	1		1 <sup>12</sup>			
Newborn/well baby nursery	1:6 bassinets <sup>33</sup>					
Workroom	1 <sup>33</sup>					
Gastrointestinal endoscopy procedure room	1 <sup>33</sup>					
Outpatient observation <sup>35</sup>	1		1			
Pediatric and Adolescent Unit toilet room	1 <sup>2,26</sup>		1 <sup>26</sup>			
<b>Pharmacy</b>	1 <sup>25</sup>					
Staff Toilet - Male	1 <sup>2</sup>		1:1-15			
Staff Toilet - Female	1 <sup>2</sup>		1:1-15			
Compounding area for parenteral solutions	1 <sup>33</sup>					
Postanesthesia care units (PACU)						1
Open plan	1:4 gurney spaces <sup>33</sup>					
Individual rooms	1 <sup>33</sup>					
Protective environment room	1 <sup>33</sup>					
Protective environment anteroom	1 <sup>20,33</sup>					
Protective environment toilet room	1 <sup>2</sup>		1 <sup>5</sup>	1 <sup>5</sup>		
Psychiatric unit patient room	1		1			
<b>Radiological/Imaging Services Space</b>	1		1 <sup>29</sup>			
Mammography	1					
Interventional imaging		1				
Ultrasound <sup>8</sup>			1 <sup>30</sup>			
Angiography		1 <sup>4, 31</sup>				
Fluoroscopy <sup>8</sup>			1 <sup>30</sup>			
Staff Toilet <sup>18</sup> - Male	1 <sup>2</sup>		1:1-15			
Staff Toilet <sup>18</sup> - Female	1 <sup>2</sup>		1:1-15			
<b>Rehabilitation Therapy Space</b>						
Training toilet			1			
Physical therapy service space	1					
Occupational therapy service space	1					

PLUMBING FIXTURES AND FIXTURE FITTINGS

TABLE 4-2  
[OSHPD 1, 2, 3, 4 & 5]<sup>24</sup> MINIMUM PLUMBING FACILITIES (continued)

II

SPACE	HANDWASHING FIXTURE	SCRUB SINKS <sup>3</sup>	TOILETS	BATHTUBS OR SHOWERS	SERVICE SINKS <sup>1</sup>	CLINIC SINKS
Speech pathology	1					
<b>Infusion Therapy</b>	1					
<b>Renal Dialysis Service Space</b>	1:4 stations				1	
Bloodborne Infection Isolation Room	1					
Nurses' station	1					
Medication dispensing	1					
Home training room	1					
Repair room <sup>11</sup>	1				1	
Dialysis patient toilet	1 <sup>2</sup>		1			
Staff lounge						
Staff Toilet - Male	1		1:1-15	1 shower		
Staff Toilet - Female	1		1:1-15	1 shower		
<b>Surgical Service Space</b>		2 <sup>33</sup>			1	
Staff clothing change areas						
Staff Toilet - Male	1 <sup>2</sup>		1	1 shower		
Staff Toilet - Female	1 <sup>2</sup>		1	1 shower		
Clean-up rooms	1					
Substerile area	1					
Anesthesia workroom	1					
Soiled workroom or soiled holding	1					1 <sup>34</sup>
Cancer treatment/infusion therapy treatment	1:4 stations					
<b>Utility/Work Room</b>						
Clean <sup>21</sup>	1					
Soiled <sup>22</sup>	1					1 <sup>14</sup>
Patient beds [Skilled Nursing/Intermediate Care Facilities][medical model]	1:8 <sup>2</sup>		1:6	1:20		
Patient toilet and bath facilities <sup>13</sup> [Correctional Treatment Center]	1:8 <sup>2</sup>		1:6	1:12		
Airborne infection isolation anteroom <sup>6</sup> [Correctional Treatment Center]	1 <sup>6</sup>		1 <sup>6</sup>	1 <sup>6</sup>		
Airborne infection isolation anteroom [Correctional Treatment Center]	1					
Protective environment room <sup>6</sup> [Correctional Treatment Center]	1 <sup>6</sup>		1 <sup>6</sup>	1 <sup>6</sup>		
Protective environment anteroom [Correctional Treatment Center]	1					

Notes:

- <sup>1</sup> Each department or nursing unit shall be served by a housekeeping room equipped with a service sink. Departments may share service closets provided the departmental services are compatible. A dedicated housekeeping room shall be provided for the following services: Surgical/Catherization, ICU, NICU, nursery, dietary, renal dialysis and outpatient surgery.
- <sup>2</sup> Conventional spouts and controls on hot-and cold-water supplies are acceptable. Aerators are not permitted. Non-aerating laminar flow devices are permitted. Nourishment areas shall have a handwashing fixture in or immediately accessible from the nourishment area, in addition to a nourishment sink.
- <sup>3</sup> Scrub sinks shall be located outside of sterile procedure rooms. A minimum of two scrub sinks shall be provided in a surgical unit containing one operating room. Four scrub sinks shall be provided in surgical units containing two operating rooms. One additional scrub sink shall be provided per each additional operating room.
- <sup>4</sup> The scrub sink is in addition to the required number for surgeries.
- <sup>5</sup> The following fixtures shall be provided in airborne infection or protective environment rooms of hospitals only:
  - a. Within an adjoining toilet room, a lavatory, a shower containing a seat or a space for a shower chair, and toilet equipped with bedpan flushing attachment with a vacuum breaker.
  - b. A handwashing fixture within a separate anteroom.
- <sup>6</sup> The following fixtures shall be provided in isolation rooms of correctional treatment centers only:
  - a. Within an adjoining toilet area, a handwashing fixture, a shower containing a seat or a space for a shower chair, and water closet equipped with bedpan flushing attachment with a vacuum breaker.
  - b. A handwashing fixture within a separate anteroom.
- <sup>7</sup> Includes burn center spaces, acute respiratory-care service spaces, and coronary-care service spaces.

- <sup>8</sup> A toilet room with handwashing fixture shall directly adjoin each procedure room.
- <sup>9</sup> One toilet with lavatory and one shower may serve two labor rooms.
- <sup>10</sup> One additional scrub sink for each additional cesarean or delivery operating room.
- <sup>11</sup> Provide emergency eye-wash and shower.
- <sup>12</sup> Conveniently located for staff use.
- <sup>13</sup> Fixtures serving individual patient rooms shall not be considered as meeting the required ratios for bedrooms not served by individual adjoining toilet or bath-rooms.
- <sup>14</sup> The clinic sink may be deleted if all bedrooms in the nursing unit are provided with adjoining toilets with bedpan flushing devices.
- <sup>15</sup> Conventional controls on hot-and cold-water supplies are acceptable. The water discharge points shall be 5 inches (127 millimeters) above the fixture rim. Aerators are not permitted. Non-aerating laminar flow devices are permitted.
- <sup>16</sup> A minimum of one bathtub is required on each floor of an acute care or acute psychiatric hospital providing skilled nursing or intermediate care services. Special bathing facilities/gurney shower shall be provided at a minimum ratio of one per 100 beds for acute care facilities.
- <sup>17</sup> In a multiple-bed room, every bed position shall be within 20 feet (6 meters) of a hands-free handwashing fixture. Where an individual room concept is used, a handwashing fixture shall be provided within each infant care room.
- <sup>18</sup> When three or more procedure rooms are provided.
- <sup>19</sup> If a separate medicine room is provided, the room shall be equipped with a sink in addition to the nurses' station handwashing fixture. Hot-water supplies are optional.
- <sup>20</sup> Not required when there is a handwash fixture in the patient bed room.
- <sup>21</sup> Handwashing fixtures may be deleted if room is used for storage and holding only.
- <sup>22</sup> If room is used only for temporary holding of soiled materials, clinic sink and work counter may be omitted. If the flushing-rim clinical sink is eliminated, facilities for cleaning bedpans shall be provided elsewhere.
- <sup>23</sup> Toilet shall be equipped with a bedpan flushing attachment.
- <sup>24</sup> Optional services approved by the licensing agency shall comply with the applicable space requirements of OSHPD 1 and 2.
- <sup>25</sup> Shall be provided in each separate room where open medication is handled.
- <sup>26</sup> Conveniently accessible throughout the unit.
- <sup>27</sup> Includes rooms or areas within coronary and intensive-care units and postanesthesia recovery rooms.
- <sup>28</sup> Modular toilet/sink combination units located within a privacy curtain may be used within individual patient space or private room. The toilet fixture shall be completely contained within cabinetry when not in use, and shall be enclosed when flushed. Bedpan washers shall not be permitted in patient bedrooms.
- <sup>29</sup> In service spaces with procedure rooms that do not have dedicated patient toilets, provide a minimum of one patient toilet room with a separate handwashing fixture within the service space.
- <sup>30</sup> Toilet room shall be accessible from the procedure room.
- <sup>31</sup> Scrub sink shall be located outside the staff entrance to the procedure room.
- <sup>32</sup> Not used.
- <sup>33</sup> Handwashing and scrub sink fixtures shall not be equipped with wrist or elbow blades but shall be equipped with sensor controls, or controls that do not involve contact with the upper extremities.
- <sup>34</sup> If room is used only for temporary holding of soiled material, clinic sink and work counter may be omitted.
- <sup>35</sup> A minimum of one separate accessible toilet room shall be provided for the use of patients. Patient toilet room(s) shall be equipped with a handwashing fixture and shall be accessible to the observation units(s) from the corridor. Reference CBC, Part 2, Section 1224.39.6.

TABLE 4-3

TYPE OF BUILDING OR OCCUPANCY	WATER CLOSETS (FIXTURES PER PERSON) <sup>7</sup>		URINALS (TROUGH URINAL TO INDIVIDUAL URINAL EQUIVALENCE) MALE		LAVATORIES (FIXTURES PER PERSON)	BATHTUBS OR SHOWERS (FIXTURES PER PERSON)	DRINKING FOUNTAINS (FIXTURES PER PERSON) <sup>3</sup>
	MALE	FEMALE					
Nonindustrial—office buildings, public buildings and similar establishments	1 1-15 2 16-35 3 36-55 4 56-80 5 81-110 6 111-150 1 additional for each additional 40 employees or fraction thereof	1 1-15 2 16-35 3 36-55 4 56-80 5 81-110 6 111-150 1 additional for each additional 40 employees or fraction thereof	Length of trough urinal 24" (610 mm) 36" (914 mm) 48" (1219 mm) 60" (1524 mm)	Number of individual urinals 1 2 2 3	1 1-15 2 16-35 3 36-60 4 61-90 5 91-125 1 additional for each additional 4 employees or fraction thereof	1:10 persons per shift required to shower	—
Industrial—factories, warehouses, loft buildings and similar establishments	1 1-15 2 16-35 3 36-55 4 56-80 5 81-110 6 111-150 1 additional for each additional 40 employees or fraction thereof	1 1-15 2 16-35 3 36-55 4 56-80 5 81-110 6 111-150 1 additional for each additional 40 employees or fraction thereof	24" (610 mm) 36" (914 mm) 48" (1219 mm) 60" (1524 mm) 72" (1829 mm)	1 2 2 3 4	1 to 100 employees 1 per 10  Over 100 employees 1 additional for each additional 15 employees or fraction thereof	1:10 persons per shift required to shower	—

Notes:

- <sup>1</sup> The figures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction thereof.
- <sup>2</sup> Each water closet shall occupy a separate compartment which shall be equipped with a door, door latch and clothes hook. The door and the walls or partitions between fixtures shall be sufficient to assure privacy.
- <sup>3</sup> Drinking fountains shall not be located in toilet rooms.
- <sup>4</sup> Washing facilities shall be reasonably accessible to all employees.
- <sup>5</sup> Toilet facilities shall be accessible to the employees at all times. Where practicable, toilet facilities should be within 200 feet (61 m) of locations at which workers are regularly employed and should not be more than one floor-to-floor flight of stairs from working areas.
- <sup>6</sup> Urinals may be installed instead of water closets in toilet rooms to be used only by men provided that the number of water closets shall not be less than two thirds of the minimum number of toilet facilities specified. The length of trough urinals to the equivalent number of individual urinals shall be based on the above table.
- <sup>7</sup> When there are less than five employees, separate toilet rooms for each sex are not required provided toilet rooms can be locked from the inside and contain at least one water closet.
- <sup>8</sup> Twenty-four linear inches of wash sink or 18 inches of circular basin, when provided with water outlets for such space, shall be considered equivalent to one lavatory.  
**Exception:** The requirements of Table 4-3 do not apply to mobile crews or to normally unattended work locations provided employees at these locations have immediately available transportation to nearby toilet facilities which meet the requirements of Table 4-3.

TABLE 4-4

TYPE OF BUILDING OR OCCUPANCY <sup>2</sup>	WATER CLOSETS (FIXTURES PER PERSON)	URINALS (FIXTURES PER MALE)	LAVATORIES (FIXTURES PER PERSON)	BATHTUBS OR SHOWERS (FIXTURES PER PERSON)	DRINKING FOUNTAINS (FIXTURES PER PERSON)
Day Use Public Beaches <sup>1,2</sup>	Male 1 1-100 No sex designated 1 1-500 Minimum of 2	Female 1 1-100	May be substituted for up to two-thirds of the water closets required		
Picnic Areas	Male 1 1-50	Female 1 1-50			
Overnight Use Public Beaches <sup>2</sup>	1 1-7.5 campsites <sup>3</sup> 1 1-7.5 campsites <sup>3</sup>		May be substituted for up to one-third of the water closets required <sup>3</sup>	1 1-12.5 campsites <sup>4</sup>	
Organized Camps	1 1-15 <sup>3</sup>		1 1-15	1 1-156	Minimum 1 per camp

Notes:

- <sup>1</sup> Toilets shall be located in accordance with actual use patterns on the beach. The reasonable intent of the toilet requirements is that it should apply on the basis of average daily use during periods of peak use. The health officer may determine how many days the population standard may be exceeded.
- <sup>2</sup> Laundry facilities are not required, but if they are provided, must be a minimum of two laundry trays or a washing machine.
- <sup>3</sup> Toilet facilities shall not be farther than 400 feet from any lot or campsite.
- <sup>4</sup> Showers are not required, but if provided, they shall be provided on the indicated ratio. Outdoor rinse-off showers may be cold water only.
- <sup>5</sup> Toilets shall be located within 300 feet from the living accommodations they serve.
- <sup>6</sup> Showers shall be provided in the living area or in a centrally located structure.  
**Exception:** Intermittent short-term organized camps are not required to provide shower facilities, but if provided, they shall comply with this part.

**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE  
CHAPTER 6 - WATER SUPPLY AND DISTRIBUTION**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4								
Adopt Entire Chapter																						
Adopt Entire Chapter as amended (amended sections listed below)	X			X	X			X	X	X	X	X	X	X			X					
Adopt only those sections that are listed below			X												X		X		X			
Chapter/Section																						
601.2 Exceptions		X		X	X												X					
601.2.1 & Exceptions				X																		
601.2.1.1				X																		
601.2.2				X																		
601.3.2				X	X																	
601.3.3		X		X													X					
601.4																				X		
601.5																	X					
601.6																	X					
601.7																	X					
601.8																	X					
603.5.11				X	X																	
603.5.14, Note			X				X	X														
604.1 Exception									X	X	X	X	X									
Table 604.1 Notes	X			X	X		X	X							X	X						
604.1.1				X	X																	
604.1.2				X	X		X	X														
604.13	X			X	X																	
605.2.2				X	X																	
605.9							X	X	X	X	X	X	X									
605.9.1							X	X	X	X	X	X	X									
605.10	X			X	X		X	X														
605.10.1	X																					
605.10.1.1	X																					
605.12.2				X	X																	
605.15				X	X		X	X	X	X	X	X	X									
606.8									X	X	X	X	X									
607.1							X	X														
609.9									X	X	X	X	X									
609.10				†	†																	
Table 610.3		X		X	X																	
612.0			X																			
613.0 & Subsections									X	X	X	X	X									
Table 613.1									X	X	X	X	X									

**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE  
CHAPTER 6 - WATER SUPPLY AND DISTRIBUTION (continued)**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4								
Adopt Entire Chapter																						
Adopt Entire Chapter as amended (amended sections listed below)	X			X	X			X	X	X	X	X	X	X			X					
Adopt only those sections that are listed below			X													X		X		X		
Chapter/Section																						
614.0 & Subsections										X	X	X	X	X	X							
615.0 - 615.3										X	X	X	X	X	X							
615.4										X												

*This state agency does not adopt sections identified with the following symbol: †*

*The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.0.*

# CHAPTER 6

## WATER SUPPLY AND DISTRIBUTION

### 601.0 General.

**601.1 Applicability.** This chapter shall govern the materials, design, and installation of water supply systems, including methods and devices used for backflow prevention.

**601.2 Hot and Cold Water Required.** 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 using an approved flush tank or flushometer valve.

#### Exceptions:

- (1) 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, DWR]** For all residential occupancies, alternate water sources may be allowed as specified in Chapter 15 of this code in addition to potable water.
- (4) **[BSC-CG, DWR]** For non-residential occupancies, alternate water sources may be allowed as specified in Chapter 15 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 and public and private bidets, bathtubs, whirlpool bathtubs, and shower control valves.

**601.2.1 Submeters. [HCD 1]** Submeters (or meters) shall be installed to measure potable and reclaimed (recycled) water (hot and cold) that is supplied for the exclusive use of an individual dwelling unit within a newly constructed, multiunit rental residential structure; or for the use of an individual dwelling unit within a newly constructed mixed-use rental residential/commercial structure. Submeters (or meters) shall be installed

in accordance with this code and the manufacturer's installation instructions.

See Water Code Section 517 for definitions of "multiunit residential structure" and "mixed-use residential and commercial structure." See also Civil Code commencing with Section 1954.201.

#### Exemptions:

- (1) Long-term health care facilities as defined in Health and Safety Code Section 1418.
- (2) Low-income housing as defined in Health and Safety Code Section 17922.14 (c)(2)(B).
- (3) Residential care facilities for the elderly as defined in Health and Safety Code Section 1569.2 (p)(1).
- (4) Housing at a place of education as defined in Title 24 of the California Code of Regulations, California Building Code, Part 2, Section 202.
- (5) Time-share property as defined in Business and Professions Code Section 11212, Subdivision (aa).

**601.2.1.1 Approved Submeters. [HCD 1]** Submeters (or meters) shall be approved in accordance with the Business and Professions Code, Division 5.

**601.2.2 Submeter Testing. [HCD 1]** Submeter (or meter) testing shall be in accordance with the California Code of Regulations, Title 4, Division 9, Chapter 3, Article 1; Civil Code, Division 3, Part 4, Title 5; and Business and Professions Code, Division 5.

**601.3 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 Section 601.3.1 through Section 601.3.5.

**601.3.1 Potable Water.** Green background with white lettering.

**601.3.2 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 by Section 601.3.3, nonpotable 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 comply with Table 601.3.2. **[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 601 for all nonpotable water systems.



FIGURE 601  
INTERNATIONAL SYMBOL

The background color and required information shall be indicated every 20 feet (6096 mm) but not less than once per room, and shall be visible from the floor level.

**601.3.3 Alternate Water Sources.** Alternate water source systems shall have a purple (Pantone color No. 512, 522C, or equivalent) background with uppercase lettering and shall be field or factory marked as follows:

- (1) Gray water systems shall be marked in accordance with this section with the words “CAUTION: NON-POTABLE GRAY WATER, DO NOT DRINK” in black letters.
- (2) Reclaimed (recycled) water systems for outdoor applications shall be marked in accordance with this section with the words: “CAUTION: NON-POTABLE RECLAIMED (RECYCLED) WATER, DO NOT DRINK” in black letters.
- (3) On-site treated water systems shall be marked in accordance with this section with the words: “CAUTION: ON-SITE TREATED NONPOTABLE WATER, DO NOT DRINK” in black letters.
- (4) Rainwater catchment systems shall be marked in accordance with this section with the words: “CAUTION: NONPOTABLE RAINWATER WATER, DO NOT DRINK” in black letters.

**Exception: [DWR]** For recycled water supply systems that are within or a part of a building, the provisions of Section 1505.7 shall apply.

TABLE 601.3.2  
MINIMUM LENGTH OF COLOR FIELD AND SIZE OF LETTERS

OUTSIDE DIAMETER OF PIPE OR COVERING (inches)	MINIMUM LENGTH OF COLOR FIELD (inches)	MINIMUM SIZE OF LETTERS (inches)
½ to 1¼	8	½
1½ to 2	8	¾
2½ to 6	12	1¼
8 to 10	24	2½
Over 10	32	3½

For SI units: 1 inch = 25.4 mm

**601.3.4 Fixtures.** Where vacuum breakers or backflow preventers are installed with fixtures listed in Table 1701.1, identification of the discharge side shall be permitted to be omitted.

**601.3.5 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.”

**601.4 [CA] Schools of Cosmetology and Cosmetological Establishments.**

**601.4.1 Hot- and Cold-Running Water.** At least one sink with hot-and cold-running water shall be provided in each work area or workroom where hairdressing is performed in each school and establishment.

**601.4.2 Handwashing Facilities.** Each school and establishment shall provide adequate handwashing facilities, including hot-and cold-running water, located within or adjacent to the toilet room or rooms in accordance with Table 422.1.

**601.4.3 Drinking Water.** Each school and establishment shall supply potable drinking water convenient to students, patrons and employees. Approved sanitary drinking fountains shall be installed and so regulated that a jet of at least 2 inches (51 mm) shall be constantly available.

**601.5 [AGR] Meat and Poultry Processing Plants.** Except as provided in Section 601.5.4, the water supply shall be ample and potable, with adequate pressure and facilities for its distribution in the plant, and its protection against contamination and pollution.

**Note:** A water report, issued under the authority of the state health agency, certifying to the potability of the water supply, shall be obtained by the applicant and furnished to the administrator whenever such report is required by the administrator.

**601.5.1** A supply of hot water shall be available.

**601.5.2** Hose connections with steam and water-mixing valves or hot-water hose connections shall be provided at locations throughout the plant.

**601.5.3** The refuse rooms shall be provided with facilities for washing refuse cans and other equipment in the rooms.

**601.5.4** Non-potable water is permitted only in those parts of official plants where no product is handled or prepared, and then only for limited purposes, such as on condensers not connected with the potable water supply, in vapor lines serving inedible product rendering tanks, and in sewer lines for moving heavy solids in the sewage. In all cases, non-potable water lines shall be clearly identified and shall not be cross connected with the potable water supply.

**Exception:** Cross connection is permitted if this is necessary for fire protection and such connection is of a type with a break to ensure against accidental contamination, and to be approved by local authorities and by the Department.

**601.5.5** Equipment using potable water shall be so installed as to prevent back-siphonage into the potable water system.

**601.5.6** All pipelines, reservoirs, tanks, cooling towers and like equipment employed in handling reused water shall be constructed and installed so as to facilitate their cleaning and inspection.



**601.5.7** *Hot water of such temperature as to accomplish a thorough cleanup shall be delivered under pressure to outlets.*

**601.5.7.1** *An ample supply of water at not less than 180°F (82°C) shall be available when used for sanitizing purposes.*

**601.5.8** *Pens, alleys, and runways shall have hose connections for cleanup purposes.*

**601.6 [AGR] Collection Centers and Facilities.**

**601.6.1** *The water supply shall be ample with facilities for its distribution. An ample supply of water at not less than 180°F (82°C), or other suitable method.*

**601.6.2** *The vehicle cleaning and sanitizing area shall be provided with adequate line steam, producing a temperature of at least 180°F (82°C), or other suitable method.*

**601.6.3** *Hose connections with steam and water-mixing valves of hot-and cold-water hose connections shall be provided at locations throughout the building and at unloading and vehicle cleaning slabs.*

**601.7 [AGR] Renderers.** *This area shall be provided with live steam or other method of sanitizing vehicles.*

**601.8 [AGR] Horse Meat and Pet Food Establishments.**

**601.8.1** *The water supply shall be ample, clean and potable, with facilities for its distribution in the plant, and its protection against contamination and pollution.*

**601.8.1.1** *Equipment using potable water shall be so installed as to prevent back-siphonage into the potable water system.*

**601.8.1.2** *Non-potable water is permitted only in those parts of official plants where no edible product is handled or prepared, and then only for limited purposes, such as on ammonia condensers not connected with the potable water supply, in vapor lines serving inedible product rendering tanks, in connection with equipment used for washing and washing inedible products preparatory to tanking, and in sewer lines for moving heavy solids in sewage. In all cases, non-potable water lines shall be clearly identified and shall not be cross connected with the potable water supply.*

**Exception:** *Cross connection is permitted if this is necessary for fire protection, and such connection is of a type with a break to ensure against accidental contamination, and is approved by local authorities or by the Department.*

**601.8.2** *All pipelines, reservoirs, tanks, cooling towers, and like equipment employed in handling reused water shall be constructed and installed so as to facilitate their cleaning and inspection.*

**601.8.3** *Hot water for cleaning rooms and equipment shall be delivered under pressure to outlets and shall be of such temperature as to accomplish a thorough cleanup.*

**601.8.3.1** *An ample supply of water at not less than 180°F (82°C) shall be available when used for sanitizing purposes.*

**601.8.4** *Pens, alleys, and runways shall have hose connections for cleanups purposes.*

**602.0 Unlawful Connections.**

**602.1 Prohibited Installation.** No installation of potable water supply piping, or part thereof, shall be made in such a manner that it will be possible for used, unclean, polluted, or contaminated water, mixtures, or substances to enter a portion of such piping from a tank, receptor, equipment, or plumbing fixture by reason of backsiphonage, suction, or other cause, either during normal use and operation thereof, or where such tank, receptor, equipment, or plumbing fixture is flooded or subject to pressure exceeding the operating pressure in the hot or cold water piping.

**602.2 Cross-Contamination.** No person shall make a connection or allow one to exist between pipes or conduits carrying domestic water supplied by a public or private building supply system, and pipes, conduits, or fixtures containing or carrying water from any other source or containing or carrying water that has been used for any purpose whatsoever, or piping carrying chemicals, liquids, gases, or substances whatsoever, unless there is provided a backflow prevention device approved for the potential hazard and maintained in accordance with this code. Each point of use shall be separately protected where potential cross-contamination of individual units exists.

**602.3 Backflow Prevention.** No plumbing fixture, device, or construction shall be installed or maintained, or shall be connected to a domestic water supply, where such installation or connection provides a possibility of polluting such water supply or cross-connection between a distributing system of water for drinking and domestic purposes and water that becomes contaminated by such plumbing fixture, device, or construction unless there is provided a backflow prevention device approved for the potential hazard.

**602.4 Approval by Authority.** No water piping supplied by a private water supply system shall be connected to any other source of supply without the approval of the Authority Having Jurisdiction, Health Department, or other department having jurisdiction.

**603.0 Cross-Connection Control.**

**603.1 General.** Cross-connection control shall be provided in accordance with the provisions of this chapter.

No person shall install a water-operated equipment or mechanism, or use a water-treating chemical or substance, where it is found that such equipment, mechanism, chemical, or substance causes pollution or contamination of the domestic water supply. Such equipment or mechanism shall be permitted where equipped with an approved backflow prevention device or assembly.

**603.2 Approval of Devices or Assemblies.** Before a device or an assembly is installed for the prevention of backflow, it shall have first been approved by the Authority Having Jurisdiction. Devices or assemblies shall be tested in accordance with recognized standards or other standards acceptable to the Authority Having Jurisdiction. Backflow prevention devices and assemblies shall comply with Table 603.2, except for specific applications and provisions as stated in Section 603.5.1 through Section 603.5.21.

Devices or assemblies installed in a potable water supply system for protection against backflow shall be maintained

**TABLE 603.2  
BACKFLOW PREVENTION DEVICES, ASSEMBLIES, AND METHODS**

DEVICE, ASSEMBLY, OR METHOD <sup>1</sup>	APPLICABLE STANDARDS	DEGREE OF HAZARD				INSTALLATION <sup>2,3</sup>
		POLLUTION (LOW HAZARD)		CONTAMINATION (HIGH HAZARD)		
		BACK- SIPHONAGE	BACK- PRESSURE	BACK- SIPHONAGE	BACK- PRESSURE	
Air gap	ASME A112.1.2	X	—	X	—	See Table 603.3.1 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 vacuum breaker (consists of a body, checking member and atmospheric port)	ASSE 1001 or CSA B64.1.1	X	—	X	—	Upright position. No valve downstream. Minimum of 6 inches or listed distance above all downstream piping and flood level rim of receptor. <sup>4,5</sup>
Antisiphon fill valve (ballcocks) for gravity water closet flush tanks and urinal tanks	ASSE 1002/ ASME A112.1002/ CSA B125.12	X	—	X	—	Installation of 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. <sup>4,5</sup>
Vacuum breaker wall hydrants, hose bibbs, freeze resistant, automatic draining type	ASSE 1019 or CSA B64.2.1.1	X	—	X	—	Installation includes wall hydrants and hose bibbs. Such devices are not for use under continuous pressure conditions (means of shutoff downstream of device is prohibited). <sup>4,5</sup>
Hose connection vacuum breakers	ASSE 1011	X	—	X	—	Such devices are not for use under continuous pressure conditions. No valve downstream. <sup>4,6</sup>
Hose connection back-flow preventers	ASSE 1052	X	—	X	—	Such devices are not for use under continuous pressure conditions. <sup>4,6</sup>
Dual check backflow preventer wall hydrants, freeze resistant	ASSE 1053	X	—	X	—	Such devices are not for use under continuous pressure conditions. <sup>4</sup>
Freeze resistant sanitary yard hydrants	ASSE 1057	X	—	X	—	Such devices are not for use under continuous pressure conditions. <sup>4</sup>
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 Vacuum Breaker (single check valve with air inlet vent and means of field testing)	ASSE 1056	X	—	X	—	Upright position. Minimum of 12 inches or listed distance above all downstream piping and flood-level rim of receptor. <sup>5</sup>
Double Check Valve Backflow Prevention Assembly (two independent check valves and means of field testing)	ASSE 1015; AWWA C510; CSA B64.5 or CSA B64.5.1	X	X	—	—	Horizontal unless otherwise listed. Access and clearance shall be in accordance with the manufacturer's instructions, and not less than a 12 inch clearance at the bottom for maintenance. May need platform/ladder for test and repair.  Does not discharge water.

**TABLE 603.2  
BACKFLOW PREVENTION DEVICES, ASSEMBLIES, AND METHODS (continued)**

DEVICE, ASSEMBLY, OR METHOD <sup>1</sup>	APPLICABLE STANDARDS	DEGREE OF HAZARD				INSTALLATION <sup>2,3</sup>
		POLLUTION (LOW HAZARD)		CONTAMINATION (HIGH HAZARD)		
		BACK-SIPHONAGE	BACK-PRESSURE	BACK-SIPHONAGE	BACK-PRESSURE	
Double Check Detector Fire Protection Backflow Prevention Assembly (two independent check valves with a parallel detector assembly consisting of a water meter and a double check valve backflow prevention assembly and means for field testing)	ASSE 1048	X	X	—	—	Horizontal unless otherwise listed. Access and clearance shall be in accordance with the manufacturer's instructions, and not less than a 12 inch clearance at the 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 for field testing)	ASSE 1020 or CSA B64.1.2	X	—	X	—	Upright position. May have valves downstream. Minimum of 12 inches above all downstream piping and flood-level rim of the receptor. May discharge water.
Reduced Pressure Principle Backflow Prevention Assembly (two independently acting loaded check valves, a differential pressure relief valve and means for field testing)	ASSE 1013; AWWA C511; CSA B64.4 or CSA B64.4.1	X	X	X	X	Horizontal unless otherwise listed. Access and clearance shall be in accordance with the manufacturer's instructions, and not less than a 12 inch clearance at the bottom for maintenance. May need platform/ladder for test and repair. May discharge water.
Reduced Pressure Detector Fire Protection Backflow Prevention Assembly (two independently acting loaded check valves, a differential pressure relief valve, with a parallel detector assembly consisting of a water meter and a reduced-pressure principle backflow prevention assembly, and means for field testing)	ASSE 1047	X	X	X	X	Horizontal unless otherwise listed. Access and clearance shall be in accordance with the manufacturer's instructions, and not less than a 12 inch clearance at the 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.

For SI units: 1 inch = 25.4 mm

**Notes:**

- <sup>1</sup> See the description of devices and assemblies in this chapter.
- <sup>2</sup> Installation in pit or vault requires previous approval by the Authority Having Jurisdiction.
- <sup>3</sup> Refer to the general and specific requirement for installation.
- <sup>4</sup> Not to be subjected to operating pressure for more than 12 hours in a 24 hour period.
- <sup>5</sup> For deck-mounted and equipment-mounted vacuum breaker, see Section 603.5.13.
- <sup>6</sup> Shall be installed in accordance with Section 603.5.7.

in good working condition by the person or persons having control of such devices or assemblies. Such devices or assemblies shall be tested at the time of installation, repair, or relocation and not less than on an annual schedule thereafter, or more often where required by the Authority Having Jurisdiction. Where found to be defective or inoperative, the device or assembly shall be repaired or replaced. No device or assembly shall be removed from use or relocated or other device or assembly substituted, without the approval of the Authority Having Jurisdiction.

Testing or maintenance shall be performed by a certified backflow assembly tester or repairer in accordance with ASSE Series 5000 or otherwise approved by the Authority Having Jurisdiction.

**603.3 Backflow Prevention Devices, Assemblies, and Methods.** Backflow prevention devices, assemblies, and methods shall comply with Section 603.3.1 through Section 603.3.9.

**603.3.1 Air Gap.** The minimum air gap to afford backflow protection shall be in accordance with Table 603.3.1.

**603.3.2 Atmospheric Vacuum Breaker (AVB).** An atmospheric vacuum breaker consists of a body, a checking member, and an atmospheric port.

**603.3.3 Hose Connection Backflow Preventer.** A hose connection backflow preventer consists of two independent check valves with an independent atmospheric vent between and a means of field testing and draining.

**603.3.4 Double Check Valve Backflow Prevention Assembly (DC).** A double check valve backflow prevention assembly consists of two independently acting internally loaded check valves, four properly located test cocks, and two isolation valves.

**603.3.5 Pressure Vacuum Breaker Backflow Prevention Assembly (PVB).** A pressure vacuum breaker backflow prevention assembly consists of a loaded air

inlet valve, an internally loaded check valve, two properly located test cocks, and two isolation valves. This device shall be permitted to be installed indoors where provisions for spillage are provided.

**603.3.6 Spill-Resistant Pressure Vacuum Breaker (SVB).** A pressure-type vacuum breaker backflow prevention assembly consists of one check valve force-loaded closed and an air inlet vent valve force-loaded open to atmosphere, positioned downstream of the check valve and located between and including two tightly closing shutoff valves and test cocks.

**603.3.7 Reduced-Pressure Principle Backflow Prevention Assembly (RP).** A reduced-pressure principle backflow prevention assembly consists of two independently acting internally loaded check valves, a differential pressure relief valve, four properly located test cocks, and two isolation valves.

**603.3.8 Double Check Detector Fire Protection Backflow Prevention Assembly.** A double check valve backflow prevention assembly with a parallel detector assembly consisting of a water meter and a double check valve backflow prevention assembly (DC).

**603.3.9 Reduced Pressure Detector Fire Protection Backflow Prevention Assembly.** A reduced-pressure principle backflow prevention assembly with a parallel detector assembly consisting of a water meter and a reduced-pressure principle backflow prevention assembly (RP).

**603.4 General Requirements.** Assemblies shall comply with listed standards and be acceptable to the Authority Having Jurisdiction, with jurisdiction over the selection and installation of backflow prevention assemblies.

**603.4.1 Backflow Prevention Valve.** Where more than one backflow prevention valve is installed on a sin-

TABLE 603.3.1  
MINIMUM AIR GAPS FOR WATER DISTRIBUTION<sup>4</sup>

FIXTURES	WHERE NOT AFFECTED BY SIDEWALLS <sup>1</sup> (inches)	WHERE AFFECTED BY SIDEWALLS <sup>2</sup> (inches)
Effective openings <sup>3</sup> not greater than ½ of an inch in diameter	1	1½
Effective openings <sup>3</sup> not greater than ¾ of an inch in diameter	1½	2¼
Effective openings <sup>3</sup> not greater than 1 inch in diameter	2	3
Effective openings <sup>3</sup> greater than 1 inch in diameter	Two times the diameter of effective opening	Three times the diameter of effective opening

For SI units: 1 inch = 25.4 mm

**Notes:**

<sup>1</sup> Sidewalls, ribs, or similar obstructions do not affect air gaps where spaced from the inside edge of the spout opening a distance exceeding three times the diameter of the effective opening for a single wall, or a distance exceeding four times the effective opening for two intersecting walls.

<sup>2</sup> Vertical walls, ribs, or similar obstructions extending from the water surface to or above the horizontal plane of the spout opening other than specified in Footnote 1 above. The effect of three or more such vertical walls or ribs has not been determined. In such cases, the air gap shall be measured from the top of the wall.

<sup>3</sup> The effective opening shall be the minimum cross-sectional area at the seat of the control valve or the supply pipe or tubing that feeds the device or outlet. Where two or more lines supply one outlet, the effective opening shall be the sum of the cross-sectional areas of the individual supply lines or the area of the single outlet, whichever is smaller.

<sup>4</sup> Air gaps less than 1 inch (25.4 mm) shall be approved as a permanent part of a listed assembly that has been tested under actual backflow conditions with vacuums of 0 to 25 inches of mercury (85 kPa).

gle premise, and the valves are installed in one location, each separate valve shall be permanently identified by the permittee in a manner satisfactory to the Authority Having Jurisdiction.

**603.4.2 Testing.** The premise owner or responsible person shall have the backflow prevention assembly tested by a certified backflow assembly tester at the time of installation, repair, or relocation and not less than on an annual schedule thereafter, or more often where required by the Authority Having Jurisdiction. The periodic testing shall be performed in accordance with the procedures referenced in ASSE Series 5000 by a tester qualified in accordance with those standards.

**603.4.3 Access and Clearance.** Access and clearance shall be provided for the required testing, maintenance, and repair. Access and clearance shall be in accordance with the manufacturer's instructions, and not less than 12 inches (305 mm) between the lowest portion of the assembly and grade, floor, or platform. Installations elevated that exceed 5 feet (1524 mm) above the floor or grade shall be provided with a platform capable of supporting a tester or maintenance person.

**603.4.4 Connections.** Direct connections between potable water piping and sewer-connected wastes shall not be permitted to exist under any condition with or without backflow protection. Where potable water is discharged to the drainage system, it shall be by means of an approved air gap of two pipe diameters of the supply inlet, but in no case shall the gap be less than 1 inch (25.4 mm). Connection shall be permitted to be made to the inlet side of a trap provided that an approved vacuum breaker is installed not less than 6 inches (152 mm), or the distance according to the device's listing, above the flood-level rim of such trapped fixture, so that at no time will such device be subjected to backpressure.

**603.4.5 Hot Water Backflow Preventers.** Backflow preventers for hot water exceeding 110°F (43°C) shall be a type designed to operate at temperatures exceeding 110°F (43°C) without rendering a portion of the assembly inoperative.

**603.4.6 Integral Backflow Preventers.** Fixtures, appliances, or appurtenances with integral backflow preventers or integral air gaps manufactured as a unit shall be installed in accordance with their listing requirements and the manufacturer's installation instructions.

**603.4.7 Freeze Protection.** In cold climate areas, backflow assemblies and devices shall be protected from freezing with an outdoor enclosure that complies with ASSE 1060 or by a method acceptable to the Authority Having Jurisdiction.

**603.4.8 Drain Lines.** Drain lines serving backflow devices or assemblies shall be sized in accordance with the discharge rates of the manufacturer's flow charts of such devices or assemblies.

**603.4.9 Prohibited Locations.** Backflow prevention devices with atmospheric vents or ports shall not be installed in pits, underground, or submerged locations. Backflow preventers shall not be located in an area containing fumes that are toxic, poisonous, or corrosive.

**603.5 Specific Requirements.** Specific requirements for backflow prevention shall comply with Section 603.5.1 through Section 603.5.21.

**603.5.1 Atmospheric Vacuum Breaker.** Water closet and urinal flushometer valves shall be protected against backflow by an approved backflow prevention assembly, device, or method. Where the valves are equipped with an atmospheric vacuum breaker, the vacuum breaker shall be installed on the discharge side of the flushometer valve with the critical level not less than 6 inches (152 mm), or the distance according to its listing, above the overflow rim of a water closet bowl or the highest part of a urinal.

**603.5.2 Ballcock.** Water closet and urinal tanks shall be equipped with a ballcock. The ballcock shall be installed with the critical level not less than 1 inch (25.4 mm) above the full opening of the overflow pipe. In cases where the ballcock has no hush tube, the bottom of the water supply inlet shall be installed 1 inch (25.4 mm) above the full opening of the overflow pipe.

**603.5.3 Backflow Prevention.** Water closet flushometer tanks shall be protected against backflow by an approved backflow prevention assembly, device, or method.

**603.5.4 Heat Exchangers.** Heat exchangers used for heat transfer, heat recovery, or solar heating shall protect the potable water system from being contaminated by the heat-transfer medium. Single-wall heat exchangers used in indirect-fired water heaters shall meet the requirements of Section 505.4.1. Double-wall heat exchangers shall separate the potable water from the heat-transfer medium by providing a space between the two walls that are vented to the atmosphere.

**603.5.5 Water Supply Inlets.** Water supply inlets to tanks, vats, sumps, swimming pools, and other receptors shall be protected by one of the following means:

- (1) An approved air gap.
- (2) A listed vacuum breaker installed on the discharge side of the last valve with the critical level not less than 6 inches (152 mm) or in accordance with its listing.
- (3) A backflow preventer suitable for the degree of hazard, installed in accordance with the requirements for that type of device or assembly as set forth in this chapter.

**603.5.6 Protection from Lawn Sprinklers and Irrigation Systems.** Potable water supplies to systems having no pumps or connections for pumping equipment, and no chemical injection or provisions for chemical injection, shall be protected from backflow by one of the following devices:

- (1) Atmospheric vacuum breaker (AVB)
- (2) Pressure vacuum breaker backflow prevention assembly (PVB)
- (3) Spill-resistant pressure vacuum breaker (SVB)
- (4) Reduced-pressure principle backflow prevention assembly (RP)

**603.5.6.1 Systems with Pumps.** Where sprinkler and irrigation systems have pumps, connections for pumping equipment, or auxiliary air tanks, or are otherwise capable of creating backpressure, the potable water supply shall be protected by the following type of device where the backflow device is located upstream from the source of backpressure:

- (1) Reduced-pressure principle backflow prevention assembly (RP)

**603.5.6.2 Systems with Backflow Devices.**

Where systems have a backflow device installed downstream from a potable water supply pump or a potable water supply pump connection, the device shall be one of the following:

- (1) Atmospheric vacuum breaker (AVB)
- (2) Pressure vacuum breaker backflow prevention assembly (PVB)
- (3) Spill-resistant pressure vacuum breaker (SVB)
- (4) Reduced-pressure principle backflow prevention assembly (RP)

**603.5.6.3 Systems with Chemical Injectors.**

Where systems include a chemical injector or provisions for chemical injection, the potable water supply shall be protected by a reduced-pressure principle backflow prevention assembly (RP).

**603.5.7 Outlets with Hose Attachments.** Potable water outlets with hose attachments, other than water heater drains, boiler drains, and clothes washer connections, shall be protected by a nonremovable hose bibb-type backflow preventer, a nonremovable hose bibb-type vacuum breaker, or by an atmospheric vacuum breaker installed not less than 6 inches (152 mm) above the highest point of usage located on the discharge side of the last valve. In climates where freezing temperatures occur, a listed self-draining frost-proof hose bibb with an integral backflow preventer or vacuum breaker shall be used.

**603.5.8 Water-Cooled Equipment.** Water-cooled compressors, degreasers, or other water-cooled equipment shall be protected by a backflow preventer installed in accordance with the requirements of this chapter. Water-cooled equipment that produces backpressure shall be equipped with the appropriate protection.

**603.5.9 Aspirators.** Water inlets to water-supplied aspirators shall be equipped with a vacuum breaker installed in accordance with its listing requirements and this chapter. The discharge shall drain through an air gap. Where the tailpiece of a fixture to receive the discharge of an aspirator is used, the air gap shall be located above the flood-level rim of the fixture.

**603.5.10 Steam or Hot Water Boilers.** Potable water connections to steam or hot water boilers shall be protected from backflow by a double check valve backflow prevention assembly or reduced pressure principle backflow prevention assembly in accordance with Table 603.2. Where chemicals are introduced into the system a reduced pressure principle backflow prevention assembly shall be provided in accordance with Table 603.2.

**603.5.11 Nonpotable Water Piping.** In cases where it is impractical to correct individual cross-connections on the domestic waterline, the line supplying such outlets shall be considered a nonpotable water line. No drinking or domestic water outlets shall be connected to the nonpotable waterline. Where possible, portions of the nonpotable waterline shall be exposed, and exposed portions shall be properly identified in a manner satisfactory to the Authority Having Jurisdiction. Each outlet on the nonpotable waterline that is permitted to be used for drinking or domestic purposes shall be posted: "CAUTION: NONPOTABLE WATER, DO NOT DRINK."

**[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 601.*

**603.5.12 Beverage Dispensers.** Potable water supply to beverage dispensers carbonated beverage dispensers, or coffee machines shall be protected by an air gap or a vented backflow preventer that complies with ASSE 1022. For carbonated beverage dispensers, piping material installed downstream of the backflow preventer shall not be affected by carbon dioxide gas.

**603.5.13 Deck-Mounted and Equipment-Mounted Vacuum Breakers.** Deck-mounted or equipment-mounted vacuum breakers shall be installed in accordance with their listing and the manufacturer's installation instructions, with the critical level not less than 1 inch (25.4 mm) above the flood-level rim.

**603.5.14 Protection from Fire Systems.**

**Note:** *Fire Protection Systems has not been adopted by the State Fire Marshal. This section cannot be adopted or enforced pursuant to California Health and Safety Code 13114.7(a), which is being cited for reference. California Health and Safety Code 13114.7.*

(a) *For the purposes of this section the following are definitions of class I and class II systems:*

- (1) *American Water Works Association [A.W.W.A] Manual No. M-14 class 1 – Automatic fire sprinkler systems with direct connection from public water mains only; no pumps, tanks, or reservoirs; no physical connection from other water supplies; no antifreeze or additives of any kind; and all sprinkler drains discharging to the atmosphere or other safe outlets.*

- (2) *American Water Works Association [A.W.W.A] Manual No. M-14 class 2 – Automatic fire sprinkler systems which are the same as class 1, except that booster pumps may be installed in the connections from the street mains.*

(b) *Automatic fire sprinkler systems described in subdivision (a) shall not require any backflow protection equipment at the service connection other than required by standards for those systems contained in the publication of the National Fire Protection Association entitled "Installation of Sprinkler Systems" [NFPA Pamphlet No. 13, 1980 edition].*

**603.5.15 Health Care or Laboratory Areas.** Vacuum breakers for washer-hose bedpans shall be located

not less than 5 feet (1524 mm) above the floor. Hose connections in health care or laboratory areas shall be not less than 6 feet (1829 mm) above the floor.

**603.5.16 Special Equipment.** Portable cleaning equipment and dental vacuum pumps shall be protected from backflow by an air gap, an atmospheric vacuum breaker, a spill-resistant vacuum breaker, or a reduced pressure principle backflow preventer.

**603.5.17 Potable Water Outlets and Valves.** Potable water outlets, freeze-proof yard hydrants, combination stop-and-waste valves, or other fixtures that incorporate a stop and waste feature that drains into the ground shall not be installed underground.

**603.5.18 Pure Water Process Systems.** The water supply to a pure water process system, such as dialysis water systems, semiconductor washing systems, and similar process piping systems, shall be protected from back-pressure and backsiphonage by a reduced-pressure principle backflow preventer.

**603.5.18.1 Dialysis Water Systems.** The individual connections of the dialysis related equipment to the dialysis pure water system shall not require additional backflow protection.

**603.5.19 Plumbing Fixture Fittings.** Plumbing fixture fittings with integral backflow protection shall comply with ASME A112.18.1/CSA B125.1.

**603.5.20 Swimming Pools, Spas, and Hot Tubs.** Potable water supply to swimming pools, spas, and hot tubs shall be protected by an air gap or a reduced pressure principle backflow preventer in accordance with the following:

- (1) The unit is equipped with a submerged fill line.
- (2) The potable water supply is directly connected to the unit circulation system.

**603.5.21 Chemical Dispensers.** The water supply to chemical dispensers shall be protected against backflow. The chemical dispenser shall comply with ASSE 1055 or the water supply shall be protected by one of the following methods:

- (1) Air gap
- (2) Atmospheric vacuum breaker (AVB)
- (3) Pressure vacuum breaker backflow prevention assembly (PVB)
- (4) Spill-resistant pressure vacuum breaker (SVB)
- (5) Reduced-pressure principle backflow prevention assembly (RP)

## 604.0 Materials.

**604.1 Pipe, Tube, and Fittings.** Pipe, tube, fittings, solvent cement, thread sealants, solders, and flux used in potable water systems intended to supply drinking water shall comply with NSF 61. Where fittings and valves are made from copper alloys containing more than 15 percent zinc by weight and are used in plastic piping systems, they shall be resistant to dezincification and stress corrosion cracking in compliance with NSF 14.

Materials used in the water supply system, except valves and similar devices, shall be of a like material, except where otherwise approved by the Authority Having Jurisdiction.

Materials for building water piping and building supply piping shall comply with the applicable standards referenced in Table 604.1.

**Exception: [OSHPD 1, 2, 3, 4 & 5]** Use of CPVC is not permitted for applications under authority of the Office of Statewide Health Planning and Development.

**604.1.1 Local Authority to Approve CPVC Pipe Within Residential Buildings Under Specified Conditions. [HCD 1 & HCD 2]** The local responsible building official of any city, county, or city and county, shall authorize by permit the use of CPVC for hot and cold water distribution systems within the interior of residential buildings provided all of the following conditions are satisfied:

- (a) **Permit Conditions.** Any building permit issued pursuant to Section 604.1.1 shall be conditioned on compliance with the mitigation measures set forth in this section.
- (b) **Approved Materials.** Only CPVC plumbing material listed as an approved material and installed in accordance with this code may be used.
- (c) **Installation and Use.** Any installation and use of CPVC plumbing material pursuant to this section shall comply with all applicable requirements of this code and the manufacturer's installation instructions.
- (d) **Certification of Compliance.** Prior to issuing a building permit pursuant to Section 604.1.1, the building official shall require as part of the permitting process that the contractor, or the appropriate plumbing subcontractors, provide written certification: (1) that is required in subdivision (e), and (2) that he or she will comply with the flushing procedures and worker safety measures of this code and the manufacturer's installation instructions.
- (e) **Worker Safety.** Any contractor applying for a building permit that includes the use of CPVC plumbing materials authorized pursuant to this section shall include in the permit application a signed written certification stating that:
  - (1) They are aware of the health and safety hazards associated with CPVC plumbing installations;
  - (2) They have included in their Injury and Illness Prevention Plan the hazards associated with CPVC plumbing pipe installations; and
  - (3) The worker safety training elements of their Injury and Illness Prevention Plan meet the Department of Industrial Relation's guidelines.
- (f) **Findings of Compliance.** The building official shall not give final permit approval of any CPVC plumbing materials installed pursuant to Section 604.1.1 unless he or she finds that the material has been installed in compliance with the requirements of this code and the manufacturer's installation instructions.

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

MATERIAL	BUILDING SUPPLY PIPE AND FITTINGS	WATER DISTRIBUTION PIPE AND FITTINGS	REFERENCED STANDARD(S) PIPE	REFERENCED STANDARD(S) FITTINGS
Copper and Copper Alloys	X	X	ASTM B42, ASTM B43, ASTM B75, ASTM B88, ASTM B135, ASTM B251, ASTM B302, ASTM B447	ASME B16.15, ASME B16.18, ASME B16.22, ASME B16.26, ASME B16.50 <sup>2</sup> , ASME B16.51, ASSE 1061
CPVC	X	X	ASTM D2846, ASTM F441, ASTM F442, CSA B137.6	ASSE 1061, ASTM D2846, ASTM F437, ASTM F438, ASTM F439, ASTM F1970, CSA B137.6
CPVC-AL-CPVC	X	X	ASTM F2855	ASTM D2846
Ductile-Iron	X	X	AWWA C151	ASME B16.4, AWWA C110, AWWA C153
Galvanized Steel	X	X	ASTM A53	—
Malleable Iron	X	X	—	ASME B16.3
PE	X <sup>1</sup>	—	ASTM D2239, ASTM D2737, ASTM D3035, AWWA C901, CSA B137.1	ASTM D2609, ASTM D2683, ASTM D3261, ASTM F1055, CSA B137.1
PE-AL-PE	X	X	ASTM F1282, CSA B137.9	ASTM F1282, ASTM F1974, CSA B137.9
PE-AL-PEX	X	X	ASTM F1986	ASTM F1986
PE-RT	X	X	ASTM F2769, CSA B137.18	ASTM D3261, ASTM F1055, ASSE 1061, ASTM F1807, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F2769, CSA B137.18
PEX <sup>3,4</sup>	X	X	ASTM F876, ASTM F877, CSA B137.5, AWWA C904 <sup>1</sup>	ASSE 1061, ASTM F877, ASTM F1807, ASTM F1960, ASTM F1961, ASTM F2080, ASTM F2159, ASTM F2735, CSA B137.5
PEX-AL-PEX <sup>5</sup>	X	X	ASTM F1281, CSA B137.10, ASTM F2262	ASTM F1281, ASTM F1974, ASTM F2434, CSA B137.10
PP	X	X	ASTM F2389, CSA B137.11	ASTM F2389, CSA B137.11
PVC	X <sup>1</sup>	—	ASTM D1785, ASTM D2241, AWWA C900	ASTM D2464, ASTM D2466, ASTM D2467, ASTM F1970, AWWA C907
Stainless Steel	X	X	ASTM A269, ASTM A312	—

**Notes:**

<sup>1</sup> For building supply or exterior cold-water applications, not for water distribution piping.

<sup>2</sup> For brazed fittings only.

<sup>3</sup> When PEX tubing is placed in soil and is used in potable water systems intended to supply drinking water to fixtures or appliances, the tubing or piping shall be sleeved with a material approved for potable water use in soil or other material that is impermeable to solvents or petroleum products.

<sup>4</sup> PEX tubing shall meet or exceed the requirements of ASTM F876-2015a or an equivalent or more stringent standard when used in continuously recirculating hot water systems and the PEX tubing is exposed to the hot water 100% of the time.

<sup>5</sup> [For BSC, DSA-SS, DSA-SS/CC & HCD] The use of PEX-AL-PEX in potable water supply systems is not adopted.

(g) **Penalties.** Any contractor or subcontractor found to have failed to comply with the flushing, ventilation, and glove requirements of this code and the manufacturer's installation instructions shall be subject to the penalties in Health and Safety Code, Division 13, Part 1.5, Chapter 6 (Section 17995 et seq.). In addition, if during the conduct of any building

inspection the building official finds that the ventilation and glove requirements of this code, are being violated, such building officials shall cite the contractor or subcontractor for that violation.

(h) **Special Requirements for CPVC Installation within Residential Structures.** In addition to the other requirements in the California Plumbing



Code, all installations of CPVC pipe within residential structures shall meet the following:

- (i) **Flushing Procedures.** All installations of CPVC pipe within residential structures shall be flushed twice over a period of at least one (1) week. The pipe system shall be first flushed for at least 10 minutes and then filled and allowed to stand for no less than 1 week, after which all the branches of the pipe system must be flushed long enough to fully empty the contained volume. At the time of the fill, each fixture shall have a removable tag applied stating:

*“This new plumbing system was first filled on (date) by (name). The California Department of Housing and Community Development requires that the system be flushed after standing at least one week after the fill date specified above. If the system is used earlier than one week after the fill date, the water must be allowed to run for at least two minutes prior to use for human consumption. This tag may not be removed prior to flushing, except by the homeowner.”*

- (ii) **Worker Safety Measures.** Mechanical ventilation sufficient to maintain exposures below the relevant exposure limits established by state regulation shall be provided in enclosed spaces. This ventilation shall be directed at the breathing zone of the worker installing the pipe. Where mechanical ventilation is not practical, respirators, suitable for organic vapors, shall be used. For the purpose of this subdivision, an enclosed space is defined as:

- (1) A space less than 100 square feet of floor area under a ceiling with a height of 10 feet or less, and which does not have openings (consisting of doors, windows, or unfinished walls) on at least two sides;
- (2) Crawl spaces having a height of less than three feet;
- (3) Enclosed attics that have a roof and ceiling; or
- (4) Trenches having a depth greater than 24 inches.

Installers of CPVC pipe within residential structures shall use non-latex thin gauge (4 millimeters) nitrile gloves, or other gloves providing an equivalent or better degree of protection during the installation of the CPVC plumbing system. Gloves shall be provided to all workers by the contractor, or plumbing subcontractor, and shall be replaced upon contamination by cements.

**604.1.2 PEX. [HCD 1 & HCD 2]** All installations of PEX pipe where it is the initial plumbing piping installed in new construction shall be flushed twice over a period of at least one week. The pipe system shall be first flushed for at least 10 minutes and then filled and allowed to stand for no less than 1 week, after which all the

branches of the pipe system must be flushed long enough to fully empty the contained volume. This provision shall not apply to the installation of PEX pipe where it replaces an existing pipe system of any material.

- (1) At the time of fill, each fixture shall have a removable tag applied stating:
  - (a) *“This new plumbing system was first filled and flushed on \_\_\_\_\_ (date) by \_\_\_\_\_ (name). The State of California requires that the system be flushed after standing at least one week after the fill date specified above. If this system is used earlier than one week after the fill date, the water must be allowed to run for at least two minutes prior to use for human consumption. This tag may not be removed prior to the completion of the required second flushing, except by the building owner or occupant.”*
- (2) Prior to issuing a building permit to install PEX pipe, the building official shall require as part of the permitting process that the contractor, or the appropriate plumbing subcontractors, provide written certification that he or she will comply with the flushing procedures set forth in the code.
- (3) The building official shall not give final permit approval of any PEX plumbing installation unless he or she finds that the material has been installed in compliance with the requirements of the code, including the requirements to flush and tag the systems.
- (4) Any contractor or subcontractor found to have failed to comply with the PEX flushing requirements shall be subject to the penalties in Health and Safety Code, Division 13, Part 1.5, Chapter 6 (Section 17995, et seq.).

**604.2 Lead Content.** The maximum allowable lead content in pipes, pipe fittings, plumbing fittings, and fixtures intended to convey or dispense water for human consumption shall be not more than a weighted average of 0.25 percent with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures. For solder and flux, the lead content shall be not more than 0.2 percent where used in piping systems that convey or dispense water for human consumption.

**Exceptions:**

- (1) Pipes, pipe fittings, plumbing fittings, fixtures, or backflow preventers used for nonpotable services such as manufacturing, industrial processing, irrigation, outdoor watering, or any other uses where the water is not used for human consumption.
- (2) Flush valves, fill valves, flushometer valves, tub fillers, shower valves, service saddles, or water distribution main gate valves that are 2 inches (50 mm) in diameter or larger.

**604.2.1 Lead Content of Water Supply Pipe and Fittings.** Pipes, pipe fittings, valves, and faucets utilized in the water supply system for non-drinking water applications shall have a maximum of 8 percent lead content.

**604.3 Copper or Copper Alloy Tube.** Copper or copper alloy tube for water piping shall have a weight of not less than Type L.

**Exception:** Type M copper or copper alloy tubing shall be permitted to be used for water piping where piping is aboveground in, or on, a building or underground outside of structures.

**604.4 Hard-Drawn Copper or Copper Alloy Tubing.** Hard-drawn copper or copper alloy tubing for water supply and distribution in addition to the required incised marking shall be marked in accordance with ASTM B88. The colors shall be: Type K, green; Type L, blue; and Type M, red.

**604.5 Flexible Connectors.** Flexible water connectors shall be installed in readily accessible locations, and where under continuous pressure shall comply with ASME A112.18.6/CSA B125.6. Flexible water connectors with an excess flow shutoff device shall comply with CSA B125.5/IAPMO Z600.

**604.6 Cast-Iron Fittings.** Cast-iron fittings up to and including 2 inches (50 mm) in size, where used in connection with potable water piping, shall be galvanized.

**604.7 Malleable Iron Fittings.** Malleable iron water fittings shall be galvanized.

**604.8 Previously Used Piping and Tubing.** Piping and tubing that has previously been used for a purpose other than for potable water systems shall not be used.

**604.9 Epoxy Coating.** The epoxy coating used on existing, underground steel building supply piping shall comply with NSF 61 and AWWA C210.

**604.10 Plastic Materials.** Approved plastic materials shall be permitted to be used in building supply piping, provided that where metal building supply piping is used for electrical grounding purposes, replacement piping, therefore, shall be of like materials.

**Exception:** Where a grounding system acceptable to the Authority Having Jurisdiction is installed, inspected, and approved, the metallic pipe shall be permitted to be replaced with nonmetallic pipe.

**604.10.1 Tracer Wire.** Plastic materials for building supply piping outside underground shall have an electrically continuous corrosion-resistant blue insulated copper tracer wire, or other approved conductor installed adjacent to the piping. Access shall be provided to the tracer wire, or the tracer wire shall terminate aboveground at each end of the nonmetallic piping. The tracer wire size shall be not less than 14 AWG, and the insulation type shall be suitable for direct burial.

**604.11 Solder.** Solder shall comply with the requirements of Section 604.2.

**604.12 Flexible Corrugated Connectors.** Flexible corrugated connectors of copper, copper alloy, or stainless steel shall be limited to the following connector lengths:

- (1) Fixture Connectors – 30 inches (762 mm)
- (2) Washing Machine Connectors – 72 inches (1829 mm)
- (3) Dishwasher and Icemaker Connectors – 120 inches (3048 mm)

**604.13 Water Heater Connectors.** Flexible metallic (copper and stainless steel), reinforced flexible, braided stainless steel, or polymer braided with EPDM core connectors that connect a water heater to the piping system shall comply with ASME A112.18.6/CSA B125.6. Copper, copper alloy, or stainless steel flexible connectors shall not exceed 24 inches (610 mm). PEX, PEX-AL-PEX, PE-AL-PE, or PE-RT tubing shall not be installed within the first 18 inches (457 mm) of piping connected to a water heater. **[BSC, HCD 1 & HCD 2] PEX-AL-PEX is not adopted for use in potable water supply and distribution systems.**

**605.0 Joints and Connections.**

**605.1 Copper or Copper Alloy Pipe, Tubing, and Joints.** Joining methods for copper or copper alloy pipe, tubing, and fittings shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.1.1 through Section 605.1.5.

**605.1.1 Brazed Joints.** Brazed joints between copper or copper alloy pipe or tubing and fittings shall be made with brazing alloys having a liquid temperature above 1000°F (538°C). The joint surfaces to be brazed shall be cleaned bright by either manual or mechanical means. Tubing shall be cut square and reamed to full inside diameter. Brazing flux shall be applied to the joint surfaces where required by manufacturer's recommendation. Brazing filler metal shall conform to AWS A5.8 and shall be applied at the point where the pipe or tubing enters the socket of the fitting.

**605.1.2 Flared Joints.** Flared joints for soft copper or copper alloy water tubing shall be made with fittings that comply with the applicable standards referenced in Table 604.1. Pipe or tubing shall be cut square using an appropriate tubing cutter. The tubing shall be reamed to full inside diameter, resized to round, and expanded with a proper flaring tool.

**605.1.3 Mechanical Joints.** Mechanical joints shall include, but are not limited to, compression, flanged, grooved, pressed, and push fit fittings.

**605.1.3.1 Mechanically Formed Tee Fittings.**

Mechanically formed tee fittings shall have extracted collars that shall be formed in a continuous operation consisting of drilling a pilot hole and drawing out the pipe or tube surface to form a collar having a height not less than three times the thickness of the branch tube wall. The branch pipe or tube shall be notched to conform to the inner curve of the run pipe or tube and shall have two dimple depth stops to ensure that penetration of the branch pipe or tube into the collar is of a depth for brazing and that the branch pipe or tube does not obstruct the flow in the main line pipe or tube. Dimple depth stops shall be in line with the run of the pipe or tube. The second dimple shall be ¼ of an inch (6.4 mm) above the first and shall serve as a visual point of inspection. Fittings and joints shall be made by brazing. Soldered joints shall not be permitted.

**605.1.3.2 Press-Connect Fittings.** Press-connect fittings for copper or copper alloy pipe or tubing shall

have an elastomeric o-ring that forms the joint. The pipe or tubing shall be fully inserted into the fitting, and the pipe or tubing marked at the shoulder of the fitting. Pipe or tubing shall be cut square, chamfered, and reamed to full inside diameter. The fitting alignment shall be checked against the mark on the pipe or tubing to ensure the pipe or tubing is inserted into the fitting. The joint shall be pressed using the tool recommended by the manufacturer.

**605.1.3.3 Push Fit Fittings.** Removable and non-removable push fit fittings for copper or copper alloy tubing or pipe that employ quick assembly push fit connectors shall comply with ASSE 1061. Push fit fittings for copper or copper alloy pipe or tubing shall have an approved elastomeric o-ring that forms the joint. Pipe or tubing shall be cut square, chamfered, and reamed to full inside diameter. The tubing shall be fully inserted into the fitting, and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to ensure the tubing is inserted into the fitting and gripping mechanism has engaged on the pipe.

**605.1.4 Soldered Joints.** Soldered joints between copper or copper alloy pipe or tubing and fittings shall be made in accordance with ASTM B828 with the following sequence of joint preparation and operation as follows: measuring and cutting, reaming, cleaning, fluxing, assembly and support, heating, applying the solder, cooling and cleaning. Pipe or tubing shall be cut square and reamed to the full inside diameter including the removal of burrs on the outside of the pipe or tubing. Surfaces to be joined shall be cleaned bright by manual or mechanical means. Flux shall be applied to pipe or tubing and fittings and shall conform to ASTM B813, and shall become noncorrosive and nontoxic after soldering. Insert pipe or tubing into the base of the fitting and remove excess flux. Pipe or tubing and fitting shall be supported to ensure a uniform capillary space around the joint. Heat shall be applied using an air or fuel torch with the flame perpendicular to the pipe or tubing using acetylene or an LP gas. Preheating shall depend on the size of the joint. The flame shall be moved to the fitting cup and alternate between the pipe or tubing and fitting. Solder conforming to ASTM B32 shall be applied to the joint surfaces until capillary action draws the molten solder into the cup. Solder and fluxes with a lead content that exceeds 0.2 percent shall be prohibited in piping systems conveying potable water. Joint surfaces shall not be disturbed until cool and any remaining flux residue shall be cleaned.

**605.1.5 Threaded Joints.** Threaded joints for copper or copper alloy pipe shall be made with pipe threads that comply with ASME B1.20.1. Thread sealant tape or compound shall be applied only on male threads, and such material shall be of approved types, insoluble in water, and nontoxic.

**605.2 CPVC Plastic Pipe and Joints.** CPVC plastic pipe and fitting joining methods shall be installed in accordance

with the manufacturer's installation instructions and shall comply with Section 605.2.1 through Section 605.2.3.

**605.2.1 Mechanical Joints.** Mechanical joints shall include compression, flanged, grooved and push fit fittings.

**605.2.1.1 Push Fit Fittings.** Removable and non-removable push fit fittings that employ a quick assembly push fit connector shall comply with ASSE 1061.

**605.2.2 Solvent Cement Joints.** Solvent cement joints for CPVC pipe and fittings shall be clean from dirt and moisture. Solvent cements shall comply with ASTM F493, requiring the use of a primer shall be orange in color. The primer shall be colored and shall comply with ASTM F656. Listed solvent cement that complies with ASTM F493 and that does not require the use of primers, yellow or red in color, shall be permitted for pipe and fittings that comply with ASTM D2846, ½ of an inch (15 mm) through 2 inches (50 mm) in diameter or ASTM F442, ½ of an inch (15 mm) through 3 inches (80 mm) in diameter. Apply primer where required inside the fitting and to the depth of the fitting on pipe. Apply liberal coat of cement to the outside surface of pipe to depth of fitting and inside of fitting. Place pipe inside fitting to forcefully bottom the pipe in the socket and hold together until joint is set. **[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 D2846.*

**605.2.3 Threaded Joints.** Threads shall comply with ASME B1.20.1. A minimum of Schedule 80 shall be permitted to be threaded; however, the pressure rating shall be reduced by 50 percent. The use of molded fittings shall not result in a 50 percent reduction in the pressure rating of the pipe provided that the molded fittings shall be fabricated so that the wall thickness of the material is maintained at the threads. Thread sealant compound that is compatible with the pipe and fitting, insoluble in water, and nontoxic shall be applied to male threads. Caution shall be used during assembly to prevent over tightening of the CPVC components once the thread sealant has been applied. Female CPVC threaded fittings shall be used with plastic male threads only.

**605.3 CPVC/AL/CPVC Plastic Pipe and Joints.** Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC) plastic pipe and fitting joining methods shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.3.1 or Section 605.3.2.

**605.3.1 Solvent Cement Joints.** Solvent cement joints for CPVC/AL/CPVC pipe and fittings shall be clean from dirt and moisture. Solvent cements that comply with ASTM F493, requiring the use of a primer shall be orange in color. The primer shall be colored and shall comply with ASTM F656. Listed solvent cement that complies with ASTM F493 and that does not require the use of primers, yellow in color, shall be permitted to join pipe that comply with ASTM F2855 and fittings that comply with ASTM D2846, ½ of an inch (15 mm) through 2 inches (50 mm) in diameter. Apply primer

where required inside the fitting and to the depth of the fitting on pipe. Apply liberal coat of cement to the outside surface of pipe to depth of fitting and inside of fitting. Place pipe inside fitting to forcefully bottom the pipe in the socket and hold together until joint is set.

**605.3.2 Mechanical Joints.** Mechanical joints shall include flanged, grooved, and push fit fittings.

**605.3.2.1 Push Fit Fittings.** Removable and non-removable push fit fittings that employ a quick assembly push fit connector shall comply with ASSE 1061.

**605.4 Ductile Iron Pipe and Joints.** Ductile iron pipe and fitting joining methods shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.4.1 or Section 605.4.2.

**605.4.1 Mechanical Joints.** Mechanical joints for ductile iron pipe and fittings shall consist of a bell that is cast integrally with the pipe or fitting and provided with an exterior flange having bolt holes and a socket with annular recesses for the sealing gasket and the plain end of the pipe or fitting. The elastomeric gasket shall comply with AWWA C111. Lubricant recommended for potable water application by the pipe manufacturer shall be applied to the gasket and plain end of the pipe.

**605.4.2 Push-On Joints.** Push-on joints for ductile iron pipe and fittings shall consist of a single elastomeric gasket that shall be assembled by positioning the elastomeric gasket in an annular recess in the pipe or fitting socket and forcing the plain end of the pipe or fitting into the socket. The plain end shall compress the elastomeric gasket to form a positive seal and shall be designed so that the elastomeric gasket shall be locked in place against displacement. The elastomeric gasket shall comply with AWWA C111. Lubricant recommended for potable water application by the pipe manufacturer shall be applied to the gasket and plain end of the pipe.

**605.5 Galvanized Steel Pipe and Joints.** Galvanized steel pipe and fitting joining methods shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.5.1 or Section 605.5.2.

**605.5.1 Mechanical Joints.** Mechanical joints shall be made with an approved and listed elastomeric gasket.

**605.5.2 Threaded Joints.** Threaded joints shall be made with pipe threads that comply with ASME B1.20.1. Thread sealant tape or compound shall be applied only on male threads, and such material shall be of approved types, insoluble in water, and nontoxic.

**605.6 PE Plastic Pipe/Tubing and Joints.** PE plastic pipe or tubing and fitting joining methods shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.6.1 or Section 605.6.2.

**605.6.1 Heat-Fusion Joints.** Heat-fusion joints between PE pipe or tubing and fittings shall be assembled in accordance with Section 605.6.1.1 through Section 605.6.1.3 using butt, socket, and electro-fusion heat methods.

**605.6.1.1 Butt-Fusion Joints.** Butt-fusion joints shall be made in accordance with ASTM F2620. Joints shall be made by heating the squared ends of two pipes, pipe and fitting, or two fittings by holding ends against a heated element. The heated element shall be removed where the proper melt is obtained and joined ends shall be placed together with applied force.

**605.6.1.2 Electro-Fusion Joints.** Electro-fusion joints shall be heated internally by a conductor at the interface of the joint. Align and restrain fitting to pipe to prevent movement and apply electric current to the fitting. Turn off the current when the proper time has elapsed to heat the joint. The joint shall fuse together and remain undisturbed until cool.

**605.6.1.3 Socket-Fusion Joints.** Socket-fusion joints shall be made in accordance with ASTM F2620. Joints shall be made by simultaneously heating the outside surface of a pipe end and the inside of a fitting socket. Where the proper melt is obtained, the pipe and fitting shall be joined by inserting one into the other with applied force. The joint shall fuse together and remain undisturbed until cool.

**605.6.2 Mechanical Joints.** Mechanical joints between PE pipe or tubing and fittings shall include insert and mechanical compression fittings that provide a pressure seal resistance to pullout. Joints for insert fittings shall be made by cutting the pipe square, using a cutter designed for plastic piping, and removal of sharp edges. Two stainless steel clamps shall be placed over the end of the pipe. Fittings shall be checked for proper size based on the diameter of the pipe. The end of pipe shall be placed over the barbed insert fitting, making contact with the fitting shoulder. Clamps shall be positioned equal to 180 degrees (3.14 rad) apart and shall be tightened to provide a leak tight joint. Compression type couplings and fittings shall be permitted for use in joining PE piping and tubing. Stiffeners that extend beyond the clamp or nut shall be prohibited. Bends shall be not less than 30 pipe diameters, or the coil radius where bending with the coil. Bends shall not be permitted closer than 10 pipe diameters of a fitting or valve. Mechanical joints shall be designed for their intended use.

**605.7 PE-AL-PE Plastic Pipe/Tubing and Joints.** PE-AL-PE plastic pipe or tubing and fitting joining methods shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.7.1 and Section 605.7.1.1.

**605.7.1 Mechanical Joints.** Mechanical joints for PE-AL-PE pipe or tubing and fittings shall be either of the metal insert fittings with a split ring and compression nut or metal insert fittings with copper crimp rings. Metal insert fittings shall comply with ASTM F1974. Crimp insert fittings shall be joined to the pipe by placing the copper crimp ring around the outer circumference of the pipe, forcing the pipe material into the space formed by the ribs on the fitting until the pipe contacts the shoulder of the fitting. The crimp ring shall then be positioned on

the pipe so the edge of the crimp ring is  $\frac{1}{8}$  of an inch (3.2 mm) to  $\frac{1}{4}$  of an inch (6.4 mm) from the end of the pipe. The jaws of the crimping tool shall be centered over the crimp ring and tool perpendicular to the barb. The jaws shall be closed around the crimp ring and shall not be crimped more than once.

**605.7.1.1 Compression Joints.** Compression joints for PE-AL-PE pipe or tubing and fittings shall be joined through the compression of a split ring, by a compression nut around the circumference of the pipe. The compression nut and split ring shall be placed around the pipe. The ribbed end of the fitting shall be inserted into the pipe until the pipe contacts the shoulder of the fitting. Position and compress the split ring by tightening the compression nut onto the insert fitting.

**605.8 PE-RT.** Polyethylene of raised temperature (PE-RT) tubing and fitting joining methods and shall comply with Section 605.8.1.

**605.8.1 Mechanical Joints.** Fittings for PE-RT tubing shall comply with the applicable standards listed in Table 604.1. Mechanical joints for PE-RT tubing shall be installed in accordance with the manufacturer's installation instructions.

**605.9 PEX Plastic Tubing and Joints.** PEX plastic tubing and fitting joining methods shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.9.1 through Section 605.9.3.

*All PEX pipe installed in California must provide at least 30-day UV protection. [OSHPD 1, 1R, 2, 3, 4 & 5] Installation and use of PEX tubing shall be in accordance with manufacturer's standards. PEX piping shall not be used for any application that would result in noncompliance with any provisions of the California Building Standards Code.*

**605.9.1 Fittings.** Fittings for PEX tubing shall comply with the applicable standards referenced in Table 604.1. PEX tubing that complies with ASTM F876 shall be marked with the applicable standard designation for the fittings, specified by the tubing manufacturer for use with the tubing. *Brass fittings used with PEX tubing shall meet or exceed NSF 14-2009 standards to prevent dezincification and stress crack corrosion. [OSHPD 1, 1R, 2, 3, 4 & 5] Installation and use of PEX tubing shall be in accordance with manufacturer's standards. PEX piping shall not be used for any application that would result in non-compliance with any provisions of the California Building Standards Code.*

**605.9.2 Mechanical Joints.** Mechanical joints shall be installed in accordance with the manufacturer's installation instructions.

**605.9.3 Push Fit Fittings.** Removable and nonremovable push fit fittings that employ a quick assembly push fit connector shall comply with ASSE 1061.

**605.10 PEX-AL-PEX Plastic Tubing and Joints.** PEX-AL-PEX plastic pipe or tubing and fitting joining methods shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.10.1 and Section 605.10.1.1.

**[DSA-SS, DSA-SS/CC, BSC, HCD 1 & HCD 2] PEX-AL-PEX is not adopted for use in potable water supply and distribution systems.**

**605.10.1 Mechanical Joints.** Mechanical joints between PEX-AL-PEX tubing and fittings shall include mechanical and compression type fittings and insert fittings with a crimping ring. Insert fittings utilizing a crimping ring shall comply with ASTM F1974 or ASTM F2434. Crimp joints for crimp insert fittings shall be joined to PEX-AL-PEX pipe by the compression of a crimp ring around the outer circumference of the pipe, forcing the pipe material into annular spaces formed by ribs on the fitting.

**[BSC] PEX-AL-PEX is not adopted for use in potable water supply and distribution systems.**

**605.10.1.1 Compression Joints.** Compression joints shall include compression insert fittings and shall be joined to PEX-AL-PEX pipe through the compression of a split ring or compression nut around the outer circumference of the pipe, forcing the pipe material into the annular space formed by the ribs on the fitting.

**[BSC] PEX-AL-PEX is not adopted for use in potable water supply and distribution systems.**

**605.11 Polypropylene (PP) Piping and Joints.** PP pipe and fittings shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.11.1 through Section 605.11.3.

**605.11.1 Heat-Fusion Joints.** Heat-fusion joints for polypropylene (PP) pipe and fitting joints shall be installed with socket-type heat-fused polypropylene fittings, fusion outlets, butt-fusion polypropylene fittings or pipe, or electro-fusion polypropylene fittings. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F2389 or CSA B137.11.

**605.11.2 Mechanical and Compression Sleeve Joints.** Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer's installation instructions.

**605.11.3 Threaded Joints.** PP pipe shall not be threaded. PP transition fittings for connection to other piping materials shall only be threaded by use of copper alloy or stainless steel inserts molded in the fitting.

**605.12 PVC Plastic Pipe and Joints.** PVC plastic pipe and fitting joining methods shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.12.1 through Section 605.12.3.

PVC piping shall not be exposed to direct sunlight unless the piping does not exceed 24 inches (610 mm) and is wrapped with not less than 0.04 of an inch (1.02 mm) thick tape or otherwise protected from UV degradation.

**605.12.1 Mechanical Joints.** Mechanical joints shall be designed to provide a permanent seal and shall be of the mechanical or push-on joint. The mechanical joint shall include a pipe spigot that has a wall thickness to withstand without deformation or collapse; the com-

pressive force exerted where the fitting is tightened. The push-on joint shall have a minimum wall thickness of the bell at any point between the ring and the pipe barrel. The elastomeric gasket shall comply with ASTM D3139, and be of such size and shape as to provide a compressive force against the spigot and socket after assembly to provide a positive seal.

**605.12.2 Solvent Cement Joints.** Solvent cement joints for PVC pipe and fittings shall be clean from dirt and moisture. Pipe shall be cut square and pipe shall be deburred. Where surfaces to be joined are cleaned and free of dirt, moisture, oil, and other foreign material, apply primer purple in color that complies with ASTM F656. Primer shall be applied to the surface of the pipe and fitting is softened. Solvent cement that complies with ASTM D2564 shall be applied to all joint surfaces. Joints shall be made while both the inside socket surface and outside surface of pipe are wet with solvent cement. Hold joint in place and undisturbed for 1 minute after assembly.

*[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 214.0.*

**605.12.3 Threaded Joints.** Threads shall comply with ASME B1.20.1. A minimum of Schedule 80 shall be permitted to be threaded; however, the pressure rating shall be reduced by 50 percent. The use of molded fittings shall not result in a 50 percent reduction in the pressure rating of the pipe provided that the molded fittings shall be fabricated so that the wall thickness of the material is maintained at the threads. Thread sealant compound that is compatible with the pipe and fitting, insoluble in water and nontoxic shall be applied to male threads. Caution shall be used during assembly to prevent over tightening of the PVC components once the thread sealant has been applied. Female PVC threaded fittings shall be used with plastic male threads only.

**605.13 Stainless Steel Pipe and Joints.** Joining methods for stainless steel pipe and fittings shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.13.1 or Section 605.13.2.

**605.13.1 Mechanical Joints.** Mechanical joints shall be designed for their intended use. Such joints shall include compression, flanged, grooved, press-connect, and threaded.

**605.13.2 Welded Joints.** Welded joints shall be either fusion or resistance welded based on the selection of the base metal. The chemical composition of the filler metal shall comply with AWS A5.9 based on the alloy content of the piping material.

**605.14 Slip Joints.** In water piping, slip joints shall be permitted to be used only on the exposed fixture supply.

**605.15 Dielectric Unions.** Dielectric unions where installed at points of connection where there is a dissimilarity of metals shall be in accordance with ASSE 1079. **[DSA-SS, DSA-SS/CC, HCD 1 & HCD 2, OSHPD 1, 1R, 2, 3, 4 & 5]** *Dielectric unions shall be used at all points of connection where there is a dissimilarity of metals.*

**605.16 Joints Between Various Materials.** Joints between various materials shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 605.16.1 through Section 605.16.3.

**605.16.1 Copper or Copper Alloy Pipe or Tubing to Threaded Pipe Joints.** Joints from copper or copper alloy pipe or tubing to threaded pipe shall be made using copper alloy adapter, copper alloy nipple [minimum 6 inches (152 mm)], dielectric fitting, or dielectric union in accordance with ASSE 1079. The joint between the copper or copper alloy pipe or tubing and the fitting shall be a soldered, brazed, flared, or press-connect joint and the connection between the threaded pipe and the fitting shall be made with a standard pipe size threaded joint.

**605.16.2 Plastic Pipe to Other Materials.** Where connecting plastic pipe to other types of piping, approved types of adapter or transition fittings designed for the specific transition intended shall be used.

**605.16.3 Stainless Steel to Other Materials.** Where connecting stainless steel pipe to other types of piping, mechanical joints of the compression type, dielectric fitting, or dielectric union in accordance with ASSE 1079 and designed for the specific transition intended shall be used.

## 606.0 Valves.

**606.1 General.** Valves up to and including 2 inches (50 mm) in size shall be copper alloy or other approved material. Sizes exceeding 2 inches (50 mm) shall be permitted to have cast iron or copper alloy bodies. Each gate or ball valve shall be a fullway or full-port type with working parts of the non-corrosive material. Valves carrying water used in potable water systems intended to supply drinking water shall comply with the requirements of NSF 61 and ASME A112.4.14, ASME B16.34, ASTM F1970, ASTM F2389, AWWA C500, AWWA C504, AWWA C507, IAPMO Z1157, MSS SP-67, MSS SP-70, MSS SP-71, MSS SP-72, MSS SP-78, MSS SP-80, MSS SP-110, MSS SP-122, or NSF 359.

**606.2 Fullway Valve.** A fullway valve controlling outlets shall be installed on the discharge side of each water meter and each unmetered water supply. Water piping supplying more than one building on one premise shall be equipped with a separate fullway valve to each building, so arranged that the water supply can be turned on or off to an individual or separate building provided; however, that supply piping to a single-family residence and building accessory thereto shall be permitted to be controlled by one valve. Such shutoff valves shall be accessible. A fullway valve shall be installed on the discharge piping from water supply tanks at or near the tank. A fullway valve shall be installed on the cold water supply pipe to each water heater at or near the water heater.

**606.3 Multidwelling Units.** In multidwelling units, one or more shutoff valves shall be provided in each dwelling unit so that the water supply to a plumbing fixture or group of fixtures in that dwelling unit can be shut off without stopping water supply to fixtures in other dwelling units. These valves shall be accessible in the dwelling unit that they control.

**606.4 Multiple Openings.** Valves used to control two or more openings shall be fullway gate valves, ball valves, or other approved valves designed and approved for the service intended.

**606.5 Control Valve.** A control valve shall be installed immediately ahead of each water-supplied appliance and immediately ahead of each slip joint or appliance supply.

Parallel water distribution systems shall provide a control valve either immediately ahead of each fixture being supplied or installed at the manifold, and shall be identified with the fixture being supplied. Where parallel water distribution system manifolds are located in attics, crawl spaces, or other locations not readily accessible, a separate shutoff valve shall be required immediately ahead of each individual fixture or appliance served.

**606.6 Accessible.** Required shutoff or control valves shall be accessible.

**606.7 Multiple Fixtures.** A single control valve shall be installed on a water supply line ahead of an automatic metering valve that supplies a battery of fixtures.

**606.8 [OSHPD 1, 1R, 2, 3, 4 & 5]** *Each riser or branch shall be provided with an accessible sectionalizing valve in hot-and cold-water systems to permit servicing or replacement of piping or equipment. Stop valves shall be provided at each fixture.*

### **607.0 Potable Water Supply Tanks.**

**607.1 General.** Potable water supply tanks shall be installed in accordance with the manufacturer's installation instructions and supported in accordance with the *California Building Code*.

**607.2 Potable Water Tanks.** Potable water supply tanks, interior tank coatings, or tank liners intended to supply drinking water shall comply with NSF 61.

**607.3 Venting.** Tanks used for potable water shall be tightly covered and vented in accordance with the manufacturer's installation instructions. Such vent shall be screened with a corrosion-resistant material of not less than number 24 mesh.

**607.4 Overflow.** Tanks shall have not less than a 16 square inch (0.01 m<sup>2</sup>) overflow that is screened with a corrosion-resistant material of not less than number 24 mesh.

**607.5 Valves.** Pressurized tanks shall be provided with a listed pressure-relief valve installed in accordance with the manufacturer's installation instructions. The relief valve shall be discharged in accordance with Section 608.5. Where a potable water supply tank is located above the fixtures, appliances, or system components it serves, it shall be equipped with a vacuum relief valve that complies with CSA Z21.22.

### **608.0 Water Pressure, Pressure Regulators, Pressure Relief Valves, and Vacuum Relief Valves.**

**608.1 Inadequate Water Pressure.** Where the water pressure in the main or other source of supply will not provide a residual water pressure of not less than 15 pounds force per square inch (psi) (103 kPa), after allowing for friction and

other pressure losses, a tank and a pump or other means that will provide said 15 psi (103 kPa) pressure shall be installed. Where fixtures, fixture fittings, or both are installed that require residual pressure exceeding 15 psi (103 kPa), that minimum residual pressure shall be provided.

**608.2 Excessive Water Pressure.** Where static water pressure in the water supply piping is exceeding 80 psi (552 kPa), an approved-type pressure regulator preceded by an adequate strainer shall be installed and the static pressure reduced to 80 psi (552 kPa) or less. Pressure regulator(s) equal to or exceeding 1½ inches (40 mm) shall not require a strainer. Such regulator(s) shall control the pressure to water outlets in the building unless otherwise approved by the Authority Having Jurisdiction. Each such regulator and strainer shall be accessibly located aboveground or in a vault equipped with a properly sized and sloped boresighted drain to daylight, shall be protected from freezing, and shall have the strainer readily accessible for cleaning without removing the regulator or strainer body or disconnecting the supply piping.

Pipe size determinations shall be based on 80 percent of the reduced pressure where using Table 610.4.

An approved expansion tank shall be installed in the cold water distribution piping downstream of each such regulator to prevent excessive pressure from developing due to thermal expansion and to maintain the pressure setting of the regulator. Expansion tanks used in potable water systems intended to supply drinking water shall comply with NSF 61. The expansion tank shall be properly sized and installed in accordance with the manufacturer's installation instructions and listing. Systems designed by registered design professionals shall be permitted to use approved pressure relief valves in lieu of expansion tanks provided such relief valves have a maximum pressure relief setting of 100 psi (689 kPa) or less.

**608.3 Expansion Tanks, and Combination Temperature and Pressure-Relief Valves.** A water system provided with a check valve, backflow preventer, or other normally closed device that prevents dissipation of building pressure back into the water main, independent of the type of water heater used, shall be provided with an approved, listed, and adequately sized expansion tank or other approved device having a similar function to control thermal expansion. Such expansion tank or other approved device shall be installed on the building side of the check valve, backflow preventer, or other device and shall be sized and installed in accordance with the manufacturer's installation instructions.

A water system containing storage water heating equipment shall be provided with an approved, listed, adequately sized combination temperature and pressure-relief valve, except for listed nonstorage instantaneous heaters having an inside diameter of not more than 3 inches (80 mm). Each such approved combination temperature and pressure-relief valve shall be installed on the water-heating device in an approved location based on its listing requirements and the manufacturer's installation instructions. Each such combination temperature and pressure-relief valve shall be provided with a drain in accordance with Section 608.5.

**608.4 Pressure Relief Valves.** Each pressure relief valve shall be an approved automatic type with drain, and each such

relief valve shall be set at a pressure of not more than 150 psi (1034 kPa). No shutoff valve shall be installed between the relief valve and the system.

**608.5 Discharge Piping.** The discharge piping serving a temperature relief valve, pressure relief valve, or combination of both shall have no valves, obstructions, or means of isolation and be provided with the following:

- (1) Equal to the size of the valve outlet and shall discharge full size to the flood level of the area receiving the discharge and pointing down.
- (2) Materials shall be rated at not less than the operating temperature of the system and approved for such use or shall comply with ASME A112.4.1.
- (3) Discharge pipe shall discharge independently by gravity through an air gap into the drainage system or outside of the building with the end of the pipe not exceeding 2 feet (610 mm) and not less than 6 inches (152 mm) above the ground and pointing downwards.
- (4) Discharge in such a manner that does not cause personal injury or structural damage.
- (5) No part of such discharge pipe shall be trapped or subject to freezing.
- (6) The terminal end of the pipe shall not be threaded.
- (7) Discharge from a relief valve into a water heater pan shall be prohibited.

**608.6 Water-Heating Devices.** A water-heating device connected to a separate storage tank and having valves between said heater and tank shall be provided with an approved water pressure relief valve.

**608.7 Vacuum Relief Valves.** Where a hot-water storage tank or an indirect water heater is located at an elevation above the fixture outlets in the hot-water system, a vacuum relief valve that complies with CSA Z21.22 shall be installed on the storage tank or heater.

### 609.0 Installation, Testing, Unions, and Location.

**609.1 Installation.** Water piping shall be adequately supported in accordance with Table 313.3. Burred ends shall be reamed to the full bore of the pipe or tube. Changes in direction shall be made by the appropriate use of fittings, except that changes in direction in copper or copper alloy tubing shall be permitted to be made with bends, provided that such bends are made with bending equipment that does not deform or create a loss in the cross-sectional area of the tubing. Changes in direction are allowed with flexible pipe and tubing without fittings in accordance with the manufacturer's instructions. Provisions shall be made for expansion in hot-water piping. Piping, equipment, appurtenances, and devices shall be installed in a workmanlike manner in accordance with the provisions and intent of the code. Building supply yard piping shall be not less than 12 inches (305 mm) below the average local frost depth. The cover shall be not less than 12 inches (305 mm) below finish grade.

**609.2 Trenches.** Water pipes shall not be run or laid in the same trench as building sewer or drainage piping constructed of clay or materials that are not approved for use within a building unless both of the following conditions are met:

- (1) The bottom of the water pipe shall be not less than 12 inches (305 mm) above the top of the sewer or drain line.
- (2) The water pipe shall be placed on a solid shelf excavated at one side of the common trench with a clear horizontal distance of not less than 12 inches (305 mm) from the sewer or drain line.

Water pipes crossing sewer or drainage piping constructed of clay or materials that are not approved for use within a building shall be laid not less than 12 inches (305 mm) above the sewer or drain pipe.

**609.3 Under Concrete Slab.** Water piping installed within a building and in or under a concrete floor slab resting on the ground shall be installed in accordance with the following requirements:

- (1) Ferrous piping shall have a protective coating of an approved type; machine applied and in accordance with recognized standards. Field wrapping shall provide equivalent protection and shall be restricted to those short sections and fittings necessarily stripped for threading. Zinc coating (galvanizing) shall not be deemed adequate protection for piping or fittings. Approved nonferrous piping shall not be required to be wrapped.
- (2) Copper or copper alloy tubing shall be installed without joints where possible. Where joints are permitted, they shall be brazed, and fittings shall be wrought copper.

For the purpose of this section, "within a building" shall mean within the fixed limits of the building foundation.

**609.4 Testing.** Upon completion of a section or of the entire hot and cold water supply system, the system shall be tested with water or air. The potable water test pressure shall be greater than or equal to the working pressure under which the system is to be used. The air pressure shall be a minimum of 50 psi (345 kPa). Plastic pipe shall not be tested with air. The piping system shall withstand the test pressure without showing evidence of leakage for a period of not less than 15 minutes.

**Exception:** PEX, PP or PE-RT tube shall be permitted to be tested with air where permitted by the manufacturer's instructions.

**609.5 Unions.** Unions shall be installed in the water supply piping not more than 12 inches (305 mm) of regulating equipment, water heating, conditioning tanks, and similar equipment that requires service by removal or replacement in a manner that will facilitate its ready removal.

**609.6 Location.** Except as provided in Section 609.7, no building supply shall be located in a lot other than the lot that is the site of the building or structure served by such building supply.

**609.7 Abutting Lot.** Nothing contained in this code shall be construed to prohibit the use of an abutting lot to:

- (1) Provide access to connect a building supply to an available public water service where proper cause and legal easement not in violation of other requirements have been first established to the satisfaction of the Authority Having Jurisdiction.
- (2) Provide additional space for a building supply where the proper cause, transfer of ownership, or change of bound-



ary not in violation of other requirements have 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 an agreement shall be recorded in the office of the County Recorder as a part of the conditions of ownership of said properties, and shall be binding on heirs, successors, and assigns to such properties. A copy of the instrument recording such proceedings shall be filed with the Authority Having Jurisdiction.

**609.8 Low-Pressure Cutoff Required on Booster Pumps for Water Distribution Systems.** Where a booster pump (excluding a fire pump) is connected to a building supply or underground water pipe, a low-pressure cutoff switch on the inlet side of the pump shall be installed not more than 5 feet (1524 mm) of the inlet. The cutoff switch shall be set for not less than 10 psi (69 kPa). A pressure gauge shall be installed between the shutoff valve and the pump.

**609.9 Disinfection of Potable Water System.** New or repaired potable water systems shall be disinfected prior to use where required by the Authority Having Jurisdiction. **[OSHPD 1, 1R, 2, 3, 4 & 5]** *Prior to utilization of newly constructed or altered potable water piping systems, all affected potable water piping shall be disinfected using procedures prescribed in California Plumbing Code Sections 609.9(1) through 609.9(4).* The method to be followed shall be that prescribed by the Health Authority or, in case no method is prescribed by it, the following:

- (1) The pipe system shall be flushed with clean, potable water until potable water appears at the points of the outlet.
- (2) The system or parts thereof shall be filled with a water-chlorine solution containing not less than 50 parts per million of chlorine, and the system or part thereof shall be valved-off and allowed to stand for 24 hours; or, the system or part thereof shall be filled with a water-chlorine solution containing not less than 200 parts per million of chlorine and allowed to stand for 3 hours.
- (3) Following the allowed standing time, the system shall be flushed with clean, potable water until the chlorine residual in the water coming from the system does not exceed the chlorine residual in the flushing water.
- (4) The procedure shall be repeated where it is shown by a bacteriological examination made by an approved agency that contamination persists in the system.

**609.10 Water Hammer. [Not adopted by HCD]** Building water supply systems where quick-acting valves are installed shall be provided with water hammer arrester(s) to absorb high pressures resulting from the quick closing of these valves. Water hammer arresters shall be approved mechanical devices that comply with ASSE 1010 or PDI-WH 201 and shall be installed as close as possible to quick-acting valves.

**609.10.1 Mechanical Devices.** Where listed mechanical devices are used, the manufacturer's specifications as to location and method of installation shall be followed.

**609.11 Pipe Insulation.** Insulation of domestic hot water piping shall be in accordance with Section 609.11.1 and Section 609.11.2.

**609.11.1 Insulation Requirements.** Domestic hot water piping shall be insulated.

**609.11.2 Pipe Insulation Wall Thickness.** Hot water pipe insulation shall have a minimum wall thickness of not less than the diameter of the pipe for a pipe up to 2 inches (50 mm) in diameter. Insulation wall thickness shall be not less than 2 inches (51 mm) for a pipe of 2 inches (50 mm) or more in diameter.

**Exceptions:**

- (1) Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration.
- (2) Hot water piping between the fixture control valve or supply stop and the fixture or appliance shall not be required to be insulated.

**610.0 Size of Potable Water Piping.**

**610.1 Size.** The size of each water meter and each potable water supply pipe from the meter or other source of supply to the fixture supply branches, risers, fixtures, connections, outlets, or other uses shall be based on the total demand and shall be determined according to the methods and procedures outlined in this section. Water piping systems shall be designed to ensure that the maximum velocities allowed by the code and the applicable standard are not exceeded.

**610.2 Pressure Loss.** Where a water filter, water softener, backflow prevention device, tankless water heater, or similar device is installed in a water supply line, the pressure loss through such devices shall be included in the pressure loss calculations of the system, and the water supply pipe and meter shall be adequately sized to provide for such a pressure loss.

No water filter, water softener, backflow prevention device, or similar device regulated by this code shall be installed in a potable water supply piping where the installation of such device produces an excessive pressure drop in such water supply piping. In the absence of specific pressure drop information, the diameter of the inlet or outlet of such device or its connecting piping shall be not less than the diameter of such water distribution piping to the fixtures served by the device.

Such devices shall be of a type approved by the Authority Having Jurisdiction and shall be tested for flow rating and pressure loss by an approved laboratory or recognized testing agency to standards consistent with the intent of this chapter.

**610.3 Quantity of Water.** The quantity of water required to be supplied to every plumbing fixture shall be represented by fixture units, as shown in Table 610.3. Equivalent fixture values shown in Table 610.3 include both hot and cold water demand.

**610.4 Sizing Water Supply and Distribution Systems.** Systems within the range of Table 610.4 shall be permitted to be sized from that table or by the method in accordance with Section 610.5.

**TABLE 610.3  
WATER SUPPLY FIXTURE UNITS (WSFU) AND MINIMUM FIXTURE BRANCH PIPE SIZES<sup>3</sup>**

APPLIANCES, APPURTENANCES OR FIXTURES <sup>2</sup>	MINIMUM FIXTURE BRANCH PIPE SIZE <sup>1,4</sup> (inches)	PRIVATE	PUBLIC	ASSEMBLY <sup>6</sup>
Bathtub or Combination Bath/Shower (fill)	½	4.0	4.0	—
¾ inch Bathtub Fill Valve	¾	10.0	10.0	—
Bidet	½	1.0	—	—
Clothes Washer	½	4.0	4.0	—
Dental Unit, cuspidor	½	—	1.0	—
Dishwasher, domestic	½	1.5	1.5	—
Drinking Fountain or Water Cooler	½	0.5	0.5	0.75
Hose Bibb	½	2.5	2.5	—
Hose Bibb, each additional <sup>8</sup>	½	1.0	1.0	—
Lavatory	½	1.0	1.0	1.0
Lawn Sprinkler, each head <sup>5</sup>	—	1.0	1.0	—
Mobilehome or Manufactured Home, each (minimum) <sup>9</sup>	—	6.0	—	—
Sinks	—	—	—	—
Bar	½	1.0	2.0	—
Clinical Faucet	½	—	3.0	—
Clinical Flushometer Valve with or without faucet	1	—	8.0	—
Kitchen, domestic with or without dishwasher	½	1.5	1.5	—
Laundry	½	1.5	1.5	—
Service or Mop Basin	½	1.5	3.0	—
Washup, each set of faucets	½	—	2.0	—
Shower, per head	½	2.0	2.0	—
Urinal, 1.0 GPF Flushometer Valve	¾	See Footnote <sup>7</sup>		—
Urinal, greater than 1.0 GPF Flushometer Valve	¾	See Footnote <sup>7</sup>		—
Urinal, flush tank	½	2.0	2.0	3.0
Urinal, Hybrid	½	1.0	1.0	1.0
Wash Fountain, circular spray	¾	—	4.0	—
Water Closet, 1.6 GPF Gravity Tank	½	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Tank	½	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Valve	1	See Footnote <sup>7</sup>		—
Water Closet, greater than 1.6 GPF Gravity Tank	½	3.0	5.5	7.0
Water Closet, greater than 1.6 GPF Flushometer Valve	1	See Footnote <sup>7</sup>		—

For SI units: 1 inch = 25 mm

**Notes:**

- <sup>1</sup> Size of the cold branch pipe, or both the hot and cold branch pipes.
- <sup>2</sup> Appliances, appurtenances, or fixtures not referenced in this table shall be permitted to be sized by reference to fixtures having a similar flow rate and frequency of use.
- <sup>3</sup> The listed fixture unit values represent their load on the cold water building supply. The separate cold water and hot water fixture unit value for fixtures having both hot and cold water connections shall be permitted to be each taken as three-quarter of the listed total value of the fixture.
- <sup>4</sup> The listed minimum supply branch pipe sizes for individual fixtures are the nominal (I.D.) pipe size.
- <sup>5</sup> For fixtures or supply connections likely to impose continuous flow demands, determine the required flow in gallons per minute (gpm) (L/s), and add it separately to the demand in gpm (L/s) for the distribution system or portions thereof.
- <sup>6</sup> Assembly [Public Use (See Table 422.1)].
- <sup>7</sup> Where sizing flushometer systems, see Section 610.10.
- <sup>8</sup> Reduced fixture unit loading for additional hose bibbs is to be used where sizing total building demand and for pipe sizing where more than one hose bibb is supplied by a segment of water distribution pipe. The fixture branch to each hose bibb shall be sized on the basis of 2.5 fixture units.
- <sup>9</sup> For water supply fixture unit values related to lots within 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 lots within 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.

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

**613.1** The domestic water-heating equipment and distribution systems shall supply water at the temperature and amounts shown in Table 613.1. Where the system is designed by a mechanical engineer, appropriate diversity factors may be utilized.

**TABLE 613.1  
[OSHPD 1, 1R, 2, 3, 4 & 5] HOT WATER USE**

	CLINICAL	DIETARY <sup>1</sup>	LAUNDRY <sup>2</sup>
Liter/Hour/Bed	11.9	7.2	7.6
Gallons/Hour/Bed	3	2	2
Temperature °C	41-49.0	49.0	71.0
Temperature °F	105-120.0	120.0	160.0

<sup>1</sup> Rinse water temperature at automatic dishwashing equipment and pot sinks shall be 180°F (82°C).

**Exception:** The rinse water supply to pot rinse sinks may be deleted if a method of chemical disinfection using a three-compartment sink is proposed.

<sup>2</sup> The required temperature of 160°F (71°C) in the laundry is that measure in the washing machine and shall be supplied so that the temperature may be maintained over the entire wash and rinse period.

**Exception:** A lower water temperature of 140°F (60°C) may be utilized, provided linens are subsequently passed through a tumbler dryer at 180°F (82°C) or a flatwork ironer at 300°F (149°C).

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

**613.3** Instantaneous heaters are permitted for supplying hot water to handwashing and bathing fixtures if a continuous mechanical recirculation system is also provided.

**613.4** Water storage tanks shall be fabricated of corrosion-resistant materials or lined with corrosion-resistant materials.

**613.5** Temperature control valves shall be provided to automatically regulate the temperature of hot water delivered to plumbing fixtures used by patients to a range of 105°F (41°C) minimum to 120°F (49°C) maximum. High temperature alarm set at 125°F (52°C) shall be provided. The audible/visual device for the high temperature alarm shall announce at a continuously occupied location.

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

**613.7** At fixtures where water exceeding 125°F (52°C) is accessible to patients or personnel, warning signs in letters at least 2 inches (51 mm) high shall be posted above the fixtures.

**613.8** Sectionalizing valves shall be provided as required by Section 606.8.

**614.0 Dialysis Water-Distribution Systems.**

**614.1 [OSHPD 1, 1R, 2, 3, 4 & 5]** Dialysis water feedlines shall be PVC (polyvinyl chloride), glass, stainless steel, or PVDF (polyvinylidene fluoride) and sized to provide a minimum velocity of 1.5 feet per second (0.46 m/s). The piping shall be a singleloop system with or without recirculation. Branches to dialysis machines shall be ¼ inch (6.4 mm) inside dimension and take off from the bottom of the main feedline. Branch lines may be PFA (perfluoroalkoxy).

**614.2** All piping for multistation or central dialysis units shall be rigid where possible. All piping and tubing shall be in a neat arrangement. The placement of piping or tubing on the floor is not permitted.

**614.3** All valves shall be located in accessible locations.

**614.4** Piping and valves shall be identified according to their function.

**614.5** A means of preventing backwashing or flushing of the system when one or more stations are in operation shall be provided.

**614.6** A continuous audible alarm shall sound at the nurses' station and remote equipment rooms when the minimum velocity is not maintained, or if backwashing or flushing is attempted while one or more stations are in operation.

**614.7** Water used for dialysis treatment shall meet the latest edition of ANSI/American Association of Medical Instrumentations (AAMI) RD62, Water treatment equipment for hemodialysis applications.

**614.8** A diagram of all piping as installed shall be posted at the nurses' station and equipment room of all multistation or central dialysis units.

**615.0 Identification of Potable and Nonpotable Water Lines.**

**615.1 Uses Not Permitted.**

**615.1.1 [OSHPD 1, 1R, 2, 3, 4 & 5]** Nonpotable water shall not be piped for drinking, washing or bathing, washing of clothing, cooking, washing of food, washing of cooking or eating utensils, washing of food preparation or processing premises, or other personal service rooms.

**615.2 [OSHPD 1, 1R, 2, 3, 4 & 5]** Non-potable water systems or systems carrying any other non-potable substance shall be installed so as to prevent backflow or back-siphonage into a potable water system.

**615.3 [OSHPD 1, 1R, 2, 3, 4 & 5]** Outlets for non-potable water, such as water for industrial or fire-fighting purposes, shall be posted in a manner understandable to all employees to indicate that the water is unsafe and shall not be used for drinking, washing, cooking or other personal service purposes.

**615.4 [OSHPD 1] Emergency Water Supply.**

**615.4.1** *For new acute care hospital buildings submitted after the effective date of this code, the hospital shall have an on-site water supply sufficient to operate essential hospital utilities and equipment in the acute care hospital building, to support 72 hours of continuing operation in the event of an emergency. Any general acute care hospital in operation after January 1, 2030 shall have an on-site water supply sufficient to operate essential hospital utilities and equipment in the acute care hospital buildings on the campus with an SPC-3, SPC-4, or SPC-5 rating, to support 72 hours of continuing operation in the event of an emergency. See also California Building Code, Part 2, Section 1616A.1.42.*

*The emergency water storage capacity shall be computed based on an approved Water Conservation/Water Rationing Plan to provide for 72 hours of operation, accepted by the licensing agency. For acute care hospital facilities or buildings required to meet NPC-5, on-site water supply of not less than 150 gallons [567.9 L] [based on 50 gallons/day/bed for 72 hours] of potable water per licensed bed shall be provided. In no event shall the campus on-site water storage capacity be less than one tank with at least 5,000 gallons capacity.*

*The emergency supply shall have fittings to allow for replenishment of the water supply from transportable water sources and a means to dispense water to portable containers in the event that normal water supply becomes unavailable.*

**Exception:** *With the approval of the Office and the licensing agency, hook-ups that allow for the use of transportable sources of potable water may be provided in lieu of 72 hours of on-site storage if a minimum onsite water supply of potable and industrial water is provided, sufficient to support 24 hours of operation, without replenishment based on the hospital's approved Water Conservation/Water Rationing plan. In no event shall the on-site water storage capacity be less than one tank with at least 5,000 gallons capacity. This emergency supply tank shall have fittings to allow for replenishment of the water supply from transportable water sources and a means to dispense water to portable containers in the event that normal water supply becomes unavailable.*

**615.4.2** *The emergency supply of water shall be provided at adequate pressure using gravity, pressure tanks, or booster pumps. Pumps used for this purpose shall be provided with electrical power from the on-site emergency power supply system.*

**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE  
CHAPTER 7 - SANITARY DRAINAGE**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4								
Adopt Entire Chapter	<b>X</b>									<b>X</b>												
Adopt Entire Chapter as amended (amended sections listed below)				<b>X</b>	<b>X</b>			<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>					
Adopt only those sections that are listed below																						
Chapter/Section																						
701.2(2)								<b>X</b>	<b>X</b>													
701.2(2) (a)				<b>X</b>	<b>X</b>																	
701.2(2) (b)										<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>							
Table 702.1		<b>X</b>		<b>X</b>	<b>X</b>																	
705.1.2				<b>X</b>	<b>X</b>																	
705.6.2				<b>X</b>	<b>X</b>																	
705.9.4				<b>X</b>	<b>X</b>																	
710.3				<b>X</b>	<b>X</b>																	
713.4				<b>X</b>																		
717.2																						<b>X</b>
724.0 - 724.2																						<b>X</b>
725.0																						<b>X</b>
726.0 - 726.2																						<b>X</b>
727.0 - 727.1(a) (b)										<b>X</b>												

*This state agency does not adopt sections identified with the following symbol: †*

*The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.0.*



# CHAPTER 7

## SANITARY DRAINAGE

### Part I – Drainage Systems.

#### 701.0 General.

**701.1 Applicability.** This chapter shall govern the materials, design, and installation of sanitary drainage systems and building sewers.

**701.2 Drainage Piping.** Materials for drainage piping shall be in accordance with one of the referenced standards in Table 701.2 except that:

- (1) No galvanized wrought-iron or galvanized steel pipe shall be used underground and shall be kept not less than 6 inches (152 mm) aboveground.
- (2) ABS and PVC DWV piping installations shall be installed in accordance with applicable standards referenced in Table 701.2 and *the firestop protection requirements in the California Building Code*. Except for individual single-family dwelling units, materials exposed within ducts or plenums shall have a flame-spread index of not more than 25 and a smoke-developed index of not more than 50, where tested in accordance with ASTM E84 or UL 723. These tests shall comply with all requirements of the standards to include the sample size, both for width and length. Plastic pipe shall not be tested filled with water.
  - (a) **[HCD 1 & HCD 2]** ABS and PVC installations are limited to not more than two stories of areas of residential accommodation.
  - (b) **[OSHPD 1, 2, 3, 4 & 5]** ABS and PVC installations are not allowed.
- (3) No vitrified clay pipe or fittings shall be used aboveground or where pressurized by a pump or ejector. They shall be kept not less than 12 inches (305 mm) belowground.
- (4) Copper or copper alloy tube for drainage and vent piping shall have a weight of not less than that of copper or copper alloy drainage tube type DWV.
- (5) Stainless steel 304 pipe and fittings shall not be installed underground and shall be kept not less than 6 inches (152 mm) aboveground.
- (6) Cast-iron soil pipe and fittings and the stainless steel couplings used to join these products shall be listed and tested in accordance with standards referenced in Table 701.2. Such pipe and fittings shall be marked with the country of origin, manufacturer's name or registered trademark as defined in the product standards, the third party certifier's mark, and the class of the pipe or fitting.

**701.3 Drainage Fittings.** Materials for drainage fittings shall comply with the applicable standards referenced in Table 701.2 of the same diameter as the piping served, and such fittings shall be compatible with the type of pipe used.

**701.3.1 Screwed Pipe.** Fittings on screwed pipe shall be of the recessed drainage type. Burred ends shall be reamed to the full bore of the pipe.

**701.3.2 Threads.** The threads of drainage fittings shall be tapped to allow ¼ inch per foot (20.8 mm/m) grade.

**701.3.3 Type.** Fittings used for drainage shall be of the drainage type, have a smooth interior water-way, and be constructed to allow ¼ inch per foot (20.8 mm/m) grade.

**701.4 Continuous Wastes.** Continuous wastes and fixture tailpieces shall be constructed from the materials specified in Section 701.2 for drainage piping, provided, however, that such connections where exposed or accessible shall be permitted to be of seamless drawn brass not less than No. 20 B & S Gauge (0.032 inches) (0.8 mm).

**701.5 Lead.** (See Table 1701.1) Sheet lead shall comply with the following:

- (1) For safe pans – not less than 4 pounds per square foot (lb/ft<sup>2</sup>) (19 kg/m<sup>2</sup>) or ¼<sup>16</sup> of an inch (1.6 mm) thick.
- (2) For flashings or vent terminals – not less than 3 lb/ft<sup>2</sup> (15 kg/m<sup>2</sup>) or 0.0472 of an inch (1.2 mm) thick.
- (3) Lead bends and lead traps shall be not less than ¼ of an inch (3.2 mm) in wall thickness.

**701.6 Caulking Ferrules.** Caulking ferrules shall be manufactured from copper or copper alloy and shall be in accordance with Table 701.6.

**701.7 Soldering Bushings.** Soldering bushings shall be of copper or copper alloy and shall be in accordance with Table 701.7.

**TABLE 701.6  
CAULKING FERRULES**

PIPE SIZE (inches)	INSIDE DIAMETER (inches)	LENGTH (inches)	MINIMUM WEIGHT EACH	
			pounds	ounces
2	2¼	4½	1	0
3	3¼	4½	1	12
4	4¼	4½	2	8

For SI units: 1 inch = 25 mm, 1 pound = 0.453 kg, 1 ounce = 0.02834 kg

**TABLE 701.7  
SOLDERING BUSHINGS**

PIPE SIZE (inches)	MINIMUM WEIGHT EACH		PIPE SIZE (inches)	MINIMUM WEIGHT EACH	
	pounds	ounces		pounds	ounces
1¼	0	6	2½	1	6
1½	0	8	3	2	0
2	0	14	4	3	8

For SI units: 1 inch = 25 mm, 1 pound = 0.453 kg, 1 ounce = 0.02834 kg

#### 702.0 Fixture Unit Equivalents.

**702.1 Trap Size.** The unit equivalent of plumbing fixtures shown in Table 702.1 shall be based on the size of the trap required, and the unit equivalent of fixtures and devices not shown in Table 702.1 shall be based on the size of trap or trap arm.

**SANITARY DRAINAGE**

**TABLE 701.2  
MATERIALS FOR DRAIN, WASTE, VENT PIPE AND FITTINGS**

<b>MATERIAL</b>	<b>UNDERGROUND DRAIN, WASTE, VENT PIPE AND FITTINGS</b>	<b>ABOVEGROUND DRAIN, WASTE, VENT PIPE AND FITTINGS</b>	<b>BUILDING SEWER PIPE AND FITTINGS</b>	<b>REFERENCED STAN- DARD(S) PIPE</b>	<b>REFERENCED STANDARD(S) FITTINGS</b>
ABS (Schedule 40)	X	X	X	ASTM D2661, ASTM D2680*	ASTM D2661, ASTM D2680*
Cast-Iron	X	X	X	ASTM A74, ASTM A888, CISPI 301	ASME B16.12, ASTM A74, ASTM A888, CISPI 301
Co-Extruded ABS (Schedule 40)	X	X	X	ASTM F628	ASTM D2661, ASTM D2680*
Co-Extruded Composite (Schedule 40)	X	X	X	ASTM F1488	ASTM D2661, ASTM D2665, ASTM F794*, ASTM F1866
Co-Extruded PVC (Schedule 40)	X	X	X	ASTM F891, ASTM F1760	ASTM D2665, ASTM F794*, ASTM F1336*, ASTM F1866
Copper and Copper Alloys (Type DWV)	X	X	X	ASTM B43, ASTM B75, ASTM B251, ASTM B302, ASTM B306	ASME B16.23, ASME B16.29
Galvanized Malleable Iron	—	X	—	—	ASME B16.3
Galvanized Steel	—	X	—	ASTM A53	—
Polyethylene	—	—	X	ASTM F714, ASTM F894	—
PVC (Schedule 40)	X	X	X	ASTM D1785, ASTM D2665, ASTM F794*	ASTM D2665, ASTM F794*, ASTM F1866
PVC (Sewer and Drain)	—	—	X	ASTM D2729	ASTM D2729
PVC PSM	—	—	X	ASTM D3034	ASTM D3034
Stainless Steel 304	—	X	—	ASME A112.3.1	ASME A112.3.1
Stainless Steel 316L	X	X	X	ASME A112.3.1	ASME A112.3.1
Vitrified Clay (Extra strength)	—	—	X	ASTM C700	ASTM C700

\* For building sewer applications.



**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE  
CHAPTER 9 - VENTS**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4								
Adopt Entire Chapter	X										X											
Adopt Entire Chapter as amended (amended sections listed below)				X	X			X	X	X		X	X	X	X							
Adopt only those sections that are listed below																						
Chapter/Section																						
903.1(2)				X				X	X													
903.1.1				X	X																	
903.1.2				X																		
903.1.3											X		X	X	X	X						
906.2.1											X	X	X	X	X	X						

*This state agency does not adopt sections identified with the following symbol: †  
The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.0.*



# CHAPTER 9

## VENTS

### 901.0 General.

**901.1 Applicability.** This chapter shall govern the materials, design, and installation of plumbing vent systems.

**901.2 Vents Required.** Each plumbing fixture trap, except as otherwise provided in this code, shall be protected against siphonage and backpressure, and air circulation shall be ensured throughout all parts of the drainage system by means of vent pipes installed in accordance with the requirements of this chapter and as otherwise required by this code.

**901.3 Trap Seal Protection.** The vent system shall be designed to prevent a trap seal from being exposed to a pressure differential that exceeds 1 inch water column (0.24 kPa) on the outlet side of the trap.

### 902.0 Vents Not Required.

**902.1 Interceptor.** Vent piping shall be permitted to be omitted on an interceptor where such interceptor acts as a primary settling tank and discharges through a horizontal indirect waste pipe into a secondary interceptor. The second interceptor shall be properly trapped and vented.

**902.2 Bars, Soda Fountains, and Counter.** Traps serving sinks that are part of the equipment of bars, soda fountains, and counters need not be vented where the location and construction of such bars, soda fountains, and counters are such as to make it impossible to do so. Where such conditions exist, said sinks shall discharge using approved indirect waste pipes into a floor sink or other approved type of receptor.

### 903.0 Materials.

**903.1 Applicable Standards.** Vent pipe and fittings shall comply with the applicable standards referenced in Table 701.2, except that:

- (1) No galvanized steel or 304 stainless steel pipe shall be installed underground and shall be not less than 6 inches (152 mm) aboveground.
- (2) ABS and PVC DWV piping installations shall be in accordance with *the firestop protection requirements in the California Building Code*. Except for individual single-family dwelling units, materials exposed within ducts or plenums shall have a flame-spread index of not more than 25 and a smoke-developed index of not more than 50 where tested in accordance with ASTM E84 or UL 723. These tests shall comply with all requirements of the standards to include the sample size, both for width and length. Plastic pipe shall not be tested filled with water.

**903.1.1 [HCD 1 & HCD 2]** *ABS or PVC installations are limited to not more than two stories of areas of residential accommodation.*

**903.1.2 [HCD 1]** *All malleable iron vents shall be galvanized.*

**903.1.3 [OSHPD 1, 2, 3, 4 & 5]** *ABS and PVC installations are not allowed.*

**903.2 Use of Copper or Copper Alloy Tubing.** Copper or copper alloy tube for underground drainage and vent piping shall have a weight of not less than that of copper or copper alloy drainage tube type DWV.

**903.2.1 Aboveground.** Copper or copper alloy tube for aboveground drainage and vent piping shall have a weight of not less than that of copper or copper alloy drainage tube type DWV.

**903.2.2 Prohibited Use.** Copper or copper alloy tube shall not be used for chemical or industrial wastes as defined in Section 811.0.

**903.2.3 Marking.** Copper or copper alloy tubing, in addition to the required incised marking, shall be marked in accordance with either ASTM B306 or ASTM B88. The colors shall be Type K, green; Type L, blue; Type M, red; and Type DWV, yellow.

**903.3 Changes in Direction.** Changes in the direction of vent piping shall be made by the appropriate use of approved fittings, and no such pipe shall be strained or bent. Burred ends shall be reamed to the full bore of the pipe.

### 904.0 Size of Vents.

**904.1 Size.** The size of vent piping shall be determined from its length and the total number of fixture units connected thereto, in accordance with Table 703.2. The diameter of an individual vent shall be not less than 1¼ inches (32 mm) nor less than one-half the diameter of the drain to which it is connected. In addition, the drainage piping of each building and each connection to a public sewer or a private sewage disposal system shall be vented by means of one or more vent pipes, the aggregate cross-sectional area of which shall be not less than that of the largest required building sewer as determined from Table 703.2. Vent pipes from fixtures located upstream from pumps, ejectors, backwater valves, or other devices that obstruct the free flow of air and other gases between the building sewer and the outside atmosphere shall not be used for meeting the cross-sectional area venting requirements of this section.

**Exception:** Where connected to a common building sewer, the drainage piping of two or more buildings located on the same lot and under one ownership shall be permitted to be vented by means of piping sized in accordance with Table 703.2, provided the aggregate cross-sectional area of vents is not less than that of the largest required common building sewer.

**904.2 Length.** Not more than one-third of the total permitted length, in accordance with Table 703.2, of a minimum-sized vent shall be installed in a horizontal position.

**Exception:** Where a minimum-sized vent is increased one pipe size for its entire length, the maximum length limitation shall not apply.

**905.0 Vent Pipe Grades and Connections.**

**905.1 Grade.** Vent and branch vent pipes shall be free from drops or sags, and each such vent shall be level or shall be so graded and connected as to drip back by gravity to the drainage pipe it serves.

**905.2 Horizontal Drainage Pipe.** Where vents connect to a horizontal drainage pipe, each vent pipe shall have its invert taken off above the drainage centerline of such pipe downstream of the trap being served.

**905.3 Vent Pipe Rise.** Unless prohibited by structural conditions, each vent shall rise vertically to a point not less than 6 inches (152 mm) above the flood-level rim of the fixture served before offsetting horizontally, and where two or more vent pipes converge, each such vent pipe shall rise to a point not less than 6 inches (152 mm) in height above the flood-level rim of the plumbing fixture it serves before being connected to any other vent. Vents less than 6 inches (152 mm) above the flood-level rim of the fixture shall be installed with approved drainage fittings, material, and grade to the drain.

**905.4 Roof Termination.** Vent pipes shall extend undiminished in size above the roof, or shall be reconnected with soil or waste vent of the proper size.

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

**905.6 Common Vertical Pipe.** Two fixtures shall be permitted to be served by a common vertical pipe where each such fixture wastes separately into an approved double fitting having inlet openings at the same level.

**906.0 Vent Termination.**

**906.1 Roof Termination.** Each vent pipe or stack shall extend through its flashing and shall terminate vertically not less than 6 inches (152 mm) above the roof nor less than 1 foot (305 mm) from a vertical surface. ABS and PVC piping exposed to sunlight shall be protected by water based synthetic latex paints.

**906.2 Clearance.** Each vent shall terminate not less than 10 feet (3048 mm) from, or not less than 3 feet (914 mm) above, an openable window, door, opening, air intake, or vent shaft, or not less than 3 feet (914 mm) in every direction from a lot line, alley and street excepted.

|| **906.2.1 [OSHPD 1,1R, 2, 3, 4 & 5]** *Each vent pipe shall terminate not less than twenty-five (25) feet (7620 mm) from any air intake or vent shaft.*

**906.3 Use of Roof.** Vent pipes shall be extended separately or combined, of full required size, not less than 6 inches (152 mm) above the roof or firewall. Flagpoling of vents shall be prohibited except where the roof is used for assembly purposes or parking. Vents within 10 feet (3048 mm) of a part of the roof that is used for assembly purposes or parking shall extend not less than 7 feet (2134 mm) above such roof and shall securely stay.

**906.4 Outdoor Installations.** Vent pipes for outdoor installations shall extend not less than 10 feet (3048 mm) above the surrounding ground and shall be securely supported.

**906.5 Joints.** Joints at the roof around vent pipes shall be made watertight by the use of approved flashings or flashing material.

**906.6 Lead.** (See Table 1701.1) Sheet lead shall comply with the following:

- (1) For safe pans – not less than 4 pounds per square foot (lb/ft<sup>2</sup>) (19 kg/m<sup>2</sup>) or 1/16 of an inch (1.6 mm) thick.
- (2) For flashings or vent terminals – not less than 3 lb/ft<sup>2</sup> (15 kg/m<sup>2</sup>) or 0.0472 of an inch (1.2 mm) thick.
- (3) Lead bends and lead traps shall be not less than 1/8 of an inch (3.2 mm) in wall thickness.

**906.7 Frost or Snow Closure.** Where frost or snow closure is likely to occur in locations having minimum design temperature below 0°F (-17.8°C), vent terminals shall be not less than 2 inches (50 mm) in diameter, but in no event smaller than the required vent pipe. The change in diameter shall be made inside the building not less than 1 foot (305 mm) below the roof in an insulated space and terminate not less than 10 inches (254 mm) above the roof, or in accordance with the Authority Having Jurisdiction.

**907.0 Vent Stacks and Relief Vents.**

**907.1 Drainage Stack.** Each drainage stack that extends 10 or more stories shall be served by a parallel vent stack, which shall extend undiminished in size from its upper terminal and connect to the drainage stack at or immediately below the lowest fixture drain. Each such vent stack shall also be connected to the drainage stack at each fifth floor, counting down from the uppermost fixture drain, using a yoke vent, the size of which shall be not less in diameter than either the drainage or the vent stack, whichever is smaller.

**907.2 Yoke Vent.** The yoke vent connection to the vent stack shall be placed not less than 42 inches (1067 mm) above the floor level, and the yoke vent connection to the drainage stack shall be using a wye-branch fitting placed below the lowest drainage branch connection serving that floor.

**908.0 Wet Venting.**

**908.1 Vertical Wet Venting.** Wet venting is limited to vertical drainage piping receiving the discharge from the trap arm of one and two fixture unit fixtures that also serves as a vent not exceeding four fixtures. Wet-vented fixtures shall be within the same story; provided, further, that fixtures with a continuous vent discharging into a wet vent shall be within the same story as the wet-vented fixtures. No wet vent shall exceed 6 feet (1829 mm) in developed length.

**908.1.1 Size.** The vertical piping between two consecutive inlet levels shall be considered a wet-vented section. Each wet-vented section shall be not less than one pipe size exceeding the required minimum waste pipe size of the upper fixture or shall be one pipe size exceeding the required minimum pipe size for the sum of the fixture units served by such wet-vented section, whichever is larger, but in no case less than 2 inches (50 mm) in diameter.

**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE  
CHAPTER 11 - STORM DRAINAGE**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4								
Adopt Entire Chapter											X											
Adopt Entire Chapter as amended (amended sections listed below)	X			X	X			X	X	X		X	X	X	X							
Adopt only those sections that are listed below																						
Chapter/Section																						
1101.4	X			X				X	X	X		X	X	X	X							
1101.4.2.1				X																		
1101.4.2.2										X		X	X	X	X							
1101.6 Exception				X	X																	

*This state agency does not adopt sections identified with the following symbol: †*

*The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.0.*



# CHAPTER 11

## STORM DRAINAGE

### 1101.0 General.

**1101.1 Applicability.** This chapter shall govern the materials, design, and installation of storm water drainage systems.

**1101.2 Where Required.** Roofs, paved areas, yards, courts, courtyards, vent shafts, light wells, or similar areas having rainwater, shall be drained into a separate storm sewer system, or into a combined sewer system where a separate storm sewer system is not available, or to some other place of disposal satisfactory to the Authority Having Jurisdiction. In the case of one- and two-family dwellings, storm water shall be permitted to be discharged on flat areas, such as streets or lawns, so long as the storm water shall flow away from the building and away from adjoining property, and shall not create a nuisance.

**1101.3 Storm Water Drainage to Sanitary Sewer Prohibited.** Storm water shall not be drained into sewers intended for sanitary drainage.

**1101.4 Material Uses.** Pipe, tube, and fittings conveying rainwater shall be of such materials and design as to perform their intended function to the satisfaction of the Authority Having Jurisdiction. Conductors within a vent or shaft shall be of cast-iron, galvanized steel, wrought iron, copper, copper alloy, lead, Schedule 40 ABS DWV, Schedule 40 PVC DWV, stainless steel 304 or 316L [stainless steel 304 pipe and fittings shall not be installed underground and shall be kept not less than 6 inches (152 mm) aboveground], or other approved materials, and changes in direction shall be in accordance with the requirements of Section 706.0. ABS and PVC DWV piping installations shall be installed in accordance with applicable standards referenced in Table 1701.1 and the firestop protection requirements in the California Building Code. Except for individual single-family dwelling units, materials exposed within ducts or plenums shall have a flame-spread index of not more than 25 and a smoke-developed index of not more than 50, where tested in accordance with ASTM E84 or UL 723. These tests shall comply with all requirements of the standards to include the sample size, both for width and length. Plastic pipe shall not be tested filled with water.

*[HCD 1 & HCD 2] ABS or PVC installations are limited to not more than two stories of areas of residential accommodation.*

*|| [OSHPD 1, 2, 3, 4 & 5] ABS and PVC installations are not allowed.*

**1101.4.1 Copper and Copper Alloys.** Joints and connections in copper and copper alloy pipe and tube shall be installed in accordance with Section 705.3.

**1101.4.2 Conductors.** Conductors installed aboveground in buildings shall comply with the applicable standards referenced in Table 701.2 for aboveground drain, waste, and vent pipe. Conductors installed aboveground level shall be of seamless copper water tube,

Type K, L, or M; Schedule 40 copper pipe or Schedule 40 copper alloy pipe; Type DWV copper drainage tube; service weight cast-iron soil pipe or hubless cast-iron soil pipe; standard weight galvanized steel pipe; stainless steel 304 or 316L [stainless steel 304 pipe and fittings shall not be installed underground and shall be kept not less than 6 inches (152 mm) aboveground], or Schedule 40 ABS or Schedule 40 PVC plastic pipe.

*1101.4.2.1 [HCD 1] ABS or PVC installations are limited to not more than two stories of areas of residential accommodation.*

*1101.4.2.2 [OSHPD 1, 2, 3, 4 & 5] ABS and PVC || installations are not allowed.*

**1101.4.3 Leaders.** Leaders installed outside shall comply with the applicable standards referenced in Table 701.2 for aboveground drain, waste, and vent pipe; aluminum sheet metal; galvanized steel sheet metal; or copper sheet metal.

**1101.4.4 Underground Building Storm Drains.** Underground building storm drains shall comply with the applicable standards referenced in Table 701.2 for underground drain, waste, and vent pipe.

**1101.4.5 Building Storm Sewers.** Building storm sewers shall comply with the applicable standards referenced in Table 701.2 for building sewer pipe.

**1101.4.6 Subsoil Drains.** Subsoil drains shall be open jointed, perforated, or both and constructed of materials in conformance with Table 1101.4.6.

**TABLE 1101.4.6  
MATERIALS FOR SUBSOIL DRAIN PIPE AND FITTINGS**

MATERIAL	REFERENCED STANDARD(S)
PE	ASTM F667
PVC	ASTM D2729
Vitrified Clay (Extra strength)	ASTM C4, ASTM C700

**1101.5 Expansion Joints Required.** Expansion joints or sleeves shall be provided where warranted by temperature variations or physical conditions.

**1101.6 Subsoil Drains.** Subsoil drains shall be provided around the perimeter of buildings having basements, cellars, crawl spaces, or floors below grade. Such subsoil drains shall be permitted to be positioned inside or outside of the footing, shall be of perforated or open-jointed approved drain tile or pipe, not less than 3 inches (80 mm) in diameter, and shall be laid in gravel, slag, crushed rock, approved ¾ of an inch (19.1 mm) crushed, recycled glass aggregate, or other approved porous material with not less than 4 inches (102 mm) surrounding the pipe. Filter media shall be provided for exterior subsoil piping.

**Exception: [HCD 1 & HCD 2]** *Subsoil drains are mandatory only when required by the Authority Having Jurisdiction due to geological conditions.*

**1101.6.1 Discharge.** Subsoil drains shall be piped to a storm drain, to an approved water course, to the front street curb or gutter, to an alley, or the discharge from the subsoil drains shall be conveyed to the alley by a concrete gutter. Where a continuously flowing spring or groundwater is encountered, subsoil drains shall be piped to a storm drain or an approved water course.

**1101.6.2 Sump.** Where it is not possible to convey the drainage by gravity, subsoil drains shall discharge to an accessible sump provided with an approved automatic electric pump. The sump shall be not less than 15 inches (381 mm) in diameter, 18 inches (457 mm) in depth, and provided with a fitted cover. The sump pump shall have an adequate capacity to discharge water coming into the sump as it accumulates to the required discharge point, and the capacity of the pump shall be not less than 15 gallons per minute (gpm) (0.95 L/s). The discharge piping from the sump pump shall be not less than 1½ inches (40 mm) in diameter and have a union or other approved quick-disconnect assembly to make the pump accessible for servicing.

**1101.6.3 Splash Blocks.** For separate dwellings not serving continuously flowing springs or groundwater, the sump discharge pipe shall be permitted to discharge onto a concrete splash block with a minimum length of 24 inches (610 mm). This pipe shall be within 4 inches (102 mm) of the splash block and positioned to direct the flow parallel to the recessed line of the splash block.

**1101.6.4 Backwater Valve.** Subsoil drains subject to backflow where discharging into a storm drain shall be provided with a backwater valve in the drain line so located as to be accessible for inspection and maintenance.

**1101.6.5 Open Area.** Nothing in Section 1101.6 shall prevent drains that serve either subsoil drains or areaways of a detached building from discharging to a properly graded open area, provided that:

- (1) They do not serve continuously flowing springs or groundwater.
- (2) The point of discharge is not less than 10 feet (3048 mm) from a property line.
- (3) It is impracticable to discharge such drains to a storm drain, to an approved water course, to the front street curb or gutter, or to an alley.

**1101.7 Building Subdrains.** Building subdrains located below the public sewer level shall discharge into a sump or receiving tank, the contents of which shall be automatically lifted and discharged into the drainage system as required for building sumps.

**1101.8 Areaway Drains.** Open subsurface space adjacent to a building, serving as an entrance to the basement or cellar of a building, shall be provided with a drain or drains. The areaway drains shall be not less than 2 inches (50 mm) in diameter for areaways at a maximum of 100 square feet (9.29

m<sup>2</sup>) in area, and shall be discharged in the manner provided for subsoil drains not serving continuously flowing springs or groundwater (see Section 1101.6.1). Areaways exceeding 100 square feet (9.29 m<sup>2</sup>) shall not drain into subsoil drains. The drains for areaways exceeding 100 square feet (9.29 m<sup>2</sup>) shall be sized in accordance with Table 1103.2.

**1101.9 Window Areaway Drains.** Window areaways at a maximum of 10 square feet (0.93 m<sup>2</sup>) in area shall be permitted to discharge to the subsoil drains through a 2 inch (50 mm) diameter pipe. However, window areaways exceeding 10 square feet (0.93 m<sup>2</sup>) in area shall be handled in the manner provided for entrance areaways (see Section 1101.8).

**1101.10 Filling Stations and Motor Vehicle Washing Establishments.** Public filling stations and motor vehicle washing establishments shall have the paved area sloped toward sumps or gratings within the property lines. Curbs not less than 6 inches (152 mm) high shall be placed where required to direct water to gratings or sumps.

**1101.11 Paved Areas.** Where the occupant creates surface water drainage, the sumps, gratings, or floor drains shall be piped to a storm drain or an approved water course.

**1101.12 Roof Drainage.** Roof drainage shall comply with Section 1101.12.1 and Section 1101.12.2.

**1101.12.1 Primary Roof Drainage.** Roof areas of a building shall be drained by roof drains or gutters. The location and sizing of drains and gutters shall be coordinated with the structural design and pitch of the roof. Unless otherwise required by the Authority Having Jurisdiction, roof drains, gutters, vertical conductors or leaders, and horizontal storm drains for primary drainage shall be sized based on a storm of 60 minutes duration and 100 year return period. Refer to Table D 101.1 (in Appendix D) for 100 years, 60-minute storms at various locations.

**1101.12.2 Secondary Drainage.** Secondary (emergency) roof drainage shall be provided by one of the methods specified in Section 1101.12.2.1 or Section 1101.12.2.2.

**1101.12.2.1 Roof Scuppers or Open Side.** Secondary roof drainage shall be provided by an open-sided roof or scuppers where the roof perimeter construction extends above the roof in such a manner that water will be entrapped. An open-sided roof or scuppers shall be sized to prevent the depth of ponding water from exceeding that for which the roof was designed as determined by Section 1101.12.1. Scupper openings shall be not less than 4 inches (102 mm) high and have a width equal to the circumference of the roof drain required for the area served, sized in accordance with Table 1103.1.

**1101.12.2.2 Secondary Roof Drain.** Secondary roof drains shall be provided. The secondary roof drains shall be located not less than 2 inches (51 mm) above the roof surface. The maximum height of the roof drains shall be a height to prevent the depth of ponding water from exceeding that for which the roof was designed as determined by Sec-



**CALIFORNIA PLUMBING CODE – MATRIX ADOPTION TABLE**  
**CHAPTER 13 - HEALTH CARE FACILITIES AND MEDICAL GAS AND MEDICAL VACUUM SYSTEMS**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4	5								
Adopt Entire Chapter			<b>X</b>																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below										<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>								
Chapter/Section																							
1304.1.1										<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>								
1304.1.2										<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>								

*This state agency does not adopt sections identified with the following symbol: †  
The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.0.*



# CHAPTER 13

## HEALTH CARE FACILITIES AND MEDICAL GAS AND MEDICAL VACUUM SYSTEMS

### Part I – General Requirements.

#### 1301.0 General.

**1301.1 Applicability.** This chapter applies to the special fixtures and systems in health care facilities; the special plumbing requirements for such facilities; and the installation, testing, and verification of Categories 1, 2, and 3 medical gas and medical vacuum piping systems, except as otherwise indicated in this chapter, from the central supply system to the station outlets or inlets in hospitals, clinics, and other health care facilities. Other plumbing in such facilities shall comply with other applicable sections of this code. For Category 3 medical gas systems, only oxygen and nitrous oxide shall be used.

**1301.2 Where Not Applicable.** This chapter does not apply to the following except as otherwise addressed in this chapter:

- (1) Cylinder and container management, storage, and reserve requirements
- (2) Bulk supply systems
- (3) Electrical connections and requirements
- (4) Motor requirements and controls
- (5) Systems having nonstandard operating pressures
- (6) Waste anesthetic gas disposal (WAGD) systems
- (7) Surface-mounted medical gas rail systems
- (8) Breathing air replenishment (BAR) systems
- (9) Portable compressed gas systems
- (10) Medical support gas systems
- (11) Gas-powered device supply systems
- (12) Scavenging systems

**1301.3 Conflict of Requirements.** The requirements of this chapter shall not be interpreted to conflict with the requirements of NFPA 99. For requirements of portions of medical gas and vacuum systems not addressed in this chapter or medical gas and vacuum systems beyond the scope of this chapter refer to NFPA 99.

**1301.4 Terms.** Where the terms medical gas or medical support gas occur, the provisions shall apply to all piped systems for oxygen, nitrous oxide, medical air, carbon dioxide, helium, nitrogen, instrument air, and mixtures thereof. Whenever the name of a specific gas service occurs, the provision shall apply only to that gas. [NFPA 99:5.1.1.3]

**1301.5 Where Required.** Construction and equipment requirements shall be applied only to new construction and new equipment, except as modified in individual chapters. [NFPA 99:1.3.2]

**1301.6 Existing Systems.** Only the altered, renovated, or modernized portion of an existing system or individual component shall be required to meet the installation and equipment requirements stated in this code. If the alteration, renovation, or modernization adversely impact the existing performance requirements of a system or component, addi-

tional upgrading shall be required. An existing system that is not in strict compliance with the provisions of this code shall be permitted to be continued in use, unless the Authority Having Jurisdiction has determined that such use constitutes a distinct hazard to life. [NFPA 99:1.3.2.1 – 1.3.2.3]

#### 1302.0 Design Requirements.

**1302.1 Building System Risk Categories.** Activities, systems, or equipment shall be designed to meet Category 1 through Category 4 requirements as detailed in this code. [NFPA 99:4.1]

**1302.1.1 Risk Assessment.** Categories shall be determined by following and documenting a defined risk assessment procedure. [NFPA 99:4.2.1]

**1302.1.2 Documented Risk Assessment.** A documented risk assessment shall not be required for Category 1. [NFPA 99:4.2.2]

**1302.2 Patient Care Spaces.** The governing body of the facility or its designee shall establish the following areas in accordance with the type of patient care anticipated (see definition of patient care spaces in Chapter 2):

- (1) Category 1 spaces
- (2) Category 2 spaces
- (3) Category 3 spaces
- (4) Category 4 spaces [NFPA 99:1.3.4.1]

**1302.3 Anesthesia.** It shall be the responsibility of the governing body of the health care organization to designate anesthetizing locations. [NFPA 99:1.3.4.2]

**1302.4 Wet Procedure Locations.** It shall be the responsibility of the governing body of the health care organization to designate wet procedure locations. [NFPA 99:1.3.4.3]

#### 1303.0 Health Care Facilities.

**1303.1 Drinking Fountain Control Valves.** Drinking fountain control valves shall be flush-mounted or fully recessed where installed in corridors or other areas where patients are transported on a gurney, bed, or wheelchair.

**1303.2 Psychiatric Patient Rooms.** Piping and drain traps in psychiatric patient rooms shall be concealed. Fixtures and fittings shall be resistant to vandalism.

**1303.3 Locations for Ice Storage.** Ice makers or ice storage containers shall be located in nursing stations or similarly supervised areas to minimize potential contamination.

**1303.4 Sterilizers and Bedpan Steamers.** Sterilizers and bedpan steamers shall be installed in accordance with the manufacturer's installation instructions and comply with Section 1303.4.1 and Section 1303.4.2.

**1303.4.1 Drainage Connections.** Sterilizers and bedpan steamers shall be connected to the sanitary drainage system through an air gap in accordance with Section

801.2. The size of indirect waste piping shall be not less than the size of the drain connection on the fixture. Each such indirect waste pipe shall not exceed 15 feet (4572 mm) in length and shall be separately piped to a receptor. Such receptors shall be located in the same room as the equipment served. Except for bedpan steamers, such indirect waste pipes shall not require traps. A trap having a seal of not less than 3 inches (76 mm) shall be provided in the indirect waste pipe for a bedpan steamer.

**1303.4.2 Vapor Vents and Stacks.** Where a sterilizer or bedpan steamer has provision for a vapor vent and such a vent is required by the manufacturer, the vent shall be extended to the outdoors above the roof. Sterilizer and bedpan steamer vapor vents shall be installed in accordance with the manufacturer's installation instructions and shall not be connected to a drainage system vent.

**1303.5 Aspirators.** Provisions for aspirators or other water-supplied suction devices shall be installed with the specific approval of the Authority Having Jurisdiction. Where aspirators are used for removing body fluids, they shall include a collection container to collect liquids and solid particles. Aspirators shall indirectly discharge to the sanitary drainage system through an air gap in accordance with Section 806.1. The potable water supply to an aspirator shall be protected by a vacuum breaker or equivalent backflow protection device in accordance with Section 603.5.9.

**1303.6 Drains.** Drains shall be installed on dryers, after-coolers, separators, and receivers.

**1303.7 Clinical Sinks.** Clinical sinks shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 1303.7.1.

**1303.7.1 Drainage Connection.** Clinical sinks shall be directly connected to the sanitary drainage system and shall be provided with approved flushing devices installed in accordance with Section 413.1.

**1303.8 Water Supply for Hospitals.** Hospitals shall be provided with not less than two approved potable water sources that are installed in such a manner as to prevent the interruption of water service.

### 1304.0 Medical Gas and Medical Vacuum Piping Systems.

**1304.1 General.** The installation of medical gas and medical vacuum piping systems shall comply with the requirements of this chapter.

**1304.1.1 [OSHPD 1, 1R, 2, 3, 4 & 5]** *Medical gas systems for health care facilities that are regulated by OSHPD (hospitals, skilled nursing facilities, and intermediate care facilities, licensed clinics, and correctional treatment centers) shall be in accordance with NFPA 99, Standard for Health Care Facilities. See California Building Code Table 1224.4.6.1 for location and number of station outlets for oxygen, vacuum, and medical air.*

**1304.1.2 [OSHPD 1, 1R, 2, 3, 4 & 5]** *A medical gas source system serving an OSHPD 1, 2, 3 or 5 building shall not be located in an OSHPD 1R or OSHPD 3 building. OSHPD 1R buildings may be served by an individual main supply line from other OSHPD buildings, with*

*a main line valve as per NFPA 99. [NFPA 99:5.1.4.2.1, 5.1.4.2.2, 5.1.4.3.1, 5.1.4.3.2] Valves shall be accessible and clearly labeled.*

**1304.2 Manufacturer's Instructions.** The installation of individual components shall be made in accordance with the instructions of the manufacturer. Manufacturer's instructions shall include directions and information deemed by the manufacturer to be adequate for attaining proper operation, testing, and maintenance of the medical gas and vacuum systems. Copies of the manufacturer's instructions shall be left with the system owner. [NFPA 99:5.1.10.11.8.1 – 5.1.10.11.8.3]

**1304.3 Category 2 Piped Medical Gas and Medical Vacuum.** Category 2 piped gas or piped vacuum system requirements shall be permitted when all of the following criteria are met:

- (1) Only moderate sedation; minimal sedation, as defined in Chapter 2; or no sedation is performed. Deep sedation and general anesthesia shall not be permitted.
- (2) The loss of the piped gas or piped vacuum systems is likely to cause minor injury to patients, staff, or visitors.
- (3) The facility piped gas or piped vacuum systems are intended for Category 2 patient care space as defined in Chapter 2. [NFPA 99:5.2.1.2]

**1304.4 Category 3 Piped Medical Gas and Medical Vacuum.** Category 3 piped gas and vacuum systems shall be permitted when all of the following criteria are met:

- (1) Only moderate sedation; minimal sedation, as defined in Chapter 2; or no sedation is performed. Deep sedation and general anesthesia shall not be permitted.
- (2) The loss of the piped gas and vacuum systems is not likely to cause injury to patients, staff, or visitors, but can cause discomfort.
- (3) The facility piped gas and vacuum systems are intended for Category 3 or Category 4 patient care rooms per Chapter 2. [NFPA 99:5.3.1.2]

**1304.5 Certification of Systems.** Certification of medical gas and vacuum systems shall comply with the requirements of Section 1319.0.

**1304.6 Construction Documents.** Before a medical gas or medical vacuum system is installed or altered in a hospital, medical facility, or clinic, duplicate construction documents shall be filed with the Authority Having Jurisdiction. Approval of the plans shall be obtained before issuance of a permit by the Authority Having Jurisdiction.

**1304.6.1 Requirements.** Construction documents shall show the following:

- (1) Plot plan of the site, drawn to scale, indicating the location of existing or new cylinder storage areas, property lines, driveways, and existing or proposed buildings.
- (2) Piping layout of the proposed piping system or alteration, including alarms, valves, the origin of gases, user outlets, and user inlets. The demand and loading of piping, existing or future, shall also be indicated.
- (3) Complete specification of materials.

**1304.6.2 Extent of Work.** Construction documents submitted to the Authority Having Jurisdiction shall clearly indicate the nature and extent of the work pro-

posed and shall show in detail that such work will be in accordance with the provisions of this chapter.

» **1304.6.3 Record.** A record of as-built plans and valve identification records shall remain on the site.

**1305.0 System Performance.**

**1305.1 Required Operating Pressures.** Medical gas and vacuum systems shall be capable of delivering service in the pressure ranges listed in Table 1305.1.

**1305.2 Minimum Flow Rates.** Medical gas and vacuum systems shall be capable of supplying the flow rates listed in Table 1305.2.

**1305.3 Minimum Station Outlets and Inlets.** Station outlets and inlets for medical gas and vacuum systems shall be provided as listed in Table 1305.3.

**TABLE 1305.1  
STANDARD DESIGNATION COLORS AND OPERATING PRESSURES FOR GAS AND VACUUM SYSTEMS [NFPA 99: TABLE 5.1.11]**

GAS SERVICE	ABBREVIATED NAME	COLORS (BACKGROUND/TEXT)	STANDARD GAUGE PRESSURE
Medical air	Med Air	Yellow/black	50–55 psi
Carbon dioxide	CO <sub>2</sub>	Gray/black or gray/white	50–55 psi
Helium	He	Brown/white	50–55 psi
Nitrogen	N <sub>2</sub>	Black/white	160–185 psi
Nitrous oxide	N <sub>2</sub> O	Blue/white	50–55 psi
Oxygen	O <sub>2</sub>	Green/white or white/green	50–55 psi
Oxygen/carbon dioxide mixtures	O <sub>2</sub> /CO <sub>2</sub> n% (n = % of CO <sub>2</sub> )	Green/white	50–55 psi
Medical–surgical vacuum	Med Vac	White/black	15 inch to 30 inch HgV
Waste anesthetic gas disposal	WAGD	Violet/white	Varies with system type
Other mixtures	Gas A% / Gas B%	Colors as above; major gas for background/minor gas for text	None
Nonmedical air (Category 3 gas-powered device)	—	Yellow-and-white diagonal stripe/black	None
Nonmedical and Category 3 vacuum	—	White-and-black diagonal stripe/black boxed	None
Laboratory air	—	Yellow-and-white checker board/black	None
Laboratory vacuum	—	White-and-black checker-board/black boxed	None
Instrument air	—	Red/white	160–185 psi

For SI units: 1 pound-force per square inch = 6.8947 kPa, 1 inch of mercury vacuum (HgV) = 3.386 kPa

**1306.0 Qualifications of Installers.**

**1306.1 General.** The installation of medical gas and vacuum systems shall be made by qualified, competent technicians who are experienced in performing such installations, including all personnel who actually install the piping system. Installers of medical gas and vacuum piped distribution systems, all appurtenant piping supporting pump and compressor source systems, and appurtenant piping supporting source gas manifold systems, not including permanently installed bulk source systems shall be certified in accordance with ASSE 6010. [NFPA 99:5.1.10.11.10.1, 5.1.10.11.10.2]

**TABLE 1305.2  
MINIMUM FLOW RATES (cubic feet per minute)**

MEDICAL SYSTEM	FLOW RATE
Oxygen	.71 CFM per outlet <sup>1</sup>
Nitrous Oxide	.71 CFM per outlet <sup>1</sup>
Medical Compressed Air	.71 CFM per outlet <sup>1</sup>
Nitrogen	15 CFM free air per outlet
Vacuum	1 SCFM per inlet <sup>2</sup>
Carbon Dioxide	.71 CFM per outlet <sup>1</sup>
Helium	.71 CFM per outlet

For SI units: 1 cubic foot per minute (CFM) = 0.47 L/s

**Notes:**

- <sup>1</sup> A room designed for a permanently located respiratory ventilator or anesthesia machine shall have an outlet capable of a flow rate of 6.36 CFM (3.0 L/s) at the station outlet.
- <sup>2</sup> For testing and certification purposes, individual station inlets shall be capable of a flow rate of 3 SCFM (1.4 L/s), while maintaining a system pressure of not less than 12 inches of mercury (41 kPa) at the nearest adjacent vacuum inlet.

**1306.2 Brazing.** Brazing shall be performed by individuals who are qualified in accordance with Section 1307.0. [NFPA 99:5.1.10.11.10.4]

**1306.2.1 Documentation.** Prior to installation work, the installer of medical gas and vacuum piping shall provide and maintain documentation on the job site for the qualification of brazing procedures and individual brazers that is required under Section 1307.0. [NFPA 99:5.1.10.11.10.5]

**1306.3 Health Care Organization Personnel.** Health care organization personnel shall be permitted to install piping systems if all of the requirements of Section 1306.0 are met during the installation. [NFPA 99:5.1.10.11.10.6]

**1307.0 Brazing Procedures.**

**1307.1 General.** Brazing procedures and brazer performance for the installation of medical gas and vacuum piping shall be qualified in accordance with either Section IX, “Welding and Brazing Qualifications” of the ASME Boiler and Pressure Vessel Code or AWS B2.2, both as modified by Section 1307.2 through Section 1307.5 [NFPA 99:5.1.10.11.11.1]

**1307.2 Examination.** Brazers shall be qualified by visual examination of the test coupon followed by sectioning. [NFPA 99:5.1.10.11.11.2]

**TABLE 1305.3  
MINIMUM OUTLETS AND INLETS PER STATION**

LOCATION	OXYGEN	MEDICAL VACUUM	MEDICAL AIR	NITROUS OXIDE	NITROGEN	HELIUM	CARBON DIOXIDE
Patient rooms for medical/surgical, obstetrics, and pediatrics	1/bed	1/bed	1/bed	—	—	—	—
Examination/treatment for nursing units	1/bed	1/bed	—	—	—	—	—
Intensive care (all)	3/bed	3/bed	2/bed	—	—	—	—
Nursery <sup>1</sup>	2/bed	2/bed	1/bed	—	—	—	—
General operating rooms	2/room	3/room <sup>4</sup>	2/room	1/room	1/room	—	—
Cystoscopic and special invasive procedures	2/room	3/room <sup>4</sup>	2/room	—	—	—	—
Recovery delivery and labor/delivery/recovery rooms <sup>2</sup>	2/bed 2/room	2/bed 3/room <sup>4</sup>	1/bed 1/room	—	—	—	—
Labor rooms	1/bed	1/bed	1/bed	—	—	—	—
First aid and emergency treatment <sup>3</sup>	1/bed	1/bed <sup>4</sup>	1/bed	—	—	—	—
Autopsy	—	1/station	1/station	—	—	—	—
Anesthesia workroom	1/station	—	1/station	—	—	—	—

**Notes:**<sup>1</sup> Includes pediatric nursery.<sup>2</sup> Includes obstetric recovery.<sup>3</sup> Emergency trauma rooms used for surgical procedures shall be classified as general operating rooms.<sup>4</sup> Vacuum inlets required are in addition to inlets used as part of a scavenging system for removal of anesthetizing gases.

**1307.3 Brazing Procedure Specification.** The brazing procedure specification shall address cleaning, joint clearance, overlap, internal purge gas, purge gas flow rate, and filler metal. [NFPA 99:5.1.10.11.11.3]

**1307.4 Documentation.** The brazing procedure qualification record and the record of brazer performance qualification shall document filler metal used, cleaning, joint clearance, overlap, internal purge gas and flow rate during brazing of coupon, and absence of internal oxidation in the completed coupon. [NFPA 99:5.1.10.11.11.4]

**1307.5 Procedures.** Brazing procedures qualified by a technically competent group or agency shall be permitted under the following conditions:

- (1) The brazing procedure specification and the procedure qualification records meet the requirements of this code.
- (2) The employer obtains a copy of both the brazing procedure specification and the supporting qualification records from the group or agency and signs and dates these records, thereby accepting responsibility for the qualifications that were performed by the group or agency.
- (3) The employer qualifies at least one brazer following each brazing procedure specification used. [NFPA 99:5.1.10.11.11.5]

**1307.6 Conditions of Acceptance.** An employer shall be permitted to accept brazer qualification records of a previous employer under the following conditions:

- (1) The brazer has been qualified following the same or an equivalent procedure that the new employer uses.
- (2) The new employer obtains a copy of the record of brazer performance qualification tests from the previous employer and signs and dates these records, thereby accepting responsibility for the qualifications performed by the previous employer. [NFPA 99:5.1.10.11.11.6]

**1307.7 Qualifications.** Performance qualifications of brazers shall remain in effect indefinitely unless the brazer does not braze with the qualified procedure for a period exceeding 6 months or there is a specific reason to question the ability of the brazer. [NFPA 99:5.1.10.11.11.7]

## Part II – Medical Gas and Vacuum System Piping.

### 1308.0 Pipe Materials.

**1308.1 General.** The provisions of this section shall apply to field-installed piping for the distribution of medical gases and vacuum systems.

**1308.2 Cleaning.** Tubes, valves, fittings, station outlets, and other piping components in medical gas systems shall have been cleaned for oxygen service by the manufacturer prior to installation in accordance with the mandatory requirements of CGA G-4.1, except that fittings shall be permitted to be cleaned by a supplier or agency other than the manufacturer. [NFPA 99:5.1.10.1.1]

Where tube ends, fittings or other components become contaminated before installation they shall be recleaned in accordance with Section 1309.6.7 and Section 1309.6.8.

**1308.3 Delivery.** Each length of tube shall be delivered plugged or capped by the manufacturer and kept sealed until prepared for installation. Fittings, valves, and other components shall be delivered sealed and labeled, and kept sealed until prepared for installation. [NFPA 99:5.1.10.1.2, 5.1.10.1.3]

**1308.4 Tubes for Medical Gas Systems.** Tubes shall be hard-drawn seamless copper ASTM B819 medical gas tube, Type L, except Type K shall be used where operating pressures are above a gauge pressure of 185 psi (1276 kPa) and the pipe sizes are larger than DN80 [(NPS 3) (3<sup>1</sup>/<sub>8</sub> inches O.D.)].

**Exception: [DWR]** Recycled water supply systems that are within or a part of a building shall comply with Section 1505.13.

» **1502.2 Supply System Inspection and Test.** Alternate water source systems shall be inspected and tested in accordance with this code for testing of potable water piping.

» **1502.3 Cross-Connection Inspection and Testing.** An initial visual inspection and initial cross-connection test shall be performed on both the potable and alternate water source systems before the initial operation of the alternate water source system. During an initial or subsequent cross-connection test, the potable and alternate water source system shall be isolated from each other and independently inspected and tested to ensure there is no cross-connection in accordance with Section 1502.3.1 through Section 1502.3.3.

» **1502.3.1 Visual System Inspection.** Before commencing the cross-connection testing, a dual system inspection shall be conducted by the Authority Having Jurisdiction and other authorities having jurisdiction as follows:

- (1) Meter locations of the alternate water source and potable water lines shall be checked to verify that no modifications were made and that no cross-connections are visible.
- (2) Pumps and equipment, equipment room signs and exposed piping in equipment room shall be checked.
- (3) Valves shall be checked to ensure that the valve lock seals are still in place and intact. Valve control door signs shall be checked to verify that no signs have been removed.

» **1502.3.2 Cross-Connection Test.** A cross-connection test shall be performed in the presence of the Authority Having Jurisdiction or other authorities having jurisdiction to determine whether a cross-connection has occurred as follows:

- (1) The potable water system shall be activated and pressurized. The alternate water source system shall be shut down, depressurized, and drained.
- (2) The potable water system shall remain pressurized for a minimum period specified by the Authority Having Jurisdiction while the alternate water source system is empty. The minimum period the alternate water source system is to remain depressurized shall be determined on a case-by-case basis, taking into account the size and complexity of the potable and the alternate water source distribution systems, but in no case shall that period be less than 1 hour.
- (3) The drain on the alternate water source system shall be checked for flow during the test and fixtures, potable and alternate water source, shall be tested and inspected for flow. Flow from an alternate water source system outlet indicates a cross-connection. No flow from a potable water outlet shall indicate that it is connected to the alternate water source system.
- (4) The potable water system shall then be depressurized and drained.
- (5) The alternate water source system shall then be activated and pressurized. When an alternate water

source is not available for the initial cross-connection test, a temporary connection to a potable water supply shall be required. At the conclusion of the initial cross-connection test, the temporary connection to the potable water supply shall be disconnected.

- (6) The alternate water source system shall remain pressurized for a minimum period specified by the Authority Having Jurisdiction while the potable water system is empty. The minimum period the potable water system is to remain depressurized shall be determined on a case-by-case basis, but in no case shall that period be less than 1 hour.
- (7) Fixtures, potable, and alternate water source shall be tested and inspected for flow. Flow from a potable water system outlet indicates a cross-connection. No flow from an alternate water source outlet will indicate that it is connected to the potable water system.
- (8) The drain on the potable water system shall be checked for flow during the test and at the end of the test.
- (9) Where there is no flow detected in the fixtures which would indicate a cross-connection, the potable water system shall be repressurized.

**1502.3.3 Discovery of Cross-Connection.** If a cross-connection is discovered, the following procedure shall be activated immediately:

- (1) Notify the Authority Having Jurisdiction of the cross connection.
- (2) The alternate water source piping to the building and its premises shall be shutdown at the meter, and the alternate water source riser shall be drained.
- (3) Potable water piping to the building and its premises shall be shutdown at the meter.
- (4) The cross-connection shall be uncovered and disconnected.
- (5) The building and its premises shall be retested in accordance with Section 1502.3.1 and Section 1502.3.2.
- (6) The potable water system shall be chlorinated with 50 parts-per-million (ppm) chlorine for 24 hours.
- (7) The potable water system shall be flushed after 24 hours, and a standard bacteriological test shall be performed. Where test results are acceptable, the potable water system shall be permitted to be recharged.

**1502.3.4 Annual Inspection.** An annual inspection of the alternate gray water source system, following the procedures listed in Section 1502.3.1 shall be required. Annual cross-connection testing, following the procedures listed in Section 1502.3.2 shall be required by the Authority Having Jurisdiction, unless site conditions do not require it. In no event shall the test occur less than once in 4 years. Alternate testing requirements shall be permitted by the Authority Having Jurisdiction.

» **1502.4 Separation Requirements.** Underground alternate water source service piping other than gray water shall be separated from the building sewer in accordance with this code. Treated nonpotable water pipes shall be permitted to be run or laid in the same trench as potable water pipes with a 12 inch (305 mm) minimum vertical and horizontal separation where both pipe materials are approved for use within a building. Where horizontal piping materials do not comply with this requirement, the minimum separation shall be increased to 60 inches (1524 mm). The potable water piping shall be installed at an elevation above the treated nonpotable water piping.

**Exception: [DWR]** Recycled water supply systems that are within or a part of a building shall comply with Section 1505.11.

» **1502.5 Abandonment.** Alternate water source systems that are no longer in use or fail to be maintained in accordance with Section 1501.5 shall be abandoned. Abandonment shall comply with Section 1502.5.1 and Section 1502.5.2.

» **1502.5.1 General.** An abandoned system or part thereof covered under the scope of this chapter shall be disconnected from remaining systems, drained, plugged, and capped in an approved manner.

» **1502.5.2 Underground Tank.** An underground water storage tank that has been abandoned or otherwise discontinued from use in a system covered under the scope of this chapter shall be completely drained and filled with earth, sand, gravel, concrete, or other approved material or removed in a manner satisfactory to the Authority Having Jurisdiction.

» **1502.6 Sizing.** Unless otherwise provided for in this chapter, alternate water source piping shall be sized in accordance with Chapter 6 for sizing potable water piping.

» **1503.0 Gray Water Systems [BSC-CG].** *Gray water systems shall be verified in accordance with the California Green Building Standards Code (CALGreen), Chapter 5, Division 5.3.*

» **1503.1 General.** The provisions of this section shall apply to the construction, alteration, and repair of gray water systems. *A city, county, or city and county or other local government may adopt, after a public hearing and enactment of an ordinance or resolution, building standards that are more restrictive than the gray water building standards adopted in this code. For additional information, see Health and Safety Code Section 18941.7.*

(A) *All gray water systems shall be designed with a diverter valve to allow the user to direct the flow to the building sewer and either the irrigation field or disposal field, whichever is used. The means of changing the direction flow of the gray water shall be clearly labeled and readily accessible to the user.*

(B) *Water used to wash diapers or similarly soiled or infectious garments or other prohibited contents shall be diverted by the user to the building sewer.*

(C) *Gray water shall not be used in spray irrigation, allowed to pond or runoff and shall not be discharged directly into or reach any storm sewer system or any surface body of water.*

(D) *Human contact with gray water or the soil irrigated by gray water shall be minimized and avoided, except as required to maintain the gray water system. The discharge point of any gray water subsoil irrigation or sub-surface irrigation field shall be covered by at least two (2) inches (51 mm) of mulch, rock, or soil, or a solid shield to minimize the possibility of human contact.*

(E) *Gray water may be released above the ground surface provided at least two (2) inches (51 mm) of mulch, rock, or soil, or a solid shield covers the release point. Other methods which provide equivalent separation are also acceptable.*

(F) *Gray water shall not contain hazardous chemicals derived from activities such as cleaning car parts, washing greasy or oily rags, or disposing of waste solutions.*

(1) **[HCD 1]** *The prohibition in Subsection (F) includes, but is not limited to, home photo labs or other similar hobbyist or home occupational activities.*

(2) **[BSC]** *Photo labs or similar activities.*

(G) *Exemption from construction permit requirements of this code shall not be deemed to grant authorization for any gray water system to be installed in a manner that violates other provisions of this code or any other laws or ordinances of the Enforcing Agency.*

(H) *An operation and maintenance manual shall be provided to the owner. Directions shall indicate that the manual is to remain with the building throughout the life of the system and upon change of ownership or occupancy.*

(I) *A gray water system shall not be connected to any potable water system without an air gap, reduced-pressure principle backflow preventer, or other physical device which prevents backflow and shall not cause ponding or runoff of gray water.*

**1503.1.1 [HCD 1] Clothes Washer System.** *A clothes washer system in compliance with all of the following is exempt from the construction permit specified in Section 1.8.4.1 and may be installed or altered without a construction permit:*

(1) *If required, notification has been provided to the enforcing agency regarding the proposed location and installation of a gray water irrigation or disposal system.*

(2) *The design shall allow the user to direct the flow to the irrigation or disposal field or the building sewer. The direction control of the gray water shall be clearly labeled and readily accessible to the user.*

(3) *The installation, change, alteration, or repair of the system does not include a potable water connection or a pump and does not affect other building, plumbing, electrical, or mechanical components including structural features, egress, fire-life safety, sanitation, potable water supply piping, or accessibility.*

**Note:** *The pump in a clothes washer shall not be considered part of the gray water system.*

(4) *The gray water shall be contained on the site where it is generated.*



- (5) Gray water shall be directed to and contained within an irrigation or disposal field.
- (6) Ponding or runoff is prohibited and shall be considered a nuisance.
- (7) Gray water may be released above the ground surface provided at least two (2) inches (51 mm) of mulch, rock, or soil, or a solid shield covers the release point. Other methods which provide equivalent separation are also acceptable.
- (8) Gray water systems shall be designed to minimize contact with humans and domestic pets.
- (9) Water used to wash diapers or similarly soiled or infectious garments shall not be used and shall be diverted to the building sewer.
- (10) Gray water shall not contain hazardous chemicals derived from activities such as cleaning car parts, washing greasy or oily rags, or disposing of waste solutions from home photo labs or similar hobbyist or home occupational activities.
- (11) Exemption from construction permit requirements of this code shall not be deemed to grant authorization for any gray water system to be installed in a manner that violates other provisions of this code or any other laws or ordinances of the enforcing agency.
- (12) An operation and maintenance manual shall be provided to the owner. Directions shall indicate that the manual is to remain with the building throughout the life of the system and upon change of ownership or occupancy.
- (13) Gray water discharge from a clothes washer system through a standpipe shall be properly trapped in accordance with Section 1005.0.

**1503.1.2 Simple System.** Simple systems exceed a clothes washer system and shall comply with the following:

- (1) The discharge capacity of a gray water system shall be determined by Section 1503.8. Simple systems have a discharge capacity of 250 gallons (947 L) per day or less.
- (2) Simple systems shall require a construction permit, unless exempted from a construction permit by the Enforcing Agency. The Enforcing Agency shall consult with the water purveyor for any public water system (as defined in Health and Safety Code Section 116275) providing drinking water to the dwelling or non-residential structure before allowing an exemption from a construction permit.
- (3) The design of simple systems shall meet generally accepted gray water system design criteria.

**1503.1.3 Complex System.** Any gray water system that is not a clothes washer system or simple system shall comply with the following:

- (1) The discharge capacity of a gray water system shall be determined by Section 1503.8. Complex systems have a discharge capacity over 250 gallons (947 L) per day.

- (2) Complex systems shall require a construction permit, unless exempted from a construction permit by the Enforcing Agency. The Enforcing Agency shall consult with the water purveyor for any public water system (as defined in Health and Safety Code, Section 116275) providing drinking water to the dwelling or non-residential structure before allowing an exemption from a construction permit.

**1503.2 System Requirements.** Gray water shall be permitted to be diverted away from a sewer or private sewage disposal system, and discharge to a subsurface irrigation or subsoil irrigation system, or disposal field. The gray water shall be permitted to discharge to a mulch basin for residential occupancies. Gray water shall not be used to irrigate root crops or food crops intended for human consumption that comes in contact with soil.

**1503.2.1 Surge Capacity.** Gray water systems shall be designed to have the capacity to accommodate peak flow rates and distribute the total amount of estimated gray water on a daily basis to a subsurface irrigation field, subsoil irrigation field, disposal field, or mulch basin without surfacing, ponding, or runoff. A surge tank is required for systems that are unable to accommodate peak flow rates and distribute the total amount of gray water by gravity drainage. The water discharge for gray water systems shall be determined in accordance with Section 1503.8.1 or Section 1503.8.2.

**Exception:** It is not the intent of this section to require that all gray water must be handled by an irrigation field or disposal field. It is acceptable for excess gray water to be diverted to the building sewer through a diverter valve or overflow drain as permitted in this chapter.

**1503.2.2 Diversion.** The gray water system shall connect to the sanitary drainage system downstream of fixture traps and vent connections through an approved diverter valve. The diverter valve shall be installed in a readily accessible location and clearly indicate the direction of flow.

**Exception: [HCD 1]** A clothes washer system in compliance with Section 1503.1.1.

**1503.2.3 Backwater Valves.** Gray water drains subject to backflow shall be provided with a backwater valve at the point of connection to the building sewer system, so located as to be accessible for inspection and maintenance.

**1503.3 Connections to Potable and Reclaimed (Recycled) Water Systems.** Gray water systems shall have no direct connection to a potable water supply, on-site treated nonpotable water supply, or reclaimed (recycled) water supply systems.

**Exceptions:**

- (1) Potable water, on-site treated nonpotable water, reclaimed (recycled) water, or rainwater is permitted to be used as makeup water for a non-pressurized storage tank provided the connection is protected by an air gap in accordance with this code.
- (2) A potable water supply may be connected temporarily for the initial cross-connection test of the untreated gray-water system as required in Section 1502.3.2.

» **1503.4 Location.** No gray water system or part thereof shall be located on a lot other than the lot that is the site of the building or structure that discharges the gray water, nor shall a gray water system or part thereof be located at a point having less than the minimum distances indicated in Table 1503.4.

**Exception:** *When there exists a lawfully recorded perpetual and exclusive covenant to an easement appurtenant and right-of-way between adjoining land-owners of two or more contiguous lots to discharge gray water from one lot to an adjoining lot.*

» **1503.5 Plot Plan Submission.** No permit for a gray water system shall be issued until a plot plan with data satisfactory to the Authority Having Jurisdiction has been submitted and approved.

**Exception: [HCD 1]** *A construction permit shall not be required for a clothes washer system in compliance with Section 1503.1.1.*

» **1503.6 Prohibited Location.** Where there is insufficient lot area or inappropriate soil conditions for adequate absorption, no gray water system shall be permitted.

» **1503.7 Drawings and Specifications.** The Authority Having Jurisdiction *may* require the following information to be included with or in the plot plan before a permit is issued for a gray water system, or at a time during the construction thereof:

- (1) Plot plan drawn to scale and completely dimensioned, showing lot lines and structures, direction and approximate slope of surface, location of present or proposed retaining walls, drainage channels, water supply lines, wells, paved areas and structures on the plot, number of bedrooms and plumbing fixtures in each structure, location of private sewage disposal system and expansion area or building sewer connecting to the public sewer, and location of the proposed gray water system.
- (2) Details of construction necessary to ensure compliance with the requirements of this chapter, together with a full description of the complete installation, including installation methods, construction, and materials.
- (3) Details for holding tanks shall include dimensions, structural calculations, bracings, and such other pertinent data as required.
- (4) A log of soil formations and groundwater level as determined by test holes dug in proximity to proposed irrigation *and/or disposal* area, together with a statement of water absorption characteristics of the soil at the proposed site as determined by approved percolation tests.

**Exceptions:**

- (1) The Authority Having Jurisdiction shall permit the use of Table 1504.2 instead of percolation tests.

»

**TABLE 1503.4<sup>7</sup>**  
**LOCATION OF GRAY WATER SYSTEM**

MINIMUM HORIZONTAL DISTANCE IN CLEAR REQUIRED FROM	SURGE TANK (feet)	SUBSURFACE AND SUBSOIL IRRIGATION FIELD AND MULCH BASIN (feet)	DISPOSAL FIELD
Building structures <sup>1</sup>	5 <sup>2, 3, 9</sup>	2 <sup>3, 8</sup>	5
Property line adjoining private property	5	5 <sup>8</sup>	5
Water supply wells <sup>4</sup>	50	100	100
Streams and lakes <sup>4</sup>	50	100 <sup>5, 10</sup>	100 <sup>5</sup>
Sewage pits or cesspools	5	5	5
Sewage disposal field <sup>10</sup>	5	4 <sup>6</sup>	4 <sup>6</sup>
Septic tank	0	5	5
On-site domestic water service line	5	0	0
Pressurized public water main <sup>7</sup>	10	10 <sup>7</sup>	10 <sup>7</sup>

For SI units: 1 foot = 304.8 mm

**Notes:**

- <sup>1</sup> *Building structures do not include porches and steps, whether covered or uncovered, breezeways, roofed carports, roofed porte cocheres, roofed patios, carports, covered walks, covered driveways, and similar structures or appurtenances.*
- <sup>2</sup> *The distance shall be permitted to be reduced to 0 feet for aboveground tanks where first approved by the Authority Having Jurisdiction.*
- <sup>3</sup> *Underground tanks shall not be located within a 45 degree angle from the bottom of the foundation, or they shall be designed to address the surcharge imposed by the structure. The distance may be reduced to six (6) inches (153 mm) for aboveground tanks when first approved by the Enforcing Agency.*
- <sup>4</sup> *Where special hazards are involved, the distance required shall be increased as directed by the Authority Having Jurisdiction.*
- <sup>5</sup> *These minimum clear horizontal distances shall apply between the irrigation or disposal field and the ocean mean higher high tide line.*
- <sup>6</sup> *Add 2 feet (610 mm) for each additional foot of depth more than 1 foot (305 mm) below the bottom of the drain line.*
- <sup>7</sup> *For parallel construction or crossings, approval by the Authority Having Jurisdiction shall be required.*
- <sup>8</sup> *The distance shall be permitted to be reduced to 1½ feet (457 mm) for drip and mulch basin irrigation systems.*
- <sup>9</sup> *The distance shall be permitted to be reduced to 0 feet for surge tanks of 75 gallons (284 L) or less.*
- <sup>10</sup> *The minimum horizontal distance may be reduced to 50 feet (15 240 mm) for irrigation or disposal fields utilizing gray water which has been filtered prior to entering the distribution piping.*

**1505.1.2 Structures Allowed for Toilet and Urinal Flushing.** *In accordance with Water Code Section 13553, reclaimed (recycled) water shall be allowed for toilet and urinal flushing in certain structures. These structures include commercial, retail, and office buildings, theaters, auditoriums, condominium projects, schools, hotels, apartments, barracks, dormitories, jails, prisons, reformatories, and other structures as determined by the State Water Resources Control Board.*

- » **1505.2 Permit.** It shall be unlawful for a person to construct, install, alter, or cause to be constructed, installed, or altered a reclaimed (recycled) water supply system within a building or on its premises without first obtaining a permit to do such work from the Authority Having Jurisdiction.

*Prior to commencing the issuance of permits for recycled water supply systems pursuant to state requirements relating to recycled water, a city, county, city and county or other local agency shall seek consultation with the State Water Resources Control Board, local public health department and local recycled water purveyor to ensure that state and local public health concerns are addressed in local standards or ordinances, or in issuing permits.*

- » **1505.2.1 Plumbing Plan Submission.** No permit for a reclaimed (recycled) water supply system shall be issued until complete plumbing plans, with data satisfactory to the Authority Having Jurisdiction, have been submitted and approved.

- » **1505.3 System Changes.** No changes or connections shall be made to either the reclaimed (recycled) water supply system or the potable water system within site containing a reclaimed (recycled) water supply system without approval by the Authority Having Jurisdiction.

- » **1505.4 Connections to Potable or Recycled Water Supply Systems.** Recycled water supply systems shall have no direct connection to a potable water supply or alternate water source system.

**Exceptions:**

- (1) Potable water is permitted to be used as makeup water for a reclaimed (recycled) water storage tank provided the potable water supply inlet is protected by an air gap in accordance with this code.
- (2) A potable water supply may be connected temporarily for initial testing of the recycled water supply system as provided in Section 1505.13.2.2. Prior to temporarily connecting the potable line to the recycled water supply system for the initial cross-connection test purposes, the potable line must have a reduced-pressure principle backflow preventer installed.
- (3) Reclaimed (recycled) water is permitted to be used as makeup water for an alternate water source system provided the recycled water supply system is protected by an air gap in accordance with this code.

- » **1505.5 Initial Cross-Connection Test.** A cross-connection test is required in accordance with Section 1505.13.2.2.

Before the building is occupied or the system is activated, the installer shall perform an initial cross-connection test in the presence of the Authority Having Jurisdiction or other authorities having jurisdiction. The test shall be ruled successful by the Authority Having Jurisdiction before final approval is granted.

- » **1505.6 Recycled Water Supply System Materials.** Recycled water supply system materials shall comply with the requirements of this code for potable water supply systems unless otherwise provided for in this section.

- » **1505.7 Recycled Water Supply System Color and Marking Information.** *All mechanical equipment, including control valves, appurtenant to recycled water supply systems shall be painted purple or composed of purple material matching Pantone color No. 512, 522C or equivalent. Recycled water supply systems shall be identified and permanently marked with clearly visible black uppercase lettering on purple background. The identification may be accomplished by labeling metallic and non-metallic piping using purple-colored (Pantone color No. 512) adhesive Mylar PVC tape affixed along the entire length of the pipe, or using non-metallic pipe manufactured with purple (Pantone color No. 512, 522C, or equivalent) integral to the material. For either material, the tape or pipe shall be installed so the wording is clearly visible and shall be field or factory marked as follows: "CAUTION: NONPOTABLE RECYCLED WATER, DO NOT DRINK".*

- » **1505.8 Valves.** Valves, except fixture supply control valves, shall be equipped with a locking feature.

**1505.8.1 Valve Seals.** *The master reclaimed (recycled) water shut-off valve and/or the reclaimed (recycled) water meter curb cock and each valve within a wall shall be sealed after the recycled water supply system has been approved and placed into operation. These seals shall be either crimped lead wire seal or plastic break away seal which, if broken after system approval, shall be deemed conclusive evidence that the recycled water supply system has been accessed. The seals shall be purple, numbered, and contain the words "RECYCLED WATER", and shall be supplied by the recycled water purveyor, or by other arrangements acceptable to the Authority Having Jurisdiction.*

**1505.8.2 Valve and Appurtenance Access Door Signs.** *Each reclaimed (recycled) water valve within a wall shall have its access door into the wall equipped with a warning sign approximately 6 inches by 6 inches (152 mm x 152 mm) with wording in approximately 3/8 inch (9.5 mm) letters on a purple background. The wording text and format of the sign shall be substantially the same as that specified in Section 1505.12.3. The signs shall be attached inside the access door frame and shall hang in the center of the access door frame. This sign requirement shall be applicable to any and all access doors, hatches, etc., leading to reclaimed (recycled) water piping and appurtenances.*

» **1505.9 Hose Bibbs.** Hose bibbs shall not be allowed on reclaimed (recycled) water piping systems. *Only quick couplers that differs from those installed on the potable water system shall be used on the recycled water piping system in areas subject to public access. Quick couplers supplying reclaimed (recycled) water shall be marked with the words: “CAUTION: NONPOTABLE RECYCLED WATER, DO NOT DRINK,” and one of the symbols in Figure 1505.9.*

**Exception:** *In accordance with Health and Safety Code Section 8117 and Section 8118, hose bibbs are approved for use in cemeteries supplied with reclaimed (recycled) water. A hose bibb in an area subject to access by the general public shall be equipped with a sign marked “CAUTION: NONPOTABLE RECYCLED WATER, DO NOT DRINK,” and one of the symbols in Figure 1505.9.*



» **FIGURE 1505.9**

» **1505.10 Required Appurtenances.** The recycled water supply system and the potable water system within the building and the premises shall be provided with the required appurtenances (e.g., valves, air/vacuum relief valves, etc.) to allow for testing as required for a cross-connection test in accordance with Section 1505.13.2.

» **1505.11 Pipe Separation in Trenches.** Reclaimed (recycled) water pipes shall be permitted to be run or laid in the same trench as potable water pipes with 12 inches (305 mm) minimum vertical and horizontal separation where both pipe materials are approved for use within a building. Where piping materials do not meet this requirement, the minimum horizontal separation shall be increased to 48 inches (1220 mm). The potable water piping shall be installed at an elevation above the reclaimed (recycled) water piping. Reclaimed (recycled) water pipes laid in the same trench or crossing building sewer or drainage piping shall be installed in accordance with Section 609.0 and Section 720.0 of this code for water pipes.

» **1505.12 Signage.** Signs in rooms and water closet tanks in buildings using reclaimed (recycled) water shall be in accordance with Section 1505.12.1, Section 1505.12.2, and Section 1505.12.3. Signs on access doors to valves and appurtenances shall be in accordance with Section 1505.8.2.

**1505.12.1 Commercial, Industrial, Institutional, and Residential Restroom Signs.** *A sign shall be installed in each restroom of commercial, industrial, and institutional occupancies, and in residential common use areas using reclaimed (recycled) water for water closets, urinals, or both. Each sign shall contain letters of a highly visible color on a contrasting background with a character height as specified in the California Building*

*Code (California Code of Regulations, Title 24, Part 2), Section 1143A.5 and Section 11B-703.5. The location of the sign(s) shall be such that the sign(s) are visible to users and shall be approved by the Authority Having Jurisdiction. The sign(s) shall contain the following text: TO CONSERVE WATER, THIS BUILDING USES RECYCLED WATER TO FLUSH TOILETS AND URINALS.*

**1505.12.2 Tank-Type Toilet Signs.** *Where tank-type toilets (water closets) are flushed with recycled water, a permanent sign (such as plastic or stainless steel) shall be installed inside the tank to warn that the water within the tank is not a suitable emergency drinking water supply. The sign shall be labeled: “CAUTION: NONPOTABLE RECYCLED WATER – DO NOT DRINK.”*

**1505.12.3 Equipment Room Signs.** *Each room containing reclaimed (recycled) water equipment shall have a sign posted in a location that is visible to anyone working on or near reclaimed (recycled) water equipment with the following wording in 1 inch (25.4 mm) letters on a purple background:*

*CAUTION: NONPOTABLE RECYCLED WATER, DO NOT DRINK. DO NOT CONNECT TO DRINKING WATER SYSTEM. NOTICE: CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM.*

**1505.13 Inspection and Testing.** Recycled water supply systems shall be inspected and tested in accordance with Section 1505.13.1 and Section 1505.13.2. The reclaimed (recycled) water purveyor or other designated appointee may substitute for the Authority Having Jurisdiction for the purpose of inspections and tests pursuant to this section. <<

**1505.13.1 Supply System Inspection and Test.** *Recycled water supply systems shall be inspected and tested in accordance with this code for testing of potable water piping.*

**1505.13.2 Cross-Connection Inspection and Testing.** *An initial visual inspection and an initial cross-connection test shall be performed on both the potable and recycled water supply systems before the initial operation of the recycled water supply system. During an initial or subsequent cross-connection test, the potable water system and recycled water supply system shall be isolated from each other and independently inspected and tested to ensure there is no cross-connection in accordance with Section 1505.13.2.2. Initial or subsequent inspections or tests shall be performed in accordance with Section 1505.13.2.1 through Section 1505.13.2.4.*

- (1) *Written reports of cross-connection inspections and testing shall be performed as provided in California Code of Regulations, Title 22, Section 60316.*
- (2) *A cross-connection test pursuant to Section 1505.13.2.2 shall be performed on the premises of a recycled water supply system when there is material reason to believe that the potable water system or recycled water supply system separation from another water supply has been compromised. A*

material reason to believe that the system has been compromised may be based on, but is not limited to, evidence gathered (a) during a visual inspection performed pursuant to Section 1505.13.2.1, (b) as a result of an inspection performed following complaints of water quality or flow conditions consistent with a compromised system, or (c) during a visual inspection that indicates that the recycled water supply system has been modified.

**1505.13.2.1 Visual System Inspection.** A visual dual system inspection shall be conducted by the Authority Having Jurisdiction and other authorities having jurisdiction to verify that no modifications were made, and that no cross-connections are visible as follows:

- (1) Meter locations of the reclaimed (recycled) water source and potable water lines shall be checked.
- (2) All pumps and equipment, equipment room signs, and exposed piping in equipment room shall be checked.
- (3) All valves shall be checked to ensure that the valve lock seals are still in place and intact. Valve control door signs shall be checked to verify that no signs have been removed.

**1505.13.2.2 Cross-Connection Test.** A cross-connection test shall be performed pursuant to Section 1505.13.2. The test shall be conducted in the presence of the Authority Having Jurisdiction or other authorities having jurisdiction to determine whether a cross connection has occurred as follows:

- (1) The potable water system shall be activated and pressurized. The recycled water supply system shall be shut down, depressurized, and drained.
- (2) The potable water system shall remain pressurized for a minimum period of time specified by the Authority Having Jurisdiction while the recycled water supply system is empty. The minimum period the recycled water supply system is to remain depressurized shall be determined on a case-by-case basis, taking into account the size and complexity of the potable and the recycled water supply systems, but in no case shall that period be less than 1 hour.
- (3) All fixtures, potable and reclaimed (recycled) water source, shall be tested and inspected for flow. Flow from a recycled water supply system outlet indicates a cross-connection. No flow from a potable water outlet shall indicate that it is connected to the recycled water supply system.
- (4) The drain on the recycled water supply system shall be checked for flow during the test and at the end of the test.
- (5) The potable water system shall then be depressurized and drained.
- (6) The recycled water supply system shall then be activated and pressurized. For the initial cross-

connection test, a temporary connection to a potable water supply shall be required to test the recycled water supply system plumbing. At the conclusion of the initial cross-connection test, the temporary connection to the potable water supply shall be disconnected.

- (7) The recycled water supply system shall remain pressurized for a minimum period of time specified by the Authority Having Jurisdiction while the potable water system is empty. The minimum period the potable water system is to remain depressurized shall be determined on a case-by-case basis, but in no case shall that period be less than 1 hour.
- (8) All fixtures, potable and reclaimed (recycled) water, shall be tested and inspected for flow. Flow from a potable water system outlet indicates a cross-connection. No flow from a recycled water supply system outlet will indicate that it is connected to the potable water system.
- (9) The drain on the potable water system shall be checked for flow during the test and at the end of the test.
- (10) Where there is no flow detected in the fixtures that would indicate a cross-connection, the potable water system shall be repressurized.

Where shutting off the water is not practical for residential, institutional, or industrial buildings, the Authority Having Jurisdiction may authorize testing procedures other than those described above.

**1505.13.2.3 Discovery of Cross-Connection.** In the event that a cross-connection is discovered, the following procedure shall be activated immediately:

- (1) Notify the Authority Having Jurisdiction of the cross-connection.
- (2) The reclaimed (recycled) water piping to the building and its premises shall be shut down at the meter, and the reclaimed (recycled) water riser shall be drained.
- (3) Potable water piping to the building and its premises shall be shut down at the meter.
- (4) The cross-connection shall be uncovered and disconnected.
- (5) The building and its premises shall be retested in accordance with Section 1505.13.2.1 and Section 1505.13.2.2.
- (6) The potable water system shall be chlorinated with 50 parts-per-million (ppm) chlorine for 24 hours.
- (7) The potable water system shall be flushed after 24 hours, and a standard bacteriological test shall be performed. Where test results are acceptable, the potable water system shall be permitted to be recharged.

**1505.13.2.4 Periodic Inspection.** *Periodic visual inspections of recycled water supply systems shall be required by the recycled water supplier or designee following the procedures in Section 1505.13.2.1. Pursuant to California Code of Regulations, Title 22, Section 60316, annual visual inspections shall be required for recycled water supply systems that are within or a part of a building.*

**1505.14 Minimum Water Quality Requirements for Reclaimed (Recycled) Water.** *The minimum water quality for reclaimed (recycled) water shall meet the applicable water quality requirements of California Code of Regulations, Title 22, Division 4, Chapter 3 (commencing with Section 60301) for disinfected tertiary recycled water and the applicable reclaimed (recycled) water use. The reclaimed (recycled) water supplier shall supply water in accordance with permits issued by the State Water Resources Control Board or Regional Water Quality Control Board.*

**1505.15 Maintenance and Inspection.** *Recycled water supply systems and components shall be inspected and maintained in accordance with the manufacturer's recommendations and/or as required by the Authority Having Jurisdiction. The frequency of testing, inspection, and maintenance shall be in accordance with Table 1505.15. The required inspection and maintenance shall be the responsibility of the property owner; unless otherwise required by the Authority Having Jurisdiction.*

» **1506.0 On-Site Treated Nonpotable Gray Water Systems.**

» **1506.1 General.** The provisions of this section shall apply to the installation, construction, alteration, and repair of on-site treated nonpotable gray water systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, above and belowground irrigation, and other uses approved by the Authority Having Jurisdiction.

*Other approved nonpotable water sources including swimming pool backwash operations, air conditioner condensate, rainwater, cooling tower blow-down water, foundation drainage, steam system condensate, fluid cooler discharge water, food steamer discharge water, combination oven discharge water, industrial process water, and fire pump test water may be permitted to be collected for re-use by gray water systems, as approved for the intended application.*

**1506.2 Plumbing Plan Submission.** No permit for an on-site treated nonpotable gray water system shall be issued until complete plumbing plans, with data satisfactory to the Authority Having Jurisdiction, have been submitted and approved. **[BSC-CG, HCD 1]** *Prior to commencing the issuance of permits for indoor gray water systems pursuant to state requirements relating to graywater; a city, county, city and county or other local agency shall seek consultation with the local public health department to ensure that local public health concerns are addressed in local standards or ordinances, or in issuing permits. See California Water Code Section 14877.3.*

**1506.3 System Changes.** No changes or connections shall be made to either the on-site treated nonpotable gray water system or the potable water system within a site containing an on-site treated nonpotable gray water system without approval by the Authority Having Jurisdiction.

**1506.4 Connections to Potable or Reclaimed (Recycled) Water Systems.** On-site treated nonpotable gray water systems shall have no direct connection to a potable water supply or recycled water supply system. ||

**Exceptions:**

- (1) Potable or reclaimed (recycled) water is permitted to be used as makeup water for a non-pressurized storage tank provided the makeup water supply inlet is protected by an air gap in accordance with this code.
- (2) A potable water supply may be connected temporarily for the initial cross-connection test of the on-site treated non-potable gray water system as provided in Section 1502.3.2. ||

**1506.5 Initial Cross-Connection Test.** A cross-connection test is required in accordance with Section 1502.3. Before the building is occupied or the system is activated, the installer shall perform the initial cross-connection test in the presence of the Authority Having Jurisdiction and other authorities having jurisdiction. The test shall be ruled successful by the Authority Having Jurisdiction before final approval is granted.

**1506.6 On-Site Treated Nonpotable Gray Water System Materials.** On-site treated nonpotable gray water supply, and distribution system materials shall comply with the requirements of this code for potable water supply and distribution systems unless otherwise provided for in this section.

**TABLE 1505.15  
MINIMUM RECLAIMED (RECYCLED) WATER SOURCE TESTING, INSPECTION, AND MAINTENANCE FREQUENCY**

DESCRIPTION	MINIMUM FREQUENCY*
Inspect and clean filters and screens, and replace (where necessary).	Every 3 months.
Inspect pumps and verify operation.	After initial installation and every 12 months thereafter.
Inspect valves and verify operation.	After initial installation and every 12 months thereafter.
Inspect pressure tanks and verify operation.	After initial installation and every 12 months thereafter.
Clear debris from and inspect storage tanks, locking devices, and verify operation.	After initial installation and every 12 months thereafter.
Inspect caution labels and marking.	After initial installation and every 12 months thereafter.

\*Note: Frequency is as described in this table, or more frequently as required by manufacturer's instructions and/or the Authority Having Jurisdiction.

**1602.9.2 Deactivation and Drainage for Cross-Connection Test.** The rainwater catchment system and the potable water system within the building shall be provided with the required appurtenances (e.g., valves, air or vacuum relief valves, etc.) to allow for deactivation or drainage as required for a cross-connection test in accordance with Section 1605.3.

**1602.9.3 Rainwater Catchment System Surfaces.** Rainwater shall be collected from roof surfaces or other impervious manmade, above-ground collection surfaces. Rainwater collected from surface water runoff, vehicular parking surfaces or manmade surfaces at or below grade shall comply with the water quality requirements for on-site treated nonpotable gray water in Section 1504.0.

**Exception:** Collected rainwater or storm water used exclusively for subsurface landscape irrigation.

» **1602.9.4 Other Surfaces.** Natural precipitation collected from surface water runoff, vehicular parking surfaces, or manmade surfaces at or below grade shall be in accordance with the water quality requirements for on-site treated nonpotable gray water systems in Section 1506.0.

**Exception:** Collected rainwater or storm water used exclusively for subsurface landscape irrigation.

» **1602.9.5 Prohibited Discharges.** Overflows and bleed-off pipes from roof-mounted equipment and appliances shall not discharge onto roof surfaces that are intended to collect rainwater.

» **1602.9.6 Minimum Water Quality.** The minimum water quality for harvested rainwater shall meet the applicable water quality requirements for the intended

applications as determined by the Authority Having Jurisdiction. In the absence of water quality requirements determined by the Authority Having Jurisdiction, the minimum treatment and water quality shall be in accordance with Table 1602.9.6.

**Exception: [BSC]** No treatment is required for rainwater used for non-spray irrigation where the maximum storage volume is less than 5000 gallons (18 927 L) where the tank is supported directly upon grade and the ratio of height to diameter or width does not exceed 2 to 1.

**1602.9.6.1 Disinfection.** Where the initial quality of the collected rainwater requires disinfection or other treatment or both, the collected rainwater shall be treated as necessary to ensure the required water quality is delivered at the point of use. Where chlorine is used for disinfection or treatment, water shall be tested for residual chlorine in accordance with ASTM D1253. The levels of residual chlorine shall not exceed the levels allowed for the intended use in accordance with the requirements of the local Enforcing Agency.

**1603.0 Rainwater Storage Tanks.**

**1603.1 General.** Rainwater storage tanks shall be constructed and installed in accordance with Section 1603.2 through Section 1603.9.

**1603.2 Construction.** Rainwater storage tanks shall be constructed of solid, durable materials not subject to excessive corrosion or decay and shall be watertight.

**TABLE 1602.9.6  
MINIMUM WATER QUALITY**

APPLICATION	MINIMUM TREATMENT	MINIMUM WATER QUALITY
Car washing	Debris excluder or other approved means in accordance with Section 1603.14, and 100 microns (100 μm) in accordance with Section 1603.15 for drip irrigation.	N/A
Surface, Subsurface and drip irrigation	Debris excluder or other approved means in accordance with Section 1603.14, and 100 microns (100 μm) in accordance with Section 1603.15 for drip irrigation.	N/A
Spray irrigation where the maximum storage volume is less than 360 gallons (1363 L)	Debris excluder or other approved means in accordance with Section 1603.14, and disinfection in accordance with Section 1603.12.	N/A
Spray irrigation where the maximum storage volume is equal to or more than 360 gallons (1363 L)	Debris excluder or other approved means in accordance with Section 1603.14.	Escherichia coli: < 100 CFU/100 mL, and Turbidity: < 10 NTU
Urinal and water closet flushing, clothes washing, and trap priming	Debris excluder or other approved means in accordance with Section 1603.14, and 100 microns (100 μm) in accordance with Section 1603.15.	Escherichia coli: < 100 CFU/100 mL, and Turbidity: < 10 NTU
Ornamental fountains and other water features	Debris excluder or other approved means in accordance with Section 1603.14.	Escherichia coli: < 100 CFU/100 mL, and Turbidity: < 10 NTU
Cooling tower make-up water	Debris excluder or other approved means in accordance with Section 1603.14, and 100 microns (100 μm) in accordance with Section 1603.15.	Escherichia coli: < 100 CFU/100 mL, and Turbidity: < 10 NTU

For SI units: 1 micron = 1 μm, 1 gallon = 3.785 L

» **1603.3 Location.** Rainwater storage tanks shall be permitted to be installed above or below grade.

» **1603.4 Above Grade.** Above grade, storage tanks shall be of an opaque material, approved for aboveground use in direct sunlight or shall be shielded from direct sunlight. Tanks shall be installed in an accessible location to allow for inspection and cleaning. The tank shall be installed on a foundation or platform that is constructed to accommodate loads in accordance with the *California Building Code*.

**Exception:** Tanks may be installed directly on grade in accordance with 1601.3.

» **1603.5 Below Grade.** Rainwater storage tanks installed below grade shall be structurally designed to withstand anticipated earth or other loads. Holding tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (lb/ft<sup>2</sup>) (1465 kg/m<sup>2</sup>) where the tank is designed for underground installation. Below grade rainwater tanks installed underground shall be provided with manholes. *Below grade storage tanks, located outside of the building, shall be provided with either a manhole not less than 24 inches (610 mm) square or a manhole with an inside diameter of not less than 24 inches (610 mm). Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter.* The manhole opening shall be located not less than 4 inches (102 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground where empty. The combined weight of the tank and hold down system shall meet or exceed the buoyancy force of the tank.

» **1603.6 Drainage and Overflow.** Rainwater storage tanks shall be provided with a means of draining and cleaning. The overflow drain shall not be equipped with a shutoff valve. The overflow outlet shall discharge in accordance with this code for storm drainage systems. Where discharging to the storm drainage system, the overflow drain *and tank drain* shall be protected from backflow of the storm drainage system by a backwater valve or other approved method. *Backwater valves shall be installed so that access is provided to the working parts for service and repair.*

» **1603.6.1 Overflow Outlet Size.** The overflow outlet shall be sized to accommodate the flow of the rainwater entering the tank and not less than the aggregate cross-sectional area of inflow pipes.

» **1603.7 Opening and Access Protection.** Rainwater tank openings shall be protected to prevent the entrance of insects, birds, or rodents into the tank *and piping systems*.

(A) **Animals and Insects.** Screens installed on vent pipes, inlets, and overflow pipes shall have an aperture of not greater than 1/16 of an inch (1.6 mm) and shall be close fitting.

(B) **Human Access.** A minimum of one access opening shall be provided to allow inspection and cleaning. Rainwater tank manholes and access openings shall be secured by either a lockable device or other approved method to prevent unauthorized access.

**1603.8 Marking.** Rainwater tanks shall be permanently marked with the capacity and the language: “NONPOTABLE RAINWATER.” Where openings are provided to allow a person to enter the tank, the opening shall be marked with the following language: “DANGER-CONFINED SPACE.”

**1603.9 Storage Tank Venting.** Where venting using drainage or overflow piping is not provided or is considered insufficient, a vent shall be installed on each tank. The vent shall extend from the top of the tank and terminate not less than 6 inches (152 mm) above grade and shall be provided with a vent sized in accordance with this code, and based on the size of the influent pipe. The vent terminal shall be directed downward and covered with a 1/16 of an inch (2.4 mm) mesh screen to prevent the entry of vermin and insects. *Tank vent pipes shall not be connected to the sanitary drainage system vent.*

**1603.10 Pumps.** Pumps serving rainwater catchment systems shall be listed. Pumps supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than 15 pounds-force per square inch (psi) (103 kPa) residual pressure at the highest and most remote outlet served. Where the water pressure in the rainwater supply system within the building exceeds 80 psi (552 kPa), a pressure reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed in accordance with this code.

**1603.11 Roof Drains.** Primary and secondary roof drains, conductors, leaders, and gutters shall be designed and installed in accordance with this code.

**1603.12 Water Quality Devices and Equipment.** Devices and equipment used to treat rainwater to maintain the minimum water quality requirements determined by the Authority Having Jurisdiction shall be listed or labeled (third-party certified) by a listing agency (accredited conformity assessment body) and approved for the intended application.

**1603.13 Freeze Protection.** Tanks and piping installed in locations subject to freezing shall be provided with an approved means of freeze protection.

**1603.14 Debris Removal.** The rainwater catchment conveyance system shall be equipped with a debris excluder or other approved means to prevent the accumulation of leaves, needles, other debris and sediment from entering the storage tank. Devices or methods used to remove debris or sediment shall be accessible and sized and installed in accordance with manufacturer’s installation instructions.

**1603.15 Required Filters.** A filter permitting the passage of particulates not larger than 100 microns (100 µm) shall be provided for rainwater supplied to water closets, urinals, trap primers, and drip irrigation systems.

**1603.16 Roof Gutters.** Gutters shall maintain a minimum slope and be sized in accordance with Section 1103.3.

**1604.0 Signs.**

**1604.1 General.** Signs in buildings using rainwater shall be in accordance with Section 1604.2 and Section 1604.3, and applicable requirements of the *California Building Code*.



» **1604.2 Commercial, Industrial, Institutional and Residential Restroom Signs.** A sign shall be installed in restrooms in commercial, industrial, and institutional occupancies, *and in residential common use areas* using non-potable rainwater for water closets, urinals, or both. *Signs shall comply with all applicable requirements of the California Building Code.* Each sign shall contain the following text:  
TO CONSERVE WATER, THIS BUILDING USES RAINWATER TO FLUSH TOILETS AND URINALS.

» **1604.3 Equipment Room Signs.** Each equipment room containing nonpotable rainwater equipment shall have a sign posted with the following wording in 1 inch (25.4 mm) letters:  
CAUTION NONPOTABLE WATER, DO NOT DRINK. DO NOT CONNECT TO DRINKING WATER SYSTEM. NOTICE: CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM.

This sign shall be posted in a location that is visible to anyone working on or near rainwater water equipment.

» **1605.0 Inspection and Testing.**

» **1605.1 General.** Rainwater catchment systems shall be inspected and tested in accordance with Section 1605.2 and Section 1605.3.

» **1605.2 Supply System Inspection and Test.** Rainwater catchment systems shall be inspected and tested in accordance with the applicable provisions of this code for testing of potable water and storm drainage systems. Storage tanks shall be filled with water to the overflow opening for a period of 24 hours, and during the inspection, or by other means as approved by the Authority Having Jurisdiction. Seams and joints shall be exposed during the inspection and checked for watertightness.

» **1605.3 Cross-Connection Inspection and Testing.** An initial visual inspection and an initial cross-connection test shall be performed on both the potable and rainwater catchment water systems *before the initial operation of the rainwater catchment system. During an initial or subsequent cross-connection test, the potable and rainwater catchment water systems shall be isolated from each other and independently inspected and tested to ensure there is no cross-connection in accordance with Section 1602.5. Initial or subsequent inspections or tests shall be performed in accordance with Section 1605.3.1 through Section 1605.3.3.*

» **1605.3.1 Visual System Inspection.** Prior to commencing the cross-connection testing, a dual system inspection shall be conducted by the Authority Having Jurisdiction and other authorities having jurisdiction as follows:

- (1) Pumps, equipment, equipment room signs, and exposed piping in an equipment room shall be checked.

» **1605.3.2 Cross-Connection Test.** *A cross-connection test shall be performed in the presence of the Authority Having Jurisdiction or other authorities having jurisdiction to determine whether a cross-connection has occurred as follows:*

- (1) The potable water system shall be activated and pressurized. The rainwater catchment water system shall be shut down and completely drained.
- (2) The potable water system shall remain pressurized for a minimum period of time specified by the Authority Having Jurisdiction while the rainwater catchment water system is empty. The minimum period the rainwater catchment water system is to remain depressurized shall be determined on a case-by-case basis, taking into account the size and complexity of the potable and rainwater catchment water distribution systems, but in no case shall that period be less than 1 hour.
- (3) Fixtures, potable, and rainwater shall be tested and inspected for flow. Flow from a rainwater catchment water system outlet shall indicate a cross-connection. No flow from a potable water outlet shall indicate that it is connected to the rainwater water system.
- (4) The drain on the rainwater catchment water system shall be checked for flow during the test and at the end of the period.
- (5) The potable water system shall then be completely drained.
- (6) The rainwater catchment water system shall then be activated and pressurized. *When rainwater is not available for the initial cross-connection test, a temporary connection to a potable water supply shall be required. At the conclusion of the initial cross-connection test, the temporary connection to the potable water supply shall be disconnected.*
- (7) The rainwater catchment water system shall remain pressurized for a minimum period of time specified by the Authority Having Jurisdiction while the potable water system is empty. The minimum period the potable water system is to remain depressurized shall be determined on a case-by-case basis, but in no case shall that period be less than 1 hour.
- (8) Fixtures, potable and rainwater catchment, shall be tested and inspected for flow. Flow from a potable water system outlet shall indicate a cross-connection. No flow from a rainwater catchment water outlet shall indicate that it is connected to the potable water system.
- (9) The drain on the potable water system shall be checked for flow during the test and at the end of the period.
- (10) Where there is no flow detected in the fixtures which would indicate a cross-connection, the potable water system shall be repressurized.

**1605.3.3 Discovery of Cross-Connection.** In the event that a cross-connection is discovered, the following procedure shall be activated immediately: <<

- (1) Rainwater catchment water piping to the building shall be shutdown at the *supply source(s)*, and the rainwater water riser shall be drained.
- (2) Potable water piping to the building shall be shutdown at the meter.

## NONPOTABLE RAINWATER CATCHMENT SYSTEMS

- (3) The cross-connection shall be uncovered and disconnected.
- (4) The building shall be retested following procedures listed in Section 1605.3.1 and Section 1605.3.2.
- (5) The potable water system shall be chlorinated with 50 ppm chlorine for 24 hours.
- (6) The potable water system shall be flushed after 24 hours, and a standard bacteriological test shall be performed. Where test results are acceptable, the potable water system shall be permitted to be recharged.



# INDEX

© 2018 International Association of Plumbing and Mechanical Officials. All rights reserved.

The copyright in this index is separate and distinct from the copyright in the document that it indexes. The licensing provisions set forth for the document are not applicable to this index. This index may not be reproduced in whole or in part by any means without the express written permission of IAPMO.

## – A –

### ABANDONED

- Grease interceptors . . . . .1014.3.7
- Sewers and sewage disposal . . . . .722.0, H 1101.0

### ACCESS PANELS . . . . .317.1, 402.10

### ACCESS TO

- Appliances . . . . .507.26, 508.3, 508.4
- Backwater valves . . . . .710.6, 1101.6.4  
1503.2.3
- Chemical waste system piping . . . . .811.4
- Cleanouts . . . . .707.8, 719.5
- Drips . . . . .1210.6.1
- Emergency eyewash and  
shower equipment . . . . .416.4
- Flexible connectors . . . . .604.5, 1212.5.3
- Flushometers . . . . .413.2
- Fuel gas meters . . . . .1208.7.1, E 402.4.1
- Fuel gas piping . . . . .1210.2.2.1, 1210.3.4
- Fuel gas pressure regulators . . . . .1208.8.2, 1210.4.1
- Fullway valves . . . . .606.2, 710.6
- Grease interceptors . . . . .1014.3.4
- Indirect waste receptors . . . . .804.1
- Interceptors . . . . .1009.3, 1009.5,  
1016.4, H 901.5
- Lapped flanges . . . . .1208.6.13.7
- Manholes . . . . .H 501.12
- Meters and submeters . . . . .L 407.4
- Plumbing fixtures . . . . .402.1
- Pool heaters on/off switch . . . . .L 503.3.6(1)
- Rainwater storage tanks . . . . .1603.4, K 105.3.1
- Septic tanks . . . . .H 501.5
- Shutoff valves . . . . .606.3, 606.6,  
1210.9, 1210.9.1,  
1210.9.2, 1210.9.4,  
1212.5.3, 1212.6,  
1311.8(1) – 1311.8(2),  
E 403.9, E 403.13(2)(6)
- Sumps . . . . .710.10, 810.3
- Toilet facilities . . . . .422.4
- Trap seal primers . . . . .1007.1
- Vacuum pumps . . . . .C 501.2.1
- Valves for  
nonpotable application . . . . .1503.8
- Vent connectors, fuel gas . . . . .509.10.10
- Water meters and submeters . . . . .L 407.4
- Water pressure regulators and strainers . . . . .608.2

### ACCESSIBLE, DEFINITION . . . . .203.0

### ACCESSIBLE, READILY, DEFINITION . . . . .203.0

### ACCESSIBLE PLUMBING FACILITIES

- For persons with disabilities . . . . .403.2
- Protection against contact . . . . .403.3
- Where required . . . . .403.1

### ACCESSORY DWELLING UNIT, DEFINITION . . . . .203.0 II

### ACRYLONITRILE-BUTADIENE-STYRENE

- (ABS) PIPE . . . . .203.0, Table 313.3, 701.2,  
Table 701.2, 705.1,  
705.9.4, 903.1, 1101.4

### ADMINISTRATION, CALIFORNIA . . . . .Chapter 1, Division I

### AIR GAPS

- Backflow prevention . . . . .603.2, Table 603.2, 603.3.1,  
Table 603.3.1, 603.4.4
- Definition . . . . .203.0
- Discharge from drinking  
water treatment units . . . . .611.2

### AIR TANK . . . . .710.11

### ALTERATIONS AND REPAIRS

- Fuel gas piping . . . . .1203.1, 1213.1.2, 1213.4.2
- Health care facilities . . . . .1301.6
- Plumbing systems . . . . .102.4, 301.2.5

### ALTERNATE MATERIALS, DESIGN,

### AND METHODS . . . . .301.3

### ALTERNATE WATER SOURCE

- Definition . . . . .203.0
- For nonpotable applications . . . . .Chapter 15
- For special water features . . . . .L 406.1
- Future Connections* . . . . .1504.9.1
- Identification of piping . . . . .601.3.3
- Nonpotable rainwater  
catchment system . . . . .Table 1601.5, 1602.4, K 102.2

### APPLIANCES

- Automatically operated . . . . .509.3.4.1, 509.5.7.1
- Categorized vent  
diameter/area, definition . . . . .203.0
- Connections to building  
fuel gas piping . . . . .1212.0
- Definition . . . . .203.0
- Direct-vent . . . . .206.0, 509.2.6, 509.5.10.1,  
509.8.2, 509.12
- In attics . . . . .508.4
- Indirect waste type . . . . .806.0, 807.0
- In under-floor spaces . . . . .508.4
- On roofs . . . . .508.0

Vent Connectors . . . . .509.10, 510.2.11  
Venting of . . . . .509.0  
**APPLICATION FOR PERMIT** . . . . .104.3  
**APPROVED, DEFINITION** . . . . .203.0  
**APPROVED TESTING**  
**AGENCY, DEFINITION** . . . . .203.0  
**AREA DRAINS** . . . . .203.0, 1101.5  
**ASBESTOS-CEMENT PIPE** . . . . .Table 510.1.2(5),  
Table 510.2(5)  
**ASPIRATORS** . . . . .203.0, 603.5.9, 1303.5  
**AUTHORITY HAVING JURISDICTION** . . . . .103.0, 203.0  
**AUTHORITY TO**  
Disconnect gas . . . . .1206.0  
Plumbing system . . . . .106.5  
Render gas service . . . . .1205.0  
**AUTOMATIC**  
Drains . . . . .K 106.4.4  
Flushometer valves . . . . .413.2  
Pressure relief valve . . . . .608.4  
Pumps . . . . .612.7.2, 1101.6.2, 1314.3,  
C 501.2.5, H 601.8  
Seat cover dispensers . . . . .411.3  
Shutoff . . . . .420.3, 504.6  
Siphon, septic tanks . . . . .H 601.8  
Sprinkler systems . . . . .603.5.14  
Sumps and receiving tanks . . . . .710.9  
Vent dampers, fuel gas . . . . .509.14, 509.14.1  
**AUTO WASH RACKS** . . . . .1011.0

- B -

**BACKFILLING** . . . . .314.4, 314.4.1, 1210.1.2.1,  
1310.6, 1310.6.3, 1310.6.5,  
1504.7.2, H 601.2  
**BACKFLOW**  
Definition . . . . .204.0  
*Fire sprinkler protection* . . . . .612.3.8  
Prevention . . . . .602.2, 602.3  
Prevention devices  
or assembly . . . . .603.1, Table 603.2, 603.3  
**BACKFLOW CONNECTION** . . . . .204.0, 603.0  
**BACKFLOW PREVENTERS**  
Approved standards . . . . .Table 603.2  
Definition . . . . .204.0  
For hot water . . . . .603.4.5  
Integral . . . . .417.2, 417.3, 417.4, 603.4.6  
Prohibited locations . . . . .603.4.9  
Protection from damage . . . . .E 302.6  
Required . . . . .603.2  
**BACKFLOW PREVENTION** . . . . .602.3, 603.3  
**BACK-TO-BACK FIXTURES** . . . . .704.2  
**BACKWATER VALVES**  
Definition . . . . .204.0  
Where Required . . . . .710.6

**BALLCOCKS** . . . . .Table 603.2, 603.5.2  
**BAPTISTRIES** . . . . .406.1  
**BATHROOM, HALF, DEFINITION** . . . . .204.0  
**BATHROOM GROUP** . . . . .204.0, 908.2, C 303.0  
**BATHTUB, PROHIBITED TYPE** . . . . .405.3  
**BATHTUBS AND**  
**WHIRLPOOL BATHTUBS** . . . . .409.0  
**BIDETS** . . . . .402.5, 410.0  
**BLOWOFF CONDENSERS** . . . . .810.1, Table 810.1  
**BOARD OF APPEALS** . . . . .107.0  
**BOILER BLOWOFF**  
Definition . . . . .204.0  
Discharge requirements . . . . .810.1  
**BONDING JUMPER**  
Bonding of CSST fuel gas piping . . . . .1211.2  
Definition . . . . .204.0  
**BOTTLING ESTABLISHMENTS** . . . . .1013.0  
**BUILDING DRAIN**  
Definition . . . . .204.0  
Existing . . . . .102.4.1  
Material . . . . .Table 701.2  
Sizing . . . . .703.0, Table 703.2, 710.5,  
C 304.2, Table C 304.2  
Testing . . . . .712.0  
**BUILDING DRAIN (STORM),**  
**DEFINITION** . . . . .204.0  
**BUILDING SEWERS**  
Definition . . . . .204.0  
Existing . . . . .102.4.1, 715.3  
Location . . . . .721.0  
Material . . . . .Table 701.2, 715.1, 720.0  
Sizing . . . . .710.5, 717.0, Table 717.1, C 304.2  
Testing . . . . .723.0  
**BUILDING SUPPLY** . . . . .204.0, Chapter 6  
**BURRED ENDS** . . . . .309.3, 609.1, 701.3.1, 903.3,  
1208.6.8, 1309.5.2

- C -

**CAPACITY OF**  
Breathing air cylinders . . . . .F 1001.1  
Graywater systems . . . . .1503.2.1  
Interceptors . . . . .1014.2.1  
Irrigation field and  
mulch basin . . . . .1503.2.1, 1504.2, Table 1504.2,  
1504.3, 1504.5.1, 1504.5.2, 1504.6.2  
Medical air compressors . . . . .1313.2.1, 1313.5.1(1)  
Rectangular scuppers . . . . .D 104.0  
Sewage ejectors or pumps . . . . .710.3  
Sump pump . . . . .1101.6.2  
Water heaters . . . . .501.1, Table 501.1(1)  
**CAST-IRON PIPE**  
Approved standards . . . . .301.2.4  
Discharge line from ejectors . . . . .710.4  
Drainage piping . . . . .701.2

Threaded joint ..... 605.1.5, 605.2.3,  
605.5.2, 605.11.3,  
605.12.3, 605.16.1,  
705.1.3, 705.3.4,  
705.4.2, 705.6.3,  
705.10.2, 1208.6.10,  
1208.6.11.1, 1208.6.11.4,  
1309.13, A 1073

Tightness ..... 105.3

Transition joint ..... 705.9.4

Various materials ..... 605.16, 705.10, 1210.1.3

Vitrified clay ..... 705.8

Welded joint ..... 212.0, 605.13.2,  
705.7.2, 1208.6.11.1,  
1309.16, F 1101.2

- L -

**LABELED** ..... 214.0, 301.2

**LAUNDRY TUBS** ..... 1001.2

**LAVATORIES** ..... 407.0, 422.9, Table 702.1,  
E 501.4

**LAVATORIES IN SETS** ..... 214.0, Table 702.1

**LAVATORY, DEFINITION** ..... 214.0

**LAVATORY FAUCETS**

*Common and public use areas* ..... 4072.3

*Maximum flow rate* ..... 4072.1, 4072.2

*Metering faucet* ..... 4072.4

*Public* ..... 4072.1

*Residential* ..... 4072.2

**LAWN SPRINKLERS** ..... Table 610.3, Table A 103.1

**LEAD**

Allowable lead contents ..... 604.2, 604.2.1

Bends and traps ..... 701.5, 906.6

Closet rings ..... 402.6.1

Flashing ..... 1102.3.1

Roof drains ..... 1102.1

Sheet ..... 408.7.3, 701.5, 906.6

Water supply ..... 604.2, 604.2.1

**LEADERS** ..... 214.0, 1101.4.3,  
1101.12.1, 1101.13.1,  
1101.15, 1101.16,  
1101.16.1, 1103.0,  
Table 1103.1

**LIMITED-DENSITY OWNER-BUILT  
RURAL DWELLING** ..... 214.0

**LIQUEFIED PETROLEUM  
GAS (LP-GAS)** ..... 214.0, 1202.1,  
1208.5.1, 1208.6.7,  
1208.6.12.4, 1210.8,  
1212.11, E 401.2,  
E 403.1, E 403.10

**LIQUID WASTES** ..... 214.0, 303.0, L 302.0

**LISTED** ..... 214.0, 301.2, 402.6.2,  
409.6, 412.1.1

**LISTING AGENCY** ..... 214.0, 301.2

**LOCATION OF**

Backwater valves ..... 710.1, 710.3, 710.4,  
710.6, 1006.0, 1101.6.4,  
1503.2.3, 1503.9.1

Fixtures ..... 308.0, 402.0

Fuel gas meters ..... 1208.7 – 1208.7.3,  
E 402.4 – E 402.4.2

Fuel gas valves ..... 1210.9 – 1210.9.4,  
1212.5.3, 1212.6, E 402.3

Interceptors and separators ..... 1009.3, 1009.5

Medical gas and  
medical vacuum system valves ..... 1312.1.1

Plumbing system or sewer on lot ..... 307.0, 721.1,  
Table 721.1

Private sewage disposal system ..... H 101.8

Water heaters ..... 504.1, 504.3 – 504.6,  
507.2, 507.5, 507.10,  
507.12 – 507.15, 507.25,  
507.26, 507.27, 508.0

**LOT, DEFINITION** ..... 214.0

**LOW HAZARD** ..... 214.0, Table 603.2

**LOW VOC CEMENT, DEFINITION** ..... 214.0

**LOW VOC ONE-STEP  
CEMENT, DEFINITION** ..... 214.0

**LOW VOC PRIMER, DEFINITION** ..... 214.0

- M -

**MACERATING TOILET SYSTEMS** ..... 215.0, 710.13

**MAIN, DEFINITION** ..... 215.0

**MAINTENANCE** ..... 102.2, 102.3, 1009.6, 1014.1.2,  
1501.5, Table 1501.5, 1501.6,  
1504.6.4, 1505.15, Table 1505.15,  
1504.11, 1601.5, Table 1601.5,  
K 101.5, K 101.5.1, Table K 104.3(2),  
L 501.5, L 504.2

**MALLEABLE IRON** ..... 604.7, Table 604.1, Table 701.2

**MANUFACTURED/MOBILE  
HOME PARKS AND  
RECREATIONAL VEHICLE PARKS** ..... Appendix E

**MARKINGS** ..... (see Identification)

**MATERIALS**

Alternate ..... 301.3, H 501.13

Approval required ..... 301.2

Approved standards ..... 301.2.2

Backwater, gate, or ball valves ..... 710.6

Building drains ..... Table 701.2

Building sewers ..... Table 701.2, 715.1, 720.0

Cesspools ..... H 801.0

Cleanouts ..... 707.1

Drainage piping, joints,  
and fittings ..... 701.2, Table 701.2,  
701.3, 705.0

Fuel gas piping, joints, and fittings . . . . .	1208.6 – 1208.6.2, 1208.6.3 – 1208.6.5, 1208.6.10, 1208.6.11, 1208.6.12
Marking of . . . . .	301.2.1
Medical gas and medical vacuum . . . . .	1308.0
Potable water piping, joints, and fittings . . . . .	604.0, 605.0
Rainwater catchment system . . . . .	1602.7
Septic tanks . . . . .	H 501.3
Storm drainage pipe . . . . .	1101.4
Subsoil drain . . . . .	1101.4.6
Sumps or receiving tanks . . . . .	710.8
Traps . . . . .	1003.1
Vents (DWV) . . . . .	Table 701.2, 903.0
<b>MAY, DEFINITION</b> . . . . .	215.0
<b>MEAT PACKING AND SLAUGHTERHOUSES</b> . . . . .	1010.0
Drainage . . . . .	717.2, 724.0
Water supply . . . . .	601.5, 601.8
<b>MEDICAL GAS AND MEDICAL VACUUM SYSTEMS</b> . . . . .	Chapter 13
Alarms . . . . .	1318.0
Aspirators . . . . .	1303.5
Category 1 . . . . .	205.0
Category 2 . . . . .	205.0
Category 3 . . . . .	205.0
Category 4 . . . . .	205.0
Cleaning . . . . .	1308.2, 1311.0
Construction documents . . . . .	1304.5
Definitions . . . . .	215.0
Installation requirements . . . . .	1304.0, 1310.0
Joints and connections . . . . .	1309.0
Labeling and identification . . . . .	1310.11
Materials . . . . .	1308.0
Medical air systems . . . . .	1314.0
Medical vacuum systems . . . . .	1315.0
Pipe sizing . . . . .	1310.2, Table 1310.2.1(1) – Table 1310.2.1(4)
Pressure-regulating equipment . . . . .	1315.0
Shutoff valves . . . . .	1312.0
Station outlets/inlets . . . . .	1305.3, Table 1305.3.1, 1316.0
Sterilizers and bedpan steamers . . . . .	1303.4
System certification . . . . .	1319.0
Testing and inspection . . . . .	1318.0
Warning system . . . . .	1317.0
<b>METALS, INTERMIXING PROHIBITED</b> . . . . .	310.6, 604.1
<b>METER, DEFINITION</b> . . . . .	215.0
<b>METERING FAUCETS</b> . . . . .	407.2.4, 407.2.4.1, 417.1.2
<b>MINIMUM STANDARDS</b> . . . . .	301.2
<b>MULCH, DEFINITION</b> . . . . .	215.0
<b>MULCH BASIN</b> . . . . .	215.0, 1504.0 – 1504.6.4

– N –

<b>NATURAL GAS, SPECIFIC GRAVITY</b> . . . . .	1214.1
<b>NITROGEN, NF, DEFINITION</b> . . . . .	216.0
<b>NONCOMBUSTIBLE PIPING INSTALLATIONS</b> . . . . .	1405.0
<b>NONPOTABLE WATER</b>	
Alternate water source . . . . .	Chapter 15
Disinfection . . . . .	1506.9.6
Identification . . . . .	601.3
Rainwater catchment system . . . . .	Chapter 16
Unlawful connections to . . . . .	603.5.11, E 502.3
<b>NONWATER SUPPLIED URINAL, DEFINITION</b> . . . . .	216.0
<b>NONWATER URINALS</b> . . . . .	412.1.1, L 402.3.1
<b>NUISANCE</b> . . . . .	102.5, 216.0

– O –

<b>OBSTRUCTIONS OF FLOW</b> . . . . .	310.5, 315.2
<b>OFFSETS</b>	
Definition . . . . .	217.0
Drainage . . . . .	706.4, C 304.3.1, C 304.3.2, C 304.4, C 401.4, C 601.7
Medical gas . . . . .	1309.2
Prohibited use . . . . .	402.6.3
Venting (fuel gas) . . . . .	509.6.2.2, 510.1.2, 510.2.4, 510.2.16
Venting (plumbing) . . . . .	910.5
<b>OIL AND FLAMMABLE INTERCEPTORS</b> . . . . .	1017.0
<b>ON-SITE TREATED NONPOTABLE WATER SYSTEMS</b> . . . . .	217.0, 601.3.3, 1506.0
Disinfection . . . . .	1506.9.6
Signage . . . . .	1501.9, 1501.9.2
<b>ONE- AND TWO-FAMILY DWELLINGS</b> . . . . .	301.6
<b>OPEN TRENCH WORK</b> . . . . .	314.3
<b>OPENING, EFFECTIVE, DEFINITION</b> . . . . .	207.0
<b>OVERFLOWS</b> . . . . .	404.2, 413.5, 607.4, 1603.6, 1603.6.1

– P –

<b>PATIENT CARE SPACE, DEFINITION</b> . . . . .	218.0
<b>PENALTIES</b> . . . . .	106.0
<b>PENETRATION</b>	
<b>FIRESTOP SYSTEMS</b> . . . . .	218.0, 1404.3, 1405.3
<b>PERCOLATION TESTS</b> . . . . .	1504.3, H 401.0
<b>PERMITS, REQUIRED</b> . . . . .	104.1, 502.1, 1501.3, 1601.3, E 101.2, E 302.7, K 101.3, H 101.9
<b>PERMITS FEES</b> . . . . .	104.5, Table 104.5
<b>PIPING</b>	
Drainage, changes in direction . . . . .	706.0
Drainage, existing sewers . . . . .	715.3
Drainage, horizontal slope . . . . .	708.0, 718.1

Drainage, material	.701.2, Table 701.2, 715.1, 720.1
Exposed to sunlight, ABS and PVC	.906.1
Fuel gas	.1208.0, 1210.0
Hangers and supports	.313.0, Table 313.3, 1210.2.4, 1210.2.4.1, Table 1210.2.4.1, 1310.5 – 1310.5.5 Table 1310.5.4(1)
Identification	.601.3
Indirect waste	.803.0
Joints and connections	..(see Joints and connections)
Medical gas, material	.1308.0
Plumbing vent, material	..Table 701.2, 903.0
Protection of	.312.0, 718.3, 1210.1.3 – 1210.1.5
Rehabilitation of	.320.0
Sprinkler system	.612.4, 612.5
Storm drainage, materials	.1101.4 – 1101.4.6
Trenching, excavation, and backfill	.314.0
Underground	.314.4.1, 1210.1.6
Water supply, material	.604.0, Table 604.1
<b>PITS, SEEPAGE</b>	.221.0, 714.3, 716.1, 722.2 – 722.4, Appendix H
<b>PLUGS, CAPS, CLEANOUT</b>	.707.1, 707.2
<b>PLUMBING</b>	
Additions, alterations, renovations or repairs	.102.4
Appliances	.218.0, 304.1, 310.5, 313.1, 417.2, 603.4.6, 606.5, Table 610.3, Table 702.1, 801.7, 803.3, 806.1, 807.0, 808.1, Table A 103.1, L 302.2
Appurtenances	.218.0, 304.1, 313.1, 603.4.6, Table 610.3, Table 702.1, 814.2.1, 1505.8.2, 1505.10, 1506.9.3, 1602.9.2, Table A 103.1, L 501.2
Connected to sewer or private disposal systems	.304.1, 713.1, L 302.2
Definition	.218.0
Inspection of	.105.0
Official	..(see Authority Having Jurisdiction)
<b>II Plumbing Equipment Schedules</b>	.323.0
System, definition	.218.0
Tests	.105.3, 105.3.1
Uncovered for inspection	.105.2.1
Vent, definition	.218.0
Vent system, definition	.218.0

## PLUMBING FIXTURES

Access	.402.1, 413.2, 416.4, 422.4
Accessibility	.403.1, 403.2, 408.5, 408.6
Alternate materials	.301.3, 406.3
Approved standards	.401.2, 408.1, 409.1, 410.1, 411.1, 412.1, 415.1, 416.1, 417.1 – 417.4, 418.1, 420.1
Back-to-back	.704.2
Below curb or sewer level	.710.1, 710.2
Clearance from wall, toilet, urinal	.402.5
Connections, drainage	.304.1, 406.1, 408.4, 409.2, 415.3, 416.5, 419.2, 420.4, 704.0
Control valves	.408.3, 408.9, 601.2, 606.5 – 606.7, 1303.1, 1505.8, 1506.10
Definition	.218.0
Distance from traps	.1001.2, 1002.2, Table 1002.2
Fixture units	.610.3, Table 610.4, 610.7 – 610.10, Table 610.10, 702.0, Table 702.1, Table 702.2(1), Table 702.2(2), 703.0, Table 703.2, Table A 103.1, Table C 303.2, Table C 303.3, C 501.4, C 501.5
Floor drains	.408.7, 414.3, 418.0, 704.3, 801.3.2, 1003.1, 1006.0, 1007.1, 1014.3.2, 1016.1, 1017.1, 1101.11, 1505.1, 1506.1, 1602.1, B 101.5, B 101.6.1, Table C 304.2, Table C 304.3, E 501.6
Improper location of	.308.0
Indirect wastes	.804.1
Installation of	.402.0, 405.3, 408.3, 408.7, 409.3, 409.6, 412.1.1, 413.1 – 413.3, 413.5, 415.4, 416.3, 418.3
Islands	.909.0
Joints	.402.2
Material of	.401.0, 406.2 – 406.4, 408.7
Minimum number	.422.0
Must be connected to sewer	.304.1, 713.1
Must be provided with trap	.1001.2
Overflows	.404.0
Prohibited	.310.5, 405.0, 910.7
Quality	.401.2

Setting	.402.5, 402.6
Size of waste for	.702.0, Table 702.1, 703.0, Table 703.2
Special fixtures	.406.0
Strainers and connections	.407.5, 408.4
Supply fittings	.402.7
Waste connections	.407.5, 408.4, 409.2, 415.3, 416.5, 419.2, 420.4
Water supply required	.601.2

**POLLUTION** .218.0, 603.1, Table 603.2, 714.5

**POLYVINYL CHLORIDE (PVC)**

**PIPE OR TUBING**

Approved standards, water supply and DWV	Table 604.1, Table 701.2
Definition	.218.0
Exposed to sunlight	.906.1
Flexible tubing for whirlpool bathtubs	.409.6.1
Joining and connections	(see Joints and connections)
Lining for shower receptors	.408.7
Roof drains	.1102.1

**POLYETHYLENE (PE) PIPE OR TUBING**

Approved standards, water supply and DWV	Table 604.1, Table 701.2
Definition	.218.0
Fuel gas	.1208.6.5, Table 1215.2(19) – 1215.2(23), Table 1215.2(34) – 1215.2(36)
Joining and connections	(see Joints and connections)
Roof drains	.1102.1

**POLYETHYLENE-ALUMINUM-POLYETHYLENE**

**(PE-AL-PE) PIPE OR TUBING**

Approved standards, water supply	Table 604.1
Definition	.218.0
Joining and connections	(see Joints and connections)

**POLYETHYLENE OF RAISED**

**TEMPERATURE (PE-RT) PIPE OR TUBING**

Approved standards, water supply	Table 604.1
Definition	.218.0
Flexible connectors	.604.13
Joining and connections	(see Joints and connections)

**POLYPROPYLENE (PP) PIPE OR TUBING**

Approved standards, water supply	Table 604.1
Chemical waste	.811.2
Definition	.218.0
Joining and connections	(see Joints and connections)
Roof drains	.1102.1

**POLYVINYLIDENE FLUORIDE (PVDF)**

**PIPE OR TUBING**

Chemical waste	.811.2
Definition	.218.0

**POTABLE RAINWATER**

**CATCHMENT SYSTEMS** Appendix K

**POTABLE WATER**

Connections	.603.4.4, 603.5.6, 603.5.7, 603.5.10 – 603.5.12, 603.5.14, 603.5.20, 801.5, 1303.5
Definition	.218.0
Devices or assemblies	.603.2
Disinfection	.609.9
Protection from heat transfer medium	.505.4.1, C 302.2
Heating	.501.1, L 601.1
Identification	.601.3
Joints and fittings	.604.2, 604.6, 605.0
Materials	.604.1, Table 604.1
Outlets	.603.5.17
Protection of	.602.0, 603.0
Sizing piping	.610.0, Appendix A
Supply required	.601.2, E 302.1
Tanks	.607.0
Unlawful connection to	.602.0, 603.5.11, 1503.3, 1505.4, 1506.4, 1602.4, E 502.3, K 102.2,
Valves	.606.0

**PRE-RINSE SPRAY VALVES** .420.3, L 201.0

**PRESSED FITTINGS** .605.1.3, 605.1.3.2,  
605.13.1, 605.16.1, 705.7.1

**PRESSURE DRAINAGE**

**CONNECTIONS** .805.0

**PRESSURE, EXCESSIVE, WATER** .608.2

**PRESSURE-LOCK-TYPE**

**CONNECTION, DEFINITION** .218.0

**PRESSURE LOSSES, WATER** .610.2

**PRESSURE REGULATORS**

Firefighter breathing air replenishment systems	.F 501.8
Fuel gas	.507.20, 507.21, 507.22, 1202.1, 1208.8, 1210.9, 1215.1.3
Medical gas and medical vacuum	.1309.8.2, 1313.4
Water	.608.2

**PRESSURE-RELIEF VALVES**

Definition	.224.0
Differential, backflow prevention	.603.3.7, Table 603.2
Discharge	.608.5
Firefighter breathing air replenishment systems	.F 501.1, F 501.8, F 701.3



Circuit venting . . . . .911.0  
Combination waste  
and vent piping . . . . .910.0, Appendix B  
Combustion air openings . . . . .506.3 – 506.5  
Condensate pipe . . . . .814.3, Table 814.3  
Disposal fields . . . . .Appendix H  
Drainage piping . . . . .Table 702.1, 703.0,  
Table 703.2, C 304.0,  
E 302.2, E 504.4  
FOG disposal systems . . . . .1015.3  
Fuel gas piping systems . . . . .1208.4, 1214.0,  
1215.0, E 403.2,  
Table E 403.2  
Fuel gas vents . . . . .509.6.2, 509.7.4,  
509.10.2, 510.0  
Flushometer valves and tanks . . . . .610.10, 610.11  
Gray water . . . . .1503.8  
Grease interceptors . . . . .1014.2.1, Table 1014.2.1,  
1014.3.6, Table 1014.3.6  
Hanger rods . . . . .313.6  
Indirect waste pipes . . . . .801.3.1, 803.3  
Leaders, conductors,  
and storm drains . . . . .1103.0, Table 1103.1,  
Table 1103.2, Table 1103.3  
Louvers, grilles, and screens . . . . .506.8  
Medical gas and medical vacuum pipe . . . . .1310.2.1  
Mulch basins . . . . .1504.6.2  
Oil tanks . . . . .E 403.12  
Pipe cleanouts . . . . .Table 707.1, 707.10  
Rainwater catchment systems . . . . .1602.6,  
K 106.7  
Reclaimed (recycled)  
water piping . . . . .1502.6, 1505.11  
Roof drainage . . . . .1101.12, Table 1103.1,  
Table 1103.2, Table 1103.3, 1105.1,  
1603.16, Appendix D, K 106.6  
Sand interceptors . . . . .1016.3  
Seepage pits and disposal fields . . . . .H 301.0  
Septic tanks . . . . .H 201.0  
Single-stack vent systems . . . . .C 601.0  
Subsoil irrigation field piping . . . . .1504.7  
Traps . . . . .702.1, Table 702.1, 910.4,  
1003.3, 1006.1, 1101.15.2  
Vacuum drainage systems . . . . .C 501.2.1  
Vent pipes . . . . .Table 703.2, 710.10, 810.1,  
Table 810.1, 904.0, 908.1.1,  
908.1.2, 908.2.2, C 401.0  
Water heaters . . . . .501.1, Table 501.1(1)  
Water piping . . . . .610.0, Table 610.3,  
Table 610.4, Table A 103.1,  
Appendix A, E 302.2,  
Water softener connections . . . . .611.4  
Wet venting . . . . .908.0

**SLAUGHTERHOUSES** . . . . .1010.0  
**SLIP JOINTS** . . . . .221.0, 402.10,  
509.10.9, 605.14,  
705.9.1, 705.9.3, 1003.2  
**SLOPE** . . . . .(see Grade)  
**SOIL PIPE** . . . . .221.0, 310.2, 310.4, 402.6.1, 402.6.3,  
Table 701.2, 701.2(6), 722.2, 1002.4,  
**SOIL POROSITY** . . . . .H 101.2  
**SOLDER, BUSHINGS** . . . . .701.7, Table 701.7  
**SOLDER JOINTS** . . . . .212.0, 309.2, Table 313.3, 402.6,  
605.1.3.1, 605.1.4, 605.16.1,  
705.3.3, 705.10.1, 705.10.2, 1309.2  
**SPACING**  
Pipe supports . . . . .313.0, Table 313.3,  
1210.2.4.1, Table 1210.2.4.1,  
1310.5, Table 1310.5.4(1),  
Table 1310.5.4(2)  
Subsoil irrigation fields . . . . .1504.7.3  
Trenching and leaching beds . . . . .H 601.9  
**SPECIAL FIXTURES** . . . . .406.0  
**SPECIAL VENTING** . . . . .909.0  
**SPECIAL WASTE PIPE** . . . . .(see Industrial wastes)  
**SPECIAL WASTES**  
Acid . . . . .811.2  
Chemical . . . . .811.0  
Definition . . . . .221.0  
Industrial . . . . .811.0  
High temperatures . . . . .810.1, Table 810.1  
Laundries, slaughterhouses,  
bottling establishments,  
and auto wash racks . . . . .711.0, 1010.0 – 1013.0  
**SPECIFIC GRAVITY,**  
**NATURAL GAS** . . . . .1214.1  
**SPECIFICATIONS**  
**FOR MATERIALS** . . . . .301.2, Table 1701.1  
**STACKS** . . . . .221.0, 317.1, 706.2,  
711.1, 906.1, 907.0,  
911.4, 1101.16.2,  
C 304.3, C 304.4,  
C 401.0, C 601.0  
**STAINLESS STEEL PIPE** . . . . .Table 313.3, Table 604.1,  
605.13, Table 701.2, 705.7,  
**STANDPIPE,**  
**CLOTHES WASHER** . . . . .804.1  
**STATION INLETS**  
**AND OUTLETS** . . . . .221.0, 1305.3, Table 1305.3,  
Table 1310.2.1(1),  
1310.2.2, 1316.0,  
**STEAM EXHAUST CONDENSER**  
**OR BLOW OFF** . . . . .810.0, Table 810.1  
**STERILE EQUIPMENT** . . . . .806.0  
**STORAGE TANKS**  
Alternate water sources . . . . .1503.3, 1505.4, 1506.4

Hot water . . . . .	.505.2, 608.6, 608.7, L 502.2, L 503.3.2, L 503.3.7	Macerating toilet systems . . . . .	.710.13.1
Potable water . . . . .	E 502.7	Pump connection permitted . . . . .	.710.2 – 710.5, 710.9, 805.1, 1101.6.2, 1101.7
Rainwater . . . . .	.1602.7.3, 1603.0, K 102.2, K 103.3, K 105.0	Pump discharges, conversion to fixture units . . . . .	.702.3, 710.5
Vacuum drainage . . . . .	C 501.2.1	Sewage . . . . .	.710.2
<b>STORM DRAINAGE SYSTEMS</b> . . . . .	Chapter 11, Appendix D	Sizing, sewage ejector and pumps . . . . .	.710.3
<b>STORM DRAINS</b> . . . . .	.221.0, 1101.4.4, 1101.6, 1101.11, 1101.12, 1101.13, 1101.15, 1103.0, 1104.1	Storm drainage . . . . .	.1101.6.2, 1101.6.3, 1101.7, 1101.10, 1101.11, 1101.14
<b>STORM SEWERS</b> . . . . .	.221.0, 715.3, 1101.2, 1101.4.5, 1101.12.2.2.2, 1101.13.1, 1103.2, 1104.1	Vents . . . . .	.710.7, 710.10, 710.13.3, 810.1, Table 810.1
<b>STRAINERS AND CONNECTIONS</b> . . . . .	.407.5, 408.4, 810.4, 1012.1, 1102.2	Water supply inlets . . . . .	.603.5.5
<b>S-TRAP PROHIBITED</b> . . . . .	.1004.1	<b>SUPPLY, WATER</b>	
<b>STREET MAIN; (SEE WATER MAIN)</b> . . . . .	.225.0, 608.1, 608.3, 610.7, Table 721.1, Table 1503.4, A 104.2, A 104.4, Table H 101.8	Fittings, fixtures . . . . .	.402.7
<b>STRUCTURAL</b>		Fixture, definition . . . . .	.208.0
<b>CONDITION SAFETY</b> . . . . .	.312.2, 312.11	Fixture units . . . . .	.610.3, Table 610.3, 610.7 – 610.10, Table 610.10, Table A 103.1, C 303.2, C 501.5, E 302.1, E 302.2, E 302.2.2, L 402.3.1
<b>II SUBMETER, DEFINITION</b> . . . . .	.221.0	Hot water . . . . .	.503.3.4, 601.2, 602.1, 603.4.5, 603.5.10, 608.7, 609.1, 609.4, 610.3, Table 610.3, 610.12.1, 610.12.2, Table A 103.1, Table C 303.2, L 502.5, L 502.7 – L 502.7.3
<b>SUBMITTAL OF PLANS</b> . . . . .	.103.3, 104.3, 104.3.2, 104.3.3, 301.5.3, 811.1, 910.2, 1105.1, 1304.5, 1304.6, 1505.2.1, 1602.2, C 301.1, C 501.1, E 101.2, H 501.1, K 101.3.1	Materials . . . . .	.604.0, Table 604.1, 1503.9.2, 1505.6, 1506.6, 1602.7, K 103.4
<b>SUBSOIL DRAINS</b> . . . . .	.221.0, 1101.4.6, Table 1101.4.6, 1101.6, 1101.8, 1101.9	Nonpotable water . . . . .	.601.3, 603.5.11, 1506.6
<b>SUBSOIL</b>		Pipe, size of . . . . .	.610.0, Table 610.3, Table 610.4, Table A 103.1, Table C 302.2, Appendix M
<b>IRRIGATION FIELDS</b> . . . . .	.221.0, 1503.2.1, Table 1503.4, 1504.2, 1504.5, Table 1504.5.3	Potable water, protection . . . . .	.409.5, 410.2, 412.2, 414.2, 419.3, 602.0, 603.0, 1303.5, 1503.3, 1505.4, 1506.4, 1602.4, E 502.3, K 101.9, K 102.2, L 411.2
<b>SUBSTITUTE MATERIALS</b> . . . . .	.301.3	Pressure . . . . .	.608.0, 1603.10, A 104.3, E 302.2.3, E 502.5, K 105.11
<b>SUBSURFACE</b>		Quality . . . . .	.601.2, 1501.7, 1506.7, 1505.14, 1506.9.2, 1601.7, 1602.9.6, Table 1602.9.6, 1603.12, E 302.1, K 101.7, K 104.3, K 106.0
<b>DISPOSAL FIELDS</b> . . . . .	.1504.0, H 101.2	Quantity . . . . .	.413.1 – 413.4, 416.2, 419.3, 610.3, E 302.1
<b>SUBSURFACE</b>		Risers . . . . .	.408.10, E 302.1
<b>IRRIGATION FIELDS</b> . . . . .	.221.0, 1503.2.1, 1504.5 – 1504.5.3	Tanks, water . . . . .	.603.5.5, 608.1
<b>SUDS RELIEF</b> . . . . .	.711.0	Testing . . . . .	.609.4
<b>SUMPS</b>		Valves . . . . .	.606.0
Boiler room, installation . . . . .	.810.1, 810.3		
Building, backwater devices . . . . .	.710.1, 710.3, 710.4, 710.6		
Building drainage systems below sewer level . . . . .	.710.2		
Condensers . . . . .	.810.0, Table 810.1		
Construction . . . . .	.810.2		
Definition . . . . .	.221.0		

# HISTORY NOTE APPENDIX

## 2019 CALIFORNIA PLUMBING CODE

### CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 5

#### HISTORY:

*For prior history, see the History Note Appendix to the California Plumbing Code, 2016 Triennial Edition, effective January 1, 2017.*

1. *(BSC 04/18, HCD 02/18, DSA-SS 04/18, OSHPD 05/18, SFM 05/18, DWR 01/18) Adoption by reference of the 2018 Uniform Plumbing Code with necessary amendments to become the 2019 California Plumbing Code, and repeal of the 2015 edition of the Uniform Plumbing Code; effective on January 1, 2020.*
2. *(BSC 02/19 CWoRE, HCD 02/19 CWoRE) Change Without Regulatory Effect to delete specified recycled water building standards declared invalid as ordered by the Superior Court of California, County of Los Angeles (Case No. BS171958—see Building Standards Commission Information Bulletin 19-02: Invalidated AB 2282 Recycled Water Building Standards). These rulemakings were approved by the California Building Standards Commission on July 17, 2019, filed with the Secretary of State on July 18, 2019, effective August 17, 2019.*
3. *Erratum to correct editorial errors in Matrix Adoption Tables and miscellaneous corrections throughout chapters 13, 15, 16, and 17, effective January 1, 2020.*
4. *Erratum to correct editorial errors in Matrix Adoption Tables and miscellaneous corrections throughout Chapters 4, 13, and 15, effective September 1, 2020.*
5. *2019 Intervening Cycle Update (BSC 03/19, DWR 01/19, DSA-SS/CC 03/19, HCD 06/19, OSHPD 06/19) Adoption of amendments to the 2019 California Plumbing Code. Approved by the California Building Standards Commission on July 13, 2020, published on January 1, 2021, effective on July 1, 2021.*

