THE FOLLOWING ARE LOCAL AMENDMENT INSERTS MADE TO REPLACE PAGES OF THE 2007 CALIFORNIA BUILDING, FIRE, PLUMBING, MECHANICAL, AND ELECTRICAL CODES.

IN ORDER TO INSERT THESE CODE AMENDMENTS, YOU WILL HAVE TO PUNCH HOLES IN THESE INSERTS THAT MATCH THE 2007 CODE 7-HOLE BINDER PATTERN.

THESE INSERTS ARE INTENDED TO REPLACE SPECIFIC PAGES IN THE 2007 STATE CODES.

THE CITY OFFERS THESE AS A CONVENIENCE ONLY. THE ACTUAL CITY ORDINANCES CONTAIN THE EXACT CODE LANGUAGE ADOPTED BY THE CITY OF VENTURA. THE CITY IS NOT RESPONSIBLE FOR ANY ERRORS IN THESE INSERTS.

2007 BUILDING CODE INSERTS

SECTION 108.8
APPEALS BOARD

Section 108.8 is deleted.

SECTION 108.9
UNSAFE BUILDINGS OR STRUCTURES

108.9.1 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 statues and regulations:*

1. *For applications subject to the State Housing Law as referenced in Section 108.3.2.1 of this code, refer to Health and Safety Code Sections 17910 through 17995.5 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 1.*
2. *For applications subject to the Mobilehome Parks Act as referenced in Section 108.3.2.2 of this code, refer to the Health and Safety Code, commencing with Section 18200, and California Code of Regulations, Title 25, Division 1, Chapter 2.*
3. *For applications subject to the Special Occupancy Parks Act as referenced in Section 108.3.2.3 of this code, refer to the Health and Safety Code, commencing with Section 18860, and California Code of Regulations, Title 25, Division 1, Chapter 2.2.*
4. *For applications subject to the Employee Housing Act as referenced in Section 108.3.2.4 of this code, refer to Health and Safety Code Sections 17000 through 17062.5 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 3.*
5. *For applications subject to the Factory-Built Housing Law as referenced in Section 108.3.2.5 of this code, refer to Health and Safety Code Sections 19960 through 19997 and California Code of Regulations, Title 25, Division 1, Chapter 3, Subchapter 1.*

108.9.2 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 108.3.2.1 of this code, refer to Health and Safety Code Sections 17980 through 17995.5 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 1.*
2. *For applications subject to the Mobilehome Parks Act as referenced in Section 108.3.2.2 of this code, refer to the Health and Safety Code Sections 18200 through 18700 and California Code of Regulations, Title 25, Division 1, Chapter 2.*
3. *For applications subject to the Special Occupancy Parks Act as referenced in Section 108.3.2.3 of this code, refer to the Health and Safety Code Sections 18866 through 18869, and California Code of Regulations, Title 25, Division 1, Chapter 2.2.*
4. *For applications subject to the Employee Housing Act as referenced in Section 108.3.2.4 of this code, refer to Health and Safety Code Sections 17060 through 17062.5 and California Code of Regulations, Title 25, Division 1, Chapter 1, Subchapter 3.*
5. *For applications subject to the Factory-Built Housing Law as referenced in Section 108.3.2.5 of this code, refer to Health and Safety Code Sections 19995 through 19997 and California Code of Regulations, Title 25, Division 1, Chapter 3, Subchapter 1.*

SECTION 108.10
OTHER BUILDING REGULATIONS

108.10.1 Existing structures. *Subject to the requirements of California Health and Safety Code Sections 17912, 17920.3, 17922(c), 17922.3, 17958.8 and 17958.9, the provisions contained in Chapter 34 relating to existing*

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structures shall only apply as identified in the Matrix Adoption Table under the authority of the Department of Housing and Community Development as listed in Sections 108.2.1.1 through 108.2.1.3 of this code.

108.10.2 Moved structures. *Subject to the requirements of California Health and Safety Code Sections 17922.3 and 17958.9, the provisions contained in Chapter 34 relating to a moved residential structure shall only apply as identified in the Matrix Adoption Table under the authority of the Department of Housing and Community Development as listed in Sections 108.2.1.1 through 108.2.1.3 of this code.*

SECTION 109
DIVISION OF THE STATE ARCHITECT

109.1 Division of the State Architect—Access Compliance.

General. *The purpose of this code is to ensure that barrier-free design is incorporated in all buildings, facilities, site work and other improvements to which this code applies in compliance with state law to ensure that these improvements are accessible to and usable by persons with disabilities. Additions, alterations and structural repairs in all buildings and facilities shall comply with these provisions for new buildings, except as otherwise provided and specified herein.*

The provisions of these regulations shall apply to any portable buildings leased or owned by a school district, and shall also apply to temporary and emergency buildings and facilities. Temporary buildings and facilities are not of permanent construction but are extensively used or are essential for public use for a period of time. Examples of temporary buildings or facilities covered include, but are not limited to: reviewing stands, temporary classrooms, bleacher areas, exhibit areas, temporary banking facilities, temporary health screening services or temporary safe pedestrian passageways around a construction site.

In addition, to incorporate standards at least as restrictive as those required by the federal government for barrier-free design under (1) Title III (Public Accommodations and Commercial Facilities), Subpart D (New Construction and Alteration) and Appendix A (Americans with Disabilities Act Standards for Accessible Design) (see 28 C.F.R., Part 36), and (2) Title II (Public Entities), Section 35.151 (New Construction and Alterations) (see 28 C.F.R., Part 35) both from the Americans with Disabilities Act of 1990, and (3) under the Fair Housing Amendments Act of 1988. Some of these regulations may be more stringent than state law in order to meet the federal requirement.

109.1.1 Application. *See Government Code commencing with Section 4450.*

Publicly funded buildings, structures, sidewalks, curbs and related facilities shall be accessible to and usable by persons with disabilities as follows:

109.1.1.1 *All buildings, structures, sidewalks, curbs and related facilities constructed in the state by the use of state, county or municipal funds, or the funds of any political subdivision of the state.*

109.1.1.2 *All buildings, structures and facilities that are leased, rented, contracted, sublet or hired by any municipal, county or state division of government, or by a special district.*

109.1.1.3 *All publicly funded buildings used for congregate residences or for one- or two-family dwelling unit purposes shall conform to the provisions applicable to living accommodations.*

109.1.1.4 *All existing publicly funded buildings and facilities when alterations, structural repairs or additions are made to such buildings or facilities. For detailed requirements on existing buildings, see Chapter 11B, Division IV.*

109.1.1.5 *With respect to buildings, structures, sidewalks, curbs and related facilities not requiring a building permit, building standards published in the California Building Standards Code relating to access for persons with disabilities and other regulations adopted pursuant to Government Code Section 4450, and in effect at the time construction is commenced, shall be applicable.*

109.1.2 Application. *See Health and Safety Code commencing with Section 19952.*

All privately funded public accommodations, as defined and commercial facilities, as defined, shall be accessible to persons with disabilities as follows:

Exception: *Certain types of privately funded multistory buildings do not require installation of an elevator to provide access above and below the first floor. See Chapter 11B.*

109.1.2.1 *Any building, structure facility, complex or improved area, or portions thereof, which are used by the general public.*

109.1.2.2 *Any sanitary facilities which are made available for the public, clients or employees in such accommodations or facilities.*

109.1.2.3 *Any curb or sidewalk intended for public use that is constructed in this state with private funds.*

109.1.2.4 *All existing privately funded public accommodations when alterations, structural repairs or additions are made to such public accommodations as set forth under Chapter 11B.*

109.1.3 Application—Public housing and private housing available for public use. *See Government Code Sections 4450 and 12955.1(d).*

109.1.4 Enforcing agency.

109.1.4.1 *The director of the Department of General Services where state funds are utilized for any project or where funds of counties, municipalities or other political subdivisions are utilized for the construction of elementary, secondary or community college projects.*

109.1.4.2 *The governing bodies where funds of counties, municipalities or other political subdivisions are utilized except as otherwise provided above.*

APPENDIX CHAPTER 1

ADMINISTRATION

Appendix Chapter 1 is not adopted by:

- ***California Building Standards Commission***
- ***Housing and Community Development***
- ***Office of the State Fire Marshal***

Except where specifically indicated by an agency banner or matrix.

SECTION 101
GENERAL

101.1 Title. These regulations shall be known as the *California Building Code of the State of California*, hereinafter referred to as "this code."

101.2 Scope. The provisions of this code shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, *use* and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures.

Exception: Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories above grade plane in height with a separate means of egress and their accessory structures shall comply with the *California Building Code.*

101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

101.3 Intent. The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, *means* of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to firefighters and emergency responders during emergency operations.

101.4 Referenced codes. The other codes listed in Appendix Chapter 1, Sections 101.4.1 through 101.4.7 and referenced elsewhere in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference.

101.4.1 Electrical. The provisions of the *California Electrical Code* shall apply to the installation of electrical systems, including alterations, repairs, replacement, equipment, appliances, fixtures, fittings and appurtenances thereto.

101.4.2 Gas. The provisions of the *California Mechanical Code* shall apply to the installation of gas piping from the point of delivery, gas appliances and related accessories as covered in this code. These requirements apply to gas piping systems extending from the point of delivery to the inlet connections of appliances and the installation and operation of residential and commercial gas appliances and related accessories.

101.4.3 Mechanical. The provisions of the *California Mechanical Code* shall apply to the installation, alterations, repairs and replacement of mechanical systems, including equipment, appliances, fixtures, fittings and/or appurtenances, including ventilating, heating, cooling, air-conditioning and refrigeration systems, incinerators and other energy-related systems.

101.4.4 Plumbing. The provisions of the *California Plumbing Code* shall apply to the installation, alteration, repair and replacement of plumbing systems, including equipment, appliances, fixtures, fittings and appurtenances, and where connected to a water or sewage system and all aspects of a medical gas system. The provisions of the *California Plumbing Code* shall apply to private sewage disposal systems.

Appendix Chapter 1, Section 101.4.5, is amended to read as follows:

101.4.5 Property Maintenance. The provisions of the *2007 Ventura City Property Maintenance Code (Article 6 of Chapter 12.310 of Division12 of the San Buenaventura Municipal Code, as amended)* shall apply to existing structures and premises; equipment and facilities; light, ventilation, space heating, sanitation, life and fire safety hazards; responsibilities of owners, operators, and occupants; and occupancy of existing premises and structures, as defined in the *2007 Ventura City Property Maintenance Code.*

101.4.6 Fire prevention. The provisions of the *California Fire Code* shall apply to matters affecting or relating to structures, processes and premises from the hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices; from conditions hazardous to life, property or public welfare in the occupancy of structures or premises; and from the construction, extension, repair, alteration or removal of fire suppression and alarm systems or fire hazards in the structure or on the premises from occupancy of operation.

101.4.7 Energy. The provisions of the *California Energy Code, Title 24, Part 6* shall apply to all matters governing the design and construction of buildings for energy efficiency.

Exception: [OSHPD 1, 2 & 4] *Not required by OSHPD.*

SECTION 102
APPLICABILITY

102.1 General. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.

102.1.1 Additional requirements. [OSHPD 1, 2, 3, & 4] See Chapter 1, Section 101.7.

102.2 Other laws. The provisions of this code shall be deemed to nullify any provisions of local, state or federal law.

102.3 Application of references. References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

102.4 Referenced codes and standards. The codes and standards referenced in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

102.5 Partial invalidity. In the event that any part or provision of this code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions.

Section 102.6 is amended to read as follows:

102.6 Existing Structures. The legal occupancy of any structure existing on the date of adoption of this code shall be permitted to continue without change, except as specifically covered in this code, the *2007 Ventura City Property Maintenance Code*, or as deemed necessary by the Building Official for the general safety and welfare of the occupants and the public.

SECTION 103
DEPARTMENT OF BUILDING SAFETY

103.1 Creation of enforcement agency. The Department of Building Safety is hereby created and the official in charge thereof shall be known as the building official.

103.2 Appointment. The building official shall be appointed by the chief appointing authority of the jurisdiction.

Section 103.3 is amended to read as follows:

103.3 Deputies. In accordance with the prescribed procedures of this jurisdiction and with the concurrence of the appointing authority, the Building Official shall have the authority to appoint a Deputy Building Official, the related technical officers, inspectors, plan examiners and other employees. Such employees shall have powers as delegated by the Building Official. For the maintenance of existing properties, see the *2007 Ventura City Property Maintenance Code*.

SECTION 104
DUTIES AND POWERS OF BUILDING OFFICIAL

104.1 General. The building official is hereby authorized and directed to enforce the provisions of this code. The building official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

104.2 Applications and permits. The building official shall receive applications, review construction documents and issue permits for the erection, and alteration, demolition and moving of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

104.3 Notices and orders. The building official shall issue all necessary notices or orders to ensure compliance with this code.

104.4 Inspections. The building official shall make all of the required inspections, or the building official shall have the authority to accept reports of inspection by approved agencies or individuals. Reports of such inspections shall be in writing and be certified by a responsible individual. The building official is authorized to engage such expert opinion as deemed necessary to report upon unusual technical issues that arise, subject to the approval of the appointing authority.

104.5 Identification. The building official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

104.6 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the building official has reasonable cause to believe that there exists in a structure or upon a premises a condition which is contrary to or in violation of this code which makes the structure or premises unsafe, dangerous or hazardous, the building official is authorized to enter the structure or premises at reasonable times to inspect or to perform the duties imposed by this code, provided that if such structure or premises be occupied that credential be presented to the occupant and entry requested. If such structure or premises is unoccupied, the building official shall first make a reasonable effort to locate the owner or other person having charge or control of the structure or premises and request entry. If entry is refused, the building official shall have recourse to the remedies provided by law to secure entry.

104.7 Department records. The building official shall keep official records of applications received, permits and certificates issued, fees collected, reports of inspections, and notices and orders issued. Such records shall be retained in the official records for the period required for retention of public records.

104.8 Liability. The building official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered liable personally and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties. Any suit instituted against an officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provision of this code shall be defended by legal representative of the jurisdiction until the final termination of the proceedings. The building official or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

104.9 Approved materials and equipment. Materials, equipment and devices approved by the building official shall be constructed and installed in accordance with such approval.

104.9.1 Used materials and equipment. The use of used materials which meet the requirements of this code for new materials is permitted. Used equipment and devices shall not be reused unless approved by the building official.

104.10 Modifications. Wherever there are practical difficulties involved in carrying out the provisions of this code, the building official shall have the authority to grand modifications for individual cases, upon application of the owner or owner's representative, provided the building official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, accessibility, life and fire safety, or structural requirements. The details of action granting modifications shall be recorded and entered in the files of the department of building safety.

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

104.11.1 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.

104.11.2 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.

104.11.3 Peer review. [OSHPD 1 & 4] *When peer review is required, it shall be performed pursuant to Section 3414A.*

SECTION 105
PERMITS

105.1 Required. Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy or a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required permit.

105.1.1 Annual permit. In lieu of an individual permit for each alteration to an already approved electrical, gas, mechanical or plumbing installation, the building official is authorized to issue an annual permit upon application therefor to any person, firm or corporation regularly employing one or more qualified tradepersons in the building, structure or on the premises owned or operated by the applicant for the permit.

105.1.2 Annual permit records. The person to whom an annual permit is issued shall keep a detailed record of alterations made under such annual permit. The building official shall have access to such records at all times or such records shall be filed with the building official as designated.

105.2 Work exempt from permit. Exemptions from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. Permits shall not be required for the following:

Building:

Section 105.2 Item 1 is amended to read as follows:

1. One-story detached accessory building used as a tool and/or storage shed, playhouse or similar use, provided it meets the following:
   a. 120 sq. ft. maximum floor area.
   b. 8 feet maximum top plate height.
   c. 4:12 maximum pitch room.
   d. Has no plumbing or electrical installations.
   e. Is located in a residential zone.
   f. No more than one such structure per lot.

Section 105.2 Item 2 is amended to read as follows:

2. Residential fences of wood, chain link or similar materials that are not more than 6 foot in height from grade as defined in this code.
3. Oil derricks.
4. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II or IIIA liquids.
5. Water tanks supported directly on grade if the capacity does not exceed 5,000 gallons (18925 L) and the ratio of height to diameter or width does not exceed 2:1.

Section 105.2 Item 6 is amended to read as follows:

6. Residential sidewalks and residential driveways not more than 30 inches above grade and not over any basement or story, and not part of a required Accessible Route of Travel as defined in this code.
7. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
8. Temporary motion picture, television and theater stage sets and scenery.
9. Prefabricated swimming pools accessory to a Group R-3 occupancy that are less than 24 inches (610 mm) deep, do not exceed 5,000 gallons (18925 L) and are installed entirely above ground.

10. Shade cloth structures constructed for nursery or agricultural purposes. Not including service systems.

11. Swings and other playground equipment accessory to detached one- and two-family dwellings.

12. Window awnings supported by an exterior wall that do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support of Group R-3 and Unidentified speaker: occupancies.

13. Nonfixed and movable fixtures, cases, racks, counters and partitions not over 5 feet 9 inches (1753 mm) in height.

Section 105.2 Item 14 is added to read as follows:

14. Outdoor Food and Produce Vendor stands, but only if such stands are limited as follows:

    a. 120 sq. ft. maximum floor area.
    b. 8 feet maximum top plate height.
    c. 4:12 maximum pitch roof.
    d. Has no plumbing or electrical installations.
    e. No more than one such structure per parcel.

Section 105.2 Electrical is amended to read as follows:

Electrical:

1. The replacement of lamps or the connection of approved portable electrical equipment to approved permanently installed electrical receptacles.

2. Equipment used to transmit radio or television signals provided that such equipment does not exceed the structural loads of the structure to support such equipment. Electrical power supply equipment serving such transmission equipment is regulated and requires permits.

Gas:

1. Portable heating appliance.

Section 105.2 Gas: Item 2 is amended to read as follows:

2. Repair of gas powered equipment that does not alter the listed approval of the gas equipment and does not create an unsafe condition.

Mechanical:

1. Portable heating appliance.

2. Portable ventilation equipment.

3. Portable cooling unit.

4. Steam, hot or chilled water piping within any heating or cooling equipment regulated by this code.

Section 105.2 Mechanical: Item 5 is amended to read as follows:

5. Repair of mechanical equipment that does not alter the listed approval of the equipment and does not create an unsafe condition.

6. Portable evaporative cooler.

Section 105.2 Mechanical: Item 7 is amended to read as follows:

7. Nationally listed plug and cord, self-contained, refrigeration systems of 1 horsepower or less.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe, provided, however, that if any concealed trap, drain pipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with the new material, such work shall be considered as new work and a permit shall be obtained and inspection made as provided in this code.

2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures and the removal and reinstallation of water closets, provided such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

Section 105.2.1 is amended to read as follows:

105.2.1 Emergency Repairs. In emergency situations, where emergency equipment replacement or repair must be performed, the person who performs the emergency work must submit a permit application for the emergency work within one working business day following the emergency replacement or repair.

105.2.2 Repairs. Application or notice to the building official is not required for ordinary repairs to structures, replacement of lamps of the connection of approved portable electrical equipment to approved permanently installed receptacles. Such repairs shall not include the cutting away of any wall, partition or portion thereof, the removal or cutting of any structural beam or load-bearing support, or the removal or change of any required means of egress, or rearrangement of parts of a structure affecting the egress requirements; nor shall ordinary repairs include addition to, alteration of, replacement or relocation of any standpipe, water supply, sewer, drainage, drain leader, gas, soil, waste, vent or similar piping, electric wiring or mechanical or other work affecting public health or general safety.

105.2.3 Public service agencies. A permit shall not be required for the installation, alteration or repair of generation, transmission, distribution or metering or other related equipment that is under the ownership and control of public service agencies by established right.

105.3 Application for permit. To obtain a permit, the applicant shall first file an application therefor in writing on a form furnished by the department of building safety for that purpose. Such application shall:

1. Identify and describe the work to be covered by the permit for which application is made.

2. Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building or work.

3. Indicate the use and occupancy for which the proposed work is intended.

Section 105.3 Item 4 is amended to read as follows:

4. Be accompanied by construction documents, fees, and other information as required by sections 106 and 108 of this code.
5. State the valuation of the proposed work.
6. Be signed by the applicant, or the applicant's authorized agent.
7. Give such other data and information as required by the building official.

Section 105.3 Item 8 is added to read as follows:

8. Have obtained Planning Division approval to make application for the building permit.

Section 105.3 Item 9 is added to read as follows:

9. Be filed by appropriate state-licensed contractors or their authorized representatives, except for work on single-family dwellings including structures accessory thereto, which may be filed by owner buildings as allowed by the Building Official.

105.3.1 Action on application. The building official shall examine or cause to be examined applications for permits and amendments thereto within a reasonable time after filing. If the application or the construction documents do not conform to the requirements of pertinent laws, the building official shall reject such application in writing, stating the reasons therefor. If the building official is satisfied that the proposed work conforms to the requirements of this code and laws and ordinances applicable thereto, the building official shall issue a permit therefor as soon as practicable.

Section 105.3.2 is amended in its entirety to read as follows:

105.3.2 Time limitation of application. An application for a permit for any proposed work shall be deemed to have been abandoned 360 days after the date of filing of the original construction permit application date, unless a permit has been issued. The Building Official is authorized to grant one or more extensions of time for additional periods not exceeding 180 days after the effective date of the next edition of the State Building Code. The extension shall be requested in writing and justifiable cause demonstrated. All extension decisions by the Building Official are final and may not be appealed."

105.4 Validity of permit. The issuance or granting of a permit shall not be construed to be a permit for, or an approval of any violation of any of the provisions of this code or of any other ordinance of the jurisdiction. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid. The issuance of a permit based on construction documents and other data shall not prevent the building official from requiring the correction of errors in the construction documents and other date. The building official is also authorized to prevent occupancy or use of a structure where in violation of this code or of any other ordinances of this jurisdiction.

Section 105.5 is amended in its entirety to read as follows:

105.5 Expiration of Permit. Every permit issued by the Building Official under the provisions of this Code will expire by limitation and become null and void:

a. If the building or work authorized by such permit is not commenced within three (3) years after the date such permit was issued, or

b. lf the abatement deadline prescribed by the City's Code Enforcement section has passed.

Valid permits are automatically extended six (6) months from the date of a City approved completed section 109.3.1 inspection. Partial inspection approvals do not qualify for automatic extension.

No permit shall be automatically extended beyond a date more than six (6) years from permit issuance.

Before work recommences on an expired permit, a new permit will first be obtained. The permit fee therefore, will be based upon the City's estimated percentage of work that remains to be completed, but shall not exceed 50% of the total permit fee when expired for less than one (1) year. Any changes made to the prior approved plans are subject to plan review, plan review fees, and additional permit fees for the changes."

105.6 Suspension or revocation. The building official is authorized to suspend or revoke a permit issued under the provisions of this code wherever the permit is issued in error or on the basis of incorrect, inaccurate or incomplete information, or in violation of any ordinance or regulation or any of the provisions of this code.

105.7 Placement of permit. The building permit or copy shall be kept on the site of the work until the completion of the project.

SECTION 106
CONSTRUCTION DOCUMENTS

106.1 Submittal documents. Construction documents, statement of special inspections and other data shall be submitted in one or more sets with each permit application. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the building official is authorized to require additional construction documents to be prepared by a registered design professional.

Exception: The building official is authorized to waive the submission of construction documents and other data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that review of construction documents is not necessary to obtain compliance with this code.

106.1.1 Information on construction documents. Construction documents shall be dimensioned and drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official.

106.1.1.1 Fire protection system shop drawings. Shop drawings for the fire protection system(s) shall be submitted to indicate conformance with this code and the construction documents shall be approved prior to the start of system installation. Shop drawings shall contain all information as required by the referenced installation standards in Chapter 9.

106.1.2 Means of egress. The construction documents shall show in sufficient detail the location, construction, size and character of all portions of the means of egress in compliance with the provisions of this code. In other than occupancies in Groups R-2, R-3, and I-1, the construction documents shall designate the number of occupants to be accommodated on every floor, and in all rooms and spaces.

106.1.3 Exterior wall envelope. Construction documents for all buildings shall describe the exterior wall envelope in sufficient detail to determine compliance with this code. The construction documents shall provide details of the exterior wall envelope as required, including flashing, intersections with dissimilar materials, corners, end details, control joints, intersections at roof, eaves or parapets, means of drainage, water-resistive membrane and details around openings.

The construction documents shall include manufacturer's installation instructions that provide supporting documentation that the proposed penetration and opening details described in the construction documents maintain the weather resistance of the exterior wall envelope. The supporting documentation shall fully describe the exterior wall system which was tested, where applicable, as well as the test procedure used.

106.2 Site plan. The construction documents submitted with the application for permit shall be accompanied by a site plan showing to scale the size and location of new construction and existing structures on the site, distances from lot lines, the established street grades and the proposed finished grades and, as applicable, flood hazard areas, floodways, and design flood elevations; and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. The building official is authorized to waive or modify the requirement for a site plan when the application for permit is for alteration or repair or when otherwise warranted.

106.3 Examination of documents. The building official shall examine or cause to be examined the accompanying construction documents and shall ascertain by such examinations whether the construction indicated and described is in accordance with the requirements of this code and other pertinent laws or ordinances.

106.3.1 Approval of construction documents. When the building official issues a permit, the construction documents shall be approved, in writing or by stamp, as "Reviewed for Code Compliance." One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the building official or a duly authorized representative.

106.3.2 Previous approvals. This code shall not require changes in the construction documents, construction or des-

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ignited occupancy of a structure for which a lawful permit has been heretofore issued or otherwise lawfully authorized, and the construction of which has been pursued in good faith within 180 days after the effective date of this code and has not been abandoned.

106.3.3 Phased approval. The building official is authorized to issue a permit for the construction of foundations or any other part of a building or structure before the construction documents for the whole building or structure have been submitted, provided that the adequate information and detailed statements have been filed complying with pertinent requirements of this code. The holder of such permit for the foundation or other parts of a building or structure shall proceed at the holder's own risk with the building operation and without assurance that a permit for the entire structure will be granted.

106.3.4 Design professional in responsible charge.

106.3.4.1 General. When it is required that documents be prepared by a registered design professional, the building official shall be authorized to require the owner to engage and designate on the building permit application a registered design professional in responsible charge. If the circumstances require, the owner shall designate a substitute registered design professional in responsible charge who shall perform the duties required of the original registered design professional in responsible charge. The building official shall be notified in writing by the owner if the registered design professional in responsible charge is changed or is unable to continue to perform the duties.

The registered design professional in responsible charge shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building.

Where structural observation is required by Section 1709, the statement of special inspections hall name the individual or firms who are to perform structural observation and describe the stages of construction at which structural observation is to occur (see also duties specified in Section 1704).

106.3.4.2 Deferred submittals. For the purposes of this section, deferred submittals are defined as those portions of the design that are not submitted at the time of the application and that are to be submitted to the building official within a specified period.

Deferral of any submittal items shall have the prior approval of the building official. The registered design professional in responsible charge shall list the deferred submittals on the construction documents for review by the building official.

Documents for deferred submittal items shall be submitted to the registered design professional in responsible charge who shall review them and forward them to the building official with a notation indicating that the deferred submittal documents have been reviewed and been found to be in general conformance to the design of the building. The deferred submittal items shall not be installed until the design and submittal documents have been approved by the building official.

106.4 Amended construction documents. Work shall be installed in accordance with the approved construction documents, and any changes made during construction that are not in compliance with the approved construction documents shall be resubmitted for approval as an amended set of construction documents.

106.5 Retention of construction documents. One set of approved construction documents shall be retained by the building official for a period of not less than 180 days from date of completion of the permitted work, or as required by state or local laws.

SECTION 107
TEMPORARY STRUCTURES AND USES

107.1 General. The building official is authorized to issue a permit for temporary structures and temporary uses. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The building official is authorized to grant extensions for demonstrated cause.

107.2 Conformance. Temporary structures and uses shall conform to the structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary requirements of this code as necessary to ensure public health, safety and general welfare.

107.3 Temporary power. The building official is authorized to give permission to temporarily supply and use power in part of an electric installation before such installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in the *California Electrical Code*.

107.4 Termination of approval. The building official is authorized to terminate such permit for a temporary structure or use and to order the temporary structure or use to be discontinued.

SECTION 108
FEES

108.1 Payment of fees. A permit shall not be valid until the fees prescribed by law have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

108.2 Schedule of permit fees. On buildings, structures, electrical, gas, mechanical, and plumbing systems or alterations requiring a permit, a fee for each permit shall be paid as required, in accordance with the schedule as established by the applicable governing authority.

Section 108.2.1 is added to read as follows:

108.2.1 The amount of the initial fee for submitting a standard plan will be the full fee specified above. The fee for subsequent submittals of plans qualifying as standard plans will be one-half (½) of the initial plan-checking fee. A standard plan is a prototype plan for a building or structure that is utilized at more than one site and which incorporates the same essential structural features, design, dimensions, and calculations as the original approved plan and is specifically submitted for plan check as a standard plan. A standard plan will be void three years after its approval or upon revision of the applicable codes under which it was plan-checked, or at the discretion of the building official.

108.3 Building permit valuations. The applicant for a permit shall provide an estimated permit value at time of application. Permit valuations shall include total value of work, including materials and labor, for which the permit is being issued, such

as electrical gas, mechanical, plumbing equipment and permanent systems. If, in the opinion of the building official, the valuation is underestimated on the application, the permit shall be denied, unless the applicant can show detailed estimates to meet the approval of the building official. Final building permit valuation shall be set by the building official.

108.4 Work commencing before permit issuance. Any person who commences any work on a building, structure, electrical, gas, mechanical or plumbing system before obtaining the necessary permits shall be subject to a fee established by the building official that shall be in addition to the required permit fees.

108.5 Related fees. The payment of the fee for the construction, alteration, removal or demolition for work done in connection to or concurrently with the work authorized by a building permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

Section 108.6 is amended to read as follows:

108.6 Refunds. The building official may authorize refunding of a fee paid hereunder which was erroneously paid or collected. The building official may authorize refunding of not more than 80 percent of the permit fee when no work has been done under a permit issued in accordance with this code. The building official may authorize refunding of not more than 80 percent of the Plan Review fee paid when an application for a permit for which a plan review has been paid is withdrawn or cancelled before any examination time had been expended. The building official shall not authorize the refunding of any fee paid, except upon written application filed by the original permittee not later than 180 days after the date of the fee payment.

Section 108.7 is added to read as follows:

108.7 Fees. Fees will be as established by city council resolution or ordinance. The city council will hold a public hearing upon notice on the resolution or on any proposed amendments thereto. The resolution or any amendment thereto will take affect on the date approved by city council adoption.

108.7.1 Sustainability Plan Review. The City of San Buenaventura hereby establishes an additional plan review duty for the review of the environmental sustainability of each permit application that includes items 1 and 2 below.

1. A new building greater than 500 sq. ft. in area.
2. A mechanical heating or cooling system.

A few for this review service will be imposed, with the amount to be established per resolution of the city council.

Exception: Section 108.7.1 will not apply to applications for permits that are either: a) compliant with the United State Green Building Council (USGBC) LEED rating of at least "Silver", as documented in writing by a LEED accredited professional, or b) residential projects complying with the City's residential green building program and accompanied by the City's residential green building compliance checklist.

SECTION 109
INSPECTIONS

109.1 General. 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 provision of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid. It shall be the duty of the permit applicant to cause the work to remain accessible and exposed for inspection purposes. Neither the building official nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

109.2 Preliminary inspection. Before issuing a permit, the building official is authorized to examine or cause to be examined buildings, structures and sites for which an application has been filed.

109.3 Required inspections. The building official, upon notification, shall make the inspections set forth in Section 109.3.1 through 109.3.10.

109.3.1 Footing and foundation inspection. Footing and foundation inspections shall be made after excavations for footings are complete and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to the inspection. Materials for the foundation shall be on the job, except where concrete is ready mixed in accordance with ASTM C 94, the concrete need not be on the job.

109.3.2 Concrete slab and under-floor inspection. Concrete slab and under-floor inspections shall be made after in-slab or under-floor reinforcing steel and building service equipment, conduit, piping accessories and other ancillary equipment items are in place, but before any concrete is placed or floor sheathing installed, including the subfloor.

109.3.3 Lowest floor elevation. In flood hazard areas, upon placement of the lowest floor, including the basement, and prior to further vertical construction, the elevation certification required in Section 1612.5 shall be submitted to the building official.

109.3.4 Frame inspection. Framing inspections shall be made after the roof deck or sheathing, all framing, fireblocking and bracing are in place and pipes, chimneys and vents to be concealed are complete and the rough electrical, plumbing, heating wires, pipes and ducts are approved.

109.3.5 Lath and gypsum board inspection. Lath and gypsum board inspections shall be made after lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or gypsum board joints and fasteners are taped and finished.

Exception: Gypsum board that is not part of a fire-resistance-rated assembly or a shear assembly.

109.3.6 Fire-resistant penetrations. Protection of joints and penetrations in fire-resistance-rated assemblies shall not be concealed from view until inspected and approved.

109.3.7 Energy efficiency inspections. Inspections shall be made to determine compliance with Chapter 13 and shall include, but not be limited to, inspections for: envelope insulation *R* and *U* values, fenestration *U* value, duct system *R* value and HVAC and water-heating equipment efficiency.

109.3.8 Other inspections. In addition to the inspections specified above, the building official is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of this code and other laws that are enforced by the department of building safety.

109.3.9 Special inspections. For special inspections, see Section 1704.

109.3.10 Final inspection. The final inspection shall be made after all work required by the building permit is completed.

109.4 Inspection agencies. The building official is authorized to accept reports of approved inspection agencies, provided such agencies satisfy the requirements as to qualifications and reliability.

109.5 Inspection requests. It shall be the duty of the holder of the building permit or their duly authorized agent to notify the building official when work is ready for inspection. It shall be the duty of the permit holder to provide access to and means for inspections of such work that are required by this code.

109.6 Approval required. Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the building official. The building official, upon notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or

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His or her agent wherein the same fails to comply with this code. Any portions that do not comply shall be corrected and such portion shall not be covered or concealed until authorized by the building official.

SECTION 110
CERTIFICATE OF OCCUPANCY

110.1 Use and occupancy. No building or structure shall be used or occupied, and no change in the existing occupancy classification of a building or structure or portion thereof shall be made until the building official has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction.

110.2 Certificate issued. After the building official inspects the building or structure and finds no violations of the provisions of this code or other laws that are enforced by the department of building safety, the building official shall issue a certificate of occupancy that contains the following:

1. The building permit number.
2. The address of the structure.
3. The name and address of the owner.
4. A description of that portion of the structure for which the certificate is issued.
5. A statement that the described portion of the structure has been inspected for compliance with the requirements of this code for the occupancy and division of occupancy and the use for which the proposed occupancy is classified.
6. The name of the building official.
7. The edition of the code under which the permit was issued.
8. The use and occupancy, in accordance with the provisions of Chapter 3.
9. The type of construction as defined in Chapter 6.
10. The design occupant load.
11. If an automatic sprinkler system is provided, whether the sprinkler system is required.
12. Any special stipulations and conditions of the building permit.

110.3 Temporary occupancy. The building official is authorized to issue a temporary certificate of occupancy before the completion of the entire work covered by the permit, provided that such portion or portions shall be occupied safely. The building official shall set a time period during which the temporary certificate of occupancy is valid.

110.4 Revocation. The building official is authorized to, in writing, suspend or revoke a certificate of occupancy or completion issued under the provisions of this code wherever the certificate is issued in error, or on the basis of incorrect information supplied, or where it is determined that the building or structure or portion thereof is in violation of any ordinance or regulation or any of the provisions of this code.

SECTION 111
SERVICE UTILITIES

111.1 Connection of service utilities. No person shall make connections from a utility, source of energy, fuel or power to any building or system that is regulated by this code for which a permit is required, until released by the building official.

111.2 Temporary connection. The building official shall have the authority to authorize the temporary connection of the building or system to the utility source of energy, fuel or power.

111.3 Authority to disconnect service utilities. The building official shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the codes referenced in case of emergency where necessary to eliminate an immediate hazard to life or property. The building official shall notify the serving utility, and wherever possible the owner and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

SECTION 112
BOARD OF APPEALS

Section 112 is amended to read as follows:

112. Local Appeals Board. A Local Appeals Board (also identified as "Board" or "Board of Appeals") is established to hear and decide appeals of orders, decisions, or determinations made by the Building Official or Fire Marshal relative to the application and interpretation of the building requirements of the city. The Board will consist of five members who will be appointed by the city council. In addition, the Building Official, or his or her designee, will be an ex-officio member and will act as secretary to the Board. Three of the voting members will constitute a quorum; the ex-officio member will have no vote. Each of the voting members will be qualified by experience and training to consider matters pertaining to construction regulations, and each will be an actual resident of the City during his/her incumbency. If a Board member ceases at any time to be an actual resident of the City, the office held by that member will be deemed vacant. Of the members of the Board first appointed, three will be appointed for initial terms of four years. Their successors will be appointed for terms of four years. Each member will serve until his or her successor is appointed. The Board will adopt reasonable rules and regulations for conducting its business and will render all decisions and findings in writing to the appellant with a copy to the Building Official. The Board may recommend to the city council such new legislation as it may deem appropriate. The Local Appeals Board will service as the appellate board or body whenever any of the codes adopted by reference provide for it. The Local Appeals Board will also act as the Appeals Board for the Earthquake Hazard Reduction Ordinance. Appeals to the Board will be processed in accordance with administrative policies and on application forms provided by the Building Official. A fee established by city council resolution will accompany an application for a hearing before the Board of Appeals. Copies of any rules and regulations adopted by the Board will be delivered to the Building Official, who will make them freely accessible to the public. The Board of Appeals will have no authority relative to interpretation of the administrative provisions of this code nor will the Board be empowered to waive requirements of this code or the technical codes.

SECTION 113
VIOLATIONS

113.1 Unlawful acts. It shall be unlawful for any person, firm or corporation to erect, construct, alter, extend, repair, move, remove, demolish or occupy any building, structure or equipment regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of this code.

113.2 Notice of violation. The building official is authorized to serve a notice of violation or order on the person responsible for the erection, construction, alteration, extension, repair, moving, removal, demolition or occupancy of a building or structure in violation of the provisions of this code, or in violation of a permit or certificate issued under the provisions of this

SECTION 114
STOP WORK ORDER

114.1 Authority. Whenever the building official finds any work regulated by this code being performed in a manner either contrary to the provisions of this code or dangerous or unsafe, the building official is authorized to issue a stop work order.

114.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property involved, or to the owner's agent, or to the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order, and the conditions under which the cited work will be permitted to resume.

114.3 Unlawful continuance. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to penalties as prescribed by law.

SECTION 115
UNSAFE STRUCTURES AND EQUIPMENT

Section 115.1 is amended to read as follows:

115.1 Conditions. Refer to the *2007 Ventura City Property Maintenance Code.*

115.2 Record. The building official shall cause a report to be filed on an unsafe condition. The report shall state the occupancy of the structure and the nature of the unsafe condition.

115.3 Notice. If an unsafe condition is found, the building official shall serve on the owner, agent or person in control of the structure, a written notice that describes the condition deemed unsafe and specifies the required repairs or improvements to be made to abate the unsafe condition, or that requires the unsafe structure to be demolished within a stipulated time. Such notice shall require the person thus notified to declare immediately to the building official acceptance or rejection of the terms of the order.

115.4 Method of service. Such notice shall be deemed properly served if a copy thereof is (a) delivered to the owner personally; (b) sent by certified or registered mail addressed to the owner at the last known address with the return receipt requested; or (c) delivered in any other manner as prescribed by local law. If the certified or registered letter is returned showing that the letter was not delivered, a copy thereof shall be posted in a conspicuous place in or about the structure affected by such notice. Service of such notice in the foregoing manner upon the owner's agent or upon the person responsible for the structure shall constitute service of notice upon the owner.

115.5 Restoration. The structure or equipment determined to be unsafe by the building official is permitted to be restored to a safe condition. To the extent that repairs, alterations or additions are made or a change of occupancy occurs during the restoration of the structure, such repairs, alterations, additions or change of occupancy shall comply with the requirements of Section 105.2.2 and Chapter 34.

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than 1 hour where such walls are located within 5 feet (1524 mm) of the property line. Openings within such walls are not permitted. Openings in exterior nonrated walls need not be protected.

Section 509.10 is added to read as follows:

509.10 Finish Floor Elevation and Lot Drainage. Every residential building must be constructed to have a finished floor at least sixteen (16) inches above the lowest adjacent public sidewalk or public way, except where a designed drainage plan may be approved by the building official. All lots must be graded so that they drain to the street or public way on which they abut or must be provided with approved drainage devices in compliance with San Buenaventura Ordinance Code § 3140.

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TABLE 1504.8
MAXIMUM ALLOWABLE MEAN ROOF HEIGHT PERMITTED FOR BUILDINGS WITH GRAVEL OR STONE ON THE ROOF IN AREAS OUTSIDE A HURRICANE-PRONE REGION

BASIC WIND SPEED FROM FIGURE 1609 (mph)[b]	MAXIMUM MEAN ROOF HEIGHT (ft)[a,c]		
	Exposure category		
	B	C	D
85	170	60	30
90	110	35	15
95	75	20	NP
100	55	15	NP
105	40	NP	NP
110	30	NP	NP
115	20	NP	NP
120	15	NP	NP
Greater than 120	NP	NP	NP

For SI: 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

a. Mean roof height in accordance with Section 1609.2.
b. For intermediate values of basic wind speed, the height associated with the next higher value of wind speed shall be used, or direct interpolation is permitted.
c. NP = gravel and stone not permitted for any roof height.

SECTION 1505
FIRE CLASSIFICATION

Section 1505.1, 1505.1.1 to 1505.1.4, and sections 1505.3 to 1505.7 are deleted and Section 1505 is amended to read as follows:

1505 Roof Covering. The roof covering on any structure regulated by this code shall be a Class A or B roof covering. The roof-covering assembly includes the roof deck, underlayment, interlayment, insulation, and covering which are assigned a roof covering classification.

Exception: When the aggregate roof area of an addition is ten percent (10%) or less of the area of the roof of an existing structure which has a non-Class A or B roof covering, the addition may be roofed with the same materials of which the existing structure is roofed.

1505.2 Class A roof assemblies. Class A roof assemblies are those that are effective against severe fire test exposure. Class A roof assemblies and roof coverings shall be listed and identified as Class A by an approved testing agency. Class A roof assemblies shall be permitted for use in buildings or structures of all types of construction.

Exception: Class A roof assemblies include those with coverings of brick, masonry, slate, clay or concrete roof tile, exposed concrete roof deck, ferrous or copper shingles or sheets.

SECTION 1506
MATERIALS

1506.1 Scope. The requirements set forth in this section shall apply to the application of roof-covering materials specified herein. Roof coverings shall be applied in accordance with this chapter and the manufacturer's installation instructions. Installation of roof coverings shall comply with the applicable provisions of Section 1507.

1506.2 Compatibility of materials. Roofs and roof coverings shall be of materials that are compatible with each other and with the building or structure to which the materials are applied.

1506.3 Material specifications and physical characteristics. Roof-covering materials shall conform to the applicable standards listed in this chapter. In the absence of applicable standards or where materials are of questionable suitability, testing by an approved agency shall be required by the building official to determine the character, quality and limitations of application of the materials.

1506.4 Product identification. Roof-covering materials shall be delivered in packages bearing the manufacturer's identifying marks and approved testing agency labels required in accordance with Section 1505. Bulk shipments of materials shall be accompanied with the same information issued in the form of a certificate or on a bill of lading by the manufacturer.

SECTION 1507
REQUIREMENTS FOR ROOF COVERINGS

1507.1 Scope. Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

1507.2 Asphalt shingles. The installation of asphalt shingles shall comply with the provisions of this section.

1507.2.1 Deck requirements. Asphalt shingles shall be fastened to solidly sheathed decks.

1507.2.2 Slope. Asphalt shingles shall only be used on roof slopes of two units vertical in 12 units horizontal (17-percenter slope) or greater. For roof slopes from two units vertical in 12 units horizontal (17-percent slope) up to four units vertical in 12 units horizontal (33-percent slope), double underlayment application is required in accordance with Section 1507.2.8.

1507.2.3 Underlayment. Unless otherwise noted, required underlayment shall conform to ASTM D 226, Type I, ASTM D 4869, Type I, or ASTM D 6757.

1507.2.4 Self-adhering polymer modified bitumen sheet. Self-adhering polymer modified bitumen sheet shall comply with ASTM D 1970.

1507.2.5 Asphalt shingles. Asphalt shingles shall have self-seal strips or be interlocking and comply with ASTM D 225 or ASTM D 3462. Asphalt shingle packaging shall bear labeling indicating compliance with ASTM D 3161 or a listing by an approved testing agency in accordance with the requirements of Section 1609.5.2.

1507.2.6 Fasteners. Fasteners for asphalt shingles shall be galvanized, stainless steel, aluminum or copper roofing nails, minimum 12 gage [0.105 inch (2.67 mm)] shank with a minimum 0.375 inch-diameter (9.5 mm) head, of a length to penetrate through the roofing materials and a minimum of 0.75 inch (19.1 mm) into the roof sheathing. Where the roof sheathing is less than 0.75 inch (19.1 mm) thick, the nails shall penetrate through the sheathing. Fasteners shall comply with ASTM F 1667.

1507.2.7 Attachment. Asphalt shingles shall have the minimum number of fasteners required by the manufacturer and Section 1504.1. Asphalt shingles shall be secured to the roof with not less than four fasteners per strip shingle or two fasteners per individual shingle. Where the roof slope exceeds 20 units vertical in 12 units horizontal (166-percent slope), asphalt shingles shall be installed in accordance with the manufacturer's printed installation instructions for steep-slope roof applications.

1507.2.8 Underlayment application. For roof slopes from two units vertical in 12 units horizontal (17-percent slope) and up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be two layers applied in the following manner. Apply a minimum 19-inch-wide (483 mm) strip of underlayment felt parallel with the starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch wide (914 mm) sheets of underlayment overlapping successive sheets 19 inches (483 mm), by fastened sufficiently to hold in place. Distortions in

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3. The applicant of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.

1510.4 Roof covering. Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other approved materials securely fastened in place.

1510.5 Reinstallation of materials. Existing late, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled.

1510.6 Flashings. Flashings shall be reconstructed in accordance with approved manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.

Section 1510.7 is added to read as follows:

1510.7 General. All re-roofing shall be constructed with Class A or B roofing and shall conform to the applicable provisions of Chapter 15 of this Code, and as otherwise required in this Chapter.

Exception: Re-roofing, replacement or repair to ten percent(10%) or less of the roof area in any twelve-month period may be done with the same materials of which the roof is covered.

SECTION 1511 [DSA-SS & OSHPD 1, 2 AND 4] SEISMIC ANCHORAGE OF SLATE SHINGLE, CLAY AND CONCRETE TILE ROOF COVERINGS

1511.1 Fasteners. *Nails shall be long enough to penetrate into the sheathing ¾ inch (19 mm). Where sheathing is less than ¾ inch (19 mm) in thickness, nails shall be driven into supports, unless nails with ring shanks are used.*

All fasteners shall be corrosion resistant and fabricated of copper, stainless steel or brass, or shall have a hot-dipped galvanized coating not less than 1.0 ounce of zinc per square foot (458 gm/m^2).

Nails for slate shingles and clay or concrete tile shall be copper, brass or stainless steel with gage and length per common ferrous nails.

1511.2 Wire. *Wire for attaching slate shingles and clay or concrete tile shall be copper, brass or stainless steel capable of supporting four times the weight of the tile.*

Wire supporting a single tile or shingle shall not be smaller than 1/16 inch (1.6 mm) in diameter. Continuous wire ties supporting more than one tile shall not be smaller than 0.084 inch (2 mm) in diameter.

1511.3 Metal strips. *Metal strips for attaching slate shingles and clay or concrete tile shall be copper, brass or stainless steel capable of supporting four times the weight of the tile.*

1511.4 Clay or concrete tiles. *Clay or concrete tile shall be installed in accordance with Table 1507.3.7 and as described herein.*

1. *On wood roofs or roofs of other material to which wood strips are secured, every cover or top tile when fastened with nails shall be nailed directly into 1¼ inches (32 mm) sound grain soft wood strips of sufficient height to support the tile.*

   Pan or bottom tiles shall be nailed directly to the roof sheathing or to wood strips. Wood strips shall be secured to the roof by nails spaced not over 12 inches (305 mm) apart.

2. *On concrete roofs, wires shall be secured in place by wire loops embedded into the concrete not less than 2 inches (51 mm). The wire loops shall be spaced not more than 36 inches (914 mm) on center parallel to the eaves, and spaced vertically to allow for the minimum 3 inches (76 mm) lapping of the tile.*

3. *Where continuous ties of twisted wire, interlocking wires or metal strips extending from the ridge to eave are used to attach tile, the ties shall be attached to the roof construction at the ridge, eave and at intervals not exceeding 10 feet (3048 mm) on center. The ties within 2 feet (610 mm) of the rake shall be attached at intervals of 5 feet (1524 mm).*

   Attachment for continuous ties shall be nails, screws, staples or approved clips of the same material as the ties and shall not be subjected to withdrawal forces. Attachments for continuous ties shall have an allowable working stress shear resistance of not less than twice the dead weight of the title tributary to the attachment, but not less than 300 pounds (136 kg).

4. *Tile with projecting anchor lugs at the bottom of the tiles shall be held in position by means of 1-inch by 2-inch (25 mm by 51 mm) wood stripping nailed to the roof sheathing over the underlay.*

5. *Clay or concrete tile on roofs with slopes exceeding 24 units vertical in 12 units horizontal (200-percent slope) shall be attached as required for veneer in Chapter 14. The nose of all tiles shall be securely fastened.*

6. *Clay or concrete tile shall have a minimum of two fasteners per tile. Tiles that are 8 inches (203 mm) in width or less are permitted to be fastened at the center of the head with one fastener per tile.*

7. *Interlocking clay or concrete tile shall have a minimum of one nail near center of head or two wire ties per tile.*

1511.5 Slate shingles. *Slate shingles on roofs with slopes exceeding 24 units vertical in 12 units horizontal (200-percent slope) shall be attached as required for veneer per Chapter 14.*

1511.6 Alternative design. *An alternative design of the fastening system used to resist seismic loads is permitted, provided that an engineering analysis or test report based on cyclic testing is provided to the enforcement agency.*

The fastening system shall be designed to resist seismic forces per ASCE 7, Section 13.3. Testing of alternative fastening system shall comply with ASCE 7, Section 13.2.5.

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Section 1613.7 is added to read as follows:

1613.7 Suspended Ceilings. Minimum design and installation standards for suspended ceilings shall be determined in accordance with the requirements of Chapter 25 of this Code and this subsection.

1613.7.1 Scope. This part contains special requirements for suspended ceilings and lighting systems. Provisions of Section 13.5.6 of ASCE 7 shall apply except as modified herein.

1613.7.2 General. The suspended ceilings and lighting systems shall be limited to 6 feet (1828 mm) below the structural deck unless the lateral bracing is designed by a licensed engineer or architect.

1613.7.3 Design and Installation Requirements.

1613.7.3.1 Bracing at Discontinuity. Positive bracing to the structure shall be provided at changes in the ceiling plane elevation or at discontinuities in the ceiling grid system.

1613.7.3.2 Support for Appendages. Cable trays, electrical conduits and piping shall be independently supported and independently braced from the structure.

1613.7.3.3 Sprinkler Heads. All sprinkler heads (drops) except fire-resistance-rated floor/ceiling or roof/ceiling assemblies, shall be designed to allow for free movement of the sprinkler pipes with oversize rings, sleeves or adaptors through the ceiling tile, in accordance with Section 13.5.6.2.2 (e) of ASCE 7.

Sprinkler heads penetrating fire-resistance-rated floor/ceiling or roof/ceiling assemblies shall comply with Section 712 of this Code.

1613.7.3.4 Perimeter Members. A minimum wall angle size of at least a two-inch (51 mm) horizontal leg shall be used at perimeter walls and interior full height partitions. The first ceiling tile shall maintain 3/4 inch (19 mm) clearance from the finished wall surface. An equivalent alternative detail that will provide sufficient movement due to anticipated lateral building displacement may be used in lieu of the long leg angle subject to the approval of the Superintendent of Building.

1613.7.4 Special Requirements for Means of Egress. Suspended ceiling assemblies located along means of egress serving an occupant load of 30 or more shall comply with the following provisions.

1613.7.4.1 General. Ceiling suspension systems shall be connected and braced with vertical hangers attached directly to the structural deck along the means of egress serving an occupant load of 30 or more, and at lobbies accessory to Group A Occupancies. Spacing of vertical hangers shall not exceed 2 feet (610 mm) on center along the entire length of the suspended ceiling assembly located along the means of egress or at the lobby.

1613.7.4.2 Assembly Device. All lay-in panels shall be secured to the suspension ceiling assembly with two hold-down clips minimum for each tile within a 4-foot (1219 mm) radius of the exit lights and exit signs.

1613.7.4.3 Emergency Systems. Independent supports and braces shall be provided for light fixtures required for exit illumination. Power supply for exit illumination shall comply with the requirements of Section 1006.3 of this Code.

1613.7.4.4 Supports for Appendage. Separate support from the structural deck shall be provided for all appendages such as light fixtures, air diffusers, exit signs, and similar elements.

Section 1613.8 is added to read as follows:

1613.8 Seismic Design Provisions for Hillside Buildings.

1613.8.1 Purpose. The purpose of this section is to establish minimum regulations for the design and construction of new buildings and additions to existing buildings when constructing such buildings on or into slopes steeper than one unit vertical in three units horizontal (33.3%). These regulations establish minimum standards for seismic force resistance to reduce the risk of injury or loss of life in the event of earthquakes.

1613.8.2 Scope. The provisions of this section shall apply to the design of the lateral-force-resisting system for hillside buildings at and below the base level diaphragm. The design of the lateral-force-resisting system above the base level diaphragm shall be in accordance with the provisions for seismic and wind design as required elsewhere in this division.

EXCEPTION: Non-habitable accessory buildings and decks not supporting or supported from the main building are exempt from these regulations.

1613.8.3 Definitions. For the purposes of this section certain terms are defined as follows:

BASE LEVEL DIAPHRAGM is the floor at, or closest to, the top of the highest level of the foundation.

DIAPHRAGM ANCHORS are assemblies that connect a diaphragm to the adjacent foundation at the uphill diaphragm edge.

DOWNHILL DIRECTION is the descending direction of the slope approximately perpendicular to the slope contours.

FOUNDATION is concrete or masonry which supports a building, including footings, stem walls, retaining walls, and grade beams.

FOUNDATION EXTENDING IN THE DOWNHILL DIRECTION is a foundation running downhill and approximately perpendicular to the uphill foundation.

HILLSIDE BUILDING is any building or portion thereof constructed on or into a slope steeper than one unit vertical in three units horizontal (33.3%). If only a portion of the building is supported on or into the slope, these regulations apply to the entire building.

PRIMARY ANCHORS are diaphragm anchors designed for and providing a direct connection as described in Sections 1613.8.5 and 1613.8.7.3 between the diaphragm and the uphill foundation.

SECONDARY ANCHORS are diaphragm anchors designed for and providing a redundant diaphragm to foundation connection, as described in Sections 1613.8.6 and 1613.8.7.4.

UPHILL DIAPHRAGM EDGE is the edge of the diaphragm adjacent and closest to the highest ground level at the perimeter of the diaphragm.

UPHILL FOUNDATION is the foundation parallel and closest to the uphill diaphragm edge.

1613.8.4 Analysis and Design.

1613.8.4.1 General. Every hillside building within the scope of this section shall be analyzed, designed, and constructed in accordance with the provisions of this division. When the code-prescribed wind design produces greater effects, the wind design shall govern, but detailing requirements and limitations prescribed in this and referenced sections shall be followed.

1613.8.4.2 Base Level Diaphragm-Downhill Direction. The following provisions shall apply to the seismic analysis and design of the connections for the base level diaphragm in the downhill direction.

1613.8.4.2.1 Base for Lateral Force Design Defined. For seismic forces acting in the downhill direction, the base of the building shall be the floor at or closest to the top of the highest level of the foundation.

1613.8.4.2.2 Base Shear. In developing the base shear for seismic design, the response modification coefficient (R) shall not exceed 4.5 for bearing wall and building frame systems. The total base shear shall include the forces tributary to the base level diaphragm including forces from the base level diaphragm.

1613.8.5 Base Shear Resistance-Primary Anchors.

1613.8.5.1 General. The base shear in the downhill direction shall be resisted through primary anchors from diaphragm struts provided in the base level diaphragm to the foundation.

1613.8.5.2 Location of Primary Anchors. A primary anchor and diaphragm strut shall be provided in line with each foundation extending in the downhill direction. Primary anchors and diaphragm struts shall also be provided where interior vertical lateral-force-resisting elements occur above and in contact with the base level diaphragm. The spacing of primary anchors and diaphragm struts or collectors shall in no case exceed 30 feet (9144 mm).

1613.8.5.3 Design of Primary Anchors and Diaphragm Struts. Primary anchors and diaphragm struts shall be designed in accordance with the requirements of Section 1613.8.8.

1613.8.5.4 Limitations. The following lateral-force-resisting elements shall not be designed to resist seismic forces below the base level diaphragm in the downhill direction:

1. Wood structural panel wall sheathing,
2. Cement plaster and lath,
3. Gypsum wallboard, and
4. Tension only braced frames.

Braced frames designed in accordance with the requirements of Section 2205.2.2 may be used to transfer forces from the primary anchors and diaphragm struts to the foundation provided lateral forces do not induce flexural stresses in any member of the frame or in the diaphragm struts. Deflections of frames shall account for the variation in slope of diagonal members when the frame is not rectangular.

1613.8.6. Base Shear Resistance-Secondary Anchors.

1613.8.6.1 General. In addition to the primary anchors required by Section 1613.8.5, the base shear in the downhill direction shall be resisted through secondary anchors in the uphill foundation connected to diaphragm struts in the base level diaphragm.

EXCEPTION: Secondary anchors are not required where foundations extending in the downhill direction spaced at not more than 30 feet (9144 mm) on center extend up to and are directly connected to the base level diaphragm for at least 70% of the diaphragm depth.

1613.8.6.2 Secondary Anchor Capacity and Spacing. Secondary anchors at the base level diaphragm shall be designed for a minimum force equal to the base shear, including forces tributary to the base level diaphragm, but not less than 600 pounds per lineal foot (8.76 kN/m). The secondary anchors shall be uniformly distributed along the uphill diaphragm edge and shall be spaced a maximum of four feet (1219 mm) on center.

1613.8.6.3 Design. Secondary anchors and diaphragm struts shall be designed in accordance with Section 1613.8.8.

1613.8.7 Diaphragms Below the Base Level-Downhill Direction. The following provisions shall apply to the lateral analysis and design of the connections for all diaphragms below the base level diaphragm in the downhill direction.

1613.8.7.1 Diaphragm Defined. Every floor level below the base level diaphragm shall be designed as a diaphragm.

1613.8.7.2 Design Force. Each diaphragm below the base level diaphragm shall be designed for all tributary loads at that level using a minimum seismic force factor not less than the base shear coefficient.

1613.8.7.3 Design Force Resistance-Primary Anchors. The design force described in Section 1613.8.7.2 shall be resisted through primary anchors from diaphragm struts provided in each diaphragm to the foundation. Primary anchors shall be provided and designed in accordance with the requirements and limitations of Section 1613.8.5.

1613.8.7.4 Design Force Resistance-Secondary Anchors.

1613.8.7.4.1 General. In addition to the primary anchors required in Section 1613.8.7.3, the design force in the downhill direction shall be resisted through secondary anchors in the uphill foundation connected to diaphragm struts in each diaphragm below the base level.

EXCEPTION: Secondary anchors are not required where foundations extending in the downhill direction, spaced at not more than 30 feet (9144 mm) on center, extend up to and are directly connected to each diaphragm below the base level for at least 70% of the diaphragm depth.

1613.8.7.4.2 Secondary Anchor Capacity. Secondary anchors at each diaphragm below the base level diaphragm shall be designed for a minimum force equal to the design force but not less than 300 pounds per lineal foot (4.38 kN/m). The secondary anchors shall be uniformly distributed along the uphill diaphragm edge and shall be spaced a maximum of four feet (1219 mm) on center.

1613.8.7.4.3 Design. Secondary anchors and diaphragm struts shall be designed in accordance with Section 1613.8.8.

1613.8.8 Primary and Secondary Anchorage and Diaphragm Strut Design. Primary and secondary anchors and diaphragm struts shall be designed in accordance with the following provisions:

1. **Fasteners.** All bolted fasteners used to develop connections to wood members shall be provided with square plate washers at all bolt heads and nuts. Washers shall be minimum 3/16 inch (4.8 mm) thick and two inch (51 mm) square for 1/2-inch (12.7 mm) diameter bolts, and 1/4-inch (6.4 mm) thick and 2-1/2-inch (64 mm) square for 5/8-inch (15.9 mm) diameter or larger bolts. Nuts shall be wrench tightened prior to covering.
2. **Fastening.** The diaphragm to foundation anchorage shall not be accomplished by the use of toenailing, nails subject to withdrawal, or wood in cross-grain bending or cross-grain tension.
3. **Size of Wood Members.** Wood diaphragm struts collectors, and other wood members connected to primary anchors shall not be less than three-inch (76 mm) nominal width. The effects of eccentricity on wood members shall be evaluated as required per Item 9.
4. **Design**. Primary and secondary anchorage, including diaphragm struts, splices, and collectors shall be designed for 125% of the tributary force.
5. **Allowable Stress Increase.** The one-third allowable stress increase permitted under Section 1605.3.2 shall not be taken when the working (allowable) stress design method is used.
6. **Seismic Load Factor.** The seismic load factor shall be 1.7 for steel and concrete anchorage when the strength design method is used.
7. **Primary Anchors.** The load path for primary anchors and diaphragm struts shall be fully developed into the diaphragm and into the foundation. The foundation must be shown to be adequate to resist the concentrated loads from the primary anchors.
8. **Secondary Anchors.** The load path for secondary anchors and diaphragm struts shall be fully developed in the diaphragm but need not be developed beyond the connection to the foundation.
9. **Symmetry.** All lateral force foundation anchorage and diaphragm strut connections shall be symmetrical. Eccentric connections may be permitted when demonstrated by calculation or tests that all components of force have been provided for in the structural analysis or tests.
10. **Wood Ledgers.** Wood ledgers shall not be used to resist cross-grain bending or cross-grain tension.

1613.8.9 Lateral-Force-Resisting Elements Normal to the Downhill Direction.

1613.8.9.1 General. In the direction normal to the downhill direction, lateral-force-resisting elements shall be designed in accordance with the requirements of this section.

1613.8.9.2 Base Shear. In developing the base shear for seismic design, the response modification coefficient (R) shall not exceed 4.5 for bearing wall and building frame systems.

1613.8.9.3 Vertical Distribution of Seismic Forces. For seismic forces acting normal to the downhill direction the distribution of seismic forces over the height of the building using Section 12.8.3 of ASCE 7 shall be determined using the height measured from the top of the lowest level of the building foundation.

1613.8.9.4 Drift Limitations. The story drift below the base level diaphragm shall not exceed 0.005 times the story height. The total drift from the base level diaphragm to the top of the foundation shall not exceed 3/4 inch (19 mm). Where the story height or the height from the base level diaphragm to the top of the foundation varies because of a stepped footing or story offset, the height shall be measured from the average height of the top of the foundation. The story drift shall

not be reduced by the effect of horizontal diaphragm stiffness.

Where code-prescribed wind forces govern the design of the lateral force resisting system normal to the downhill direction, the drift limitation shall be 0.0025 for the story drift and the total drift from the base level diaphragm to the top of the foundation may exceed 3/4 inch (19 mm) when approved by the Department. In no case, however, shall the drift limitations for seismic forces be exceeded.

1613.8.9.5 Distribution of Lateral Forces.

1613.8.9.5.1 General. The design lateral force shall be distributed to lateral-force-resisting elements of varying heights in accordance with the stiffness of each individual element.

1613.8.9.5.2 Wood Structural Panel Sheathed Walls. The stiffness of a stepped wood structural panel shear wall may be determined by dividing the wall into adjacent rectangular elements, subject to the same top of wall deflection. Deflections of shear walls may be estimated by Section 2305.3.2. Sheathing and fastening requirements for the stiffest section shall be used for the entire wall. Each section of wall shall be anchored for shear and uplift at each step. The minimum horizontal length of a step shall be eight feet (2438 mm) and the maximum vertical height of a step shall be two feet, eight inches (813 mm).

1613.8.9.5.3 Reinforced Concrete or Masonry Shear Walls. Reinforced concrete or masonry shear walls shall have forces distributed in proportion to the rigidity of each section of the wall.

1613.8.9.6 Limitations. The following lateral force-resisting elements shall not be designed to resist lateral forces below the base level diaphragm in the direction normal to the downhill direction:

1. Cement plaster and lath,
2. Gypsum wallboard, and
3. Tension-only braced frames.

Braced frames designed in accordance with the requirements of Chapter 22 of this Code may be designed as lateral-force-resisting elements in the direction normal to the downhill direction, provided lateral forces do not induce flexural stresses in any member of the frame. Deflections of frames shall account for the variation in slope of diagonal members when the frame is not rectangular.

1613.8.10 Specific Design Provisions.

1613.8.10.1 Footings and Grade Beams. All footings and grade beams shall comply with the following:

1. Grade beams shall extend at least 12 inches (305 mm) below the lowest adjacent grade and provide a minimum 24-inch (610 mm) distance horizontally from the bottom outside face of the grade beam to the face of the descending slope.
2. Continuous footings shall be reinforced with at least two No. 4 reinforcing bars at the top and two No. 4 reinforcing bars at the bottom.
3. All main footing and grade beam reinforcement steel shall be bent into the intersecting footing and fully developed around each corner and intersection.
4. All concrete stem walls shall extend from the foundation and reinforced as required for concrete or masonry walls.

1613.8.10.2 Protection Against Decay and Termites. All wood to earth separation shall comply with the following:

1. Where a footing or grade beam extends across a descending slope, the stem wall, grade beam, or footing shall extend up to a minimum 18 inches (457 mm) above the highest adjacent grade.

   EXCEPTION: At paved garage and doorway entrances to the building, the stem wall need only extend to the finished concrete slab, provided the wood framing is protected with a moisture proof barrier.
2. Wood ledgers supporting a vertical load of more than 100 pounds per lineal foot (1.46 kN/m) and located within 48 inches (1219 mm) of adjacent grade are prohibited. Galvanized steel ledgers and anchor bolts, with or without wood nailers, or treated or decay resistant sill plates supported on a concrete or masonry seat may be used.

1613.8.10.3 Sill Plates. All sill plates and anchorage shall comply with the following:

1. All wood framed walls, including nonbearing walls, when resting on a footing, foundation, or grade beam stem wall, shall be supported on wood sill plates bearing on a level surface.
2. Power-driven fasteners shall not be used to anchor sill plates except at interior nonbearing walls not designed as shear walls.

1613.8.10.4 Column Base Plate Anchorage. The base of isolated wood posts (not framed into a stud wall) supporting a vertical load of 4000 pounds (17.8 kN) or more and the base plate for a steel column shall comply with the following:

1. When the post or column is supported on a pedestal extending above the top of a footing or grade beam, the pedestal shall be designed and reinforced as required for concrete or masonry columns. The pedestal shall be reinforced with a minimum of four No. 4 bars extending to the bottom of the footing or grade beam. The top of exterior pedestals shall be sloped for positive drainage.

2. The base plate anchor bolts or the embedded portion of the post base, and the vertical reinforcing bars for the pedestal, shall be confined with two No. 4 or three No. 3 ties within the top five inches (127 mm) of the concrete or masonry pedestal. The base plate anchor bolts shall be embedded a minimum of 20 bolt diameters into the concrete or masonry pedestal. The base plate anchor bolts and post bases shall be galvanized and each anchor bolt shall have at least two galvanized nuts above the base plate.

1613.8.10.5 Steel Beam to Column Supports. All steel beam to column supports shall be positively braced in each direction. Steel beams shall have stiffener plates installed on each side of the beam web at the column. The stiffener plates shall be welded to each beam flange and the beam web. Each brace connection or structural member shall consist of at least two 5/8 inch (15.9 mm) diameter machine bolts.

Section 1614 is added to read as follows:

1614 Modifications to ASCE 7 Design Standard. The text of ASCE 7 shall be modified as indicated in this Section.

1614.1. Wood Diaphragms Modification. Modify ASCE 7 Section 12.11.2.3 to read as follows:

12.11.2.2.3 *Wood Diaphragms*. In wood diaphragms, the continuous ties shall be in addition to the diaphragm sheathing. Anchorage shall not be accomplished by use of toenails or nails subject to withdrawal nor shall wood ledgers or framing be used in cross-grain bending or cross-grain tension. This section shall not consider the diaphragm sheathing effective as providing ties or struts required.

For wood diaphragms supporting concrete or masonry walls, wood diaphragms shall comply with the following:

1. The spacing of continuous ties shall not exceed 40 feet. Added chords of diaphragms may be used to form subdiaphragms to transmit the anchorage forces to the main continuous crossties.
2. The maximum diaphragm shear used to determine the depth of the subdiaphragm shall not exceed 75% of the maximum diaphragm shear.

1614.2. ***Minimum Building Separation Modification.*** *Replace ASCE 7 Section 12.12.3 as follows:*

12.12.3 *Minimum Building Separation*. All structures shall be separated from adjoining structures. Separations shall allow for the maximum inelastic response displacement (delta M). Delta M shall be determined at critical locations with consideration for both translational and torsional displacements of the structure as follows:

$$\Delta_M = C_d \delta_{max} \qquad \text{(Equation 16-45)}$$

Where delta max is the calculated maximum displacement at Level x as define in ASCE 7 Section 12.8.4.3.

Adjacent buildings on the same property shall be separated by at least a distance delta MT, under the following circumstances:

$$\Delta_{MT} = \sqrt{(\Delta_{M1})^2 + (\Delta_{M2})^2}$$

(Equation 16-46)

and also when delta M1 and delta M2 are the maximum inelastic response displacements of the adjacent buildings.

Where a structure adjoins a property line not common to a public way, the structure shall also be set back from the property line by at least the displacement, delta M, of that structure.

EXCEPTION: Smaller separations or property line setbacks shall be permitted when justified by rational analyses.

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CHAPTER 18
SOILS AND FOUNDATIONS

SECTION 1801
GENERAL

1801.1 Scope. The provisions of this chapter shall apply to building and foundation systems in those areas not subject to scour or water pressure by wind and wave action. Buildings and foundations subject to such scour or water pressure loads shall be designed in accordance with Chapter 16.

1801.2 Design. Allowable bearing pressures, allowable stresses and design formulas provided in this chapter shall be used with the allowable stress design load combinations specified in Section 1605.3. The quality and design of materials used structurally in excavations, footings and foundations shall conform to the requirements specified in Chapters 16, 19, 21, 22 and 23 of this code. Excavations and fills shall also comply with Chapter 33.

[HCD1] For limited-density owner-built rural dwellings, pier foundations, stone masonry footings and foundations, pressure-treated lumber, poles, or equivalent foundation materials or designs may be used provided that the bearing is sufficient for the purpose intended.

1801.2.1 Foundation design for seismic overturning. Where the foundation is proportioned using the load combinations of Section 1605.2, and the computation of the seismic overturning moment is by the equivalent lateral-force method or the modal analysis method, the proportioning shall be in accordance with Section 12.13.4 of ASCE 7.

SECTION 1802
FOUNDATION AND SOILS INVESTIGATIONS

Section 1802.1 is amended to read as follows:

1802.1 General. The classification of the soil at each building site shall be determined when required by the building official. An investigation, or investigations, shall be conducted for each site by an engineer appropriately licensed in California and reports shall be submitted in accordance with CBC Section 1802.6.

EXCEPTION: The following may be exempt from this requirement:

1. Sites having natural formations known by the building official to be free of adverse characteristics.
2. Sites for minor buildings and additions less than one thousand (1,000) square feet in area when the building official determines that no special site conditions exist.

1802.1.1 ***General and where required for applications listed in Section 108.2.1.1 regulated by the Department of Housing and Community Development. [HCD 1]*** *Foundation and soils investigations shall be conducted in conference with Health and Safety Code Sections 17953 through 17955 as summarized below:*

1802.1.1.1 Preliminary soil report. *Each city, county, or city and county shall enact an ordinance which requires a preliminary soil report, prepared by a civil engineer who is registered by the state. The report shall be based upon adequate test borings or excavations, of every subdivision, where a tentative and final map is required pursuant to Section 66426 of the Government Code.*

The preliminary soil report may be waived if the building department of the city, county or city and county, or other enforcement agency charged with the administration and enforcement of the provisions of this part, shall determine that, due to the knowledge such department has as to the soil qualities of the soil of the subdivision or lot, no preliminary analysis is necessary.

1802.1.1.2 Soil investigation by lot, necessity, preparation, and recommendations. *If the preliminary soil report indicates the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects, such ordinance shall require a soil investigation of each lot in the subdivision.*

The soil investigation shall be prepared by a civil engineer who is registered in this state. It shall recommend corrective action which is likely to prevent structural damage to each dwelling proposed to be constructed on the expansive soil.

1802.1.1.3 Approval, building permit conditions, appeal. *The building department of each city, county or city and county, or other enforcement agency charged with the administration and enforcement of the provisions of this part, shall approve the soil investigation if it determines that the recommended action is likely to prevent structural damage to each dwelling to be constructed. As a condition to the building permit, the ordinance shall require that the approved recommended action be incorporated in the construction of each dwelling. Appeal form such determination shall be to the local appeals board.*

1802.2 Where required. The owner or applicant shall submit a foundation and soils investigation to the building official where required in Sections 1802.2.1 through 1802.2.7.

EXCEPTION: The building official need not require a foundation or soils investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the conditions in Sections 1802.2.1 through 1802.2.6.

[OSHPD 2] Geotechnical reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371 m^2) for less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from California Geological Survey (CGS). Allowable foundation and lateral soil pressure values may be determined from Table 1804.2.

1802.2.1 Questionable soil. Where the classification, strength or compressibility of the soil are in doubt or where a load-bearing value superior to that specified in this code is claimed, the building official shall require that the necessary investigation be made. Such investigation shall comply with the provisions of Sections 1802.4 through 1802.6.

1802.2.2 Expansive soils. In areas likely to have expansive soil, the building official shall require soil tests to determine where such soils do exist.

1802.2.3 Ground-water table. A subsurface soil investigation shall be performed to determine whether the existing ground-water table is above or within 5 feet (1524 mm) below the elevation of the lowest floor level where such floor is located below the finished ground level adjacent to the foundation.

Exception: A subsurface soil investigation shall not be required where waterproofing is provided in accordance with Section 1807.

1802.2.4 Pile and pier foundations. Pile and pier foundations shall be designed and installed on the basis of a foundation investigation and report as specified in Sections 1802.4 through 1802.6 and Section 1808.2.2.

1802.2.5 Rock strata. Where subsurface exploration at the project site indicate variations or doubtful characteristics in the structure of the rock upon which foundations are to be constructed, a sufficient number of borings shall be made to a depth of not less than 10 feet (3048 mm) below the level of the foundations to provide assurance of the soundness of the foundation bed and its load-bearing capacity.

1802.2.6 Seismic Design Category C. Where a structure is determined to be in Seismic Design Category C in accordance with Section 1613, an investigation shall be conducted and shall include an evaluation of the following potential hazards resulting from earthquake motions: slope instability, liquefaction and surface rupture due to faulting or lateral spreading.

1802.2.7 Seismic Design Category D, E or F. Where the structure is determined to be in Seismic Design Category D, E or F, in accordance with Section 1613, the soils investigation requirements for Seismic Design Category C, given in Section 1802.2.6, shall be met, in addition to the following. The investigation shall include:

1. A determination of lateral pressures on basement and retaining walls due to earthquake motions.
2. An assessment of potential consequences of any liquefaction and soil strength loss, including estimation of differential settlement, lateral movement or reduction in foundation soil-bearing capacity, and shall address mitigation measures. Such measures shall be given consideration in the design of the structure and can include but are not limited to ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements or any combination of these measures. The potential for liquefaction and soil strength loss shall be evaluated for site peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions. Peak ground acceleration shall be determined from a site-specific study taking into account soil amplification effects, as specified in Chapter 21 of ASCE 7.

   Exception: A site-specific study need not be performed, provided that peak ground acceleration equal to $S_{DS}/2.5$ is used, where S_{DS} is determined in accordance with Section 21.2.1 of ASCE 7.

1802.3 Soil classification. Where required, soils shall be classified in accordance with Section 1802.3.1 or 1802.3.2.

1802.3.1 General. For the purposes of this chapter, the definition and classification of soil materials for use in Table 1804.2 shall be in accordance with ASTM D 2487.

1802.3.2 Expansive soils. Soils meeting all four of the following provisions shall be considered expansive, except that tests to show compliance with Items 1, 2 and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. Plasticity index (PI) of 15 or greater, determined in accordance with ASTM D 4318.
2. More than 10 percent of the soil particles pass a No. 200 sieve (75 μm), determined in accordance with ASTM D 422.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D 422.
4. Expansion index greater than 20, determined in accordance with ASTM D 4829.

1802.4 Investigation. Soil classification shall be based on observation and any necessary tests of the materials disclosed by borings, test pits or other subsurface exploration made in appropriate locations. Additional studies shall be made as necessary to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on soil-bearing capacity, compressibility, liquefaction and expansiveness.

1802.4.1 Exploratory boring. The scope of the soil investigation including the number and types of borings or soundings, the equipment used to drill and sample, the in-situ testing equipment and the laboratory testing program shall be determined by a registered design professional.

Section 1802.4.2 is added to read as follows:

1802.4.2 Special Site Investigation. Whenever, in the building officials' opinion, test borings or excavations required by the provisions of CBC Section 1802.4 cannot determine the adequacy of a building's overall stability, the building official may require a special geologic, hydrologic, seismic, liquefaction, or other investigation. Geologic investigations, such as hillside stability and potential fault activity, shall be conducted by a California Certified Engineering Geologist.

The engineering geologist's work must be based upon a detailed, accurate topographic base map. The map shall be of suitable scale and shall cover the project area as well as any adjacent area which may be affected. The map shall include the existing and proposed contours, location of streets, pads, slopes, structures, and pertinent elevations.

1802.4.2.1 Hillside Stability.

A. Any report required by the building official to determine a building's stability, will be based upon an investigation conducted to

reveal any subsurface conditions that may lead to landslides, slump, or settlement. It shall include descriptions of topography relief, drainage, earth materials and structure, a detailed geological map, geologic cross sections and recommendations for site development, including consideration for site drainage.

B. Any such report will also describe the effects of the development on the site and adjacent properties and specific conclusions concerning the feasibility and anticipated future stability of the overall development. Specific recommendations for the correction of all known and/or anticipated geologic hazards on the site must be included.

1802.4.2.2 Fault Activity. A report required by the Building Official will include information and recommendations concerning:

A. Surface rupture along faults, including age, type of surface displacement and amount of reasonable anticipated future displacements of any faults within, or immediately adjacent to, the site; definition of any areas of high risk; and recommended building restrictions or use limitations within any designated high risk area.

B. Secondary ground effects, including estimated magnitude and distance of all relevant earthquakes, lurching and shallow ground rupture, liquefaction of sediments and soils, settlement of soils, and potential for earthquake induced landslides.

1802.5 Soil boring and sampling. The soil boring and sampling procedure and apparatus shall be in accordance with generally accepted engineering practice. The registered design professional shall have a fully qualified representative on the site during all boring and sampling operations.

Section 1802.6 is replaced with the following:

1802.6. REPORTS. When the building official requires that a written report of the soils investigation be submitted, that written report of the soils investigation shall include, without limitation, the following information:

1. A plot plan showing the location of all test borings and/or excavations and location of cut to-fill "daylight line."
2. Descriptions and classifications of materials encountered.
3. Elevation of the water table if encountered.
4. Expected total and differential settlement.
5. Location of property or site, including address or lot number and tract.
6. Description of site, including existing use of ground, topographical irregularities, such as barrancas, existing structures, and elevations or ground slopes.
7. Description of proposed structure.
8. Boring logs showing subsurface material to a depth of at least ten (10) feet.
9. Expansive indexes, including location and depth of samples.
10. Any information that may indicate geological or earthquake problems, or the potential for hydro consolidation.
11. Recommendations for foundation type and design criteria, including bearing capacity, provisions to minimize the effects of expansive soils and hydro consolidation, and the effects of adjacent loads.
12. Retaining wall design studies and recommendations (if applicable).
13. Special studies and recommendations concerning the expansion potential, erosion potential, erosion control, and irrigation requirements, and maintenance requirements on slopes steeper than two horizontal to one vertical whenever requested by the building official.
14. Pile and stilt design studies and recommendations (if applicable).
15. Swimming pool design studies and recommendations (if applicable).
16. Special site investigations (if applicable).

1802.7 Engineering geologic reports. [OSHPD 2]

1802.7.1 *Geologic and earthquake engineering reports shall be required for all proposed construction.*

Exceptions:

1. *Reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371 m^2) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from California Geological Survey (CGS); nonstructural, associated structural or nonrequired structural alterations and incidental structural additions or alterations, and structural repairs for other than earthquake damage (see Section 3402A.1 for definitions of terms in this section).*
2. *A previous report for a specific site may be resubmitted, provided that a reevaluation is made and the report is found to be currently appropriate.*

1802.7.2 *The purpose of the engineering geologic report shall be to identify geologic and seismic conditions that may require project mitigations. The reports shall contain data which provide an assessment of the nature of the site and potential for earthquake damage based on appropriate investigations of the regional and site geology, project foundation conditions and the potential seismic shaking at the site. The report shall be prepared by a California-certified engineering geologist in consultation with a California-registered geotechnical engineer.*

The preparation of the engineering geologic report shall consider the most CGS Note 49: Checklist for the Review of Engineering Geology and Seismology Reports for California Public School, Hospitals, and Essential Services Buildings. In addition, the most recent version of CGS Special Publication 42: Fault Rupture Hazard Zones in California, shall be considered for project sites proposed within an Alquist-Priolo Earthquake Fault Zone. The most recent version of CGS Special Publication 117: Guidelines for Evaluating and Mitigating Seismic Hazards in California, shall be considered for project sites proposed within a Seismic Hazard Zone. All conclusions shall be fully supported by satisfactory data and analysis.

The report shall include, but not be limited to, the following:

1. *Geologic investigation.*
2. *Evaluation of the known active and potentially active faults, both regional and local.*
3. *Ground-motion parameters, as required by Section 1613 and ASCE 7.*
4. *Evaluation of slope stability at or near the site and;*
5. *The liquefaction and settlement potential of the earth materials in the foundation.*

1802.8 Geotechnical and supplemental ground-response reports. [OSHPD 2]

1802.8.1 Geotechnical report. *The geotechnical report shall provide completed evaluations of the foundation conditions of the site and the potential geologic/seismic hazards affecting the site. The geotechnical report shall include, but shall not be limited to, site-specific evaluations of design criteria related to the nature and extent of foundation materials, groundwater conditions, liquefaction potential, settlement potential and slope stability. The report shall contain the results of the analysis of the problem areas identified in the engineering geologic report. The geotechnical report shall incorporate estimates of the characteristics of site ground motion provided in the engineering geologic report.*

1802.8.2 Supplemental ground-response report. *If site-specific ground-motion procedures, as set forth in ASCE 7 Chapter 21, or ground-motion time-history analysis, as set forth in ASCE 7 Chapter 16 or Section 17.3, are used for design, then a supplemental ground-response report may be required. All conclusions and ground-motion parameters shall be fully supported by satisfactory data and analysis.*

1802.8.2.1 *The ground-motion element shall be prepared by a registered geotechnical engineer or geophysicist (depending on the scope of the element), or engineering geologist licensed in the state of California, and having professional specialization in earthquake analysis. The ground-motion element shall present a detailed characterization of earthquake ground motions for the site, which incorporates data given in the geotechnical report. The level of ground motion considered by the ground-motion element shall be as described in ASCE 7 Chapter 21. The characterization of ground motion in the ground-motion element shall be given, according to the requirements of the analysis, in terms of:*

1. *Elastic structural response spectra.*
2. *Time-history plot of predicted ground motion at the site.*
3. *Other analysis in conformance with accepted engineering and seismological practice.*

1802.8.2.2 *The advanced geotechnical element shall contain the results of dynamic geotechnical analyses specified by the approved geotechnical report. Where site response analysis, as set forth in ASCE 7 Section 21.1, is required, the response model shall be fully explained. The input data and assumptions shall be fully documented, and the surface ground motions recommended for design shall be clearly identified.*

The supplemental ground-response report shall be submitted to the Office of Statewide Health Planning and Development for review and approval. The review shall determine whether the ground-motion response evaluations of the site are adequately represented. The enforcement agency, in consultation with its advisors, may require additional information, analysis or clarification of potential ground-response issues reported in the supplemental ground-response report for the proposed building site.

SECTION 1803
EXCAVATION, GRADING AND FILL

1803.1 Excavations near footings or foundations. Excavations for any purpose shall not remove lateral support from any footing or foundation without first underpinning or protecting the footing or foundation against settlement or lateral translation.

1803.2 Placement of backfill. The excavation outside the foundation shall be backfilled with soil that is free of organic material, construction debris, cobbles and boulders or a controlled low-strength material (CLSM). The backfill shall be placed in lifts and compacted, in a manner that does not damage the foundation or the waterproofing or dampproofing material.

Exception: Controlled low-strength material need not be compacted.

1803.3 Site grading. The ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than one unit vertical in 20 units horizontal (5-percent slope) for a minimum distance of 10 feet (3048 mm) measured perpendicular to the face of the wall. If physical obstructions or lot lines prohibit 10 feet (3048 mm) or horizontal distance, a 5-percent slope shall be provided to an approved alternative method of diverting water away from the foundation. Swales used for this purpose shall be sloped a minimum of 2 percent where located within 10 feet (3048 mm) of the building foundation. Impervious surfaces within 10 feet (3048 mm) of the building foundation shall be sloped a minimum of 2 percent away from the building.

Exception: Where climatic our soil conditions warrant, the slop of the ground away from the building foundation is permitted to be reduced to not less than one unit vertical in 48 units horizontal (2-percent slope).

The procedure used to establish the final ground level adjacent to the foundation shall account for additional settlement of the backfill.

1803.4 Grading and fill in flood hazard areas. In flood hazard areas established in Section 1612.3, grading and/or fill shall not be approved:

1. Unless such fill is placed, compacted and sloped to minimize shifting, slumping and erosion during the rise and fall of flood water and, as applicable, wave action.
2. In floodways, unless it has been demonstrated through hydrologic and hydraulic analyses performed by a registered design professional in accordance with standard engineering practice that the proposed grading or fill, or both, will not result in any increase in flood levels during the occurrence of the design flood.
3. In flood hazard areas subject to high-velocity wave action, unless such fill is conducted and/or placed to avoid diversion of water and waves toward any building or structure.
4. Where design flood elevations are specified but floodways have not been designated, unless it has been demonstrated that the cumulative effect of the proposed flood hazard area encroachment, when combined with all other existing and anticipated flood hazard area encroachment, will not increase the design flood elevation more than 1 foot (305 mm) at any point.

1803.5 Compacted fill material. Where footings will bear on compacted fill material, the compacted fill shall comply with the provisions of an approved report, which shall contain the following:

1. Specifications for the preparation of the site prior to placement of compacted fill material.
2. Specifications for material to be used as compacted fill.
3. Test method to be used to determine the maximum dry density and optimum moisture content of the material to be used as compacted fill.
4. Maximum allowable thickness of each lift of compacted fill material.
5. Field test method for determining the in-place dry density of the compacted fill.
6. Minimum acceptable in-place dry density expressed as a percentage of the maximum dry density determined in accordance with Item 3.
7. Number and frequency of field tests required to determine compliance with Item 6.

Exception: Compacted fill material less than 12 inches (305 mm) in depth need not comply with an approved report, provided it has been compacted to a minimum of 90 percent Modified Proctor in accordance with ASTM D 1557. The compaction shall be verified by a qualified inspector approved by the building official.

1803.6 Controlled low-strength material (CLSM). Where footings will bear on controlled low-strength material (CLSM), the CLSM shall comply with the provisions of an approved report, which shall contain the following:

1. Specifications for the preparation of the site prior to placement of the CLSM.
2. Specifications for the CLSM.
3. Laboratory or field test method(s) to be used to determine the compressive strength or bearing capacity of the CLSM.
4. Test methods for determining the acceptance of the CLSM in the field.
5. Number and frequency of field tests required to determine compliance with Item 4.

Section 1803.7 is added to read as follows:

1803.7 Site drainage.

1803.7.1 Drainage precautions in hillside areas. Where buildings are constructed in hillside areas as defined in the San Buenaventura Ordinance Code, they shall be provided with gutters and site drainage as follows:

Eave or ground gutters shall be provided to receive all roof water and deliver it through a non-erosive device to a street or watercourse.

Building pads shall slope to an approved drainage device or to a public street. Where used, the drainage device shall be an adequately designed system of catch basins and drain lines which conducts the water to a street, storm drain or natural watercourse approved by the building official.

1803.7.2 Drainage precautions in expansive soil. Where buildings are constructed on soils having an expansive index reading exceeding 90, gutters shall be provided to receive all roof water and deliver it through an approved non-erosive device to a street or approved water course, unless alternate means of foundation protection recommended by the geotechnical engineer and approved by the building official is provided.

SECTION 1804
ALLOWABLE LOAD-BEARING VALUES OF SOILS

1804.1 Design. The presumptive load-bearing values provided in Table 1804.2 shall be used with the allowable stress design load combinations specified in Section 1605.3.

1804.2 Presumptive load-bearing values. The maximum allowable foundation pressure, lateral pressure or lateral sliding-resistance values for supporting soils near the surface shall not exceed the values specified in Table 1804.2 unless data to substantiate the use of a higher value are submitted and approved.

Presumptive load-bearing values shall apply to materials with similar physical characteristics and dispositions.

Mud, organic silt, organic clays, peat or unprepared fill shall not be assumed to have a presumptive load-bearing capacity unless data to substantiate the use of such a value are submitted.

> **Exception:** A presumptive load-bearing capacity is permitted to be used where the building official deems the load-bearing capacity of mud, organic silt or unprepared fill is adequate for the support of lightweight and temporary structures.

1804.3 Lateral sliding resistance. The resistance of structural walls to lateral sliding shall be calculated by combining the values derived from the lateral bearing and the lateral sliding resistance shown in Table 1804.2 unless data to substantiate the use of higher values are submitted for approval. For clay, sandy clay, silty clay and clayey silt, in no case shall the lateral sliding resistance exceed one-half the dead load.

1804.3.1 Increases in allowable lateral sliding resistance. The resistance values derived from the table are permitted to be increased by the tabular value for each additional foot (305 mm) of depth to a maximum of 15 times the tabular value.

Isolated poles for uses such as flagpoles or signs and poles used to support buildings that are not adversely affected by a 0.5 inch (12.7 mm) motion at the ground surface due to short-term lateral loads are permitted to be designed using lateral-bearing values equal to two times the tabular values.

SECTION 1805
FOOTINGS AND FOUNDATIONS

1805.1 General. Footings and foundations shall be designed and constructed in accordance with Sections 1805.1 through 1805.9. Footings and foundations shall be built on undisturbed soil, compacted fill material or CLSM. Compacted fill material shall be placed in accordance with Section 1803.5. CLSM shall be placed in accordance with Section 1803.6.

The top surface of footings shall be level. The bottom surface of footings is permitted to have a slope not exceeding one unit vertical in 10 units horizontal (10-percent slope). Footings shall be stepped where it is necessary to change the elevation of the top surface of the footing or where the surface of the ground slopes more than one unit vertical in 10 units horizontal (10-percent slope).

1805.2 Depth of footings. The minimum depth of footings below the undisturbed ground surface shall be 12 inches (305 mm). Where applicable, the depth of footings shall also conform to Sections 1805.2.1 through 1805.2.3.

1805.2.1 Frost protection. Except where otherwise protected from frost, foundation walls, piers and other permanent supports of buildings and structures shall be protected by one or more of the following methods:

1. Extending below the frost line of the locality;
2. Constructing in accordance with ASCE 32; or

TABLE 1804.2
ALLOWABLE FOUNDATION AND LATERAL PRESSURE

CLASS OF MATERIALS	ALLOWABLE FOUNDATION PRESSURE (psf)[d]	LATERAL BEARING (psf/f below natural grade)[d]	LATERAL SLIDING	
			Coefficient of friction[a]	Resistance (psf)[b]
1. Crystalline bedrock	12,000	1,200	0.70	—
2. Sedimentary and foliated rock	4,000	400	0.35	—
3. Sandy gravel and/or gravel (GW and GP)	3,000	200	0.35	—
4. Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	2,000	150	0.25	—
5. Clay, sandy clay, silty clay, clayey silt, silt and sandy silt (CL, ML, MH and CH)	1,500[c]	100	—	130

For SI: 1 pound per square foot = 0.0479 kPa, 1 pound per square foot per foot = 0.157 kPa/m.

a. Coefficient to be multiplied by the dead load.

b. Lateral sliding resistance value to be multiplied by the contact area, as limited by Section 1804.3.

c. Where the building official determines that in-place soils with an allowable bearing capacity of less than 1,500 psf are likely to be present at the site, the allowable bearing capacity shall be determined by a soils investigation.

d. An increase of one-third is permitted when using the alternate load combinations in Section 1605.3.2 that include wind or earthquake loads.

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3. Erecting on solid rock.

Exception: Free-standing buildings meeting all of the following conditions shall not be required to be protected:

1. Classified in Occupancy Category I, in accordance with Section1604.5;
2. Area of 600 square feet (56 m^2) or less for light-frame construction or 400 square feet (37 m^2) or less for other than light-frame construction; and
3. Eave height of 10 feet (3048 mm) or less.

Footings shall not bear on frozen soil unless such frozen condition is of a permanent character.

1805.2.2 Isolated footings. Footings on granular soil shall be so located that the line drawn between the lower edges of adjoining footings shall not have a slope steeper than 30 degrees (0.52 rad) with the horizontal, unless the material supporting the higher footing is braced or retained or otherwise laterally supported in an approved manner or a greater slope has been properly established by engineering analysis.

1805.2.3 Shifting or moving soils. Where it is known that the shallow subsoils are of a shifting or moving character, footings shall be carried to a sufficient depth to ensure stability.

1805.3 Footings on or adjacent to slopes. The placement of buildings and structures on or adjacent to slopes steeper than one unit vertical in three units horizontal (33.3-percent slope) shall conform to Sections 1805.3.1 through 1805.3.5.

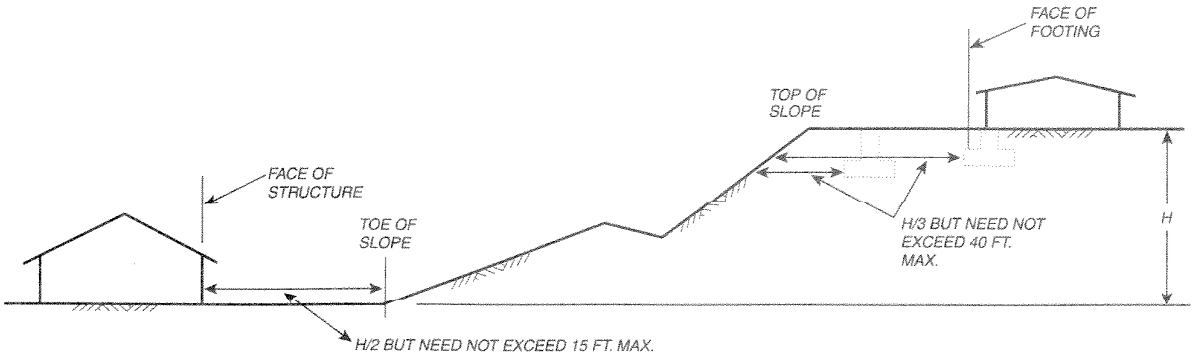
1805.3.1 Building clearance from ascending slopes. In general, buildings below slopes shall be set a sufficient distance from the slope to provide protection from slope drainage, erosion and shallow failures. Except as provided for in Section 1805.3.5 and Figure 1805.3.1, the following criteria will be assumed to provide this protection. Where the existing slope is steeper than one unit vertical in one unit horizontal (100-percent slope), the toe of the slope shall be assumed to be at the intersection of a horizontal plane drawn from the top of the foundation and a plane drawn tangent to the slope at an angle of 45 degrees (0.79 rad) to the horizontal. Where a retaining wall is constructed at the toe of the slope, the height of the slope shall be measured from the top of the wall to the top of the slope.

1805.3.2 Footing setback from descending slope surface. Footings on or adjacent to slope surfaces shall be founded in firm material with an embedment and set back from the slope surface sufficient to provide vertical and lateral support for the footing without detrimental settlement. Except as provided for in Section 1805.3.5 and Figure 1805.3.1, the following setback is deemed adequate to meet the criteria. Where the slope is steeper than 1 unit vertical in 1 unit horizontal (100-percent slope), the required setback shall be measured from an imaginary plane 45 degrees (0.79 rad) to the horizontal, projected upward from the toe of the slope.

1805.3.3 Pools. The setback between pools regulated by this code and slopes shall be equal to one-half the building footing setback distance required by this section. That portion of the pool wall within a horizontal distance of 7 feet (2134 mm) from the top of the slope shall be capable of supporting the water in the pool without soil support.

1805.3.4 Foundation elevation. On graded sites, the top of any exterior foundation shall extend above the elevation of the street gutter at point of discharge or the inlet of an approved drainage device a minimum of 12 inches (305 mm) plus 2 percent. Alternate elevations are permitted subject to the approval of the building official, provided it can be demonstrated that required drainage to the point of discharge and away from the structure is provided at all locations on the site.

1805.3.5 Alternate setback and clearance. Alternate setbacks and clearances are permitted, subject to the approval of the building official. The building official is permitted to require an investigation and recommendation of a registered design professional to demonstrate that the intent of this section has been satisfied. Such an investigation shall



For SI: 1 foot = 304.8 mm.

FIGURE 1805.3.1
FOUNDATION CLEARANCES FROM SLOPES

Include consideration of material, height of slope, slope gradient, load intensity and erosion characteristics of slope material.

1805.4 Footings. Footings shall be designed and constructed in accordance with Sections 1805.4.1 through 1805.4.6.

1805.4.1 Design. Footings shall be so designed that the allowable bearing capacity of the soil is not exceeded, and that differential settlement is minimized. The minimum width of footings shall be 12 inches (305 mm).

Footings in areas with expansive soils shall be designed in accordance with the provisions of Section 1805.8.

1805.4.1.1 Design loads. Footings shall be designed for the most unfavorable effects due to the combinations of loads specified in Section 1605.2 or 1605.3. The dead load is permitted to include the weight of foundations, footings and overlying fill. Reduced live loads, as specified in Sections 1607.9 and 1607.11, are permitted to be used in the design of footings.

1805.4.1.2 Vibratory loads. Where machinery operations or other vibrations are transmitted through the foundation, consideration shall be given in the footing design to prevent detrimental disturbances of the soil.

1805.4.2 Concrete footings. The design, materials and construction footings shall comply with Sections 1805.4.2.1 through 1805.4.2.6 and the provisions of Chapter 19.

Exception: Where a specific design is not provided, concrete footings supporting walls of light-frame construction are permitted to be designed in accordance with Table 1805.4.2.

1805.4.2.1 Concrete strength. Concrete in footings shall have a specified compressive strength of (f'_c) of not less than 2,500 pounds per square inch (psi) (17 237 kPa) at 28 days.

1805.4.2.2 Footing seismic ties. Where a structure is assigned to Seismic Design Category D, E or F in accordance with Section 1613, individual spread footings founded on soil defined in Section 1613.5.2 as Site Class E or F shall be interconnected by ties. Ties shall be capable of carrying, in tension or compression, a force equal to the product of the larger footing load times the seismic coefficient, S_{DS} divided by 10 unless it is demonstrated that equivalent restraint is provided by reinforced concrete beams within slabs on grade or reinforced concrete slabs on grade.

1805.4.2.3 Plain concrete footings. The edge thickness of plain concrete footings supporting walls of other than light-frame construction shall not be less than 8 inches (203 mm) where placed in soil.

Exception: For plain concrete footings supporting Group R-3 occupancies, the edge thickness is permitted to be 6 inches (152 mm), provided that the footing does not extend beyond a distance greater than the thickness of the footing on either side of the supported wall.

1805.4.2.4 Placement of concrete. Concrete footings shall not be placed through water unless a tremie or other method approved by the building official is used. Where placed under or in the presence of water, the concrete shall be deposited by approved means to ensure minimum segregation of the mix and negligible turbulence of the water.

1805.4.2.5 Protection of concrete. Concrete footings shall be protected from freezing during depositing and for a period of not less than five days thereafter. Water shall not be allowed to flow through the deposited concrete.

1805.4.2.6 Forming of concrete. Concrete footings are permitted to be cast against the earth where, in the opinion of the building official, soil conditions do not require forming. Where forming is required, it shall be in accordance with Chapter 6 of ACI 318.

CBC Table 1805.4.2 is replaced as follows:

Table 18-I-C—Foundations for stud bearing walls—minimum requirements[1, 10,11,12]

Weighted expansion index	Foundation for slab and raised floor systems[2,5,7]							Concrete slabs		Pre-moisteneing of soils under footings, piers and slabs[5,6]	Restrictions on piers under raised floors
	No. of stories	Stem thickness[8]	Footing width[9]	Footing thickness	All perimeter footings[6]	Interior footings for slab and raised floors[6]	Reinforcement for continuous foundations [3,8]	3-1/2" minimum thickness 4" with E.I. over 51			
					Depth below natural surface of ground and finish grade			Reinforcement [4]	Total thickness of sand		
		Inches									
0-20	1	6	12	6	12	12	1-#4	#4 @ 48" o/c..		Moistening of ground	Piers allowed for
Very low	2	6	15	7	18	18	Top and	each way	2"	prior to placing concrete	single floor
non expansive	3	10	18	8	24	24	bottom	or		is recommended	loads only
21-50	1	6	12	6	15	12	1-#4	#3 @ 36" o/c..		3% over optimum moisture required	Piers allowed for
Low	2	8	15	7	18	18	Top and	each way	4"	to a depth of 18" below lowest adjacent	single floor
	3	10	18	8	24	24	bottom			grade. Testing required.	loads only
51-90	1	6	12	8	21	12	1-#4 top	#3 @ 24" o.c.		3% over optimum moisture required	
Medium	2	8	15	8	21	18	and bottom	each way	4"	to a depth of 18" below lowest adjacent	Piers not
	3	10	18	8	24	24	#3 bars @ 24" o.c. each way 12" into footing, 36" into slab [10]			grade. Testing required.	allowed
91-130	1	6	12	8	27	12	2- #4	#3 @ 24" o.c.		3% over optimum moisture required	
High	2	8	15	8	27	18	Top & bottom	each way	4"	to a depth of 18" below lowest adjacent	Piers not
	3	10	18	8	27	24	#3 bars @ 24" o.c. each way 12" into footing, 36" into slab [10]			grade. Testing required.	allowed
Above 130 very high	Special design by a licensed Architect or Engineer required										

CBC TABLE 1805.4.2. FOOTNOTES

1. Premoistening is required where specified in Table 1805.4.2 in order to achieve maximum and uniform expansion of the soil before construction and thus limit structural distress caused by uneven expansions and shrinkage. Other systems which do not include pre-moistening may be approved by the building official when such alternatives are shown to provide equivalent safeguards against the adverse effects of expansive soil.
2. Underfloor access crawl holes must be provided with curbs extending not less than six (6) inches above adjacent grade to prevent surface water from entering the foundation area.
3. Reinforcement for continuous foundations shall be placed not less than 3" above the bottom of the footing and not less than 3" below the top of the stem.
4. Slab reinforcement shall be placed at slab mid-depth and continue to within two inches of the exterior face of the exterior footing walls.
5. Moisture content shall be maintained until foundations and piers are poured and a vapor barrier is installed. Tests shall be taken within 24 hours of each slab pour.
6. Crawl spaces under raised floors need not be pre-moistened except under interior footings. Interior footings which are not enclosed by a continuous perimeter foundation system or equivalent concrete or masonry moisture barrier shall be designated and constructed as specified for perimeter footings in Table 1805.4.2.
7. A grade beam not less than 12" x 12" in cross-sectional area, reinforced as specified for continuous foundations in Table 1805.4.2. shall be provided at garage door openings.
8. Foundation stem walls which exceed a height of 3 times the stem thickness above the lowest adjacent grade shall be reinforced in accordance with CBC Chapters 18 & 19 or as required by engineering design, whichever is more restrictive.
9. Footing widths may be reduced upon submittal of calculations by a registered civil or structural engineer or licensed architect, but shall be a minimum of 12 inches for one and two-story structures and 15 inches for three-story structures.
10. Bent reinforcing bars between exterior footing and slab shall be omitted when the floor is designed as an independent, "floating" slab.
11. Fireplace footings shall be reinforced with a horizontal grid located 3" above the bottom of the footing and consisting of not less than No. 4 bars at 12" on center each way. Vertical chimney reinforcing bars shall be hooked under the grid.

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check that the flow of grout inside the casing is not obstructed.

2. For a pile or portion of a pile grouted in an open drill hole in soil without temporary casing, the minimum design diameter of the drill hole shall be verified by a suitable device during grouting.
3. For piles designed for end bearing, a suitable means shall be employed to verify that the bearing surface is properly cleaned prior to grouting.
4. Subsequent piles shall not be drilled near piles that have been grouted until the grout has had sufficient time to harden.
5. Piles shall be grouted as soon as possible after drilling is completed.
6. For piles designed with casing full length, the casing must be pulled back to the top of the bond zone and re-inserted or some other suitable means shall be employed to verify grout coverage outside the casing.

SECTION 1811
COMPOSITE PILES

1811.1 General. Composite piles shall conform to the requirements of Sections 1811.2 through 1811.5.

1811.2 Design. Composite piles consisting of two or more approved pile types shall be designed to meet the conditions of installation.

1811.3 Limitation of load. The maximum allowable load shall be limited by the capacity of the weakest section incorporated in the pile.

1811.4 Splices. Splices between concrete and steel or wood sections shall be designed to prevent separation both before and after the concrete portion has set, and to ensure the alignment and transmission of the total pile load. Splices shall be designed to resist uplift caused by upheaval during driving of adjacent piles, and shall develop the full compressive strength and not less than 50 percent of the tension and bending strength of the weaker section.

1811.5 Seismic reinforcement. Where a structure is assigned to Seismic Design Category C, D, E or F in accordance with Section 1613, the following shall apply. Where concrete and steel are used as part of the pile assembly, the concrete reinforcement shall comply with that given in Sections 1810.1.2.1 and 1810.1.2.2 or the steel section shall comply with Section 1810.6.4.1.

SECTION 1812
PIER FOUNDATIONS

1812.1 General. Isolated and multiple piers used as foundations shall conform to the requirements of Sections 1812.2 through 1812.10, as well as the applicable provisions of Section 1808.2.

1812.2 Lateral dimensions and height. The minimum dimension of isolated piers used as foundations shall be 2 feet (610 mm), and the height shall not exceed 12 times the least horizontal dimension.

1812.3 Materials. Concrete shall have a 28-day specified compressive strength (f'_c) of not less than 2,500 psi (17.24 MPa). Where concrete is placed through a funnel hopper at the top of the pier, the concrete mix shall be designed and proportioned so as to produce a cohesive workable mix having a slump of not less than 4 inches (102 mm) and not more than 6 inches (152 mm). Where concrete is to be pumped, the mix design including slump shall be adjusted to produce a pumpable concrete.

1812.4 Reinforcement. Except for steel dowels embedded 5 feet (1524 mm) or less in the pier, reinforcement where required shall be assembled and tied together and shall be placed in the pier hole as a unit before the reinforced portion of the pier is filled with concrete.

Exception: Reinforcement is permitted to be wet set and the $2^1/_2$-inch (64 mm) concrete cover requirement be reduced to 2 inches (51 mm) for Group R-3 and U occupancies not exceeding two stories of light-frame construction, provided the construction method can be demonstrated to the satisfaction of the building official.

Reinforcement shall conform to the requirements of Sections 1810.1.2.1 and 1810.1.2.2.

Exceptions:

1. Isolated piers supporting posts of Group R-3 and U occupancies not exceeding two stories of light-frame construction are permitted to be reinforced as required by rational analysis but not less than a minimum of one No. 4 bar, without ties or spirals, when detailed so the pier is not subject to lateral loads and the soil is determined to be of adequate stiffness.
2. Isolated piers supporting posts and bracing from decks and patios appurtenant to Group R-3 and U occupancies not exceeding two stories of light-frame construction are permitted to be reinforced as required by rational analysis but not less than one No. 4 bar, without ties or spirals, when the lateral load, E, to the top of the pier does not exceed 200 pounds (890 N) and the soil is determined to be of adequate stiffness.
3. Piers supporting the concrete foundation wall of Group R-3 and U occupancies not exceeding two stories of light-frame construction are permitted to be reinforced as required by rational analysis but not less than two No. 4 bars, without ties or spirals, when it can be shown the concrete pier will not rupture when designed for the maximum seismic load, E_m and the soil is determined to be of adequate stiffness.
4. Closed ties or spirals where required by Section 1810.1.2.2 are permitted to be limited to the top 3 feet (914 mm) of the piers 10 feet (3048 mm) or less in depth supporting Group R-3 and U occupancies of Seismic Design Category D, not exceeding two stories of light-frame construction.

1812.5 Concrete placement. Concrete shall be placed in such a manner as to ensure the exclusion of any foreign matter and to secure a full-sized shaft. Concrete shall not be placed through water except where a tremie or other approved method is used.

When depositing concrete from the top of the pier, the concrete shall not be chuted directly into the pier but shall be poured in a rapid and continuous operation through a funnel hopper centered at the top of the pier.

1812.6 Belled bottoms. Where pier foundations are belled at the bottom, the edge thickness of the bell shall not be less than that required for the edge of footings. Where the sides of the bell slope at an angle less than 60 degrees (1 rad) from the horizontal, the effects of vertical shear shall be considered.

1812.7 Masonry. Where the unsupported height of foundation piers exceeds six times the least dimension, the allowable working stress on piers of unit masonry shall be reduced in accordance with ACI 530/ASCE 5/TMS 402.

1812.8 Concrete. Where adequate lateral support is not provided, and the unsupported height to least lateral dimension does not exceed three, piers of plain concrete shall be designed and constructed as pilasters in accordance with ACI 318. Where the unsupported height to least lateral dimension exceeds three, piers shall be constructed of reinforced concrete, and shall conform to the requirements for columns in ACI 318.

> **Exception:** Where adequate lateral support is furnished by the surrounding materials as defined in Section 1808.2.9, piers are permitted to be constructed of plain or reinforced concrete. The requirements of ACI 318 for bearing on concrete shall apply.

1812.9 Steel shell. Where concrete piers are entirely encased with a circular steel shell, and the area of the shell steel is considered reinforcing steel, the steel shall be protected under the conditions specified in Section 1808.2.17. Horizontal joints in the shell shall be spliced to comply with Section 1808.2.7.

1812.10 Dewatering. Where piers are carried to depths below water level, the piers shall be constructed by a method that will provide accurate preparation and inspection of the bottom, and the depositing or construction of sound concrete or other masonry in the dry.

Section 1813 is added to read as follows:

1813. Slab floor construction at or below grade. Slab floors on grade for all structures, including carports, shall be of Portland cement concrete and comply with the minimum requirements of CBC Table No. 1805.4.2. The following requirements for slab floor construction shall be adhered to, except where engineered modifications are approved by the building official and continuous inspection during construction is provided.

1. Loose fill shall be pasted and compacted according to the building official's instructions.
2. Except for buildings, or portions thereof, used only for agricultural, storage, industrial, or similar uses, an approved vapor barrier of not less than six (6) mil thickness shall be installed under all slabs. Such vapor barrier shall cover all earth or fill material within the exterior boundaries of the building. At all footings or barriers, such vapor barrier shall be turned up or down at least three (3) inches. In no case shall the vapor barrier penetrate within three (3) inches horizontally of any fastener used to transfer shear or uplift, such as anchor bolts, tiedown bolts and shot pins. Joints shall be lapped a minimum of twelve (12) inches or be fastened together with a suitable compound with three (3) inches of minimum lap.
3. A two-inch minimum barrier of sand shall be placed over the vapor barrier and moistened just prior to placing concrete, except only a 1-inch minimum layer of sand is required when an approved vapor barrier of not less than ten (10) mil thickness is installed.

pozzolans, silica fume or slag that is included in the concrete shall not exceed the percentages of the total weight of cementitious materials permitted by ACI 318, Section 4.2.3.

1904.3 Sulfate exposures. Concrete that will be exposed to sulfate-containing solutions or soils shall comply with the maximum water-cementitious materials ratios and/or minimum specified compressive strength and be made with the appropriate type of cement in accordance with the provisions of ACI 318, Section 4.3.

1904.4 Corrosion protection of reinforcement. Reinforcement in concrete shall be protected from corrosion and exposure to chlorides in accordance with ACI 318, Section 4.4.

SECTION 1905
CONCRETE QUALITY, MIXING AND PLACING

1905.1 General. The required strength and durability of concrete shall be determined by compliance with the proportioning, testing, mixing and placing provisions of Sections 1905.1.1 through 1905.13.

1905.1.1 Strength. Concrete shall be proportioned to provide an average compressive strength as prescribed in Section 1905.3 and shall satisfy the durability criteria of Section 1904. Concrete shall be produced to minimize the frequency of strengths below f'_c as prescribed in Section 1905.6.3. *For concrete designed and constructed in accordance with this chapter, f'_c shall not be less than 2,500 psi (17.22 MPa).* No maximum specified compressive strength shall apply unless restricted by a specific provision of this code or ACI 318.

1905.2 Selection of concrete proportions. Concrete proportions shall be determined in accordance with the provisions of ACI 318, Section 5.2.

1905.3 Proportioning on the basis of field experience and/or trial mixtures. Concrete proportioning determined on the basis of field experience and/or trial mixtures shall be done in accordance with ACI 318, Section 5.3.

1905.4 Proportioning without field experience or trial mixtures. Concrete proportioning determined without field experience or trial mixtures shall be done in accordance with ACI 318, Section 5.4.

1905.5 Average strength reduction. As data become available during construction, it is permissible to reduce the amount by which the average compressive strength (f'_c) is required to exceed the specified value of f'_c in accordance with ACI 318, Section 5.5.

1905.6 Evaluation and acceptance of concrete. The criteria for evaluation and acceptance of concrete shall be as specified in Sections 1905.6.2 through 1905.6.5.

1905.6.1 Qualified technicians. Concrete shall be tested in accordance with the requirements in Sections 1905.6.2 through 1905.6.5. Qualified field testing technicians shall perform tests on fresh concrete at the job site, prepare specimens required for curing under field conditions, prepare specimens required for testing in the laboratory and record the temperature of the fresh concrete when preparing specimens for strength tests. Qualified laboratory technicians shall perform all required laboratory tests.

1905.6.2 Frequency of testing. The frequency of conducting strength tests of concrete and the minimum number of tests shall be as specified in ACI 318, Section 5.6.2.

Exception: When the total volume of a given class of concrete is less than 50 cubic yards (38 m^3), strength tests are not required when evidence of satisfactory strength is submitted to and approved by the building official.

1905.6.3 Strength test specimens. Specimens prepared for acceptance testing of concrete in accordance with Section 1905.6.2 and strength test acceptance criteria shall comply with the provisions of ACI 318, Section 5.6.3.

1905.6.4 Field-cured specimens. Where required by the building official to determine adequacy of curing and protection of concrete in the structure, specimens shall be prepared, cured, tested and test results evaluated for acceptance in accordance with ACI 318, Section 5.6.4.

1905.6.5 Low-strength test results. Where any strength test (see ACI 318, Section 5.6.2.4) falls below the specified value of f'_c, the provisions of ACI 318, Section 5.6.5, shall apply.

1905.7 Preparation of equipment and place of deposit. Prior to concrete being placed, the space to receive the concrete and the equipment used to deposit it shall comply with ACI 318, Section 5.7.

1905.8 Mixing. Mixing of concrete shall be performed in accordance with ACI 318, Section 5.8.

1905.9 Conveying. The method and equipment for conveying concrete to the place of deposit shall comply with ACI 318, Section 5.9.

1905.10 Depositing. The depositing of concrete shall comply with the provisions of ACI 318, Section 5.10.

1905.11 Curing. The length of time, temperature and moisture conditions for curing of concrete shall be in accordance with ACI 318, Section 5.11.

1905.12 Cold weather requirements. Concrete to be placed during freezing or near-freezing weather shall comply with the requirements of ACI 318, Section 5.12.

1905.13 Hot weather requirements. Concrete to be placed during hot weather shall comply with the requirements of ACI 318, Section 5.13.

SECTION 1906
FORMWORK, EMBEDDED PIPES AND CONSTRUCTION JOINTS

1906.1 Formwork. The design, fabrication and erection of forms shall comply with ACI 318, Section 6.1.

1906.2 Removal of forms, shores and reshores. The removal of forms and shores, including from slabs and beams (except where cast on the ground), and the installation of reshores shall comply with ACI 318, Section 6.2.

1906.3 Conduits and pipes embedded in concrete. Conduits, pipes and sleeves of any material not harmful to concrete and within the limitations of ACI 318, Section 6.3, are permitted to be embedded in concrete with approval of the registered design professional.

1906.4 Construction joints. Construction joints, including their location, shall comply with the provisions of ACI 318, Section 6.4.

SECTION 1907
DETAILS OF REINFORCEMENT

1907.1 Hooks. Standard hooks on reinforcing bars used in concrete construction shall comply with ACI 318, Section 7.1.

1907.2 Minimum bend diameters. Minimum reinforcement bend diameters utilized in concrete construction shall comply with ACI 318, Section 7.2.

1907.3 Bending. The bending of reinforcement shall comply with ACI 318, Section 7.3.

1907.4 Surface conditions of reinforcement. The surface conditions of reinforcement shall comply with the provisions of ACI 318, Section 7.4..

1907.5 Placing reinforcement. The placement of reinforcement, including tolerances on depth and cover, shall comply with the provisions of ACI 318, Section 7.5. Reinforcement shall be accurately placed and adequately supported before concrete is placed.

1907.6 Spacing limits for reinforcement. The clear distance between reinforcing bars, bundles bars, tendons and ducts shall comply with ACI 318, Section 7.6.

1907.7 Concrete protection for reinforcement. The minimum concrete cover for reinforcement shall comply with Sections 1907.7.1 through 1907.7.7.

1907.7.1 Cast-in-place concrete (nonprestressed). Minimum concrete cover shall be provided for reinforcement in nonprestressed, cast-in-place concrete construction in accordance with ACI 318, Section 7.7.1.

1907.7.2 Cast-in-place concrete (prestressed). The minimum concrete cover for prestressed and nonprestressed reinforcement, ducts and end fittings in cast-in-place prestressed concrete shall comply with ACI 318, Section 7.7.2.

1907.7.3 Precast concrete (manufactured under plant control conditions). The minimum concrete cover for prestressed and nonprestressed reinforcement, ducts and end fittings in precast concrete manufactured under plant control conditions shall comply with ACI 318, Section 7.7.3.

1907.7.4 Bundled bars. The minimum concrete cover for bundled bars shall comply with ACI 318, Section 7.7.4.

1907.7.5 Corrosive environments. In corrosive environments or other severe exposure conditions, prestressed and nonprestressed reinforcement shall be provided with additional protection in accordance with ACI 318, Section 7.7.5.

1907.7.6 Future extensions. Exposed reinforcement, inserts and plates intended for bonding with future extensions shall be protected from corrosion.

1907.7.7 Fire protection. When this code requires a thickness of cover for fire protection greater than the minimum concrete cover specified in Section 1907.7, such greater thickness shall be used.

1907.8 Special reinforcement details for columns. Offset bent longitudinal bars in columns and load transfer in structural steel cores of composite compression members shall comply with the provisions of ACI 318, Section 7.8.

1907.9 Connections. Connection between concrete framing members shall comply with the provisions of ACI 318, Section 7.9.

1907.10 Lateral reinforcement for compression members. Lateral reinforcement for concrete compression members shall comply with the provisions of ACI 318, Section 7.10.

1907.11 Lateral reinforcement for flexural members. Lateral reinforcement for compression reinforcement in concrete flexural members shall comply with the provisions of ACI 318, Section 7.11.

1907.12 Shrinkage and temperature reinforcement. Reinforcement for shrinkage and temperature stresses in concrete members shall comply with the provisions of ACI 318, Section 7.12.

1907.13 Requirements for structural integrity. The detailing of reinforcement and connections between concrete members shall comply with the provisions of ACI 318, Section 7.13, to improve structural integrity.

SECTION 1908
MODIFICATIONS TO ACI 318

Section 1908.1 is modified to read as follows:

1908.1 General. The text of ACI 318 shall be modified as indicated in Sections 1908.1.1 through 1908.1.17.

1908.1.1 ACI 318, Section 10.5. Modify ACI 318, Section 10.5, by adding new Section 10.5.5 to read as follows:

10.5.5 – In structures assigned to Seismic Design Category B, beams in ordinary moment frames forming part of the seismic-force-resisting system shall have at least two main flexural reinforcing bars continuously top and bottom throughout the beam and continuous through or developed within exterior columns or boundary elements.

1908.1.2 ACI 318, Section 11.11. Modify ACI 318, Section 11.11, by changing its title to read as shown below and by adding new Section 11.11.3 to read as follows:

11.11 – Special provisions for columns.

11.11.3 – In structures assigned to Seismic Design Category B, columns of ordinary moment frames having a clear height-to-maximum-plan-dimension ratio of five or less shall be designed for shear in accordance with 21.12.3.

1908.1.3 ACI 318, Section 21.1. Modify existing definitions and add the following definitions to ACI 318, Section 21.1.

Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall not be less than 7½ inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 22.6.6.5.

(b) Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.

Exception: *In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.*

(c) Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.

Exceptions:

1. *In detached one- and two-family dwellings three stories or less in height and constructed with stud-bearing walls, plain concrete footings without longitudinal reinforcement supporting walls are permitted.*
2. *For foundation systems consisting of a plain concrete footing and a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.*
3. *Where a slab on ground is cast monolithically with the footing, one No. 5 bar is permitted to be located at either the top of the slab or bottom of the footing.*

1908.1.16 ACI 318, Section D.3.3. Modify ACI 318, Sections D.3.3.2 through D.3.3.5, to read as follows:

D.3.3.2 – *In structures assigned to Seismic Design Category C,D,E or F,* post-installed anchors for use under D.2.3 shall have passed the Simulated Seismic Tests of ACI 355.2.

D.3.3.3 – *In structures assigned to Seismic Design Category C, D, E or F,* the design strength of anchors shall be taken as $0.75\varphi N_n$ and $0.75\varphi V_n$ where φ is given in D.4.4 or D.4.5, and N_n and V_n are determined in accordance with D.4.1.

D.3.3.4 – *In structures assigned to Seismic Design Category C, D, E or F,* anchors shall be designed to be governed by tensile or shear strength of a ductile steel element, unless D.3.3.5 is satisfied.

D.3.3.5 – Instead of D.3.3.4, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a load level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.3, *or the minimum design strength of the anchors shall be at least 2.5 times the factored forces transmitted by the attachment.*

Section 1908.1.17 is added to read as follows:

1908.1.17 ACI 318, Section 14.8. Modify ACI 318 Section 14.8.3 and 14.8.4 replacing equation (14-7), (14-8) and (14-9).

1. Modify equation (14-7) of ACI 318 Section 14.8.3 as follows:

   I_{cr} shall be calculated by Equation (14-7), and M_a shall be obtained by iteration of deflections.

$$I_{cr} = \frac{E_s}{E_c}\left(A_s + \frac{P_u}{f_y}\frac{h}{2d}\right)(d-c)^2 + \frac{l_w c^3}{3} \qquad (14\text{-}7)$$

   The value E_s/E_c shall not be taken less than 6.

2. Modify ACI 318 Sec, 14.8.4 as follows:

   14.8.4 – Maximum out-of-plane deflection, Δ_s, due to service loads, including PΔ effects, shall not exceed $l_c/150$.

   If M_a, maximum moment at mid-height of wall due to service lateral and eccentric loads, including PΔ effects, exceed ($^2/_3$) M_{cr}, Δ_s shall be calculated by Equation (14-8):

$$\Delta_s = \frac{2}{3}\Delta_{cr} + \frac{M_a - \frac{2}{3}M_{cr}}{M_n - \frac{2}{3}M_{cr}}\left(\Delta_n - \frac{2}{3}\Delta_{cr}\right) \qquad (14\text{-}8)$$

   If M_a does not exceed ($^2/_3$) M_{cr}, Δ_s shall be calculated by Equation (14-9):

$$\Delta_s = \left(\frac{M_a}{M_{cr}}\right)\Delta_{cr} \qquad (14\text{-}9)$$

   Where:

$$\Delta_{cr} = \frac{5 M_{cr} l_c^2}{48 E_c I_g} \qquad \Delta_n = \frac{5 M_n l_c^2}{48 E_c I_{cr}}$$

SECTION 1909
STRUCTURAL PLAIN CONCRETE

1909.1 Scope. The design and construction of structural plain concrete, both cast-in-place and precast, shall comply with the minimum requirements of Section 1909 and ACI 318, Chapter 22, as modified in Section 1908.

1909.1.1 Special structures. For special structures, such as arches, underground utility structures, gravity walls and shielding walls, the provisions of this section shall govern where applicable.

1909.2 Limitations. The use of structural plain concrete shall be limited to:

1. Members that are continuously supported by soil, such as walls and footings, or by other structural members capable of providing continuous vertical support.
2. Members for which arch action provides compression under all conditions of loading.
3. Walls and pedestals.

The use of structural plain concrete columns and structural plain concrete footings on piles is not permitted. See Section 1908.1.15 for additional limitations on the use of structural plain concrete.

1909.3 Joints. Contraction or isolation joints shall be provided to divide structural plain concrete members into flexurally discontinuous elements in accordance with ACI 318, Section 22.3.

1909.4 Design. Structural plain concrete walls, footings and pedestals shall be designed for adequate strength in accordance with ACI 318, Sections 22.4 through 22.8.

Exception: For Group R-3 occupancies and buildings of other occupancies less than two stories in height of light-frame construction, the required edge thickness of ACI 318 is permitted to be reduced to 6 inches (152 mm), provided that the footing does not extend more than 4 inches (102 mm) on either side of the supported wall.

1909.5 Precast members. The design, fabrication, transportation and erection of precast, structural plain concrete elements shall be in accordance with ACI 318, Section 22.9.

1909.6 Walls. In addition to the requirements of this section, structural plain concrete walls shall comply with the applicable requirements of ACI 318, Chapter 22.

1909.6.1 Basement walls. The thickness of exterior basement walls and foundation walls shall be not less than 7 ½

inches (191 mm). Structural plain concrete exterior basement walls shall be exempt from the requirements for special exposure conditions of Section 1904.2.2.

1909.6.2 Other walls. Except as provided for in Section 1909.6.1, the thickness of bearing walls shall be not less than $^1/_{24}$ the unsupported height or length, whichever is shorter, but not less than $5^1/_2$ inches (140 mm).

1909.6.3 Openings in walls. Not less than two No. 5 bars shall be provided around window and door openings. Such bars shall extend at least 24 inches (610 mm) beyond the corners of openings.

SECTION 1910
MINIMUM SLAB PROVISIONS

1910.1 General. The thickness of concrete floor slabs supported directly on the ground shall not be less than $3^1/_2$ inches (89 mm). A 6-mil (0.006 inch; 0.15 mm) polyethylene vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the base course or subgrade and the concrete floor slab, or other approved equivalent methods or materials shall be used to retard vapor transmission through the floor slab.

Exception: A vapor retarder is not required:

1. For detached structures accessory to occupancies in Group R-3, such as garages, utility buildings or other unheated facilities.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports attached to occupancies in Group R-3.
3. For buildings of other occupancies where migration of moisture through the slab from below will not be detrimental to the intended occupancy of the building.
4. For driveways, walks, patios and other flatwork which will not be enclosed at a later date.
5. Where approved based on local site conditions.

SECTION 1911
ANCHORAGE TO CONCRETE—ALLOWABLE STRESS DESIGN

1911.1 Scope. The provisions of this section shall govern the allowable stress design of headed bolts and headed stud anchors cast in normal-weight concrete for purposes of transmitting structural loads from one connected element to the other. These provisions do not apply to anchors installed in hardened concrete or where load combinations include earthquake loads or effects. The bearing area of headed anchors shall be not less than one and one-half times the shank area. Where strength design is used, or where load combinations include earthquake loads or effects, the design strength of anchors shall be determined in accordance with Section 1912. Bolts shall conform to ASTM A 307 or an approved equivalent.

1911.2 Allowable service load. The allowable service load for headed anchors in shear or tension shall be as indicated in Table 1911.2. Where anchors are subject to combined shear and tension, the following relationship shall be satisfied:

$$(P_s / P_t)^{5/3} + (V_s / V_t)^{5/3} \leq 1 \qquad \textbf{(Equation 19-1)}$$

where:

P_s = Applied tension service load, pounds (N).

P_t = Allowable tension service load from Table 1911.2, pounds (N).

V_s = Applied shear service load, pounds (N).

V_t = Allowable shear service load from Table 1911.2, pounds (N).

1911.3 Required edge distance and spacing. The allowable service loads in tension and shear specified in Table 1911.2 are for the edge distance and spacing specified. The edge distance and spacing are permitted to be reduced to 50 percent of the val-

TABLE 1911.2
ALLOWABLE SERVICE LOAD ON EMBEDDED BOLTS (pounds)

BOLT DIAMETER (inches)	MINIMUM EMBEDMENT (inches)	EDGE DISTANCE (inches)	SPACING (inches)	MINIMUM CONCRETE STRENGTH (psi)					
				f'_c = 2,500		f'_c = 3,000		f'_c = 4,000	
				Tension	Shear	Tension	Shear	Tension	Shear
$^1/_4$	$2^1/_2$	$1^1/_2$	3	200	500	200	500	200	500
$^3/_8$	3	$2^1/_4$	$4^1/_2$	500	1,100	500	1,100	500	1,100
$^1/_2$	4	3	6	950	1,250	950	1,250	950	1,250
	4	5	5	1,450	1,600	1,500	1,650	1,550	1,750
$^5/_8$	$4^1/_2$	$3^3/_4$	$7^1/_2$	1,500	2,750	1,500	2,750	1,500	2,750
	$4^1/_2$	$6^1/_4$	$7^1/_2$	2,125	2,950	2,200	3,000	2,400	3,050
$^3/_4$	5	$4^1/_2$	9	2,250	3,250	2,250	3,560	2,250	3,560
	5	$7^1/_2$	9	2,825	4,275	2,950	4,300	3,200	4,400
$^7/_8$	6	$5^1/_4$	$10^1/_2$	2,550	3,700	2,550	4,050	2,550	4,050
1	7	6	12	3,050	4,125	3,250	4,500	3,650	5,300
$1^1/_8$	8	$6^3/_4$	$13^1/_2$	3,400	4,750	3,400	4,750	3,400	4,750
$1^1/_4$	9	$7^1/_2$	15	4,000	5,800	4,000	5,800	4,000	5,800

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 0.00689 MPa, 1 pound = 4.45 N.

opposite faces, fiberboard structural sheathing and gypsum wallboard on opposite faces or hardboard panel siding and gypsum wallboard on opposite faces shall equal the sum of the sheathing capacities of each face separately.

2305.3.10 Adhesives. Adhesive attachment of shear wall sheathing is not permitted as a substitute for mechanical fasteners, and shall not be used in shear wall strength calculations alone, or in combination with mechanical fasteners in Seismic Design Category D, E or F.

2305.3.11 Sill plate size and anchorage in Seismic Design Category D, E or F. Anchor bolts for shear walls shall include steel plate washers, a minimum of 0.229 inch by 3 inches by 3 inches (5.82 mm by 76 mm by 76 mm) in size, between the sill plate and nut. The hole in the plate washer is permitted to be diagonally slotted with a width of up to $^3/_{16}$inch (4.76 mm) larger than the bolt diameter and a slot length not to exceed $1^3/_4$ inches (44 mm), provided a standard cut washer is placed between the plate washer and the nut. Sill plates resisting a design load greater than 490 plf (7154 N/m) using load and resistance factor design or 350 plf (5110 N/m) using allowable stress design shall not be less than a 3-inch (76 mm) nominal member. Where a single 3- inch (76 mm) nominal sill plate is used, 2- 20d box end nails shall be substituted for 2-16d common end nails found in line 8 of Table 2304.9.1.

Exception: In shear walls where the design load is greater than 490 plf (7151 N/m) but less than 840 plf (12 264 N/m) using load and resistance factor design or greater than 350 plf (5110 N/m) but less than 600 plf (8760 N/m) using allowable stress design, the sill plate is permitted to be a 2-inch (51 mm) nominal member if the sill plate is anchored by two times the number of bolts required by design and 0.229-inch by 3-inch by 3-inch (5.82 mm by 76 mm by 76 mm) plate washers are used.

SECTION 2306
ALLOWABLE STRESS DESIGN

2306.1 Allowable stress design. The structural analysis and construction of wood elements in structures using allowable stress design shall be in accordance with the following applicable standards:

American Forest & Paper Association.

NDS National Design Specification for Wood Construction

American Institute of Timber Construction.

AITC 104 Typical Construction Details

AITC 110 Standard Appearance Grades for Structural Glued Laminated Timber

AITC 113 Standard for Dimensions of Structural Glued Laminated Timber

AITC 117 Standard Specifications for Structural Glued Laminated Timber of Softwood Species

AITC 119 Structural Standard Specifications for Glued Laminated Timber of Hardwood Species

AITC A190.1 Structural Glued Laminated Timber

AITC 200 Inspection Manual

American Society of Agricultural Engineers.

ASAE EP 484.2 Diaphragm Design of Metal-Clad, Post-Frame Rectangular Buildings

ASAE EP 486.1 Shallow Post Foundation Design

ASAE 559 Design Requirements and Bending Properties for Mechanically Laminated Columns

APA—The Engineered Wood Association.

Panel Design Specification

Plywood Design Specification Supplement 1 - Design & Fabrication of Plywood Curved Panel

Plywood Design Specification Supplement 2 - Design & Fabrication of Glued Plywood-Lumber Beams

Plywood Design Specification Supplement 3 - Design & Fabrication of Plywood Stressed-Skin Panels

Plywood Design Specification Supplement 4 - Design & Fabrication of Plywood Sandwich Panels

Plywood Design Specification Supplement 5 - Design & Fabrication of All-Plywood Beams

EWS T300 Glulam Connection Details

EWS S560 Field Notching and Drilling of Glued Laminated Timber Beams

EWS S475 Glued Laminated Beam Design Tables

EWS X450 Glulam in Residential Construction

EWS X440 Product and Application Guide: Glulam

EWS R540 Builders Tips: Proper Storage and Handling of Glulam Beams

Truss Plate Institute, Inc.

TPI 1 National Design Standard for Metal Plate Connected Wood Truss Construction

2306.1.1 Joists and rafters. The design of rafter spans is permitted to be in accordance with the *AF&PA Span Tables for Joists and Rafters.*

2306.1.2 Plank and beam flooring. The design of plank and beam flooring is permitted to be in accordance with the *AF&PA Wood Construction Data No. 4.*

2306.1.3 Treated wood stress adjustments. The allowable unit stresses for preservative-treated wood need no adjustment for treatment, but are subject to other adjustments.

The allowable unit stresses for fire-retardant-treated wood, including fastener values, shall be developed from an approved method of investigation that considers the effects of anticipated temperature and humidity to which the fire-retardant-treated wood will be subjected, the type of treatment and the redrying process. Other adjustments are applicable except that the impact load duration shall not apply.

2306.1.4 Lumber decking. The capacity of lumber decking arranged according to the patterns described in Section 2304.8.2 shall be the lesser of the capacities determined for flexure and deflection according to the formulas in Table 2306.1.4.

TABLE 2306.1.4
ALLOWABLE LOADS FOR LUMBER DECKING

PATTERN	ALLOWABLE AREA LOAD[a,b]	
	Flexure	Deflection
Simple span	$\sigma_b = \frac{8F_b'}{l^2}\frac{d^2}{6}$	$\sigma_\Delta = \frac{384\Delta E'}{5l^4}\frac{d^3}{12}$
Two-span continuous	$\sigma_b = \frac{8F_b'}{l^2}\frac{d^2}{6}$	$\sigma_\Delta = \frac{185\Delta E'}{l^4}\frac{d^3}{12}$
Combination simple- and two-span continuous	$\sigma_b = \frac{8F_b'}{l^2}\frac{d^2}{6}$	$\sigma_\Delta = \frac{131\Delta E'}{l^4}\frac{d^3}{12}$
Cantilevered pieces intermixed	$\sigma_b = \frac{20F_b'}{3l^2}\frac{d^2}{6}$	$\sigma_\Delta = \frac{105\Delta E'}{l^4}\frac{d^3}{12}$
Controlled random layup		
Mechanically laminated decking	$\sigma_b = \frac{20F_b'}{3l^2}\frac{d^2}{6}$	$\sigma_\Delta = \frac{100\Delta E'}{l^4}\frac{d^3}{12}$
2-inch decking	$\sigma_b = \frac{20F_b'}{3l^2}\frac{d^2}{6}$	$\sigma_\Delta = \frac{100\Delta E'}{l^4}\frac{d^3}{12}$
3-inch and 4-inch decking	$\sigma_b = \frac{20F_b'}{3l^2}\frac{d^2}{6}$	$\sigma_\Delta = \frac{116\Delta E'}{l^4}\frac{d^3}{12}$

For SI: 1 inch = 25.4 mm.

a. σ_b = Allowable total uniform load limited by bending.
σ_Δ = Allowable total uniform load limited by deflection.

b. d = Actual decking thickness.
l = Span of decking.
F_b' = Allowable bending stress adjusted by applicable factors.
E' = Modulus of elasticity adjusted by applicable factors.

2306.2 Wind provisions for walls.

2306.2.1 Wall stud bending stress increase. The AF&PA NDS fiber stress in bending (F_b) design values for sawn lumber wood studs resisting out of plane wind loads shall be increased by the factors in Table 2306.2.1, in lieu of the 1.15 repetitive member factor. These increases take into consideration the load sharing and composite actions provided by the wood structural panels as defined in Section 2302.1. The increases shall apply where the studs are designed for bending and are spaced no more than 16 inches (406 mm) o.c., covered on the inside with a minimum of $^1/_2$-inch (12.7 mm) gypsum board fastened in accordance with Table 2306.4.5 and sheathed on the exterior with a minimum of $^3/_8$-inch (9.5 mm) wood structural panel sheathing. All panel joints shall occur over studs or blocking and shall be attached using a minimum of 8d common nails spaced a maximum of 6 inches o.c. (152 mm) at panel edges and 12 inches o.c. (305 mm) at intermediate framing members.

TABLE 2306.2.1
WALL STUD BENDING STRESS INCREASE FACTORS

STUD SIZE	SYSTEM FACTOR
2 × 4	1.5
2 × 6	1.35
2 × 8	1.25
2 × 10	1.2
2 × 12	1.15

2306.3 Wood diaphragms.

2306.3.1 Wood structural panel diaphragms. Wood structural panel diaphragms are permitted to resist horizontal forces using the allowable shear capacities set forth in Table 2306.3.1 or 2306.3.2.

2306.3.2 Shear capacities modifications. The allowable shear capacities in Tables 2306.3.1 and 2306.3.2 for horizontal wood structural panel diaphragms shall be increased 40 percent for wind design.

2306.3.3 Diagonally sheathed lumber diaphragms. Diagonally sheathed lumber diaphragms shall be nailed in accordance with Table 2306.3.3.

2306.3.4 Single diagonally sheathed lumber diaphragms. Single diagonally sheathed lumber diaphragms shall be constructed of minimum 1-inch (25 mm) thick nominal sheathing boards laid at an angle of approximately 45 degrees (0.78 rad) to the supports. The shear capacity for single diagonally sheathed lumber diaphragms of southern pine or Douglas fir-larch shall not exceed 300 plf (4378 N/m) of width. The shear capacities shall be adjusted by reduction factors of 0.82 for framing members of species with a specific gravity equal to or greater than 0.42 but less than 0.49 and 0.65 for species with a specific gravity of less than 0.42, as contained in the AF&PA NDS.

TABLE 2306.3.3
DIAGONALLY SHEATHED LUMBER DIAPHRAGM NAILING SCHEDULE

SHEATHING NOMINAL DIMENSION	NAILING TO INTERMEDIATE AND END-BEARING STUDS		NAILING AT THE SHEAR PANEL BOUNDARIES	
	Type, size and number of nails per board			
	Common nails	Box nails	Common nails	Box nails
1 × 6	2 - 8d	3 - 8d	3 - 8d	5 - 8d
1 × 8	3 - 8d	4 - 8d	4 - 8d	6 - 8d
2 × 6	2 - 16d	3 - 16d	3 - 16d	5 - 16d
2 × 8	3 - 16d	4 - 16d	4 - 16d	6 - 16d

2306.3.4.1 End joints. End joints in adjacent boards shall be separated by at least one stud or joist space and there shall be at least two boards between joints on the same support.

2306.3.4.2 Single diagonally sheathed lumber diaphragms. Single diagonally sheathed lumber diaphragms made up of 2-inch (51 mm) nominal diagonal lumber sheathing fastened with 16d nails shall be designed with the same shear capacities as shear panels using 1-inch (25 mm) boards fastened with 8d nails, provided there are not splices in adjacent boards on the same support and the supports are not less than 4 inch (102 mm) nominal depth or 3 inch (76 mm) nominal thickness.

2306.3.5 Double diagonally sheathed lumber diaphragms. Double diagonally sheathed lumber diaphragms shall be constructed of two layers of diagonal sheathing boards at 90 degrees (1.57 rad) to each other on the same face of the supporting members. Each chord shall be considered as a beam with uniform load per foot equal to 50 percent of the unit shear due to diaphragm action. The load shall be assumed as acting normal to the chord in the plan of the diaphragm in either direction. The span of the chord or portion thereof shall be the distance between framing members of the diaphragm, such as the joists, studs and blocking that serve to transfer the assumed load to the sheathing. The shear capacity of double diagnonally sheathed diaphragms of Southern pine or Douglas fir-larch shall not exceed 600 plf (8756 kN/m) of width. The shear capacity shall be adjusted by reduction factors of 0.82 for framing members of species with a specific gravity equal to or greater than 0.42 but less than 0.49 and 0.65 for species with a specific gravity of less than 0.42, as contained in the AF&PA NDS. Nailing of diagonally sheathed lumber diaphragms shall be in accordance with Table 2306.3.3.

2306.3.6 Gypsum board diaphragm ceilings. Gypsum board diaphragm ceilings shall be in accordance with Section 2508.5.

2306.4 Shear walls. Panel sheathing joints in sheath walls shall occur over studs or blocking. Adjacent panel sheathing joints shall occur over and be nailed to common framing members (see Section 2305.3.1 for limitations on shear wall bracing materials).

Section 2306.4.1 is amended to read as follows:

2306.4.1 Wood structural panel shear walls. The allowable shear capacities for wood structural panel shear walls shall be in accordance with Table 2306.4.1. These capacities are permitted to be increased 40 percent for wind design. Wood shear walls shall be constructed of wood structural panels manufactured with exterior glue and not less than 4 ft. by 8 ft. (1219 mm by 2348 mm), except at boundaries and at changes in framing. Wood structural panel thickness for shear walls shall not be less than 3/8 inch thick and studs shall not be spaced at more than 16 inches on center.

The maximum allowable shear value for three-ply plywood resisting seismic forces is 200 pounds per foot (2.92 kn/m). Nails shall be placed not less than ½ inch (12.7mm) in from the panel edges and not less than 3/8 inch (9.5 mm) from the edge of the connecting members for shear greater than 350 pounds per foot (5.11 kN/m). Nails shall be placed not less than 3/8 inch (9.5 mm) from panel edges and not less than ¼ inch (6.4 mm) from the edge of the connecting members for shears of 350 pounds per foot (5.11 kN/m) or less.

Any wood structural panel sheathing used for diaphragms and shear walls that are part of the seismic-force-resisting system shall be applied directly to framing members.

Exception: Wood structural panel sheathing in a horizontal diaphragm may be fastened over solid lumber planking or laminated decking, provided the panel joints and lumber planking or laminated decking joints do not coincide.

2306.4.2 Lumber sheathed shear walls. Single and double diagonally sheathed lumber diaphragms are permitted using the construction and allowable load provisions of Sections 2306.3.4 and 2306.3.5.

2306.4.3 Particleboard shear walls. The design shear capacity of fiberboard shear walls shall be in accordance with Table 2306.4.3. Shear panels shall be constructed with particleboard sheets not less than 4 ft. by 8 ft. (1219 mm) by 2438 mm), except at boundaries and changes in framing. Particleboard panels shall be designed to resist shear only, and chords, collector members and boundary elements shall be connected at all corners. Panel edges shall be backed with 2-inch (51 mm) nominal or wider framing. Sheets are permitted to be installed either horizontally or vertically. For 3/8 inch (9.5 mm) particleboard sheets installed with the long dimension parallel to the studs spaced 24 inches (610 mm) o.c, nails shall be spaced at 6 inches (152 mm) o.c. along intermediate framing members. For all other conditions, nails of the same size shall be spaced at 12 inches (305 mm) o.c. along intermediate framing members. Particleboard panels less than 12 inches (305 mm) wide shall be blocked. Particleboard shall not be used to resist seismic forces in structures in Seismic Design Category D, E or F.

2306.4.4 Fiberboard shear walls. The design shear capacity of fiberboard shear walls shall be in accordance with Table 2306.4.4. The fiberboard sheathing shall be applied vertically or horizontally to wood studs not less than 2 inch (51 mm) in nominal thickness spaced 16 inches (406 mm) o.c. Blocking not less than 2 inch (51 mm) nominal in thickness shall be provided at horizontal joints. Fiberboard shall not be used to resist seismic forces in structures in Seismic Design Category D, E or F.

2306.4.5 Shear walls sheathed with other materials. Shear capacities for walls sheathed with lath, plaster or gypsum board shall be in accordance with Table 2306.4.5. Shear walls sheathed with lath, plaster or gypsum board shall be constructed in accordance with Chapter 25 and Section 2306.4.5.1. Walls resisting seismic loads shall be subject to the limitations in Section 12.2.1 of ASCE 7. The allowable shear values shown in Table 2306.4.5 for material in Category 1 is limited to 90 pound per foot (1.31 kN/m); materials in Category 2 thru 4 are limited to 30 pound per foot (438 N/m). Shear walls sheathed with lath, plaster or gypsum board shall not be used below the top level in a multi-level building.

2306.4.5.1 Application of gypsum board or lath and plaster to wood framing.

2306.4.5.1.1 Joint staggering. End joints of adjacent courses of gypsum board shall not occur over the same stud.

2306.4.5.1.2 Blocking. Where required in Table 2306.4.5, wood blocking having the same cross-sectional dimensions as the studs shall be provided at joints that are perpendicular to the studs.

2306.4.5.1.3 Fastening. Studs, top and bottom plates and blocking shall be fastened in accordance with Table 2304.9.1.

2306.4.5.1.4 Fasteners. The size and spacing of fasteners shall be set forth in Table 2306.4.5. Fasteners shall be spaced not less than 3/8 inch (9.5mm) from edges and ends of gypsum boards or sides of studs, blocking and top and bottom plates.

Table 2306.4.1 of the 2007 California Building Code is hereby replaced as follows:

TABLE 2306.4.1
ALLOWABLE SHEAR (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL SHEAR WALLS WITH FRAMING OF DOUGLAS FIR-LARCH OR SOUTHERN PINE[a] FOR WIND OR SEISMIC LOADING[b, h, i, j, l, m, n]

PANEL GRADE	MINIMUM NOMINAL PANEL THICKNESS (inch)	MINIMUM FASTENER PENETRATION IN FRAMING (inches)	ALLOWABLE SHEAR VALUE FOR SEISMIC FORCES PANELS APPLIED DIRECTLY TO FRAMING					ALLOWABLE SHEAR VALUE FOR WIND FORCES PANELS APPLIED DIRECTLY TO FRAMING				
			NAIL (common or galvanized box) or staple size[k]	Fastener spacing at panel edges (inches)				NAIL (common or galvanized box) or staple size[k]	Fastener spacing at panel edges (inches)			
				6	4	3	2[e]		6	4	3	2[e]
Structural I Sheathing	5/16	1-1/4	6d (2"x0.113" common, 2"x0.099" galvanized box)	150	200	200	200	6d (2"x0.113" common, 2"x0.099" galvanized box)	200	300	390	510
		1	1-1/2 16 Gage	124	184	200	200	1-1/2 16 Gage	165	245	325	415
	3/8	1-3/8	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	200	200	200	200	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	230[d]	360[d]	460[d]	610[d]
		1	1-1/2 16 Gage	116	176	200	200	1-1/2 16 Gage	155	235	310	400
	7/16	1-3/8	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	255[d]	395[d]	505[d]	670[d]	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	255[d]	395[d]	505[d]	670[d]
		1	1-1/2 16 Gage	128	195	259	330	1-1/2 16 Gage	170	260	345	440
	15/32	1-3/8	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	280	430	550	730	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	280	430	550	730
		1	1-1/2 16 Gage	139	210	281	356	1-1/2 16 Gage	185	280	375	475
		1-1/2	10d (3"x0.148" common, 3"x0.128" galvanized box)	340	510	665[f]	870	10d (3"x0.148" common, 3"x0.128" galvanized box)	340	510	665[f]	870
Sheathing, plywood siding[g] except Group 5 Species	5/16 or 1/4[c]	1-1/4	6d (2"x0.113" common, 2"x0.099" galvanized box)	180	200	200	200	6d (2"x0.113" common, 2"x0.099" galvanized box)	180	270	350	450
		1	1-1/2 16 Gage	109	165	200	200	1-1/2 16 Gage	145	220	295	375
	3/8	1-1/4	6d (2"x0.113" common, 2"x0.099" galvanized box)	200	200	200	200	6d (2"x0.113" common, 2"x0.099" galvanized box)	200	300	390	510
		1-3/8	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	200	200	200	200	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	220[d]	320[d]	410[d]	530[d]
		1	1-1/2 16 Gage	105	158	200	200	1-1/2 16 Gage	140	210	280	360
	7/16	1-3/8	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	240[d]	350[d]	450[d]	585[d]	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	240[d]	350[d]	450[d]	585[d]
		1	1-1/2 16 Gage	116	173	233	296	1-1/2 16 Gage	155	230	310	395
	15/32	1-3/8	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	260	380	490	640	8d (2½"x0.131" common, 2½"x0.113" galvanized box)	260	380	490	640
		1-1/2	10d (3"x0.148" common, 3"x0.128" galvanized box)	310	460	600[f]	770	10d (3"x0.148" common, 3"x0.128" galvanized box)	310	460	600[f]	770
		1	1-1/2 16 Gage	128	191	251	323	1-1/2 16 Gage	170	255	335	430
	19/32	1-1/2	10d (3"x0.148" common, 3"x0.128" galvanized box)	340	510	665[f]	870	10d (3"x0.148" common, 3"x0.128" galvanized box)	340	510	665[f]	870
		1	1-3/4 16 Gage	139	210	281	356	1-3/4 16 Gage	185	280	375	475
			Nail Size (galvanized casing)					Nail Size (galvanized casing)				
	5/16[c]	1-1/4	6d (2"x0.099")	140	200	200	200	6d (2"x0.099")	140	210	275	360
	3/8	1-3/8	8d (2½"x0.113")	160	200	200	200	8d (2½"x0.113")	160	240	310	410

Notes to Table 2306.4.1

For SI: 1 inch = 25.4 mm, 1 foot = 25.4 mm, 1 pound per foot = 14.5939 N/m.

a. For framing of other species: (1) Find specific gravity for species of lumber in AF&PA NDS. (2) For staples find shear value from table above for Structural I panels (regardless of actual grade) and multiply value by 0.82 for species with specific gravity of 0.42 or greater, or 0.65 for all other species. (3) For nails find shear value from table above for nail size for actual grade and multiply value by the following adjustment factor: Specific Gravity Adjustment Factor = [1-(0.5-SG)], where SG = Specific Gravity of the framing lumber. This adjustment factor shall not be greater than 1.

b. Panel edges backed with 2-inch nominal or thicker framing. Install panels either horizontally or vertically. Space fasteners maximum 6 inches on center along intermediate framing members for 3/8-inch and 7/16-inch panels installed on studs spaced 24 inches on center. For other conditions and panel thickness, space fasteners maximum 12 inches on center on intermediate supports.

c. 3/8-inch panel thickness or siding with a span rating of 16 inches on center is the minimum recommended where applied direct to framing as exterior siding.

d. Except for wood structural panel sheathing used for shear walls that are part of the seismic-force-resisting system, allowable shear values are permitted to be increased to values shown for 15/32-inch sheathing with same nailing provided (a) studs are spaced a maximum of 16 inches on center, or (b) panels are applied with long dimension across studs.

e. Framing at adjoining panel edges shall be 3 inches nominal or wider, and nails shall be staggered where nails are spaced 2 inches on center.

f. Framing at adjoining panel edges shall be 3 inches nominal or wider, and nails shall be staggered where both of the following conditions are met: (1) 10d (3"x0.148") nails having penetration into framing of more than 1-1/2 inches and (2) nails are spaced 3 inches on center.

g. Values apply to all-veneer plywood. Thickness at point of fastening on panel edges governs shear values.

h. Where panels applied on both faces of a wall and nail spacing is less than 6 inches o.c. on either side, panel joints shall be offset to fall on different framing members, or framing shall be 3-inch nominal or thicker at adjoining panel edges and nails on each side shall be staggered.

i. In Seismic Design Category D, E or F, where shear design values exceed 350 pounds per linear foot, all framing members receiving edge nailing from abutting panels shall not be less than a single 3-inch nominal member, or two 2-inch nominal members fastened together in accordance with Section 2306.1 to transfer the design shear value between framing members. Wood structural panel joint and sill plate nailing shall be staggered in all cases. See Section 2305.3.11 for sill plate size and anchorage requirements.

j. Galvanized nails shall be hot dipped or tumbled.

k. Staples shall have a minimum crown width of 7/16 inch and shall be installed with their crowns parallel to the long dimension of the framing members.

l. For shear loads of normal or permanent load duration as defined by the AF&PA NDS, the values in the table above shall be multiplied by 0.63 or 0.56, respectively.

m. [DSA-SS & OSHPD 1, 2 and 4] Refer to Section 2305.2.4.2, which requires any wood structural panel sheathing used for diaphragms and shear walls that are part of the seismic-force-resisting system to be applied directly to framing members.

n. The maximum allowable shear value for three-ply plywood resisting seismic forces is 200 pounds per foot (2.92 kn/m).

TABLE 2306.4.3
ALLOWABLE SHEAR FOR PARTICLEBOARD SHEAR WALL SHEATHING[b]

PANEL GRADE	MINIMUM NOMINAL PANEL THICKNESS (inch)	MINIMUM NAIL PENETRATION IN FRAMING (inches)	PANELS APPLIED DIRECT TO FRAMING				
			Nail size (common or galvanized box)	Allowable shear (pounds per foot) nail spacing at panel edges (inches)[a]			
				6	4	3	2
M-S "Exterior Glue" and M-2 "Exterior Glue"	3/8	1 ½	6d	120	180	230	300
	3/8	1 ½	8d	130	190	240	315
	1/2			140	210	270	350
	1/2	1 5/8	10d	185	275	360	460
	5/8			200	305	395	520

For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.5939 N/m.

a. Values are not permitted in Seismic Design Category D, E or F.

b. Galvanized nails shall be hot-dipped or tumbled.

TABLE 2306.4.4
ALLOWABLE SHEAR VALUES (plf) FOR WIND OR SEISMIC LOADING ON SHEAR WALLS OF FIBERBOARD SHEATHING BOARD CONSTRUCTION FOR TYPE V CONSTRUCTION ONLY[a,b,c,d,e,f,g,h]

THICKNESS AND GRADE	FASTENER SIZE	SHEAR VALUE (pounds per linear foot) 3-INCH NAIL SPACING AROUND PERIMETER AND 6-INCH AT INTERMEDIATE POINTS
1/2" Structural	No. 11 gage galvanized roofing nail 1 1/2" long, 7/16" head	125 [g]
25/32" Structural	No. 11 gage galvanized roofing nail 1 3/4" long, 7/16" head	175[g]

For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.5939 N/m.

a. Fiberboard sheathing diaphragms shall not be used to brace concrete or masonry walls.

b. Panel edges shall be backed with 2 inch or wider framing of Douglas fir-larch or Southern pine.

c. Fiberboard sheathing on one side only.

d. Fiberboard panels are installed with their long dimension parallel or perpendicular to studs.

e. Fasteners shall be spaced 6 inches on center along intermediate framing members.

f. For framing of other species: (1) Find specific gravity for species of lumber in AF&PA NDS and (2) Multiply the shear value from the above table by 0.82 for species with specific gravity of 0.42 or greater, or 0.65 for all other species.

g. The same values can be applied when staples are used as described in Table 2304.9.1.

h. Values are not permitted in Seismic Design Category D, E or F.

2306.4.5.1.5 Gypsum lath. Gypsum lath shall be applied perpendicular to the studs. Maximum allowable shear values shall be as set forth in Table 2306.4.5.

2306.4.5.1.6 Gypsum sheathing. Four-foot-wide (1219 mm) pieces of gypsum sheathing shall be applied parallel or perpendicular to studs. Two-foot-wide (610 mm) pieces of gypsum sheathing shall be applied perpendicular to the studs. Maximum allowable shear values shall be as set forth in Table 2306.4.5.

2306.4.5.1.7 Other gypsum boards. Gypsum board shall be applied parallel or perpendicular to studs. Maximum allowable shear values shall be as set forth in Table 2306.4.5.

Table 2306.4.5 of the 2007 California Building Code is hereby replaced as follows:

TABLE 2306.4.5
ALLOWABLE SHEAR FOR WIND OR SEISMIC FORCES FOR SHEAR WALLS OF LATH AND PLASTER OR GYPSUM BOARD WOOD FRAMED WALL ASSEMBLIES

TYPE OF MATERIAL	THICKNESS OF MATERIAL	WALL CONSTRUCTION	FASTENER SPACING[b] MAXIMUM (inches)	SHEAR VALUE[a,e] (plf)		MINIMUM FASTENER SIZE[c,d,j,k,l]
				Seismic[l]	Wind	
1. Expanded metal, or woven wire lath and portland cement plaster	7/8"	Unblocked	6	90	180	No. 11 gage, 1-1/2" long, 7/16" head 16 Ga. Galv. Staple, 7/8" legs
2. Gypsum lath, plain or perforated	3/8" lath and 1/2" plaster	Unblocked	5	30	100	No. 13 gage, 1-1/8" long, 19/64" head, plasterboard nail 16 Ga. Galv. Staple, 1-1/8" long 0.120" Nail, min. 3/8" head, 1-1/4" long
3. Gypsum sheathing	1/2" x 2' x 8'	Unblocked	4	30	75	No. 11 gage, 1-3/4" long, 7/16" head, diamond-point, galvanized 16 Ga. Galv. Staple, 1-3/4" long
	1/2" x 4'	Blocked[f]	4	30	175	
		Unblocked	7	30	100	
	5/8" x 4'	Blocked	4" edge/ 7" field	30	200	6d galvanized 0.120" Nail, min. 3/8" head, 1-3/4" long
4. Gypsum board, gypsum veneer base or water-resistant gypsum backing board	1/2"	Unblocked[f]	7	30	75	5d cooler (1-5/8" lx 0.086") or wallboard 0.120" Nail, min. 3/8" head, 1-1/2" long 16 Gage Staple, 1-1/2" long
		Unblocked[f]	4	30	110	
		Unblocked	7	30	100	
		Unblocked	4	30	125	
		Blocked[g]	7	30	125	
		Blocked[g]	4	30	150	
		Unblocked	8/12[h]	30	60	No. 6- 1-1/4" screws[i]
		Blocked[g]	4/16[h]	30	160	
		Blocked[g]	4/12[h]	30	155	
		Blocked[f, g]	8/12[h]	30	70	
		Blocked[g]	6/12[h]	30	90	
	5/8"	Unblocked[f]	7	30	115	6d cooler (1-7/8" x 0.092") or wallboard 0.120" Nail, min. 3/8" head, 1-3/4" long 16 Gage Staple, 1-1/2" legs, 1-5/8" long
			4	30	145	
		Blocked[g]	7	30	145	
			4	30	175	
		Blocked[g] Two ply	Base ply: 9 Face ply: 7	30	250	Base ply-6d cooler (1-7/8" x 0.092") or wallboard 1-3/4" x 0.120" Nail, min. 3/8" head 1-5/8" 16 Ga. Galv. Staple Face ply-8d ciiker (2-3/8" x 0.113") or wallboard 0.120" Nail, min. 3/8" head, 2-3/8" long 15 Ga. Galv. Staple, 2-1/4" long
		Unblocked	8/12[h]	30	70	No. 6- 1-1/4" screws[i]
		Blocked[g]	8/12[h]	30	90	

For SI: 1 inch = 25.4 mm, 1 foot = 25.4 mm, 1 pound per foot = 14.5939 N/m.

a. These shear walls shall not be used to resist loads imposed by masonry or concrete construction (see Section 2305.1.5). Values shown are for short-term loading due to wind or seismic loading. Walls resisting seismic loads shall be subject to the limitations in Section 12.2.1 of ASCE 7. Values shown shall be reduced 25 percent for normal loading.
b. Applies to fastening at studs, top and bottom plates and blocking.
c. Alternate fasteners are permitted for use if their dimensions are not less than the specified dimensions. Drywall screws are permitted to substitute for the 5d (1-5/8" x 0.086"), and 6d (1-7/8" x 0.092")(cooler) nails listed above, and No. 6 1-1/4 inch Type S or W screws for 6d (1-7/8" x 0.092")(cooler) nails.
d. For properties of cooler nails, see ASTM C 514.
e. Except as noted, shear values are based on maximum framing spacing of 16 inches on center.
f. Maximum framing spacing of 24 inches on center.
g. All edges are blocked, and edge fastening is provided at all supports and all panel edges.
h. First number denotes fastener spacing at the edges; second number denotes fastener spacing at intermediate framing members.
i. Screws are Type W or S.
j. Staples shall have a minimum crown width of 7/16 inch, measure outside the legs, and shall be installed with their crowns parallel to the long dimension of the framing members.
k. Staples for the attachment of gypsum loath and woven-wire lath shall have a minimum crown width of ¾ inch, measured outside the legs.
l. This construction shall not be used below the top level of wood construction in a multi-level building.

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3104.3 Construction. The pedestrian walkway shall be of noncombustible construction.

Exceptions:

1. Combustible construction shall be permitted where connected buildings are of combustible construction.
2. Fire-retardant-treated wood, in accordance with Section 603.1, Item 1.3, shall be permitted for the roof construction of the pedestrian walkway where connected buildings are a minimum of Type I or II construction.

3104.4 Contents. Only materials and decorations approved by the building official shall be located in the pedestrian walkway.

3104.5 Fire barriers between pedestrian walkways and buildings. Walkways shall be separated from the interior of the building by fire-barrier walls with a fire-resistance rating of not less than 2 hours. This protection shall extend vertically from a point 10 feet (3048 mm) above the walkway roof surface or the connected building roof line, whichever is lower, down to a point 10 feet (3048 mm) below the walkway and horizontally 10 feet (3048 mm) from each side of the pedestrian walkway. Openings within the 10-foot (3048 mm) horizontal extension of the protected walls beyond the walkway shall be equipped with devices providing a $^3/_4$-hour fire protection rating in accordance with Section 715.

Exception: The walls separating the pedestrian walkway from a connected building are not required to have a fire-resistance rating by this section where any of the following conditions exist:

1. The distance between the connected buildings is more than 10 feet (3048 mm), the pedestrian walkway and connected buildings, except for open parking garages, are equipped throughout with an automatic sprinkler system in accordance with NFPA 13 and the wall is constructed of a tempered, wired or laminated glass wall and doors subject to the following:
   1.1. The glass shall be protected by an automatic sprinkler system in accordance with NFPA 13 and the sprinkler system shall completely wet the entire surface of interior sides of the glass wall when actuated.
   1.2. The glass shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler operates.
   1.3. Obstructions shall not be installed between the sprinkler heads and the glass.
2. The distance between the connected buildings is more than 10 feet (3048 mm) and both sidewalls of the pedestrian walkway are at least 50 percent open with the open area uniformly distributed to prevent the accumulation of smoke and toxic gases.
3. Buildings are on the same lot in accordance with Section 503.1.2.
4. Where exterior walls of connected buildings are required by Section 704 to have a fire-resistance rating greater than 2 hours, the walkway shall be equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13.

The previous exception shall apply to pedestrian walkways have a maximum height above grade of three stories or 40 feet (12 192 mm), or five stories or 55 feet (16 764 mm) where sprinklered.

3104.6 Public way. Pedestrian walkways over a public way shall also comply with Chapter 32.

3104.7 Egress. Access shall be provided at all times to a pedestrian walkway that serves as a required exit.

3104.8 Width. The unobstructed width of pedestrian walkways shall not be less than 36 inches (914 mm). The total width shall not exceed 30 feet (9144 mm).

3104.9 Exit access travel. The length of exit access travel shall not exceed 200 feet (60 960 mm).

Exceptions:

1. Exit access travel distance on a pedestrian walkway equipped throughout with an automatic sprinkler system in accordance with NFPA 13 shall not exceed 250 feet (76 200 mm).
2. Exit access travel distance on a pedestrian walkway constructed with both sides at least 50 percent open shall not exceed 300 feet (91 440 mm).
3. Exit access travel distance on a pedestrian walkway constructed with both sides at least 50 percent open, and equipped throughout with an automatic sprinkler system in accordance with NFPA 13, shall not exceed 400 feet (122 m).

3104.10 Tunneled walkway. Separation between the tunneled walkway and the building to which it is connected shall not be less than 2-hour fire-resistant construction and openings therein shall be protected in accordance with Table 715.4.

SECTION 3105
AWNINGS AND CANOPIES

3105.1 General. Awnings or canopies shall comply with the requirements of this section and other applicable sections of this code.

3105.2 Definition. The following term shall, for the purposes of this section and as used elsewhere in this code, have the meaning shown herein.

RETRACTABLE AWNING. A retractable awning is a cover with a frame that retracts against a building or other structure to which it is entirely supported.

3105.3 Design and construction. Awnings and canopies shall be designed and constructed to withstand wind or other lateral loads and live loads as required by Chapter 16 with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration. Awnings shall have frames of noncombustible material, fire-retardant-treated wood, wood of Type IV size, or 1-hour construction with combustible or noncombustible covers and shall be either fixed, retractable, folding or collapsible.

3105.4 Canopy materials. Canopies shall be constructed of a rigid framework with an approved covering that meets the fire propagation performance criteria of NFPA 701 or has a flame spread index not greater than 25 when tested in accordance with ASTM E 84.

SECTION 3106
MARQUEES

3106.1 General. Marquees shall comply with this section and other applicable sections of this code.

3106.2 Thickness. The maximum height or thickness of a marquee measured vertically from its lowest to its highest point shall not exceed 3 feet (914 mm) where the marquee projects more than two-thirds of the distance from the property line to the curb line, and shall not exceed 9 feet (2743 mm) where the marquee is less than two-thirds of the distance from the property line to the curb line.

3106.3 Roof construction. Where the roof or any part thereof is a skylight, the skylight shall comply with the requirements of Chapter 24. Every roof and skylight of a marquee shall be sloped to downspouts that shall conduct any drainage from the marquee in such a manner so as not to spill over the sidewalk.

3106.4 Location prohibited. Every marquee shall be so located as not to interfere with the operation of any exterior standpipe, and such that the marquee does not obstruct the clear passage of stairways or exit discharge from the building or the installation or maintenance of street lighting.

3106.5 Construction. A marquee shall be supported entirely from the building and constructed of noncombustible materials. Marquees shall be designed as required in Chapter 16. Structural members shall be protected to prevent deterioration.

SECTION 3107
SIGNS

3107.1 General. Signs shall be designed, constructed and maintained in accordance with this code.

SECTION 3108
RADIO AND TELEVISION TOWERS

3108.1 General. Subject to the provisions of Chapter 16 and the requirements of Chapter 15 governing the fire-resistance ratings of buildings for the support of roof structures, radio and television towers shall be designed and constructed as herein provided.

3108.2 Location and access. Towers shall be located and equipped with step bolts and ladders so as to provide ready access for inspection purposes. Guy wires or other accessories shall not cross or encroach upon any street or other public space, or over above-ground electric utility lines, or encroach upon any privately owned property without written consent of the owner of the encroached-upon property, space or above-ground electric utility lines.

3108.3 Construction. Towers shall be constructed of approved corrosion-resistant noncombustible material. The minimum type of construction of isolated radio towers not more than 100 feet (30 480 mm) in height shall be Type IIB.

3108.4 Loads. Towers shall be designed to resist wind loads in accordance with TIA/EIA-222. Consideration shall be given to conditions involving wind load on ice-covered sections in localities subject to sustained freezing temperatures.

3108.4.1 Dead load. Towers shall be designed for the dead load plus the ice load in regions where ice formation occurs.

3108.4.2 Wind load. Adequate foundations and anchorage shall be provided to resist two times the calculated wind load.

3108.5 Grounding. Towers shall be permanently and effectively grounded.

SECTION 3109
SWIMMING POOL ENCLOSURES AND SAFETY DEVICES

3109.1 General. Swimming pools shall comply with the requirements of this section and other applicable sections of this code.

Sections 3109.1.1-11 are added to read as follows:

3109.1.1 Location

1. No swimming pool, spa or hot tub will be constructed in a required front yard as defined by this code unless specific approval is granted through a variance.
2. The distance from the inner surface of a swimming pool, spa or hot tub wall to a property line will not be less than three feet. Swimming pool and spa walls adjacent to foundations and slopes will be designed in accordance with this code.

3109.1.2 Pools in Uncertified Fill Soils. Permits may be issued for the construction of "floating" type pools in fill areas when the following conditions are met.

1. A complete soils investigation of the fill is made by an engineer qualified in soils design and, based on the findings, the engineer establishes the design conditions and extends recommendations that would lead to a stable and safe pool.
2. A structural design is prepared by a Registered Civil Engineer who incorporates the recommendations of the soils investigation as approved by the Building Official.
3. The pool is designed under the assumption that it receives vertical support from the soil lying under the pool bottom. The limits of the supporting soil will be below a line drawn around the perimeter of the pool and located on the bottom where a line sloping at 44 degrees with the horizontal is tangent to the pool bottom.
4. Pool walls will be designed assuming no support from the surrounding soil and in accordance with the minimum requirements as set forth in this Article.
5. The pit for the pool backwash will not be located within the fill material.

3109.1.3 Surface Water. The pool deck and all portions of the lot will drain to the street or to an approved drainage course. When a pool deck extends to within three feet of an adjacent property, means will be provided to conduct splash water to a satisfactory point of disposal.

3109.1.4 Waste Water. Disposal of swimming pool wastewater will be in conformance with this code.

3109.1.5 Hydrostatic Uplift. Any pool to be constructed in an area in which residual groundwater creates hydrostatic head against the pool structure will have a suitable underdrain relief to which a pump can be properly attaches, sufficient mass weight to prevent floatation, or hydrostatic relief valves.

3109.1.6 Diving Boards. No diving board will be installed in a pool whose greatest depth is less than eight feet. A depth of not less than 8 feet, 6 inches, will be required for a one-meter board. A depth of not less than 10 feet will be required for a three-meter board.

3109.1.7 Materials for Pool Shell. Swimming pool shells will be of reinforced concrete, or other material equivalent in strength and durability, designed and built to withstand anticipated stresses, of watertight construction with smooth and impervious surfaces. A waterproof interior finish, which will withstand repeated brushing, scrubbing and cleaning procedures, will completely line the pool to the coping or cantilevered decking.

3109.1.8 Construction Changes. The design engineer or architect will approve all changes in writing before the Building Official reviews them.

3109.1.9 Signature of Design Professional. A State-licensed Registered Civil Engineer or Architect will sign structural plans and calculations for any pool where the maximum depth is more than three feet.

3109.1.10 Deck. A concrete deck will be provided around the pool with a minimum width of 4 feet, measured from the pool water line and with a 2% slope away from the pool. Natural soil under deck will slope 2% away from the pool and soil around the deck will slope at 1 % minimum to drain away from the edge of the deck. The deck will have a minimum thickness of 4 inches nominal and will re reinforced with 3/8-inch reinforcement bars at 24 inches on center each way or equivalent reinforcing. The outer edge of the deck will have a cutoff wall not less than 15 inches below grade. A 6-foot deck may be used in lieu of a 4-foot deck and cutoff wall. Decks of lesser width may be utilized when the cutoff wall depth is increased by a proportionate amount of the reduced deck width. When the soil under decks has an expansive index of 91 or greater, it will be presaturated with water to a depth of 18 inches before the placement of the concrete deck. Approved joints will be provided in the deck at corners, at maximum 10-foot intervals, and wherever necessary in order to control cracking, to allow for differential movements, and to minimize damage to the deck from such movement should it occur. Joints in decks and coping will be made watertight with an approved permanent resilient sealant.

EXCEPTION: The deck may be omitted provided that the pool shell is designed to resist normal external forces plus 20 p.c.f. equivalent fluid pressure, and the bond beam has a thickness of not less than 12 inches and is reinforced with a minimum of three (3) 1/2=-inch reinforcement bars in each face with ¼-inch reinforcement ties at 48 inches on center.

3109.1.11. Design.

Minimum Standards. Every swimming pool design will admit to rational analysis according to accepted engineering principles and all criteria hereafter noted are to be considered as minimum standards only.

Expansive Soil Design. Pools constructed below grade will be designed on the assumption that their construction is to be in an area of moderately expansive soil having an expansion index of 51-91 and an equivalent fluid pressure of not less than 45 pounds per cubic foot (45 p.c.f.)

Exception: Where tests indicate that soils at a pool site are non-expansive or have low expansion characteristics from the ground surface to the full depth of the pool, structural design may be based on an equivalent fluid pressure not less than 30 p.c.f.

In highly expansive soils having an expansion index of 91-130, pools will be designed for not less than 60 p.c.f. equivalent fluid pressure.

In very highly expansive soils having an expansion index over 130, pool design will be subject to special requirements based on a site investigation, soil testing, and engineering analysis by a registered civil engineer to determine appropriate design parameters for the site.

Hydrostatic Pressure. Hydrostatic pressure will be used in an outward direction as design criteria where concrete is not deposited against natural undisturbed earth or approved compacted fill.

Reinforcing Steel. Minimum reinforcing steel will be no less than 3/8-inch reinforcement bars at 12 inches O.C. both ways, with a minimum cover of two inches, except longitudinal steel in the bottom transition area from the shall to deep end will be 3/8-inch reinforcement bars at six inches O.C. minimum, extending a minimum distance of five feet beyond each side of the transition.

Empty Pool Condition. Pools will be designed for both empty and filled conditions.

Surcharge Loads. When located adjacent to building foundations, retaining walls and ascending earth slopes, appropriate surcharge loading will be incorporated in the pool design.

Bond Beams. A top bond beam will be provided with a minimum width and depth of 12 inches and with a minimum of four ½-inch reinforcement bars (two ½-inch reinforcement bars near each face) with ¼-inch reinforcement ties at 48 inches on center. Vertical steel will be bent at least eight inches horizontally over top longitudinal steel and will be carried around the corner and lapped to form a rigid construction. Special design and plan details will be required for any niches or indentation sin the steel or other special details.

Pool Walls. The minimum thickness of pool walls will be five inches.

Section 3109.2 is revised to read as follows:

3109.2. Definitions. For the purpose of this section, certain terms are defined as follows:

Pool. Any body of water created by artificial means which is designated or used for swimming or immersion purposes and any portion of which is capable of containing water 18 inches deep or deeper also called swimming pool. Plumbing fixtures such as bathtubs are exempt.

Hillside Areas. Areas where there is a difference of four feet in original and/or final grade of any two sides of the pool.

Expansive Soils. The expansiveness of soils will be classified by the requirements of the California Building Code as adopted by the City Council.

3109.3 Public swimming pools. Public swimming pools shall be completely enclosed by a fence at least 4 feet (1290 mm) in height or a screen enclosure. Openings in the fence shall not permit the passage of a 4-inch-diameter (102 mm) sphere. The fence or screen enclosure shall be equipped with self-closing and self-latching gates.

Section 3109.3.1 is added to read as follows:

3109.3.1 Health Official Approval. Application for permit to construct or operate a public swimming pool, bath house or related appurtenances will be accompanied by plans with the State Board of Health approval stamped thereon.

3109.4 Residential swimming pools. Residential swimming pools shall comply with Sections 3109.4.1 through 3109.4.3.

Exception: A swimming pool with a power safety cover or a spa with a safety cover complying with ASTM F 1346.

3109.4.1 Barrier height and clearances. The top of the barrier shall be at least 48 inches (1219 mm) above grade measured on the side of the barrier that faces away from the swimming pool. The maximum vertical clearance between grade and the bottom of the barrier shall be 2 inches (51 mm) measured on the side of the barrier that faces away from the swimming pool. Where the top of the pool structure is above grade, the barrier is authorized to be at ground level or mounted on top of the pool structure, and the maximum vertical clearance between the top of the pool structure and the bottom of the barrier shall be 4 inches (102 mm).

3109.4.1.1 Openings. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere.

3109.4.1.2 Solid barrier surfaces. Solid barriers which do not have openings shall not contain indentations or

5. The alterations do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

6. The alterations do not result in the creation of an unsafe condition.

3403.2.3.2 Adoption. *[OSHPD 2] All additions, alterations, repairs and seismic retrofit to the existing structures or portions thereof may be designed and constructed in accordance with the provisions of FEMA 356, as modified herein.*

3403.2.3.3.1 Referenced standards. All referenced standards listed in FEMA 356 shall be replaced by referenced standards listed in Chapter 35 of this code.

3403.2.3.3.2 FEMA 356 Section 1.5 – Target building performances. *Target building performance level shall be Life Safety Building Performance Level (3-C) as defined in Section 1.5.3.3, with Structural performance level S-3 as defined in Section 1.5.1.3 and Non-structural performance level N-C as defined in Section 1.5.2.3.*

3403.2.3.3.3 FEMA 356 Section 1.6 – Seismic hazard. *The ground motion characterization shall be based on ground shaking having a 10-percent probability of exceedance in 50 years.*

Ground shaking having a 10-percent probability of exceedance in 50 years need not exceed 2/3 of the maximum considered earthquake.

Response spectra and acceleration time histories shall be constructed in accordance with Section 1613, 1802.7 and 1802.8.

3403.2.3.3.4 Analysis procedure. *The selection of a particular analysis procedure from FEMA 356 may be subject to the approval of the enforcement agent.*

3403.2.3.3.5 Design criteria. *Prior to implementation of FEMA 356 non-linear procedures, the ground motion, analysis and design methods, material assumptions and acceptance criteria proposed by the engineer shall be reviewed by the enforcement agent.*

3403.2.3.3.6 Enforcement agency approval. *The analysis, conclusion and design decisions shall be reviewed and accepted by the enforcement agent.*

3403.2.3.3.7 Structural observation, testing and inspections. *Construction testing, inspection and structural observation requirements shall be as required for new construction.*

3403.3 Nonstructural. Non structural alterations or repairs to an existing building or structure are permitted to be made of the same materials of which the building or structure is constructed, provided that they do not adversely affect any structural member or the fire-resistance rating of any part of the building or structure.

3403.4 Stairways. An alteration or the replacement of an existing stairway in an existing structure shall not be required to comply with the requirements of a new stairway as outlined in Section 1009 where the existing space and construction will not allow a reduction in pitch or slope.

Section 3403.5 is added to read as follows:

3403.5 Repair and Reconstruction.

3403.5.1 Adoption and Intent. This chapter establishes regulations as amendments to the building code for the expeditious repair of damaged structures. In the event an amendment to the California Building Standards Code results in differences between these building standards and the California Building Standards Code, the text of these building standards shall govern. This chapter also establishes standard placards to be used to indicate the condition of a structure for continued occupancy. The chapter further authorizes the Building Official and his or her authorized representatives to post the appropriate placard at each entry point to a building or structure upon completion of a safety assessment.

3403.5.2 Definitions. For the purposes of this chapter, the following definition applies:

3403.5.2.1 Substantial Structural Damage. A condition where:

1. In any story, the vertical elements of the lateral-force-resisting system, have suffered damage such that the lateral load-carrying capacity of the structure in any direction has been reduced by more than 20 percent from its pre-damaged condition, or

2. The capacity of any vertical gravity load-carrying component, or any group of such components, that supports more than 30 percent of the total area of the structure's floor(s) and roof(s) has been reduced more than 20 percent from its pre-damaged condition, and the remaining capacity of such affected elements with respect to all dead and live loads is less than 75 percent of that required by the building code for new buildings of similar structure, purpose, and location.

3403.5.2.2 Safety Assessment. A visual, non-destructive examination of a building or structure for the purpose of determining the condition for continued occupancy.

3403.5.3 Placards.

3403.5.3.1 Descriptions. The following are verbal descriptions of the official jurisdiction placards to be used to designate the condition for continued occupancy of buildings or structures. Copies of actual placards are attached.

(1) INSPECTED - Lawful Occupancy Permitted is to be posted on any building or structure wherein no apparent structural hazard has been found. This placard is not intended to mean that there is no damage to the building or structure.

(2) RESTRICTED USE is to be posted on each building or structure that has been damaged wherein the damage has resulted in some form of restriction to the continued occupancy. The individual who posts this placard will note in general terms the type of damage encountered and will clearly and concisely note the restrictions on continued occupancy.

(3) UNSAFE - Do Not Enter or Occupy is to be posted on each building or structure that has been damaged such that continued occupancy poses a threat to life safety. Buildings or structures posted with this placard shall not be entered under any circumstance except as authorized in writing by the Building Official, or his or her authorized representative. Safety assessment teams shall be authorized to enter these buildings at any time. This placard is not to be used or considered as a demolition order. The individual who posts this placard will note in general terms the type of damage encountered.

3403.5.3.2 Reference. This ordinance number, the name of the jurisdiction, its address, and phone number shall be permanently affixed to each placard.

3403.5.3.3 Removal of Placards. Once it has been attached to a building or structure, a placard is not to be removed, altered or covered until done so by an authorized representative of the Building Official. It shall be unlawful for any person, firm or corporation to alter, remove, cover or deface a placard unless authorized pursuant to this section.

3403.5.4 Repairs. Repairs of structural elements shall comply with this section.

3403.5.4.1 Seismic evaluation and design. Seismic evaluation and design of an existing building and its components shall be based on the following criteria.

3403.5.4.1.1 Evaluation and design procedures. The seismic evaluation and design shall be based on the procedures specified in the building code, ASCE 31 Seismic Evaluation of Existing Buildings (for evaluation only) or ASCE 41 Seismic Rehabilitation of Existing Buildings. Use of the procedures contained in Appendix A of the International Existing Building Code shall be permitted as specified in Section 3403.5.4.1.3.

3403.5.4.1.2 CBC level seismic forces. When seismic forces are required to meet the building code level, they shall be one of the following:

1. One hundred percent (100%) of the values in the building code. The R factor used for analysis in accordance with Chapter 16 of the building code shall be the R factor specified for structural systems classified as "Ordinary" unless it can be demonstrated that the structural system satisfies the proportioning and detailing requirements for systems classified as "Intermediate" or "Special".

2. Forces corresponding to BSE-1 and BSE-2 Earthquake Hazard Levels defined in ASCE 41. Where ASCE 41 is used, the corresponding performance levels shall be those shown in Table 3403.5.4.1.2.

TABLE 3403.5.4.1.2

ASCE 41 and ASCE 31 PERFORMANCE LEVELS

OCCUPANCY CATEGORY (BASED ON IBC TABLE 1604.5)	PERFORMANCE LEVEL FOR USE WITH ASCE 31 AND WITH ASCE 41 BSE-1 EARTHQUAKE HAZARD LEVEL	PERFORMANCE LEVEL FOR USE WITH ASCE 41 BSE-2 EARTHQUAKE HAZARD LEVEL
I	Life Safety (LS)	Collapse Prevention (CP)
II	Life Safety (LS)	Collapse Prevention (CP)
III	Note (a)	Note (a)
IV	Immediate Occupancy (IO)	Life Safety (LS)

a. Performance Levels for Occupancy Category III shall be taken as halfway between the performance levels specified for Occupancy Category II and Occupancy Category IV.

3403.5.4.1.3 Reduced CBC level seismic forces. When seismic forces are permitted to meet reduced building code levels, they shall be one of the following:

1. Seventy-five percent (75%) of the forces prescribed in the building code. The R factor used for analysis in accordance with Chapter 16 of the building code shall be the R factor as specified in Section 3403.5.4.1.2.

2. In accordance with the applicable chapters in Appendix A of the International Existing Building Code as specified in Items 2.1 through 2.5 below. Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A shall be deemed to comply with the requirements for reduced building code force levels.

2.1. The seismic evaluation and design of unreinforced masonry bearing wall buildings in Occupancy Category I or II are permitted to be based on the procedures specified in Appendix Chapter A1.

2.2. Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in Occupancy Category I or II are permitted to be based on the procedures specified in Appendix Chapter A2.

2.3. Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in Occupancy Category I or II are permitted to be based on the procedures specified in Appendix Chapter A3.

2.4. Seismic evaluation and design of soft, weak, or open-front wall conditions in multiunit residential buildings of wood construction in Occupancy Category I or II are permitted to be based on the procedures specified in Appendix Chapter A4.

2.5. Seismic evaluation and design of concrete buildings and concrete with masonry infill buildings in all Occupancy Categories are permitted to be based on the procedures specified in Appendix Chap. A5.

3. In accordance with ASCE 31 based on the applicable performance level as shown in Table 3403.5.4.1.2.

4. Those associated with the BSE-1 Earthquake Hazard Level defined in ASCE 41 and the performance level as shown in Table 3403.5.4.1.2. Where ASCE 41 is used, the design spectral response acceleration parameters Sxs and Sx1 shall not be taken less than 75 percent of the respective design spectral response acceleration parameters SDS and SD1 defined by the International Building Code and its reference standards.

3403.5.4.2 Wind Design. Wind design of existing buildings shall be based on the procedures specified in the building code.

3403.5.5 Repairs to damaged buildings. Repairs to damaged buildings shall comply with this section.

3403.5.5.1 Unsafe conditions. Regardless of the extent of structural damage, unsafe conditions shall be eliminated.

3403.5.5.2 Substantial structural damage to vertical elements of the lateral–force-resisting system. A building that has sustained substantial structural damage to the vertical elements of its lateral-force-resisting system shall be evaluated and repaired in accordance with the applicable provisions of Section 3403.5.5.2.1 through 3403.5.5.2.3.

3403.5.5.2.1 Evaluation. The building shall be evaluated by a registered design professional, and the evaluation findings shall be submitted to the code official. The evaluation shall establish whether the damaged building, if repaired to its pre-damage state, would comply with the provisions of the building code. Wind forces for this evaluation shall be those prescribed in the building code. Seismic forces for this evaluation are permitted to be the reduced level seismic forces specified in Code Section 3403.5.4.1.3.

3403.5.5.2.2 Extent of repair for compliant buildings. If the evaluation establishes compliance of the pre-damage building in accordance with Section 3403.5.5.2.1, then repairs shall be permitted that restore the building to its pre-damage state, using materials and strengths that existed prior to the damage.

3403.5.5.2.3 Extent of repair for non-compliant buildings. If the evaluation does not establish compliance of the pre-damage building in accordance with Section 3403.5.5.2.1, then the building shall be rehabilitated to comply with applicable provisions of the building code for load combinations including wind or seismic forces. The wind design level for the repair shall be as required by the building code in effect at the time of original construction unless the damage was caused by wind, in which case the design level shall be as required by the code in effect at the time of original construction or as required by the building code, whichever is greater. Seismic forces for this rehabilitation design shall be those required for the design of the pre-damaged building, but not less than the reduced level seismic forces specified in Section 3403.5.4.1.3. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of the building code for new buildings of similar structure, purpose, and location.

3403.5.5.3 Substantial structural damage to vertical load-carrying components. Vertical load-carrying components that have sustained substantial structural damage shall be rehabilitated to comply with the applicable provisions for dead and live loads in the building code. Undamaged vertical load-carrying components that receive dead or live loads from rehabilitated components shall also be rehabilitated to carry the design loads of the rehabilitation design. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of the building code for new buildings of similar structure, purpose, and location.

3403.5.5.3.1 Lateral force-resisting elements. Regardless of the level of damage to vertical elements of the lateral force-resisting system, if substantial structural damage to vertical load-carrying components was caused primarily by wind or seismic effects, then the building shall be evaluated in accordance with Section 3403.5.5.2.1 and, if non-compliant, rehabilitated in accordance with Section 3403.5.5.2.3.

3403.5.5.4 Less than substantial structural damage. For damage less than substantial structural damage, repairs shall be allowed that restore the building to its pre-damage state, using materials and strengths that existed prior to the damage. New structural members and connections used for this repair shall comply with the detailing provisions of the building code for new buildings of similar structure, purpose, and location.

3403.5.6 Referenced Standards

Standard Reference Number	Title	Referenced in Code Section Number
ASCE 31-03	Seismic Evaluation of Existing Buildings	3403.5.4.1.1, TABLE 3403.5.4.1.2, 3403.5.4.1.3
ASCE 41-06	Seismic Rehabilitation of Existing Buildings	3403.5.4.1.1, 3403.5.4.1.2, TABLE 3403.5.4.1.2, 3403.5.4.1.3

SECTION 3404
FIRE ESCAPES

3404.1 Where permitted. Fire escapes shall be permitted only as provided for in Sections 3404.1.1 through 3404.1.4.

3404.1.1 New buildings. Fire escapes shall not constitute any part of the required means of egress in new buildings.

3404.1.2 Existing fire escapes. Existing fire escapes shall be continued to be accepted as a component in the means of egress in existing buildings only.

3404.1.3 New Fire escapes. New fire escapes for existing buildings shall be permitted only where exterior stairs cannot be utilized due to lot lines limiting stair size or due to the sidewalks, alleys or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.

3404.1.4 Limitations. Fire escapes shall comply with this section and shall not constitute more than 50 percent of the required number of exits nor more than 50 percent of the required exit capacity.

3404.2 Location. Where located on the front of the building and where projecting beyond the building line, the lowest landing shall not be less than 7 feet (2134 mm) or more than 12 feet (3658 mm) above grade, and shall be equipped with a counterbalanced stairway to the street. In alleyways and thoroughfares less than 30 feet (9144 mm) wide, the clearance under the lowest landing shall not be less than 12 feet (3658 mm).

3404.3 Construction. The fire escape shall be designed to support a live load of 100 pounds per square foot (4788 Pa) and shall be constructed of steel or other approved noncombustible materials. Fire escapes constructed of wood not less than nominal 2 inches (51 mm) thick are permitted on building of Type 5 construction. Walkways and railings located over or supported by combustible roofs in buildings of Type 3 and 4 construction are permitted to be of wood not less than nominal 2 inches (51 mm) thick.

3404.4 Dimensions. Stairs shall be at least 22 inches (559 mm) wide with risers not more than, and treads not less than, 8 inches (203 mm) and landings at the foot of stairs not less than 40 inches (1016 mm) wide by 36 inches (914 mm) long, located not more than 8 inches (203 mm) below the door.

3404.5 Opening protectives. Doors and windows along the fire escape shall be protected with ¾-hour opening protectives.

SECTION 3405
GLASS REPLACEMENT

3405.1 Conformance. The installation or replacement of glass shall be as required for new installations.

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SECTION 3406
CHANGE OF OCCUPANCY

3406.1 Conformance. No change shall be made in the use or occupancy of any building that would place the building in a different division of the same group of occupancy or in a different group of occupancies, unless such building is made to comply with the requirements of this code for such division or group of occupancy. Subject to the approval of the building official, the use or occupancy of existing buildings shall be permitted to be changed and the building is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.

3406.2 Certificate of occupancy. A certificate of occupancy shall be issued where it has been determined that the requirements for the new occupancy classification have been met.

3406.3 Stairways. Existing stairways in an existing structure shall not be required to comply with the requirements of a new stairway as outlined in Section 1009 where the existing space and construction will not allow a reduction in pitch or slope.

3406.4 Change of occupancy. When a change of occupancy results in a structure being reclassified to a higher occupancy category, the structure shall conform to the seismic requirements for a new structure.

Exceptions:

1. Specific seismic detailing requirements of this code or ASCE 7 for a new structure shall not be required to be met where it can be shown that the level of performance and seismic safety is equivalent to that of a new structure. Such analysis shall consider the regularity, overstrength, redundancy and ductility of the structure within the context of the existing and retrofit (if any) detailing provided.
2. When a change of use results in a structure being reclassified from Occupancy Category I or II to Occupancy Category III and the structure is located in a seismic map area where $S_{DS} < 0.33$, compliance with the seismic requirements of this code and ASCE 7 are not required.

SECTION 3407
HISTORICAL BUILDINGS

[DSA-AC] For applications listed in Section 109.1 regulated by the Division of the State Architect—Access Compliance for Qualified Historical Buildings, see California Code of Regulations, Title 24, Part 8 (California Historical Building Code).

3407.1 Historic buildings. The provisions of this code relating to the construction, repair, alteration, addition, restoration and movement of structures, and change of occupancy shall not be mandatory for historic building official to not constitute a distinct life safety hazard.

3407.2 Flood hazard areas. Within flood hazard areas established in accordance with Section 1612.3, where the work proposed constitutes substantial improvement as defined in Section 1612.2, the building shall be brought into conformance with Section 1612.

Exception: Historic buildings that are:

1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; or
2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminary determined to qualify as an historic district; or
3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

SECTION 3408
MOVED STRUCTURES

3408.1Conformance. Structures moved into or within the jurisdiction shall comply with the provisions of this code for new structures.

Exception: [HCD] *After July 1, 1978, local ordinances or regulations for moved apartment houses and dwellings shall permit the retention of existing materials and methods of construction, provided the apartment house or dwelling complies with the building standards for foundations applicable to new construction and does not become or continue to be a substandard building. For additional information, see Health and Safety Code Section 17958.9.*

SECTION 3409
Reserved

SECTION 3410
COMPLIANCE ALTERNATIVES

3410.1 Compliance. The provisions of this section are intended to maintain or increase the current degree of public safety, health and general welfare in existing buildings while permitting repair, alteration, addition and change of occupancy without requiring full compliance with Chapters 2 through 33, or Sections 3401.3, and 3403 through 3407, except where compliance with other provisions of this code is specifically required in this section.

3410.2 Applicability. Structures existing prior to *January 1, 2008*, in which there is work involving additions, alterations or changes of occupancy shall be made to conform to the requirements of this section or the provisions of Sections 3403 through 3407. The provisions in Sections 3410.2.1 through 3410.2.5 shall apply to existing occupancies that will continue to be, or are proposed to be, in Groups A, B, E, F, M, R, S and U. These provisions shall not apply to buildings with occupancies in Group H or I.

3410.2.1 Change in occupancy. Where an existing building is changed to a new occupancy classification and this section is applicable, the provisions of this section for the

APPENDIX H
SIGNS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION H101
GENERAL

H101.1 General. A sign shall not be erected in a manner that would confuse or obstruct the view of or interfere with exit signs required by Chapter 10 or with official traffic signs, signals or devices. Signs and sign support structures, together with their supports, braces, guys and anchors, shall be kept in repair and in proper state of preservation. The display surfaces of signs shall be kept neatly painted or posted at all times.

CBC Appendix Chapter H, Section H101.1.1 is added to read as follows:

H101.1.1 Conflicts with other City Codes and Ordinances. When a conflict exists between City Planning and Zoning regulations and this chapter, the City Planning and Zoning regulations will take precedence.

H101.2 Signs exempt from permits. The following signs are exempt from the requirements to obtain a permit before erection:

1. Painted nonilluminated signs.
2. Temporary signs announcing the sale or rent of property.
3. Signs erected by transportation authorities.
4. ***CBC Appendix Chapter H, Section H101.2, Item 4 is deleted.***
5. The changing of moveable parts of an approved sign that is designed for such changes, or the repainting or repositioning of display matter shall not be deemed an alteration.

SECTION H102
DEFINITIONS

H102.1 General. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of the *California Building Code* for general definitions.

COMBINATION SIGN. A sign incorporating any combination of the features of pole, projecting and roof signs.

DISPLAY SIGN. The area made available by the sign structure for the purpose of displaying the advertising message.

ELECTRIC SIGN. A sign containing electrical wiring, but not including signs illuminated by an exterior light source.

GROUND SIGN. A billboard or similar type of sign which is supported by one or more uprights, poles or braces in or upon the ground other than a combination sign or pole sign, as defined by this code.

POLE SIGN. A sign wholly supported by a sign structure in the ground.

PORTABLE DISPLAY SURFACE. A display surface temporarily fixed to a standardized advertising structure which is regularly moved from structure to structure at periodic intervals.

PROJECTING SIGN. A sign other than a wall sign, which projects from and is supported by a wall of a building or structure.

ROOF SIGN. A sign erected upon or above a roof or parapet of a building or structure.

SIGN. Any letter, figure, character, mark, plane, point, marquee sign, design, poster, pictorial, picture, stroke, stripe, line, trademark, reading matter or illuminated service, which shall be constructed, placed, attached, painted, erected, fastened or manufactured in any manner whatsoever, so that the same shall be used for the attraction of the public to any place, subject, person, firm, corporation, public performance, article, machine or merchandise, whatsoever, which is displayed in any manner outdoors. Every sign shall be classified and conform to the requirements of that classification as set forth in this chapter.

SIGN STRUCTURE. Any structure which supports or is capable of supporting a sign as defined in this code. A sign structure is permitted to be a single pole and is not required to be an integral part of the building.

WALL SIGN. Any sign attached to or erected against the wall of a building or structure, with the exposed face of the sign in a plane parallel to the plane of said wall.

SECTION H103
LOCATION

H103.1 Location restrictions. Signs shall not be erected, constructed or maintained so as to obstruct any fire escape or any window or door or opening used as a means of egress or so as to prevent free passage from one part of a roof to any other part thereof. A sign shall not be attached in any form, shape or manner to a fire escape, nor be placed in such manner as to interfere with any opening required for ventilation.

SECTION H104
IDENTIFICATION

H104.1 Identification. Every outdoor advertising display sign hereafter erected, constructed or maintained, for which a permit is required shall be plainly marked with the name of the person, firm or corporation erecting and maintaining such sign and shall have affixed on the front thereof the permit number issued for said sign or other method of identification approved by the building official.

SECTION H105
DESIGN AND CONSTRUCTION

H105.1 General requirements. Signs shall be designed and constructed to comply with the provisions of this code for use of materials, loads and stresses.

H105.2 Permits, drawings and specifications. Where a permit is required, as provided in Chapter 1, construction docu-

ments shall be required. These documents shall show the dimensions, material and required details of construction, including loads, stresses and anchors.

H105.3 Wind load. Signs shall be designed and constructed to withstand wind pressure as provided for in Chapter 16.

H105.4 Seismic load. Signs designed to withstand wind pressures shall be considered capable of withstanding earthquake loads, except as provided for in Chapter 16.

H105.5 Working stresses. In outdoor advertising display signs, the allowable working stresses shall conform to the requirements of Chapter 16. The working stresses of wire rope and its fastenings shall not exceed 25 percent of the ultimate strength of the rope or fasteners.

Exceptions:

1. The allowable working stresses for steel and wood shall be in accordance with the provisions of Chapters 22 and 23.
2. The working strength of chains, cables, guys or steel rods shall not exceed one-fifth of the ultimate strength of such chains, cables, guys or steel.

H105.6 Attachment. Signs attached to masonry, concrete or steel shall be safely and securely fastened by means of metal anchors, bolts or approved expansion screws of sufficient size and anchorage to safely support the loads applied.

SECTION H106
ELECTRICAL

H106.1 Illumination. A sign shall not be illuminated by other than electrical means, and electrical devices and wiring shall be installed in accordance with the requirements of the *California Electrical Code.* Any open spark or flame shall not be used for display purposes unless specifically approved.

H106.1.1 Internally illuminated signs. Except as provided for in Sections 402.14 and 2611, where internally illuminated signs have facings of wood or approved plastic, the area of such facing section shall not be more than 120 square feet (11.16 m^2) and the wiring for electric lighting shall be entirely enclosed in the sign cabinet with a clearance of not less than 2 inches (51 mm) from the facing material. The dimensional limitation of 120 square feet (11.16 m^2) shall not apply to sign facing sections made from flame-resistant-coated fabric (ordinarily known as "flexible sign face plastic") that weighs less than 20 ounces per square yard (678 g/m^2) and that, when tested in accordance with NFPA 701, meets the fire propagation performance requirements of both Test 1 and Test 2 or that when tested in accordance with an approved test method, exhibits an average burn time of 2 seconds or less and a burning extent of 5.9 inches (150 mm) or less for 10 specimens.

H106.2 Electrical service. Signs that require electrical service shall comply with the *California Electrical Code.*

SECTION H107
COMBUSTIBLE MATERIALS

H107.1 Use of combustibles. Wood, approved plastic or plastic veneer panels as provided for in Chapter 26, or other materials of combustible characteristics similar to wood, used for moldings, cappings, nailing blocks, letters and latticing, shall comply with Section H109.1, and shall not be used for other ornamental features of signs, unless approved.

H107.1.1 Plastic materials. Notwithstanding any other provisions of this code, plastic materials which burn at a rate no faster than 2.5 inches per minute (64 mm/s) when tested in accordance with ASTM D 635 shall be deemed approved plastics and can be used as the display surface material and for the letters, decorations and facings on signs and outdoor display structures.

H107.1.2 Electric sign faces. Individual plastic facings of electric signs shall not exceed 200 square feet (18.6 m^2) in area.

H107.1.3 Area limitation. If the area of a display surface exceeds 200 square feet (18.6 m^2), the area occupied or covered by approved plastics shall be limited to 200 square feet (18.6 m^2) plus 50 percent of the difference between 200 square feet (18.6 m^2) and the area of display surface. The area of plastic on a display surface shall not in any case exceed 1,100 square feet (102 m^2).

H107.1.4 Plastic appurtenances. Letters and decorations mounted on an approved plastic facing or display surface can be made of approved plastics.

SECTION H108
ANIMATED DEVICES

H108.1 Fail-safe device. Signs that contain moving sections or ornaments shall have fail-safe provisions to prevent the section or ornament from releasing and falling or shifting its center of gravity more than 15 inches (381 mm). The fail-safe device shall be in addition to the mechanism and the mechanism's housing which operate the movable section or ornament. The fail-safe device shall be capable of supporting the full dead weight of the section or ornament when the moving mechanism releases.

SECTION H109
GROUND SIGNS

H109.1 Height restrictions. The structural frame of ground signs shall not be erected of combustible materials to a height of more than 35 feet (10668 mm) above the ground. Ground signs constructed entirely of noncombustible material shall not be erected to a height of greater than 100 feet (30 480 mm) above the ground. Greater heights are permitted where approved and located so as not to create a hazard or danger to the public.

H109.2 Required clearance. The bottom coping of every ground sign shall be not less than 3 feet (914 mm) above the ground or street level, which space can be filled with platform decorative trim or light wooden construction.

2007 FIRE CODE INSERTS

CHAPTER 2
DEFINITIONS

SECTION 201
GENERAL

201.1 Scope. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the *California Building Code, California Mechanical Code* or *California Plumbing Code,* such terms shall have the meanings ascribed to them as in those codes.

201.4 Terms no defined. Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies. *Webster's Third New International Dictionary of the English Language, Unabridged,* shall be considered as providing ordinarily accepted meanings.

For applications listed in Section 111 regulated by the Office of the State Fire Marshal, where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies. Webster's Third New International Dictionary of the English Language, Unabridged, shall be considered as providing ordinarily accepted meanings.

SECTION 202
GENERAL DEFINITIONS

[B] ACCESSIBLE MEANS OF EGRESS. See Section 1002.1.

CFC Section 202 is amended to add the following definition:

ADDITION TO A BUILDING OR STRUCTURE. An extension or increase in floor area or height of a building or structure.

AEROSOL. See Section 2802.1.

Level 1 aerosol products. See Section 2802.1.

Level 2 aerosol products. See Section 2802.1.

Level 3 aerosol products. See Section 2802.1.

AEROSOL CONTAINER. See Section 2802.1.

AEROSOL WAREHOUSE. See Section 2802.1.

[B] AGED HOME OR INSTITUTION. *A facility used for the housing of persons 65 years of age or older in need of care and supervision. (See definition of "care and supervision.")*

AGENT. A person who shall have charge, care or control of any structure as owner, or agent of the owner, or as executor, executrix, administrator, administratrix, trustee or guardian of the estate of the owner. Any such person representing the actual owner shall be bound to comply with the provisions of this code to the same extend as if that person was the owner.

AIR-SUPPORTED STRUCTURE. See Section 2402.1.

AIRCRAFT OPERATION AREA (AOA). See section 1102.1.

AIRPORT. See Section 1102.1.

AISLE. See Section 1002.

[B] AISLE ACCESSWAY. See Section 1002.1.

ALARM NOTIFICATION APPLIANCE. See Section 902.1.

ALARM SIGNAL. See Section 902.1.

ALARM VERIFICATION FEATURE. See Section 902.1.

ALCOHOL-BASED HAND RUB. See Section 3402.1.

[EB] ALTERATION. Any construction or renovation to an existing structure other than a repair or addition.

[B] ALTERNATING TREAD DEVICE. See Section 1002.1.

AMMONIUM NITRATE. See Section 3302.1.

ANNUNCIATOR. See Section 902.1.

APPROVED. Acceptable to the fire code official.

[B] AREA OF REFUGE. See Section 1002.1.

ARRAY. See Section 2302.1.

ARRAY, CLOSED. See Section 2302.1.

[B] ASSEMBLY. *The gathering together of 50 or more persons for such purposes as deliberation, education, instruction, worship, entertainment, amusement, drinking, dining or waiting transportation.*

[B] ASSEMBLY BUILDING. *A building or portion of a building used for the gathering together of 50 or more persons for such purposes as deliberation, education, instruction, worship, entertainment, amusement, drinking or dining, or awaiting transportation. Any building or structure or portion thereof used or intended to be used for the showing of motion pictures when an admission fee is charged and when such building or structure is open to the public and has a capacity of 10 or more persons.*

AUDIBLE ALARM NOTIFICATION APPLIANCE. See Section 902.1.

AUTOMATIC. See Section 902.1.

AUTOMATIC FIRE-EXTINGUISHING SYSTEM. See Section 902.1.

AUTOMATIC SPRINKLER SYSTEM. See Section 902.1.

AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY. See Section 2201.1.

AVERAGE AMBIENT SOUND LEVEL. See Section 902.1.

BARRICADE. See Section 3302.1.

Artificial barricade. See Section 3302.1.

Natural barricade. See Section 3302.1.

BARRICADED. See Section 3302.1.

BATTERY SYSTEM, STATIONARY LEAD ACID. See Section 602.1.

BATTERY TYPES. See Section 602.1.

Nickel cadmium (Ni-Cd) battery. See Section 602.1.

Nonrecombinant battery. See Section 602.1.

Recombinant battery. See Section 602.1.

Stationary storage battery. See Section 602.1.

Valve-regulated lead-acid battery. See Section 602.1.

Vented (Flooded) lead-acid battery. See Section 602.1.

*[B] **BEDRIDDEN PERSON.** A person, requiring assistance in turning and repositioning in bed, or being unable to independently transfer to and from bed, except in facilities with appropriate and sufficient care staff, mechanical devices if necessary, and safety precautions as determined in Title 22 regulations, by the Director of Social Services or his or her designated representative.*

The Director of Social Services or his or her designated representative shall make the determination of the bedridden status of persons with developmental disabilities, in consulation with the Director of Developmental Services or his or her designated representative.

The Director of Social Services or his or her designated representative shall make the determination of the bedridden status of all other persons with disabilities who are not developmentally disabled.

BIN BOX. See Section 2302.1.

BLAST AREA. See Section 3302.1.

BLAST SITE. See Section 3302.1.

BLASTER. See Section 3302.1.

BLASTING AGENT. See Section 3302.1.

[B] BLEACHERS. See Section 1002.1.

BOILING POINT. See Section 2702.1.

BONFIRE. See Section 302.1.

BRITISH THERMAL UNIT (BTU). The heat necessary to raise the temperature of 1 pound (0.454 kg) of water by 1°F (0.5565°C).

*[B] **BUILDING.** Any structure used or intended for supporting or sheltering any use or occupancy.*

Note: Building shall have the same meaning as defined in Health and Safety Code Sections 17920 and 18908 for the applications specified in Section 111.

BULK OXYGEN SYSTEM. See Section 4002.1.

BULK PLANT OR TERMINAL. See Section 3402.1.

BULK TRANSFER. See Section 3402.1.

BULLET RESISTANT. See Section 3302.1.

CANOPY. See Section 2402.1.

CARBON DIOXIDE EXTINGUISHING SYSTEM. See Section 902.1.

*[B] **CARE AND SUPERVISION.** Any one or more of the following activities provided by a person or facility to meet the needs of the clients:*

Assistance in dressing, grooming, bathing and other personal hygiene

Assistance with taking medication

Central storing and/or distribution of medications

Arrangement of and assistance with medical and dental care

Maintenance of house rules for the protection of clients

Supervision of client schedules and activities

Maintenance and/or supervision of client cash resources or property

Monitoring food intake or special diets

Providing basic services required by applicable law and regulation to be provided by the licensee in order to obtain and maintain a community-care facility license

CARTON. A cardboard or fiberboard box enclosing a product.

*[B] **CATASTROPHICALLY INJURED.** As termed, means a person whose origin of disability was acquired through trauma or nondegenerative neurologic illness, for whom it has been determined by the Department of Health Services Certification and Licensing that active rehabilitation would be beneficial.*

CEILING LIMIT. See Section 2702.1.

*[B] **CELL.** A housing unit in a detention or correctional facility for the confinement of not more than two inmates or prisoners.*

*[B] **CELL COMPLEX.** A cluster or group of cells or dormitories in a jail, prison, or other detention facility, together with rooms used for accessory purposes, all of which open into the cell complex, and are used for functions such as dining, counseling, exercise, classrooms, sick call, visiting, storage, staff offices, control rooms or similar functions, and interconnecting corridors all within the cell complex.*

*[B] **CELL TIERS.** Cells, dormitories and accessory spaces. Cell tiers are located one level above the other, and do not exceed two levels per floor. A cell tier shall not be considered a story or mezzanine.*

[EB] CHANGE OF OCCUPANCY. A change in the purpose or level of activity within a building that involves a change in application of the requirements of this code.

CHEMICAL. See Section 2702.1.

CHEMICAL NAME. See Section 2702.1.

*[B] **CHILD-CARE CENTER.** Any facility of any capacity other than a large or small family day-care home as defined in these regulations in which less than 24-hour-per-day nonmedical supervision is provided for children in a group setting.*

*[B] **CHILD OR CHILDREN.** A person or persons under the age of 18 years.*

*[B] **CHRONICALLY ILL.** See "Terminally ill."*

CLEAN AGENT. See Section 902.1.

PERMANENT PORTABLE BUILDING. *A portable building that is used to serve or house students and is certified as a permanent building on a new public school campus by the public school administration shall comply with the requirements of new campus buildings.*

PERMISSIBLE EXPOSURE LIMIT (PEL). See Section 2702.1.

CFC Section 202 is amended to add the following definition:

PERSON. A natural person, his heirs, executors, administrators or assigns, and also includes a firm, partnership (whether general or limited), corporation, unincorporated association, union or organization, cooperative and trust, its or their successors or assigns, or the agent of any of the aforesaid. The term shall include the plural as well as the singular number, the male and female gender, and all governmental entities subject in whole or in part to this Code and the codes adopted by reference herein.

PESTICIDE. See Section 2702.1.

[B] PHOTOLUMINESCENT. *See Section 1002.*

PHYSICAL HAZARD. See Section 2702.1.

PHYSIOLOGICAL WARNING THRESHOLD. See Section 3702.1.

PLOSOPHORIC MATERIAL. See Section 3302.1.

PLYWOOD and VENEER MILLS. See Section 1902.1.

PORTABLE BUILDING. *Portable Building is a classroom building or structure of modular design and construction that houses and/or serves students from kindergarten through twelfth grade (K-12) and is funded pursuant to the Education Code, commencing with section 17070.10 and meets all of the following criteria:*

- *The portable building or structure is designed and constructed to be relocatable and transportable over public streets.*
- *The portable building or structure is designed and constructed for relocation without detaching the roof or the floor from the building or structure.*
- *The portable building or structure is sited upon a temporary foundation in a manger that is designed to permit easy removal.*
- *The portable building or structure has a floor area of 2,000 sq. ft. or less when measured from the extend of the exterior walls.*
- *The portable building shall be removed within three years of installation or the school administration may request a three-year extension pursuant to Education Code Section 17074.54 (a) and (b).*

POWERED INDUSTRIAL TRUCK. See Section 302.1.

PRESSURE VESSEL. See Section 2702.1.

PRIMARY CONTAINMENT. The first level of containment, consisting of the inside portion of that container which comes into immediate contact on its inner surface with the material being contained.

PROCESS TRANSFER. See Section 3402.1.

PROPELLANT. See Section 2802.1.

PROTECTIVE SOCIAL CARE. *Protective Social Care is the housing and care of any person of any age when such person is referred to or placed within such home or facility for care and supervision services by any governmental agency.*

PROXIMATE AUDIENCE. See Section 3302.1.

PUBLIC TRAFFIC ROUTE (PTR). See Section 3302.1.

[B] PUBLIC WAY. See Section 1002.1.

PYROPHORIC. See Section 4102.1.

PYROTECHNIC COMPOSITION. See Section 3302.1.

PYROTECHNIC SPECIAL EFFECT. See Section 3302.1.

QUANTITY-DISTANCE (Q-D). See Section 3302.1.

Minimum Separation Distance (D_0). See Section 3302.1.

Intraline Distance (ILD) or Intraplant Distance (IPD). See Section 3302.1.

Inhabited Building Distance (IBD). See Section 3302.1.

Intermagazine Distance (IMD). See Section 3302.1.

RAILWAY. See Section 3302.1.

[B] RAMP. See Section 1002.1.

RAW PRODUCT. See Section 1902.1.

READY BOX. See Section 3302.1.

RECORD DRAWINGS. See Section 902.1.

RECREATION FIRE. See Section 302.1.

REDUCED LOW VALVE. See Section 3702.1.

REFINERY. See Section 3402.1.

REFRIGERANT. See Section 602.1.

REFRIGERATION SYSTEM. See Section 602.1.

[B] REGISTERED DESIGN PROFESSIONAL. An architect or engineer, registered or licensed to practice professional architecture or engineering, as defined by the statutory requirements of the professional registration laws of the state in which the project is to be constructed.

[B] RELIGIOUS WORSHIP, PLACE OF. A building or portion thereof intended for the performance of religions services.

REMOTE EMERGENCY SHUTOFF DEVICE. See Section 3402.1.

REMOTELY LOCATED, MANUALLY ACTIVATED SHUTDOWN CONTROL. A control system that is designed to initiate shutdown of the flow of gases or liquids that is manually activated from a point located some distance form the delivery system.

REMOTE SOLVENT RESERVOIR. See Section 3402.1.

REPAIR GARAGE. See Section 2202.1.

[B] RESIDENTIAL CARE FACILITY FOR THE CHRONICALLY ILL (RCF/CI). *As termed, means a housing arrangement with a maximum capacity of 25 residents that provides a range of services to residents who have chronic, life-threatening illnesses.*

[B] RESIDENTIAL CARE FACILITY FOR THE ELDERLY (RCFE). *As defined in Health and Safety Code Section 1569.2, shall mean a facility with a housing arrangement chosen voluntarily by persons 60 years of age or over, or their authorized representative, where varying levels and intensities of care and supervision, protective supervision or personal care are provided, based on their varying needs, as determined in order to be admitted and to remain in the facility. Persons under 60 years of age with compatible needs, as determined by the Department of Social Services in regulations, may*

be allowed to be admitted or retained in a residential care facility for the elderly.

Pursuant to Health and Safety Code Section 13133, regulations of the State Fire Marshal pertaining to occupancies classified as Residential Facilities (RF) and Residential Care Facilities for the Elderly (RCFE) shall apply uniformly throughout the state and no city, county, city and county, including a charter city or charter county, or fire protection district shall adopt or enforce any ordinance or local rule or regulation relating to fire and panic safety which is inconsistent with these regulations. A city, county, city and county, including a charter city or charter county may pursuant to Health and Safety Code Section 13143.5, or a fire protection district may pursuant to Health and Safety Code Section 13869.7, adopt standards more stringent than those adopted by the State Fire Marshal that are reasonably necessary to accommodate local climate, geological, or topographical conditions relating to roof coverings for Residential Care Facilities for the Elderly.

[B] RESIDENTIAL FACILITY (RF). *As defined in Section 1502 of the Health and Safety Code, shall mean any family home, group care facility, or similar facility determined by the director of Social Services, for 24-hour nonmedical care of persons in need of personal services, supervision, or assistance essential for sustaining the activities of daily living or for the protection of the individual. Such facilities include small family homes and social rehabilitation facilities.*

Pursuant to Health and Safety Code Section 13133, regulations of the State Fire Marshal pertaining to Group R, Division 2 occupancies classified as Residential Facilities (RF) and Residential Care Facilities for the Elderly (RCFE) shall apply uniformly throughout the state and no city, county, city and county, including a charter city or charter county, or fire protection district shall adopt or enforce any ordinance or local rule or regulation relating to fire and panic safety which is inconsistent with these regulations. A city, county, city and county, including a charter city or charter county may pursuant to Health and Safety Code Section 13143.5, or a fire protection district may pursuant to Health and Safety Code Section 13869.7, adopt standards more stringent than those adopted by the State Fire Marshal that are reasonably necessary to accommodate local climate, geological, or topographical conditions relating to roof coverings for Residential Care Facilities for the Elderly.

RESIN APPLICATION AREA. See Section 1502.1.

RESPONSIBLE PERSON. See Section 2602.1.

[B] RESTRAINT. *Restraint shall mean the physical retention of a person within a room, cell or cell block by any means, or within the exterior walls of a building by means of locked doors inoperable by the person restrained. Restraint shall also mean the physical binding, strapping or similar restriction of any person in a chair, walker, bed or other contrivance for the purpose of deliberately restricting the free movement of ambulatory persons.*

Restraint shall not be construed to include nonambulatory persons nor shall it include the use of bandage material, strip sheeting or other fabrics or materials (soft ties) used to restrain persons in hospital-type beds or wheelchairs to prevent injury, provided an approved method of quick release is maintained. Facilities employing the use of soft ties, however, shall be classified as a building used to house nonambulatory persons.

Restraint shall not be practiced in licensed facilities classified as Group I-1, R-3 and R-4 occupancies unless constructed as a Group I-3 occupancy. For Group I-3 occupancies, see California Building Code Section 308.2.

RETAIL DISPLAY AREA. See Section 2802.1.

ROLL COATING. See Section 1502.1.

RUBBISH (TRASH). Combustible and noncombustible waste materials, including residue from the burning of coal, wood, coke or other combustible material, paper, rags, cartons, tin cans, metals, mineral matter, glass crockery, dust and discarded refrigerators, and heating, cooking or incinerator-type appliances.

SAFETY CAN. See Section 2702.1.

[B] SCISSOR STAIR. See Section 1002.1.

SECONDARY CONTAINMENT. See Section 2702.1.

SEGREGATED. See Section 2702.1.

[B] SELF-LUMINOUS. *See Section 1002.*

SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY. See Section 2202.1.

SEMICONDUCTOR FABRICATION FACILITY. See Section 1802.1.

SERVICE CORRIDOR. See Section 1802.1.

SHELF STORAGE. See Section 2302.1.

SINGLE-STATION SMOKE ALARM. See Section 902.1.

[B] SLEEPING UNIT. See Section 902.1.

SMALL ARMS AMMUNITION. See Section 3302.1.

SMALL ARMS PRIMERS. See Section 3302.1.

SMOKE ALARM. See Section 902.1.

SMOKE DETECTOR. See Section 902.1.

[B] SMOKE-PROTECTED ASSEMBLY SEATING. See Section 1002.1.

SMOKELESS PROPELLANTS. See Section 3302.1.

SOLID. See Section 2702.1.

SOLID SHELVING. See Section 2302.1.

SOLVENT DISTILLATION UNIT. See Section 3402.1.

SOLVENT OR LIQUID CLASSIFICATIONS. See Section 1202.1.

Class I solvents. See Section 1202.1.
Class II solvents. See Section 1202.1.
Class IIIA solvents. See Section 1202.1.
Class IIIB solvents. See Section 1202.1.
Class IV solvents. See Section 1202.1.

SPECIAL AMUSEMENT BUILDING. A building that is temporary, permanent or mobile that contains a device or system that conveys passengers or provides a walkway along, around or over a course in any direction as a form of amusement arranged so that the egress path is not readily apparent

due to visual or audio distraction or an intentionally confounded egress path, or is not readily available because of the mode of conveyance through the building or structure.

SPECIAL INDUSTRIAL EXPLOSIVE DEVICE. See Section 3302.1.

SPRAY BOOTH. See Section 1502.1.

SPRAY ROOM. See Section 1502.1.

SPRAYING SPACE. See Section 1502.1.

[B] STAIR. See Section 1002.1.

[B] STAIRWAY. See Section 1002.1.

[B] STAIRWAY, EXTERIOR. See Section 1002.1.

[B] STAIRWAY, INTERIOR. See Section 1002.1.

[B] STAIRWAY, SPIRAL. See Section 1002.1.

STANDPIPE SYSTEM, CLASSES OF. See Section 902.1.

Class I system. See Section 902.1.

Class II system. See Section 902.1.

Class III system. See Section 902.1.

STANDPIPE, TYPES OF. See Section 902.1.

Automatic dry. See Section 902.1.

Automatic wet. See Section 902.1.

Manual dry. See Section 902.1.

Manual wet. See Section 902.1.

Semiautomatic dry. See Section 902.1.

[B] STATE-OWNED/LEASED BUILDING. *A building or portion of a building that is owned, leased or rented by the state. State-leased buildings shall include all required exits to a public way serving such leased area or space. Portions of state-leased buildings that are not leased or rented by the state shall not be included within the scope of this section unless such portions present an exposure hazard to the state-leased area of space.*

STATIC PILES. See Section 1902.1.

STEEL. Hot- or cold-rolled as defined by the *California Building Code.*

STORAGE, HAZARDOUS MATERIALS. See Section 2702.1.

SUPERVISING STATION. See Section 902.1.

SUPERVISORY SERVICE. See Section 902.1.

SUPERVISORY SIGNAL. See Section 902.1.

SUPERVISORY SIGNAL-INITIATING DEVICE. See Section 902.1.

SYSTEM. See Section 2702.1.

TANK. A vessel containing more than 60 gallons (227 L).

TANK, ATMOSPHERIC. See Section 2702.1.

TANK, PORTABLE. See Section 2702.1.

TANK, PRIMARY. See Section 3402.1.

TANK, PROTECTED ABOVE GROUND. See Section 3402.1.

TANK, STATIONARY. See Section 2702.1.

TANK VEHICLE. See Section 2702.1.

TENT. See Section 2402.1.

[B] TERMINALLY ILL. *As termed for an individual, means the individual has a life expectancy of six months or less as stated in writing by his or her attending physician and surgeon.*

THEFT RESISTANT. See Section 3302.1.

THERMAL INSECTICIDAL FOGGING. See Section 1702.1.

TIMBER and LUMBER PRODUCTION FACILITIES. See Section 1902.1.

TIRES, BULK STORAGE OF. See Section 902.1.

TOOL. See Section 1802.1.

TORCH-APPLIED ROOF SYSTEM. See Section 2602.1.

TOXIC. See Section 3702.1.

TRANSVERSE FLUE SPACE. See Section 2302.1.

TRASH. See "Rubbish."

TROUBLE SIGNAL. See Section 902.1.

UNAUTHORIZED DISCHARGE. See Section 2702.1.

CFC Section 202 is amended to add the following definition:

UNDETERMINED USE. In reference to a building/structure, this means that the specific occupancy type is not determined at the time of permit application for purposes of installation of a fire protection system.

UNSTABLE (REACTIVE) MATERIAL. See Section 4302.1.

Class 4. See Section 4302.1.

Class 3. See Section 4302.1.

Class 2. See Section 4302.1.

Class 1. See Section 4302.1.

UNWANTED FIRE. A fire not used for cooking, heating or recreational purposes or one not incidental to the normal operations of the property.

USE (MATERIAL). See Section 2702.1.

VAPOR PRESSURE. See Section 2702.1.

VISIBLE ALARM NOTIFICATION APPLIANCE. See Section 902.1.

WATER-REACTIVE MATERIAL. See Section 4402.1.

Class 3. See Section 4402.1.

Class 2. See Section 4402.1.

Class 1. See Section 4402.1.

WET-CHEMICAL EXTINGUISHING AGENT. See Section 902.1.

[B| WINDER. See Section 1002.1.

[B] WINERY CAVES. *A subterranean space for winery facilities in natural or manmade caves shall be in accordance with the California Building Code, Section 436. Winery caves have a floor level used for human occupancy more than 30 feet (9144 mm) below the lowest level of exit discharge.*

WIRELESS PROTECTION SYSTEM. See Section 902.1.

WORKSTATION. See Section 1802.1.

ZONE. See Section 902.1.

CHAPTER 3
GENERAL PRECAUTIONS AGAINST FIRE

SECTION 301
GENERAL

301.1 Scope. The provisions of this chapter shall govern the occupancy and maintenance of all structures and premises for precautions against fire and the spread of fire.

301.2 Permits. Permits shall be required as set forth in Appendix Chapter 1, Section 105.6 for the activities or uses regulated by Sections 306, 307, 308.3, 308.4, 308.5 and 315.

SECTION 302
DEFINITIONS

302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

BONFIRE. An outdoor fire utilized for ceremonial purposes.

HI-BOY. A cart used to transport hot roofing materials on a roof.

OPEN BURNING. The burning of materials wherein products of combustion are emitted directly into the ambient air without passing through a stack or chimney from an enclosed chamber. Open burning does not include road flares, smudgepots and similar devices associated with safety or occupational uses typically considered open flames or recreational fires. For the purpose of this definition, a chamber shall be regarded as enclosed when, during the time combustion occurs, only apertures, ducts, stacks, flues or chimneys necessary to provide combustion air and permit the escape of exhaust gas are open.

POWERED INDUSTRIAL TRUCK. A forklift, tractor, platform lift truck or motorized hand truck powered by an electrical motor or internal combustion engine. Powered industrial trucks do not include farm vehicles or automotive vehicles for highway use.

RECREATIONAL FIRE. An outdoor fire burning materials other than rubbish where the fuel being burned is not contained in an incinerator, outdoor fireplace, barbeque grill or barbeque pit and has a total fuel area of 3 feet (914 mm) or less in diameter and 2 feet (610 mm) or less in height for pleasure, religious, ceremonial, cooking, warmth or similar purposes.

SECTION 303
ASPHALT KETTLES

303.1 Transporting. Asphalt (tar) kettles shall not be transported over any highway, road or street when the heat source for the kettle is operating.

> **Exception:** Asphalt (tar) kettles in the process of patching road surfaces.

303.2 Location. Asphalt (tar) kettles shall not be located within 20 feet (6096 mm) of any combustible material, combustible building surface or any building opening and within a controlled area identified by the use of traffic cones, barriers or other approved means. Asphalt (tar) kettles and pots shall not be utilized inside or on the roof of a building or structure. Roofing kettles and operating asphalt (tar) kettles shall not block means of egress, gates, roadways or entrances.

303.3 Location of fuel containers. Fuel containers shall be located at least 10 feet (3048 mm) from the burner.

> **Exception:** Containers properly insulated from heat or flames are allowed to be within 2 feet (610 mm) of the burner.

303.4 Attendant. An operating kettle shall be attended by a minimum of one employee knowledgeable of the operations and hazards. The employee shall be within 100 feet (30 480 mm) of the kettle and have the kettle within sight. Ladders or similar obstacles shall not from a part of the route between the attendant and the kettle.

303.5 Fire extinguishers. There shall be a portable fire extinguisher complying with Section 906 and with a minimum 40-B:C rating within 25 feet (7620 mm) of each asphalt (tar) kettle during the period such kettle is being utilized. Additionally, there shall be one portable fire extinguisher with a minimum 3-A:40-B:C rating on the roof being covered.

303.6 Lids. Asphalt (tar) kettles shall be equipped with tight-fitting lids.

303.7 Hi-boys. Hi-boys shall be constructed of noncombustible materials. Hi-boys shall be limited to a capacity of 55 gallons (208 L). Fuel sources of heating elements shall not be allowed as part of a hi-boy.

303.8 Roofing kettles. Roofing kettles shall be constructed of noncombustible materials.

303.9 Fuel containers under air pressure. Fuel containers that operate under air pressure shall not exceed 20 gallons (76 L) in capacity and shall be approved.

SECTION 304
COMBUSTIBLE WASTE MATERIAL

304.1 Waste accumulation prohibited. Combustible waste material creating a fire hazard shall not be allowed to accumulate in buildings or structures or upon premises.

> **304.1.1 Waste material.** Accumulations of wastepaper, wood, hay, straw, weeds, litter or combustible or flammable waste or rubbish of any type shall not be permitted to remain on a roof or in any court, yard, vacant lot, alley, parking lot, open space, or beneath a grandstand, bleacher, pier, wharf, manufactured home, recreational vehicle or other similar structure.

CFC Section 304.1.2 is amended to read as follows:

> **304.1.2 Vegetation.** Weeds, grass, vines, or other growth that is capable of being ignited and endanger property shall be cut down and removed by the owner or occupant of the premises. Vegetation clearance requirements in urban-wildland interface areas, hazardous watershed fire areas, hazardous fire areas and parcels declared a public nuisance shall be in accordance with Appendix I (the Appendix portion of the CFC is being amended to include this additional appendix).

304.1.3 Space underneath seats. Spaces underneath grandstand and bleacher seats shall be kept free from combustible and flammable materials. Except where enclosed in not less than 1-hour fire-resistance-rated construction in accordance with the *California Building Code,* spaces underneath grandstand and bleacher seats shall not be occupied or utilized for purposes other than means of egress.

304.2 Storage. Storage of combustible rubbish shall not produce conditions that will create a nuisance or a hazard to the public health, safety or welfare.

304.3 Containers. Combustible rubbish, and waste material kept within a structure shall be store in accordance with Sections 304.3.1 through 304.3.3.

304.3.1 Spontaneous ignition. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container. Contents of such containers shall be removed and disposed of daily.

304.3.2 Capacity exceeding 5.33 cubic feet. Containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) shall be provided with lids. Containers and lids shall be constructed of noncombustible materials or approved combustible materials.

304.3.3 Capacity exceeding 1.5 cubic yards. Dumpsters and containers with an individual capacity of 1.5 cubic yards [40.5 cubic feet (1.15 m^3)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines.

Exceptions:

1. Dumpsters or containers in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction, located not less than 10 feet (3048) mm) from other buildings and used exclusively for dumpster or container storage.

SECTION 305
IGNITION SOURCES

305.1 Clearance from ignition sources. Clearance between ignition sources, such as luminaires, heaters, flame-producing devices and combustible materials, shall be maintained in an approved manner.

305.2 Hot ashes and spontaneous ignition sources. Hot ashes, cinders, smoldering, coals or greasy or oily materials subject to spontaneous ignition shall not be deposited in a combustible receptacle, within 10 feet (3048 mm) of other combustible material including combustible walls and partitions or within 2 feet (610 mm) of openings to buildings.

Exception: The minimum required separation distance to other combustible materials shall be 2 feet (610 mm) where the material is deposited in a covered, noncombustible receptacle placed on a noncombustible floor, ground surface or stand.

305.3 Open-flame warning devices. Open-flame warning devices shall not be used along an excavation, road, or any place where the dislodgement of such device might permit the device to roll, fall or slid on to any area or land containing combustible material.

305.4 Deliberate or negligent burning. It shall be unlawful to deliberately or through negligence set fire to or cause the burning of combustible material in such a manner as to endanger the safety of person or property.

CFC Section 305.5 is added to read as follows:

305.5 Chimneys used with fireplaces, or heating appliances in which solid or liquid fuel is used, will be maintained with a spark arrested as approved by the fire code official.

SECTION 306
MOTION PICTURE PROJECTION ROOMS AND FILM

306.1 Motion picture projection rooms. Electric arc, xenon or other light source projection equipment which develops hazardous gases, dust or radiation and the projection of ribbon-type cellulose nitrate film, regardless of the light source used in projection, shall be operated within a motion picture projection room complying with Section 409 of the *California Building Code.*

306.2 Cellulose nitrate film storage. Storage of cellulose nitrate film shall be in accordance with NFPA 40.

SECTION 307
OPEN BURNING AND RECREATIONAL FIRES

307.1 General. A person shall not kindle or maintain or authorize to be kindled or maintained any open burning unless conducted and approved in accordance with this section.

307.1.1 Prohibited open burning. Open burning that is offensive or objectionable because of smoke or odor emissions or when atmospheric conditions or local circumstances make such fires hazardous shall be prohibited.

307.2 Permit required. A permit shall be obtained from the fire code official in accordance with the Appendix Chapter 1, Section 105.6 prior to kindling a fire for recognized silvicultural or range or wildlife management practices, prevention or control of disease or pests, or a bonfire. Application for such approval shall only be presented by and permits issued to the owner of the land upon which the fire is to be kindled.

307.2.1 Authorization. Where required by state or local law or regulations, open burning shall only be permitted with prior approval from the state or local air and water quality management authority, provided that all conditions specified in the authorization are followed.

307.3 Extinguishment authority. The fire code official is authorized to order the extinguishment by the permit holder, another person responsible or the fire department of open burning that creates or adds to a hazardous or objectionable situation.

307.4 Location. The location for open burning shall not be less than 50 feet (15 250 mm) from any structure, and provisions

available for use in smothering the flames in the event of an emergency.

SECTION 309
POWERED INDUSTRIAL TRUCKS AND EQUIPMENT

309.1 General. Powered industrial trucks and similar equipment including, but not limited to, floor scrubbers and floor buffers, shall be operated and maintained in accordance with this section.

309.2 Battery chargers. Battery chargers shall be of an approved type. Combustible storage shall be kept a minimum of 3 feet (915 mm) from battery chargers. Battery charging shall not be conducted in areas accessible to the public.

309.3 Ventilation. Ventilation shall be provided in an approved manner in battery-charging areas to prevent a dangerous accumulation of flammable gases.

309.4 Fire extinguishers. Battery-charging areas shall be provided with a fire extinguisher complying with Section 906 having a minimum 4-A:20-B:C rating within 20 feet (6096 mm) of the batter charger.

309.5 Refueling. Powered industrial trucks using liquid fuel, LP-gas or hydrogen shall be refueled outside of buildings or in areas specifically approved for that purpose. Fixed fuel-dispensing equipment and associated fueling operations shall be in accordance with Chapter 22. Other fuel-dispensing equipment and operations, including cylinder exchange for LP-gas-fueled vehicles, shall be in accordance with Chapter 34 for flammable and combustible liquids or Chapter 38 for LP-gas.

309.6 Repairs. Repairs to fuel systems, electrical systems and repairs utilizing open flame or welding shall be done in approved locations outside of buildings or in areas specifically approved for that purpose.

SECTION 310
SMOKING

310.1 General. The smoking or carrying a lighted pipe, cigar, cigarette or any other type of smoking paraphernalia or material is prohibited in the areas indicated in this section.

310.2 Prohibited areas. Smoking shall be prohibited where conditions are such as to make smoking a hazard, and in spaces where flammable or combustible materials are stored or handled.

310.3 "No Smoking" signs. The fire code official is authorized to order the posting of "No Smoking" signs in a conspicuous location in each structure or location in which smoking is prohibited. The content, lettering, size, color and location of required "No Smoking" signs shall be approved.

310.4 Removal of signs prohibited. A posted "No Smoking" sign shall not be obscured, removed, defaced, mutilated or destroyed.

301.5 Compliance with "No Smoking" signs. Smoking shall not be permitted nor shall a person smoke, throw or deposit any lighted or smoldering substance in any place where "No Smoking" signs are posted.

310.6 Ash trays. Where smoking is permitted, suitable noncombustible ash trays or match receivers shall be provided on each table and at other appropriate locations.

310.7 Burning objects. Lighted matches, cigarettes, cigars or other burning object shall not be discarded in such a manger that could cause ignition of other combustible material.

310.8 Hazardous environmental conditions. When the fire code official determines that hazardous environmental conditions necessitate controlled use of smoking materials, the ignition or use of such materials in mountainous, brush-covered or forest-covered areas or other designated areas is prohibited except in approved designated smoking areas.

SECTION 311
VACANT PREMISES

311.1 General. Temporarily unoccupied buildings, structures, premises or portions thereof, including tenant spaces, shall be safeguarded and maintained in accordance with this section.

CFC Section 311.1.1 is amended to read as follows:

311.1.1 Abandoned premises. Buildings, structures and premises for which an owner cannot be identified or located by dispatch of a certificate of mailing to the last known or registered address, which persistently or repeatedly become unprotected or unsecured, which have been occupied by unauthorized persons or for illegal purposes, or which present a danger of structural collapse or fire spread to adjacent properties shall be considered abandoned, declared unsafe and abated by demolition or rehabilitation in accordance with the *2007 Ventura City Property Maintenance Code* (Chapter 12.130 of Division 12 of San Buenaventura Municipal Code).

311.1.2 Tenant spaces. Storage and lease plans required by this code shall be revised and updated to reflect temporary or partial vacancies.

311.2 Safeguarding vacant premises. Temporarily unoccupied buildings, structures, premises or portions thereof shall be secured and protected in accordance with this section.

311.2.1 Security. Exterior openings and interior openings accessible to other tenants or unauthorized persons shall be boarded, locked, blocked or otherwise protected to prevent entry by unauthorized individuals.

311.2.2 Fire protection. Fire alarm, sprinkler and standpipe systems shall be maintained in an operable condition at all times.

Exceptions:

1. When the premises have been cleared of all combustible materials and debris and, in the opinion of the fire code official, the type of construction, fire separation distance and security of the premises do not create a fire hazard.
2. Where buildings will not be heated and fire protection systems will be exposed to freezing temperatures, fire alarm and sprinkler systems are permitted to be placed out of service and standpipes are permitted to be maintained as dry systems (without an automatic water supply) provided the building has no contents or storage, and windows, doors and other openings are secured to prohibit entry by unauthorized persons.

311.2.3 Fire separation. Fire-resistance-rated partitions, fire barriers, and fire walls separating vacant tenant spaces from the remainder of the building shall be maintained. Openings, joints, and penetrations in fire-resistance-rated assemblies shall be protected in accordance with Chapter 7.

311.3 Removal of combustibles. Persons owning, or in charge or control of, a vacant building or portion thereof, shall remove therefrom all accumulations of combustible materials, flammable or combustible waste or rubbish and shall securely lock or otherwise secure doors, windows and other openings to prevent entry by unauthorized persons. The premises shall be maintained clear of waste or hazardous materials.

Exceptions:

1. Buildings or portions of buildings undergoing additions, alterations, repairs, or change of occupancy in accordance with the *California Building Code*, where waste is controlled and removed as required by Section 304.
2. Seasonally occupied buildings.

311.4 Removal of hazardous materials. Persons owning or having charge or control of a vacant building containing hazardous materials regulated by Chapter 27 shall comply with the facility closure requirements of Section 2701.6.

311.5 Placards. Any building or structure determined to be unsafe pursuant to Section 110 of this code shall be marked as required by Sections 311.5.1 through 311.5.5.

311.5.1 Placard location. Placards shall be applied on the front of the structure and be visible from the street. Additional placards shall be applied to the side of each entrance to the structure and on penthouses.

311.5.2. Placard size and color. Placards shall be 24 inches by 24 inches (610 mm by 610 mm) in size with a red background, white reflective strives and a white reflective border. The stripes and border shall have a 2-inch (51 mm) stroke.

311.5.3 Placard date. Placards shall bear the date of their application to the building and the date of the most recent inspection.

311.5.4 Placard symbols. The design of the placards shall use the following symbols:

1.  This symbol shall mean that the structure had normal structural conditions at the time of marking.
2.  This symbol shall mean that structural or interior hazards exist and interior fire-fighting or rescue operations should be conducted with extreme caution.
3.  This symbol shall mean that structural or interior hazards exist to a degree that consideration should be given to limit fire fighting to exterior operations only, with entry only occurring for known life hazards.

311.5.5 Informational use. The use of these symbols shall be informational only and shall not in any way limit the discretion of the on-scene incident commander.

CFC § 311.6 is added to read as follows:

311.6 – Property or Materials Damaged by Fire.

311.6.1. The owner or other person having under their control any property or materials damaged by fire will secure the property either by boarding up all openings, fencing, barricading, or other appropriate measures as directed by the chief.

311.6.2. All debris and/or damaged materials will be removed from the property in the manner, and within the time frame, established by the chief.

SECTION 312
VEHICLE IMPACT PROTECTION

312.1 General. Vehicle impact protection required by this code shall be provided by posts that comply with Section 312.2 or by other approved physical barriers that comply with Section 312.3.

312.2 Posts. Guard posts shall comply with all of the following requirements:

1. Constructed of steel not less than 4 inches (102mm) in diameter and concrete filled.
2. Spaced not more than 4 feet (1219 mm) between posts on center.
3. Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.
4. Set with the top of the posts not less than 3 feet (914 mm) above ground.
5. Located not less than 3 feet (914 mm) from the protected object.

312.3 Other barriers. Physical barriers shall be a minimum of 36 inches (914 mm) in height and shall resist a force of 12,000 pounds (53 375 N) applied 36 inches (914 mm) above the adjacent ground surface.

SECTION 313
FUELED EQUIPMENT

313.1 General. Fueled equipment, including but not limited to motorcycles, mopeds, lawn-care equipment and portable cooking equipment, shall not be stored, operated or repaired within a building.

Exceptions:

1. Buildings or rooms constructed for such use in accordance with the *California Building Code.*
2. Where allowed by Section 314.
3. Storage of equipment utilized for maintenance purposes is allowed in approved locations when the aggregate fuel capacity of the stored equipment does not exceed 10 gallons (38 L) and the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

313.1.1 Removal. The fire code official is authorized to require removal of fueled equipment from locations where the presence of such equipment is determined by the fire code official to be hazardous.

313.2 Group R occupancies. Vehicles powered by flammable liquids, Class II combustible liquids, or compressed flammable gases shall not be stored within the living space of Group R buildings.

SECTION 314
INDOOR DISPLAYS

314.1 General. Indoor displays constructed within any occupancy shall comply with Sections 314.2 through 314.4.

314.2 Fixtures and displays. Fixtures and displays of goods for sale to the public shall be arranged so as to maintain free, immediate and unobstructed access to exits as required by Chapter 10.

314.3 Highly combustible goods. The display of highly combustible goods, including but not limited to fireworks, flammable or combustible liquids, liquefied flammable gases, oxidizing materials, pyroxylin plastics and agricultural goods, in main exit access aisles, corridors, covered malls, or within 5 feet (1524 mm) of entrances to exits and exterior exit doors is prohibited when a fire involving such goods would rapidly prevent or obstruct egress.

314.4 Vehicles. Liquid- or gas-fueled vehicles, boats or other motorcraft shall not be located indoors except as follows:

1. Batteries are disconnected.
2. Fuel in fuel tanks does not exceed one-quarter tank or 5 gallons (19 L) (whichever is least).
3. Fuel tanks and fill openings are closed and sealed to prevent tampering.
4. Vehicles, boats or other motorcraft equipment are not fueled or defueled within the building.

SECTION 315
MISCELLANEOUS COMBUSTIBLE MATERIALS STORAGE

315.1 General. Storage, use and handling of miscellaneous combustible materials shall be in accordance with this section. A permit shall be obtained in accordance with Appendix Chapter 1, Section 105.6.

315.2 Storage in buildings. Storage of combustible materials in buildings shall be orderly. Storage shall be separated from heaters or heating devices by distance or shielding so that ignition cannot occur.

315.2.1 Ceiling clearance. Storage shall be maintained 2 feet (610 mm) or more below the ceiling in nonsprinklered areas of buildings or a minimum of 18 inches (457 mm) below sprinkler head deflectors in sprinklered areas of buildings.

315.2.2 Means of egress. Combustible materials shall not be stored in exits or exit enclosures.

315.2.3 Equipment rooms. Combustible material shall not be stored in boiler rooms, mechanical rooms or electrical equipment rooms.

315.2.4 Attic, under-floor and concealed spaces. Attic, under-floor and concealed spaces used for storage of combustible materials shall be protected on the storage side as required for 1-hour fire-resistance-rated construction. Openings shall be protected by assemblies that are self-closing and are of noncombustible construction or solid wood core not less than 1.75 inches (44.5 mm) in thickness. Storage shall not be placed on exposed joist.

Exceptions:

1. Areas protected by approved automatic sprinkler systems.
2. Group R-3 and Group U occupancies.

315.3 Outside storage. Outside storage of combustible materials shall not be located within 10 feet (3048 mm) of a property line.

Exceptions:

1. The separation distance is allowed to be reduced to 3 feet (914 mm) for storage not exceeding 6 feet (1829 mm) in height.
2. The separation distance is allowed to be reduced when the fire code official determines that no hazard to the adjoining property exists.

315.3.1 Storage beneath overhead projections from buildings. Combustible materials stored or displayed outside of buildings that are protected by automatic sprinklers shall not be store or displayed under nonsprinklered eaves, canopies or other projections or overhangs.

315.3.2 Height. Storage in the open shall not exceed 20 feet (6096 mm) in height.

CFC § 316 is added to read as follows:

SECTION 316
COMBUSTIBLE MATERIALS SUBJECT TO SPONTANEOUS IGNITION

316.1 General. Combustible materials subject to spontaneous ignition shall be kept in accordance with CFC Section 316.

316.2 Prevention of Ignition. Materials shall be stored, handled, treated, and monitored as necessary and in such a manner as to prevent ignition.

316.3 Provisions for Extinguishment. The owner or person responsible for materials regulated by CFC Sec 316 shall provide the necessary means to extinguish a fire, should ignition occur. Piles of ignitable material shall be arranged in a manner so as not to exceed the capability of available resources to extinguish a fire in a single pile. Access for firefighting apparatus shall be approved by the fire code official.

SECTION 505
PREMISES IDENTIFICATION

CFC § 505.1 is amended to read as follows:

505.1 Address Numbers. New and existing buildings shall have approved address numbers, building numbers, or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. Address numbers shall be provided at additional locations on the building and at locations adjacent to roads or driveways leading to buildings when required by the fire code official. These numbers shall contrast with their background. The height and minimum stroke of numbers or letters shall be approved by the fire code official.

505.1.1 Directories. When required by the fire code official, complexes with multiple buildings may be required to provide directories, premise maps, and directional signs. The scale, design, and location of directories shall be approved by the fire code official and may be required to be illuminated.

505.2 Street or road signs. Streets and roads shall be identified with approved signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles. Signs shall be of an approved size, weather resistance and be maintained until replaced by permanent signs.

SECTION 506
KEY BOXES

506.1 Where required. Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, the fire code official is authorized to require a key box to be installed in an approved located. The key box shall be of an approved type and shall contain keys to gain necessary access as required by the fire code official.

506.1.1 Locks. An approved lock shall be installed on gates or similar barriers when required by the fire code official.

506.2 Key box maintenance. The operator of the building shall immediately notify the fire code official and provide the new key when a lock is changed or rekeyed. The key to such lock shall be secured in the key box.

SECTION 507
HAZARDS TO FIRE FIGHTERS

507.1 Trapdoors to be closed. Trapdoors and scuttle covers, other than those that are within a dwelling unit or automatically operated, shall be kept closed at all times except when in use.

507.2 Shaftway markings. Vertical shafts shall be identified as required by this section.

507.2.1 Exterior access to shaftways. Outside openings accessible to the fire department and which open directly on a hoistway or shaftway communicating between two or more floors in a building shall be plainly marked with the word SHAFTWAY in red letters at least 6 inches (152 mm) high on a white background. Such warning signs shall be placed so as to be readily discernible from the outside of the building.

507.2.2 Interior access to shaftways. Door or window openings to a hoistway or shaftway from the interior of the building shall be plainly marked with the word SHAFTWAY in red letters at least 6 inches (152 mm) high on white background. Such warning signs shall be placed so as to be readily discernible.

Exception: Marking shall not be required on shaftway openings which are readily discernible as openings onto a shaftway by the construction or arrangement.

507.3 Pitfalls. The intentional design or alteration of buildings to disable, injure, maim or kill intruders is prohibited. No person shall install and use firearms, sharp or pointed objects, razor wire, explosives, flammable or combustible liquid containers, or dispensers containing highly toxic, toxic, irritant or other hazardous materials in a manner which may passively or actively disable, injury, maim or kill a fire fighter who forcibly enters a building for the purpose of controlling or extinguishing a fire, rescuing trapped occupants or rendering other emergency assistance.

SECTION 508
FIRE PROTECTION WATER SUPPLIES

508.1 Required water supply. An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction.

508.2 Type of water supply. A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

508.2.1 Private fire service mains. Private fire service mains and appurtenances shall be installed in accordance with NFPA 24.

508.2.2 Water tanks. Water tanks for private fire protection shall be in stalled in accordance with NFPA 22.

508.3 Fire flow. Fire flow requirements for buildings or portions of buildings and facilities shall be determined by an approved method *or Appendix B*.

508.4 Water supply test. The fire code official shall be notified prior to the water supply test. Water supply tests shall be witnessed by the fire code official or approved documentation of the test shall be provided to the fire code official prior to final approval of the water supply system.

508.5 Fire hydrant systems. Fire hydrant systems shall comply with Sections 508.5.1 through 508.5.6 *and Appendix C or by an approved method*.

508.5.1 Where required. Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (122 m) from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official.

Exceptions:

1. For Group R-3 and Group U occupancies, the distance requirement shall be 600 feet (183 m).

2. For buildings equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 600 feet (183 m).

508.5.2 Inspection, testing and maintenance. Fire hydrant systems shall be subject to periodic tests as required by the fire code official. Fire hydrant systems shall be maintained in an operative condition at all times and shall be repaired where defective. Additions, repairs, alterations and servicing shall comply with approved standards.

508.5.3 Private fire service mains and water tanks. Private fire service mains and water tanks shall be periodically inspected, tested and maintained in accordance with *Title 19 California Code of Regulations Chapter 5.*

508.5.4 Obstruction. Posts, fences, vehicles, growth, trash, storage and other materials or objects shall not be placed or kept near fire hydrants, fire department inlet connections or fire protection system control valves in a manner that would prevent such equipment or fire hydrants from being immediately discernible. The fire department shall not be deterred or hindered from gaining immediate access to fire protection equipment or fire hydrants.

508.5.5 Clear space around hydrants. A 3-foot (914 mm) clear space shall be maintained around the circumference of fire hydrants except as otherwise required or approved.

508.5.6 Physical protection. Where fire hydrants are subject to impact by a motor vehicle, guard posts or other approved means shall comply with Section 312.

SECTION 509
FIRE COMMAND CENTER

509.1 Features. Where required by other sections of this code and in all buildings classified as high-rise buildings by the *California Building Code,* a fire command center for fire department operations shall be provided. The location and accessibility of the fire command center shall be approved by the fire department. The fire command center shall be separated from the remainder of the building by not less than a 1-hour fire barrier constructed in accordance with Section 706 of the *California Building Code* or horizontal assembly constructed in accordance with Section 711 of the *California Building Code,* or both. The room shall be a minimum of 96 square feet (9 m^2) with a minimum dimension of 8 feet (2438 mm). A layout of the fire command center and all features required by this section to be contained therein shall be submitted for approval prior to installation. The fire command center shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communication system unit.
2. The fire department communications system.
3. Fire-detection and alarm system annunciator system.
4. Annunciator visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air-handling systems.
6. The fire-fighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking stairway doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, fire-fighting equipment and fire department access.
13. Work table.
14. Generator supervision devices, manual start and transfer features.
15. Public address system, where specifically required by other sections of this code.
16. *Fire command centers shall not be used for the housing of any boiler, heating unit, generator, combustible storage, or similar hazardous equipment or storage.*

SECTION 510
FIRE DEPARTMENT ACCESS TO EQUIPMENT

510.1 Identification. Fire protection equipment shall be identified in an approved manner. Rooms containing controls for air-conditioning systems, sprinkler risers and valves, or other fire detection, suppression or control elements shall be identified for the use of the fire department. Approved signs required to identify fire protection equipment and equipment location, shall be constructed of durable materials, permanently installed and readily visible.

standards referenced in Section 903.3.1. The potable water supply shall be protected against backflow in accordance with *Health and Safety Code 13114.7.*

903.3.5.1 Domestic services. Where the domestic service provides the water supply for the automatic sprinkler system, the supply shall be in accordance with this section.

CFC Section 903.3.5.1.1 is deleted.

903.3.5.1.2 Residential combination services. A single combination water supply shall be allowed provided that the domestic demand is added to the sprinkler demand as required by NFPA 13R.

903.3.5.2 Secondary water supply. A secondary on-site water supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirements, shall be provided for high-rise buildings in Seismic Design Category C, D, E or F as determined by the *California Building Code*. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13.

Exception: Existing buildings.

903.3.6 Hose threads. Fire hose threads and fittings used in connection with automatic sprinkler systems shall be as prescribed by the fire code official.

903.3.7 Fire department connections. The location of fire department connection shall be approved by the fire code official.

903.4 Sprinkler system monitoring and alarms. All valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels and temperatures, critical air pressures, and water-flow switches on all sprinkler systems shall be electrically supervised.

Exceptions:

1. Automatic sprinkler systems protecting one- and two-family dwellings.
2. Limited area systems service fewer than 20 sprinklers.
3. Automatic sprinkler systems installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the automatic sprinkler system, and a separate shutoff valve for the automatic sprinkler systems is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.

903.4.1 Signals. Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an approved central station, remote supervising station or proprietary supervising station as defined in NFPA 72 or, when approved by the fire code official, shall sound an audible signal at a constantly attended location.

Exceptions:

1. Underground key or hub valves in roadway boxes provided by the municipality or public utility are not required to be monitored.
2. Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.

903.4.2 Alarms. Approved audible devices shall be connected to every automatic sprinkler system. Such sprinkler water-flow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Alarm devices shall be provided on the exterior of the building in an approved location. Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuated the building fire alarm system.

CFC § 903.4.2.1 is added to read as follows:

903.4.2.1 Alarms in buildings/structures with multiple occupancies. In buildings or structures containing multiple occupancies, approved visual and audible devices shall be provided in the interior of each unit and connected to the automatic sprinkler system for the building/structure.

903.4.3 Floor control valves. Approved supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise building.

903.5 Testing and maintenance. Sprinkler systems shall be tested and maintained in accordance with Section 901.

903.6 Existing buildings. The provisions of this section are intended to provide a reasonable degree of safety in existing structures not complying with the minimum requirements of the *California Building Code* by requiring installation of an automatic fire-extinguishing system.

903.6.1 Pyroxylin plastics. All structures occupied for the manufacture or storage of articles of cellulose nitrate

[CONTINUED ON PAGE 98]

(pyroxylin) plastic shall be equipped with an approved automatic fire-extinguishing system. Vaults located within buildings for the storage of raw pyroxylin shall be protected with an approved automatic sprinkler system capable of discharging 1.66 gallons per minute per square foot (68 L/min/m^2) over the area of the vault.

SECTION 904
ALTERNATIVE AUTOMATIC FIRE-EXTINGUISHING SYSTEMS

904.1 General. Automatic fire-extinguishing systems, other than automatic sprinkler systems, shall be designed, installed, inspected, tested and maintained in accordance with the provisions of this section and the applicable referenced standards.

904.2 Where required. Automatic fire-extinguishing systems installed as an alternative to the required automatic sprinkler systems of Section 903 shall be approved by the fire code official. Automatic fire-extinguishing systems shall not be considered alternatives for the purposes of exceptions or reductions allowed by other requirements of this code.

904.2.1 Commercial hood and duct systems. Each required commercial kitchen exhaust hood and duct system required by Section 609 to have a Type I hood shall be protected with an approved automatic fire-extinguishing system installed in accordance with this code.

904.3 Installation. Automatic fire-extinguishing systems shall be installed in accordance with this section.

904.3.1 Electrical wiring. Electrical wiring shall be in accordance with the *California Electrical Code.*

904.3.2 Actuation. Automatic fire-extinguishing systems shall be automatically actuated and provided with a manual means of actuation in accordance with Section 904.11.1.

904.3.3 System interlocking. Automatic equipment interlocks with fuel shutoffs, ventilation controls, door closers, window shutters, conveyor openings, smoke and heat vents, and other features necessary for proper operation of the fire-extinguishing system shall be provided as required by the design and installation standard utilized for the hazard.

904.3.4 Alarms and warning signs. Where alarms are required to indicate the operation of automatic fire-extinguishing systems, distinctive audible, visible alarms and warning signs shall be provided to warn of pending agent discharge. Where exposure to automatic-extinguishing agents poses a hazard to persons and a delay is required to ensure the evacuation of occupants before agent discharge, a separate warning signal shall be provided to alert occupants once agent discharge has begun. Audible signals shall be in accordance with Section 907.10.2.

904.3.5 Monitoring. Where a building fire alarm system is installed, automatic fire-extinguishing systems shall be monitored by the building fire alarm system in accordance with NFPA 72.

904.4 Inspection and testing. Automatic fire-extinguishing systems shall be inspected and tested in accordance with the provisions of this section prior to acceptance.

904.4.1 Inspection. Prior to conducting final acceptance tests, the following items shall be inspected:

1. Hazard specification for consistency with design hazard.
2. Type, location and spacing of automatic- and manual-initiating devices.
3. Size, placement and position of nozzles or discharge orifices.
4. Location and identification of audible and visible alarm devices.
5. Identification of devices with proper designations.
6. Operating instructions.

904.4.2 Alarm testing. Notification appliances, connections to fire alarm systems, and connections to approved supervising stations shall be tested in accordance with this section and Section 907 to verify proper operation.

904.4.2.1 Audible and visible signals. The audibility and visibility of notification appliances signaling agent discharge or system operation, where required, shall be verified.

904.4.3 Monitor testing. Connections to protected premises and supervising station fire alarm systems shall be tested to verify proper identification and retransmission of alarms from automatic fire-extinguishing systems.

904.5 Wet-chemical systems. Wet-chemical extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with *Title 19 California Code of Regulations, Chapter 5 and* NFPA 17A and their listing.

904.5.1 System test. Systems shall be inspected and tested for proper operation at 6-month intervals. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing system units shall be weighed and the required amount of agent verified. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals indicated by the manufacturer.

904.5.2 Fusible link maintenance. Fixed temperature-sensing elements shall be maintained to ensure proper operation of the system.

904.6 Dry-chemical systems. Dry-chemical extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with *Title 19 California Code of Regulations, Chapter 5 and* NFPA 17 and their listing.

904.6.1 System test. Systems shall be inspected and tested for proper operation at 6-month intervals. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing system units shall be weighed, and the required amount of agent verified. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals indicated by the manufacturer.

power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exception: Smoke alarms are permitted to be solely battery operated: in existing buildings where no construction *or construction, requiring a permit, not exceeding $1000 has* taken place; in buildings that are not served from a commercial power source; and in existing areas of buildings undergoing alterations or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available which could provide access for building wiring without the removal of interior finishes.

907.3.2.4 Group R-3.1. *In all facilities housing a bedridden client, smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms shall be electrically interconnected so as to cause all smoke alarms to sound a distinctive alarm signal upon actuation of any single smoke alarm. Such alarm signal shall be audible throughout the facility at a minimal level of 15 db above ambient noise level. These devices need not be interconnected to any other fire alarm device, have a control panel, or be electrically supervised or provided with emergency power.*

907.4 Manual fire alarm boxes. Manual fire alarm boxes shall be installed in accordance with Sections 907.4.1 through 907.4.5.

907.4.1 Location. Manual fire alarm boxes shall be located not more than 5 feet (1524 mm) from the entrance to each exit. Additional manual fire alarm boxes shall be located so that travel distance to the nearest box does not exceed 200 feet (60 960 mm).

Exception: *When individual dwelling units are served by a single exit stairway, additional boxes at other than the ground floor may be omitted.*

907.4.2 Height. The height of the manual fire alarm boxes shall be a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1219 mm) measured vertically, from the floor level to the *[DSA-AC] highest point of the* activating handle or lever of the box. *[DSA-AC] Manual fire alarm boxes shall also comply with Chapter 11B, Section 1117B.6 item 4 of the California Building Code*.

Exception: [DSA-AC] *In existing buildings there is no requirement to retroactively relocate existing manual fire alarm boxes to a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1219 mm) from the floor level to the activating handle or lever of the box*.

907.4.3 Color. Manual fire alarm boxes shall be red in color.

907.4.4 Signs. Where fire alarm systems are not monitored by a supervising station, an approved permanent sign shall be installed adjacent to each manual fire alarm box that reads: WHEN ALARM SOUNDS – CALL FIRE DEPARTMENT.

Exception: Where the manufacturer has permanently provided this information on the manual fire alarm box.

907.4.5 Operation. *Manual fire alarm boxes shall be operable with one hand including boxes with protective covers.*

907.4.6 Protective covers. The fire code official is authorized to require the installation of listed manual fire alarm box protective covers to prevent malicious false alarms or to provide the manual fire alarm box with protection from physical damage. The protective cover shall be transparent or red in color with a transparent face to permit visibility of the manual fire alarm box. Each cover shall include proper operating instructions. A protective cover that emits a local alarm signal shall not be installed unless approved. *Each cover shall not exceed a combined projection over 4 inches from the surface of the wall into walks, halls, corridors, passageways or aisles.*

907.5 Power supply. The primary and secondary power supply for the fire alarm system shall be provided in accordance with NFPA 72.

CFC Section 907.5.1 is added to read as follows:

907.5.1 Secondary power supply capacity. The secondary power supply capacity shall be of an approved type, provide a minimum of 60 hours of power under non-alarm conditions, and be capable of operating all alarm notification appliances for 5 minutes after 60 hours.

Exception: Fire alarm and sprinkler monitoring systems meeting the requirements of a central station fire alarm system per NFPA 72.

907.6 Wiring. Wiring shall comply with the requirements of the *California Electrical Code* and NFPA 72. Wireless protection systems utilizing radio-frequency transmitting devices shall comply with the special requirements for supervision of low-power wireless systems in NFPA 72.

907.7 Activation. Where an alarm notification system is required by another section of this code, it shall be activated by:

1. Automatic fire alarm system.
2. Sprinkler water-flow devices.
3. Manual fire alarm boxes.

907.8 Presignal system. Presignal systems shall not be installed unless approved by the fire code official and the fire department. Where a presignal system is installed, 24-hour personnel supervision shall be provided at a location approved by the fire department, in order that the alarm signal can be actuated in the event of fire or other emergency.

907.9 Zones. *Fire alarm systems shall be divided into zones where required by this section. For the purposes of annunciation and notification, zoning shall be in accordance with the following:*

1. *Where the fire-protective signaling system serves more than one building, each building shall be considered as a separate zone.*
2. *Each floor of a building shall be considered as a separate zone.*
3. *Each section of floor of a building that is separated by fire walls or by horizontal exits shall be considered as a separate zone.*
4. Each zone shall not exceed 22,500 square feet (2090 m^2). The length of any zone shall not exceed 300 feet (91440 mm) in any direction.

Exception: *Automatic sprinkler system zones shall not exceed the area permitted by NFPA 13.*

5. *For Group I-3 occupancies each cell complex shall be considered a separate zone.*
6. *Annunciation shall be further divided into zones where deemed necessary by the enforcing agency.*

907.9.1 Annunciation. *Alarm, supervisory and trouble signals shall be annunciated in the main control unit by means of an audible signal and a visual display in accordance with NFPA 72. Identification of the type of alarm and supervisory initiating devices, such as manual, automatic, sprinkler waterflow, sprinkler valve supervisory, fire-pump supervisory, etc., shall be separately indicated.*

Exception: *Group R-3 occupancies.*

907.9.2 *Annunciator* panel. An annunciator panel *complying with Section 907.8.1* and the associated controls shall be provided in an *approved remote location where deemed necessary by the enforcing agency.* The visual zone indication shall lock in until the system is reset and shall not be canceled by the operation of an audible alarm-silencing switch.

907.9.3 High-rise buildings. In *high-rise* buildings, a separate zone by floor shall be provided for all of the following types of alarm-initiating devices where provided:

1. Smoke detectors.
2. Sprinkler water-flow devices.
3. Manual fire alarm boxes.
4. Other approved types of automatic fire detection devices or suppression systems.

907.9.4 Notification zoning. *Upon activation of initiating devices where occupant notification is required for evacuation, all notification zones shall operate simultaneously throughout the building.*

Exceptions:

1. *High-rise buildings as permitted in Section 907.2.12.2.*
2. *In hospitals and convalescent facilities with staff-alerting notification appliances or voice/alarm communication, zoning shall be in accordance with the approved fire plan.*
3. *Detention facilities.*
4. *Upon approval by the fire code official in buildings which are sprinklered throughout, specific notification zoning shall be permitted where the notification zones are separated by a minimum of a 2-hour fire barrier and 2-hour fire-resistive floor assembly. The system shall have the capability to activate all other notification zones by automatic and manual means.*
5. *Upon approval by the fire code official in buildings which are sprinklered throughout, specific notification zoning shall be permitted where the activated initiating device or fire extinguishing system is separated from any nonactive notification zones by a minimum horizontal distance of 300 feet. The system shall have the capability to activate all other notification zones by automatic and manual means.*

907.10 Alarm notification appliances. Alarm notification appliances shall be provided and shall be listed for their purpose.

907.10.1 Visible alarms. Visible alarm notification appliances shall be provided in accordance with Sections 907.10.1.1 through *907.10.1.5.*

Exceptions:

1. *In other than Groups I-2 and I-2.1, visible* alarm notification appliances are not required in alterations, except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed.
2. Visible alarm notification appliances shall not be required in *enclosed exit stairways, exterior exit stairs, and exterior exit ramps.*

907.10.1.1 Public and common use areas. Visible alarm notification appliances shall be provided in public *use* areas and common *use* areas *including but not limited to:*

1. *Sanitary facilities including restrooms, bathrooms and shower rooms.*
2. *Corridors.*
3. *Music practice rooms.*
4. *Band rooms.*
5. *Gymnasiums.*
6. *Multipurpose rooms.*
7. *Occupational shops.*
8. *Occupied rooms where ambient noise impairs hearing of the fire alarm.*
9. *Lobbies.*
10. *Meeting rooms.*
11. *Classrooms.*

907.10.1.2 Employee work areas. Where employee work areas have audible alarm coverage, the notification appliance circuits serving the employee work areas shall be initially designed with a minimum of 20 percent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing impaired employee(s).

907.10.1.3 Groups I-1 and R-1. Group I-1 and R-1 sleeping units in accordance with Table 907.10.1.3 shall be provided with a visible alarm notification appliance, activated by both the in-room smoke alarm and the building fire alarm system.

TABLE 907.10.1.3
VISIBLE AND AUDIBLE ALARMS

NUMBER OF SLEEPING UNITS	SLEEPING ACCOMMODATIONS WITH VISIBLE AND AUDIBLE ALARMS
6 to 25	2
26 to 50	4
51 to 75	7
76 to 100	9
101 to 150	12
151 to 200	14
201 to 300	17
301 to 400	20
401 to 500	22
501 to 1,000	5% of total
1,001 and over	50 plus 3 for each 100 over 1,000

Also, see Chapter 11B, Section 1111B.4.5, Table 11B-3 and Table 11B-4 of the California Building Code.

907.10.1.4 Group R-2. In Group R-2 occupancies required by Section 907 to have a fire alarm system, all dwelling units and sleeping units shall be provided with the capability to support visible alarm notification appliances in accordance with *NFPA 72*.

907.10.1.5 Groups I-1, R-3.1 and R-4. *Protective social care facilities which house persons who are hearing impaired, shall be provided with notification appliances for the hearing impaired installed in accordance with NFPA 72 and which shall activate upon initiation of the fire alarm system or the smoke alarms.*

907.10.2 Audible alarms. Audible alarm notification appliances shall be provided and shall sound a distinctive sound that is not to be used for any purpose other than that of a fire alarm. The audible alarm notification appliance shall provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level or 5 dBA above the maximum sound level having duration of at least 60 seconds, which is greater, in every occupied space within the building. The minimum sound pressure levels shall be: 75 dBA in occupancies in Group R and I-1; 90 dBA in mechanical equipment rooms and 60 dBA in other occupancies. The maximum sound pressure level for audible alarm notification appliances shall be *110* dBA at the minimum hearing distance from the audible appliance. Where the average ambient noise is greater than *95* dBA, visible alarm notification appliances shall be provided in accordance with NFPA 72 and audible alarm notification appliances shall not be required.

In Group I-2 occupancies, audible appliances placed in patient areas shall be only chimes or similar sounding devices for alerting staff.

Exception: Visible alarm notification appliances shall be allowed in lieu of audible alarm notification appliances in *patient* areas of Group I-2 occupancies.

907.10.2.1 Audible alarm signal. *The audible signal shall be the standard fire alarm evacuation signal, ANSI S34.1 Audible Emergency Evacuation Signal, "three pulse temporal pattern," as described in NFPA 72.*

Exception: *The use of the existing evacuation signaling scheme shall be permitted where approved by the enforcing agency.*

907.11 Fire safety functions. Automatic fire detectors utilized for the purpose of performing fire safety functions shall be connected to the building's fire alarm control *unit* where a fire alarm system is *installed*. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliance or activate a visible and audible supervisory signal at a constantly attended location. In buildings not required to be equipped with a fire alarm system, the automatic fire detector shall be powered by normal electrical service and, upon actuation, perform the intended function. The detectors shall be located in accordance with Chapter 5 of NFPA 72.

CFC § 907.11.1 is added to read as follows:

907.11.1 Fog or smoke emitting systems. No system shall be installed in any building/structure, or portion thereof, which discharges any gas, vapor, liquid, or other product when the primary intent of system discharge is to obscure the vision, cause disorientation, or otherwise incapacitate any occupant of said building/structure or portion thereof. Nothing in this section is intended to preclude the installation of an approved fire suppression system.

907.12 Duct smoke detectors. Duct smoke detectors shall be connected to the building's fire alarm control *unit* when a fire alarm system is provided. Activation of a duct smoke detector shall initiate a visible and audible supervisory signal at a constantly attended location. Duct smoke detectors shall not be used as a substitute for required open area detection.

Exceptions:

1. The supervisory signal at a constantly attended location is not required where duct smoke detectors activate the building's alarm notification appliances.
2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and an audible signal in an approved location. Smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble.

907.13 Access. Access shall be provided to each detector for periodic inspection, maintenance and testing.

907.14 Fire-extinguishing systems. Automatic fire-extinguishing systems shall be connected to the building fire alarm system where a fire alarm system is required by another section of this code or is otherwise installed.

907.15 Monitoring. Fire alarm systems required by this chapter or by the *California Building Code* shall be monitored by an approved supervising station in accordance with NFPA 72.

Exception: Supervisory service is not required for:

1. Single- and multiple-station smoke alarms required by Section 907.2.10.
2. Group I-3 occupancies *shall be monitored in accordance with Section 907.2.6.3.4.*
3. Automatic sprinkler systems in one- and two-family dwellings.

907.16 Automatic telephone-dialing devices. Automatic telephone-dialing devices used to transmit an emergency alarm shall not be connected to any fire department telephone number unless approved by the fire chief.

907.17 Acceptance tests. Upon completion of the installation of the fire alarm system, alarm notification appliances and circuits, alarm-initiating devices and circuits, supervisory-signal initiating devices and circuits, signaling line circuits, primary and secondary power supplies *fire safety function control devices and interfaces, and off-site monitoring equipment* shall be tested in accordance with NFPA 72.

907.18 Record of completion. A record of completion in accordance with NFPA 72 verifying that the system has been installed in accordance with the approved plans and specifications shall be provided.

907.19 Instructions. Operating, testing and maintenance instructions and record drawings ("as builts") and equipment specifications shall be provided at an approved location.

907.20 Inspection, testing and maintenance. The maintenance and testing schedules and procedures for fire alarm and fire detection systems shall be in accordance with this section and Chapter 10 of NFPA 72.

907.20.1 Maintenance required. Whenever or wherever any device, equipment, system, condition, arrangement, level of protection or any other feature is required for compliance with the provisions of this code, such device, equipment, system, condition, arrangement, level of protection or other feature shall thereafter be continuously maintained in accordance with applicable NFPA requirements or as directed by the fire code official.

907.20.2 Testing. Testing shall be performed in accordance with the schedules in Chapter 10 of NFPA 72 or more frequently where required by the fire code official. Where automatic testing is performed at least weekly by a remotely monitored fire alarm control unit specifically listed for the application, the manual testing frequency shall be permitted to be extended to annual.

Exception: devices or equipment that are inaccessible for safety considerations shall be tested during scheduled shutdowns where approved by the fire code official, but not less than every 18 months.

907.20.3 Detector sensitivity. *Smoke* detector sensitivity shall be checked within one year after installation and every alternate year thereafter. After the second calibration test, where sensitivity tests indicate that the detector has remained within its listed and marked sensitivity range (or 4-percent obscuration light grey smoke, if not marked), the length of time between calibration tests shall be permitted to be extended to a maximum of five years. Where the frequency is extended, records of detector-caused nuisance alarms and subsequent trends of these alarms shall be maintained. In zones or areas where nuisance alarms show any increase over the previous year, calibration tests shall be performed.

907.20.4 Method. To ensure that each smoke detector is within its listed and marked sensitivity range, it shall be tested using either a calibrated test method, the manufacturer's calibrated sensitivity test instrument, listed control equipment arranged for the purpose, a smoke detector/control unit arrangement whereby the detector causes a signal at the control unit where its sensitivity is outside its acceptable sensitivity range or other calibrated sensitivity test method acceptable to the fire code official. Detectors found to have a sensitivity outside the listed and marked sensitivity range shall be cleaned and recalibrated or replaced.

Exceptions:

1. Detectors listed as field adjustable shall be permitted to be either adjusted within the listed and marked sensitivity range and cleaned and recalibrated or they shall be replaced.
2. This requirement shall not apply to single-station smoke alarms.

907.20.4.1 Testing device. Detector sensitivity shall not be tested or measured using a device that administers an unmeasured concentration of smoke or other aerosol into the detector.

907.20.5 Maintenance, inspection and testing. The building owner shall be responsible for ensuring that the fire and life safety systems are maintained in an operable condition at all times. Service personnel shall meet the qualification requirements of NFPA 72 for maintaining, inspecting and testing such systems. A written record shall be maintained and shall be made available to the fire code official.

SECTION 908
EMERGENCY ALARM SYSTEMS

908.1 Group H occupancies. Emergency alarms for the detection and notification of an emergency condition in Group H occupancies shall be provided as required in Chapter 27.

908.2 Group H-5 occupancy. Emergency alarms for notification of an emergency condition in an HPM facility shall be provided as required in Section 1803.12. A continuous gas detection system shall be provided for HPM gases in accordance with Section 1803.13.

908.3 Highly toxic and toxic materials. Where required by Section 3704.2.2.10, a gas detection system shall be provided for indoor storage and use of highly toxic and toxic compressed gases.

908.4 Ozone gas-generator rooms. A gas detection system shall be provided in ozone gas-generator rooms in accordance with Section 3705.3.2.

908.5 Repair garages. A flammable-gas detection system shall be provided in repair garages for vehicles fueled by nonodorized gases in accordance with Section 2211.7.2.

908.6 Refrigeration systems. Refrigeration system machinery rooms shall be provided with a refrigerant detector in accordance with Section 606.8.

SECTION 909
SMOKE CONTROL SYSTEMS

909.1 Scope and purpose. This section applies to mechanical or passive smoke control systems when they are required for new buildings or portions thereof by provisions of the *California Building Code* or this code. The purpose of this section is to establish minimum requirements for the design, installation

in compliance with Section 2206.7.6 and be manually held open during the dispensing operation.

2204.4.3 Location of containers being filled. Portable containers shall not be filled while located inside the trunk, passenger compartment or truck bed of a vehicle.

SECTION 2205
OPERATIONAL REQUIREMENTS

2205.1 Tank filling operations for Class I, II or IIIA liquids. Delivery operations to tanks for Class I, II or IIIA liquids shall comply with Sections 2205.1.1 through 2205.1.3 and the applicable requirements of Chapter 34.

2205.1.1 Delivery vehicle location. Where liquid delivery to above-ground storage tanks is accomplished by positive-pressure operation, tank vehicles shall be positioned a minimum of 25 feet (7620 mm) from tanks receiving Class I liquids and 15 feet (4572 mm) from tanks receiving Class II and IIIA liquids.

2205.1.2 Tank capacity calculation. The driver, operator or attendant of a tank vehicle shall, before making delivery to a tank, determine the unfilled, available capacity of such tank by an approved gauging device.

2205.1.3 Tank fill connections. Delivery of flammable liquids to tanks more than 1,000 gallons (3785 L) in capacity shall be made by means of approved liquid- and vapor-tight connections between the delivery hose and tank fill pipe. Where tanks are equipped with any type of vapor recovery system, all connections required to be made for the safe and proper functioning of the particular vapor recovery process shall be made. Such connections shall be made liquid and vapor tight and remain connected throughout the unloading process. Vapors shall not be discharged at grade level during delivery.

2205.2 Equipment maintenance and inspection. Motor fuel-dispensing facility equipment shall be maintained in proper working order at all times in accordance with Sections 2205.2.1 through 2205.2.3.

2205.2.1 Dispensing devices. Where maintenance to Class I liquid dispensing devices becomes necessary and such maintenance could allow the accidental release or ignition of liquid, the following precautions shall be taken before such maintenance is begun:

1. Only persons knowledgeable in performing the required maintenance shall perform the work.
2. Electrical power to the dispensing device and pump serving the dispenser shall be shut off at the main electrical disconnect panel.
3. The emergency shutoff valve at the dispenser, where installed, shall be closed.
4. Vehicle traffic and unauthorized persons shall be prevented from coming within 12 feet (3658 mm) of the dispensing device.

2205.2.2 Emergency shutoff valves. Automatic emergency shutoff valves required by Section 2206.7.4 shall be checked not less than once per year by manually tripping the hold-open linkage.

2205.2.3 Leak detectors. Leak detection devices required by Section 2206.7.7.1 shall be checked and tested at least annually in accordance with the manufacturer's specifications to ensure proper installation and operation.

2205.3 Spill control. Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills, or other approved means.

2205.4 Sources of ignition. Smoking and open flames shall be prohibited in areas where fuel is dispensed. The engines of vehicles being fueled shall be shut off during fueling. Electrical equipment shall be in accordance with the *California Electrical Code.*

2205.5 Fire extinguishers. Approved portable fire extinguishers complying with Section 906 with a minimum rating of 2-A:20-B:C shall be provided and located such that an extinguisher is not more than 75 feet (22 860 mm) from pumps, dispensers or storage tank fill-pipe openings.

2205.6 Warning signs. Warning signs shall be conspicuously posted within sight of each dispenser in the fuel-dispensing area and shall state the following:

1. No smoking.
2. Shut off motor.
3. Discharge your static electricity before fueling by touching a metal surface away from the nozzle.
4. To prevent static charge, do not reenter your vehicle while gasoline is pumping.
5. If a fire starts, do not remove nozzle-back away immediately.
6. It is unlawful and dangerous to dispense gasoline into unapproved containers.
7. No filling of portable containers in or on a motor vehicle. Place container on ground before filling.

2205.7 Control of brush and debris. Fenced and diked areas surrounding above-ground tanks shall be kept free from vegetation, debris and other material that is not necessary to the proper operation of the tank and piping system.

Weeds, grass, brush, trash and other combustible materials shall be kept not less than 10 feet (3048 mm) from fuel-handling equipment.

SECTION 2206
FLAMMABLE AND COMBUSTIBLE LIQUID MOTOR FUEL-DISPENSING FACILITIES

2206.1 General. Storage of flammable and combustible liquids shall be in accordance with Chapter 34 and this section.

2206.2 Method of storage. Approved methods of storage for Class I, II and IIIA liquid fuels at motor fuel-dispensing facilities shall be in accordance with Sections 2206.2.1 through 2206.2.5.

2206.2.1 Underground tanks. Underground tanks for the storage of Class I, II and IIIA liquid fuels shall comply with Chapter 34.

2206.2.1.1 Inventory control for underground tanks. Accurate daily inventory records shall be maintained and reconciled on underground fuel storage tanks for indication of possible leakage from tanks and piping. The records shall be kept at the premises or made available for inspection by the fire code official within 24 hours of a written or verbal request and shall include records for each product showing daily reconciliation between sales, use, receipts and inventory on hand. Where there is more than one system consisting of tanks serving separate pumps or dispensers for a product, the reconciliation shall be ascertained separately for each tank system. A consistent or accidental loss of product shall be immediately reported to the fire code official.

2206.2.2 Above-ground tanks located inside buildings. Above-ground tanks for the storage of Class I, II and IIIA liquid fuels are allowed to be located in buildings. Such tanks shall be located in special enclosures complying with Section 2206.2.6, in a liquid storage room or a liquid storage warehouse complying with Chapter 34, or shall be listed and labeled as protected above-ground tanks.

CFC Section 2206.2.3 is amended to read as follows:

2206.2.3 Above-ground tanks located outside, above grade. Above-ground tanks shall not be used for automotive fuel dispensing at any retail sales occupancy. Above-ground tanks shall not be used for the storage of Class I, II or IIIA liquid motor fuels except as provided by this section.

1. Above-ground tanks sued for outside, above-grade storage of Class I liquids shall be listed and labeled as protected above-ground tanks and be in accordance with Chapter 34. Such tanks shall be located in accordance with Table 2206.2.3.
2. Above-ground tanks used for above-grade storage of Class II or IIIA liquids are allowed to be protected above-ground tanks or, when approved by the fire code official, other above-ground tanks that comply with Chapter 34. Tank locations shall be in accordance with Table 2206.2.3.
3. Tanks containing fuels shall not exceed 12,000 gallons (45 420 L) in individual capacity or 48,000 gallons (181 680 L) in aggregate capacity. Installations with the maximum allowable aggregate capacity shall be separated from other such installations by not less than 100 feet (30 480 mm).
4. Tanks located at farms, construction projects, or rural areas shall comply with Section 3406.2.

2206.2.4 Above-ground tanks located in above-grade vaults or below-grade vaults. Above-ground tanks used for storage of Class I, II or IIIA liquid motor fuels are allowed to be installed in vaults located above grade or below grade in accordance with Section 3404.2.8 and shall comply with Section 2206.2.4.1 and 2206.2.4.2. Tanks in above-grade vaults shall also comply with Table 2206.2.3.

2206.2.4.1 Tank capacity limits. Tanks storing Class I and Class II liquids at an individual site shall be limited to a maximum individual capacity of 15,000 gallons (56 775 L) and an aggregate capacity of 48,000 gallons (181 680 L).

2206.2.4.2 Fleet vehicle motor fuel-dispensing facilities. Tanks storing Class II and Class IIIA liquids at a fleet vehicle motor fuel-dispensing facility shall be limited to a maximum individual capacity of 20,000 gallons (75 700 L) and an aggregate capacity of 80,000 gallons (302 800 L).

TABLE 2206.2.3
MINIMUM SEPARATION REQUIREMENTS FOR ABOVE-GROUND TANKS

CLASS OF LIQUID AND TANK TYPE	INDIVIDUAL TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM NEAREST IMPORTANT BUILDING ON SAME PROPERTY (feet)	MINIMUM DISTANCE FROM NEAREST FUEL DISPENSER (feet)	MINIMUM DISTANCE FROM LOT LINE THAT IS OR CAN BE BUILT UPON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)	MINIMUM DISTANCE FROM NEAREST SIDE OF ANY PUBLIC WAY (feet)	MINIMUM DISTANCE BETWEEN TANKS (feet)
Class I protected above-ground tanks	Less than or equal to 6,000	5	25[a]	15	5	3
	Greater than 6,000	15	25[a]	25	15	3
Class II and III protected above-ground tanks	Same as Class I	Same as Class I	Same as Class I	Same as Class I	Same as Class I	Same as Class I
Tanks in vaults	0-20,000	0[b]	0	0[b]	0	Separate compartment required for each tank
Other tanks	All	50	50	100	50	3

For SI: 1 foot = 304.8, 1 gallon = 3.785 L.

a. At fleet vehicle motor fuel-dispensing facilities, no minimum separation distance is required.

b. Underground vaults shall be located such that they will not be subject to loading from nearby structures, or they shall be designed to accommodate applied loads from existing or future structures that can be built nearby.

CHAPTER 33
EXPLOSIVES AND FIREWORKS

SECTION 3301
GENERAL

3301.1 Scope. *For explosives requirements, see Title 19 California Code of Regulations, Chapter 10. For fireworks requirements, see Title 19 California Code of Regulations, Chapter 6.*

Exceptions:

1. The Armed Forces of the United States, Coast Guard or National Guard.
2. Explosives in forms prescribed by the official United States Pharmacopoeia.
3. The possession, storage and use of small arms ammunition when packaged in accordance with DOTn packaging requirements.
4. The use of explosive materials be federal, state and local regulatory, law enforcement and fire agencies acting in their official capacities.
5. Items preempted by federal regulations.

SECTION 3302
RESERVED

SECTION 3303
RESERVED

SECTION 3304
RESERVED

SECTION 3305
RESERVED

SECTION 3306
RESERVED

SECTION 3307
RESERVED

SECTION 3308
FIREWORKS DISPLAY

3308.1 General. The display of fireworks, including proximate audience displays and pyrotechnic special effects in theatrical, and group entertainment productions, shall comply with this chapter and *Title 19 California Code of Regulations, Chapter 6 – Fireworks.*

3308.1.1 Scope. *Fireworks and temporary storage, use, and handling of pyrotechnic special effects material used in motion pictures, television, and theatrical and group entertainment productions shall be in accordance with Title 19 California Code of Regulations, Chapter 6 – Fireworks.*

CFC Section 3308.1.2 is added to read as follows:

3308.1.2 Storage. A permit is required to store fireworks in any quantity and will only be issued for storage associated with a display, or for the use of, pyrotechnic special effects material by state-licensed pyrotechnicians as described in section 3308.1.1.

CFC Section 3308.2 is added to read as follows:

3308.2 Prohibitions. The manufacture, possession, storage, sale, use, and handling of fireworks are prohibited.

Exceptions:

1. Storage of fireworks in accordance with Section 3308.1.2.
2. Use and handling of fireworks for display in accordance with Section 3308.1.

structed of noncombustible material and shall be designed to be weaker than the walls of the vault, to ensure that the thrust of an explosion occurring inside the vault is directed upward before significantly high pressure can develop within the vault.

The top of an at-grade or below-grade vault shall be designed to relieve safely or contain the force of an explosion occurring inside the vault. The top and floor of the vault and the tank foundation shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable. The walls and floor of a vault installed below grade shall be designed to withstand anticipated soil and hydrostatic loading.

Vaults shall be designed to be wind and earthquake resistant, in accordance with the *California Building Code.*

3404.2.8.3 Secondary containment. Vaults shall be substantially liquid tight and there shall be no backfill around the tank or within the vault. The vault floor shall drain to a sump. For premanufactured vaults, liquid tightness shall be certified as part of the listing provided by a nationally recognized testing laboratory. For field-erected vaults, liquid tightness shall be certified in an approved manner.

3404.2.8.4 Internal clearance. There shall be sufficient clearance between the tank and the vault to allow for visual inspection and maintenance of the tank and its appurtenances. Dispensing devices are allowed to be installed on tops of vaults.

3404.2.8.5 Anchoring. Vaults and their tanks shall be suitably anchored to withstand uplifting by ground water or flooding, including when the tank is empty.

3404.2.8.6 Vehicle impact protection. Vaults shall be resistant to damage from the impact of a motor vehicle, or vehicle impact protection shall be provided in accordance with Section 312.

3404.2.8.7 Arrangement. Tanks shall be listed for above-ground use, and each tank shall be in its own vault. Compartmentalized tanks shall be allowed and shall be considered as a single tank. Adjacent vaults shall be allowed to share a common wall. The common wall shall be liquid and vapor tight and shall be designed to withstand the load imposed when the vault on either side of the wall is filled with water.

3404.2.8.8 Connections. Connections shall be provided to permit venting of each vault to dilute, disperse and remove vapors prior to personnel entering the vault.

3404.2.8.9 Ventilation. Vaults that contain tanks of Class I liquids shall be provided with an exhaust ventilation system installed in accordance with Section 2704.3. The ventilation system shall operate continuously or be designed to operate upon activation of the vapor or liquid detection system. The system shall provide ventilation at a rate of not less than 1 cubic foot per minute (cfm) per square foot of floor area [0.00508 $m^3/(s \cdot m^2)$], but not less than 150 cfm (0.071 m^3/s). The exhaust system shall be designed to provide air movement across all parts of the vault floor. Supply and exhaust ducts shall extend to within 3 inches (76 mm), but not more than 12 inches (305 mm), of the floor. The exhaust system shall be installed in accordance with the *California Mechanical Code.*

3404.2.8.10 Liquid detection. Vaults shall be equipped with a detection system capable of detecting liquids, including water, and activating an alarm.

3404.2.8.11 Monitoring and detection. Vaults shall be provided with approved vapor and liquid detection systems and equipped with on-site audible and visual warning devices with battery backup. Vapor detection systems shall sound an alarm when the system detects vapors that reach or exceed 25 percent of the lower explosive limit (LEL) of the liquid stored. Vapor detectors shall be located no higher than 12 inches (305 mm) above the lowest point in the vault. Liquid detection systems shall sound an alarm upon detection of any liquid, including water. Liquid detectors shall be located in accordance with the manufacturer's instructions. Activation of either vapor or liquid detection systems shall cause a signal to be sounded at an approved, constantly attended location within the facility serving the tanks or at an approved location. Activation of vapor detection systems shall also shut off dispenser pumps.

3404.2.8.12 Liquid removal. Means shall be provided to recover liquid from the vault. Where a pump is used to meet this requirement, the pump shall not be permanently installed in the vault. Electric-powered portable pumps shall be suitable for use in Class I, Division 1 locations, as defined in the *California Electrical Code.*

3404.2.8.13 Normal vents. Vent pipes that are provided for normal tank venting shall terminate at least 12 feet (3658 mm) above ground level.

3404.2.8.14 Emergency vents. Emergency vents shall be vapor tight and shall be allowed to discharge inside the vault. Long-bolt manhole covers shall not be allowed for this purpose.

3404.2.8.15 Accessway. Vaults shall be provided with an approved personnel accessway with a minimum dimension of 30 inches (762 mm) and with a permanently affixed, nonferrous ladder. Accessways shall be designed to be nonsparking. Travel distance from any point inside a vault to an accessway shall not exceed 20 feet (6096 mm). At each entry point, a warning sign indicating the need for procedures for safe entry into confined spaces shall be posted. Entry points shall be secured against unauthorized entry and vandalism.

3404.2.8.16 Fire protection. Vaults shall be provided with a suitable means to admit a fire suppression agent.

3404.2.8.17 Classified area. The interior of a vault containing a tank that stores a Class I liquid shall be designated a Class I, Division 1 location, as defined in the *California Electrical Code.*

3404.2.8.18 Overfill protection. Overfill protection shall be provided in accordance with Section

3404.2.9.6.6. The use of a float vent valve shall be prohibited.

3404.2.9 Above-ground tanks. Above-ground storage of flammable and combustible liquids in tanks shall comply with Section 3404.2 and Sections 3404.2.9.1 through 3404.2.9.6.10.

3404.2.9.1.1 Required foam fire protection systems. When required by the fire code official, foam fire protection shall be provided for above-ground tanks, other than pressure tanks operating at or above 1 pound per square inch gauge (psig) (6.89 kPa) when such tank, or group of tanks spaced less than 50 feet (15 240 mm) apart measured shell to shell, has a liquid surface area in excess of 1,500 square feet (139 m^2), and is in accordance with one of the following:

1. Used for the storage of Class I or II liquids.
2. Used for the storage of crude oil.
3. Used for in-process products and is located within 100 feet (30 480 mm) of a fired still, heater, related fractioning or processing apparatus or similar device at a processing plant or petroleum refinery as herein defined.
4. Considered by the fire code official as posing an unusual exposure hazard because of topographical conditions; nature of occupancy, proximity on the same or adjoining property, and height and character of liquids to be stored; degree of private fire protection to be provided; and facilities of the fire department to cope with flammable liquid fires.

3404.2.9.1.2 Foam fire protection system installation. Where foam fire protection is required, it shall be installed in accordance with NFPA 11 *(Section 4.8)* and NFPA 11A.

3404.2.9.1.2.1 Foam storage. Where foam fire protection is required, foam-producing materials shall be stored on the premises.

Exception: Storage of foam-producing materials off the premises is allowed as follows:

1. Such materials stored off the premises shall be of the proper type suitable for use with the equipment at the installation where required.
2. Such materials shall be readily available at the storage location at all times.
3. Adequate loading and transportation facilities shall be provided.
4. The time required to deliver such materials to the required location in the event of fire shall be consistent with the hazards and fire scenarios for which the foam supply is intended.
5. At the time of a fire, these off-premises supplies shall be accumulated in sufficient quantities before placing the equipment in operation to ensure foam production at an adequate rate without interruption until extinguishment is accomplished.

3404.2.9.1.3 Fire protection of supports. Supports or pilings for above-ground tanks storing Class I, II or IIIA liquids elevated more than 12 inches (305 mm) above grade shall have a fire-resistance rating of not less than 2 hours in accordance with the fire exposure criteria specified in ASTM E 1529.

Exceptions:

1. Structural supports tested as part of a protected above-ground tank in accordance with UL 2085.
2. Stationary tanks located outside of buildings when protected by an approved water-spray system designed in accordance with Chapter 9 and NFPA 15.
3. Stationary tanks located inside of buildings equipped throughout with an approved automatic sprinkler system designed in accordance with Section 903.3.1.1.

3404.2.9.1.4 Inerting of tanks with boilover liquids. Liquids with boilover characteristics shall not be stored in fixed roof tanks larger than 150 feet (45 720 mm) in diameter unless an approved gas enrichment or inerting system is provided on the tank.

Exception: Crude oil storage tanks in production fields with no other exposures adjacent to the storage tank.

3404.2.9.2 Supports, foundations and anchorage. Supports, foundations and anchorages for above-ground tanks shall be designed and constructed in accordance with NFPA 30 and the *California Building Code.*

3404.2.9.3 Stairs, platforms and walkways. Stairs, platforms and walkways shall be of noncombustible construction and shall be designed and constructed in accordance with NFPA 30 and the *California Building Code.*

3404.2.9.4 Above-ground tanks inside of buildings. Tanks storing Class I, II and IIIA liquids inside buildings shall be equipped with a device or other means to prevent overflow into the building including, but not limited to: a float valve; a preset meter on the fill line; a valve actuated by the weight of the tanks contents; a low head pump which is incapable of producing overflow; or a liquid-tight overflow pipe at least one pipe size larger than the fill pipe and the discharging by gravity back to the outside source of liquid or to an approved location.

3404.2.9.5 Above-ground tanks outside of buildings. Above-ground tanks outside of buildings shall comply with Section 3404.2.9.5.1 through 3404.2.9.5.3.

CFC Section 3404.2.9.5.1 is amended to read as follows:

3404.2.9.5.1. Storage of Class I and Class II liquids in aboveground tanks outside of buildings is prohibited within the City limits of the City of San Buenaventura.

Exceptions:

1. The fire code official may permit tanks with a maximum capacity of five hundred (500) gallons temporarily installed at construction sites if installed in accordance with this code and related local regulations.
2. Existing facilities in compliance with requirements of this code may have their use continued with approval of the fire code official.
3. Upon approval of the fire code official, above-ground tanks with a maximum capacity of five hundred (500) gallons may be used for the storage of crankcase drainings from internal combustion engines.
4. Above-ground storage tanks for motor fuel-dispensing stations may be allowed in accordance with CFC section 3404.2.9.6.

3404.2.9.5.1.1 Location of tanks with pressures 2.5 psig or less. Above-ground tanks operating at pressures not exceeding 2.5 psig (17.2 kPa) for storage of Class I, II or IIIA liquids, which are designed with a floating roof, a weak roof-to-shell seam or equipped with emergency venting devices limiting pressure to 2.5 psig (17.2 kPa), shall be located in accordance with Table 4.3.2.1.1(a) of NFPA 30.

Exceptions:

1. Vertical tanks having a weak roof-to-shell seam and storing Class IIIA liquids are allowed to be located at one-half the distances specified in Table 4.3.2.1.1(a) of NFPA 30, provided the tanks are not within a diked area or drainage path for a tank storing Class I or II liquids.
2. Liquids with boilover characteristics and unstable liquids in accordance with Sections 3404.2.9.5.1.3 and 3404.2.9.5.1.4.
3. For protected above-ground tanks in accordance with Section 3404.2.9.6 and tanks in at-grade or above-grade vaults in accordance with Section 3404.2.8, the distances in Table 4.3.2.1.1(b) of NFPA 30 shall apply and shall be reduced by one-half, but not to less than 5 feet (1524 mm).

3404.2.9.5.1.2 Location of tanks with pressures exceeding 2.5 psig. Above-ground tanks for the storage of Class I, II or IIIA liquids operating at pressures exceeding 2.5 psig (17.2 kPa) or equipped with emergency venting allowing pressures to exceed 2.5 psig (17.2 kPa) shall be located in accordance with Table 4.3.2.1.2 of NFPA 30.

Exception: Liquids with boilover characteristics and unstable liquids in accordance with Sections 3404.2.9.5.1.4 and 3404.2.9.5.1.5.

3404.2.9.5.1.3 Location of tanks for boilover liquids. Above-ground tanks for storage of liquids with boilover characteristics shall be located in accordance with Table 4.3.2.1.3 of NFPA 30.

3404.2.9.5.1.4 Location of tanks for unstable liquids. Above-ground tanks for the storage of unstable liquids shall be located in accordance with Table 4.3.2.1.4 of NFPA 30.

3404.2.9.5.1.5 Location of tanks for Class IIIB liquids. Above-ground tanks for the storage of Class IIIB liquids, excluding unstable liquids, shall be located in accordance with Table 4.3.2.1.5 of NFPA 30, except when located within a diked area of drainage path for a tank or tanks storing Class I or II liquids. Where a Class IIIB liquid storage tank is within the diked area or drainage path for a Class I or II liquid, distances required by Section 3404.2.9.5.1.1 shall apply.

3404.2.9.5.1.6 Reduction of separation distances to adjacent property. Where two tank properties of diverse ownership have a common boundary, the fire code official is authorized to, with the written consent of the owners of the two properties, apply the distances in Section 3404.2.9.5.1.2 through 3404.2.9.5.1.5 assuming a single property.

3404.2.9.5.2 Separation between adjacent stable or unstable liquid tanks. The separation between tanks containing stable liquids shall be in accordance with Table 4.3.2.2.1 of NFPA 30. Where tanks are in a diked area containing Class I or II liquids, or in the drainage path of Class I or II liquids, and are compacted in three or more rows or in an irregular pattern, the fire code official is authorized to require greater separation than specified in Table 4.3.2.2.1 of NFPA 30 or other means to make tanks in the interior of the pattern accessible for fire-fighting purposes.

Exception: Tanks used for storing Class IIIB liquids are allowed to be spaced 3 feet (914 mm) apart unless within a diked area or drainage path for a tank storing Class I or II liquids.

The separation between tanks containing unstable liquids shall not be less than one-half the sum of their diameters.

3404.2.9.5.3 Separation between adjacent tanks containing flammable or combustible liquids and LP-gas. The minimum horizontal separation between an LP-gas container and a Class I, II or IIIA liquid storage tank shall be 20 feet (6096 mm) except in the case of Class I, II or IIIA liquid tanks operating at pressures exceeding 2.5 psig (17.2 kPa) or equipped with emergency venting allowing pressures to exceed 2.5 psig (17.2 kPa), in which case the provisions of Section 3404.2.9.5.2 shall apply.

An approved means shall be provided to prevent the accumulation of Class I, II or IIIA liquids under adjacent LP-gas containers such as by dikes, diversion curbs or grading. When flammable or combustible liquid storage tanks are within a diked area, the LP-gas containers shall be outside the diked area and at least 10 feet (3048 mm) away from the centerline of the wall of the diked area.

Exceptions:

1. Liquefied petroleum gas containers of 125 gallons (473 L0 or less in capacity installed adjacent to fuel-oil supply tanks of 660 gallons (2498 L) or less in capacity.
2. Horizontal separation is not required between above-ground LP-gas containers and

[CONTINUED ON PAGE 384]

underground flammable and combustible liquid tanks.

3404.2.9.6 Additional requirements for protected above-ground tanks. In addition to the requirements of this chapter for above-ground tanks, the installation of protected above-ground tanks shall be in accordance with Sections3404.2.9.6.1 through 3404.2.9.6.10.

3404.2.9.6.1 Tank construction. The construction of a protected above-ground tank and its primary tank shall be in accordance with Section 3404.2.7.

3404.2.9.6.2 Normal and emergency venting. Normal and emergency venting for protected above-ground tanks shall be provided in accordance with Sections 3404.2.7.3 and 3404.2.7.4. The vent capacity reduction factor shall not be allowed.

3404.2.9.6.3 Flame arresters. Approved flame arresters or pressure vacuum breather valves shall be installed in normal vents.

3404.2.9.6.4 Secondary containment. Protected above-ground tanks shall be provided with secondary containment, drainage control or diking in accordance with Section 2704.2. A means shall be provided to establish the integrity of the secondary containment in accordance with NFPA 30.

3404.2.9.6.5 Vehicle impact protection. Where protected above-ground tanks, piping, electrical conduit or dispensers are subject to vehicular impact, they shall be protected therefrom, either by having the impact protection incorporated into the system design in compliance with the impact test protocol of UL 2085, or by meeting the provisions of Section 312, or where necessary, a combination of both. Where guard posts or other approved barriers are provided, they shall be independent of each above-ground tank.

3404.2.9.6.6 Overfill prevention. Protected above-ground tanks shall not be filled in excess of 95 percent of their capacity. An overfill prevention system shall be provided for each tank. During tank-filling operations, the system shall comply with one of the following:

1. The system shall:
   1.1. Provide an independent means of notifying the person filling the tank that the fluid level has reached 90 percent of tank capacity by providing an audible or visual alarm signal, providing a tank level gauge marked at 90 percent of tank capacity, or other approved means; and
   1.2. Automatically shut off the flow of fuel to the tank when the quantity of liquid in the tank reaches 95 percent of tank capacity. For rigid hose fuel-delivery systems, an approved means shall be provided to empty the fill hose into the tank after the automatic shutoff device is activated.
2. The system shall reduce the flow rate to not more than 15 gallons per minute (0.95 L/sec) so that at the reduced flow rate, the tank will not overfill for 30 minutes, and automatically shut off flow into the tank so that none of the fittings on the top of the tank are exposed to product because of overfilling.

3404.2.9.6.6.1 Information signs. A permanent sign shall be provided at the fill point for the tank, documenting the filling procedure and the tank calibration chart.

Exception: Where climatic conditions are such that the sign may be obscured by ice or snow, or weathered beyond readability or otherwise impaired, said procedures and chart shall be located in the office window, lock box or other area accessible to the person filling the tank.

3404.2.9.6.6.2 Determination of available tank capacity. The filling procedure shall require the person filling the tank to determine the gallonage (literage) required to fill it to 90 percent of capacity before commencing the fill operation.

3404.2.9.6.7 Fill pipe connections. The fill pipe shall be provided with a means for making a direct connection to the tank vehicle's fuel delivery hose so that the delivery of fuel is not exposed to the open air during the filling operation. Where any portion of the fill pipe exterior to the tank extends below the level of the top of the tank, a check valve shall be installed in the fill pipe not more than 12 inches (305 mm) from the fill hose connection.

3404.2.9.6.8 Spill containers. A spill container having a capacity of not less than 5 gallons (19 L) shall be provided for each fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to the tank and equipped with a manual drain valve that drains into the primary tank. For tanks with a remote fill connection, a portable spill container shall be allowed.

3404.2.9.6.9 Tank openings. Tank openings in protected above-ground tanks shall be through the top only.

3404.2.9.6.10 Antisiphon devices. Approved antisiphon devices shall be installed in each external pipe connected to the protected above-ground tank when the pipe extends below the level of the top of the tank.

3404.2.10 Drainage and diking. The area surrounding a tank or group of tanks shall be provided with drainage control or shall be diked to prevent accidental discharge of liquid from endangering adjacent tanks, adjoining property or reaching waterways.

Exceptions:

1. The fire code official is authorized to alter or waive these requirements based on a technical report which demonstrates that such tank or group of

3405.3.7.5.1 Ventilation. Continuous mechanical ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot [0.00508 $m^3/(s \times m^2)$] of floor area over the design area. Provisions shall be made for introduction of makeup air in such a manner to include all floor areas or pits where vapors can collect. Local or spot ventilation shall be provided when needed to prevent the accumulation of hazardous vapors. Ventilation system design shall comply with the *California Building Code* and *California Mechanical Code.*

Exception: Where natural ventilation can be shown to be effective for the materials used, dispensed or mixed.

3405.3.7.5.2 Explosion control. Explosion control shall be provided in accordance with Section 911.

3405.3.7.5.3 Spill control and secondary containment. Spill control shall be provided in accordance with Section 3403.4 where Class I, II or IIIA liquids are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with Section 3403.4 when the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 100 gallons (378.5 L).

3405.3.7.6 Closed systems. Use or mixing of flammable or combustible liquids in closed systems shall be in accordance with Sections 3405.3.7.6.1 through 3405.3.7.6.3.

3405.3.7.6.1 Ventilation. Closed systems designed to be opened as part of normal operations shall be provided with ventilation in accordance with Section 3405.3.7.5.1.

3405.3.7.6.2 Explosion control. Explosion control shall be provided when an explosive environment can occur as a result of the mixing or use process. Explosion control shall be designed in accordance with Section 911.

Exception: When process vessels are designed to contain fully the worst-case explosion anticipated within the vessel under process conditions considering the most likely failure.

3405.3.7.6.3 Spill control and secondary containment. Spill control shall be provided in accordance with Section 3403.4 when flammable or combustible liquids are dispensed into containers exceeding a 1.3 gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with Section 3403.4 when the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 1,000 gallons (3785 L).

3405.3.8 Use, dispensing and handling outside of buildings. Outside use, dispensing and handling shall be in accordance with Sections 3405.3.8.1 through 3405.3.8.3.

Dispensing of liquids into motor vehicle fuel tanks at motor fuel-dispensing facilities shall be in accordance with Chapter 22.

3405.3.8.1 Spill control and drainage control. Outside use, dispensing and handling areas shall be provided with spill control as set forth in Section 3403.4.

3405.3.8.2 Location on property. Dispensing activities which exceed the quantities set forth in Table 3405.3.8.2 shall not be conducted within 15 feet (4572 mm) of buildings or combustible materials or within 25 feet (7620 mm) of building openings, lot lines, public streets, public alleys or public ways. Dispensing activities that exceed the quantities set forth in Table 3405.3.8.2 shall not be conducted within 15 feet (4572 mm) of storage of Class I, II or III liquids unless such liquids are stored in tanks which are listed and labeled as 2-hour protected tank assemblies in accordance with UL 2085.

Exceptions:

1. The requirements shall not apply to areas where only the following are dispensed: Class III liquids; liquids that are heavier than water; water-miscible liquids; and liquids with viscosities greater than 10,000 centipoise (cp) (10 Pa • s).
2. Flammable and combustible liquid dispensing in refineries, chemical plants, process facilities, gas and crude oil production facilities and oil blending and packaging facilities, terminals and bulk plants.

TABLE 3405.3.8.2
MAXIMUM ALLOWABLE QUANTITIES FOR DISPENSING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN OUTDOOR CONTROL AREAS[a,b]

CLASS OF LIQUID	QUANTITY (gallons)
Flammable	
Class IA	10
Class IB	15
Class IC	20
Combination Class IA, IB and IC	30[c]
Combustible	
Class II	30
Class IIIA	80
Class IIIB	3,300

For SI: 1 gallon = 3.785 L.

a. For definition of "Outdoor Control Area," see Section 2702.1.

b. The fire code official is authorized to impose special conditions regarding locations, types of containers, dispensing units, fire control measures and other factors involving fire safety.

c. Containing not more than the maximum allowable quantity per control area of each individual class.

3405.3.8.3 Location of processing vessels. Processing vessels shall be located with respect to distances to lot lines which can be built on in accordance with Table 3405.3.4(1).

Exception: In refineries and distilleries.

3405.3.8.4 Weather protection. Weather protection for outdoor use shall be in accordance with Section 2705.3.9.

3405.4 Solvent distillation units. Solvent distillation units shall comply with Sections 3405.4.1 through 3405.4.9.

3405.4.1 Unit with capacity of 60 gallons or less. Solvent distillation units used to recycle Blass I, II or IIIA liquids having a distillation chamber capacity of 60 gallons (227 L) or less shall be listed, labeled and installed in accordance with Section 3405.4 and UL 2208.

Exceptions:

1. Solvent distillation units installed in dry cleaning plants in accordance with Chapter 12.
2. Solvent distillation units used in continuous through-put industrial processes where the source of heat is remotely supplied using steam, hot water, oil or other heart transfer fluids, the temperature of which is below the auto-ignition point of the solvent.
3. Solvent distillation units listed for and used in laboratories.
4. Approved research, testing and experimental processes.

3405.4.2 Units with a capacity exceeding 60 gallons. Solvent distillation units used to recycle Class I, II or IIIA liquids, having a distillation chamber capacity exceeding 60 gallons (227 L) shall be used in locations that comply with the use and mixing requirements of Section 3405 and other applicable provisions in this chapter.

3405.4.3 Prohibited processing. Class I, II and IIIA liquids also classified as unstable (reactive) shall not be processed in solvent distillation units.

Exception: Appliances listed for the distillation of unstable (reactive) solvents.

3405.4.4 Labeling. A permanent label shall be affixed to the unit by the manufacturer. The label shall indicate the capacity of the distillation chamber, and the distance the unit shall be placed away from sources of ignition. The label shall indicate the products for which the unit has been listed for use or refer to the instruction manual for a list of the products.

3405.4.5 Manufacturer's instruction manual. An instruction manual shall be provided. The manual shall be readily available for the user and the fire code official. The manual shall include installation, use and servicing instruction. It shall identify the liquids for which the unit has been listed for distillation purposes along with each liquid's flash point and auto-ignition temperature. For units with adjustable controls, the manual shall include directions for setting the heater temperature for each liquid to be instilled.

3405.4.6 Location. Solvent distillation units shall be used in location in accordance with the listing. Solvent distillation units shall not be used in basements.

3405.4.7 Storage of liquids. Distilled liquids and liquids awaiting distillation shall be stored in accordance with Section 3404.

3405.4.8 Storage of residues. Hazardous residue from the distillation process shall be stored in accordance with Section 3404 and Chapter 27.

3405.4.9 Portable fire extinguishers. Approved portable fire extinguishers shall be provided in accordance with Section 906. At least one portable fire extinguisher having a rating of not less than 40-B shall be located not less than 10 feet (3048 mm) or more than 30 feet (9144 mm) from any solvent distillation unit.

3405.5 Alcohol-based hand rubs classified as Class I or II liquids. The use of wall-mounted dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. The dispensers shall not be installed directly adjacent to, directly above or below an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor shall remain clear and unobstructed.
4. Dispensers shall be mounted so that the bottom of the dispenser is a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not release their contents except when the dispenser is manually activated.
6. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 3404 and 3405.
7. Dispensers installed in occupancies with carpeted floors shall only be allowed in smoke compartments or fire areas equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

3405.5.1 Corridor installations. Where wall-mounted dispensers containing alcohol-based hand rubs are installed in corridors, they shall be in accordance with all of the following:

1. Aerosol containers shall not be allowed in corridors.
2. The maximum capacity of each dispensers shall be 41 ounces (1.2 L).
3. The maximum quantity allowed in a corridor within a control area shall be 10 gallons (37.85 L).
4. The minimum corridor width shall be 72 inches (1829 mm).
5. Projections into a corridor shall be in accordance with Section 1003.3.3.

CFC § 3405.6 is added to read as follows:

3405.6 Dispensing from Aboveground Tanks. Class I and II liquids will not be dispensed into the fuel tank of a motor vehicle from above ground tanks except as provided in CFC section 3404.2.9.6.

construction documents and other data. Any addition to or alteration of approved construction documents shall be approved in advance by the fire code official, as evidenced by the issuance of a new or amended permit.

105.3.7 Information on the permit. The fire code official shall issue all permits required by this code on an approved form furnished for that purpose. The permit shall contain a general description of the operation or occupancy and its location and any other information required by the fire code official. Issued permits shall bear the signature of the fire code official or other approved legal authorization.

105.4 Construction documents. Construction documents shall be in accordance with this section.

105.4.1 Submittals. Construction documents shall be submitted in one or more sets and in such form and detail as required by the fire code official. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

105.4.2 Information on construction documents. Construction documents shall be drawn to scale upon suitable material. Electronic media documents are allowed to be submitted when approved by the fire code official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations as determined by the fire code official.

105.4.3 Applicant responsibility. It shall be the responsibility of the applicant to ensure that the construction documents include all of the fire protection requirements and the shop drawings are complete and in compliance with the applicable codes and standards.

105.4.4 Approved documents. Construction documents approved by the fire code official are approved with the intent that such construction documents comply in all respects with this code. Review and approval by the fire code official shall not relieve the applicant of the responsibility of compliance with this code.

105.4.5 Corrected documents. Where field conditions necessitate any substantial change from the approved construction documents, the fire code official shall have the authority to require the corrected construction documents to be submitted for approval.

105.4.6 Retention of construction documents. One set of construction documents shall be retained by the fire code official until final approval of the work covered therein. One set of approved construction documents shall be returned to the applicant, and said set shall be kept on the site of the building or work at all times during which the work authorized thereby is in progress.

105.5 Revocation. The fire code official is authorized to revoke a permit issued under the provisions of this code when it is found by inspection or otherwise that there has been a false statement or misrepresentation as to the material facts in the application or construction documents on which the permit or approval was based including, but not limited to, any one of the following:

1. The permit is used for a location or establishment other than that for which it was issued.
2. The permit is used for a condition or activity other than that listed in the permit.
3. Conditions and limitations set forth in the permit have been violated.
4. There have been any false statements or misrepresentations as to the material fact in the application for permit or plans submitted or a condition of the permit.
5. The permit is used by a different person or firm than the name for which it was issued.
6. The permittee failed, refused or neglected to comply with orders or notices duly served in accordance with the provisions of this code within the time provided therein.
7. The permit was issued in error or in violation of an ordinance, regulation or this code.

105.6 Required operational permits. The fire code official is authorized to issue operational permits for the operations set forth in Appendix Chapter 1, Sections 105.6.1 through 105.6.46.

105.6.1 Aerosol products. An operational permit is required to manufacture, store or handle an aggregate quantity of Level 2 or Level 3 aerosol products in excess of 500 pounds (227 kg) net weight.

105.6.2 Amusement buildings. An operational permit is required to operate a special amusement building.

105.6.3 Aviation facilities. An operational permit is required to use a Group H or Group S occupancy for aircraft servicing or repair and aircraft fuel-servicing vehicles. Additional permits required by other sections of this code include, but are not limited to, hot work, hazardous materials and flammable or combustible finishes.

105.6.4 Carnivals and fairs. An operational permit is required to conduct a carnival or fair.

105.6.5 Cellulose nitrate film. An operational permit is required to store, handle or use cellulose nitrate film in a Group A occupancy.

105.6.6 Combustible dust-producing operations. An operational permit is required to operate a grain elevator, flour starch mill, feed mill, or a plant pulverizing aluminum, coal, cocoa, magnesium, spices or sugar, or other operations producing combustible dusts as defined in Chapter 2.

105.6.7 Combustible fibers. An operational permit is required for the storage and handling of combustible fibers in quantities greater than 100 cubic feet (2.8 m^3).

Exception: A permit is not required for agricultural storage.

105.6.8 Compressed gases. An operational permit is required for the storage, use or handling at normal tempera-

ture and pressure (NTP) of compressed gases in excess of the amounts listed in Appendix Chapter 1, Table 105.6.8.

Exception: Vehicles equipped for and using compressed gas as a fuel for propelling the vehicle.

TABLE 105.6.8
PERMIT AMOUNTS FOR COMPRESSED GASES

TYPE OF GAS	AMOUNT (cubic feet at NTP)
Corrosive	200
Flammable (except cryogenic fluids and liquefied petroleum gases)	200
Highly toxic	Any Amount
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any Amount
Toxic	Any Amount

For SI: 1 cubic foot = 0.02832 m^3.

105.6.9 Covered mall buildings. An operational permit is required for:

1. The placement of retail fixtures and displays, concession equipment, displays of highly combustible goods and similar items in the mall.
2. The display of liquid- or gas-fired equipment in the mall.
3. The use of open-flame or flame-producing equipment in the mall.

105.6.10 Cryogenic fluids. An operational permit is required to produce, store, transport on site, use, handle or dispense cryogenic fluids in excess of the amounts listed in Appendix Chapter 1, Table 105.6.10.

Exception: Permits are not required for vehicles equipped for and using cryogenic fluids as a fuel for propelling the vehicle or for refrigerating the lading.

TABLE 105.6.10
PERMIT AMOUNTS FOR COMPRESSED GASES

TYPE OF CRYOGENIC FLUID	INSIDE BUILDING (gallons)	OUTSIDE BUILDING (GALLONS)
Flammable	More than 1	60
Inert	60	500
Oxidizing (includes oxygen)	10	50
Physical or health hazard not indicated above	Any Amount	Any Amount

For SI: 1 gallon = 3.785 L

105.6.11 Cutting and welding. An operational permit is required to conduct cutting or welding operations within the jurisdiction.

CFC Section 105.6.12 is amended to read as follows:

105.6.12 Dry Cleaning Plants. An operational permit is required to engage in the business of dry cleaning utilizing flammable or combustible liquids as the cleaning solvent. Such permits will prescribe the class of system to be used.

105.6.13 Exhibits and trade shows. An operational permit is required to operate exhibits and trade shows.

105.6.14 Explosives. An operational permit is required for the manufacture, storage, handling, sale or use of any quantity of explosives, explosive materials, fireworks or pyrotechnic special effects within the scope of Chapter 33.

Exception: Storage in Group R-3 occupancies of smokeless propellant, black powder and small arms primers for personal use, not for resale and in accordance with Section 3306.

105.6.15 Fire hydrants and valves. An operational permit is required to use or operate fire hydrants or valves intended for fire suppression purposes which are installed on water systems and accessible to a fire apparatus access road that is open to or generally used by the public.

Exception: A permit is not required for authorized employees of the water company that supplies the system or the fire department to use or operate fire hydrants or valves.

105.6.16 Flammable combustible liquids. An operational permit is required:

1. To use or operate a pipeline for the transportation within facilities of flammable or combustible liquids. This requirement shall not apply to the off-site transportation in pipelines regulated by the Department of Transportation (DOTn) nor does it apply to piping systems.
2. To store, handle or use Class I liquids in excess of 5 gallons (19 L) in a building or in excess of 10 gallons (37.9 L) outside of a building, except that a permit is not required for the following:
   2.1. The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant, unless such storage, in the opinion of the code official, would cause an unsafe condition.
   2.2. The storage or use of paints, oils, varnishes or similar flammable mixtures when such liquids are store for maintenance, painting or similar purposes for a period of not more than 30 days.
3. To store, handle or use Class II or Class IIIA liquids in excess of 25 gallons (95 L) in a building or in excess of 60 gallons (227 L) outside a building, except for fuel oil used in connection with oil-burning equipment.
4. To remove Class I or Class II liquids from an underground storage tank used for fueling motor vehicles by any means other than the approved, stationary on-site pumps normally used for dispensing purposes.
5. To operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed or used.
6. To place temporarily out of service (for more than 90 days) an underground, protected above-ground or above-ground flammable or combustible liquid tank.

7. To change the type of contents stored in a flammable or combustible liquid tank to a material which poses a greater hazard than that for which the tank was designed and constructed.
8. To manufacture, process, blend or refine flammable or combustible liquids.
9. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments.
10. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments.

105.6.17 Floor finishing. An operation permit is required for floor finishing or surfacing operations exceeding 350 square feet (33 m^2) using Class I or Class II liquids.

105.6.18 Fruit and crop ripening. An operation permit is required to operate a fruit-, or crop-ripening facility or conduct a fruit-ripening process using ethylene gas.

105.6.19 Fumigation and thermal insecticidal fogging. An operational permit is required to operate a business of fumigation or thermal insecticidal fogging and to maintain a room, vault or chamber in which a toxic or flammable fumigant is used.

105.6.20 Hazardous materials. An operational permit is required to store, transport on site, dispense, use or handle hazardous materials in excess of the amounts listed in Table 105.6.20.

CFC Section 105.6.20.1 is added to read as follows:

105.6.20.1 Sale or delivery without permit. No person shall sell, deliver, or cause to be delivered any hazardous commodity to any person not in possession of a valid permit when such permit is required by the provisions of this code.

105.6.21 HPM facilities. An operational permit is required to store, handle or use hazardous production materials.

105.6.22 High-piled storage. An operational permit is required to use a building or portion thereof as a high-piled storage area exceeding 500 square feet (45 m^2).

105.6.23 Hot work operations. An operational permit is required for hot work including, but not limited to:

1. Public exhibitions and demonstrations where hot work is conducted.
2. Use of portable hot work equipment inside a structure.

   Exception: Work that is conducted under a construction permit.
3. Fixed-site hot work equipment such as welding booths.
4. Hot work conducted within a hazardous fire area.
5. Application of roof coverings with the use of an open-flame device.
6. When approved, the fire code official shall issue a permit to carry out a Hot Work Program. This program allows approved personnel to regulate their facility's hot work operations. The approved personnel shall be trained in the fire safety aspects denoted in this chapter and shall be responsible for issuing permits requiring compliance with the requirements found in Chapter 26. These permits shall be issued only to their employees or hot work operations under their supervision.

[**CONTINUED ON PAGE 499-A]**

TABLE 105.6.20
PERMIT AMOUNTS FOR HAZARDOUS MATERIALS

TYPE OF MATERIAL	AMOUNT
Combustible liquids	See Section 105.6.16
Corrosive materials	
Gases	See Section 105.6.8
Liquids	55 gallons
Solids	500 pounds
Explosive materials	See Section 105.6.14
Flammable materials	
Gases	See Section 105.6.8
Liquids	See Section 105.6.16
Solids	100 pounds
Highly toxic materials	
Gases	See Section 105.6.8
Liquids	Any Amount
Solids	Any Amount
Oxidizing materials	
Gases	See Section 105.6.8
Liquids	
Class 4	Any Amount
Class 3	1 gallon[a]
Class 2	10 gallons
Class 1	55 gallons
Solids	
Class 4	Any Amount
Class 3	10 pounds[b]
Class 2	100 pounds
Class 1	500 pounds
Organic peroxides	
Liquids	
Class I	Any Amount
Class II	Any Amount
Class III	1 gallon
Class IV	2 gallons
Class V	No Permit Required
Solids	
Class I	Any Amount
Class II	Any Amount
Class III	10 pounds
Class IV	20 pounds
Class V	No Permit Required
Pyrophoric materials	
Gases	Any Amount
Liquids	Any Amount
Solids	Any Amount
Toxic materials	
Gases	See Section 105.6.8
Liquids	10 gallons
Solids	100 pounds
Unstable (reactive) materials	
Liquids	
Class 4	Any Amount
Class 3	Any Amount
Class 2	5 gallons
Class 1	10 gallons
Solids	
Class 4	Any Amount
Class 3	Any Amount
Class 2	50 pounds
Class 1	100 pounds
Water-reactive materials	
Liquids	
Class 3	Any Amount
Class 2	5 gallons
Class 1	55 gallons
Solids	
Class 3	Any Amount
Class 2	50 pounds
Class 1	500 pounds

For SI: 1 gallon = 3.785 L, 1 pound = 0.454 kg.

a. 20 gallons when Table 2703.1.1(1) Note k applies and hazard identification signs in accordance with Section 2703.5 are provided for quantities of 20 gallons or less.

b. 200 pounds when Table 2703.1.1(1) Note k applies and hazard identification signs in accordance with Section 2703.5 are provided for quantities of 200 pounds or less.

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105.6.24 Industrial ovens. An operational permit is required for operation of industrial ovens regulated by Chapter 21.

105.6.25 Lumber yards and woodworking plants. An operational permit is required for the storage or processing of lumber exceeding 100,000 board feet (8,333 ft^3) (236 m^3).

105.6.26 Liquid- or gas-fueled vehicles or equipment in assembly buildings. An operational permit is required to display, operate or demonstrate liquid- or gas-fueled vehicles or equipment in assembly buildings.

105.6.27 LP-gas. An operational permit is required for:

1. Storage and use of LP-gas.

   Exception: A permit is not required for individual containers with a 500-gallon (1893 L) water capacity or less serving occupancies in Group R-3.

2. Operation of cargo tankers that transport LP-gas.

105.6.28 Magnesium. An operational permit is required to melt, cast, heat treat or grind more than 10 pounds (4.54 kg) of magnesium.

105.6.29 Miscellaneous combustible storage. An operational permit is required to store in any building or upon any premises in excess of 2,500 cubic feet (71 m^3) gross volume of combustible empty packing cases, boxes, barrels or similar containers, rubber tires, rubber, cork or similar combustible material.

105.6.30 Open burning. An operational permit is required for the kindling or maintaining of an open fire or a fire on any public street, alley, road, or other public or private ground. Instructions and stipulations of the permit shall be adhered to.

Exception: Recreational fires.

105.6.31 Open flames and torches. An operational permit is required to remove paint with a torch; or to use a torch or open-flame device in a hazardous fire area.

105.6.32 Open flames and candles. An operational permit is required to use open flames or candles in connection with assembly areas, dining areas of restaurants or drinking establishments.

105.6.33 Organic coatings. An operational permit is required for any organic-coating manufacturing operation producing more than 1 gallon (4 L) of an organic coating in one day.

105.6.34 Places of assembly. An operational permit is required to operate a place of assembly.

105.6.35 Private fire hydrants. An operational permit is required for the removal from service, use or operation of private fire hydrants.

Exception: A permit is not required for private industry with trained maintenance personnel, private fire brigade or fire departments to maintain, test and use private hydrants.

105.6.36 Pyrotechnic special effects material. An operational permit is required for use and handling of pyrotechnic special effects material.

105.6.37 Pyroxylin plastics. An operational permit is required for storage or handling of more than 25 pounds (11 kg) of cellulose nitrate (pyroxylin) plastics and for the assembly or manufacture of articles involving pyroxylin plastics.

105.6.38 Refrigeration equipment. An operational permit is required to operate a mechanical refrigeration unit or system regulated by Chapter 6.

105.6.39 Repair garages and motor fuel-dispensing facilities. An operational permit is required for operation of repair garages and automotive, marine and fleet motor fuel-dispensing facilities.

105.6.40 Rooftop heliports. An operational permit is required for the operation of a rooftop heliport.

105.6.41 Spraying or dipping. An operational permit is required to conduct a spraying or dipping operation utilizing flammable or combustible liquids or the application of combustible powders regulated by Chapter 15.

105.6.42 Storage of scrap tires and tire byproducts. An operational permit is required to establish, conduct or maintain storage of scrap tires and tire byproducts that exceeds 2,500 cubic feet (71 m^3) of total volume of scrap tires and for indoor storage of tires and tire byproducts.

105.6.43 Temporary membrane structures, tents and canopies. An operational permit is required to operate an air-supported temporary membrane structure or a tent having an area in excess of 200 square feet (19 m^2), or a canopy in excess of 400 square feet (37 m^2).

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Fabric canopies open on all sides which comply with all of the following:
   2.1. Individual canopies having a maximum size of 700 square feet (65 m^2).
   2.2. The aggregate area of multiple canopies placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m^2) total.
   2.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.

105.6.44 Tire-rebuilding plants. An operational permit is required for the operation and maintenance of a tire-rebuilding plant.

105.6.45 Waste handling. An operational permit is required for the operation of wrecking yards, junk yards and waste material-handling facilities.

105.6.46 Wood products. An operational permit is required to store chips, hogged material, lumber or plywood in excess of 200 cubic feet (6 m^3).

105.6.47 Additional Permits. *In addition to the permits required by Appendix Chapter 1, Section 105.6, the following permits shall be obtained from the Bureau of Fire Prevention prior to engaging in the following activities, operations, practices or functions:*

1. ***Production facilities.*** *To change use or occupancy, or allow the attendance of a live audience, or for wrap parties.*
2. ***Pyrotechnics and special effects.*** *To use pyrotechnic special effects, open flame, use of flammable or combustible liquids and gases, welding, and the parking of motor vehicles in any building or location used for the purpose of motion picture, television and commercial production.*
3. ***Live audiences.*** *To install seating arrangements for live audiences in approved production facilities, production studios and sound stages. See Chapter 46.*

105.7 Required construction permits. The fire code official is authorized to issue construction permits for work as set forth in Appendix Chapter 1, Sections 105.7.1 through 105.7.13.

105.7.1 Automatic fire-extinguishing systems. A construction permit is required for installation of or modification to an automatic fire-extinguishing system. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

105.7.2 Battery systems. A permit is required to install stationary storage battery systems having a liquid capacity of more than 50 gallons (189 L).

105.7.3 Compressed gases. When the compressed gases in use or storage exceed the amounts listed in Appendix Chapter 1, Table 105.6.8, a construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a compressed gas system.

Exceptions:

1. Routine maintenance.
2. For emergency repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

The permit applicant shall apply for approval to close storage, use or handling facilities at least 30 days prior to the termination of the storage, use or handling of compressed or liquefied gases. Such application shall include any change or alteration of the facility closure plan filed pursuant to Section 2701.6.3. The 30-day period is not applicable when approved based on special circumstances requiring such waiver.

105.7.4 Fire alarm and detection systems and related equipment. A construction permit is required for installation of or modification to fire alarm and detection systems and related equipment. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

105.7.5 Fire pumps and related equipment. A construction permit is required for installation of or modification to fire pumps and related fuel tanks, jockey pumps, controllers, and generators. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

105.7.6 Flammable and combustible liquids. A construction permit is required:

1. To repair or modify a pipeline for the transportation of flammable or combustible liquids.
2. To install, construct or alter tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed or used.
3. To install, alter, remove, abandon or otherwise dispose of a flammable or combustible liquid tank.

105.7.7 Hazardous materials. A construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a storage facility or other area regulated by Chapter 27 when the hazardous materials in use or storage exceed the amounts listed in Appendix Chapter 1, Table 105.6.20.

Exceptions:

1. Routine maintenance.
2. For emergency repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

105.7.8 Industrial ovens. A construction permit is required for installation of industrial ovens covered by Chapter 21.

Exceptions:

1. Routine maintenance.
2. For repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

105.7.9 LP-gas. A construction permit is required for installation of or modification to an LP-gas system.

105.7.10 Private fire hydrants. A construction permit is required for the installation or modification of private fire hydrants.

105.7.11 Spraying or dipping. A construction permit is required to install or modify a spray room, dip tank or booth.

105.7.12 Standpipe systems. A construction permit is required for the installation, modification, or removal from service of a standpipe system. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

105.7.13 Temporary membrane structures, tents and canopies. A construction permit is required to erect an

air-supported temporary membrane structure or a tend having an area in excess of 200 square feet (19 m^2), or a canopy in excess of 400 square feet (37 m^2).

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Funeral tents and curtains or extensions attached thereto, when used for funeral services.
3. Fabric canopies and awnings open on all sides which comply with all of the following:
   - 3.1 Individual canopies shall have a maximum size of 700 square feet (65 m^2) .
   - 3.2 The aggregate area of multiple canopies placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m^2) total.
   - 3.3 A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be maintained.

SECTION 106
INSPECTIONS

106.1 Inspection authority. The fire code official is authorized to enter and examine any building, structure, marine vessel, vehicle or premises in accordance with Appendix Chapter 1, Section 104.3 for the purpose of enforcing this code.

106.2 Inspections. The fire code official is authorized to conduct such inspections as are deemed necessary to determine the extent of compliance with the provisions of this code and to approve reports of inspection by approved agencies or individuals. All reports of such inspections shall be prepared and submitted in writing for review and approval. Inspection reports shall be certified by a responsible officer of such approved agency or by the responsible individual. The fire code official is authorized to engage such expert opinion as deemed necessary to report upon unusual, detailed or complex technical issues subject to the approval of the governing body.

106.3 Concealed work. Whenever any installation subject to inspection prior to use is covered or concealed without having first been inspected, the fire code official shall have the authority to require that such work be exposed for inspection.

106.4 Approvals. Approval as the result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel provisions of this code or of other ordinances of the jurisdiction shall not be valid.

SECTION 107
MAINTENANCE

107.1 Maintenance of safeguards. Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, or any other feature is required for compliance with the provisions of this code, or otherwise installed, such device, equipment, system, condition, arrangement, level of protection, or other feature shall thereafter be continuously maintained in accordance with this code and applicable referenced standards.

107.2 Testing and operation. Equipment requiring periodic testing or operation to ensure maintenance shall be tested or operated as specified in this code.

107.2.1 Test and inspection records. Required test and inspection records shall be available to the fire code official at all times or such records as the fire code official designates shall be filed with the fire code official.

107.2.2 Reinspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made so as to achieve compliance with this code. The work or installation shall then be resubmitted to the fire code official for inspection and testing.

107.3 Supervision. Maintenance and testing shall be under the supervision of a responsible person who shall ensure that such maintenance and testing are conducted at specified intervals in accordance with this code.

107.4 Rendering equipment inoperable. Portable or fixed fire-extinguishing systems or devices and fire-warning systems shall not be rendered inoperative or inaccessible except as necessary during emergencies, maintenance, repairs, alterations, drills or prescribed testing.

107.5 Owner/occupant responsibility. Correction and abatement of violations of this code shall be the responsibility of the owner. If an occupant creates, or allows to be created, hazardous conditions in violation of this code, the occupant shall be help responsible for the abatement of such hazardous conditions.

107.6 Overcrowding. Overcrowding or admittance of any person beyond the approved capacity of a building or a portion thereof shall not be allowed. The fire code official, upon finding any overcrowding conditions or obstructions in aisles, passageways or other means of egress, or upon finding any condition which constitutes a life safety hazard shall be authorized to cause the event to be stopped until such condition or obstruction is corrected.

SECTION 108
BOARD OF APPEALS

CFC § 108.1 is amended to read as follows:

108.1. Appeals to determine the suitability of alternate materials and types of construction, and to provide for reasonable interpretations of the provisions of this code, will be heard and determined in the following manner:

1. The appeal will be first directed in writing to the fire code official. The fire code official will render a decision and finding in writing to the appellant.
2. In the event an appellant is not satisfied with the decision and finding rendered by the fire code official, a further appeal may be made in writing to the Local Appeals Board (Board) within 30 days of the date of decision and findings made by the chief. This Board, established in Section 108.8 of the California Building Code as adopted by the City (Chapter 12.115 of Division 12 of the San Buenaventura Municipal Code), will also act as the Board of Appeals with respect to the CFC.

APPENDIX I is added to read as follows:

APPENDIX I
FIRE HAZARD ABATEMENT

I101.1 Scope. This appendix contains provisions intended to identify hazard areas and mitigate the risk to life and structures from intrusion of fire from wildland fires and fire exposure from adjacent structures, as well as to mitigate fires from spreading to wildland fuels that may threaten to destroy life, overwhelm fire suppression capabilities, or result in large property loss.

I101.2 Purpose. The purpose of this appendix is to establish minimum requirements in wildland-urban interface areas to increase the ability of buildings to resist the intrusion of flame or burning embers being projected by a vegetation fire. Such provisions include the identification of hazardous fire areas that require applicable defensible space provisions included in this code and enforced by the fire code official, and applicable state and local fire-resistive building standards that are required by the local building official.

I102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

Combustible Material. Includes seasonal and recurrent weeds, stubble, brush, dry leaves, tumbleweeds, rubbish, litter, or flammable materials of any kind.

Defensible Space. An area either natural or man-made where material capable of allowing a fire to spread unchecked has been treated, cleared, or modified to slow the rate and intensity of an advancing wildfire, and which may be used for fire suppression operations to be conducted.

Hazardous Fire Area is and which is covered with grass, grain, brush, or forest, whether publicly or privately owned, which is so situated, or is in such an inaccessible location, that a fire originating upon such land would present an abnormally difficult task of suppression or would potentially result in great and unusual damage due to fire or resulting erosion. The fire code official shall designate such areas and is authorized to utilize the following as reference: (i) the definition of Hazardous Watershed Fire Area; (ii) the Local Agency Fire Hazard Severity Zone Maps designated pursuant to California Government Code Sections 51175 through 51189; and (iii) the International Wildland-Urban Interface Code.

Hazardous Watershed Fire Area is a location within 500 feet of a forest or brush, grass, or grain-covered land, exclusive of small individual lots or parcels of land located outside of a forest or brush, grass, or grain-covered area.

Parcel is a portion of land of any size, the area of which is determined by the assessor's maps and records, and may be identified by an assessor's parcel number, whether or not any buildings are present.

Public Nuisance is a declaration by the fire code official that the presence of combustible material on a parcel creates a fire hazard.

Wildland-Urban Interface Area is that geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

I103 Unlawful Disposal. Every person who places, deposits, or dumps combustible material on a parcel, whether or not he owns such parcel, or whether or not he so places, deposits, or dumps on such parcel with the consent of the owner thereof, is subject to civil penalties as set forth in SBMC Chapter 1.050 and to criminal penalties as set forth in the California Health and Safety Code, Section 13871.

I104 Clearance of Brush, Vegetative Growth, and Combustible Material from Parcels. All parcels declared a public nuisance shall be cleared entirely of combustible material. If the fire code official determines this impractical due to hazards posed by the resulting clearance, the provisions of Section I105 may be used.

I105 Clearance of Brush and Vegetative Growth Away from Structures. Any person owning, leasing, controlling, operating or maintaining any building in, upon, or adjacent to any hazardous fire area, and any person owning, leasing, or controlling any land adjacent to such building, shall at all times maintain, around and adjacent to such building, an effective firebreak made by removing and clearing away all combustible material for a distance of not less than 100 feet from all portions of the building.

EXCEPTION: Single specimens or stands of protected species of trees, ornamental shrubbery, or similar plants used as ground covers, provided they do not form a means of rapidly transmitting a fire from the native growth to any building.

I106 Prosecution. The fire code official shall serve a written order upon the owner of a parcel when in the opinion of the fire code official a public nuisance exists thereon. The order shall direct such owner to remove or abate the public nuisance per the procedures and timeframes outlined in SBMC Chapter 8.010.

Appendix J is added to read as follows:

APPENDIX J
FIRE PROTECTION SYSTEMS

J101 General. An Automatic fire extinguishing system shall be installed in all occupancies and locations as set forth in Appendix J and Chapter 9.

J102 Definitions.

Building/Structure, Existing means buildings or structures permitted and constructed, and for which final authorization for occupancy is received prior to November 6, 1991, from the authority having jurisdiction.

Building/Structure, New means buildings or structures permitted and constructed, and for which final authorization for occupancy is received on or after November 6, 1991, from the authority having jurisdiction.

Floor Area is as defined by the California Building Code

Multiple Use Occupancies are buildings or structures that contain more than one occupancy group listed in Section 202, as determined by the fire code official.

J103 Where required, approved automatic sprinkler systems shall be provided in new and existing buildings/structures in the locations as described in this section.

J103.1 New Buildings/Structures. In all new buildings or structures to be occupied by Groups A, B, E, F, H, I, L M, R, S, U, or mixed use occupancy classifications, when over 500 square feet in floor area.

EXCEPTIONS:

1. Detached U occupancy carports used for motor vehicle storage, and intended for no other use or storage, that are open on sixty percent (60%) of exterior walls. Such carports are limited to three thousand (3,000) square feet or less in floor area and will be constructed entirely of noncombustible materials. Treated lumber is not permitted.
2. Detached residential U occupancy carports or garages limited to one thousand (1,000) square feet or less in floor area.
3. Non-combustible detached car wash structures provided the car wash is separated from other structures with an assumed property line.
4. Public schools shall comply with Section 903.2.2 of this code.

J103.2 Existing Buildings/Structures.

J103.2.1 In all existing residential buildings or structures when cumulative additions are made which result in a total floor area expansion of 100% or greater from that authorized as of November 6, 1991.

J103.2.2 In all other existing buildings/structures, when cumulative additions are made which results in a total building/structure floor area expansion equal to or greater than five thousand (5000) square feet and the additions exceed the greater of:

a. Ten percent (10%) of the original floor area, or

b. Two thousand five hundred (2500) square feet.

EXCEPTION: Occupancy types required to have an automatic fire sprinkler system installed by the California Building Code when the square footage is less than 5,000 square feet will comply with the requirements of the California Building Code.

J103.2.3 In all existing buildings/structures having a total floor area equal to or greater than five thousand (5,000) square feet, when a change in occupancy classification or use occurs that results in a more hazardous use, based on life and fire risk that is greater than that allowed for by the existing occupancy classification or use.

EXCEPTION: Occupancy types required to have an automatic fire sprinkler system installed by the California Building Code when the square footage is less than 5,000 square feet will comply with the requirements of the California Building Code.

J103.2.4 In all existing buildings/structures where renovations require a building permit and the total area of the ceiling covering removed or exposed exceeds 75% or greater of the total floor area of the building/structure.

EXCEPTION: Occupancy types required to have an automatic fire sprinkler system installed by the California Building Code will comply with the requirements of the California Building Code.

J104 Installation Requirements

J104.1 Modifications

J104.1.1 For the purposes of this Appendix, firewalls shall not be considered as creating separate buildings.

J104.1.2 Where allowed, sprinkler systems installed in accordance with NFPA 13D in Group R-3 occupancies shall provide sprinkler protection for attached Group U occupancies.

J104.1.3 When NFPA 13R sprinkler systems are provided in Group R occupancies, exceptions to, or reductions in, code requirements are not allowed based on the installation of either a NFPA 13R or NFPA 13 sprinkler system. This shall also include requirements in the California Code of Regulations, Title 24, Part 2 and Part 9.

J104.1.4 Buildings/structures containing multiple use occupancies which include one or more Group R occupancies shall be protected throughout with fire sprinklers that meet NFPA 13 standards.

2007 ELECTRICAL CODE INSERTS

90.6 Formal Interpretations. To promote uniformity of interpretation and application of the provisions of this *Code,* formal interpretation procedures have been established and are found in the NFPA Regulations Governing Committee Projects.

90.7 Examination of Equipment for Safety. For specific items of equipment and materials referred to in this *Code,* examinations for safety made under standard conditions provide a basis for approval where the record is made generally available through promulgation of organizations properly equipped and qualified for experimental testing, inspections of the run of goods at factories, and service-value determination through field inspections. This avoids the necessity for repetition of examinations by different examiners, frequently with inadequate facilities for such work, and the confusion that would result from conflicting reports on the suitability of devices and materials examined for a given purpose.

It is the intent of this *Code* that factor-installed internal wiring or the construction of equipment need not be inspected at the time of installation of the equipment, except to detect alterations or damage, if the equipment has been listed by a qualified electrical testing laboratory that is recognized as having the facilities described in the preceding paragraph and that requires suitability for installation in accordance with this *Code*.

FPN No. 1: See requirements in 110.3.

FPN No. 2: *Listed* is defined in Article 100.

FPN No. 3: Annex A contains an informative list of product safety standards for electrical equipment.

90.8 Wiring Planning.

(A) Future Expansion and Convenience. Plans and specifications that provide ample space in raceways, spare raceways, and additional spaces allow for future increases in electric power and communication circuits. Distribution centers located in readily accessible locations provide convenience and safety of operation.

(B) Number of Circuits in Enclosures. It is elsewhere provided in this *Code* that the number of wires and circuits confined in a single enclosure be varyingly restricted. Limiting the number of circuits in a single enclosure minimizes the effects from a short circuit or ground fault in one circuit.

90.9 Units of Measurement.

(A) Measurement System of Preference. For the purpose of this *Code*, metric units of measurement are in accordance with the modernized metric system known as the International System of Units (SI).

(B) Dual System of Units. SI units shall appear first, and inch-pound units shall immediately follow in parentheses. Conversion from inch-pound units to SI units shall be based on hard conversion except as provided in 90.9(C).

(C) Permitted Uses of Soft Conversion. The cases given in 90.9(C)(1) through (C)(4) shall not be required to use hard conversion and shall be permitted to use soft conversion.

(1) Trade Sizes. Where the actual measured size of a product is not the same as the normal size, trade size designators shall be used rather than dimensions. Trade practices shall be followed in all cases.

(2) Extracted Material. Where material is extracted from another standard, the context of the original material shall not be compromised or violated. Any editing of the extracted text shall be confined to making the style consistent with that of the *NEC*.

(3) Industry Practice. Where industry practice is to express units in inch-pound units, the inclusion of SI units shall not be required.

(4) Safety. Where a negative impact on safety would result, soft conversion shall be used.

(D) Compliance. Conversion from inch-pound units to SI units shall be permitted to be an approximate conversion. Compliance with the numbers shown in either the SI system or the inch-pound system shall constitute compliance with this *Code*.

FPN No. 1: Hard conversion is considered a change in dimensions or properties of an item into new sizes that might or might not be interchangeable with the sizes used in the original measurement. Soft conversion is considered a direct mathematical conversion and involves a change in the description of an existing measurement but not in the actual dimension.

FPN No. 2: SI conversions are based on IEEE/ASTM SI 10-1997, *Standard for the Use of the International System of Units (SI): The Modern Metric System.*

CEC Section 90-10 is added to read as follows:

90.10 Administration. The 2007 California Building Code as adopted in the SBMC specifies the applicable fees and administrative regulations for this article.

Chapter 1 General

ARTICLE 100
Definitions

Scope. This article contains only those definitions essential to the proper application of this *Code*. It is not intended to include commonly defined general terms or commonly defined technical terms from related codes and standards. In general, only those terms that are used in two or more articles are defined in Article 100. Other definitions are included in the article in which they are used but may be referenced in Article 100.

Part I of this article contains definitions intended to apply wherever the terms are used throughout this *Code*. Part II contains definitions applicable only to the parts of articles specifically covering installations and equipment operating at over 600 volts, nominal.

I. General

Accessible (as applied to equipment). Admitting close approach; not guarded by locked doors, elevation, or other effective means.

Accessible (as applied to wiring methods). Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in by the structure or finish of the building.

Accessible, Readily (Readily Accessible). Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth.

Ampacity. The current, in amperes, that a conductor can carry continuously under the conditions of use without exceeding its temperature rating.

Appliance. Utilization equipment, generally other than industrial, that is normally built in standardized sizes or types and is installed or connected as a unit to perform one or more functions such as clothes washing, air conditioning, food mixing, deep frying, and so forth.

Approved. Acceptable to the authority having jurisdiction.

Askarel. A generic term for a group of nonflammable synthetic chlorinated hydrocarbons used as electrical insulating media. Askarels of various compositional types are used. Under arcing conditions, the gases produced, while consisting predominantly of noncombustible hydrogen chloride, can include varying amounts of combustible gases, depending on the askarel type.

Attachment Plug (Plug Cap) (Plug). A device that, by insertion in a receptacle, establishes a connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle.

Authority Having Jurisdiction (AHJ). The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure.

FPN: The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the AHJ may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the AHJ. In many circumstances, the property owner or his or her designated agent assumes the role of the AHJ; at government installations, the commanding officer or departmental official may be the AHJ.

Automatic. Self-acting, operating by its own mechanism when actuated by some impersonal influence, as, for example, a change in current, pressure, temperature, or mechanical configuration.

Bathroom. An area including a basin with one or more of the following: a toilet, a tub, or a shower.

Bonding (Bonded). The permanent joining of metallic parts to form an electrically conductive path that ensures electrical continuity and the capacity to conduct safely any current likely to be imposed.

Bonding Jumper. A reliable conductor to ensure the required electrical conductivity between metal parts required to be electrically connected.

Bonding Jumper, Equipment. The connection between two or more portions of the equipment grounding conductor.

Bonding Jumper, Main. The connection between the grounded circuit conductor and the equipment grounding conductor at the service.

Bonding Jumper, System. The connection between the grounded circuit conductor and the equipment grounding conductor at a separately derived system.

Branch Circuit. The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s).

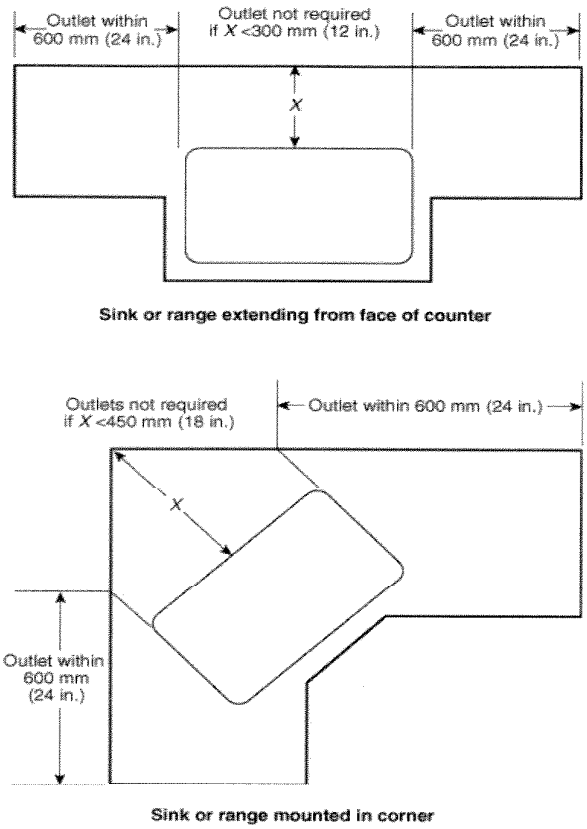

Figure 210.52 Determination of Area Behind Sink or Range.

(4) Separate Spaces. Countertop spaces separated by rangetops, refrigerators, or sinks shall be considered as separate countertop spaces in applying the requirements of 210.52(C)(1), (C)(2), and (C)(3).

(5) Receptacle Outlet Location. Receptacle outlets shall be located above, but not more than 500 mm (20 in.) above, the countertop. Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1), Exception, or appliances occupying dedicated space shall not be considered as these required outlets.

Exception to (5): To comply with the conditions specified in (1) or (2), receptacle outlets shall be permitted to be mounted not more than 300 mm (12 in.) below the countertop. Receptacles mounted below a countertop in accordance with this exception shall not be located where the countertop extends more than 150 mm (6 in.) beyond its support base.

(1) Construction for the physically impaired

(2) On island and peninsular countertops where the countertop is flat across its entire surface (no backsplashes, dividers, etc.) and there are no means to mount a receptacle within 500 mm (20 in.) above the countertop, such as an overhead cabinet

(D) Bathrooms. In dwelling units, at least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each basin. The receptacle outlet shall be located on a wall or partition that is adjacent to the basin or basin countertop.

Exception: The receptacle shall not be required to be mounted in the wall or partition where it is installed on the side or face of the basin cabinet not more than 300 mm (12 in.) below the countertop.

(E) Outdoor Outlets. For a one-family dwelling and each unit of a two-family dwelling that is at grade level, at least one receptacle outlet accessible at grade level and not more than 2.0 m (6½ ft) above grade shall be installed at the front and back of the dwelling.

For each dwelling unit of a multifamily dwelling where the dwelling unit is located at grade level and provided with individual exterior entrance/egress, at least one receptacle outlet accessible from grade level and not more than 2.0 m (6½ ft) above grade shall be installed. See 210.8(A)(3).

(F) Laundry Areas. In dwelling units, at least one receptacle outlet shall be installed for the laundry.

Exception No. 1: In a dwelling unit that is an apartment or living area in a multifamily building where laundry facilities are provided on the premises and are available to all building occupants, a laundry receptacle shall not be required.

Exception No. 2: In other than one-family dwellings where laundry facilities are not to be installed or permitted, a laundry receptacle shall not be required.

(G) Basements and Garages. For a one-family dwelling, at least one receptacle outlet, in addition to any provided for laundry equipment, shall be installed in each basement and in each attached garage, and in each detached garage with electric power. See 210.8(A)(2) and (A)(5). Where a portion of the basement is finished into one or more habitable rooms, each separate unfinished portion shall have a receptacle outlet installed in accordance with this section.

(H) Hallways. In dwelling units, hallways of 3.0 m (10 ft) or more in length shall have at least one receptacle outlet.

As used in this subsection, the hall length shall be considered the length along the centerline of the hall without passing through a doorway.

210.60 Guest Rooms or Guest Suites.

(A) General. Guest rooms or guest suites in hotels, motels, and similar occupancies shall have receptacle outlets installed in accordance with 210.52(A) and 210.52(D). Guest rooms or guest suites provided with permanent provisions for cooking shall have receptacle outlets installed in accordance with all of the applicable rules in 210.52.

(B) Receptacle Placement. In applying the provisions of 210.52(A), the total number of receptacle outlets shall not be less than the minimum number that would comply with the provisions of that section. These receptacle outlets shall be permitted to be located conveniently for permanent furniture layout. At least two receptacle outlets shall be readily accessible. Where receptacles are installed behind the bed, the receptacle shall be located to prevent the bed from contacting any attachment plug that may be installed or the receptacle shall be provided with a suitable guard.

210.62 Show Windows. At least one receptacle outlet shall be installed directly above a show window for each 3.7 linear m (12 linear ft) or major fraction thereof of show window area measured horizontally at its maximum width.

210.63 Heating, Air-Conditioning, and Refrigeration Equipment Outlet. A 125-volt, single-phase, 15- or 20- ampere-rated receptacle outlet shall be installed at an accessible location for the servicing of heating, air-conditioning, and refrigeration equipment. The receptacle shall be located on the same level and within 7.5 m (25 ft) of the heating, air-conditioning, and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the equipment disconnecting means.

Exception: A receptacle outlet shall not be required at one- and two-family dwellings for the service of evaporative coolers.

FPN: See 210.8 for ground-fault circuit-interrupter requirements.

210.70 Lighting Outlets Required. Lighting outlets shall be installed where specified in 210.70(A), (B), and (C).

(A) Dwelling Units. In dwelling units, lighting outlets shall be installed in accordance with 210.70(A)(1), (A)(2), and (A)(3).

(1) Habitable Rooms. At least one wall switch-controlled lighting outlet shall be installed in every habitable room and bathroom.

Exception No. 1: In other than kitchens and bathrooms, one or more receptacles controlled by a wall switch shall be permitted in lieu of lighting outlets.

Exception No. 2: Lighting outlets shall be permitted to be controlled by occupancy sensors that are (1) in addition to wall switches or (2) located at a customary wall switch location and equipped with a manual override that will allow the sensor to function as a wall switch.

(2) Additional Locations. Additional lighting outlets shall be installed in accordance with (A)(2)(a), (A)(2)(b), and (A)(2)(c).

(a) At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, attached garages, and detached garages with electric power.

(b) For dwelling units, attached garages, and detached garages with electric power, at least one wall switch-controlled lighting outlet shall be installed to provide illumination on the exterior side of outdoor entrances or exits with grade level access. A vehicle door in a garage shall not be considered as an outdoor entrance or exit.

(c) Where one or more lighting outlet(s) are installed for interior stairways, there shall be a wall switch at each floor level, and landing level that includes an entryway, to control the lighting outlet(s) where the stairway between floor levels has six risers or more.

Exception to (A)(2)(a), (A)(2)(b), and (A)(2)(c): In hallways, stairways, and at outdoor entrances, remote, central, or automatic control of lighting shall be permitted.

(3) Storage or Equipment Spaces. For attics, underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring servicing. At least one point of control shall be at the usual point of entry to these spaces. The lighting outlet shall be provided at or near the equipment requiring servicing.

(B) Guest Rooms or Guest Suites. In hotels, motels, or similar occupancies, guest rooms or guest suites shall have at least one wall switch-controlled lighting outlet installed in every habitable room and bathroom.

Exception No. 1: In other than bathrooms and kitchens where provided, one or more receptacles controlled by a wall switch shall be permitted in lieu of lighting outlets.

Exception No. 2: Lighting outlets shall be permitted to be controlled by occupancy sensors that are (1) in addition to wall switches or (2) located at a customary wall switch location and equipped with a manual override that will allow the sensor to function as a wall switch.

(C) Other Than Dwelling Units. For attics and underfloor spaces containing equipment requiring servicing, such as heating, air-conditioning, and refrigeration equipment, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed in such spaces. At least one point of control shall be at the usual point of entry to these spaces. The lighting outlet shall be provided at or near the equipment requiring servicing.

CEC Section 210-70 is amended to add subsection (d) to read as follows:

210.70(d) Accessory building. Buildings accessory to dwellings or duplexes, excluding patios, porches and carports, shall be wired with a minimum of one (1) switched lighting outlet and one (1) grounding type receptacle on a separate fifteen (15) to twenty (20) ampere circuit.

Exception: For jacketed multiconductor service cable without splice.

(F) Drip Loops. Drip loops shall be formed on individual conductors. To prevent the entrance of moisture, service-entrance conductors shall be connected to the service-drop conductors either (1) below the level of the service head or (2) below the level of the termination of the service-entrance cable sheath.

(G) Arranged that Water Will Not Enter Service Raceway or Equipment. Service-drop conductors and service-entrance conductors shall be arranged so that water will not enter service raceway or equipment.

230.56 Service Conductor with the Higher Voltage to Ground. On a 4-wire, delta-connected service where the midpoint of one phase winding is grounded, the service conductor having the higher phase voltage to ground shall be durably and permanently marked by an outer finish that is orange in color, or by other effective means, at each termination or junction point.

V. Service Equipment – General

230.62 Service Equipment – Enclosed or Guarded. Energized parts of service equipment shall be enclosed as specified in 230.62(A) or guarded as specified in 230.62(B).

(A) Enclosed. Energized parts shall be enclosed so that they will not be exposed to accidental contact or shall be guarded as in 230.62(B).

(B) Guarded. Energized parts that are not enclosed shall be installed on a switchboard, panelboard, or control board and guarded in accordance with 110.18 and 110.27. Where energized parts are guarded as provided in 110.27(A)(1) and (A)(2), means for locking or sealing doors providing access to energized parts shall be provided.

230.66 Marking. Service equipment rated at 600 volts or less shall be marked to identify it as being suitable for use as service equipment. Individual meter socket enclosures shall not be considered service equipment.

VI. Service Equipment – Disconnecting Means

230.70 General. Means shall be provided to disconnect all conductors in a building or other structure from the service-entrance conductors.

(A) Location. The service disconnecting means shall be installed in accordance with 230.70(A)(1), (A)(2), and (A)(3).

(1) Readily Accessible Location. The service disconnecting means shall be installed at a readily accessible location either outside of the building or structure or inside nearest the point of entrance of the service conductors.

(2) Bathrooms. Service disconnecting means shall not be installed in bathrooms.

(3) Remote Control. Where a remote control device(s) is used to actuate the service disconnecting means, the service disconnecting means shall be located in accordance with 230.70(A)(1).

(B) Marking. Each service disconnect shall be permanently marked to identify it as a service disconnect.

(C) Suitable for Use. Each service disconnecting means shall be suitable for the prevailing conditions. Service equipment installed in hazardous (classified) locations shall comply with the requirements of Articles 500 through 517.

CEC Section 230-70 is amended to add subsection (D) to read as follows:

(D) Multimeter Installations. 480 or 480/277 volt multimeter installations shall have a single service disconnect for all meter sockets.

230.71 Maximum Number of Disconnects.

(A) General. The service disconnecting means for each service permitted by 230.2, or for each set of service-entrance conductors permitted by 230.40, Exception Nos. 1, 3, 4, or 5, shall consist of not more than six switches or sets of circuit breakers, or a combination of not more than six switches and sets of circuit breakers, mounted in a single enclosure, in a group of separate enclosures, or in or on a switchboard. There shall be not more than six sets of disconnects per service grouped in any one location. For the purpose of this section, disconnecting means used solely for power monitoring equipment, transient voltage surge suppressors, or the control circuit of the ground-fault protection system or power-operable service disconnecting means, installed as part of the listed equipment, shall not be considered a service disconnecting means.

(B) Single-Pole Units. Two or three single-pole switches or breakers, capable of individual operation, shall be permitted on multiwire circuits, one pole for each ungrounded conductor, as one multipole disconnect, provided they are equipped with handle ties or a master handle to disconnect all conductors of the service with no more than six operations of the hand.

FPN: See 408.36(A) for service equipment in panelboards, and see 430.95 for service equipment in motor control centers.

230.72 Grouping Disconnects.

(A) General. The two to six disconnects as permitted in 230.71 shall be grouped. Each disconnect shall be marked to indicate the load served.

Exception: One of the two to six service disconnecting means permitted in 230.71, where used only for a water pump also intended to provide fire protection, shall be permitted to be located remote from the other disconnecting means.

(B) Additional Service Disconnecting Means. The one or more additional service disconnecting means for fire pumps, emergency systems, legally required standby, or optional standby services permitted by 230.2 shall be installed remote from the one to six service disconnecting means for normal service to minimize the possibility of simultaneous interruption of supply.

(C) Access to Occupants. In a multiple-occupancy building, each occupant shall have access to the occupant's service disconnecting means.

Exception: In a multiple-occupancy building where electric service and electrical maintenance are provided by the building management and where these are under continuous building management supervision, the service disconnecting means supplying more than one occupancy shall be permitted to be accessible to authorized management personnel only.

230.74 Simultaneous Opening of Poles. Each service disconnect shall simultaneously disconnect all ungrounded service conductors that it controls from the premises wiring system.

230.75 Disconnection of Grounded Conductor. Where the service disconnecting means does not disconnect the grounded conductor from the premises wiring, other means shall be provided for this purpose in the service equipment. A terminal or bus to which all grounded conductors can be attached by means of pressure connectors shall be permitted for this purpose. In a multisection switchboard, disconnects for the grounded conductor shall be permitted to be in any section of the switchboard, provided any such switchboard section is marked.

230.76 Manually or Power Operable. The service disconnecting means for ungrounded service conductors shall consist of one of the following:

(1) A manually operable switch or circuit breaker equipped with a handle or other suitable operating means

(2) A power-operated switch or circuit breaker, provided the switch or circuit breaker can be opened by hand in the event of a power supply failure

230.77 Indicating. The service disconnecting means shall plainly indicate whether it is in the open or closed position.

230.79 Rating of Service Disconnecting Means. The service disconnecting means shall have a rating not less than the load to be carried, determined in accordance with Article 220. In no case shall the rating be lower than specified in 230.79(A), (B), (C), or (D).

(A) One-Circuit Installation. For installations to supply only limited loads of a single branch circuit, the service disconnecting means shall have a rating of not less than 15 amperes.

(B) Two-Circuit Installations. For installations consisting of not more than two 2-wire branch circuits, the service disconnecting means shall have a rating of not less than 30 amperes.

(C) One-Family Dwelling. For a one-family dwelling, the service disconnecting means shall have a rating of not less than 100 amperes, 3-wire.

(D) All Others. For all other installations, the service disconnecting means shall have a rating of not less than 60 amperes.

230.80 Combined Rating of Disconnects. Where the service disconnecting means consists of more than one switch or circuit breaker, as permitted by 230.71, the combined ratings of all the switches or circuit breakers used shall not be less than the rating required by 230.79.

230.81 Connection to Terminals. The service conductors shall be connected to the service disconnecting means by pressure connectors, clamps, or other approved means. Connections that depend on solder shall not be used.

230.82 Equipment Connected to the Supply Side of Service Disconnect. Only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means:

(1) Cable limiters or other current-limiting devices

(2) Meters and meter sockets nominally rated not in excess of 600 volts, provided all metal housings and service enclosures are grounded

(3) Meter disconnect switches nominally rated not in excess of 600 volts that have a short-circuit current rating equal to or greater than the available short circuit current, provided all metal housings and service enclosures are grounded

(4) Instrument transformers (current and voltage), impedance shunts, load management devices, and arresters

(5) Taps used only to supply load management devices, circuits for standby power systems, fire pump equipment, and fire and sprinkler alarms, if provided with service equipment and installed in accordance with requirements for service-entrance conductors

(6) Solar photovoltaic systems, fuel cell systems, or interconnected electric power production sources

(7) Control circuits for power-operable service disconnecting means, if suitable overcurrent protection and disconnecting means are provided

(8) Ground-fault protection systems or transient voltage surge suppressors, where installed as part of listed equipment, if suitable overcurrent protection and disconnecting means are provided

The neutral conductor shall have an ampacity of not less than the maximum current rating of the grounding impedance. In no case shall the neutral conductor be smaller than 8 AWG copper or 6 AWG aluminum or copper-clad aluminum.

(C) System Neutral Connection. The system neutral conductor shall not be connected to ground except through the grounding impedance.

FPN: The impedance is normally selected to limit the ground-fault current to a value slightly greater than or equal to the capacitive charging current of the system. This value of impedance will also limit transient overvoltages to safe values. For guidance, refer to criteria for limiting transient overvoltages in ANSI/IEEE 142-1991, *Recommended Practice for Grounding of Industrial and Commercial Power Systems.*

(D) Neutral Conductor Routing. The conductor connecting the neutral point of the transformer or generator to the grounding impedance shall be permitted to be installed in a separate raceway. It shall not be required to run this conductor with the phase conductors to the first system disconnecting means or overcurrent device.

(E) Equipment Bonding Jumper. The equipment bonding jumper (the connection between the equipment grounding conductors and the grounding impedance) shall be an unspliced conductor run from the first system disconnecting means or overcurrent device to the grounded side of the grounding impedance.

(F) Grounding Electrode Conductor Location. The grounding electrode conductor shall be attached at any point from the grounded side of the grounding impedance to the equipment grounding connection at the service equipment or first system disconnecting means.

(G) Equipment Bonding Jumper Size. The equipment bonding jumper shall be sized in accordance with (1) or (2) as follows:

(1) Where the grounding electrode conductor connection is made at the grounding impedance, the equipment bonding jumper shall be sized in accordance with 250.66, based on the size of the service entrance conductors for a service or the derived phase conductors for a separately derived system.

(2) Where the grounding electrode conductor is connected at the first system disconnecting means or overcurrent device, the equipment bonding jumper shall be sized the same as the neutral conductor in 250.36(B).

III. Grounding Electrode System and Grounding Electrode Conductor

250.50 Grounding Electrode System. All grounding electrodes as described in 250.52(A)(1) through (A)(6) that are present at each building or structure served shall be bonded together to form the grounding electrode system. Where none of these grounding electrodes exist, one or more of the grounding electrodes specified in 250.52(A)(4) through (A)(7) shall be installed and used.

Exception: Concrete-encased electrodes of existing buildings or structures shall not be required to be part of the grounding electrode system where the steel reinforcing bars or rods are not accessible for use without disturbing the concrete.

250.52 Grounding Electrodes.

(A) Electrodes Permitted for Grounding.

(1) Metal Underground Water Pipe. A metal underground water pipe in direct contact with the earth for 3.0 m (10 ft) or more (including any metal well casing effectively bonded to the pipe) and electrically continuous (or made electrically continuous by bonding around insulating joints or insulating pipe) to the points of connection of the grounding electrode conductor and the bonding conductors. Interior metal water piping located more than 1.52 m (5 ft) from the point of entrance to the building shall not be used as a part of the grounding electrode system or as a conductor to interconnect electrodes that are part of the grounding electrode system.

Exception: In industrial and commercial buildings or structures where conditions of maintenance and supervision ensure that only qualified persons service the installation, interior metal water piping located more than 1.52 m (5 ft) from the point of entrance to the building shall be permitted as a part of the grounding electrode system or as a conductor to interconnect electrodes that are part of the grounding electrode system, provided that the entire length, other than short sections passing perpendicular through walls, floors, or ceilings, of the interior metal water pipe that is being used for the conductor is exposed.

(2) Metal Frame of the Building or Structure. The metal frame of the building or structure, where any of the following methods are used to make an earth connection:

(1) 3.0 m (10 ft) or more of a single structural metal member in direct contact with the earth or encased in concrete that is in direct contact with the earth

(2) The structural metal frame is bonded to one or more of the grounding electrodes as defined in 250.52(A)(1), (A)(3), or (A)(4)

(3) The structural metal frame is bonded to one or more of the grounding electrodes as defined in 250.52(A)(5) or (A)(6) that comply with 250.56, or

(4) Other approved means of establishing a connection to earth.

(3) Concrete-Encased Electrode. An electrode encased by at least 50 mm (2 in.) of concrete, located within and near the bottom of a concrete foundation or footing that is in direct contact with the earth, consisting of at least 6.0 m (20 ft) of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 13 mm (1/2 in.) in diameter, or consisting of at least 6.0 m (20 ft) of bare copper conductor not smaller than 4 AWG. Reinforcing bars shall be permitted to be bonded together by the usual steel tie wires or other effective means.

(4) Ground Ring. A ground ring encircling the building or structure, in direct contact with the earth, consisting of at least 6.0 m (20 ft) of bare copper conductor not smaller than 2 AWG.

(5) Rod and Pipe Electrodes. Rod and pipe electrodes shall not be less than 2.5 m (8 ft) in length and shall consist of the following materials.

(a) Electrodes of pipe or conduit shall not be smaller than metric designator 21 (trade size 3/4) and, where of iron or steel, shall have the outer surface galvanized or otherwise metal-coated for corrosion protection.

(b) Electrodes of rods of iron or steel shall be at least 15.87 mm (5/8 in.) in diameter. Stainless steel rods less than 16 mm (5/8 in.) in diameter, nonferrous rods, or their equivalent shall be listed and shall not be less than 13 mm (1/2 in.) in diameter.

(6) Plate Electrodes. Each plate electrode shall expose not less than 0.186 m^2 (2 ft^2) of surface to exterior soil. Electrodes of iron or steel plates shall be at least 6.4 mm (1/4 in.) in thickness. Electrodes of nonferrous metal shall be at least 1.5 mm (0.06 in.) in thickness.

(7) Other Local Metal Underground Systems or Structures. Other local metal underground systems or structures such as piping systems, underground tanks, and underground metal well casings that are not effectively bonded to a metal water pipe.

(B) Electrodes Not Permitted for Grounding. The following shall not be used as grounding electrodes:

(1) Metal underground gas piping system

(2) Aluminum electrodes

FPN: See 250.104(B) for bonding requirements of gas piping.

CEC § 250-52(C) is added as follows:

(C) Service grounding. Grounding shall be as required by Article 250 of this Code, except that:

(1) In new construction where concrete footings in direct contact with the earth are employed, the electrical service grounding electrode shall be:

(a) Of the concrete encased type.

(b) Located in the bottom three(3) inches of the footing.

(c) Not less than twenty (20) feet in length.

(d) Bare copper conductor, sized in accordance with this Code, Table 250-66, but not smaller than No. 4 AWG.

(2) In existing construction that does not have a grounding electrode system as described in NEC 2005 article 250.52(A)(1) through (A)(7), the following shall be provided:

(a) As described in NEC 250.56 for a single rod installation with or without a metal underground water pipe in contact with the earth for ten (10) feet or more it shall be verified in writing and tested with a listed Ground Resistance Test Device that the earth resistance is 25 ohms or less.

(b) If a test is not performed and verified, or the test results exceed a ground resistance of 25 ohms, then a minimum of two half-inch by eight foot (½" x 8') copper clad ground rods shall be driven to 8 feet deep and bonded together. They shall be no closer than 6 feet apart.

Note: Bonding as described in NEC 250.104 shall apply in either case.

250.53 Grounding Electrode System Installation.

FPN: See 547.9 and 547.10 for special grounding and bonding requirements for agricultural buildings.

(A) Rod, Pipe, and Plate Electrodes. Where practicable, rod, pipe, and plate electrodes shall be embedded below permanent moisture level. Rod, pipe, and plate electrodes shall be free from nonconductive coatings such as paint or enamel.

(B) Electrode Spacing. Where more than one of the electrodes of the type specified in 250.52(A)(5) or (A)(6) are used, each electrode of one grounding system (including that used for air terminals) shall not be less than 1.83 m (6 ft) from any other electrode of another grounding system. Two or more grounding electrodes that are effectively bonded together shall be considered a single grounding electrode system.

(C) Bonding Jumper. The bonding jumper(s) used to connect the grounding electrodes together to form the grounding electrode system shall be installed in accordance with 250.64(A), (B), and (E), shall be sized in accordance with 250.66, and shall be considered a single grounding electrode system.

(D) Metal Underground Water Pipe. Where used as a grounding electrode, metal underground water pipe shall meet the requirements of 250.53(D)(1) and (D)(2).

(1) Continuity. Continuity of the grounding path or the bonding connection to interior piping shall not rely on water meters or filtering devices and similar equipment.

(2) Supplemental Electrode Required. A metal underground water pipe shall be supplemented by an additional electrode of a type specified in 250.52(A)(2) through (A)(7). Where the supplemental electrode is a rod, pipe, or plate type, it shall comply with 250.56.

The supplemental electrode shall be permitted to be bonded to the grounding electrode conductor, the grounded service-entrance conductor, the nonflexible grounded service raceway, or any grounded service enclosure.

Exception: The supplemental electrode shall be permitted to be bonded to the interior metal water piping at any convenient point as covered in 250.52(A)(1), Exception.

(E) Supplemental Electrode Bonding Connection Size. Where the supplemental electrode is a rod, pipe, or plate electrode, that portion of the bonding jumper that is the sole connection to the supplemental grounding electrode shall not be required to be larger than 6 AWG copper wire or 4 AWG aluminum wire.

(F) Ground Ring. The ground ring shall be buried at a depth below the earth's surface of not less than 750 mm (30 in.).

(G) Rod and Pipe Electrodes. The electrode shall be installed such that at least 2.44 m (8 ft) of length is in contact with the soil. It shall be driven to a depth of not less than 2.44 m (8 ft) except that, where rock bottom is encountered, the electrode shall be driven at an oblique angle not to exceed 45 degrees from the vertical or, where rock bottom is encountered at an angle up to 45 degrees, the electrode shall be permitted to be buried in a trench that is at least 750 mm (30 in.) deep. The upper end of the electrode shall be flush with or below ground level unless the aboveground end and the grounding electrode conductor attachment are protected against physical damage as specified in 250.10.

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(J) Luminaires (Fixtures). A box or conduit body shall not be required where a luminaire (fixture) is used as a raceway as permitted in 410.31 and 410.32.

(K) Embedded. A box or conduit body shall not be required for splices where conductor are embedded as permitted in 424.40, 424.41(D), 426.22(B), 426.24(A), and 427.19(A).

(L) Manholes and Handhole Enclosures. Where accessible only to qualified persons, a box or conduit body shall not be required for conductors in manholes or handhole enclosures, except where connecting to electrical equipment. The installation shall comply with the provisions of Part V of Article 110 for manholes, and 314.30 for handhole enclosures.

(M) Closed Loop. A box shall not be required with a closed-loop power distribution system where a device identified and listed as suitable for installation without a box is used.

300.16 Raceway or Cable to Open or Concealed Wiring.

(A) Box or Fitting. A box or terminal fitting having a separately bushed hole for each conductor shall be used wherever a change is made from conduit, electrical metallic tubing, electrical nonmetallic tubing, nonmetallic-sheathed cable, Type AC cable, Type MC cable, or mineral-insulated, metal-sheathed cable and surface raceway wiring to open wiring or to concealed knob-and-tube wiring. A fitting used for this purpose shall contain no taps or splices and shall not be used at luminaire (fixture) outlets.

(B) Bushing. A bushing shall be permitted in lieu of a box or terminal where the conductors emerge from a raceway and enter or terminate at equipment, such as open switchboards, unenclosed control equipment, or similar equipment. The bushing shall be of the insulating type for other than lead-sheathed conductors.

CEC § 300-16 is amended to add subsection (c) to read as follows:

(C) Single Family Dwellings - Spare Raceways. In any flush mounted panel, where provisions for spare circuit protection devices are provided, raceways of sufficient capacity to permit utilization of such spares or spaces shall be provided to an accessible location. Minimum size shall be ¾-inch raceway.

Where sufficient attic space or underfloor space is available, raceway shall terminate conveniently for future use in each space. Where neither space is available, such termination shall be in a location approved by the building official.

300.17 Number and Size of Conductors in Raceway. The number and size of conductors in any raceway shall not be more than will permit dissipation of the heat and ready installation or withdrawal of the conductors without damage to the conductors or to their insulation.

FPN: See the following sections of this *Code*: intermediate metal conduit, 342.22; rigid metal conduit, 344.22; flexible metal conduit, 348.22; liquidtight flexible metal conduit, 350.22; rigid nonmetallic conduit, 352.22; liquidtight nonmetallic flexible conduit, 356.22; electrical metallic tubing, 358.22; flexible metallic tubing, 360.22; electrical nonmetallic tubing, 362.22; cellular concrete floor raceways, 372.11; cellular metal floor raceways, 374.5; metal wireways, 376.22; nonmetallic wireways, 378.22; surface metal raceways, 386.22; surface nonmetallic raceways, 388.22; underfloor raceways, 390.5; fixture wire, 402.7; theaters, 520.6; signs, 600.31(C); elevators, 620.33; audio signal processing, amplification, and reproduction equipment, 640.23(A) and 640.24; Class 1, Class 2, and Class 3 circuits, Article 725; fire alarm circuits, Article 760; and optical fiber cables and raceways, Article 770.

300.18 Raceway Installations.

(A) Complete Runs. Raceways, other than busways or exposed raceways having hinged or removable covers, shall be installed complete between outlet, junction, or splicing points prior to the installation of conductors. Where required to facilitate the installation of utilization equipment, the raceway shall be permitted to be initially installed without a terminating connection at the equipment. Prewired raceway assemblies shall be permitted only where specifically permitted in this *Code* for the applicable wiring method.

Exception: Short sections of raceways used to contain conductors or cable assemblies for protection from physical damage shall not be required to be installed complete between outlet, junction, or splicing points.

(B) Welding. Metal raceways shall not be supported, terminated, or connected by welding to the raceway unless specifically designed to be or otherwise specifically permitted to be in this *Code.*

300.19 Supporting Conductors in Vertical Raceways.

(A) Spacing Intervals – Maximum. Conductors in vertical raceways shall be supported if the vertical rise exceeds the values in Table 300.19(A). One cable support shall be provided at the top of the vertical raceway or as close to the top as practical. Intermediate supports shall be provided as necessary to limit supported conductor lengths to not greater than those values specified in Table 300.19(A).

Exception: Steel wire armor cable shall be supported at the top of the riser with a cable support that clamps the steel wire armor. A safety device shall be permitted at the lower end of the riser to hold the cable in the event there is slippage of the cable in the wire-armored cable support. Additional wedge-type supports shall be permitted to relieve the strain on the equipment terminals caused by expansion of the cable under load.

(B) Support Methods. One of the following methods of support shall be used.

(1) By clamping devices constructed of or employing insulating wedges inserted in the ends of the raceways. Where clamping of insulation does not adequately support the cable, the conductor also shall be clamped.

(2) By inserting boxes at the required intervals in which insulating supports are installed and secured in a satisfactory manner to withstand the weight of the conductors attached thereto, the boxes being provided with covers.

Table 300.19(A) Spacings for Conductor Supports

Size of Wire	Support of Conductors in Vertical Raceways	Conductors			
		Aluminum or Copper-Clad Aluminum		Copper	
		m	ft	m	ft
18 AWG through 8 AWG	Not greater than	30	100	30	100
6 AWG through 1/0 AWG	Not greater than	60	200	30	100
2/0 AWG through 4/0 AWG	Not greater than	55	180	25	80
Over 4/0 AWG through 350 kcmil	Not greater than	41	135	18	60
Over 350 kcmil through 500 kcmil	Not greater than	36	120	15	50
Over 500 kcmil through 750 kcmil	Not greater than	28	95	12	40
Over 750 kcmil	Not greater than	26	85	11	35

(3) In junction boxes, by deflecting the cables not less than 90 degrees and carrying them horizontally to a distance not less than twice the diameter of the cable, the cables being carried on two or more insulating supports and additionally secured thereto by tie wires if desired. Where this method is used, cables shall be supported at intervals not greater than 20 percent of those mentioned in the preceding tabulation.

(4) By a method of equal effectiveness.

300.20 Induced Currents in Metal Enclosures or Metal Raceways.

(A) Conductors Grouped Together. Where conductors carrying alternating current are installed in metal enclosures or metal raceways, they shall be arranged so as to avoid heating the surrounding metal by induction. To accomplish this, all phase conductors and, where used, the grounded conductor and all equipment grounding conductors shall be grouped together.

Exception No. 1: Equipment grounding conductors for certain existing installations shall be permitted to be installed separate from their associated circuit conductors where run in accordance with the provisions of 250.130(C).

Exception No. 2: A single conductor shall be permitted to be installed in a ferromagnetic enclosure and used for skin-effect heating in accordance with the provisions of 426.42 and 427.47.

(B) Individual Conductors. Where a single conductor carrying alternating current passes through metal with magnetic properties, the inductive effect shall be minimized by (1) cutting slots in the metal between the individual holes through which the individual conductors pass or (2) passing all the conductors in the circuit through an insulating wall sufficiently large for all of the conductors of the circuit.

Exception: In the case of circuits supplying vacuum or electric-discharge lighting systems or signs or X-ray apparatus, the currents carried by the conductors are so small that the inductive heating effect can be ignored where these conductors are placed in metal enclosures or pass through metal.

FPN: Because aluminum is not a magnetic metal, there will be no heating due to hysteresis; however, induced currents will be present. They will not be of sufficient magnitude to require grouping of conductors or special treatment in passing conductors through aluminum wall sections.

300.21 Spread of Fire or Products of Combustion. Electrical installations in hollow spaces, vertical shafts, and ventilation or air-handling ducts shall be made so that the possible spread of fire or products of combustion will not be substantially increased. Openings around electrical penetrations through fire-resistant–rated walls, partitions, floors, or ceilings shall be firestopped using approved methods to maintain the fire resistance rating.

FPN: Directories of electrical construction materials published by qualified testing laboratories contain many listing installation restrictions necessary to maintain the fire-resistive rating of assemblies where penetrations or openings are made. Building codes also contain restrictions on membrane penetrations on opposite sides of a fire-resistance–rated wall assembly. An example is the 600-mm (24-in.) minimum horizontal separation that usually applies between boxes installed on opposite sides of the wall. Assistance in complying with 300.21 can be found in building codes, fire resistance directories, and product listings.

300.22 Wiring in Ducts, Plenums, and Other Air-Handling Spaces. The provisions of this section apply to the installation and uses of electric wiring and equipment in ducts, plenums, and other air-handling spaces.

FPN: See Article 424, Part VI, for duct heaters.

(A) Ducts for Dust, Loose Stock, or Vapor Removal. No wiring systems of any type shall be installed in ducts used to transport dust, loose stock, or flammable vapors. No wiring system of any type shall be installed in any duct, or shaft containing only such ducts, used for vapor removal or for ventilation of commercial-type cooking equipment.

(3) Temporary Wiring. Temporary wiring, except as permitted by Article 590, shall not be used to supply power to boats.

(B) Installation.

(1) Overhead Wiring. Overhead wiring shall be installed to avoid possible contact with masts and other parts of boats being moved in the yard.

Conductors and cables shall be routed to avoid wiring closer than 6.0 m (20 ft) from the outer edge or any portion of the yard that can be used for moving vessels or stepping or unstepping masts.

(2) Outside Branch Circuits and Feeders. Outside branch circuits and feeders shall comply with Article 225 except that clearances for overhead wiring in portions of the yard other than those described in 555.13(B)(1) shall not be less than 5.49 m (18 ft) above grade.

(3) Wiring Over and Under Navigable Water. Wiring over and under navigable water shall be subject to approval by the authority having jurisdiction.

FPN: See NFPA 303-2000, *Fire Protection Standard for Marinas and Boatyards*, for warning sign requirements.

(4) Portable Power Cables.

(a) Where portable power cables are permitted by 555.13(A)(2), the installation shall comply with the following:

(1) Cables shall be properly supported.

(2) Cables shall be located on the underside of the pier.

(3) Cables shall be securely fastened by nonmetallic clips to structural members other than the deck planking.

(4) Cables shall not be installed where subject to physical damage.

(5) Where cables pass through structural members, they shall be protected against chafing by a permanently installed oversized sleeve of nonmetallic material.

(b) Where portable power cables are used as permitted in 555.13(A)(2)(2), there shall be an approved junction box of corrosion-resistant construction with permanently installed terminal blocks on each pier section to which the feeder and feeder extensions are to be connected. Metal junction boxes and their covers, and metal screws and parts that are exposed externally to the boxes, shall be of corrosion-resistant materials or protected by material resistant to corrosion.

(5) Protection. Rigid metal or nonmetallic conduit suitable for the location shall be installed to protect wiring above decks of piers and landing stages and below the enclosure that it serves. The conduit shall be connected to the enclosure by full standard threads. The use of special fittings of nonmetallic material to provide a threaded connection into enclosures on rigid nonmetallic conduit, employing joint design as recommended by the conduit manufacturer, for attachment of the fitting to the conduit shall be acceptable, provided the equipment and method of attachment are approved and the assembly meets the requirements of installation in damp or wet locations as applicable.

555.15 Grounding. Wiring and equipment within the scope of this article shall be grounded as specified in Article 250 and as required by 555.15(A) through 555.15(E).

(A) Equipment to Be Grounded. The following items shall be connected to an equipment grounding conductor run with the circuit conductors in the same raceway, cable, or trench:

(1) Metal boxes, metal cabinets, and all other metal enclosures

(2) Metal frames of utilization equipment

(3) Grounding terminals of grounding-type receptacles

(B) Type of Equipment Grounding Conductor. The equipment grounding conductor shall be an insulated copper conductor with a continuous outer finish that is either green or green with one or more yellow stripes. The equipment grounding conductor of Type MI cable shall be permitted to be identified at terminations. For conductors larger than 6 AWG, or where multiconductor cables are used, re-identification of conductors as allowed in 250.119(A)(2)(b) and (A)(2)(c) or 250.119(B)(2) and (B)(3) shall be permitted.

(C) Size of Equipment Grounding Conductor. The insulated copper equipment grounding conductor shall be sized in accordance with 250.122 but not smaller than 12 AWG.

(D) Branch-Circuit Equipment Grounding Conductor. The insulated equipment grounding conductor for branch circuits shall terminate at a grounding terminal in a remote panelboard or the grounding terminal in the main service equipment.

(E) Feeder Equipment Grounding Conductors. Where a feeder supplies a remote panelboard, an insulated equipment grounding conductor shall extend from a grounding terminal in the service equipment to a grounding terminal in the remote panelboard.

555.17 Disconnecting Means for Shore Power Connection(s). Disconnecting means shall be provided to isolate each boat from its supply connection(s).

(A) Type. The disconnecting means shall be permitted to consist of a circuit breaker, switch, or both, and shall be properly identified as to which receptacle it controls.

(B) Location. The disconnecting means shall be readily accessible, located not more than 762 mm (30 in.) from the receptacle it controls, and shall be located in the supply circuit ahead of the receptacle. Circuit breakers or switches located in marine power outlets complying with this section shall be permitted as the disconnecting means.

555.19 Receptacles. Receptacles shall be mounted not less than 305 mm (12 in.) above the deck surface of the pier and not below the electrical datum plane on a fixed pier.

(A) Shore Power Receptacles.

(1) Enclosures. Receptacles intended to supply shore power to boats shall be housed in marine power outlets listed as marina power outlets or listed for set locations, or shall be installed in listed enclosures protected from the weather or in listed weatherproof enclosures. The integrity of the assembly shall not be affected when the receptacles are in use with any type of booted or nonbooted attachment plug/cap inserted.

(2) Strain Relief. Means shall be provided where necessary to reduce the strain on the plug and receptacle caused by the weight and catenary angle of the shore power cord.

(3) Branch Circuits. Each single receptacle that supplies shore power to boats shall be supplied from a marine power outlet or panelboard by an individual branch circuit of the voltage class and rating corresponding to the rating of the receptacle.

FPN: Supplying receptacles at voltages other than the voltages marked on the receptacle may cause overheating or malfunctioning of connected equipment, for example, supplying single-phase, 120/240-volt, 3-wire loads from a 208Y/120-volt, 3-wire source.

(4) Ratings. Shore power for boats shall be provided by single receptacles rated not less than 30 amperes.

FPN: For locking- and grounding-type receptacles for auxiliary power to boats, see NFPA 303-2000, *Fire Protection Standard for Marinas and Boatyards*.

(a) Receptacles rated not less than 30 amperes or more than 50 amperes shall be of the locking and ground type.

FPN: For various configurations and ratings of locking and grounding-type receptacles and caps, see ANSI/NEMA 18WD 6-1989, National Electrical Manufacturers Association's *Standard for Dimensions of Attachment Plugs and Receptacles.*

(b) Receptacles rated for 60 amperes or 100 amperes shall be of the pin and sleeve type.

FPN: For various configurations and ratings of pin and sleeve receptacles, see ANSI/UL 1686, *UL Standard for Safety Pin and Sleeve Configurations.*

CEC § 555.19(A) is amended to add Section 555.19 (A)(5) as follows:

(5) All new marina power distribution systems shall be equipped with a listed Ground Fault Monitoring System installed at a visible point at the distribution system(s) with the intent of alerting marina management to any hazardous low level ground fault conditions in the water. These systems shall comply with NFPA Standard 303 of the 2006 edition.

(B) Other Than Shore Power.

(1) Ground-Fault Circuit-Interrupter (GFCI) Protection for Personnel. Fifteen- and 20-ampere, single-phase, 125-volt receptacles installed outdoors, in boathouses, in buildings used for storage, maintenance, or repair where portable electrical hand tools, electrical diagnostic equipment, or portable lighting equipment are to be used shall be provided with GFCI protection for personnel. Receptacles in other locations shall be protected in accordance with 210.8(B).

(2) Marking. Receptacles other than those supplying shore power to boats shall be permitted to be housed in marine power outlets with the receptacles that provide shore power to boats, provided they are marked to clearly indicate that they are not to be used to supply power to boats.

555.21 Motor Fuel Dispensing Stations – Hazardous (Classified) Locations. Electrical wiring and equipment located at or serving motor fuel dispensing stations shall comply with article 514 in addition to the requirements of this article. All electrical wiring for power and lighting shall be installed on the side of the wharf, pier, or dock opposite from the liquid piping system.

FPN: For additional information, see NFPA 303-2000, *Fire Protection Standard for Marinas and Boatyards,* and NFPA 30A-2003, *Motor Fuel Dispensing Facilities and Repair Garages.*

555.22 Repair Facilities – Hazardous (Classified) Locations. Electrical wiring and equipment located at facilities for the repair of marine craft containing flammable or combustible liquids or gases shall comply with Article 511 in addition to the requirements of this article.

555.23 Marine Hoists, Railways, Cranes, and Monorails. Motors and controls for marine hoists, railways, cranes, and monorails shall not be located below the electrical datum plane. Where it is necessary to provide electric power to a mobile crane or hoist in the yard and a trialing cable is utilized, it shall be a listed portable power cable rated for the conditions of use and be provided with an outer jacket of distinctive color for safety.

ARTICLE 590
Temporary Installations

590.1 Scope. The provisions of this article apply to temporary electrical power and lighting installations.

590.2 All Wiring Installations.

(A) Other Articles. Except as specifically modified in this article, all other requirements of this *Code* for permanent wiring shall apply to temporary wiring installations.

(B) Approval. Temporary wiring methods shall be acceptable only if approved based on the conditions of use and any special requirements of the temporary installation.

2007 MECHANICAL CODE INSERTS

CALIFORNIA CHAPTER 1

GENERAL CODE PROVISIONS

For the purposes of establishing fees, administering permits and inspections, processing alternate methods of compliance, hearing appeals, and other local administrative reasons, in place of Chapter 1 of the CMC, the 2007 California Building Code as adopted in SBMC Chapter 12.115 is intended to replace Chapter 1.

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2007 PLUMBING CODE INSERTS

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CALIFORNIA CHAPTER 1

GENERAL CODE PROVISIONS

For the purposes of establishing fees, administering permits and inspections, processing alternate methods of compliance, hearing appeals, and other local administrative purposes, Chapter 1 is not adopted. The 2007 California Building Code as adopted in SBMC is intended to replace these portions of Chapter 1.

vacuum pumps, and chemical dispensers shall be protected from backflow by an airgap, an atmospheric vacuum breaker, a spill-proof vacuum breaker, or a reduced pressure principle backflow preventer.

603.4.19 Water Heater Connectors. Flexible metallic water heater connectors or reinforced flexible water heater connectors connecting water heaters to the piping system shall be in compliance with the appropriate standards listed in Table 14-1.

603.4.20 Combination stop-and-waste valves or cocks shall not be installed underground.

603.4.21 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 back-siphonage by a reduced-pressure principle backflow preventer.

603.4.21.1 Dialysis Water Systems. The individual connections of the dialysis related equipment to the dialysis pure water system do not require additional backflow protection.

603.4.22 Plumbing Fixture Fittings. Plumbing fixture fittings with integral backflow protection shall comply with ASME A112.18.1.

604.0 Materials.

604.1 All pipe, tube, and fittings carrying water used in potable water systems intended to supply drinking water shall meet the requirements of NSF 61 as found in Table 14-1. All 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 be in accordance with Table 6-4 and the standards in Table 14-1.

Exceptions:

(1) ***[OSHPD 1, 2, 3 & 4]*** *Use of CPVC is not permitted for applications under authority of the Office of Statewide Health Planning and Development.*

(2) ***[OSHPD 1, 2, 3 & 4]*** *Use of PEX piping is not permitted for applications under the authority of the Office of Statewide Health Planning and Development.*

(3) ***[OSHPD 1, 2, 3 & 4]*** *Use of PEX-AL-PEX piping is not permitted for applications under the authority of the Office of Statewide Health Planning and Development.*

(4) ***[AGR, DHS]*** *Use of PEX piping is not adopted for applications under the authority of the Department of Health Services and the Department of Food and Agriculture.*

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, in accordance with the procedures set forth in Chapter 3 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 Section 301.0 of Appendix I of this code, Installation Standard for CPVC Solvent Cemented Hot and Cold Water Distribution Systems, IAPMO IS 20-2005.*

(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 set forth in Section 301.0 of Appendix I of this code, Installation Standard for CPVC Solvent Cemented Hot and Cold Water Distribution Systems, IAPMO IS 20-2005.*

(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 that the installer has complied with the requirements in Section 1.2.1 of Appendix I of this code, Installation Standards for CPVC Solvent Cemented Hot and Cold Water Distribution Systems, IAPMO IS 20-2005.*

(g) Penalties. *Any contractor or subcontractor found to have failed to comply with the ventilation, glove or flushing requirements of Section 1.2.2 of Appendix I of this code, Installation Standards for CPVC Solvent Cemented Hot and Cold Water Distribution Systems, IAPMO IS 20-2005 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 Section 1.2.2 of Appendix I of this code, "Special Requirements for CPVC Installation within Residential Buildings," are being violated, such building officials shall cite the contractor or subcontractor for that violation.*

CPC Section 604.2 is amended to read as follows:

604.2 Use of copper tubing. Copper tube for water piping shall have a weight of not less than Type L.

604.3 All hard-drawn copper tubing for water supply and distribution in addition to the required incised marking, shall be marked in accordance with ASTM B 88 *Seamless Copper Water Tube* as listed in Table 14-1. The colors shall be: Type K, green; Type L, blue; Type M, red.

604.4 Listed flexible copper water connectors shall be installed in readily accessible locations, unless otherwise listed.

604.5 Cast-iron fittings up to and including two (2) inches (51 mm) in size, when used in connection with potable water piping, shall be galvanized.

604.6 All malleable iron water fittings shall be galvanized.

604.7 Piping and tubing that has previously been used for any purpose other than for potable water systems shall not be used.

604.8 Approved plastic materials may be used in water service piping, provided that where metal water service 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, metallic pipe may be replaced with nonmetallic pipe.

604.9 Solder shall conform to the requirements of Section 316.1.3.

604.10 Water pipe and fittings with lead content which exceed eight (8) percent shall be prohibited in piping systems used to convey potable water.

Note: *On or after January 1, 2010, see Section 116875 of the Health and Safety Code for the lead content of pipes, pipe or plumbing fittings, or fixtures intended to convey or dispense water for human consumption.*

604.11 PEX. ***[Not adopted by BSC, HCD, DSA/SS, DHS, AGR & OSHPD 1, 2, 3 & 4]*** Cross-linked polyethylene (PEX) tubing shall be marked with the appropriate standard designation(s) listed in Table 14-1 for which the tubing has been approved. PEX tubing shall be installed in compliance with the provisions of this section.

604.11.1 PEX Fittings. ***[Not adopted by BSC, HCD, DSA/SS, DHS, AGR & OSHPD 1,2,3 & 4]*** Metal insert fittings, metal compression fittings, and cold expansion fittings used with PEX tubing shall be manufactured to and marked in accordance with the standards for the fittings in Table 14-1.

604.11.2 Water Heater Connections. ***[Not adopted by BSC, HCD, DSA/SS, DHS, AGR & OSHPD 1, 2, 3 & 4]*** PEX tubing shall not be installed within the first eighteen (18) inches (457 mm) of piping connected to a water heater.

604.12 Flexible Corrugated Connectors. Flexible corrugated connectors of copper or stainless steel shall be limited to the following connector lengths:

Water Heater Connectors - twenty-four (24) inches (609 mm).

Fixture Connectors – thirty (30) inches (762 mm).

Washing Machine Connectors – seventy-two (72) inches (1827 mm).

Dishwasher and Icemaker Connectors – one hundred twenty (120) inches (3048 mm).

604.13 PEX-AL-PEX and PE-AL-PE. Crosslinked polyethylene-aluminum-crosslinked polyethylene (PEX-AL-PEX) and polyethylene-aluminum-

CONTINUED ON PAGE 119

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 Whenever a water filter, water softener backflow prevention device, or similar device is installed in any 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 any such pressure loss.

No water filter, water softener, backflow prevention device, or similar device regulated by this code shall be installed in any potable water supply piping when the installation of such device produces an excessive pressure drop in any such water supply piping. In the absence of specific pressure drop information, the diameter of the inlet or outlet of any such device or its connecting piping shall not be less than the diameter of such water distribution piping to the fixtures served by the device.

All 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 The quantity of water required to be supplied to every plumbing fixture shall be represented by fixture units, as shown in Table 6-5. Equivalent fixture values shown in Table 6-5 include both hot and cold water demand.

610.4 Systems within the range of Table 6-6 may be sized from that table or by the method set forth in Section 610.5.

Listed parallel water distribution systems shall be installed in accordance with their listing, but at no time shall any portion of the system exceed the maximum velocities allowed by the code.

610.5 Except as provided in Section 610.4, the size of each water piping system shall be determined in accordance with the procedure set forth in Appendix A. For alternate methods of sizing water supply systems, see Appendix L.

610.6 Except where the type of pipe used and the water characteristics are such that no decrease in capacity due to length of service (age of system) may be expected, all friction-loss data shall be obtained from the "Fairly Rough" or "Rough" charts in Appendix A of this code. Friction or pressure losses in water meter, valve, and fittings shall be obtained from the same sources. Pressure losses through water-treating equipment, backflow prevention devices, or other flow-restricting devices shall be computed as required by Section 610.2.

610.7 On any proposed water piping installation sized using Table 6-6, the following conditions shall be determined:

(1) Total number of fixture units as determined from Table 6-5, Equivalent Fixture Units, for the fixtures to be installed.

(2) Developed length of supply pipe from meter to most remote outlet.

(3) Difference in elevation between the meter or other source of supply and the highest fixture or outlet.

(4) Pressure in the street main or other source of supply at the locality where the installation is to be made.

(5) In localities where there is a fluctuation of pressure in the main throughout the day, the water piping system shall be designed on the basis of the minimum pressure available.

610.8 Size of Meter and Building Supply Pipe Using Table 6-6. The size of the meter and the building supply pipe shall be determined as follows:

(1) Determine the available pressure at the water meter or other source of supply.

(2) Subtract one-half (1/2) pound per square inch pressure (3.4 kPa) for each foot (305 mm) of difference in elevation between such source of supply and the highest water supply outlet in the building or on the premises.

(3) Use the "pressure range" group within which this pressure will fall using Table 6-6.

(4) Select the "length" column that is equal to or longer than the required length.

(5) Follow down the column to a fixture unit value equal to or greater than the total number of fixture units required by the installation.

(6) Having located the proper fixture unit value for the required length, sizes of meter and building supply pipe as found in the two left-hand columns shall be applied.

No building supply pipe shall be less than three-quarter (3/4) inch (20 mm) in diameter.

610.9 Size of Branches. When Table 6-6 is used, the minimum size of each branch shall be determined by the number of fixture units to be served by that branch, the total developed length of the system, and the meter and street service size as per Section 610.8. No branch piping is required to be larger in size than that required by Table 6-6 for the building supply pipe.

610.10 Sizing for Flushometer Valves. When

using Table 6-6 to size water supply systems serving flushometer valves, the number of flushometer fixture units assigned to every section of pipe, whether branch or main, shall be determined by the number and category of flushometer valves served by that section of pipe, in accordance with Table 6-7. Piping supplying a flushometer valve shall not be less in size than the valve inlet.

When using Table 6-7 to size water piping, care must be exercised to assign flushometer fixture units based on the number and category of fixtures served. In the example below, fixture units assigned to each section of pipe are computed as follows: Note: Each capital letter refers to the section of pipe above it, unless otherwise shown.

A: 1 WC = 40 F.U.

B: 2 WC = 70 F.U

C: 2 WC (70) + 1 UR (20) = 90 F.U.

D: 2 WC (70) + 2 UR (35) = 105 F.U.

E: 2 WC (70) + 2 UR (35) + 1 LAV (1) = 106 F.U.

F: 2 WC (70) + 2 UR (35) + 2 LAV (2) – 107 F.U.

G: 1 LAV = 1 F.U.

H: 2 LAV = 2 F.U.

I: 2 LAV (2) + 1 UR (20) = 22 F.U.

J: 2 LAV (2) + UR (35) = 37 F.U.

K: 2 LAV (2) + 2 UR (35) + 1 WC (40) = 77 F.U.

L: 2 LAV (2) + 2 UR (35) + 2 WC (70) = 107 F.U.

M: 4 WC (105) + 4 UR (53) + 4 LAV (4) = 162 F.U.

N: 1 WC = 40 F.U.

O: 1 WC (40) + 1 UR (20) = 60 F.U.

P: 1 WC (40) + 1 UR (20) + 1 LAV (1) = 61 F.U.

Q: 2 WC (70) + 1 UR (20) + 1 LAV (1) = 91 F.U.

R: 2 WC (70) + 2 UR (35) + 1 LAV (1) = 106 F.U.

S: 2 WC (70) + 2 UR (35) + 2 LAV (2) = 107 F.U.

T: 6 WC (125) + UR (63) + LAV (6) = 194 F.U.

611.11 Sizing Systems for Flushometer Tanks. The size of branches and mains serving flushometer tanks shall be consistent with the sizing procedures for flush tank water closets.

610.12 Sizing for Velocity. Water piping systems shall not exceed the maximum velocities listed in this section or Appendix A.

610.12.1 Copper Tube Systems. Maximum velocities in copper and copper allow tube and fitting systems shall be limited to a maximum of eight (8) feet per second (fps) (2.4) mps in cold water and five (5) fps in hot water (1.52 mps).

610.12.2 Tubing Systems Using Copper Allow Fittings. Maximum velocities through copper allow fittings in tubing other than copper shall be limited to a maximum of eight (8) feet per second (fps) (2.4 mps) in cold water and five (5) fps in hot water (1.52 mps).

610.13 Exceptions. The provisions of this section relative to size of water piping shall not apply to the following:

(1) Water supply piping systems designed in accordance with recognized engineering procedures acceptable to the Authority Having Jurisdiction.

(2) Alteration of or minor additions to existing installations, provided the Authority Having Jurisdiction finds that there will be an adequate supply of water to operate all fixtures.

(3) Replacement of existing fixtures or appliances.

(4) Piping that is part of fixture equipment.

(5) Unusual conditions where, in the judgment of the Authority Having Jurisdiction, an adequate supply of water is provided to operate fixtures and equipment.

(6) Nonpotable waterlines as defined in Sections 601.2.2 and 601.2.3.

(7) The size and material of irrigation water piping installed outside of any building or structure and separated from the potable water supply by means of an approved airgap or backflow prevention device is not regulated by this code. The potable water piping system supplying each such irrigation system shall be adequately sized as required elsewhere in this chapter to deliver the full connected demand of both the domestic use and the irrigation systems.

611.0 Drinking Water Treatment Units.

611.1 Compliance with Standard. Drinking water treatment units shall meet the requirements of the appropriate standard referenced in Table 14-1.

611.2 Airgap Discharge. Discharge from all drinking water treatment units shall meet the requirements of the appropriate standard referenced in Table 14-1.

611.3 Connection Tubing. The tubing to and from drinking water treatment units shall be of a size and material as recommended by the manufacturer. The tubing shall comply with the requirements of the appropriate standards referenced in Table 14-1.

611.4 Sizing of Residential Softeners. Residential-use water softeners shall be sized per Table 6-8.

CPC Section 611.5 is added to read as follows:

611.5 Water Softener Loop. Each single-family and multi-family dwelling unit will have its water distribution and drainage system designed to allow for connection to water softener equipment. The connection will be by means of an exposed, readily accessible plumbing loop or by other means approved by the administrative authority. The water softener discharge will terminate into an approved plumbing receptor.

Exception: Apartment units (excluding condominiums) with a common water meter and common main water line.

1010.1 [AGR] Meat and Poultry Processing Plants.

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

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

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

Exception: *Floor drains in areas not regularly washed down will be acceptable with deep-seal traps, provided that such drains are connected to secondary drainage systems discharging into a safe sink or basin (air gap) that is properly trapped and vented, and that such drains accomplish the objectives and intent of this section.*

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

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

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

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

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

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

1011.0 Minimum Requirements for Auto Wash Racks. Every private or public wash rack and/or floor or slab used for cleaning machinery or machine parts shall be adequately protected against storm or surface water and shall drain or discharge into an approved interceptor (clarifier).

1012.0 Commercial and Industrial Laundries. Laundry equipment in commercial and industrial buildings that does not have integral strainers shall discharge into an interceptor having a wire basket or similar device that is removable for cleaning and that will prevent passage into the drainage system of solids one-half (1/2) inch (12.7 mm) or larger in maximum dimension, such as string, rags, buttons, or other solid materials detrimental to the public sewerage system.

1013.0 Bottling Establishments. Bottling plants shall discharge their process wastes into an interceptor that will provide for the separation of broken glass or other solids, before discharging liquid wastes into the drainage system.

1014.0 Grease Interceptors.

1014.1 Where it is determined by the Authority Having Jurisdiction that waste pretreatment is required, an approved type of grease interceptor(s) complying with the provisions of this section shall be correctly sized and properly installed in grease waste line(s) leading from sinks and drains, such as floor drains and floor sinks and other fixtures or equipment in serving establishments such as restaurants, cafes, lunch counters, cafeterias, bars and clubs, hotels, hospitals, sanitariums, factor or school kitchens, or other establishments where grease may be introduced into the drainage or sewage system in quantities that can effect line stoppage or hinder sewage treatment or private sewage disposal. A grease interceptor shall not be required for individual dwelling units or for any private living quarters. Water closets, urinals, and other plumbing fixtures conveying human waste shall not drain into or through the grease interceptor.

CPC Section 1014.1 is amended to add the following:

The approved type of grease trap shall also meet the requirements of other divisions of the City.

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

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

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

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

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

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

1014.2 Hydromechanical Grease Interceptors.

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

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

1014.2.2 The total capacity in gallons (L) of fixtures discharging into any hydromechanical grease interceptor shall not exceed two and one-half (2-1/2) times the certified GPM (L/s) flow rate of the interceptor as per Table 10-2.

For the purpose of this section, the term "fixture" shall mean and include each plumbing fixture, appliance, apparatus, or other equipment required to be connected to or discharged into a grease interceptor by any provision of this section.

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

Table 10-2
Hydromechanical Grease Interceptor (HGI) Sizing Chart*

DFU	HGI FLow (gpm)
8	20
10	25
13	35
20	50
35	75
172	100
216	150
342	200
428	250
576	350
720	500

*Based on intermittent potentially full flow in drainage lines.

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

1014.3.1 General.

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

1014.3.2 Waste Discharge Requirements.

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

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

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

1014.3.3 Design.

1014.3.3.1 Gravity Interceptors shall be