

**EXPRESS TERMS  
FOR  
PROPOSED BUILDING STANDARDS  
OF THE  
CALIFORNIA BUILDING STANDARDS COMMISSION (CBSC)**

**REGARDING ADOPTION OF AMENDMENTS TO THE 2010 CALIFORNIA BUILDING STANDARDS  
CODE, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR), PARTS 2, 3, 4, 5 and 6 in  
TITLE 24, CCR, PART 11, CALIFORNIA GREEN BUILDING STANDARDS CODE**

**LEGEND FOR EXPRESS TERMS**

1. New California language and modified language is underlined.
2. Repealed text: All such language appears in ~~strikeout~~.

**The California Building Standards Commission (CBSC) proposes to amend the 2010 edition of the California Green Building Standards Code (CGBSC) as shown on the following pages. Adopt new text as follows:**

**EXPRESS TERMS**

**CHAPTER 1**

**ADMINISTRATION**

**SECTION 101  
GENERAL**

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**101.3.1 State-regulated buildings, structures and applications.** Provisions of this code shall apply to the following buildings, structures, and applications regulated by state agencies as referenced in the Matrix Adoption Tables and as specified in Sections 103 through 106, except where modified by local ordinance pursuant to Section 101.7. When adopted by a state agency, the provisions of this code shall be enforced by the appropriate enforcing agency, but only to the extent of authority granted to such agency statute.

1. State-owned buildings, including buildings constructed by the Trustees of the California State University, and to the extent permitted by California laws, buildings designed and constructed by the Regents of the University of California and regulated by the Building Standards Commission. See Section 103 for additional scoping provisions.
2. Energy efficiency standards regulated by the California Energy Commission
3. Low-rise residential buildings constructed throughout the State of California, including but not limited to, hotels, motels, lodging houses, apartment houses, dwellings, dormitories, condominiums, shelters for homeless persons, congregate residences, employee housing, factory-built housing and other types of dwellings containing sleeping accommodations with or without common toilets or cooking facilities. See Section 104 for additional scoping provisions.
4. Public elementary and secondary schools, and community college buildings regulated by the Division of the State Architect. See Section 105 for additional scope provisions.
5. Qualified historical buildings and structures and their associated sites regulated by the State Historical Building Safety Board within the Division of the State Architect.
6. General acute care hospitals, acute psychiatric hospitals, skilled nursing and/or intermediate care facilities, clinics licensed by the Department of Public Health and correctional treatment centers regulated by the Office of Statewide Health Planning and Development. See Section 106 for additional scoping provisions.
7. Graywater systems regulated by the Department of Water Resources and the Department of Housing and Community Development.
8. Green building standards for occupancies where no state agency has authority or expertise, adopted by the California Building Standards Commission. See Section 103 for additional scoping provisions.

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**SECTION 103  
BUILDING STANDARDS COMMISSION**

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

**1. All occupancies.**

**Application** – New construction, unless otherwise indicated in this code, of State buildings (all occupancies),

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

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

**Authority Cited** – Health and Safety Code Sections ~~18930.5~~, 18934.5 and ~~18938 (b)~~.

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

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

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

**Authority Cited** – Health and Safety Code Sections 18930.5 and 18938 (b).

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

### **2.3. University of California, California State Universities, and California Community Colleges.**

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

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

**Authority Cited** – Government Code Section 14617.

**Reference** – Government Code Section 14617.

### **3.4. Existing State-Owned Buildings, including those owned by the University of California and by the California State University.**

**Application** – Building seismic retrofit standards including abating falling hazards of structural and nonstructural components and strengthening of building structures. See also Division of the State Architect.

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

**Authority Cited** – Government Code Section 16600.

**Reference** – Government Code Sections 16600 through 16604.

### **4.5. Unreinforced Masonry Bearing Wall Buildings.**

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

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

**Authority Cited** – Health and Safety Code Section 18934.6.

**Reference** – Health and Safety Code Sections 18901 through 18949.

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

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## **CHAPTER 2**

### **SECTION 202 DEFINITIONS**

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**ARB (CARB).** The California Air Resources Board.

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**TIME DEPENDENT VALUATION (TDV) ENERGY.** The time varying energy caused to be used by the building to provide space conditioning and water heating and for specified buildings lighting. TDV energy accounts for the energy used at the building site and consumed in producing and in delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses.

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Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

## **CHAPTER 3**

### **GREEN BUILDING**

#### **SECTION 301 GENERAL**

## SECTION 304

### VOLUNTARY TIERS

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**304.1 Purpose.** Voluntary tiers are intended to further encourage building practices that improve public health, safety and general welfare by promoting the use of building concepts which minimize the building's impact on the environment and promote a more sustainable design.

**304.1.1 Tiers.** The provisions of ~~Appendices~~ Divisions A4.6 and A5.6 outline means, in the form of voluntary tiers, for of achieving enhanced construction levels by incorporating additional measures for residential and nonresidential new construction. Voluntary tiers may be adopted by local governments and, when adopted, enforced by local agencies. Buildings complying with tiers specified for each occupancy contain additional prerequisite and elective green building measures necessary to meet the threshold of each tier. See Section 101.7 for procedures and requirements related to local amendments, additions or deletions, including changes to energy standards.

**[BSC]** Where there are practical difficulties involved in complying with the threshold levels of a tier, the enforcing agency may grant modifications for individual cases. The enforcing agency shall first find that a special individual reason makes the strict letter of the tier impractical and that modification is in conformance with the intent and purpose of the measure. The details of any action granting modification shall be recorded and entered in the files of the enforcing agency.

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Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

## CHAPTER 5

### NONRESIDENTIAL MANDATORY MEASURES

#### DIVISION 5.1 PLANNING AND DESIGN

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#### SECTION 5.102 DEFINITIONS

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~~**PZEV.** Any vehicle certified by the California Air Resources Board as a Partial Credit Zero Emission Vehicle.~~

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#### SECTION 5.106 SITE DEVELOPMENT

~~**5.106.1 Storm water soil loss prevention plan.** For newly constructed projects of less than one acre, develop a Storm Water soil loss Pprevention plan that has been designed, specific to its site, conforming to the State Storm water NPDES Construction Permit 99-08 DWQ or local ordinance, whichever is stricter, as is required for projects one acre or more. The plan should cover prevention of soil loss by storm water run-off and/or wind erosion, of sedimentation, and/or of dust/particulate matter air pollution.~~

**5.106.1 Storm water pollution prevention.** Newly constructed projects which disturb less than one acre of land shall prevent the pollution of stormwater runoff from the construction activities through one or more of the following measures:

**5.106.1.1 Local ordinance.** Comply with a lawfully enacted stormwater management and/or erosion control ordinance.

~~**Note:** No state permit is required, but construction best management practices (BMPs) shall be followed. BMPs include but are not limited to the following:~~

**5.106.1.2. Best management practices (BMP).** Prevent the loss of soil through wind or water erosion by implementing an effective combination of erosion and sediment control and good housekeeping BMP.

1. Erosion and sediment control BMPs Soil loss BMP that should be considered for implementation as appropriate for each project include, but are not limited to, the following:

- a. Scheduling construction activity
- b. Preservation of natural features, vegetation and soil
- c. Drainage swales or lined ditches to control stormwater flow
- d. Mulching or hydroseeding to stabilize disturbed soils

- e. Erosion control to protect slopes
- f. Protection of storm drain inlets (gravel bags or catch basin inserts)
- g. Perimeter sediment control (perimeter silt fence, fiber rolls)
- h. Sediment trap or sediment basin to retain sediment on site
- i. Stabilized construction exits
- j. Wind erosion control
- k. Other soil loss BMP acceptable to the enforcing agency

2. Housekeeping BMPs Good housekeeping BMP to manage construction equipment, materials, and wastes that should be considered for implementation as appropriate for each project include, but are not limited to, the following:

- a. Material handling and waste management
- b. Building materials stockpile management
- c. Management of washout areas (concrete, paints, stucco, etc.)
- d. Control of vehicle/equipment fueling to contractor's staging area
- e. Vehicle and equipment cleaning performed off site
- f. Spill prevention and control
- g. Other housekeeping BMP acceptable to the enforcing agency

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**5.106.4 Bicycle parking.** Comply with Sections 5.106.4.1 and 5.106.4.2; or meet local ordinance ~~or the University of California Policy on Sustainable Practices~~, whichever is stricter.

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**5.106.5.2 Designated parking.** . . .

**5.106.5.2.1 Parking stall marking.** Paint, in the paint used for stall striping, the following characters such that the lower edge of the last word aligns with the end of the stall striping and is visible beneath a parked vehicle:

**“CLEAN AIR/  
VEHICLE VANPOOL/EV”**

**Note:** Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces.

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**5.106.10 Grading and Paving.** ~~The site shall be planned and developed to keep surface water from entering buildings.~~ Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

- 1. Swales
- 2. Water collection and disposal systems
- 3. French drains
- 4. Water retention gardens
- 5. Other water measures which keep surface water away from buildings and aid in groundwater recharge

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

## CHAPTER 5

### NONRESIDENTIAL MANDATORY MEASURES

#### SECTION 5.303 INDOOR WATER USE

#### SECTION 5.303 INDOOR WATER USE

**5.303.1 Meters.** Separate submeters or metering devices shall be installed for the uses described in Sections 5.303.1.1 and 5.303.1.2.

**5.303.1.1 Buildings in excess of 50,000 square feet (4645 m<sup>2</sup>).** Separate submeters shall be installed as follows:

- 1. For each individual leased, rented, or other tenant space within the building projected to consume more than 100 gal/day (380 L/day), including, but not limited to, spaces used for laundry or cleaners, restaurant or food service, medical or dental office, laboratory, or beauty salon or barber shop.
- 2. ~~For spaces used for laundry or cleaners, restaurant or food service, medical or dental office, laboratory, or~~

~~beauty salon or barber shop projected to consume more than 100 gal/day. Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems:~~

- ~~a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s)~~
- ~~b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s)~~
- ~~c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW)~~

**5.303.1.2 Excess consumption.** Any building within a project or a space within a building that is projected to consume more than 1,000 gal/day (3800 L/day).

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**5.303.2 20% Savings.** A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 20% shall be provided. The reduction shall be based on the maximum allowable water use per plumbing fixture and fittings as required by the California Building Standards Code. The 20% reduction in potable water use shall be demonstrated by one of the following methods.

1. Prescriptive method. Each plumbing fixture and fitting shall ~~meet the 20% reduced flow rate~~ not exceed the maximum flow rate at  $\geq 20$  percent reduction as specified in Table 5.303.2.3, or
2. Performance method. A calculation demonstrating a 20% reduction in the building “water use baseline” as established in Table 5.303.2.2 shall be provided.

**5.303.2.1 Multiple showerheads serving one shower.** When ~~single shower fixtures are~~ a shower is served by more than one showerhead, the combined flow rate of all the showerheads controlled by a single valve shall not exceed the maximum flow rate at  $\geq 20$  percent reduction contained in Table 5.303.2.2 or the shower shall be designed to only allow one showerhead to be in operation at a time.

**Exception:** The maximum flow rate for shower heads when using the ~~calculation~~ performance method specified in Section 5.303.2.1, Item 2 is 2.5 gpm @ 80 psi.

**TABLE 5.303.2.2  
INDOOR WATER USE BASELINE <sup>4 3</sup>**

Fixture Type	Baseline Flow-rate <sup>2</sup>	Duration	Daily uses	Occupants <sup>2, 3, 4 3</sup>
Showerheads	2.5 gpm @ 80 psi	<del>8 5</del> min.	1	X <sup>3</sup>
Lavatory faucets, residential	2.2 gpm @ 60 psi	.25 min.	3	X
Lavatory Faucets Nonresidential	0.5 gpm @ 60 psi	.25 min.	3	X <sup>3</sup>
Kitchen Faucets	2.2 gpm @ 60 psi	4 min.	1	X
Replacement Aerators	2.2 gpm @ 60 psi			X
Wash Fountains	2.2 [rim space (in.) / 20 gpm @ 60 psi]			X
Metering Faucets	0.25 gallons/cycle	.25 min.	3	X
Metering Faucets for Wash Fountains	.25 [rim space (in.) / 20 gpm @ 60 psi]	.25 min.		X
Gravity tank type Water Closets	1.6 gallons/flush	1 flush	1 male <sup>1</sup> 3 female	X
Flushometer Tank Water Closets	1.6 gallons/flush	1 flush	1 male <sup>1</sup> 3 female	X
Flushometer Valve Water Closets	1.6 gallons/flush	1 flush	1 male <sup>1</sup> 3 female	X
Electromechanical Hydraulic Water Closets	1.6 gallons/flush	1 flush	1 male <sup>1</sup> 3 female	X
Urinals	1.0 gallons/flush	1 flush	2 male	X

Fixture “Water Use” = Flow rate x Duration x Occupants x Daily uses

<sup>1</sup> The daily use number shall be increased to three if urinals are not installed in the room.

<sup>2</sup> ~~The flow rate is from the CEC Appliance Efficiency Standards, Title 20 California Code of Regulations; where a conflict occurs, the CEC standards shall apply.~~

<sup>3 2</sup> Refer to Table A, Chapter 4, California Plumbing Code, for occupant load factors.

(a) Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.

(b) Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.

<sup>4 3</sup> Use Worksheet WS-1 to calculate base line water use.

**TABLE 5.303.2.3 FIXTURE FLOW RATES**

Fixture Type	Baseline Flow-rate	Maximum flow rate at
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		<b>≥ 20% Reduction</b>
Showerheads	2.5 gpm @ 80 psi	2 gpm @ 80 psi
<u>Lavatory faucets, residential</u>	<u>2.2 gpm @ 60 psi</u>	<u>1.5 gpm @ 60 psi<sup>1</sup></u>
Lavatory Faucets Nonresidential	0.5 gpm @ 60 psi	0.4 gpm @ 60 psi <sup>3</sup>
Kitchen Faucets	2.2 gpm @ 60 psi	1.8 gpm @ 60 psi <sup>2</sup>
Wash Fountains	2.2 [rim space (in.) / 20 gpm @ 60 psi]	1.8 [rim space (in.) / 20 gpm @ 60 psi]
Metering Faucets	0.25 gallons/cycle	0.2 gallons/cycle
Metering Faucets for Wash Fountains	.25 [rim space (in.) / 20 gpm @ 60 psi]	.20 [rim space (in.) / 20 gpm @ 60 psi]
Gravity tank type Water Closets	1.6 gallons/flush	1.28 gallons/flush <sup>1</sup>
Flushometer Tank Water Closets	1.6 gallons/flush	1.28 gallons/flush <sup>1</sup>
Flushometer Valve Water Closets	1.6 gallons/flush	1.28 gallons/flush <sup>1</sup>
Electromechanical Hydraulic Water Closets	1.6 gallons/flush	1.28 gallons/flush <sup>1</sup>
Urinals	1.0 gallons/flush	.5 gallons/flush

<sup>1</sup> Lavatory Faucets Residential shall not have a flow rate less than 0.8 gpm at 20 psi.

<sup>2</sup> Kitchen faucets may temporarily increase flow above the maximum rate, but not above 2.2 gpm @ 60 psi and must default to a maximum flow rate of 1.8 gpm @ 60 psi.

<sup>3</sup> Where complying faucets are unavailable, aerators rated at .35 gpm or other means may be used to achieve reduction.

<sup>4</sup> Includes single and dual flush water closets with an effective flush of 1.28 gallons or less.

Single Flush Toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is the average flush volume when tested in accordance with ASME A112.19.233.2.

Dual Flush Toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is defined as the composite, average flush volume of two reduced flushes and one full flush. Flush volumes will be tested in accordance with ASME A112.19.2 and ASME A112.19.14.

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**TABLE 5.303.6  
STANDARDS FOR PLUMBING FIXTURES AND FIXTURE FITTINGS**

REQUIRED STANDARDS	
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Residential bathroom lavatory sink faucets: Maximum flow rate – 1.5 gpm (5.7 l/min) <sup>1</sup>	ASME A112.18.1/CSA B125.1
<u>Showerheads: Maximum flow rate – 2.5 gal (9.5 l/min)</u>	<u>ASME A112.18.1/CSA B125.1</u>

**SECTION 5.304  
OUTDOOR WATER USE**

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**5.304.2 Outdoor potable water use.** For new water service for landscaped areas ~~between~~ of at least 1000 square feet ~~and but not more than~~ 5000 square feet (the level at which Water Code §535 applies), separate ~~meters or~~ submeters or metering devices shall be installed for ~~indoor and~~ outdoor potable water use.

**5.304.3 Irrigation design.** In new nonresidential construction with ~~between~~ at least 1000 square feet ~~and but not more than~~ 2500 square feet of landscaped area (the level at which the MLO applies), install irrigation controllers and sensors which include the following criteria, and meet manufacturer's recommendations.

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Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

**CHAPTER 5**

## NONRESIDENTIAL MANDATORY MEASURES

### DIVISION 5.4 MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

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#### SECTION 5.408

#### CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

~~**5.408.1 Construction waste diversion.** Establish a construction waste management plan for the diverted materials, or meet local construction and demolition waste management ordinance, whichever is more stringent.~~

**5.408.2 1 Construction waste management plan.** Recycle and/or salvage for reuse a minimum of 50% of the non-hazardous construction waste in accordance with Section 5.408.1.1, 5.408.1.2 or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.

**5.408.1.1 Construction waste management plan.** Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan ~~for approval by the enforcement agency~~ that:

1. Identifies the construction waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project, or salvage for future use or sale.
2. Determines if construction waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
3. Identifies diversion facilities where construction waste material collected will be taken.
4. Specifies that the amount of construction waste materials diverted shall be calculated by weight or volume, but not by both.

**5.408.1.2 Waste management company.** Utilize a waste management company that can provide verifiable documentation that the percentage of construction waste material diverted from the landfill complies with this section.

**Note:** The owner or contractor shall make the determination if the construction waste material will be diverted by a waste management company.

**Exceptions to 5.408.1.1 and 5.408.1.2:**

1. Excavated soil and land-clearing debris
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets, where demolition of an existing structure(s) is necessary for the construction of a new structure.

**5.408.1.3 Waste stream reduction alternative.** The combined weight of new construction disposal that does not exceed 2 lbs/s.f. of building area may be deemed to meet the 50% minimum requirement as approved by the enforcing agency.

**5.408.2-1.4 Documentation.** Documentation shall be provided to the enforcing agency which demonstrates compliance with Section 5.408.2 1.1, ~~Items thru 4~~ through 5.408.1.3. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.

**Notes:**

1. Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located at <http://www.bsc.ca.gov/CALGreen/default.htm> may be used to assist in documenting compliance with the waste management plan.
2. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

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**5.408.2-2 Isolated jobsites.** The enforcing agency may make exceptions to the requirements of this section when jobsites are located in areas beyond the haul boundaries of the diversion facility.

**Notes:**

1. ~~Sample forms found in Chapter 8 may be used to assist in documenting compliance with the waste management plan.~~
2. ~~Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).~~

~~**5.408.3 Construction waste reduction of at least 50%.** Recycle and/or salvage for reuse a minimum of 50% of the non-hazardous construction and demolition debris, or meet a local construction and demolition waste management ordinance, whichever is more stringent. Calculate the amount of materials diverted by weight or volume, but not by both.~~

**Exceptions:**

1. ~~Excavated soil and land clearing debris~~
2. ~~Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities~~

~~capable of compliance with this item do not exist.~~

**5.408.4.3 Excavated soil and land clearing debris.** 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.

Exception: Reuse, either on-or off-site, of vegetation or soil contaminated by disease or pest infestation.

**Notes:**

1. If contamination by disease or pest infestation is suspected, contact the County Agricultural Commissioner and follow its direction for recycling or disposal of the material. ([www.cdfa.ca.gov/exec/county/county\\_contacts.html](http://www.cdfa.ca.gov/exec/county/county_contacts.html))
2. For a map of known pest and/or disease quarantine zones, consult with the California Department of Food and Agriculture ([www.cdfa.ca.gov](http://www.cdfa.ca.gov))

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**5.410.2 Commissioning.** For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity. Commissioning requirements shall include:

1. Owner's or Owner representative's project requirements
2. Basis of design
3. Commissioning measures shown in the construction documents
4. Commissioning plan
5. Functional performance testing
6. Documentation and training
7. Commissioning report

**Exceptions:**

1. Dry storage warehouses of any size
2. Areas under 10,000 square feet used for offices or other conditioned accessory spaces within dry storage warehouses
3. Tenant improvements under 10,000 square feet as described in Section 303.1.1.

All building operating systems and components covered by Title 24, Part 6, as well as process equipment and controls, and renewable energy systems shall be included in the scope of the Commissioning Requirements.

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**5.410.2.2 Basis of Design (BOD).** A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project, ~~and updated as necessary during the design and construction phases.~~ The Basis of Design document shall cover the following systems:

8. Heating, ventilation, air conditioning (HVAC) systems and controls
9. Indoor lighting system and controls
10. Water heating system
11. Renewable energy systems
12. Landscape irrigation systems
13. Water reuse systems

**5.410.2.3 Commissioning plan.** Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned ~~and shall be started during the design phase of the building project.~~ The Commissioning Plan shall include the following:

1. General project information
2. Commissioning goals
3. Systems to be commissioned. Plans to test systems and components shall include:
  - a. An explanation of the original design intent
  - b. Equipment and systems to be tested, including the extent of tests
  - c. Functions to be tested
  - d. Conditions under which the test shall be performed
  - e. Measurable criteria for acceptable performance
4. Commissioning team information
5. Commissioning process activities, schedules and responsibilities. Plans for the completion of ~~commissioning requirements listed in A5.410.4.4 through A5.410.4.6~~ shall be included

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**5.410.2.5.1 Systems manual.** Documentation of the operational aspects of the building shall be completed within the Systems Manual and delivered to the building owner or representative ~~and facilities operator.~~ The Systems Manual shall include the following:

1. Site information, including facility description, history and current requirements
2. Site contact information

3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log
4. Major systems
5. Site equipment inventory and maintenance notes
6. A copy of all ~~special inspection~~ verifications required by the enforcing agency or this code
7. Other resources and documentation if applicable

**5.410.2.5.2 Systems operations training.** ~~The~~ A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and documented in the commissioning report and shall include the following:

1. System/equipment overview (what it is, what it does and with what other systems and/or equipment it interfaces)
2. Review and demonstration of servicing/preventive maintenance
3. Review of the information in the Systems Manual
4. Review of the record drawings on the system/equipment

**5.410.2.6 Commissioning report.** ~~A complete report of commissioning process activities undertaken through the design, and construction and reporting recommendations for post-construction phases of the building project shall be completed and provided to the owner or representative.~~

**5.410.4 Testing and adjusting.** Testing and adjusting of systems shall be required for buildings less than 10,000 square feet.

#### 5.410.4.1 Reserved

**5.410.4.2 Systems.** Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include ~~at a minimum,~~ as applicable to the project:

1. HVAC systems and controls
2. Indoor and outdoor lighting and controls
3. Water heating systems
4. Renewable energy systems
5. Landscape irrigation systems
6. Water reuse systems

**5.410.4.3 Procedures.** Perform testing and adjusting procedures in accordance with manufacturer's specifications and industry best practices and applicable national standards on each system ~~as determined by the building official.~~

**5.410.4.3.1 HVAC balancing.** In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, balance the system ~~shall be balanced~~ in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards; the National Environmental Balancing Bureau Procedural Standards; ~~or~~ Associated Air Balance Council National Standards or as approved by the ~~building official~~ enforcing agency.

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Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

## CHAPTER 5

### NONRESIDENTIAL MANDATORY MEASURES

#### DIVISION 5.5 ENVIRONMENTAL QUALITY

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#### SECTION 5.502 DEFINITIONS

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**ARTERIAL HIGHWAY.** A general term denoting a highway primarily for through traffic usually on a continuous route.

**A-WEIGHTED SOUND LEVEL (dBA).** The sound pressure level in decibels as measured on a sound level meter using the internationally standardized A-weighting filter or as computed from sound spectral data to which A-weighting adjustments have been made.

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**COMMUNITY NOISE EQUIVALENT LEVEL (CNEL).** A metric similar to Ldn, except that a 5 dB adjustment is added to the equivalent continuous sound exposure level for evening hours (7 p.m. to 10 p.m.) in addition to the 10 dB nighttime adjustment used in the Ldn.

**COMPOSITE WOOD PRODUCTS.** Composite wood products include hardwood plywood, particleboard, and medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, prefabricated wood I-joists, or finger-jointed lumber, all as specified in CCR, Title 17, Section 93120.1(a).

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**DAY-NIGHT AVERAGE SOUND LEVEL (L<sub>dn</sub>).** The A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10 p.m. to 7 a.m.).

**DECIBEL (dB).** A measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power, sound intensity) with respect to a reference quantity.

**ENERGY EQUIVALENT (NOISE) LEVEL (L<sub>eq</sub>).** The level of a steady noise which would have the same energy as the fluctuating noise level integrated over the time period of interest.

**EXPRESSWAY.** An arterial highway for through traffic which may have partial control of access, but which may or may not be divided or have grade separations at intersections.

**FREEWAY.** A divided arterial highway with full control of access and with grade separations at intersections.

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**VOC.** A volatile organic compound broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a).

**Note:** Where specific regulations are cited from different agencies such as South Coast Air Quality Management District (SCAQMD), California Air Resources Board (ARB or CARB), etc, the VOC definition included in that specific regulation is the one that prevails for the specific measure in question.

## **SECTION 5.504 POLLUTANT CONTROL**

**5.504.1.3 Temporary ventilation.** The permanent HVAC system shall only be used during construction if necessary to condition the building within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy.

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**5.504.3 Covering of duct openings and protection of mechanical equipment during construction.** At the time of rough installation, ~~or~~ and during storage on the construction site ~~and~~ until final startup of the heating, ~~and~~ cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust ~~or~~ water and debris which may collect in enter the system.

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**5.504.4.4 Carpet systems.** All carpet installed in the building interior shall meet the testing and product requirements of one of the following:

1. Carpet and Rug Institute's Green Label Plus Program
2. California Department of Public Health Standard ~~Practice for the testing of VOCs (Specification 01350) Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010 (also known as Specification 01350.)~~
3. NSF/ANSI 140 at the Gold level or higher
4. Scientific Certifications Systems Sustainable Choice

**5.504.4.4.1 Carpet cushion.** All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.

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**5.504.4.5 Composite wood products.** Hardwood plywood, particleboard, and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table 5.504.4.5. . . .

**5.504.4.5.1 Early compliance. Reserved.**

**5.504.4.5.2 3 Documentation.** Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following.

1. Product certifications and specifications.
2. Chain of custody certifications.

- ~~3. Other methods acceptable to the enforcing agency.~~
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.)
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.
5. Other methods acceptable to the enforcing agency.

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**5.504.4.6 Resilient flooring systems.** For 50% of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its ~~Low-emitting Materials List (or Product Registry) High Performance Products Database;~~ products compliant with CHPS criteria certified under the Greenguard Children & Schools program; or certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet California Department of Public Health 2010 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010 (also known as Specification 01350.)

**Note:** ~~Products compliant with CHPS criteria certified under the Greenguard Children & Schools program may also be used.~~

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**5.504.5.3 Filters.** In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air ~~prior to occupancy~~ that provides at least a Minimum Efficiency Reporting Value (MERV) of 8. MERV 8 filters shall be installed prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.

**Exception:** A MERV-1 filter shall be allowed for return air only or return with prefiltered outside air, if the filter is of a re-usable, non-disposable type, and the fan energy use of that air delivery system is 0.4W/cfm or less at design airflow.

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**5.504.7 Environmental tobacco smoke (ETS) control.** Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and ~~in buildings within the building as already prohibited by other laws or regulations;~~ or as enforced by ordinances, regulations, or policies of any city, county, city and county, California Community College, campus of the California State University, or campus of the University of California, whichever are more stringent. When ordinances, regulations, or policies are not in place, post signage to inform building occupants of the prohibitions.

## SECTION 5.506 INDOOR AIR QUALITY

**5.506.1 Outside air delivery.** For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 121 (Requirements For Ventilation) of the 2010 California Energy Code, ~~CCR, Title 24, Part 6;~~ or the applicable local code, whichever is more stringent, and Division 1, Chapter 4 of CCR, Title 8.

**5.506.2 Carbon dioxide (CO<sub>2</sub>) monitoring. [BSC]** For buildings equipped with demand control ventilation, CO<sub>2</sub> sensors and ventilation controls shall be specified and installed in accordance with the requirements of the ~~current edition of the 2010 California Energy Code, CCR, Title 24, Part 6,~~ Section 121(c).

## SECTION 5.507 ENVIRONMENTAL COMFORT

**5.507.4 Acoustical control.** Employ building assemblies and components with Sound Transmission Coefficient Class (STC) values determined in accordance with ASTM E90 and ASTM E413 ~~or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E1332, using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2.~~

**Exception:** Buildings with few or no occupants or where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking structures, and utility buildings.

**5.507.4.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall have meet a composite an STC rating of at least 50 or a composite OITC rating of no less than 40, and exterior windows shall have a minimum STC of 30 with exterior windows of a minimum STC of 40 or OITC of 30 in the following locations:

1. Within the 65 CNEL noise contour of an airport

**Exceptions:**

1. Ldn or CNEL for military airports shall be determined by the facility Air Installation Compatible Land Use Zone (AICUZ) plan.

2. Ldn or CNEL for other airports and heliports for which a land use plan has not been developed shall be determined by the local general plan noise element.

2. Within the 65 CNEL or L<sub>dn</sub> noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway source as determined by the Noise Element of the General Plan

~~1. Within 1000 ft. (300 m.) of right of ways of freeways.~~

~~2. Within 5 mi. (8 km.) of airports serving more than 10,000 commercial jets per year.~~

~~3. Where sound levels at the property line regularly exceed 65 decibels, other than occasional sound due to church bells, train horns, emergency vehicles and public warning systems.~~

**5.507.4.1.1 Noise exposure where noise contours are not readily available.** Buildings exposed to a noise level of 65 dB Leq-1-hr during any hour of operation shall have exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).

**5.507.4.2 Performance method.** For buildings located as defined in Sections A5.507.4.1 or A5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (L<sub>eq</sub>-1Hr) of 50 dBA in occupied areas during any hour of operation.

**5.507.4.2.1 Site features.** Exterior features such as sound walls, vegetation and trees compliant with wildland-urban interface provisions of the California Fire Code may be utilized as appropriate to the project to mitigate sound migration to the interior.

**5.507.4.2.2 Documentation of compliance.** An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.

**Exception:** Buildings with few or no occupants and where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking structures, and utility buildings.

**5.507.4.3 Interior sound transmission.** Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.

**Note:** Examples of assemblies and their various STC ratings may be found at the California Office of Noise Control: [http://www.toolbase.org/PDF/CaseStudies/stc\\_icc\\_ratings.pdf](http://www.toolbase.org/PDF/CaseStudies/stc_icc_ratings.pdf).

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Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

## CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES

### DIVISION 5.7

### ADDITIONS AND ALTERATIONS TO EXISTING NONRESIDENTIAL BUILDINGS

#### SECTION 5.701 ADMINISTRATION

**5.701.1 Scope.** For those occupancies subject to section 103 of this code, the provisions of this division shall apply to the planning, design, operation, construction, use and occupancy of additions to buildings or structures, unless otherwise indicated in this code. The provisions of this Division shall only apply to the portions of the building being added or altered within the scope of the permitted work. Compliance for additions and alterations is required on or before the dates shown in Table 5.701.

**TABLE 5.701**

<u>Effective date of compliance</u>	<u>Square footage of addition</u>	<u>Permit valuation or estimated construction cost of alteration</u>
July 1, 2012	2000	\$500,000
<u>Effective date of the 2013 California Building Standards Code</u>	1000	\$200,000

**Notes:**

1. The effective date of the 2013 California Building Standards Code currently is projected to be January 1, 2014.
2. This division does not apply to additions and alterations of qualified historical buildings.

## **SECTION 5.702** **DEFINITIONS**

**5.702.1 Definitions.** Unless otherwise stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this division. Refer also to definitions in Chapter 2 of this code.

**ADDITION.** An extension or increase in floor area of an existing building or structure.

**ALTERATION OR ALTER.** Any construction or renovation to an existing structure other than repair for the purpose of maintenance or addition.

**ARB (CARB).** The California Air Resources Board.

## **SECTION 5.703** **GREEN BUILDING**

**5.703.1 Scope.** Building additions and alterations shall be designed to include the green building measures specified as mandatory in the application checklists for alterations or additions contained in this code.

**5.703.2 Phased projects.** For shell buildings and others constructed for future tenant improvements, only those code measures relevant to the building components and systems considered to be new construction (or newly constructed) shall apply.

**5.703.2.1 Tenant improvements.** The provisions of this code shall apply to the initial tenant or occupant improvements to a project and to subsequent tenant improvements subject to Section 5.701.1.

## **SECTION 5.710** **PLANNING AND DESIGN**

**5.710.1 General.** The provisions of this chapter outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore, and enhance the environmental quality of the site and respect the integrity of adjacent properties.

**5.710.2 Definitions.** Refer to Section 5.102 of this code.

**5.710.3 Site selection (Reserved)**

**5.710.4 Site preservation (Reserved)**

**5.710.5 Deconstruction and reuse of existing structures (Reserved)**

**5.710.6 Site development**

**5.710.6.1 Storm water pollution prevention.** Additions that disturb soil of less than one acre shall prevent the pollution of stormwater runoff from the construction activities through one or more of the following measures:

**5.710.6.1.1 Local ordinance.** Comply with a lawfully enacted stormwater management and/or erosion control ordinance.

**5.710.6.1.2. Best management practices (BMP).** Prevent the loss of soil through wind or water erosion by implementing an effective combination of erosion and sediment control and good housekeeping BMP.

1. Soil loss BMP that should be considered for implementation as appropriate for each project include, but are not limited to, the following:

- a. Scheduling construction activity
- b. Preservation of natural features, vegetation and soil
- c. Drainage swales or lined ditches to control stormwater flow
- d. Mulching or hydroseeding to stabilize disturbed soils
- e. Erosion control to protect slopes
- f. Protection of storm drain inlets (gravel bags or catch basin inserts)
- g. Perimeter sediment control (perimeter silt fence, fiber rolls)
- h. Sediment trap or sediment basin to retain sediment on site
- i. Stabilized construction exits
- j. Wind erosion control

2. Good housekeeping BMP to manage construction equipment, materials, and wastes that should be considered for implementation as appropriate for each project include, but are not limited to, the following:

- a. Material handling and waste management
- b. Building materials stockpile management
- c. Management of washout areas (concrete, paints, stucco, etc.)

- d. Control of vehicle/equipment fueling to contractor's staging area
- e. Vehicle and equipment cleaning performed off site
- f. Spill prevention and control

**5.710.6.2 Bicycle parking.** Comply with Sections 5.710.6.2.1 and 5.710.6.2.2; or meet the applicable local ordinance, whichever is stricter.

**5.710.6.2.1 Short-term bicycle parking.** If the project is anticipated to generate visitor traffic and adds 10 or more vehicular parking spaces, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of the additional visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.

**5.710.6.2.2 Long-term bicycle parking.** For buildings with over 10 tenant-occupants that add 10 or more vehicular parking spaces, provide secure bicycle parking for 5% of additional motorized vehicle parking capacity, with a minimum of one space. Acceptable parking facilities shall be convenient from the street and may include:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; and
3. Lockable, permanently anchored bicycle lockers.

**5.710.6.3 Designated parking.** For projects that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles as shown in Table 5.106.5.2 of Division 5.1 based on the number of additional spaces.

**5.710.6.3.1 Parking stall marking.** Paint, in the paint used for stall striping, the following characters such that the lower edge of the last word aligns with the end of the stall striping and is visible beneath a parked vehicle:

**CLEAN AIR/  
VANPOOL/EV**

**5.710.6.4 Reserved.**

**5.710.6.5 Reserved.**

**5.710.6.6 Grading and Paving.** Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

1. Swales
2. Water collection and disposal systems
3. French drains
4. Water retention gardens
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge

**Exception:** Additions and alterations not altering the drainage path.

**SECTION 5.711  
ENERGY EFFICIENCY (Reserved)**

**SECTION 5.712  
WATER EFFICIENCY AND CONSERVATION**

**5.712.1 Scope.** The provisions of this section shall establish the means of conserving water used indoors, outdoors, and in wastewater conveyance.

**5.712.2 Definitions.** Refer to Section 5.302 of this code.

**5.712.3 Indoor water use.**

**5.712.3.1 Meters.** Separate submeters or metering device shall be installed for the uses described in Sections 5.712.3.1.1 and 5.712.3.1.2.

**5.712.3.1.1 Additions to existing buildings in excess of 50,000 square feet (4645 m<sup>2</sup>).** Separate submeters shall be installed as follows:

1. For each individual leased, rented, or other tenant space within the building projected to consume more than 100 gal/day (380 L/day), including, but not limited to, spaces used for laundry or cleaners, restaurant or food service, medical or dental office, laboratory, or beauty salon or barber shop.
2. Where meters for individual building tenants are unfeasible, for water supplied to the following subsystems:
  - a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s)
  - b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s)
  - c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW)

**5.712.3.1.2 Excess consumption.** Any addition or added space within an addition that is projected to consume more than 1,000 gal/day (3800 L/day).

**5.712.3.2 20% Savings.** A schedule of newly installed plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the addition or area of alteration to the building by 20% shall be provided. The reduction shall be based on the maximum allowable water use per plumbing fixture and fittings as required by the California Building Standards Code. The 20% reduction in potable water use shall be demonstrated by one of the following methods.

1. Prescriptive method. Each plumbing fixture and fitting shall not exceed the maximum flow rate at  $\geq 20$  percent reduction as specified in Table 5.303.2.3 of Division 5.3, or
2. Performance method. A calculation demonstrating a 20% reduction in the building "water use baseline" as established in Table 5.303.2.2 shall be provided.

**5.712.3.3 Multiple showerheads serving one shower.** When a shower is served by more than one newly installed showerhead, the combined flow rate of all the showerheads controlled by a single valve shall not exceed the maximum flow rate at  $\geq 20$  percent reduction contained in Table 5.303.2.2 or the shower shall be designed to only allow one showerhead to be in operation at a time.

**Exception:** The maximum flow rate for shower heads when using the performance method specified in Section 5.303.2.1, Item 2 is 2.5 gpm @ 80 psi.

#### **5.712.3.4 (Reserved)**

**5.712.3.5 Plumbing fixtures and fittings.** Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall meet the standards referenced in Table 5.503.6 of Division 5.3.

### **5.712.4 Outdoor water use.**

**5.712.4.1 Water budget.** A water budget shall be developed for landscape irrigation use installed in conjunction with addition or alteration that conforms to the local water efficient landscape ordinance or to the California Department of Water Resources Model Water Efficient Landscape Ordinance where no local ordinance is applicable.

**Note:** Prescriptive measures to assist in compliance with the water budget are listed in Sections 492.5 through 492.8, 492.10 and 492.11 of the ordinance, which may be found at: <http://www.owue.water.ca.gov/landscape/ord/ord.cfm>

**5.712.4.2 Outdoor potable water use.** For building addition or alteration requiring upgraded water service for landscaped areas of at least 1000 square feet but not more than 5000 square feet (the level at which Water Code §535 applies), separate submeters or metering devices shall be installed for outdoor potable water use.

**5.712.4.3 Irrigation design.** In building addition or alteration with at least 1000 square feet but not more than 2500 square feet of cumulative landscaped area (the level at which the MLO applies), install irrigation controllers and sensors which include the following criteria, and meet manufacturer's recommendations.

**Exception:** New irrigation controllers are not required when existing irrigation controllers have sufficient capacity to serve the new landscaped area.

**5.712.4.3.1 Irrigation controllers.** Automatic irrigation system controllers installed at the time of final inspection shall comply with the following:

1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change.
2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.

**Note:** More information regarding irrigation controller function and specifications is available from the Irrigation Association.

#### **5.712.5 Water reuse systems (Reserved)**

## **SECTION 5.713 MATERIAL CONSERVATION AND RESOURCE EFFICIENCY**

**5.713.1 Scope.** The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through protection of buildings from exterior moisture, construction waste diversion, provisions in the workplace for recycling of materials, and system testing and adjusting and balancing of HVAC.

**5.713.2 Definitions.** Refer to Section 5.402 of this code.

#### **5.713.3 Foundation systems (Reserved)**

#### **5.713.4 Efficient framing techniques (Reserved)**

#### **5.713.5 Material sources (Reserved)**

## **5.713.6 Enhanced durability and reduced maintenance (Reserved)**

### **5.713.7 Water resistance and moisture management.**

**5.713.7.1 Weather protection.** Provide a weather-resistant exterior wall and foundation envelope as required by California Building Code Section 1403.2 (Weather Protection) and California Energy Code Section 150, (Mandatory Features and Devices), manufacturer's installation instructions, or local ordinance, whichever is more stringent.

**5.713.7.2 Moisture control.** Employ moisture control measures by the following methods.

**5.713.7.2.1 Sprinklers.** Design and maintain landscape irrigation systems to prevent spray on structures.

**5.713.7.2.2 Entries and openings.** Design exterior entries and/or openings subject to foot traffic or wind-driven rain to prevent water intrusion into buildings.

**Notes:**

1. Use features such as overhangs and recesses, and flashings integrated with a drainage plane.
2. Use non-absorbent floor and wall finishes within at least two feet around and perpendicular to such openings.

### **5.713.8 Construction waste reduction, disposal and recycling**

**5.713.8.1 Construction waste management.** Recycle and/or salvage for reuse a minimum of 50% of the non-hazardous construction waste in accordance with Section 5.713.8.1.1 or 5.713.8.1.2; or meet a local construction and demolition waste management ordinance, whichever is more stringent.

**5.713.8.1.1 Construction waste management plan.** Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan that:

1. Identifies the construction waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project, or salvage for future use or sale.
2. Determines if construction waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
3. Identifies diversion facilities where construction waste material collected will be taken.
4. Specifies that the amount of construction waste materials diverted shall be calculated by weight or volume, but not by both.

**5.713.8.1.2 Waste management company.** Utilize a waste management company, approved by the enforcing agency, that can provide verifiable documentation that the percentage of construction waste material diverted from the landfill complies with this section.

**Note:** The owner or contractor shall make the determination if the construction waste material will be diverted by a waste management company.

**Exceptions to 5.713.8.1.1 and 5.713.8.1.2:**

1. Excavated soil and land-clearing debris
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets, where demolition of an existing structure(s) is necessary for the new construction

**5.713.8.1.3 Documentation.** Documentation shall be provided to the enforcing agency which demonstrates compliance with Section 5.713.8.1.1, Items through 4. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.

**Notes:**

1. Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located at <http://www.bsc.ca.gov/CALGreen/default.htm> may be used to assist in documenting compliance with the waste management plan.
2. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

**5.713.8.2 Isolated jobsites.** The enforcing agency may make exceptions to the requirements of this section when jobsites are located in areas beyond the haul boundaries of the diversion facility.

**5.713.8.3 Excavated soil and land clearing debris.** 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.

**Exception:** Reuse, either on-or off-site, of vegetation or soil contaminated by disease or pest infestation.

**Notes:**

1. If contamination by disease or pest infestation is suspected, contact the County Agricultural Commissioner and follow its direction for recycling or disposal of the material.

([www.cdfa.ca.gov/exec/county/county\\_contacts.html](http://www.cdfa.ca.gov/exec/county/county_contacts.html))

2. For a map of known pest and/or disease quarantine zones, consult with the California Department of Food and Agriculture ([www.cdfa.ca.gov](http://www.cdfa.ca.gov))

#### **5.713.9 Life cycle assessment (Reserved)**

#### **5.713.10 Building maintenance and operation**

**5.713.10.1 Recycling by occupants.** If not provided on the existing site and where site conditions permit, provide readily accessible areas that serve the entire building and are identified for the depositing, storage, and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics and metals, metals in accordance with one of the following:

1. For additions or alterations by an owner or a tenant conducted within a 12-month period under single or multiple permits resulting in an increase of 30% or more in floor area
2. For additions or alterations by an owner or a tenant for which multiple permits are applied within a 12-month period resulting in an increase of 30% or more in floor area
3. As required by a lawfully enacted local recycling ordinance, if more restrictive.

**5.713.10.1.1 Sample ordinance.** Space allocation for recycling areas shall comply with Chapter 18, Part 3, Division 30 of the Public Resources Code. Chapter 18 is known as the California Solid Waste Reuse and Recycling Access Act of 1991 (Act).

**Note:** A sample ordinance for use by local agencies may be found in Appendix A of the document at the CalRecycle's web site.

#### **5.713.10.2 (Reserved)**

#### **5.713.10.3 (Reserved)**

**5.713.10.4 Testing and adjusting.** Testing and adjusting of new systems installed in to serve an addition or alteration subject to Section 5.701.1 shall be required.

#### **5.713.10.4.1 (Reserved)**

**5.713.10.4.2 Systems.** Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include, as applicable to the project:

1. HVAC systems and controls
2. Indoor and outdoor lighting and controls
3. Water heating systems
4. Renewable energy systems
5. Landscape Irrigation Systems
6. Water Reuse Systems.

**5.713.10.4.3 Procedures.** Perform testing and adjusting procedures in accordance with applicable standards on each system as determined by the enforcing agency.

**5.713.10.4.3.1 HVAC balancing.** In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, balance the system in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards; the National Environmental Balancing Bureau Procedural Standards; or Associated Air Balance Council National Standards or as approved by the enforcing agency.

**5.713.10.4.4 Reporting.** After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

**5.713.10.4.5 Operation and maintenance (O & M) manual.** Provide the building owner or representative with detailed operating and maintenance instructions and copies of warranties/warranties for each system. O & M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142, and other related regulations.

**5.713.10.4.5.1 Inspections and reports.** Include a copy of all inspection verifications and reports required by the enforcing agency.

### **SECTION 5.714** **ENVIRONMENTAL QUALITY**

**5.714.1 Scope.** The provisions of this chapter shall outline means of reducing the quantity of air contaminants that are odorous, irritating, and/or harmful to the comfort and well-being of a building's installers, occupants, and neighbors.

**5.714.2 Definitions.** Refer to Section 5.502 of this code.

### **5.714.3 Fireplaces.**

**5.714.3.1 General.** Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace, or a sealed woodstove or pellet stove, and refer to residential requirements in the California Energy Code, Title 24, Part 6, Subchapter 7, Section 150. Woodstoves, pellet stoves and fireplaces shall comply with applicable local ordinances.

**5.714.3.1.1 Woodstoves.** Woodstoves and pellet stoves shall comply with US EPA Phase II emission limits.

### **5.714.4 Pollutant control.**

**5.714.4.1 Temporary ventilation.** The permanent HVAC system shall only be used during construction if necessary to condition additions or areas of alteration within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy, or, if the building is occupied during alteration, at the conclusion of construction.

#### **5.714.4.2 (Reserved)**

**5.714.4.3 Covering of duct openings of mechanical equipment during construction.** At the time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.

**5.714.4.4 Finish material pollutant control.** Finish materials shall comply with Sections 5.714.4.4.1 through 5.714.4.4.4.

**5.714.4.4.1 Adhesives, sealants, and caulks.** Adhesives, sealants, and caulks used on the project shall meet the requirements of the following standards.

1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2 in Division 5.5. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene), except for aerosol products as specified in subsection 2, below.
2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of California Code of Regulations, Title 17, commencing with Section 94507.

#### **5.714.4.4.2 (Reserved)**

**5.714.4.4.3 Paints and coatings.** Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table 5.504.4.3 in Division 5.5, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 5.504.4.3, shall be determined by classifying the coating as a Flat, Nonflat, or Nonflat-High Gloss coating, based on its gloss, as defined in subsections 4.21, 4.36, and 4.37 of the 2007 California Air Resources Board, Suggested Control Measure, and the corresponding Flat, Nonflat, or Nonflat-High Gloss VOC limit in Table 5.504.4.3 shall apply.

**5.714.4.4.3.1 Aerosol Paints and Coatings.** Aerosol paints and coatings shall meet the Product-Weighted MIR Limits for ROC in section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in sections 94522(c)(2) and (d)(2) of California Code of Regulations, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.

**5.714.4.4.3.2 Verification.** Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:

1. Manufacturers product specification.
2. Field verification of on-site product containers.

**5.714.4.4.4 Carpet systems.** All carpet installed in the building interior shall meet the testing and product requirements of one of the following:

1. Carpet and Rug Institute's Green Label Plus Program
2. California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010 (also known as Specification 01350.)
3. NSF/ANSI 140 at the Gold level or higher

#### 4. Scientific Certifications Systems Sustainable Choice

**5.714.4.4.1 Carpet cushion.** All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program.

**5.714.4.4.2 Carpet adhesive.** All carpet adhesive shall meet the requirements of Table 5.504.4.1 in Division 5.5.

**5.714.4.4.5 Composite wood products.** Hardwood plywood, particleboard, and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table 5.504.4.5 in Division 5.5.

**5.714.4.4.5.1 Early compliance. Reserved.**

**5.714.4.4.5.2 Documentation.** Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following.

1. Product certifications and specifications.
2. Chain of custody certifications.
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.)
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.
5. Other methods acceptable to the enforcing agency.

**5.714.4.4.6 Resilient flooring systems.** For 50% of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its High Performance Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet California Department of Public Health 2010 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010 (also known as Specification 01350.)

**5.714.4.4.6.1 Verification of compliance.** Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.

**5.714.4.5 Hazardous particulates and chemical pollutants.** Minimize and control pollutant entry into buildings and cross-contamination of regularly occupied areas.

**5.714.4.5.1 (Reserved)**

**5.714.4.5.2 (Reserved)**

**5.714.4.5.3 Filters.** In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provide at least a Minimum Efficiency Reporting Value (MERV) of 8. MERV 8 filters shall be installed after any flush-out or testing and prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.

**Exception:** A MERV-1 filter shall be allowed for return air only or return with prefiltered outside air, if the filter is of a re-usable, non-disposable type, and the fan energy use of that air delivery system is 0.4W/cfm or less at design airflow.

**5.714.4.6 (Reserved)**

**5.714.4.7 Environmental tobacco smoke (ETS) control.** Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations, or policies of any city, county, city and county, California Community College, campus of the California State University, or campus of the University of California, whichever are more stringent. When ordinances, regulations, or policies are not in place, post signage to inform building occupants of the prohibition.

#### **5.714.5 Indoor moisture control**

**5.714.5.1 Indoor moisture control.** Buildings shall meet or exceed the provisions of California Building Code, CCR, Title 24, Part 2, Sections 1203 (Ventilation) and Chapter 14 (Exterior Walls). For additional measures not applicable to low-rise residential occupancies, see Section 5.407.2 of this code.

#### **5.714.6 Indoor air quality**

**5.714.6.1 Outside air delivery.** For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 121 (Requirements For Ventilation) of the 2010 California Energy Code, or the applicable local code, whichever is more stringent, and Chapter 4 of CCR, Title 8.

**5.714.6.2 Carbon dioxide (CO<sub>2</sub>) monitoring.** For additions equipped with demand control ventilation, CO<sub>2</sub>

sensors and ventilation controls shall be specified and installed in accordance with the requirements of the current edition of the 2010 California Energy Code, Section 121(c).

#### **5.714.7 Environmental comfort**

**5.714.7.1 Acoustical control.** Employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E90 and ASTM E413 or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E1332, using either the prescriptive or performance method in Section 5.714.7.1.1 or 5.714.7.1.2.

**Exception:** Buildings with few or no occupants or where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking structures, and utility buildings.

**5.714.7.1.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building addition or altered envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 in the following building locations:

1. Within the 65 CNEL noise contour of an airport

**Exceptions:**

1. Ldn or CNEL for military airports shall be determined by the facility Air Installation Compatible Land Use Zone (AICUZ) plan.
2. Ldn or CNEL for other airports and heliports for which a land use plan has not been developed shall be determined by the local general plan noise element.

2. Within the 65 CNEL or L<sub>dn</sub> noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source as determined by the Noise Element of the General Plan

**5.714.7.1.1.1 Noise exposure where noise contours are not readily available.** Buildings exposed to a noise level of 65 dB Leq-1-hr during any hour of operation shall have exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).

**5.714.7.1.2 Performance method.** For buildings located as defined in Sections A5.714.7.1.1 or A5.714.7.1.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building addition or altered envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (L<sub>eq</sub>-1Hr) of 50 dBA in occupied areas during any hour of operation.

**5.714.4.1.2.1 Site features.** Exterior features such as sound walls, vegetation and trees may be utilized as appropriate to the addition or alteration project to mitigate sound migration to the interior.

**5.714.7.1.2.2 Documentation of compliance.** An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.

**5.714.7.1.3 Interior sound transmission.** Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.

**Note:** Examples of assemblies and their various STC ratings may be found at the California Office of Noise Control: [http://www.toolbase.org/PDF/CaseStudies/stc\\_icc\\_ratings.pdf](http://www.toolbase.org/PDF/CaseStudies/stc_icc_ratings.pdf) .

#### **5.714.8 Outdoor air quality**

**5.714.8.1 Ozone depletion and greenhouse gas reductions.** Installations of HVAC, refrigeration, and fire suppression equipment shall comply with Sections 5.714.8.1.1 and 5.714.8.1.2.

**5.714.8.1.1 Chlorofluorocarbons (CFCs.)** Install HVAC, refrigeration and fire suppression equipment that do not contain CFCs.

**5.714.8.1.2 Halons.** Install HVAC, refrigeration and fire suppression equipment that do not contain Halons.

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

## **CHAPTER 6**

### **REFERENCED ORGANIZATIONS AND STANDARDS**

#### **SECTION 601 GENERAL**

**601.1** This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard.

<u>Organization</u>	<u>Standard</u>	<u>Referenced Section</u>
...		
...	...	...
<b>ASTM</b> ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2859 <a href="http://www.astm.org">www.astm.org</a>	C 33 C 150 C 595 C 618 C 989 C 1157 C 1240 C1371-98  C 1549 C 1602 C 1697 E 90  E 408-74(2002)  E 413 E 1332 E 1333-96 (2002)  E 1903-97 E-1918 E 1980-01	A5.405.5.3.2 A5.405.5.1 A5.405.5.1 A5.405.5.2.1 A5.405.5.2.1 A5.405.5.1 A5.405.5.2.1 A4.205.1, A5.106.11.2. 2 A5.106.11.1 A5.405.5.3.2.3 A5.405.5.2.1 5.507.5.4 A4.205.1, A5.102.6.11.2.2 5.507.5.4 5.507.4 Table 4.504.5 & 5.504.4.5 A5.103.4 A5.106.11.1 A4.106.5.3, A5.106.11.2.3
...		
...	...	...

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

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## CHAPTER 8 COMPLIANCE FORMS AND WORKSHEETS

...

[BSC] Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located at <http://www.bsc.ca.gov/CALGreen/default.htm> may be used to assist in documenting compliance with the waste management plan and other provisions of this code.

...

### WORKSHEET (WS-1) BASELINE WATER USE

BASELINE WATER USE CALCULATION TABLE							
FIXTURE TYPE	FLOW RATE <sup>2</sup> (gpm)		DURATION		DAILY USES	OCCUPANTS <sup>3,4,1.2</sup>	GALLONS PER DAY
Showerheads	2.5	X	5 min.	X	1	2	=
...							
Kitchen faucets	2.2	X	4 min.		1	2	

...									
Gravity tank type Water Closets	1.6	X	1 flush	X	1 male <sup>43</sup> 3 female	X		=	
Flushometer Tank Water Closets	1.6	X	1 flush	X	1 male <sup>43</sup> 3 female	X		=	
Flushometer Valve Water Closets	1.6	X	1 flush	X	1 male <sup>43</sup> 3 female	X		=	
Electromechanical Hydraulic Water Closets	1.6	X	1 flush	X	1 male <sup>43</sup> 3 female	X		=	
Urinals	1.0	X	1 flush	X	2 male	X		=	
Total Daily baseline water use (BWU)								=	
_____ (BWU) X .80 = _____ Allowable water use									

1. ~~The daily use number shall be increased to three if urinals are not installed in the room.~~
2. ~~The flow rate is from the CEC Appliance Efficiency Standards, Title 20, California Code of Regulations; where a conflict occurs, the CEC standards shall apply.~~
31. For low-rise residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.
42. For nonresidential occupancies, refer to Table A, Chapter 4, 2010 California Plumbing Code, for occupant load factors.
  - (a) Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
  - (b) Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
3. ~~The daily use number shall be increased to three if urinals are not installed in the room.~~

**WORKSHEET (WS-2)**  
**20 PERCENT REDUCTION WATER USE CALCULATION TABLE**

FIXTURE TYPE	FLOW-RATE (gpm) <sup>2,1</sup>		DURATION		DAILY USES		OCCUPANTS <sup>3,4,2,3</sup>		GALLONS PER DAY
Showerheads		X	5 min.	X	1	X	<u>3</u>	=	
...									
Kitchen faucets	<del>2.2</del>	X	4 min.		1		<u>3</u>		
...									
Gravity tank type Water Closets		X	1 flush	X	1 male <sup>45</sup> 3 female	X		=	
HET <sup>54</sup> High Efficiency Toilet	1.28	X	1 flush	X	1 male <sup>45</sup> 3 female	X		=	
Flushometer Tank Water Closets		X	1 flush	X	1 male <sup>45</sup> 3 female	X		=	
Flushometer Valve Water Closets		X	1 flush	X	1 male <sup>45</sup> 3 female	X		=	
Electromechanical Hydraulic Water Closets		X	1 flush	X	1 male <sup>45</sup> 3 female	X		=	
...									
Proposed water use								=	
_____ (BWU from WS-1) X .80 = _____ Allowable water use									

1. ~~The daily use number shall be increased to three if urinals are not installed in the room.~~
2. ~~The flow rate is from the CEC Appliance Efficiency Standards, Title 20, California Code of Regulations; where a conflict occurs, the CEC standards shall apply.~~ The flow rate values shall not exceed the baseline flow rates from the 2010 California Code of Regulations, Title 20, Appliance Efficiency Regulations (See Table 4.303.2.)
32. For low-rise residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.
43. For nonresidential occupancies, refer to Table A, Chapter 4, 2010 California Plumbing Code, for occupant load factors.

- (a) Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
- (b) Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
54. Includes single and dual flush water closets with an effective flush of 1.28 gallons or less.  
Single flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is the average flush volume when tested in accordance with ASME A112.19.233.2.  
Dual flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is defined as the composite, average flush volume of two reduced flushes and one full flush. Flush volumes will be tested in accordance with ASME A112.19.2 and ASME A112.19.14.
45. The daily use number shall be increased to three if urinals are not installed in the room.

**WORKSHEET (WS-3)  
30-35 OR 40 PERCENT REDUCTION WATER USE CALCULATION TABLE**

FIXTURE TYPE	FLOW-RATE (gpm) <sup>2,1</sup>		DURATION		DAILY USES		OCCUPANTS <sup>3,4,2,3</sup>		GALLONS PER DAY
Showerheads		X	5 min.	X	1	X	<u>3</u>	=	
...									
Kitchen faucets	<u>2.2</u>	X	4 min.		1		<u>3</u>		
...									
Gravity tank type Water Closets		X	1 flush	X	1 male <sup>45</sup> 3 female	X			
HET <sup>54</sup> High Efficiency Toilet	1.28	X	1 flush	X	1 male <sup>45</sup> 3 female	X			
Flushometer Tank Water Closets		X	1 flush	X	1 male <sup>45</sup> 3 female	X			
Flushometer Valve Water Closets		X	1 flush	X	1 male <sup>45</sup> 3 female	X			
Electromechanical Hydraulic Water Closets		X	1 flush	X	1 male <sup>45</sup> 3 female	X			
...									
Proposed water use								=	
30% Reduction _____ (BWU from WS-1) X .70 = _____ Allowable water use									
35% Reduction _____ (BWU from WS-1) X .65 = _____ Allowable water use									
40% Reduction _____ (BWU from WS-1) X .60 = _____ Allowable water use									

1. ~~The daily use number shall be increased to three if urinals are not installed in the room.~~
2. ~~The flow rate is from the CEC Appliance Efficiency Standards, Title 20, California Code of Regulations; where a conflict occurs, the CEC standards shall apply. The flow rate values shall not exceed the baseline flow rates from the 2010 California Code of Regulations, Title 20, Appliance Efficiency Regulations (See Table 4.303.2.)~~
32. For low-rise residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.
43. For nonresidential occupancies, refer to Table A, Chapter 4, 2010 California Plumbing Code, for occupant load factors.
  - (a) Show use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
  - (b) Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
54. Includes single and dual flush water closets with an effective flush of 1.28 gallons or less.
  - Single flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is the average flush volume when tested in accordance with ASME A112.19.233.2.
  - Dual flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is defined as the composite, average flush volume of two reduced flushes and one full flush. Flush volumes will be tested in accordance with ASME A112.19.2 and ASME A112.19.14.
45. The daily use number shall be increased to three if urinals are not installed in the room.

## Construction Waste Management (CWM) Plan

Note: This sample form may be used to assist in documenting compliance with the waste management plan.

Project Name: \_\_\_\_\_  
Job #: \_\_\_\_\_  
Project Manager: \_\_\_\_\_

Waste Hauling Company: \_\_\_\_\_  
Contact Name: \_\_\_\_\_

All Subcontractors shall comply with the project's Construction Waste Management Plan. \_\_\_\_\_  
All Subcontractor foremen shall sign the CWM Plan Acknowledgement Sheet. \_\_\_\_\_

Subcontractors who fail to comply with the Waste Management Plan will be subject to backcharges or withholding of payment, as deemed appropriate. For instance, Subcontractors who contaminate debris boxes that have been designated for a single material type will be subject to backcharge or withheld payment, as deemed appropriate.

1. The project's overall rate of waste diversion will be \_\_\_\_\_%.
2. This project shall generate the least amount of waste possible by planning and ordering carefully, following all proper storage and handling procedures to reduce broken and damaged materials and reusing materials whenever possible. The majority of the waste that is generated on this jobsite will be diverted from the landfill and recycled for other use.
3. Spreadsheet 1, enclosed, identifies the waste materials that will be generated on this project, the diversion strategy for each waste type and the anticipated diversion rate.
4. Waste prevention and recycling activities will be discussed at the beginning of weekly subcontractor meetings. As each new subcontractor comes on-site, the WMP Coordinator will present him/her with a copy of the CWM Plan and provide a tour of the jobsite to identify materials to be salvaged and the procedures for handling jobsite debris. Each Subcontractor foremen will acknowledge in writing that they have read and will abide by the CWM Plan. Subcontractor Acknowledgement Sheet enclosed. The CWM Plan will be posted at the jobsite trailer.
5. Salvage: Excess materials that cannot be used in the project, nor returned to the vendor, will be offered to site workers, the owner, or donated to charity if feasible.
6. [HAULING COMPANY] will provide a commingled drop box at the jobsite for most of the construction waste. These commingled drop boxes will be taken to [Sorting Facility Name and Location]. The average diversion rate for commingled waste will be \_\_\_\_\_%.  
As site conditions permit, additional drop boxes will be used for particular phases of construction (e.g. concrete and wood waste) to ensure the highest waste diversion rate possible.
7. In the event that the waste diversion rate achievable via the strategy described in (6) above, is projected to be lower than what is required, then a strategy of source-separated waste diversion will be implemented. Source separated waste refers to jobsite waste that is not commingled but is instead allocated to a debris box designated for a single material type, such as clean wood or metal.
8. [HAULING COMPANY] will track and calculate the quantity (in tons) of all waste leaving the project and calculate the waste diversion rate for the project. [HAULING COMPANY] will provide Project Manager with an updated monthly report on the waste diversion rate being achieved on the project. [HAULING COMPANY's] monthly report will track separately the diversion rates for commingled debris and for each source-separated waste stream leaving the project. In the event that [HAULING COMPANY] does not service any or all of the debris boxes on the project, the [HAULING COMPANY] will work with the responsible parties to track the material type and weight (in tons) in such debris boxes in order to determine waste diversion rates for these materials.
9. In the event that Subcontractors furnish their own debris boxes as part of their scope of work, such Subcontractors shall not be excluded from complying with the CWM Plan and will provide [HAULING COMPANY] waste diversion data for their debris boxes.
10. In the event that site use constraints (such as limited space) restrict the number of debris boxes that can be used for collection of designated waste the project Superintendent will, as deemed appropriate, allocate specific areas onsite where individual material types are to be consolidated. These collection points are not to be contaminated with non-designated waste types.
11. Debris from jobsite office and meeting rooms will be collected by [DISPOSAL SERVICE COMPANY]. [DISPOSAL SERVICE COMPANY] will, at a minimum, recycle office paper, plastic, metal and cardboard.

**CONSTRUCTION WASTE MANAGEMENT (CWM) WORKSHEET**

Note: This sample form may be used to assist in documenting compliance with the waste management plan.

<b>Project Name:</b>	_____
<b>Job Number:</b>	_____
<b>Project Manager:</b>	_____
<b>Waste Hauling Company:</b>	_____

**Construction Waste Management (CWM) Plan**

Waste Material Type	Diversion Method:		Projected Diversion Rate
	Commingled and Sorted Off-site	Source Separated Onsite	
Asphalt			
Concrete			
Shotcrete			
Metals			
Wood			
Rigid Insulation			
Fiberglass Insulation			
Acoustic Ceiling Tile			
Gypsum Drywall			
Carpet/Parpet Pad			
Plastic Pipe			
Plastic Buckets			
Plastic			
Hardiplank Siding and Boards			
Glass			
Cardboard			
Pallets			
Job office trash, paper, glass & plastic bottles, cans, plastic			
Alkaline and rechargeable, batteries, toner cartridges, and electronic devices			
Other:			



**APPENDIX A5  
NONRESIDENTIAL VOLUNTARY MEASURES**

...

**DIVISION A5.1 SITE PLANNING AND DESIGN**

...

**SECTION A5.102  
DEFINITIONS**

**A5.102.1 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.

**ALBEDO.** Synonymous with solar reflectance, which is a ratio of the energy reflected back into the atmosphere to the energy absorbed by the surface, with 100% being total reflectance.

...

~~**PZEV.** Any vehicle certified by the California Air Resources Board as a Partial Credit Zero Emission Vehicle.~~

...

**SOLAR REFLECTANCE.** A measure of the fraction of solar energy that is reflected by a surface (measured on a scale of 0 to 1).

**SOLAR REFLECTANCE INDEX (SRI).** A measure of a material surface's ability to reflect solar heat, as shown by a small temperature rise. It includes both solar reflectance and thermal emittance and is quantified such that a standard black surface (solar reflectance 0.05, thermal emittance 0.90) is 0 and a standard white surface (solar reflectance 0.80, thermal emittance 0.90) is 100.

**THERMAL EMITTANCE.** The relative ability of a surface to radiate absorbed heat (measured on a scale of 0 to 1).

...

**VEGETATED SPACE.** Vegetated spaces include, but are not limited to, native, undisturbed areas; rehabilitation of previously disturbed areas with landscaping; green belts; and recreation facilities that include landscaping, such as golf courses.

...

**SECTION A5.104  
SITE PRESERVATION**

...

**A5.106.4 Bicycle parking and changing rooms.** Comply with Sections A5.106.4.1 through A5.106.4.3; or meet local ordinance or the University of California Policy on Sustainable Practices, whichever is stricter.

**A5.106.4.1 Short-term bicycle parking. [DSA-SS]** If the project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks . . .

**A5.106.4.2 Long-term bicycle parking. [DSA-SS]** For buildings with over 10 tenant-occupants, provide secure bicycle parking . . .

**A5.106.5.1 Designated parking for fuel efficient vehicles.** Provide designated parking for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles as shown in Table A5.106.5.1.1 or A5.106.5.1.2.

**A5.106.5.1.1. Tier 1 [BSC] 10% of total spaces [DSA-SS]** Provide 10% of total designated parking spaces for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles as follows:

**Table A5.106.5.1.1  
Tier 1  
10% of Total Spaces [DSA-SS]**

Total Number of Parking Spaces	Number of Required Spaces
0-9	0
...	...
201 and over	At least 10% of total

**A5.106.5.1.2. Tier 2** Provide 12% of total designated parking spaces for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles as follows:

**Table A5.106.5.1.2  
Tier 2 [BSC]**

**12% of Total Spaces**

Total Number of Parking Spaces	Number of Required Spaces
0-9	1
...	...
201 and over	At least 12% of total

**A5.106.5.1.3 Parking stall marking.** Paint, in the paint used for stall striping, the following characters such that the lower edge of the last word aligns with the end of the stall striping and is visible beneath a parked vehicle:

**“CLEAN AIR/  
VEHICLE VANPOOL/EV”**

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces.

**A5.106.5.1.4 Vehicle designations.** Building managers may consult with local community Transit Management Associations (TMAs) for methods of designating qualifying vehicles, such as issuing parking stickers. . . .

**A5.106.5.3.1 Electric vehicle supply wiring.** For each space required in Table A5.106.5.3.1, provide panel capacity and dedicated conduit for one 120 VAC 20 amp and one 208/240 amp, grounded AC outlet or panel capacity and conduit installed for future outlet circuit terminating within 5 feet of the midline of each parking space.

...

**A5.106.7 Exterior wall shading.** Meet requirements in the current edition of the California Energy Code and ~~select one of the following~~ comply with either Section A5.106.7.1 or A5.106.7.2 for wall surfaces. If using vegetative shade, plant species documented to reach desired coverage within 5 years of building occupancy.

4. **A5.106.7.1 Fenestration.** Provide vegetative or man-made shading devices for all fenestration on east-, south-, and west-facing walls ~~with windows.~~

**A5.106.7.1.1 East and west walls.** Shading devices shall have with 30% coverage to a height of 20 feet or to the top of the exterior wall, whichever is less, for east and west walls. Calculate shade coverage on the summer solstice at 10 AM for east-facing walls and at 3 PM for west-facing walls. ~~Plant vegetative shade of species documented to reach desired coverage within 5 years of building occupancy.~~

**A5.106.7.1.2 South walls.** Shading devices shall have 60% coverage to a height of 20 feet or to the top of the exterior wall, whichever is less.

2. **A5.106.7.2 Opaque wall areas.** Use wall surfacing with minimum SRI 25 (aged), for 75% of opaque wall areas.

**Exception:** Use of vegetated shade in Wildland-Urban Interface Areas as defined in Chapter 7A (Materials and Construction Methods for Exterior Wildfire Exposure) of the California Building Code shall meet the requirements of that chapter.

**Note:** If not available from the manufacturer, aged SRI value calculations may be found at the California Energy Commission’s web site at [www.energy.ca.gov](http://www.energy.ca.gov).

**A5.106.9 Building orientation.** Locate and orient the building as follows:

1. When site and location permit, orient the long axis of the building with the long sides facing north and south east and west, with a maximum allowable deviation of 30°.
2. Protect the building from thermal loss, drafts, and degradation of the building envelope caused by wind and wind-driven materials such as dust, sand, snow, and leaves with building orientation and landscape features.

**Note:** For information on sun angles and shading, visit: <http://www2.aud.ucla.edu/energy-design-tools/>. Calculations may be made using the Solar-2 tool.

**A5.106.11 Heat island effect.** Reduce non-roof heat islands by Section A5.106.11.1 and roof heat islands by A5.106.11.2.

**A5.106.11.1 Hardscape alternatives.** Use one or a combination of strategies 1 through 3 for 50% of site hardscape or put 50% of parking underground.

1. Provide shade (mature within 5 years of occupancy).
2. Use light colored materials with an initial solar reflectance value of at least .30 as determined in accordance with American Society for Testing and Materials (ASTM) Standards E1918 or C1549.
3. Use open-grid pavement system or pervious or permeable pavement system.

**A5.106.11.2 Cool roof.** Use roofing materials having a minimum 3-year aged solar reflectance and thermal emittance complying with A5.106.11.2.1 and A5.106.11.2.2 or a minimum aged Solar Reflectance Index (SRI) ~~3~~ complying with A5.106.11.2.3 and as shown in Table A5.106.11.2.1 for Tier 1 or A5.106.11.2.2 for Tier 2.

...

**A5.106.11.2.2 Thermal emittance.** Roofing materials shall have a CRRC initial or 3-year aged thermal emittance as determined in accordance with ASTM E 408 or C 1371 equal to or greater than those specified in Table A5.106.11.2.1 for Tier 1 and Table A5.106.11.2.2 for Tier 2.

**A5.106.11.2.3 Solar reflectance index alternative.** Solar Reflectance Index (SRI) equal to or greater than the values specified in Table A5.106.11.2.1 for Tier 1 and Table A5.106.11.2.2 for Tier 2 may be used as an alternative to compliance with the 3-year aged solar reflectance values and thermal emittance.

SRI values used to comply with this section shall be calculated using the Solar ~~Reflective~~ Reflectance Index (SRI) Calculation Worksheet (SRI-WS) developed by the California Energy Commission or in compliance with ASTM E1980-01 as specified in ~~Title 24, Part 6~~ the California Energy Code, Section 118(i)3. Solar reflectance values used in the SRI-WS shall be based on the 3-year aged reflectance value of the roofing product or the equation in section A5.106.11.2.1 if the CRRC certified aged solar reflectance are not available. Certified Thermal emittance used in the SRI-WS may be either the initial value or the three year aged value listed by the CRRC.

**Note:** The Solar ~~Reflective~~ Reflectance Index Calculation Worksheet (SRI-WS) is available by contacting the Energy Standard Hotline at 1-800-772-3300, website at [www.energy.ca.gov](http://www.energy.ca.gov) or by email at [Title24@energy.state.ca.us](mailto:Title24@energy.state.ca.us).

**Table A5.106.11.2.1 [BSC]  
Tier 1**

Roof Slope	Roof Weight	Climate Zone	Minimum 3-year Aged Solar Reflectance	Thermal Emittance	SRI
≤ 2 : 12	N.A	<del>13 &amp; 2</del> -15	0.55	0.75	64
> 2 : 12	< 5 lbs./ft <sup>2</sup>	<del>40</del> 2-16	0.20	0.75	16
	≥ 5 lbs./ft <sup>2</sup>	1-16	0.15	0.75	10

**Table A5.106.11.2.2  
Tier 2**

Roof Slope	Roof Weight	Climate Zone	Minimum 3-year Aged Solar Reflectance	Thermal Emittance	SRI
≤ 2 : 12	N/A	2, 4, 6 -15	0.65	0.85	78
> 2 : 12	<del>N/A</del> < 5 lbs./ft <sup>2</sup>	<del>2, 4, 6 -15</del> 2-16	0.23	0.85	<del>20</del> 23
	≥ 5 lbs./ft <sup>2</sup>	1-16	0.30	0.85	30

...

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b)

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

## APPENDIX A5

### NONRESIDENTIAL VOLUNTARY MEASURES

#### DIVISION A5.2 ENERGY EFFICIENCY

...

#### SECTION A5.202 DEFINITIONS

##### A5.202.1 Definitions. ...

**TIME DEPENDENT VALUATION (TDV) ENERGY.** The time varying energy caused to be used by the building to provide space conditioning and water heating and for specified buildings lighting. TDV energy accounts for the energy cost used at the building site and consumed in producing and in delivering energy to a site, including, but not limited

to, power generation, transmission and distribution losses.  
*[This definition is being moved to Chapter 2]*

...

## SECTION A5.203 PERFORMANCE APPROACH

**A5.203.1 Energy performance.** For the purposes of energy efficiency standards in this code the California Energy Commission will continue to adopt mandatory building standards. It is the intent of this code to encourage green buildings to achieve exemplary performance in the area of energy efficiency. Specifically, a green building should achieve more than a 15% reduction in energy usage when compared to the State's mandatory energy efficiency standards. Using an Alternative Calculation Method approved by the California Energy Commission, calculate each nonresidential building's annual TDV regulated energy use components and CO<sub>2</sub> emissions, and compare them to the standard or "budget" building.

**Note:** The "percent better than" calculation omits Process and Receptacle energy use components in comparing the Standard and Proposed energy use.

**A5.203.1.1 Tier 1 [BSC] Energy efficiency – 15% above Title 24, Part 6 the California Energy Code. [DSA-SS]** Exceed the 2010 California Energy Code requirements, based on the 2008 Energy Efficiency Standards by 15% percent and meet the requirements of Division A5.6.

**A5.203.1.2 Tier 2 [BSC] Energy efficiency – 30% above Title 24, Part 6 the California Energy Code. [DSA-SS]** Exceed the 2010 California Energy Code requirements, based on the 2008 Energy Efficiency Standards by 30% percent and meet the requirements of Division A5.6.

Field verify and document the measures and calculations used to reach the desired level of efficiency following the requirements specified in the Title 24 Reference Appendices.

...

**A5.204.4 Commissioning. [OSHPD 1 & 4]** Building commissioning shall be included in the design and construction processes of the building project . . .

## SECTION A5.205 [OSHPD 1 & 4] BUILDING ENVELOPE

...

## SECTION A5.207 [OSHPD 1, 2 & 4] HVAC DESIGN, EQUIPMENT AND INSTALLATION

...

## A5.209 [OSHPD 1, 2 & 4] LIGHTING

...

## SECTION A5.210 [OSHPD 1, 2 & 4] APPLIANCES

...

## SECTION A5.211 RENEWABLE ENERGY

...

**A5.211.4 Pre-wiring for future rooftop solar.** ~~Install~~ Size and install conduit from the building roof or eave to a location within the building identified as suitable for future installation of controls and/or storage batteries ~~a charge controller (regulator) and inverter.~~

**A5.211.4.1 Grid-connected system without storage.** Location within the building shall be of sufficient dimensions to accommodate an inverter and/or other controls as approved by the utility.

**A5.211.4.2 Off grid pre-wiring for future solar System for future energy storage.** If battery storage is anticipated, ~~conduit should run to a location within the building that is shall:~~

1. Be stable, weather-proof, insulated against very hot and very cold weather, and isolated from occupied spaces
2. Be able to accommodate batteries, ventilation complying with the California Fire Code, an inverter with or without a charge controller (regulator) and, if grid-connected, other controls as approved by the utility.

## SECTION A5.212 ELEVATORS, ESCALATORS AND OTHER EQUIPMENT

**A5.212.1 Elevators and escalators.** In buildings with more than one elevator or two escalators, provide systems and controls to reduce the energy demand of elevators for part of the day and escalators as follows. to reduce speed when no traffic is detected. Document the systems operation and controls in the project specifications and commissioning plan.

**A5.212.1.1 Elevators.** Traction elevators shall have a regenerative drive system that feeds electrical power back into the building grid when the elevator is in motion.

**A5.212.1.1.1 Car lights and fan.** A parked elevator shall turn off its car lights and fan automatically until the elevator is called for use.

**A5.212.1.2 Escalators.** An escalator shall have a VVVF motor drive system that is fully regenerative when the escalator is in motion.

**A5.212.1.3 Stairs as an alternative [DSA-SS].** In Public School and Community College buildings, locate stairs conveniently to encourage their use in lieu of elevators or escalators.

**A5.212.1.4 Controls.** Controls that reduce energy demand shall meet requirements of CCR, Title 8, Chapter 4, Subchapter 6 and shall not interrupt emergency operations for elevators required in CCR, Title 24, Part 2, California Building Code.

...

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

## APPENDIX A5

### NONRESIDENTIAL VOLUNTARY MEASURES

#### DIVISION A5.3 WATER EFFICIENCY AND CONSERVATION

##### SECTION A5.303 INDOOR WATER USE

...

**A5.303.2.3.1 Tier 1 – 30% Savings [DSA-SS] 30 % savings..** A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 30% shall be provided. The reduction shall be based on the maximum allowable water use per plumbing fixture and fittings as required by the California Building Standards Code. The 30% reduction in potable water use shall be demonstrated by one of the following methods.

1. Prescriptive method. Each plumbing fixture and fitting shall ~~meet the 30% reduced flow rate~~ not exceed the maximum flow rate at ≥30 percent reduction as specified in Table A5.303.2.1, or
2. Performance method. A calculation demonstrating a 30% reduction in the building “water use baseline” as established in Table 5.303.1 shall be provided.

**TABLE A5.303.2.2  
WATER USE BASELINE <sup>4</sup><sub>3</sub>**

FIXTURE TYPE	BASELINE FLOW RATE <sup>2</sup>	DURATION	DAILY USES	OCCUPANTS <sub>3</sub> <sup>2</sup>
Showerheads	2.5 gpm @ 80 psi	8 <u>5</u> min.	1	X <sup>2</sup>
Lavatory faucets nonresidential	<del>2.2</del> <u>.5</u> gpm @ 60 psi	.25 min.	3	X
Kitchen faucets	2.6 gpm @ 60 psi	4 min.	1	X <sup>2</sup>
Replacement aerators	2.6 gpm @ 60 psi			X
Wash fountains	2.2 [rim space (in.) / 20 gpm @ 60 psi]			X
Metering faucets	0.25 gallons/cycle	.25 min.	3	X
Metering faucets for wash fountains	.25 [rim space (in.) / 20 gpm @ 60 psi]	.25 min.	1 male <sup>1</sup> 3 female	X
Gravity tank type water closets	1.6 gallons/flush	1 flush	1 male <sup>1</sup> 3 female	X
Flushometer tank water closets	1.6 gallons/flush	1 flush	1 male <sup>1</sup> 3 female	X
Flushometer valve water closets	1.6 gallons/flush	1 flush	1 male <sup>1</sup> 3 female	X
Electromechanical hydraulic water closets	1.6 gallons/flush	1 flush	1 male <sup>1</sup> 3 female	X
Urinals	1.6 gallons/flush	1 flush	2 male	X

1. The daily use number shall be increased to three if urinals are not installed in the room.
2. ~~The flow rate is from the CEC Appliance Efficiency Standards, Title 20, California Code of Regulations; where a conflict occurs, the CEC standards shall apply.~~
3. 2. Refer to Table A, Chapter 4, 2007 *California Plumbing Code*, for occupant load factors.
  - (a) Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
  - (b) Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
4. 3. Use worksheet WS-1 to calculate base line water use.

**Table A5.303.2.3.1  
FIXTURE FLOW RATES**

<b>FIXTURE TYPE</b>	<b>BASELINE FLOW-RATE<sup>2</sup></b>	<b>MAXIMUM FLOW RATE AT ≥ 30% REDUCTION</b>
Showerheads	2.5 gpm @ 80 psi	1.8 gpm @ 80 psi
Lavatory Faucets Non-residential	0.5 gpm @ 60 psi	0.35 gpm @ 60 psi <sup>2</sup>
Kitchen Faucets	2.2 gpm @ 60 psi	1.6 5 gpm @ 60 psi <sup>2</sup>
Wash Fountains	2.2 [rim space(in.) / 20 gpm @ 60 psi]	1.6 [rim space(in.) / 20 gpm @ 60 psi]
Metering Faucets	0.25 gallons/cycle	0.18 gallons/cycle
Metering Faucets for Wash Fountains	.25 [rim space(in.) / 20 gpm @ 60 psi]	.18 [rim space(in.) / 20 gpm @ 60 psi]
Gravity tank type Water Closets	1.6 gallons/flush	1.12 gallons/flush <sup>1</sup>
Flushometer Tank Water Closets	1.6 gallons/flush	1.12 gallons/flush <sup>1</sup>
Flushometer Valve Water Closets	1.6 gallons/flush	1.12 gallons/flush <sup>1</sup>
Electromechanical Hydraulic Water Closets	1.6 gallons/flush	1.12 gallons/flush <sup>1</sup>
Urinals	1.0 gallons/flush	.5 gallons/flush

<sup>1</sup> Includes water closets with an effective flush rate of 1.12 gallons or less when tested per ASME A112.19.2 and ASME A112.19.14.

<sup>2</sup> See Table 5.503.2.3 for additional notes and references.

...

**A5.303.3 Appliances and fixtures for commercial application.** Appliances and fixtures shall meet the following:

1. Clothes washer shall have a maximum Water Factor (WF) that will reduce the use of water by 10% below the California Energy Commissions' WF standards for commercial clothes washers located in Title 20 of the California Code of Regulations.
2. Dishwashers shall meet the following water use standards:
  - a. Residential—5.8 gallons (21.9 L) per cycle
  - b. Commercial—refer to Table 603.3

**TABLE A5.303.3  
COMMERCIAL DISHWASHER WATER USE**

<b>Type</b>	<b>High-Temperature— maximum gallons per rack</b>	<b>Chemical—maximum gallons per rack</b>
Conveyer	0.70 (2.6 L)	0.62 (4.4 L)
Door	0.95 (3.6 L)	1.16 (2.6 L) [BSC] 2.26 (8.6 L) [DSA-SS]
Undercounter	0.90 (3.4 L)	0.98 (3.7 L)

3. Ice makers shall be air cooled.
4. Food steamers shall be connection-less or boiler-less.
5. [BSC] The use and installation of water softeners that discharge to the community sewer system ~~shall~~ may be limited or prohibited by local agencies if certain conditions are met.
6. Combination ovens shall not consume more than 10 gph (38 L/h) in the full operational mode.
7. Commercial pre-rinse spray valves manufactured on or after January 1, 2006 shall function at equal to or less than 1.6 gpm (0.10 L/s) at 60 psi (414 kPa) and

- a. Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate
- b. Be equipped with an integral automatic shutoff
- c. Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gpm (0.08 L/s) or less

...

**SECTION A5.304  
OUTDOOR WATER USE**

...

**A5.304.2.1. Outdoor potable water use.** For new water service not subject to the provisions of Water Code Section 535, separate meters or submeters shall be installed for indoor and outdoor potable water use for landscaped areas ~~between~~ of at least 500 square feet and but not more than 1000 square feet (the level at which Section 5.304.2 applies).

...

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

**APPENDIX A5**

**NONRESIDENTIAL VOLUNTARY MEASURES**

**DIVISION A5.4 MATERIAL CONSERVATION AND RESOURCE EFFICIENCY**

...

**SECTION A5.402  
DEFINITIONS**

...

**EUTROPHICATION.** Excessive growth of aquatic plants, especially algae, producing bacteria which consume nearly all the oxygen required to sustain fauna and other flora.

...

**LIFE CYCLE ASSESSMENT (LCA).** A technique to evaluate the relevant energy and material consumed and environmental impacts ~~emissions~~ associated with the entire life of a product, process, activity or service, including a whole building.

...

**LIFE CYCLE INVENTORY (LCI).** A process of quantifying energy and raw material requirements, atmospheric emissions, waterborne emissions, solid wastes, and other releases for the entire life cycle of a product, process, or activity, including a whole building.

...

**SECTION A5.405  
MATERIAL SOURCES**

...

**A5.405.4 Recycled content.** ~~**Tier 1 [DSA-SS] Recycled content.**~~ Use materials, equivalent in performance to virgin materials, with post-consumer or pre-consumer recycled content value (RCV) for a minimum of 10% of the total value, based on estimated cost of materials on the project. ~~Provide documentation as to the respective values, with a total (combined) recycled content value (RCV) of:~~

~~**A5.405.4.1 Recycled content, Tier 2 [BSC]** Use materials, equivalent in performance to virgin materials, with post-consumer or pre-consumer recycled content value (RCV) for a minimum of 15% of the total value, based on estimated cost of materials on the project. Provide documentation as to the respective values.~~

~~**A5.405.4.2 Determination of recycled content value (RCV).** The recycled content of a material assembly shall be determined by weight the fractional value of the weight is then multiplied by the total estimated cost of the material assembly~~

~~**Note:** Sources and recycled content of some recycled materials can be found at CalRecycle.~~

~~**Tier 1 [BSC] Recycled content [DSA-SS].** The RCV shall not be less than 10 percent of the total material cost of the project.~~

~~Required Total RCV (dollars) = Total Material Cost (dollars) x 10 percent **(Equation A5. 4-1)**~~

**Tier 2 [BSC].** The RCV shall not be less than 15 percent of the total material cost of the project.  
Required Total RCV (dollars) = Total Material Cost (dollars) x 15 percent (Equation A5. 4-2)

For the purposes of this section, materials used as components of the structural frame shall not be used to calculate recycled content. The structural frame includes the load bearing structural elements such as wall studs, plates, sills, columns, beams, girders, joists, rafters, and trusses.

**Notes:**

1. Sample forms which allow user input and automatic calculation are located at [www.hcd.ca.gov/CALGreen.html](http://www.hcd.ca.gov/CALGreen.html) and may be used to simplify documenting compliance with this section and for calculating recycled content value of materials or assembly products.
2. Sources and recycled content of some recycled materials can be obtained from CalRecycle if not provided by the manufacturer.

**A5.405.4.1 Total material cost.** Total material cost is the total estimated or actual cost of materials and assembly products used in the project. The required total recycled content value for the project (in dollars) shall be determined by Equation A5.4-1 or Equation A5.4-2.

Total material cost shall be calculated by using one of the methods specified below:

**1. Simplified method.** To obtain the total cost of the project multiply the square footage of the structure by the square foot valuation established by the enforcing agency. The total material cost is 45 percent of the total cost of the project. Use Equations A5.4-3A or A5.4-3B to determine total material costs using the simplified method.

Total material costs =

Project square footage x square foot valuation x 45 percent (Equation A5.4-3A)

Total estimated or actual cost of project x 45 percent (Equation A5.4-3B)

**2. Detailed method.** To obtain the total cost of the project, add the estimated and/or actual costs of materials used for the project including the structure (steel, concrete, wood or masonry); the enclosure (roof, windows, doors and exterior walls); the interior walls, ceilings and finishes (gypsum board, ceiling tiles, etc.). The total estimated and/or actual costs shall not include fees, labor and installation costs, overhead, appliances, equipment, furniture or furnishings.

**A4.405.4.2 Determination of total recycled content value (RCV).** Total RCV may be determined either by dollars or percentage as noted below.

**1. Total recycled content value for the project (in dollars).** This is the sum of the recycled content value of the materials and/or assemblies considered and shall be determined by Equation A5.4-4. The result of this calculation may be directly compared to Equations A5.4-1 and A5.4-2 to determine compliance with Tier 1 or Tier 2 prerequisites.

Total Recycled Content Value (dollars) =  $(RCV_M + RCV_A)$  (Equation A5.4-4)

**2. Total recycled content value for the project (by percentage).** This is expressed as a percentage of the total material cost and shall be determined by Equation A5.4-4 and Equation A5.4-5. The result of this calculation may be directly compared for compliance with Tier 1 (10 percent) or Tier 2 (15 percent) prerequisites.

Total Recycled Content Value (percent) =  
 $[\text{Total Recycled Content Value (dollars)} \div \text{Total Material Cost (dollars)}] \times 100$  (Equation A5. 4-5)

**A5.405.4.3 Determination of recycled content value of materials (RCV<sub>M</sub>).** The recycled content value of each material (RCV<sub>M</sub>) is calculated by multiplying the cost of material, as defined by the recycled content. See Equations A5.4-6 and A5.4-7.

$RCV_M(\text{dollars}) = \text{Material cost (dollars)} \times RC_M(\text{percent})$  (Equation A5. 4-6)

$RC_M(\text{percent}) = \text{Post-consumer content percentage} + (\frac{1}{2}) \text{ Pre-consumer content percentage}$  (Equation A5. 4-7)

**Notes:**

1. If the post-consumer and pre-consumer recycled content is provided in pounds, Equation A5.4-7 may be used, but the final result (in pounds) must be multiplied by 100 to show RC<sub>M</sub> as a percentage.
2. If the manufacturer does not separately identify the pre-consumer and post-consumer recycled content of a material but reports it as a total single percentage, one half of the total shall be considered pre-consumer and one half shall be considered post-consumer recycled material.

**A5.405.4.4. Determination of recycled content value of assemblies – (RCV<sub>A</sub>).** Recycled content value of assemblies is calculated by multiplying the total cost of assembly by the total recycled content of the assembly (RC<sub>A</sub>), and shall be determined by Equation A5.4-8.

$$\text{RCV}_A \text{ (dollars)} = \text{Assembly cost (dollars)} \times \text{Total RC}_A \text{ (percent)} \quad \text{(Equation A5.4-8)}$$

If not provided by the manufacturer, Total RC<sub>A</sub> (percent) is the sum ( $\Sigma$ ) of the Proportional Recycled Content (PRC<sub>M</sub>) of each material in the assembly. RC<sub>A</sub> shall be determined by Equation A4.4-9.

$$\text{RC}_A = \Sigma \text{ PRC}_M \quad \text{(Equation A5.4-9)}$$

PRC<sub>M</sub> of each material may be calculated by one of two methods using the following formulas:

**Method 1: Recycled content (Post-consumer and Pre-consumer) of each material provided in percentages**

$$\text{PRC}_M \text{ (percent)} = \text{Weight of material (percent)} \times \text{RC}_M \text{ (percent)} \quad \text{Equation A5.4-10)}$$

$$\text{Weight of material (percent)} = [\text{Weight of material (lbs)} \div \text{Weight of assembly (lbs)}] \times 100 \quad \text{(Equation A5.4-11)}$$

$$\text{RC}_M \text{ (percent)} = \text{Post-consumer content percentage} + (1/2) \text{ Pre-consumer content percentage} \quad \text{(See Equation A5.4-7)}$$

**Method 2: Recycled content (Post-consumer and Pre-consumer) provided in pounds**

$$\text{PRC}_M \text{ (percent)} = [\text{RC}_M \text{ (lbs)} \div \text{Weight of material (lbs)}] \times 100 \quad \text{(Equation A5.4-12)}$$

$$\text{RC}_M \text{ (lbs)} = \text{Post-consumer content (lbs)} + (1/2) \text{ Pre-consumer content (lbs)} \quad \text{(Equation A5.4-13)}$$

**NOTE:** If the manufacturer does not separately identify the pre-consumer and post-consumer recycled content of a material but reports it as a total single percentage, one half of the total shall be considered pre-consumer and one half shall be considered post-consumer recycled material.

**A5.405.4.5. Alternate method for concrete.** When Supplementary Cementitious Materials (SCMs), such as fly ash or ground blast furnace slag cement, are used in concrete, an alternate method of calculating and reporting recycled content in concrete products shall be permitted. When determining the recycled content value, the percent recycled content shall be multiplied by the cost of the cementitious materials only, not the total cost of the concrete.

**A5.405.5 Cement and concrete.** Use cement and concrete made with recycled products and complying with the following sections.

**A5.405.5.1 Cement.** Cement shall comply with one of the following standards for cement:

1. Portland Cement shall meet ASTM C 150, Standard Specification for Portland Cement
2. Blended Cement shall meet ASTM C 595, Standard Specification for Blended Hydraulic Cement or
3. Other Hydraulic Cements shall meet ASTM C 1157, Standard Performance Specification for Hydraulic Cement.

**A5.405.5.2 Concrete.** Unless otherwise directed by the Engineer of Record, use concrete manufactured with cementitious materials in accordance with Sections A5.405.5.2.1 and A5.405.5.2.1.1, as approved by the enforcing agency.

**A5.405.5.2.1 Supplementary cementitious materials (SCMs).** Use concrete made with one or more of the following supplementary cementitious materials (SCMs) conforming to the following standards:

1. Fly ash meeting conforming to ASTM C 618, Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete-
2. Slag cement (GGBFS) meeting conforming to ASTM C 989, Specification for Slag Cement Ground Granulated Blast Furnace Slag for Use in Concrete and Mortars-
3. Silica fume meeting conforming to ASTM C 1240, Specification for Silica Fume Used in Cementitious Mixtures.
4. Natural pozzolan meeting conforming to ASTM C 618, Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
5. Blended supplementary cementitious materials conforming to ASTM C 1697, Standard Specification for Blended Supplementary Cementitious Materials. The amount of each SCM in the blend will be used separately in calculating Equation A5.4-1. If Class C fly ash is used in the blend, it will be considered to be "SL" for the purposes of satisfying the equation.
- 2.6. Ultra fine fly ash (UFFA) meeting conforming to ASTM C 618, Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete, and CalTrans Standard Specification, Section 90-2.01B the

following chemical and physical requirements:

<u>Chemical Requirements</u>	<u>Percent</u>
<u>Sulfur Trioxide (SO<sub>3</sub>)</u>	<u>1.5 max.</u>
<u>Loss on ignition</u>	<u>1.2 max.</u>
<u>Available Alkalies (as Na<sub>2</sub>O) equivalent</u>	<u>1.5 max.</u>

<u>Physical Requirements</u>	<u>Percent</u>
<u>Particle size distribution</u>	
<u>Less than 3.5 microns</u>	<u>50</u>
<u>Less than 9.0 microns</u>	<u>90</u>
<u>Strength Activity Index with portland cement</u>	
<u>7 days</u>	<u>95 (minimum % of control)</u>
<u>28 days</u>	<u>110 (minimum % of control)</u>
<u>Expansion at 16 days when testing job materials in conformance with ASTM C 1567*</u>	<u>0.10 max.</u>

\* In the test mix, cement shall be replaced with at least 12% UFFA by weight.

3.7. Metakaolin meeting conforming to ASTM C 618, Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete, and CalTrans Standard Specification, Section 90-2.01B the following chemical and physical requirements:

<u>Chemical Requirements</u>	<u>Percent</u>
<u>Silicon Dioxide (SiO<sub>2</sub>) + Aluminum Oxide (Al<sub>2</sub>O<sub>3</sub>)</u>	<u>92.0 min.</u>
<u>Calcium Oxide (CaO)</u>	<u>1.0 max</u>
<u>Sulfur Trioxide (SO<sub>3</sub>)</u>	<u>1.0 max.</u>
<u>Loss on ignition</u>	<u>1.2 max.</u>
<u>Available Alkalies (as Na<sub>2</sub>O) equivalent</u>	<u>1.0 max.</u>

<u>Physical Requirements</u>	<u>Percent</u>
<u>Particle size distribution</u>	<u>95</u>
<u>Less than 45 microns</u>	
<u>Strength Activity Index with portland cement</u>	
<u>7 days</u>	<u>100 (minimum % of control)</u>
<u>28 days</u>	<u>100 (minimum % of control)</u>

7.8. Other materials with comparable or superior environmental benefits, as approved by the Engineer of Record and enforcing authority.

**Note:** CalTrans specifications for UFFA and metakaolin may be found the 2009-09 updates to the 2006 CalTrans specifications.

**A5.405.5.2.1.1 Mix design equation.** Use any combination of one or more SCMs, satisfying Equation A5.4-4 4. When ASTM C 595 or ASTM C 1157 cement is used, the amount of SCM in these cements shall be used in calculating Equation A5.4-1.

**Exception:** Minimums in mix designs approved by the Engineer of Record may be lower where high early strength is needed for concrete products or to meet an accelerated project schedule.

$$F/25 + SL/50 + UF/12 \geq 1 \quad \text{Equation A5.4-4 4}$$

Where: F = Fly ash, natural pozzolan, or other approved SCM, as a percent of total cementitious material for concrete on the project

SL = GGBFS, ~~including the amount in blended cement,~~ as a percent of total cementitious material for concrete on the project

UF = Silica fume, metakaolin, or UFFA, ~~including the amount in blended cement,~~ as a percent of total cementitious material for concrete on the project

**Exception:** Minimums for concrete products requiring high early strength may be lower as directed by the engineer.

**A5.405.5.3 Additional means of compliance.** Any of the following measures ~~may~~ shall be permitted to be employed for the production of cement or concrete, depending on their availability and suitability, in conjunction with A5.405.5.2.

**A5.405.5.3.1 Cement.** The following measures ~~may~~ shall be permitted to be used in the manufacture of cement.

**A5.405.5.3.1.1 Alternative fuels.** The use of alternative fuels w~~h~~ere permitted by state or local air quality

standards, ~~use alternative fuels.~~

**A5.405.5.3.1.2 Alternative power.** ~~Use a~~ Alternate electric power generated at the cement plant and/or green power purchased from the utility meeting the requirements of A5.211.

**A5.405.5.3.1.3 Alternative ingredients.** ~~Use inorganic processing additions and limestone meeting ASTM C 150, Standard Specifications for Portland Cement.~~

**A5.405.5.3.2 Concrete.** The following measures ~~may~~ shall be permitted to be used in the manufacture of concrete, \_

**A5.405.5.3.2.1 Alternative energy.** ~~Use r~~ Renewable or alternative energy meeting the requirements of Section A5.211.

**A5.405.5.3.2.2 Recycled aggregates.** ~~Use e~~ Concrete made with one or more of the following materials:

1. Blast furnace slag as a lightweight aggregate in ~~non~~ unreinforced concrete.
2. Recycled concrete that meets grading requirements of ASTM C 33, Standard Specification for Concrete Aggregates.
3. Other materials with comparable or superior environmental benefits, as approved by the engineer and enforcing authority.

**A5.405.5.3.2.3 Mixing water.** ~~Use w~~ Water recycled by the local water purveyor or water reclaimed from manufacturing processes and conforming to meeting ASTM C1602, Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete, ~~either recycled water provided by the local water purveyor or water reclaimed from manufacturing processes.~~

**A5.405.5.3.2.4 High strength concrete.** Concrete elements designed to reduce their total size compared to standard 3,000 psi concrete, thereby reducing the total volume of cement, aggregate and water used on the project, as approved by the Engineer of Record.

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## SECTION A5.407 [OSHPD 1, 2 & 4] WATER RESISTANCE AND MOISTURE MANAGEMENT

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## SECTION A5.408 CONSTRUCTION WASTE REDUCTION, DISPOSAL, AND RECYCLING

**A5.408.3.1 Enhanced construction waste reduction – Tier 1.** Divert to recycle or salvage at least 65% of non-hazardous construction and demolition debris waste generated at the site, ~~in compliance with one of the following:~~

~~Tier 1. At least a 65% reduction.~~ **A5.408.3.1.1 Enhanced construction waste reduction – Tier 2.** Divert to recycle or salvage at least 80% of non-hazardous construction waste generated at the site.

~~Tier 2. At least an 80% reduction.~~

**A5.408.3.1.4.2 Verification of compliance.** A copy of the completed waste management report or documentation of certification of the waste management company utilized shall be provided.

### Exceptions:

1. Excavated soil and land-clearing debris
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets, where demolition of an existing structure(s) is necessary for the construction of a new structure.

**A5.408.5 Construction waste diversion [OSHPD 1, 2 & 4].** Establish a construction waste management plan . . .

**A5.408.6 Construction waste reduction of at least 50% [OSHPD 1, 2 & 4].** Recycle and/or salvage for reuse a minimum of 50% of the non-hazardous construction and demolition debris . . .

**A5.408.7 Excavated soil and land clearing debris [OSHPD 1, 2 & 4].** 100 percent of trees, stumps, rocks and associated vegetation and soils . . .

## SECTION A5.409 LIFE CYCLE ASSESSMENT

**A4.409.1 General.** Life cycle assessment shall be ISO 14044 compliant. The service life of the building and materials assemblies shall not be less than 60 years unless designated in the construction documents as having a shorter service life as approved by the enforcing agency.

**A5.409.2 Whole building life cycle assessment.** Conduct a whole building life assessment, including operating energy, showing that the building project achieves at least a 10 percent improvement for at least three of the impacts listed in Section A5.409.2.2, one of which shall be climate change, compared to a reference building of similar size, function, complexity and operating energy performance, and meeting the 2010 California Energy Code at a minimum.

**A5.409.2.1 Building components.** The building envelope, structural elements, including footings and foundations, interior ceilings, walls, and floors; and exterior finishes shall be considered in the assessment.

**Exceptions:**

1. Plumbing, mechanical and electrical systems and controls; fire and smoke detection and alarm systems and controls; and conveying systems.
2. Interior finishes are not required to be included.

**Notes:**

1. Software for calculating whole building life cycle assessments includes those found at the Athena Institute website (Impact Estimator software), the PE International website (GaBi software), and the PRe Consultants website (SimaPro software).
2. Interior finishes, if included, may be assessed using the NIST BEES tool.

**A5.409.2.2 Impacts to be considered.** Select from the following impacts in the assessment:

1. Climate change (greenhouse gases)
2. Fossil fuel depletion
3. Stratospheric ozone depletion
4. Acidification of land and water sources
5. Eutrophication
6. Photochemical oxidants (smog)

**A5.409.3 Materials and system assemblies.** If whole building analysis of the project is not elected, s Select a minimum of 50% of materials or assemblies based on life cycle assessment of at least three of 8

the impacts listed in Section A5.409.2.2, one of which shall be climate change of their embodied energy and/or green house gas emission potentials.

**Notes:**

- ~~1. Software for calculating life cycle assessments costs for materials assemblies and materials may be found at:ET a. the Athena Institute web site- b. and ;T the NIST BEES web site. c. Life Cycle assessment may also be done in accordance with ISO Standard 14044.~~

**A5.409.4 Substitution for prescriptive standards.** Performance of a life cycle assessment completed in accordance with Section A5.409.2 may be substituted for other prescriptive Material Conservation and Resource Efficiency provisions of Division A5.4, including those made mandatory through local adoption of Tier 1 or Tier 2 in Division A5.6.

**A5.409.5 Verification of compliance.** Documentation of compliance shall be provided as follows:

1. The assessment is performed in accordance with ISO 14044.
  2. The project meets the requirements of other parts of Title 24.
  3. A copy of the analysis shall be made available to the enforcement authority.
  4. A copy of the analysis and any maintenance or training recommendations shall be included in the operation and maintenance manual.
2. ~~More information on life cycle assessment may be found at the Sustainable Products Purchasers Coalition: [www.sppcoalition.org](http://www.sppcoalition.org); at the American Center for Life Cycle Assessment: [www.lcacenter.org](http://www.lcacenter.org); at U.S. EPA Life Cycle Assessment Research: [www.epa.gov/nrmrl/lcaccess/index.html](http://www.epa.gov/nrmrl/lcaccess/index.html); and at U.S. EPA Environmentally Preferable Products, [www.epa.gov/epp](http://www.epa.gov/epp).~~

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**SECTION A5.410  
BUILDING MAINTENANCE AND OPERATION**

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**A5.410.6 Recycling by occupants [OSHPD 1, 2 & 4].** Provide readily accessible areas that serve the entire building and are identified for the depositing, storage, and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics and metals.

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

**APPENDIX A5**

**NONRESIDENTIAL VOLUNTARY MEASURES**

**DIVISION A5.5 ENVIRONMENTAL QUALITY**

**SECTION A5.502  
DEFINITIONS**

**A5.502.1 Definitions.** . . .

**NO ADDED FORMALDEHYDE (NAF) BASED RESINS.** Resins formulated with no added formaldehyde as part of the resin cross linking structure for making hardwood plywood, particle board or medium density fiberboard. "No added formaldehyde-based resins" include, but are not limited to, resins made from soy, polyvinyl acetate, or methylene diisocyanate. See CCR, Title 17, Section 93120.1(a).  
...

**ULTRA-LOW EMITTING FORMALDEHYDE (ULEF) RESINS.** Resins formulated such that average formaldehyde emissions are consistently below the Phase 2 emission standards in section 93120.2 of Title 17, as provided in section 93120.3(d) of Title 17, California Code of Regulations. See CCR, Title 17, Section 93120.1(a).  
...

**SECTION A5.504  
POLLUTANT CONTROL**

**A5.504.1 Indoor air quality (IAQ) during construction.** Maintain IAQ as provided in Sections A5.504.1.1 and A5.504.1.2.

**A5.504.1.1 Temporary ventilation.** Provide temporary ventilation during construction in accordance with Section 121 (Requirements for Ventilation) of the California Energy Code, CCR, Title 24, Part 6, and Chapter 4 of CCR, Title 8, and as follows:

1. Ventilation during construction shall be achieved through openings in the building shell using fans to produce a minimum of three air changes per hour.
- ~~2. During dust producing operations, protect supply and return HVAC system openings from dust.~~
- ~~3. The permanent HVAC system shall only be used during construction if necessary to condition the building within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy.~~
- 2 4. If the building is occupied during demolition or construction, meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3.

...  
**A5.504.2 IAQ Post-construction.** After all interior finishes have been installed, flush out the building by supplying continuous ventilation with all air handling units at their maximum outdoor air rate and all supply fans at their maximum position and rate for at least 14 days.

1. During this time, maintain an internal temperature of at least 60 °F, and relative humidity no higher than 60%. If extenuating circumstances make these temperature and humidity limits unachievable, the flush out may be conducted under conditions as close as possible to these limits, provided that documentation of the extenuating circumstances is provided in writing.
2. Occupancy may start after 4 days, provided flush-out continues for the full 14 days. During occupied times, the thermal comfort conditions of Title 24 must be met.
3. For buildings that rely on natural ventilation, exhaust fans and floor fans must be used to improve air mixing and removal during the 14-day flush out, and windows should remain open.
4. Do not "bake out" the building by increasing the temperature of the space.
5. (If continuous ventilation is not possible, flush-out must total the equivalent of 14 days of maximum outdoor air.) The equivalent of 14 days of maximum outdoor air (the target air volume) shall be calculated by multiplying the maximum feasible air flow rate (in ft<sup>3</sup>/m) by 14 days (20,160 minutes). The air volumes for each period of ventilation are then calculated and summed, and the flush out continues until the total equals the target air volume.

...  
**A5.504.4.5.1 Early compliance with formaldehyde limits, Tier 1.** ~~Where complying composite wood product is readily available for non-residential occupancies, meet the requirements contained in Table A5.504.8.5 before the compliance dates indicated in Table A5.504.8.5. (Tier 1), or use composite wood products made with either CARB approved no-added formaldehyde (NAF) resins or CARB approved ultra-low emitting formaldehyde (ULEF) resins (Tier 2).~~

**A5.504.4.5.2 No added formaldehyde, Tier 2.** Use composite wood products approved by the California Air Resources Board (ARB) as no-added formaldehyde (NAF) based resins or ultra-low emitting formaldehyde (ULEF) resins.

**Notes:**

1. For Tier 2 requirements, see Title 17, Section 93120.3(c) and (d), respectively.

2. Documentation must be provided verifying that materials are certified to meet the pollutant emission limits. A list of manufacturers and their NAF and ULEF certified materials is provided at: [http://www.arb.ca.gov/toxics/compwood/naf\\_ulef/listofnaf\\_ulef.htm](http://www.arb.ca.gov/toxics/compwood/naf_ulef/listofnaf_ulef.htm)

..

**A5.504.4.7 Resilient flooring systems, Tier 1 [BSC DSA-SS] Resilient flooring systems [DSA-SS].** For 80% of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its ~~Low-emitting Materials List (or Product Registry)~~ High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; or certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet California Department of Public Health 2010 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010 (also known as Specification 01350.)

**A5.504.4.7.1 Resilient flooring systems, Tier 2 [BSC].** For 90% of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its ~~Low-emitting Materials List (or Product Registry)~~ High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; or certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet California Department of Public Health 2010 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010 (also known as Specification 01350.)

**Note:** ~~Products compliant with CHPS criteria certified under the Greenguard Children & Schools program may also be used.~~

...

**A5.504.4.8 Thermal insulation, Tier 1 [BSC DSA-SS] Thermal insulation [DSA-SS].** Comply with the following standards:

1. Chapter 12-13 in Title 24, Part 12, the California Referenced Standards Code;
2. ~~and with t~~ The VOC-emission limits defined in 2009 CHPS criteria and listed on its ~~Low-emitting Materials List (or Product Registry)~~ High Performance Products Database-
3. California Department of Public Health 2010 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010 (also known as Specification 01350.)

**A5.504.4.8.1 Thermal insulation, Tier 2 [BSC].** ~~Install No Added Formaldehyde thermal insulation in addition to meeting the 2009 CHPS criteria and listed on its Low-Emitting Materials List (or Product Registry) which complies with Tier 1 plus does not contain any added formaldehyde.~~

...

**A5.504.4.9 Acoustical ceilings and wall panels.** Comply with Chapter 8 in Title 24, Part 2, the California Building Code, and with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its ~~Low-emitting Materials List, [BSC, OSHPD 1, 2 & 4] (or Product Registry)~~ High Performance Products Database.

...

**A5.504.8 Finish material pollutant control [OSHPD 1, 2 & 4].** Finish materials shall comply with Sections A5.504.4.1 through A5.504.4.4 5.

...

**A5.504.9 Environmental tobacco smoke (ETS) control [OSHPD 1, 2 & 4].** Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and ~~in buildings~~ within the building, if not already prohibited by other laws or regulations, or as enforced by ordinances, regulations, or policies of any city, county, city and county, California Community College, campus of the California State University, or campus of the University of California, whichever are more stringent. When ordinances, regulations, or policies are not in place, post signage to inform building occupants of the prohibitions.

## SECTION A5.505 [OSHPD 1, 2 & 4] INDOOR MOISTURE CONTROL

...

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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

### APPENDIX A5

#### NONRESIDENTIAL VOLUNTARY MEASURES

## DIVISION A5.6 VOLUNTARY TIERS

### SECTION A5.601 CALGREEN TIER 1 AND TIER 2

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#### A5.601.2 CALGreen TIER 1

**A5.601.2.1 Prerequisites.** To achieve *CALGreen* Tier 1 status, a project must meet all of the mandatory measures in Chapter 5, and, in addition, meet the provisions of this section.

**A5.601.2.2 Energy performance.** For the purposes of energy efficiency standards in this code the California Energy Commission will continue to adopt mandatory building standards.

Using an Alternative Calculation Method approved by the California Energy Commission, calculate each nonresidential building's annual TDV regulated energy use components and CO<sub>2</sub> emissions, and compare ~~it~~ them to the standard or "budget" building.

**Note:** The "percent better than" calculation omits Process and Receptacle energy use components in comparing the Standard and Proposed energy use.

**A5.601.2.3 Tier 1.** Exceed California Energy Code requirements, based on the ~~2008 Energy Efficiency Standards~~ 2010 California Energy Code, by 15%. Field verify and document the measures and calculations used to reach the desired level of efficiency following the requirements specified in the Title 24 Nonresidential Alternative Calculation Method Manual.

**A5.601.2.4 Voluntary measures for CALGreenTier 1.** In addition to the provisions of Sections A5.601.2.1 and A5.601.2.3 above, compliance with the following voluntary measures from Appendix A5 is required for Tier 1:

1. From Division A5.1,
- ...
2. From Division A5.3,
  - a) Comply with the 30 percent reduction for indoor potable water use in Section A5.303.2.1.
  - b) Comply with ~~the reduction in outdoor potable water use in~~ Section A5.304.4.1 for outdoor potable water use not to exceed 60 percent of ETo.
  - c) Comply with one elective measure selected from this division.
3. From Division A5.4,<sup>2</sup>

...

#### A5.601.3 CALGreen TIER 2

**A5.601.3.1 Prerequisites.** To achieve *CALGreen* Tier 2 status, a project must meet all of the mandatory measures in Chapter 5, and, in addition, meet the provisions of this section.

**A5.601.3.2 Energy performance.** For the purposes of energy efficiency standards in this code the California Energy Commission will continue to adopt mandatory building standards.

Using an Alternative Calculation Method approved by the California Energy Commission, calculate each nonresidential building's annual TDV regulated energy use components and CO<sub>2</sub> emissions, and compare ~~it~~ them to the standard or "budget" building.

**Note:** The "percent better than" calculation omits Process and Receptacle energy use components in comparing the Standard and Proposed energy use.

**A5.601.3.3 Tier 2.** Exceed California Energy Code requirements, based on the ~~2008 Energy Efficiency Standards~~ 2010 California Energy Code, by 30%. Field verify and document the measures and calculations used to reach the desired level of efficiency following the requirements specified in the Title 24 Nonresidential Alternative Calculation Method Manual.

**A5.601.3.4 Voluntary measures for CALGreenTier 2.** In addition to the provisions of Sections A5.601.3.1 and A5.601.3.3 above, compliance with the following voluntary measures from Appendix A5 and additional elective measures shown in Table A5.601.3.4 is required for Tier 2:

1. From Division A5.1,
- ...
2. From Division A5.3,
  - a) Comply with the 35 percent reduction for indoor potable water use in Section A5.303.2.1.
  - b) Comply with ~~the reduction in outdoor potable water use in~~ Section A5.304.4.2 for outdoor potable water use not to exceed 55 percent of ETo.
  - c) Comply with three elective measures selected from this division.
3. From Division A5.4,<sup>2</sup>

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<sup>2</sup> Life cycle assessment compliant with Section A5.409.4 in this code may be substituted for prescriptive measures from Division

A5.4.

**Table A5.601: NON-RESIDENTIAL BUILDINGS: Green Building Standards Code  
Proposed Performance Approach**

Note: This table is intended only as an aid in illustrating the nonresidential tier structure

<u>Category</u>	<u>Environmental Performance Goal</u>	<u>Tier 1</u>	<u>Tier 2</u>
<u>All</u>	<u>Minimum Mandatory</u>	<u>Meet all of the provisions of Chapter 5</u>	<u>Meet all of the provisions of Chapter 5</u>
<u>Planning and Design</u>	<u>Designated Parking for Fuel Efficient Vehicles</u>	<u>10 percent of total spaces</u>	<u>12 percent of total spaces</u>
	<u>Cool Roof to Reduce Heat Island Effect</u>	<u>Roof Slope &lt; 2:12 SRI 64</u> <u>Roof Slope &gt; 2:12:</u> <u>&lt; 5 lb/s.f. SRI 16</u> <u>≥ 5 lb/s.f. SRI 10</u>	<u>Roof Slope &lt; 2:12 SRI 78</u> <u>Roof Slope &gt; 2:12:</u> <u>&lt; 5 lb/s.f. SRI 23</u> <u>≥ 5 lb/s.f. SRI 30</u>
		<u>1 additional Elective from Division A5.1</u>	<u>3 additional Electives from Division A5.1</u>
<u>Energy Efficiency</u>	<u>Energy Performance</u>	<u>Exceed 2010 CA Energy Code by 15 percent</u>	<u>Exceed 2010 CA Energy Code by 30 percent</u>
<u>Water Efficiency and Conservation</u>	<u>Indoor Water Use</u>	<u>30 percent Savings</u>	<u>35 percent Savings</u>
	<u>Outdoor Water Use</u>	<u>Not exceed 60 percent of ETo times the landscape area</u>	<u>Not exceed 55 percent of ETo times the landscape area</u>
		<u>1 additional Elective from Division A5.3</u>	<u>3 additional Electives from Division A5.3</u>
<u>Material Conservation and Resource Efficiency<sup>2</sup></u>	<u>Construction Waste Reduction</u>	<u>At least 65 percent reduction</u>	<u>At least 80 percent reduction</u>
	<u>Recycled Content</u>	<u>Utilize recycled content materials for 10 percent of total material cost</u>	<u>Utilize recycled content materials for 15 percent of total material cost</u>
		<u>1 additional Elective from Division A5.4</u>	<u>3 additional Electives from Division A5.4</u>
<u>Environmental Quality</u>	<u>Low-VOC Resilient Flooring</u>	<u>80 percent of flooring meets VOC limits</u>	<u>90 percent of flooring meets VOC limits</u>
	<u>Low-VOC Thermal Insulation</u>	<u>Comply with VOC limits</u>	<u>Install no-added formaldehyde insulation &amp; comply VOC limits</u>
		<u>1 additional Elective from Division A5.5</u>	<u>3 additional Electives from Division A5.5</u>
<u>Additional Measures</u>	<u>Added measures shall be achieved across at least 3 categories</u>	<u>1 Additional Elective</u>	<u>3 Additional Electives</u>
<u>Approximate Total Measures</u>		<u>14</u>	<u>24</u>

Notation:

**Authority** – Health and Safety Code Sections 18930.5, 18934.5 and 18938 (b).

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