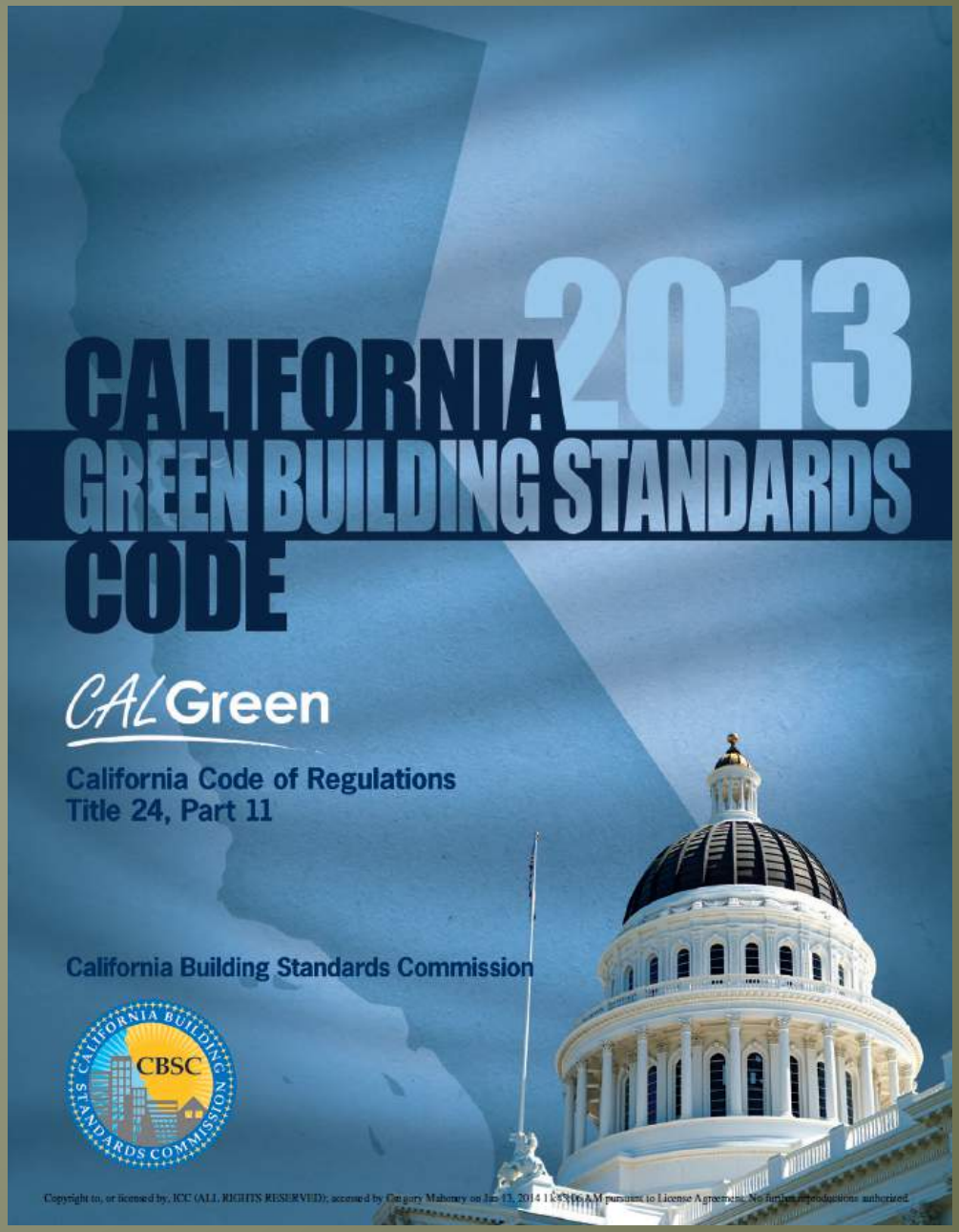
2013 California Green Building Standards Code (CAL Green)

Principles of Green Building

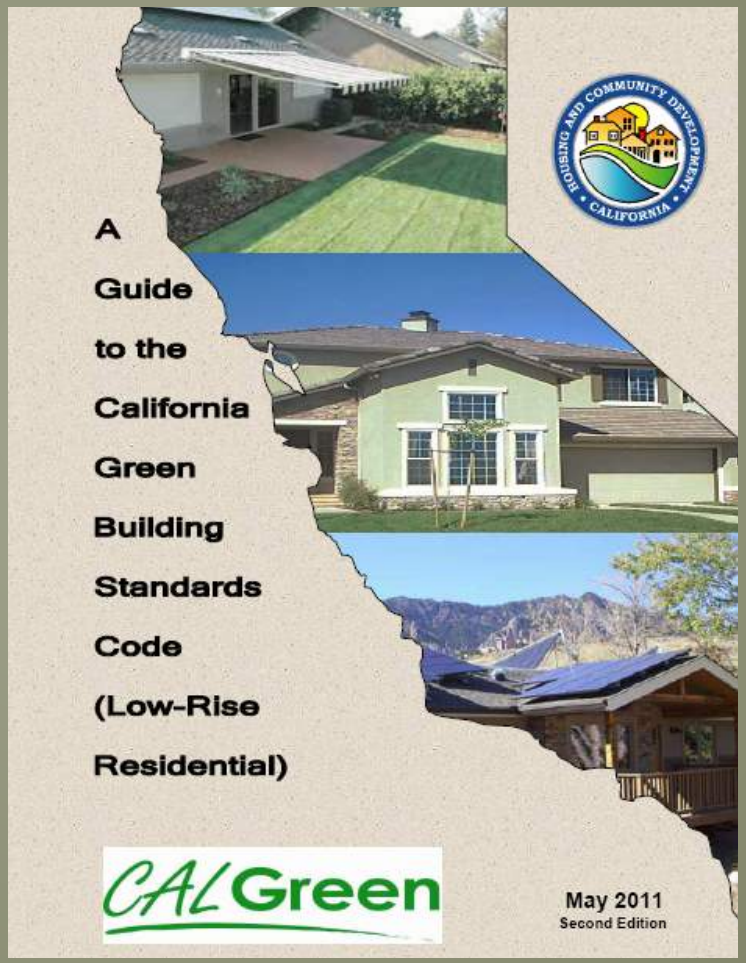
- Community Design
- Energy Efficiency
- Water Efficiency
- Resource Conservation
- Indoor Environmental Quality

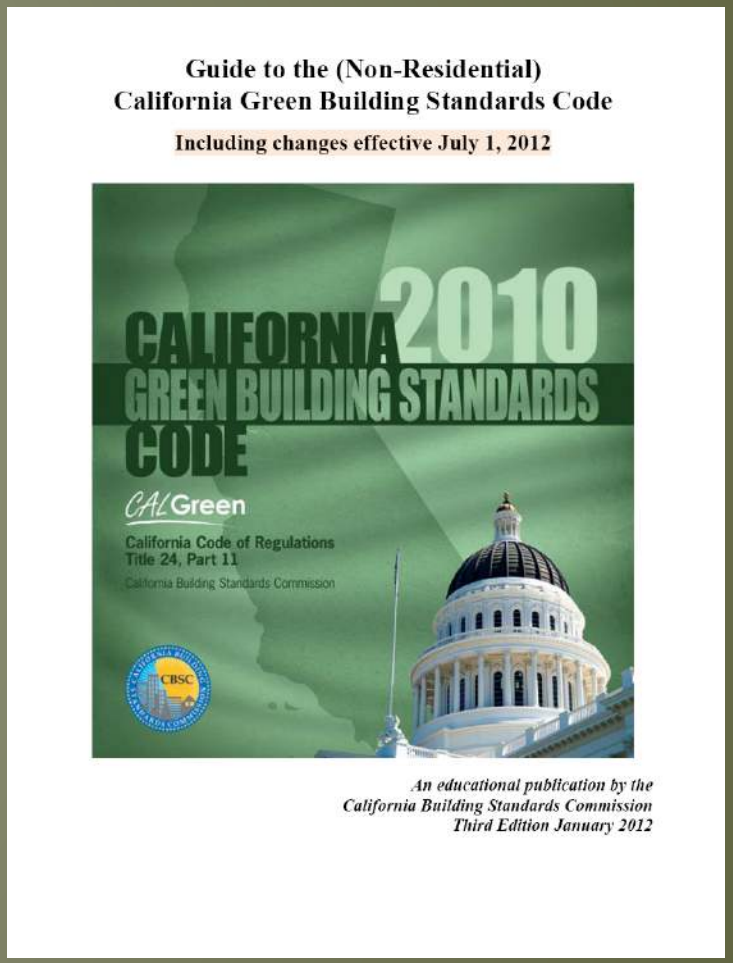
Why a State Green Building Code?

- AB 32 Reduce GHG emissions to 1990 levels by 2020
- EO S-20-04: Reduce grid based electricity by 20% in state-owned buildings by 2015
- Numerous Green Building Bills vetoed by Governor Schwarzenegger.
- BSC directed to develop green building standards.



CAL Green Guides Available






GUIDE TO THE 2013
CALIFORNIA
GREEN BUILDING STANDARDS
CODE
RESIDENTIAL


GUIDE TO THE 2013
CALIFORNIA
GREEN BUILDING STANDARDS
CODE
NONRESIDENTIAL
CALGreen

Structure of the CAL Green

- Chapter 1 - Administration
- Chapter 2 – Definitions
- Chapter 3 – Green Building
- Chapter 4 – Residential Mandatory Measures
- Chapter 5 - Non-Residential Mandatory Measures
- Chapter 6 – Referenced Organizations and Standards
- Chapter 7 – Installer and Special Inspector Qualifications
- Chapter 8 – Compliance Forms and Worksheets
- Appendix A4 – Residential Voluntary Measures
- Appendix A5 – Non-Residential Voluntary Measures

Implementation

- Each Jurisdiction is different with different approaches.
- No right or wrong way as long as we are working towards compliance.
- Jurisdictions could do a better job working towards regional consistency

Implementation

- Collaborate with other Departments in the jurisdiction to eliminate redundancies
  - Waste Diversion
  - Water Conservation
  - SWPPP
  - Outdoor Lighting
  - Bicycle Parking

Construction Documents and Installation Verification

- CALGreen requires that construction documents be submitted in one or more sets with a permit application.
- Documents must provide information in sufficient detail to determine compliance with CALGreen

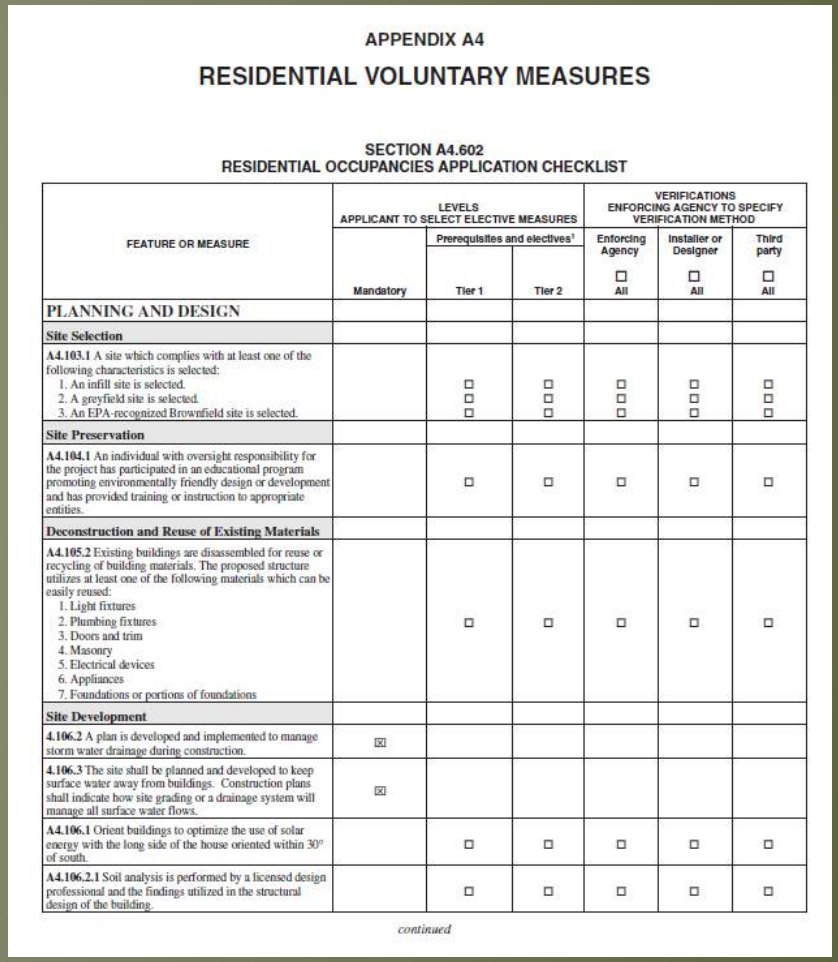
2010 CALIFORNIA GREEN BUILDING CODE COMPLIANCE - SUMMARY

DIVISION A5.7 NONRESIDENTIAL CHECKLIST

CODE #	SUMMARY	MANDATORY	TIER 1	REMARKS
A5.103.1	COMMUNITY CONNECTIVITY		X	SITE WITHIN DOWNTOWN
A5.105.1.1	EXISTING BUILDING STRUCT.		X	
A5.105.1.2	EXISTING NON STRUCT. ELEM.		X	SEE DEMO PLAN A-1
A5.105.1.3	SALVAGE		X	CONTRACTOR TO COMPLY
A5.106.8	LT. POLLUTION REDUCTION	X		SEE ELECT. DRAWINGS
1 THRU 4		X		
A5.201.1	SCOPE	X		
A5.204.1	ENERGY STAR EQ. AND APPLIANCES		X	SEE FS AND ELECT. DWG'S
A5.303.2.3.1	30 PERCENT SAVINGS		X	SEE PLUMBING DWG'S
A5.303.4.1	WASTEWATER REDUCTION	X		SEE PLUMBING DWG'S
A5.303.3	APPLIANCES			
2, 3, 4			X	SEE FS DWG'S
A5.303.6	PLUMBING FIXTURES AND FITTINGS			
2, 3, 4		X		PER PLUMBING DWG'S
A5.404.1	WOOD FRAMING		X	
A5.405.2.1	CERTIFIED WOOD PRODUCTS		X	
A5.405.2.2	RAPIDLY RENEWABLE MATERIALS		X	
A5.405.3	REUSED MATERIALS		X	
A5.405.4	RECYCLE CONTENT		X	
A5.405.5.1	CEMENT		X	
A5.406.1.1	SERVICE LIFE		X	
A5.406.1.2	REDUCED MAINTENANCE		X	
A5.406.1.3	RECYCLABILITY		X	
A5.408.1	CONST. WASTE DIVERSION	X		CONTRACTOR PROVIDED
A5.408.3	CONST. WASTE	X		
A5.408.3.1.1	CONST. WASTE REDUCTION		X	
A5.410.1	REDUCTION BY OCCUPANTS	X		
A5.410.4.2	SYSTEMS	X		
A5.410.4.3	PROCEDURES	X		
A5.410.4.3.1	HVAC BALANCING	X		
A5.410.4.4	REPORTING	X		
A5.410.4.5	OPERATION & MAINTENCE MANUAL	X		CONTRACTOR PROVIDED
A5.410.5.1	INSPECTIONS AND REPORTS	X		
A5.504.1.1	TEMP. VENTILATION		X	
A5.504.2.	IAQ POST CONSTRUCTION		X	
A5.504.2.1	TESTING		X	
A5.504.3	DUCT / MECH. OPENING PROTECT	X		
A5.504.4.1	ADHESIVE, SEALANTS, CAULKS	X		
A5.504.4.3	PAINTS AND COATINGS	X		
A5.504.4.4	CARPETS SYSTEMS	X		
A5.504.4.4.2	CARPETS ADHESIVE	X		
A5.504.4.5	COMPOSITE WOOD PRODUCTS	X		
A5.504.4.5.1	FORMALDEHYDE LIMITS		X	
A5.504.4.5.2	DOCUMENTATION		X	
1 & 3		X		PROVIDED BY CONTRACTOR
A5.504.4.6	RESILIENT FLOOR SYSTEMS	X		

Implementation

- Plan review
  - Checklists incorporated in plans
  - Items on checklist reflected in plans



APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
PLANNING AND DESIGN						
Site Selection						
A4.103.1 A site which complies with at least one of the following characteristics is selected: 1. An infill site is selected. 2. A greyfield site is selected. 3. An EPA-recognized Brownfield site is selected.		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
Site Preservation						
A4.104.1 An individual with oversight responsibility for the project has participated in an educational program promoting environmentally friendly design or development and has provided training or instruction to appropriate entities.		☐	☐	☐	☐	☐
Deconstruction and Reuse of Existing Materials						
A4.105.2 Existing buildings are disassembled for reuse or recycling of building materials. The proposed structure utilizes at least one of the following materials which can be easily reused: 1. Light fixtures 2. Plumbing fixtures 3. Doors and trim 4. Masonry 5. Electrical devices 6. Appliances 7. Foundations or portions of foundations		☐	☐	☐	☐	☐
Site Development						
4.106.2 A plan is developed and implemented to manage storm water drainage during construction.	☒					
4.106.3 The site shall be planned and developed to keep surface water away from buildings. Construction plans shall indicate how site grading or a drainage system will manage all surface water flows.	☒					
A4.106.1 Orient buildings to optimize the use of solar energy with the long side of the house oriented within 30° of south.		☐	☐	☐	☐	☐
A4.106.2.1 Soil analysis is performed by a licensed design professional and the findings utilized in the structural design of the building.		☐	☐	☐	☐	☐

continued

Implementation (RES addition/remodel)

CITY OF DAVIS
DEPARTMENT OF COMMUNITY DEVELOPMENT AND SUSTAINABILITY
23 Russell Blvd. Davis CA 95616
530 757-5610 FAX 530 757-5660

CAL-GREEN RESIDENTIAL ROOM ADDITION / REMODEL APPLICATION CHECKLIST

Feature or Measure	Required	N/A	Approval
A4.203.1 Exceed the California Energy Code requirements by 15%			
4.303.1 Indoor water use shall be reduced by at least 20 percent using one of the following methods. 1. Water saving fixtures or flow restrictors shall be used. 2. A 20 percent reduction in baseline water use shall be demonstrated. **(7/1/2011)**			
4.303.2 When using the calculation method specified in Section 4.303.1, multiple showerheads shall not exceed maximum flow rates. **(7/1/2011)**			
4.303.3 Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with specified performance requirements. **(7/1/2011)**			
A4.303.1 Kitchen faucets and dishwashers shall comply with this section. Tier 1. The maximum flow rate at a kitchen sink faucet shall not be greater than 1.5 gallons per minute at 60 psi. **(7/1/2011)**			
A4.403.2 Cement use in foundation mix design is reduced. Tier 1. Not less than a 20 percent reduction in cement use.			
A4.405.3 Postconsumer or preconsumer recycled content value (RCV) materials are used on the project. Tier 1. Not less than a 10 percent recycled content value.			
4.406.1 Joints and openings. Annular spaces around pipes, electric cables, conduits or other openings in plates at exterior walls shall be protected against the passage of rodents by closing such openings with cement mortar, concrete masonry or similar method acceptable to the enforcing agency.			
A4.408.1 Construction waste generated at the site is diverted to recycle or salvage in compliance with the following: 1. Tier 1 at least a 65 percent reduction			
4.503.1 Any installed gas fireplace shall be a direct-vent sealed-combustion type. Any installed woodstove or pellet stove shall comply with US EPA Phase II emission limits where applicable. Woodstoves, pellet stoves and fireplaces shall also comply with applicable local ordinances.			
4.504.1 Duct openings and other related air distribution component openings shall be covered during construction.			

Feature or Measure	Required	N/A	Approval
4.504.1 Duct openings and other related air distribution component openings shall be covered during construction.			
4.504.2.4 Documentation shall be provided to verify that compliant VOC limit finish materials have been used. Complete and sign VOC self certification from to verify compliance.			
A4.504.2 Install VOC compliant resilient flooring systems. Tier 1. At least 80 percent of the resilient flooring installed shall comply.Common types of resilient flooring include but are not limited to: 1. Vinyl composition tile 2. Vinyl tile and sheet flooring 3. Linoleum tile and sheet 4. Cork tile and sheet flooring 5. Rubber tile and sheet flooring 6. Polymeric poured seamless flooring 7. Other types of non-textile synthetic flooring			
A4.504.3 Thermal insulation installed in the building shall meet the following requirements: Tier 1. Install thermal insulation in compliance with the VOC-emission limits defined in Collaborative for High Performance Schools (CHPS) Low-emitting Materials List.			
4.505.2 Vapor retarder and capillary break is installed at slab on grade foundations.			
4.505.3 Moisture content of building materials used in wall and floor framing is checked before enclosure.			
4.506.1 Exhaust fans which terminate outside the building are provided in every bathroom.			
4.507.1 Whole house exhaust fans shall have insulated louvers or covers which close when the fan is off. Covers or louvers shall have a minimum insulation value of R-4.2.			
4.507.2. Duct systems are sized, designed, and equipment is selected using the following methods: 1. Establish heat loss and heat gain values according to ACCA Manual J or equivalent. 2. Size duct systems according to ACCA 29-D (Manual D) or equivalent. 3. Select heating and cooling equipment according to ACCA 36-S (Manual S) or equivalent.			

Implementation (NON-RES tenant improvement)

CITY OF DAVIS
DEPARTMENT OF COMMUNITY DEVELOPMENT AND SUSTAINABILITY
23 Russell Blvd. Davis CA 95616
530 757-5610 FAX 530 757-5660

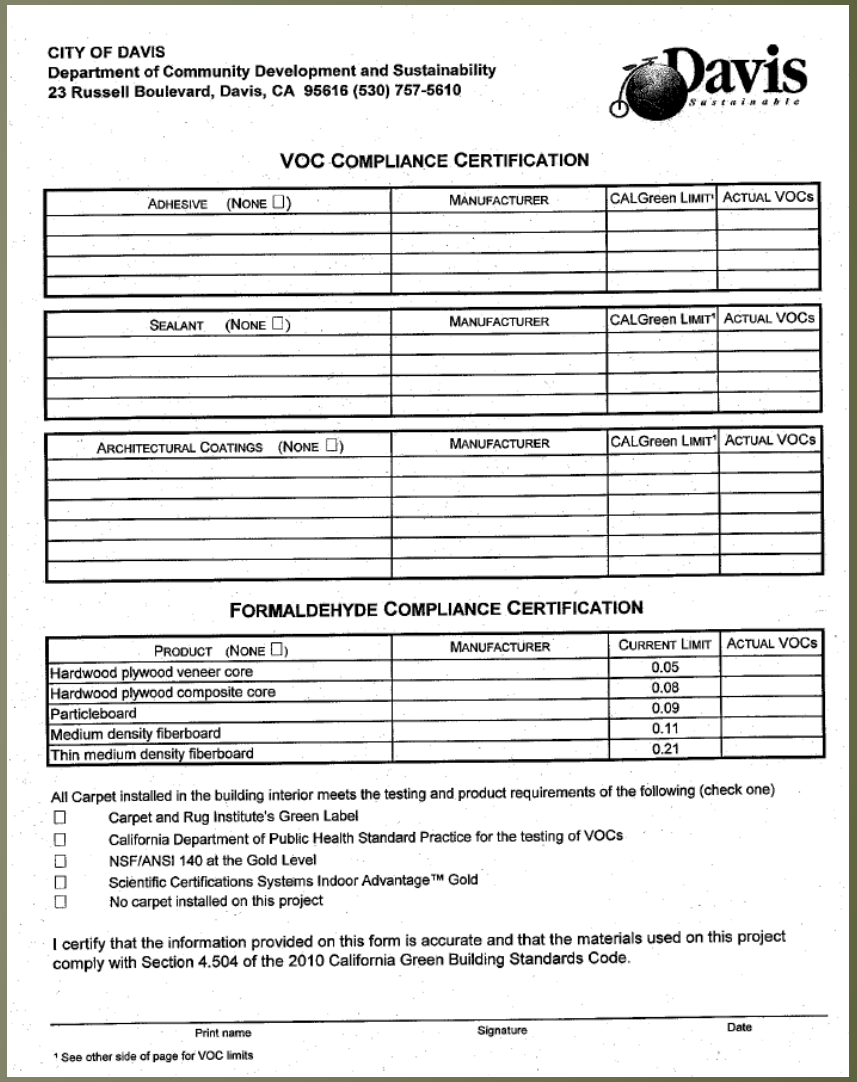
CAL-GREEN NON-RESIDENTIAL TENANT IMPROVEMENT/ REMODEL APPLICATION CHECKLIST

Feature or Measure	Required	N/A	Approval
A5.203.1 Energy performance. Using an Alternative Calculation Method approved by the California Energy Commission, calculate each nonresidential building's TDV energy and CO2 emissions and compare it to the standard or "budget" building. **A5.203.1.1 Tier 1**. Exceed California Energy Code requirements, based on the 2008 Energy Efficiency Standards, by 15 percent.			
5.303.1 Meters. Separate meters shall be installed for the uses described in Sections 503.1.1 through 503.1.3. **5.303.1.1** Buildings in excess of 50,000 square feet. 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. 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.			
5.303.2 20 percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 20 percent shall be provided. (Calculate savings by Water Use Worksheets)			
5.303.2.1 Multiple showerheads serving one shower. When single shower fixtures are served by more than one showerhead, the combined flow rate of all the showerheads shall not exceed the maximum flow rates specified in the 20 percent reduction column contained in Table 5.303.2.3 or the shower shall be designed to only allow one showerhead to be in operation at a time.			
A5.303.2.3.1 Tier 1 – 30 percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 30 percent shall be provided.			
A5.405.4 Recycled content, Tier 1. Use materials, equivalent in performance to virgin materials, with postconsumer or preconsumer recycled content value (RCV) equaling at least 10 percent of the total value, based on estimated cost of materials on the project. Provide documentation as to the respective values.			
A5.408.3.1 Enhanced construction waste reduction. Divert to recycle or salvage nonhazardous construction and demolition debris generated at the site in compliance with one of the following: Tier 1. At least a 65 percent reduction			

Feature or Measure	Required	N/A	Approval
5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation or during storage on the construction site and until final startup of the heating and cooling 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 debris which may collect in the system.			
5.504.4 Finish material pollutant control. Finish materials shall comply with Sections 5.504.4.1 through 5.504.4.4. Complete and sign VOC self certification from to verify compliance.			
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 MERV of 8.			
5.508.1 Ozone depletion and global warming reductions. Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2. **5.508.1.1** CFCs. Install HVAC and refrigeration equipment that does not contain CFCs.1 **5.508.1.2** Halons. Install fire suppression equipment that does not contain Halons.1			

Implementation

- Field Inspection
  - Handouts
  - Dialogue with contractor
  - Reduce surprises



CITY OF DAVIS
Department of Community Development and Sustainability
23 Russell Boulevard, Davis, CA 95616 (530) 757-5610

Davis Sustainable

VOC COMPLIANCE CERTIFICATION

ADHESIVE (NONE ☐)	MANUFACTURER	CALGreen LIMIT[1]	ACTUAL VOCs

SEALANT (NONE ☐)	MANUFACTURER	CALGreen LIMIT[1]	ACTUAL VOCs

ARCHITECTURAL COATINGS (NONE ☐)	MANUFACTURER	CALGreen LIMIT[1]	ACTUAL VOCs

FORMALDEHYDE COMPLIANCE CERTIFICATION

PRODUCT (NONE ☐)	MANUFACTURER	CURRENT LIMIT	ACTUAL VOCs
Hardwood plywood veneer core		0.05	
Hardwood plywood composite core		0.08	
Particleboard		0.09	
Medium density fiberboard		0.11	
Thin medium density fiberboard		0.21	

All Carpet installed in the building interior meets the testing and product requirements of the following (check one)

- ☐ Carpet and Rug Institute's Green Label
- ☐ California Department of Public Health Standard Practice for the testing of VOCs
- ☐ NSF/ANSI 140 at the Gold Level
- ☐ Scientific Certifications Systems Indoor Advantage™ Gold
- ☐ No carpet installed on this project

I certify that the information provided on this form is accurate and that the materials used on this project comply with Section 4.504 of the 2010 California Green Building Standards Code.

Print name _____ Signature _____ Date _____

[1] See other side of page for VOC limits

301.1.1 Additions and alterations. [HCD]

The mandatory provisions of Chapter 4 shall be applied to additions or alterations of existing residential buildings ***where the addition or alteration increases the building's conditioned area, volume, or size.*** The requirements shall apply only to and/or within the specific area of the addition or alteration.

301.1.1 Additions and alterations. [HCD]

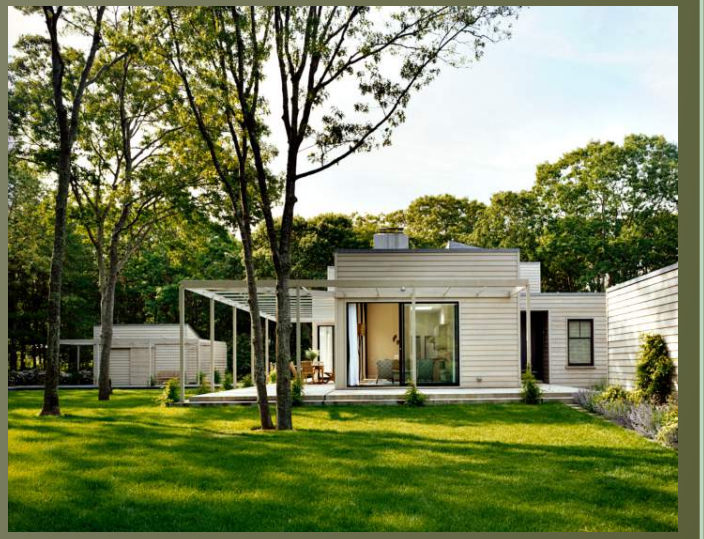
Note: On and after January 1, 2014, residential buildings undergoing permitted alterations, additions or improvements shall replace noncompliant plumbing fixtures with water-conserving plumbing fixtures.

Plumbing fixture replacement is required prior to issuance of a certificate of final completion, certificate of occupancy or final permit approval by the local building department.

See Civil Code Section 1101.1, et seq., for the definition of a noncompliant plumbing fixture, types of residential buildings affected and other important enactment dates.

301.2 Low-rise and high-rise residential buildings. [HCD]

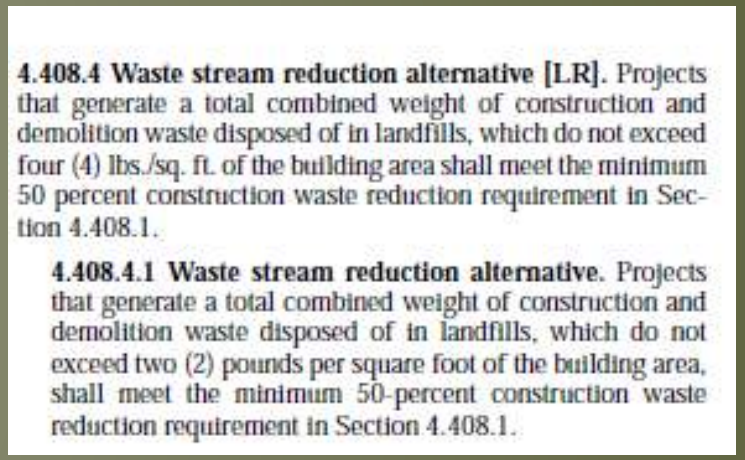
The provisions of individual sections of *CALGreen* may apply to either low-rise residential buildings, high-rise residential buildings, or both.



301.2 Low-rise and high-rise residential buildings. [HCD]

Individual sections will be designated by banners to indicate where the section applies specifically to ***low-rise only (LR) or high-rise only (HR)***. When the section applies to both low-rise and high-rise buildings, no banner will

be used.



4.408.4 Waste stream reduction alternative [LR]. Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed four (4) lbs./sq. ft. of the building area shall meet the minimum 50 percent construction waste reduction requirement in Section 4.408.1.

4.408.4.1 Waste stream reduction alternative. Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed two (2) pounds per square foot of the building area, shall meet the minimum 50-percent construction waste reduction requirement in Section 4.408.1.

301.3 Nonresidential additions and alterations. [BSC]

The provisions of individual sections of Chapter 5 apply to newly constructed buildings, building additions of 1,000 square feet or greater, and/or building alterations with a permit valuation of $200,000 or above (for occupancies within the authority of California Building Standards Commission).

301.3 Nonresidential additions and alterations. [BSC]

Code sections relevant to additions and alterations shall only apply to the portions of the building being added or altered within the scope of the permitted work.

301.3 Nonresidential additions and alterations. [BSC]

A code section will be designated by a banner to indicate where the code section only applies to ***newly constructed buildings [N] or to additions and alterations [AA].*** When the code section applies to both, no banner will be used.

5.410.2 Commissioning. [N] 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 or owner representative'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.

302.1 Mixed occupancy buildings.

In mixed occupancy buildings, each portion of a building shall comply with the specific green building measures applicable to each specific occupancy.

- Live/Work
  - Residential
  - Non-Residential
  - Or both?

Phased Projects

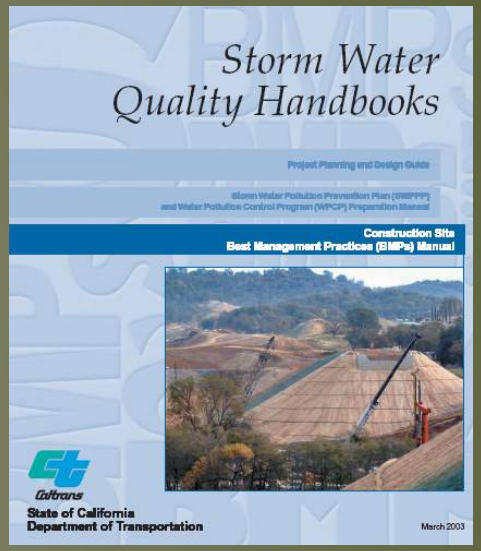
303.1 Phased projects. For shell buildings and others constructed for future tenant improvements, ***only those code measures relevant to the building components*** and systems considered to be new construction (or newly constructed) shall apply.

Phased Projects

303.1.1 Tenant improvements. The provisions of this code shall ***apply only to the initial tenant or occupant improvements*** to a project.

4.106.2 Storm water drainage and retention during construction.

- Projects which disturb less than one acre of soil ….shall manage storm water drainage during construction.
  - *California State Water Resources Control Board (SWRCB) issues permits for projects which are larger than one acre.*



Erosion Control Handout

Davis California

Community Development Department
23 Russell Boulevard-Davis, California 95616
530/757-5610 Fax: 530/757-5660 TDD: 530/757-5666

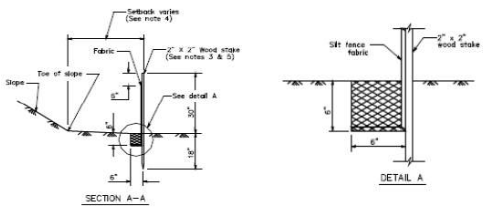
STORM WATER POLLUTION PREVENTION

The 2010 California Green Building Standards (CAL Green) include storm water pollution prevention requirements for construction projects that disturb less than one acre of land. These requirements include best management practices (BMPs) to prevent loss of soil as well as good housekeeping BMPs to prevent pollution. Some projects may be required to provide an erosion and sediment control plan that is specific to the site. When site specific plans are not required the general provisions outlined in this document may be implemented to comply with CALGreen requirements for storm water pollution prevention.

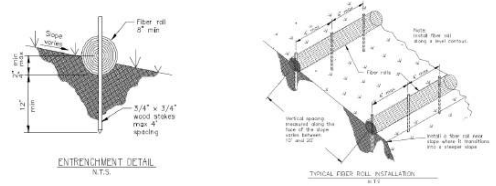
SOIL LOSS BMPs Soil loss BMPs shall be implemented as appropriate for each project. These BMPs include, but are not limited to, the following:

Perimeter sediment control (perimeter silt fence, fiber rolls)
Employ sediment control measures to prevent sediment from flowing off the property in storm run-off.

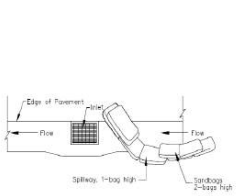
SILT FENCE



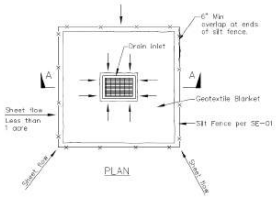
FIBER ROLLS



Protection of storm drain inlets (gravel bags or catch basin inserts)
Drain inlets (DIs) that are subject to runoff from construction activities must be protected from sediment-laden runoff. Drain inlet protection shall be in place and properly maintained at all times.

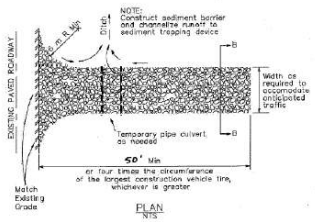


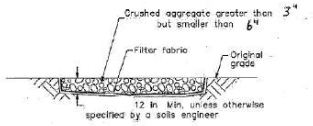
TYPICAL PROTECTION FOR INLET ON GRADE



DI PROTECTION TYPE 1
NOT TO SCALE

Stabilized construction access
A stabilized construction access is required where construction vehicles enter and leave the property if there is no paving provided. The access must be maintained to prevent tracking of mud and dirt onto public roads by construction vehicles. If mud and or dirt are tracked onto the street, then it must be cleaned up using only dry methods. **Dirt or mud shall not be cleaned off the street by wet methods.**





Preservation of natural features, vegetation and soil
Limit the footprint of the construction activities to the extent possible in order to preserve existing vegetation on the site.

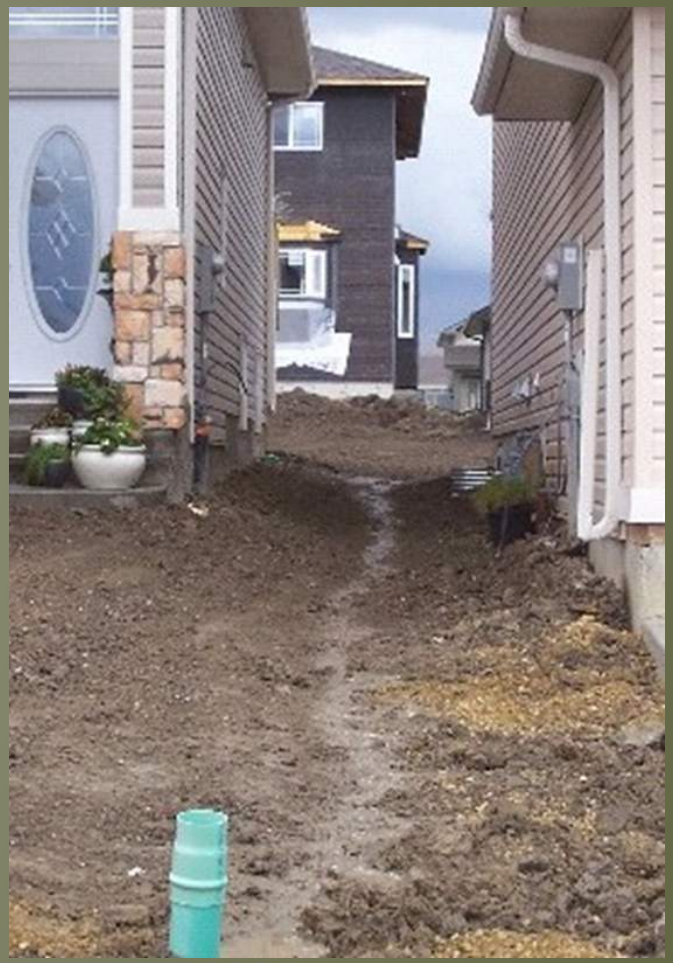
Scheduling construction activity
Weather conditions shall be considered when scheduling construction activities. Activities that are likely to disturb the soil shall not be undertaken when there is a 50% or greater chance of a significant rain event as forecasted by the National Weather Service. Grading and similar activities shall not be undertaken on windy days (wind in excess of 15 mph). Keep the site stabilized year-round, and retain and maintain rainy season (October 1 to April 30) sediment trapping devices in operational condition.

Some additional BMPs that may be required depending on site conditions
- Wind erosion control
- Mulching or hydroseeding to stabilize disturbed soils
- Erosion control to protect slopes
- Sediment trap or sediment basin to retain sediment on site

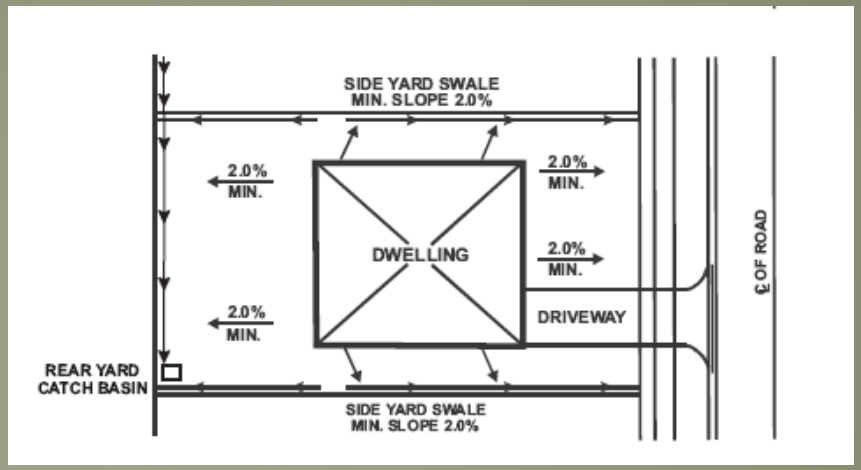

STOP

4.106.3 Grading and paving.

Construction plans shall indicate how the site grading or 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:



Rainwater collection and disposal systems

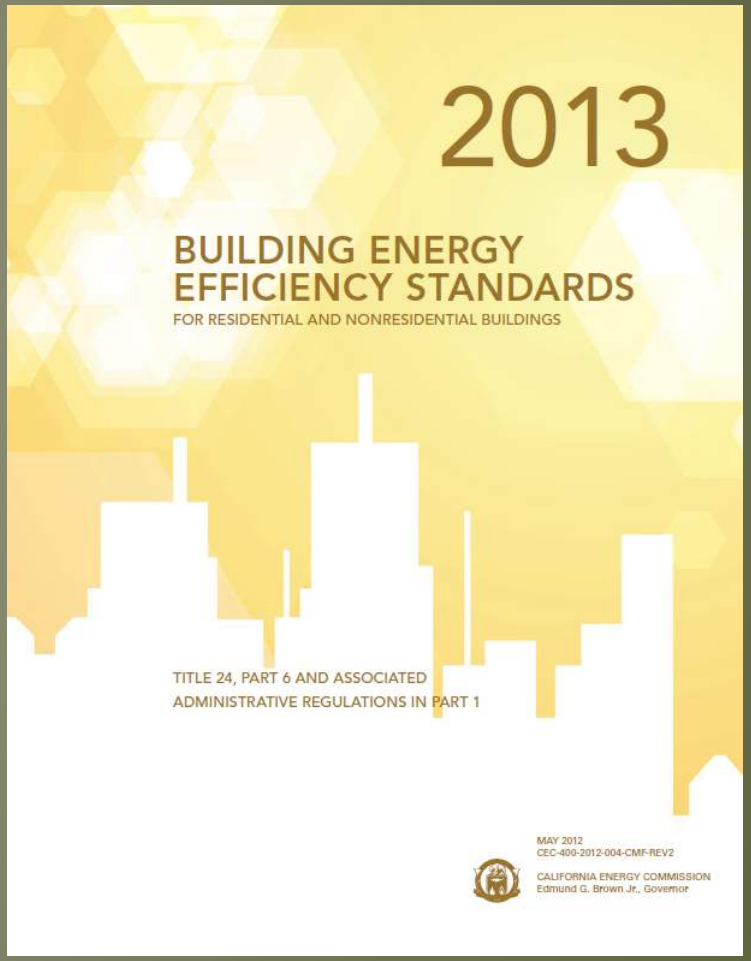


Note: IRC requires 6” fall within the first 10” of the building (5%).

Rainwater collection and disposal systems

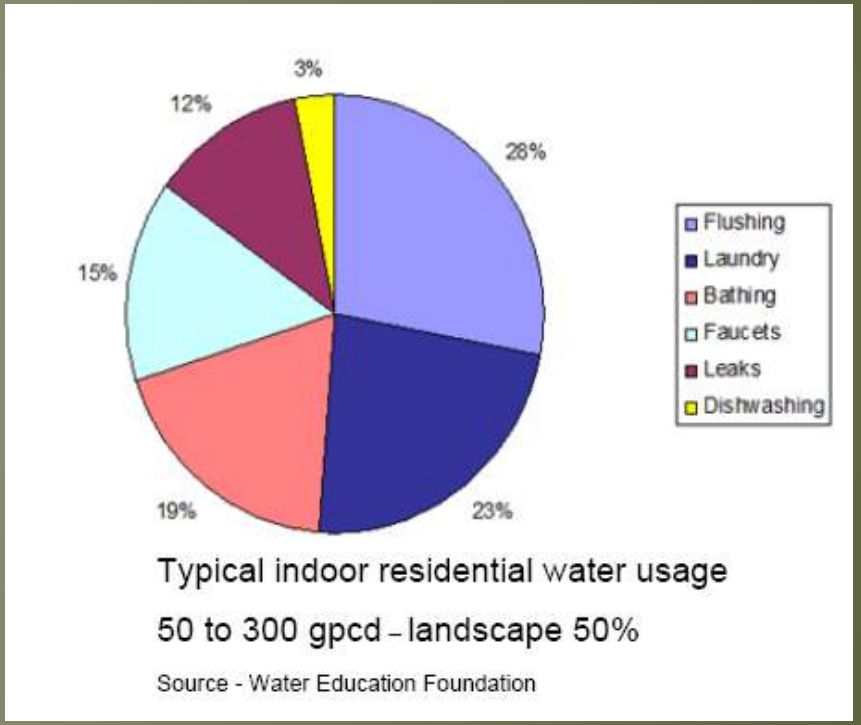
Energy Efficiency

4.201.1 Scope. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards.



Water Efficiency and Conservation

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



Water Efficiency

4.303.1.1 Water closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush.

Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-type Toilets.

Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.

Water Efficiency

4.303.1.2 Urinals. The effective flush volume of urinals shall not exceed 0.5 gallons per flush.

Water Efficiency

4.303.1.3.1 Single showerhead. Showerheads shall have a maximum flow rate of not more than 2.0 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA Water Sense Specification for Showerheads.

Water Efficiency

4.303.1.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 2.0 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time.

Note: A hand-held shower shall be considered a showerhead

Water Efficiency

4.303.1.4.1 Residential lavatory faucets. The maximum flow rate of residential lavatory faucets shall not exceed 1.5 gallons per minute at 60 psi. The minimum flow rate of residential lavatory faucets shall not be less than 0.8 gallons per minute at 20 psi.

Water Efficiency

4.303.1.4.2 Lavatory faucets in common and public use areas. The maximum flow rate of lavatory faucets installed in common and public use areas (outside of dwellings or sleeping units) in residential buildings shall not exceed 0.5 gallons per minute at 60 psi.

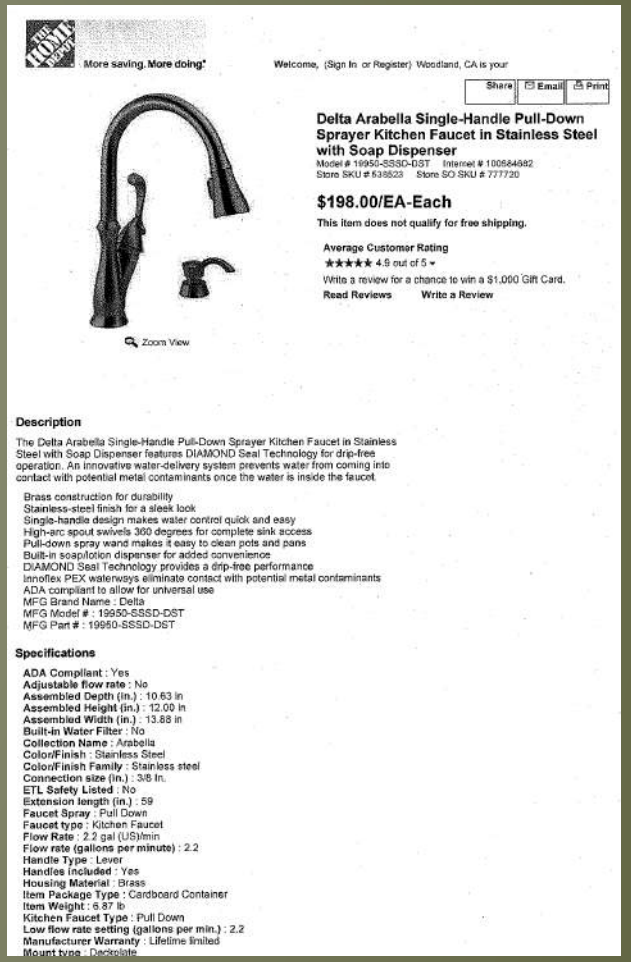
Water Efficiency

4.303.1.4.3 Metering faucets. Metering faucets when installed in residential buildings shall not deliver more than 0.25 gallons per cycle.

Water Efficiency

4.303.1.4.4 Kitchen faucets. The maximum flow rate of kitchen faucets shall not exceed 1.8 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons per minute at 60 psi.

Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.



More saving. More doing.®

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Delta Arabella Single-Handle Pull-Down Sprayer Kitchen Faucet in Stainless Steel with Soap Dispenser

Model # 19950-SSSD-DST Internet # 100584682
Store SKU # 538523 Store SO SKU # 777720

$198.00/EA-Each

This item does not qualify for free shipping.

Average Customer Rating
★★★★★ 4.9 out of 5

Write a review for a chance to win a $1,000 Gift Card.
Read Reviews Write a Review

Zoom View

Description

The Delta Arabella Single-Handle Pull-Down Sprayer Kitchen Faucet in Stainless Steel with Soap Dispenser features DIAMOND Seal Technology for drip-free operation. An innovative water-delivery system prevents water from coming into contact with potential metal contaminants once the water is inside the faucet

Brass construction for durability
Stainless-steel finish for a sleek look
Single-handle design makes water control quick and easy
High-arc spout swivels 360 degrees for complete sink access
Pull-down spray wand makes it easy to clean pots and pans
Built-in soap/lotion dispenser for added convenience
DIAMOND Seal Technology provides a drip-free performance
Innoflex PEX waterways eliminate contact with potential metal contaminants
ADA compliant to allow for universal use
MFG Brand Name : Delta
MFG Model # : 19950-SSSD-DST
MFG Part # : 19950-SSSD-DST

Specifications

ADA Compliant : Yes
Adjustable flow rate : No
Assembled Depth (in.) : 10.63 in
Assembled Height (in.) : 12.00 in
Assembled Width (in.) : 13.88 in
Built-in Water Filter : No
Collection Name : Arabella
Color/Finish : Stainless Steel
Color/Finish Family : Stainless steel
Connection size (in.) : 3/8 in.
ETL Safety Listed : No
Extension length (in.) : 59
Faucet Spray : Pull Down
Faucet type : Kitchen Faucet
Flow Rate : 2.2 gal (US)/min
Flow rate (gallons per minute) : 2.2
Handle Type : Lever
Handles included : Yes
Housing Material : Brass
Item Package Type : Cardboard Container
Item Weight : 6.87 lb
Kitchen Faucet Type : Pull Down
Low flow rate setting (gallons per min.) : 2.2
Manufacturer Warranty : Lifetime limited
Mount type : Deckplate

Compliance Certification Form

CITY OF DAVIS
Department of Community Development and Sustainability
23 Russell Boulevard, Davis, CA 95616 (530) 757-5610

Address Permit #

FIXTURE FLOW RATE COMPLIANCE CERTIFICATION

SHOWERHEAD (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

LAVATORY FAUCET (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

KITCHEN FAUCET (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

REPLACEMENT AERATORS (RES) or WASH FOUNTAINS (NON-RES) (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

WATER CLOSET / URINAL (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

I certify that the information provided on this form is accurate and that the fixtures used on this project comply with Section 4.303 (Residential) or 5.303 (Non-Residential) of the 2010 California Green Building Standards Code.

Print name Signature Date

[1] See other side of page for Prescriptive Flow Rates

[2] Provide WS-1 and WS-2 if using CAL Green Worksheet Flow Rates

RESIDENTIAL - TABLE 4.303.2 FIXTURE FLOW RATES

FIXTURE TYPE	MAXIMUM FLOW RATE AT ≥ 20 percent REDUCTION
Showerheads	2 gpm @ 80 psi
Lavatory faucets, residential	1.5 gpm @ 60 psi[1]
Lavatory faucets, nonresidential	0.4 gpm @ 60 psi[2]
Kitchen faucets	1.8 gpm @ 60 psi[3]
Gravity tank-typewater closets	1.28 gallons/flush[4]
Flushometer tankwater closets	1.28 gallons/flush[4]
Flushometer valvewater closets	1.28 gallons/flush[4]
Electromechanical hydraulic water closets	1.28 gallons/flush[4]
Urinals	.5 gallon/flush

NON-RESIDENTIAL - TABLE 5.303.2.3 FIXTURE FLOW RATES

FIXTURE TYPE	MAXIMUM FLOW RATE AT 20 PERCENT REDUCTION
Showerheads	2 gpm @ 80 psi
Lavatory faucets—residential	1.5 gpm @ 60 psi[1]
Lavatory faucets—nonresidential	0.4 gpm @ 60 psi[3]
Kitchen faucets	1.8 gpm @ 60 psi[2]
Wash fountains	1.8 [rim space (in.)/20 gpm @ 60 psi]
Metering faucets	0.2 gallons/cycle
Metering faucets for wash fountains	.20 [rim space (in.)/20 gpm @ 60 psi]
Gravity tank type water closets	1.28 gallons/flush[1]
Flushometer tank water closets	1.28 gallons/flush[1]
Flushometer valve water closets	1.28 gallons/flush[1]
Electromechanical hydraulic water closets	1.28 gallons/flush[1]
Urinals	.5 gallons/flush

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

2. 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 @ 60psi.

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

4. 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 A 112.19.233.2.

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.

CITY OF DAVIS
Department of Community Development and Sustainability
23 Russell Boulevard, Davis, CA 95616 (530) 757-5610

Address **Permit #**

FIXTURE FLOW RATE COMPLIANCE CERTIFICATION

SHOWERHEAD (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

LAVATORY FAUCET (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

KITCHEN FAUCET (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

REPLACEMENT AERATORS (RES) or WASH FOUNTAINS (NON-RES) (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

WATER CLOSET / URINAL (NONE ☐)

MANUFACTURER & MODEL NUMBER	CALGreen Worksheet Flow Rate[2]	CALGreen Prescriptive Flow Rate[1]	ACTUAL Flow Rate

I certify that the information provided on this form is accurate and that the fixtures used on this project comply with Section 4.303 (Residential) or 5.303 (Non-Residential) of the 2010 California Green Building Standards Code.

Print name Signature Date

[1] See other side of page for Prescriptive Flow Rates

[2] Provide WS-1 and WS-2 if using CAL Green Worksheet Flow Rates

4.304 Outdoor Water Use

- **Irrigation controllers.**
  - Applies to controllers installed at time of final inspection.
  - This section does not mandate that controllers be installed.

4.304 Outdoor Water Use

- **Irrigation controllers.**
  - Controllers shall be weather- or soil moisture-based controllers

Enhanced Durability

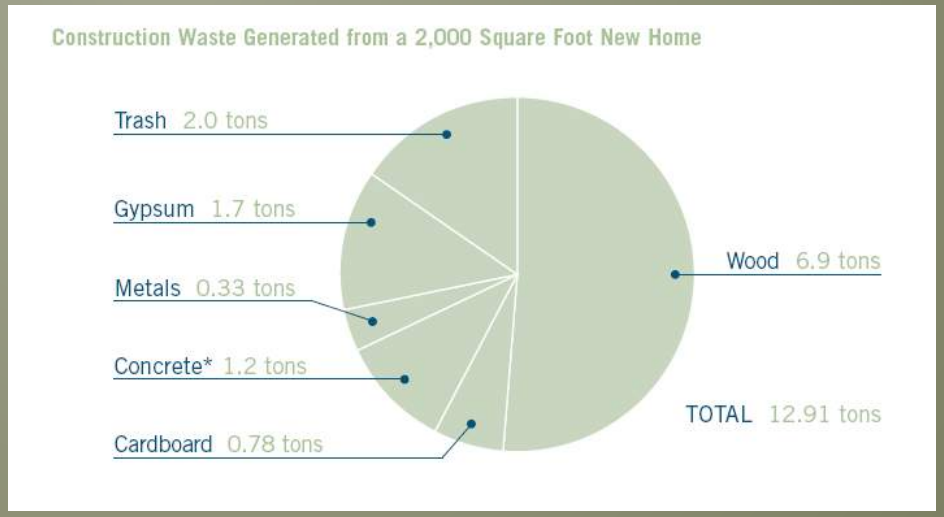
4.406.1 Rodent proofing. Annular spaces around pipes, electric cables, conduits or other openings in sole/bottom plates at exterior walls shall be protected against the passage of rodents by closing such openings with cement mortar, concrete masonry or a similar method acceptable to the enforcing agency.

Joints and openings.

- Openings as small as ¼ inch can be used by a rodent to enter a wall, crawl space or attic.

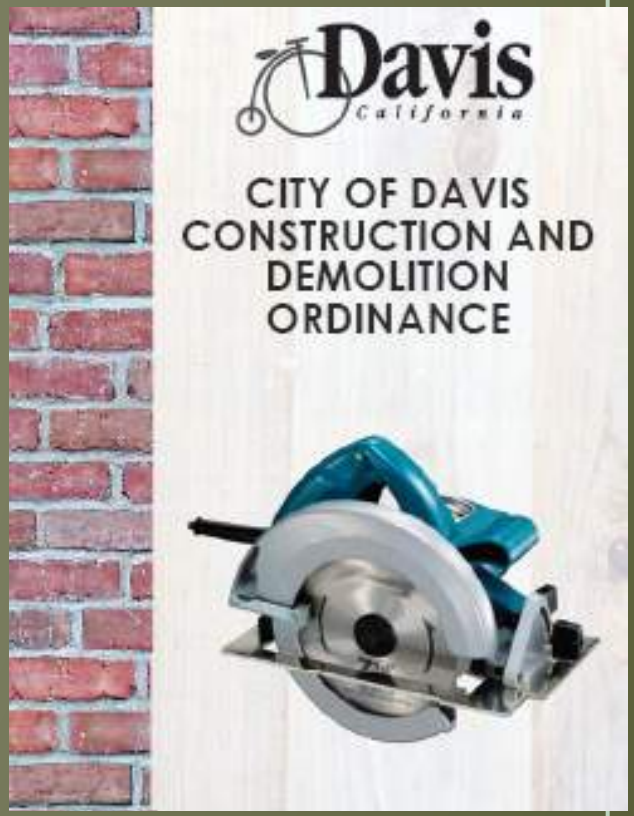
Construction and Demolition Waste Diversion

- ***Recycle and/or salvage for reuse a minimum of 50 percent of the non-hazardous construction and demolition debris.***



Construction waste management plan.

- Where a local jurisdiction does not have a construction and demolition waste management ordinance, a construction waste management plan shall be submitted
  1. Identify the ***construction and demolition waste*** materials to be diverted
  2. Specify if ***construction and demolition waste*** materials will be sorted on-site or co-mingled
  3. Identify the ***facilities where construction and demolition waste material will be taken.***
  4. Identify construction methods ***employed*** to reduce ***the amount of construction and demolition waste generated.***
  5. Specify the amount of ***construction and demolition waste*** calculated by weight or volume, ***but not by both***



Waste Management Co.

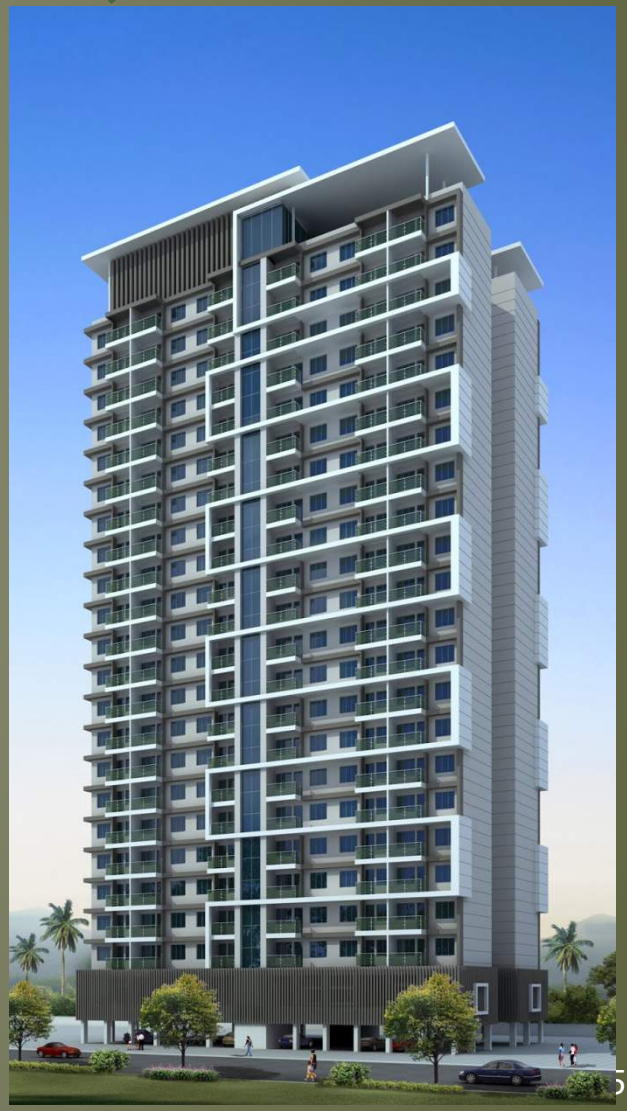
- Utilize a waste management company approved by the enforcing agency.
  - Most waste management companies can tell you what percent of construction waste is diverted.

Waste Stream Reduction Alt.

- If the project does not generate in excess of ***four pounds per sq. ft.*** of the building area complies with the 50% diversion.

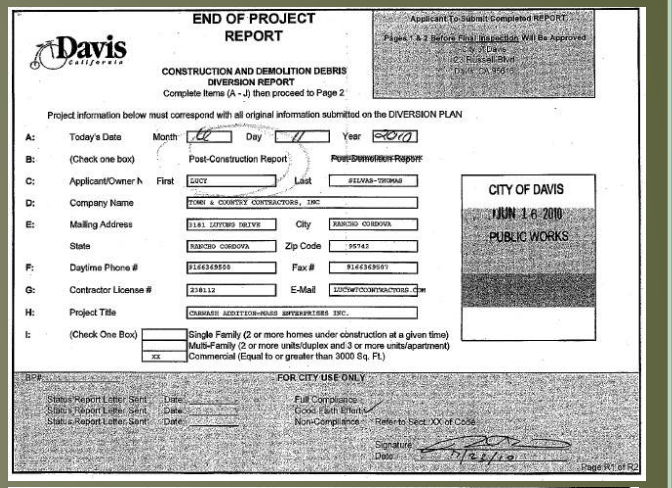
Waste Stream Reduction Alt. (New in 2013)

4.408.4.1Waste stream reduction alternative. [HR] Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed two (2) pounds per square foot of the building area, shall meet the minimum 50-percent construction waste reduction requirement in Section 4.408.1.



Documentation.

- Documentation shall be provided to the enforcing agency which demonstrates compliance.
  - Sample forms found in “A Guide to the California Green Building Standards (Low Rise Residential)”
  - Construction and demolition debris processors can found at Cal Recycle website. http://www.calrecycle.ca.gov/ConDemo/Recyclers/RecyclerSearch.aspx



END OF PROJECT REPORT

CONSTRUCTION AND DEMOLITION DEBRIS DIVERSION REPORT

Complete Items (A - J) then proceed to Page 2

Project information below must correspond with all original information submitted on the DIVERSION PLAN

A: Today's Date — Month 6 — Day 11 — Year 2010

B: (Check one box) — Post-Construction Report — ~~Post-Demolition Report~~

C: Applicant/Owner Name — First LUCY — Last SILVAS-THOMAS

D: Company Name — TOMO & COMPANY CONTRACTORS, INC

E: Mailing Address — 3181 LOVING DRIVE — City RANCHO CORDOVA

State — RANCHO CORDOVA — Zip Code 95742

F: Daytime Phone # — 9166369550 — Fax # 9166369587

G: Contractor License # — 238112 — E-Mail LUCY@TOMOCONTRACTORS.Com

H: Project Title — CARWASH ADDITION-HAND ENTERPRISES INC.

I: (Check One Box) — Single Family (2 or more homes under construction at a given time); Multi-Family (2 or more units/duplex and 3 or more units/apartment); XX Commercial (Equal to or greater than 3000 Sq. Ft.)

CITY OF DAVIS — JUN 16 2010 — PUBLIC WORKS

Applicant To Submit Completed REPORT: Pages 1 & 2 Before Final Inspection Will Be Approved — City of Davis, 23 Russell Blvd, Davis, CA 95616

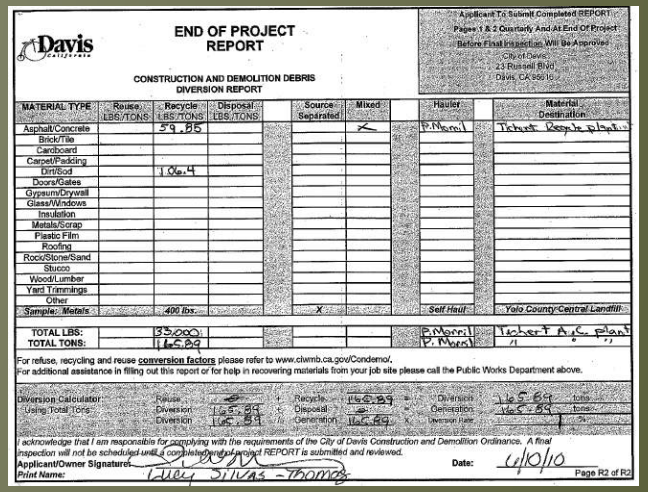
FOR CITY USE ONLY

BDP: Status Report Letter Sent Date: / Status Report Letter Sent Date: / Status Report Letter Sent Date:

Full Compliance / Good Faith Effort / Non-Compliance — Refer to Sect. XX of Code

Signature / Date 7/2/10

Page R1 of R2



END OF PROJECT REPORT

CONSTRUCTION AND DEMOLITION DEBRIS DIVERSION REPORT

Applicant To Submit Completed REPORT: Pages 1 & 2 Quarterly And At End Of Project Before Final Inspection Will Be Approved — City of Davis, 23 Russell Blvd, Davis, CA 95616

MATERIAL TYPE	Reuse LBS/TONS	Recycle LBS/TONS	Disposal LBS/TONS	Source Separated	Mixed	Hauler	Material Destination
Asphalt/Concrete		59.55			X	P.Morril	Ticket Recycle plant
Brick/Tile							
Cardboard							
Carpet/Padding							
Dirt/Sod		106.4					
Doors/Gates							
Gypsum/Drywall							
Glass/Windows							
Insulation							
Metals/Scrap							
Plastic Film							
Roofing							
Rock/Stone/Sand							
Stucco							
Wood/Lumber							
Yard Trimmings							
Other							
Sample: Metals		400 lbs.		X		Self Haul	Yolo County Central Landfill
TOTAL LBS:		35,000				P.Morril	Tichert Asc. plant
TOTAL TONS:		165.89				P. Morril	

For refuse, recycling and reuse conversion factors please refer to www.ciwmb.ca.gov/Condemol.

For additional assistance in filling out this report or for help in recovering materials from your job site please call the Public Works Department above.

Diversion Calculator: Using Total Tons — Reuse — Diversion 165.89 — Recycle 165.89 — Disposal — Generation 165.89 — Diversion 165.89 tons — Diversion Rate 100 %

I acknowledge that I am responsible for complying with the requirements of the City of Davis Construction and Demolition Ordinance. A final inspection will not be scheduled until a completed, revised REPORT is submitted and reviewed.

Applicant/Owner Signature: [signature] — Date: 6/10/10

Print Name: Lucy Silvas-Thomas

Page R2 of R2

53

Building Maintenance and Operation

- **4.410.1** *Operation and maintenance manual. At the time of final inspection, a manual, compact disc, web-based reference or other media acceptable to the enforcing agency which includes all of the following shall be placed in the building:*

Operation and Maintenance Manual.

1. Directions to the owner or occupant
2. Instructions for the following:
   a. Equipment and appliances
   b. Roof and yard drainage
   c. Space conditioning systems
   d. Landscape irrigation systems
   e. Water reuse systems
3. ***Information from local utility***
4. ***Public transportation and/or carpool options***
5. ***Educational material on the positive impacts of an interior relative humidity between 30–60 percent***

Operation and Maintenance Manual.

6. Information about water-conserving landscape and irrigation design and controllers which conserve water.

7. ***Instructions for maintaining gutters and downspouts and diverting water at least 5 feet away from foundation.***

8. Information on required routine maintenance measures, including, but not limited to, caulking, painting, grading around the building, etc.

9. Information about state solar energy and incentive programs available.

10. A copy of all special inspection verifications required by the enforcing agency or this code.

Fireplaces

- Shall be a direct-vent sealed-combustion type
- Woodstove or pellet stove shall comply with U.S. EPA Phase II
- Comply with applicable local ordinances

No indoor air for combustion or exhaust

Pollution Control

- All duct and other related air distribution component openings shall be covered

Adhesive VOC Limit

- Adhesives, sealants and caulks used on the project shall meet the requirements

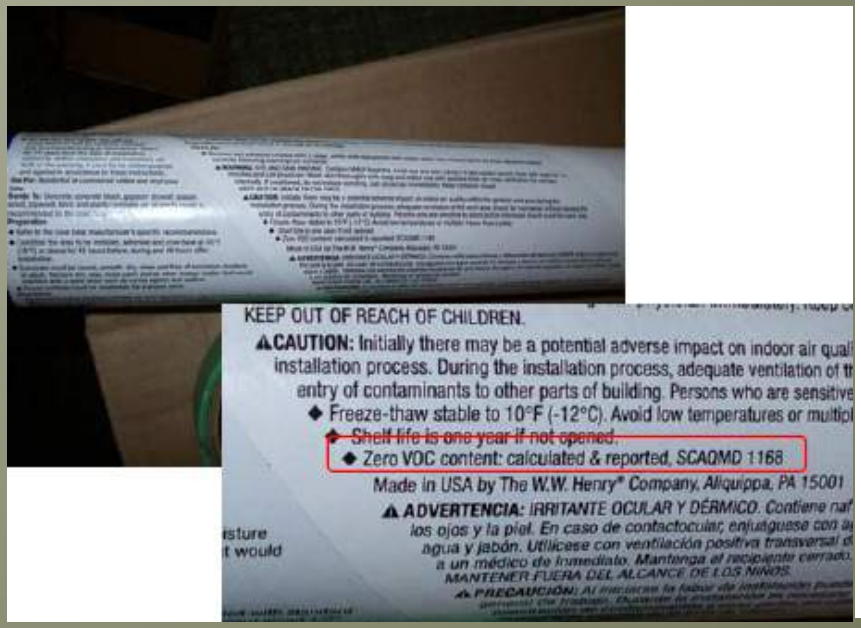


TABLE 4.504.1
ADHESIVE VOC LIMIT[1,2]
Less Water and Less Exempt Compounds in Grams per Liter

ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesive	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Drywall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single-ply roof membrane adhesives	250
Other adhesives not specifically listed	50
SPECIALTY APPLICATIONS	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact adhesive	80
Special purpose contact adhesive	250
Structural wood member adhesive	140
Top and trim adhesive	250
SUBSTRATE SPECIFIC APPLICATIONS	
Metal to metal	30
Plastic foams	50
Porous material (except wood)	50
Wood	30
Fiberglass	80

1. If an adhesive is used to bond dissimilar substrates together, the adhesive with the highest VOC content shall be allowed.
2. For additional information regarding methods to measure the VOC content specified in this table, see South Coast Air Quality Management District Rule 1168.

Verification

- Documentation may include, but is not limited to, the following:
  1. Manufacturer's product specification.
  2. Field verification of on-site product containers.

TABLE 4.504.3
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2, 3]
Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds

COATING CATEGORY	EFFECTIVE 1/1/2010	EFFECTIVE 1/1/2012
Flat coatings	50	
Nonflat coatings	100	
Nonflat-high gloss coatings	150	
Specialty Coatings		
Aluminum roof coatings	400	
Basement specialty coatings	400	
Bituminous roof coatings	50	
Bituminous roof primers	350	
Bond breakers	350	
Concrete curing compounds	350	
Concrete/masonry sealers	100	
Driveway sealers	50	
Dry fog coatings	150	
Faux finishing coatings	350	
Fire resistive coatings	350	
Floor coatings	100	
Form-release compounds	250	
Graphic arts coatings (sign paints)	500	
High temperature coatings	420	
Industrial maintenance coatings	250	
Low solids coatings[1]	120	
Magnesite cement coatings	450	
Mastic texture coatings	100	
Metallic pigmented coatings	500	
Multicolor coatings	250	
Pretreatment wash primers	420	
Primers, sealers, and undercoaters	100	

VOC Limits

- Adhesives
- Paints and Coatings
- Aerosol Paints and Coatings
- Carpet Systems
- Resilient Flooring Systems (cork, vinyl, linoleum, rubber)
- Composite Wood Products

4.504.5.1 (5) "Other methods acceptable to the enforcing agency"

CITY OF DAVIS
Department of Community Development and Sustainability
23 Russell Boulevard, Davis, CA 95616 (530) 757-5610

VOC COMPLIANCE CERTIFICATION

ADHESIVE (NONE ☐)	MANUFACTURER	CALGreen LIMIT[1]	ACTUAL VOCs

SEALANT (NONE ☐)	MANUFACTURER	CALGreen LIMIT[1]	ACTUAL VOCs

ARCHITECTURAL COATINGS (NONE ☐)	MANUFACTURER	CALGreen LIMIT[1]	ACTUAL VOCs

FORMALDEHYDE COMPLIANCE CERTIFICATION

PRODUCT (NONE ☐)	MANUFACTURER	CURRENT LIMIT	ACTUAL VOCs
Hardwood plywood veneer core		0.05	
Hardwood plywood composite core		0.08	
Particleboard		0.09	
Medium density fiberboard		0.11	
Thin medium density fiberboard		0.21	

All Carpet installed in the building interior meets the testing and product requirements of the following (check one)

- ☐ Carpet and Rug Institute's Green Label
- ☐ California Department of Public Health Standard Practice for the testing of VOCs
- ☐ NSF/ANSI 140 at the Gold Level
- ☐ Scientific Certifications Systems Indoor Advantage™ Gold
- ☐ No carpet installed on this project

I certify that the information provided on this form is accurate and that the materials used on this project comply with Section 4.504 of the 2010 California Green Building Standards Code.

Print name Signature Date

[1] See other side of page for VOC limits

TABLE 4.504.3
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2,3]
Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds

COATING CATEGORY	EFFECTIVE 1/1/2010	EFFECTIVE 1/1/2012
Flat coatings	50	
Nonflat coatings	100	
Nonflat-high gloss coatings	150	
Specialty Coatings		
Aluminum roof coatings	400	
Basement specialty coatings	400	
Bituminous roof coatings	50	
Bituminous roof primers	350	
Bond breakers	350	
Concrete curing compounds	350	
Concrete/masonry sealers	100	
Driveway sealers	50	
Dry fog coatings	150	
Faux finishing coatings	350	
Fire resistive coatings	350	
Floor coatings	100	
Form-release compounds	250	
Graphic arts coatings (sign paints)	500	
High temperature coatings	420	
Industrial maintenance coatings	250	
Low solids coatings[1]	120	
Magnesite cement coatings	450	
Mastic texture coatings	100	
Metallic pigmented coatings	500	
Multicolor coatings	250	
Pretreatment wash primers	420	
Primers, sealers, and undercoaters	100	
Reactive penetrating sealers	350	
Recycled coatings	250	
Roof coatings	50	
Rust preventative coatings	400	250
Shellacs Clear Opaque	 730 550	
Specialty primers, sealers and undercoaters	350	100
Stains	250	
Stone consolidants	450	
Swimming pool coatings	340	
Traffic marking coatings	100	
Tub and tile refinish coatings	420	
Waterproofing membranes	250	
Wood coatings	275	
Wood preservatives	350	
Zinc-rich primers	340	

1. Grams of VOC per liter of coating, including water and including exempt compounds.
2. The specified limits remain in effect unless revised limits are listed in subsequent columns in the table.
3. Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available from the Air Resources Board.

TABLE 4.504.1
ADHESIVE VOC LIMIT[1,2]
Less Water and Less Exempt Compounds in Grams per Liter

ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesive	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Drywall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single-ply roof membrane adhesives	250
Other adhesives not specifically listed	50
SPECIALTY APPLICATIONS	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact adhesive	80
Special purpose contact adhesive	250
Structural wood member adhesive	140
Top and trim adhesive	250
SUBSTRATE SPECIFIC APPLICATIONS	
Metal to metal	30
Plastic foams	50
Porous material (except wood)	50
Wood	30
Fiberglass	80

1. If an adhesive is used to bond dissimilar substrates together, the adhesive with the highest VOC content shall be allowed.
2. For additional information regarding methods to measure the VOC content specified in this table, see South Coast Air Quality Management District Rule 1168.

TABLE 4.504.2
SEALANT VOC LIMIT
Less Water and Less Exempt Compounds in Grams per Liter

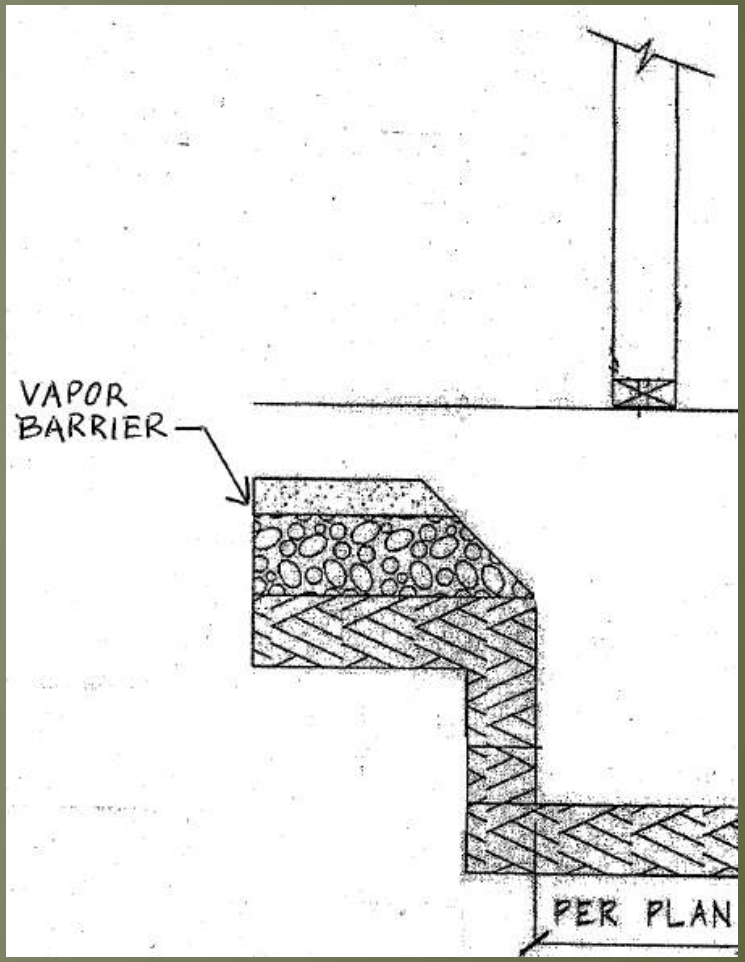
SEALANTS	CURRENT VOC LIMIT
Architectural	250
Marine deck	760
Nonmembrane roof	300
Roadway	250
Single-ply roof membrane	450
Other	420
SEALANT PRIMERS	
Architectural Nonporous Porous	 250 775
Modified bituminous	500
Marine deck	760
Other	750

Concrete Slab Foundations

- Concrete slab foundations required to have a ***vapor retarder*** by *California Building Code* or the *California Residential Code* shall also comply with this section (4505.2).
- **1910 (CBC)**
  - Min thickness 3.5 inches
  - 6 mil polyethylene ***vapor retarder***, joints lapped min 6" (*with joints taped)* placed between the base course or subgrade or other approved method to retard vapor transmission
- **R506 (CRC)**
  - Min thickness 3.5 inches
  - A 6-mil polyethylene or *approved* ***vapor retarder*** with joints lapped not less than 6 inches (*with joints taped*) shall be placed between the concrete floor slab and the base course or the prepared subgrade where no base course exists.

Capillary break

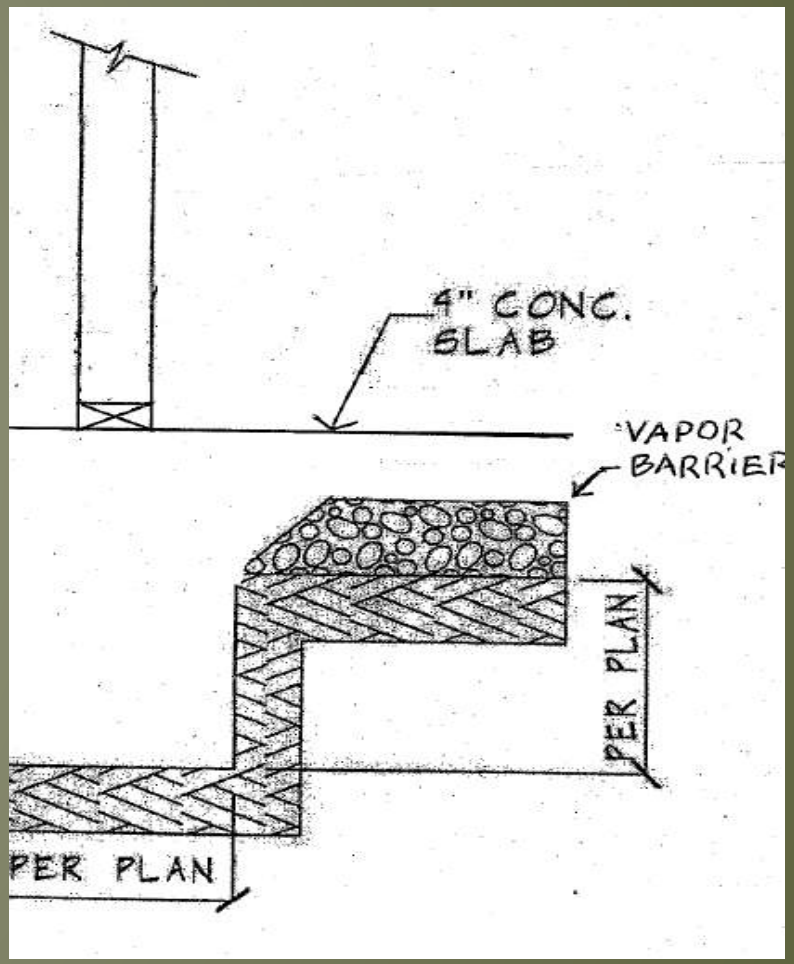
- **Capillary break.**
  1. A 4-inch (101.6 mm) thick base of 1/2 inch (12.7 mm) or larger clean aggregate shall be provided with a ***vapor ~~barrier~~*** retarder (supplement) in direct contact with concrete
  2. Other equivalent methods approved by the enforcing agency.
  3. A slab design specified by a licensed design professional.



Capillary break

Capillary break.

1. A 4-inch (101.6 mm) thick base of 1/2 inch (12.7 mm) or larger clean aggregate shall be provided with a ***vapor ~~barrier~~*** retarder (supplement) in direct contact with concrete
2. Other equivalent methods approved by the enforcing agency.
3. A slab design specified by a licensed design professional.



Capillary break

- **VAPOR RETARDER CLASS.** (CBC Definitions) A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class shall be defined using the desiccant method of ASTM E 96 as follows:
  - **Class I:** 0.1 perm or less.
    Class II: 0.1 < perm ≤ 1.0 perm.
    Class III: 1.0 < perm ≤ 10 perm.
  - **ASTM E96-00 Standard Test Methods for Water Vapor Transmission of Materials**

Capillary break

- **VAPOR BARRIER.** (CALGreen).
  Material that has a permeance of one perm or less and that provides resistance to the transmission of water vapor. (*Test Standard not defined in CAL Green)*

- **VAPOR RETARDER.** (No definition in CAL Green)

  - ASTM E1643 - 11 Standard Practice for Selection, Design, Installation, and Inspection of Water ***Vapor Retarders*** Used in Contact with Earth or Granular Fill Under Concrete Slabs

  - ASTM E 1754: These test methods covers flexible, preformed sheet membrane materials to be used as ***vapor retarders*** in contact with soil or granular fill under concrete slabs.

Vapor Retarder ASTM E-96 (10 mill, 2 layers)

Alternate Methods & Materials

Community Development Department
23 Russell Boulevard-Davis, California 95616
530/757-5610 Fax: 530/757-5660 TDD: 530/757-5666

OFC 10-2301

Davis California

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City of Davis
Community Development

Alternate Materials or Methods of Construction and/or Design Request

Alternate Material No: _____

Please fully complete and submit two (2) copies of all documents, including plans showing the proposed alternate. Under the authority of Sections 108.7 of the 2007 CBC; 301.2 of the CPC; 105.5.1 of the CMC; and 90-4 of the CEC, the undersigned request approval of alternate materials and methods of construction is for:

Project Name and Address: Regis Homes - Verona — 3405 Verona Terrace			Permit No:
Occupancy Group: R3	Type of Construction: V B	Sprinklered (Y/N):	No. of Stories:
Total Floor Area:	Floor Area Per Floor:	Tenant Floor Area:	
Describe Use:			

Subject of Alternative *(separate forms should be filled out for each different item):*
Installation of concrete slabs over 2" sand layer, over 10 mil. vapor barrier. Future application to eliminate 10 mil vapor barrier completely and place 10" concrete slab directly over gravel base.
Code Requirement *(specify code edition and section):*
4.505.2
Alternate proposed:
Provide design mix with MOXIE 1800 SUPER-ADMIX.

Justification *(attach copies of any reference, test reports, expert opinions, etc. The Building Official may require that a consultant be hired by the applicant to perform test, research and analysis and submit a full report of evaluation to the Community Development Department for consideration and approval):*
Admixture stops water vapor transmission

Requested by (architect or engineer must wet-stamp and sign below):

Owner: (Print Name)		(Signature)
Architect:		
Engineer: Richard M. Roberson		
Contractor:		

REGISTERED PROFESSIONAL ENGINEER — RICHARD M. ROBERSON — No. C 051196 — Exp. June 30, 2012 — CIVIL — STATE OF CALIFORNIA

Contact Person's Name _____ Phone No. _____ Date requested _____

STAFF USE ONLY

Staff Findings:
Staff has determined that the use of "Moxie 1800 Super Ad Mix" will provide equivalent moisture intrusion protection

Staff Person/Title: Gregory Mahoney Asst Bldg Off	Approval Recommended (Y/N): Y
Building Official (Sign & Date): 5-3-2011	Approved/Denied:

S:\Documents and Settings\Rick\Local Settings\Temporary Internet Files\Content.Outlook\6K1434PY\Alternate Materials or Methods Request.doc
Rev. 2/15/2008 – new code ref.

moxie INTERNATIONAL **1800 SUPER-ADMIX**

Basic Use:
MOXIE 1800 SUPER-ADMIX is a ready to use liquid admixture formulated for concrete to stop moisture vapor migration and alkali efflorescence attack above and below grade. Ideal for use on stucco, shotcrete, mortar and white portland cement pool plaster applications. A complex process converts the by-products of hydration into a higher density of cementitious materials thereby reducing permeability. The additional cementitious materials, by their very chemical and physical nature, produce concrete with a much greater density and surface hardness, a dramatic increase in bond, flexural, tensile and compressive strength, and reducing shrinkage cracking while achieving near-zero capillary voids. Adhesion characteristics of the surface are improved by providing the ideal surface dry condition necessary for coatings, paint or floor coverings. The use of MOXIE 1800 SUPER-ADMIX alone, without any other additives, will produce of the highest quality, impermeable concrete possible for the given mix design.

Advantages:
- Stops moisture migration, above/below grade (0.011 WVT)
- Increased flexural strength up to 200% or more
- Replaces sand/visqueen vapor barrier
- Shrinkage compensating thermal barrier
- Plasticizer
- Curing compound sealer
- Dust proofing compound
- Prevents chloride intrusion
- Resists freeze thaw
- Resists spalling and flaking
- Resists acids and sulfates erosion
- Resistant to extreme abrasion
- Ideal for stucco, plaster, shotcrete, grout and mortar
- Increased compression strength up to 177%
- Increased surface hardness to 200% or more
- Corrosion inhibitor
- Pumping-quality mix
- Finishing aid
- Reduces internal chloride ion level
- Resists scaling
- Resistant to oils fats and solvents
- Resists chlorides and hydrogen sulfides
- Resists lichen, moss and other accretions
- Resists rust and water-borne stains

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Description:
MOXIE 1800 SUPER-ADMIX is an in-organic, chemically reactive, complex catalyzed silicate that initially *FORMS AN INTEGRAL COLLOIDAL GEL MEMBRANE* prior to initial set. This *ELIMINATES BLEED WATER* and *RESTRICTS THE RAPID EVAPORATION OF SURFACE WATER* even in gusty wind conditions, which *PREVENTS SHRINKAGE CRACKING AND SLAB CURL*, and provides an *INTEGRAL CURING COMPOUND*. Additionally the colloidal gel mass *SERVES AS A THERMAL BARRIER* that *CONSERVES HEAT* generated by hydration during colder conditions, *REDUCES HEAT ABSORPTION* in hot weather, and forms a passive, *CORROSION INHIBITING, BARRIER* around reinforcing steel, ultimately forming a permanent, cementitious barrier. This process continues to parallel the curing process by forming additional cementitious material for 28 days. From 28 days to completion of hydration the final chemical phase completes the last of the chemical process converting and reducing the remaining capillary voids present after hydration to near-zero.

Packaging:
MOXIE 1800 SUPER-ADMIX is available as follows: * 275 gallon tote(US) * 55 gallon drums(US) * 5 gallon pails(US)

Applicable Standards:
ASTM E96 E1745 F710 E1907 Sec 7.9, C156 C157 C567 C666 C805 C494 D4263 D5084 C309 Performance, IBC 1911 CARB EPA USDA VOC=0

Limitations:
If ambient temperature is below 50° F or an accelerator is needed, use **MOXIE *FASTSET50*** to decrease set time up to 50%, or above 85° F, a retarder may be used per manufacturer's instructions to extend the working time of the concrete. If a retarder is used, mixing should continue for at least 15 minutes before placing, ASTM C94 - Specifications for Ready Mix Concrete. DO NOT USE SURFACE SEALER/HARDENERS, THEY WILL PREVENT PROPER MECHANICAL BOND OF ADHESIVES. VAPOR BARRIER MAY BE OMITTED, DO NOT USE CURING COMPOUNDS, NON-CHLORIDE ACELLERATORS MAY BE USED, FOG MIST ONLY WITH WATER IF NECESSARY, ACI 302 – CONCRETE FLOOR AND SLAB CONSTRUCTION.

Technical data:

Water Vapor ASTM E96		Moisture Vapor ASTM D4263			Permeability ASTM D5084	Curing (loss of water) ASTM C309 (C156)
0.011 WVT -	96 hr's. @ 70° F	none	48hrs @ 110° F	none	6.56 x 10^{-1} cm/s	24 hrs. - 0.433k²/m²
.3 WVT min	127 hr's. @ 70° F	none	96hrs @ 110° F	none	@ 50psi cell pres	72 hrs. - 0.541k²/m²

Physical Characteristics

Dispersion	Liquid	Flammability	none	Freezing	32°F
Appearance	colorless/straw	Flash Point	none	Shelf life	indefinite
Odor	none	pH	11.3(alkaline)	VOC	0

Dosage:
MOXIE 1800 SUPER-ADMIX is used at a dosage of 10 ounces per 94 pound sack of portland cement, or 15 to 20 ounces per sack for mortar, stucco, shotcrete, or a higher performance dosage. Include any cementitious materials such as fly ash in the calculation. Consult the 'Batch Plant Instructions' or a MOXIE International Technical Representative for specific details.

Warranty: 20 year standard warranty. **Optional 10 Year Registered Warranty**

3352-B SWETZER ROAD, LOOMIS, CA 95650 TOLL FREE: (800) 356-3476 BUS: (916) 652-1300 FAX: (916) 652-1301 www.moxie-intl.com

Alternate Methods & Materials

moXie INTERNATIONAL

1800 SUPER-ADMIX

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- Resists freeze thaw
- Resists spalling and flaking
- Resists acids and sulfates erosion
- Resistant to extreme abrasion
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- Increased surface hardness to 200% or more
- Corrosion inhibitor
- Pumping-quality mix
- Finishing aid
- Reduces internal chloride ion level
- Resists scaling
- Resistant to oils fats and solvents
- Resists chlorides and hydrogen sulfides
- Resists lichen, moss and other accretions
- Resists rust and water-borne stains

Alternate Methods & Materials

Moisture Content

- Wall and floor framing shall not be enclosed when the framing members exceed 19 percent moisture content

Moisture Content

- Determined with either a probe-type or contact-type moisture meter. *Equivalent verification per 101.8* (supplement)
- ***Readings shall be taken at a point 2 feet to 4 feet from the grade stamped end***
- ***At least three random moisture readings shall be performed on wall and floor framing***

Moisture Content

- ***Insulation products which are visibly wet or have a high moisture content shall be replaced or allowed to dry prior to enclosure.***
- Crawlspace?

Indoor Air Quality and Exhaust

- **4.506.1** Bathroom exhaust fans shall comply with the following:
  - 1. Fans shall be ENERGY STAR compliant and be ducted to terminate outside the building.

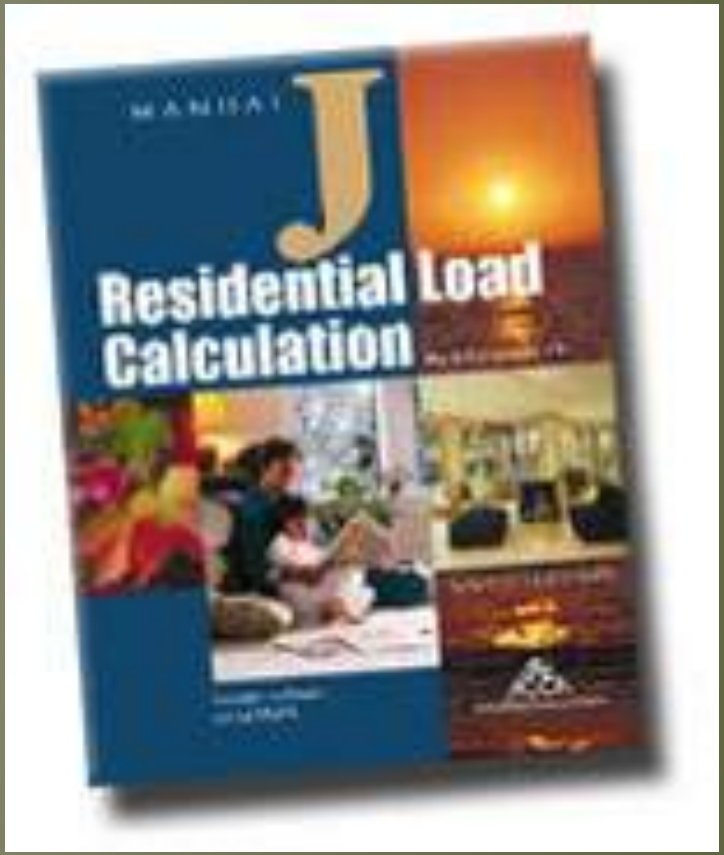
Indoor Air Quality and Exhaust

- 2. Unless functioning as a component of a whole house ventilation system: fans ***must*** be controlled by a humidistat control
  - ***capable of adjustment between ≤ 50 to a maximum of 80 percent***
  - *May utilize manual or automatic means of adjustment* (supplement)
  - *May be separate from the fan, not required to be integral*

Heating and Air-Conditioning System Design

The heat loss and heat gain is established according to ACCA Manual J, ASHRAE handbooks or other equivalent design software or methods.

- Calculates heating and cooling loads.



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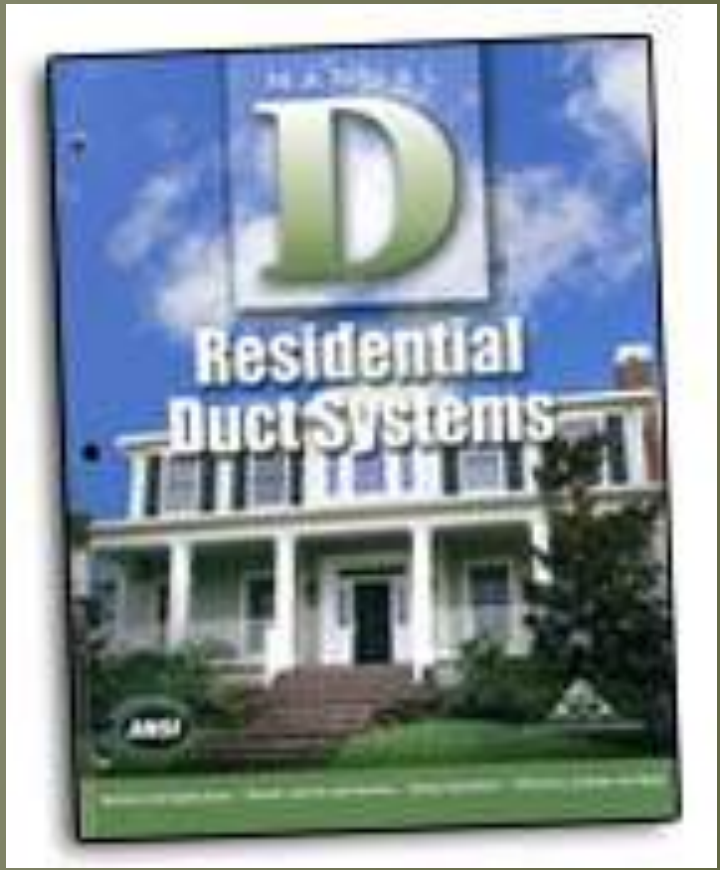
Heating and Air-Conditioning System Design

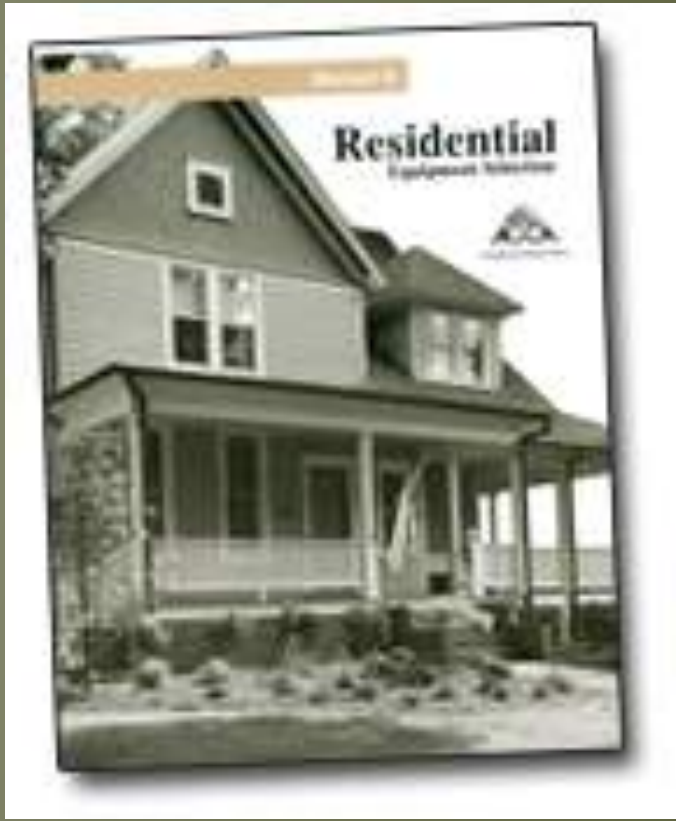
Duct systems are sized according to ACCA 29-D Manual D, ASHRAE handbooks or other equivalent design software or methods.

- Design duct system based on heating and cooling loads and cfm requirements per room



Heating and Air-Conditioning System Design

Select heating and cooling equipment according to ACCA 36-S Manual S or other equivalent design software or methods.



Site Development (2010)

- **Storm Water Pollution Prevention Plan (SWPPP) required for new projects less than an acre.**
- **Must conform to the State storm water National Pollutant Discharge Elimination System (NPDES) Construction Permit or local ordinance, whichever is stricter.**

Storm Water Pollution Prevention (2013)

- **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.
- **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 an sediment control and good housekeeping BMP.

Storm Water Pollution Prevention (2013)

- 1. Soil loss BMPs 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

Storm Water Pollution Prevention (2013)

- 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
  - f. Spill prevention and control
  - g. Other housekeeping BMP acceptable to the enforcing agency

Bicycle Parking and Changing Rooms

- Short-Term bicycle parking.
  - Permanently anchored within 200 feet
  - Equivalent to 5% of the motorized vehicle parking capacity.

Bicycle Parking and Changing Rooms

- Long-Term secure bicycle parking for buildings with over 10 tenant –occupants ***or alterations or additions that add 10 or more tenant vehicle parking spaces (2013 CALGreen),*** provide amount equivalent to 5% of vehicle parking
  - Covered, lockable enclosures
  - Lockable bike rooms
  - Lockable bicycle lockers

Designated Parking

- Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicle
- Parking stall marking "CLEAN AIR/VANPOOL/EV"

Note: Vanpool and EV added by supplement

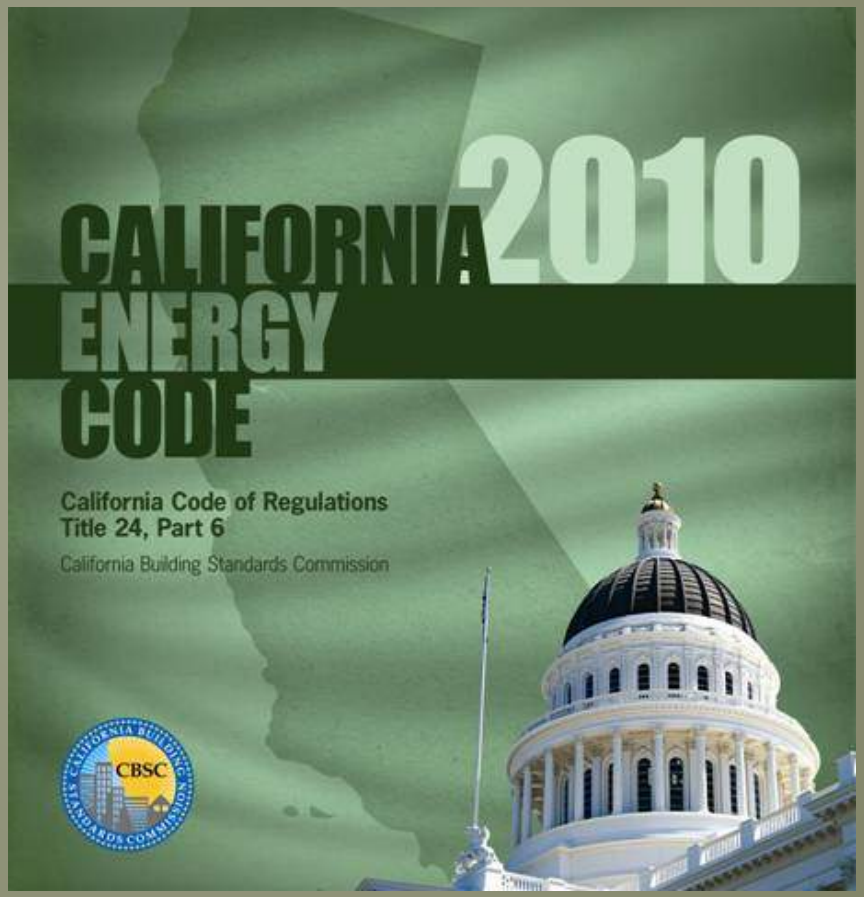
TABLE 5.106.5.2

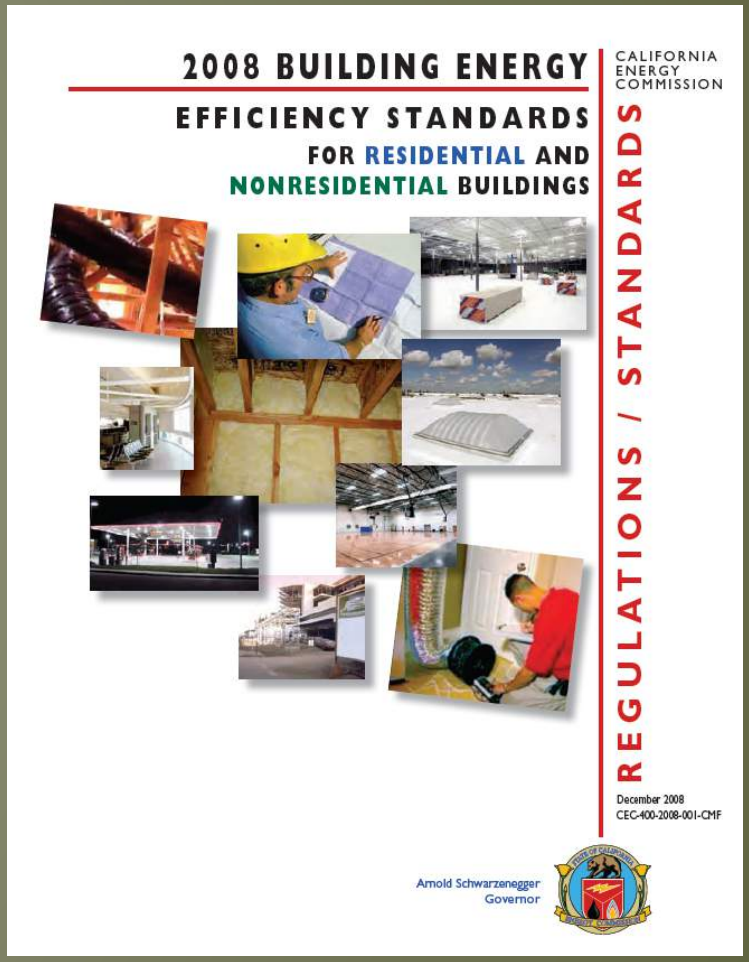
TOTAL NUMBER OF PARKING SPACES	NUMBER OF REQUIRED SPACES
0–9	0
10–25	1
26–50	3
51–75	6
76–100	8
101–150	11
151–200	16
201 and over	At least 8 percent of total

Light Pollution Reduction

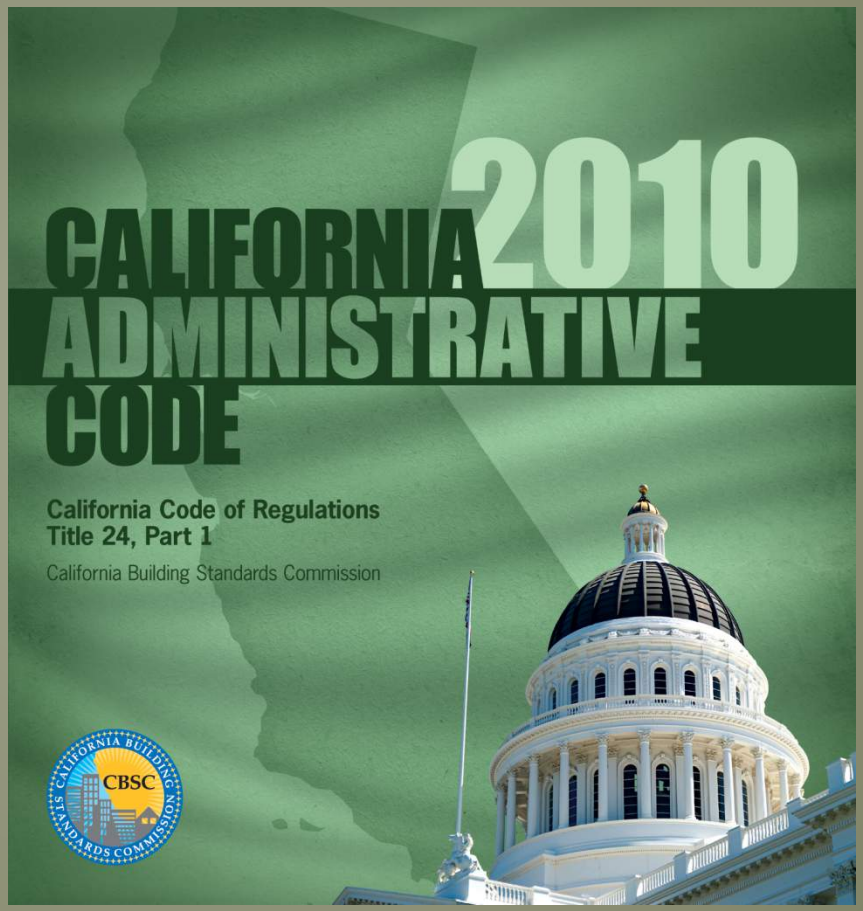
- Comply with the *California Energy Code, Lighting Zones 1-4.*

Light Pollution Reduction





Light Pollution Reduction



CHAPTER 10

ADMINISTRATIVE REGULATIONS FOR THE CALIFORNIA ENERGY COMMISSION (CEC)

ARTICLE 1
ENERGY BUILDING REGULATIONS

10-101. Scope.

(a) This article contains administrative regulations relating to the energy building regulations in Title 24, Part 6. This article applies to all residential and nonresidential buildings.

(b) Nothing in this article lessens any necessary qualifications or responsibilities of licensed or registered building professionals or other designers or builders, or the duties of enforcement agencies, that exist under state or local law.

Authority: Sections 25402 and 25402.1, Public Resources Code.
Reference: Sections 25402 and 25402.1, Public Resources Code.
HISTORY:

1. New Article 1 (Section 1401) filed 5-3-76; effective thirtieth day thereafter (Register 76, No. 19).
2. Amendment filed 8-17-77; designated effective 3-11-78 (Register 77, No. 34).
3. Repealer of Article 1 (Section 1401) and new Article 1 (Sections 1401-1408, not consecutive) filed 12-9-81; designated effective 7-1-82 (Register 81, No. 50).
4. Amendment filed 12-27-84; designated effective 1-1-85 pursuant to Government Code Section 11346.2 (d) (Register 84, No. 52).

10-102. Definitions. In this article the following definitions apply:

ACCEPTANCE REQUIREMENTS are "acceptance requirements for code compliance" as defined in Section 101(b) of Part 6.

ALTERNATIVE CALCULATION METHOD APPROVAL MANUAL or "ACM Manual" is the Alternative Calculation Method (ACM) Approval Manual for the Energy Efficiency Standards for Nonresidential Buildings for nonresidential buildings, hotels and multifamily residential buildings with four or more stories and the Alternative Calculation Method (ACM) Approval Manual for the Energy Efficiency Standards for Residential Buildings for all single-family and low-rise multifamily residential buildings.

APPLIANCE EFFICIENCY REGULATIONS are the regulations in Title 20, Section 1601 et Seq. of the California Code of Regulations.

APPROVED CALCULATION METHOD is a Public Domain Computer Program approved under Section 10-109 (a), or any Alternative Calculation Method approved under Section 10-109(b).

BUILDING PERMIT is an electrical, plumbing, mechanical, building or other permit or approval, that is issued by an enforcement agency, and that authorizes any construction that is subject to Part 6.

COMMISSION is the State Energy Resources Conservation and Development Commission.

COMPLIANCE APPROACH is any one of the allowable methods by which the design and construction of a building may be demonstrated to be in compliance with Part 6. The compliance approaches are the performance compliance approach and the prescriptive compliance approach. The requirements for each compliance approach are set forth in Section 100(e)2 of Part 6.

CONDITIONED FLOOR AREA is "conditioned floor area" as defined in Section 101(b) of Part 6.

CRRC-1 is the Cool Roof Rating Council document entitled "Product Rating Program."

ENERGY BUDGET is the "energy budget" as defined in Section 101(b) of Part 6.

ENFORCEMENT AGENCY is the city, county or state agency responsible for issuing a building permit.

EXECUTIVE DIRECTOR is the executive director of the Commission.

HVAC SYSTEM is the "HVAC system" as defined in Section 101(b) of Part 6.

MANUFACTURED DEVICE is "manufactured device" as defined in Section 101(b) of Part 6.

NFRC 100 is the National Fenestration Rating Council document entitled "NFRC 100: Procedure for Determining Fenestration Product U-factors." (2007; NFRC 100 includes procedures for site built fenestration formerly included in a separate document, NFRC 100-SB).

NFRC 200 is the National Fenestration Rating Council document entitled "NFRC 200: Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence." (2007)

NFRC 400 is the National Fenestration Rating Council document entitled "NFRC 400: Procedure for Determining Fenestration Product Air Leakage." (2007)

NSHP GUIDEBOOK is the California Energy Commission document entitled "New Solar Home Partnership Guidebook" that is in effect at the time of application for the building permit.

PART 6 is Title 24, Part 6 of the California Code of Regulations.

PUBLIC ADVISER is the Public Adviser of the Commission.

***R*-VALUE** is the measure of the thermal resistance of insulation or any material or building component expressed in ft^2-hr°F/Btu.

RECORD DRAWINGS are drawings that document the as installed location and performance data on all lighting and space conditioning system components, devices, appliances and equipment, including but not limited to wiring sequences, control sequences, duct and pipe distribution system layout and sizes, space conditioning system terminal device layout and air flow rates, hydronic system and flow rates, and connections for

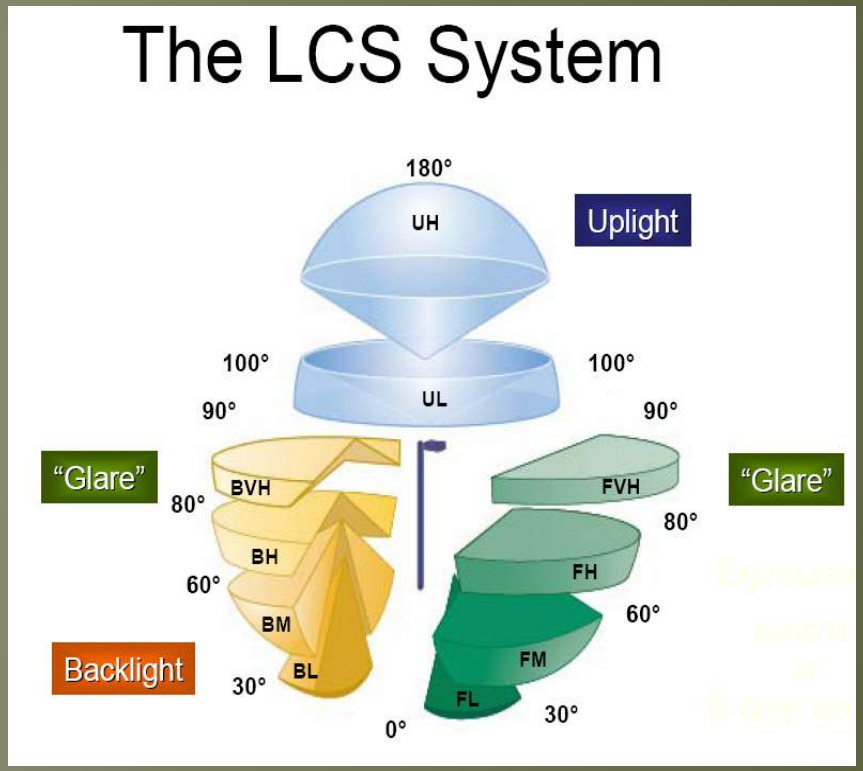
Light Pollution Reduction

TABLE 10-114-A LIGHTING ZONE CHARACTERISTICS AND RULES FOR AMENDMENTS BY LOCAL JURISDICTIONS

Zone	Ambient Illumination	State wide Default Location	Moving Up to Higher Zones	Moving Down to Lower Zones
LZ1	Dark	Government designated parks, recreation areas, and wildlife preserves. Those that are wholly contained within a higher lighting zone may be considered by the local government as part of that lighting zone.	A government designated park, recreation area, wildlife preserve, or portions thereof, can be designated as LZ2 or LZ3 if they are contained within such a zone.	Not applicable.
LZ2	Low	Rural areas, as defined by the 2000 U.S. Census.	Special districts within a default LZ2 zone may be designated as LZ3 or LZ4 by a local jurisdiction. Examples include special commercial districts or areas with special security considerations located within a rural area.	Special districts and government designated parks within a default LZ2 zone maybe designated as LZ1 by the local jurisdiction for lower illumination standards, without any size limits.
LZ3	Medium	Urban areas, as defined by the 2000 U.S. Census.	Special districts within a default LZ3 may be designated as a LZ4 by local jurisdiction for high intensity nighttime use, such as entertainment or commercial districts or areas with special security considerations requiring very high light levels.	Special districts and government designated parks within a default LZ3 zone may be designated as LZ1 or LZ2 by the local jurisdiction, without any size limits.
LZ4	High	None.	Not applicable.	Not applicable.

Light Pollution Reduction

- Backlight, Uplight and Glare (BUG) ratings as defined in IESNA TM-15-11; and
- Allowable BUG ratings not exceeding those shown in Table 5.106.8, or
- Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.



Light Pollution Reduction

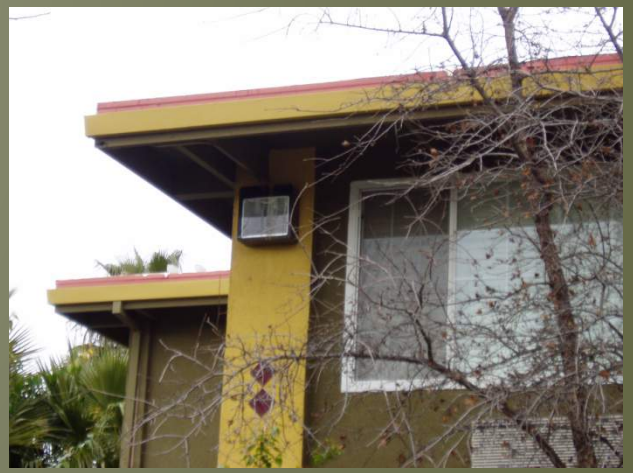
TABLE 5.106.8
MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE (BUG) RATINGS[1,2]

ALLOWABLE RATING	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
Maximum Allowable Backlight Rating[3]				
Luminaire greater than 2 mounting heights (MH) from property line	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1 – 2 MH from property line	B2	B3	B4	B4
Luminaire back hemisphere is 0.5 – 1 MH from property line	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	B0	B0	B1	B2
Maximum Allowable Uplight Rating				
For area lighting[4]	U0	U0	U0	U0
For all other outdoor lighting, including decorative luminaires	U1	U2	U3	U4
Maximum Allowable Glare Rating[5]				
Luminaire greater than 2 MH from property line	G1	G2	G3	G4
Luminaire front hemisphere is 1 – 2 MH from property line	G0	G1	G1	G2
Luminaire front hemisphere is 0.5 – 1 MH from property line	G0	G0	G1	G1
Luminaire back hemisphere is less than 0.5 MH from property line	G0	G0	G0	G1

1. IESNA Lighting Zones 0 and 5 are not applicable; refer to Lighting Zones as defined in the *California Energy Code* and Chapter 10 of the *California Administrative Code*.
2. For property lines that abut public walkways, bikeways, plazas and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.
3. If the nearest property line is less than or equal to two mounting heights from the back hemisphere of the luminaire distribution, the applicable reduced Backlight rating shall be met.
4. General lighting luminaires in areas such as outdoor parking, sales or storage lots shall meet these reduced ratings. Decorative luminaires located in these areas shall meet *U*-value limits for "all other outdoor lighting".
5. If the nearest property line is less than or equal to two mounting heights from the front hemisphere of the luminaire distribution, the applicable reduced Glare rating shall be met.

Light Pollution Reduction

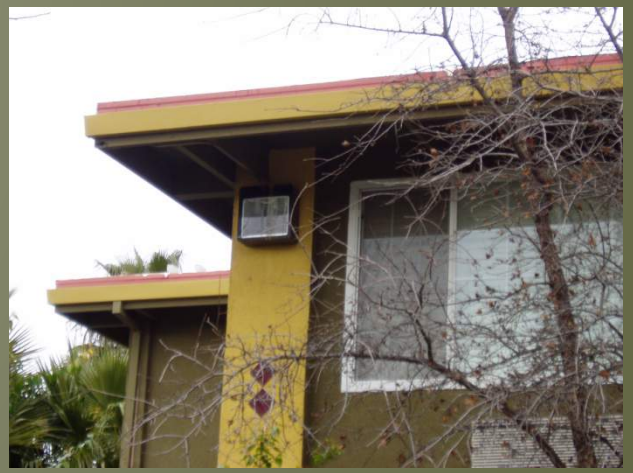
- **Exceptions:**
- 1. Luminaires that qualify as exceptions in Section 147 of the California Energy Code (14 exceptions)



Light Pollution Reduction

- **Exceptions:**
- 2. Emergency lighting

- **5.106.8.1 Effective date.** Newly constructed nonresidential projects submitted on or after July 1, 2012 shall comply with this section.



Moisture Control

Employ moisture control measures.

- **5.407.2.2 Entries and openings.** Design exterior entries and/or openings *subject to foot traffic or wind driven rain to prevent water intrusion into buidlings as follows:*

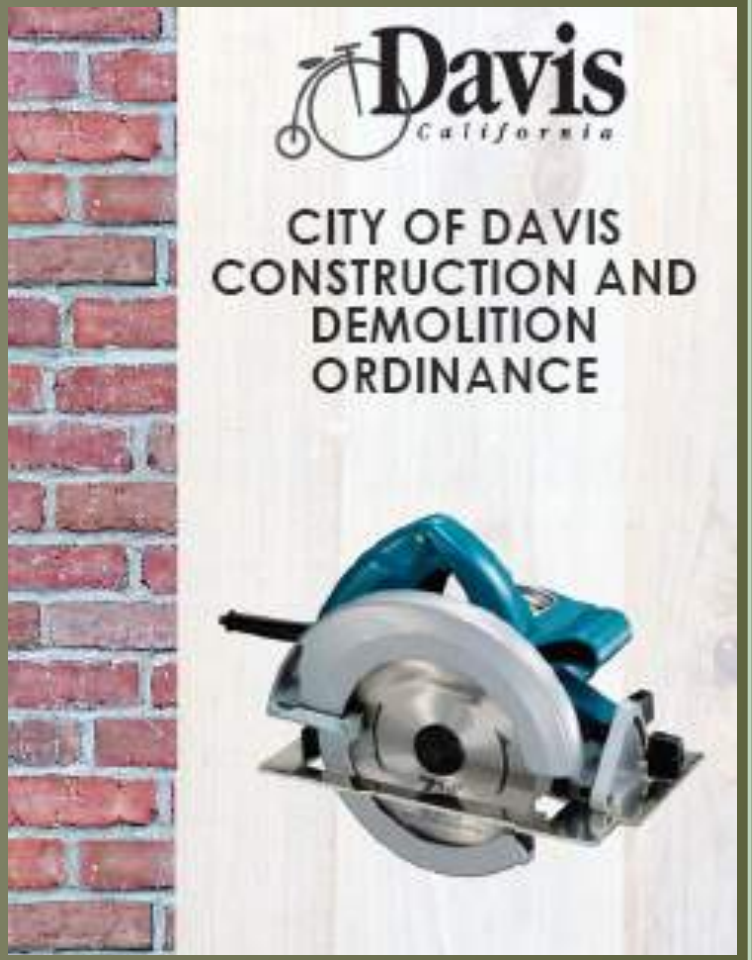
- **5.407.2.2.1 Exterior door protection.** Primary exterior entries shall be covered to prevent water intrusion by using nonabsorbent floor andwall finishes within at least 2 feet around and perpendicular to such openings plus at least one of the following:

1. An installed awning at least 4 feet in depth.
2. The door is protected by a roof overhang at least 4 feet in depth.
3. The door is recessed at least 4 feet.
4. Other methods which provide equivalent protection

- **5.407.2.2.2 Flashing.** Install flashings integrated with a drainage plane.

Construction Waste Diversion

- **Section: 5.408. 1 Construction waste management.** Recycle and/or salvage for reuse a minimum of 50 percent of the non-hazardous construction waste in accordance with:
  - 5.408.1.1,
  - 5.408.1.2
  - 5.408.1.3;
  - meet a local construction and demolition waste management ordinance, whichever is more stringent..



Recycling by Occupants

- **5.410.1 Recycling by occupants.** Provide readily accessible areas that serve the entire building
  - Paper
  - Corrugated cardboard
  - Glass
  - Plastics
  - Metals

Recycling by Occupants

5.410.1.1 Additions. [A] All additions conducted within a 12-month period under single or multiple permits, resulting in an increase of 30 percent or more in floor area, shall provide recycling areas on site.

- **Exception:** Additions within a tenant space resulting in less than a 30-percent increase in the tenant space floor area.

5.410.2 Commissioning.

- Buildings 10,000 square feet and over performed by trained personnel
- Commissioning requirements shall include:
  - 1. Owner’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
- ***Some exceptions included in supplement***

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What is Commissioning?

- Quality assurance process
- Spans the entire design and construction process
- Ensures that the building's performance meets owner expectations.

Commissioning

- “Commissioning shall be performed by trained personnel with experience on projects of comparable size and complexity.”
- Trained personnel may include members of owner staff, contractor and design team as well as independent commissioning professionals.
- It is essential that there is a single person designated to lead and manage the commissioning activities.
- Methods of evaluating the trained personnel include review of :
  - 1. Technical knowledge
  - 2. Relevant experience
  - 3. Potential conflict of interest concerns
  - 4. Professional certifications and training
  - 5. Communication and organizational skills
  - 6. Reference and sample work products

Commissioning

- **5.410.2.1 Owner's Project Requirements (OPR)** The expectations and requirements of the building shall be documented before the design phase of the project begins. This documentation shall include the following:
  - 1. Environmental and sustainability goals
  - 2. Energy efficiency goals
  - 3. Indoor environmental quality requirements
  - 4. Project program, including facility functions and hours of operation, and need for after hours operation
  - 5. Equipment and systems expectations
  - 6. Building occupant and operation and maintenance (O&M) personnel expectations

Commissioning

- The Basis of Design document shall cover the following systems:
  - 1. Heating, ventilation, air conditioning (HVAC) systems and controls
  - 2. Indoor lighting system and controls
  - 3. Water heating system
  - 4. Renewable energy systems
  - 5. Landscape irrigation systems
  - 6. Water reuse systems

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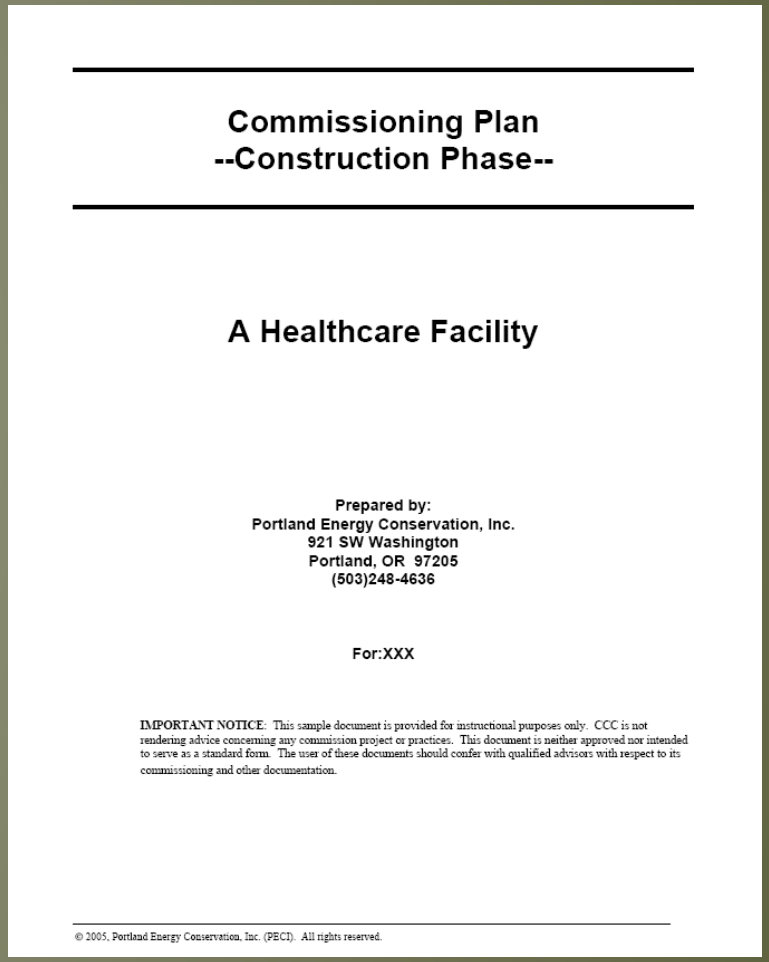
Commissioning

- **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.***~~

Commissioning

- The Commissioning Plan shall include the following:
  - 1. General project information
  - 2. Commissioning goals
  - 3. Systems to be commissioned.
  - 4. Commissioning team information
  - 5. Commissioning process activities, schedules and responsibilities. *Plans for the completion of commissioning shall be included.*



Commissioning Plan
--Construction Phase--

A Healthcare Facility

Prepared by:
Portland Energy Conservation, Inc.
921 SW Washington
Portland, OR 97205
(503)248-4636

For:XXX

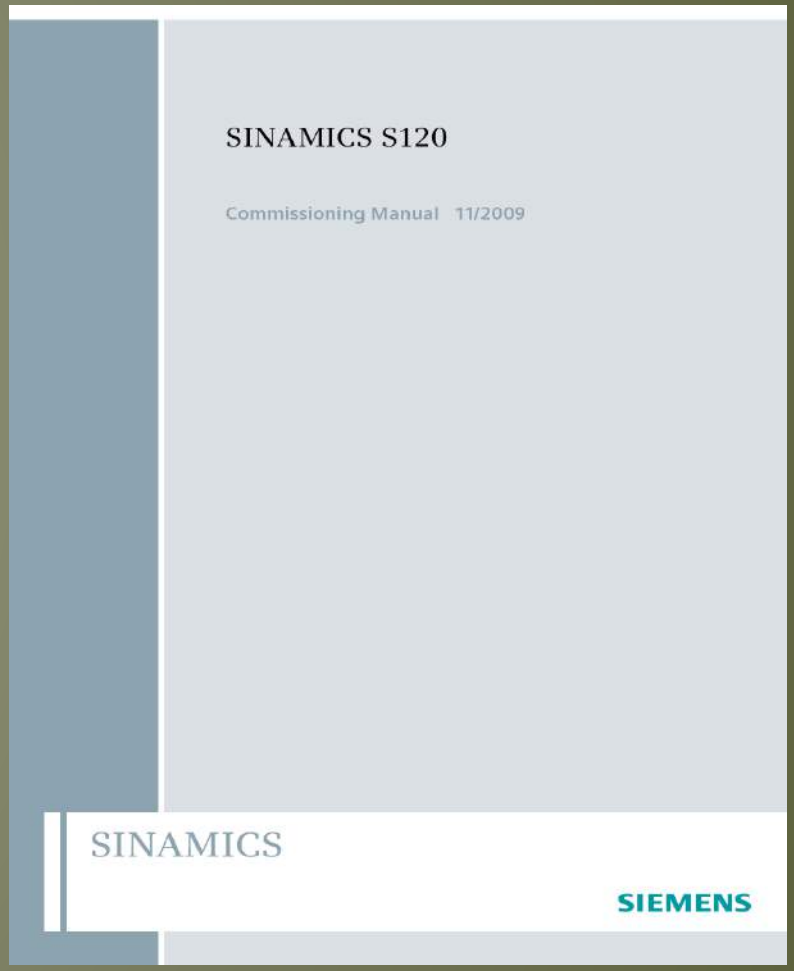
IMPORTANT NOTICE: This sample document is provided for instructional purposes only. CCC is not rendering advice concerning any commission project or practices. This document is neither approved nor intended to serve as a standard form. The user of these documents should confer with qualified advisors with respect to its commissioning and other documentation.

Commissioning

- **5.410.2.4 Functional performance testing.** Functional performance tests shall demonstrate the correct installation and operation of:
  - each component
  - system
  - system to system interface
- Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized

Commissioning

- **5.410.2.5 Documentation and training.** A Systems Manual and Systems Operations Training are required.



Commissioning

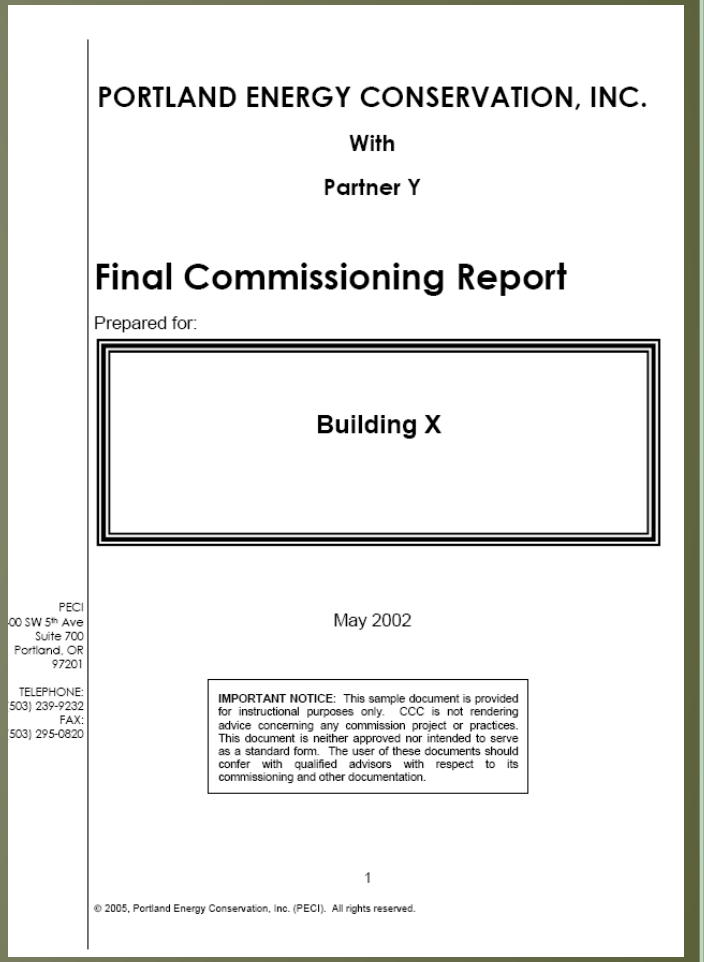
- The Systems Manual shall include the following:
  - 1. Site information
  - 2. Site contact information
  - 3. Basic operations and maintenance
  - 4. Major systems
  - 5. Site equipment inventory and maintenance notes
  - 6. Special inspection verifications
  - 7. Other resources and documentation

Commissioning

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

Commissioning

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



PORTLAND ENERGY CONSERVATION, INC.

With

Partner Y

Final Commissioning Report

Prepared for:

Building X

May 2002

PECI
00 SW 5th Ave
Suite 700
Portland, OR
97201

TELEPHONE:
503) 239-9232
FAX:
503) 295-0820

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1

Roadblocks to compliance

- Lack of awareness of code requirements
- Lack of personnel
- Lack of resources/training
- Lack of expertise and experience in commissioning
- Lack of clear direction in the code regarding roles and responsibilities

CALGreen Commissioning Requirements

Defined

- Commissioning Required
- Trained Personnel
- Owners Project Requirements
- Basis of Design
- Commissioning Plan Required
- Functional Testing Required
- Documentation and Training
- Commissioning Report

Unclear

- Who is ultimately responsible for compliance?
- Business owner or building owner (OPR)?
- Who is responsible for verification of compliance?
- Does the AHJ have a role in QA/QC?
- Is the Report required to be completed prior to final sign-off?
- Does the AHJ have a role in final review of the Report?

Building Department's Role in Commissioning

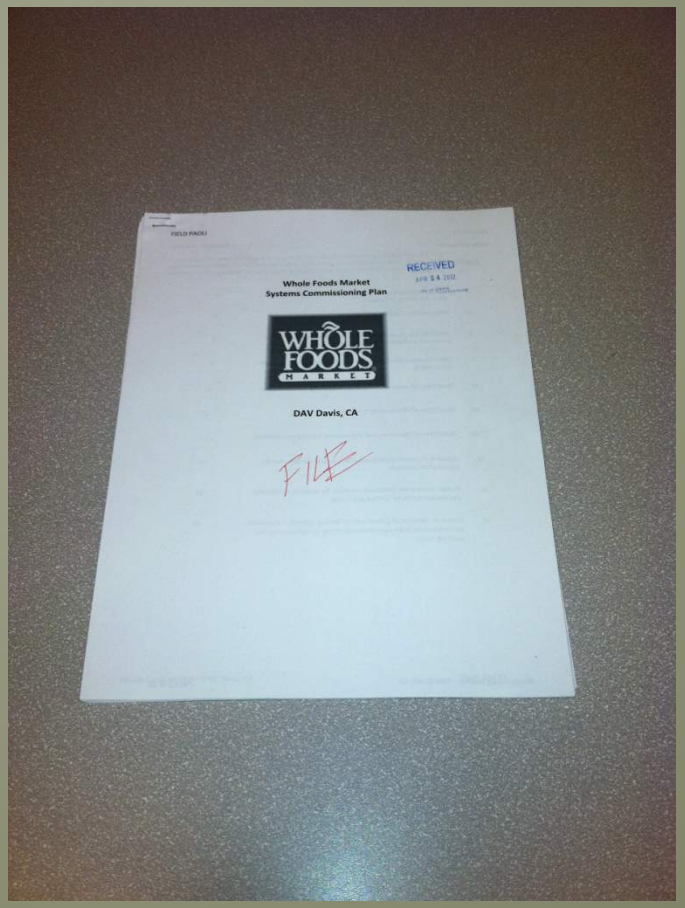
- Building Department staff needs to be informed about CAL Green commissioning requirements
- Define expectations for staff review and inspection
- Notify applicants early on in the process (Design Review)
  - What is required
  - Scope of review and inspection

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.***~~

Commissioning Plan/Report

54 pages



1200+ pages

Templates-CAL Green Non-Res Guide (July 1, 2012 Supplement)

CALGreen Compliance Template- **Owner's Project Requirements (OPR)**	**CALGreen Std. BSC-5.4-4 10-08-10**

[The Owner's Project Requirements (OPR) is a step of commissioning required for compliance with the 2010 CALGREEN Code, section 5.410.2.1, for newly constructed buildings greater than 10,000 sq. ft. This template is a guide to collecting the information recommended for the OPR. The information should be developed by the project team in collaboration with the Owner.]

Owner and User Requirements

a) [Typically already covered in Project Scope as described in the building program. Includes primary purpose, program and use of project. May also describe future expansion needs, flexibility, quality of materials, construction and operation costs.]

Environmental and Sustainability Goals

a) Project shall meet performance requirements required by the owner.

b) Other Owner requirements: *[e.g. Owner priorities among CALGREEN Code or other areas*

Energy Efficiency Goals

a) Project shall comply with Title 24 building energy efficiency standards, or achieve increased level of efficiency determined by owner.

b) Lighting systems offer cost effective energy savings potential, and lighting fixtures and/or controls shall be selected to exceed Title 24 minimum efficiency requirements by level determined by owner.

c) High efficiency HVAC equipment offers cost effective energy savings, and HVAC equipment shall be selected that exceeds Title 24 minimum efficiency requirements by level determined by owner.

d) Additional energy efficiency measures that provide cost effective energy savings shall be included wherever feasible.

e) Other Owner requirements: *[e.g. orientation, siting, daylighting, cool roof, natural ventilation, landscaping]*

Indoor Environmental Quality Requirements

a) Indoor lighting requirements: *[List any specific non-standard requirements. E.g. pendant-mounted lighting, illumination requirements, special applications.]*

b) Occupant lighting control requirements: *[List any non-standard requirements. E.g. multi-mode controls for assembly spaces]*

CALGreen Compliance Form- **Commissioning Measures in the Construction Documents**	**CALGreen Std. BSC-5.4-7 10-08-10**

The following form may be required to be printed on the permit set of construction drawings or submitted separately. Italicized text indicates direct or partial quotes from the CALGreen Code.

CALGreen Commissioning Requirement 5.410.2-Commissioning Measures in the Construction Documents

5.410.2. Commissioning measures shall be shown in the construction documents. The commissioning measures shown in the construction documents include the checked elements listed below and have been approved by the Owner, Owner Representative or Designer of record.

	Commissioning Measure Elements	**Included**
1.	Measures shown in the specifications and cross referenced	☐
2.	List of commissioned equipment and systems	☐
3.	Cx roles and responsibilities of all parties	☐
4.	Meeting requirements	☐
5.	Commissioning schedule management procedures	☐
6.	Procedures for addressing outstanding issues or non-compliance	☐
7.	Requirements for execution and documentation of installation and equipment start up	☐
8.	Specific testing requirements for each system type1	☐
9.	Submittal review and approval requirements	☐
10.	Contents and approval process of the commissioning plan	☐
11.	Cx documentation and reporting requirements	☐
12.	Facility staff training requirements and verification procedures	☐
13.	O&M manual review and approval procedures	☐
14.	Systems manual development and approval procedures	☐
15.	Definitions	☐

1These are not the detailed step-by-step test procedures, but are lists of features, elements, modes and conditions of tests for specific equipment.

Owner / Owner Representative or Designer of Record Signature

Date

2013 California Green Building Standards Code

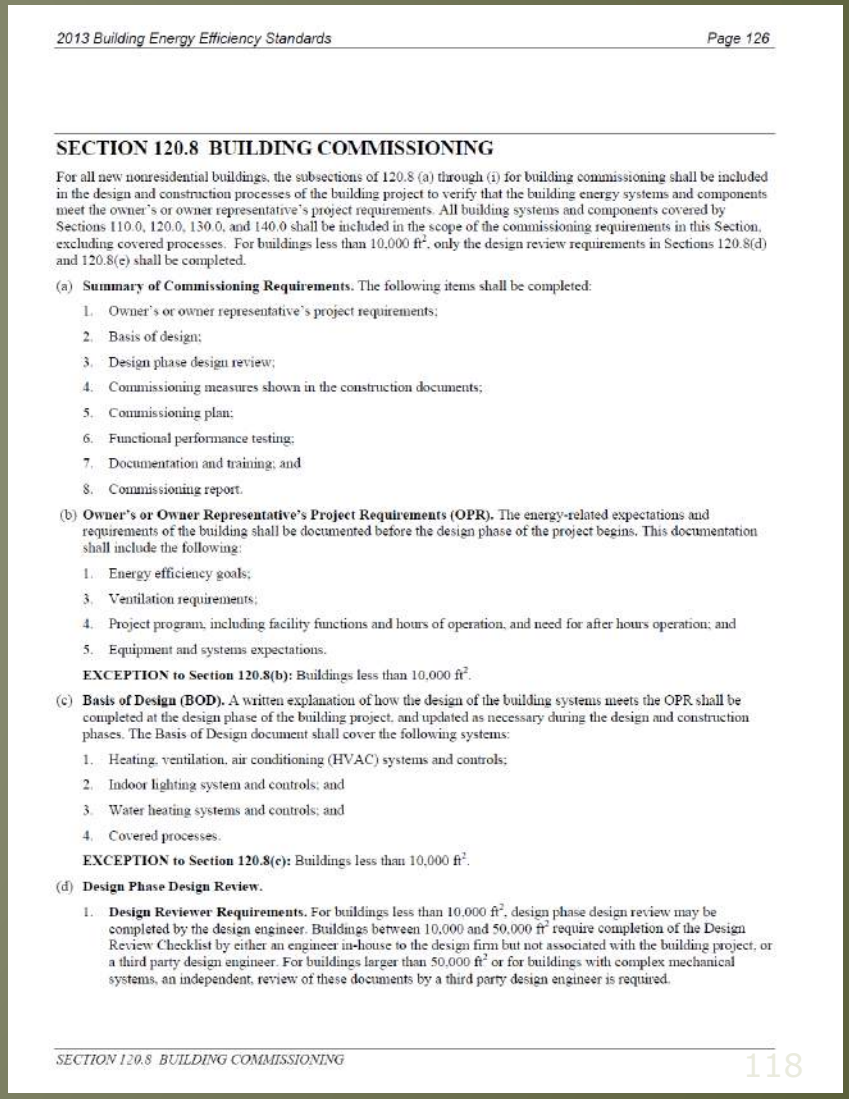
SECTION 5.410 - BUILDING MAINTENANCE AND OPERATION

- *NOTE: Title 24, Part 6, Section 120.8 describes the Building Commissioning requirements for energy systems covered by the Nonresidential Building Energy Efficiency Standards. The following Commissioning requirements are for building systems NOT covered by Title 24, Part 6.*

2013 Building Energy Efficiency Standards

Section 120.8 – Building Commissioning

- New Section for the 2013 Energy Code
- For Energy Systems
- Similar to requirements in CALGreen



SECTION 120.8 BUILDING COMMISSIONING

For all new nonresidential buildings, the subsections of 120.8 (a) through (i) for building commissioning shall be included in the design and construction processes of the building project to verify that the building energy systems and components meet the owner's or owner representative's project requirements. All building systems and components covered by Sections 110.0, 120.0, 130.0, and 140.0 shall be included in the scope of the commissioning requirements in this Section, excluding covered processes. For buildings less than 10,000 ft^2, only the design review requirements in Sections 120.8(d) and 120.8(e) shall be completed.

(a) **Summary of Commissioning Requirements.** The following items shall be completed:

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

(b) **Owner's or Owner Representative's Project Requirements (OPR).** The energy-related expectations and requirements of the building shall be documented before the design phase of the project begins. This documentation shall include the following:

1. Energy efficiency goals;
3. Ventilation requirements;
4. Project program, including facility functions and hours of operation, and need for after hours operation; and
5. Equipment and systems expectations.

EXCEPTION to Section 120.8(b): Buildings less than 10,000 ft^2.

(c) **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:

1. Heating, ventilation, air conditioning (HVAC) systems and controls;
2. Indoor lighting system and controls; and
3. Water heating systems and controls; and
4. Covered processes.

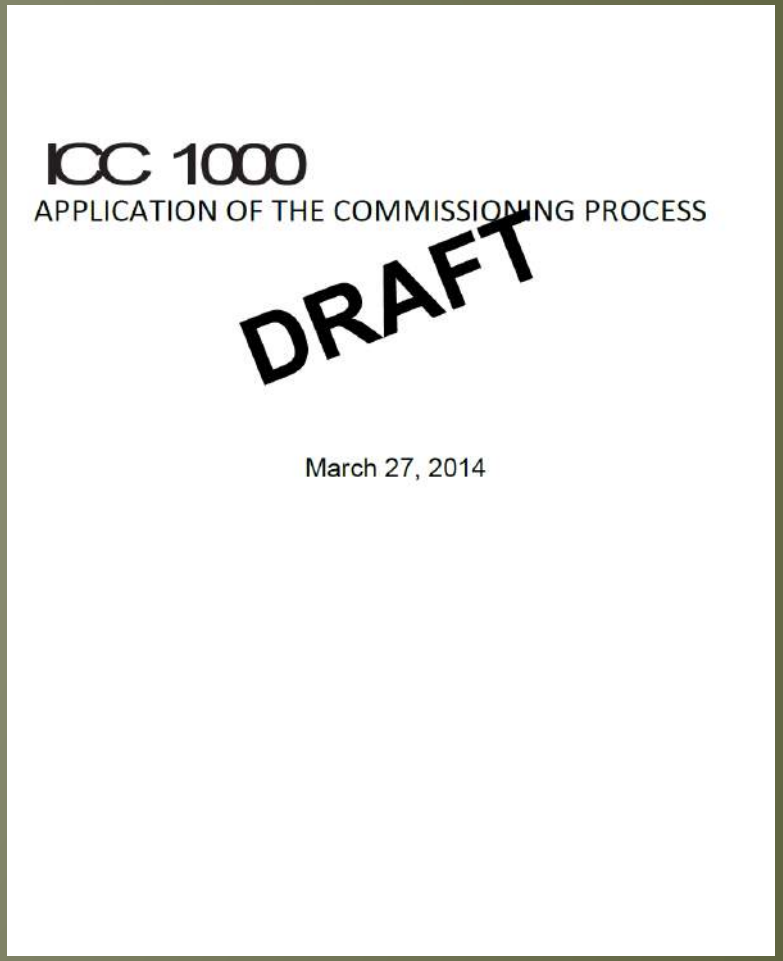
EXCEPTION to Section 120.8(c): Buildings less than 10,000 ft^2.

(d) **Design Phase Design Review.**

1. **Design Reviewer Requirements.** For buildings less than 10,000 ft^2, design phase design review may be completed by the design engineer. Buildings between 10,000 and 50,000 ft^2 require completion of the Design Review Checklist by either an engineer in-house to the design firm but not associated with the building project, or a third party design engineer. For buildings larger than 50,000 ft^2 or for buildings with complex mechanical systems, an independent, review of these documents by a third party design engineer is required.

ICC Commissioning Guide

- Scheduled to be completed and approved in 2014



Testing and Adjusting

- **5.410.4 Testing and adjusting.** Testing and adjusting of systems shall be required for buildings less than 10,000 square feet *or for new systems to serve an assition or alteration subject to Sections303.1*.

Testing and Adjusting

- **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

Testing and Adjusting

- **5.410.4.3 Procedures.** Perform testing and adjusting procedures in accordance with industry best practices and applicable standards on each system as determined by the building official.

Testing and Adjusting

- **5.410.4.3.1 HVAC balancing.** The system shall be balanced in accordance with:
  - Testing Adjusting and Balancing Bureau National Standards;
  - National Environmental Balancing Bureau Procedural Standards
  - Associated Air Balance Council National Standards

Testing and Adjusting

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

Testing and Adjusting

- **5.410.4.5 Operation and maintenance (O &M) manual.** Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/ warranties for each system.