



CITY OF ORANGE BUILDING DIVISION

2016 Green Building Code Requirements For Non-Residential Construction

In order to facilitate sustainable construction practices, all projects* must comply with the State of California 2016 Green Building Standards Code (CGBSC) at both the design and construction phases of development. Before preparing plans for submittal, please be aware of the following information. This information is the most common items for non-Residential projects.

* All new non-residential building addition of 1,000 square feet or greater, and/or building alterations with a permit valuation of \$200,000 or above.

Site Development – CGBSC 5.106

1.0 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 measures below:

1.1 Local ordinance – Comply with a lawfully enacted stormwater management and/or erosion control ordinance.

1.2 Best management practices (BMP) – Prevent the loss of soil through wind or water erosion by implementing an effective combination of erosion and sediment control and good housekeeping BMP. This is further explained in CGBSC 5.106.1.2.

2.0 Bicycle parking.

2.1. Short term parking for visitor parking: provide anchored bike racks within 200 feet of visitor entrance with a capacity of 5 percent of vehicle parking capacity with a minimum of a two-bike capacity rack.

2.2 For buildings with over 10 tenant occupants or for additions or alterations that add 10 or more tenant vehicular parking space, provide secure bike parking for 5 percent of vehicle parking capacity, with a minimum of one space. Acceptable parking facilities shall be convenient from the street and may include:

2.2.1 Covered, lockable enclosures with permanently anchored bike racks.

2.2.2 Lockable bicycle rooms with permanently anchored racks.

2.2.3 Lockable bike lockers.

3.0 Designated parking for clean air vehicles. In new projects, additions or alterations that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel efficient and carpool/van vehicles per Table 5.106.5.2 (below). Paint, in the paint used for stall striping, the following characters such that the lower edge of the last word aligns with the end of the stall striping and is visible beneath a parked vehicle:

CLEAN AIR/ VANPOOL/EV

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

3.1. Construction shall facilitate future installation of electric vehicle supply equipment (ESVE).

TABLE 5.106.5.3.3

TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CHARGING SPACES
0-9	0
10-25	1
26-50	2
51-75	4
76-100	5
101-150	7
151-200	10
201 and over	6 percent of total

3.1.1 When only a single charging space is required per table 5.106.5.3.3, a raceway is required to be installed at the time of construction and shall be installed in accordance with the California Electrical Code. Construction plans and specifications shall include, but are not limited to, the followings:

- 1- The type and location of the EVSE.
- 2- A listed raceway capable of accommodating a 208/240- volt dedicated branch circuit.
- 3- The raceway shall not be less than trade size 1”.
- 4- The raceway shall originate at a service panel or a subpanel serving the area, and shall terminate in close proximity to the proposed location of the charging equipment and into listed suitable cabinet, box, enclosure or equivalent.
- 5- The service panel or subpanel shall have sufficient capacity to accommodate a minimum 40 ampere dedicated branch circuit for the future installation of the EVSE.

3.1.2 When multiple charging spaces are required per table 5.106.5.3.3, a raceway(s) is/are required to be installed at the time of construction and shall be installed in accordance with the California Electrical Code. Construction plans and specifications shall include, but are not limited to, the followings:

- 1- The type and location of the EVSE.
- 2- The raceway(s) shall originate at a service panel or a subpanel(s) serving the area, and shall terminate in close proximity to the proposed location of the charging equipment and into listed suitable cabinet(s), box(es), enclosure(s) or equivalent.
- 3- Plan design shall be based upon 40-ampere minimum branch circuits.
- 4- Electrical calculations shall substantiate the design of the electrical system, to include the rating of equipment and any on-site distribution transformers and have sufficient capacity to simultaneously charge all required EVs at its full rated amperage.
- 5- The service panel or subpanel shall have sufficient capacity to accommodate a minimum 40 ampere dedicated branch circuit for the future installation of the EVSE.

4.0 Light pollution reduction. Outdoor lighting systems shall be designed and installed to comply with the following:

- 4.1 The minimum requirements in the *California Energy Code* for Lighting Zones 1-4 as defined in Chapter 10 of the California Administrative Code.
- 4.2 Backlight, Uplight and Glare (BUG) ratings as defined in IES TM-15-11.
- 4.3 Allowable BUG ratings not exceeding those shown in Table 5.106.8.

TABLE 5.106.8

ALLOWABLE RATING	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
Maximum Allowable Backlight Rating				
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 Rating⁵				
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

MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLAVE (BUG) RATINGS^{1 2}

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.

Or, if more stringent, comply with a local ordinance lawfully enacted pursuant to Section 101.7.

Exceptions:

1. Luminaires that qualify as exceptions in Section 140.7 of the California Energy Code.
2. Emergency lighting.
3. Building facade meeting the requirements in Table 140.7-B of the California Energy Code, Part 6.
4. Custom lighting features as allowed by the local enforcing agency, as permitted by Section 101.8 Alternate materials, designs and methods of construction.

Note: See also California Building Code, Chapter 12, Section 1205.6 for college campus lighting requirements for parking facilities and walkways.

Indoor Water Use - CGBSC 5.303

1.0 Meters.

1.1 New buildings or additions in excess of 50,000 square feet. Separate submeters shall be installed as follows:

- 1.1.1 For each individual leased, rented, or other tenant space within the building projected to consume more than 100 gal/day
- 1.1.2 Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems:

- 1.1.2.1 Makeup water for cooling towers where flow through is greater than 500 gpm.
- 1.1.2.2 Makeup water for evaporative coolers greater than 6 gpm.
- 1.1.2.3 Steam and hot-water boilers with energy input more than 500,000 Btu/h.

1.2 Excess consumption. A separate submeter or metering device shall be provided for any tenant within a new building or within an addition that is projected to consume more than 1,000 gal/day.

2.0 Indoor plumbing fixtures must comply with the following:

WATER REDUCTION FIXTURE FLOW CHARTS

FIXTURE TYPE	MAXIMUM FLOW RATE
Kitchen faucets	1.8 gpm @ 60 psi
Wash fountains	1.8 gallons per minute/20 [rim space(in.) @ 60 psi]
Metering faucets	0.20 gallons/cycle
Metering faucets for wash fountains	0.20 gallons per cycle/20 [rim space (in.) @ 60 psi]
Wall-mounted Urinals	0.125 ⁴ gallons/flush
Floor-mounted Urinals	0.5 gallons/flush
Water Closets (toilets)	1.28 gallons/flush
Showerheads	2.0 gpm @ 80 psi

Outdoor Water Use - CGBSC 5.304

5.304.2 Outdoor water use in landscape areas equal to or greater than 500 square feet. When water is used for outdoor irrigation for new construction projects with an aggregate landscape area equal to or greater than 500 square feet requiring a building or landscape permit, plan check or design review, one of the following shall apply:

1. A local water efficient landscape ordinance that is, based on evidence in the record, at least as effective in conserving water as the updated model ordinance adopted by the Department of Water Resources (DWR) per Government Code Section 65595 (c).
2. The California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELo) commencing with Section 490 of Chapter 2.7, Division 2, Title 23, *California Code of Regulations*.
3. Outdoor water use in rehabilitated landscape projects equal to or greater than 2,500 square feet. Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review shall comply with Section 5.304.2, Item 1 or 2.

4. Outdoor water use in landscape areas of 2,500 square feet or less. Any project with an aggregate landscape area of 2,500 square feet or less may comply with the performance requirements of MWELo or conform to the prescriptive compliance measures contained in MEWLO's Appendix D.

Water Resistance and Moisture Management – CGBSC 5.407

1. Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by California Building Code Section 1403.2 and California Energy Code Section 150, manufacturer's installation instructions or local ordinance, whichever is more stringent.
2. Moisture control. Employ moisture control measures by the following methods:
 - 2.1 Sprinklers
 - 2.2 Entries and openings
 - 2.2.1 Exterior door protection – Primary exterior entries shall be covered to prevent water intrusion as outlined in CGBSC 5.407.2.2.1
 - 2.2.2 Flashing – Install flashings integrated with a drainage plane.

Construction Waste Reduction – CGBSC 5.408

1. A construction and demolition waste management plan shall be submitted at plan check.
 - 1.1 Identifies the materials to be diverted from disposal by recycling, reuse on the project, or salvage for future use or sale.
 - 1.2 Determines if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
 - 1.3 Identifies diversion facility where construction and demolition waste material collected will be taken.
 - 1.4 Specifies that the amount of materials diverted shall be calculated by weight or volume, but not by both.
2. Recycle and/or salvage for reuse a minimum of 65% of non-hazardous construction and demolition debris. Amount to be calculated by weight or volume. Forms are available for documenting waste reduction. 100% of trees, stumps, rocks, vegetation, and soils from land clearing shall be reused or recycled.

Building Maintenance and Operation – CGBSC 5.410

1. Provide areas that serve the entire building for collection of non-hazardous materials for recycling.
2. New buildings over 10,000 square feet in area must comply with Sections 5.410.2 through 5.410.2.6 of the California Green Building Standards Code. The final commissioning report required by Section 5.410.2.6 must be provided to the building owner and to the City's Building Division prior to Certificate of Occupancy.
3. New buildings under 10,000 square feet in area or new systems to serve an addition or alteration subject to Section 303.1 of the California Green Building Standards Code:
 - 3.1 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included are:

- 3.1.1 HVAC systems and controls
 - 3.1.2 Indoor and outdoor lighting and controls
 - 3.1.3 Water heating systems
 - 3.1.4 Renewable energy systems
 - 3.1.5 Landscape irrigation systems
 - 3.1.6 Water reuse systems
- 3.2 Perform testing and adjusting procedures in accordance with industry practices and applicable standards on each system.
- 3.3 The system must be balanced in accordance with procedures defined by approved national standards. After completion of testing, adjusting and balancing, a final report of testing signed by the testing agency must be completed.
- 3.4 An operation and maintenance manual with operating and maintenance instructions and copies of warranties for each system in the building must be provided to the building owner.
- 3.5 All inspection reports and certification that the operation and maintenance manual has been provided for the building owner must be submitted to the Building Division prior to Certificate of Occupancy.

Fireplaces – CGBSC 5.503

1. Fireplaces must be of the direct-vent sealed-combustion gas only..

Pollution Control – CGBSC 5.504

1. The permanent HVAC system shall only be used during construction if necessary. If the HVAC system is used during construction, use return air filters that comply with Section 5.504.1 of CGBSC. Replace all filters immediately prior to occupancy or after construction if the building is occupied during alteration.
2. All duct and related distribution component openings must be covered with tape or other approved means to prevent dust accumulation.
3. Adhesives, sealants, and caulks must be meet minimum VOC limits as shown in CGBSC Table 5.504.4.1 and 5.504.4.2).
4. Paints and coatings must meet minimum VOC limits as shown in CGBSC Table 5.504.4.3.
5. Aerosol Paints and coatings shall meet the Product-Weighted MIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of California Code of Regulations, Title 17, commencing with Section 94520.
6. All carpet installed in the building interior shall meet at least one of the following testing and product requirements:
 - 6.1 Carpet and Rug Institute’s Green Label Plus Program.
 - 6.2 Compliant with the VOC-emission limits and testing requirements specified in the California Department of Public Health Standard Practice for the testing of VOCs (CDPH Standard Method V1.1 or Specification 01350).
 - 6.3 NSF/ANSI 140 at the Gold Level.
 - 6.4 Scientific Certifications Systems Indoor Advantage Gold.

6.5 Compliant with the California Collaborative for High Performance Schools (CA-CHPS) Criteria Interpretation for EQ 7.0 and EQ 7.1 (formerly EQ2.2) dated July 2012 and listed in the CHPS High Performance Product Database.

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

8. All carpet adhesive shall meet minimum VOC limits as shown in CGBSC Table 5.504.4.1).

9. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood (17 CCR 93120 et seq.). Those materials not exempted under the ATCM must meet the specified emissions limits, as shown in Table 4.504.4.5:

FORMALDEHYDE LIMITS IN PARTS PER MILLION

Product	Current Limit
Hardwood plywood veneer core	0.05
Hardwood plywood composite core	0.05
Particle board	0.09
Medium density fiberboard	0.11
Thin medium density fiberboard	0.13

10. For 80 percent of floor area receiving resilient flooring, installed resilient flooring shall meet at least one of the following:

10.1 Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program.

10.2 Compliant with the VOC-emission limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010.

10.3 Compliant with the California Collaborative for High Performance Schools (CA-CHPS) Criteria Interpretation for EQ 7.0 and EQ 7.1 (formerly EQ 2.2) dated July 2012 and listed in the CHPS High Performance Product Database.

10.4 Products certified under UL GREENGUARD Gold (formerly the Greenguard Children's & Schools Program)

11. Filters in outside and return air paths must provide Minimum Efficiency Reporting Value (MERV) of 8.

12. Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and in buildings. Post signage to inform building occupants of the prohibitions.

13. Documentation for the items listed above must be made available to your inspector upon request.

Documentation shall include at least one of the following:

13.1 Product certifications and specifications.

13.2 Chain of custody certifications.

13.3 Product labeled and invoiced as meeting the Composite Wood Products regulation.

13.4 Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.

13.5 Other methods acceptable to the enforcing agency.

Indoor Moisture Control – CGBSC 5.505

1. Buildings shall meet or exceed the provisions of the California Building Code, CCR, Title 24, Part 2, Sections 1203 and Chapter 14. For additional measures not applicable to low-rise residential occupancies, see CGBSC 5.407.2.

Indoor Air Quality – CGBSC 5.506

1. Outside air delivery. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 120.1 of the 2013 California Energy Code, or the applicable local code, whichever is more stringent, and Division 1, Chapter 4 of CCR, Title 8.

2. Carbon dioxide monitoring. For buildings or additions equipped with demand control ventilation, CO₂ sensors and ventilation controls shall be specified and installed in accordance with the requirements of the 2013 California Energy Code, Section 120(c)(4).

Environmental Comfort – CGBSC 5.507

1. Building assemblies and components must have Sound Transmission Coefficient (STC) values as determined in accordance with ASTM E90 and ASTM E413 where required below.

1.1 Exterior noise transmission. Wall and roof-ceiling assemblies making up the building envelope have an STC of at least 50 or a composite OITC rating of no less than 40, and exterior windows have a minimum STC of 40 or OITC of 30 where sound levels at the property line regularly exceed 65 decibels.

Exception: Buildings with few or no occupants and where occupants are not likely to be affected by exterior noise, such as factories, storage, parking, and utility buildings.

Exception: For public schools and community colleges, the requirements of this section and all subsections apply only to new construction.

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

Outdoor Air Quality 5.508

1.0 Installations of HVAC, refrigeration and fire suppression equipment must comply with below.

1.1 Chlorofluorocarbons (CFCs). CFCs have not been used for HVAC equipment.

1.2 Halons have not been installed in HVAC, refrigeration, or fire suppression systems.

2.0 Supermarket refrigerant leak reduction. New commercial refrigeration systems shall comply with the provisions of this section when installed in retail food stores 8,000 square feet or more conditioned area, and that utilize either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units. The leak reduction measures apply to refrigeration systems containing high-global-warming potential (high-GWP) refrigerants with a GWP of 150 or greater. New

refrigeration systems include both new facilities and the replacement of existing refrigeration systems in existing facilities.

Exceptions: Low-global warming potential refrigerant with a GWP value less than 150 are not subject to this section.

2.1 Refrigerant piping compliant with the California Mechanical Code shall be installed to be accessible for leak protection and repairs. Piping runs using threaded pipe, copper tubing with an outside diameter (OD) less than ¼ inch, flared tubing connections and short radius elbows shall not be used in refrigerant systems except as noted in CGBSC 5.508.2.1.

2.2 Valves and fittings shall comply with the California Mechanical Code and as noted in CGBSC 5.508.2.2.

2.3 Refrigerated service cases holding food products containing vinegar and salt shall have evaporator coils of corrosion-resistant material, such as stainless steel; or be coated to prevent corrosion from these substances.

2.4 Refrigerant receivers with capacities greater than 200 pounds shall be fitted with a device that indicates the level of refrigerant in the receiver.

2.5 The system shall be pressure tested during installation prior to evacuation and charging as outlined by CGBSC 5.508.2.5.

2.6 The system shall be evacuated after pressure testing and prior to charging as outlined by CGBSC 5.508.2.6.