

2010 CEC – ELECTRICAL PLAN CHECK **CORRECTION LIST (With 2008 Energy** Code)

County of Orange

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ELECTRICAL REGULATIONS: A.

- **A.1** NOTE: The governing code is the 2010 California Electric Code, Title 24 part 3 (CEC) (2008 NEC) with local amendments. (Applies to all projects submitted after 1/1/2011).
- A.2 Provide a single line diagram to show feeder length and voltage drop. [CEC 215.5]
- A.3 Provide a copy of the utilities fault current report indicating available fault current, voltage, and phase of the service from utility services company SCE.
- A.4 Specify the interrupting rating, short circuit rating of devices and equipment, percent impedance of transformer(s), and line impedance per foot. [CEC 110.9&10]
- A.5 Dedicated electrical space: No piping, ducts or equipment foreign to electrical equipment shall be permitted to be located within a space extending from the floor to a height of 6' above the equipment for indoor installation. [CEC 110.26(F)1]
- Indicate the provisions to insure the proper operation of G.F.I. equipment on a separately A.6 grounded service and generator system. [CEC 110.10]
- A.7 Revise plans to show 3 foot clearance for panels 600 volts or less. [CEC Table 110.26(A)1]
- A.8 Revise plans to show foot clearance from fence to live parts for panels over 600 volts. [CEC Table 110.31], and minimum depth of clear working space [Table 110.34(A & E)]
- A.9 Provide and maintain required work space, adequate illumination, access to work space and head room for and above electrical equipment. [CEC 110.26(A, B, C, D & E)]
- A.10 Electrical equipment rooms or enclosure housing electrical apparatus that are controlled by a lock shall be considered accessible to qualified persons. [CEC 110.26(G)]
- A.11 For electrical equipment rated 1200 amperes or more and over 6 feet wide, there shall be one entrance and egress not less than 24 inches wide and 6.5 feet high at each end of working space and a personnel door must be provided with panic and push plate hardware. [CEC 110.26(C)2, & 3]
- A.12 Provide protection from physical damage against accidental contact for switchboards, panel boards, and other electrical equipment. [CEC 110.27(A, B & C)]
- A.13 Provide minimum distance from fence to live part for all electrical equipment more than 600 volts. [CEC Table 110.31]

Form No. G01-11 Updated 12-6-2010

- A.14 The walls, roof, floor and doorway of vault containing conductors and equipment over 600 volts shall be constructed with a minimum fire rating of 3 hours. [CEC 110.34(A)]
- A.15 Entrance to enclosure and access to working space. [CEC 111.33], large equipment, switchboard & control panel exceeding 6 feet in width shall have entrance at each end of the equipment. 110.33(A.1)
- A.16 For equipment exceeding 600 volts, minimum depth of clear working space per CEC table 110.31(A)
- A.17 Each multiwire branch circuit shall be provided with a means that will simultaneously disconnect all underground conductors at the point where the branch circuit originates [CEC 210.4(B)]
- A.18 Provide panel schedules for new and existing panels.
- A.19 Ground fault circuit interrupter protection for personnel location for dwellings and non-dwelling units. [CEC 210.8(A), (B).]
- A.20 Arc fault circuit interrupter protection (AFCI) outlets are required at dwelling units. [CEC 210.12]
- A.21 For branch circuits less than and over 600 volts minimum ampacity and size of conductors shall be per CEC 210.19(A),(B)
- A.22 The maximum cord and plug connected load to receptacle and receptacle rating. [CEC table 210.21(B) (2) and table 210.21(B) (3)]
- A.23 Submit electrical load calculations and general lighting calculations[CEC Table 220.3 & Table 220.12]
- A.24 Required outlets locations for one and two family dwellings and multifamily dwellings.[CEC210.52]
- A.25 Lighting outlet/ switch required at dwelling units, guestroom and other than dwelling unit.[CEC 210.70]
- A.26 Where a feeder supplies continuous loads or non-continuous loads, the rating of the over current device shall not be less than the non-continuous load plus 125% of the continuous load. [CEC215.3]
- A.27 Lighting load calculation for specified occupancies per CEC table 220.12, revise plans and calculation for compliance. Lighting load demand factor per CEC table 220.42.
- A.28 Demand factor for household clothes dryers and kitchen equipment per CEC table 220.54 and 220.56
- A.29 Electrical feeder load and service load calculation for single family dwelling unit. [CEC220.82 (A), (B). (C)] and multi family dwelling units. [CEC220.84]
- A.30 A building or other structure can be supplied by one service. [CEC 230.2]

- A.31 Services conductors and final span shall comply with: clearances, vertical clearance and building openings [CEC 230.9]
- A.32 Overhead services drop conductors and underground service lateral conductors [CEC 230.23 (A thru C) & 230.31, 32 & 33]
- A.33 Where more than one building is supplied by a service, the grounded conductor supplying each building shall be adequately sized and grounded at each building or an equipment grounding conductor shall be provided from the main service to each building. [CEC 225.30 and 250.32]
- A.34 All services supplying a building shall have the same grounding electrode system. [CEC 250.52(A & B)]
- A.35 Grounding Electrode Conductor at the services, at each building or structure where supplied by a feeder or a branch circuit, or at a separately derived system shall be installed per [CEC 250.64(A thru F)]
- A.36 Provide properly sized grounding conductors for equipment and raceway systems. [CEC 250.53]
- A.37 Provide an electrical floor plan showing the location of all receptacles, lighting outlets and switches. [CEC 210.50 through 70]
- A.38 Provide an electrical floor plan showing location of receptacle and lighting outlets. [CEC 210.52(A-H) & 210.70]
- A.39 Provide receptacles within 2 feet of kitchen sink and at 4 feet on-center at counters and islands. [CEC 210.52(C) (1) thru (C) (5)]
- A.40 Provide at least one outlet for island or peninsular counter space. [CEC 210.52(C) 2&3]
- A.41 A minimum 100 amp service panel, 3 wires are required for all new dwellings. [CEC 230.79(C)]
- A.42 Revise electrical plans to show receptacle outlets so that no point along the wall is further than 6 feet from an outlet. [CEC 210.52(A)]
- A.43 All power and lighting outlets in bedroom, family, dining, living, parlor, library, recreation room, sunroom, hallway, den or similar rooms or areas to be protected by an arc-fault interrupter(s) circuit. [CEC 210.12(B)]
- A.44 Bathrooms and powder rooms are required to have at least one GFI receptacle outlet within 36 inches of each lavatory. [CEC 210.52(D)]
- A.45 At least one outlet to be installed at the front and rear of a dwelling unit. [CEC 210.52(E)]
- A.46 Hallways longer than 10 feet are required to have at least one receptacle outlet. [CEC 210.52(H)]
- A.47 Lighting outlets are required in habitable rooms, bathroom, hallways, garages and exterior doors. Revise plans to show compliance. [CEC 210.70]

- A.48 Revise plans to show locations of light switches at both top and bottom of stairways. [CEC 210.70(A)2c]
- A.49 Provide an exterior light at all exterior doors switched by the door. [CEC 210.70(A)2b]
- A.50 Electrical panels or other over current devices, other than supplementary overcorrect protection, shall be accessible location and shall not be located in bathrooms or in the vicinity of easily ignitable material such as clothes closets. [CEC 230.70(A) & 240.24(D&E)]
- A.51 Where a service consists of more than a single enclosure as permitted in CEC230.71 (A), the main bonding jumper for each enclosure shall be sized base on largest underground conductor serving that enclosure. [CEC 250.28(D) (2)]
- A.52 Permanently installed generators shall comply with CEC 250.35(A), (B).
- A.53 Service with multiple disconnecting means enclosure in permitted by CEC 230.71(A), the grounding electrode connection based on CEC 250.64(D) (1), (2), and (3).
- A.54 Size of alternating current grounding electrode conductor CEC Table 250.66
- A.55 Bonding of metal water piping system and exposed structural steel shall comply with CEC 250.104.
- A.56 Size of equipment grounding conductors shall not be smaller than permitted by CEC Table 250.122
- A.57 There shall be a service distribution panel in, and for, each apartment. Feeders for sub panels shall be enclosed in an approved raceway. [CEC 230.2]
- A.58 There shall be no more than six disconnecting means per service grouped in any one location without a main disconnect. [CEC 230.71(A)]
- A.59 Show a UFER ground on the foundation plan, sized in accordance with Article 250.52A (3).
- A.60 Show location of bonding wire to metal water supply system, or ground rods. [CEC 250.52A(1) & (5)]
- A.61 All underground bonding of electrically conductive material and other equipment shall be copper or creates a low impedance path for ground fault current [CEC 250.4(B)3]
- A.62 Outlets located within 18 inches of a floor in a parking garage to be designed as Class 1, Division 2. And mechanical ventilation is provided with a minimum of six air changes per hour and exhaust air shall be taken at a point within 12" of the floor...[CEC 511.3(D1(a)]
- A.63 There shall be illumination at outside doors, either time clock operated or switched at door, hallway, garage with grade level access.[CEC 210.70(A) 2]
- A.64 All exterior lighting fixtures shall have the appropriate damp or wet location labels. [CEC 410.10(A)], and luminaries near and over combustible materials shall be equipped with guard [CEC 410.11&12]

- A.65 Incandescent light fixtures with open or partially enclosed lamp in clothes closets shall comply with CEC 410.16.
- A.66 Household ranges and cooking appliances branch circuit shall be a minimum of 40 ampere. [CEC 210.19(A)(.3)]
- A.67 Over current protection: for any combination of continuous and non-continuous loads shall not be less than the non-continuous load plus 125% of the continuous load. [CEC 210.20(A)]
- A.68 Only intermediate and heavy-duty ceiling systems may be used for the support of lighting fixtures. All lighting fixtures shall be permanently attached to the ceiling system. [CEC 410.30]
- A.69 Conductor penetration of fire rated portions of a structure shall be effectively sealed and sleeved with steel flex 3 feet each side of the penetration, or other applied methods.
- A.70 Underground installation for wet locations: minimum cover requirements, 0 to 600 volts, direct buried cable, conduits or race way shall install per CEC table 300.5.
- A.71 Fire stopping (penetration sealing with using an approved method to maintain fire resistance rating.) is required for each penetration through a fire rated wall. Provide detail to show compliance. [CEC 300.21, CEC 770.26 & CEC 800.26]
- A.72 Support methods and spacing intervals for fire rated cables and conductors shall not exceed values in CEC Table 300.19(A).
- A.73 Wiring in air plenums shall conform to CEC 300.22(B) & (C).
- A.74 Minimum size of conductors AWG shall be based on CEC Table 310.5, revise plans for compliance.
- A.75 More than three conductors installed without maintaining spacing for a continuous length in a raceway required comply with adjustment factor. [CEC Table 310.15(B)2(a)]
- A.76 Conduits exposed to sunlight on roof top, the adjustment on CEC Table 310.15(B) 2(c) shall be added for correction factors in Table 310.16 & 310.18.
- A.77 Provide at least one outlet shall be installed within 18" of the top of show window for each 12 linear feet or major fraction thereof show window area measured horizontally at maximum width. [CEC 210.62]
- A.78 Provide lighting load calculations for show/display window. [CEC 220.12(G)]
- A.79 Two or more circuits sharing the same neutral and terminating in the same junction box shall be protected by a double or triple pole breaker. [CEC 230.71(B)]
- A.80 Buildings served by more than one water system shall have all interior metal piping bonded together and made electrically continuous to structure grounding electrode. Interior metal water piping located more than 5 feet from the point of entrance to the building shall not be used as a part of grounding electrode system. [CEC 250.52 (A) 1]

- A.81 Where multiple concrete encased electrodes are present at a building, it shall be permitted to bond only one into the grounding electrode system. [CEC 250.52(3)]
- A.82 There shall be no more than six disconnecting means per service, grouped in any one location without a main disconnect. [CEC 230.71(A)]
- A.83 Conductors rated over 600 volts shall not occupy the same wiring enclosure, raceway, or cable with conductors of 600 bolts or less unless permitted. [CEC 300.3(C)2]
- A.84 Conduits entering/leaving coolers and freezers shall be sealed subjected to different temperatures. [CEC 300.7(A)]
- A.85 Provide cable supporting conductors in vertical raceways. [CEC 300.19 & Table 300.19(A)]
- A.86 Where conduits or raceways enter or leave the enclosure below busbars, their support, their end fitting shall not rise more than 3" above bottom of enclosure CEC 408.5, and the clearance for conductors entering bus enclosure per table 408.5.
- A.87 Vending machines and electric drinking fountain shall be connected to a GFCI protected outlets. [CEC 422.51 & 422.52]
- A.88 Provide a ground fault circuit interrupter on the pool light (15 Amp, single phase) circuit. [CEC 680.22(B)]
- A.89 Provide an equipment grounding conductor between remote panel board and service or source of a separating derived system [CEC 680.25(B)]
- A.90 Provide hazardous classification by class, division, zones (if applicable and group, and show boundaries of hazardous area(s). [CEC 500]
- A.91 Equipment and wiring in hazardous areas shall comply with the code provisions for those areas. [CEC 500 thru 504]
- A.92 Provide conduit seals at boundaries of hazardous areas in type MI cable termination fitting to exclude moisture and other fluids from the cable insulation. [CEC 501.15(A to F)]
- A.93 Classify the pits in the garage areas [CEC 511.2] and wiring and equipment installed above class I location [CEC 511.7]
- A.94 For motor fuel dispensing facilities, class I Div. I & II: underground wiring, sealing and circuit disconnects. [CEC Table 514.3(B) 2, 514.8, 514.9 & 514.11]
- A.95 For health care facilities: wiring and protection, ground fault protection, communication system, fire alarm system and isolated power system comply with CEC Article 517.
- A.96 For assembly occupancies, theaters, television studio comply with CEC Article 518 & 520.
- A.97 For solar photovoltaic system: a. Installation CEC 690.4

- b. Maximum voltages CEC Table 690.7
- c. Circuit sizing and current CEC 690.8
- d. Over current protection CEC 690.9
- e. Disconnecting means CEC 690.13
- f. System and equipment grounding CEC 690.42 & 690.43
- g. Storage batteries CEC 690.71
- A.98 Indicate location and switching for emergency lighting circuits. [CEC 700.20]
- A.99 Fire alarm circuits shall be identified at terminal and junction locations in a manner that helps to prevent unintentional signals on fire alarm system circuits during testing and service of other system. [CEC 760.30]
- A.100 For optical fiber cable and raceways comply with CEC Article 770.
- A.101 Pool area shall be bonded per Equipotential Bonding requirement of section 680.26 CEC.
- A.102 Electric Vehicle Charging system shall comply with Article 625, CEC.
- A.103 In Dwelling Units, in all areas specified in section 210.52, all 125-volt, 15- and 20- ampere receptacle shall be listed Tamper-resistant receptacles. [CEC 406.11]

A.104 CALIFORNIA ENERGY CODE 2010 Requirements

- 1. Comply with 2008 California Energy Efficiency Standards Code (2008 EES) table 100-An application standards and CEC 100 (e) for newly constructed building and new construction in existing building.
- 2. Submit a complete energy compliance package complying with California Energy Code, Title 24 part 6. 2008 EES Sections 140 thru 146.
- 3. The LTG-1 form is to be signed by the principal lighting designer, and Parts 1 & 2 is to be reproduced on the plans. [T24-1-10-103(a)2A]
- 4. Revise plans to show location of lighting switching for each area. Controls to be readily accessible and in the lighted area. [2008 EES 131(a)1A]
- 5. Revise plans to show how the occupant-sensing devices shall be capable of automatically turn off all lights in 30 minutes after the area has been vacated per 2008 EES Section 119(d). [2008 EES 131(a)1A]
- 6. Comply with 2008 EES 131 for indoor lighting control: area controls, multilevel lighting control, and day light area control. And shut off controls.
- 7. Indicate that all areas more than 100 square feet or having a lighting load exceeding 0.8 watts per square foot shall be separately switched so that the lighting level can be reduced by one-half, dual switching. [2008 EES 131(b)]

- 8. Each area enclosed by ceiling-height partitions shall have an independent switching or control devices for lighting systems, other than lighting required for building security or emergency egress, that shall be readily accessible and located so that a person using the device can see the lights or area controlled by that switch. [2008 EES 131(b)]
- 9. Day lit areas in enclosed spaces exceeding 250 square feet in area shall have at least one device that controls only luminaries in the day lit area, and controls at least 50 percent of the luminaries in the day lit area, independent of all other luminaries in the enclosed space. [2008 EES 131(C) 1]
- 10. Indicate that all areas within 15 feet of exterior glazed openings, and skylights, shall be separately switched from the adjacent areas and also be able to reduce lighting level by one-half when not needed. [2008 EES 131(C)]
- 11. All permanently installed exterior luminaries attached to or powered by the electrical service in building that contain conditioned spaces (s) AND employing lamps rated more than 100 watts shall have a source efficacy of at least 60 lumens per watt or be controlled by a motion sensor unless exempted. [2008 EES 132(a)]
- 12. Permanently installed exterior lighting attached to or powered by the electrical service in buildings that contain conditioned space(s) shall be controlled by a directional photocell which turns off the exterior lighting when daylight is available, unless exempted by 2008 EES 132(c).
- 13. Prescriptive calculation of requirements for indoor lighting method per 2008 EES table 146-C.
- 14. Method of calculation of allowed indoor lighting power density by:
 - a. Complete building method (90% of the space) 2008 EES table 146-E.
 - b. Area category method 2008 EES Table 146-F
 - c. Tailored method 2008 EES table 146-G.
- 15. Comply with 2008 EES 147 of requirements for outdoor lighting.