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A. GENERAL REQUIREMENTS:

A.1 Conductors for branch circuits shall be sized to prevent a voltage drop exceeding 3% at the farthest outlet. The maximum total voltage drop on both feeders and branch circuits to the farthest outlet does not exceed 5%. (210.19(A) Note 4, 215.2(A) (3) Note 2)

A.2 Indicate the short circuit withstand/interrupting rating of switchboards, panels, ATS, circuit breakers, fuses, and the % impedance of transformers. (110.9, 110.10)

A.3 Provide single line diagram. (215.5)

A.4 Unless listed otherwise, the ampacity of 600 Volts or less conductors shall be based on the terminals not to exceed 60°C (140°F) for conductor size 14 through 1AWG or 75°C (167°F) for conductor sizes over 1 AWG. (110.14(C))

A.5 No piping, ducts or equipment foreign to electrical equipment shall be permitted to be located within the dedicated space above the electrical equipment. Provide a note on the plans. (110.26(E)(1))

A.6 Provide and maintain required work space, adequate illumination, access to work space and head room about electrical equipment. (110.26)

A.7 For electrical equipment rated 1200 amperes or more and over 6 feet wide:

a. There shall be one entrance not less than 24 inches (610 mm) wide and 6-1/2 feet (1.98 m) high at each end. (110.26(C)(2))

b. The door(s) within 25 ft. of the nearest edge of work space shall open in the direction of egress and be provided with approved panic bars. (110.26(C)(3))

A.8 Provide protection from physical damage for switchboards, panelboards and other electrical equipment. (110.27(B))

A.9 Equipment in a plenum such as a fan room shall be noncombustible and only serve the loads that are permitted in such areas. (300.22(B))

B. GENERAL REQUIREMENTS:

B.1 Indicate circuit designations near outlets, luminaires, and equipment; identify all home-runs.

B.2 Provide a receptacle outlet within six feet (1.83 m) of any point along walls in livable rooms of dwelling occupancies. (210.52(A))

B.3 Provide a dedicated 20-ampere circuit for receptacles in dwelling unit bathroom(s). (210.11(C)(3), 210.52(D))

B.4 Provide arc-fault circuit interrupter (AFCI), combination type protection on branch circuits serving outlets in dwelling units except in kitchens, bathrooms, garage, unfinished basement, and crawl space. (210.12, 406.4(D))

B.5 In dwelling units where branch-circuit wiring is modified, replaced, or extended in any of the areas specified in 210.12(A), the branch circuit must be protected by either a listed combination AFCI located at the origin of the branch circuit or a listed branch circuit AFCI located at the first receptacle outlet of the existing branch circuit. (210.12(B))

B.6 Provide ground fault circuit interrupter (GFCI) protection for personnel on receptacle(s) located in: (210.8)

a. Kitchens, bathrooms, garages, outdoors, crawl spaces, and unfinished basements of dwelling units.
b. Within 6 feet of laundry, utility and wet bar sinks in dwelling units.
c. Bathrooms, commercial and institutional kitchens, and roof tops of any occupancy.
d. Outdoors in public spaces.
e. Accessory building to dwelling units with inhabitable room at or below grade level.

B.7 All 125 volts 15 and 20 ampere receptacles as required in Section 220.52 in dwelling units, guest rooms/suites, and child care facilities shall be tamper-resistant. (406.12, 406.13, 406.14)

B.8 Provide show window lighting(s) and receptacle branch circuit(s). The receptacle outlets shall be within 18 inches from the top of a show window. (210.62, 220.43(A))

B.9 A single receptacle installed on an individual branch circuit shall have an ampere rating of not less than that of the branch circuit. Indicate the receptacle rating. (210.21(B)(1))

B.10 Provide receptacle outlets wherever cord connected equipment will be used. (210.50(B))

B.11 Conductors of a multi-wire branch circuit shall originate from the same panelboard. The branch circuit shall be provided with a means that will simultaneously disconnect all ungrounded conductors at the point where the branch circuit originates. (210.4, 240.15(B) (1))

C. FEEDERS

C.1 A building or structure shall be supplied by one feeder or branch circuit unless permitted in (225.30(A) through (E))

C.2 The following feeders are undersized. (225.5, 310.15, 110.14(c), 240.4)

D. BRANCH CIRCUITS & FEEDER CALCULATIONS

D.1 Branch circuit loads were incorrectly calculated or omitted:

D.2 Feeder loads shall include 150 VA of load for every 2 feet of track lighting or the rating of the device used to limit the current to the track. (220.43(B))

D.3 Provide proper feeder, panel board and branch circuit ampacity for general lighting load as required for the particular occupancy. (220.12, 220.40, 215.2)

D.4 Provide a dedicated branch circuit for exterior sign or outline lighting system calculated at a minimum of 1200 VA. (220.14(F), 600.5(A))

D.5 Provide a dedicated branch circuit for the light, receptacle(s), auxiliary lighting power source, and ventilation on each elevator car. (620.22(A))

D.6 Provide a dedicated branch circuit for the air conditioning and heating units on each elevator car. (620.22(B))

D.7 Feeder loads were incorrectly calculated or omitted. (220.40)

D.8 Provide a minimum of 200 VA for each linear foot of show window supplied by a branch circuit. (220.14(G))

D.9 Feeder and branch circuit rating shall be based on not less than non-continuous loads and 125% of continuous loads. (210.19(A), 215.2(A) (1))

D.10 Provide 180 VA of load for each general use receptacle. (220.14(I) & (L))

D.11 Small Appliance branch circuits shall be rated at 1500 VA each. (220.52(A))

E. SERVICES

E.1 Show the service conductor routing from the utility service point.

E.2 Provide a copy of the utility company's service report indicating the available fault current, voltage, amperes and phase at the service.

E.3 Provide an elevation drawing of the service equipment. Indicate dimensions and show each section, meter, and disconnect.

E.4 Service disconnect(s) shall be installed at a readily accessible location either outside of a building or structure, or located nearest the point of entrance of the service conductors. (230.70(A))

E.5 There shall be not more than six sets of disconnects per service grouped in any one location and each disconnect shall be marked to indicate the load served. (230.72(A))

E.6 Additional service disconnecting means for fire pumps, emergency systems, legally required standby, or optional standby service shall be installed remote from the one to six service disconnecting means for normal service. (230.72(B))

E.7 No more than one service disconnecting means is permitted for motor control centers. (430.95)

E.8 The service equipment shall have a rating not less than the load served. This load shall be calculated per Article 220.

E.9 Ground fault protection is required on each 1000 amperes or more, 4W, 277/480 volts wiring system of a service or a feeder disconnecting means. (230.95, 215.10)

E.10 Except as permitted in section 230.2(A), a building or other structure shall be supplied by only one service. (230.2)

E.11 When more than one building or other structure is on the same property and under single management, each building or structure shall be provided with means for disconnecting all ungrounded conductors. (225.31)

E.12 Equipment shall not be connected to the supply side of the service disconnecting means. (230.82)

E.13 In a multiple occupancy building, each occupant shall have access to their service disconnecting means. (230.72(C))

E.14 Provide service load calculation. (230.42)

E.15 Service and feeder demand load calculation shall be in accordance with Article 220.87.

F. OVERCURRENT PROTECTION AND SHORT CIRCUIT PROTECTION

F.1 Submit overcurrent coordination study. (240.12, 620.62, Table 685.3)

F.2 Indicate the provisions to ensure the proper operation of Ground Fault Protection equipment on a separately grounded service and generator system. (215.10, 230.95(C), 240.13, 110.26)

F.3 Provide proper overcurrent protection for conductors on circuits. (240.4)

F.4 Overcurrent devices shall be connected at the supply point of ungrounded conductors. (240.21)

F.5 Fuses shall be provided with rejection type fuse holders. Provide notes on the plan. (240.60(B))

F.6 Provide short circuit analysis including motor contribution. Fuse let-thru is not acceptable. (110.9 & 10)

F.7 If series rating is used for short circuit protection:

a. Indicate the series combination interrupting rating of overcurrent devices. Identify on the plan, the fuse class and the circuit breaker manufacturer, model designation, type and electrical rating used as part of series rating. Include manufacturer specification sheet(s).

b. Series combination interrupting rating shall not be used when the second device in the series is subjected to a total connected full load motor current of more than 1% of it's AIC rating.

c. Motor circuit protectors shall not be used as part of a series combination interrupting rating. (110.3)

d. If series combination ratings are used, provide a cautionary label to the series rated device cover stating Caution - Series Rated System _____ A available. Identified replacement component required. (240.86, 110.3, 110.22(C), UL Recognition Directory)

G. GROUNDING

G.1 The service shall be grounded. (250.20)

G.2 Provide properly sized grounding electrode conductor(s) to connect the equipment grounding conductor(s) and the grounded conductor(s) to the grounding electrode(s). (100, 250.26, 250.66, Table 250.66)

G.3 Separately derived systems shall be grounded. In addition to comply with 250.30(A) for grounded systems, or as provided in 250.30(B) for ungrounded systems, separately derived systems shall comply with (250.20, 250.21, 250.22, and 250.26).

G.4 The grounded conductor of a 3-phase, 3-wire delta service shall have an ampacity not less than that of the ungrounded conductors. (250.24(C))

G.5 Where more than one building or structure is supplied by a feeder or branch circuit, an equipment grounding conductor shall be run from the main service with the supply conductors and connected to each building or structure disconnecting means and to the grounding electrode(s). (250.32(A) & (B))

G.6 All services, feeders or branch circuits supplying a building shall have common grounding electrode system. (250.58)

G.7 Provide properly sized equipment grounding conductor(s). (250.122)

G.8 All grounding electrodes that are present at each building or structure shall be bonded together. (250.50, 250.52(A))

G.9 All equipment fastened in place or connected by permanent wiring method shall be grounded. (250.110 & 112)

G.10 Where the phase conductors are increased in size (e.g., for voltage drop compensation), equipment grounding conductor shall be increased in size proportionately according to circular mil area of the phase conductors. (250.122(B))

G.11 An equipment grounding conductor shall not be used as a grounding electrode conductor. (250.121)

G.12 Provide an insulated equipment grounding conductor between service and remote panelboard serving swimming pool equipment. (680.25(B))

G.13 Provide equal potential bonding for all pool related equipment, including the perimeter surface that is within 3 feet horizontally from the inside wall of the pool. (680.26)

G.14 Patient care area receptacles shall be grounded by an insulated copper equipment grounding conductor. (517.13(B))

G.15 Receptacles with insulated grounding terminals, as described in 250.146(D) (isolated receptacles identified by an orange triangle), shall not be permitted. (517.16)

G.16 Panelboards serving power to the same individual patient care vicinity area shall be bonded together with minimum 10 AWG insulated copper conductor. (517.14)

H. WIRING METHODS

H.1 Conductors rated over 600 volts shall not occupy the same wiring enclosure, raceway or cable with

conductors of 600 volts or less. (300.3(C)(2))

H.2 In dwelling units and guest rooms of hotels, motels and similar occupancies, the lighting and outlet circuit voltage shall not exceed 120 volts nominal. (210.6(A))

H.3 Indicate the burial depth of underground conduits and conductors and specify the cover material. (Table 300.5)

H.4 Portions of raceways and cable sleeves that are exposed to widely different temperatures, such as coolers, freezers or service entrance conductors, shall be sealed to prevent circulation of air and/or moisture. (300.7(A))

H.5 Provide expansion fittings for raceways subject to thermal expansion and contraction. (300.7(B), 352.44, 355.44)

H.6 Provide cable supports on vertical runs. (300.19)

H.7 Identify the cable trays used, dimensions, conductor types, and provide cable tray fill calculations per Article 392.

H.8 Wiring methods beneath the raised floors shall comply with all requirements of Article 645.

H.9 Provide a ground fault circuit interrupter on the pool light circuit operating above 15 volts. (680.23(A)(3))

I. CONDUCTORS FOR GENERAL WIRING

I.1 Provide the proper wire type (temperature rating) for use in the following applications. (310.10)

I.2 The following branch circuit/feeder conductors are improperly sized. (310.15)

I.3 Where the number of conductors in a raceway or cable exceeds three, or where over 24 inches of single conductors or multiconductor cables are installed together without any spacing in between them and are not installed in a raceway, the allowable ampacity of each conductor shall be reduced per Table 310.15(B)(3)(a).

I.4 Where the ambient temperature is over 30°C, (86°F), the referenced correction factors shall apply to conductors. (Table 310.15(B)(2)(a) and (b))

I.5 Types NM, NMC and NMS cable(s) cannot be used for _____. (334.12)

I.6 Types NM, NMC and NMS cable(s) is permitted in Type I and II construction when installed in approved raceway(s). (334.12(A) (1) Exception)

J. CONDUIT, RACEWAYS, J-BOXES, ETC.

J.1 Indicate the number of conductors in raceways. (300.17, Chapter 9 Table 1)

J.2 Provide proper conduit size on (Chapter 9, Tables 4, 5 & 5A)

J.3 A separate grounding conductor shall be installed in non-metallic conduit runs. (352.60, 353.60,

354.60, 355.60, 356.60, 362.60, 378.60, and 388.60)

J.4 Exit signs shall not be used as J-boxes. Show location of required junction boxes. (700.10)

J.5 Indicate type of conduit(s) used.

J.6 The following outlet, pull or junction boxes are inadequately sized. (314.16, 314.28, 314.71)

J.7 Unless permitted otherwise, the highest operable part of all controls, dispensers, receptacles shall be placed within not less than 15 inches above floor and no more than 48 inches above floor. (CBC11B-308.1.2)

K. SWITCHES, PANELS, & ROOF EQUIPMENT

K.1 Provide permanent access to roof mounted equipment. (240.24, 430.102, 440.14)

K.2 Switches, circuit breakers, fuses shall be readily accessible. (404.8(A), 240.24, 430.102, 440.14)

K.3 Provide individual overcurrent protection on the supply side of each lighting and appliance branch circuit panel board. (408.36(A))

K.4 Provide weather proof, GFCI protected outlets within 25 feet of heating, air conditioning, or refrigeration equipment. (210.63, 210.8(B)(3))

K.5 Circuit breakers used as switches in 120 and 277 volt fluorescent lighting circuits shall be listed and marked SWD or HID. (240.83(D))

K.6 Switches controlling line-to-neutral lighting loads must have a neutral provided at the switch location. (404.2(C))

L. MOTORS

L.1 Provide the nameplate current rating of the following: (430.6, 430.22, Table 430.250)

a. Locked-rotor current of Torque motors.
b. AC adjustable voltage motors.
c. Low Speed (1200 RPM or Less) motors.
d. Multi-speed motors.
e. Non-continuous duty motors.

L.2 Indicate the Duty-Cycle service and design of motors. This information should include the motors duty and time rating. (430.22, Table 430.22(E))

L.3 Provide proper conductor size for motor(s). (430.22, 430.24, 430.26)

L.4 Provide overload protection for the following motor(s). (430.31, 430.32)

L.5 Provide proper short circuit ground fault protection for motor(s). (Specify breaker/fuse type). (430.52, 430.62)

L.6 An individual branch circuit is required for each motor over one horsepower or 6 amperes of full load current. (430.53(A))

L.7 Provide properly located disconnects, types and size on motor(s) (430.102, 103, 109 & 110)

M. TRANSFORMERS

M.1 Provide overcurrent protection on the primary of the transformer. (450.3)

M.2 Provide overcurrent protection for the secondary conductors of transformer. (240.21)

M.3 Indicate transformer(s) secondary tap length(s). (240.21)

M.4 Provide adequate ventilation in transformer room(s). (450.9)

M.5 Indoor dry type transformers over 112.5kVA shall be installed in minimum 1-hour fire rated room. (450.21(B))

M.6 Transformers over 50kVA shall not be installed in hollow spaces, ceiling spaces of the building. (450.13(B))

M.7 Indicate transformer type (dry, liquid, ventilated, etc.) and provide its nameplate marking. This information should also include the transformer impedance value for 25 KVA or larger transformers. (450.11, 450.3, 450.21, through 27)

M.8 Transformers, other than Class 2 or Class 3 transformers, shall have a disconnecting means located either in sight of the transformer or in a remote location (shall be lockable and location shall be field-marked on the transformer). (450.14)

N. HAZARDOUS AREAS

N.1 Provide hazardous classification by class, division or zones and group, and show boundaries of the hazardous area(s). (Art. 500, 505, 511.3, 513.3, 514.3, 515.3, 516.3)

N.2 Wiring in hazardous areas shall comply with the Code provisions for such areas. (Art. 500 through 516)

N.3 Provide conduit seals at boundaries of hazardous areas. (501.15, 504.70, 505.16. 506.16, 511.9, 513.9, 514.9, 515.9)

N.4 Provide a conduit seal between dust-ignition proof enclosure and regular enclosure located in Class II, Division 1 or 2 areas. (502.15)

N.5 Maximum permitted cross-section fill of seals shall not exceed 25% of the cross-sectional area of a conduit of the same trade size unless specifically approved. (501.15(C) (6))

N.6 Submit details of the natural or mechanical ventilation provided in garage area(s). (511.3(C), (D), or (E))

N.7 Provide GFCI protection for outlets in repair garages. (511.12)

N.8 Classify the pits in the garage areas. (511.3(B))

N.9 A manually operated remote control installed at an approved location shall be provided to shut off fans or blowers installed as part of ventilation system that are located in flammable vapor or dust systems. (CMC 503.1)

N.10 Electrical equipment located in operations that generate explosive or flammable vapors, fumes or dust shall be interlocked with the ventilation system so that the equipment can not be operated unless the ventilation fans are in operation. (CMC 503.1)

O. CLINICS

O.1 Indicate type of clinic(s).

O.2 Provide a list of equipment to be installed.

O.3 Equipment classified for life-support purpose shall be supplied from an essential system as required per Sections (517.31 through 517.45).

O.4 Indicate if the clinic is or will be licensed by the State of California.

O.5 Clarify if a generator is to be installed to supply all the loads in the ambulatory surgical clinics. (517.45(D)(1))

O.6 Clarify if wiring installation within an ambulatory surgical or hemodialysis clinics are in accordance with 517.45(F) and (G).

O.7 Provide a nurse call system in the birthing clinic. (CBC 1226.11.1.3)

O.8 Provide minimum of 100 fc at working surface in a birthing clinic. (CBC 1226.11.1.5)

O.9 Operating room of a surgical clinic shall include a clock and elapsed timer and an x-ray film illuminator. (CBC 1224.15.3.6)

P. FIRE PUMP

P.1 A dedicated feeder shall be permitted where it is derived from a service connection as described in 695.3(A)(1).

P.2 If the sources in 695.3(A) are not practicable and the installation is part of a multi-building campus-style complex, feeder sources shall be permitted if approved by the Building Official and installed in accordance with either (C)(1) and (C)(3) OR (C)(2) and (C)(3). (695.3(C))

P.3 Fire pump circuit conduits shall be encased in no less than 2 inches of concrete. (695.6)

P.4 Show the routing of the fire pump feeder. (695.6)

P.5 Overcurrent protection for fire pump services shall provide short circuit protection and shall be set to carry fire pump motor locked rotor current indefinitely. (695.4(B)(2))

P.6 Provide an emergency source of power for fire pump. (695.3(B), 700.12)

P.7 No disconnecting means shall be installed within the fire pump feeder circuit. (695.4(A))

P.8 Transfer of power shall take place within the fire pump room. (695.12(A))

P.9 All energized equipment shall be located at least 12 in. above the floor level. (695.12(D))

P.10 When starting, the voltage at the fire pump controller line terminals shall not drop more than 15% below normal voltage. (695.7(A))

P.11 When the motor is operating at 115% of the full-load current rating, the voltage at the motor terminals shall not drop more than 5% below the voltage rating of the motor. (695.7(B))

P.12 Diesel engine fire pump and associated equipment shall be listed for fire pump service. (695.10)

Q. EMERGENCY SYSTEMS

Q.1 Provide (a) properly sized emergency power source(s) for required emergency load(s). (700.4)

Q.2 A completely independent raceway, switchboards and wiring system shall be installed for emergency circuits including generator control wiring. (700.10)

Q.3 Transfer equipment shall supply only emergency loads. (700.5(D))

Q.4 The means of egress illumination level shall not be less than 1 foot-candle at the walking surface level. (CBC 1006.2)

Q.5 Emergency lights shall be provided in all means of egress as defined in Section 1006.3. (CBC 1006.3)

Q.6 The emergency luminaires shall provide an initial average illumination level of at least 1 foot-candle but at any point it shall not be less than 0.1 foot-candle along the path of egress at floor level. (CBC 1006. 3.1)

Q.7 At the end of the required emergency source time duration, the emergency luminaires shall provide an average illumination level of at least 0.6 foot-candle but at any point it shall not be less than 0.06 foot-candle along the path of egress at floor level. (CBC 1006.3.1)

Q.8 The emergency illumination level shall have a maximum-to- minimum emergency illumination uniformity ratio that does not exceed 40 to 1. (CBC 1006. 3.1)

Q.9 Emergency exit illumination shall be supplied from:
a)generator, b) storage battery, c) UPS, d) Fuel Cell with storage battery, or e) unit equipment. (CBC 1006.3, 700.12)

Q.10 Provide exit signs. (CBC 1011.1)

Q.11 Provide floor level exit sign & path marking. (CBC 1011.7, 1011.8)

Q.12 Provide battery capacity calculation. (700.4, 700.12(A))

Q.13 Storage batteries shall comply with Article 480.

Q.14 Provide selective overcurrent protection. (700.27)

Q.15 Exit signs shall be supplied by two circuits, one from normal source and one from emergency source. (700.17, 700.3, 110.3, CBC 1101.5 & 1011.6.3)

Q.16 Provide a lock-on device for circuits supplying emergency unit equipment. (700.12(F) Exception)

Q.17 The branch circuit feeding the unit equipment (emergency light with self-contained rechargeable battery) shall be the same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches or time clocks. Indicate the correct circuit wiring diagram on the plans. (700.12(F))

Q.18 Remote heads providing lighting for the exterior of an exit door shall be permitted to be supplied by the unit equipment serving the area immediately inside the doors. (700.12(F))

Q.19 Provide Coordination study for all emergency and legally required standby systems overcurrent protective devices. (700.27, 701.18)

Q.20 Provide 4 pole automatic transfer switch to transfer normal to emergency power under any of following conditions:

a. Ground fault protected service or feeder supplying the transfer switch. (700.27)
b. Ground fault indicating for the emergency source and Ground fault protected service or feeder. (700.26)

OR

c. Two levels of ground fault protection on normal supply side. (700.6)

Q.21 Emergency generators shall not be located in a room or an area used for any other purpose other than equipment and controls related to the generation and distribution of emergency power. This room shall be separated from the reminder of the building by a one-hour fire barrier. (CBC 432.2.1, 432.2.3)

R. MACHINERY ROOM

R.1 A readily accessible control switch shall be provided immediately adjacent to and outside of each machinery room exit to shut off all electrically operated machinery in machinery room(s). (CMC 1109.4)

R.2 No electrical equipment other than specified in California Mechanical Code Section 1109.1 shall be located in machinery room(s).

R.3 Purging fans and associated equipment in a refrigerant room containing refrigerants other than group A1 or B1 shall comply with the requirements of Article 500 Class I, Division 1 area. (CMC 1108.8)

R.4 Provide a readily accessible emergency off-only fan control switch outside of machinery room(s). (CMC 1109.4)

R.5 Machinery rooms shall have approved refrigerant vapor detectors and shall activate visual and audible alarms when the concentration of refrigerant vapor exceeds 25 percent of the LFL. (CMC 1107.4)

R.6 Refrigerant detection and alarm systems shall be powered and supervised as required for fire alarm systems in accordance with the Fire Code. (CMC 1121.2)

R.7 The detection and alarm systems shall be annunciated at an approved location in accordance with the fire code. (CMC 1121.3)

R.8 Except as permitted, provide sufficient illumination and service receptacles to safely perform required tasks in the machinery rooms. (CMC 1106.4, & 310)

S. SMOKE DETECTORS

S.1 Unless a fire alarm system with smoke detectors is installed within the occupancies, single- or multiple- station smoke alarms (detectors with built-in battery) shall be installed in the following locations and specified occupancy. (CBC 907.2.8.3, 907.2.9.2, 907.2.10.3, 907.2.11, NFPA 72)

a. Group R-1: (CBC 907.2.11.1)

1. In sleeping areas.

2. In every room in the path of the means of egress from the sleeping area to the door leading from the sleeping unit.

3. In each story within the sleeping unit, including basements. For sleeping units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

b. Groups R-2, R-2.1, R-3, R-3.1, R-4 and I-1: (CBC 907.2.11.2)

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.

2. In each room used for sleeping purposes.

Exception: Single- or multiple-station smoke alarms in Group I-1 shall not be required where smoke detectors are provided in the sleeping rooms as part of an automatic smoke detection system.

3. In each story within a dwelling unit, including basements but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

4. In a Group R-3.1 occupancies, in addition to the above, smoke alarms shall be provided throughout the habitable areas of the dwelling unit except kitchens.

c. Group I-4 (CBC 907.2.11.2.1)

Large family day-care homes shall be equipped with State Fire Marshal approved and listed single station residential type smoke alarms.

d. Specific location requirements

(CBC 907.2.11.2.5, NFPA 72 Section 29.8.3.4)

The installation of smoke alarms and smoke detectors shall comply with the following requirements:

(1) Smoke alarms and smoke detectors shall not be located where ambient conditions, including humidity and temperature, are outside the limits specified by the manufacturer's published instructions.

(2) Smoke alarms and smoke detectors shall not be located within unfinished attics or garages or in other spaces where temperatures can fall below 40ºF (4ºC) or exceed 100ºF (38ºC).

(3) Where the mounting surface could become considerably warmer or cooler

than the room, such as a poorly insulated ceiling below an-unfinished attic or an exterior wall, smoke alarms and smoke detectors shall be mounted on an inside wall.
(4) Smoke alarms or smoke detectors shall be installed a minimum of 20 feet horizontal distance from a permanently installed cooking appliance.

Exceptions:
(1) Ionization smoke alarms with an alarm silencing switch or photoelectric smoke alarms shall be permitted to be installed 10 feet (3 m) or greater from a permanently installed cooking appliance.
(2) Photoelectric smoke alarms shall be permitted to be installed greater than 6 feet (1.8 m) from a permanently installed cooking appliance where the kitchen or cooking area and adjacent spaces have no clear interior partitions and the 10 ft. distances would prohibit the placement of a smoke alarm or smoke detector required by other sections of the code.
(3) Smoke alarms listed for use in close proximity to a permanently installed cooking appliance.
(4) Installation near bathrooms. Smoke alarms shall be installed not less than a 3-foot (0.91 m) horizontal distance from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by other sections of the code.
(5) Smoke alarms and smoke detectors shall not be installed within a 36 in. (910 mm) horizontal path from the supply registers of a forced air heating or cooling system and shall be installed outside of the direct airflow from those registers.
(6) Smoke alarms and smoke detectors shall not be installed within a 36 in. (910 mm) horizontal path from the tip of the blade of a ceiling-suspended (paddle) fan.
(7) Where stairs lead to other occupied levels, a smoke alarm or smoke detector shall be located so that smoke rising in the stairway cannot be prevented from reaching the smoke alarm or smoke detector by an intervening door or obstruction.
(8) For stairways leading up from a basement, smoke alarms or smoke detectors shall be located on the basement ceiling near the entry to the stairs.
(9) For tray-shaped ceilings (coffered ceilings), smoke alarms and smoke detectors shall be installed on the highest portion of the ceiling or on the sloped portion of the ceiling within 12 in. (300 mm) vertically down from the highest point.
(10) Smoke alarms and detectors installed in rooms with joists or beams shall comply with the requirements of NFPA 72, Section 17.7.3.2.4.
(11) Heat alarms and detectors installed in rooms with joists or beams shall comply with the requirements of NFPA 72, Section 17.6.3.

S.2 Interconnection. (907.2.11.3)

Where more than one smoke alarm is required to be installed within an individual dwelling unit or sleeping unit in Group R occupancies, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.

T. OVER 600 VOLTS

T.1 Provide proper type and size of overcurrent protection for high voltage feeders. (240.100)

T.2 Select proper feeder ampacity per Duct bank Details (310.60)

T.3 Medium voltage equipment shall be listed by the County recognized testing laboratory or approved by the Building Official. (110.2)

T.4 Provide detail, specifications, and evidence of listings for the following: (110.2)

a. Cables.
b. Overcurrent protective devices (electrical ratings, listing, type, AIC rating, close-and-latch rating, breakers AK@ factor, MVA rating, continuous current rating, fuse time-current curves, etc.)
c. Transformer(s) (rating, listing, etc.)
d. Raceway(s) (size, material, etc.)
e. Terminations and Splices.
f. Pull boxes and Manholes.
g. Disconnect devices (type, size, electrical rating, magnetizing current interrupting ratings, cable charging rating, fault close rating, etc.)
h. Switchgear(s), Substation(s), Unit substation(s).
i. Grounding Impedance (continues and watt rating, etc.)
j. Bracing. (110.8)

T.5 Clarify the grounding method used. Include information on size and termination method. (Art. 250)

T.6 Provide detail on high impedance grounding. (Art. 250)

T.7 Provide cable pull calculation. (300.17)

T.8 Provide detailed short circuit analysis including a coordination study. The analysis should reflect the three and single phase fault as well as ground fault and line to line to ground fault (when applicable). (110.9 & 10, 240.12)

T.9 Provide a coordinated protection for the motor circuit. This coordination shall include the fault current, overload, circuit conductors and motor control apparatus. (430.225)

T.10 Provide means to discharge the stored energy in capacitors and provide a warning sign and discharge instructions on the equipment. (460.28)