



CITY OF EL MONTE

Economic Development Department Building Division

Standard Notes for R-3 Residential Construction

2016 CRC, CPC, CMC, CEC, CALGreen & CEnC (effective January 1, 2017)

THE FOLLOWING STANDARD NOTES AND PRESCRIPTIVE CONSTRUCTION REQUIREMENTS ARE APPLICABLE TO MOST STANDARD (PRESCRIPTIVE) RESIDENTIAL CONSTRUCTION METHODS AND ARE NOT INTENDED TO REPLACE ANY MORE RESTRICTIVE MINIMUM LIFE-SAFETY OR STRUCTURAL CODE REQUIREMENTS OR PROJECT CONDITIONS. REFERENCES IN BRACKETS [XX, XX.X] ARE CODE SECTIONS.

THE FOLLOWING STANDARD NOTES ARE INTENDED TO BE ADDED (TAPED OR COPIED ON THE FINAL APPROVED PLANS) TO A SET OF PLANS TO ELIMINATE THE NEED TO MAKE THESE CORRECTIONS DURING THE PLAN CHECK PROCESS. THESE NOTES SUPPLEMENT THE PLAN CHECK PROCESS AND THE ADDITIONAL REQUIREMENTS ON THE PLANS. THESE NOTES ARE NOT INTENDED TO CREATE A CONFLICT BETWEEN THE DESIGN AND MINIMUM CODE REQUIREMENTS. WHERE A CONFLICT EXISTS BETWEEN THESE NOTES AND THE PLANS, THESE NOTES TAKE PRECEDENCE ONLY FOR MINIMUM CODE COMPLYING CONSTRUCTION PURPOSES.

BUILDING PLANNING [Ch 3]:

FIRE RESISTANT CONSTRUCTION [R302]

1. **Penetrations [R302.4.1, .2]:**
 - a. The annular space of through or membrane penetrations shall be filled (penetration firestop).
 - b. Steel electrical boxes are limited to 16 sq. inches. The maximum annular space is 1/8 inch.
 - c. Listed electrical boxes shall be installed in accordance with their listing.
2. **Garage Opening Protection [R302.5]:**
 - a. Openings from a garage directly into a sleeping room are not permitted.
 - b. Other openings shall be solid wood doors not less than 1-3/8 inch; solid or honeycomb core steel doors not less than 1-3/8 inch or 20-minute fire-rated equipped with self-closing and self-latching devices.
3. **Duct Penetration [R302.5.2]:**
 - a. Ducts in the garage and ducts penetrating the walls or ceiling separating the dwelling from the garage shall be constructed of a minimum No. 26 gage sheet steel and have no opening into the garage.
4. **Dwelling/Garage (or carport) Fire Separation [R302.6]:**
 - a. Separation walls (residence & attic) – 1/2" gyp. board.
 - b. Habitable rooms above – 5/8" gyp. board.
5. **Fireblocking [R302.11]:**
 - a. In combustible construction, **fireblocking** shall be installed to cut off concealed draft openings (both vertical and horizontal) and shall form an effective barrier between floors, between a top story and a roof or attic space in accordance with the following:
 - b. In concealed spaces of stud walls and partitions, including furred spaces, and parallel rows of studs or staggered studs vertically at the ceiling and floor levels and horizontally at intervals not exceeding 10 feet.

- c. At interconnections between concealed vertical stud wall or partitions spaces and concealed horizontal spaces created by an assembly of floor joist or trusses and concealed spaces such as occur at soffits, drop ceilings, cove ceiling and similar locations.
- d. Concealed space between stair stringers at the top and bottom of the run.
- e. Openings around vents, pipes, ducts, chimneys and fireplace at ceiling and floor levels.

LIGHT, VENTILATION AND HEATING [R303]

6. All habitable rooms shall have an aggregate glazing area of not less than 8% of the floor areas. Natural ventilation shall be through approved opening to the outdoor air. The minimum openable areas to the outdoors shall be 4% of the floor area being ventilated. The following exceptions may be applicable [R303.1]:
 - a. The glazed areas need not be openable where the opening is not required for emergence escape and a whole-house mechanical ventilation system is installed in accordance with the CMC.
 - b. The glazed areas need not be installed in rooms where the above exception is satisfied and artificial light is provided capable of producing an average illumination of 6 footcandles over the area.
7. **Bathrooms, containing a bathtub, shower or tub/shower combination** shall be mechanically ventilated for purpose of humidity control. Window operation is not a permissible method of providing bathroom exhaust for humidity control. [R303.3]
8. Interior and exterior stairways shall have artificial lighting. [R303.7, R311.7.9]
9. Where the interior stair has six or more risers, there shall be a wall switch at each floor.
10. The illumination of exterior stairways shall be controlled from inside the dwelling unit.

ROOM AREAS [R304]

11. Every dwelling unit shall have at least one habitable room of not less than 120 sq. ft of gross floor area.
12. Except for Kitchens, other habitable rooms shall have a floor area of not less than 70 sq. ft.
13. Except for Kitchens, habitable rooms shall not be less than 7 ft. in any horizontal dimension.

CEILING HEIGHT [R305]

14. Habitable space, hallways, bathrooms, toilet rooms, laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 7 ft.

TOILET, BATH AND SHOWER SPACES [R307]

15. Bathtub and shower floors and walls above bathtubs with installed shower heads and in shower compartments shall be finished with nonabsorbent surface. Such wall surfaces shall extend to a height of not less than 6 ft.

SAFETY GLAZING [R308]

16. Permanently identified safety glazing shall be provided in the following locations:
 - a. Glazing in all doors, except decorative or < 3" dia.
 - b. Glazing within a 24 inch arc of a door.
 - c. Enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any portion of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches above a standing surface.
 - d. Panels over 9 sq. ft. having the bottom edge less than 18 inches above the floor and top edge greater than 36 inches above the floor and a walking surface within 36 inches.
 - e. Glazing in guards and railing including structural baluster panels and all nonstructural in-fill panels.
 - f. Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs and spas.
 - g. Glazing adjacent to stairways, landing and ramps within 36 inches horizontally of a walking surface.
 - h. Glazing adjacent to the bottom stair landing and within 60" horizontally.

EMERGENCY ESCAPE AND RESCUE [R310]

17. Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening meeting the following conditions:
 - a. Bottom of the clear opening not greater than 44 inches above the floor.
 - b. The opening shall open directly into a public way or to a yard or court that opens to a public way.
 - c. Openings shall have a minimum net clear opening of 5.7 sq. ft.
 - d. Minimum opening height shall be 24 inches.
 - e. Minimum opening width shall be 20 inches.
 - f. Opening shall be operational from the inside without the use of keys, tools or special knowledge.
18. Window wells shall:

- a. Have a minimum horizontal area of 9 sq. ft.
 - b. Have a minimum horizontal projection and width of 36 inches.
 - c. Allow the escape opening to be fully opened.
 - d. Have proper drainage.
19. Window wells with a vertical depth greater than 44 inches shall:
 - a. Be equipped with a permanently affixed ladder or steps
 - b. Ladders or steps shall have an inside width of at least 12 inches.
 - c. Project at least 3 inches from the wall.
 - d. Spaced not more than 18 inches on center vertically.

DOORS AND LANDINGS [R311.2-.3]

20. The egress door from individual dwelling units:
 - a. Shall provide a minimum clear width of 32 inches
 - b. Shall be readily openable from the inside without the use of a key or special knowledge or effort.
21. There shall be a floor or landing on each side of each exterior door:
 - a. With a minimum dimension of 36 inches in the direction of travel.
 - b. Landing shall not be more than 1-1/2" lower than the top of the threshold.
 - c. Or, the exterior landing shall not be more than 7-3/4 inches below the top of the threshold provided the door does not swing over the landing.
22. A landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provide the door does not swing over the stairway.

STAIRWAYS [R311.7]

23. Stairways shall not be less than 36 inches in clear width.
24. The maximum riser height shall be 7-3/4 inches and the minimum tread depth shall be 10 inches.
25. Dimensional uniformity: The greatest riser height and/or the greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch. [R311.7.4]
26. Open risers are restricted to permit a 4" sphere.
27. Enclosures Under Stairways [R302.7]:
 - a. The enclosed accessible spaces under stairways shall be protected on the enclosed side with 1/2-inch gypsum board.
28. Handrails [R311.7.8]:
 - a. Stairways with 4 or more risers require a handrail on one side.
 - b. Handrail height above the stair tread nosing shall be uniform, not less than 34 inches and not more than 38 inches.
 - c. Handrails shall be continuous, shall be returned or terminate in newel posts and have a space of not less than 1-1/2 inch between the wall and the handrail.
 - d. Grip-size [R311.7.7.3]:
 - i. Handrails with a circular cross-section shall have an outside diameter of at least 1.25 inches and not greater than 2 inches.

- ii. If not circular, the handrail shall have a perimeter dimension of at least 4 inches and not greater than 6.25 inches with a maximum cross-section dimension of 2.25 inches.
- iii. Handrails with a perimeter greater than 6-1/4 inches shall have a graspable finger recess on both sides of the profile.

GUARDS (GUARDRAILS) [R312]

- 29. Where Required [R312.1]:
 - a. Guards shall be located along open-sided walking surfaces, stairways and landings located more than 30 inches above the adjacent floor or grade below.
- 30. Height [R312.2]:
 - a. Guards shall form a protective barrier not less than 42 inches in height.
 - b. Guards whose top rail also serves as a stair handrail shall have a height not less than 34 inches and not more than 38 inches.
- 31. Opening Limitations [R312.3]:
 - a. Open guards shall have a balusters or ornamental pattern such that 4-inch diameter sphere cannot pass through any opening.
 - b. The triangular openings formed by the riser, tread and bottom rail at the open side of a stairway shall be a maximum size such that a 6-inch sphere cannot pass.
 - c. Opening for required guard on the sides of stair treads shall not allow a sphere of 4.75 inches to pass.
- 32. Window Fall Protection [R312.2]:
 - a. Where openings of an operable window are located more than 72 inches above the finished grade, the lowest part of the clear opening shall be a minimum of 24 inches above the floor.

AUTOMATIC FIRE SPRINKLER SYSTEMS [R313]

- 33. **New Construction Only:** An automatic residential fire sprinkler system shall be installed in new one- and two-family dwellings.
- 34. The fire sprinkler systems shall be designed and installed in accordance with R313.3 or NFPA 13D.

SMOKE ALARMS [R314]

- 35. Smoke alarms shall be listed per UL 217, installed per NFPA 72 and shall be Calif. State Fire Marshal listed.
- 36. **Smoke alarms in new construction** shall be installed, maintained and connected in the following locations/manner [R314.3, .4, .5]:
 - a. In each sleeping room.
 - b. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
 - c. On each additional story of the dwelling, including basement and split levels.
 - d. When more than one smoke alarm is installed, the alarm devices shall be interconnected such that the actuation of one alarm will activate all the alarms.

- e. Smoke alarms shall receive their primary power from the building wiring and shall be equipped with a battery backup.
- 37. In **existing dwellings** where a permit for alterations, repairs or additions exceed \$1000 smoke alarms shall be installed, maintained and connected in the following locations/manner [R314.3.1, .4, .6]:
 - a. The dwelling shall be equipped with smoke alarms located as require for new construction.
 - b. Smoke alarms are permitted to be solely battery operated where no construction is taking place.

CARBON MONOXIDE (CO) ALARMS [R315]

- 38. For **new dwelling** unit construction having an attached garage or fuel-burning appliances, an approved **carbon monoxide alarm** shall be installed, maintained and connected in the following locations/manner:
 - a. Outside of each sleeping area in the immediate vicinity of the bedroom(s).
 - b. On every level of a dwelling unit including basements.
 - c. Where more than one CO alarm is installed, the alarm shall be interconnected in a manner that activation of one alarm shall activate all of the alarms.
- 39. In **existing dwellings** where a permit for alterations, repairs or additions exceed \$1000 CO alarms shall be installed, maintained and connected in the following locations/manner [R314.3.1, .4, .6]:
 - a. The dwelling shall be equipped with CO alarms located as require for new construction.
 - b. CO alarms are permitted to be solely battery operated where no construction is taking place.

PROTECTION OF WOOD AGAINST DECAY [R317]

- 40. **Protection against decay** shall be provided by the use of naturally durable or preservative-treated wood for:
 - a. **Wood joists** or the bottom of a wood structural floor without joists are closer than 18 inches; wood **girders** closer than 12 inches to the exposed ground. [2304.11.2].
 - b. **Wood framing members**, including wood sheathing that rest on exterior foundation walls and are less than 8 inches from exposed earth. [2304.11.2.2]
 - c. **Sills and Sleepers** on a concrete or masonry slab that is in direct contact with earth. [2304.11.2.4]
 - d. The ends of **wood girders** entering exterior masonry or concrete walls shall be provided with a 1/2-inch air space. [2304.11.2.5]
- 41. Clearance between **wood siding** and earth on the exterior of a building shall not be less than 6 inches. [2304.11.2.6]
- 42. **Fasteners and connectors** in contact with preservative-treated and fire-retardant-treated wood shall be hot dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. [R317.3.1]

PROTECTION AGAINST TERMITES [R318]

- 43. Wood construction shall be protected from termites by:

- a. Pressure-preservative-treated wood with a quality mark of an approved testing agency. Field-cut ends, notches and drilled holes shall be retreated.
- b. Naturally durable termite-resistant wood.

EXTERIOR WILDFIRE EXPOSURE (VHFHSZ) [R337]

44. For projects in the State identified **Very High Fire Hazard Severity Zones**, see the separate VHFHSZ Standard Notes

FOUNDATIONS [Ch 4]:

CONCRETE [R402.2]

45. Minimum Concrete compressive strength shall be 2500 psi

UNDERFLOOR VENTILATION AND ACCESS [R408]

- 46. The space between the bottom of the floor joists and the earth under any building shall be provided with **ventilation openings** through foundation or exterior walls.
- 47. The minimum net area of ventilation openings shall not be less than 1 sq. foot for each 150 sq. feet of crawl-space area. [R408.1 & .2]
- 48. Ventilation openings shall be covered with perforations not exceeding ¼ inch.
- 49. Access to all Under-floor Spaces [R408.4]:
 - a. Access shall be provided with a minimum of one access opening not less than 18 inches by 24 inches through the floor or 16 inches by 24 inches if located in a wall.

FLOORS [Ch 5]:

- 50. **Drilling and Notching** [R502.8]:
 - a. Notches in solid lumber joists, rafters and beams shall not exceed one-sixth of the depth.
 - b. Shall not be longer than one-third of the depth.
 - c. Shall not be located in the middle one-third of the span.
 - d. Holes shall not exceed one-third the depth.
 - e. Shall not be closer than 2 inches to the top or bottom.
 - f. Shall not be closer than 2 inches to a notch.
 - g. Cuts, notches and holes in trusses, composite or glue-laminated members or I-joists are prohibited except where permitted by the manufacturer.
- 51. **Post and beam or girder** construction shall be positively connected against uplift and displacement. [R502.9]
- 52. **Wood trusses** shall be designed by an engineer and shall be submitted for review prior to installation. [R502.11]

WALL CONSTRUCTION [Ch 6]:

- 53. Studs shall be continuous from support at the sole plate to a support at the top plate. [R602.3]
- 54. **Top Plates** [R602.3.2]:
 - a. Wood stud walls shall be capped with a double top plate to provide overlapping at corners and intersections with bearing partitions.
 - b. End joints shall be offset at least 24 inches.

- 55. **Bottom/Sole Plates** shall have full bearing on nominal 2X or larger plates/sills having a width at least equal to the stud. [R602.3.4]
- 56. **Drilling and Notching Studs** [R602.6]:
 - a. Exterior wall or bearing studs may be cut or notched to a depth not exceeding 25% of its width.
 - b. Any stud may be bored/drilled not more than 60% of the width.
- 57. **Top plates cut, drilled or notched** more than 50% of its width, shall have a galvanized metal ties not less than 0.054 inch thick and 1-1/2 inches wide. The plate shall extend a minimum of 6 inches past the opening. [R602.6.1]

EXTERIOR WINDOWS AND DOORS [R609]

- 58. **Installation, Testing and Labeling:** Exterior windows and sliding doors shall be tested and labeled and installed per manufacturer's recommendations. [R609.1, .2, .7]

WALL COVERING [Ch 7]:

- 59. **Water-resistant Gypsum Backing Board** [R702.3.7]:
 - a. May be used on ceiling where framing spacing does not exceed 12 inches on center for ½ inch and 16 inches on center for 5/8 inch.
 - b. Shall not be installed over Class I or II vapor retarder in a shower or tub compartment.
 - c. Cut or exposed edges, including those at wall intersections shall be sealed.
 - d. Shall not be used where there will be direct exposure to water or continuous humidity.
- 60. **Weep Screed:** The weep screed shall be placed a minimum of 4 inches above the earth or 2 inches above paved areas and shall allow trapped water to drain. [R703.7.2.1]
- 61. **Adhered Masonry Veneer** [R703.12]:
 - a. Adhered masonry veneer shall be installed in accordance with the manufacturer's instructions.
 - b. On exterior stud walls, adhered masonry veneer shall be installed a minimum of: 4 inches above earth; 2 inches above paving.
 - c. Flashing at Foundation: A corrosion-resistant screed or flashing with a minimum vertical flange of 3-1/2 inches shall be installed to extend a minimum of 1 inch below the foundation plate line. [703.8 & .12]

ROOF-CEILING CONSTRUCTION [Ch 8]:

- 62. **Roof Drainage:** In areas where expansive or collapsible soils are known to exist, a controlled method of water disposal from roofs shall be provided that will collect and discharge roof drainage to the ground surface at a point at least 5 feet from the foundation. [R801.3]

ROOF/ATTIC VENTILATION [R806]

- 63. **Enclosed Attic/Rafter Spaces:**
 - a. **Enclosed attics and enclosed rafter spaces** formed where ceiling are applied directly to the underside of roof framing members (cathedral ceilings) shall have cross ventilation for each separate space by ventilating openings.

- b. Exterior openings shall be covered with corrosion-resistant wire cloth not exceeding ¼ inch.
 - c. Minimum Area [R806.2]:
 - i. The net free ventilating area shall not be less than 1/150 of the area of the space ventilated.
 - ii. As an alternate, the net free area may be reduced to 1/300 when 40-50% of the required ventilation areas are provided in the upper portion of the attic, located no more than 3 feet below the ridge.
64. Vent and insulation clearance. [R806.3]
- a. Where eave or cornice vents are installed, insulation shall not block the free flow of air. A minimum of a 1-inch space shall be provided between the insulation and the roof sheathing.
65. Unvented Attic Assemblies may be used if a design is submitted for review. [R806.4]

ATTIC ACCESS [R807]

66. An opening not less than 22 inches by 30 inches with a clear headroom of 30 inches, shall be provided to any combustible ceiling or roof construction **attic area** having a clear height of over 30 inches and a area exceeding 30 square feet.
67. The opening shall be located in a hallway or other readily accessible location.
68. If located in a wall, the opening shall be a minimum of 22 inches wide by 30 inches high.
69. See CPC Sec. 508.4, CMC 304.4 and CEC 210.70 and these notes for access to mechanical equipment in the attic.

ROOF ASSEMBLIES [Ch 9]:

70. **Roof Classification** shall be a minimum of Class A, B or C and shall be tested in accordance with UL 790 or ASTM E 108 and identified and verified in the field prior to installation. [R902.1]
71. **Weather Protection** [R903]:
- a. Roof decks shall be covered with an approved roof covering secured to the structure.
 - b. **Flashing** shall be installed in a manner to prevent moisture entering the wall and roof.
 - c. Where **flashing** is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (No. 26 galvanized sheet).

REQUIREMENTS FOR ROOF COVERINGS [R905]

72. All roof materials shall be installed per the manufacture's installation instructions.
73. **Asphalt Shingles** [R905.2]:
- a. Asphalt shingles shall be fastened to solidly sheathed decks.
 - b. Deck slope shall be two in 12 or greater.
 - c. Asphalt shingles shall be secured to the roof with not less than four fasteners per strip shingle or two fasteners per individual shingle.
 - d. A **Drip Edge** shall be provided at eaves and gables.
74. **Clay and Concrete Tile** [R905.3]:

- a. Concrete and clay tile shall be installed only over solid sheathing or spaced structural sheathing boards
 - b. Deck Slope minimum 2-1/2:12.
 - c. All Roof slopes: One fastener per tile.
75. **Metal Roof Shingles** [R905.4]:
- a. Metal roof shingles shall be applied to solid deck.
 - b. Deck slope shall not be < 3:12.
76. **Mineral-surfaced Roll Roofing** [R905.5]:
- a. Shall be fastened to solidly sheathed decks.
 - b. Deck slope shall be a minimum of 1:12.
77. **Wood Shingles** [R905.7]:
- a. Wood shingles shall be installed on solid or spaced sheathing.
 - b. Deck slope shall 3:12 or greater.
78. **Wood Shakes** [R905.8]:
- a. **Wood shakes** shall be installed on solid or spaced sheathing.
 - b. Deck slope shall be 3:12 or greater.
79. **Built-up Roofs** [R905.9]:
- a. Design Slope minimum: ¼:12 (2%).
80. **Metal Roof Panels** [R905.10]:
- a. Metal roof panel coverings shall be applied to solid or spaced sheathing.
 - b. Slopes:
 - i. Lapped, nonsoldered-seam without sealant: 3:12.
 - ii. Lapped, nonsoldered-seam with sealant: ½:12.
 - iii. Standing-seam: ¼:12.

CHIMNEYS AND FIREPLACES [Ch 10]:

CHIMNEY TERMINATION [R1003.9]

81. Chimneys shall extend at least 2 feet higher than any; portion of a building within 10 feet, but shall not be less than 3 feet above the surrounding roof.
82. All chimneys attached to any appliance or fireplace that burns solid fuel shall be equipped with an approved **spark arrester** meeting the following:
- a. The new free area of the spark arrester shall not be less than four times the area of the outlet.
 - b. The spark arrester screen shall have heat and corrosion resistance equivalent to 12 gage wire, 19 gage galvanized wire or 24 gage stainless steel.
 - c. Opening shall not permit the passage of spheres having a diameter larger than ½ inch and shall not block the passage of spheres having a diameter of less than 3/8 inch.
 - d. The Spark Arrester shall be accessible for cleaning and shall be removable to allow for cleaning of the flue.

FACTORY-BUILT FIREPLACES/CHIMNEYS [R1004/1005]

83. **Decorative Shrouds** shall not be installed except where the shrouds are listed and labeled for use the specific factory-built fireplace/chimney system and installed in accordance with the manufacturer's instructions.

PLUMBING SYSTEMS [2016 CPC]:

GENERAL REGULATIONS [Ch 3]

84. All pipe, pipe fittings, traps, fixtures, material and devices used in a plumbing system shall be listed or labeled by a listing agency and shall conform to approved applicable recognized standards. [301.1]
85. Piping subject to corrosion, erosion, or mechanical damage shall be protected in an approved manner. [312.4]
86. Plastic and copper piping penetrating a framing members to within one inch of the exposed framing shall be protected by **steel nail plate/striker barrier** not less than 0.0478 inches in thickness. The steel nail plate shall extend along the framing member a minimum of 1-1/2 inches beyond the outside diameter of the piping or tubing. [312.9, 1210.3.3]

PLUMBING FIXTURES AND FIXTURE FITTINGS [Ch 4]

87. **Water closet** or bidet shall [402.5]:
 - a. Not be set closer than 15 inches from its center to any side wall or obstruction nor closer than 30 inches center to center to any fixture.
 - b. Have a clear space in front of not less than 24 inches.
88. **Water-Conserving Fixtures and Fittings** [407-412]:
 - a. **Water closets** (single & dual flush) shall have an average consumption of not more than 1.28 gallons of water per flush.
 - b. **Kitchen Faucets** shall not exceed 1.8 default/2.2 (temporary) gpm.
 - c. **Lavatory Faucets** shall not exceed 1.2 gpm.
 - d. **Shower Heads** shall not exceed 2.0 gallons per minute. [408.2]
 - e. More restrictive measure may be required by selected measures from the CalGreen Code, Sec. 4.303.
89. **Shower compartments** shall have a minimum finished interior of 1,024 square inches and shall also be capable of encompassing a 30-inch circle to a height of 70 inches above the drain. [408.6]
90. **Shower control valves and showerheads** shall be located on the sidewall of shower or other approved arrangement. [408.9]
91. **Limitation of Hot Water in Bathtubs and Whirlpool Bathtubs.** The maximum hot water temperature discharging from the bathtub and whirlpool bathtub filler shall be limited to 120 degrees F. The water heater thermostat shall not be considered a control for meeting this provision. [409.4]
92. **Installation of Fixture Fittings** [417.5]:
 - a. Where two separate handles control the hot and cold water, the left-hand control shall control the hot water.
 - b. Single-handle mixing valves shall have the flow of hot water correspond to the marking on the fitting.
 - c. **Shower and tub-shower combinations** shall be provided with individual control valves of the pressure balance, thermostatic, or combination pressure balance/thermostatic mixing valve that provide scald and thermal shock protection

conforming to ASSE 1016 or ASME A112.18.1. Handle positions shall be adjusted to deliver a maximum mixed water setting of 120 degrees F. [408.3]

WATER HEATERS [Ch 5]

93. Water heaters shall be provided with approved overpressure and over temperature protection. [504.4 & .5]
94. A minimum of 100 sq. inches of indoor **Combustion Air** shall be provided within 12 inches of the top and within 12 inches of the bottom. [506.3]
95. All new and replacement water heaters shall be **anchored or strapped** to resist horizontal displacement due to earthquake motion. Strapping shall be at points within the upper one-third and lower one-third. At the lower point, a minimum distance of 4 inches shall be maintained above the controls. [507.2]
96. A water heater supported from the **ground** shall rest on level concrete or other approved materials not less than 3 inches above the adjoining ground level. [507.4]
97. When a water heater is located in an area where damage may result from a **leaking water** heater, a watertight pan of corrosion-resistant materials shall be installed beneath the water heater with a minimum three-quarter inch drain to an approved location. [507.5]
98. **Installation in Residential Garages** [507.13]:
 - a. Shall be installed so that all burners and burner-ignition devices are located not less than 18 inches above the floor.
 - b. Shall be protected so it is not subject to **mechanical damage** shall be guarded against such damage by being installed behind protective barriers, elevated or located out of the path of vehicles. Protection may require the installation of a 3 inch steel pipe, 4" curb or wheel stop.

WATER SUPPLY AND DISTRIBUTION [Ch 6]

99. **Backflow Prevention** [602.3 & 603]:
 - a. Potable water outlets with hose attachments (other than water heater drains, boiler drains and clothes washer connections) shall be protected by a non-removable hose-bibb-type backflow preventer. [603.5.7]
100. **Pressure Relief Valve Drains** shall be terminated in an approved location. [608.5]

SANITARY DRAINAGE [Ch 7]

101. Horizontal drainage piping shall be run in practical alignment and a uniform slope of not less than 1/4 inch per foot (2%). [708, 718.1]
102. Fixtures installed on a floor level that is lower than the next upstream manhole cover shall be protected from backflow of sewage by installing an approved type backwater valve. [710.1]
103. Drainage piping serving fixtures that are located below the crown level of the main sewer shall discharge into an

approved watertight sump or receiving tank where it shall be discharged by an approved system. [710.2]

VENTS [Ch 9]

104. Venting for Island Fixtures [909.1]:

- a. Traps for island sinks shall be roughed in above the floor and may be vented by extending the vent as high as possible, but not less than the drainboard height and then returning it downward and connecting it to the horizontal sink drain immediately downstream from the vertical fixture drain.

STORM DRAINAGE [Ch 11]

105. Storm Water shall drain away from buildings and away from adjoining property and shall not create a nuisance. [1101.2]

106. Where provided and required, **Secondary Roof Drains** shall be not less than two inches above the roof surface and shall have a separate piping system. [1101.12.2.2 & 1101.11.2.2.1]

FUEL GAS PIPING [Ch 12]

107. **Underground piping** systems shall be installed with a minimum of 18 inches of cover; or 12 inches if damage is not likely to occur. [1210.1.1]

108. **Concealed Piping:** A steel striker barrier not less than 0.0508 inches thick shall be installed between the tubing and the finished wall and extends at least 4 inches beyond concealed penetrations of plates, fire stops and studs. [1210.3.3]

109. An accessible **gas shutoff valve** shall be provided upstream of each gas pressure regulator. [1210.11]

110. **Gas appliances** shall have an accessible manual shutoff valve within six feet of the appliance. [1212.5]

MECHANICAL SYSTEMS [2016 CMC]:

111. Location & Protection Against Damage [305]:

- a. Equipment generating a glow, spark or flame shall be installed with pilots and burners or heating elements and switches at least 18 inches above the floor level. [305.1]
- b. Appliances installed in garages subject to mechanical damage shall be guarded against damage. Protection may require the installation of a 3-inch steel pipe, 4" curb or wheel stop or other means [305.1.1]

112. **Electrical Connections** [301.4]:

- a. Equipment shall have a positive means of disconnect adjacent to and in sight from the equipment served.
- b. A 120 V receptacle shall be located within 25 feet of the equipment for service and maintenance purposes.

EXHAUST SYSTEMS [Ch 5]

113. **Clothes Dryers** [504.4]:

- a. Moisture exhaust ducts shall terminate outside the building and shall be equipped with a backdraft damper.

- b. A minimum 4 inch metal duct with smooth interior surfaces shall be provided.
- c. When installed in a closet, a minimum opening of 100 square inches for makeup air shall be provided in the door or other location.
- d. Ducts shall not exceed a total combined horizontal and vertical length of 14 feet, including two 90 degree elbows unless permitted by the manufacturer.

COMBUSTION AIR [Ch 7]

114. The minimum indoor **combustion air volume** for gas utilization equipment shall be 50 cf per 1000 Btu/hour. [701.4.1]

CHIMNEY AND VENTS [Ch 8]

115. Masonry, Metal and Factory-built Chimneys: [802.5]

- a. **Factory-built Chimneys** shall be installed per their listing and manufacturer's instructions.
- b. **Masonry and Metal chimneys** shall be built and installed in accordance with **NFPA 211**.
- c. A chimney shall extend at least 3 feet above the highest point where it passes through a roof and at least 2 feet higher than any portion of a building within 10 feet. [802.5.4]
- d. **Decorative shrouds** shall not be installed at the termination of factory-built chimneys except where such shrouds are listed and labeled for use with the specific factory-built chimney system and are installed in accordance with manufacturers' installation instructions. [802.5.4.3]

116. **Type B & BW gas vents** shall terminate [802.6]:

- a. Above the roof surface with a listed cap or listed roof assembly.
- b. Gas vents 12" or smaller may terminate 1 ft. above the roof provided they are at least 8 ft from a vertical wall.
- c. **Decorative shrouds** shall not be installed at the termination of gas vents except where such shrouds are listed.

INSTALLATION OF SPECIFIC APPLIANCES [Ch 9]

117. **Decorative appliances or vented gas fireplaces** shall not be installed in bathrooms or bedrooms unless the appliance is listed and the bedroom or bathroom has the required volume. [911, 912]

118. **Household Cooking Appliances:** [921.3, 921.4]:

- a. Cooking appliances shall have a vertical clearance above the cooking top of not less than 30 inches to combustible material or metal cabinets.
- b. Horizontal clearances shall be that specified by the permanent marking on the appliance.

119. **Wall Furnaces:** [907]

- a. Listed wall furnaces shall be installed in accordance with their listing and the manufacturers' instructions.

PLUMBING & MECHANICAL EQUIPMENT ON ROOFS OR IN ATTICS [CPC/CMC]

120. **Equipment on Roofs, Installation** [508.2.1/303.8.4]:
- Equipment shall be installed on a well-drained surface of the roof.
 - At least 6 ft. of clearance shall be available between any part of the equipment and the roof edge or rigidly fixed rails, guard, parapets or other structure at least 42 inches in height.
121. All equipment requiring an external source of **electrical power** shall be provided with [508.2.2/303.8.5]:
- A readily accessible electrical disconnecting means within sight of the equipment that will completely de-energize the equipment, and
 - A 120-VAC grounding-type receptacle outlet on the roof adjacent to the equipment and on the supply side of the disconnect switch.
122. **Access to Equipment on Roofs** [508.3/304.3.1]:
- Equipment located on roofs/elevated locations shall be accessible.
 - Buildings more than 15 feet in height shall have an inside means of access, unless other means acceptable are used.
123. **Permanent Lighting** shall be provided at the roof access and controlled by a switch inside the building near the access leading to the roof. [508.3.3]
124. **Appliances in Attics** shall [508.4/304.4]:
- Be listed for attic installation and installed per manufacturer's instructions.
 - Be provided with access not less than **22 inches x 30 inches**.
 - Have a maximum distance to the appliance shall not exceed **20 feet**.
 - Have continuous **solid flooring** not less than 24 inches wide.
 - Have a level **working platform** not less than 30 inches x 30 inches in front of the service side.
 - Have a permanent 120-volt **receptacle outlet** and a **lighting fixture** with a switch located at the entrance to the passageway.

ELECTRICAL SYSTEMS [2013 CEC]:

125. **Ground-Fault Circuit-Interrupter Protection (GFCI)** [210.8]:
- All 125-volt, single-phase, 15- and 20-ampere receptacles installed in bathrooms, garages, accessory buildings, outdoors, crawl spaces (at or below grade), unfinished basements, kitchen countertop surfaces, laundry, utility and wet bar sinks where receptacles are installed within 6 feet of the sink edge shall have a ground-fault circuit-interrupter protection.
126. **Arc-Fault Circuit-Interrupter Protection (AFCI)** [210.12]:
- All 120-volt, single-phase 15- and 20-ampere branch circuits supplying **outlets** installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation

- rooms, closets, hallways, or similar rooms or areas shall be protected by a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit.
127. **Receptacle Outlets:** Every kitchen, family room, dining room, living room, parlor, library, den, sunroom, bedroom, recreation room, or similar room or area shall have receptacle outlets installed in accordance with [210.52(A)]:
- Receptacles shall be installed so that no point measured horizontally along the floor line in any wall space is more than 6 ft. from a receptacle outlet.
 - Wall Space** shall include: 1) Any space 2 ft. or more in width (including space measure around corners) and unbroken along the floor line by doorways/similar openings, fireplaces and fixed cabinets. 2) The space occupied by fixed panels in exterior walls, excluding sliding panels. 3) The space afforded by fixed room dividers such as freestanding bar-type counters or railings.
 - Receptacle outlets in: 1) **floors** shall not be counted as part of the required number of receptacle outlets unless located within 18 in. of the wall. 2) **Countertop Receptacles** shall not be counted.
128. **Receptacle outlets in kitchen and dining room counters spaces** shall be installed in accordance with [210.52(C)]:
- Wall counter space outlets** shall be installed at each wall counter space that is 12 in. or wider and installed so that no point along the wall line is more than 24 in. from a receptacle outlet.
 - At least one receptacle shall be installed at each **island countertop** space with a long dimension of 24 in. or greater and a short dimension of 12 in. or greater.
 - At least one receptacle outlet shall be installed at each **peninsular countertop** space with along dimension of 24 in. or greater and a short dimension of 123 in. or greater.
 - Counter outlets** shall be located above, but not more than 20 in. above the countertop.
129. At least one outlet shall be installed in **bathrooms** within 3 ft. of the outside edge of each basin [210.52(D)].
130. At least one outlet accessible at grade level and not more than 6-1/2 ft. above grade shall be installed at the **front and back** of the dwelling [210.52(E), 210.8(A)(3)].
131. **Balconies, decks and porches** that are accessible from inside the dwelling shall have at least one receptacle outlet installed within the perimeter of the balcony, deck or porch. The receptacle shall not be located more than 6-1/2 feet above the surface [210.52(E)(3)].
132. At least one outlet shall be installed for the **laundry** [210.52(F)].
133. At least one receptacle outlet, shall be installed in each **basement and unfinished portion** and in each attached **garage and in each detached garage or accessory building** [210.52(G)].
134. **Hallways** 10 ft. or more in length shall have at least one receptacle outlet [210.52(H)].

- 135. Foyers not part of a Hallway and that have an area that is greater than 60 sf shall have a receptacle located in each wall space [210.52(I)].
- 136. A 125-volt, 15- or 20-ampere-rated receptacle outlet shall be installed at an accessible location for the servicing of **heating, air conditioning and refrigeration equipment**. The outlet shall be installed at the same level and within 25 ft. of the equipment [210.63].
- 137. **Lighting Outlets** shall be installed in and in accordance with [210.70]:
 - a. At least one wall switch-controlled lighting outlet shall be installed in every **habitable room and bathroom**.
 - b. At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, and garages.
 - c. At least one wall switch-controlled lighting outlet shall be installed to provide illumination on the **exterior side of outdoor entrances or exits with grade level access**.
 - d. Where one or more lighting outlet(s) are installed for **interior stairways**, there shall be a wall switch at each floor level and landing level that includes an entryway, to control the lighting outlet(s) where the stairway between floor levels has six risers or more.
 - e. For **attics, underfloor spaces, utility rooms and basements**, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring servicing. The lighting outlet shall be provided at or near the equipment requiring servicing.
- 138. Where NM Cable (**Romex**) is run across the top of accessible ceiling joists, protection within 6-ft. of the nearest edge of the scuttle hole or attic entrance is required [334.23, 320.23(A)].
- 139. **Receptacles, Cord Connectors and Attachment Plugs** [406]:
 - a. Receptacle faceplates shall be installed so as to completely cover the opening and seat against the mounting surface [406.6].
 - b. **Damp or Wet Locations** [406.9]:
 - i. All 15- and 20-ampere, 125- and 250-volt receptacles shall be listed weather-resistant type.

- ii. Receptacles shall not be installed within or directly over a bathtub or shower stall.
- c. All 125-volt, 15- and 20-ampere receptacles in dwellings shall be listed **tamper-resistant** [406.12].

CALGREEN STANDARDS: [2016 CALGREEN CODE]

- 140. All applicable **Residential Mandatory** and **selected Voluntary measures** as indicted in the project documents shall be completed, documented and field verified per the approved plans.
- 141. **Additions and Alterations** shall provide the following:
 - a. The mandatory provisions (Ch 4) shall be applied to additions or alterations where the additions or alteration increases the building's conditioned area, volume or size. The requirements shall apply only to and/or within the specific area of addition or alteration.
 - b. Permitted alterations, additions or improvements shall replace **noncompliant plumbing fixtures with water-conserving plumbing fixtures**. Water Closets: 1.28 GPF; Showerheads: 2.0 GPM; Lavatory Faucets: 1.5 GPM; Kitchen Faucets: 1.8 GPM.
 - c. Any installed gas fireplace shall be direct-vent, sealed-combustion type

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- 142. All exterior walls, roof & floors, exterior openings, HVAC systems, water heating, lighting and special features shall be in conformance to Forms CF-1R and MF-1R.
- 143. All applicable "Installation Certificates" (CF-6R) forms and "Certificate of Field Verifications and Diagnostic Testing" (CF-4R) forms shall be completed and posted at the project site to be verified by the building inspector. **HERS inspections and certifications** may be required for Leakage Testing, Duct System/Air Filter Grille Sizing, Zonally Controlled Central FAU and Ventilation for Indoor Air Quality.