






**2010 CMC – MECHANICAL PLAN CHECK
CORRECTION LIST (With 2008 Energy
Code)**

County of Orange

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MECHANICAL PLAN CHECK CORRECTION LIST CMC 2010

- A.1 All works shall comply with CMC 2010 Title 24 part 4, based on 2009 UMC.
- A.2 Show a job address on all sheets of the plans. [CMC 113.1.2]
- A.3 Show the intended use of each room. Specify occupancy group and type of construction on cover sheet of plans [CMC 113.1.3]
- A.4 All plans and calculations to be signed by a licensed architect, mechanical engineer, or mechanical contractor who has the contract for installing the equipment. [CMC 113.1.5 and 113.2]
- A.5 Provide specification for all material to be used. [CMC 113.3]
- A.6 Specify that an approved independent electrical disconnect will be provided for each piece of equipment within sight of the equipment, when supply voltage is greater than 50 volts. [CMC 308]
- A.7 Factory made air ducts shall comply with reference standard Chapter 17. Support of ducts, installer shall provide the manufacture's field fabrication and installation instruction.[CMC 604.5]
- A.8 Provide structural anchorage details for anchorage of equipment to the supporting structure. [CMC 303.4]
- A.9 Show size of condensate drain lines and attachment to drainage system. [CMC 309.2]
- A.10 Standard installation clearance for unlisted heat product appliance [CMC Table 3-2] and clearance with specified forms of protection [CMC Table 3-3]
- A.11 Chimney connector and vent connector clearance from combustibile materials [CMC Table 3-4]
- A.12 Outside air or return air for a heating or cooling air system shall not taken from [CMC 311.3]:
 - a. 10 feet from an appliance vent outlet, discharge outlet of an exhaust fan.
 - b. Where it is less than 10 feet above the surface of public way, sidewalk, street alley or driveway.
 - c. A hazardous or insanitary location, refrigeration machinery room.
 - d. A closet, bathroom, toilet room or kitchen.
 - e. Room or space containing fuel burn appliance serve as source of return air.
- A.13 Toilet room, kitchen, parking garage and classroom shall provide minimum exhaust rate per CMC Table 4-4.

- A.14 For education facilities, food services office building, hotel/resorts, public assembly, retail & residential unit. The minimum ventilation rates in breathing zone per CMC Table 4-1.
- A.15 Provide the exhaust ventilation design for enclosed parking garage [CMC 403.8]
- A.16 Mechanical ventilation shall be provided when natural ventilation is not permitted. Ventilation rates shall be designed per CMC 403.1.1 thru 403.5]
- A.17 Environmental air duct exhaust shall be terminated a minimum 3 feet from property line and 3 feet from opening into building [CMC 504.5]
- A.18 Domestic clothes dryer exhaust vent shall be minimum 4" diameter and total 14 feet combination horizontal ,vertical included 2-90° elbows [CMC 504.3.2.2]
- A.19 Moisture exhaust ducts shall be terminated on the outside of building with back draft damper. [CMC 504.3.1]
- A.20 Provide a minimum 18-inch high platform for a water heater, dryers and FAU located in the garage, or in areas subject to mechanical damage. [CMC 308.1]
- A.21 The minimum indoor and outdoor combustion air rated shall be calculated per CMC 701.2. & 701.4. Show calculation and method of compliance on plan.
- A.22 Provide details and sizes of combustion air vents, one-half within upper 12 inches and one-half within the lower 12 inches. [CMC 701.10 (4) Fig 7-1]
- A.23 In take for combustion air will be taken from outside the building or vented attic space. [CMC 701.10 (6)] and Fig 7-4 & 7-5.
- A.24 Show location and size of all combustion-air openings or ducts. [CMC 701.10 Figure 7-1 to Figure 7-5)
- A.25 Where all combustion air is provided by an outdoor mechanical air supply system at minimum rate 0.35 feet³/min per 1000 Btu/h for all appliances located within the space. [CMC 701.7]
- A.26 Size of combustion air openings and/or ducts and their points of termination in an unobstructed space allowing free movement of combustion air to the appliances. [CMC 701.10 (2) & NFPA 54:9.3.8.2]
- A.27 The separation between ducts serving upper and lower combustion air opening shall be maintained , Intake opening located at least 12" vertically from above grade [CMC 701.10(4),(6)]
- A.28 Provide calculations for the combustion air. Size of openings or ducts will have 25% free area and metal louver and grills will have 75% free are. [CMC 701.9]. For indoor / outdoor openings size and location per CMC 70.13 &701.4.
- A.29 A combustion-air duct will be of galvanized steel. [CMC 701.10 (1)]
- A.30 If an attic is used as a source of combustion air, the requirements of CMC 701.3) must be met.
- A.31 Upper combustion air ducts shall extend horizontally or upward to the outside or to the attic. [CMC Sec. 701.10]

- A.32 Dampers are not allowed in combustion-air ducts or plenums. [CMC 701.11]
- A.33 Provide minimum clearance on all sides, back, front and top of the furnace. Show all required dimensions on plan.[CMC 904.2(F),(H),(I),(J)]
- A.34 Warm air furnaces and water heaters will be installed in accordance with manufacture instructions on a noncombustible floor. [CMC 904.3]
- A.35 If a central heating furnace is installed /open. Into bedroom or bathroom shall comply with CMC 904.1(1), (2).
- A.36 Provide details of how return air is positively separated from combustion air.
- A.37 Material exposed within ducts or plenums shall be noncombustible or have a flame spread not greater than 25 and smoke density index not greater than 50. [CMC 602.2]
- A.38 Ducts are installed under floor crawl space and factory made air ducts shall comply with CMC 604.1& 604.3. Ducts shall be insulated with R=3.5per CMC 605.
- A.39 Dampers and/or flow restrictors are not permitted in return air ducts or plenums. [CMC 701.11]
- A.40 Gas burn fireplace chimney termination shall comply with CMC 802.5.2 for low heat and medium heat appliances and type of venting system to be used per CMC Table 8-1.
- A.41 Gas vents (type B or type L vents) passing thru a roof shall be termination per Figure 8-2 and CMC 802.6.2.
- A.42 Makeup air shall not be taken within ten feet of an appliance vent, unless such vent outlets are located three feet above the outside air inlet. [CMC 802.5.2]
- A.43 Gas vents serving appliances on more than one floor: All appliances connected to common vent shall be located in rooms separated from habitable space. Each of these rooms shall have an adequate supply of combustion, ventilation and dilution air that is not supplied from habitable space. [CMC 802.6.4 & Figure 8-3]
- A.44 For FAU's located in the attic, provide a minimum 22 x 30 inches access, a walkway and work platform, and light switched by the opening. [CMC 904.11.1]
- A.45 Under-floor FAU's shall have a minimum 30 x 30 inches access opening located within 20 feet of the unit. [CMC 904.11.2]
- A.46 Upright furnace may be installed in attic or under floor space more than 5 feet in height with all required clearances are observed. [CMC 904.11.6]
- A.47 Decorative fireplace shall be installed only in a vented fireplace having a chimney flue and constructed with noncombustible materials. [CMC 907.2 & 908.2]
- A.48 Floor furnaces supported by ground / concrete slab shall be installed not less than 3 inches above grade. [CMC 904.3.1.1]
- A.49 If an attic is used as a source of combustion air, the requirements of CMC 701.3) must be met.
- A.50 Combustion air shall not be obtained from a hazardous location or from any area in which flammable vapor, lint or dust are released.

- A.51 Details of the wall furnace installation shall be shown on the plans. The provisions of CMC Figure 7-1 thru 7-5.
- A.52 Show location and construction details for permanent access and walkways to equipment on the roof. [CMC 304.1 & 904.10.3]
- A.53 Provide details and/or specification of gas venting, size, type, clearances and locations to show compliance with sections 806 through 809 as required.
- A.54 The gas venting shall be double wall type B or L. [CMC 802.6.2.1]
- A.55 The cross section area vent diameter shall be equal or greater than the diameter of the vent collar of the appliance. [CMC 803.2.7]
- A.56 The vent termination shall be at least 5 feet above the vent collar. [CMC 802.6.2 .1& Figure 8-2]
- A.57 Vents shall extend above the roof and shall terminate in a vent cap. Termination points shall be at least 3 feet above any forced air inlet into the building located within 10 feet, and shall be 4 feet away from the property line. [CMC 802.6.2 & 802.6.2.6]
- A.58 Vents shall terminate at least 4 feet below or horizontally from, and 1 foot above any opening into the building. [CMC 802.6.2.2]
- A.59 Provide detail for multistory gas vent installation [CMC 803.2.12 & Fig 8-5, 8-6]. Offset in multistory common vent system [CMC 803.2.15]
- A.60 The vent shall extend vertically, except where a 60 degree off set is allowed. [CMC 803.2.5]
- A.61 The total horizontal run of a vent plus the length of a horizontal vent connector shall not exceed 75% of the vertical height of the vent. [CMC 802.10.9.2]
- A.62 The area of a common vent connector shall not be less than the area of the largest vent connectors plus 50% of the areas of the additional vent connectors. [CMC 803.2.8]
- A.63 Specify type of material to be used for all appliance vents in accordance with Tables 8-1 [NFPA 54:12.5.1]
- A.64 Two appliances cannot use the same venting system unless they are on the same story and additional requirements per CMC 803.2
- A.65 Specify materials to be used for supply and return air ducts. [CMC 602.5]
- A.66 Provide a duct layout showing size, duct gage (if metal) and register locations. [CMC 604.2]
- A.67 Provide ventilation to corridors. Walls, ceilings and/or floor ceiling assembly shall be protected by smoke and fire dampers if the corridor is to be rated. [CMC 606]
- A.68 Show location of all required fire dampers-smoke/fire dampers, walls ceilings, shafts and access. [CMC 606.2 & 606.5]
- A.69 Rated corridors cannot be used as return or supply air plenums. [CMC 602.1]
- A.70 Provide details showing how ducts are supported. [CMC 604.2.2 & 604.2.3]

- A.71 Chimney and vent terminations shall comply with CMC Section 802.6.2.
- A.72 Liquefied petroleum gas-burning appliances shall be installed in accordance with CMC Section 303.7
- A.73 Specify type and locations for all fire dampers where ducts and similar items pass through rated walls. [CBC 510.1.1]
- A.74 Provide details for access to the fire dampers. [CMC 606.5]
- A.75 Details of the chimney or vent roof penetration shall be provided to ensure compliance with the provisions of CMC Chapter 8 & Figure 8-1.
- A.76 Size of condensate drain and location of its discharge shall comply with CMC 309. Show on roof plan A/C location, size (tonnage), and size of the drain per table 3-1.
- A.77 Outside air intake shall be located at least 25 feet from exhaust outlet of ventilation system, medical surgical vacuum, cooling tower, plumbing vents accordance with CMC 407.2.1. OSHPD 1,2,3 & 4
- A.78 Exhaust outlets shall be located minimum 10 feet above adjoining grade and 10 feet from door and operable windows [CMC407.2.2] OSHPD 1, 2, 3 & 4.
- A.79 Provide duct type smoke detectors in the supply air ducts in every air-conditioning system in excess of 2,000 cfm to be enclosed spaces within building shall be equipped with an automatic shutoff. [CMC 609]
- A.80 Access to HVAC units, in enclosed spaces except attic space, shall have a minimum 22"x 24" minimum of six feet in height and 42" guard at exposed side. [CMC 904.10.3.]
- A.81 Revise plans to indicate types and quantities of refrigerants to be used or stored. Refrigerants shall be classified in accordance with Table 11-1 as listed. [CMC 1105]
- A.82 Revise plans to indicate the maximum quantities of refrigerants to be used or stored in each separate space along with the associated volume of each space. See Table 11-1 for maximum quantities. [CMC 1105.2]
- A.83 Specify that refrigeration machinery rooms will be provided with a refrigeration-vapor alarm as required by CMC Section 1107.4.
- A.84 The refrigeration machinery room shall be provided with a continuous source of outside air and separate mechanical ventilation system complying with CMC Section 1108, and provided with an emergency switch located within two feet of the exit door per building code. Provide calculations to justify the proposed system. [CMC 1108.2]
- A.85 Refrigeration machinery room more than 1000 sq ft shall be a minimum of one-hour fire-resistive construction with 20-minute rated fire door and no other openings that will convey refrigerants to other parts of the building. All openings shall be sealed. [CMC 1107.4]
- A.86 The refrigeration machinery room ventilation exhaust vent shall be discharged not be closer than 20 feet from property line or an exterior door, window or ventilation air inlet. [CMC 1108.7]
- A.87 Provide calculations to justify the size of the refrigeration machinery room exhaust size. [CMC 1108.2]

- A.88 Refrigerated rooms or space with two exits when the area exceeds 1000 square feet and maintained below 68°F. [CMC 1106.3 & CBC 1015.5]
- A.89 Provide calculations for anchoring refrigeration equipment and anchorage details as required by ASCE 13.3.1 based on an Occupancy Category II. Anchorage details shall indicate attachment to supporting structure. [CMC 1106.2]
- A.90 A compressor/condenser unit supported from the ground shall rest on a concrete slab extending not less than three inches above adjacent grades. [CMC 1106.2]
- A.91 Kitchen hoods that collect steam, smoke grease or heat vapors, heat or odors shall be installed above deep fryer, broiler, grills hot range, rotisseries, and dishwasher. All solid fuel cooking equipment shall comply with CMC 508.1.
- A.92 Specify hood, grease remove devices and ducts shall have minimum clearance 18" to combustible materials, 3" to limited combustible [CMC 507.2]
- A.93 Note on plans; all seams, joints and penetrations of hood enclosure that direct and capture grease laden vapors and exhaust gas shall have a liquid tight continuous external weld to the hood's lower outermost perimeter [CMC 508.2 and NFPA 96:5.1.2]
- A.94 Commercial kitchen hood shall be sized according to capture and removal grease laden vapors, the capacity of hood per CMC 508.4.1.1.
- A.95 Grease removal devices protection and grease filters per CMC 509.2.3 and 509.2.4.
- A.96 Provide details of the clean out access to the grease collection point. [CMC 510.3.3.4] and access panel per CMC 510.3.4.4.
- A.97 Exhaust outlets from grease hoods shall extend through the roof a minimum of three feet and be at least ten feet from parts of the property line or air intake opening from any building, 3 feet above any air intake and 40" above the roof surface. [CMC 510.8.2.1 (A) (B)]
- A.98 Details on plans for Commercial TYPE 1 hoods and grease duct shall show complete system, roof plans, location of makeup air, rated shafts, ceilings, metal flashing of grease ducts to shaft/ceiling, construction of walls to side of or behind of appliances, and clearances to combustible and non combustible material. Details shall be shown on plans as hood/exhaust system is to be installed. [CMC 508.4] or submit manufacture's installation sheet to show method of compliance.
- A.99 Provide details of exhaust hood duct shafts to show compliance with: [CMC 510.7.2.1]
 - a. One-hour fire-resistive construction if building is less than 4 stories.
 - b. Two-hour fire-resistive construction for more than 4 story and Type I and II fire rated construction buildings.
- A.100 Solid-fuel char broiler shall be provided with a separate exhaust system, independent of all other systems serving cooking appliances. [CMC 517.3.2]
- A.101 Ducts and plenums serving commercial kitchen hoods shall be built and installed in accordance with CMC Section 508 & 509.
- A.102 Kitchen ventilation duct gage shall be at least No. 18 steel or No. 20 stainless steel. The type II hood shall be No. 24 gage steel. [CMC 508.1.1]

- A.103 The kitchen exhaust duct shall be sealed with metal flashing around the duct at the point of penetration and vented to the exterior at the point of termination. The shaft shall be separated from the duct by at least three inches and not more than 12 inches and should serve a single grease exhaust system. [CMC 508.4]
- A.104 Plans shall show that the kitchen exhaust canopy-type hood extends a minimum six inches beyond the cooking surface on all open sides and not to exceed 4 feet between lip of hood and cooking surface [CMC 508.4.1]
- A.105 Kitchen exhaust shall have make-up air supplied to the room equal to the amount to be exhausted. The exhaust and make-up air systems shall be connected by an electric interlocking switch.
- A.106 Dust or flammable or vapor collection systems shown on the plans shall fully comply with the requirements of CMC Chapter 5.

A.107 CALIFORNIA ENERGY CODE 2010 Requirements

1. Submit a complete energy compliance package complying with CEC Sections 140 thru 146. [T24-1-10.103]
2. The MECH-1 form is to be signed by the principal mechanical designer, and Parts 1 thru 3 are to be reproduced on the plans. [T24-1-10-103(a)2A]
3. The PERF-1 form is to be signed by each respective designer and reproduced on the plans. [T24-1-10-103(a)2A]
4. Indicate all Mandatory Measures on the respective plans(i.e., Architectural, Mechanical & Electrical)
5. Provide documentation to show that the proposed heating/cooling equipment complies with 2008 EES Section 120.
6. Indicate mechanical equipment on plans, specify the make, model, capacities, and minimum efficiencies for both heating and cooling, and provide evidence of 2008 EES certification. [2008 EES 112-A thru G]
7. Indicate water heater insulation requirements on the MECH form. Minimum external insulation is R-12 or internal insulation of R-16. [2008 EES 113(c)4]
8. Specify that the air handling duct system will be insulated and sealed in accordance with Section 604 of the State Mechanical Code. [2008 EES 118(d)3]
9. Provide calculations to justify the outside air complies with 2008 EES Section 121(b) 2B.
10. HVAC systems serving assembly areas shall have demand control ventilation devices complying with 121 (c) 4.
11. Air distribution system ducts and plenums and pipe insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as specified in 2008 EES 123 and 2008 EES 124(b) thru (h).
12. Fan or other exhaust systems exhausting air from the building to the outside shall be provided with back draft dampers or automatic dampers to prevent air leakage. [2008 EES 122(f)]

13. Show location of the thermostat on the plan. [2008 EES 122]
14. Thermostatically controlled heating or cooling systems, except electric heat pumps shall have an automatic thermostat with a clock mechanism which the building occupant can manually program to automatically set back the thermostat set points for at least two periods within 24 hours. [2008 EES 122]
15. Provide certification by manufacturer for water-heating system to show compliance with requirements in 2008 EES section 113.
16. Note on plan to cover duct openings and protect mechanical equipment s during construction. [Cal Green 4.504.1 , 5- 504.3]
17. Bathroom exhaust fan shall comply with requirement of Cal Green code section 4.506.1
18. For buildings equipped with demand control ventilation, CO2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the California Energy Code and Cal Green section 5.506.2
19. Ozone depletion and greenhouse reductions- Installations of HVAC, refrigeration and fire suppression equipment shall comply with Cal Green Sections 5.508.1.1 and 5.508.1.2.