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|    | <h2>ALL TRADES<br/>INSPECTION</h2> <p>Mechanical, Plumbing, Electrical, Frame, Roof<br/>                 City of Palo Alto (CPA)<br/>                 Building Inspection Division<br/>                 285 Hamilton Ave.<br/>                 Inspection Request: 650 329-2496</p> | Revision Date:07/24/15  |
|   | <p><b>IVR Inspection code # 220</b></p>   | General Requirements/Checklist for:<br><b>Residential</b>   |
|   |   | Codes Enforced:<br>Current California Code of Regulations Title 24<br>Palo Alto Municipal Code (PAMC) |
| <p>The information provided in this document is general and intended as a guide only. Each project is unique and additional requirements may be enforced as deemed appropriate.</p> |   |   |

**WARNING**

- Failure to complete items below, prior to inspection, may result in a re-inspection fee
- Construction hour sign and address shall be posted on all job site prior to inspection.
- Gas/Electric utilities will be removed if found to be unsafe at time of inspection.

**PHOTOVOLTAIC SYSTEM**

- If a conduit for a photovoltaic system is being installed, a separate inspection shall be scheduled prior to all trades approval. IVR# 702

**THIS SECTION SHALL BE COMPLETED PRIOR TO "ALL TRADES" INSPECTION**

- Prior to inspection verify all required sequential inspections and correction notices are complete.
- Building shall be weather tight (roof on, paper or TYVEK on the walls and windows installed, chimney flashed and sealed.) Projects with stucco exteriors and tile roofs must have roofing systems installed that will withstand weather exposure for 180 days. Mineral surface cap sheet over felt or peel and stick underlay such as "Winter Guard" is acceptable.
- **Exterior Lath:** The installation of exterior lath and type "D" paper should be immediately followed **within 7 days** with stucco or other approved building finish wall materials.
- **Gas stub-stub location** shall be approved and Green tagged by WGW, contact Michael Haynes @ 650-496-5940).
- Verify required special inspections have been performed.
- Verify revisions have been submitted and approved.
- A roof in-progress shall be scheduled prior to completion of roof.
- If applicable, HERS testing.
- Fire blocking shall be completed at this inspection NO EXCEPTIONS.
- If applicable, **Underground conduit** and service entrance conductors shall be installed from the city vault to house electrical panel location/stub-out and "Green Tagged" by CPA Utilities Department. Contact Scott Wilt @ 650-444-8031 See **FIGURE A-3** for example.

### **FIRE SPRINKLERS SYSTEMS**

- Fire Department approval of fire sprinkler system is required prior to All Trades inspection.

#### **Application**

- **One-and two-family dwellings and townhouse:** An automatic residential fire sprinkler system shall be installed. *CRC R313.2*
- *for exceptions see PAMC 16.06.190 amendments*

**Important:** Installation of fire sprinklers also requires the installation of a **Double Check Backflow Preventer** and **Expansion Tank** for water heater/boiler. See Residential Inspection Guidelines for installation requirements at [www.cityofpaloalto.org/building](http://www.cityofpaloalto.org/building)

### **ALTERNATE METHODS AND MATERIALS**

- Alternate methods and materials shall be submitted and approved prior to installation and inspection (i.e. Clothes dryer inline booster fans.)

#### **NOT ALLOWED**

- Underfloor installations of inline dryer booster fans.
- Air admittance valves are not allowed.
- Waterless urinals are not allowed.
- ABS and Kelly cast iron type two-way sewer cleanouts are not allowed (see Sewer Inspection Guidelines for cleanout requirements).
- Electric water heaters when natural gas or propane is available to structure. *California Energy Code*

### **ADDITIONAL REQUIREMENTS**

- New homes and major remodels require installation of a new sewer.
- Fireplaces hearth extension requires thermal barrier installed.

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| <ul style="list-style-type: none"><li><input type="checkbox"/> <b>Helpful Reminder:</b> Don't forget to install the thermostat and communication wires.</li><li><input type="checkbox"/> Verify roof is completed and building is weather tight; if possible schedule "Exterior Lath" inspection with All Trades inspection.</li><li><input type="checkbox"/> Verify that an accessible electrical receptacle is installed at the same level and within 25' of the a/c unit. The outlet shall not be connected to the load side of the a/c disconnect. <i>CEC 210.63</i></li><li><input type="checkbox"/> Verify A/C unit rough in location has been clearly shown on <u>site plan</u>.</li><li><input type="checkbox"/> Verify sewer line has been replaced from building to City clean-out.</li><li><input type="checkbox"/> Verify roof penetration clearances (plumbing and mechanical clearances to openable windows &amp; combustible construction )</li><li><input type="checkbox"/> Verify underfloor/attic vents have min. 1 sq. ft. per 150 sq. ft. of attic/underfloor area</li><li><input type="checkbox"/> Water service and house piping system charged for testing (west of and along El Camino, high pressure requires pressure regulator with by-pass) or expansion tank. <i>CPC 608.2</i></li><li><input type="checkbox"/> Exterior deck shall be water tight and water tested prior to inspection.</li></ul> |
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**ELECTRICAL**

**General Electrical:**

- See Electrical Panel Final checklist.
- \*Receptacles are required for all decks, balconies and porches regardless of size if accessible from the inside of a dwelling unit. *CEC 210.52 (E)(3)*
- \*Only one feeder or branch circuit can supply power from one building to another. CEC 225.30
- \*Foyers larger than 60 sq. ft. require a receptacle on each wall space 3' or longer. *CEC 210.52(1)*
- \*GFCI receptacles are required to be accessible. *CEC 210.8(B)*
- \*Raceways for underground circuits are required to be sealed. *CEC 225.27*
- \*AFCI, tamper resistant (TR) and weather resistant (WR) receptacles are required where replacement receptacles are installed. *CEC 406.4(D)(4),(5) & (6)*
- GFCI receptacles are required within 6' of all dwelling unit sinks. *CEC 210.8*
- At least one receptacle outlet shall be installed at the front and back of the dwelling, not more than 6'6" above grade. *CEC 210.52 (E)(1)*
- Electrical panel shall be fire rated when installed in a fire rated wall assembly.
- For all nonmetallic boxes and conduit bodies, wiring shall be secured to the box. (*Exception: where NMC or multi-conductor type UF cable is used in boxes not larger than 2 1/4" x 4" and secured within 8" of the box.*) *CEC 314.17 (C)*
- Ejector pump receptacle outlet shall not** be located in pit. Install receptacle min. 12" above floor level.
- Non metallic pipe identification:** A label shall be fastened to the main electric meter panel stating **"THIS STRUCTURE HAS A NON-METALLIC WATER SERVICE"**. *IAPMO Installation Standards 7-2008 (2.7.5)*

**Sub Panel Location**

- Overcurrent devices shall not be located over steps/stairways. *CEC 240.24(F)*
- Panels are prohibited from being placed in bathrooms and clothes closets. *CEC 240.24 (D),(E)*
- Provide working clearance 36" deep X 30" wide X 6'6" high. *CEC 110.26* (Panels shall not be placed behind or over laundry equipment.)

**Grounding Electrode Conductor (GEC)**

- For new buildings and remodels that have at least 20' of new foundation the CPA Building Division requires the primary electrode be 20' of # 4 rebar OR 20' of minimum 4 AWG bare copper wire placed 3" from the bottom of the footing (if no footing, use (2) 8' long by 5/8" ground rods spaced a minimum of 6' apart). In addition to the primary grounding electrode a metal water pipe supplemental electrode is required and must be connected with a minimum 4 AWG copper wire and connected at the exterior hose bib where the water service enters the building. *CEC 250.52, 250.53 and 250.66*

**AFCI-Arc-Fault Circuit Interrupter (AFCI)**

- All 120-volts, 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 provided by

a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit. *CEC 210.12*

- \*Branch circuit modifications, where AFCI is required, the branch circuit must be AFCI protected. *CEC 210.12(B)*
- Tamper Resistant Receptacles in Dwelling Units:** Tamper resistant (TR) receptacles are required on 15 and 20 amp receptacles. *CEC 406.11*
  - Exception: Receptacles in the following areas are not required to be tamper resistant:*
    - (1) Receptacles located more than 5' 6" above the floor.*
    - (2) Receptacles that are part of a luminaire or appliance.*
    - (3) A single receptacle or a duplex receptacle for permanently installed appliances. (Dishwashers, refrigerators, washing machines and other similar appliances)*
    - (4) Non-grounding receptacles used for replacements as permitted in 406.4(D)(2)(a).*

### Kitchen receptacles

#### Frequently Missed/Inspection Failure

- Provide receptacles within 24" of the edge of sinks, ranges and edges of counter tops. Receptacle outlets shall be installed so that no point along the wall line is more than 24" measured horizontally from a receptacle outlet in that space. *CEC 210.52 (C)(1)*
- All 125-volt, 15 and 20 ampere receptacles installed to serve counter top surfaces are required to be GFCI. *CEC 210.8 (A)(6)*
- Cables and raceways must be installed a minimum of 1 1/4" from the edge of framing member. Where cables and raceways are closer than 1 1/4", a 1/16" steel plate shall be installed. *CEC 300.4*
- When more than 3 current-carrying conductors are stacked or bundled, stackers shall be used to secure the conductors in lieu of staples. *CEC 310.15 (B)(3)*
- Where the sink or range extends more than 12" from the face of the counter and where the sink or range is mounted in a corner more than 18", that space shall be included in measuring the wall counter space. *CEC 210.52 (C)(4)*
- Counter tops 12" or more in width require a receptacle outlet. *CEC 210.52 (C)(1)*
- Islands and peninsulas shall be provided with a min. of (1) receptacle. *CEC 210.52 (C)(1), (2) and (3).*
- Provide dedicated circuit for kitchen hood. *CEC 210.52 (B)*
- Outlets shall not be mounted over 20" above counter top and not more than 12" below counter. *CEC 210.52 (C)(5)*

### Wall receptacles

- Receptacle spacing: Max. 6' from end of wall and max. 12' from plug to plug. *CEC 210.52 (A)*
- Receptacle required for walls 2' or more (including space measured around corners) and unbroken along the floor line by doorways, fireplaces, and similar openings. *CEC 210.52 (A)*
- Hallways 10' or more in length require a Min. (1) Receptacle. *CEC 210.52 (H)*

### Bathroom receptacles and switches

- All 125-volt, 15 and 20 ampere receptacles installed in bathrooms are required to be GFCI. *CEC 210.8 (A)(1)*
- At least one receptacle outlet shall be installed in bathrooms within 3' of outside edge of each basin. *CEC 210-52 (D)*
- Exhaust fans and light/fan combo shall be **separately switched** from the lights. *Energy Code 150 (k)*

### **Laundry area receptacles**

- All 125-volt, 15 and 20 ampere receptacles installed within 6' of the outside edge of a sink are required to be GFCI. *CEC 210.8 (A)(7)*
- Laundry areas require at least (1) receptacle. *CEC 210.52 (F)*

### **Un-finished basement receptacles**

- All 125-volt, 15 and 20 ampere receptacles installed in un-finished basements that are not intended for habitation are required to be GFCI. *CEC 210.8 (A)(5)*
- At least one receptacle outlet shall be installed in un-finished basement areas that are not intended for habitation. *CEC 210.52 (G)*

### **Garages (attached or detached) and accessory structures**

- \*If electrical is routed to an accessory building, you must add a receptacle. *CEC 210.52(G)*
- All 125-volt, 15 and 20 ampere receptacles installed in garages (attached or detached) and/or accessory structures are required to be GFCI. *CEC 210.8 (A)(2)*
- At least one receptacle shall be installed in garages (attached or detached) and/or accessory structures. These shall be in addition to those required for specific equipment such as laundry. *CEC 210.52 (G)*
- Panelboards at separate structures require a main disconnect *CEC 250.32(D)*

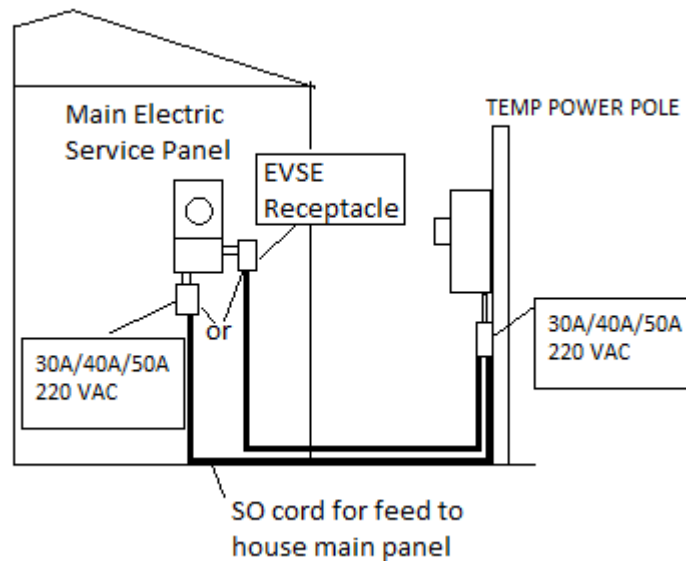
### **Outdoor receptacles**

- All 125-volt, 15 and 20 ampere receptacles installed on the exterior of the dwelling are required to be GFCI. *CEC 210.8 (A)(3)*
- All 125-volt and 250-volt receptacles installed on the exterior of the dwelling, where directly exposed to weather (wet location), shall be weather resistant type and be protected with a "while in use" type cover. *CEC 406.9 (A)(B)*
- Receptacle required at fixed room dividers such as freestanding bar-type counters or railing. *CEC 210.52 (A)(4)*
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### **Junction boxes**

- Junction boxes shall be accessible and have working clearance.
- Install grounding pigtailed in metal boxes.
- Junction boxes and similar enclosures shall be accessible (*CEC 314.29*) and shall have required working clearances *CEC 110.26 (A)*

**Optional means of feeding power to residence during construction through the temporary power pole as allowed.**



- See EVSE (Electric Vehicle Supply Equipment) Checklist.
  - **Reminder!! EVSE Provisions (EVSE Conduit, EVSE Ready-Outlet, or EVSE) are required at all new residential construction. (PAMC)**
- Provide 30, 40 or 50A receptacle at main electrical service panel, or provide a receptacle for the required EVSE. This outlet may be used as a connection point for feeding main service from temporary power source for course of construction power. If the receptacle is to be installed at an exterior location, it must be a “while in use” type. (see illustration)
- The panel must be identified “Currently Powered By Alternate Power Source”.
- Main breaker must be turned off, locked out, and tagged out by qualified person when service is fed from temp power.

**☑ SMOKE AND CARBON MONOXIDE (CO) ALARMS**

**Smoke Alarm requirements**

- Smoke alarms over ten years must be replaced. If date is not indicated on existing smoke alarm it must be replaced. *CRC R314.3.2*
- Smoke alarms shall be listed and labeled in accordance with UL 217 and installed in accordance with the CBC and NFPA 72. Systems and components shall be California State Fire Marshal list and approved for the purpose for which they are installed. *CRC 314.1*
- **See FIGURE A-4 Smoke Alarms detail for required location.**
- Clearance:** Smoke alarms shall be located on the ceiling not less than 4” from a sidewall to the near edge or, if on sidewall, between 4” and 12” down from the ceiling to the top of the alarm. Maintain minimum 3’ clearance from any air supply, ceiling fan, or door opening to a bathroom. *CRC R314.3.4, NFPA 72-29.8.3*

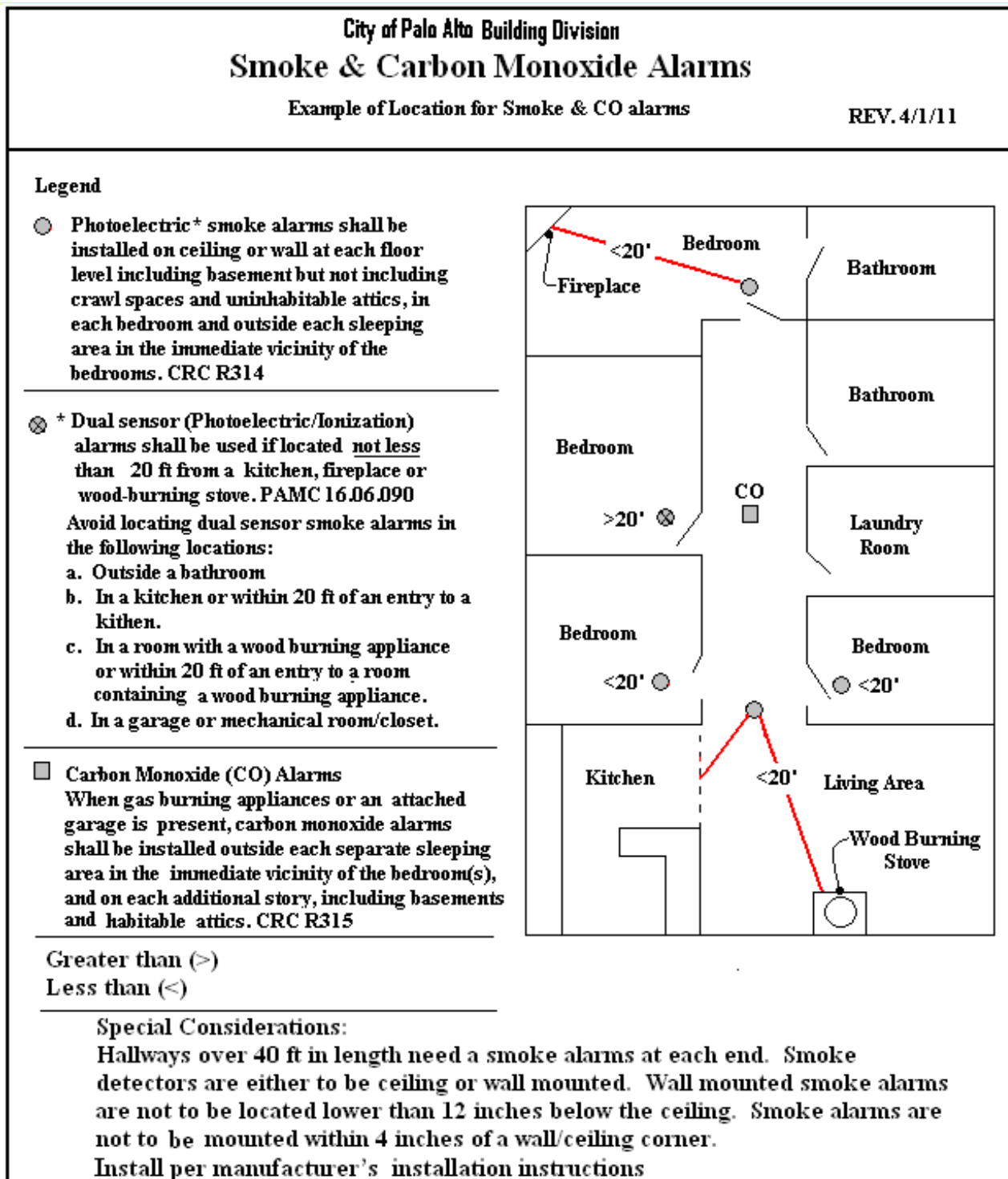
- **Photoelectric smoke alarms** shall be installed on ceiling or wall at each floor level including basement but not including crawl spaces and uninhabitable attics, in each bedroom and outside each sleeping area in the immediate vicinity of the bedrooms. *CRC R314.3*
- **Dual sensor (Photoelectric/Ionization)** alarms shall be used if located not less than 20ft from a kitchen, fireplace or wood-burning stove. *PAMC*
- **Power source and Interconnection:** Smoke alarms shall be interconnected, hardwired with battery backup except where alterations or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available which could provide access for interconnection without the removal of interior finishes. *CRC R314.3.1, R314.5*

### **Carbon Monoxide (CO) Alarms requirements**

- **New construction:** CO alarms shall be installed in dwelling units and in sleeping units within which fuel-burning appliances are installed and in dwelling units that have attached garages. *CRC R315.1*
  - **Existing construction:** CO alarms shall be installed where a permit is required for alterations, repairs or additions exceeding \$1,000, existing dwellings or sleeping units that have attached garages or fuel-burning appliances. *CRC R315.2*
  - Carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. *CRC 315.1*
  - Carbon Monoxide Alarm must be replaced within 10 years of the date of manufacture. *NFPA 720-9.6.1.8*
  - **CO Alarm location:** CO alarms shall be installed outside of each separate dwelling unit sleeping area, in the immediate vicinity of the bedroom(s), and on every level of a dwelling unit, including basements. *CRC R315.1.4*
  - **Power supply:** CO alarms must receive their primary power from a commercial source and be equipped with a battery back-up. Alarm wiring shall be directly connected to the permanent building wiring without a disconnecting switch other than that required for over current protection. *CRC R315.1.2*
- Exceptions:**
1. May be solely battery operated where no commercial power supply exist.
  2. May be solely battery operated, or plug in type with battery backup, in existing dwellings where repairs or alterations do not result in the removal of wall and ceiling finishes.
- **Interconnection:** Where more than one CO alarm is required the alarms shall be interconnected. *CRC R315.1.2*
- Exception:** Interconnection is not required in existing dwellings where repairs or alterations do not result in the removal of wall and ceiling finishes, and no previous method for interconnection existed.

**Multi-Purpose/Combo Alarms:** *Carbon monoxide* alarms combined with *smoke alarms* shall comply with all applicable standards, and requirements for listing and approval by the Office of the State Fire Marshal for smoke alarms, and must be listed to UL 217 for smoke alarms and UL 2034 for carbon monoxide alarm standards.

FIGURE A-4



**Alarm requirements:**

- Smoke alarms shall be listed UL 217 and California State Fire Marshal listed
- Carbon monoxide (CO) alarms shall be listed UL 2034 and UL 2075
- Combination carbon monoxide alarms combined with smoke alarms shall be



California State Marshal listed.

- Go to [California State Fire Marshal](#) website for the current list of approved State Fire Marshal smoke and CO alarms

**MECHANICAL**

- See "**Make Up Air**" check list for mandatory requirements. *Title 24 Energy Standards, and Make up air requirements per PAMC.*
- **Factory Built Fireplace:** See "Factory Built Fireplace" inspection guidelines for requirements.
- Not Allowed:** Flexible ducts and air connectors shall not pass through any fire-resistive-rated assembly. Flexible connectors shall not pass through any wall, floor or ceiling.
- Flood zone area:** Ducts shall be located above the base flood elevation (BFE). *CMC 603.6*
- Flood zone area:** Air exhaust and intake openings shall be located at or above the base flood elevation. *CMC 308.2.2*
- Bathroom:** Rooms containing bathtubs, showers, spas and similar bathing fixtures shall be mechanical ventilated. Exhaust ducts shall terminate outside the building and be equipped with a back draft damper. No exception for window. *CGBS 4.506.1*
- Bathroom Exhaust:** Ducts shall be installed and tape shall be listed. *CMC 602.4*
- Verify furnace in attic working clearance: Minimum 30" x 30" x 30") *CMC305*
- Laundry room makeup air:** Provide make up air per **dryer** manufacturer's installation instructions, but not less than an opening of 100 square inches for makeup air shall be provided in the door or by other approved means. *CMC 504.3.1*

**NOTE:** When installing an **exhaust fan** in a laundry room, provide adequate make up air (i.e. undercut / vented door or other approved method).

- Flex ducting** shall be secured per manufacturer's requirements but not to exceed 5' on center. Straps shall be a min. width of 1-1/2". See **[FIGURE A-1]** *CMC 603.5 and SMACNA HVAC Duct Construction Standards.*
- Environmental air duct exhaust** such as hoods, dryer and bathroom vents shall terminate a min. of 3' from property line and 3' from openings into a building. *CMC 504.5*
- Domestic Range Vents:** Ducts used for domestic kitchen range ventilation shall be of metal and shall have smooth interior surfaces. Ducts for domestic range hoods shall serve cooking appliances.

**Exception:** Ducts for domestic kitchen downdraft grill-range ventilation installed under a concrete slab floor shall be permitted to be of approved Schedule 40 PVC provided:

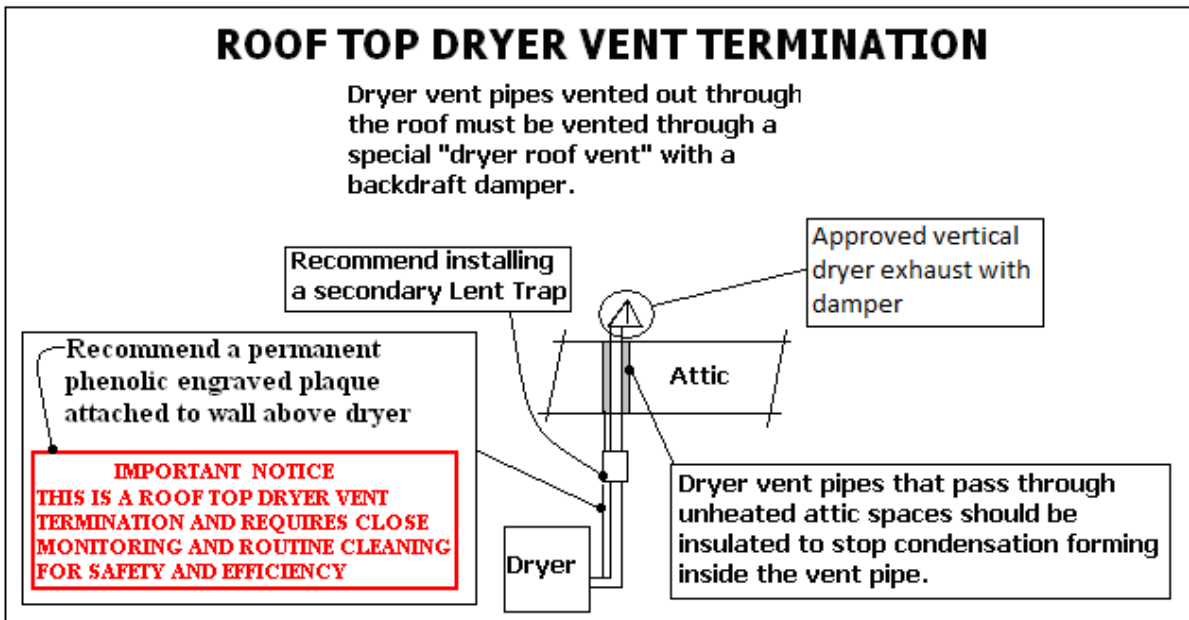
1. The under-floor trench in which the duct is installed shall be completely backfilled with sand or gravel.
2. Not more than 1" of 6" diameter PVC coupling shall be permitted to protrude above the concrete floor surface.
3. PVC pipe joints shall be solvent cemented to provide an air and grease tight duct.
4. The duct shall terminate above grade outside the building and shall be equipped with a back-draft damper.

**Dryer exhaust ducts:**

- **Fire Warning:** According to the U.S. Consumer Product Safety Commission, there is an average of 6,000 fires, 20 deaths, 210 injuries, and \$79.3 million property loss

annually due to clothes dryer fires, Several hundred people a year are also subjected to carbon monoxide poisoning from improper dryer vent setups. In some cases faulty appliances are to blame, but many fires can be prevented with proper dryer venting. (2010-2012 report)

- **GREEN TIP:** 90 degree long turn dryer elbow- overcomes length of run issues and increases efficiency. The DRYER-ELL has a longer radius and smooth interior that reduces friction. \_See Venders list for local supplier.
  - Round to square fitting transitions are not allowed. Round to square method causes lint build up creating a fire hazard.
  - Plastic pipe for dryer exhaust duct is not allowed.
  - In-line booster fans in under floor/crawlspace areas.
- In-line Booster Fan:** In-line booster fans are considered an Alternate Method and shall be pre-approved by City of Palo Alto prior to installation. This method is discouraged because of accessibility and maintenance issues. (Not allowed in under floor/crawlspace areas.) When approved, the fan shall have a min. 15' of duct clearance to the dryer outlet. **Exception:** *Provide a secondary lint filter installed between the dryer and the booster fan.*
- Roof Top Termination:** Roof top termination of dryer exhaust is discouraged because of maintenance issues. If no other option, recommend accessible lint collector above dryer. *See illustration below*
- Moisture Exhaust Duct:** Min. 4" diameter metal duct with smooth interior surfaces, joints in direction of air flow. (Screws and Flexible ducts are not allowed). *CMC 504.3.1*
- Length Limitation:** Unless otherwise permitted or required by the dryer manufacturer's instructions and approved by the Authority Having Jurisdiction, domestic dryer moisture exhaust ducts shall not exceed a total combined horizontal and vertical length of 14 feet including two 90 degree elbows. A length of 2 feet shall be deducted for each 90 degree elbow in excess of two. *CMC 504.3.1.2*
- Exhaust Duct Termination:** Duct shall terminate independently to the outside and be equipped with an approved back-draft damper (no screens). Termination shall be listed for roof/horizontal or wall/vertical termination and be no closer than 3' to any openings of the building, including underfloor air vents. *CMC 504.1*



## Plumbing

- If applicable, see attached **Island Venting** Illustration.
- Identify roof drain pipes with Label**

### Palo Alto Municipal Code Requirements

- If applicable, verify that **Backflow Prevention Device** is installed (water supply) *PAMC see backflow prevention inspection guidelines*
- Drainage piping serving fixtures with flood level rims located below one foot above the elevation of the next upstream manhole cover of the public or private sewer serving such drainage piping shall be protected from backflow of sewage by installing an approved backwater valve. Fixtures above such elevation shall not discharge through the backwater valve except as approved by the local administrative authority. On existing structures, the backwater valve may be installed on the private property sewer lateral upstream of the building's cleanout at the public right of way. *PAMC 16.08.110, CPC 710.2*
- **Materials CPC 701.1:** Drainage piping shall be of **\*cast iron**, galvanized steel, galvanized wrought iron, lead, **\*\*copper**, brass, stainless steel 304 or 316L, schedule 40 ABS DWV, schedule 40 PVC DWV, extra-strength vitrified clay pipe, or other approved material having a smooth and uniform bore, **except that:**
  - No galvanized wrought-iron, galvanized steel pipe, or stainless steel 304 pipe shall be used underground and shall be kept not less than 6 inches above ground.
  - ABS and PVC is allowed within commercial buildings except when piping is exposed within ducts or plenums. **Important:** highly recommend "solid core PVC"
- ABS and PVC installations are limited to residential construction not more than two stories of areas of residential accommodation. *[HCD 1 & 2] CPC 701.1.2 (a)*

\* **CPC 701.1 (6)** Cast-iron pipe and fittings shall be listed and tested in accordance with standards referenced in CPC Table 1401.1. Such pipe and fittings shall be marked with country of origin and identification of the original manufacturer in addition to markings required by referenced standards.

**\*\*CPA ORDINANCE 16.08.090 Section 701.1.4 amended – Materials.**

**NOTE: CPA Ordinance Supersedes the California Plumbing Code**

Section 701.1.4 of the California Plumbing Code is amended to read:

**701.1.4** Copper, copper alloys, lead and lead alloys, including brass, shall not be used for building sanitary sewer systems except for domestic waste sink traps and short lengths of associated connecting pipes where alternate materials are not practical.

Where permitted by the Building Official, copper tube for drainage and vent piping shall have a weight of not less than that of copper drainage tube type DWV.

**16.08.100 Table 7-1 amended - Materials for drain, waste, vent pipe and fittings.**

Footnote 1 is added to Table 701.1 to read as follows:

1. For limitations on the use of Brass and Copper (Type DWV) refer to Section 701.1.4.

**16.08.170 Section 1101.3 amended – Storm drainage, material uses.**

Section 1101.3 of the California Plumbing Code is amended to read:

**1101.3 Material Uses.** Rainwater piping placed within the interior of a building or run within a vent or shaft shall be of cast iron, galvanized steel, wrought iron, Schedule 40 ABS DWV, Schedule 40 PVC DWV, stainless steel 304 or 316L (stainless steel 304 pipe and fittings shall not be installed underground and shall be kept not less than six (6) inches (152 mm) aboveground), or other approved materials, and changes in direction shall conform to the requirements of Section 706.0. ABS and PVC DWV piping installations shall be installed in accordance with IS 5 and IS 9. Except for individual single-family dwelling units, materials exposed within ducts or plenums shall have a flame-spread index of a maximum of twenty-five (25) and a smoke-developed index of a maximum of fifty (50), when tested in accordance with the Test for Surface-Burning Characteristics of the Building Materials (see the Building Code standards based on ASTM E 84 and UL 723.).

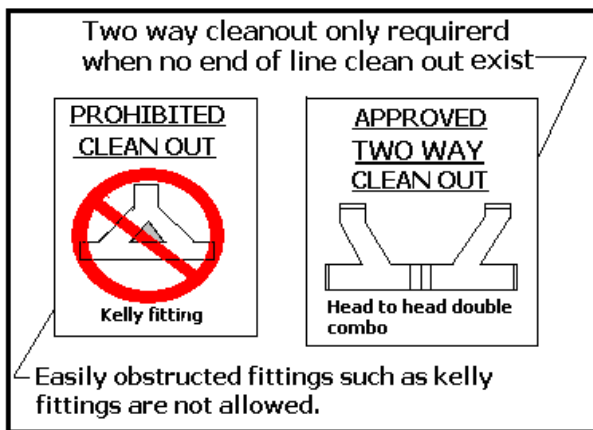
[HCD 1 & HCD 2] ABS or PVC installations are limited to not more than two stories of areas of residential accommodation.

- Horizontal Drainage Piping:** Horizontal drainage piping shall be run in practical alignment and a uniform slope of not less than ¼ inch per foot or 2 percent toward the point of disposal provided that, where it is impractical due to the depth of the street sewer, to the structural features, or to the arrangement of a building or structure to obtain a slope of 1/4 inch per foot or 2 percent, such pipe or piping 4 inches or larger in diameter shall be permitted to have a slope of not less than 1/8 inch per foot or 1 percent, where first approved by the Authority Having Jurisdiction. *CPC 708.1*
- Testing piping system:** Drain, waste, and vent (DWV) system shall be tested with no less than 10' of head water above the system for 15 minutes OR 5 psi air test for 15 minutes. *CPC 712.2* (Note: Plastic DWV piping shall not be tested by air test method)
- Tub test:** Fill the tub with water to the overflow. Have additional water ready to flood the overflow at inspection. (Must have the tub filled prior to inspection.)
- Water Pipe Testing:** Upon completion of a section or of the entire hot and cold water supply system, it shall be tested and proved tight under a water pressure not less than the working pressure under which it is to be used. Except for plastic piping, a 50 psi air pressure shall be permitted to be substituted for the water test. In either method of test, the piping shall withstand the test without leaking for a period of not less than 15 minutes. *CPC 609.4*
- Water Service:** Water service shall be tested prior to trench backfill.

- **Plastic water service pipe** requires blue insulated min. 18 AWG copper tracer wire. Plastic pipe is only allowed when not using water service as an electrical ground. Tracer wire must terminate above ground at each end of the plastic piping. CPC 604.8 Non-metallic pipe identification: A label shall be fastened to the main electric meter panel stating "**THIS STRUCTURE HAS A NON-METALLIC WATER SERVICE**". IAPMO Installation Standards 7-2008 (2.7.5)

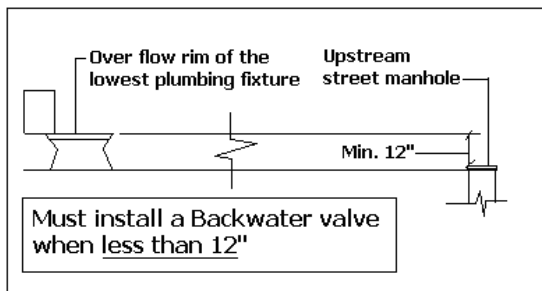
**Sewer line clean-out**

- Cleanout shall be approved type WYE, combo fittings or approved two way cleanout such as head to head double combos.
- Verify building sewer clean-out is within 2' feet of the building terminating at grade level. CPC 718.3
- Additional clean-outs are required at property lines, end of line, horizontal change of direction exceeding 135 degrees, and runs exceeding 100' in length. CPC 707.0 and 719.0
- Clean-out shall be installed so that it opens to allow cleaning in the direction of flow. CPC 719.4



**Backwater Valve**

- Drainage piping serving fixtures with flood level rims located below one foot above the elevation of the next upstream manhole cover of the public or private sewer serving such drainage piping shall be protected from backflow of sewage by installing an approved backwater valve. Fixtures above such elevation shall not discharge through the backwater valve except as approved by the local administrative authority. On existing structures, the backwater valve may be installed on the private property sewer lateral upstream of the building's cleanout at the public right of way. PAMC 16.08.110, CPC 710.2 See illustration below.



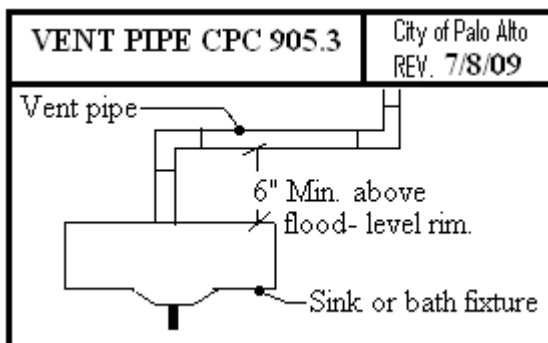
**New home requirements for backwater valve:**

- A licensed surveyor shall certify in written form that compliance with the ordinance 16.08.110 has been met and provide certification at time of inspection to include the following:
  - Surveyor's stamp, date, job address, and job permit number.
  - Elevation measurements from top of slab or the overflow rim of the lowest plumbing fixture to the top of the next upstream manhole.
  - A backwater valve is:  required       not required
- Backwater valves:** Cleanouts for drains that pass through a backwater valve shall be clearly identified with a permanent label stating "**BACKWATER VALVE DOWNSTREAM**". *CPC 710.1*

- Vent Size:** The size of vent piping shall be determined from its length and the total number of fixture units connected thereto, in accordance with Table 703.2. The diameter of an individual vent shall be not less than 1-1/4 inches nor less than one-half the diameter of the drain to which it is connected. In addition, the drainage piping of each building and each connection to a public sewer or a private sewage disposal system shall be vented by means of one or more vent pipes, the aggregate cross-sectional area of which shall be not less than that of the largest require building sewer, as determined from Table 703.2. Vent pipes from fixtures located upstream from pumps, ejectors, backwater valves, or other devices that obstruct the free flow of air and other gases between the building sewer and the outside atmosphere shall not be used for meeting the cross-sectional area venting requirements of this section.

*Exception:* Where connected to a common building sewer, the drainage piping of two or more buildings located on the same lot and under one ownership shall be permitted to be vented by means of piping sized in accordance with Table 703.2, provided the aggregate cross-sectional area of vents is not less than that of the largest required common building sewer. *CPC 904.1*

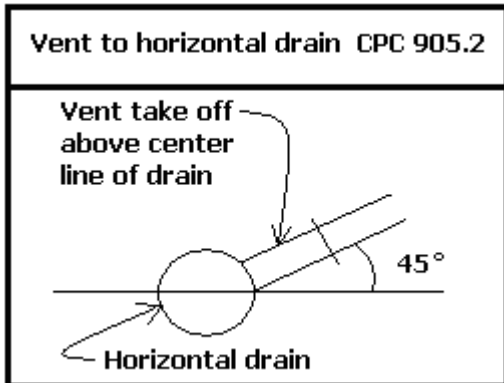
- Vent Pipe Rise:** Unless prohibited by structural conditions, each vent shall rise vertically to a point not less than 6 inches above the flood-level rim of the fixture served before offsetting horizontally, and where two or more vent pipes converge, each such vent pipe shall rise to a point not less than 6 inches in height above the flood-level rim of the plumbing fixture it serves before being connected to any other vent. *CPC 905.3*



- Vent Length:** Not more than one-third of the total permitted length, in accordance with Table 703.2, of a minimum-sized vent shall be installed in a horizontal position.
 

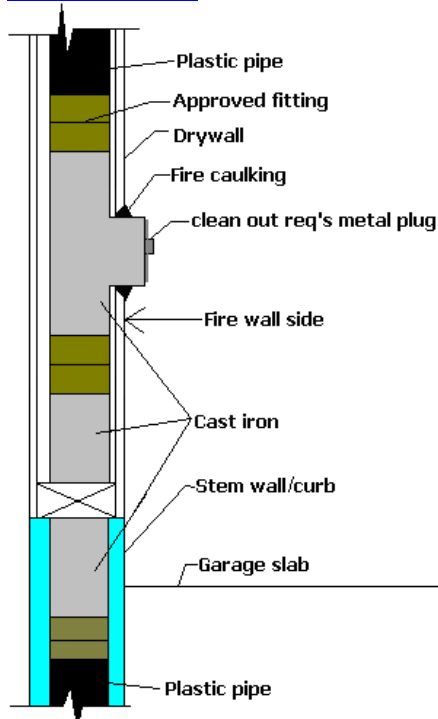
*Exception:* Where a minimum-sized vent is increased one pipe size for its entire length, the maximum length limitation shall not apply. *CPC 904.2*

- **Horizontal Drainage Pipe:** Where vents connect to a horizontal drainage pipe, each vent pipe shall have its invert taken off above the drainage centerline of such pipe downstream of the trap being served. *CPC 905.2*



- **Vent Termination:** Each vent pipe or stack shall extend through its flashing and shall terminate vertically not less than 6 inches above the roof nor less than 1 foot from a vertical surface. *CPC 906.1*
- **Vent Clearance:** Each vent shall terminate not less than 10 feet from, or not less than 3 feet above, an openable window, door, opening, air intake, or vent shaft, or not less than 3 feet in every direction from a lot line, alley and street excepted. *CPC 906.2*
- **Fire rated walls:** All plastic pipe such as condensate lines, vacuum lines, exhaust lines, drain lines, waste & vent lines require an approved U.L. tested fire stop collar or equivalent at fire rated wall/ceiling **OR** use cast iron. See **[FIGURE A-2]**
- Transitions fitting between metal and plastic pipe shall be listed for that use.

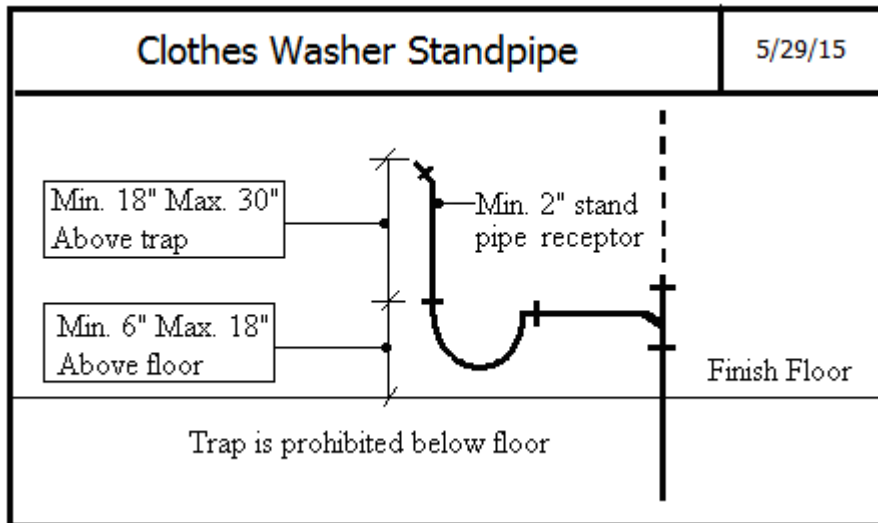
**FIGURE A-2**



- Island sink vent shall have an accessible cleanout on the vertical portion of the foot vent.  
*CPC 909.1*
- Check for steam showers requirements.
- Ejector vent shall be run separately through roof, vent size per Table 703.2 but never smaller than 1-1/2". *CPC 710.10*

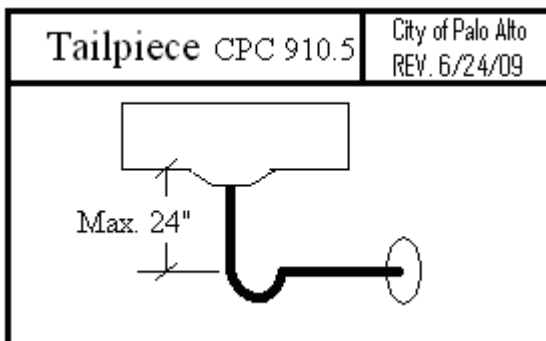
**Clothes Washer Standpipe Receptor: *CPC 804.1***

- Trap for washing machine shall not be installed below the floor.
- Trap shall be installed not less than 6" or more than 18" above floor.
- Stand pipe receptor shall not extend less than 18" or more than 30" above its trap.



**Tailpiece: *CPC 910.5***

- The vertical distance between a fixture outlet and the trap weir shall be as short as practicable, and not more than 24" in length.



**GAS**

- See attached **Gas Pipe Stub Out** detail for location requirements.
- See **Under Structure Gas Pipe** checklist, if applicable.
- Prohibited locations:** Gas piping shall not be installed in or through a circulating air duct, clothes chute, chimney or gas vent, ventilation duct, dumbwaiter, or elevator shaft. *CMC 1311.2.4, CPC 1210.2.3*
- Verify that WGW approved location of gas stub out prior to this inspection; a **green sticker** must be attached to gas stub out (call WGW @ 650-496-5940.) Where more than one gas meter exists, each separate gas meter shall be identified with a brass tag. *CPC 1208.6.4*



- Gas pipe stub out** shall extend a min. 4", max. 6" beyond face of wall. *WGW Assembly Standard 250-630*
- Gas pipe passing through outside wall shall be protected against corrosion by coating, wrapping or sleeve. Sleeved pipe shall be sealed at the annular space between the gas pipe and sleeve. **(Recommend prime and wrap with 2 layers of 20 mil tape)** *CPC 1210.2 and 1210.1.5*
- All branch piping in yard must be tied in prior to whole house gas test and shall be configured for isolated shut off lockable valve.
- Test gauges** shall have a pressure range **not greater** than twice the test pressure applied *CPC 318.5*
- Test pressure:** 10 PSI ON A 15 PSI GAGE FOR 15 MINUTES. *CPA Policy, CPC 1213.3*
- Gas Shut-off valve** shall be accessible rigid piping upstream from the flexible connector and within 6' of the gas appliance. *CPC 1211.5*
- Shutoff valves installed in firebox of fire place shall be installed per manufacture instructions.
- Gas pipe penetration into fireplace shall be sealed with refractory sealant.

**WINDOW EGRESS/SAFETY** (Open all egress windows for inspection)

- See attached **Egress Windows** detail for sizing requirements.
- Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening, with the bottom of clear opening not more than 44 inches above finished floor. *CRC 310.1*
- All emergency escape and rescue opening shall have a minimum net clear opening of 5.7 square feet. *Exception:* Grade floor openings shall have a minimum net clear opening of 5 square feet. *CRC 310.1.1*
- Minimum net clear openings height shall be 24 inches, minimum net clear opening width shall be 20 inches. *CRC 310.1.2 and 310.1.3*
- Openable windows 72" inches or more above exterior grade must be at least 24" above the finished interior floor OR no opening to window that would allow 4" sphere OR install window guards complying with ASTM F 2006 OR F 2090. *CRC 312.2.1*

**FRAMING**

- See **Cutting and Notching** Table
- Use 2x6 studs when plumbing pipes are over 3", the max. hole size is 3-5/8" for 2x6. 2x4 studs max. hole size is 2-1/8".
- Secure insulation in exterior walls behind manufactured fireplaces and one-piece tub/showers & light wells.
- Engineered wood products shall be notched and bored per manufactured recommendations.
- Install MST straps or nail plates for over notched/bored members.
- Verify insulation baffles installed at eave blocks.

**FIRE BLOCKING AT CEILING AND FLOOR PENETRATIONS, AND TOP AND BOTTOM PLATE OF WALLS:**

- Approved Materials: Approved foam and caulking shall be certified materials that resist the free passage of flame and the products of combustion.
- Fire blocking shall be installed at openings around vents, pipes, tub & shower traps, ducts, electrical wires, chimneys and fireplaces at ceiling and floor levels with approved materials.
- Fire caulk must be listed for fire sprinkler plastic pipes (e.g. CPVC, PVC, ABS etc...)**
- Fire rated duct wrap must be continues through walls and floors.
- Plastic pipes require fire stop collars at all fire rated walls and ceiling or use metallic pipe.
- Firestop at soffit, trayed or dropped ceilings and mechanical chases.
- Insulate/firestop under bath tub cutout.
- Fireplaces shall have hearth thermal barriers installed. (Micore, Cerrafoam, etc.) and shall be CPA Inspected prior to covering with tile/stone.

**LIGHTING**

- Title 24 lighting requirements—see checklist
- Verify kitchen lighting complies with Title 24 page of plans.
- Furnace location: Verify lighting and receptacle outlets are installed in attic or underfloor locations were furnace is located.
- All luminaries (fixtures) installed in wet locations shall be marked "Suitable for Wet Locations". Damp locations shall be marked "Suitable for Damp Locations" *CEC 410.10(A)*
- Fan and Light/fan combo may require GFCI protection in wet/damp locations. Install per manufacturers instructions. (provide Inspector with manufacturers instructions)
- Exhaust fans and light/fan combo shall be **separately switched** from the lights. *Energy Code 150(k)(2)(B)*.
- Verify that light cans are AIR TIGHT at top floor ceiling or attic space, and IC rated if recessed into insulated ceilings. *Energy Code 150(k)(8)*
- LED lighting assemblies shall be listed and CEC approved. LED light components **are not allowed** to be used with HALO or other housing/cans.

**TITLE 24 ENERGY** See "Title-24 Energy" checklist

- Verify **windows and skylights** U-factor and SHGC comply with CF-1R report.
- When required Home Energy Rating Systems (HERS) field verification and diagnostic testing shall be performed prior to closing walls.
- Verify duct insulation R-value (if insulation wrap is used, must provide bag to verify number of wraps required for installed R-value.)
- Verify 4-side blocking at ceiling AC cans and min. 2-side blocking on mechanical exhaust openings unless otherwise required by manufacturer.
- Verify that UL-181B listed tape is used at all duct connection.
- Duct work shall not be restricted.
- Verify height of attic mechanical platform from face of ceiling to bottom of platform for insulation value to be installed.

**DETACHED GARAGE**

- A minimum of one wall switched controlled lighting outlet shall be installed to provide illumination on the exterior side of outdoor entrances or exits. (man door) Exception: A

vehicle door in garage shall not be considered as an outdoor entrance or exit. *CEC 210.70(A)(2)(a&b)*

- A minimum of one receptacle outlet is required in a detached garage with electrical power in addition to any provided for laundry equipment. *CEC 210.52 (G)*
- GFCI protection at all electrical receptacles. *CEC 210.8(A)(2)*
- Exposed electrical cable within 7' from the floor shall be protected with rigid metal conduit, electrical metallic tubing or schedule 80 PVC rigid nonmetallic conduit extending at least 6" above the floor. *CEC 398.10(C), 334.15(B)*

**TYPE OF HOOD REQUIREMENTS**

There have been a number of new cooking appliances introduced to the food service industry over the past several years, which has raised questions to the type of hood required for a specific cooking appliance. This chart will provide direction for our commercial food service customers in determining the type of hood that is appropriate for a particular appliance.

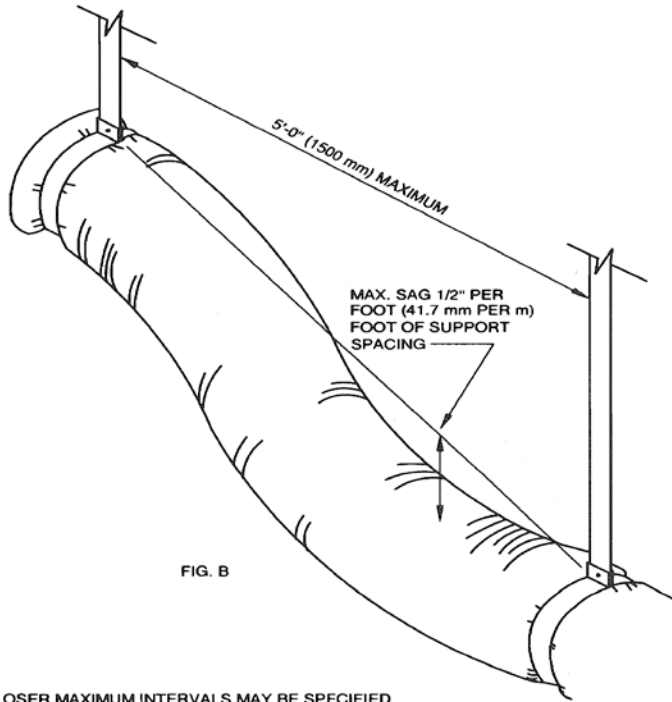
| <b>Light-duty</b>                    | Type I | Type II | No hood |
|--------------------------------------|--------|---------|---------|
| Cheesemelters                        | x      |         |         |
| Coffee makers                        |        |         | x       |
| Convection/steamer ovens             | x      |         |         |
| Deck-style pizza ovens               | x      |         |         |
| Egg cookers                          |        |         | x       |
| Electric Convection ovens (single)   |        |         | x       |
| Electric Convection ovens (multiple) |        | x       |         |
| Gas Convection ovens                 | x      |         |         |
| Holding/warming ovens                |        |         | x       |
| Hot dog cookers                      |        |         | x       |
| Popcorn poppers                      |        |         | x       |
| Retherm ovens (single)               |        |         | x       |
| Retherm ovens (multiple)             |        | x       |         |
| Revolving ovens                      | x      |         |         |
| Rice cookers                         |        |         | x       |
| Roasting ovens                       | x      |         |         |
| Standard ovens                       | x      |         |         |
| Steam tables, electric               |        |         | x       |
| Steam tables, gas fired              |        | x       |         |
| Steamers                             |        | x       |         |
| Steam-jacketed kettles               |        | x       |         |
| Toasters (counter-top)               |        |         | x       |
| Toasters (conveyor style)            |        | x       |         |

| <b>Medium-duty</b>              | Type I | Type II | No hood |
|---------------------------------|--------|---------|---------|
| Conveyor pizza ovens            | x      |         |         |
| Donut fryers                    | x      |         |         |
| Double-sided griddles           | x      |         |         |
| Electric discrete-element range | x      |         |         |
| Griddles                        | x      |         |         |
| Hot-top ranges                  | x      |         |         |
| Kettle fryers                   | x      |         |         |
| Open deep-fat fryers            | x      |         |         |
| Pasta cookers                   |        |         |         |
| Pressure fryers                 | x      |         |         |
| Tilting skillets                | x      |         |         |

| <b>Heavy-duty</b>      | Type I | Type II | No hood |
|------------------------|--------|---------|---------|
| Gas conveyor broilers  | x      |         |         |
| Gas open burner ranges | x      |         |         |
| Salamanders            | x      |         |         |
| Under-fired broilers   | x      |         |         |
| Upright broilers       | x      |         |         |
| Wok ranges             | x      |         |         |

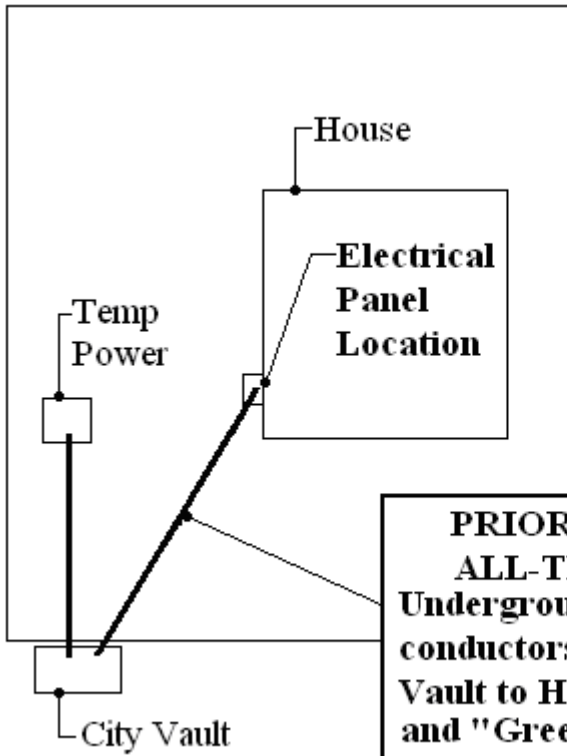
| <b>Extra Heavy-duty</b> | Type I | Type II | No hood |
|-------------------------|--------|---------|---------|
| Solid-fueled appliances | x      |         |         |

**FIGURE A-1**



CLOSER MAXIMUM INTERVALS MAY BE SPECIFIED AS A CONDITION OF U.L. LISTING, PARTICULARLY IN FIRE RATED FLOOR - CEILING ASSEMBLIES.

**FIGURE A-3**



**IMPORTANT**

Contractor must schedule an inspection with Utilities before entering the City of Palo Alto Utilities electrical vault. Contact Scott Wilt at 650-496-6977

**PRIOR TO BUILDING DEPT. ALL-TRADES INSPECTION**  
Underground conduit and service conductors shall be installed from City Vault to House Elect. panel location and "Green Tagged" by Utilities Dept.