

Listed Vent Cap (Note 22)

Storm Collar

Roof Flange

Hot Water Line (Note 5)

Vent Connector (Note 24 to 27)

Flexible Connectors (Note 10)

Draft Hood (Note 27)

Location for Dielectric Connection if required (Note 6)

2X4 Stud wall

Provide bollard protection where water heater is located in a vehicle area. (Note 16)

Burner Cover

18" Min. to source of ignition above garage floor (Note 15)

Support platform

Labeled Vent Pipe: Type B or L

- Type B Vent - double wall for concealed or non-concealed spaces.
- Type L Vent - single wall for non-concealed spaces.

Expansion Tank (where required Note 7)

Cold Water Line, Full-way Shutoff Valve, and Flex Connector (with union type joints). (Note 5)

Required R-4 insulation on the first 5' of water lines, required for both hot and cold lines, is not shown for clarity. (Note 9)

Approved Temperature and Pressure Relief Valve (T&P Valve)

Anchor brackets to studs in wall so that it will not displace during earthquakes.

Approved earthquake strapping method, straps shall be within the top and bottom 1/3 of the water heater. The bottom strap shall be a min. of 4" above the controls. (Note 1)

Manufacturer's label, installation information, Energy Label, First Hour Rating, and other information. (Note 2)

Accessible Gas Shut-off Valve and Flex Connector (with union type joints) (Note 4)

Gas line Sediment Trap (min 3") with removable cap (Note 8)

T&P Valve drain pipe, draining to the outside (copper or galvanized only), terminate facing down 6" to 24" above grade with no threads on the end of the pipe. Slope to pipe to drain. Drain size shall not be less than the size of the relief valve outlet. (3/4" Min.)

Maintain fire protection behind stand at garage condition.

4" Min. above the controls

Drip pan drain (Note 13)

Drip Pan (Note 12)

This information is intended to provide general guidance on the installation of gas water heaters in single family residences. It summarizes information contained in the California Plumbing Code (C.P.C.) and the City Building Code, but does not replace it. Manufacturer's installation instructions are an integral part of the installation requirements and shall be followed accordingly. If conditions are encountered that are not covered herein, the codes need to be consulted. Copies of the code can be reviewed in many libraries or at your local building department.

WATER HEATER

HELP FOR THE HOMEOWNER

BUILDING AND ENGINEERING

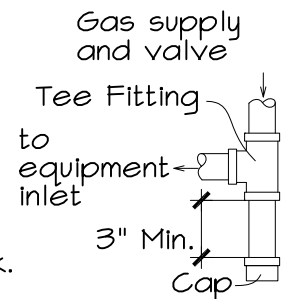


Steve Newman 5/23/19
 Deputy Building Official: Date

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NOTES

1. Most home improvement stores sell kits to anchor strap water heaters. These kits must be approved by the State of California, State Architect. This is demonstrated by the seal of the State Architect, which looks like a sea-shell with "ACCEPTABLE METHOD" written below. Install these kits per the manufacturer's instructions. Other methods which have been approved by the State Architect may be submitted to the Building Official for approval.
2. Manufacturer's labels include instructions for installation and requirements for required clearances from combustibles and other important information, so it is important to review this information prior to installation.
3. Access to water heaters must be provided. The opening to water heater closets must be at least 24" wide and large enough to remove the heater. See the code for additional requirements.
4. Fuel gas piping flex connectors must be approved for the type of installation, exterior or interior grade, based on the location.
5. The inlet and outlet water lines must be at least 6" above and 6" away from the draft hood. Provide a full-way valve on the inlet side of the heater.
6. Mixing of dissimilar metals is not permitted, unless dielectric insulators are used in the connections.
7. Expansion Tank is required if the home also has fire sprinklers. A water system with a check valve, backflow preventor or other normally closed device that prevents dissipation of building pressure back into the water main, independent of the type of water heater used, shall be provided with an approved, listed, and adequately sized expansion tank or other approved device having a similar function to control thermal expansion.
8. Sediment Traps catch sediment and contaminate in the gas line. Where a sediment trap is not incorporated as a part of the appliance, a sediment trap shall be installed downstream of the appliance shutoff valve as close to the inlet of the appliance, as practical, before the flex connector (As illustrated on the drawing to the right.)
9. Water piping line insulation thickness shall be a minimum of 1" (for pipes 1" or smaller.). The following conditions require insulation:
 - The first 5 feet of hot and cold water pipes from the storage tank.
 - All piping with a nominal diameter of 3/4" or larger.
 - All piping part of a hot water recirculation system.
 - Piping from the heating source to storage tank or between tanks.
 - Piping below grade (in addition the pipes that are buried below grade must be installed in a water proof and non-crushable casing or sleeve.
 - All hot water pipes from the heating source to the kitchen fixture.
10. Flexible connection shall be 24" maximum length. PEX, PEX-AL-PEX, PE-AL-PE, or PE-RT tubing shall not be installed within the first 18 inches of piping connected to a water heater.



For continuation of numbering see next page.

LOCATION REQUIREMENTS

11. Prohibited Locations - Gas fired water heaters, which depend on the combustion of fuel for heat, shall not be installed in the following locations (Exception direct vent water heaters):
 - A room used or designed to be used for sleeping purposes;
 - A bathroom;
 - A clothes closet; or in a closet or other confined space opening into a bathroom or bedroom.
12. Provide a drip pan where water heater leakage may cause damage, provide a drain line to an approved location (such as an exterior sidewalk or planter area.)
13. Drip pan - A drip pan shall be at least 2" deep and 2" wider than the unit, must be provided with a drain to the outside or an approved fixture.
14. Exterior Installation - The water heater must be located on a level concrete slab at least 3" above grade and located in an approved enclosure.
15. Garage Installation - The burner for the water heater must be located at least 18" above the floor to preclude the ignition of combustible vapors, unless the water heater is Flammable Vapor Ignition Resistant (F.V.I.R.).
16. Garage Location - The water heater must be protected from vehicular damage, usually by means of a bollard (3" min. steel pipe filled with concrete embedded in the slab.)
17. Change of Water Heaters - Water heaters replaced in the same location must be installed per the manufacturer's installation instructions. Water heaters which are relocated must comply with all new code requirements.
18. New Water Heater or New Locations - Systems using gas or propane water heaters to serve individual dwelling units shall include the following components:
 - A 120 V electrical receptacle that is within 3 feet from the water heater and accessible to the water heater with no obstructions; and
 - A Category III or IV vent, or a type B vent with straight pipe between the outside termination and the space where the water heater is installed; and
 - A condensate drain that is no more than 2 inches higher than the base of the installed water heater, and allows natural draining without pump assistance; and
 - A gas supply line with a capacity of at least 200,000 Btu/hr.

COMBUSTION AIR

19. Fuel burning water heaters must be provided with air to assure proper combustion of fuel and ventilation. The required size of combustion air openings is detailed in the C.P.C. For water heaters 50 gallons or less, a combustion air duct of 25 sq. in. (6" round) is required. The combustion air duct can take air from the outside of the building or a ventilated attic (min. of 30" in height).
20. Combustion air openings must be placed so that one-half of the required air supply enters the water heater enclosure within 12" of the ceiling and one-half enters within 12" of the floor. The cross section of the duct cannot be less than 3" in the smallest dimension and a total area not less than 100 square inches. They shall be at least 10' from the return air inlet of a blower-type furnace.
21. For larger water heaters, multiple fuel burning appliances in a single area, or if different duct sizes are used, review the code for the combustion air requirements.

For continuation of numbering see next page.

QUICK NOTE ON TANKLESS WATER HEATERS

Tankless water heaters are becoming more popular. Some items to be aware of are the requirements that electrical outlet must be added to the location. Venting requirements change and vents must be redone. Gas demand of a tankless water heater can be 3 to 5 times greater requiring the gas lines be replaced to enlarge them. Condensate lines requirements also change. Most require special configurations based on the model and maker of the appliance.



WATER HEATER

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Steve Newman

5/23/19

Deputy Building Official:

Date

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SIZING WATER HEATERS

Code requires that water heaters be sized per the table to the right.

Number of Bathrooms	1 to 1.5			2 to 2.5				3 to 3.5			
Number of Bedrooms	1	2	3	2	3	4	5	3	4	5	6
First Hour Rating ² , Gallons	42	54	54	54	67	67	80	67	80	80	80

Notes:

¹ The first hour rating is found on the "Energy Guide" label.

² Non-storage and solar water heaters shall be sized to meet the appropriate first hour rating as shown in the table.

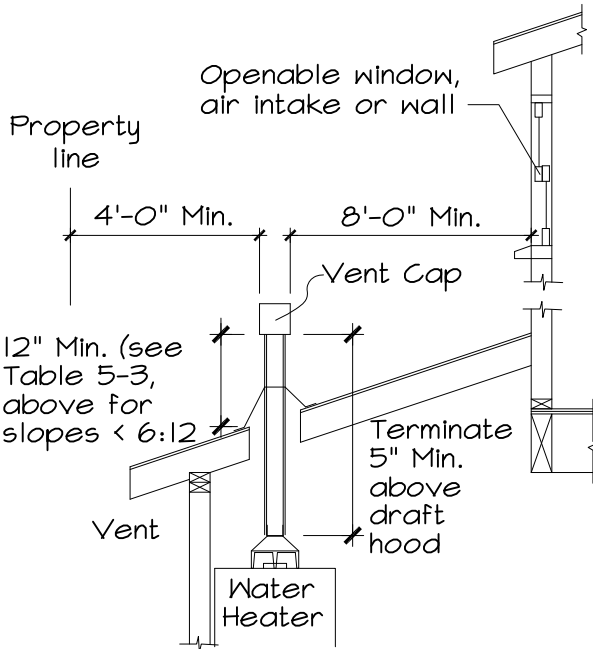
VENTING REQUIREMENTS

22. Vents must terminate in accordance with the drawings below.
23. Single wall vent connectors must be fastened with sheet metal screws, rivets, etc.
24. Single wall vent connectors must start and end in the same space as the heater and cannot be concealed.
25. Provide separation to combustibles as required by labeling requirements of vent pipe selected. (6" Type "L" and 1" Type "B" Typical.)
26. Bucket or Thimble - required where vent penetrates in to a concealed space such as a floor ceiling, wall, or roof ceiling assembly.
27. Vent Connectors - same size as the draft hood.
 - They must slope up from the draft hood to the vent at least 1/4" per foot.
 - The total horiz. length of the system, including vent and vent connector, must not exceed 75% of the vertical height of the vent.

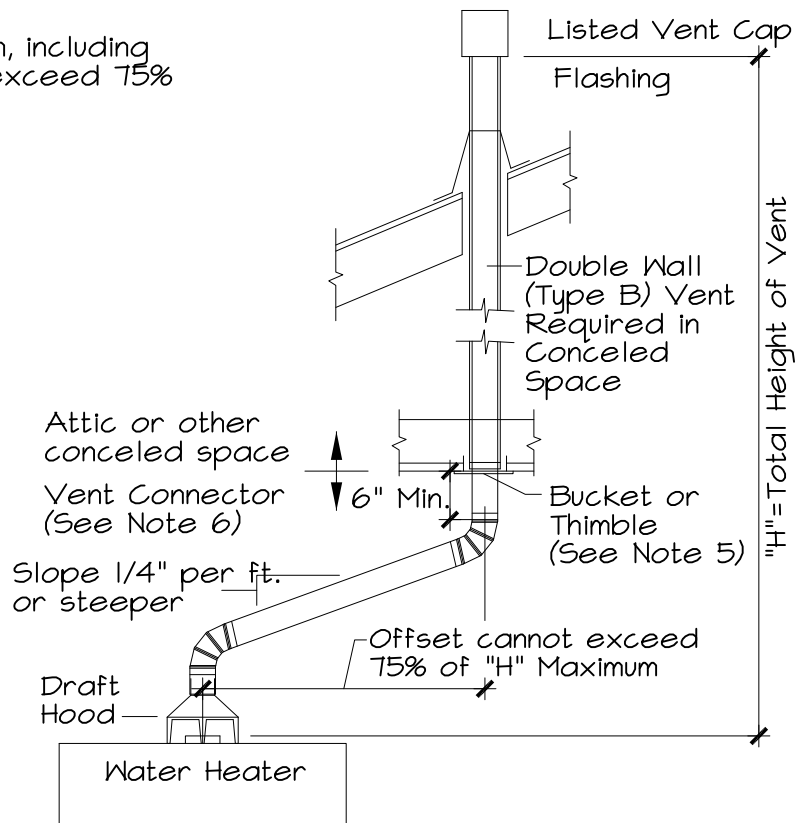
TABLE 5-3 CPC

Roof Slope Rise/Run (Min. to Max.)	Height Above Roof to Lowest Discharge
Flat to 6/12	12"
6/12 to 7/12	1'-3"
7/12 to 8/12	1'-6"
8/12 to 9/12	2'-0"
9/12 to 10/12	2'-6"
10/12 to 11/12	3'-3"
11/12 to 12/12	4'-0"

Consult code for slopes above 12/12



VENT TERMINATION



VENT AND VENT CONNECTOR



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