CITY OF PALO ALTO

DEVELOPMENT SERVICES – BUILDING INSPECTION

INSPECTION GUIDELINES: TANKLESS WATER HEATER

INSPECTION CODE: 503

SCOPE: RESIDENTIAL AND COMMERCIAL

APPLICABLE CODES: 2016 CBC, CRC, CPC, CMC, CEC, CALGreen, CEnC, and PAMC

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.

IMPROTANT

☐ Failure to complete items below prior to inspection may result in a re-inspection fee.

EXPANSION TANK

☐ An expansion tank is required when the water system is a "closed loop". A system is considered a closed loop when a water regulator and or back flow prevention device such as the Reduced Pressure backflow preventer (RP) is installed. Such device shall be installed on the building side of the check valve, backflow preventer, or other device and shall be sized and installed in accordance with manufacturer's installation instructions. (CPC 608.3)

INSPECTION

GENERAL REQUIREMENTS

☐ Tankless Water Heaters shall be installed per manufacturer's installation instructions. Installation instructions shall be onsite and available to inspector. (CPC 507.24)

☐ Verify water heater is listed for location interior/exterior. (CPC 507.24)

☐ Verify water heater clearances from combustibles as specified in the manufacturer's installation specification and listing i.e. sides, top, back. Exterior models verify clearance to ventilated and unventilated soffit or other overhang. (CPC 504.3.1)

☐ Where a water heater is located in an attic or on an attic-ceiling assembly, floor-ceiling assembly, or floor-subfloor assembly where damage results from a leaking water heater, a watertight pan of corrosion-resistant materials shall be installed beneath the water heater with not less than 3⁄4" drain to an approved location. Such pan shall be not less than 1 1⁄2" in depth. (CPC 507.5)

☐ When a tankless water heater is installed on an interior wall, the wall shall be protected from water leakage with sheet metal at water heater location to the floor.

- ☐ Water heater must be provided with an approved, listed, adequately sized combination temperature and pressure-relief valve. (CPC 608.3)

- ☐ Temperature pressure valve shall be drained to the exterior and terminate toward the ground or flood level of the area receiving the discharge and pointing downwards not less than 6” above the ground, nor more than 24”. The diameter of the valve opening shall be ¾” and must be maintained to the termination of the drain. Discharge from a relief valve into a water heater pan shall be prohibited. (CPC 608.5)

- ☐ Verify expansion tank for “closed loop systems”. Expansion tank shall be seismically braced or secured and installed per manufacturer’s installation instructions. (CPC 608.3)

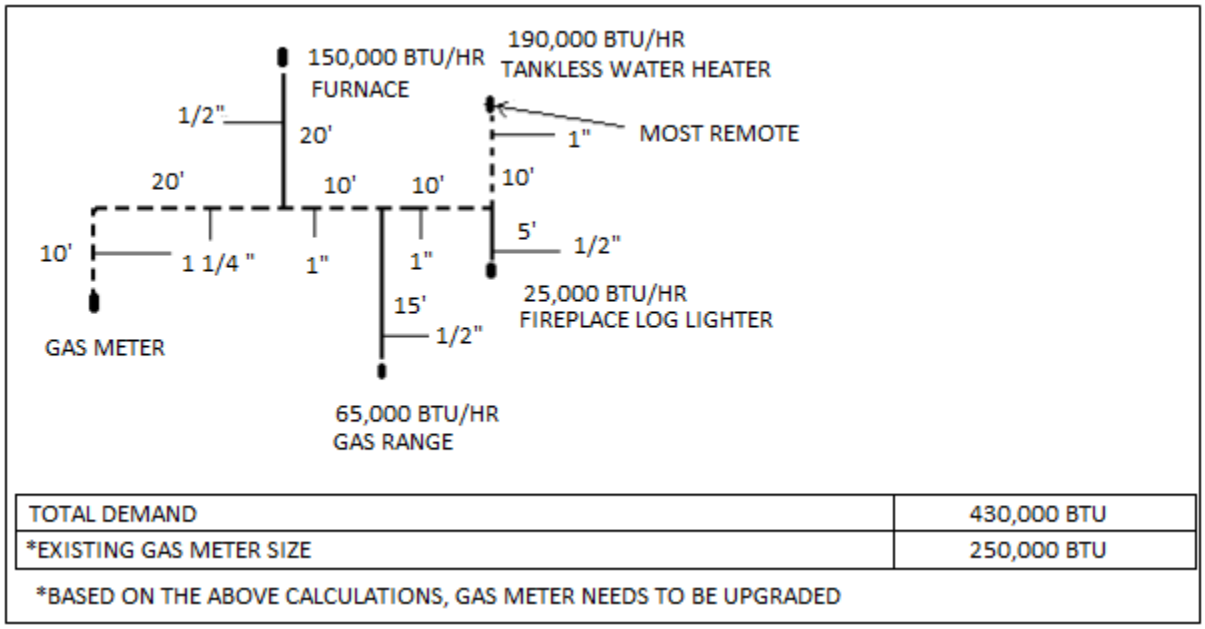
- ☐ A full way shutoff valve is required on cold water piping to water heater. (CPC 606.2)

- ☐ A union must be installed within 12” of water heater to facilitate removal. (CPC 609.5)

- ☐ Insulate first 5’ of hot and cold pipe at the water heater. (CEnC 150.0(J))

- ☐ Bond the hot water pipe to cold water pipe to gas pipe. (CEC 250.104)

- ☐ City of Palo Alto approved single line diagram shall be available during inspection. Inspector shall verify proper gas sizing and gas piping is properly secured. See figure CPA 058 below.



TOTAL DEMAND	430,000 BTU
*EXISTING GAS METER SIZE	250,000 BTU

*BASED ON THE ABOVE CALCULATIONS, GAS METER NEEDS TO BE UPGRADED

Figure CPA 058—Example Single Line Gas Diagram

- ☐ A whole house gas test is required when any modifications are made to gas line piping excluding gas connector. If applicable see Whole House Gas Test for checklist. (CPC 1213.1.3

- ☐ Verify proper gas meter size. (CPC 1208.4)

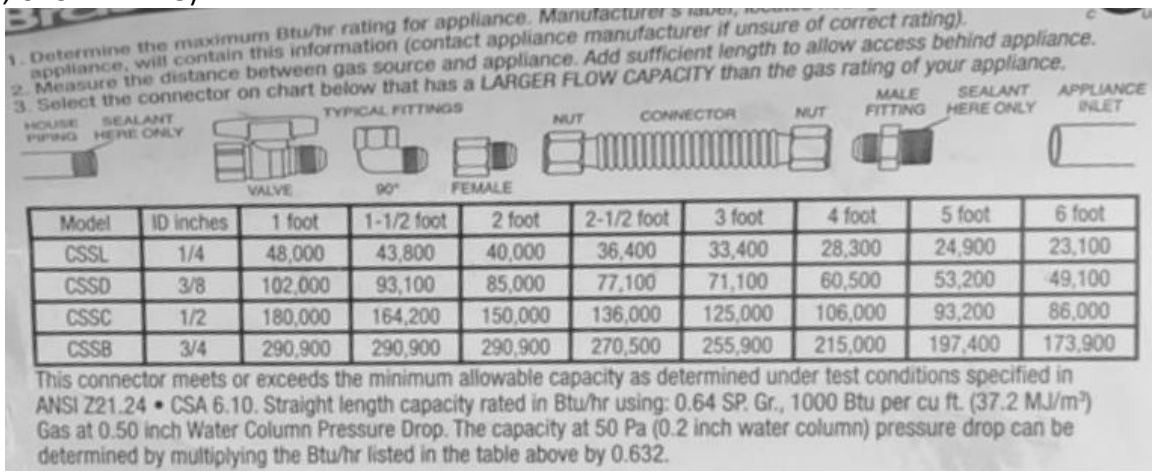
- ☐ If a meter upgrade is required, gas stub out location shall be approved and Green Tagged by Water Gas Waster Water Utilities prior to inspection. Contact Utilities Operations at (650) 496-5940 to schedule a green tag inspection.

- ☐ An accessible gas shut off valve is required within 6' of the unit. (CPC 1212.15)

- ☐ Gas piping shall not be used as a grounding conductor or electrode (CPC 1211.3)

- ☐ Gas piping shall be seismically braced and secured. (CPC 1210.2.4)

- ☐ Gas connector shall be sized for the load of the water heater, the connector shall be of the minimum practical length. The existing old connector shall not be reused when replacing water heater. (CPC 1208.4, CPC 1212.4.3)



Model	ID inches	1 foot	1-1/2 foot	2 foot	2-1/2 foot	3 foot	4 foot	5 foot	6 foot
CSSL	1/4	48,000	43,800	40,000	36,400	33,400	28,300	24,900	23,100
CSSD	3/8	102,000	93,100	85,000	77,100	71,100	60,500	53,200	49,100
CSSC	1/2	180,000	164,200	150,000	136,000	125,000	106,000	93,200	86,000
CSSB	3/4	290,900	290,900	290,900	270,500	255,900	215,000	197,400	173,900

This connector meets or exceeds the minimum allowable capacity as determined under test conditions specified in ANSI Z21.24 • CSA 6.10. Straight length capacity rated in Btu/hr using: 0.64 SP. Gr., 1000 Btu per cu ft. (37.2 MJ/m³) Gas at 0.50 inch Water Column Pressure Drop. The capacity at 50 Pa (0.2 inch water column) pressure drop can be determined by multiplying the Btu/hr listed in the table above by 0.632.

Figure CPA 068 – Example Flex Connector Sizing Label

- ☐ Where a sediment trap is not incorporated as part of the appliance, a sediment trap shall be installed downstream of the appliance shut off valves as close to the inlet of the appliance as practical, before the flex connector. (CPC 1212.8)

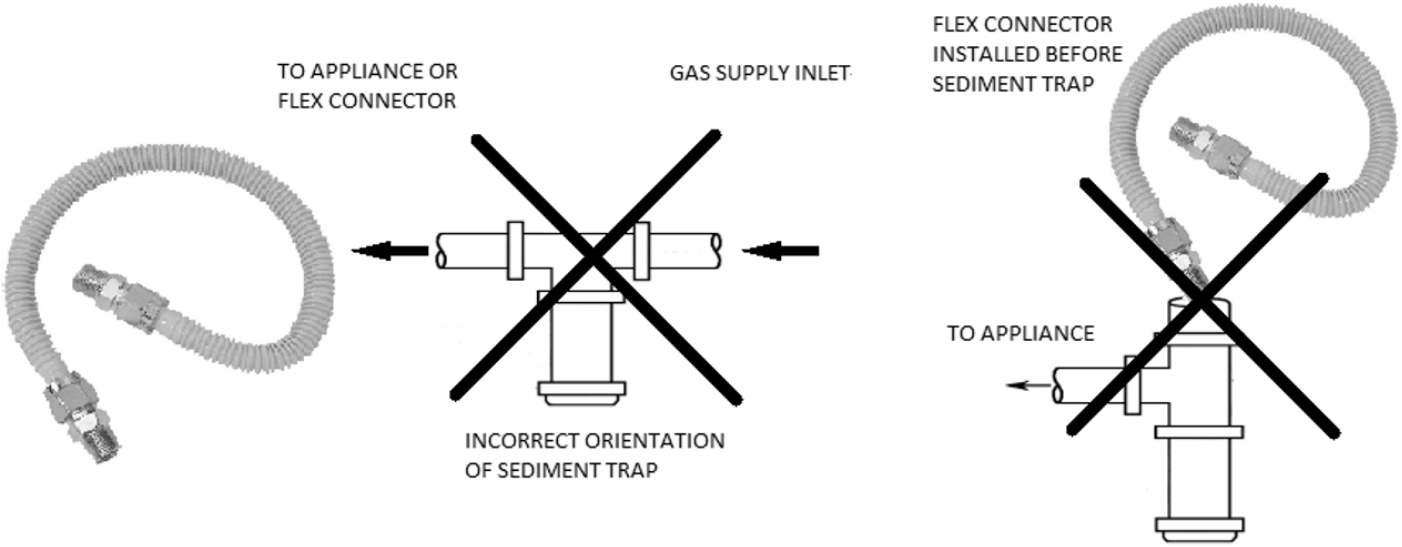


Figure CPA 065 – Improper Installations of Sediment Trap

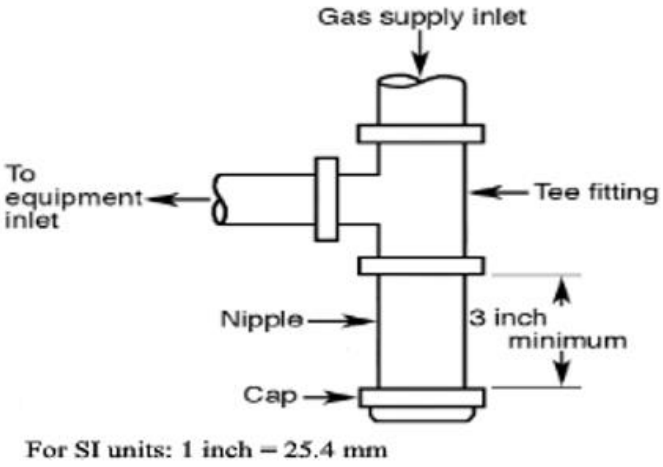


FIGURE 1212.8
METHOD OF INSTALLING A
TEE FITTING SEDIMENT TRAP
[NFPA 54: FIGURE 9.6.7]

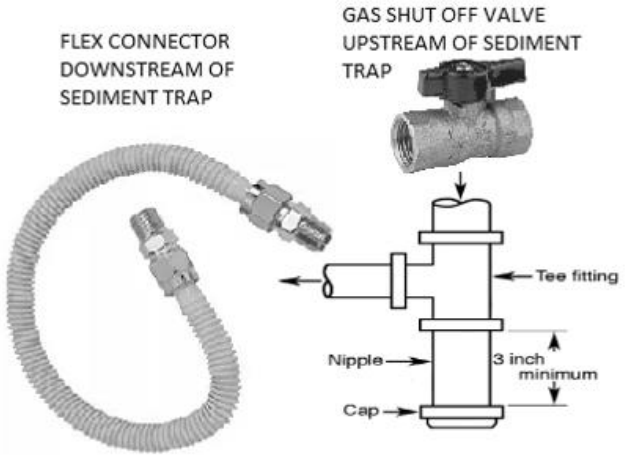


Figure CPA 066 – Correct Installation of Sediment Trap

COMBUSTION AIR

- ☐ Provide combustion air per manufacturer's installation requirements. (CMC 701.1)
- ☐ Combustion air typically required for garage installation. (CMC 701.4.1)
- ☐ See "Combustion Air for Gas Appliances" checklist.

VENTING

- ☐ Category II, III, and IV venting systems shall be sized and installed per the manufacturer's installation instructions. (CPC 802.6.3.3)
- ☐ Provision shall be made to collect and dispose of condensate from venting systems serving Category II and Category IV appliances. (CMC 802.9)

- ☐ Condensate shall be discharged to an approved plumbing fixture or disposal area. Where discharged into the drainage system, equipment shall drain by means of an indirect waste pipe. Waste pipe must be sloped a minimum of 1/4” per foot. (CPC 814.1)

- ☐ Through-the-wall vent terminations shall terminate not less than 3’ above a forced air inlet within 10’. (CMC 802.8)

- ☐ The vent terminal of a direct-vent appliance with an input of 10000 Btu/h or less shall be located not less than 6” from an air opening into a building, and such an appliance with an input over 10000 Btu/h but not exceeding 50000 Btu/h shall be installed with a 9” vent termination clearance, and an appliance with an input exceeding 50000 Btu/h shall have not less than a 12” vent termination clearance. The bottom of the vent terminal and the air intake shall be located not less than 12” above finished ground level. (CMC 802.8.2)

CLOSET INSTALLATION

- ☐ Water heater installed in a closet located in a bedroom or bathroom shall have a listed, gasketed door assembly and a listed self-closing device with no hold open mechanism. The door assembly shall be installed with a threshold and bottom door seal. All combustion air shall be obtained from the outdoors. (CPC 504.1(1))

BASEMENT INSTALLATION

- ☐ Temperature and pressure relief valve (T&P) shall be plumbed up and out to the building exterior per Figure CPA 046.

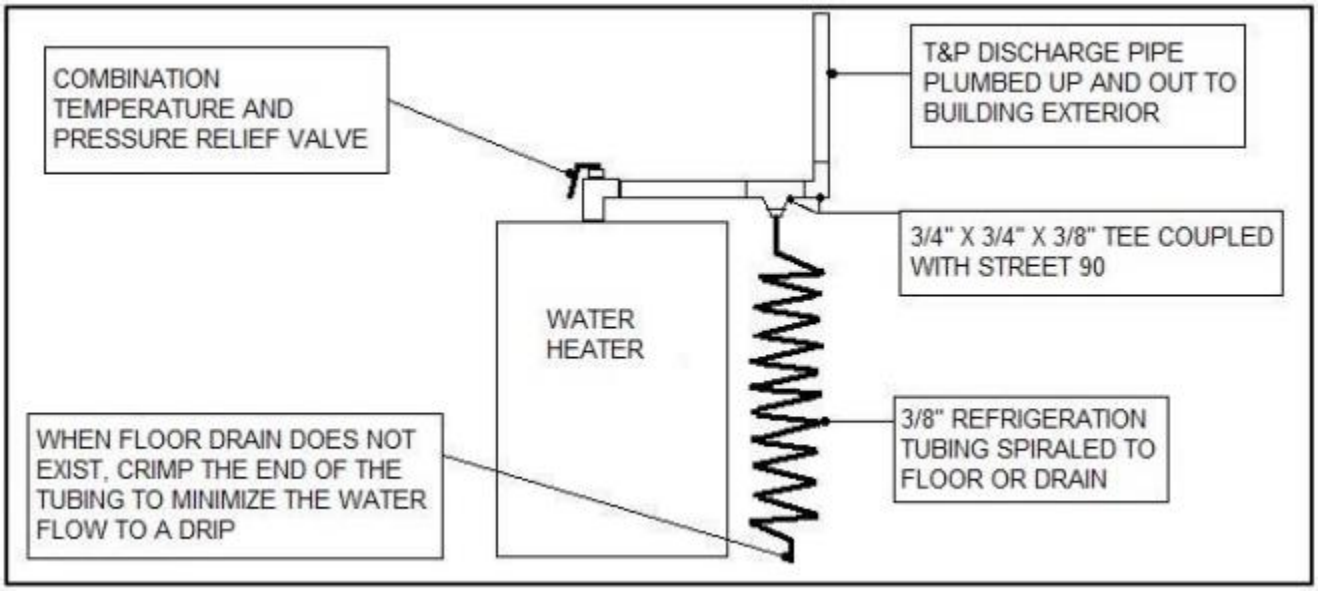


Figure CPA 046—Water Heater/Electric Heat Pump Water Heater Basement Installation

ATTIC INSTALLATION

- ☐ Attic trap door or opening shall not be less than 22”x30” or as needed to remove the largest piece of equipment, but in no case smaller than the water heater. (CPC 508.4)

- ☐ An unobstructed solidly floored working space is required in front of the water heater not less than 30” x 30” and a minimum of 30” headroom. (CPC 508.4.3)

- ☐ An unobstructed catwalk not less than 24” wide is provided from attic opening to the water heater. Where the height of the passage way is less than 6’ feet the distance from the access to the appliance shall not be greater than 20’ feet. (CPC 508.4.1)

- ☐ A permanent 120-volt receptacle outlet and a lighting fixture shall be installed near the appliance. The switch controlling the light fixture should be located at the entrance to the passage way. (CPC 508.4.4)

- ☐ Install drip pan with 3/4” drain pipe under tankless water heater in attic and all furred spaced subject to water damage. Pan shall drain to exterior. (CPC 507.5)

GARAGE INSTALATION

- ☐ Water heaters installed in a garage shall be installed so that burners and burner ignition devices are at least 18” above the garage floor surface unless listed as flammable vapor ignition resistant. (CPC 507.13)

- ☐ Appliances installed in garages, warehouses, or other areas subject to mechanical damage shall be guarded against such damage by being installed behind protective barriers or by being elevated or located out of the normal path of vehicles. (CPC 507.13.1)

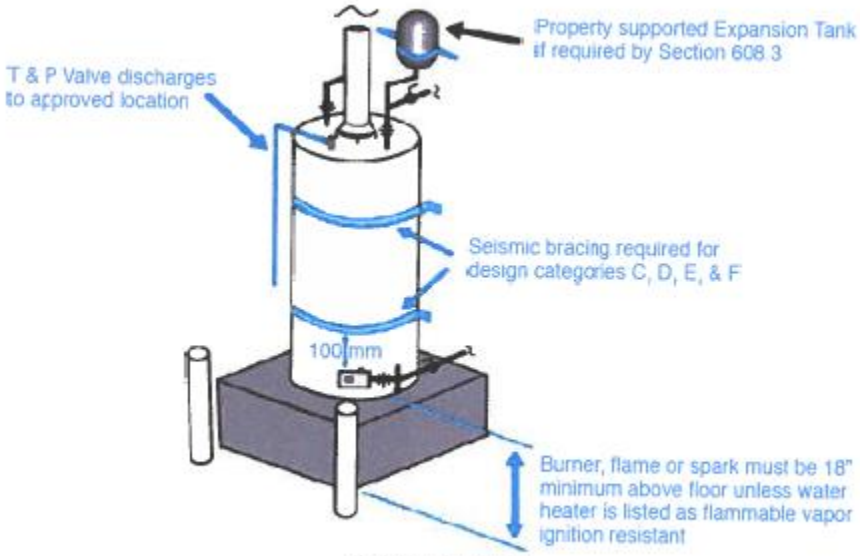


FIGURE 507.13A
RESIDENTIAL GARAGE WATER HEATER INSTALLATION