

# —Plumbing Homeowner's Guide—

*The following is an informational document only.*

## **May I do my own plumbing work?**

A homeowner may do their own plumbing work provided these three criteria are met:

1. It is a single-family dwelling.
2. The person resides or plans to reside at this residence.
3. The person doing the work owns the dwelling.

*A friend or family member **may not** obtain the Homeowner's Plumbing Permit.*

## **When do I need to obtain a plumbing permit?**

Permits are required before any alterations are made to an existing plumbing system or if a new system is installed. A plumbing system is defined as a system water supply and distribution pipes, plumbing fixtures, supports, and appurtenances: soil, waste and vent pipes: sanitary drains and building sewers to an approved point of disposal.

## **When and where do I get a permit?**

Permits are issued at the Building Services division on the main floor in the City Center located at 231 North Dakota Avenue. Office hours are between 8 a.m. to 5 p.m., Monday through Friday excluding holidays. The Building Services phone number is 605-367-8670.

## **Active Permits.**

Your permit only pertains to the work described on the permit application. Homeowner plumbing permits have a life period of one-year maximum. After the one-year time period has elapsed, a new permit will be required. In order for the permit to remain active for the duration of the one-year period, a required inspection by a division of Building Services (Building, Plumbing, Mechanical, or Electrical) shall be performed within 180 days of issuance and within each consecutive 180-day time period. It is the permittee's responsibility to make all required corrections and call for re-inspection within a 30-day time period. No permit shall be canceled, abandoned, or have occupancy granted with outstanding violations.

## **Do I have to do the work, or may I hire a friend or family member to do it for me?**

The only person a homeowner's permit allows to do the work is the actual homeowner. Any person who receives monetary compensation for doing any plumbing work in the city of Sioux Falls must be employed by a plumbing contractor licensed in the city of Sioux Falls and must be doing the work for said plumbing contractor. In simpler terms, the work must be run through the plumbing contractor's business and they may **not** do the work on the side.

## **What if I have already done my plumbing work without obtaining any permits or receiving any inspections?**

Work done without permits is always a problem for both the homeowner and the inspectors. The Plumbing Inspector cannot inspect the work if it is not visible; hence, you will be required to remove wall and/or ceiling coverings to the extent that a proper inspection may be obtained. If any code violations are noticed during the inspection process, said violations will be required to be corrected within 30 days of that inspection.

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**IMPORTANT NOTICE:** Ensure that all products comply with:

- Uniform Plumbing Code—Section 301.1.1 Approvals
- International Plumbing Code—Section 303.4 Third-Party Agencies

*All pipe, pipe fittings, traps, fixtures, material, and devices used in a plumbing system shall be listed or labeled (third-party certified) by a listing agency (accredited conformity assessment body) and shall conform to approved applicable recognized standards referenced in this code, and shall be free from defects.*

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**Inspections. Groundwork.** Before the work in the ground is covered by dirt, sand, etc., and the concrete is poured, a groundwork inspection is required. All the piping shall be complete and it shall be ready for covering when the inspection is requested. The Plumbing Inspector will either give you the OK to cover it up; or if there are corrections, said corrections will need to be completed and the Plumbing Inspector will need to be called for a re-inspection. All drainage underground must be 2 inches or larger; under “no” circumstances can black “ABS” pipe and fittings be glued to white “PVC” piping or fittings. Purple primer is required on ALL underground piping.

**Rough-In.** After all of the in-wall drainage pipes, waterlines, tubs, showers, and tub/shower valves are installed, a rough-in inspection is required. If installing a shower, call the Plumbing Inspector to see if you will need an inspection for the shower drain and trap. This is before any insulation or wall coverings are installed. The Plumbing Inspector will either give you the OK to cover it up; or if there are corrections, said corrections will need to be fixed and the Plumbing Inspector will need to be called for a re-inspection.

**Final.** After all the fixtures are set, the drain lines and the waterlines are connected and the water heater is energized, a final inspection is required to be obtained. The Plumbing Inspector will either give a final or if there are corrections, fix the corrections and then call the Plumbing Inspector for a re-inspection. Final inspections also include setting temperatures on lavatories (bathroom sinks), tubs, tub/shower combo, and showers. The maximum temperature for all sinks and lavatories is 140 degrees. The maximum temperature for all tubs, tub shower combo, or shower is 120 degrees. The scald guard on all single-handle faucets for tubs and showers **MUST BE** set to no matter what the temperature, but cannot be over 120 degrees. Any two-handle faucets for tubs, tub/shower, or shower will need to have a mixing valve added to set the temperature. The water heater **cannot** be used to control tub and shower water temperatures.

**Requesting an Inspection.** It is the responsibility of the permit applicant to provide accessibility to the work. One should always keep in mind, **“If the Plumbing Inspector cannot see the work, the work cannot be inspected.”** The City of Sioux Falls is not liable for expenses entailed in the removal or replacement of any material required to allow inspection. There are separate inspectors for the Electrical, Plumbing, Building, and Mechanical divisions. **All of the applicable inspectors must approve the rough-in or framing of their specific division before anything is covered.**

The permit holder must call the Building Services division at 605-367-8670 when the work is ready for inspection. Inspections must be requested a minimum of one day prior to desired day for the inspection. Inspection requests after office hours can be logged in on the answering machine at 605-367-8670.

When calling for inspection, be prepared to give the following information:

- Permit Number.
- Street address.
- Owner’s name.
- Type of inspection needed (groundwork, rough-in, final).
- Date and time frame that the inspection will be requested for. Keep in mind that the inspectors may not enter an occupied dwelling unit unless an adult or contractor with authority over the dwelling is present and gives permission to enter.
- Daytime phone number that the permit holder or contractor may be reached at.

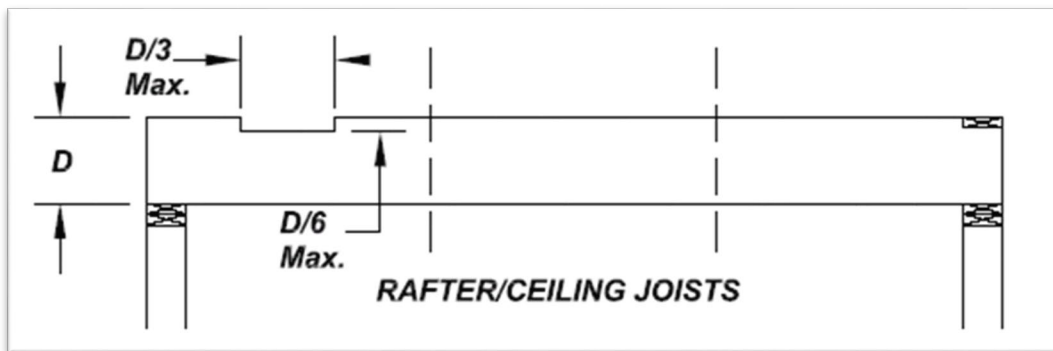
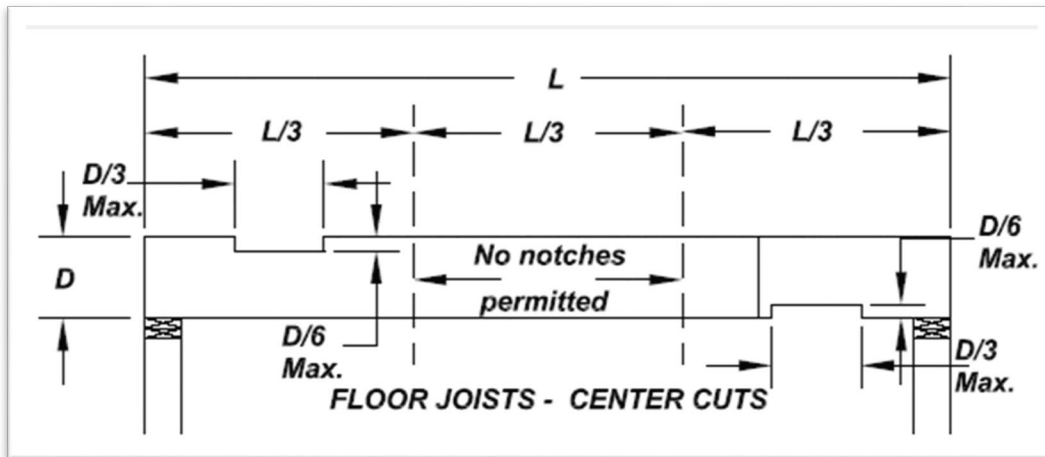
**Re-inspection Fee.** A fee may be assessed, and must be paid before any further inspection will be made, for any of the following reasons:

- When work, for which an inspection is called, is not completed or ready for inspection.
- When corrections called for are not made.
- When access to the premises is not provided on the requested inspection date.

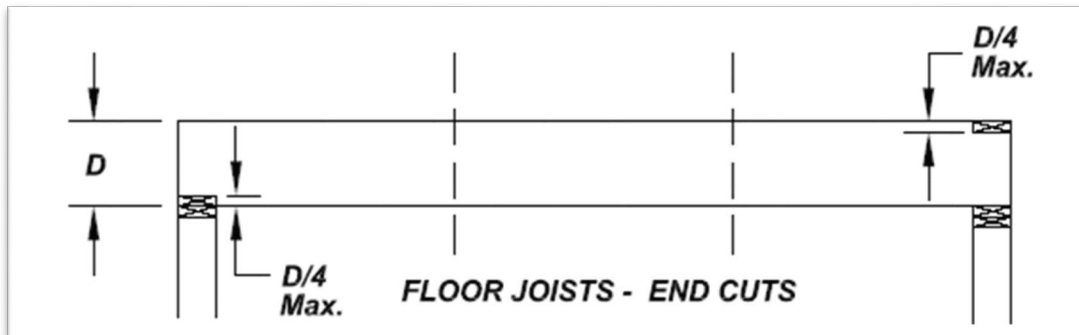
- For deviating from the approved plans.
- When work is concealed from access or sight before it has been inspected.
- When work is done in phases that require additional inspections, a fee may be charged per inspection. Additional fees must be paid prior to inspection.

**Drilling Holes and Notching in Framing.** For the protection and structural stability of your home, there are limitations to any cutting of floor joists and wall framing. **Engineered truss systems (open webbed floor or attic trusses) are engineered systems and cannot be modified or cut without an analysis by a structural engineer.**

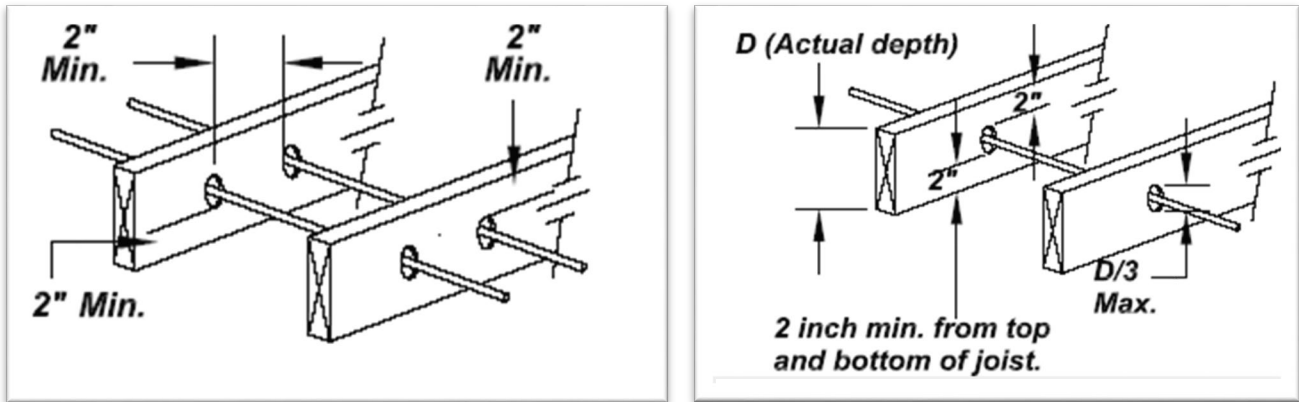
**Protection of Structure.** *Notching Joists.* Notches in sawn lumber (2 x 4, 2 x 6, 2 x 8, etc.) shall not exceed one-sixth of the depth of the member and shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span.



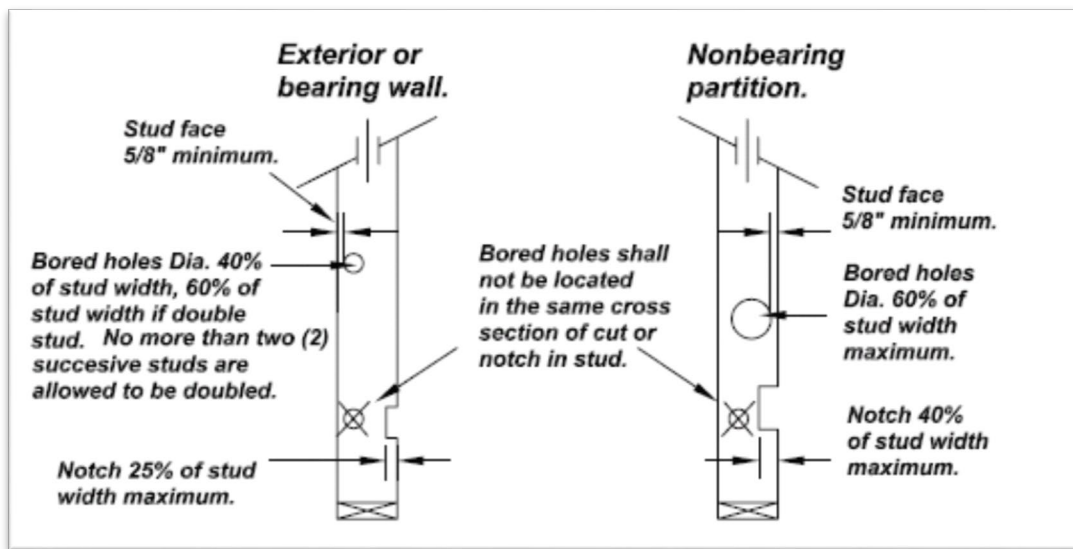
Notches on the ends of sawn lumber shall not be notched over one-fourth the depth of the member.



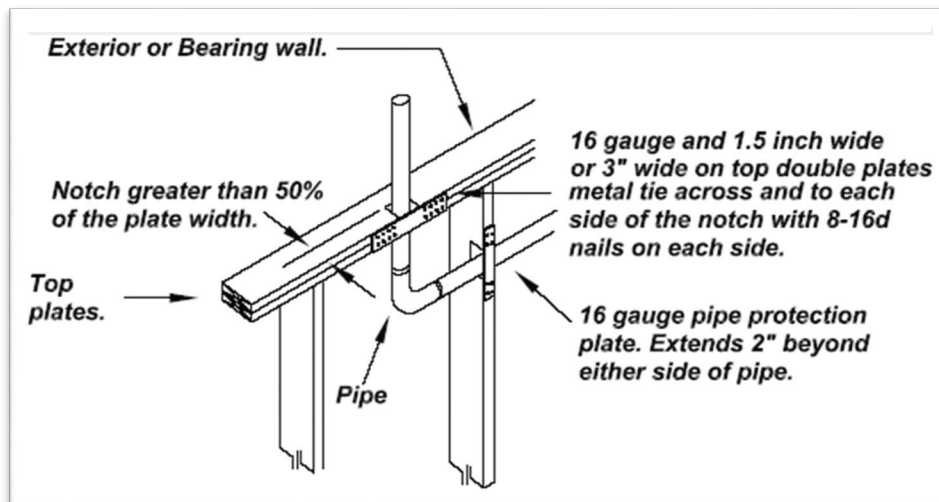
**Holes in Joists.** Holes drilled in sawn lumber shall not be larger than one-third the depth of the member. The holes may not be closer than 2 inches to the bottom or top of the member. Any two holes may not be closer than 2 inches from each other and any hole may not be closer than 2 inches from a notch.



**Drilling and Notching Studs.** A maximum of 25 percent of the width of a stud may be cut or notched in an exterior wall or interior load-bearing wall. A maximum of 40 percent of the width of a stud may be cut or notched in a non-load-bearing wall. A bored or drilled hole in a stud may not exceed 40 percent of the width of the stud (exterior, load bearing, or non-load-bearing), provided the hole is no closer than 5/8 inch to the edge of the stud and the hole is not located in the same section as a cut or notch.

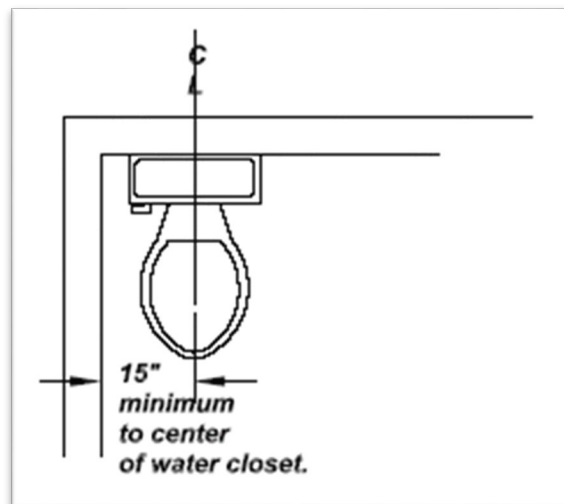


**Drilling and Notching of Top Plate.** When the top plate of an exterior wall or interior load-bearing wall is drilled or notched by more than 50 percent of its width, a galvanized metal tie is required to be installed. The metal tie shall be a minimum of 16 gauge, 1 1/2 inches wide, and shall be fastened on each side of the notch or hole by a minimum of eight 16d nails.

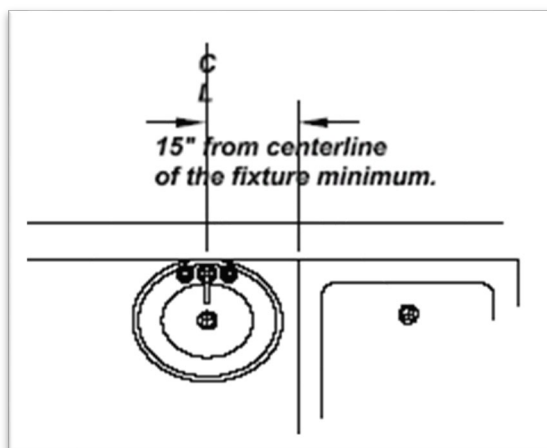
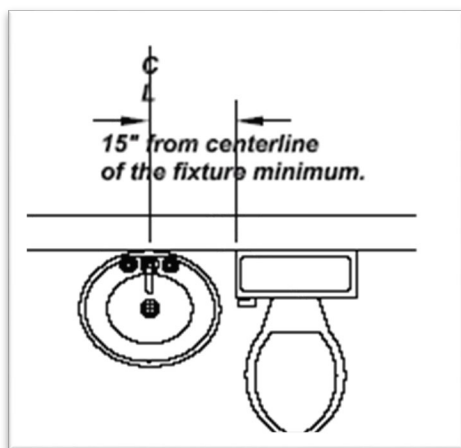


**Pipe Protection.** Plastic piping (PEX and PVC) that is installed in holes of studs, joists, rafters, or similar members that are less than 1 inch from the nearest edge shall be protected by a shield plate. Flexible gas piping (CSST) that is installed in holes of studs, joists, rafters, or similar members that are less than 3 inches from the edge shall be protected by a heavy shield plate. The plate shall be a minimum of 16-gauge steel, cover the area the member is notched or bored, and shall extend a minimum of 2 inches above bottom plates and below top plates.

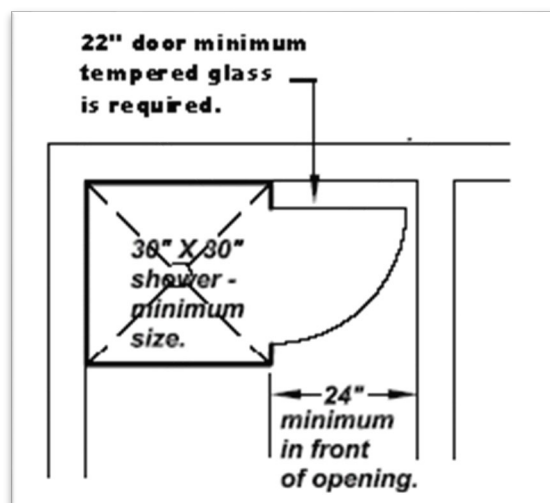
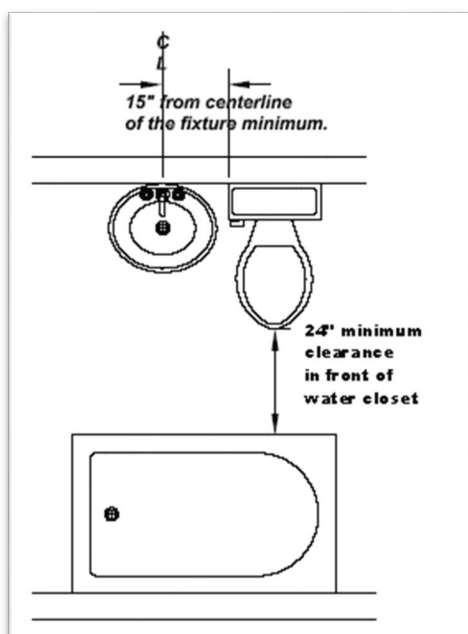
**Plumbing Fixtures. Installation.** A minimum of 15 inches shall be provided from the center of a toilet or bidet to an adjacent wall or partition. This will also include a tub or shower and vanity.



There shall also be 15 inches from the center of a lavatory to a toilet, tub, or wall.



A minimum of 24 inches shall be provided in front of a toilet, bidet, or lavatory to any wall, partition, door, or any other fixtures.



The location of any pipe, fixtures, or similar items shall not interfere with the operation of any door or window.

**Standpipes.** A standpipe, such as used for a washing machine, shall be a minimum of 18 inches and a maximum of 30 inches of total travel above the trap weir.

**Showers.** All showers shall have a minimum of 1,024 square inches and shall also be capable of encompassing a minimum 30-inch circle.

**Water Heaters.** An approved automatic water heater or other type of domestic water heating system sufficient to supply hot water to plumbing fixtures and appliances intended for bathing, washing, or culinary purposes. The maximum temperature for all water heaters is 140 degrees.

When a water heater is installed on a combustible surface where damage may result from a leaking water heater, a watertight, corrosion-resistant pan shall be installed beneath said water heater. The pan shall be equipped with a minimum 1-inch drain that shall discharge to an approved location; i.e., floor drain.

**Relief Valve.** All water heaters shall be provided with a pressure-limiting device and a temperature-limiting device. The drain shall not be smaller than the relief valve's outlet. If piped in PEX, increase to 1-inch.

**Expansion Tanks.** An expansion tank shall be installed and set to the incoming water pressure if a backflow preventer is installed after the water meter.

**Venting.** When the water heater is replaced, the venting will be required to meet current codes. Venting of Category I type appliances; i.e., water heaters, is very complicated and too extensive to go into detail in this document. Contact a Mechanical Inspector at 605-367-8687 for the correct information concerning this type of venting.

**Combustion Air.** All gas-fired appliances require combustion air supplied to them or they will not work well or efficiently and can even become carbon monoxide hazards. Unfinished basements usually have plenty of free area for combustion, but when a basement is finished, some means of providing combustion air will often be needed. The amount depends on the size and type of appliances.

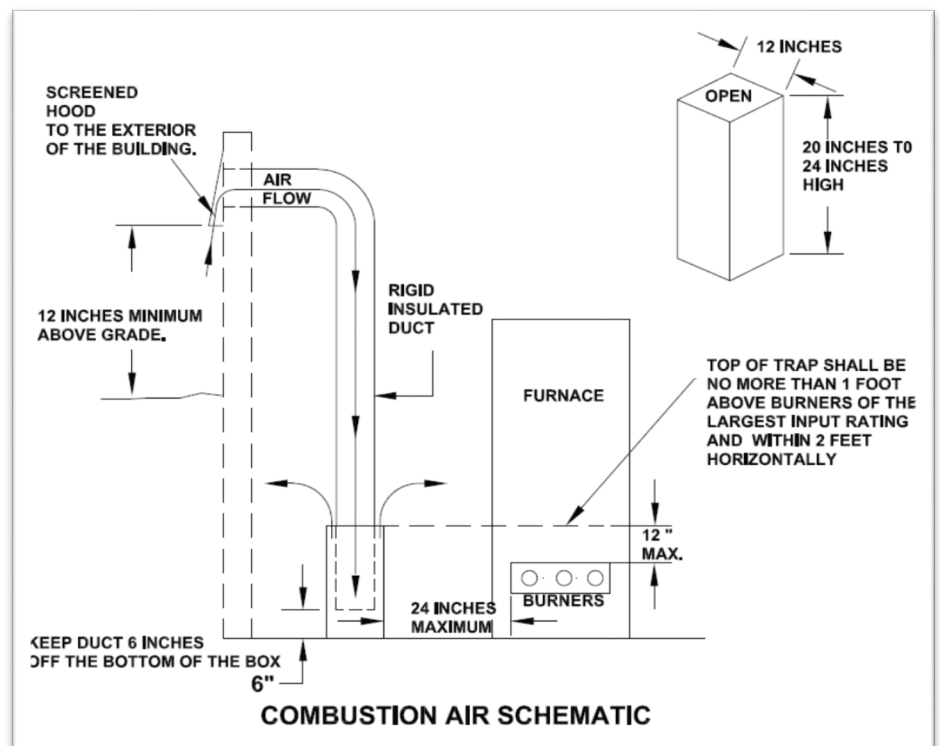
Electric appliances require no combustion air, and most (not all) high efficiency furnaces already have combustion air piped directly to them. An electric water heater requires no combustion air, and a high efficiency furnace with TWO 2-inch or 3-inch PVC plastic pipes going to the outside requires no combustion air. If you have a gas water heater, a furnace with only one PVC pipe, or a furnace with a metal vent pipe, you will probably have to provide more combustion air.

To determine combustion air size, find the BTU input of all appliances needing combustion air and add them together. This can be found on the appliance nameplate along with the model and serial number of the appliance. A standard 40-gallon water heater will be around 40,000 BTUs, and a typical furnace for an average sized home will be anywhere from 60,000 to 90,000 BTUs. Check the nameplates to be sure.

Combustion air can either be brought from the outside or from elsewhere in the house. There is no code requirement for which method to use. For houses that are very tightly built, have large kitchen or other exhaust systems, or have higher BTU needs for combustion air, it is recommended to bring combustion air from the outside.

### **Combustion Air From Outside.**

All combustion air ducts are required to be rigid metal. It is recommended that ducts bringing in air from the outside be insulated (required if going above finished ceilings). The exterior hood needs to be fixed open, have a screen with 1/4-inch to 1/2-inch openings, and be at least 12 inches above grade outside.



There are two methods for sizing outdoor combustion air. The first method requires an opening to the outside within 12 inches of the ceiling of the furnace room, with a size of 1 square inch for every 3000 BTUs of input.

The second method requires a little more work but may allow for a smaller opening size. On the inside, it needs to go to within 2 feet horizontally and 1 foot vertically of the burner of the largest appliance BTU-wise that needs combustion air. It is recommended but not required to drop it into a box. A 4-inch pipe will handle up to 100,000 BTUs, a 5-inch pipe up to 150,000 BTUs, and 6-inch pipe up to 225,000 BTUs. Pipe needs to be increased by one size if over 20 feet long and also if there is a dryer in the room. See the drawing to the right.

**Combustion Air From Inside.** Combustion air can be taken from inside by connecting spaces through permanent openings. To determine if a space is large enough for combustion air, multiply the volume of the space by 20. This will let you know how many BTUs of combustion air the space can provide. Spaces can be connected by two permanent openings: one within 12 inches of the ceiling and one within 12 inches of the floor. Size is 1 square inch of free area per 1,000 BTUs with a minimum size of 100 square inches of free area for EACH opening. Registers and grills have about 75 percent free area, so to get 100 square inches of free area, a grill needs about 140 square inches of nominal area. A 14-foot x 10-foot or 12-foot x 12-foot grill works.

**Water Supply. Materials.** Pipe and fittings for the water supply in a dwelling unit may be brass, copper, CPVC, or PEX.

PEX tubing shall not be installed within 18 inches of the inlet and discharge of a water heater. This does not apply to electric water heaters.

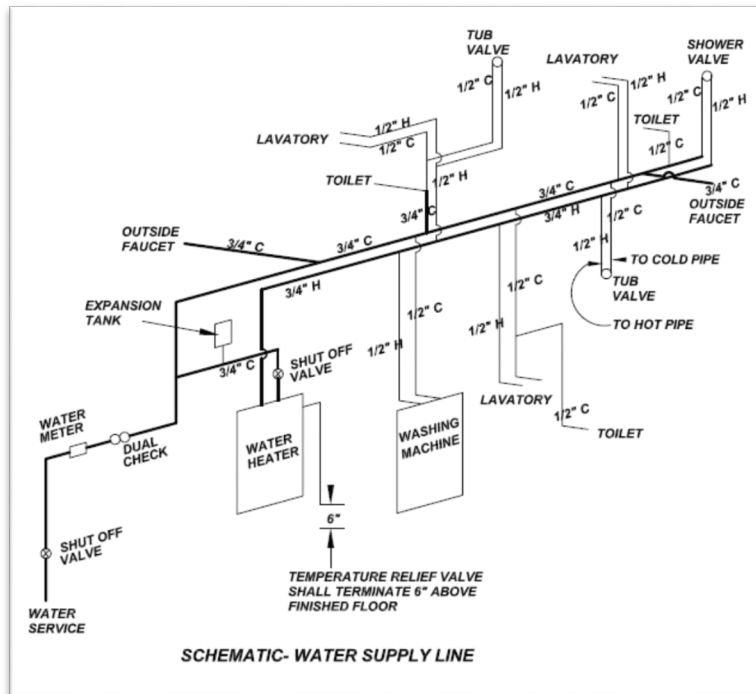
Flexible corrugated connectors made of copper or stainless steel are allowed; however, they are limited in length. A maximum of 24 inches is allowed for water heater, 30 inches for fixtures, 72 inches for a washing machine, and 120 inches for a dishwasher or ice maker.

**Valves.** A control valve shall be installed immediately ahead of each water-supplied appliance and ahead of each slip joint or appliance supply. The valves are required to be accessible and within 6 feet from the water heater. A full-way valve shall be installed on the cold water supply line of each water heater.

**Support.** Copper tubing or pipe 1 1/2 inches and smaller shall be supported horizontally at intervals not greater than 6 feet. PEX pipe at intervals not exceeding 32 inches.

**Water Pressure.** If the incoming water pressure exceeds 80psi, a pressure-reducing valve must be installed after the water meter.

**Supply Lines.** A minimum of a 1/2-inch I.D. supply line shall be installed for each hot or cold connection to each fixture. No more than two fixtures are allowed on one 1/2-inch line.





**Water Hammer.** All building water supply systems with quick-acting valves installed, shall be provided with devices to absorb the hammer caused by high pressures resulting from the quick closing of these valves such as water hammer arresters or approved mechanical devices as long as they are accessible. Some examples would be an ice maker and laundries.

**Sanitary Drainage. Materials.** Drainage piping shall be cast iron, galvanized steel, galvanized wrought iron, lead, copper, brass, Schedule 40 ABS DWV, or Schedule 40 PVC DWV.

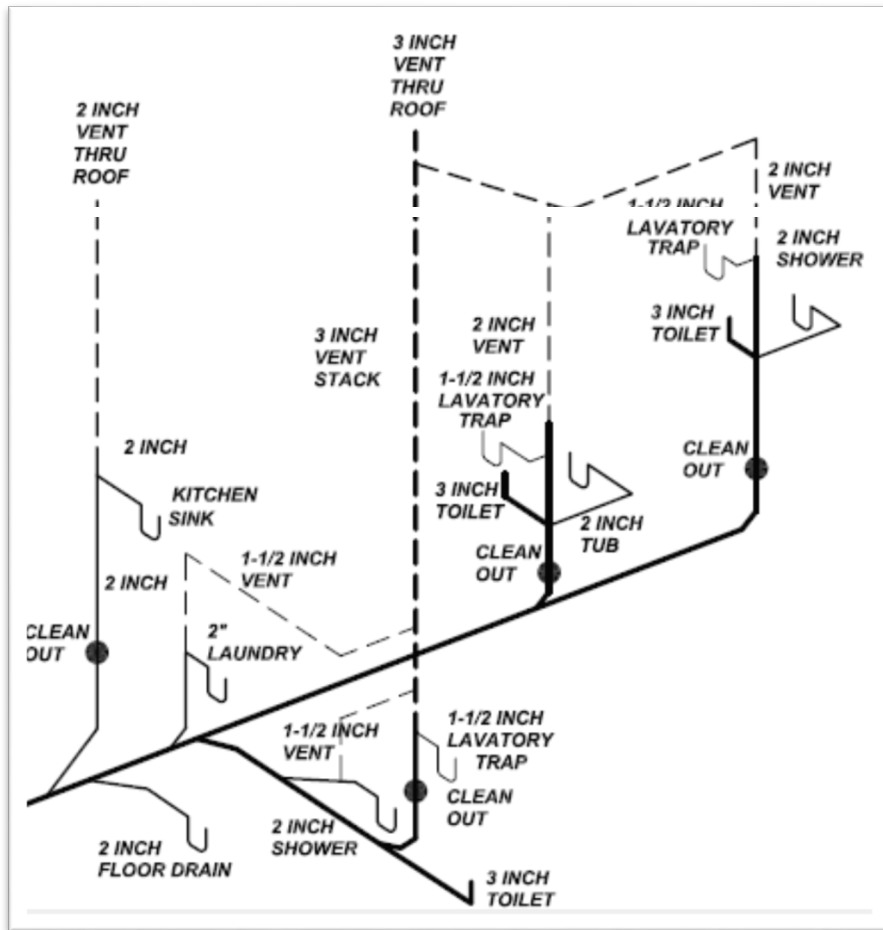
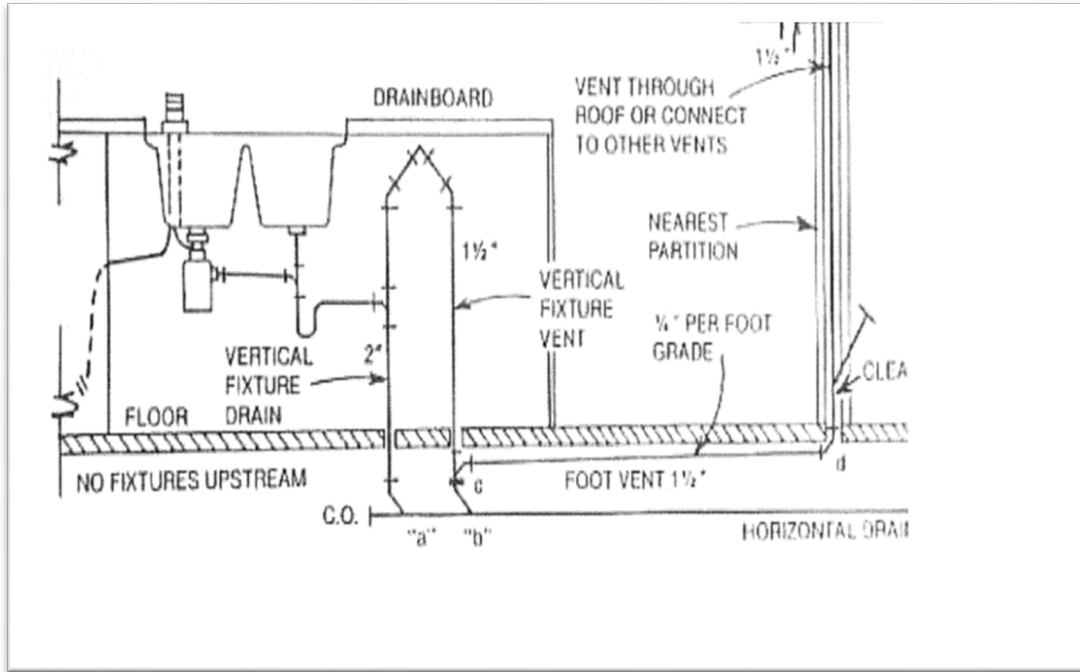
***Plastic piping shall be glued with the specific type of cleaner, solvent, or glue for that type of pipe. All-purpose glues are not allowed to be used. Under NO circumstances can PVC be glued to ABS.***

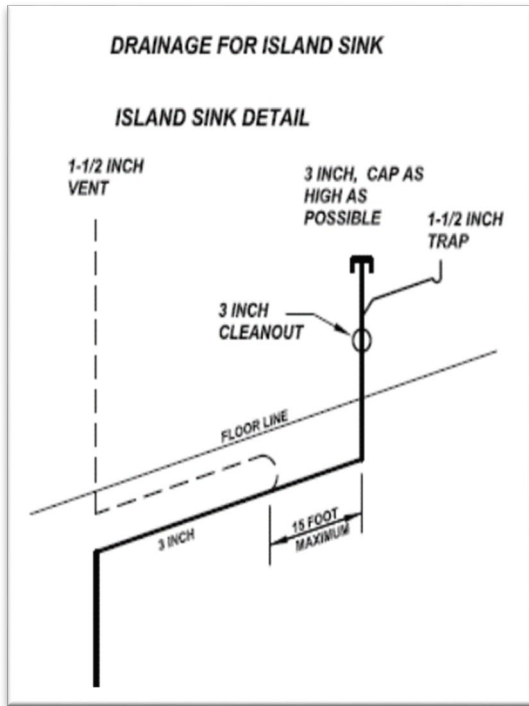
**Support.** All piping shall be properly supported. Underground piping shall be supported for its entire length. Aboveground piping shall be supported to ensure alignment, prevent sagging, and allow movement for expansion and contraction of the pipe. ABS and PVC pipe shall be supported at a maximum distance horizontally of 4 feet.

**Tail Pieces and Drains.** A minimum of a 1 1/2-inch diameter trap and trap arm shall be provided for sinks, dishwashers, laundry tubs, bathtubs, and similar fixtures. A minimum of a 1 1/4-inch diameter shall be provided for bidets, lavatories, and similar fixtures. Floor drains shall have waste outlets not less than 2 inches in diameter. ***Flexible tailpieces, and/or p-traps may be available at your local hardware store but are prohibited for use.***

**Slip Joints.** Slip joints are allowed to be used on the inlet, outlet, and trap seal within each trap. If the slip joint is to be concealed, it must be provided with an access panel with its minimum dimension being 12 inches. This is to provide the slip joint with access for inspection and repair.

**Grade.** Horizontal drainage pipe less than 4 inches in diameter shall have a uniform slope of not less than 1/4 inch per foot. Pipe that is 4 inches and larger shall have a slope of not less than 1/8 inch per foot.





**Vents. Materials.** Drainage piping shall be cast iron, galvanized steel, galvanized wrought iron, lead, copper, brass, Schedule 40 ABS DWV, or Schedule 40 PVC DWV.

**Size.** The minimum vent size for an individual vent is 1 1/4 inches and also not less than one-half the diameter of the drain to which it is connected. The vent shall be a minimum of 3 inches in diameter where it terminates above the roof. The vent shall maintain this size to a point a minimum of 1 foot below the roofline

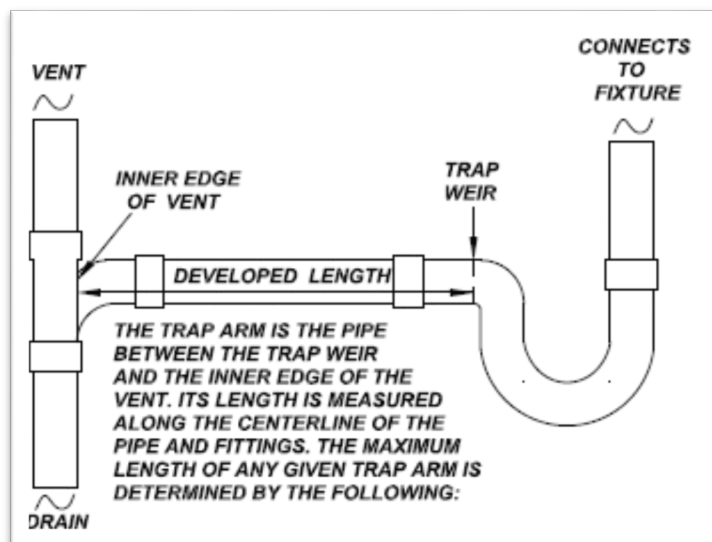
**Grade and Connections.** All vent pipes shall not have any sags. The horizontal pipes shall be level or slope back to the drainage pipe it serves. When vents connect to horizontal drainage piping, the vent connection shall be above the centerline of the drainage pipe. This connection shall be located downstream of the trap being served. The vent shall run vertically to a point that is a minimum of 6 inches above the flood level rim of the fixture it is venting before it is allowed to run horizontally.

**Vent Termination.** Each vent pipe or stack shall extend through its flashing and shall terminate a minimum of 10 inches above the roof. It shall be a minimum of 1 foot from any vertical surface. The termination shall be a minimum of 10 feet from any openable window, door, opening, air intake, or vent shaft. The exception to this is if the vent terminates a minimum of 3 feet above said openings.

The vent pipes may extend through the roof separately or combined for one penetration through the roof; however, the size must be increased if combining vents to accommodate the additional load. The vent may be 2 inches in diameter if it serves the kitchen sink only; otherwise, 3 inches is the minimum it may be. If a change in diameter is required, it shall be made inside the building at least 1 foot below the roof.

**Traps.** Each plumbing fixture is required to have a trap. It may be an integral trap like a toilet has or more often a separate trap from the fixture. One trap may not serve more than three lavatories adjacent to each other, provided the waste outlets are not more than 30 inches apart and the trap is centrally located. The vertical distance between the trap and the fixture outlet shall be as short as possible; however, it shall never exceed 24 inches in length.

Each trap shall be protected against siphonage and back pressure by means of a vent. The distance from the trap to the vent is determined by the size of the trap in accordance with the following table. The distance is measured from the trap weir to the inner edge of the vent. The trap arm may change directions; however, if the change of direction is greater than 90 degrees, a cleanout is required. The minimum distance between the vent and the trap is two times the pipe diameter.



Trap Size	Maximum distance from vent to trap
1 1/4"	2 feet 6 inches
1 1/2"	3 feet 6 inches
2"	5 feet
3"	6 feet
4" and larger	10 feet

"S" traps, bell traps, running traps, and crown-vented traps are not allowed to be used. No fixture is allowed to be double trapped.

**Fuel Gas Piping.** Fuel gas piping may be of steel (wrought-iron, black, or galvanized) or seamless copper tubing and CSST (Corrugated Stainless Steel Tubing).

Every appliance shall have a shutoff valve installed within 6 feet of said appliance and shall be installed upstream from the union. The shutoff shall not be installed in a concealed location and shall be installed so as to provide access for operation.

One-half-inch steel gas pipe shall be supported at intervals not exceeding 6 feet and 3/4- or 1-inch pipe at a distance not greater than 8 feet. Gas piping shall not be installed in or through an air duct, clothes chute chimney, or gas vent. Unions, tubing fittings, right and left couplings, bushings, swing joints, and compression couplings are not allowed to be installed in concealed locations.

Gas piping installed underground must be a minimum of 18 inches deep. The trench shall be dug so that the pipe is substantially continuous on the bottom. Gas piping that is in contact with the earth shall be of materials that will not corrode or shall be protected against corrosion.

A sediment trap shall be provided before each piece of equipment. A minimum of a 3-inch drip leg is required. However, fireplaces, lights, ranges, and clothes dryers are not required to have sediment traps before them.

Gas piping shall be sized to accommodate all equipment. There are many charts and different situations to figure out the required gas line size; therefore, it is impossible to put everything in this handout.

Gas piping shall be leak tested with air. OXYGEN SHALL NEVER BE USED. The test pressure shall be one and one-half times the proposed maximum working pressure; however, never less than 10 psi. The test shall have a duration of not less than 15 minutes.

Yellow-jacketed CSST must be bonded to the bonding electrode conductor or copper water service below the water meter. A minimum of a #6 copper wire must be used. Bond clamps used shall be stamped Direct Burial or "DB."

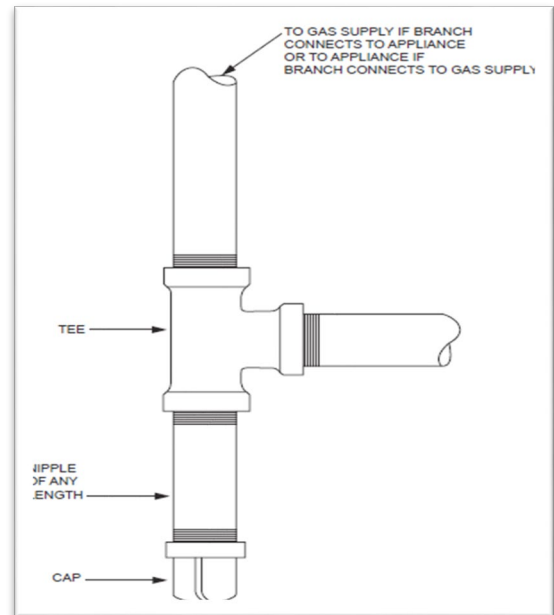
Black-jacketed CSST identified by the brand names Counter Strike or Flash Shield are not required to be bonded if the appliance has a ground wire installed directly to it. If the ground wire is not provided, it will be required to be bonded.

### **Gas Piping.**

**Black Iron Pipe** must be Schedule 40 and listed. Threaded joints can be in concealed locations, but unions and shutoffs must be readily accessible and not above any type of ceiling.

**Copper Tubing** must be Type K or L. All mechanical joints must be accessible. Any concealed joints must be brazed. 16-gauge steel nail plates that extend 4 inches beyond the framing are required where tubing goes through framing within 1 1/2 inch of the edge of the stud or joist.

**CSST (flexible gas line).** Joints are listed for concealed locations. Where going through holes in framing, CSST must be protected with manufacturer-provided hardened steel plates if within 3 inches of the edge of the framing. CSST with the yellow jacketing is required to be electrically bonded with a 6-gauge copper ground wire going from a rigid portion of the gas line before the first CSST branch to the building electrical ground. Clamps making those connections must be listed for that purpose. CSST with the black jacketing does not require this bonding if any appliance that the gas piping system is connected to has permanent (not plug-in) line voltage wiring to it.



**Connections to Appliances.** Every appliance requires its own dedicated shutoff with a union fitting or listed flexible appliance connector between the shutoff and appliance. A flexible connector can only go through the appliance cabinet wall if the opening is protected with a rubber or plastic grommet. A drip leg/sediment trap is required at each appliance. If one vertical riser supplies multiple nearby appliances, one drip leg at the bottom of that riser is acceptable.

**Pressure Testing.** All new gas piping is required to have an air pressure test to check for leaks. Reconnection of gas line for appliance replacements does not require an air pressure test. Check those joints for leaks with a gas detector or soap bubbles. If you are using a gas line that was previously roughed in but not used, that will also have to be tested for leaks. Minimum pressure for this test is 10 PSI, but not less than one-fifth the maximum reading of the gauge used. Regulators and appliance gas valves are not designed to withstand these higher pressures and need to be isolated from the pressure test. **The Plumbing Inspector does not perform this test. The air hold test needs to be in place at time of inspection so the Plumbing Inspector can verify there are no leaks.**

**Two Pound Gas Systems. WARNING!** Some homes have gas supplied to them at 2 PSI that is about five times higher than the operating range of most appliance valves. There is an in-line regulator between the gas meter and the appliances to step gas pressure down to appliance operating range. If you connect to the 2 PSI portion of the gas line, a regulator will be required in that branch before the appliance.