

## 4.1.1 Conditions

Let's look at some of the problems we find with traps.

1. Missing
2. Wrong type
3. Leak
4. Double trapping
5. Split, rusted or damaged
6. Freezing
7. Tail piece (fixture outlet pipe) too long
8. Trap arm (fixture drain) too short or too long
9. Traps too small or too big
10. Trap primer problems
11. Non-standard shape or material
12. Clogged/no cleanout provision

### 4.1.1.1 MISSING

Every fixture should be provided with a trap, except for a toilet.

**CAUSES** This is an installation issue.

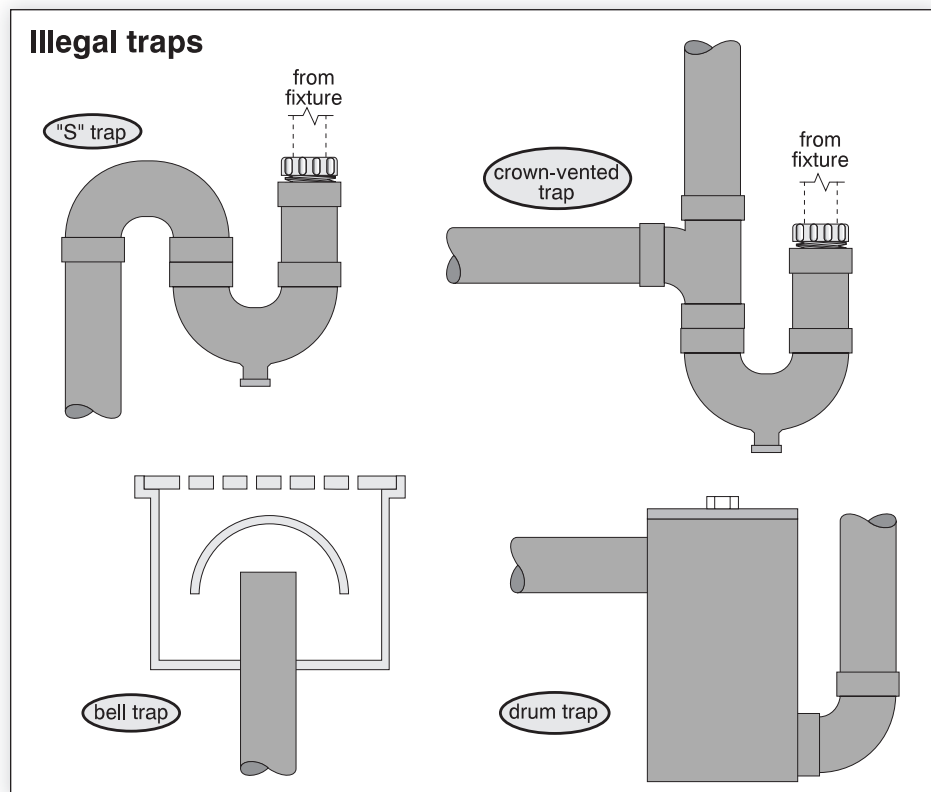
**IMPLICATIONS** An unhealthy environment in the house will result if sewer gases find their way into the home.

**STRATEGY** Where you can see below fixtures, look for a trap. If you can't see below the fixture, look down the fixture drain. You should see standing water. You can also use your nose to search for sewer odors.

Keep in mind that sometimes the trap may be hidden, so you have to be careful. This is often the case with kitchen islands with sinks. Sometimes, you can see the trap in an unfinished basement or crawlspace.

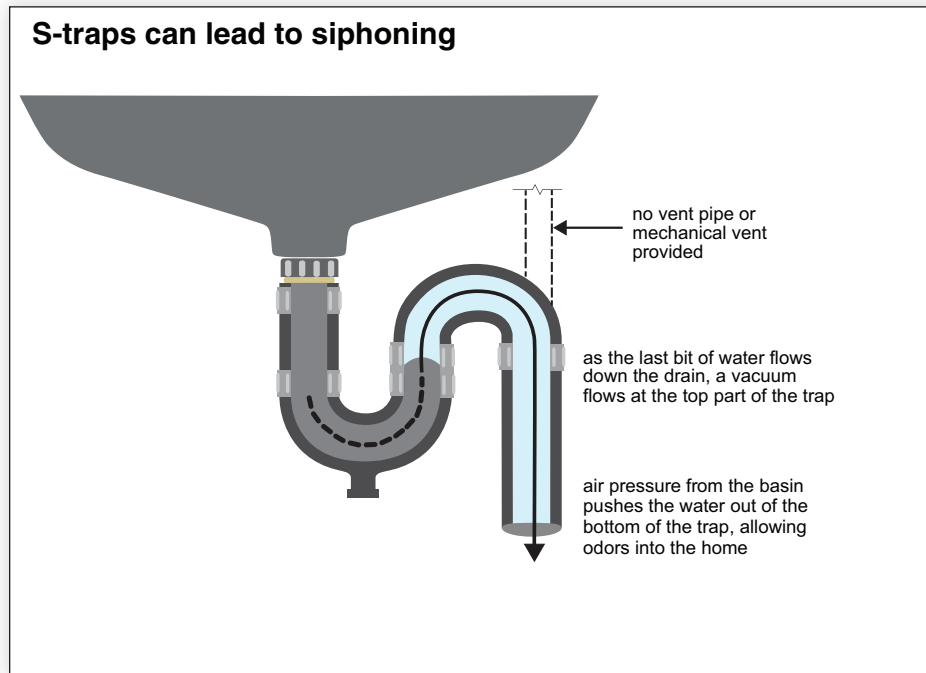
### 4.1.1.2 WRONG TYPE

Residential traps should be **P-type**. **S-traps, drum traps, bell traps, and crown-vented traps** are usually not permitted. Any trap with mechanical parts is also not permitted.



**CAUSES** The presence of these traps is an installation issue.

**IMPLICATIONS** The implication of an S-trap is siphoning. The implication of a crown-vented trap is obstruction of the vent and, ultimately, siphoning. Bell traps are unreliable and drum traps are not self-scouring. They tend to accumulate solids. Another type of trap is called a bottle trap, which is allowed in some areas and not others. Know the rules in your area.



**STRATEGY** Look for P-traps. Recommend that other types of traps be replaced or closely monitored for sewer odors or clogging. S-traps are common on older laundry tub drains using copper, brass or lead. Siphoning can be avoided by flowing a small amount of water slowly to prime the trap. This is probably the more realistic approach from homeowners in most cases, as opposed to removing the S-trap.

### 4.1.1.3 LEAKS

Leaks are common at traps.

**CAUSES** Leaks may occur because –

- the trap is rusted or worn through
- the connections are not water tight
- the trap has been mechanically damaged or frozen and split
- the trap has been unsuccessfully repaired

**IMPLICATIONS** Obviously, waste leaking into the home is a health issue and a water damage issue.

**STRATEGY** When you are operating each plumbing fixture, look below if possible, and make sure the trap is not leaking. Many inspectors fill the basin and pull the plug, rather than simply run water through. Their thinking is that they will ensure that the tail piece, trap and trap arm are completely flooded. Some leaks only show up when these components are flooded.

**EVIDENCE OF LEAKAGE** You can also watch for evidence of leakage including –

- staining or streaking on the trap
- rusting on cleanout plugs
- buckets or trays below the trap
- water damage on the floor, finishes or structural members below the trap

**A WORD OF CAUTION** Many old tail pieces and traps are brass, often chrome- or nickel-plated. Be careful touching these components. They are sometimes so thin, or so badly deteriorated, that simply putting your hand on them can cause them to leak or break.

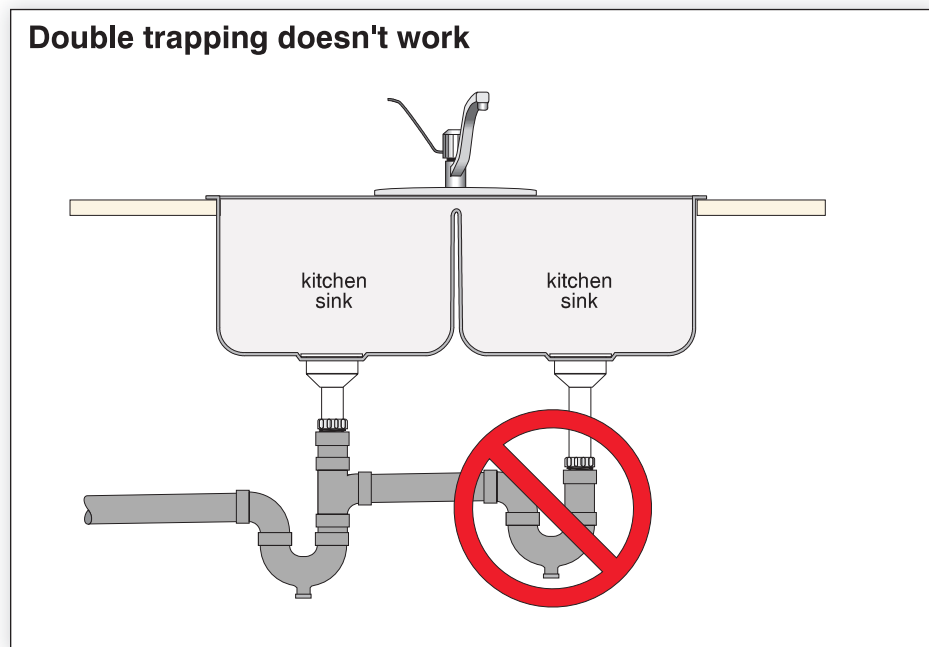
#### 4.1.1.4 DOUBLE TRAPPING

Double trapping sounds like a good idea but it's not.

**CAUSES** This is an installation issue.

**IMPLICATIONS** The implication of double trapping is clogging of the trap. We mentioned earlier that the speed at which the waste moves through the trap is important. If we have double trapping, the velocity coming into the second trap will be reduced and solids are more likely to collect and clog the second trap.

**STRATEGY** Watch for double trapping. A common spot for double trapping is under double sinks in kitchens, laundry areas or bathrooms. This can occur elsewhere in the house as well, but may be more difficult to detect.



#### 4.1.1.5 SPLIT, RUSTED OR DAMAGED

---

In some cases you won't be able to run the water and find the leaks. In other cases there won't be any apparent leakage but you can see obvious weakness in the trap.

**CAUSES** Split, rusted or damaged traps are the result of –

- freezing
- corrosion of metals
- mechanical impact
- building settlement or heaving
- abrasive effect of water over time

**IMPLICATIONS** Trap leakage is the risk here.

**STRATEGY** Look at the trap for evidence of splitting, rusting or damage. A mirror and a flashlight are helpful. Looking at just the front of the trap doesn't give you the whole picture, obviously. Traps below washing machine standpipes on exterior walls can freeze as well.

#### 4.1.1.6 FREEZING

---

Traps in cold areas are susceptible to freezing. In most cases, traps will be in heated areas, but traps in bathrooms above unheated garages or crawlspaces, for example, can be vulnerable.

**CAUSES** This is a building arrangement issue and may be an insulation issue.

**IMPLICATIONS** A freezing trap will split and leakage will result.

**STRATEGY** Where plumbing fixtures are close to cold areas, think about the possibility of freezing traps. Pay particular attention to showers and bathtubs, for example, which typically have their drains and traps below the floor level. This can also be an issue on island sinks, where in some jurisdictions it's common to drop the trap below the floor level.

**WINTERIZED SYSTEMS** Home inspectors should not activate house systems that have been shut down. This includes plumbing systems. Turning on a plumbing system that has been shut off is risky for the following reasons:

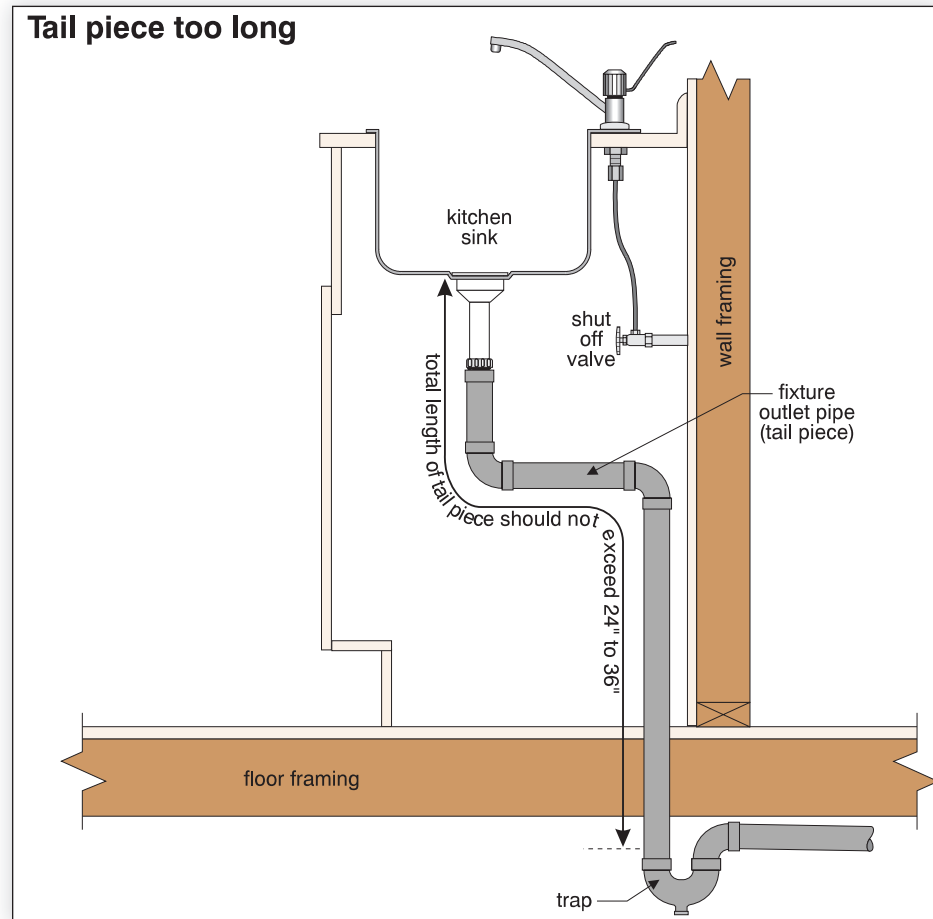
- the supply or waste piping may leak, flooding the house.
- fixtures may leak causing water damage.
- the water heater may leak.
- anti-freeze in traps of winterized systems will be washed down the drain.
- protection against freezing will be lost.

Plumbing systems are usually shut off for a reason. Don't turn them back on and don't operate the fixtures. Document this limitation in your report.

### 4.1.1.7 TAIL PIECE (FIXTURE OUTLET PIPE) TOO LONG

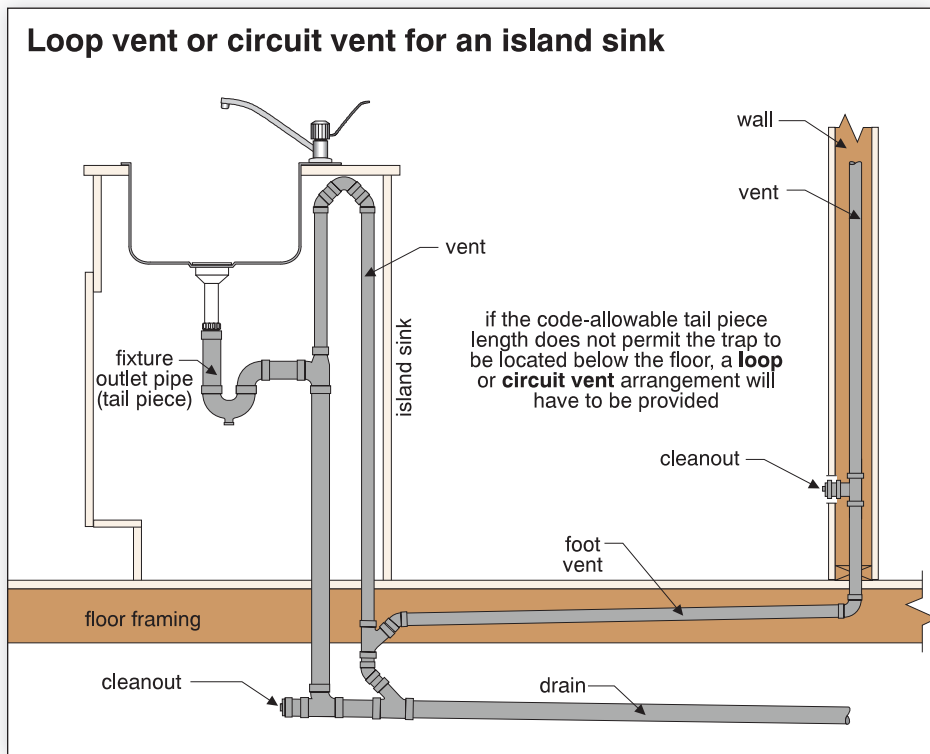
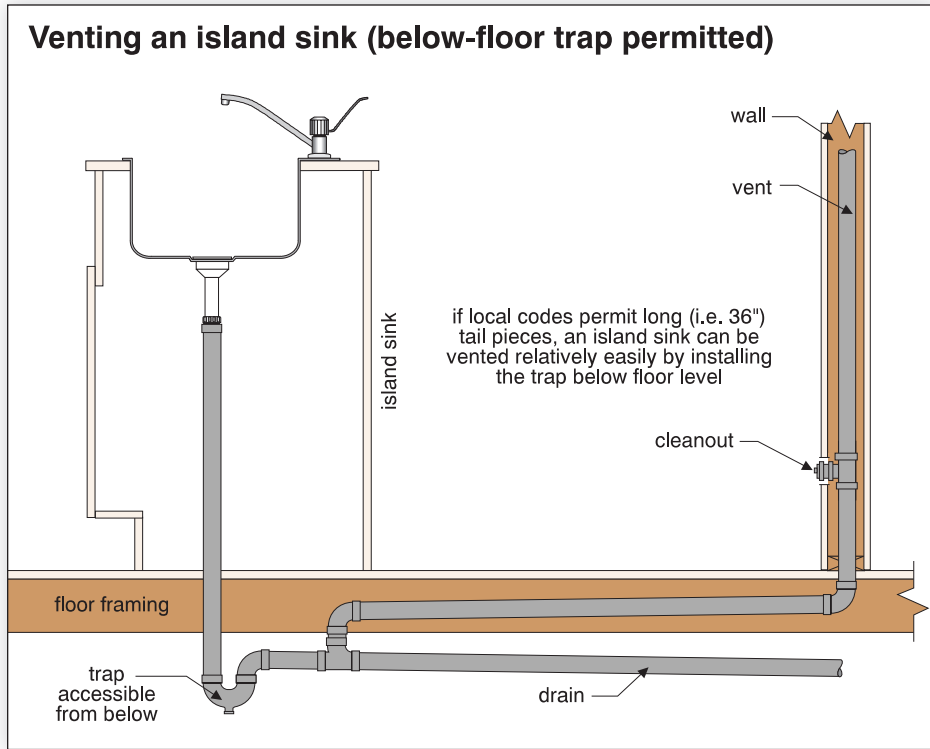
The vertical or horizontal distance between the fixture and the trap is important. We talked earlier about maintaining adequate waste velocity through the trap.

Most codes call for this distance to be a maximum of 24 inches. (36 inches in Canada.)



**AN IMPORTANT DIFFERENCE**

The 24 inch versus 36 inch length rules become important when we're talking about island sinks in kitchens, for example. It's tough to run a vent pipe for an island sink. The vent pipe should be close to the downstream side of the trap, but most people don't want a vent pipe running up through the middle of the kitchen. If the trap can go below the floor and the space below is accessible, a vent can come off the trap and run above the drain line, along the underside of the floor level, over to a wall. The vent can then run up the wall in a conventional fashion. While this is not an ideal arrangement, it is better than the **loop vent** or **circuit vent** arrangement, which is the alternative if you can't drop the trap below the floor. We'll talk about this loop or circuit venting later.



**CAUSE** The cause of an excessively long fixture outlet pipe (tail piece) is an installation issue.

**IMPLICATIONS** The implications are siphoning of the trap if the tail piece is vertical, or clogging of the trap if the tail piece is horizontal.

**STRATEGY** If you can get a look, check to see how far the trap is from the fixture. Depending on your jurisdiction (you'll have to check), it should be no more than 24 or 36 inches.

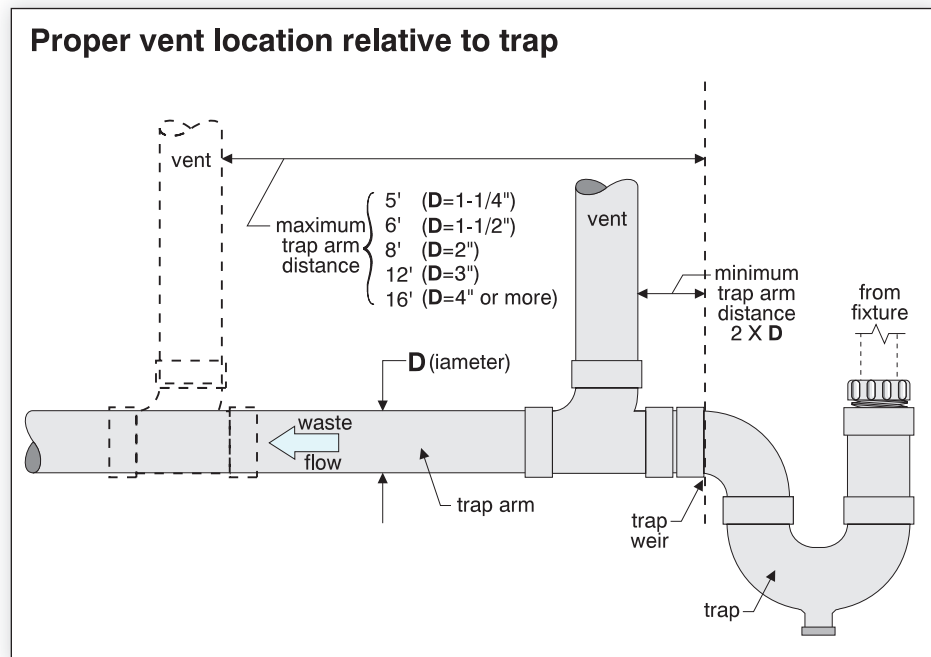
### 4.1.1.8 TRAP ARM TOO LONG OR TOO SHORT

The distance from the trap to the vent can't be too long or we may siphon the trap. If the trap arm is too short, waste might splash up into the vent and eventually clog it.

**MINIMUM TRAP ARM LENGTH** A trap arm should be at least two pipe diameters long. For example, if the trap is 1½ inch diameter, the trap arm should be at least 3 inches long.

**MAXIMUM TRAP ARM LENGTH** Many jurisdictions use a 5 foot rule. In some areas, different rules apply based on different pipe diameters. Some authorities allow unlimited trap arm length for toilets. Here is an example of one jurisdiction's rules:

Trap Arm Diameter in Inches	Maximum Trap Arm Length in Feet:
1¼	5
1½	6
2	8
3	12





We want the vent above the trap weir. Most of these numbers include a margin of safety. The object is to have the vent coming off the top of the trap arm higher than the weir of the trap. We don't want the vent pipe flooded because then it won't be able to add air to the trap arm to break the vacuum. Breaking the vacuum is important in preventing direct siphoning of the water in the trap.

**CAUSES** Trap arms that are too short or too long are an installation issue.

**IMPLICATIONS** Siphoning the trap or blocking the vent pipe are the implications of trap arms that are too long or too short.

**STRATEGY** While it is sometimes difficult to see much, where you can determine the length of the trap arm, check that it falls within the parameters we've outlined above (depending on your jurisdiction). You'll have to find out what rules apply in your area if you are going to call these defects out for improvement. It is more important to look for the functional implications such as siphoning traps, than to memorize rules. This is consistent with our philosophy throughout a home inspection. However, it's very helpful to know that there are rules.

### 4.1.1.9 TRAPS TOO SMALL OR TOO BIG

---

Most authorities specify minimum trap sizes. Most also make a general comment that the trap size shouldn't be so large that the velocity of the waste slows down to a point where solids will collect in the trap. This is hard to define. As a general rule, the trap should be the same diameter as, or one pipe size larger than, the tail piece (fixture outlet pipe) and the same size as the trap arm. Where the drains from three sinks or basins are manifolded, the trap arm is usually one size larger than the traps and the tail pieces.

**CAUSES** Traps that are too small or too large are an installation issue.

**IMPLICATIONS** The implications of both an undersized and oversized trap are clogging.

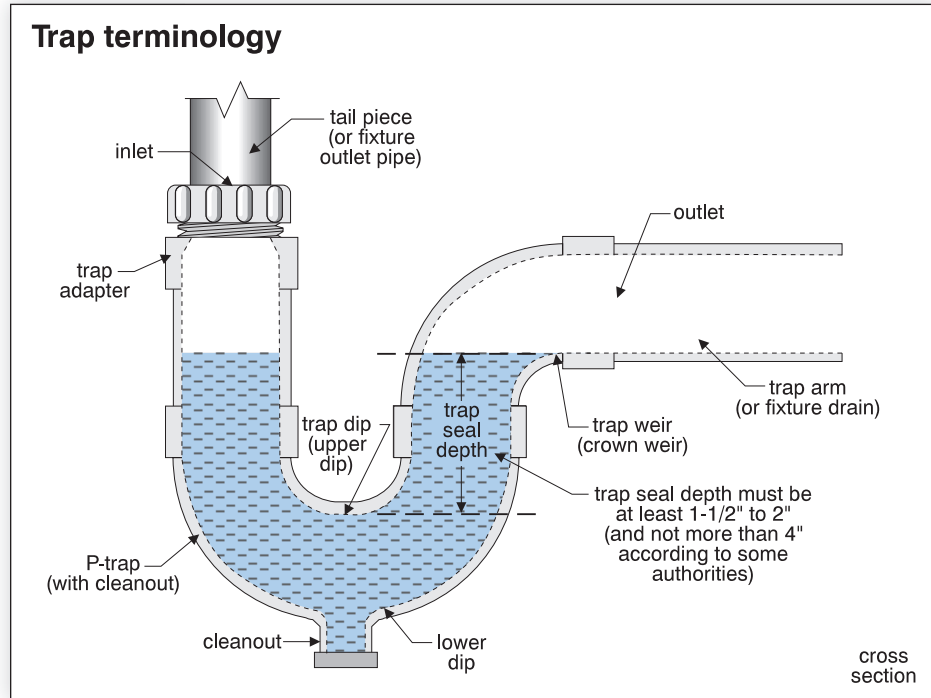
**STRATEGY** Traps should be the same size as the trap arm if we are draining a single fixture. Where the trap is a different size, watch for backup and/or siphoning at that fixture.

### 4.1.1.10 TRAP PRIMER PROBLEMS

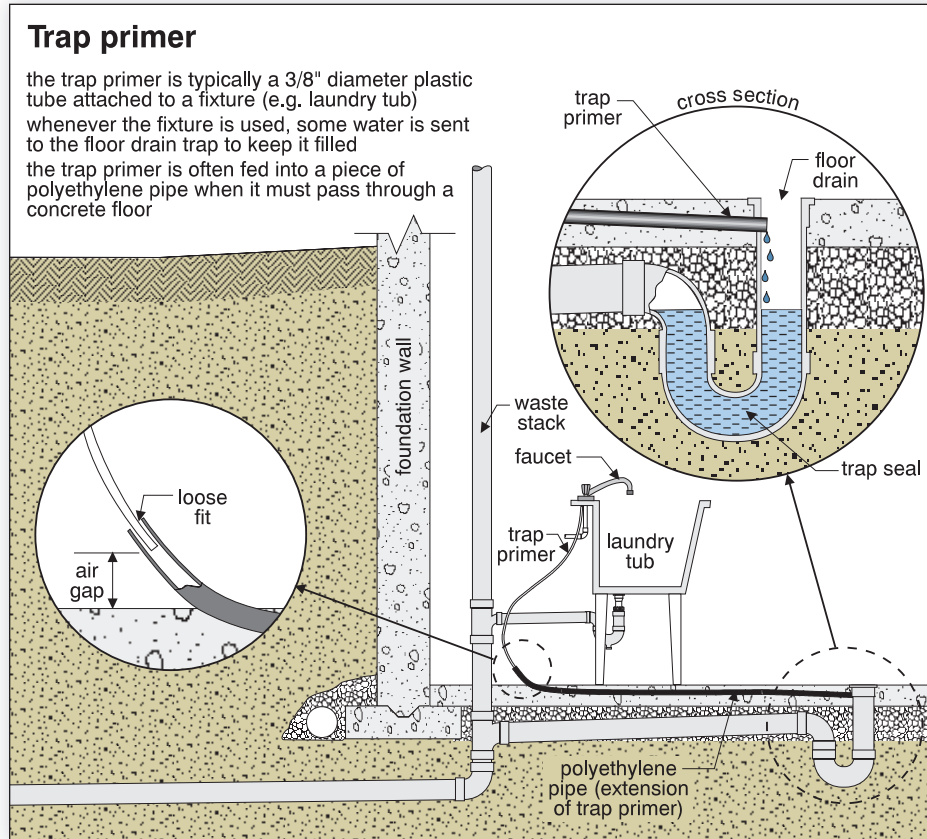
Trap primers are typically required for infrequently used traps such as those on floor drains. Without a primer, the water in the trap will eventually evaporate and the seal will be lost. Sewer gases will back up into the house.

MINIMUM  
TRAP SEAL  
DEPTH

Different jurisdictions have minimum trap seal depths. A 1½ inch depth is required for trap seals in some areas – others call for a trap seal of not less than 2 inches and not more than 4 inches.

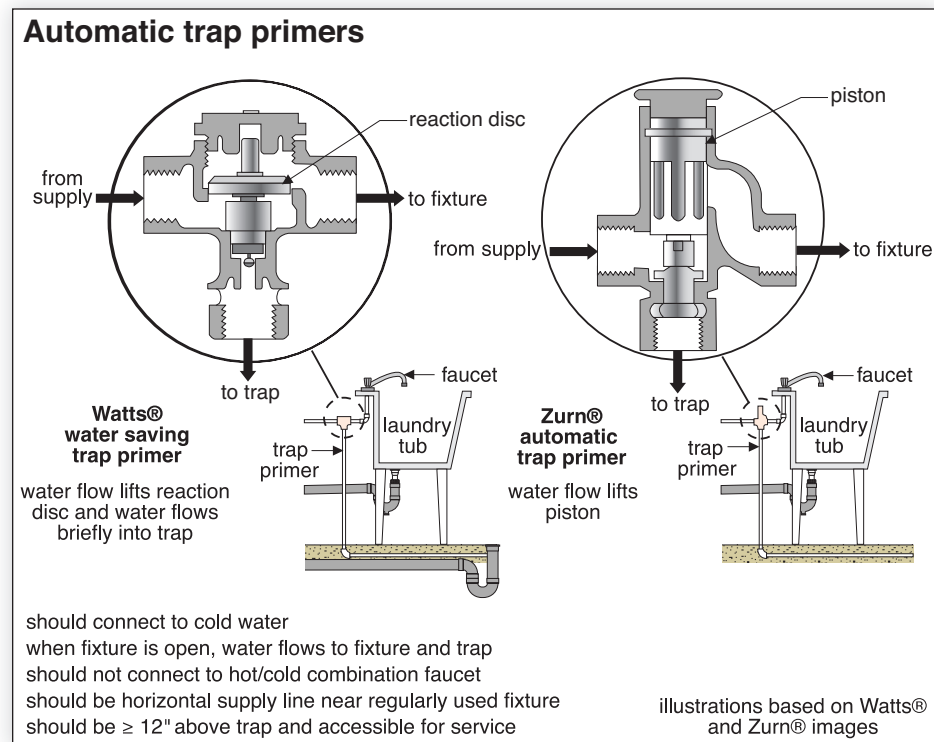


Trap primers typically consist of a  $\frac{3}{8}$  inch diameter plastic tube that connects to a fixture that is regularly used. Primers can be supplied from toilets (at the tank or flush bend) or faucets from laundry tubs, for example. Every time the faucet is used, or the toilet is flushed, water will be added to the trap, ensuring that the water will not evaporate. This maintains the seal.



**AUTOMATIC TRAP PRIMERS**

Other trap primer devices in use are connected in a horizontal position located on the cold water supply leading into the fixture. These devices should be installed a minimum of 12 inches above the trap and should be accessible for servicing.



**CAUSE** There may be no trap primer because it was not required when the property was built or because it was inadvertently omitted.

**IMPLICATIONS** Sewer odors may enter the house if the seal is lost on the floor drain trap.

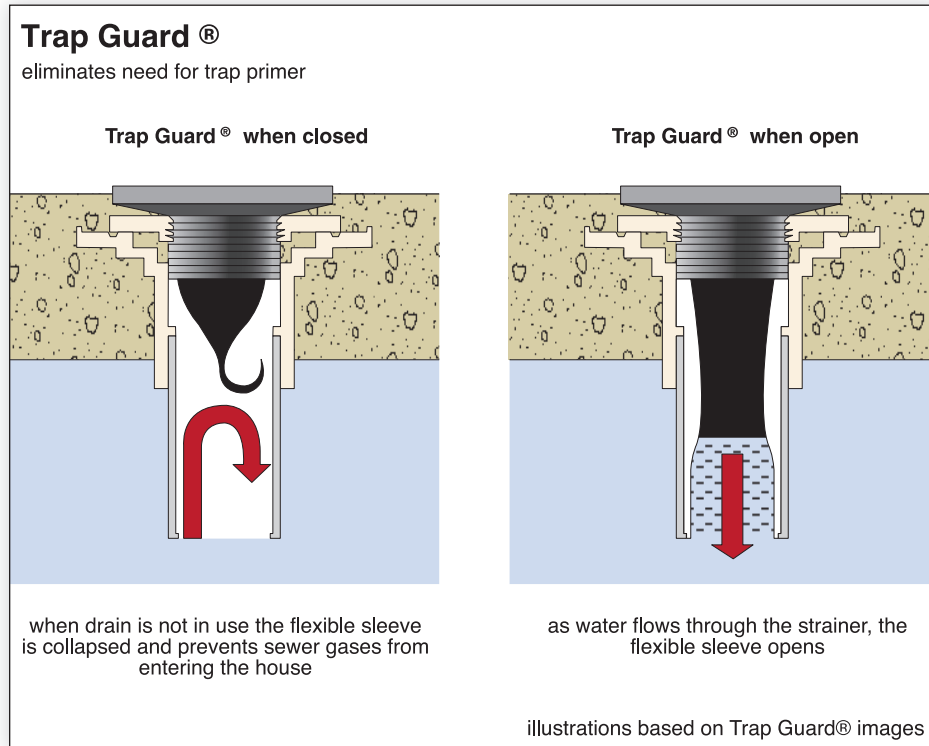
**STRATEGY** Check to see that there is water in the floor drain. If you remove the grate on the floor drain, you can usually see the trap primer entering the sidewall of the drain above the water level in the trap. You can sometimes also see the piping leading from the fixture to the floor drain.

The primer may be flooded if the floor drain backs up. This could form a cross connection. Trap primers need an air gap (ending 1 inch above the top of the floor drain) or need a backflow prevention device as a separate attachment or an integral part of the device itself.

Except in new construction, we would usually not make an issue out of the absence of a trap primer. You can accomplish the same thing by pouring a bucket of water down the trap whenever the seal is lost. You'll notice that the seal is lost by the odors coming up through the drain.

Some people use a layer of mineral oil or trap priming chemicals to slow down the evaporation of the water from the trap in the floor drain. This only works if you remember to put more mineral oil in every time water flows through the trap.

Earlier we mentioned an alternative to a trap primer is a plastic sleeve hanging below the floor drain strainer. A product known as Trap Guard® by Proset® is suitable for homes without a trap primer. It contains a flexible sleeve placed inside the floor drain. The sleeve is open when water is flowing, and collapsed when not in use. This prevents sewer gases entering the home. You may be able to identify this system if you see Proset® on the grate or if you see a flexible sleeve in the drain. Some inspectors pour water in the drain.



#### 4.1.1.11 NON-STANDARD SHAPE OR MATERIAL

We talked about traps being engineered systems. Their shape is critical and so are smooth inside walls. Homemade traps, or traps made from different materials than those that are approved, are usually not successful. Their depth of seal may be appropriate, but they won't maintain the proper velocity and self-scouring effect.

**CAUSE** This is an installation issue.

**IMPLICATION** The trap is not likely to perform well and is more likely to clog or siphon.

**STRATEGY** Whenever you see a trap that does not have the characteristic P-shape, you should note it as a questionable performer. Watch also for either a cleanout plug or slip joints that allow the trap to be removed for cleaning.

### 4.1.1.12 CLOGGED

---

When you are performing your drainage test, you may find that an individual fixture is clogged. Very often, the trap is the problem. While we shouldn't be troubleshooting, you may be able to determine that the trap is clogged. We do not recommend that you remove cleanouts or slip joints to inspect traps. The chances of breaking a fitting or making a mess are significant.

**CAUSES** Traps may clog because –

- the trap is a poor type, shape or size
- of double trapping
- the tail piece is too long
- foreign material is stuck in the trap

**IMPLICATIONS** The fixture will not drain, at least not at its normal speed.

**STRATEGY** You will be describing drainage problems where fixtures don't get rid of their water in a reasonable amount of time. You may or may not know that it's a clogged trap, but include this as a possibility. This is more likely if only one fixture is slow to drain. If all fixtures in the house are slow to drain, the problem is more likely in a main drain, for example.

We find –

- basins usually drain in 15 to 25 seconds
- kitchen sinks drain in 30 to 60 seconds
- standard 5-foot-long bathtubs (with roughly 8 inches of water in them) drain in 2 to 5 minutes