



# Install a Whole-House Sediment Filter

Sturdy mounts and a filter bypass prevent problems down the road

BY TOM CARDILLO

One of the most important parts of a home's plumbing system is also one of its most underappreciated: the sediment filter. Optimally placed near the point the water service line enters the house, the filter prevents particles suspended in the water from reaching downstream appliances and fixtures, where sediment can clog and damage everything from showerheads and faucets to boilers and water heaters.

Unfortunately, many well drillers and plumbers skimp on sediment filters and their installation—if they install one at all. Putting

a filter in a spot where it's hard to service, or using a flimsy mounting system that flexes during filter changes, can lead to leaks. I've seen all of these problems in my service work, so I take extra care to make sure my whole-house filter installations are rock solid. I'm careful to match the filter system to the diameter of the main line so there's minimal loss of pressure and water volume, and I mount the filter at a convenient height so it's easier to maintain. Finally, I include a bypass so the water can be temporarily routed around the filter during maintenance and if the filter housing starts leaking. A leaky housing

# PREP THE HOUSING

A trouble-free water-filter installation requires that the filter housing be rock-solid to prevent leaks when swapping filters. The process starts with installing a piece of 3/4-in. plywood large enough that you can secure the filter, filter loop or bypass branch, shutoff valves, and adjacent piping onto it.



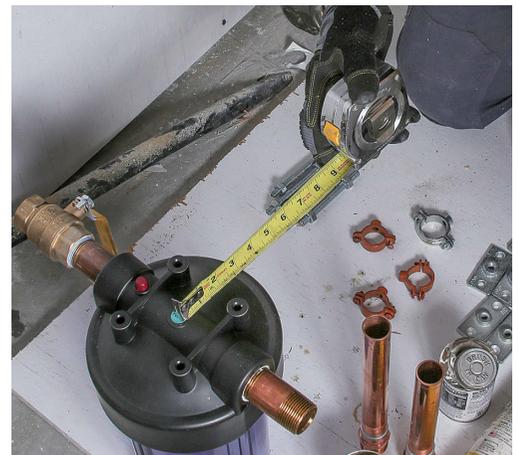
**LAY OUT THE LOCATION** The filter must be installed so the inlet and outlet are horizontal, otherwise water will spill on the floor during cartridge changes, so for vertical water lines I use a horizontal loop. Mark the location of the filter housing, and lay out the loop about 12 in. to 16 in. above it.



**USE NIPPLES, NOT ADAPTERS** To connect to the piping, use 3-in. brass nipples on both sides of the filter housing, and be careful not to overtighten because the housing can crack. Don't use male adapters, which have fewer threads than nipples and can bottom out before they're tight.



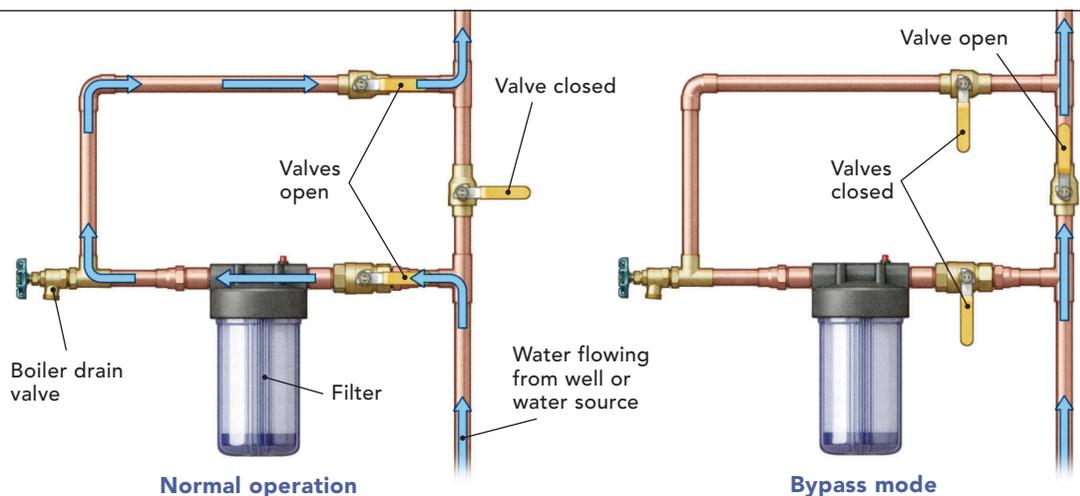
**SWITCH TO COPPER** Install a full-flow shutoff just before the brass inlet nipple. Use the same-size shutoff as the line coming in from the well or municipal supply to maintain volume and pressure. Though I use PEX in many other plumbing installations, I prefer the sturdiness of copper pipe for filter installations.



**MAKE THE MOUNTS** For a secure installation, use split-ring clamps and standoffs—made from threaded rod connected to two-hole mounting flanges—rather than the stamped-steel bracket sold by filter-housing manufacturers. Measure the filter housing and fabricate the standoffs to leave about 1/2 in. between the widest part of the housing and the wall.

## A BYPASS SYSTEM CUTS OFF PROBLEMS

When the unit needs maintenance or repair—to replace the cartridge or fix a leaky housing, for example—the water will have to be shut off. The filter can be bypassed by closing a shutoff valve upstream of the housing, keeping water flowing to the rest of the house.



# BUILD THE LOOP

Once the filter is mounted, connect the filter piping inlet to the main line coming from the well or municipal service and then connect the outlet to the rest of the house's water system.



## MOUNT THE INLET PIPING

Once the standoff length is determined, install the riser tubing on the inlet side of the filter housing. At the top of the riser, install a tee. One branch of the tee goes to the filter and the other branch is for the bypass. Bypassing the filter is reserved for problems, because the water will be unfiltered while the bypass branch is in use.

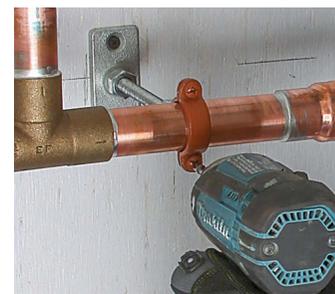


**CHECK FOR LEVEL** Level the housing in both directions before tightening the standoffs and the clamps that secure the housing. Once the inlet side of the filter piping is established and the fittings are soldered, move on to completing the rest of the filter loop and connecting to the rest of the home's water-system piping.



## SWEAT THE CONNECTIONS

Sweat the filter outlet's female adapter to a short length of tubing before threading it onto the male nipple to protect the plastic housing from the torch's heat. Then dry-fit the rest of the filter loop before soldering the connections. The threaded elbow will get a drain valve later.



## CHECK THE CLAMPS

After soldering all fittings, double-check that the split rings and mounting plates are fully tightened. Then make sure the assembly doesn't move when you tug on the filter basket with its special wrench.



**CHECK EVERY JOINT** Look around the entire circumference of every soldered connection to ensure the solder made it throughout the joint. An inspection mirror helps you see the back side of the fitting.



**ADD A DRAIN** The lower corner of the filter loop has a 3/4-in. female fitting for a boiler drain valve. The drain allows you to relieve the pressure and drain off some of the water before changing the filter.



**LOW FLOW AT FIRST** With the inlet valve just barely open, start filling the filter loop while listening for the gentle hiss of air that would indicate a leak. Increase the pressure as the housing and pipes fill with water.



**HANG THE WRENCH** Most filter housings come with a matching wrench to unscrew the filter basket. If your filter kit doesn't include a wrench, get one anyway—it's very difficult to change the filter without it. Hang the wrench above the filter so it's easy to find when it comes time to change filters.

is surprisingly common because the O-ring that seals the filter basket to the housing can be damaged when the cartridge is changed.

### What kind of housing and filter?

Here I'm installing a Sterling HJ10-Clear filter housing. Its translucent basket allows homeowners to see a buildup of trapped sediment, indicating it's time to change the filter. I've found them to be very reliable, and local plumbing suppliers stock matching filters and O-rings. There are also multistage filters for capturing multiple particle sizes and for reverse-osmosis, as well as other types of filters for water with hard-to-remove contaminants. The only way to know exactly what you need is to have the water tested. Your local health department can usually offer suggestions for nearby environmental labs that test drinking water. You can also experiment with different micron ratings (for more, see sidebar, right).

This filter and most others have optional steel mounting brackets that screw to the top of the filter housing. The "L"-shaped bracket, which costs a few bucks, saves installation time, but it flexes when you have to remove a stubborn screw-on basket.

I've seen this flexing cause leaks where the threaded fittings screw into the housing. I've found that split rings and threaded standoffs commonly used in commercial plumbing are a stronger way to mount the filter.

### Choose the right spot

As mentioned earlier, the filter should be mounted after the main shutoff and before any downstream fixtures or appliances. The exception to this is if you have an exterior hydrant or sillcock that will be used for irrigation or car washing.

The filter should also be mounted at waist level so it's easy to see and change. I've seen filter housings mounted on the sides of the floor joists because it's easier to put there than on a concrete foundation wall, but homeowners are less likely to change a filter if they have to get on a step ladder to reach it.

It costs a little more money to install a filter my way, but I think it's worth it to avoid the stress of leaks or turned-off water because of a problem filter. □

Tom Cardillo is a plumber in Coventry, R.I. Photos by Patrick McCombe, except where noted.

## Which filter do you need?

The best way to know what kind of water filter you need is to have your water tested. Filters are rated by the size of particles they're designed to capture, so a 50-micron filter catches particles 50 microns and larger. Filters that trap smaller particles won't last as long as filters with a higher micron rating. Pleated-, string-, and carbon-filter cartridges each have pros and cons (see below). Most residential filter housings are either 2½ in. or 4½ in. in diameter and 10 in. or 20 in. long. Larger filter elements last longer (and cost more) than smaller ones, but some sizes are hard to find locally.

### Pleated

Pleated filters have more surface area than string-wound or spun cartridges, so they can hold more sediment. They are commonly available in versions that filter particles from 5 to 50 microns. These filters work best with sediment particles of the same size. If the particles vary in size, smaller particles will slip through the filter and larger particles will clog the surface.



### String

String-wound and string-spun cartridges are also commonly available in 5- to 50-micron versions and use two layers of filtration to catch sediment. The outer layer catches larger particles, and the inner layer catches smaller particles that slip through the outer layer. While better at filtering out a wide range of particles, these cartridges tend to have a shorter life.



### Carbon

In addition to sediment, carbon filters trap odors, VOCs, and chlorine. They can also remove some unpleasant tastes. These cartridges are more expensive than sediment-only filters. Sometimes carbon filters are used in combination with an upstream sediment filter. The sediment filter catches the majority of the larger particles, so the more-expensive carbon filter isn't clogged prematurely.

