

Installing a Sprinkler System

Tool & Material Checklist

100 ft. Measuring Tape	Stop-and-Waste Valve	Sprinkler Heads
Hacksaw	Control Valves	Emery Paper
String	Graph Paper	PVC Solvent
PVC Pipe	Steep Tape Measure	Controller
Risers	Level	Anti-siphon Valves
Pocket Knife	Shovel	Pencil or Felt Tip Pen
PVC Cleaner	Pipe Fittings	

Types of Sprinkler Systems

The water pressure in most residential systems isn't great enough to water an entire lawn at once. As a result, most systems are divided into circuits, each with its own control valve. Control valves are operated by an electronic controller that turns each circuit on and off according to the schedule you set.

The system consists of standard PVC pipe running from your existing water supply line. At each sprinkler, the pipe connects to a riser that feeds the sprinkler head. Sprinkler heads are designed to throw water in a full circle, a half circle, or a quarter circle. There are two types: rotary sprinkler heads extend above the ground permanently, and pop-up heads are designed to be flush with the ground when off, so you can mow over them.

Planning Your Sprinkler System

The first step in planning your system is to check with your local building department and get any permits you may need. Then make a sketch of your property, showing the locations of all structures, walkways and driveways, and trees and shrubs. Call your local utility companies and have them come out and mark the location of buried gas, electrical, and telephone lines. Note those locations on your sketch.

Next, determine your water pressure and flow rate. Borrow or rent a water pressure gauge and attach it to a hose bibb. Turn the water on full (with all other water in the house off) to find the pressure. Systems vary, but you'll probably need a minimum of 20 pounds per square inch (psi) pressure to install sprinklers.

Check the flow rate by placing a one-gallon bucket under a hose bibb, turning the water on full (with all other water in the house off) and time how long it takes to fill the bucket. Divide the number of seconds by 60 to find the gallons per minute (gpm) capacity of your line. The result of this test will determine the size of each sprinkler circuit.

Then plot the locations of sprinkler heads on your sketch. Multiply the throw distance of the heads (usually 15 feet) by 1.4 to find the spacing between sprinkler heads, so the areas covered by each head overlap. In windy areas, space the sprinkler heads the same as the throw rating.

Finally, divide the system into circuits. The manufacturer's instructions will include an output chart that gives you a gpm rating for each sprinkler head. Divide the gpm capacity of your water line by the rating of each head to find the number of sprinkler heads that you can put on each circuit. Never combine different types of sprinkler heads (e.g., lawn sprinklers with low-shrub sprinklers) on the same circuit.

As a rule, you'll use 3/4" PVC pipe to lay a system with circuits that are less than 100' long, or 1" pipe for circuits over 100'. In any case, your system pipe will be no larger than the supply line you tap into.

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The first step in installing the system is to build a manifold. A manifold is a group of control valves connected to a length of PVC pipe, spaced 3" to 6" apart. Water comes to the manifold from the supply line, then is routed through the proper control valve to the circuit by the controller. The manifold can be mounted above ground or buried (with the control valves projecting above ground), then covered with a box.

Next, dig V-shaped trenches at least 8" deep for the pipe. The trenches should be straight and reasonably level. To tunnel under a sidewalk, connect a piece of galvanized pipe to a garden hose and turn the water on full force to wash away the soil. Then cap a length of PVC pipe with duct tape and drive it through the hole.

Tap into the water supply line by installing a tee at one of three locations: 1) just past the water meter in the basement; 2) just behind an outside hose bibb; or 3) along the main supply line before it enters the house, but past the outside meter (if there is one). Install a stop-and-waste valve as an emergency shutoff and to be able to drain the system for the winter. Install the shutoff valve just past the connection to the supply line, then run pipe to the manifold. Once the PVC connections are cured, turn the water on for a minute or two to flush the system.

Install anti-siphon valves onto the control valves to prevent contaminated water from getting back into your home's supply lines.

Lay the pipe in the trenches, then begin making connections. Before you install each threaded riser tee, screw the riser in place temporarily. As you install the riser tees, hold a carpenter's square against the riser to make sure the tee is set so each riser will be at a 90-degree angle to the ground.

Once the pipes are assembled and the connections cured, install the risers. Cut them carefully to make sure the sprinkler heads will be at the correct height. Once the risers are in place, attach the sprinkler heads.

Finally, mount the controller (typically, the controller goes in the garage), and run low-voltage wires to the control valves. Set the watering controls for each circuit, then test the system by opening and shutting each circuit. Backfill the trenches, then water the soil down thoroughly to compact it. Add more soil until each trench is slightly raised, then replace the sod or reseed.

Connecting PVC Pipe

The type of material you use to install your sprinkler system will depend on the manufacturer's recommendations. Some systems use flexible pipe, plastic or metal inserts, and clamps. Other systems use PVC pipe and fittings. This sprinkler system requires PVC pipe. Be sure to use PVC cleaner on any PVC pipe project.

Step 1: Cut the pipe to length, then remove any burrs with a pocket knife. The cut should be as square as possible to insure a leak free installation.

Step 2: Take the gloss off both ends of the connection (the end of the pipe and the inside of the fitting) with a piece of emery paper, then wipe both ends with PVC cleaner.

Step 3: If necessary (e.g., for riser tees), fit the pieces together dry and mark the alignment with a felt tip pen.

Steps 4 & 5: Finally, coat both surfaces with PVC solvent and connect the pieces together as far as you can and then give the pipe a 1/4 turn to spread the solvent. Wait two hours before running water through the pipe.