



# Relieve Pressure and Reduce Water Waste From Spray Sprinklers



Many irrigation systems operate at water pressures that are higher than what the manufacturer recommends, which can result in excess and uneven watering. Spray sprinkler bodies (SSBs) that have earned the U.S. Environmental Protection Agency (EPA) WaterSense® label can reduce water waste and improve plant health by regulating water pressure at the spray nozzle. This document describes the characteristics, benefits, optional features, and installation tips for WaterSense labeled SSBs, and how SSBs fit into a water-smart landscape.

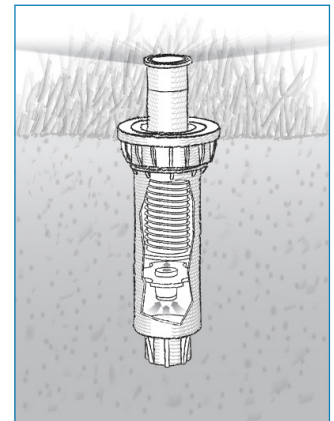
## Background

Most spray sprinklers have recommended operating pressures between 30 pounds per square inch (psi) and 45 psi. Operating a sprinkler system at a pressure higher than recommended can cause significant water waste, due to excessive flow rates, misting, fogging, overspray, and uneven coverage.

High water pressure can be caused by high supply pressure or changes in landscape elevation. High pressure can be managed by installing pressure regulators on the main line near valves that separate irrigation zones or sprinkler bodies that have internal pressure regulation. The location and number of pressure regulators will depend on where a system experiences high pressure. A pressure regulator on the main

line will reduce incoming supply water pressure for the entire system. Some systems will require multiple pressure regulators along the path of water. Some sprinkler bodies include an internal pressure regulator that is housed inside the stem. This mechanism is engaged when water entering the sprinkler body is at a pressure higher than the manufacturer-specified regulation pressure. This “integral pressure regulator” allows the sprinkler body to work at or near its optimal operating pressure, resulting in a consistent flow of water, generating the appropriate water droplet size, and providing a more uniform distribution of water across the landscape.

High pressure in irrigation systems is more common than one would expect. For example, based on irrigation audits conducted by Utah State University Extension and by the Center for Resource Conservation in Boulder, Colorado, 63 percent of



Internal structure of a spray sprinkler body. Courtesy of the Irrigation Association.



Operating under too much pressure can cause misting, fogging, overspray, and uneven coverage. Courtesy of the Irrigation Association.

irrigation systems in those regions operate at water pressures higher than 30 psi. Installing WaterSense labeled SSBs in an irrigation system for the average household, operating at or above 60 psi, can save nearly 5,600 gallons of water per year.

## Why Install WaterSense Labeled Spray Sprinkler Bodies?

There are many benefits to installing WaterSense labeled SSBs:

- **Reduce overwatering and improve plant health:** By using integral pressure regulation to ensure the intended amount of water is applied, WaterSense labeled SSBs reduce the likelihood of overwatering, resulting in a healthier, more attractive landscape.
- **Pay for themselves with avoided water costs:** Replacing existing sprinkler bodies with WaterSense labeled models throughout an in-ground irrigation system operating at or above 60 psi can save a home with an average sized residential landscape more than \$60 per year in water and sewer costs, resulting in a payback period of 2.1 years.
- **Make installation a snap:** WaterSense labeled SSBs are installed the same way as a standard model. Both installation and maintenance are simple and straightforward.

## Optional Features

In addition to integral pressure regulation, sprinkler bodies can also come with optional features such as flow reduction capabilities, integral check valves, and caps to indicate reclaimed water use. Flow reduction prevents water from flowing when a sprinkler is broken or damaged. An integral check valve prevents water from flowing out the bottom of sprinklers at

### Savings All Season

Installing sprinklers with flow reduction could save more than 25,000 gallons of water and \$280 in water costs over a six-month irrigation season.

## Performance Under Pressure



WaterSense labeled SSBs are tested and independently certified to meet EPA's criteria for efficiency and performance, as described in the [\*WaterSense Specification for Spray Sprinkler Bodies\*](#).

- Labeled SSBs are tested for a consistent flow rate under varying upstream water pressures that are higher than ideal operating pressures for sprinkler nozzles.
- By testing for performance related to flow rate, WaterSense labeled models have demonstrated that they will perform under a variety of high-pressure conditions.
- WaterSense labeled SSBs are also tested to ensure that performance is maintained under low-pressure conditions.

lower elevations. Both are beneficial for operating an efficient irrigation system.

## Design and Installation

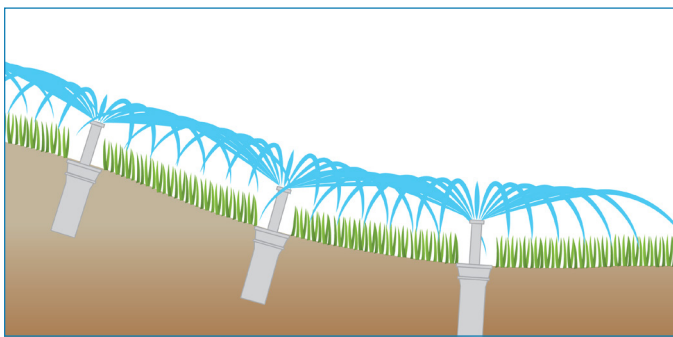
Even the most water-efficient components cannot compensate for poor irrigation system design, installation, or maintenance. A holistic approach will help customers achieve the full potential of water savings outdoors.

An irrigation system should be designed and installed to provide the right amount of water to plants based on plant type. When designing a new landscape, group plants by water requirements into irrigation zones designed to match plant water needs. All sprinklers within a zone should have integral pressure regulation and share the same recommended operating pressure. This maintains even pressure distribution and flow rates throughout the zone, providing a uniform distribution of water and preventing misting and overspray.

For best results, after assembling the irrigation pipe, but before connecting the sprinklers, flush the entire system to remove any debris that could be in the

pipes. When installing sprinklers, as with all system components, the connection should be secure. All threaded connections should be wrapped with tape to keep the connection secure and prevent leaks. Most connections should also be glued, because the high system pressure can push joints apart.

When installing WaterSense labeled SSBs, like any sprinkler body, the top of the sprinkler body should be level with the top of the soil. During operation, the top of the sprinkler nozzle should rise higher than the grass level so that the spray is uninterrupted. Nozzle patterns should conform to the shape of the irrigated area. During installation, the direction and spray distance should be adjusted to avoid hitting any walls or hardscapes. Spray sprinklers should be avoided on steep slopes. If used on shallow slopes, to ensure

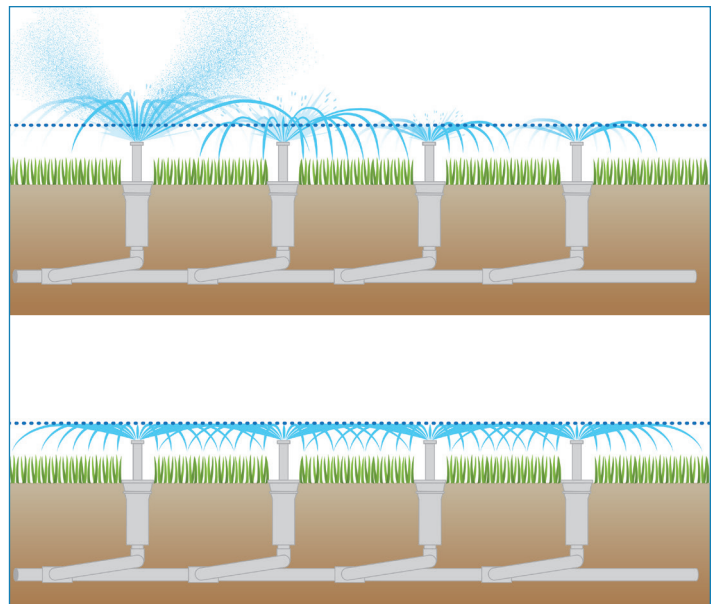


**Figure 1**

Installing sprinklers perpendicular to the ground allows for head-to-head coverage and an even distribution of water across the landscape.

even coverage, sprinklers should be installed such that they are oriented perpendicular to the surface of the ground (see Figure 1).

For maximum efficiency, sprinklers should be placed so that the spray of one sprinkler reaches the adjacent sprinkler. Ensuring that all sprinklers in a zone can maintain consistent pressure and flow makes even spacing and head-to-head coverage easier to achieve and avoids gaps in irrigated areas of the landscape (see Figure 2). Designing your system for head-to-head coverage includes selecting the correct nozzle, which is just as important as selecting a WaterSense labeled SSB. Differences in nozzles are based on discharge angle, pattern, and distance.



**Figure 2**

The top image represents a system operating at high pressure without integral pressure regulation. The bottom image shows the benefits of pressure regulation: consistent flow, reduction in misting and overspray, and improved coverage.

Exact specifications for sprinkler body spacing should be included in the manufacturer's literature.

## Maximizing Outdoor Water Savings

While WaterSense labeled SSBs help reduce water waste when pressure is too high, there are other components of an irrigation system that can improve water savings. For systems where irrigation events are scheduled using a standard clock-timer controller watering at set intervals, irrigation will occur whether plants need it or not. [WaterSense labeled weather-based irrigation controllers](#) (WBICs) use local weather



Weather-based irrigation controller. Courtesy of Rachio.



data and landscape conditions to apply water only when plants need it.

Since smart irrigation is only one piece of the puzzle when it comes to reducing outdoor water waste, here are a few more ideas to keep in mind when creating a landscape or irrigation system:

- **Select plants** based on the local climate. Plants native to the region are accustomed to local weather patterns and require less irrigation.
- **Establish healthy soils** to promote deep root growth and store water.
- **Create cycle-soak schedules** if water begins to pool on the landscape surface. Dividing irrigation cycles into shorter runtimes allows water to soak into the landscape between cycles.
- **Consider [soil moisture-based irrigation control technologies](#)**, which water plants based on their needs by measuring the amount of moisture in the soil and tailoring irrigation schedules accordingly.
- **Install [microirrigation](#) around trees and shrubs**; by allowing water to seep into the soil, this technology better irrigates the root zone of plants, where they need water most.
- **Winterize** during the cold months to eliminate the chance of cracks and leaks caused by freezing. Winterizing uses air pressure to remove all water from inside the pipes. Note: If any sprinklers are installed using the side inlet, instead of the bottom inlet, winterizing will only remove water to the depth of the side inlet, and any water below that inside the sprinkler body needs to be manually removed.

## Don't Lose Your Head

Foot traffic, landscaping equipment, or other machinery can easily break sprinklers and cause water to leak or spray uncontrollably. A broken or missing sprinkler head can waste as much as 1,000 gallons of water per week!

## Resources

EPA offers a wide variety of information about water-smart landscaping and irrigation, as well as resources to find WaterSense labeled irrigation products and professionals certified by a WaterSense labeled program. Here are just a few resources:

- Find irrigation professionals certified by WaterSense labeled programs: <https://www.epa.gov/watersense/irrigation-pro>
- WaterSense Product Search Tool (including SSBs and WBICs): <https://www.epa.gov/watersense/product-search>
- Watering tips (including Sprinkler Spruce-Up): <https://www.epa.gov/watersense/watering-tips>
- Irrigation Association's Landscape Irrigation Best Management Practices: <https://www.irrigation.org/IA/Advocacy/Standards-Best-Practices/Landscape-Irrigation-BMPs/IA/Advocacy/Landscape-Irrigation-BMPs.aspx>

For more information about smart outdoor water use, visit <https://www.epa.gov/watersense/outdoors>.

