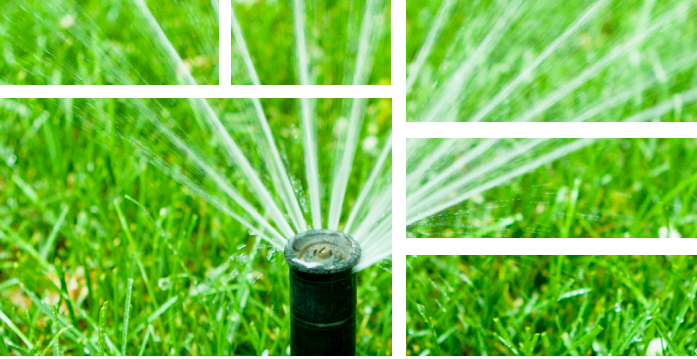


## A few small changes for big water savings: NOZZLE RETROFITS



Irrigation systems can save time when it comes to watering the landscape. Most systems have pop-up spray heads or rotors and the efficiency of these nozzles can be affected by the following factors:

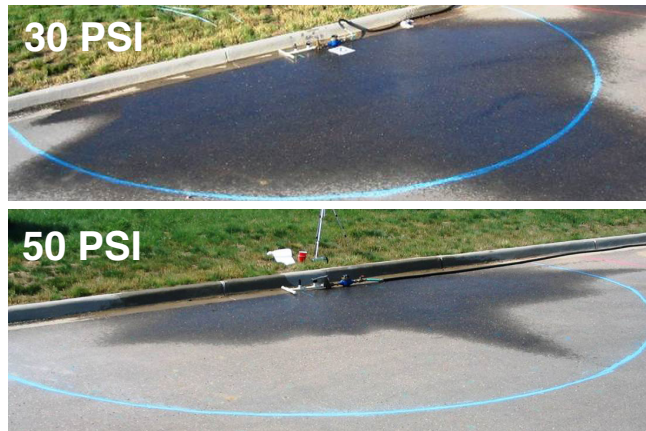
- High or low water pressure
- Broken nozzles
- Misaligned and sunken heads
- High winds
- Excessive run times that lead to runoff

Inefficient systems lead to higher water bills and can cause plant stress. Studies across the country show that the average efficiency of residential and commercial irrigation is only 50 percent.

### Problem: high water pressure

Water pressure in irrigation systems is expressed in pounds per square inch (PSI). For pop-up spray heads the optimum water pressure is 30 PSI. If water pressure is higher than 30 PSI on a spray zone, the increased water pressure leads to an increase in gallons per minute (GPM). High water pressure

causes misting and reduces efficiency of the nozzle spray pattern. This can be clearly seen in the photos below.



The fine droplets found in misting are easily evaporated, further increasing water loss. If you notice dry spots or bad water coverage, it may be a pressure issue. Increasing run times will not solve the problem and wastes water.

### Solution 1:

Replace the existing pop-up spray body with one that has built-in pressure regulation of 30 PSI. A retrofit to pressure-regulated spray bodies can mean big water savings over time.

Let's say just one 15-foot, half-circle nozzle spray zone is operating at 50 PSI without pressure regulation. The flow would be 2.1 GPM. With pressure-regulated heads at 30 PSI, flow would be about 1.7 GPM, 0.4 GPM less.

If there are 10 pop-up sprays on that zone and you run the zone for 30 minutes, you've saved about 120 gallons every time you irrigate that zone. **If you water three times a week, that equals a savings of 360 gallons a week or 1,440 gallons per month.** That number would double with full-circle sprays.

### Swap and save water

It's easy to change out the standard spray bodies with a pressure-regulated version. Purchase new pressure-regulated sprays at a local irrigation store. Be sure you know the brand and model you currently have installed.

Locate and screw off the top of the existing spray body in the ground.



Remove the internal parts.



Unscrew the new pressure-regulated spray.



Remove the internal parts and drop into the old spray body. Screw the new internals into the body.



If your spray heads are old, you might dig up the old spray head and replace it with a pressure-regulated head. Pressure-regulated spray bodies are available in three, four, six and 12-inch models.

### **Solution 2:**

Replace existing spray nozzles with multi-stream rotating spray nozzles. Rotating spray nozzles deliver water slowly which reduces runoff and soil erosion. Rotating spray nozzles have a strong multi-stream pattern offering high wind resistance that is very important in Oklahoma.

All three major irrigation manufacturers offer rotating spray nozzles:

- Hunter® Industries MP Rotator® - Different models, adjustable or full circle, with a radius range of eight to 35 feet.
- Rain Bird® Rotary Nozzles- Different adjustable models, with a radius range of 13 to 24 feet
- Toro® Precision™ Series Rotating Nozzles – Gear-driven adjustable and full circle rotating nozzles. This product has a radius range of 14 to 26 feet.

Toro also offers high efficiency spray nozzles. Toro's Precision™ Series Spray Nozzles have a low precipitation rate of one-inch per hour and a lower flow rate than standard spray nozzles. If low pressure is a problem with your irrigation system – usually noted when heads don't pop up or spray volume is low – then these nozzles can be a solution. They use 35 percent less water than standard spray nozzles and have a more wind resistant oscillating spray pattern.



To change out nozzles, use either a small flat-head screw driver or special pull-up tool to raise the stem of the pop-up spray.



Unscrew the existing nozzle.



Remove the nozzle and the filter.



Hold the stem with one hand, drop in the new filter and screw on the new rotating spray nozzle. Turn on the irrigation system and check your work.



Over time, sprinkler heads get out of adjustment from tree roots, mowing equipment, settling of soil, kids and many other factors. When you replace clogged or broken nozzles, make certain you replace the nozzle with the exact same brand and size or replace the entire zone with water-conserving nozzles.

You can easily fix sunken heads following these simple steps.



1. Purchase some inexpensive cutoff riser extensions.



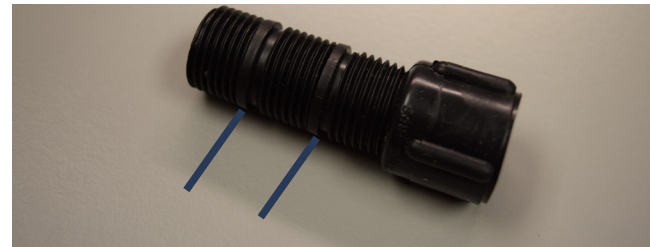
2. Turn the system on and flag the heads that need to be raised. Turn it off.



3. Remove the grass from around the spray with a sharp shooter or trowel.



4. Determine how far to raise the head and carefully cut the riser extension.



5. Gently unscrew the spray head from the funny pipe fitting or plastic nipple.



6. Dig a hole using a sharp shooter or trowel to minimize lawn damage.



7. Screw the male end of the 1/2 inch riser into the bottom of the spray head.



8. Screw the female end onto the funny pipe elbow or existing nipple.



9. Attach a flush nozzle and briefly turn the system on to clean out the sprinkler body.



10. Replace the soil and nozzle. Make sure the spray body is straight and check your work.



For sprays that are throwing the wrong direction, simply take hold of the spray stem and gently “ratchet it around” to the correct position. The ratchet sound you hear won’t damage the spray head.



Whether you choose rotating nozzles or high efficiency spray nozzles, it is extremely important that you change out the nozzles on the entire zone. Each type of nozzle has a different output and is shown in the table below. If you have a zone with a mix of different nozzles, you will have very poor application uniformity creating dry and wet spots.

At least twice a year, conduct a two-minute test of every zone on your irrigation system. Flag the heads with problems to make it easy for you to find the sprinklers once you turn the system off. Align sprinkler heads that are out of adjustment. Periodically watch for broken sprinkler heads and turn off your system until the problem is fixed.

### Expectations from retrofits and repairs

You can easily increase the system performance by at least 10 percent simply from giving your irrigation system a tune-up. By retrofitting nozzles on your irrigation system, it is a realistic expectation that you can have an irrigation system with application uniformity of 70 percent. You could see a 20 percent savings on your water bill if run times are correctly programmed on your irrigation controller.

Contact a reputable professional irrigation contractor for help retrofitting irrigation nozzles.



The City of  
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Utilities Department



Brand	Nozzle Type	Nozzle Model	Gallons/minute 30 PSI	Inches/hour 30 PSI	Gallons/minute 40 PSI	Inches/hour 40 PSI
Hunter	Standard Spray	15-ft half circle	1.86	1.59	2.16	1.44
Hunter	Multi-Stream Rotating	MP Rotator MP1000 8-15 feet	0.32	0.43	0.37	0.39
Rain Bird	Standard Spray	15-ft half circle standard nozzle	1.85	1.58	Not recommended at this pressure	Not recommended at this pressure
Rain Bird	Multi-Stream Rotating	R-Van 1318 Rotary Nozzle 13-18 feet	0.85	0.65	0.98	0.63
Rain Bird	Multi-Stream Rotating	R-Van 1724 Rotary Nozzle 18-24 feet	1.41	0.70	1.69	0.63
Toro	Standard Spray	T-15H 15-foot pressure compensating	1.50	1.29	1.50	1.29
Toro	Standard Spray	TVAN-15 adjustable 15-foot nozzle	2.08	1.78	2.40	2.05
Toro	High Precision Spray Nozzle	Precision Series Spray Nozzles 15-foot	1.16	1.00	1.25	1.00
Toro	Multi-stream Rotating Nozzle	Precision Series Rotating Nozzles adjustable 14-26 feet	0.94	0.63	1.22	0.65