

Conserve Water with Spray Nozzle Maintenance

by Daniel Hermanson



One of the most common issues facing car wash owners and operators today is water conservation. Higher water costs and stricter laws for water usage force all in the car wash industry to find better ways to conserve water while maintaining or increasing profits. After all, one must turn a profit if they want to stay in business.

There are many “suspects” in the average car wash that are commonly investigated when you notice a higher water bill. However, a commonly overlooked component is often the largest contributor to water waste. These seemingly small components are the spray nozzles installed in your self-serve and in-bay automatic car wash.

Spray nozzles, while usually the least expensive part in your wash, are quite possibly the most important. When your spray nozzles are in good condition, your car wash can operate at peak efficiency. The water and chemicals in your wash are being applied perfectly, the customers using your car wash are satisfied, and more important, your water bills can be at their lowest. But what happens when your spray nozzles start to wear out?

As a nozzle is used in your car wash, the fluid being sprayed will slowly wear away at the elliptical spray orifice of the nozzle. Many times this wear is not even visible to the naked eye. On the left you can see an example of this scenario.

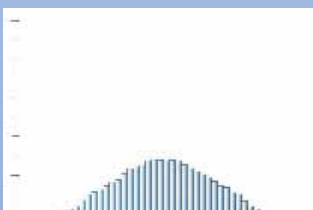
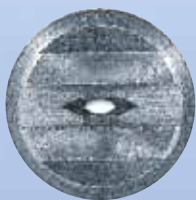
These two nozzles may appear to be the same, but take a closer look. The worn nozzle on the right has a larger elliptical spray orifice than the good nozzle on the left. This means that more water is being sprayed than is necessary. Many times this nozzle wear is not even visible in the spray pattern itself.

It takes a well trained nozzle expert to notice any difference in these two nozzle spray patterns. To the naked eye, both nozzles appear to be working properly. But take a look at an analysis of the two spray pattern distributions of liquid.

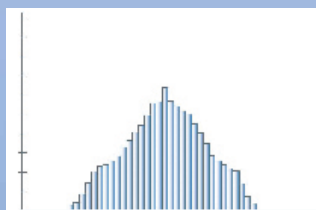
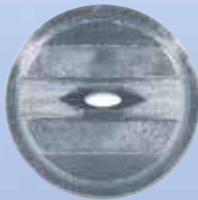
The good spray tip has an even tapered spray pattern, while the worn spray tip has lost its even pattern. There is also a noticeable increase in water in the center of the spray and an increase in water flow along the rest of the spray pattern as well. How much wasted water and money does this equate to? Take a look at some examples below.

How Much Is Wasted Water Costing Me?

Good spray tip.



Worn spray tip.



Assumptions

Average cost of water:	\$2.50/1,000 gal
Average cost of chemical:	\$10/gal
Dilution ration:	40:1
Chemical usage:	35%
Excess liquid sprayed:	15%

Inbay Automatic Car Wash

Number of bays:	2
Average cars per day per bay:	40
Days open per year:	365
Liquid used:	876,000 gal
Wasted water:	131,4000 gal
Wasted chemical:	1,150 gal

Annual cost of wasted water and chemical: \$11,826

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Self-Serve Car Wash

Number of bays: 6
 Hours of utilization(18 hrs day x 365 days/yr x 15% utilization) 985
 Flow rate: 2.5 gpm
 Liquid used:(150 gph x 985 hrs per year x 6 bays) 886,950 gal
 Wasted water: 133,042 gal
 Wasted chemical: 1,164 gal

Annual cost of wasted water and chemical: \$11,974

As you can see, the potential savings in water conservation can be extremely significant. You are probably wondering what steps are necessary to take advantage of these cost savings. Quite simply, it's all in how you take care of your nozzles.

Nozzle Maintenance

Maintaining your nozzles can seem like a tedious task at first, but as you can see from the projected cost savings, it is well worth the effort. Also, with proper knowledge and preparation, nozzle maintenance can be straightforward and take you little time at all. The first step is to know how to detect wear in your nozzles.

At the beginning of this exercise, you saw that detecting wear can not be easily done with the naked eye. So, how can you detect wear in your spray nozzles? Often, you can detect wear in your spray nozzles by looking at your pump. With positive displacement pumps, you can notice a drop in your line pressure. Often times you may be tempted to adjust your pump to get pressure back to your desired value. However, this does not solve the underlying problem, and will result in more wasted water. With centrifugal pumps, you can see evidence of an increase in flow rate. Again, you can compensate by altering the settings on the pump, but this will still result in more wasted water and money out of your pocket.

The best way to detect wear in your nozzles is by doing what is called a bottle check. All you need to do this bottle check are a stop watch, a measuring cup and a container or bucket. There are five easy steps to this process.

Step 1 - Spray a new nozzle into the container for a measured amount of time. Typically, this time should be one minute or longer.

Step 2 - Pour the water from your container into your measuring cup and record the value. Take care to get as much water as you can out of the container for a more accurate measurement.

Step 3 - Divide the amount of water by the collection time from the stop watch. This will tell you the gallons per minute of the new spray nozzle.

Step 4 - Take a baseline measurement by using new nozzles at each stage of your car wash. This will allow you to record what the flow rate is at each stage of your wash when everything is in perfect running order.

Step 5 - Repeat these steps on a regular basis on the same nozzles. You should record the date and measurements and keep a log of the measured flow rates at each stage of your wash. Since your first record is of a new nozzle, you can see how your nozzles are wearing over time. This can also help you determine when you should replace your nozzles. Typically, you should replace your nozzles when they have achieved a 10 percent to 20 percent flow increase or when the spray pattern becomes visually below standard.

It is also important to remember to keep your nozzles clean. You can prolong the life of your nozzles by utilizing strainers before the nozzles and also by making sure that your strainers are cleaned on a regular basis. When you do not have strainers in your system, or the strainers are not cleaned, debris can get to the nozzle orifice causing the orifice to wear more quickly.

You can also increase your nozzle life by cleaning the spray orifice of your nozzles. It is extremely critical that when cleaning your nozzles, you use the proper tools. You should NEVER use a metal object to clean your nozzles. A metal tool can create gouges in the nozzle orifice. This can result in a bad spray pattern or increased flow rate. This means less money in your pocket due to wasted water and negative customer satisfaction. The proper tool for cleaning nozzles is a soft toothbrush or even a wooden toothpick. These items are softer than metal nozzles and typically do not cause damage to the orifice. You should also be very gentle when cleaning plastic nozzles, as plastic material could be damaged more easily than metal nozzles.

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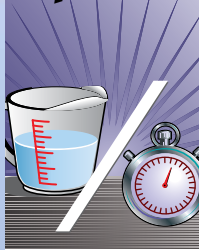
Step 1



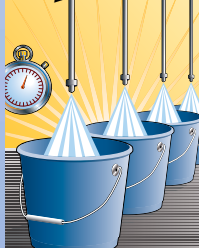
Step 2



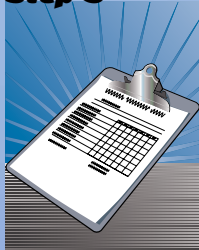
Step 3



Step 4



Step 5





Is There A Better Nozzle?

If you could get the same cleaning effectiveness from a high-pressure spray nozzle with less pump pressure and less water, would you? It seems obvious that the answer would be, absolutely. Unfortunately, this is typically not the choice car wash owners and operators make.

With the increasing globalization of nozzle manufacturers in the market place, it is very tempting to get caught up in upfront nozzle price when ordering your nozzle replacements. However, even though you can save a seemingly significant amount in upfront cost, your overall profits can go down. In most cases the profit loss far outweighs any savings in nozzle price.

Many nozzle manufacturers around the world claim to supply a high quality high-pressure nozzle that will provide the best cleaning effectiveness for your wash. The plain and simple truth is that some nozzle manufacturers are better than others, and you will get what you pay for. If you can get a high-pressure spray nozzle for an extremely inexpensive price, you should ask yourself if that nozzle will help you conserve water so that your water costs do not go through the roof. As this exercise in cost savings shows, lost profits due to wasted water are significant. You need to make sure that the nozzles you buy have good spray quality, long wear lives, and consistent flow rates from nozzle to nozzle. If you install nozzles that do not have these qualities, you may see a decrease in your car wash profits.

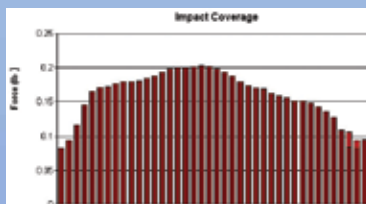
Also, some nozzle manufacturers offer a premium high-pressure nozzle option to their standard high-pressure nozzles. Premium nozzles, while slightly higher in upfront cost, can give you the same or better cleaning effectiveness at lower pressures and lower flow rates. This means that you conserve water with less work from your pumps.

Here is an example:

	Standard MEG	Premium IMEG	Premium IMEG Benefits
Impact Pressure	17 psi	17 psi	25% More Impact 13% Less Water & Chemicals
System Pressure	1,500 psi	1,125 psi	
Flow Rate	2.10 gpm	1.82 gpm	

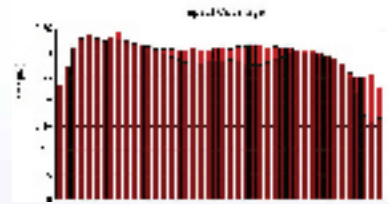
The key feature in these high-pressure premium nozzles is their ability to provide the same or better impact pressure at lower flow rates and pressure. Impact equals cleaning effectiveness. You may be wondering what 25 percent more impact really means. Refer to the graphs below for a comparison of a standard high pressure nozzle vs. a premium nozzle of the same flow rate and pressure.

Standard high-pressure nozzle



Premium high-pressure nozzle

You can see clearly that the premium nozzle delivers significantly higher impact than the standard nozzle. Again, higher impact means that you get better cleaning effectiveness.



It is easy to see from this example that the water and chemical savings would far outweigh any upfront cost savings of a standard nozzle. You also get more impact pressure from the nozzle, which translates to more cleaning effectiveness. By using premium nozzles you can not only increase your profits, but you can also improve your customer satisfaction with the improved cleaning ability.

Start Conserving Now

Hopefully after reading this you now have a better idea of how to find where you are wasting water in your car wash and how to fix it, so that you don't lose profits.

Worn spray nozzles can account for significant amounts of wasted water. This wasted water translates directly into higher water bills and a lower quality wash for your customers. In many cases the cost of wasted water from worn nozzles can be more than \$10,000 per year.

Remember, you cannot always detect worn nozzles with the naked eye. You will need to perform bottle checks with new nozzles as your baseline, and continue the bottle checks at regular intervals every month. This will help you to see how fast your nozzles are wearing out and when to purchase new nozzles. Making sure that your nozzles are cleaned on a regular basis is also helpful.

You can also take advantage of water savings by testing samples of premium high-pressure nozzles in your wash. You will probably find that even though you pay a little more in upfront cost, the savings you will achieve in water and pump conservation are much more valuable. To determine potential savings for your car wash operation, check out the online car wash savings calculator at www.spray.com/carwash, as well as Spraying Systems Co. Catalog 25. †

About Spraying Systems Co. - Spraying Systems Co. is the leading global manufacturer of industrial spray products. The company has more than 85 sales offices and 11 manufacturing facilities throughout the world. Spraying Systems Co. is an expert in spray technology for all types of car washes and offers products for presoak, wash, foam, rinse and wax applications.

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