Spraying Systems Co.®
Experts in Spray Technology



REDUCING CAR WASH OPERATING COSTS WHILE IMPROVING CLEANING

A GOOD, BETTER, BEST APPROACH TO THE CAR WASH INDUSTRY

INTRODUCTION

In car wash operations, cleaning performance and operating cost go hand in hand. Every operator wants better results for their customers. But higher performance shouldn't require excessive water and chemical consumption or accelerate system wear. The most effective way to improve both cleaning and cost control, is to understand what really drives spray impact, and then apply the right nozzle technology for the job.

A common misconception is that higher pressure always means better cleaning. In reality, cleaning effectiveness is determined by impact per square inch, and impact depends on more than just pressure alone. Flow rate, droplet size, spray angle, and nozzle design all influence how effectively a nozzle cleans.

This is where a good, better, best nozzle strategy helps. By offering multiple levels of performance, car wash operators can choose the right balance of cleaning effectiveness, operating efficiency, and total cost.

WHAT DRIVES CLEANING EFFECTIVENESS

To reiterate, the true measure of cleaning effectiveness is spray impact per square inch. Maximizing spray impact involves increasing both the mass of the spray and its velocity. This is influenced by three primary factors:

- Flow rate
- Droplet size
- Pressure

Total theoretical spray impact can be described by the formula:

$$I = K \times Q \times \sqrt{P}$$

I	Total theoretical spray impact	lbs./kg
K	Constant	.0526/.24
Q	Flow rate	gpm/lpm
P	Liquid pressure	psi/bar

This relationship shows that pressure is only one part of the equation. Increasing pressure may produce smaller droplets,

which have less mass, and therefore less cleaning impact. As a result, simply increasing pressure can sometimes be counterproductive.

Flow Rate	0.95 gpm (3.6 lpm)	0.95 gpm (3.6 lpm)	1.9 gpm (7.2 lpm)
Pressure	400 psi (28 bar)	800 psi (55 bar)	400 psi (28 bar)
Total Theoretical Spray Impact	**1.0 lbs (.07 bar)**	**1.4 lbs (.10 bar)**	**2.0 lbs (.14 bar)**



A useful rule of thumb is that increasing flow rate is often more effective than increasing pressure. As seen in the figure above, doubling flow rate can increase impact by as much as 100%, while doubling pressure and keeping the same flow rate provides only about 40% more impact.

WHY OPERATING COST MATTERS

Although higher flow can improve impact, it also increases water consumption. In a car wash, water consumption is a major operating cost. Higher water consumption can lead to higher chemical use and greater utility expenses for water, sewer, and power. Operators must balance cleaning performance with cost efficiency.

The goal is not just to clean better, the goal is to clean better while controlling cost and improving efficiency. That is why nozzle selection is critical. A more efficient nozzle can help maintain or improve cleaning performance while at the same time lowering operating cost.



A GOOD, BETTER, BEST APPROACH TO NOZZLE SELECTION

Good: SA MEG WashJet® Nozzle

The SA MEG option provides a practical starting point for basic cleaning applications. It serves as the entry-level solution in the lineup and is suited for operators looking for a functional, economical choice.

This option is appropriate where cleaning demands are modest and initial cost is a primary consideration. It delivers standard spray performance and offers a dependable baseline for operators who need a straightforward nozzle solution.

Better: MEG WashJet Nozzle

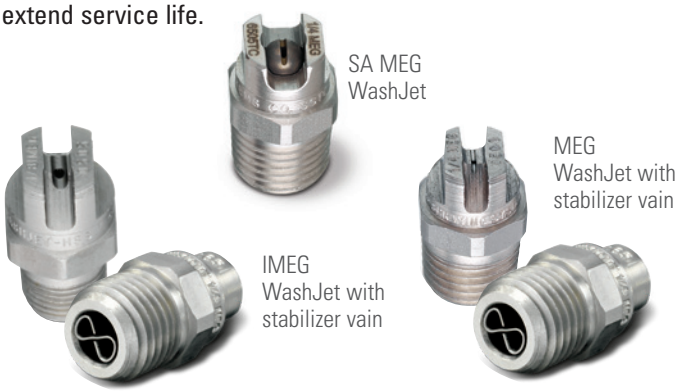
The MEG is the next step up in performance. Compared to SA MEG, it provides improved spray control and a more refined spray pattern, helping operators achieve better cleaning consistency.

This is the balanced choice for operators who want stronger performance without moving all the way to a premium nozzle. It offers a solid combination of cleaning capability and value, making it a strong middle-tier option.

Best: IMEG® WashJet Nozzle

IMEG nozzles represent the premium market option for operators focused on both cleaning performance and operating efficiency. Premium high-pressure IMEG WashJet nozzles are engineered to provide up to 25% greater impact than standard MEG WashJet nozzles at the same flow rate and system pressure.

That higher efficiency creates real value. It means operators can maintain the same or better strong cleaning performance while reducing water and chemical use. It also reduces system pressure requirements, which may reduce equipment wear and extend service life.



COMPARING PERFORMANCE: STANDARD VS. PREMIUM

The difference between standard and premium nozzle technology is clear when comparing MEG and IMEG performance as shown in the below figure.

In this comparison, the IMEG achieves the same impact pressure while using both lower system pressure and flow. This improved performance can be expressed in at least two ways:

- 25% more impact at the same pressure and a flow rate
- The same impact but 13% less water and chemicals

YEARLY SAVINGS:

Savings comparison assumption:

- 15 seconds cycle time per arch
- 30 washes per hour: 12 hours per day, 7 days a week, 52 weeks per year
- 15 nozzles per arch

Standard MEG Nozzle	Premium IMEG Nozzle:
2.10 GPM @ 1,500 psi	1.82 GPM @1,125 PSI
0.035 gal/sec	0.030 gal/sec
0.525 gal	0.455 gal
68,796 gal per year per nozzle	59,623 gal per year per nozzle
Total flow of 1,031,940 gallons per arch per year	**Total flow of 894,345 gallons per arch per year***

*Reduction of 9,173 gallons per year FOR JUST ONE NOZZLE!!!

More than 137,600 gallons of water and sewer savings could be achieved with a single 15-nozzle arch, not including additional savings from reduced chemical use and lower energy consumption due to reduced pumping pressure.

This delivers significant cost savings for car wash operators by reducing water, sewer and chemical use. In addition to cutting utility and consumable costs, lower pressure can also help



reduce stress on pumps and other system components. The result: lowering operating costs without sacrificing cleaning performance.

WHY THIS MATTERS IN CAR WASH OPERATIONS

Nozzle selection is often viewed as a simple hardware decision, but it has a direct impact on ongoing operational expenses. In a competitive market with ever-increasing utility and consumables costs, operators need equipment choices that support both wash quality and improved profitability.

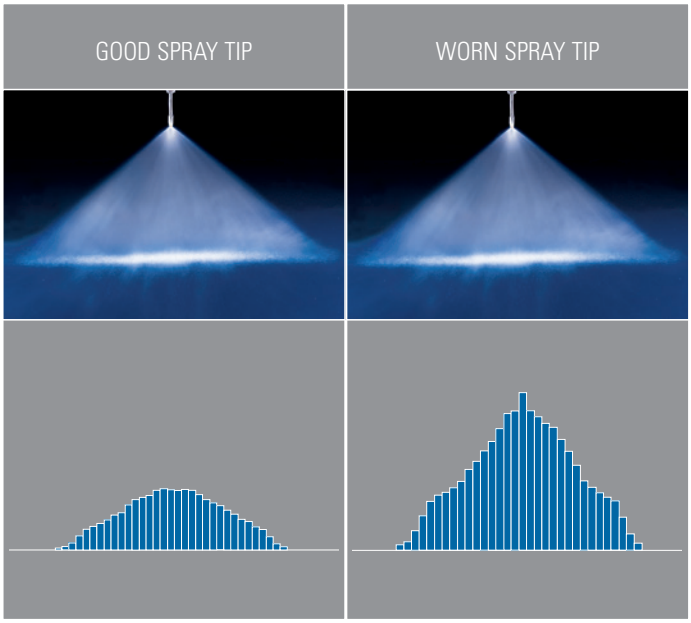
A lower-cost nozzle may appear more attractive at the point of purchase, but if it requires more water, more chemicals, or higher pressure to achieve the desired result, the total operating cost can be significantly increase over time.

Premium nozzles like an IMEG shifts that equation. By improving spray efficiency, it allows operators to get more cleaning impact with less water and less pressure. That makes it a strong fit for operations concerned with long-term savings and performance consistency.

HOW A NOZZLE IS CONSTRUCTED EFFECTS WEAR LIFE

Most high-pressure nozzles are currently constructed of hardened stainless steel, however, not all manufacturers use the same hardening process, which can lessen the durability of the material. To prove this point, we tested our WashJet® nozzles, made of hardened stainless steel, against a competitor's similar nozzle. The competitor's nozzle reached a 10 percent wear point more than twice as fast as the WashJet nozzle.

Nozzles with ceramic orifices are able to withstand harsh cleaning chemicals and high temperatures. Nozzles constructed of PVDF, a very tough plastic material, are good choices for high-temperature wax sealing applications.



Spray patterns of both tips show little difference. Spray collection in tubes gives dramatic evidence of 30% increase in capacity.

CONCLUSION

Better cleaning is not simply a matter of increasing pressure which is often counter-productive. Cleaning effectiveness depends on achieving the right spray impact, and that impact is influenced by flow rate, droplet size, spray angle, and nozzle design. For car wash operators, the right nozzle selection can improve wash performance while helping reduce water use, chemical consumption, and overall operating costs.

At Spraying Systems Co., we work with car wash operators to identify the right nozzle solution for each application. From basic upgrades to premium performance improvements, our team delivers the product expertise, technical guidance, and application support needed to help our customers improve cleaning results while controlling costs.

Make Every Drop Count™

ABOUT THE AUTHOR:

Parth Patel is a Design Engineer at Spraying Systems Co., where he develops and optimizes solutions for a wide range of industrial spray applications. His work spans product design, performance analysis, testing, and validation, supporting customer requirements from concept through implementation.

Parth earned his BSME degree from the University of Illinois Chicago and focuses on delivering robust, application-specific solutions that provide reliable performance under real-world operating conditions.

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