

# Technical Perspectives

Published by your Local Madison Chemical & Bex Nozzles Representatives

## The Case For Frequent Nozzle Maintenance In Industrial Spray Washers

There is a basic axiom which states that ... no chemical is any better than the equipment used to apply it. This is especially true in the case of spray nozzles. They are responsible for delivering chemical and rinse solutions in sufficient volume, in the correct spray pattern, and with sufficient impingement or impact to enable the chemicals to do their job.

Unfortunately, nozzles are the most neglected and least understood part of the spray washer. And, they are the last items to be replaced when they wear out. To help alleviate at least a few of the rumors being spread, we'd like to offer this advice.

### *Replace Metal Nozzles Every 12 to 18 Months And Plastic Nozzles Every 6 to 12 Months*

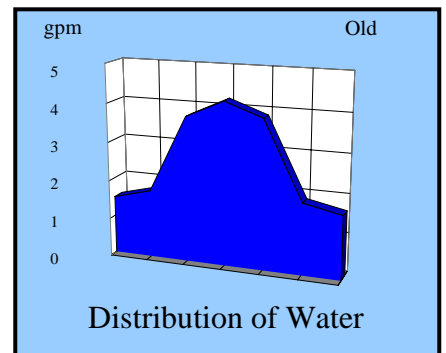
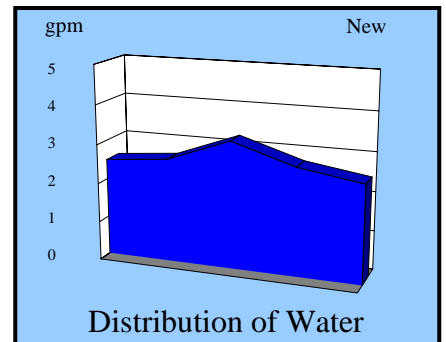
Nozzle patterns, distribution of water within that spray pattern and the total volume of water sprayed will change significantly as the nozzle ages. The diagrams to the right show how distribution of water within a V-Jet pattern changed over a 12-month period. Flows increase and water is delivered to the center of the pattern, not evenly over the entire pattern. Using worn nozzles, such as those displayed in the diagram, you can expect to see less efficient cleaning, possibly streaking where spray patterns were severely affected, phosphate coatings that are noticeably lighter and a significant increase (10 to 15%) in the volume of water pumped.

Determining the frequencies for a nozzle "change out" should be based on experience and the nature of the materials being sprayed. More abrasive materials require more frequent change outs. But, eighteen months is about the limit on metal and 12 months on plastic. After that, they still spray ... but not anything like new ones. Your results may not be like new either.

### The Cost Of Using Worn Nozzles

A 15% increase in the volume of water pumped from a 1200 gallon 140°F stage would increase costs for ...

Electricity .....	\$189.00
Heat .....	\$1026.00
Water .....	\$127.94



## Keep Nozzles Clean, On a Daily Basis to Get Consistent Results

Start with the screens located in front of the pump. There should be two. The screen nearest to the solution pump should be a 4 to 6 mesh screen. The second should be made from a much smaller mesh (roughly three-quarter [3/4] the size of the nozzle opening) to catch items that might plug nozzles. Each should be removed and cleaned when pumps are off to prevent trash from entering pump intakes. In addition, operators should visually inspect and clean nozzles, “daily”. This should be accomplished before beginning operation, unless you prefer using plugged nozzles.

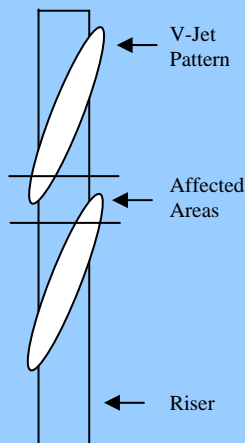
## Improve Nozzle Performance By Adjusting Them Properly

There are three basic adjustments for every nozzle. The first is to turn the top of each nozzle towards the front of the washer by 15 to 20 degrees, as shown in TBN-1. This uncovers the patterns, vertically, and improves performance at the outside edge of each pattern.

### Vertical Adjustments

Turning nozzles at an angle towards the front of the washer prevents them from interfering with each other at the outside edges of their spray patterns.

TBN-1 (facing view)

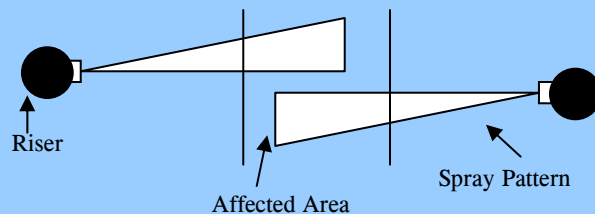


The second adjustment is to turn either the nozzles or risers, horizontally, so that spray patterns from each will barely slip past one another. This prevents excessive turbulence at the center of the washer and reduces overspray into adjacent stages. Diagram TBN-2 shows how this is accomplished.

### Horizontal Adjustment

(top view)

TBN-2



When patterns slip past one another, turbulence is significantly reduced, and overspray between stages held to a minimum.

Last, but not least, the first and last two risers in each stage should be turned at 30 to 45 degree angles towards the center of their respective stages. This further reduces overspray and keeps each stage from contaminating its neighbors.

Finally, make sure that nozzles do not spray directly, or indirectly, into conveyor chain guards. The chemical/water that is introduced removes conveyor chain lube ... which drops on clean parts as they exit the washer ... and shortens the life of the chain. Also, make sure chain guards are in place and in good repair.

## Sizing of Nozzles to Pump Capacity Makes a Big Difference

A simple rule of thumb states that you should never use more than 70 to 75% of the pump’s capacity. This ensures that patterns open fully and that impingement is adequate.



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