

Nozzles

How to Choose and Use

An introduction to shower nozzle selection, specification, use and maintenance.



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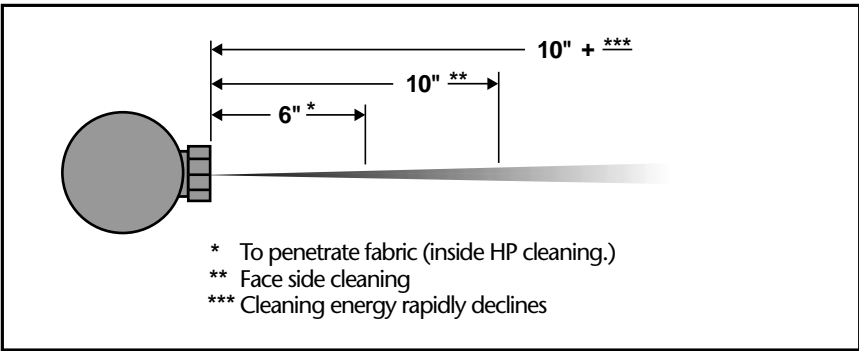
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Nozzles Specification Basics

Steps to selecting the right nozzle:

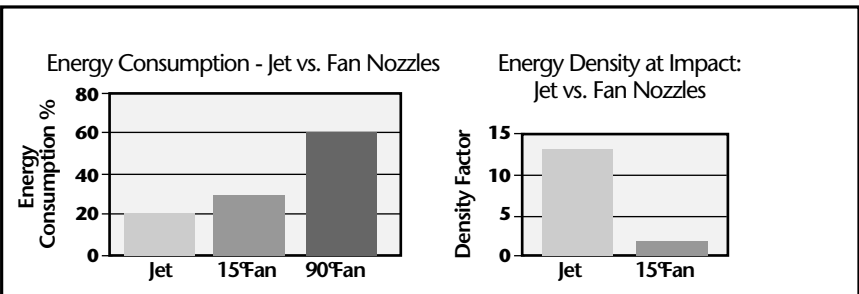
Cleaning with high pressure water. What to look for:

1. Identify type, source and location of contaminants on (or in) the fabric:
Face-side contaminant = sheet side HP showering
Void Volume contaminant = HP shower from inside the fabric
2. Forming section showers -filtered fresh water or clarified white water
3. Press or dryer showers = filtered fresh water showers



Fans vs. Jets

A nozzle consumes a considerable amount of its energy to form its pattern. For example, a jet nozzle consumes about 20% of its energy to form the needle, a 15° fan about 30% and a 90° fan about 60%. The impact area is much greater for a fan, so the energy density is much less. At the fabric, the width of a 15° fan, 6" from point of impact is about 3x the orifice diameter. This represents a decrease in density by a factor of 13 for a .040" orifice.



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General Application Guidelines

Where each nozzle works best:

Kadant AES has the experience to be a source for application information, having years of experience, and high level of expertise in the paper industry. Our recommendations are charted below:

+Recommended ■Acceptable -Not Recommended

Orifice Limits/PPM (MG/L)

Nozzle Type	Filtered Fresh	.040 (1mm)> 50-75*	.055 (1.4mm)> 75-100*	.125 (3mm)> 100-200*	Brush 200-500*	Purge 500->*
 2005	+	+	+	+	-	-
 2149-2	+	+	+	+	-	-
 2226	+	+	+	+	■	-
 2637	+	+	+	+	-	-
 2149-1	+	+	+	+	-	-
 2227	+	+	+	+	+	-
 2939/A	+	+	+	+	-	-
 Silver Bullet	+	+	+	+	-	-
 Disc	+	+	+	+	-	-
 Aqua Shuttle	■	■	■	■	+	■
 Brush	■	■	■	■	+	■
 42/43 Purge	■	■	■	■	■	+
 Tru-Purge/II	■	■	■	■	■	+
 V Fan	+	+	+	+	-	-
 Flat Fan	+	+	+	+	-	-
 Flood Fan	+	+	+	+	-	-

* PPM (MG/L) is water filtered through 100 mesh or 150 micron or equivalent media. The general rule for filtration is the media opening should be 6 times smaller than the orifice size.



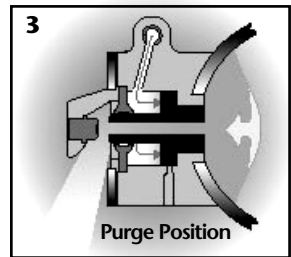
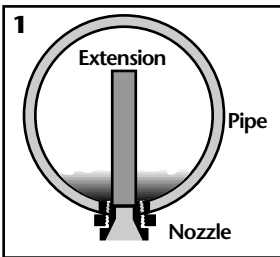
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Nozzles Specification Basics

To purge or not purge.

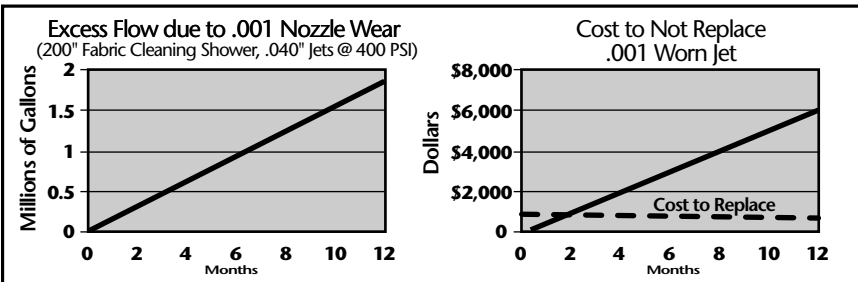
When using CCW, we recommend:

1. Internal nozzle extensions when utilizing fixed orifice nozzles that spray downward (at the 4 and 8 o'clock positions.) This technique prevents deposits at the bottom of the pipe from clogging nozzle orifices.
2. Brush type nozzles if CWW is <500 ppm (Mg/l.)
3. Purgeable type nozzles if CWW is <500 ppm (Mg/l.)



Why replace worn nozzles?

Consider a .040" jet wears .001" to become a .042" jet. the increase in water consumption of a 200" high pressure fabric shower with .040" jets on 3" centers, 6" stroke, operating at 400 PSI is about 3.96 gpm. Assuming the average paper machine operates 8,000 hours per year, this represents about 1.9 million gallons per year. Based on \$3/1000 gpm to buy and sewer and \$.08/kW-hr to pump the excess water, this can add up to about \$6,300/year vs. under \$900 to replace the nozzles.



Rebuilding: an overlooked alternative for purge type nozzles.

Most purging nozzles have a removable hardened bottom that can be replaced by Kadant AES at a fraction of the cost of a new one. Contact your local Kadant AES Sales Engineer to inquire about this program.

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Nozzles Orders and Assistance

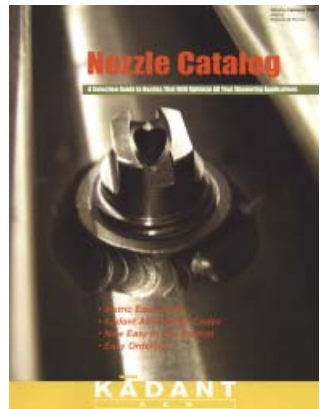
Ways to get the right equipment and advice sooner:

Better quality from a better source.

Kadant AES supplies a full line of shower nozzles designed exclusively for paper mill applications. They are manufactured in a "state-of-the-art" facility by experienced technicians. Kadant AES nozzles are constructed of 316 stainless steel for longer life. The workmanship is of the highest quality.

The Nozzle Catalog puts the information in your hands.

The Nozzle Catalog is a valuable aid to finding and ordering precisely the nozzle—or nozzle part—you need. If you don't already have one, please e-mail, fax or call in your request to Kadant AES.



Programs that make ordering and replacement easier.

A consignment program is now available for your nozzle requirements. Various design nozzles are contained in a cabinet we install at your mill. The nozzles in it are identified by their operating positions. This program is extremely beneficial for those mills who have machines that utilize large quantities of nozzles. Also, annual contracts are available enabling you to take advantage of quantity price considerations.

For Orders and Information, telephone: (518) 793-8801 or fax: (518) 793-9392.

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