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Energy Savings – Part 2 - Fan Showers – Nozzle Selection

Quick Facts

1. Significant energy is lost when excess water leaves the mill as effluent
2. Showers can be a major source of fresh water usage.

Quick Calculations

1. One gallon a minute is 500,000 gallons a year
2. \$800/yr is the Energy cost of this one gpm if the water leaves the mill 50 F warmer than it enters the mill at an energy cost of \$4/MMBTU.
3. \$400,000/yr, the savings from reducing fresh water intake by 500 gpm at \$4/MMBTU.

Mill Conditions – Typical Total Shower Flows by Machine Type

1. Fine Paper Machines - 3,000 gpm
2. Liner Board Machines - 2,500 gpm
3. Tissue Machines - 1,800 gpm

How to save 500 gpm

1. The impact of volume by changing nozzle orifice size at 40 psi.
 - a. Changing the orifice size from 0.072” to 0.052” on one particular shower nozzle will drop the water flow by half, going from 0.8 gpm to 0.4 gpm.
2. The impact of Pressure on a 0.052” nozzle orifice.
 - a. Dropping the pressure from 80 psi to 40 psi will drop the water flow from 0.6 gpm to 0.4 gpm. A 33% to 50% reduction in water consumption is possible with careful control of shower water pressure. Caution is required as most fan shower nozzles will change fan geometry with pressure. It may be necessary to change the shower nozzle angle to maintain desired geometry.

Suggested Water Savings procedures

1. Consider a 40 psi standard for all fan showers. Adjust shower nozzle size (and spacing if necessary) to produce the desired flow. Consider giving all crew members the authority to adjust/maintain this standard.
2. Lubricating Shower standards (consult your felt supplier to get approval): max 0.5 to 0.6 gpm per foot width of felt.
3. Chemical Cleaning showers: 0.8 gpm/ft width of felt/wire (this should be fresh water)
4. Chemical Coating showers: 0.8 gpm/ft width of felt/wire (this should be fresh water)
5. Dr. Blade showers: 0.5 gpm/ft width of roll surface. Consider turning off, particularly in older PMs.
6. Double Dr Blade positions: Go with supplier recommendation. Experiment with lowering flow in this position carefully.
7. Knock Off showers: These should be on recycled water. If not experiment slowly. If currently on fresh water it may be advisable to go to a larger orifice when switching to recycled water. If staying with fresh water lower flow by using a smaller orifice nozzle. Consider a step wise approach when lowering the nozzle size

Call us with any questions on Showers and Nozzles, we can provide tables and calculations for estimating your energy saving prior to beginning a program. We also have several case studies on water/energy savings.

We will consider HP Needle showers next.

We didn't forget the fiber savings and the chemical savings and the effluent treatment savings when water consumption is lowered. We would be pleased to share some case studies with you, just call or e-mail. We have a few case studies in the Library section of our web site, www.spgspg.com.

Good luck, the jobs you save might be yours and mine!