



# CASE STUDY

**Rolland inc.**  
a division of the Cascades Group

## The Vortisand<sup>®</sup> filter



MR. LUC PELLETIER, DEVELOPMENT ENGINEER

**Quality and high efficiency filtration  
for paper mill operations**



**0.45-micron  
ultrafine filtration**



# Rolland inc., Fine Papers Division

Rolland inc. specializes in the manufacture of uncoated fine papers and high-end deinked pulp. The Fine Papers Division in St-Jerome (Quebec, Canada) has had major problems with water quality, more specifically in the case of two critical applications:

1. THE 4 TRIM SQUIRTS
2. THE 2 DANDY ROLL SHOWERS (A TOTAL OF 246 SHOWER NOZZLES)

## THE TRIM SQUIRTS

The trim squirts cut the extremities of the humid sheet of paper at the end of the drainage table with a high pressure water stream before transferring it to the press section. If a trim squirt clogs, there will be a sheet break and also a production loss. The highest quality of rinse water is required because of the fine size of the trim squirts' nozzles (0,01 inch).



## THE DANDY ROLLS

The dandy rolls render the paper sheet more uniform. Inside the dandy roll, a high pressure shower continually washes the rolls' surface with its shower nozzles. The first dandy roll has 96 nozzles, while the other has 150; and if the shower nozzles become obstructed (0,024 inch diameter), the visual quality of the paper is altered and it will be rejected.

Although process water is used in the majority of the plant applications, municipal treated water has to be used on the trim squirts and the dandy rolls showers. As part of their plan to be respectful of the environment and its resources, Rolland inc. had the objective to reduce water consumption and to use process water (river water treated by the company's plant) to replace the municipal water supplied by the City of St-Jerome.

## Marginal performance of conventional treatment

Like most river water sources, turbidity level fluctuates. Even at low turbidity levels, conventional treatment would not provide adequate quality of water to be used in the dandy rolls and the trim squirts. The existing treatment plant includes the following steps:

- flocculation
- decantation
- conventional sand filtration
- chlorination

Cartridge filters (15-micron) were used for further particle reduction. However, nozzle obstruction continued. It was apparent that a higher level of filtration was required to reduce the problems related to water quality.

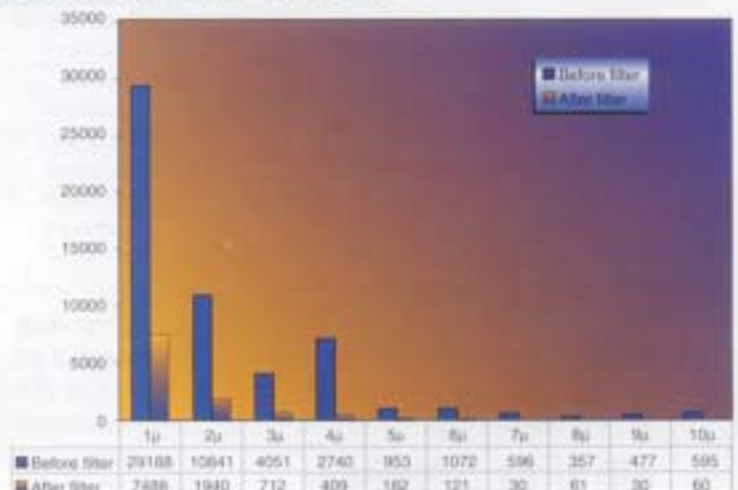


FIGURE 1 ▶ TEST RESULTS OF PARTICLE SIZE ANALYSIS CLEARLY DEMONSTRATE THE NEED FOR FINE FILTRATION



## Pilot / rental proved its point

From June 1996 to November 1996, a 120 gpm fully automatic backwashable Vortisand filter was rented to pilot test the efficiency in the Rolland inc. process.

The trial was a complete success and Mr. Luc Pelletier, Development Engineer for the Fine Papers Division, requested in January 1997, the permanent set-up of a Vortisand filter with a 0.45-micron filtration.

Regularly, a suspended solids test using a 1.5-micron paper filter (Figure 2) and a particle size analysis (Figure 1) were done to demonstrate and to evaluate the need for fine filtration and the efficiency of the Vortisand filter (0.45-micron) installed at Rolland inc.



FIGURE 2 ▶ SAMPLES OF 1.5-MICRON PAPER FILTER TESTS THAT SHOW CLEANER WATER AFTER VORTISAND FILTRATION (0.45-MICRON FILTRATION)

## Multiple savings



### WATER CONSUMPTION

Before the installation of the Vortisand filter, the only alternative to a good filtration of the river water was the use of city treated water. Average consumption was 80 gallons per minute, or more than 42 millions of gallons of water per year for this procedure. Utilizing the Vortisand filter, Rolland inc. is now able to minimize municipal water consumption by switching to efficiently treated river water.

The Vortisand filter gave Rolland inc. opportunities to save on many other aspects. Table 1 summarizes typical savings.

TABLE 1 ▶ VORTISAND RELATED SAVINGS AT ROLLAND INC.

TOTAL BREAKDOWN DECREASE	\$12 900
SHOWER NOZZLE REPLACEMENTS	\$2 600
CARTRIDGE UTILIZATION	\$1 670
CHEMICAL PRODUCTS	\$17 280
ENERGY CONSUMPTION	\$28 600
<b>TOTAL SAVINGS PER YEAR</b>	<b>\$63 110</b>



### MAINTENANCE

Machine break-downs due to clogged nozzles were substantially reduced with the installation of the filter. Nozzle replacements requiring labor has also been reduced. Finally, the cartridge filters (15-micron) do not need to be replaced as often.



### ENERGY

The energy consumption related to heating the municipal water was eliminated, resulting in savings of more than \$28 000 annually.



### CHEMICALS

Rolland inc. benefited both economically and ecologically from a drastic reduction in chemical consumption, saving more than \$17 000 in chemicals with the new Vortisand filtration system.



# Return on investment: less than a year

The Vortisand filter pays for itself. A clean, filtered water prevents the formation of sediments, corrosion and scaling. The Vortisand removes the extra-fine particles (down to 0.45-micron) that create build up that clogs the nozzles. This, in turn, decreases the frequency of breakdowns and replacement of machinery parts. While calculating the savings at Rolland inc., Mr. Pelletier did not take into account the cost related to labor when equipment had to be replaced when water is not properly filtered. In less than a year, the miscellaneous costs associated with the Vortisand filter installation were paid back. The Vortisand filter is a very profitable project and investment for Rolland inc.

## VORTISAND FILTRATION SYSTEM INSTALLED AT ROLLAND INC. ▶ MODEL A3-24-SS



### TECHNICAL SPECIFICATIONS

- Three (3), 24 inch diameter vessels
- Nominal 0.45-micron filtration
- 304 stainless steel tanks conform to ASME standards
- 304 stainless steel face piping
- 304 stainless steel internals
- Automatic backwash on differential pressure and/or timer
- 180 gpm filtration capacity
- Backwash flow rate: 35 gpm for five minutes per vessel
- Downflow rinse flow rate: 60 gpm for 1 minute per vessel
- Operating temperature: 105°F
- Operating pressure: 100 psig
- Filtration rate: 19 gpm / ft<sup>2</sup>
- Control panel: NEMA 12

## A filter tailored to your needs

### INDUSTRIAL AND UTILITIES

- filtration of process water
- side-stream filtration of cooling water
- cooling water for pumps, refiners, etc.
- wash water (filtration)
- dilution water

### HVAC

- chilled water
- condenser water
- hot water heating
- thermal storage water

### COMMERCIAL FILTRATION

- public swimming pools
- aquariums
- waterslides
- aquaculture (fish breeding)

### POTABLE WATER

- iron removal
- filtration before disinfection
- removal of turbidity and suspended matter in water
- lower Silt Density Index

### ULTRAPURE WATER

- prefiltration to remove suspended solids, reducing or eliminating need for cartridges
- reduction in Silt Density Index readings
- prefiltration for reverse osmosis, ion exchange systems, activated carbon and softeners

### WASTE WATER

- tertiary treatment after clarification to remove suspended solids
- pretreatment before disinfection and ultraviolet light sterilization
- treated sewage water reuse
- removal of suspended heavy metals
- pretreatment before metal recovery systems

### FOR MORE INFORMATION

### SONITEC INC.

85 Sargeant St.

P.O. Box 6141

Holyoke, Mass.

01041-6141

Tel.: (413) 532-6089

Fax: (413) 534-5893

4020, chemin Bois-Franc

St-Laurent (Quebec)

Canada

H4S 1A7

Tel.: (514) 335-2200

Fax: (514) 335-2295