

## THE DOLLAR DRAIN

It's not unusual for a mill to flush \$5,000 worth of white water down the drain every day.

Much of this loss represents energy needed to heat replacement water. For example, on a 250-inch reel trim machine, the shower water typically amounts to 4 gpm/inch. On a 24-hour basis, this can add up to almost 1.5 million gallons of water per day. But more importantly, heating this water to 100°F. costs about \$1.0 million per year!

On top of that, the costs for fresh water treatment, wastewater treatment and fiber losses can easily add up to several hundred thousand more dollars a year, not to mention potential production increases.

## A PLUG FOR THE SOLUTION

The obvious solution to all these problems is to recycle the white water...but that elusive carrot has been dangled in front of Plant Managers before.

The problem has always been that no piece of equipment could reliably clean up the white water

enough to prevent fibers from plugging shower nozzles. Which, of course, creates an intolerable downtime situation. And solving that problem generally creates throughput problems that make the whole scheme unworkable.

Enter the SWECO® White Water Filter — with spectacular successes in major mills throughout the United States, Canada and Europe.

For example, in one typical application, a SWECO White Water Filter has made it possible to reclaim 450 gpm of 90-degree heated white water. The heat savings alone amount to the equivalent of 15,800 barrels of oil per year. At \$26.00 per barrel, the annual fuel savings add up to an impressive \$410,000. And, obviously, as fuel costs escalate, the potential savings become even more attractive.

Fiber savings with the SWECO White Water Filter are equally impressive. In the application just described, fiber recovery averages about 2.1 tons per day. At \$400.00 per ton, last years savings

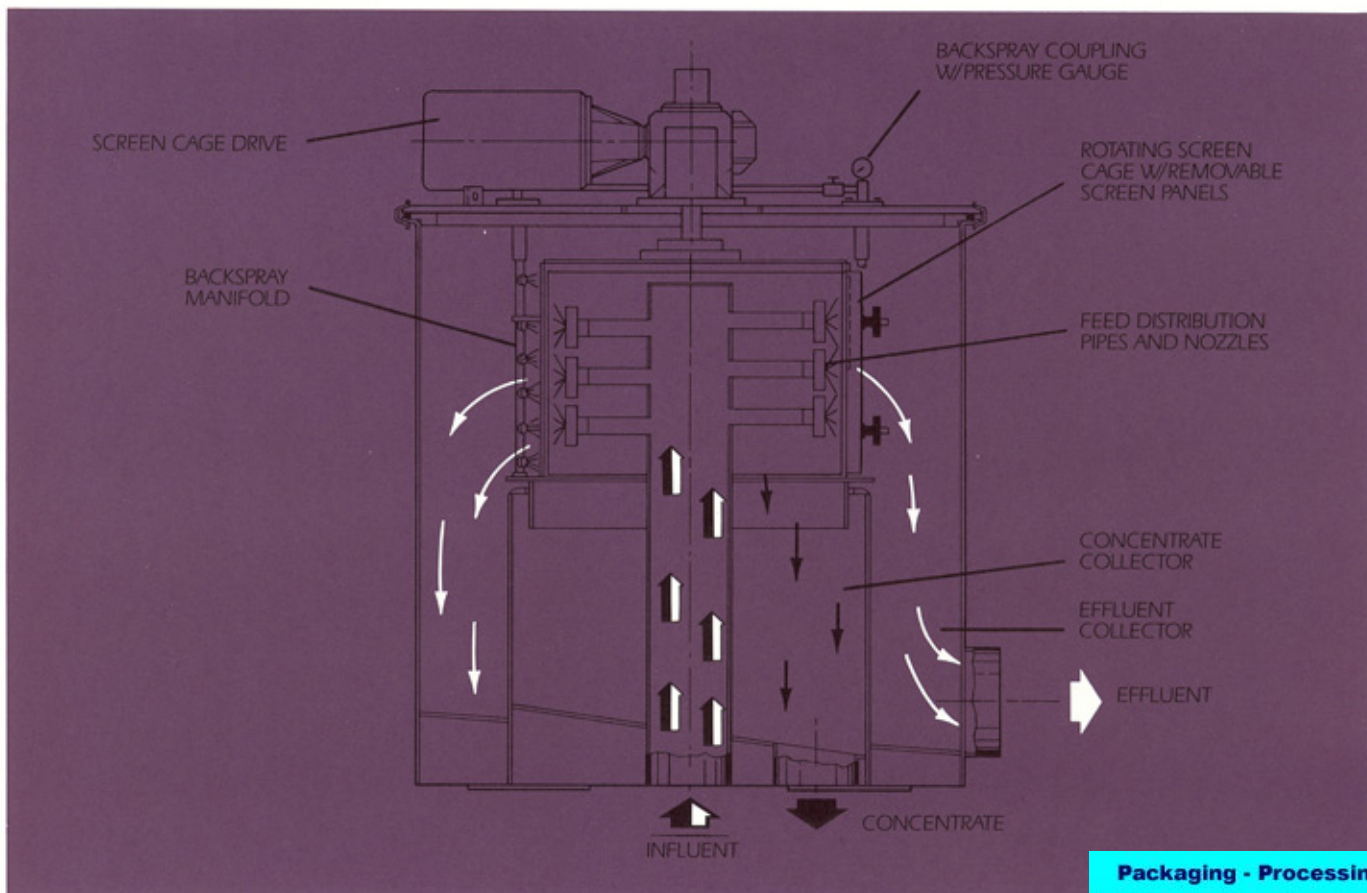
amounted to \$294,000!

Applications for white water screened with the SWECO White Water Filter include wire and felt showers, vacuum pump seals and save-all showers as well as general wash down.

The SWECO White Water Filter can provide excellent insurance against existing save-all upsets by filtering the "clear leg" water prior to its use on the paper machine.

It's also important to note that, where white water has replaced fresh water on knock-off showers, the machine operating temperature has increased by as much as 10 degrees. This higher temperature has the effect of improving drainage and drying and allows the machine to be operated at higher speeds with higher production.

The net effect is that, in every installation, mills report significant reduction in final effluent, and several have reduced it to a mere trickle.



## KEY FEATURES

- Produces shower quality water
- Allows water system close-up with
  - Heat saving
  - Fiber saving
  - Reduced effluent treatment
  - Increased production due to higher machine operating temperature
- Capacity to 4000 gpm per unit
- Insensitive to normal process fluctuations
- Nonplugging design
- High solids removal efficiency
- Needs almost no operating attention

## HOW IT WORKS

The SWECO White Water Filter (WWF) is an important concept in liquid solids separation. It utilizes high flow-rate, fine mesh centrifugal screening to remove all particles larger than the screen mesh opening, with no dependence on differences in specific gravity.

The incoming flow enters the unit with approximately 10 feet of hydraulic head. This flow travels up through the center feed pipe of the WWF and out horizontal distribution pipes to nozzles which present the feed tangentially against the inner surface of the revolving screens in a series of overlapping, thin layers of liquid.

A low centrifugal force is generated by the rotating screen cage sufficient to force the white water through the screens at high rates while allowing the rejected fibers to slough down the inner surface in a concentrated stream. This sloughing action is assisted by continuously operating, high pressure, external spray nozzles directed at the outside of the rotating screen and angled to facilitate the downward movement of the solids.

In addition to assisting in the sloughing process, the high pressure sprays clean every screen opening several times each second. The back-spray liquid can be the screened white water from the WWF, so no fresh water need be used.

The combination of the rotational velocity of the screens and the

impingement velocity of the influent make it possible for the screens to remove particles smaller than the mesh openings. The WWF is not designed to remove fillers and fine particles; however, these small elements generally don't create plugging problems.

## CONSTRUCTION

Normal construction materials are 316 stainless steel or 304 stainless steel with all stainless steel internals.

Being a fine screening device, the WWF is normally equipped with screens ranging from 100 to 325 mesh, depending on the fiber size and where the recycled white water is going to be used. These mesh screens are normally supplied in stainless steel but synthetic textiles are also available.

## FLOW SPLIT

The WWF discharges two streams; the filtered white water effluent and the rejected fibers called the con-

centrate. The quantity which passes through the screen versus the quantity rejected is termed the split. A 90/10 split means that, of the flow entering the unit, 90% passes through the screen as effluent and 10% is rejected as concentrate.

Split varies with the amount and type of suspended solids in the liquid and with the screen mesh. Low fiber concentrations (50-300 ppm) can result in splits from 90/10 to 95/5. As the fiber concentration in the feed increases, the percentage of concentrate increases. Coarse screens produce less concentrate volume than finer screens. The concentrate can easily be returned to the white water system for stock dilution.



## GETTING DOWN TO CASES

The following case histories illustrate the extraordinary efficiency and usefulness of the SWECO White Water Filter. Obviously, every requirement is unique to some extent and so we urge you to contact a SWECO representative for system information pertinent to your needs.

### APPLICATION NO. 1

For more than three years now, Weyerhaeuser Company's mill in Springfield, Oregon has achieved favorable results in white water recycling through the use of a combination of the plant's flotation save-alls and SWECO White Water Filters.



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Weyerhaeuser utilizes five White Water Filters with 150-mesh screens to process more than 4 million gpd of white water on the mill's two paper machines. The fine mesh screening recovers fiber particles down to 105 microns in size; the recovered particles are then recycled to the primary fan pumps on the two machines. Screened effluent flows from the White Water Filters to filtered water tanks and from there is recycled to the machine showers.

Environmental benefits have proven to be considerable on Weyerhaeuser's white water recycling systems. Water consumption and wastewater discharge to the McKenzie River have been signifi-

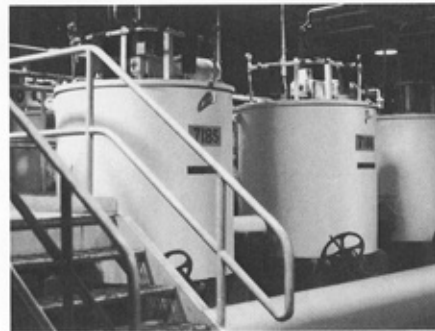
cantly reduced. The systems have also paid off in reduction of energy consumption, as the recycled white water retains much of its previous heat.

### APPLICATION NO. 2

In 1978, Owens-Illinois launched a capacity expansion at the firm's corrugating medium mill in Tomahawk, Wisconsin. An important element in the expansion was the implementation of a system of eleven SWECO White Water Filters, utilized for recycling of white water on Owens-Illinois' #2, #3 and the newly constructed #4 paper machines.

Eight of the SWECO units provide coarse-mesh screening of white water that removes and recovers fibers larger than 200 microns. A nominal flow of 5300 gpm is processed in this eight-unit system. The screened white water goes to a storage tank for use on certain paper machine showers and as a feed source for the secondary SWECO treatment system.

This secondary system, consisting of three SWECO White Water Filters with 325-mesh screens, produces "superclear" recycled white water containing no particles greater than 50 microns in size. The "superclear" processed white water is utilized by Owens-Illinois in small-orifice, high-pressure



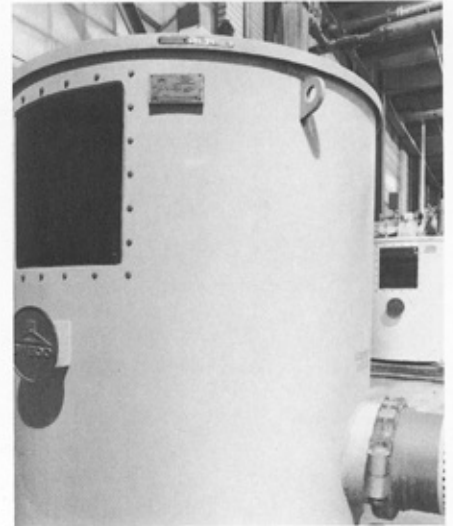
showers on the paper machines and in other in-plant applications requiring highest quality water.

Results for Owens-Illinois have been excellent. The plant has expanded capacity from 620 to more than 1000 tons/day with

no increase in process water discharge. Additionally, the plant is realizing significant energy savings. Owens-Illinois estimates that the mill is recovering about one billion Btu/day through recycling of heated water in place of fresh water.

### APPLICATION NO. 3

At Consolidated Papers, Inc's Wisconsin River Division Plant in Whiting, Wisconsin, a system of four SWECO White Water Filters is utilized on the firm's new 330



tons/day "Specialist 64" paper machine. This machine produces lightweight grades of enamel printing paper used principally in magazine and catalog production.

Three of the SWECO White Water Filters use 165-mesh screens and are operated in parallel, processing a 2300 gpm flow (clear-60 ppm solids) from the disc filter. The processed white water is then used for fourdrinier and wet end showers. The recovered fiber is returned to processing.

The fourth SWECO unit utilizes 325-mesh screening and processes water also from the disc filter that goes to the ultra-clear storage tank. This high-quality, recycled white water is then used in certain critical applications in the plant where highest quality water is required, such as the breast roll shower, disc filter knockoff and segment cleaning showers, and the felt

flooding showers press section.

Consolidated reports key benefits include less fresh water usage and reduced effluent treatment.

#### APPLICATION NO. 4

Another application indicative of the cost efficiencies obtainable with a SWECO White Water Filter involves the recovery of white water in a West Coast mill which is producing nearly 450 tons per day of newsprint.



The recovery system is comprised of three WWF's utilizing 165-mesh screens to process a cumulative total of 1600 gpm.

Feed for the system is provided by the uhle box drains, press save-all pan drains and wringer roll drains.

WWF1 processes 460 gpm with the effluent being recycled to edge trim showers, headbox showers and kraft save-all lifting showers.

WWF2 processes 580 gpm which is likewise utilized for edge trim and kraft save-all lifting showers.

The third WWF unit processes 560 gpm and also supplies white water to the kraft save-all lifting showers. Excess flow is stored in a filtrate tank and delivered via a level control system to the collection sump.

A level control system also monitors the screened filtrate tank, admitting fresh water as necessary for makeup.

The concentrate is sewered in this application, and although some fiber recovery occurs, the primary benefit results from the heat savings.

#### APPLICATION NO. 5

A three-unit WWF system has been in operation since 1974 at a major Pacific Northwest mill which produces fine paper products.

Operating at a total flow rate of 1300 gpm, the White Water Filters use 150-mesh market grade screens to remove all particles greater than 105 microns.

Recycled white water is used in the paper machine showers and

pump seals. Due to the heat of the recycled white water, both paper machine speed and overall performance have been improved. As a result, paper tonnages and quality ratings are higher.



Other reported benefits include substantial dollar savings in fiber and filler recovery, energy cost reductions, and low to zero discharge to the sewers.

#### APPLICATION SUMMARY

- Paper machine shower water preparation
- Vacuum pump seal water filtration
- Washer shower water filter
- Thickener shower water filter
- Save-all shower water filter
- Incoming fresh water filter

#### SWECO WWF TYPICAL PERFORMANCE DATA

TYPICAL APPLICATIONS	INLET SOLIDS RANGE (lbs/1000 gal)	CAPACITY RANGE (GPM)	SCREEN MESH
Fine Paper Machine Shower Water	3.0 to 6.0	Up to 2000	325
Tissue Machine Shower Water	3.0 to 5.0	Up to 2200	200
Vacuum Pump Seal Water	0.2 to 0.6	Up to 3600	165
Save-All "Clear Leg" Water	0.5 to 1.5	Up to 3600	165

#### COST SAVINGS

The SWECO White Water Filter opens up enormous opportunities for cost savings on energy, water, fiber, chemicals and wastewater treatment. Plus the savings on downtime and maintenance costs related to shower nozzle plugging.

And because the cost savings are so great, the payback period can be very short — in fact, as little as six months, as numerous SWECO

installations have demonstrated.

Add to that the tax credits, purchase incentives and capital depreciation and your profitability prospects with a SWECO WWF suddenly become very appealing, indeed.

#### SUPPORT AND MORE SUPPORT

SWECO applications engineers are available to analyze your waste-

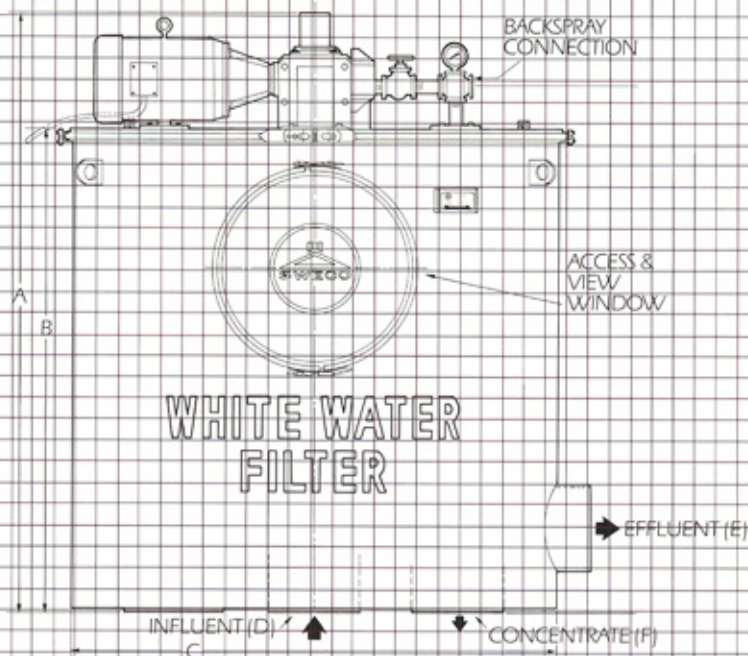
water and process stream requirements and recommend the best equipment solution for your needs. Where the situation suggests a more comprehensive systems solution, SWECO engineers will work with you to develop a system to meet your specific requirements

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## SWECO WWF SPECIFICATIONS AND DIMENSIONS



### MATERIALS

VESSEL	STAINLESS STEEL OR COATED MILD STEEL
PIPE FEEDER AND NOZZLES	STAINLESS STEEL
INTERNAL FITTINGS	STAINLESS STEEL
SCREEN CAGE	STAINLESS STEEL
SCREEN FRAMES	STAINLESS STEEL
OPTIONAL FLANGES	STAINLESS STEEL
VIEW WINDOW	LEXAN

MODEL*	WWF12S	WWF12SDD	WWF30S	WWF30SDD	WWF60SDD
Nominal Capacity – gpm (120 Mesh at 100 ppm)	150	250	800	1600	3200
Motor Size – HP	¾	¾	3	5	10
RPM	228	228	114	114	80
No. of Screens	8	8	9	9	18
Screen Size	5" x 16"	5" x 28"	10⅜" x 21"	10⅜" x 42"	10⅜" x 42"
Backspray at 125 psi	8 gpm	14 gpm	20 gpm	40 gpm	80 gpm
Unit Weight – Lbs.	450	550	1800	2800	8000
A – Overall Height	48¾"	56¼"	72"	96"	112"
B – Vessel Height	37"	45"	57"	81"	87"
C – Vessel Diameter	24"	24"	54"	54"	84"
D – Influent Connection	3"	3"	8"	8"	12"
E – Effluent Connection	6"	6"	10"	16"	18"
F – Concentrate Connection	6"	6"	8"	8"	12"

\*Other sizes available for different space and capacity requirements.  
All specifications are subject to change without notice.



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