

# ***Multiple Barrel Filter Systems***



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# Multiple Barrel Filter Systems

Barrel Filter Media — A range for every filtration requirement



## Perforated Stainless Steel

For extremely coarse filtration requirements. Holes sizes .125" (3.15 mm) and larger.



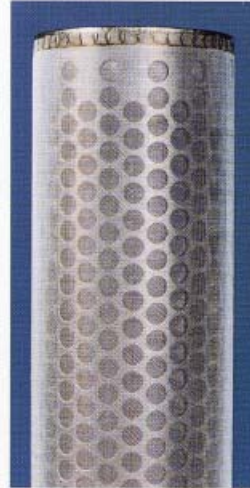
## Synthetic Fabrics

For filtration from 5 to 250 microns nominal. Mounted on stainless backer for support.



## Spiral Wound Slotted Wedge Wire

Extremely rugged; with-stands high differential pressures, effectively removes fiber and gelatinous particles. Slot openings from .001" to .065" (.05 - 1.65 mm.)



## Metallic Screens

For filtration to 44 microns nominal. Standard sizes from 20 to 325 mesh.



## Diffusion Bonded Elements

Strong, integrated structure of 3 stainless steel screens sintered to a perforated support plate. Filtration from 5 to 863 microns.

## Media Sizes

Approximate Pore Opening		Stainless Steel Perforated	Synthetic Fabric	Spiral Wound Slotted Wedge Wire	Metallic Screen	Diffusion Bonded Element
Inches	Microns	Hole Size	Micron Rating	Slotted Opening	Wires/Inch	Micron Rating
.187	4750	.1875"				
.034	863				20	
.024	600			.024"		
.014	350			.014"	40	
.010	254		250	.010"		
.0092	233				60	
.0059	149		150	.006"	100	
.0041	104		100		150	100
.0030	75		75	.003"	200	75
.0024	61				250	
.0020	50		50	.002"		
.0014	44		36		325	44
.0013	32				32*	32
.0010	25		25	.001"		
.0008	20				20*	20
.0006	15		15			
.0004	10		10		10*	10
.0002	5		5			5

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## In-Line Filters Operation and Cleaning

### Single-filter

Kadant AES in-line filter designs maintain filtration efficiency and lengthen filter life—while reducing and simplifying maintenance.

Quarter-turn caps allow access to filter elements in seconds. Filters are inspected and cleaned while housings remain installed and in line. The cap also locks the element in position eliminating stress and vibration.

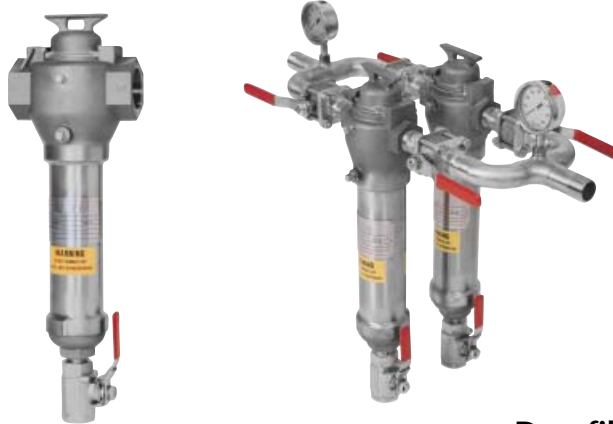
O-rings maintain absolute sealing integrity to prevent bypass, regardless of the frequency of cap openings or the pressure applied.

The head casting's baffled flow disperses filtrate evenly over the filter media. This produces uniform contaminant build-up for longer media life with less frequent cleaning.

A centering pin keeps the element properly centered in the housing even in non-vertical positions.

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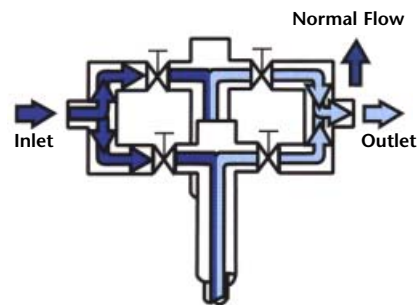


### Duo-filter

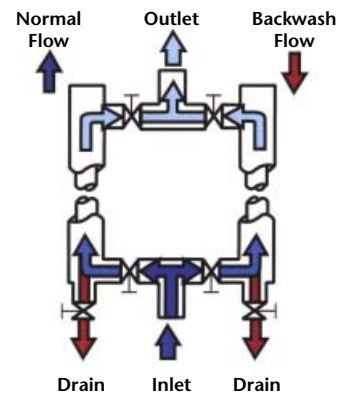
Duo-filter installations let you isolate one barrel for cleaning or inspection—while process liquids flow uninterrupted through the other filter.



### Duo-filter Alternatives



In-Line Design



Bottom Entry -  
Top Outlet Design

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## Operation and Cleaning

### Backflushing: The different techniques

Although each Kadant AES multiple barrel filter is fabricated to meet specific application requirements, all share common features.

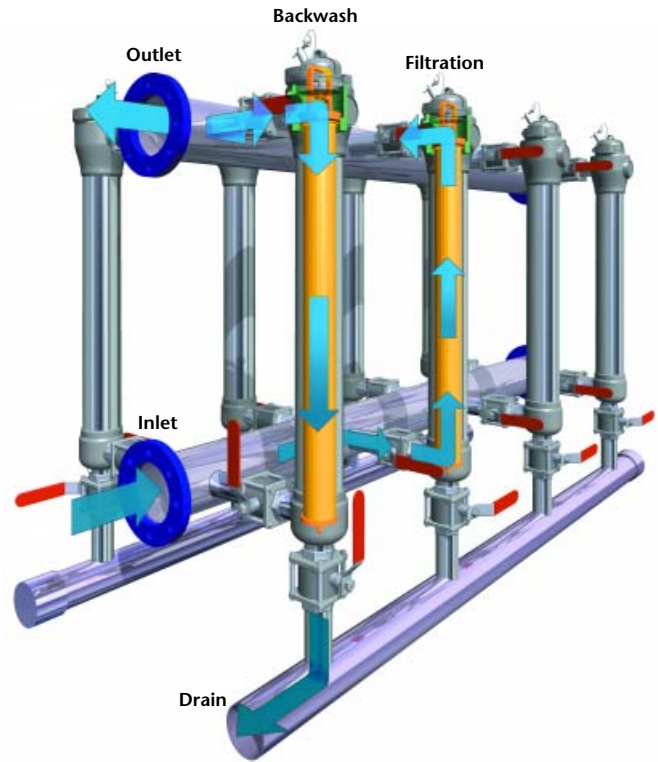
All barrels are mounted on a common header to provide continuous flow during backwash. The individual barrel filters use permanent, reusable filter elements along with the quarter-turn caps, O-ring seals and element centering pins as found in Kadant AES In-Line filters.

A wide range of options may be specified, including different seal materials, manual backflush, or automatic backflush (by time clock or pressure differential) that can be linked to mill PLC or DCS.

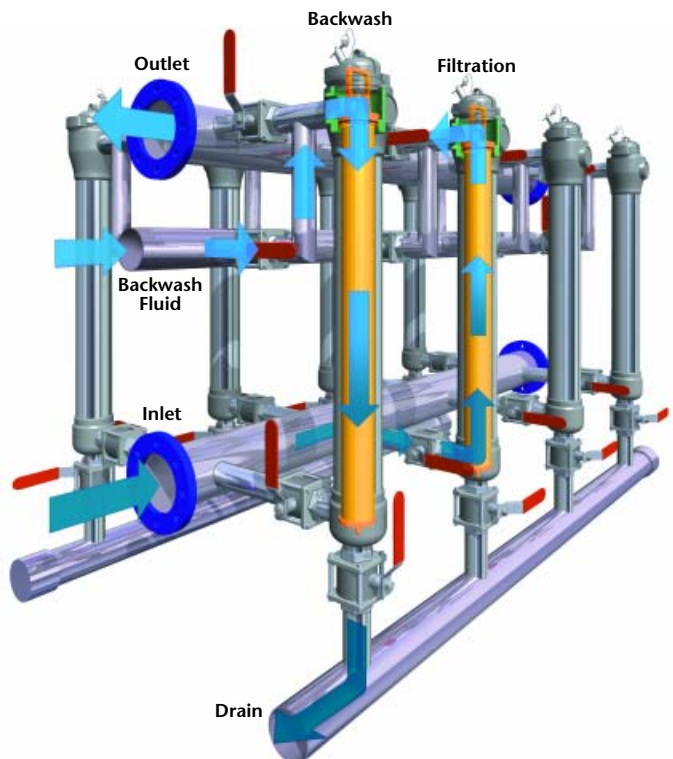


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Internal Backwash uses filtered product to clean barrels.



External Backwash uses external liquid to clean filter barrels.

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## General Guidelines Aiding Barrel Filter Sizing

**1. Pertinent operating conditions**

Application: \_\_\_\_\_

Type of liquid: \_\_\_\_\_

Flow Rate: \_\_\_\_\_ gpm

Pressure: \_\_\_\_\_ inlet (psi) \_\_\_\_\_ Design (psi)

Temperature: \_\_\_\_\_

Viscosity: \_\_\_\_\_ Centipoise

Contaminants: \_\_\_\_\_ ppm, or \_\_\_\_\_ % cons, or \_\_\_\_\_ lbs./1000 gal.

\_\_\_\_\_

**2. Liquid source:** \_\_\_\_\_

**3. Objective of filtration:** (Why filter?, problem to solve, etc.) \_\_\_\_\_

\_\_\_\_\_

**4. Level of filtration:** (see application guidelines) \_\_\_\_\_

\_\_\_\_\_

Do not filter finer than required for the application—equipment, installation and operating costs generally increase with finer filtration.

**5. Gasket material (circle one):** Buna N EPDM Viton Teflon

**6. Flow diagram:**

Fax data to Kadant AES at (518)793-9392 or call (518)793-8801 and ask for a Filtration Application Engineer for your recommended solution.



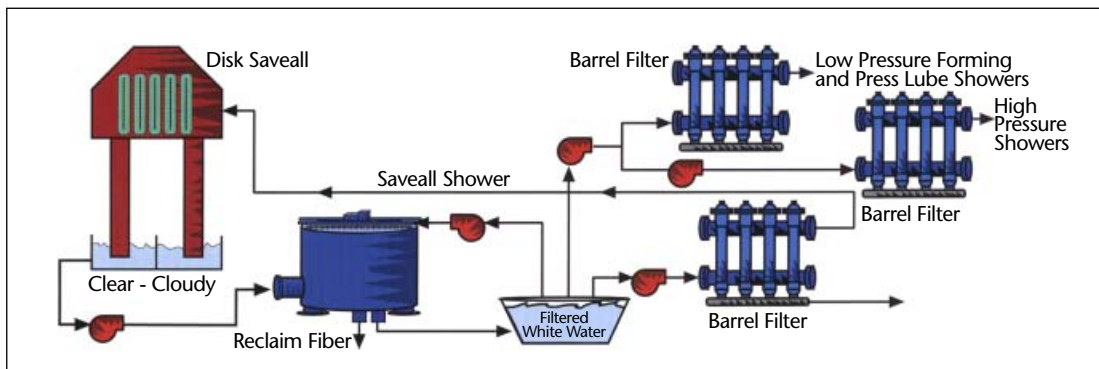
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# Multiple Barrel Filter Systems

## Application Guidelines for Water and White Water

Application	Media			Typical Retention	Typical Element Cleaning	Comments
	Slotted	Wire Mesh	Fabric			
<b>Water Applications</b>						
Cooling tower water, full flow	Yes	Yes	Yes	0.004" & >	Internal	Can go finer depending on type of debris, tower location
Cooling tower water, side stream	Yes	Yes	Yes	5 mic & >	Internal	Filter system volume 1X per hour, or 5-10% of full flow
Gland seal water	Yes	Yes	Yes	25 - 50 mic	Internal External Manual	Filter system volume 1X per hour, or 5-10% of full flow
Lake water	Yes	Yes	Yes	44 mic & >	Internal	Caution - TSS can change with weather conditions
Municipal (City) water	Yes	Yes	Yes	5 mic & >	Internal	TSS normally low. Rust, pipe scale, dirt typical
River water	Yes	Yes	Yes	0.004" & >	Internal	Caution - TSS can change with weather conditions
Water, clear	Yes	Yes	Yes	All	Internal External Manual	Maximum solids loading of 200 ppm
Well water	Yes	Yes	Yes	5 mic & >	Internal	TSS normally low. Typical includes rust, scale, iron
<b>White Water*</b>						
Clarified & Strained w/w 60 ppm max	Yes	No	No	0.003" & >	Internal	Do not use media finer than gravity strainer media
Clarified white water 60 ppm max	Yes	No	No	0.006" & >	Internal	Media sized at 1/5 - 1/6th nozzle dia. for shower water
Clarified white water 180 ppm max	Yes	No	No	0.010" & >	Internal	Media sized at 1/5 - 1/6th nozzle dia. for shower water
White water less than 1200 ppm	Yes	No	No	0.024" & >	Internal	Media sized at 1/5 - 1/6th nozzle dia. for shower water

\* Clarified refers to the removal of fiber & fines by mat filtration using a saveall, or flotation techniques.  
Strained refers to the removal of solids by a Kadant AES VA or 4000 series gravity strainer.



## White Water Reuse

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## Application Guidelines Mill Equipment/Viscous Liquids

Application	Media			Typical Retention	Typical Element Cleaning	Comments
	Slotted	Wire Mesh	Fabric			
<b>Paper Mill Equipment</b>						
Finished coatings, on machine	Yes	No	No	0.004" & >	External	Consult Kadant AES
Showers, fresh & mill warm water <sup>1</sup>	Yes	Yes	Yes <sup>2</sup>	0.003" & >	Internal	Media sized as 1/5 - 1/6th nozzle diameter
Showers, white water	Yes	No	No	0.006" & >	Internal	Determine solids loading and refer to previous page
Size Press, 8-12% typical on mach <sup>3</sup>	Yes	No	No	0.006"-0.01"	External	BMSP requires bubble free operation, flooded nip does not
Vacuum pump seal waters	Yes	No	No	0.006" & >	Internal	Size as white water filter Felt hair typical contaminant
<b>Viscous Liquids</b>						
Viscous Liquid to 1 - 100 cps	Yes	Yes	Yes	All	Internal External Manual	Use only if application is not found in the table
Viscous Liquid to 101 - 3000 cps	Yes	Yes	Yes	All	Internal External Manual	Use only if application is not found in the table
Viscous Liquids 3000 cps & higher	Yes	Yes	Yes	All	Internal External Manual	Consult Kadant AES

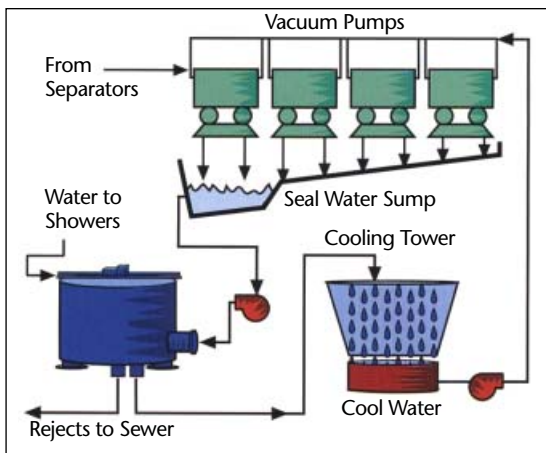
1 Determine source of water and refer to the white water or fresh water guidelines on previous page. Typical shower applications include: Press Section Flooding, inside & sheet side high pressure, uhle pipe lube\*, lumpbreaker roll\*, couch roll\*, flooded nip\*, trim knock-off\*, high pressure showers\*, wire return roll\*, grooved roll\*, doctor lube\*, suction roll, grooved roll, traversing high pressure showers, Forming Section-Headbox\*, breast roll\*, dandy roll\*

\* Can be used on white water

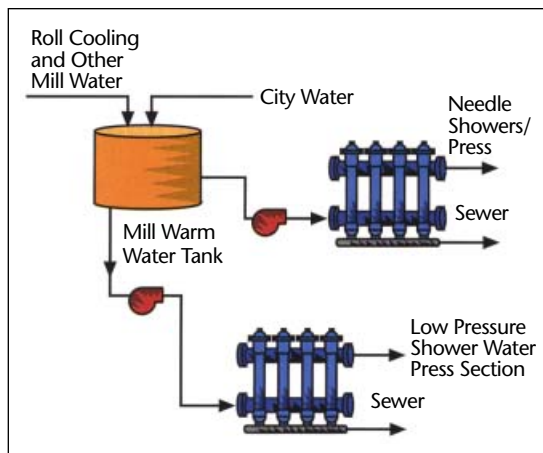
2 Used less frequently than other types of acceptable media

3 Determine type of size press before quoting.

"BMSP"-Blade Metering Size Press



Vacuum Pump Seal Water



Mill Water

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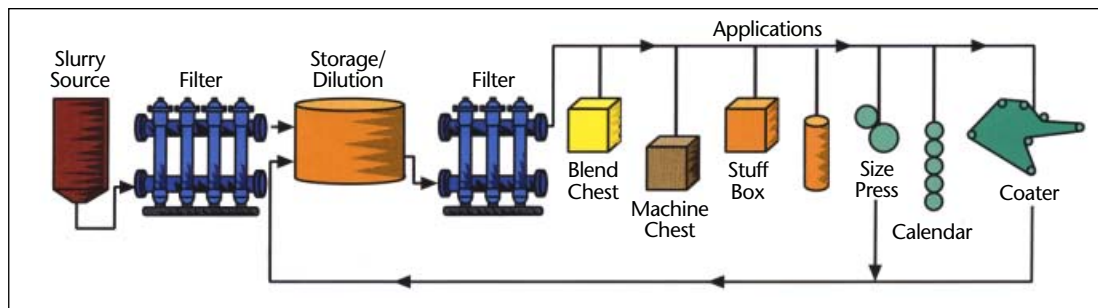
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# Multiple Barrel Filter Systems

## Application Guidelines Additives/Coatings

Application	Media			Typical Retention	Typical Element Cleaning	Comments
	Slotted	Wire Mesh	Fabric			
<b>Additives</b>						
Alum	Yes	Yes	Yes <sup>1</sup>	0.004" & >	External Manual	Solids 10-50% < 100 cps, 0.006" & > typ. Don't use 340
Calcium Carbonate, solids < 30%	Yes	Yes	No	60-100 mesh	External	Consult Kadant AES for higher solids applications
Clay (slurry, slip, filler, kaolin, bentonite)	Yes	Yes	No	0.006" & >	External Manual	Consult Kadant AES for sizing
CMC, surface treatment	Yes	Yes	No	0.006" & >	External	Typical viscosity 1000 - 3000 cps
Defoamers	No	Yes	Yes	30-100 mesh	External Manual	OK to filter down to 200 mesh, but this is not typical
Dispersants	No	Yes	Yes	30-100 mesh	External Manual	Size based on viscosity
Dyes	Yes	Yes	Yes <sup>1</sup>	0.006" & >	Manual	Typical viscosity 1 - 10 cps, some as high as 100 cps
Latex, viscosity < 500 cps	Yes	Yes	Yes	0.001" & >	External Manual	0.006" & > typical. Size as viscous liquid if cps > 500
Pigments	Yes	Yes	No	30-150 mesh	External Manual	Determine process conditions & consult Kadant AES for size
Retention Aid	Yes	Yes	No	0.006" & >	Manual	0.006" media most common
Starch slurry, 30 - 39% solids	Yes	Yes	Yes <sub>1</sub>	0.004" & >	External Manual	Amb. Temp, between storage tank & cooker (converter)
Starch solutions, 3 - 20% solids	Yes	Yes	Yes <sub>1</sub>	0.004" & >	External	From converter to SP storage on wet end of machine

<sup>1</sup> Used less frequently than other types of acceptable media. Typical solids 40 - 70%. Applications include: titanium dioxide (Anatase), titanium dioxide (Rutile), sodium silicate, satin white, gypsum, talc, plastic pigment, alumina trihydrate, calcium carbonate.



## Additives/Coatings

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## Definitions

**Backwashing:** Cleaning filter media and removing entrapped solids by forcing a flow of liquid in a reverse direction through the media.

**External Backwash:** Use of a liquid other than that being filtered to backwash the media. This source could be the filtered liquid with boosted pressure.

**Internal Backwash:** Use of the liquid being filtered to backwash the media.

**Cycle Length:** Duration, measured in time or gallons/liters, that filter media can operate effectively between cleanings.

**Filter Medium:** A barrier of permeable material that traps solids in flow.

**Filtrate:** Liquid that has passed through a filter medium.

**Continuous Filtration:** All flow is filtered; the filtration process is uninterrupted by media cleaning, replacement, or maintenance.

**Sidestream Filtration:** Taking a portion of a given process stream and filtering the portion before reintroducing it into the mainstream.

**Batch Filtration:** Filtering a given volume of liquid prior to cleaning a filter stream. The process may be interrupted to clean the filter medium.

**Surface Filtration:** Separates solids from liquid by trapping them on the surface of a filter medium.

**Media Open Area:** Amount of space on a filter medium surface that can be penetrated by a liquid. A prime determinant of solids retaining capacity.

**Pressure Differential:** Difference in pressure between an entrance flow and an exiting flow.

**Solids:** Granular, fibrous or glutinous material suspended in a liquid which can be removed by the mechanical process of filtration. Expressed in parts per million by weight.

## Conversions

atm x 101.33 = kPa	in Hg (0°C) x 3.3864 = kPa
atm x 1.0333 = kg/cm <sup>2</sup>	kg/cm <sup>2</sup> x 14.22 = PSI
atm x 14.7 = PSI	kPa x 1000 = MPa
bars x 0.1 = MPa	m x 3.281 = ft
bars x 0.9869 = atm	micron = 0.001 mm
bars x 14.5 = PSI	micron = 3.94 x 10 <sup>-5</sup> in
°Celsius = (°F -32) x 5/9	PPM = mg/l (at 1.0 S.G.)
°Fahrenheit = (°C x 9/5) +32	PSI x 6.8948 = kPa
cm Hg (0 °C) x 1.3332 = kPa	U.S. Gal x 3.7854 = liters
in x 25.4 = mm	Imp Gal x 4.5461 = liters

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