



LIQUID FILTRATION SYSTEMS



KĀDANT
A E S

AN ACCENT ON INNOVATION

Kadant AES Liquid Filtration Systems are used in a wide variety of industries. Nearly every application that processes or uses liquids will realize benefits with a Kadant AES filter system. With over 30 years experience, Kadant AES Sales and Application Engineers can supply the answers to your liquid filtration needs.

PULP & PAPER

WATER APPLICATIONS:

Air compressor cooling water
Bearing cooling water
Belt press shower water
Bleach plant water
Breast roll showers
Brown stock seal water
Chill roll water
Clarified white water
Chlorine dioxide dilution water
Cloudy white water
Condensate water
Cooling water
Couch roll water
Cylinder showers
Dandy roll showers
Decker knock-off showers
Doctor lube showers
Felt showers
Flooded nip showers
Fresh water
Headbox showers
High pressure felt cleaning showers
High pressure wire cleaning showers
Lake water
Lancaster washer showers
Lumpbreaker roll
Mill water
Municipal water
Press roll showers
Recycled fresh water
River water
Saveall knock-off showers
Seal water, packing glands
Seal water, mechanical pumps
Sheet knock-off showers
Steam stripper showers
Trim knock-off showers
Uhle box showers
Vacuum pump seal water
Vat showers
Warm/hot water
Venta-nip cleaning showers
Well water
Wire cleaning showers
Wire knock-off showers
Wire return showers

PULP & PAPER

***SURFACE TREATMENT
AND ADDITIVE APPLICATIONS:***

Adhesives
Alum
Binders, natural and synthetic
Bentonite
Calendar box
Calcium carbonate
Calcined clay
CMC
Coating clays
Defoamers
Delaminated clay
Dilute polyethylene
Dilute colloidal silica dispersion
Dispersants
Dyes
Ethyl alcohol
Felt cleaning solution
Filler clays
Finished coatings
Flocculants
Ground calcium carbonate
Hydrocol pigment/retention aid
Insolubilizers
Inks
Internal sizing compounds
Latex
Lubricants
Pigments
Polymers
Polyacrylamide oil & water retention
Polyvinyl acetate
Polyvinyl alcohol
Precipitated calcium carbonate
Protein
Resin
Retention aid
Rosins
Silica
Size press
Sodium carbonate
Starch solutions
Talc
Titanium dioxide

FOOD PROCESSING APPLICATIONS:

Beer
Brine
Chocolate
Corn syrup
Fruit juices
Jellies
Lard
Lemon effluent
Liquors
Vegetable oil
Wash water

CHEMICAL APPLICATIONS:

Alum
Brine
Ethyl alcohol
Ferric chloride
Herbicides/Pesticides
Hydrochloric acid
Mineral oil
Nitric acid
Phosphoric acid
Sodium Hydroxide
Sodium hypochlorate
Sodium sulphate
Sulphuric acid
Synthetic oils

PHARMACEUTICAL APPLICATIONS:

Acetic acid
Aerosol
Bath oil
Citric acid
Glycerine
Lipstick
Shampoo
Soap
Suntan lotion
Tallow
Toothpaste

Other INDUSTRIAL APPLICATIONS:

Adhesives
Boiler feed water
Caustic soda
Chiller water
City water
Clay slip
Condensate
Coolant water
Cooling tower water
Deionized water
Ethylene glycol
Glycerine
Inks
Liquid detergent
Machine oil
Pelletizer water
Phenolic resin binder
Photo chemicals
Pump seal water
Quench water
Resins
Scrubber water
Waxes

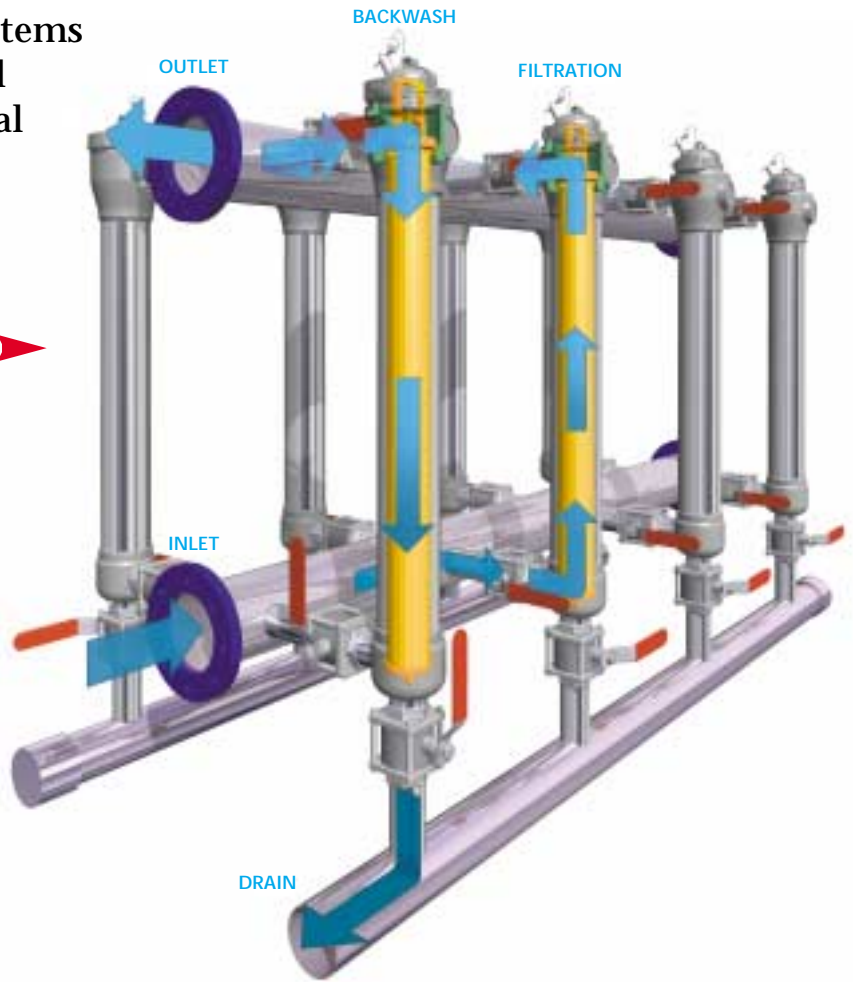
Kadant AES Liquid Filtration Systems utilize either internal or external source wash fluids in the removal of contaminants from process and/or product.

INTERNAL Backwash Systems ▶

Flow enters through the bottom inlet header and is distributed equally through each filter barrel. As contaminants build on the exterior filter screen, the differential pressure increases and backflushing is typical at a system pressure loss of 10-20 psid. During backflush, one filter barrel is removed from service at a time by closing the inlet and opening the drain valve. Clean filtrate flows from the outlet header through the filter barrel to the drain. Each barrel is backwashed for 4-8 seconds. After all barrels have been backwashed, the system differential returns to 1-7 psid.

Internal Backwash Considerations:

- Minimum inlet pressure 40-60 psig required.
- Clean system pressure loss is typically 1-7 psid, backflushing required at 12-20 psid.
- Outlet flow will decrease 50-150 gpm for 4-8 seconds per barrel.

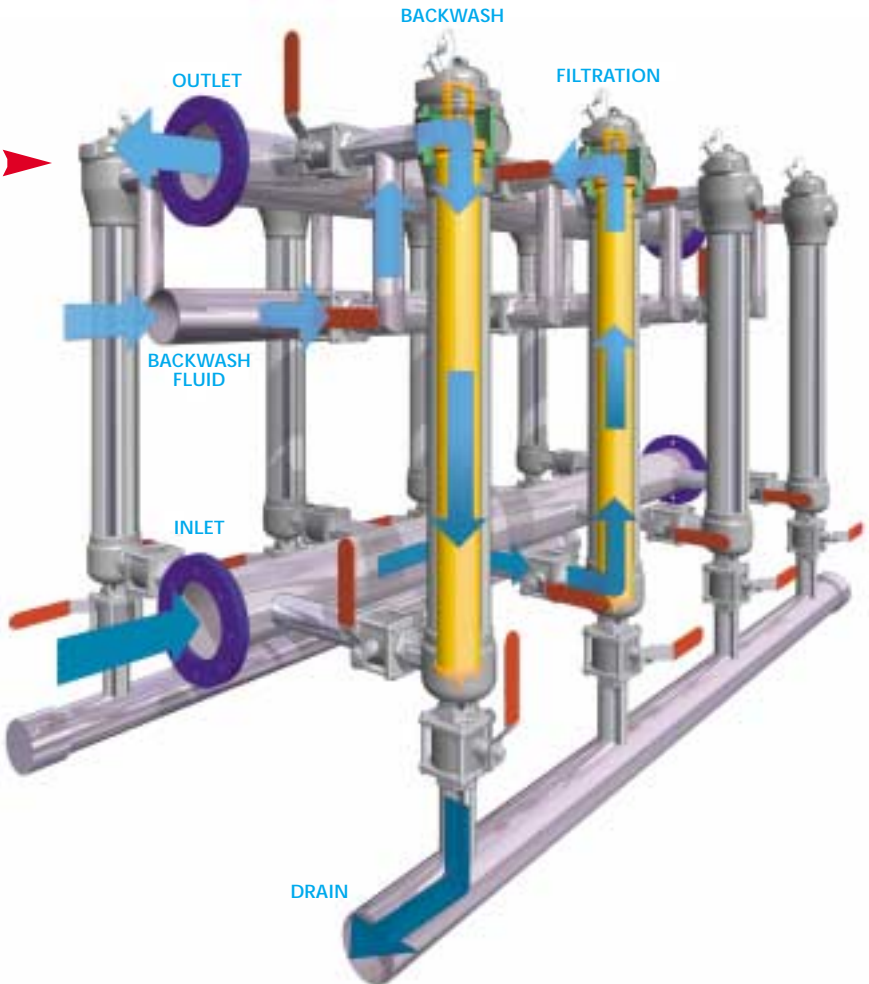


EXTERNAL Backwash Systems ▶

The system operates identically to the internal backwash system in the filtration mode. An additional header is added at the top of the unit to introduce a secondary source of clean backflush fluid. When the differential pressure reaches 10-20 psid, the filter system must be backwashed. The inlet and outlet valves are closed and the drain and backwash supply header valves are opened. The outside source of clean liquid flushes the contaminants to drain. Each barrel is backwashed sequentially for 4-8 seconds and the system returns to the clean 1-7 psid.

External Backwash Considerations:

- No minimum inlet pressure required for backflush.
- Virtually no outlet flow fluctuations during backwash.
- For backwash, a clean fluid is required at 60 psig or greater.
- Normally used where the process liquid is expensive, or viscous.





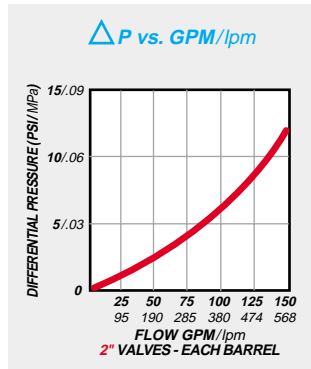
LIQUID FILTRATION SYSTEMS

Note for BOTH Internal Backwash and External Backwash units:

- Design pressure at 100 degrees F. Higher temperatures will decrease the maximum working pressure.
- Maximum flow with 2.5" valves and coarse filter screens. Actual flow dependent upon type of filter media used and influent contaminant loading.
- Dimensional information for reference only. Consult Kadant AES for installation information.



Number of Filter Barrels & Length:



Model:

Pressure:

Inlet/Outlet Valves:

Standard Flange Sizes:

Largest Unit Maximum Flow:

Filter Elements:

Width:

Width with Service Step:

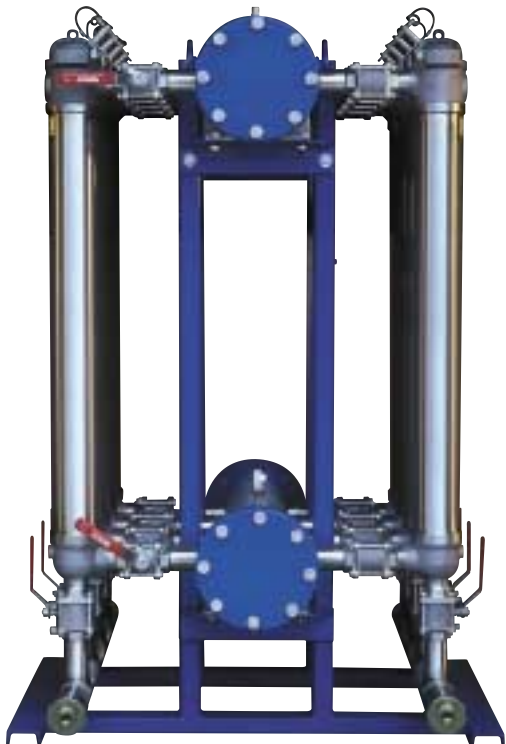
Height:

Service Height:

INTERNAL BACKWASH FILTERS

	DUAL ROW BARRELS	DUAL ROW BARRELS	SINGLE ROW BARRELS	SINGLE ROW BARRELS
Model:	5600	6600	5700	6700
Pressure:	285, 1000 psig	285, 1000 psig	285, 1000 psig	285, 1000 psig
Inlet/Outlet Valves:	2", 2.5"* 2-way	2" 2-way	2", 2.5"* 2-way	2" 2-way
Standard Flange Sizes:	3" to 14"	3" to 8"	3" to 8"	2.5" to 8"
Largest Unit Maximum Flow:	5000 gpm	3000 gpm	2500 gpm	1500 gpm
Filter Elements:	3.25"x40", 408 in ²	2"x36", 225 in ²	3.25"x40", 408 in ²	2"x36", 225 in ²
Width:	46"	32"	38"	27"
Width with Service Step:	68"	NA	45"	NA
Height:	67"	63"	72"	63"
Service Height:	105"	96"	105"	96"
	6 39"	6 39"	2 27"	2 27"
	8 49"	8 49"	3 39"	3 39"
	10 59"	10 59"	4 49"	4 49"
	12 69"	12 69"	5 59"	5 59"
	14 79"	14 79"	6 69"	6 69"
	16 89"	16 89"	7 79"	7 79"
	18 99"	18 99"	8 89"	8 89"
	20 109"	20 109"	9 99"	9 99"
			10 109"	10 109"

* Not available on 1000 psig units



5600, 8-Barrel, Internal Manual Backwash



5700, 6-Barrel, Internal Automatic Backwash

A Kadant AES Sales or Applications Engineer can supply the liquid filtration system configuration that meets the demands of your specific process.

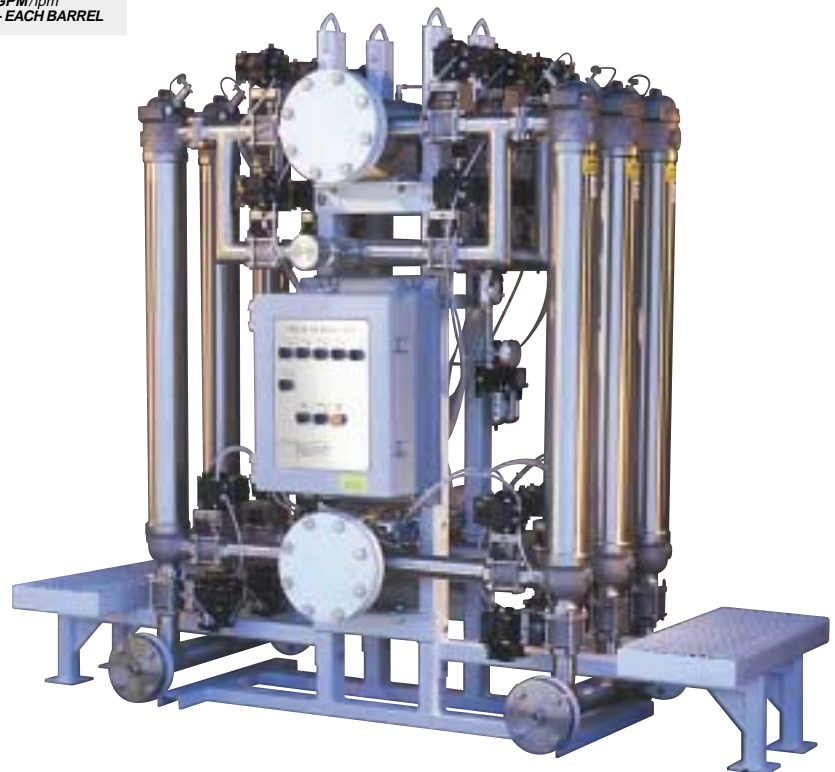
Kadant AES Liquid Filtration Systems are built to individual customer specifications, delivered complete and ready for installation. Two configurations (single or dual row) are available to help make the best use of available floor space.



Differential Pressure Switch and Gauge



5750, 4-Barrel, External Automatic Backwash

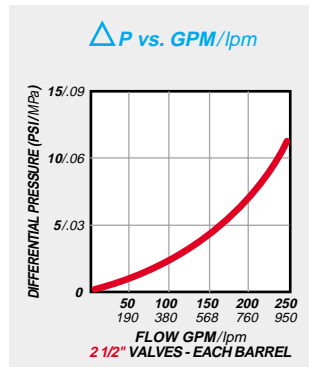


5650, 6-Barrel, External Automatic Backwash

EXTERNAL BACKWASH FILTERS

	DUAL ROW BARRELS	SINGLE ROW BARRELS	SINGLE ROW BARRELS	SINGLE ROW BARRELS
Model:	5650	5750	5751	6750
Pressure:	285 psig	285 psig	285 psig	285 psig
Inlet/Outlet Valves:	2", 2.5"* 2-way	2" 3-way	2" 2-way	2" 3-way
Standard Flange Sizes:	3" to 14"	3" to 8"	3" to 8"	3" to 8"
Largest Unit Maximum Flow:	5000 gpm	1500 gpm	1500 gpm	1500 gpm
Filter Elements:	3.25"x40", 408 in ²	3.25"x40", 408 in ²	3.25"x40", 408 in ²	2"x36", 225 in ²
Width:	61"	38"	35"	38"
Width with Service Step:	83"	44"	50"	NA
Height:	74"	77"	74"	71"
Service Height:	105"	100"	105"	102"
Number of Filter Barrels & Length:	6 39"	2 36"		2 29"
	8 49"	3 47"	3 39"	3 40"
	10 59"	4 58"	4 49"	4 51"
	12 69"	5 69"	5 59"	5 62"
	14 79"	6 80"	6 69"	6 73"
	16 89"	7 91"	7 79"	7 84"
	18 99"	8 102"	8 89"	8 95"
	20 109"	9 113"	9 99"	9 106"
		10 124"	10 109"	10 117"

* Not available on 1000 psig units

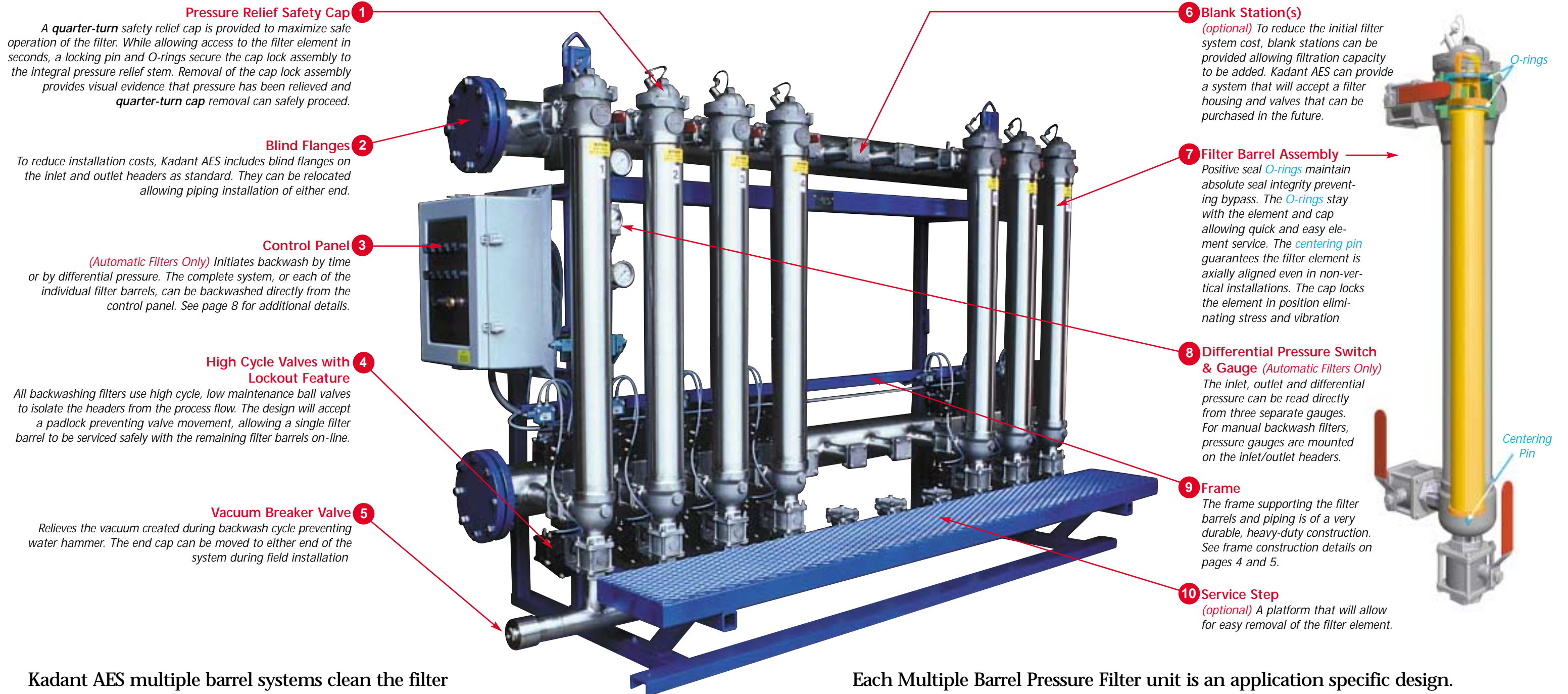




LIQUID FILTRATION SYSTEMS

Kadant AES self-cleaning multiple barrel filters have been favored by process engineers and maintenance personnel for over 30 years.

The backwashing filter is a reliable, low maintenance method of solids/liquids separation that can be installed quickly and easily.



1 Pressure Relief Safety Cap

A **quarter-turn** safety relief cap is provided to maximize safe operation of the filter. While allowing access to the filter element in seconds, a locking pin and O-rings secure the cap lock assembly to the integral pressure relief stem. Removal of the cap lock assembly provides visual evidence that pressure has been relieved and **quarter-turn cap** removal can safely proceed.

2 Blind Flanges

To reduce installation costs, Kadant AES includes blind flanges on the inlet and outlet headers as standard. They can be relocated allowing piping installation of either end.

3 Control Panel

(Automatic Filters Only) Initiates backwash by time or by differential pressure. The complete system, or each of the individual filter barrels, can be backwashed directly from the control panel. See page 8 for additional details.

4 High Cycle Valves with Lockout Feature

All backwashing filters use high cycle, low maintenance ball valves to isolate the headers from the process flow. The design will accept a padlock preventing valve movement, allowing a single filter barrel to be serviced safely with the remaining filter barrels on-line.

5 Vacuum Breaker Valve

Relieves the vacuum created during backwash cycle preventing water hammer. The end cap can be moved to either end of the system during field installation

6 Blank Station(s)

(optional) To reduce the initial filter system cost, blank stations can be provided allowing filtration capacity to be added. Kadant AES can provide a system that will accept a filter housing and valves that can be purchased in the future.

7 Filter Barrel Assembly

Positive seal **O-rings** maintain absolute seal integrity preventing bypass. The **O-rings** stay with the element and cap allowing quick and easy element service. The **centering pin** guarantees the filter element is axially aligned even in non-vertical installations. The cap locks the element in position eliminating stress and vibration

8 Differential Pressure Switch & Gauge

(Automatic Filters Only) The inlet, outlet and differential pressure can be read directly from three separate gauges. For manual backwash filters, pressure gauges are mounted on the inlet/outlet headers.

9 Frame

The frame supporting the filter barrels and piping is of a very durable, heavy-duty construction. See frame construction details on pages 4 and 5.

10 Service Step

(optional) A platform that will allow for easy removal of the filter element.

Kadant AES multiple barrel systems clean the filter screens automatically or by manually turning valves. Multiple housings are mounted on common inlet, outlet and drain headers.

Each Multiple Barrel Pressure Filter unit is an application specific design. With thousands of units in operation, Kadant AES has the experience required to solve the toughest filtration problems.



LIQUID FILTRATION SYSTEMS

Design Characteristics

- Temperature 400°F
- Pressure 285 psig / 1000 psig at 100°F
- Flow Rate .61 gpm maximum per sq.in. filter media
- Viscosity To 3000 CPS
- Filtration Levels 5 to 5000 microns

Low pressure or high pressure construction

Filter Element/Media

- Type Surface filtration cylindrical
- Construction Woven stainless steel or synthetic cloth over perforated stainless steel backer; slotted stainless steel
- Flow Direction Outside to inside
- Back Flush 50 - 150 gpm at 60 psig for 4 - 8 seconds per tube
- Seal O-rings and flat gaskets
EPDM standard
Buna "N", Teflon, Viton optional

Frame Assembly

- Construction Welded structural steel
- Features Future stations available
- Options Single or dual/paired barrels
Service access steps

Headers

- Connections *Inlet/outlet:* A-105, lap-joint flanges (150# on 285 psig design / 600# on 1000 psig design)
Drain: 2.5" NPT drains
- Orientation Horizontal (lower header inlet / upper header outlet)
- Backwash 2.5" NPT or 3" lap-joint flange

Controls

- Automatic Valve sequencing by solid-state circuit board and electro-pneumatic solenoid valves. Cycle start by differential pressure switch, timer, or push button. DCS control options available.

Barrel Service

Panel

- Selector switch on control panel sequences all auto valves, Standard hand valves for manual backwash.

Services

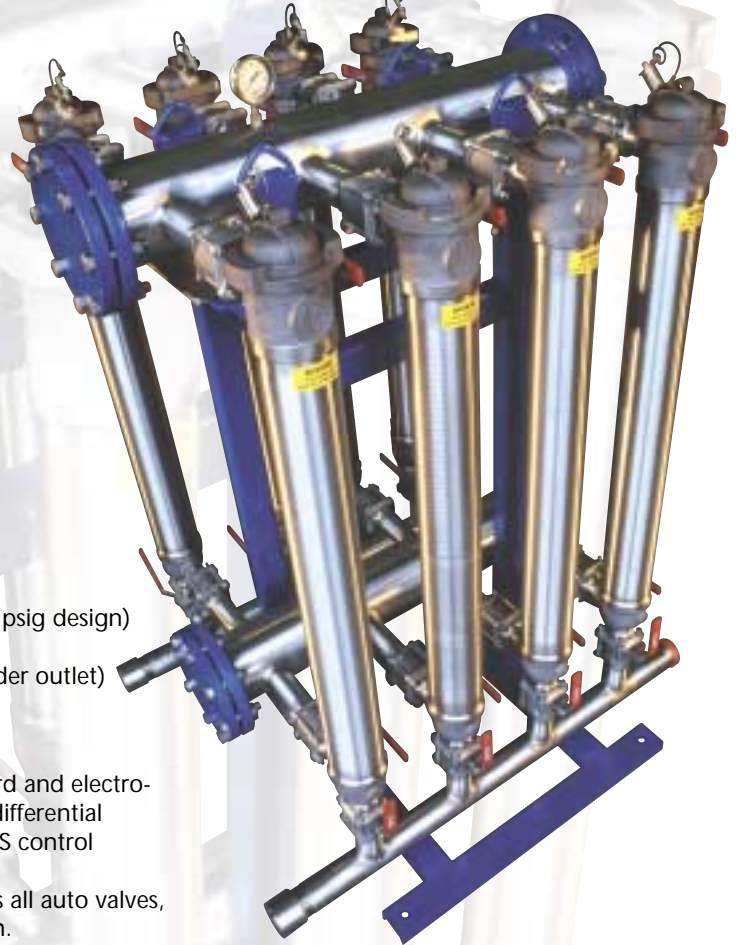
- Electric 100-240 Vac, 50/60 Hz, single phase
- Air 2 cfm per minute at 80 psig

Valves

- Type 3-piece ball valve
- Size/C_v 2" / 120, 2.5" / 195, 2" 3-way/70
- Material 316 Stainless Steel
- Seats & Seals PTFE and/or glass filled PTFE
- Actuation Manual handle or single rotary pneumatic actuator

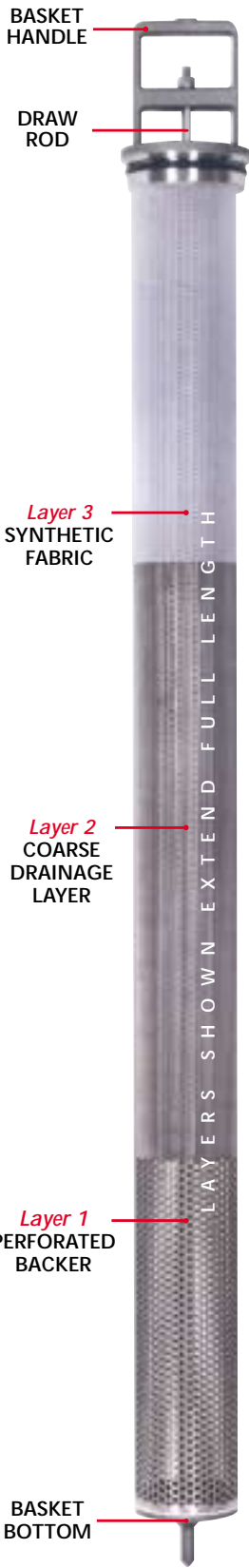
Filter Tubes

- Arrangement Vertical multiple tubular, single or paired
- Construction Welded 316 stainless steel
- Access Quarter turn, quick-access cap(s) with safety pressure relief
- Seals EPDM O-rings
Optional: Buna "N", Teflon, Viton



Automated filtration controls can be integrated into process-wide PLC or DCS.

With easy maintenance in mind, Kadant AES provides basket assemblies with rugged, reusable filter elements that can be removed and replaced in seconds, minimizing the time a filter housing is out of service.



Diffusion Bonded filter elements are highly efficient, extremely durable wire mesh screens that can withstand many high pressure washes without the need for replacement. They are manufactured with multiple layers of 316 stainless steel wire mesh that are supported by a perforated element. All layers are sintered at above 2000 °F (1095 °C) in a controlled atmosphere to allow the molecules to migrate (diffuse) across the contact points and recrystallize. This forms a strong, integrated structure where all contact points of the structures are bonded together.



Wire Mesh filter screens are wrapped tightly around and welded to a perforated stainless steel backer screen. For 150 mesh and finer filter elements, a coarse mesh drainage layer is placed between the fine mesh and the perforated backer screen for structural support, to disperse the flow and assure full utilization of the screen surface, and to eliminate the dead spots that would otherwise be created.



Synthetic Fabric filter screens are available in different materials that include nylon and polyester. As with the wire mesh, a coarse 20 or 60 mesh drainage layer is attached to the perforated backer. The filter cloth is a sewn tube and the ends are tucked inside the bottom and top of the perforated element. The gasketed basket handle and basket bottom firmly clamp the fabric in place preventing bypass of contaminants.



Spiral Wound Slotted Wedge Wire is an extremely rugged filter media capable of withstanding very high differential pressures. It is especially suited for filtering fibers or gelatinous particles that have a tendency to "staple" themselves into the openings of the filter screens, making manual cleaning difficult.



Perforated Stainless Steel can be used as filter media alone for the removal of coarse particles, or as the support structure for wire mesh or synthetic type filter elements. The rolled steel straight seam design provides an element with exceptional crush resistance and more open area compared with tubes made using spiral wrap construction.

To reduce required spare parts, basket handles, basket bottoms, and draw rods are reusable.

Filter Basket with Synthetic Fabric Screen

FILTER MEDIA

Particle Retention Microns	Inches	Approximate Mesh Equivalent	Wedge Wire	Wire Mesh	Diffusion Bonded	Synthetic	Perforated Backup Only
2	0.0001				o		
5	0.0002				o	o	
10	0.0004				o	o	
15	0.0006					o	
20	0.0008				o		
25	0.0010		x			o	
32	0.0013	700			o		
36	0.0014	400				o	
44	0.0017	325		x	o		
50	0.0020		x			o	
60	0.0024	250		x	o		
75	0.0030	200	x	x	o	o	
100	0.0039	150	o	x		o	
104	0.0041				o		
140	0.0055				o		
150	0.0059	100	x	x		o	
180	0.0071	80	o				
250	0.0098	60	x	x		o	
355	0.0140	45	x				
425	0.0167	40		x			
500	0.0197	35	o				
600	0.0236	30	o				
787	0.0310		o				
841	0.0331	20		x			
1600	0.0630	12	o				o
4750	0.1870	4					x

x - normally stocked elements o - consult factory for availability

**Single/Duo Filters
In-Line**

Kadant AES in-line filters can be provided in either a single or duplex arrangement. A single in-line filter is normally used in applications where the flow can be interrupted, or the the filter can be bypassed when the filter element is serviced. Duo filters are typically used when continuous filtration is required. They can be operated with either 1 or 2 filter housings on-line. Because of the inlet/outlet orientation, both the single and duo in-line filters can be easily, quickly and cost effectively installed in a horizontal run of pipe.

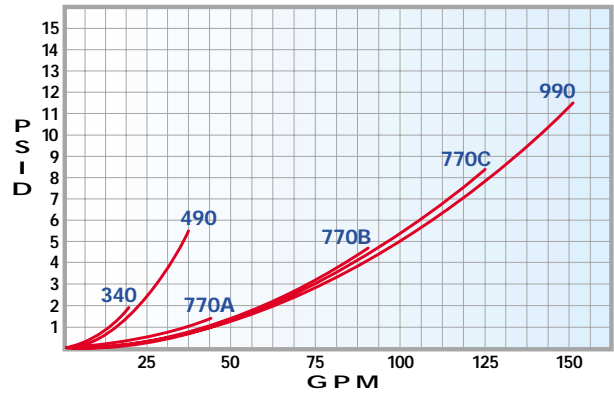


490 DUO

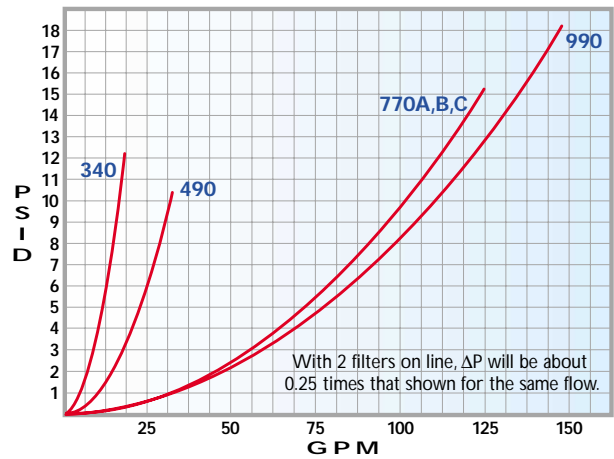


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**Single Filters
Differential Pressure (PSID) vs. Flow (GPM)**



**Duo Filters - One Filter On Line
Differential Pressure (PSID) vs. Flow (GPM)**



Model	¹ Pipe Connection	Filter Element Size (D x L)	Area (in. ²)	² Maximum Flow (gpm)	Can Use 2" x 12" Segments	Number of 2" x 12" Segments	Design Pressure (psi)	Minimum Installation Area (L" x W" x H")
340	3/4"	1 5/8" x 4 3/4"	22	15	N	NA	300, 1000	6 x 4 x 14
490	1"	2" x 12"	75	30	Y	1	300, 1000	7 x 9 x 26
770A	2"	2" x 12"	75	40	Y	1	300, 1000	8 x 12 x 24
770B	2"	2" x 24"	150	80	Y	2	300, 1000	8 x 12 x 36
770C	2"	2" x 36"	225	120	Y	3	300, 1000	8 x 12 x 48
990	2"	3 1/4" x 40"	408	150	N	NA	300	10 x 15 x 60
340 DUO	3/4"	1 5/8" x 4 3/4"	44	30	N	NA	300, 1000	20 x 14 x 18
490 DUO	1"	2" x 12"	150	60	Y	2	300, 1000	32 x 14 x 26
770A DUO	2"	2" x 12"	150	80	Y	2	300, 1000	40 x 20 x 24
770B DUO	2"	2" x 24"	300	160	Y	4	300, 1000	40 x 20 x 36
770C DUO	2"	2" x 36"	450	240	Y	6	300, 1000	40 x 20 x 48
990 DUO	2"	3 1/4" x 40"	816	300	N	NA	300	40 x 24 x 60

¹ NPT connection is standard; socket weld and lap joint flange connections available.

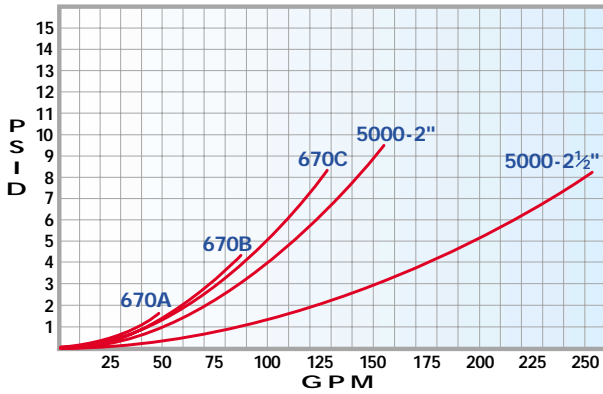
² Flow is based on the inlet and outlet connection size.

Actual flow will be dependent upon the type of filter media used and influent contaminant loading.

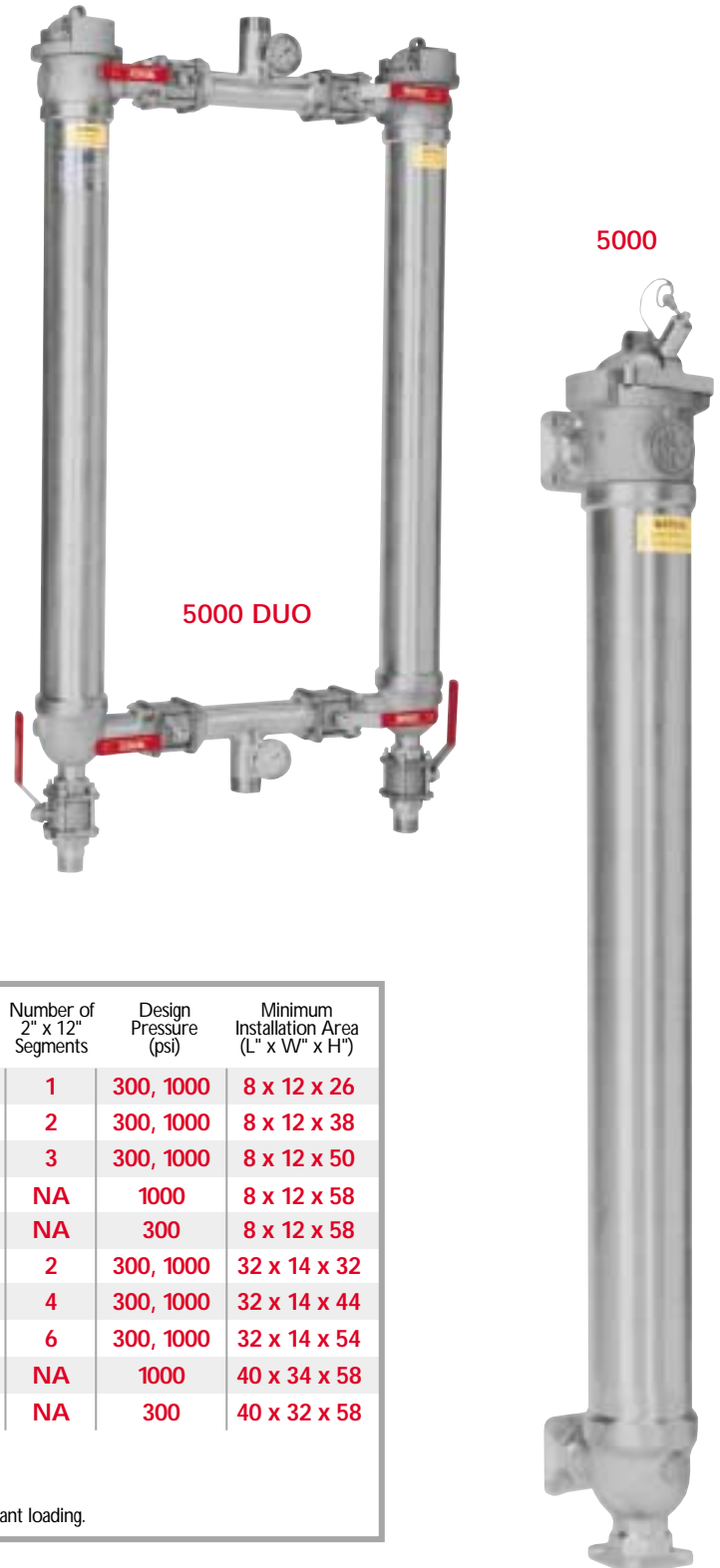
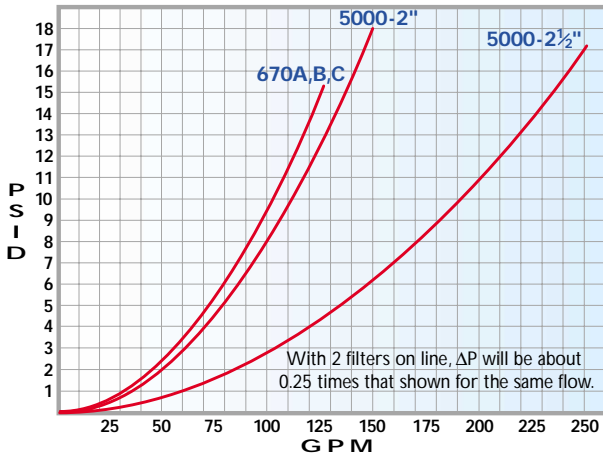
Single/Duo Filters
Bottom Entry

Kadant AES bottom entry filters are commonly used in vertical piping system installations, or in applications such as slurries where flow from the bottom to the top will help mix the fluid and prevent particles from settling. Fluid enters through a connection near the bottom of the filter housing and clean liquid exits at the top. Like the in-line filter system, the fluid flows from the outside to the inside of the filter screen, depositing debris on the exterior of the filter elements.

Single Filters
Differential Pressure (PSID) vs. Flow (GPM)



Duo Filters - One Filter On Line
Differential Pressure (PSID) vs. Flow (GPM)



Model	¹ Pipe Connection	Filter Element Size (D x L)	Area (in. ²)	² Maximum Flow (gpm)	Can Use 2" x 12" Segments	Number of 2" x 12" Segments	Design Pressure (psi)	Minimum Installation Area (L" x W" x H")
670A	2"	2" x 12"	75	40	Y	1	300, 1000	8 x 12 x 26
670B	2"	2" x 24"	150	80	Y	2	300, 1000	8 x 12 x 38
670C	2"	2" x 36"	225	120	Y	3	300, 1000	8 x 12 x 50
5000HP	2"	3 1/4" x 40"	408	150	N	NA	1000	8 x 12 x 58
5000LP	2", 2.5"	3 1/4" x 40"	408	150	N	NA	300	8 x 12 x 58
670A DUO	2"	2" x 12"	150	80	Y	2	300, 1000	32 x 14 x 32
670B DUO	2"	2" x 24"	300	160	Y	4	300, 1000	32 x 14 x 44
670C DUO	2"	2" x 36"	450	240	Y	6	300, 1000	32 x 14 x 54
5000HP DUO	2"	3 1/4" x 40"	816	300	N	NA	1000	40 x 34 x 58
5000LP DUO	2", 2.5"	3 1/4" x 40"	816	300	N	NA	300	40 x 32 x 58

¹ 2" plain end for socket weld connection standard on single units.
² 2" NPT standard on duo's; lap joint flange connections available on all models.
² Flow is based on the inlet and outlet connection size.
 Actual flow will be dependent upon the type of filter media used and influent contaminant loading.

Filtration has always been a core specialty of Kadant AES. Our product innovations and manufacturing excellence continually set performance standards within the industry.

Pulse Purge™ — Multiple barrel filtration with a self-contained backflush system that provides a high intensity, short duration backwash allowing successful screen regeneration in very difficult applications.



RapidKleen™ — Compact and economical automatic water strainer for flows from 40 - 40,000 gpm and particle removal from 50 - 5,000 micron. Internal and external backwash options available.



Petax — Innovative filtration device that combines high solids removal to 2000 ppm, and fine filtration from 1 - 20 micron in a single unit, with flow capacities to 1100 gpm.



Para-Flow Inclined Screen™ — Side hill screen capable of solids/liquid separation for applications with 1.5% solids and flows to 900 gpm.



Gravity Strainer — Simple, low maintenance device with capacities to 3000 gpm, particle removal down to 75 micron, and feed solids to 0.1%

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