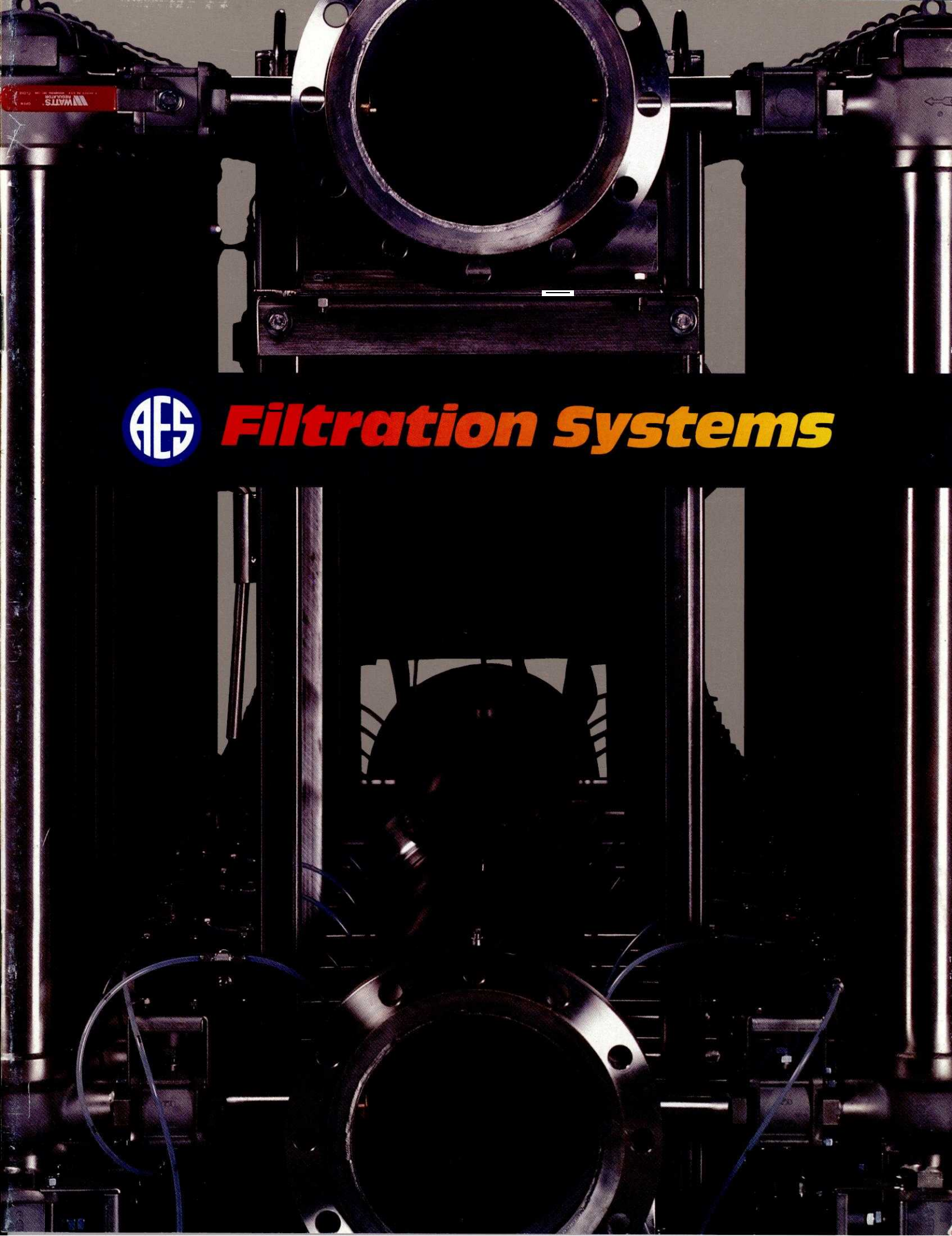

AES
Filtration Systems

AES is

committed to

helping papermakers

consistently achieve

a high quality

product.

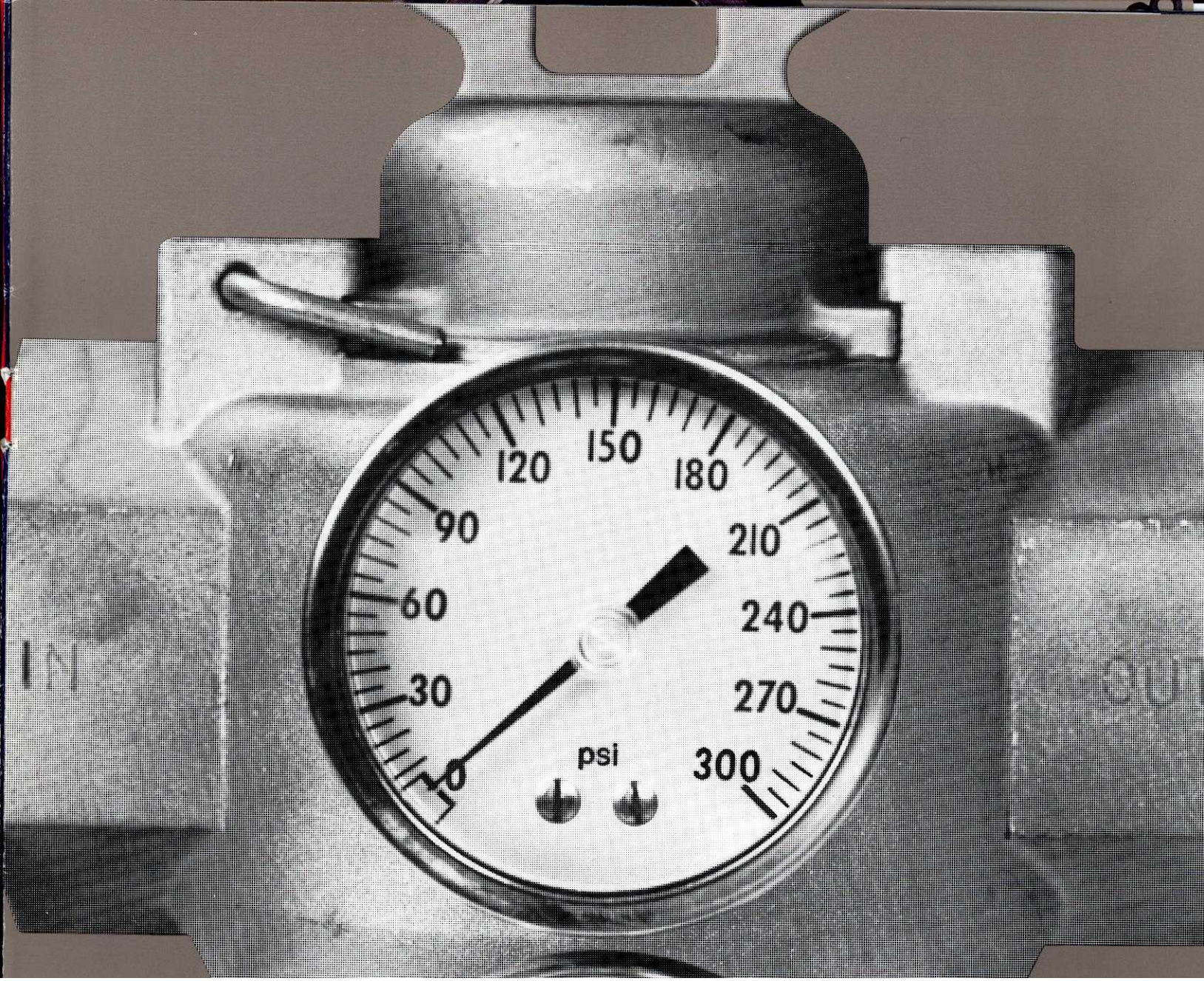
Filtration has been a core specialty at AES Engineered Systems since the company's inception. Our design innovations and manufacturing excellence continually set standards that serve as performance goals within the industry. We are a world leader in supplying filtration systems for papermaking mills that produce all types of paper products.

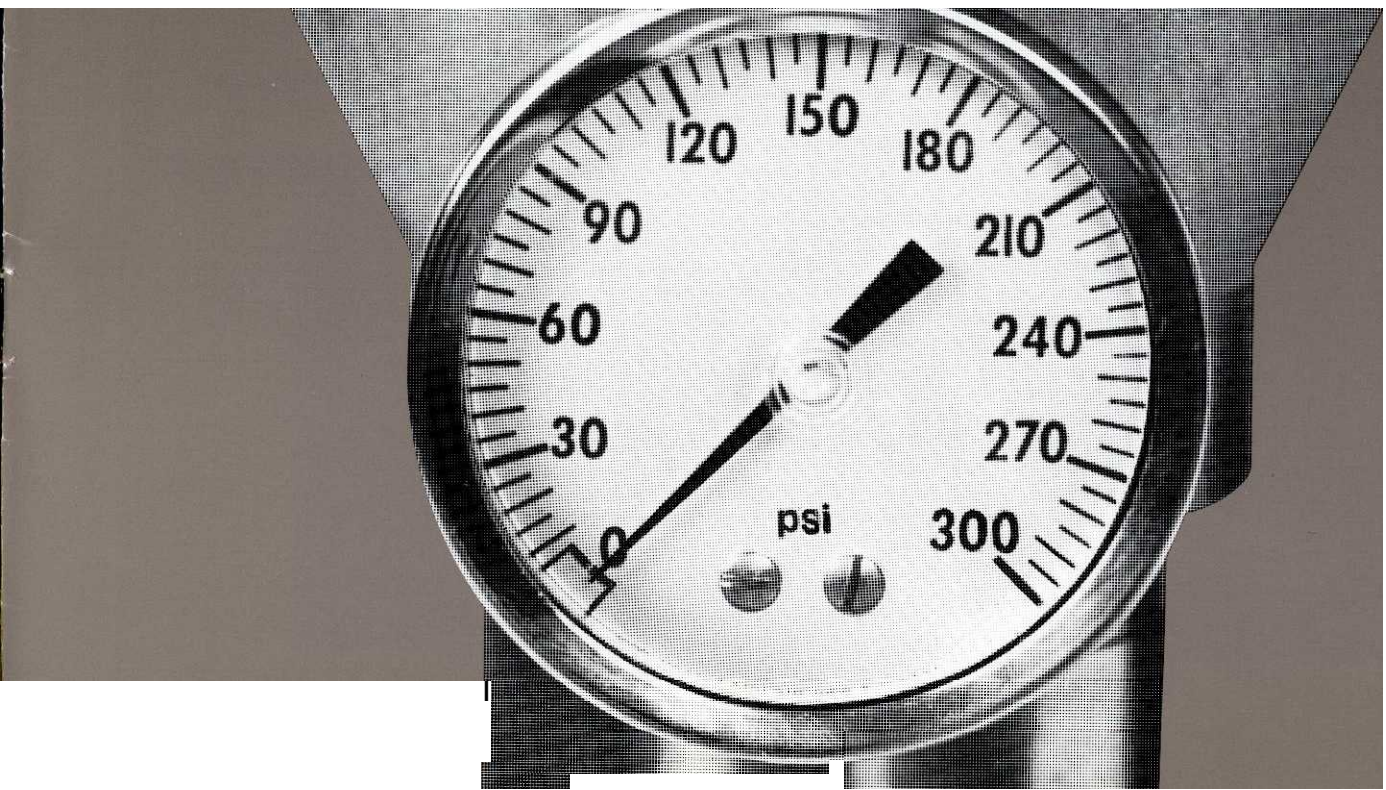
Built to meet specific applications, AES filtration components consist primarily of in-line and multiple barrel pressure filters and gravity or vacuum assisted strainers. A complete range of design options can be used to meet the demands of a specific process. High efficiency, operating control and ease of operation are key design objectives.

Your mill might require a white water recovery system for economy and reduced energy consumption. AES has the capability, expertise and experience to meet your papermaking filtration requirement. Our workmanship is unmatched and our attentive services are readily available before, during and after installation. You can depend on consistent, effective filtration to help you achieve uniform, high quality paper products.

We take our responsibility for helping papermakers seriously. That commitment goes hand-in-hand with producing ultimate papermaking filtration systems.

Engineered
stems


120
150
180
90
210
60
240
30
270
0
psi
300


120
150
180
90
210
60
240
30
270
0
psi
300

In-Line Filters

Providing

distinct

benefits to

papermaking

applications

There are features unique to each AES Engineered Systems In-Line Filter-features providing distinct benefits to papermakers.

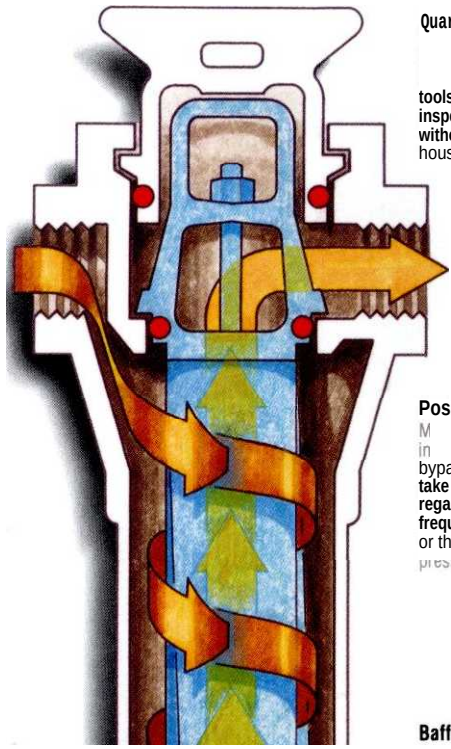
- Quarter turn caps provide access to filter elements in seconds -without tools-for immediate inspection and cleaning without removing the housing from the line.

- Element centering pins guarantee axial alignment of the element even in non-vertic^ installations. The quarter turn cap locks the element in position, eliminating stress and vibration problems.

- Positive sealing "0" rings will maintain absolute seal integrity to prevent bypass. They will not take a compression set regardless of the frequency of opening or the amount of pressure applied.

- The baffled flow design of the head castin helps route the liquid to provide uniform dispersion over the filter media resulting in even contaminant buildup, longer media life and less frequent cleaninq.

Single Filters



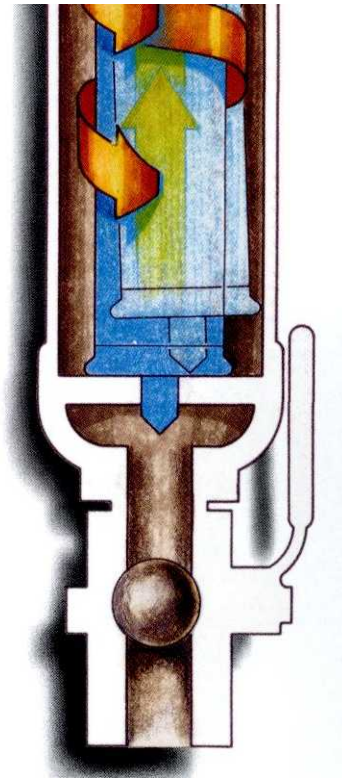
Quarter Turn Caps

tools, for immediate inspection and cleaning without removing the housing from the line.

Positive Sealing 0-rings

M
in
bypass. They will not **take a compression set regardless of the frequency of opening** or the amount of pressure applied.

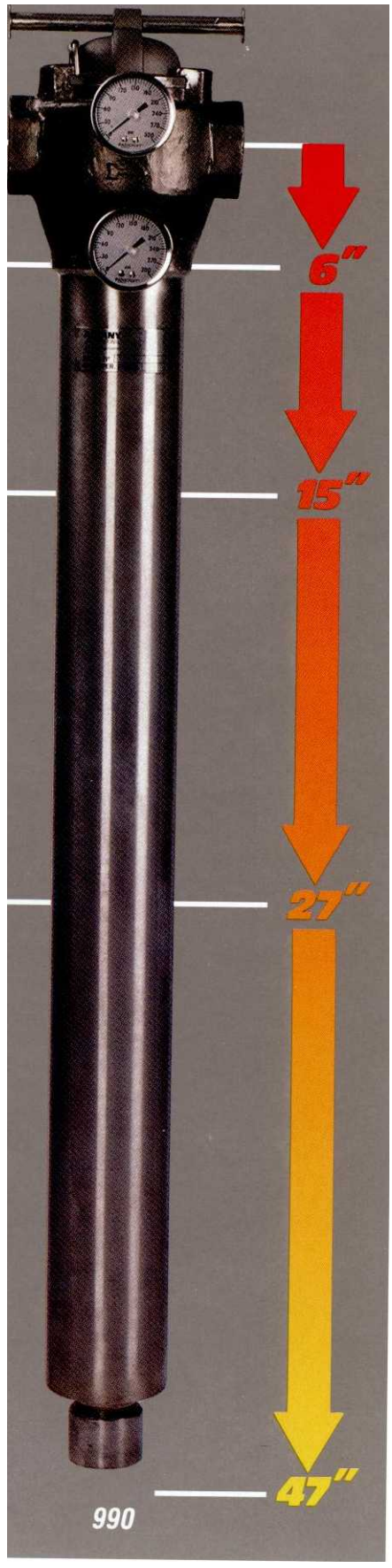
Baffled Flow Design



dispersion over the filtor media resulting in **even** contaminant buid-up. longer media life and less freauent cleaning.

Element Centering Pin

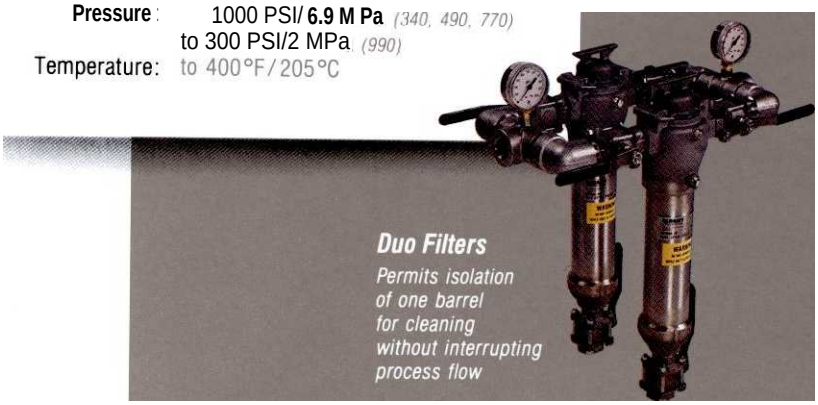
Guarantees the filter element is axially aligned even in non-vertical installations. **The quarter turn cap locks the element in** position, **eliminating stress and vibration problems.**



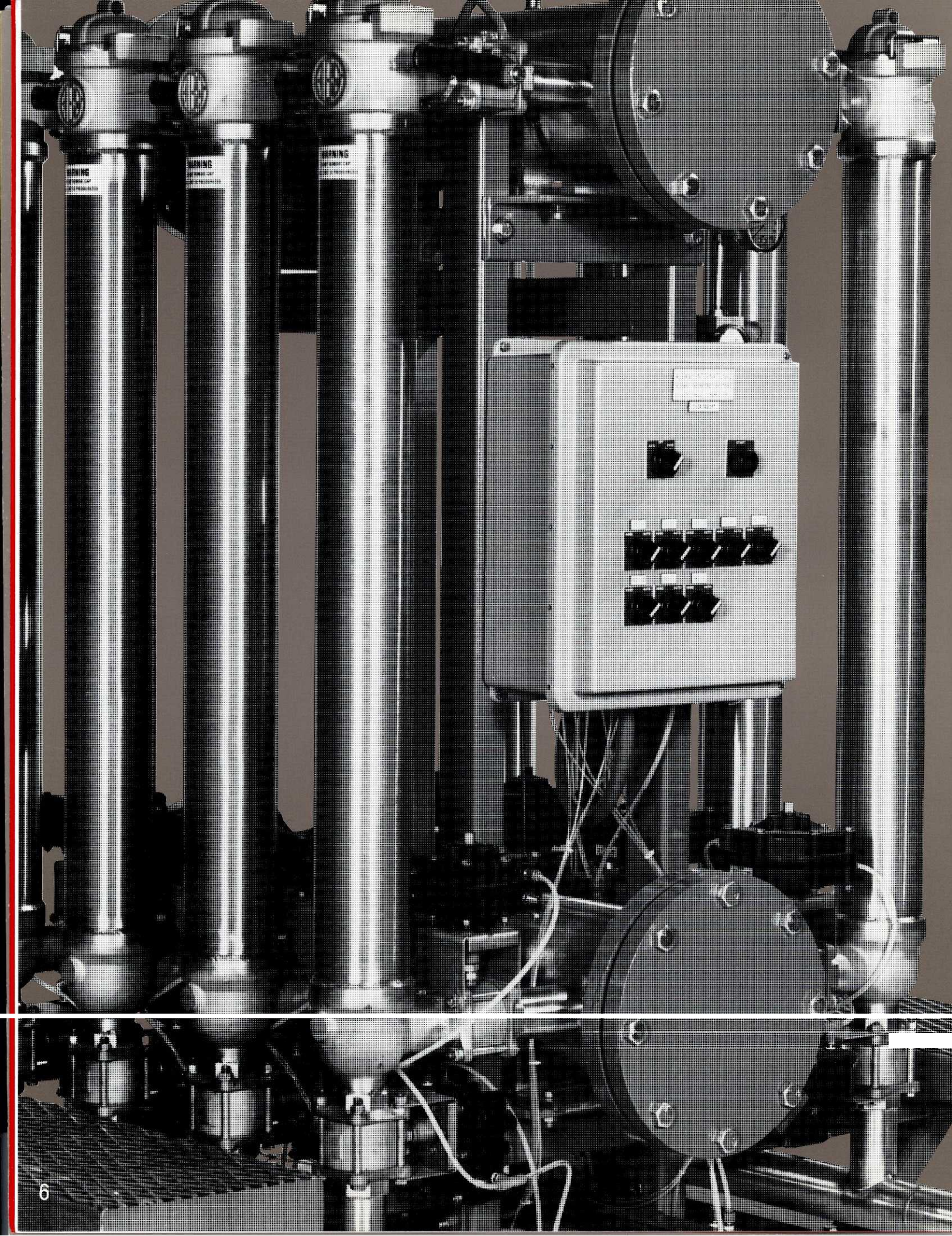
Design Specifications

Model	Pipe NPT Connection	Nominal Flow GPM	Nominal Flow fpm	Media Area in'	Media Area cm'
J4U	a14 "	15	55	22	142
490	1"	30	115	75	484
770A	2"	40	150	75	484
7708	2"	80	300	150	968
770C	2"	120	455	225	1452
990	2"	150	570	408	2632

Material: **6 Stainless Steel**
Pressure: 1000 PSI/ **6.9 M Pa** *(340, 490, 770)*
to 300 PSI/2 MPa *(990)*
Temperature: to 400°F/205°C



Duo Filters
Permits isolation of one barrel for cleaning without interrupting process flow



Multiple Barrel Filters

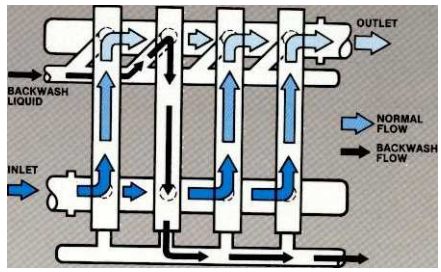
Fabricated to meet

the papermaker's

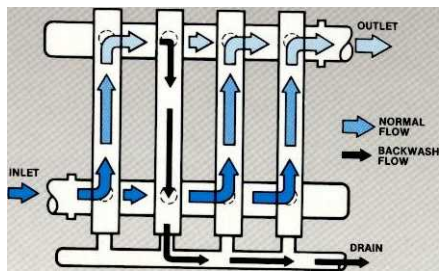
specific application

- AES Engineered Systems Multiple Barrel Filters offer the papermaker significant process advantages.
- Permanent, reusable elements eliminate recurring costs.
- Quarter-turn caps provide quick, easy and clean access to elements without need for tools and without barrel removal. Housings are piped solidly into the line.
- Standard "0" rings seal easily and securely to prevent leakage.
- The element's centering pin prevents misalignment or warping.
- Parallel barrels on a common header provide continuous flow during backwash. The process is not interrupted.
- Pressure gauges on each header plus a differential pressure gauge provide easy determination of pressure drop.
- Internal or external backwash allows choice of backwash liquid.

Backwash by external liquid



***Backwash** by filtered product*



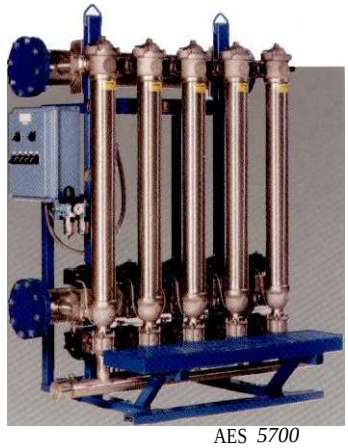
Backwash occurs only upon demand and may be triggered by a pressure differential switch, by a timing device, a combination of the two, or manually. Process flow is uninterrupted in remaining units as a barrel is backwashed.

Features and options Include:

- ***Manual or automatic backwash***

  Automatic backwash by time clock and/or pressure differential switch
- ***Automatic package features solid state electronics with additional options available including connection to customer's PLC or DCS***
- ***Automatic units have manual override***
- *2" or 2½" valve choice*
- ***Cone diffusers are available***
- *EPDM* **seals *are standard. Buna "N"; Teflon or Viton are available as options.***

Multiple Barre/ Filters



AES *5700*
5 BARREL

Design Characteristics

Temperature	!0°F/205°C maximum
Pressure	^5 PSIG/1.9 MPa maximum at 100°F.
Flow Rate	l GPM/2.3 Ipm maximum per Sq.ln Filter Media
Viscosity	3000 CP.
Solids Removal	PPM maximum
Filtration Levels	5000 Microns

Filter Element%Milt

Type	:-lace Filtration Cylindrical
Construction	ven stainless steel or synthetic cloth perforated stainless steel backer, 'tted stainless steel.
Flow Direction	aide to inside
Size	"%80 mm diameter by 40"/1015 mm length 18 sq.in./2632 Sq.cm. per element)
Back Flush	1 GPM/570 Ipm at 60 PSIG/.4 MPa for 5 seconds per tube
Seal	rings and flat gaskets, EPDM standard na "N", Teflon, Viton optional)

Frame Assembly

Construction	-d structural steel
Features	stations available
Options	or paired barrels ,s step

Connections	class 150 lap-joint flanges on and outlet, 21/2" NPT drains.
Orientation	^ntal (lower header inlet/upper header outlet)
Backwash	'l PT or 3" lap-joint flange

Controls

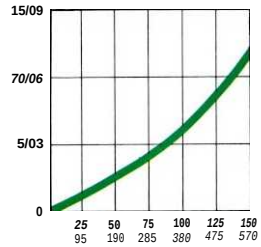
Automatic	'quencing solid state electro-pneumatic iy automatic. Cycle start by differential -,ssure switch, timer or push button.
Panel	ma 4X water tight
Manual	lndard hand valves

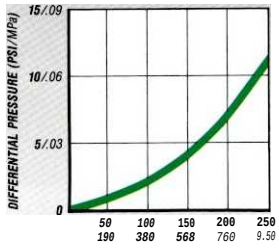
Electric	240 Vac. 50/60 Hz, single phase
Air	51/.055 m3 per min. at 80 PSIG/.5 MPa

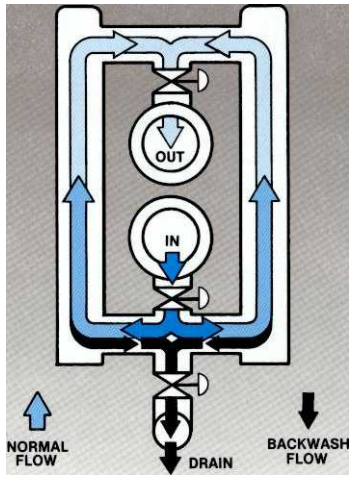
Type	':ece ball valve
Size/C,	!20, 21/2"/195
Material	Stainless Steel
Seats & Seals	-E and/or glass filled PTFE
Actuation	ual handle or single rotary pneumatic Bator (double acting type)

Arrangement	-al multiple tubular, single or pairei
Construction	:ed Stainless Steel
Size	**115** mm 0.D. by 52"/1320 mm 11
Access	!,irn quick-access cap
Seals	to "0" rings is "N". Teflon, Viton optional)

OP vs. ***GPM/fpm***







AES *5500*

Design Specifications

Model	Number of Barrels	2" Valve Nominal Flow GPM	2" Valve Nominal Flow lpm	2'/2" Valve Nominal Flow GPM	2'/2" Valve Nominal Flow lpm	Media Area in-	Media Area cm,
500002	z	ltU	5/U	Z5U	945	816	5265
5000C3	3	300	1135	500	1895	1224	7895
5000C4	4	450	1705	750	2840	1632	10530
5000C5	5	600	2270	1000	3785	2040	13160
5000C6	6	750	2840	1250	4730	2448	15795
500008	B	1050	3975	1750	6625	3264	21060
5000C10	0	1350	5110	2250	8515	4080	26325
5000020	0	3000	11355	5000	18925	8160	52645

lly for lightly loaded feed (low PPM) or low pressure drop. Consult your AES Sales Engineer for details.

AES 6700
10 BARREL

Model Definitions

AES 5000 Duo Paired construction with tee connections to the inlet and accepts **2 barrels** using three individual manual valves. Used for aerate flows when backwash is not required. Elements are aned manually and may operate individually with one in ndby or in parallel.

AES 5500 ;ed construction with one valve set per pair of barrels with ier manual or automatic *INTERNAL backwash.* Used for fine ation (low micron) for low to moderate flows. One *PAIR* of gels flush with each backwash.

AES 5550 ne as 5500 Series except *EXTERNAL backwash. (REF Pg.7)*

AES 5600 red construction with one valve set per barrel with either nual or automatic *INTERNAL backwash.* Generally used when .r more barrels are required, or with less than 6 barrels if ce is a problem with the 5700 series.

AES 5650 ne as 5600 Series except *EXTERNAL backwash. (REF. Pg.7)*

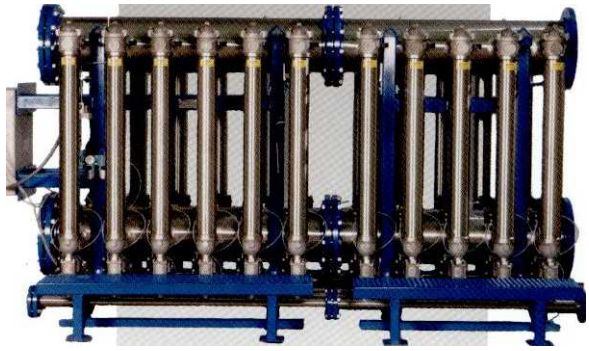
AES 5700 igle in-line construction with one valve set per barrel with her manual or automatic *INTERNAL backwash.* Generally used en up to 6 barrels are required, or with up to 10 barrels if ace is a problem with the 5600 Series.

AES 5750 **Same as 5700 Series except** *EXTERNAL* ***backwash*** *. (REF Pg.7)*

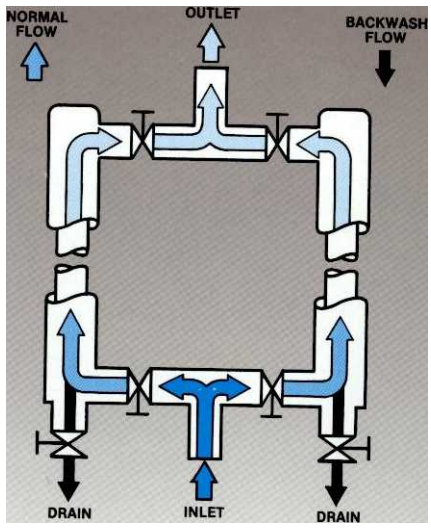
AES 6600 **Paired construction with one valve set per barrel. May be constructed for either low pressure** (**maximum 285 PSI/1.9 MPa**) **or high pressure** (**maximum 1000 PSI/6.9 MPa)** applications with either manual or automatic *INTERNAL* backwash. Filter elements are smaller than the 5000 Series listed above. This allows the 6600 Series to be used when the inlet flow is too low for the 5000 Series to backwash effectively pout undue flow interruption.

AES 6700 ne as 6600 Series except single in-line construction.

AES 6750 ie as 6700 Series except *EXTERNAL backwash* for LOW LSSURE units only. *(REF. P_q.7)*



AES 5600 S10 and 5600 S12 connected to provide 22 BARREL UNIT



AES 5000 DUO and AES 670 DUO

Filter Media

A wide variety

available to

handle your

individual

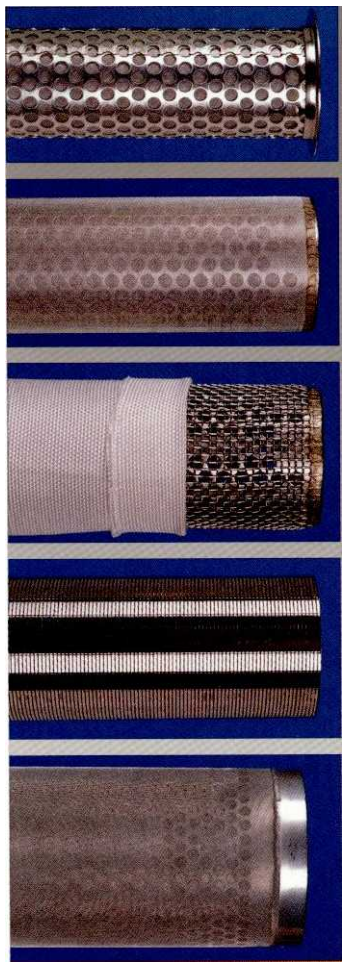
filtration needs.

- *Perforated Stainless Steel* is appropriate for extremely coarse filtration requirements. It is available with hole sizes .125" (3.15 mm) diameter and larger.

- *Metallic screens,* 150 mesh or finer, and all *Synthetic Fabrics* are mounted over a perforated backer and 20 or 60 mesh screen for structural support. This disperses the flow and assures full utilization of the entire surface area of the outer screen or fabric. Available for filtration down to 5 microns nominal.

- *Spiral Wound Slotted Wedge Wire* is extremely rugged media capable of withstanding very high differential pressures. It's especially suited for filtering fi bers or gelatinous particles that have a tendency to "staple" themselves into the openings of screens, which impedes backwashing. The triangular shape of the wire increases backwash flow velocity at the external surface of the media. This increases turbulence and facilitates the cake release. Available in slot openings from .001 " to .065" (.025 mm - 1.65 mm).

- *Diffusion Bonded elements* are made by taking three layers of engineered screens and a perforated support plate, all of 316 stainless steel material, and sintering them at above 2000°F (1095°C) in a controlled atmosphere to allow molecules to migrate (diffuse) across the contact points and recrystalize. This forms a strong integrated structure where all contact points of the structure are bonded together. The material is then rolled and welded into the shape of a filter element. The elements are solution heat treated after welding to maintain corrosion resistance.



***Perforated Stainless* Steel**

Fine Stainless Steel Metallic Screen

Synthetic Fabric over Stainless Steel Backer

Wedge Wire

Diffusion Bonded

V1/LQ/ in

Approximate Pore Opening ***Inches*** *Microns*	S.S. *Perforated* Hole *Size*	SS. *Spiral Wound* Slot *Opening*	S S. *Square Mesh* Wires/Inch	S.S *Wire Cloth Micron Rating*	*Synthetic Fabric Micron Rating*
.187 4750	*.1875"*				
.034 863			*20*		
.014 355		*.014"*	*40*		
.010 254		***.010"***			***250***
.0092 233			*60*		
.0059 *149*		*.006"*	***100***		***150***
.0041 104			***150***		***100***
.0030 *75*		*.003"*	*200*		*75*
.0024 61			***250***		
.0020 *50*		*.002"*			*50*
.0014 *44*			*325*	*44*	*36*
.0013 32				*32*	
.0010 *25*		*.001"*			*25*
.0008 20				***20***	
.0006 15					***15***
.0004 10				***10***	***10***
.0002 5					***5***

Chart for normally stocked media. Special media designs available. Contact AES All Ratings APX. Nominal opening comparison. Particle removal performance may differ from standard mesh

144-1

M.k

Simple,

efficient,

designed for

economical

results.

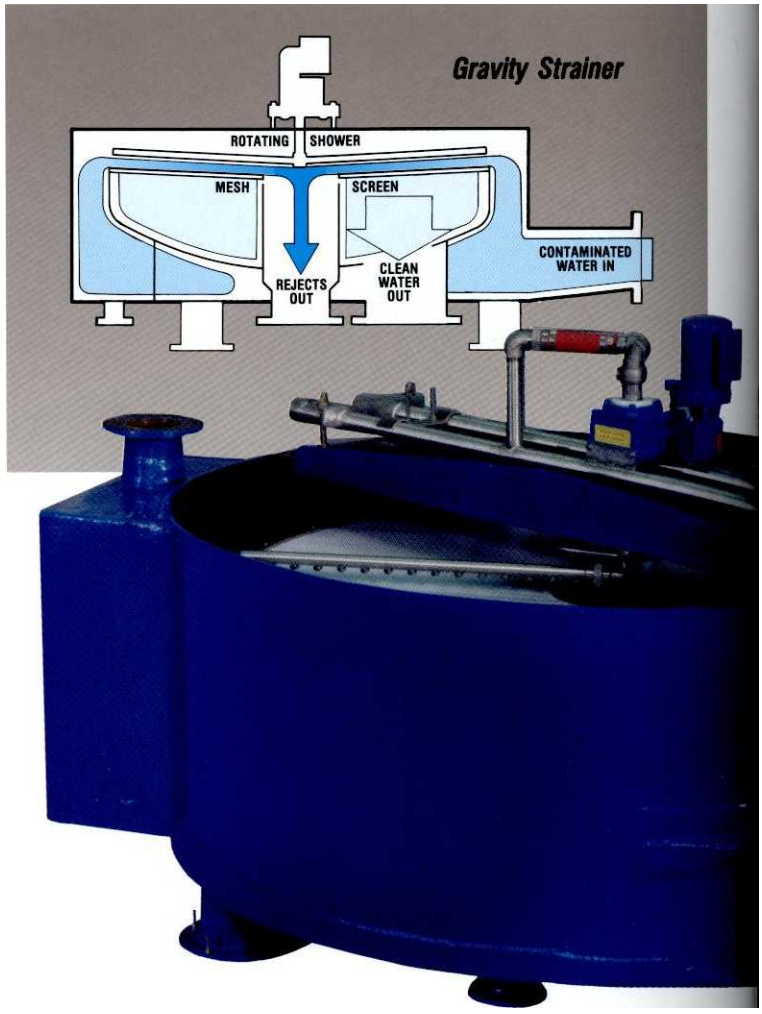
Mills worldwide value AES Engineered Systems strainers for their outstanding economical and reliable performance in many papermaking applications.

- AES Gravity Strainers are in use polishing white water for showers, removing felt hairs from recycled press water, on pulp mill applications, on deckers, stock washers and on savealls-even on mill influent systems.

- Benefits include substantial energy and water savings, highly effective fiber and solids removal and reliable operation even when upsets and slugs occur.

Gravity Strainer Capacities at Various Fiber Removal Ra

Model	Mesh	0 99 PPM		(80.299 PPM		Gallons/Liters Per Minute with Free Draining Stock 300 499 PPM	500-799 PPM	800.1000 PPM
4005	60	610	2310					
	100	470	1780	408	1545	316 1195	250 945	158 600
	150	430	1630	37				
	200	285	1080	248	940	191 725	152 575	96 365
4015	60	1037	3925	901	3410	6972640	553 2095	348 1315
	100	798	3020	694	2625	537 2030	426 1610	268 1015
	150	731	2770	635	2405	491 1860	390 1475	246 930
	200	484	1830	421	1595	325 1230	258 975	163 615
4025	50	1537	5820	1336	5055	1033 3910	819 3100	516 1955
	100	1184	4480	1029	3895	795 3010	631 2390	398 1505
	150	1084	4105	942	3565	728 2755	570 2190	364 1380
	200	718	2720	624	2360	482 1825	383 1550	241 910
4035	60	2153	8150	1871	7080	1447 5475	1148 4345	724 2740
	100	1658	6275	1441	5455	1114 4215	884 3345	557 2110
	150	1518	5745	1319	4990	1020 3860	809 3060	510 1930
	200	1006	3810	874	3310	676 2560	536 2030	338 1280
4045	60	3257	12330	2831	10715	2189 8285	1736 6570	1094 4140
	100	2508	9495	2180	8250	1686 5380	1337 5060	843 3190
	150	2296	8690	1996	7555	1543 5840	1224 4635	772 2920
	200	1521	5755	1322	5005	1022 3870	811 3070	511 1935



Gravity Strainer ***Design*** **Sped**

Model	Flow Capacity Range BPM pip	Nominal Diameter In cm	Nominal Height' In cm	Net/Reject Connection In cm	Accept Connection In cm	Gross Weight Dry LBS Kg	Flooded LBS Kg
4005	96 · 610	61	59	6	10	725	2875
	365 · 2310	155	150	15	25	330	1305
4015	163 · 1037	73	66	8	12	825	5150
	615 · 3925	185	170	20	30	375	2335
4025	241 · 1537	85	72	10	14	1100	7700
	910 · 5820	215	185	25	35	500	3495
4035	338 · 2153	97	73	12	16	1225	10750
	1280 · 8150	245	185	30	40	555	4875
4045	511 · 3257	115	87	14	18	1560	15000
	1935 -12330	290	220	35	45	710	6805

Height of support legs can vary to suit application.
Capacity can vary depending on inlet loading and screen mesh.

VA Strainers

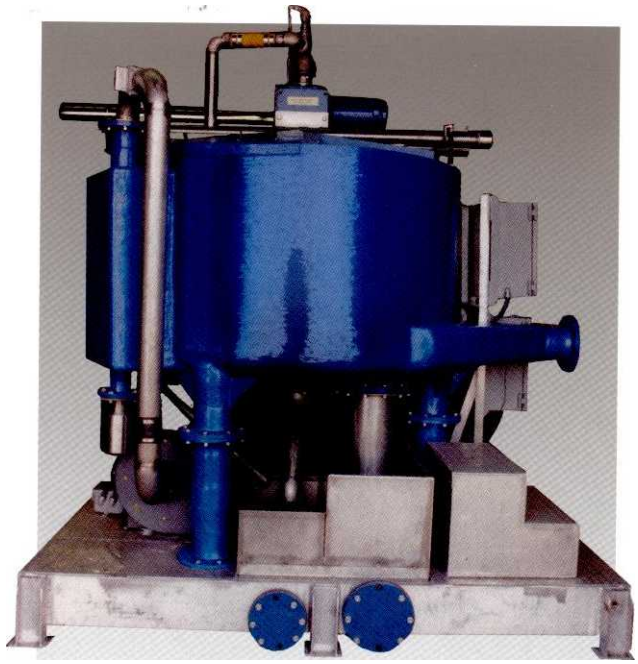
Advanced technology for optimum process results.

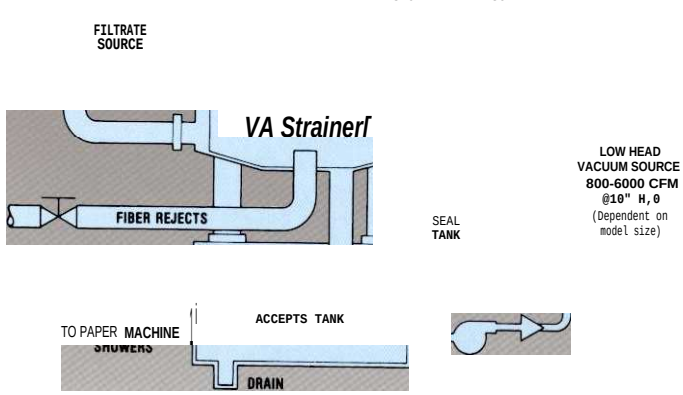
The latest addition to the AES filtration product line is the vacuum assisted VA Strainer.

This is a further refinement of the highly successful AES 4000 Series gravity strainer which has proven its efficiency in applications around the world.

Assisted by a low horsepower, low head blower this strainer is capable of handling up to 1% feed consistency and harder to drain (low freeness) material than the gravity units. The low vacuum also enhances the use of very fine media (down to 40 micron) on applications previously unachievable with gravity strainers.

The vacuum assisted dewatering, maintenance-free operation and maximum process protection yield optimum results for polishing, scalping and thickener applications. All this with a short payback period on the investment.





VA Strainer Design Speci#catlo

ode!	Flow Capacay Range" GPM lpm	Noma! Diameter In cm	Nominal Height' In cm	Inlet/Relecl Connection In Ho	Accept Connection In cm	Gross Dry LBS Kg	Weight Hooded LBS Kg
VA 5	100 · 525	61	66	6	10	725	2875
	375 - 2000	155	168	15	25	330	1300
VA 15	175 · 850	73	72	8	12	875	5150
	665 . 3200	185	183	20	30	400	2335
VA 25	250 · 1250	85	78	10	14	1225	10750
	950 - 4750	216	198	25	36	555	4875
VA 35	350 · 1750	97	89	12	16	1800	18050
	1325 - 6600	246	226	30	40	815	8185
VA 45	550 · 2600	115	97	14	18	3000	29400
	2075 . 9850	292	247	36	46	1360	13335

Height of support legs can vary to suit application.
Capacity can ***vary*** **depending of inlet loading** and screen mesh.

white water Syste ms

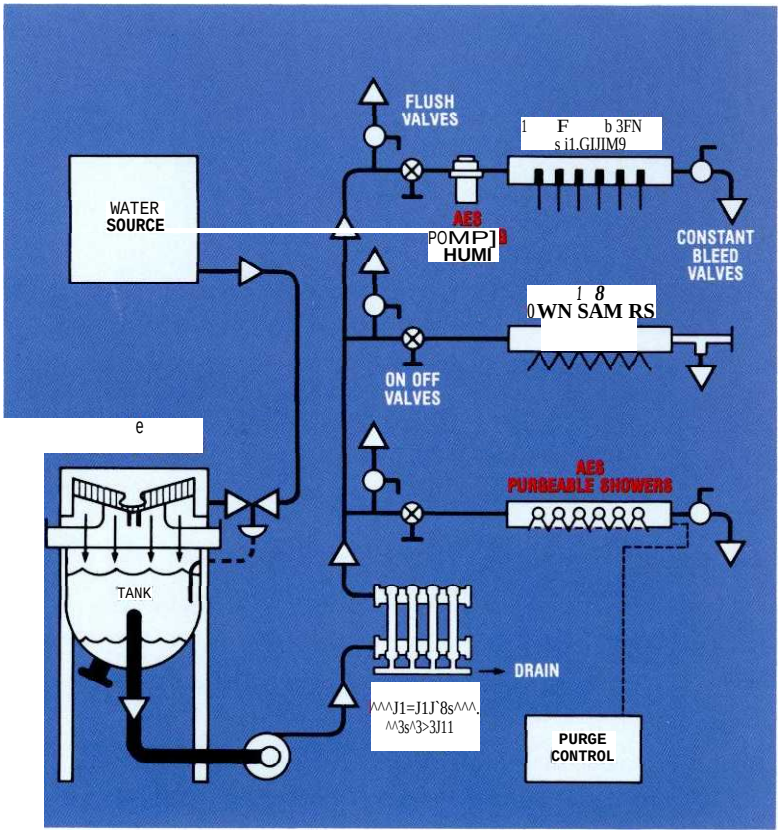
Today's emphasis toward increased usage of recycled fiber, environmental concerns, energy savings potential and the desire to improve efficiency are reasons why most paper mills are using recycled white water for all showers in the forming section. Despite these benefits, there are some problems which must be addressed.

Shower nozzle plugging is critical. To minimize plugging, the shower system must be designed to use recycled white water. The illustration shows the components which typically constitute a correctly designed and applied white water system.

The gravity or vacuum assisted strainer initially separates fiber and contaminates from the water supply.

Floculation will occur (especially at shutdown) in the filtered white water tank. This tank must include a sludge removal drain. The pump suction outlet must be located well above the tank bottom.

To remove the flocs, an automatic or manual backwash multiple barrel pressure filter may be required downstream of the strainer. Single in-line pressure filters (polishing filters) should be used ahead of fixed orifice showers-especially if used intermittently-due to refloculation in the pipeline and for removal of pipe scale.



Conversion Table for Suspended Solids Computations

PPM	90	lbs./ 1000 gal.
10,000	0	80
8, 000	8	70
		60
6,000		50
4,000	.4	40
		30
2,000	.2	20
		15
1,000	.10	10.0 9.0
800	.08	8.0 7.0
600	.06	6.0 5.0
400	.04	4.0 3.0
200	.02	2.0 1.5
100	.01	1.0 .9 .8
80	.008	.7
60	.006	.6 .5
40	.004	.4 .3
20	.002	4.2 -4.15
10	.001	.4.10 4.09 44.08
8	.0008	14.07 .06
6	.0006	-4.05 -4.04
4	.0004	-4.03
2	.0002	.02 .015
1.0	.0001	.01 -4.00834

Definitions

BACKWASHING — Cleaning filter media and removing entrapped solids by forcing a flow of liquid in a reverse direction back 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 a filter media can operate effectively between cleanings.

Insoluable particles which are easily filtered. They may be added to a liquid with solids difficult to filter. The resultant mixture Is thereby made easier to filter. Common filter aids are diatomaceous earth, perlite and cellulose fibers.

FILTER MEDIUM — The combined filter media and, its support structure. A simple barrier of specifically selected permeable material upon which the solids removed are deposited.

FILTER MEDIA — Plural of filter medium.

FILTRATE — Liquid that has passed through a filter medium.

CONTINUOUS FILTRATION — Used where it is necessary to maintain continuous product flow uninterrupted by media cleaning, replacement or normal maintenance.

DEPTH FILTRATION — Traps solids at different levels of penetration within a filter medium. The medium retains solids with tortuous passages, e.g. fibrous or granular. Retention efficiency Is attained by a series of low efficiency particle captures.

The flow of water across a valve at 602F in gallons/minute at a pressure drop of 1 PSI.

Conversions

atm x 101.33 = kPa

atm x 1.0333 = kg/cm'

atm x 14.7 = PSI

bars x 0.1 = MPa

bars x 0.9869 = atm

bars x 14.5 = PSI

°Celsius = (°F-32)5/9

°Fahrenheit = (°Cx9/5)+32

cm Hg (0°C) x 1.3332 = 'kPa

in x 25.4 = mm

in Hg (0°C) x 3.3864 = *kPa

kg/cm' x 14.22 = PSI

kPa x 1000 = MPa

m x 3.281 = ft

micron = 0.001 mm

micron = 3.94 x 10', in

PPM = mg/I (at 1.0 S.G.)

PSI x 6.8948 = 'kPa

US Gal x 3.7854 = liters

Imp Gal x 4.5461 = liters

* Note: *These preferred SI units (Systems International d' Unites) have been adapted by the General Conference of Weights and Measures and endorsed by the International Organization for Standardization (ISO).*

Definitions

INTERMITTENT FILTRATION — Used for batch cleaning or where product flow may be Interrupted. Filter unit may be shut down for cleaning, etc. without loss of process time.

SURFACE FILTRATION — Separates solids from liquid by trapping them on the surface of a filter medium. All AES filters are surface filtering devices.

CONTAMINATED LIQUID — Any liquid containing Impurities In the form of suspended solids.

Filter media blocking or blinding. The openings in the media become partially covered by solids, reducing the effective pore size and permeability.

MONOFILAMENT MEDIUM — A filter medium woven of threads which contain only a single filament.

MULTIFILAMENT MEDIUM — A filter medium woven of yarns which are made up of multiple filaments.

MEDIA OPEN AREA — The amount of space on the surface of a filter medium that is available for penetration by a liquid and which affects the solids retaining capacity to a large extent.

MEDIUM *PERMEABILITY* — The ease with which the medium permits the passage of a fluid.

PRESSURE DIFFERENTIAL — The difference In pressure between the entrance flow and exit flow of the filter.

SOLIDS — Materials suspended in liquid which can be removed by mechanical process (filtration). Solids may be granular, fibrous, glutinous, etc. The quantity of solids In a liquid is expressed as parts per million by weight.

SOLIDS RETAINING CAPACITY — The quantity of solids capable of being trapped on a filter media before cleaning is required.

In-Line Filters

Model	
340	
490	high pressure
670 A,B,C	
670 A,B,C	high pressure
770 A,B,C	
990	low pressure
670 A, B,C Duo	
670 A, B,C Duo	high pressure
5000 Duo	low pressure; 2″ and 2½″ valves

Multiple Barrel Filters

Flows up to 250 GPM/950 lpm per barrel

LOW Pressure (≤ 300 PSI/2 MPa)
HIGH Pressure (≤ 1000 PSI/6.9 MPa)

Model	
5500	low pressure; 2″ valves
5550	low pressure; 2″ valves
5600	low pressure; 2″ and 2½″ valves
5650	low pressure; 2″ and 2½″ valves
5700	low pressure; 2″ and 2½″ valves
5750	pressure; 2″ 3-way valves
6600	
6600	h pressure
6700 A,B,C	
6700 A,B,C	high pressure
6750 B, C	2″ 3-way valves

® Model	
4005 to 4045	
4000 to 4040	
VA 5 to VA 45	
VA 5S to VA 45S	

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