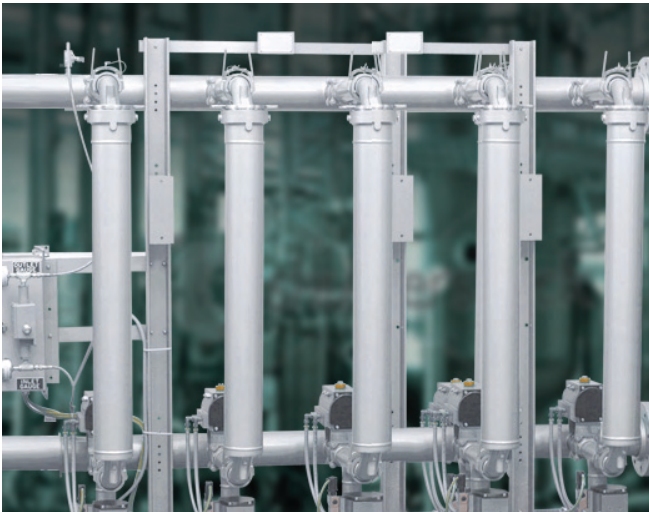


Tubular Backwashing Filter

AFC, AFR & F-Series

Reduce Waste,
Improve Process
Efficiency
& Increase
Product Quality



Industry Leading Family of Solutions

Eaton offers a full line of tubular backwashing solutions to meet your specific application demands and business needs. From the high-capacity AFR-Series for high flow in a compact footprint, to our simple single tube AFC-Series

for stand-alone applications with low solids loading, there is an Eaton solution for any process. All Eaton filters are engineered for the best performance and value in every application.

TUBULAR BACKWASHING FEATURES & BENEFITS

- Tight retentions (as low as 1 micron) with high flow rates—ideal for a wide range of process liquids and parameters
- Eliminates the need for disposable media including bags and cartridges—reduces disposal costs, materials loss, labor, and inventory
- Choice of configurations—available solutions to optimize your system for almost any filtration challenge
- Modular scalable systems—your system can grow with your application demands
- Automated clean-in-place operation—optimizes cleaning frequency and reduces labor demands
- Wide range of operating pressures—capable of reliable operation and performance up to 1,000 psi (69 bar)

Barrier Filtration

Barrier filtration uses either stainless steel or a fabric screen, selected for its retention and flow properties. This filtration media, within the filter housing, collects debris on its surface because the liquid flows inward. Contaminants on the surface slowly form a barrier, capable of removing smaller particles.

Backwash Cleaning

The core principle behind backwashing, when automated, is that the filters are designed to initiate a backwash sequence when the differential pressure reaches its set point. The flow of liquid is reversed, dislodging the debris that has built up on the surface of the filter media. A drain header, located at the base of the filter, provides an outlet for the debris to be purged from the system.

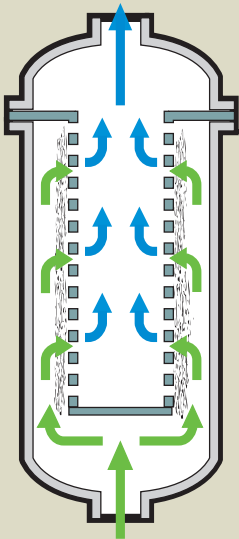


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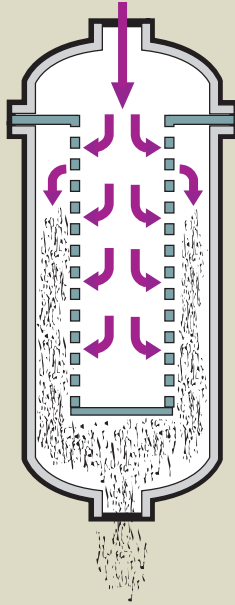
TYPICAL APPLICATIONS

- city water lines • hot condensate • chiller water • fresh water
- whitewater / shower water • cip fluids • papermaking wet end starch • pelletizer water • single and duo tubular filters for a wide range of applications up to 1000 psi and high viscosity applications

Tubular Backwashing Filter



Process liquid flows into the housing inlet at its base and passes across the filter media from the outside inward. Because of this flow path, contaminants collect on the outside of the filter element slowly forming a cake, removing smaller particles.



During backwash, triggered by time or pressure differential, a valve switches one station's flow from the inlet header to the drain header and the direction of the flow is reversed in the filter tube, dislodging contaminants from the media surface. The source of the cleaning fluid may be a diversion of process fluids (internal backwashing) or an external source (external backwashing).

Contaminants and the fluids used for cleaning are expelled through the drain header at the base of the unit. Once backwashing is complete, the flow is reversed again and normal filtration resumes.

Cake formation increases filtration efficiency

Whereas the filtration media provides some of the filtration action, collected contaminants further increase efficiency. We call this phenomenon "cake formation." The collected solids, or "cake," trap additional contaminants. The key to making this principle work is timely cleaning—too soon and you lose the benefit, too late and the system flow becomes hindered.

Eaton's filtration systems come factory pre-set to backwash when the differential pressure from inlet to outlet reaches 15 psi (1 bar)—typically the optimum time to initiate backwashing, although this is adjustable.



When your application demands high-pressure operation—up to 1,000 psi (69 bar)—and scalable flexibility, the Eaton AFC-Series is optimal. Systems are available in single, duo, and multiplex configurations to meet your application and business demands.

For liquid filtering applications that require unattended operation, maximum uptime, and solids removal from 1 to 1,700 microns, the Eaton F-Series family of filter systems delivers unbeatable performance.



The revolutionary Eaton AFR-Series delivers high-flow filtration of water-like liquids at retentions as low as 1 micron—in a compact one-square-meter footprint.



Eaton
North America – HQ
70 Wood Avenue, South
2nd Floor
Iselin, NJ 08830

Toll Free: (800) 656-3344
(North America only)

Voice: (732) 767-4200
Fax: (952) 906-3706

Eaton Brazil
Voice: +55 (11) 6465-8780

Eaton China
Voice: (86-21) 5200-0099

Eaton
Europe/Africa/Middle East
Voice: +49-2486-809-0

Eaton Singapore
Voice: +65 6825-1668

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EF-TT-01
1-2011

Tubular Backwashing Filter

AFC-Series



When an application demands high-pressure operation – up to 1,000 psi (69 bar) – and scalable flexibility, the Eaton AFC-Series is optimal. Systems are available in single, duo, and multiplex configurations.

FEATURES/BENEFITS

- Solids removal from 1 to 1,700 microns
- Single system flow rates up to 3,000 gpm (681 m³/hr)
- Broad selection of filter media materials and retentions suitable for a wide range of applications
- Smooth pipe and nozzle connection transitions to avoid dead spots in the fluid stream and minimize pressure drop
- Numerous automated backwash options for operator-free service and minimal backwash effluent (<2% of system volume)
- Available ACCUFLUX™ media dramatically increases filter surface area in the same footprint
- Proprietary 3-way, full-ported valves on AFC-1100 multiplex filters allow fast, frequent sequencing and maximum cleaning force during backwashing
- Isolated top-to-bottom backwash flow on AFC-1100 and AFC-3300 multiplex filters ensures complete and efficient media cleaning while continuing to deliver filtered product downstream
- Quick coupler valve connectors for ease of body tube removal

OPTIONS

- Straight-Thru and Standard configurations
- Single, duo and multiplex (up to 20 station) models
- Pressure gauge and drain valve options
- Internal or external backwashing
- Drain header trap
- Media-cleaning diffusers for more effective cleaning at low operating pressures or volumes
- 304 stainless steel frame material



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Straight-Thru Design

Single Filters

Designed for batch or intermittent service, AFC-Series filters are ideal for a wide range of applications. Quick coupling connectors afford easy media access for inspection, cleaning, or replacement. Choice of straight-thru and standard configurations, both are available with pressure gauge and drain valve options.

Duo Standard Design

Standard Design

Duo Filters

Two single filter units are connected to a pair of 3-way valves for continuous service during cleaning or maintenance. If a pressure rating above 350 psi is required, 2-way ball valves rated at 1,000 psi are incorporated. For intermittent service applications, the valves can be positioned so that both units operate simultaneously.

Multiplex Filters

Multiplex units consist of two or more single filter units valved in parallel to common headers. This configuration enables sequential backwashing of individual elements while the system remains in operation.



AFC-2200 Multiplex High-Pressure Unit

TYPICAL APPLICATIONS

- city water lines • hot condensate • chiller water • fresh water
- wastewater / shower water • cip fluids • papermaking wet end starch
- pelletizer water • single and duo tubular filters for a wide range of applications up to 1000 psi and high viscosity applications

AFC-Series Tubular Backwashing Filter

Single and Duo

	1100	1500	2200	3300 ¹				
Body Inlet/Outlet Size - in (mm)	1 (25.4)	1.5 (38.1)	2 (50.8)	3 (76.2)				
Body Diameter - in (mm)	2.875 (73)	3.5 (88.9)	4.5 (114.3)	4.5 (114.3)				
Screen Length - in (mm)	12 (304.8) 18 (457.2)	24 (381) 36 (914.4)	18 (457.2) 36 (914.4)	18 (457.2) 36 (914.4)				
Element Styles Available ² - in (mm)	2 (50.8) dia. single	2.25 (57.1) dia. single	3.25 (82.8) dia. single, Tri-Cluster, Accuflux - 7	3.25 (82.8) dia. single, Tri-Cluster, Accuflux - 7				
Pressure Rating ³ - psi (bar)	150 (10.3) 250 (17.2) ⁴	150 (10.3) 250 (17.2) ⁴	150 (10.3) 250 (17.2) ⁴ 350 (24.1), 740 (51.7), +1000 (101.3) ^{4/5}	150 (10.3)				
Total Volumetric Capacity - Model #'s	1112	1118	1524	1536	2218	2236	3318	3336
Single Unit - gal (l)	0.4 (1.5)	0.5 (1.9)	1 (3.8)	1.4 (5.3)	1.3 (4.9)	2.4 (9.1)	1.3 (4.9)	2.4 (9.1)
Duo-Unit - gal (l)	0.8 (3.0)	1 (3.8)	2 (7.6)	2.8 (10.6)	2.6 (9.8)	4.8 (18.2)	2.6 (9.8)	4.8 (18.2)
Single Unit Weight - lbs (kg)	15 (6.8)	18 (8.2)	25 (11.3)	30 (13.6)	35 (15.9)	40 (18.1)	40 (18.1)	45 (20.4)
Duo Unit Weight - lbs (kg)	80 (36.3)	90 (40.8)	110 (49.9)	125 (56.7)	140 (63.5)	160 (72.6)	180 (81.6)	300 (136.0)
Drain Size ⁶ - in (mm)	Standard 0.75 (19)	Straight-Thru 0.5 (12.7)	Standard 0.75 (19)	Straight-Thru 0.5 (12.7)	Standard 1.25 (31.75)	Straight-Thru 0.5 (12.7)	Straight-Thru 0.5 (12.7)	

¹Available in Straight-Thru design only ²Consult media availability chart for specific retentions and types available. ³Teflon gaskets limit pressure maximum to 80 psi (5.5 bar)

⁴All high pressure units (250 psi and over) incorporate 2-way ball valves. ⁵Duo configuration 350, 740 and 1000 psi available in Straight-Thru design only. ⁶Consult factory for optional additional drain sizes

Multiplex

	1100	2200	3300
Body Inlet/Outlet Size - in (mm)	1 (25.4)	2 (50.8)	3 (76.2)
Inlet/Outlet Header Size ¹ - in (mm)	3 (76.2) 4 (101.8)	3 (76.2) 4 (101.8) 6 (152.4) 8 (203.2) 10 (254.0) 12 (304.8)	3 (76.2) 4 (101.8) 6 (152.4) 8 (203.2) 10 (254.0) 12 (304.8)
Body Diameter - in (mm)	2.875 (73)	4.25 (114.3)	4.25 (114.3)
Screen Length - in (mm)	18 (457.2)	36 (914.4)	36 (914.4)
Element Styles Available ² - in (mm)	2 (50.8) diameter single	3.25 (82.3) diameter single, Tri-Cluster, Accuflux - 7	3.25 (82.3) diameter single, Tri-Cluster, Accuflux - 7
Pressure Rating ³ - psi (bar)	150 (10.3) 250 (17.2)	1000 (101.3)	150 psi (10.3 bar)
Air Requirement (Automated Units)	60-120 psi (4.1-8.3 bar) @ 5 cfm, for sequencing	60-120 psi (4.1-8.3 bar) @ 5 cfm, for sequencing	60-120 psi (4.1-8.3 bar) @ 5 cfm, for sequencing
Electrical Requirement (Automated Units)	110/220 V, 50/60 Hz, single phase	110/220 V, 50/60 Hz, single phase	110/220 V, 50/60 Hz, single phase

¹Drain header size 3" (76.2). Consult factory for custom sizes ²Consult media availability chart for specific retentions and types available.

³Teflon gaskets limit pressure maximum to 80 psi (5.5 bar) AFC 2200 available in 1000 psi (101.3 bar) only



AFC-1100 Multiplex Unit

Eaton
North America – HQ
70 Wood Avenue, South
2nd Floor
Iselin, NJ 08830

Toll Free: (800) 656-3344
(North America only)

Voice: (732) 767-4200
Fax: (952) 906-3706

Eaton Brazil
Voice: +55 (11) 6465-8780

Eaton China
Voice: (86-21) 5200-0099

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EF-TT-02
1-2011

Tubular Backwashing Filter

F-Series



For liquid filtering that requires unattended operation, maximum uptime, and solids removal from 1 to 1,700 microns, the Eaton F-Series delivers unbeatable performance.



FEATURES/BENEFITS

- Solids removal from 1 to 1,700 microns
- Single system flow rates up to 3,000 gpm (681 m³/hr)
- Smooth pipe and nozzle connection transitions to avoid dead spots in the fluid stream and minimize pressure drop
- Broad selection of filter media materials and retentions suitable for a wide range of applications
- Proprietary 3-way, full-ported valves allow fast, frequent sequencing and maximum cleaning force during backwashing
- Isolated top-to-bottom backwash flow ensures complete and efficient media cleaning while continuing to deliver filtered product downstream
- Numerous automated backwash options for operator-free service and minimal backwash effluent (<2% of system volume)
- Available ACCUFLUX™ media dramatically increases filter surface area in the same footprint

OPTIONS

- Internal or external backwashing
- Media-cleaning diffusers for more effective cleaning at low operating pressures or volumes
- Drain header trap
- Quick coupler valve connectors for ease of body tube removal
- 304 stainless steel frame material
- ASME code vessels

TYPICAL APPLICATIONS

- city water lines • hot condensate • chiller water • fresh water
- whitewater / shower water • cip fluids • papermaking wet end starch • pelletizer water • single and duo tubular filters for a wide range of applications up to 1000 psi and high viscosity applications

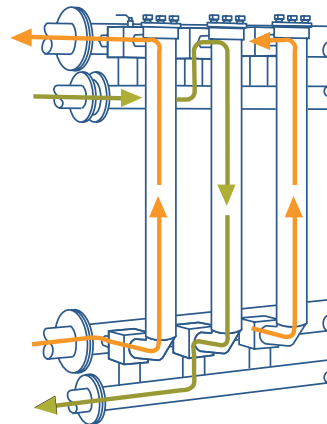
The key to the F-Series' versatility is its modular design that enables future capacity and configuration flexibility. F-Series systems can include 2 to 20 body tubes on a single framed skid and can be ordered with blank stations to allow low-cost expanded capacity.

The F-Series uses cleanable media. This further reduces life cycle costs and maximizes productivity by eliminating the labor, replacement, and disposal costs of bags and cartridges. Three types of elements are offered: single element with 364 in² of surface area, the Tri-Cluster® with 510 in² of surface area, or the Accuflux® 7 with 791 in² of surface area.

The F-Series features 3-way ball valves, automated cleaning with direct mounted actuators and solenoids, and available blank stations for easy future expansion.

How the F-Series Works

When cleaning is required, triggered by time or pressure differential, a single valve removes the tube to be backwashed from the incoming flow stream. The resulting pressure drop redirects a portion of the clean process flow downward, flushing the contaminants to the drain manifold. When process liquids are very valuable or hazardous, an external backwash configuration, which uses a small amount of cleaning liquid introduced through a separate manifold, is recommended. External backwashing is also recommended when operating pressures are expected to be less than 45 psi (3.1 bar).



External backwash system shown. Secondary header at the top of the unit introduces cleaning fluid, typically water, (green arrows) to loosen and discharge debris to the drain header at the bottom.



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F-Series Tubular Backwashing Filter

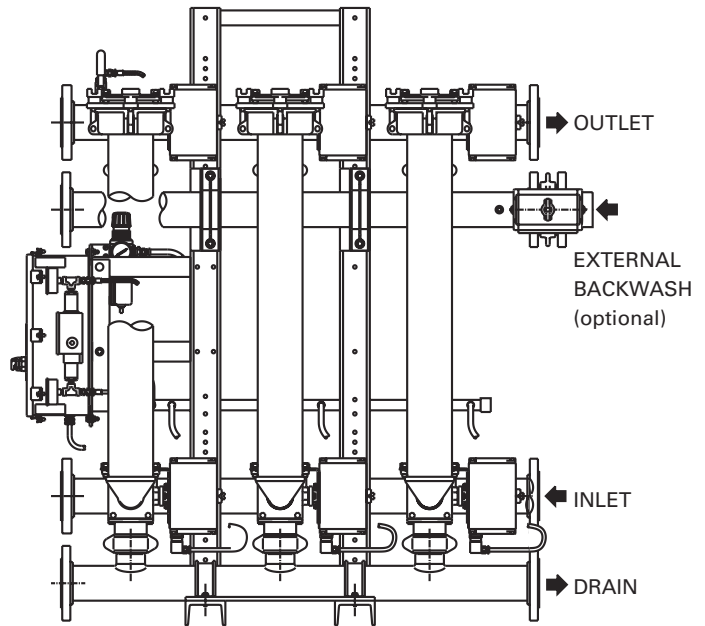
SPECIFICATIONS

Body Inlet/Outlet Size - in (mm)	3 (76.2)
Inlet/Outlet Header Size ¹ - in (mm)	3 (76.2), 4 (101.8), 8 (203.2), 10 (254), 12 (304.8)
Body Diameter - in (mm)	4.5 (114.3)
Screen Length - in (mm)	36 (914.4)
Element Styles Available ²	3.25 (82.8) dia. single, Tri-Cluster, Accuflux-7
Pressure Rating ³ - psi (bar)	250 (17.2)
Temperature - °F (°C)	350 (177) system maximum (determined by screen material and elastomer seals)
Air Requirement-auto units - psi (bar)	60 - 120 (4.1-8.3) @ 5 cfm, for sequencing
Electrical Requirement -	110/220V, 50/60 Hz, single phase
Backwash minimum flow	90 gpm (340 l/min) for single and Tri-Cluster media; 150 gpm (567 l/min) for ACCUFLUX™ media

¹Drain header size 3" (76.2). Consult factory for custom sizes

²Consult media availability chart for specific retentions and types available

³Teflon gaskets limit pressure maximum to 80 psi (5.5 bar). ASME code units are limited to 150 psi (10.3 bar)



3-way ball valves

To ensure positive sealing and maximum flow, our F-Series filters feature the industry's best 3-way ball valves. These important components—designed and manufactured by Eaton exclusively for Eaton systems—were developed specifically for the demands of industrial filtration. Their full-ported design reduces pressure drop and requires no additional linkages for actuation.

Model	Weight (dry) lbs (kg)	Height in (mm)	Footprint w x l in (mm)	Volume gal (l)	Configuration # of Tubes
F202	450 (204)	62 (1575)	28.5 x 45 (725 x 1145)	18 (68)	2
F203	600 (272)	62 (1575)	28.5 x 48 (725 x 1220)	23 (87)	3
F204	750 (340)	62 (1575)	28.5 x 63 (725 x 1600)	30 (114)	4
F205	900 (408)	62 (1575)	28.5 x 78 (725 x 1980)	37 (140)	5
F206	1200 (544)	62 (1575)	28.5 x 93 (725 x 2360)	65 (246)	6
F207	1350 (612)	62 (1575)	28.5 x 108 (725 x 2745)	75 (284)	7
F208	1500 (680)	62 (1575)	28.5 x 123 (725 x 3125)	85 (322)	8
F209	1800 (816)	62 (1575)	28.5 x 138 (725 x 3505)	124 (470)	9
F210	1950 (885)	62 (1575)	28.5 x 153 (725 x 3885)	138 (522)	10
F211	2100 (952)	62 (1575)	28.5 x 168 (725 x 4265)	151 (572)	11
F212	2400 (1089)	62 (1575)	28.5 x 183 (725 x 4650)	165 (625)	12

Eaton
North America – HQ
 70 Wood Avenue, South
 2nd Floor
 Iselin, NJ 08830

Toll Free: (800) 656-3344
 (North America only)

Voice: (732) 767-4200
 Fax: (952) 906-3706

Eaton Brazil
 Voice: +55 (11) 6465-8780

Eaton China
 Voice: (86-21) 5200-0099

Eaton Europe/Africa/Middle East
 Voice: +49-2486-809-0

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Tubular Backwashing Filter

AFR-Series

Fabricated
Construction

Backwash
Cleaned

Permanent
Media

The revolutionary Eaton AFR-Series delivers high-flow filtration of water-like liquids at retentions as low as 1 micron in a compact one-square-meter footprint.

FEATURES/BENEFITS

- Solids removal from 1 to 1,700 microns
- Flow rates up to 2,000 gpm (454 m³/hr)
- Broad selection of filter media materials and retentions suitable for a wide range of applications
- Numerous automated backwash options for operator-free service and minimal backwash effluent (<2% of system volume)
- Smooth pipe and nozzle connection transitions to avoid dead spots in the fluid stream and minimize pressure drop
- Isolated top-to-bottom backwash flow for complete and efficient media cleaning while continuing to deliver filtered product downstream
- Available ACCUFLUX™ media dramatically increases filter surface area in the same footprint
- Configured with an array of up to eight - 4" (101.8 mm) or 6" (152.4 mm) body tubes surrounding a central cleaning valve

OPTIONS

- Media-cleaning diffusers for more effective cleaning with low operating pressures or volumes
- Drain header trap
- Isolation butterfly valves for individual body tube removal while filter is in operation
- Hinge-lock quick couplings
- 304 stainless steel frame material

TYPICAL APPLICATIONS

- city water lines • hot condensate • chiller water • fresh water
- whitewater / shower water • cip fluids • papermaking wet end starch • pelletizer water • single and duo tubular filters for a wide range of applications up to 1000 psi and high viscosity applications



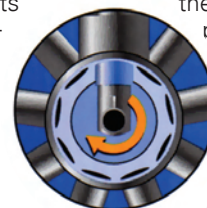
How the AFR-Series Works

A single AFR-Series equals the performance of an in-line filter in only one-fifth the floor space. AFR-Series minimizes the number of moving parts for low-cost operation and long service life. A single rotating flow diverter replaces multiple valves, actuators, linkages, and seals required by other systems.

Like many Eaton filters, the AFR-Series uses cleanable media. This core design philosophy further reduces life cycle costs and maximizes productivity by eliminating labor and disposal costs as well as lost production associated with bags and cartridges.

The AFR-Series uses a circular configuration of up to eight tubular filter housings. Process fluid flows into the housing at the inlet at its base and passes across the filter media from the outside inward. Due to this flow path, contaminants collect on the outside of the filter element slowly forming a cake, removing smaller particles.

During backwash, triggered by time or pressure differential, the flow diverter inside the cleaning valve rotates to the tube to be cleaned. This closes the tube to the incoming process liquid and opens it to the atmosphere (via a drain line). The result causes outlet process liquid to flow in reverse through the element, cleaning it of contaminants and expelling them through the drain at the top of the system.



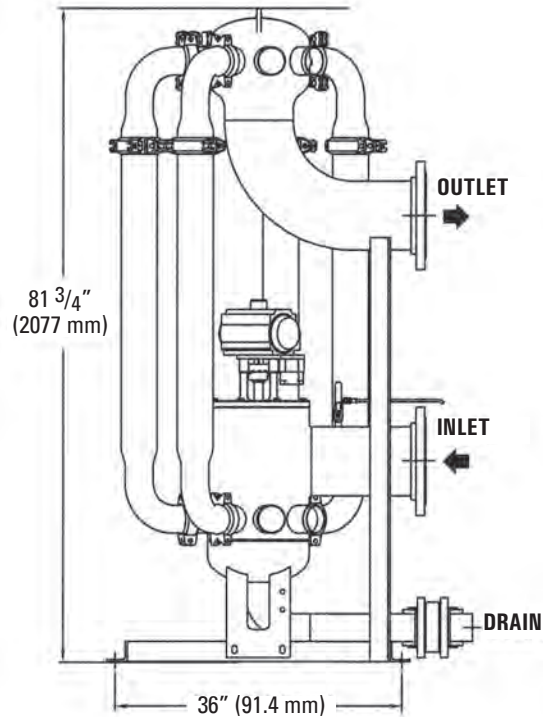
Flow diverter inside the AFR's cleaning valve

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SPECIFICATIONS

- Connection Inlet and Outlet: 8" ANSI or 200 mm DIN flanged. Drain: 3" (80 mm) weld stub
- Process Parameters Temperature: 300°F (149°C) maximum (determined by screen material and elastomer seals). Operating pressure: up to 250 psi (17 bar)
- Elastomer Seals Standard: Buna-N (180°F (82°C) max). Optional: Nordel (230°F (110°C) max); Viton® (300°F (149°C) max)
- Housing/ Wetted Parts Materials Standard: 316 stainless steel. Optional: Wide range available; consult Eaton
- Frame Material Standard: Painted carbon steel. Optional: 304 stainless steel
- Automation Standard: Choice of programmable logic controller (PLC) or semi-automatic. Optional: Wide range available; ask your representative for more information
- Utilities Electrical: 110 or 220 Volt, 50 or 60 Hz, single-phase. Air: 60-120 psi (4.1-8.3 bar) @ 5 cfm. Air must be clean, dry and non-lubricated



	AFR-8-4	AFR-8-6
Body Inlet/Outlet Size - in. (mm)	3 (76.2)	3 (76.2)
Inlet Outlet Header Size ¹ - in. (mm)	8 (203.2)	8 (203.2)
Body Diameter - in. (mm)	4 (101.8)	6 (152.4)
Screen Length - in. (mm)	36 (914.4)	36 (914.4)
Element Styles Available ² - in. (mm)	3.25 (82.8) diameter single, Tri-Cluster, Accuflux-7	5-Cluster, 7-Cluster, Accuflux-15
Pressure Rating - psi (bar)	250 (17.2)	250 (17.2)
Volumetric Capacity	Each body tube = 4 gallons	Each body tube = 4.8 gallons
Single Unit Weight ³ - lbs. (kg)	1,100 (499)	1,300 (590)
Air Requirement	60-120 psi (4.1-8.3 bar) @ 5 cfm for sequencing	60-120 psi (4.1-8.3 bar) @ 5 cfm, for sequencing
Electrical Requirement	110/220 V, 50/60 Hz, single phase	110/220 V, 50/60 Hz, single phase

¹Drain connection is 3" (76.2) weld stub ²Consult media availability chart for specific retentions and types available

³Weights are approximate and assume eight filled stations

Eaton
North America – HQ
 70 Wood Avenue, South
 2nd Floor
 Iselin, NJ 08830

Toll Free: (800) 656-3344
 (North America only)

Voice: (732) 767-4200
 Fax: (952) 906-3706

Eaton Brazil
 Voice: +55 (11) 6465-8780

Eaton China
 Voice: (86-21) 5200-0099

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 Voice: +49-2486-809-0

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 Voice: +65 6825-1668

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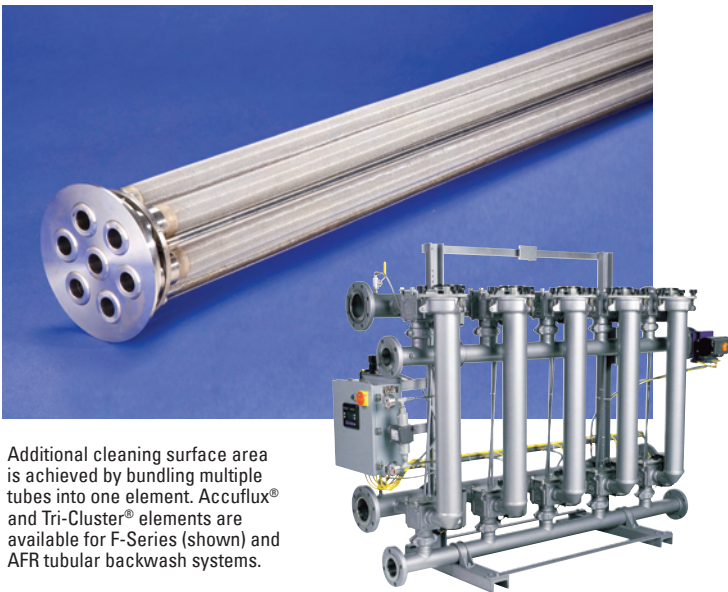


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Cleanable Media

Matching media configuration, retention, and materials to your application is easy when selecting an Eaton tubular backwashing filtration system. Eaton offers media choices from compact configurations—that pack a large amount of surface area into a small amount of space—to simple strainer-type systems for removing larger contaminants.



Additional cleaning surface area is achieved by bundling multiple tubes into one element. Accuflux® and Tri-Cluster® elements are available for F-Series (shown) and AFR tubular backwash systems.

TUBULAR BACKWASHING MEDIA MATERIAL



Wire mesh: 1,650 – 2 microns

Woven screens made of 316 stainless steel with a 316 stainless steel backing for added strength. Provide maximum open area (for high flows), excellent contaminant release properties, and a long operating life.



Fabric: 230 – 1 microns

For the finest filtration applications, fabric media deliver reliable contaminant removal down to 1 micron. Fabric screens are supported by a 316 stainless steel backing and are chemically compatible with most process liquids.



Slotted: 1,600 – 25 microns

Made by winding a continuous triangular-shaped wire around a series of vertical support stringers, these media require no backing. Their inherent strength makes them ideal for reliable performance with abrasive slurries or fibrous materials.



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Tubular Backwashing Filter Media

Media	Particle Retention			Type						Percentage of Open Area	
	Mesh	Inches	Micron	Single	Tri-Cluster	Five-Cluster	Seven-Cluster	Accuflux 7	Accuflux 15		
WIRE MESH	10	0.065	1650	x	x	x				56%	
	20	0.035	890	x	x	x				46%	
	30	0.023	585	x	x	x	x		x	41%	
	40	0.015	380	x	x	x	x		x	36%	
	60	0.009	230	x	x	x	x		x	27%	
	80	0.007	180	x	x	x	x			32%	
	100	0.0055	140	x	x	x	x		x	30%	
	150	0.0046	115	x	x	x	x			37%	
	200	0.0033	84	x	x	x				33%	
	250	0.0024	60	x	x	x		x	x	36%	
	400	0.0018	45	x	x	x		x	x	36%	
	700	0.0012	30	x	x	x		x	x	25%	
	-	-	20						x	x	-
	-	-	10						x	x	-
-	-	5						x	x	-	
-	-	2						x	x	-	
SLOTTED WEDGE WIRE	10	0.063	1600	x	x	x				50%	
	15	0.045	1140	x	x	x				43%	
	20	0.035	890	x	x	x				36%	
	30	0.024	610	x	x	x	x	x		30%	
	40	0.015	380	x	x	x	x	x		20%	
	60	0.009	230	x	x	x	x	x		18%	
	80	0.007	180	x	x	x				15%	
	100	0.006	150	x	x	x	x	x		13%	
	120	0.005	125	x	x	x				11%	
	150	0.004	100	x	x	x				9%	
	200	0.003	75	x	x	x				7%	
	325	0.002	50	x	x	x				5%	
	-	0.001	25	x	x	x	x	x	x		3.2%
FABRIC MESH	60	0.009	230	x	x	x				Percentage of open area not applicable to fabric media.	
	80	0.007	180	x	x	x					
	100	0.0055	140	x	x	x					
	150	0.0046	115	x	x	x					
	250	0.0024	60	x	x	x					
	500	0.0016	40	x	x						
	-	-	25-30	x	x	x					
	-	-	15-20	x	x	x					
-	-	5-10	x	x	x						
-	-	1-3	x	x	x						



- **ACCUFLUX®** - The most efficient way to achieve a low flux rate is to increase active filter surface area. This has been achieved with Eaton's AccuFlux media elements featuring ultra-high surface area, clustered element designs, and new-age media materials. AccuFlux elements are available in configurations with 7 or 15 individual, replaceable filter tubes
- **TRI-CLUSTER®** - Three-tube 1 1/2" diameter media for 40% greater surface area than single element designs, with an economical initial investment
- **Additional Media Options** - Select from single tube to five-cluster or seven-cluster designs to meet your specific demands. All are available in wire mesh, fabric, and slotted wedge wire designs

Eaton
North America – HQ
 70 Wood Avenue, South
 2nd Floor
 Iselin, NJ 08830

Toll Free: (800) 656-3344
 (North America only)

Voice: (732) 767-4200
 Fax: (952) 906-3706

Eaton Brazil
 Voice: +55 (11) 6465-8780

Eaton China
 Voice: (86-21) 5200-0099

Eaton Europe/Africa/Middle East
 Voice: +49-2486-809-0

Eaton Singapore
 Voice: +65 6825-1668

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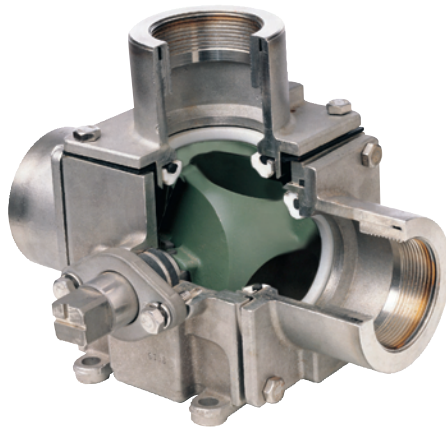
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Tubular Backwashing Filter

Components & Options



Eaton offers tubular backwashing systems with a full spectrum of standard and optional features. You can customize a system to precisely fit the demands of your application and process. Our experienced team can help seamlessly integrate a filtration solution into your new or existing application for optimum performance.



3-way ball valves

To ensure positive sealing and maximum flow, Eaton's F-Series filters and AFC Multiplex Filters feature the industry's best 3-way ball valves. These important components—designed and manufactured exclusively for Eaton systems—were developed specifically for the demands of industrial filtration. The full-ported design reduces pressure drop and requires no additional linkages for actuation.



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TUBULAR BACKWASHING CONTROL OPTIONS



Allen-Bradley MicroLogix

The Allen-Bradley PLC controls the backwash process and includes a PanelView 300 display mounted on the enclosure door. PLC is housed in a NEMA 4 polyester coated carbon steel enclosure. Backwash is initiated by a signal from the supplied differential pressure switch or the interval timer. Automation includes rotary actuators, solenoid valves, differential pressure switch, power light, and disconnect switch.



Siemens S7-200

The Siemens PLC controls the backwash process and includes a display module mounted on the enclosure door. PLC is housed in a NEMA 4 polyester coated carbon steel enclosure. Backwash is initiated by a signal from the supplied differential pressure switch or the interval timer. Automation includes rotary actuators, solenoid valves, differential pressure switch, power light, and disconnect switch.



Semi-Automatic

The semi-automatic design includes rotary actuators, solenoid valves, differential pressure switch, and a terminal strip for wiring to the customer's control system. The enclosure is polyester coated carbon steel and is mounted to the filter frame. Includes mode lights and selector switch (run/stop/backwash).

WIDE RANGE OF AVAILABLE OPTIONS

Eaton tubular backwashing systems can be ordered with a wealth of custom options to precisely match your application and business demands. Examples include:

- ASME code vessels (F-Series housings only)
- Quick couplers on inlet and outlet of body tubes on F-Series housings for easy removal
- Back-to-back station configuration to reduce footprint (available on multiplex units with four or more stations)
- 304 stainless steel frame material
- Butterfly isolation valves on each station (AFR-Series only)
- Electropolished interiors available upon request

System and media sealing

A filtration system that leaks or allows process fluid bypass is not effective.

Eaton sealing systems are designed to ensure that even with minimal training, your operators can easily obtain a perfect seal. We also offer a wide range of elastomer materials to meet the temperature, pressure, and chemical properties of your process stream.



A total process perspective

When you choose Eaton as your filtration partner for a tubular backwashing system, you are choosing an expert. Not just in the science of filtration, but in how it can benefit your manufacturing process and even help you meet specific production objectives. We consider not just the filter, but how it integrates into your entire process. We can show you the impact that a change in filtration can offer your business.

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Eaton
Europe/Africa/Middle East
 Voice: +49-2486-809-0

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Differential pressure system for optimum cleaning timing

Automated systems are designed to initiate a backwash sequence when the differential pressure reaches its set point. A timer switch is also used as a backup.



Drain header trap for efficient backwashing

The addition of a simple, optional drain header trap prevents the drain header from drying out and helps minimize water-hammering during the cleaning cycle.

Diffusers optimize cleaning

For challenging solids removal, Eaton offers two styles of backwash diffusers to effectively distribute backwash flow and ensure removal of all contaminants from the filtration media.



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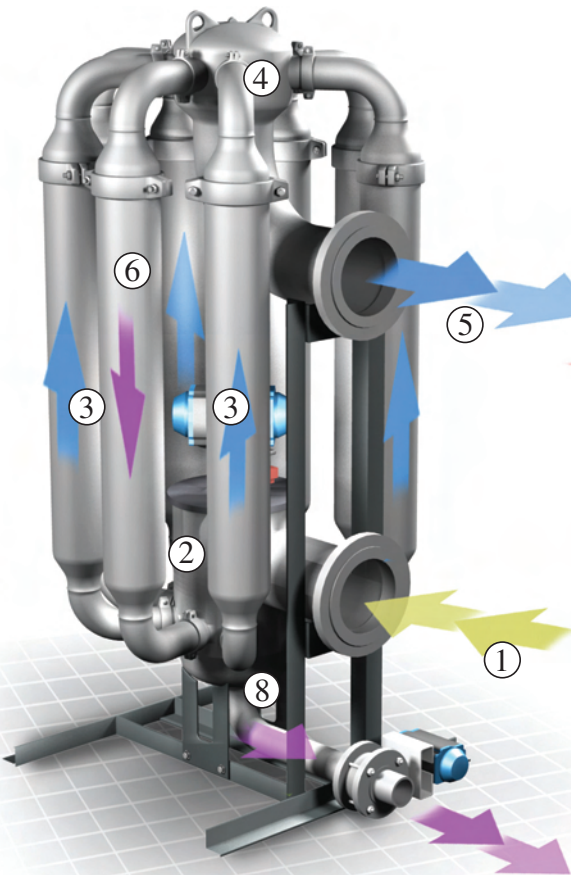
Pressure Tactics

Tubular backwashing systems save you time and money compared with disposable media systems. The permanent media of Eaton's AFR, AFC, and F-Series systems is "cleaned-in-place" using reverse flow technology. System maintenance is significantly reduced and the cost of landfill disposal is eliminated.

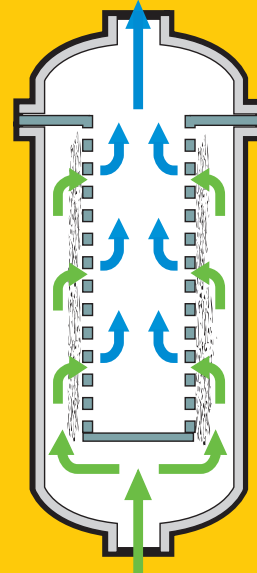
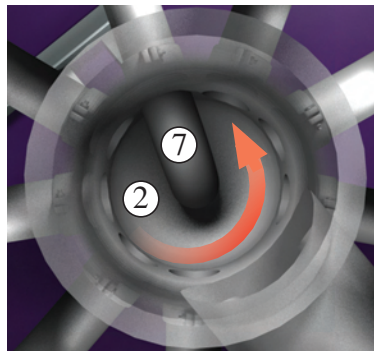
How the AFR-Series Works

The simple, space-saving design of the AFR-Series – with only a single moving part – is ideal for the most demanding applications. The unit features a circular configuration of up to 8 tubes surrounding a central cleaning valve. During the filtration phase, filtrate travels from the inlet (1) to the diverter chamber (2) and up into the filter tubes (3). Cleaned liquids flow to the upper chamber (4) and out the large outlet near the top of the unit (5).

All tubes can be in filtration mode or the diverter mechanism can be rotated so that each individual tube (6) can be backwashed while the others remain in filtration mode.

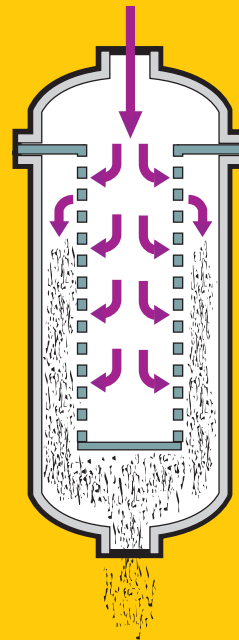


During backwash, a diverter (7) inside the cleaning valve rotates to the tube to be cleaned. This closes the tube to the incoming process liquid and opens it to the atmosphere via the drain line (8). The result causes outlet process liquid to flow in reverse through the element, cleaning it of contaminants and expelling them through the drain (8).



Filtration Cycle

Contaminated material flows up the outside of the filter tubes, through the filter media, and the cleaned fluid is expelled to the top from inside the tube. Debris collects on the outside surface of the screen forming a cake, which facilitates efficient filtration.

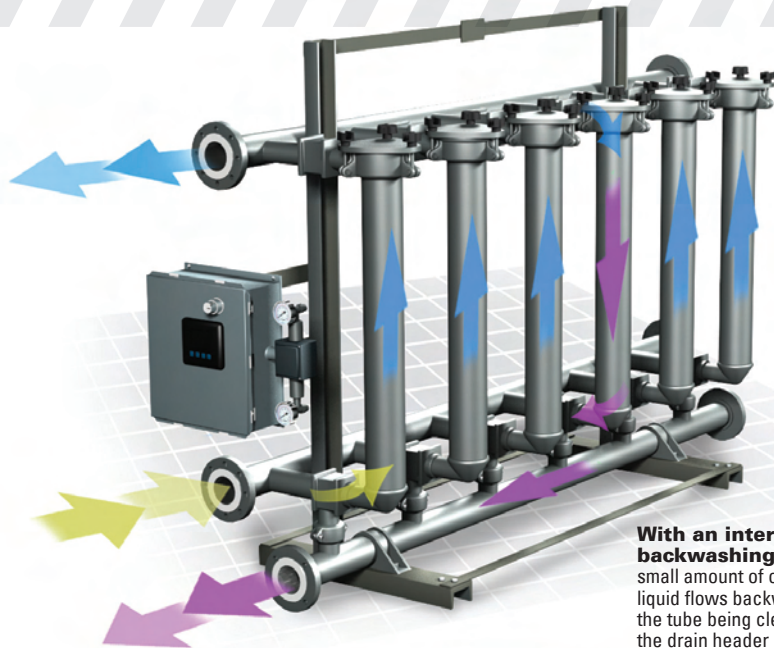


Backwashing Cycle

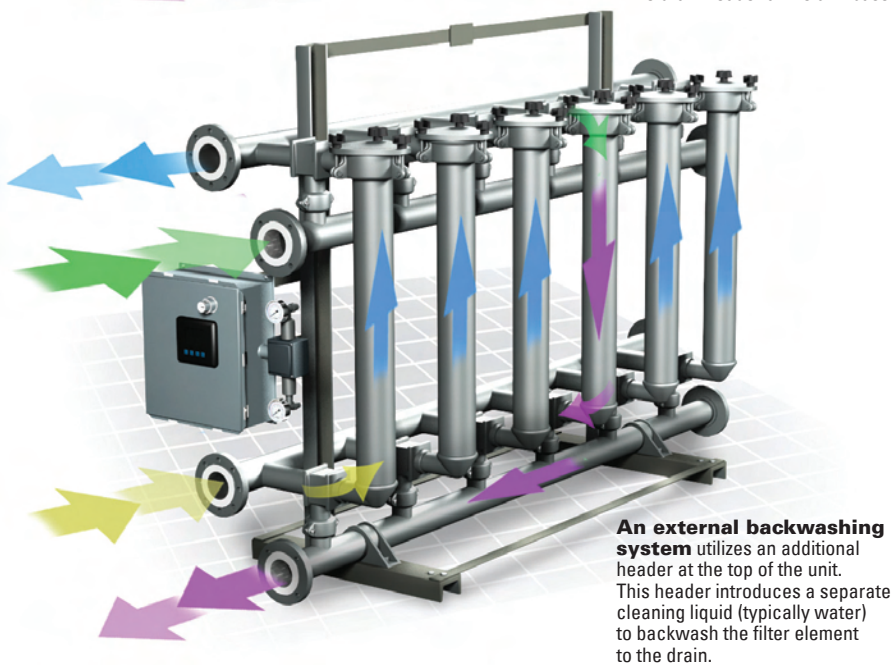
During backwash, triggered by time or pressure differential, the direction of the flow is reversed in the filter tube causing contaminants on the media surface to become dislodged and allowing them to be purged downward and out the drain valve.

TECHNICAL INFORMATION

Tubular Backwashing Systems



With an internal backwashing system, a small amount of clean process liquid flows backward through the tube being cleaned and out the drain header at the unit base.



An external backwashing system utilizes an additional header at the top of the unit. This header introduces a separate cleaning liquid (typically water) to backwash the filter element to the drain.

F-Series and AFC-Series

Eaton's F-Series and AFC-Series are designed for the best possible performance. During backwash, a single tube is taken off-line from the process flow via a three-way valve. Once an element is clean, it is returned to service and the next element may be cleaned. The remaining elements in the filter remain operational throughout this cycle. F-Series and AFC-Series multiplex units consist of 2-20 individual tubes valved in parallel to common inlet, outlet, and drain headers. AFC-Series units are also available in economical single and duo tube configurations, which must be removed from service for manual cleaning.

Internal and external backwashing configurations

Eaton's F-Series and AFC-Series tubular multiplex systems are available in both internal and external backwashing configurations. Internal backwashing systems are designed for processes with system pressure greater than or equal to 45 psi (3.1 bar) and low viscosity process liquids. External backwashing systems are designed for applications with high-value process liquids and/or processes with low operating pressures.

System control

Designed to monitor and operate the backwash cleaning system, Eaton automatic control systems are simple to operate, reliable, and easily maintained. They are set to clean on differential pressure with a timed backup. The design allows field adjustments to suit the demands of the service conditions, ensuring effective cleaning with a minimum use of backwash fluid. Systems are available in automatic intermittent or continuous backwashing modes.



Eaton
North America – HQ
70 Wood Avenue, South
2nd Floor
Iselin, NJ 08830

Toll Free: (800) 656-3344
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Voice: (732) 767-4200
Fax: (952) 906-3706

Eaton Brazil
Voice: +55 (11) 6465-8780

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