Automatic Self-Cleaning Family
Eaton's Filtration business is a global leader in manufacturing filtration products that include automatic self-cleaning and fabricated pipeline strainers, mechanically cleaned filters and strainers, bag and cartridge filtration systems, and gas/liquid separators for industrial customers worldwide. Headquartered in Iselin, New Jersey, Eaton has engineering, along with research and development centers in Portage, Michigan; Sint Niklaas, Belgium; Nettersheim, Germany; and Jining, China. Sales and service centers are located in 11 countries. Eaton supplies high-quality systems, parts, and services to markets that include automotive, food and beverage, ethanol and biofuels, oil and gas, pharmaceutical, power generation, pulp and paper, chemical, paints and coatings, electronics, iron and steel manufacturing, and municipal and industrial water. Eaton is well positioned in key markets and is expanding its global footprint with initiatives in the Americas, EMEA, and Asia Pacific.

Eaton's Filtration business has led the way with technology that meets the growing and rigorous demands of vital industrial sectors. Utilizing a variety of filtration technologies, Eaton has consistently implemented the best solutions available while continually striving to make a difference for customers and the environment.

**EATON FILTRATION SERVICES**
- State-of-the-art water testing lab facility
- Long-term or short-term equipment rental
- Field service - inspections, start-up, maintenance, repair, and replacement
- Field trials
- Extensive network of manufacturer representatives and distributors throughout North America
- Worldwide technical support in international markets
- Team of product specialists dedicated to providing application engineering

**EATON TECHNOLOGIES**
- Customized and modular solutions provide a full range of retention capabilities and construction materials in manual and automated designs
- ISO 9001-2008 quality management
- Standard ASME “U,” “UM” Code, and CRN Stamp
- “N” stamp available
- European standards - DIN/CE/PED
- EPA compliant solutions
- Properly sized components to meet any specified flow rate and retention requirement
- NSF approved coatings
- Ultra low discharge strainer technology that offers reduced purge volumes

**EATON SUSTAINABILITY COMMITMENT**
Eaton is unwavering in our commitment to being sustainable by design—in the way we operate, through the design of our products, and through the energy and climate saving benefits our products deliver. Eaton issues a Sustainability Report as part of its Annual Report, available on www.eaton.com.
Automatic Self-Cleaning Family

Contents

BACKWASHING TECHNOLOGY - FILTERS AND STRAINERS

- 2596-Series Motorized Strainer - Introduction
- 2596 2”– 8” Cast Iron or Stainless Steel
- 2596 10”– 16” Cast Ductile Iron
- 2596 10”– 60” Fabricated Carbon Steel and Stainless Steel
- How it Works - “Revolutionary Arm”
- Technical Data
- Media and Control Systems

- Tubular Backwashing Series - Introduction
- AFC-Series
- F-Series
- AFR-Series
- How it Works - “Pressure Tactics”
- Cleanable Media
- Components and Options

MECHANICALLY CLEANED TECHNOLOGY - FILTERS AND STRAINERS

- Mechanically Cleaned Filters and Strainers - Introduction
- DCF-400, 800, 1600
- DCF-2000
- MCF-824 Series
- MCS-500
- MCS-1500
- How it Works - “Disc Power”
- Cleanable Media and Systems Options
For more than 50 years, Eaton filters and strainers have earned the confidence of thousands of satisfied users. Through innovation and design, we continue to meet the ever-growing and rigorous process demands of industrial manufacturers. In facilities around the globe, you will find Eaton filters and strainers used extensively in a variety of applications.

- Automotive
- Chemical
- Electronics
- Ethanol and Biofuels
- Food and Beverage
- Industrial and Municipal Water
- Manufacturing
- Marine
- Oil and Gas
- Paint and Coatings
- Pharmaceutical
- Power Generation
- Pulp and Paper
Automatic Self-Cleaning Strainers

2596 Series

Continuous flow, simplified maintenance, and worry-free operation

The Eaton 2596 Automatic Self-Cleaning Strainer is a motorized strainer designed for the continuous removal of entrained solids from liquid in pipeline systems. This strainer is ideal for applications that demand uninterrupted flow, a major consideration in plant operations.

Eaton Automatic Self-Cleaning Strainers are available in the following pipe sizes, 2” to 8” cast iron or cast stainless steel, 10” to 60” cast ductile iron and 6” to 60” fabricated carbon steel and stainless steel. Custom designs and exotic materials are available upon request. A wide range of screen designs are offered from \( \frac{1}{8} \)” perf to 200 mesh. They are used for straining cooling water from ponds, lakes or rivers, cooling towers, plant service water, boiler feed water, secondary effluent, irrigation, and municipal water intake for equipment protection.

The determining factors are the level of solids content and the ability to handle the backwash discharge flow. They are a worthwhile investment when loading is high or upset conditions occur. These strainers also provide worry-free operation. Continuous flow is assured, even while the system is being backwashed, providing uninterrupted protection for nozzles, pumps, valves, heat exchangers, and other process equipment.

Frequent cleaning and servicing of manual strainers is costly, and if not properly done, serious disruptions to the entire piping system can occur. Eaton Automatic Self-Cleaning Strainers will significantly reduce these maintenance costs. They are ideal replacements for either simplex or duplex manual strainers.

MODEL 2596 - TYPICAL APPLICATIONS

- Automatic self-cleaning strainers are used to strain fresh, brackish, or salt intake water for plant services such as cooling, process, and fire protection. The strainers allow water to be recycled within the plant, reducing costs.
- Process Industry—Protect heat exchangers, pumps, valves, and spray nozzles.
- Power Industry—Pump seal protection and cooling water.
- Pulp and Paper Industry—Remove and separate bark and chips for recycling and prevent clogging of nozzles.
- Sewage and Water Treatment Plants—Strain secondary effluent prior to discharge and provide clean plant service water.
- Primary Metal Industry—Provide clean water for quenching, descaling, and blast furnace cooling.

Eaton

Powering Business Worldwide
MODEL 2596 Automatic Self-Cleaning Strainers

MODEL 2596 FEATURES / BENEFITS

- **Quality Construction:** Eaton Automatic Self-Cleaning Strainers are designed and constructed in accordance with ASME Section VIII, Division 1. ASME Code Stamp is available. Seismic qualification is also available.

- **idL™ Seal:** The unique Eaton idL Shaft Seal prevents trouble-some leakage. This special quad seal means that the strainer always stays dry and clean in service with no process media leaking down the sides of the strainer.

- **Ease of Maintenance:** Unitized modular assembly—the motor, gear reducer, cover, and complete internal operating mechanism lift off as a unit, making all components easily accessible. This greatly simplifies maintenance and reduces costs.

- **Low Backwash Fluid Requirements:** Only a small portion of system flow is used during backwash due to the efficient hydraulic design.

- **Choice of Screen Elements:** DuraWedge®, Perforated, or Mesh elements.

- **Minimal Power Consumption:** 1/4 HP drive motor in 2” through 16”, 1/3 HP in 18” through 30”, 1/3 HP in 30”, 1 HP in 36” through 42”, and 2 HP in 48”.

- **No Bypass of Contaminants:** 2” to 8” element caps are epoxy sealed to screen media. O-ring seals on body cover prevent bypass around element. 10” to 60” element caps are epoxy sealed to screen media. A machined cover and body provide metal-to-metal sealing and prevents bypass around the element. For those elements whose retention is below 300 micron (60 mesh) an elastomer seal is provided on top and bottom of the element.

- **Cover Seat Design:** O-ring permits resealing without time-consuming gasket replacements and adjustment.

- **Manual Operation if Required:** Utilizing extended shaft.

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**Cenpeller™ Technology**
A common problem in many automatic self-cleaning strainers is inefficient backwashing due to debris lodged in the strainer element. The Model 2596 2”- 8” strainer features a unique vane plate positioned at the inlet of the strainer element where it contacts the process media before it enters the element. The vane causes the incoming liquid to move in a circular motion forcing the debris to lay up against the surface of the strainer element rather than lodging in the element’s openings. Lodged debris can negatively impact the differential pressure across the strainer, resulting in a shut down of the strainer and manual cleaning of the element. Cenpeller Technology helps prevent this situation and delivers easier and more efficient backwashing.

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**MODEL 2596 APPLICATION CONSIDERATIONS**

For coarse straining applications, such as raw water intakes from lakes, ponds, and streams, the convoluted perforated elements will perform well and offer the most economical unit pricing.

On applications in which pre-screening of the fluid has been performed, but finer filtering of the fluids is desired, the sinter-bonded mesh element may be selected.

On applications in which the fluid being strained encounters fibrous materials, the DuraWedge element will minimize the impact of the fibers stapling to the screen.

**Debris:** Cleaning the straining element is accomplished by using the pressure differential between line pressure and atmosphere. During the cleaning cycle, when the backwash valve is opened to atmosphere, a portion of the strained fluid reverses flow back across the isolated section of element, lifts off the debris, and ejects it out of the strainer.

Sticky or greasy debris are more difficult to backwash and may require longer backwash cycle durations. Sand, dirt, and pipe scale should backwash easily. The quantity of debris coming into the strainer also can be a problem. Ensure that the volume of the suspended solids does not exceed 200 ppm or 0.02 percent. If the application requires heavier loading consult Eaton.

**Backwash Requirements:** The quantity of fluid required to clean a straining element is dependent upon the type and quantity of debris. Under normal conditions, approximately five percent of the line flow will be used for cleaning of the straining element during the cleaning cycle. To minimize the loss of fluid through the backwash, it is recommended that a manual throttling valve be added downstream of the automated valve.

**Pressure and Temperature**
- Cast Iron is rated at 200 psi @ 150°F.
- Ductile Iron is rated at 150 psi @ 150°F.
- Cast Stainless Steel is rated 275 psi @ 150°F.
- Fabricated units are rated at 150 psi @ 150°F. However, other ratings are available, consult Eaton.
- The minimum operating pressure is 20 psi
Eaton’s Model 2596 Automatic Self-cleaning Cast Pipeline Strainers are available in 2”, 3”, 4”, 6”, and 8” sizes. A 4”L size is also available which allows for greater flow rates. The Model 2596 is recognized across industries for its continuous flow, simplified maintenance, and worry-free operation.

**FEATURES / BENEFITS**

- Flow rates up to 1800 gpm (409 m³/hr)
- A broad selection of screen options
- Automatic backwashing for operator-free service and minimal backwash effluent
- Exclusive idL™ Seal for leak free service
- Unitized modular assembly for easy maintenance
- Cenpeller technology for more efficient and complete backwashing
- Cast iron or stainless steel construction
- High-efficiency motor

**OPTIONS**

25 micron and 40 micron stainless steel element with a flow rate of up to 800 gpm

The Eaton Model 2596 Automatic Self-cleaning Strainer is designed for the continuous removal of entrained solids from liquids in pipeline systems. With an automated control system monitoring the strainer operation, cleaning is accomplished by an integral backwash system. A small portion of the screen element is isolated and cleaned by reverse flow while the remaining screen area continues to strain—providing uninterrupted flow. This efficient design uses only a small amount of the liquid being strained to carry debris away from the strainer element.

The Model 2596 features the idL™ shaft seal that positively prevents leakage from the backwash shaft at the top of the strainer. This unique quad seal keeps the exterior of the strainer dry and prevents external leakage or weeping of the process media down the sides of the strainer.

The 2" to 8" size strainers feature Eaton’s Cenpeller™ technology, which directs incoming liquid into a circular flow—forcing the debris to lay up against the surface of the strainer element in a way that makes backwashing easier and more efficient and greatly reduces the need for manual cleanouts.

To simplify maintenance the Model 2596 features a unitized modular assembly. The motor, gear reducer, and the internal operating mechanism are housed within the strainer cover and lift off as a unit. This makes all components easily accessible and reduces associated maintenance costs.
Model 2596 2” to 8” Automatic Self-Cleaning Strainers

Model 2596 2” - 8” Flow Rates

Pressure drop data indicates results to be expected with clean water, under normal flows with standard straining media and in clean strainer.

Application Limits

- Cast Iron Class 125 Flange (-20° to 150 °F) 200 psi (2” - 8”)
- Cast 316 Stainless Steel Class 150 Flange (-20° to 100 °F) 275 psi (2” - 4”)
- 6” - 8” Fabricated Class 150 Flange (150 °F) 150 psi

DuraWedge® Element
DuraWedge is a nonclogging, rugged stainless steel element for the most demanding applications. It is constructed from V-shaped profile wire. A wide range of opening sizes is available.

Convoluted Element
A sturdy, economical stainless steel element for general service use. Available perforated openings of 1/8", 1/16", and 1/32". Available mesh sizes of 20, 40, 60, 80, 100, 150, and 200 mesh.

Low Micron Element
Stainless steel with a high degree of permeability will substantially lower pressure differential, increase flow capacity, and extend the filter life. Sintered mesh construction prevents media migration into processed product. Available in 25µ and 40µ retention.

STRAINER MEDIA

Convoluted Element
A sturdy, economical stainless steel element for general service use. Available perforated openings of 1/8", 1/16", and 1/32". Available mesh sizes of 20, 40, 60, 80, 100, 150, and 200 mesh.

Low Micron Element
Stainless steel with a high degree of permeability will substantially lower pressure differential, increase flow capacity, and extend the filter life. Sintered mesh construction prevents media migration into processed product. Available in 25µ and 40µ retention.

For more information, please email us at filtration@eaton.com or visit www.eaton.com/filtration

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Eaton’s Model 2596 Automatic Self-cleaning Cast Pipeline Strainers are available in 10”, 12”, 14” and 16” sizes. The Model 2596 is recognized across industries for its continuous flow, simplified maintenance, and worry-free operation.

**FEATURES / BENEFITS**

- Flow rates up to 6500 gpm (1476 m³/hr)
- A broad selection of screen options
- Automatic backwashing for operator-free service and minimal backwash effluent
- Exclusive idL™ Seal for leak free service
- Unitized modular assembly for easy maintenance
- Cast ductile iron construction

The Eaton Model 2596 Automatic Self-Cleaning Strainer is designed for the continuous removal of entrained solids from liquids in pipeline systems. With an automated control system monitoring the strainer operation, cleaning is accomplished by an integral backwash system. A small portion of the screen element is isolated and cleaned by reverse flow while the remaining screen area continues to strain—providing uninterrupted flow. This efficient design uses only a small amount of the liquid being strained to carry debris away from the strainer element.

The Model 2596 features the idL™ shaft seal that positively prevents leakage from the backwash shaft at the top of the strainer. This unique quad seal keeps the exterior of the strainer dry and prevents external leakage or weeping of the process media down the sides of the strainer.

To simplify maintenance the Model 2596 features a unitized modular assembly. The motor, gear reducer, and the internal operating mechanism are all housed within the strainer cover and lift off as a unit. This makes all components easily accessible and reduces associated maintenance costs.
Model 2596 10” to 16” Automatic Self-Cleaning Strainers

**Model 2596 10” - 16” Flow Rates**

<table>
<thead>
<tr>
<th>Flow Rate (Water) m³/hr</th>
<th>Differential Pressure, PSI</th>
<th>Differential Pressure, Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 +13+14+16”</td>
<td>0.114</td>
<td>0.28</td>
</tr>
<tr>
<td>12+13+14+16”</td>
<td>0.227</td>
<td>0.55</td>
</tr>
<tr>
<td>14+15+16”</td>
<td>0.54</td>
<td>1.48</td>
</tr>
<tr>
<td>16+17+16”</td>
<td>0.91</td>
<td>2.12</td>
</tr>
</tbody>
</table>

Pressure drop data indicates results to be expected with clean water, under normal flows with standard straining media and in clean strainer.

**Application Limits**

- Ductile Iron Class 125 Flange (-20° to 150°F) 150 psi

**Application Limit 16” Size**

- Ductile Iron Class 125 Flange (-20° to 150°F) 150 psi Based on ASME Section VIII, Div. 1. Lower pressure ratings at higher temperatures

### Approximate Dimensions (inches)

<table>
<thead>
<tr>
<th>10”</th>
<th>12”</th>
<th>14”</th>
<th>16”</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30</td>
<td>36</td>
<td>44</td>
</tr>
<tr>
<td>B</td>
<td>7 1/4</td>
<td>9 1/4</td>
<td>11 1/4</td>
</tr>
<tr>
<td>C</td>
<td>11 1/4</td>
<td>14 1/4</td>
<td>16 1/4</td>
</tr>
<tr>
<td>D</td>
<td>13 1/4</td>
<td>16 1/4</td>
<td>18 1/4</td>
</tr>
<tr>
<td>E</td>
<td>36</td>
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<td>48</td>
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<tr>
<td>F</td>
<td>8 1/2</td>
<td>10 1/2</td>
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<td>G</td>
<td>90</td>
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<tr>
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<td>M</td>
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<tr>
<td>P</td>
<td>12 1/2</td>
<td>14 1/2</td>
<td>16 1/2</td>
</tr>
<tr>
<td>L</td>
<td>24 1/2</td>
<td>24 1/2</td>
<td>29 1/2</td>
</tr>
<tr>
<td>Dry</td>
<td>1,840</td>
<td>1,880</td>
<td>2,810</td>
</tr>
<tr>
<td>Wet</td>
<td>2,615</td>
<td>2,675</td>
<td>4,360</td>
</tr>
<tr>
<td>Cover</td>
<td>705</td>
<td>705</td>
<td>1,050</td>
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</table>

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FEATURES / BENEFITS
- Flow rates up to 35,000 gpm (7949 m³/hr)
- A broad selection of screen options
- Automatic backwashing for operator-free service and minimal backwash effluent
- Exclusive idL™ Seal for leak free service, available up to 24” only
- Unitized modular assembly for easy maintenance
- Fabricated carbon steel construction

OPTIONS
- Various grades of stainless steel, copper nickel, monel, and other exotic materials of construction
- ASME Section VIII, Div. 1. code stamp available.
- Flanged, screwed, or socket weld backwash connections
- Internal and external epoxy paint or other coatings, upon request, on all carbon steel components for fresh water service applications
- Custom designs are available upon request

The Eaton Model 2596 Automatic Self-Cleaning Strainer is designed for the continuous removal of entrained solids from liquids in pipeline systems. With an automated control system monitoring the strainer operation, cleaning is accomplished by an integral backwash system. A small portion of the screen element is isolated and cleaned by reverse flow while the remaining screen area continues to strain—providing uninterrupted flow. This efficient design uses only a small amount of the liquid being strained to carry debris away from the strainer element.

The Model 2596 features the idL™ shaft seal that positively prevents leakage from the backwash shaft at the top of the strainer. This unique quad seal keeps the exterior of the strainer dry and prevents external leakage or weeping of the process media down the sides of the strainer.

To simplify maintenance the Model 2596 features a unitized modular assembly. The motor, gear reducer, and the internal operating mechanism are housed within the strainer cover and lift off as a unit. This makes all components easily accessible and reduces associated maintenance costs.
10” to 36” Fabricated Carbon Steel and Stainless Steel

Note:
K= Diameter Bolt Hole (4) Required 90˚ Apart
L= Diameter Bolt Circle

Dimensions are for reference only. For installation purposes, request certified drawings.

<table>
<thead>
<tr>
<th>Approximate Dimensions (in)</th>
<th>Approximate Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>10”</td>
<td>38</td>
</tr>
<tr>
<td>12”</td>
<td>42</td>
</tr>
<tr>
<td>14”</td>
<td>44</td>
</tr>
<tr>
<td>16”</td>
<td>44</td>
</tr>
<tr>
<td>18”</td>
<td>48</td>
</tr>
<tr>
<td>20”</td>
<td>54</td>
</tr>
<tr>
<td>24”</td>
<td>54</td>
</tr>
<tr>
<td>30”</td>
<td>64</td>
</tr>
<tr>
<td>36”</td>
<td>84</td>
</tr>
</tbody>
</table>

Sizes 10” Thru 60”

Application Limits
- Fabricated strainers are designed within the limits of the customer’s specifications and design criteria along with any applicable code requirement, i.e. ASME Section VIII Div. 1.

Specific descriptions and construction details illustrated may vary slightly from equipment furnished. We reserve the right to review or discontinue equipment or design features without notice. We recommend that you review performance and application data with us prior to final design.
Model 2596 Strainer: How it Works

The debris-laden fluid enters the strainer’s bottom chamber (1) where the line velocity is reduced. Flow continues upward, passing radially through the sealed screen element, (2) which traps debris on the inside of the screen. The flow is uninterrupted and the strained fluid flows to the outer annulus (3) and exits through the outlet nozzle (4).

Backwash cleaning is accomplished by utilizing the pressure differential between line pressure and atmosphere. A high-efficiency, full flow backwash arm (5) extending the entire length of the screen element, rotates slowly inside of the screen and is piped to atmosphere. The port shoe (6) is in proximity to the screen and its opening is equivalent to the “debris collector” sections created by the convolutions and/or vertical collector bars in the element.

When cleaning is required the automatic backwash valve opens the system to atmosphere, causing a high velocity reverse flow across the isolated section of the screen. Dirt and debris are dislodged from this segment of the screen into the backwash arm and out the strainer through the backwash piping (7). During the backwashing cycle the main flow is uninterrupted and continues to be strained in the normal manner.

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.
TECHNICAL INFORMATION
Model 2596 Automatic Self-Cleaning Strainers

Sizes 2” Thru 8”
Cast Construction
Model 2596
Automatic
Self-Cleaning
Pipeline
Strainers are available for six different pipeline sizes. The 4”L size is designed for applications where the combination of flow rate and open area requirements may be too great for a standard 4” size. Flow rates up to 1,800 GPM.

2596 10” to 18” Cast Metal models provide flow rates up to 6500 GPM.

Model 2596 Flow Rate Comparison Chart

<table>
<thead>
<tr>
<th>Size &amp; Construction</th>
<th>GPM Flow Rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2” cast</td>
<td>50 - 120</td>
</tr>
<tr>
<td>3” cast</td>
<td>100 - 260</td>
</tr>
<tr>
<td>4”/4L” cast</td>
<td>170 - 450</td>
</tr>
<tr>
<td>6” cast</td>
<td>370 - 1000</td>
</tr>
<tr>
<td>8” cast</td>
<td>500 - 1900</td>
</tr>
<tr>
<td>10” cast</td>
<td>900 - 2800</td>
</tr>
<tr>
<td>12” cast</td>
<td>1200 - 4000</td>
</tr>
<tr>
<td>14” cast</td>
<td>1600 - 5000</td>
</tr>
<tr>
<td>16” cast</td>
<td>2000 - 6500</td>
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<tr>
<td>10” fabricated</td>
<td>900 - 2800</td>
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<tr>
<td>12” fabricated</td>
<td>1200 - 4000</td>
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<tr>
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<tr>
<td>18” fabricated</td>
<td>2500 - 8500</td>
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<tr>
<td>20” fabricated</td>
<td>2900 - 10,200</td>
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<tr>
<td>24” fabricated</td>
<td>3200 - 15,000</td>
</tr>
<tr>
<td>30” fabricated</td>
<td>5000 - 24,000</td>
</tr>
<tr>
<td>36” fabricated</td>
<td>7800 - 35,000</td>
</tr>
</tbody>
</table>

* Pressure drop data is approximate and indicates results to be expected with clean water, under normal flows with standard straining media and in clean strainer. For DuraWedge and sinter bonded elements, consult Eaton.

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Eaton Automatic Control Systems (ACS) are specifically designed to monitor and operate the backwash cleaning system of Eaton Automatic Strainers. Simple to operate, reliable, and easily maintained. The design allows field adjustments to suit the demands of the service conditions, ensuring effective cleaning with a minimum use of backwash fluid.

**STANDARD CONTROL SYSTEM FEATURES**

**ACS-1S** This system features a NEMA 4 rated (water and dust tight) panel box complete with adjustable timer, display differential pressure override, 10 amp control relay for backwash valve activation, display lights to indicate Power On, Backwash Valve Open, and High Differential Pressure. A selector switch is also included to manually control the backwash valve functions of Off-On-Auto. The panel also has contact terminals for a motor starter and an external alarm connection. The panel requires 110 VAC input, CANBOA/USA UL listed. The panel has a differential pressure switch and an electrically actuated ball valve that controls the backwash function.

**ACS-2S** This system has all of the features of the ACS-1 and includes a motor starter in addition to the other standard equipment.

**ACS-3S** This system has all of the features of the ASC-2 system and includes a 460V/120V step down transformer.

Optional designs to meet specific requirements with special wiring arrangements, panel boxes (NEMA 7, 9), control valves, and air actuation among others, can be furnished.

**MODES OF OPERATION**

**The automatic intermittent mode** is adjustable by setting the timer in the panel that controls the frequency of backwashing and the “open” time of the backwash valve. Field adjustments should be made to suit the application. A differential pressure switch to initiate backwashing under high load conditions also can be adjusted.

**The continuous backwashing mode** is recommended where the backwashing fluid can be recycled to its source or when very high solid loadings are encountered.

In both the automatic intermittent and continuous backwashing modes the backwash arm continuously rotates at a low 2-4 RPM.

**COMPONENTS**

**Motors** An electric motor and gear box are furnished as part of the strainer. The standard TEFC motor is 120V/220V, Single phase 60 Hz, or 230V/460V Three Phase 60 Hz, at customer option. Other motors are available.

**Differential Pressure Switch** A diaphragm-type differential pressure switch is a standard component in all Control Systems. It compensates for sudden high pressure loading by overriding the time cycle and initiating backwashing. The differential pressure setting as well as a delay time setting can be adjusted. Two psid above the clean reading is the differential setting recommended. A delay timer will continue the cleaning to customer’s requirement. The time delay can be adjusted from 0.6 seconds to 24 hours, depending on system’s needs.

**Backwash Valve** Electrically actuated (115 VAC/60 Hz) ball valves are also standard in the Control Systems. Materials of construction are suitable for water service. Other materials, valve types and pneumatic actuation are optional.

**Backwash Valve Sizes**

<table>
<thead>
<tr>
<th>Strainer Size</th>
<th>Valve Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;, 3&quot;, 4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>6&quot;, 8&quot;</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>10&quot;, 12&quot;, 14&quot;, 16&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>18&quot;, 20&quot;, 24&quot;, 30&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>36&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>48&quot;, 60&quot;</td>
<td>8&quot;</td>
</tr>
</tbody>
</table>
**Eaton offers a full range of element choices for Automatic Strainers. All are manufactured to the toughest industry standards and are designed for long term use in even the most demanding applications.**

**DuraWedge® Element**

DuraWedge® is a nonclogging, rugged stainless steel straining element constructed from V-shaped profile wire. Available only from Eaton.

**FEATURES**

- Two point contact straining from the “smooth” side prevents plugging or packing of debris and particles.
- Effective dislodging of dirt, debris, and fibers from the element during backwash. This is accomplished by the increased velocity of the reverse flow (during backwash) from the “open side” of the vee.
- Fiber stapling is reduced because of smooth surfaces and the design contour of the profile wire.
- Vertical collector bars form spaces to accumulate debris and dirt, preventing snow plowing of materials by the rotating backwash arm and port shoe.
- No bypass. Elements are sealed.
- Longer service life. All-welded design with circumferential reinforcing bands provides structural integrity.

**DuraWedge Media Selection**

<table>
<thead>
<tr>
<th>Strainer Size</th>
<th>Standard Openings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;, 3&quot;, 4&quot;, 6&quot;, 8&quot;</td>
<td>⅛&quot;, ⅛&quot;, ⅛&quot;, ⅛&quot;, 0.015&quot;</td>
</tr>
<tr>
<td>10&quot;, 12&quot;, 14&quot;, 16&quot;</td>
<td>5&quot;, 5&quot;, 5&quot;, 5&quot;, 0.015&quot;, 0.009&quot;</td>
</tr>
<tr>
<td>18&quot;, 20&quot;, 24&quot;</td>
<td>5¹⁄₁₆&quot;, 5¹⁄₁₆&quot;, 5¹⁄₁₆&quot;, 5¹⁄₃₂&quot;, 0.015&quot;, 0.009&quot;</td>
</tr>
</tbody>
</table>

**Convoluted Element**

This is a sturdy, economical stainless steel element for general service use. It is ideal in applications where leaves, twigs, and large amounts of miscellaneous debris are encountered. The generous spaces created by the convolutions provide an area for the debris to collect. “Packing” does not occur due to the gradual contoured shape of the convolutions. During backwashing the debris is easily dislodged and carried away through the backwash arm and out of the strainer.

**FEATURES**

- Circumferential reinforcing bands for added resistance to pressure and flexing ensures long service life.
- Cartridge design for easy removal and cleaning.
- Convoluted sections are individually isolated by the port shoe during backwash for increased cleaning efficiency.
- No snow plowing. Convoluted profile provides collection spaces for debris.
- Extended area design offered only by Eaton.
- No bypass.
- Sinter bonded mesh available - An Eaton exclusive.

**Convoluted Media Selection**

<table>
<thead>
<tr>
<th>Strainer Size</th>
<th>Standard Openings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convoluted Perf Element</td>
<td>5&quot;, 5&quot;, 5&quot;, 5&quot;, 0.015&quot;, 0.009&quot;</td>
</tr>
<tr>
<td>2&quot;, 3&quot;, 4&quot;, 6&quot;, 8&quot;</td>
<td>5¹⁄₁₆&quot;, 5¹⁄₁₆&quot;, 5¹⁄₁₆&quot;, 5¹⁄₃₂&quot;, 0.015&quot;, 0.009&quot;</td>
</tr>
<tr>
<td>10&quot;, 12&quot;, 14&quot;, 16&quot;</td>
<td>5¹⁄₃₂&quot;, 5¹⁄₆&quot;, 5¹⁄₈&quot;, 0.015&quot;, 0.009&quot;</td>
</tr>
<tr>
<td>18&quot;, 20&quot;, 24&quot;</td>
<td>5¹⁄₃₂&quot;, 5¹⁄₆&quot;, 5¹⁄₈&quot;, 0.015&quot;, 0.009&quot;</td>
</tr>
</tbody>
</table>

**Convoluted Mesh Element**

All Sizes 20 mesh (0.015") to 200 mesh (0.003")

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Basic Sizing Guidelines
1. Ensure that the pipeline flow velocity falls within the standard design range of the strainer.
2. Select the correct screen and opening size, do not make smaller than necessary.
3. The quantity, type, and nature of debris to be removed are considered.
4. The strainer meets the design pressure and temperature requirements of the pipeline.
5. Backwash line should discharge to atmosphere in close proximity to the strainer.

Standard Design Parameters
1. Self-cleaning strainers have a design flow range where the unit will best perform its two main functions, straining and self-cleaning.
2. Inlet flow velocity to the strainer should be in the 6 to 10 feet per minute range. There may be applications where the operating flow will fall outside the normal design range. When this occurs, please contact Eaton for recommendations.
3. Minimum operating pressure is 20 psi for standard units. Consult Eaton for equipment options when the system pressure is less than 20 psi.
4. Suspended solids should not exceed 200 ppm or 0.02% of volume (see below). For heavier loadings consult Eaton.

STRAINER SIZING CHART

SUSPENDED SOLIDS SIZING CHART AND CONVERSION TABLE

<table>
<thead>
<tr>
<th>PPM</th>
<th>%</th>
<th>Lbs. / 1000 Gal.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10000</td>
<td>1.0</td>
<td>80</td>
</tr>
<tr>
<td>8000</td>
<td>0.8</td>
<td>60</td>
</tr>
<tr>
<td>6000</td>
<td>0.6</td>
<td>40</td>
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<td>4000</td>
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<td>2000</td>
<td>0.2</td>
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EATON
Powering Business Worldwide
### TECHNICAL DATA

**Model 2596 Automatic Self-Cleaning Strainers**

#### VOLUME CONVERSION FACTORS

<table>
<thead>
<tr>
<th>To Obtain:</th>
<th>Multiply By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Gallon</td>
<td>Imperial Gallon</td>
</tr>
<tr>
<td>Pounds/Gal</td>
<td>Kilogram Sq. Cm</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Inch Water</td>
</tr>
<tr>
<td>Foot Water</td>
<td>Inch Mercury</td>
</tr>
<tr>
<td>Nitro Mercury</td>
<td>Bar</td>
</tr>
</tbody>
</table>

#### PRESSURE CONVERSION FACTOR

To convert from one unit to another, locate the starting unit in the left column. Multiply by factor horizontally to the right under desired unit.

#### PRESSURE CONVERSION FACTOR

<table>
<thead>
<tr>
<th>To Obtain:</th>
<th>Multiply By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pounds/Sq. In</td>
<td>Pounds/Sq. Ft</td>
</tr>
<tr>
<td>Kilogram/Sq. Cm</td>
<td>Atmosphere</td>
</tr>
<tr>
<td>Inch Water</td>
<td>Foot Water</td>
</tr>
<tr>
<td>Inch Mercury</td>
<td>mm Mercury</td>
</tr>
<tr>
<td>Bar</td>
<td></td>
</tr>
</tbody>
</table>

#### FLOW VELOCITY CONVERSION FACTORS

Velocity = GPM X 0.4085 in Ft./Sec = 10^2 in Inches

#### FLOW CONVERSION FACTORS

- **M/hr**: 3.671 I.G.M.
- **I.G.P.M.**: 41.14 Barrels/Day
- **T.P.H.**: 3.74 I.G.M.
- **I.G.P.M.**: 1.2 U.S. G.P.M.
- **I.G.P.M.**: 4.54 Liters/Min
- **US G.P.M.**: 0.833 I.G.P.M.
- **Barrel**: 35 Imp. Gallons
- **Barrel**: 42 U.S. Gallons

#### VISCOSITY EQUIVALENTS

<table>
<thead>
<tr>
<th>SSU (Saybolt Seconds Universal)</th>
<th>Centipoise</th>
<th>Engler Degrees 20°C</th>
<th>Redwood Standard</th>
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<tr>
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<td>10000</td>
<td>3600</td>
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</table>

#### STRAINER BASKET OPENING EQUIVALENTS

<table>
<thead>
<tr>
<th>Mesh</th>
<th>Inches</th>
<th>Millimeters</th>
<th>Microns</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>0.027</td>
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<td>20</td>
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<td>862</td>
</tr>
</tbody>
</table>

Tighter retentions available, consult Eaton.

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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.

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.

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 FEATURES & BENEFITS

- Tight retentions (as low as 2 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)
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.

For liquid filtering applications that require unattended operation, maximum uptime, and solids removal from 2 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 2 micron—in a compact one-square-meter footprint.

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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 2 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, 2200 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

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 1,000 psi and high viscosity applications
### AFC-Series Tubular Backwashing Filter

#### Single and Duo

<table>
<thead>
<tr>
<th></th>
<th>1100</th>
<th>1500</th>
<th>2200</th>
<th>3300</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body Inlet/Outlet Size - in (mm)</strong></td>
<td>1 (25.4)</td>
<td>1.5 (38.1)</td>
<td>2 (50.8)</td>
<td>3 (76.2)</td>
</tr>
<tr>
<td><strong>Body Diameter - in (mm)</strong></td>
<td>2.675 (73)</td>
<td>3.5 (89.9)</td>
<td>4.5 (114.3)</td>
<td>4.5 (114.3)</td>
</tr>
<tr>
<td><strong>Screen Length - in (mm)</strong></td>
<td>12 (304.8)</td>
<td>24 (381)</td>
<td>18 (457.2)</td>
<td>18 (457.2)</td>
</tr>
<tr>
<td><strong>Element Styles Available</strong></td>
<td>2 (50.8) dia. single</td>
<td>2.25 (57.1) dia. single</td>
<td>3.25 (82.8) dia. single</td>
<td>3.25 (82.8) dia. single</td>
</tr>
<tr>
<td><strong>Pressure Rating</strong></td>
<td>150 (10.3) psi</td>
<td>250 (17.2) psi</td>
<td>150 (10.3) psi</td>
<td>150 (10.3) psi</td>
</tr>
<tr>
<td><strong>Total Volumetric Capacity - Model #s</strong></td>
<td>1112</td>
<td>1118</td>
<td>1524</td>
<td>1536</td>
</tr>
<tr>
<td><strong>Single Unit - gal (l)</strong></td>
<td>0.4 (1.5)</td>
<td>0.5 (1.9)</td>
<td>1.3 (4.9)</td>
<td>1.3 (4.9)</td>
</tr>
<tr>
<td><strong>Duo-Unit - gal (l)</strong></td>
<td>0.8 (3.0)</td>
<td>1 (3.8)</td>
<td>2.6 (9.8)</td>
<td>2.6 (9.8)</td>
</tr>
<tr>
<td><strong>Single Unit Weight - lbs (kg)</strong></td>
<td>15 (6.8)</td>
<td>25 (11.3)</td>
<td>35 (15.9)</td>
<td>40 (18.1)</td>
</tr>
<tr>
<td><strong>Duo Unit Weight - lbs (kg)</strong></td>
<td>80 (36.3)</td>
<td>110 (49.9)</td>
<td>140 (63.5)</td>
<td>180 (81.6)</td>
</tr>
<tr>
<td><strong>Element Styles Available</strong></td>
<td>2 (50.8) diameter single</td>
<td>10 (254.0)</td>
<td>12 (304.8)</td>
<td>12 (304.8)</td>
</tr>
<tr>
<td><strong>Screen Length - in (mm)</strong></td>
<td>18 (457.2)</td>
<td>36 (914.4)</td>
<td>36 (914.4)</td>
<td>36 (914.4)</td>
</tr>
</tbody>
</table>

#### Multiplex

<table>
<thead>
<tr>
<th></th>
<th>1100</th>
<th>2200</th>
<th>3300</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body Inlet/Outlet Size - in (mm)</strong></td>
<td>1 (25.4)</td>
<td>2 (50.8)</td>
<td>3 (76.2)</td>
</tr>
<tr>
<td><strong>Body Diameter - in (mm)</strong></td>
<td>2.675 (73)</td>
<td>4.25 (114.3)</td>
<td>4.25 (114.3)</td>
</tr>
<tr>
<td><strong>Screen Length - in (mm)</strong></td>
<td>18 (457.2)</td>
<td>36 (914.4)</td>
<td>36 (914.4)</td>
</tr>
<tr>
<td><strong>Element Styles Available</strong></td>
<td>2 (50.8) diameter single</td>
<td>3.25 (82.3) diameter single</td>
<td>3.25 (82.3) diameter single</td>
</tr>
<tr>
<td><strong>Pressure Rating</strong></td>
<td>150 (10.3) psi</td>
<td>1000 (101.3) psi</td>
<td>150 psi (10.3 bar)</td>
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</tbody>
</table>

#### Specifications

- **Drain Size**: 3" (76.2). Consult factory for custom sizes.
- **Air Requirement (Automated Units)**: 60-120 psi (4.1-8.3 bar) @ 5 cfm, for sequencing.
- **Electrical Requirement (Automated Units)**: 110/220 V, 50/60 Hz, single phase.

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For liquid filtering that requires unattended operation, maximum uptime, and solids removal from 2 to 1,700 microns, the Eaton F-Series delivers unbeatable performance.

**FEATURES/BENEFITS**

- Solids removal from 2 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 F-Series’ versatility is its modular design that enables future capacity and configuration flexibility. F-Series systems can include 2 to 24 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.

**EATON**

Powering Business Worldwide
F-Series Tubular Backwashing Filter

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight (dry) lbs (kg)</th>
<th>Height in (mm)</th>
<th>Footprint w x l in (mm)</th>
<th>Volume gal (l)</th>
<th>Configuration # of Tubes</th>
</tr>
</thead>
<tbody>
<tr>
<td>F202</td>
<td>450 (204)</td>
<td>62 (1575)</td>
<td>28.5 x 45 (725 x 1145)</td>
<td>18 (68)</td>
<td>2</td>
</tr>
<tr>
<td>F203</td>
<td>600 (272)</td>
<td>62 (1575)</td>
<td>28.5 x 48 (725 x 1220)</td>
<td>23 (87)</td>
<td>3</td>
</tr>
<tr>
<td>F204</td>
<td>750 (340)</td>
<td>62 (1575)</td>
<td>28.5 x 63 (725 x 1600)</td>
<td>30 (114)</td>
<td>4</td>
</tr>
<tr>
<td>F205</td>
<td>900 (408)</td>
<td>62 (1575)</td>
<td>28.5 x 78 (725 x 1980)</td>
<td>37 (140)</td>
<td>5</td>
</tr>
<tr>
<td>F206</td>
<td>1200 (544)</td>
<td>62 (1575)</td>
<td>28.5 x 93 (725 x 2360)</td>
<td>65 (246)</td>
<td>6</td>
</tr>
<tr>
<td>F207</td>
<td>1350 (612)</td>
<td>62 (1575)</td>
<td>28.5 x 108 (725 x 2745)</td>
<td>75 (284)</td>
<td>7</td>
</tr>
<tr>
<td>F208</td>
<td>1500 (680)</td>
<td>62 (1575)</td>
<td>28.5 x 123 (725 x 3125)</td>
<td>85 (322)</td>
<td>8</td>
</tr>
<tr>
<td>F209</td>
<td>1800 (816)</td>
<td>62 (1575)</td>
<td>28.5 x 138 (725 x 3505)</td>
<td>124 (470)</td>
<td>9</td>
</tr>
<tr>
<td>F210</td>
<td>1950 (885)</td>
<td>62 (1575)</td>
<td>28.5 x 153 (725 x 3985)</td>
<td>138 (522)</td>
<td>10</td>
</tr>
<tr>
<td>F211</td>
<td>2100 (952)</td>
<td>62 (1575)</td>
<td>28.5 x 168 (725 x 4265)</td>
<td>151 (572)</td>
<td>11</td>
</tr>
<tr>
<td>F212</td>
<td>2400 (1089)</td>
<td>62 (1575)</td>
<td>28.5 x 183 (725 x 4650)</td>
<td>165 (625)</td>
<td>12</td>
</tr>
</tbody>
</table>

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.

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)
The revolutionary Eaton AFR-Series delivers high-flow filtration of water-like liquids at retentions as low as 2 microns in a compact one-square-meter footprint.

**FEATURES/BENEFITS**
- Solids removal from 2 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**

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. Like many Eaton filters, the AFR-Series uses cleanable media. This 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.

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.
SPECIFICATIONS

Connection Inlet and Outlet: 8” ANSI or 200 mm DIN flanged.
Drain: 3” (76.2 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® (350°F (149°C) max)

Housing/Wetted Parts Materials Standard: 316 stainless steel.
Optional: Wide range available; consult Eaton

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

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

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
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.

**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 – 2 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.
### Tubular Backwashing Filter Media

<table>
<thead>
<tr>
<th>Media</th>
<th>Particle Retention</th>
<th>Type</th>
<th>Percentage of Open Area</th>
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<tr>
<td>WIRE MESH</td>
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<tr>
<td>10</td>
<td>0.065</td>
<td>1650</td>
<td>x</td>
</tr>
<tr>
<td>20</td>
<td>0.035</td>
<td>890</td>
<td>x</td>
</tr>
<tr>
<td>30</td>
<td>0.023</td>
<td>585</td>
<td>x</td>
</tr>
<tr>
<td>40</td>
<td>0.015</td>
<td>380</td>
<td>x</td>
</tr>
<tr>
<td>60</td>
<td>0.009</td>
<td>230</td>
<td>x</td>
</tr>
<tr>
<td>80</td>
<td>0.007</td>
<td>180</td>
<td>x</td>
</tr>
<tr>
<td>100</td>
<td>0.0055</td>
<td>140</td>
<td>x</td>
</tr>
<tr>
<td>150</td>
<td>0.0046</td>
<td>115</td>
<td>x</td>
</tr>
<tr>
<td>200</td>
<td>0.0033</td>
<td>84</td>
<td>x</td>
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<tr>
<td>250</td>
<td>0.0024</td>
<td>60</td>
<td>x</td>
</tr>
<tr>
<td>400</td>
<td>0.0018</td>
<td>45</td>
<td>x</td>
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<tr>
<td>700</td>
<td>0.0012</td>
<td>30</td>
<td>x</td>
</tr>
<tr>
<td></td>
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<tr>
<td>SLOTTED WEDGE WIRE</td>
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<tr>
<td>10</td>
<td>0.063</td>
<td>1600</td>
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<td>15</td>
<td>0.045</td>
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<tr>
<td>20</td>
<td>0.035</td>
<td>890</td>
<td>x</td>
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<td>30</td>
<td>0.024</td>
<td>610</td>
<td>x</td>
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<td>0.015</td>
<td>380</td>
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<td>x</td>
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<tr>
<td>80</td>
<td>0.007</td>
<td>180</td>
<td>x</td>
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<td>50</td>
<td>x</td>
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<tr>
<td>FABRIC MESH</td>
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<td>60</td>
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<td>80</td>
<td>0.007</td>
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</tbody>
</table>

- **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.

For more information, please email us at filtration@eaton.com or visit www.eaton.com/filtration

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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.

Eaton HMi Operator Interface
HMi is the workhorse of the industry. Ideal for machinery OEMs, the HMi series provides the most value with the latest technology and advanced feature set in an economical hardware and software package.
Features include:
- Screen and backlight saver
- Animated graphics
- Ethernet, COMM port and USB upload/download
- USB ports for data storage
- Three serial ports
- Alarm/event recording and viewing
- Real-time and historical trending

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.

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 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.

For more information, please email us at filtration@eaton.com or visit www.eaton.com/filtration

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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).

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).
TECHNICAL INFORMATION
Tubular Backwashing Systems

**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.
Mechanically Cleaned Filters and Strainers

DCF, MCF, MCS

Unbeatable reliability with measurable ROI

**PERMANENT MEDIA WITH DISC CLEANING TECHNOLOGY**
- Elimination or reduction in disposable filter bags or cartridges for reduced operator handling inventory costs and landfill waste
- Reduction in product loss, more thorough contaminant purge
- Reduction or elimination of operator intervention for safer operation
- Virtually maintenance free, near 100% uptime
- Compact design, lower capital cost to fit most installations
- Choice of pneumatic, motor drive or magnetic actuation
- Stainless steel screens from 15 micron slots to 1/4” perforations to handle a wide range of filtration needs
- Short payback period and increased ROI

**TYPICAL APPLICATIONS**
- Paper coatings • pcc/gcc slurries • phenolic resins • detergents
- Petroleum based greases • ethanol processing • hot fry oils
- CIP fluids (sodium hydroxide) • starch • lime slurries • adhesives
- Curtain coaters • nutricuticals • machining coolants • paint
- Ink • chocolate • edible oils • tallow

Eaton’s mechanically cleaned filters are based on a simple concept: A cylindrical stainless steel housing (1) contains a filter screen (2); unfiltered liquids enter the inlet (3); solids are deposited on the interior surface of the filtration screen; and filtered fluid exits at the outlet (4).

When the media requires cleaning (based on time, differential pressure, or manual selection), a spring loaded cleaning disc travels down and up, wiping the media clean of concentrated solids in both strokes. Once the debris is removed from the slotted screen, the cleaning disc directs the contaminant to the bottom of the housing (6) and out of the flow path (7). This cleaning process happens while the filter remains in service, thereby maintaining process efficiency and dramatically reducing loss of valuable product.

Eaton’s unique spring loaded cleaning disc (shown here in an MCS-500) ensures intimate contact with the filtration screen to thoroughly and uniformly clean the media.

**Choice of actuation method**

**Pneumatic** - The cleaning disc can be actuated by air pressure alone (60 to 80 psi @ 5 cfm). DCF-800 and DCF-1600 models feature single or twin air cylinders. The smaller DCF-400 is equipped with a single cylinder.

**Pneumatic with magnetic coupling** - MCS and MCF-Series utilize rare earth magnets to eliminate the need for lid thru-holes and their associated seals. This cost-effective method reduces maintenance and lengthens operating life.

**Motorized** - The DCF-2000 Series uses a motor to drive the cleaning disc through higher viscosity fluids and other challenging conditions.

Eaton
Powering Business Worldwide
Mechanically Cleaned Filters

**DCF with Twin Actuation**

Designed for the rigors of processing highly viscous, abrasive, sticky, or otherwise hard-to-process liquids, the Twin Actuation is ideal for a broad spectrum of challenging applications.

**DCF-1600 Series**

When processing water and water-like liquids where a low initial investment is demanded, this series delivers tremendous benefits.

**DCF-2000 Series**

Designed specifically for the needs of the pulp and paper industry, the DCF-2000 features a rugged motorized cleaning action, which can handle the continuous processing requirements of protecting critical wet-end coating operations.

**High Flow MCS Strainer**

Engineered to conserve valuable process water while protecting costly equipment from debris, the MCS features fast-cleaning magnetically coupled actuation. This high flow strainer uses a magnetically coupled cleaning disc, which eliminates the need for cover thru-holes and their associated seals.

**DCF-400**

<table>
<thead>
<tr>
<th>Capacity gal (liters)</th>
<th>Total Volumetric Capacity gal (liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.94 (3.5)</td>
<td>18.7 (70.8)</td>
</tr>
</tbody>
</table>

**DCF-800**

<table>
<thead>
<tr>
<th>Flow Rate Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–20 (0.45–4.5)</td>
</tr>
</tbody>
</table>

**DCF-1600**

<table>
<thead>
<tr>
<th>Flow Rate Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–60 (4.5–13.6)</td>
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</table>

**DCF-2000**

<table>
<thead>
<tr>
<th>Flow Rate Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>60–200 (13.6–45.4)</td>
</tr>
</tbody>
</table>

**DCF-2000**

<table>
<thead>
<tr>
<th>Flow Rate Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>30–200 (6.8–45.4)</td>
</tr>
</tbody>
</table>

**DCF-400 DCF-800 DCF-1600 DCF-2000 MCF-824 MCS-500 MCS-1500**

**MCF 824-Series**

The MCF features a magnetically coupled cleaning disc, which eliminates the need for lid thru-holes and their associated seals. The MCF was designed specifically for the most challenging process liquids and conditions, and features the fastest cleaning action of the mechanically cleaned family.
The Eaton DCF-Serie is ideal for highly viscous, abrasive, or sticky liquids. The DCFs operate at a consistently low differential pressure and deliver simple, reliable operation in which a low initial investment is a key driving factor.

**FEATURES**

- Elimination or reduction in disposable filter bags and cartridges for reduced operator handling inventory costs and landfill waste
- Reduction in product loss, more thorough contaminant purge in a highly concentrated waste stream
- Reduction or elimination of operator intervention for safer operation
- Virtually maintenance free, near 100% uptime
- Compact design, lower capital cost to fit most installations
- Stainless steel screens from 15 micron slots to 1/4" perforations to handle a wide range of filtration needs
- Available with UHMWPE, Urethane®, Teflon, or Kynar® Cleaning Discs

**TYPICAL APPLICATIONS**

- paper coatings
- pcc/gcc slurries
- phenolic resins
- detergents
- petroleum based greases
- ethanol processing
- hot fry oils
- cip fluids (sodium hydroxide)
- starch
- lime slurries
- adhesives
- curtain coaters
- nutricuticals
- machining coolants
- paint
- ink
- chocolate
- edible oils
- tallow

When processing water and water-like liquids where a low initial investment is demanded, DCF single actuator models deliver tremendous benefits. Available in 400, 800, and 1600 sizes, The DCF-Series enables operation at a vast range of flow rates and retentions.

The DCF-800 and DCF-1600 are also available in twin actuator models, which are designed for the rigors of processing highly viscous, abrasive, sticky, or otherwise hard-to-process liquids. DCF filters are suitable for a broad spectrum of challenging applications and accommodate a wide range of flow and retention requirements.
DCF-400, DCF-800, DCF-1600 Disc Cleaning Filters

<table>
<thead>
<tr>
<th>DCF-400</th>
<th>DCF-800 Twin</th>
<th>DCF-1600 Twin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Unit Weight</strong></td>
<td>35 lbs (16 kg)</td>
<td>75 lbs (34 kg)</td>
</tr>
<tr>
<td><strong>Service Height</strong></td>
<td>61.25 in (1556 mm)</td>
<td>69.25 in (1760 mm)</td>
</tr>
<tr>
<td><strong>Total Volumetric Capacity</strong></td>
<td>0.94 gal (3.5 liters)</td>
<td>3.9 gal (14.8 liters)</td>
</tr>
<tr>
<td><strong>Purge Chamber Capacity</strong></td>
<td>4 ft oz (119 ml)</td>
<td>25 ft oz (0.74 liters)</td>
</tr>
<tr>
<td><strong>Filtration Surface Area</strong></td>
<td>112 in²</td>
<td>264 in²</td>
</tr>
<tr>
<td><strong>Depth</strong></td>
<td>722 cm²</td>
<td>1703 cm²</td>
</tr>
<tr>
<td><strong>Flow Rate Range at 100μ</strong></td>
<td>2–20 gpm</td>
<td>20–60 gpm</td>
</tr>
<tr>
<td><strong>Temperature, maximum</strong></td>
<td>350°F (177°C)</td>
<td>350°F (177°C)</td>
</tr>
<tr>
<td><strong>Pressure, maximum</strong></td>
<td>300 psi (21 bar)</td>
<td>150 psi (10.5 bar) standard</td>
</tr>
</tbody>
</table>

**Service Requirements**

- **Air for Actuator Drive, min**
  - DCF-400: 400/800 = 60 psi at 5 cfm (4 bar @ 8.5 m³/min)
  - 1600 = 80 psi at 5 cfm (5 bar @ 8.5 m³/min)

- **Electrical for Controllers**
  - Control for all three models, automated only, 110/220V, 50/60 Hz, single phase

*Dependent on elastomer seal selection.

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Eaton’s DCF-2000 is designed specifically to address the challenges associated with filtering coatings and slurries in the paper making industry. Eliminate paperbreaks or streaks, reduce the environmental impact, and maximize uptime and productivity—for high production volumes and consistent product quality.

**FEATURES**
- Filters 48-72% solids coatings at 75 micron retention—the tightest in the industry
- Continuously removes contaminants from the coating and efficiently evacuates collected contaminants while operating at a low, constant differential pressure
- Designed for continuous unattended operation—without the need for operator intervention
- Mechanically cleaned media eliminates replacement media cost and the expense and hazard of waste disposal
- Increased profitability—improves system efficiency, reduces paperbreaks and associated downtime
- Multiplex configurations available and valved to a common tapered header for high-flow applications

**TYPICAL APPLICATIONS**
- paper coatings
Driven at a constant rate and pressure, the cleaning disc continuously wipes collected debris from the screen. Collected contaminants are agitated in the collection chamber, keeping them in a semi-liquid state, ready to be purged from the system.

### DCF-2000 Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Unit Weight</td>
<td>564 lbs (256 kg)</td>
</tr>
<tr>
<td>Service Height</td>
<td>72 in (1829 mm)</td>
</tr>
<tr>
<td>Total Volumetric Capacity</td>
<td>11 gal (41.6 liters)</td>
</tr>
<tr>
<td>Purge Chamber Capacity</td>
<td>1.5 gal (6 liters)</td>
</tr>
<tr>
<td>Filtration Surface Area</td>
<td>610 in² (3935 cm²)</td>
</tr>
<tr>
<td>Flow Rate Range at 100μ</td>
<td>30–200 gpm, 6.8–45.4 m³/hr</td>
</tr>
<tr>
<td>Temperature, maximum*</td>
<td>160˚ F (71˚ C)</td>
</tr>
<tr>
<td>Pressure, maximum</td>
<td>150 psi (10.5 bar) standard</td>
</tr>
<tr>
<td>Electrical for Motor Drive</td>
<td>single phase 110/220V, 50/60 Hz for control and three phase, 220/380/440/575V (please specify), 50/60 Hz for motor.</td>
</tr>
<tr>
<td>Electrical for Controllers</td>
<td>single phase 110/220V, 50/60 Hz</td>
</tr>
</tbody>
</table>

* Dependent on elastomer seal selection
Simplified design uses only 25 total parts

Up to 200 GPM throughput with virtually no downtime with the MCF 824-Series magnetically coupled self-cleaning filter. This technology allows for quick and easy access for maintenance, reduces potential leaks, and requires few moving parts while providing a long service life.

FEATURES
• Permanent media retains valuable product otherwise lost by media changeout
• Simple design with very few wear parts— for reduced spare parts stocking needs
• No external shaft or drive seals—eliminates all associated leakage
• Cleanable permanent media eliminates downtime and disposal requirements
• Easy no-tools access for routine maintenance and service
• Continuous operation—even during cleaning cycles

OPTIONS
• EPT/EPDM (Nordel™) or Viton® seal material
• Advanced programmable microprocessors
• ASME code and CRN design units
• Automatic pressure transmitters
• Purge welding, internal and external polishing
• Multi-station configurations
• Air bleed capability

TYPICAL APPLICATIONS
• paper coatings • pcc/gcc slurries • phenolic resins • petroleum based greases • ethanol processing
• cip fluids (sodium hydroxide) • hot fry oils • starch • lime slurries • curtain coaters • nutricuticals
• machining coolants • adhesives • paint • ink • chocolate • edible oils • detergents • tallow

The MCF, from Eaton, draws upon our rich history of self-cleaning filtration. The innovative, magnetically coupled drive technology that moves the cleaning disc—without the need for shaft or drive external seals—makes the MCF unique. The MCF, a cost effective solution, is designed for a wide range of industrial liquid filtration applications. It also addresses the challenges of environmental concerns, loss of valuable product, and demand for greater operator safety.

How the MCF works
Filtrate flows from the top down and from the inside of the media toward the outside to increase retention of contaminants. The unique design uses a spring loaded cleaning disc that travels top to bottom inside the filter media — removing collected contaminants. The cleaning disc and flow continually drive undesirable solids downward, where they are concentrated in the purging chamber for easy expulsion. A hollow shaft at the center of the system contains a piston with powerful rare earth magnets. These internal magnets are coupled to external magnets housed in a carrier connected to the cleaning disc.

Pneumatic actuation moves the inner magnet up and down the shaft, with the outer magnet on the cleaning disc following. The result is powerful actuation, without the need for a physical linkage passing through the vessel.
MCF 824-Series Magnetically Coupled Filter

MCF-824 STANDARD SPECIFICATIONS

Single Unit Weight  200 lbs (91 kg)
Service Height  64 in. (1,626 mm)
Footprint  19.6 in. (498 mm) x 18 in. (457 mm)
Volumetric Capacity  11 gal (41.6 l) total
Purge Chamber  1.3 gal (5 l) capacity
Connections: Standard  3 in (75 mm) I/O NPTE thread, 2 in (50 mm) NPTI purge
Connections: Optional  150# RFSO flanged, Sanitary, DIN (PM16) flanged, or BSPT—and purge valve options and more
Filtration Surface Area  601 in² (3935 cm²)
Media  Wedge wire: 15μ–1125μ, or defined pore: 25μ–100μ
Screen Diameter: 8 in (203 mm), Length: 24 in (610 mm), Area: 610 in² (3935 cm²)
Flow Rate Range  30–200 gpm (6.8–45.4 m³/hr)
Temperature, maximum  180°F (82°C)
Operating pressure  30–150 psi (2–10.5 bar)
Elastomer Seal Optional: EPT/EPDM (Nordel™) or Viton®
Cleaning Disc Standard: Delrin - optional: High-Density Polyethylene
Housing/Wetted Parts Materials Standard: 316 stainless steel
Controllers Standard: continuous cleaning valve (CCV)
Controller Options Push button, semi-automatic electric, electric timer, PLC
Air for Actuator Drive  80 psi (5.5 bar) at 5 cfm (140 m³/m).
(Electric for Controllers (if equipped with optional electric automatic control timer): 110 or 220 Volt, 50 or 60 Hz, single-phase

Choice of stainless steel filters include wedge wire, rated from 15 – 1125 microns or perforated screens for complete removal of large solids.

The MCF purge chamber was engineered without horizontal surfaces to facilitate flow dynamics for an extremely thorough purging process.

Quartered spring loaded cleaning disc combines maximum wear characteristics with optimized cleaning ability.

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The MCS-500’s magnetically coupled actuation eliminates the need for dynamic seals. This technology provides quick and easy access for maintenance, reduces potential leaks, and requires few moving parts while providing a long service life.

**FEATURES**
- No dynamic seals
- Minimal purge for low waste operation
- Easy in-line installation
- Continuous 24/7 operation
- Maintenance-friendly design means lower labor costs
- Eco-friendly. No bags to purchase, change, or landfill
- 316 stainless steel vessel

**OPTIONS**
- Multi-station configuration
- EPT/EPDM (Nordel™) or Viton® seal material
- Advanced programmable microprocessors
- ASME Code units
- Automatic pressure transmitters
- Purge welding
- Air bleed capability
- 304 stainless steel controller enclosure
- Gauge ports: 1/4”

**TYPICAL APPLICATIONS**
- paper coatings • pcc/gcc slurries • phenolic resins • petroleum based greases • ethanol processing
- cip fluids (sodium hydroxide) • hot fry oils • starch • lime slurries • curtain coaters • nutricuticals
- machining coolants • adhesives • paint • ink • chocolate • edible oils • detergents • tallow

The MCS-Series is engineered to conserve valuable process water while protecting costly equipment from debris. It offers minimal purge volumes in fresh water applications—allowing you to save on the cost of make up liquids, chemical treatment, and heating energy.

Featuring fast cleaning magnetically coupled actuation, this design offers an optimized configuration to help improve and reduce costly maintenance and downtime. In addition, this actuation method eliminates the need for cover thru-holes and their associated seals.

The actuation piston and cleaning disc are coupled by powerful rare earth magnets—a simple design that delivers tremendous benefits by eliminating the need for shaft or external drive seals.
HIGH FLOW MCS-500 SPECIFICATIONS

Approx Weight 350 lbs (159 kg)
Service Height 66 in (1676 mm)
Flow Rates at 100μ Up to 500 gpm / 114 m³/hr
Operating Pressure 30-150 psi (2-10.5 bar)
Operating Temperature, max. 180° F (82° C)
Viscosity Water/water-like fluids
Standard Retention* 150–1,100 microns
Vessel Material 316 Stainless Steel
Elastomers EPT/EPDM (Nordel™) or Viton®
Process Connections 6 in 150# Flanged / DN 200 Flanged
Purge Connection 1 ½ in NPT / 1 ½ in BSPT
Air for Actuator Drive 80 psi (5.5 bar) min - 116 psi (8 bar) max
(Clean, dry, non-lubricated air) 5.0 cfm (141.5 L/min)
Electrical for Controllers 115 VAC or 230 VAC 50/60 Hz
Semi-Auto Voltage 24 VAC, 115 VAC, 230 VAC
24 VDC 115/230 VAC

MCS-500 Flow Rates

Slotted Wedge Wire Strainer

Element Options

<table>
<thead>
<tr>
<th>Inch</th>
<th>Micron</th>
<th>Mesh</th>
<th>% Open Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>.002</td>
<td>50</td>
<td>325</td>
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<tr>
<td>.003</td>
<td>75</td>
<td>200</td>
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<tr>
<td>.045</td>
<td>1140</td>
<td>15</td>
<td>60</td>
</tr>
</tbody>
</table>

* Tighter retentions available. Please call for more information.

Additional retentions available, consult Eaton.
High Flow
MCS-1500

Environmentally Sustainable Design

Eaton's MCS-1500 is perfect for high-capacity straining needs. Its magnetically coupled actuation eliminates the need for dynamic seals. This technology provides quick and easy access for maintenance, reduces potential leaks, and requires few moving parts while providing a long service life.

FEATURES
- No dynamic seals
- Minimal purge for low waste operation
- Easy in-line installation
- Continuous 24/7 operation
- Maintenance-friendly design means lower labor costs
- Eco-friendly. No bags to purchase, change, or landfill
- 316 stainless steel vessel

OPTIONS
- Multi-station configuration
- EPT/EPDM (Nordel™) or Viton® seal material
- Advanced programmable microprocessors
- ASME Code units
- Automatic pressure transmitters
- Purge welding
- High pressure units
- Air bleed capability
- 304 stainless steel controller enclosure
- Gauge port: ¼”

The MCS-Series is engineered to conserve valuable process water while protecting costly equipment from debris. It offers minimal purge volumes in fresh water applications, allowing you to save on the cost of make up liquids, chemical treatment and heating energy.

Featuring fast cleaning magnetically coupled actuation, this design offers an optimized configuration to help improve and reduce costly maintenance and downtime. In addition, this actuation method eliminates the need for cover thru-holes and their associated seals.

TYPICAL APPLICATIONS
- paper coatings • pcc/gcc slurries • phenolic resins • petroleum based greases • ethanol processing
- cip fluids (sodium hydroxide) • hot fry oils • starch • lime slurries • curtain coaters • nutricuticals
- machining coolants • adhesives • paint • ink • chocolate • edible oils • detergents • tallow

The actuation piston and cleaning disc are coupled by powerful rare earth magnets—a simple design that delivers tremendous benefits by eliminating the need for shaft or external drive seals.
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How it works

Eaton’s mechanically cleaned filters are based on a simple concept: A cylindrical stainless steel housing contains a filter screen; unfiltered liquids enter the inlet; solids are deposited on the interior surface of the filtration screen; and filtered fluid exits at the outlet.

When the media requires cleaning (based on time, differential pressure, or manual selection), a spring loaded cleaning disc travels down and up, wiping the media clean of concentrated solids in both strokes. Once the debris is removed from the slotted screen, the cleaning disc directs the contaminant to the bottom of the housing and out of the flow path. This cleaning process happens while the filter remains in service, thereby maintaining process efficiency and dramatically reducing loss of valuable product.

In Eaton’s DCF mechanically cleaned filter unit, incoming fluids (1) are channeled from the interior cylinder through a wire screen (2) to the outer cylinder and out the discharge port (3). A cleaning disc (4) travels down and up inside the cylinder to periodically clear the filter screen. Particles are collected at the bottom of the housing where they can be discharged (5).

Eaton MCF and MCS operate in much the same manner as DCF units, but add the advantage of a magnetically coupled disc mechanism (6). This unique design eliminates the need for internal seals and reduces maintenance costs.
## TECHNICAL INFORMATION

### Mechanically Cleaned Filters & Strainers

<table>
<thead>
<tr>
<th>Model</th>
<th>DCF-400</th>
<th>DCF-800</th>
<th>DCF-1600</th>
<th>DCF-2000</th>
<th>MCF-824</th>
<th>MCS-500</th>
<th>MCS-1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx Weight - lbs (kg)</td>
<td>35 (16)</td>
<td>75 (34)</td>
<td>215 (97.5)</td>
<td>564 (256)</td>
<td>200 (91)</td>
<td>350 (159)</td>
<td>775 (352)</td>
</tr>
<tr>
<td>Service Height - in (mm)</td>
<td>62 (1575)</td>
<td>69 (1753)</td>
<td>102 (2591)</td>
<td>80 (2032)</td>
<td>64 (1626)</td>
<td>66 (1676)</td>
<td>102 (2591)</td>
</tr>
<tr>
<td>Volumetric Capacity-gal (L)</td>
<td>0.94 (3.5)</td>
<td>3.9 (14.8)</td>
<td>11 (41.6)</td>
<td>11 (41.6)</td>
<td>18.7 (70.8)</td>
<td>49.2 (186.2)</td>
<td></td>
</tr>
<tr>
<td>Purge Chamber Capacity-gal (L)</td>
<td>0.0313 (0.119)</td>
<td>0.2 (0.74)</td>
<td>1.5 (6)</td>
<td>1.5 (6)</td>
<td>1.3 (5)</td>
<td>0.56 (2.1)</td>
<td>1.1 (4.1)</td>
</tr>
<tr>
<td>Filtration Surface Area - in² (cm²)</td>
<td>112 (722)</td>
<td>264 (1703)</td>
<td>610 (3935)</td>
<td>610 (3935)</td>
<td>610 (3935)</td>
<td>610 (3935)</td>
<td>1508 (9729)</td>
</tr>
<tr>
<td>Flow Rate Range at 100µ - gpm (m³/hr)</td>
<td>2–20 (0.45–4.5)</td>
<td>20–60 (4.5–13.6)</td>
<td>60–200 (13.6–45.4)</td>
<td>30–200 (6.8–45.4)</td>
<td>30–200 (6.8–45.4)</td>
<td>up to 500</td>
<td>up to 1500 (up to 342)</td>
</tr>
<tr>
<td>Temp. max F (C)</td>
<td>350˚ (177˚)</td>
<td>350˚ (177˚)</td>
<td>350˚ (177˚)</td>
<td>160˚ (71˚)</td>
<td>180˚ (82˚)</td>
<td>180˚ (82˚)</td>
<td>180˚ (82˚)</td>
</tr>
<tr>
<td>Pressure, max- psi (bar)</td>
<td>300 (21)</td>
<td>150 (10.5)</td>
<td>150 (10.5)</td>
<td>150 (10.5)</td>
<td>150 (10.5)</td>
<td>150 (10.5)</td>
<td>150 (10.5)</td>
</tr>
</tbody>
</table>

**Notes:**
- All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user’s responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.
- Filtered products are not intended to be used in hydraulic systems containing lead-based products. Eaton is committed to working toward eliminating lead from our products. If you are unable to use Eaton filters due to regulations or other reasons, contact Eaton for assistance.

**Contact Information:**
- North America: 44 Apple Street, Tinton Falls, NJ 07724
- Europe/Africa/Middle East: Auf der Heide 2, 53947 Nettersheim, Germany
- Singapore: 4 Loyang Lane #04-01/02, Singapore 508914
- Brazil: Rua Clark, 2001 - Macuco 13279-400 - Valinhos, Brazil
- China: No. 3, Lane 260, Linhong Road, Changle District, 200335 Shanghai, P.R. China
- Additional locations and contact information provided.

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Mechanically Cleaned Filters and Strainers

Cleanable Media and System Options

Selection of media retentions and degree of automation is easy with Eaton mechanically cleaned filtration systems. Choose from 15 micron filter elements to 1/4" strainers. Manual to semi-automatic to full microprocessor controlled systems can be configured to suit specific operations, and the range of internal and external components help make Eaton systems a logical choice for long-term efficiency and cost control.

MEDIA ELEMENTS

Slotted Wedge Wire
DCF/MCF/MCS filter screens feature special wedge wire that is honed perfectly circular to guarantee contact with the cleaning disc so the slot openings are smallest at the screen’s surface. This design helps prevent particle plugging of the slot openings while assuring total rated solids removal.

Perforated
Perforated screens feature precise and uniform perforation patterns for complete removal of larger solids. These elements are ideal for straining large volumes of viscous fluids. 1/16”, 1/8”, and 1/4” perforations are available.

A range of control systems can be employed to actuate and monitor mechanically cleaned systems. Microcomputer controls can also be integrated with system-wide operations.
MEDIA RETENTIONS

<table>
<thead>
<tr>
<th>Slotted Wedge Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
</tr>
<tr>
<td>.006</td>
</tr>
<tr>
<td>.01</td>
</tr>
<tr>
<td>.015</td>
</tr>
<tr>
<td>.02</td>
</tr>
<tr>
<td>.03</td>
</tr>
<tr>
<td>.04</td>
</tr>
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<td>.06</td>
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<td>.07</td>
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<td>.08</td>
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<tr>
<td>.09</td>
</tr>
<tr>
<td>.15</td>
</tr>
<tr>
<td>.24</td>
</tr>
<tr>
<td>.30</td>
</tr>
<tr>
<td>.45</td>
</tr>
</tbody>
</table>

Perforated

<table>
<thead>
<tr>
<th>Inch</th>
<th>Micron</th>
<th>Mesh</th>
<th>% Open Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16</td>
<td>1575</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>1/8</td>
<td>3175</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>1/4</td>
<td>6380</td>
<td>3</td>
<td>57</td>
</tr>
</tbody>
</table>

Additional retentions available. Consult Eaton.

CONTROL SYSTEM CHOICES

The control options for mechanically cleaned filters are as broad as the applications they serve. Available controllers include:

- PLC microcomputer controls deliver programmable stand-alone performance, or can integrate with control networks. Allen-Bradley and Siemens controls are standard PLC options.
- Continuous Cleaning Valve (CCV) is the standard configuration where the cleaning disc continuously cycles, driven by shop airflow. Purge is controlled by a manual valve or push-button.
- Electric timer for timed stroke (single) or stroke and purge (dual) in a NEMA 4-, 7-, or 12- rated enclosure. Dual pneumatic timers are available for explosion proof environments.
- Semi-automatic electric control units for use with customer supplied controls for stroke and purge.

DISC AND SEAL CHOICES

To meet the widest range of operating conditions and process liquid characteristics, Eaton mechanically cleaned systems are available with a number of lid and element seal elastomers and cleaning discs.

- Lid and element seals
  - VITON®
  - NORDEL®
- Cleaning discs
  - UHMWPE
  - Teflon or Kynar® (DCF design shown)
  - Urethane®
Bag and Cartridge Filtration Systems
Ideal for the removal of large amounts of very fine material from the process media.
• Single or multi-bag vessels in stainless steel, carbon steel, or corrosion-resistant plastic
• Choose from a huge selection of filter bags in a variety of materials and retentions
• High performance, cost-effective liquid process filter cartridges for common and difficult industrial applications

Mechanically Cleaned Filters
A sustainable solution for the automatic removal of debris from liquids with no bags to buy, change, or landfill.
• Tubular Backwashing
• Disc Cleaning
• Pneumatic, Motorized, or Magnetically Coupled Actuation

Standard Cast Pipeline Strainers
Protecting pumps, filters, nozzles, flowmeters, valves, heat exchangers, condensers, oil burners, boilers, and other process system components from damaging pipeline debris is what Eaton Pipeline Strainers do best.
• Heavy-duty Y Strainer
• Simplex Basket Strainers
• Duplex Basket Strainers

Hydraulic and Lubrication Oil Filtration Systems
• 4000 different filter elements, including corresponding filter housings
• Condition Monitoring
• Hydraulic Filter Accessories

Depth Filtration
High-quality systems and media for the food and beverage, chemical, pharmaceutical, and biotechnology industries.
• Depth Filter Sheets and Cartridges
• Stacked Disc Cartridges
• Filtration Systems
• Measuring and Testing Devices

Gas/Liquid Separators
Remove over 99% of moisture and particulate matter 10 microns and larger from air, gas, and steam lines.
An exclusive vortex containment plate (VCP) prevents re-entrainment and eliminates the need for complex baffles or deflectors. Offered in a variety of different models for application flexibility.
Eaton Filtration Solutions

SPECIALITY & CUSTOM SYSTEMS
In addition to our standard solutions, Eaton offers many industry specific filtration, strainer, and separation products with a proven record of accomplishment. Eaton engineers can customize and design modular solutions that provide a full range of retention capabilities and construction materials in manual and automated designs.

MEDIA OPTIONS
Eaton offers thousands of options for both disposable media systems and equipment that utilizes permanent filtration and strainer elements.

- Permanent media elements for self-cleaning filters and strainers
- Bag filters to fit a wide range of filter housings—with filtration efficiencies up to 99.98%
- Cartridge filters with a variety of retention ratings, sizes, end caps, material, and gaskets
- Depth filtration sheets for course, clarifying and fine filtration as well as microbe reduction and removal.