PRODUCT CATALOGUE

JFC Corporation
Manufacturing & Sales Products

✓ **Filtration Equipment**
  - Filtration System Engineering
  - Metallic Filter:
    - Multi-Layer sintered, Fiber metal sintered,
    - Powder metal sintered
  - Cartridge Filter:
    - Wound Depth Cartridge, Resin Bonded Fiber Cartridge,
    - Binder-free Cartridge, Pleated Paper Cartridge,
    - Metallic Cartridge (Cylindrical & Pleated Type),
    - Membrane Cartridge
  - Candle Filter
  - Bag Filter
  - Activated Carbon Filter System

✓ **Coalescer / Separator**
  - Liquid-liquid Coalescer
  - Liquid-gas Coalescer
  - Oily Water Separator

✓ **Mist Eliminator**
  - Vane Type Eliminator
  - Pad/demister Type Eliminator
  - Cartridge Type Eliminator

✓ **Strainer**
  - Forged Strainer
  - Casting Strainer
  - Steel Welded Strainer
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<td>JS-D</td>
<td>Duplex Type Strainer</td>
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Basic Check Point When Designing Filter

✔ Filter Housing Material
- Carbon Steel, Stainless Steel 304, 316, Hastelloy, Nickel Alloy and etc.

✔ Applicable Design Code
- ASME Sec. VIII Div.1

✔ Cover Opening Type
- Stud Bolt & Nut with Davit
- Swing Bolt & Eye Nut with Hinge or Davit
- Quick Opening Closure
- Hydraulic Cover Lift

✔ Operation Condition (Minimum information when ordering)
- Design Pressure : Kg/㎠.G, psid, bar-g, etc.
- Operating Pressure : Kg/㎠.G, psid, bar-g, etc.
- Design Temperature : ℃, ℉
- Operating Temperature : ℃, ℉
- Flow Rate : ㎡/hour, gpm, cfm, etc.
- Filtration Rating : ㎛, #mesh, mm, inch, etc.
- Fluid Name : Water, Oil, Compressed Air, Hydrogen Amine, etc.
- Specific Gravity or Density : kg/㎡, kg/liter, etc.
- Connection Size & Rating : ASME, AWWA, MSS, API, etc.
- Operating Mode : Batch or continuous
- Purpose to use filter
- Pollution concentration
**Check Point When Selecting Filter**

✔ **Initial Pressure Drop**
- The lower initial pressure drop, the longer change cycle of element
  (The optimum design must be considered the comparison of Economic Efficiency of some costs for initial installation, maintenance and repair.)

✔ **Removal Rating of Element**
- According to use purpose, as there are various elements, it must be selected whether pollution particle is nominal rating or absolute rating. In case of the same shape, the relative superiority become clear comparing Beta Ratio

✔ **Five points of performance decision of filter is simply summarized in the following Darcy’s law**

\[
Q = \frac{\Delta P \times A}{\mu \times R}
\]

- A : filtration area
- Q : Flow rate
- \(\Delta P\) : Pressure Drop
- \(\mu\) : Viscosity
- R : Media Resistance
FILTER CARTIDGE

JFC Corporation
Metallic Filter Cartridge

✓ Advantages of JFC Metallic Filter Cartridge
  - It is advantageous in the side of life and protection of Environment as it is possible to re-use after cleaning or reverse cleaning comparing existed cartridge
  - It is beneficial in the super-low temperature, high temperature and high pressure
  - It maintains absolute ratio of filtration
  - The ratio of porous is very high
  - Pressure loss is very low

✓ The use ranges of JFC Metallic Filter Cartridge
  - Filtration of process for nuclear power generation and industry
  - Filtration of process for petrochemical and refinery
  - Filtration of gas and operating of oil pressure
### Ordering Information

**JJC 1 C 010 – 30 – SO**

| 1 | JFC Code | JC : Cleanable  
JD : Disposable |
|---|----------|----------------|
| 2 | Media Form | JC-1 : Powder Sintered  
JC-2 : Multi-Layer Woven Wire Sintered  
JC-3 : Fiber Metal Sintered  
JC-4 : Woven Wire Screen  
JD-5 : Wound  
JD-6 : Pleated  
JD-7 : Bag |
| 3 | Cartridge Type | C : Cylindrical  
P : Pleated |
| 4 | Removal Grade | Model No. according to Series |
| 5 | Cartridge OD/Length | 10 : 10” (OD : 2.5”)  
20 : 20” (OD : 2.5”)  
30 : 30” (OD : 2.5”)  
40 : 40” (OD : 2.5”)  
436 : 36” (OD : 4.5”) |
| 6 | End Connection | DO : Double Open Ends  
SO : Single Open End  
NPT : NPT Single Open End |
**PS Series**

**Filter Cartridge for Powder Metal Sintered**

**Powder Sintered Media**

Porous media is produced by diffusional sintered bond of powder metal.

- Porousness is uniformed as it becomes sintered forming with regular particle.
- Filtration efficiency is high because it is depth type to pile up pollution material in the twisted windingly flow passage.
- Durability and conservation capacity for filtration particle of medium is excellent as it is formed by the sintered method of powder metal.
- It can be used in lots of usage as it produced by various material, 304LSS, 316LSS, Inconel, Monel, Hastelloy, Alloy 20, and Titanium and etc. to have excellent corrosion resistance.
- It is semi-permanent and regeneration effect is high with reverse-cleaning and supersonic cleaning method as the washing rate is excellent with high washing rate.
- The application limit of temperature is wide range from super-low-temperature to high-temperature of 926 °C.
- It can endure the high-pressure-drop and can be applied to high pressure as it has high burst and collapse pressure.

**Feature**

- Powder Sintered Medium
  - Liquid Rating : 2 micron absolute
  - Porosity : 35%
  - Flow (H,O) : 2gpm/ft² at 0.5 psid
  - Contaminant Capacity : 0.7g/ft² at 0.5 psid

<table>
<thead>
<tr>
<th>Type</th>
<th>Model No.</th>
<th>Removal Rating (㎛)</th>
<th>Liquid</th>
<th>Gaseous</th>
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100X views of standard micron grades

JFC Corporation
Filter Cartridge for Multi-Layer Metal Sintered

Multi-Layer Sintered Media
This media is produced through Multi-Layer Diffusion Sintered Bond of Woven Wire Screen to be woven by metal wire in order of support layer, distribution layer, filtration layer and protection layer

Feature
- It is a metal net to be weaved at regular intervals and maintains the uniform pore, as it became sintered forming
- The choice range of filtration granularity is wide
- Media production is possible as it adjusted the join order of metal net according to usage
- Treatment is easy and there is no need for a supporting or reinforcing structure as it is solid
- It is advantageous in an application of high-temperature and corrosion resistance is excellent as it is made by a raw material such as 304SS, 304LSS, 316SS, 316LSS
- It can endure a high-pressure-drop and is advantageous to a high-pressure as it has a high-burst and a collapse pressure
- It is semi-permanent and regeneration effect is high with a super sonic wash or reverse-wash

<table>
<thead>
<tr>
<th>Type</th>
<th>Model No.</th>
<th>Removal Rating (㎛)</th>
<th>Liquid</th>
<th>Gaseous</th>
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Woven Wire Cloth Laminate
Liquid Rating : 10 micron absolute
Porosity : 35%
Flow (H₂O) : 2gpm/ft² at 0.5 psid
Contaminant Capacity : 0.7g/ft² at 0.5 psid
Filter Cartridge for Woven Wire Screen

Woven Wire Screen Media

It has feature and merit of each form and there are woven wire screen of various type according to weaving method of a metal wire as following pictures.

<table>
<thead>
<tr>
<th>Type</th>
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</table>
Filter Cartridge for Fiber Metal Sintered

Media for Fiber Metal Sintered
This media is produced by Diffusional Sintered Bond with a mat type of a fiber metal of delicate denia

Feature
- Filtration effect is high as a fiber metal of delicate denia type is sintered
- Conservation ability of filtration particle is excellent
- Life time is long as a heaping capacity for pollution material is big
- Cartridge production of pleated type is possible as the material thickness is thin
- Application Range of fluid and gas is wide and the corrosion resistance is excellent as it possible to produce by various materials such as 304LSS, 316LSS, Inconel, Monel, Hastelloy, Alloy 20, and Titanium and etc.
- It is semi-permanent and regeneration effect is high with a super-sonic wash or reverse-wash as permeability is high and wash is excellent

Fiber Metal Medium
Liquid Rating : 3 micron absolute
Porosity : 60%
Flow (H,O) : 8gpm/ft² at 0.5 psid
Contaminant Capacity : 2.2g/ft² at 0.5 psid
JD Series

Disposable Cartridge

Application

- General process industry
- Petrochemical industry
- Chemical industry

JD-5 : Wound type Cartridge

Wound type cartridge for traditional depth filtering.
Filter media supplied as: Cotton, Cellulose, Polyester, Polypropylene, Micron Fiber-glass.

JD-6 : Pleated type Cartridge

JD-P cartridges are pleated liquid filtration elements designed for applications with large flow and contaminant requirements.
Filter media supplied as: Cotton, Cellulose, Polyester, Polypropylene, Micron Fiber-glass.

JD-7 : Bag type Cartridge

Coalescer/Separator is an equipment to separate material of two liquid types not to be able to mix through a method of deposition or stabilization in a process to extract solvent in a petrochemical plant or in a process to refine petroleum in the refinery plant.

JFC can supply, manufacture and design Coalescer/Separator to guarantee optimum performance from customer requirement and accumulated Know-How that is based on an experience of production and design for many years.

There are following some kinds of Coalescer/Separator according to material to want to separate or fluid to be applied:

1) Liquid/Liquid Coalescer
2) Liquid/Gas Coalescer
3) Oily Water Separator

It is possible to manufacture Vane Type, Cartridge Type, Pad Type, Double Stage, Single Stage, Horizontal Type and Vertical Type according to shape or arrangement of element to be used.

Feature of JFC Coalescer/Separator
1) Low Pressure Drop
2) Various applicable range
3) Complete separation
4) Compact Design
5) Simple and easy Maintenance
Design of JFC coalescers utilize the latest technology to bring clients the best liquid-liquid coalescer that separate a wide range of two immiscible liquids. Products that are emulsified and hazy are very difficult to separate. They require a specific coalescer design. JFC has the latest solution for even the most difficult to separate applications.

More stringent environmental compliance by governments around the world forces the industry to seek the help of liquid-liquid coalescing technology.

Radial flow coalescers are the latest technology available to JFC. They allow JFC Eng. to design high capacity applications while the vessel size remains small. Radial flow coalescers are also the preferred choice when retrofiting existing liquid-liquid separators for up to 100% more capacity and or improved efficiency.

JFC can design and manufacture coalescer internals, coalescer vessel and the complete skid mounted 2 or 3 phase coalesce systems. JFC can provide efficiencies of <15ppm of free water in oil or free oil in water. JFC can provide instead of a dual pre-filter coalescer vessel system to protect the coalescer pack from plugging, a CPI coalescer or Plate Pack Coalescer. The CPI coalescer will remove solids greater than 10microns and is installed in that same coalescer vessel, which is a more cost effective solution.

**BENEFITS**

1) Reduces cost due to smaller vessel design  
2) Capacity increase for the existing vessels  
3) Higher recovery of valuable products  
4) Removal of haziness in the product  
5) Reduces blending delays  
6) Reduces wastewater production from tankage, separator and desalter

* JFC can also offer calming baffles, sand jet removal systems
JFC two stage filter separator technology allows you to have the smallest possible vessel diameter, resulting in the lowest cost while removing aerosol liquids and solid particles efficiently.

The first stage contains replaceable coalescing filters mounted on a tube sheet. Here the bulk liquids and solids are removed while coalescing the aerosol liquid droplets into large ones (greater than 10 microns). Some of these coalesced droplets fall off the filter but the majority is pushed to the second stage due to the high surface velocity. In the second stage, these large droplets are removed by a high capacity Double Pocket Vane.

Filter separators can be designed both vertically and horizontally.

**BENEFITS**

1) Removes aerosol mist to protect downstream equipment from damage, fouling, pitting corrosion or deactivating of catalyst of molecular sieves.

2) Reduces amine or glycol foaming problem by removing solids and free liquid particles from the inlet gas stream

3) Allow low cost vessel designs

4) Debottleneck existing equipment, and adding up to 100% more capacity without requiring a new separator

5) Protects ultra low NOx burners from plugging, therefore preventing furnace heat imbalance
JFC provides high performance Mesh Type Mist Eliminators versus the standard units that many companies supply. In today’s demanding market standard, Mesh Mist Eliminators cannot meet the stringent requirements like higher capacity, better efficiency and lower pressure drop. For every new application, upgrade of debottlenecking such help is a must to make the most of your mist eliminator investment. Since the variables involved in specifying mesh mist eliminators are numerous the client should consult with JFC engineers before making a final selection.

The most widely used standard type of mesh mist eliminator is the 144 kg/m3 density made of metal and using a 0.028 wire. The knitted mesh is crimped and layer (alternate directions) to form a 100mm or 150mm thick unit. The rigidity is provided by a top and bottom grid structure welded together. Pads that are 914mm and larger are fabricated in narrow sections, enough to pass through a manway for assembly inside the separator. Recent advances in technology have brought mist eliminator designs and application expertise to new levels.

**BENEFITS**

1) Increases separator throughput or reduce size of new separators.

2) Improves product purity and reduce environmental pollution

3) Reduces operation cost

4) Increases recovery of valuable liquids and therefore reduce downstream corrosion

With the more advanced mesh mist eliminators it is critical for the design of the mist eliminator that you consider; vessel layout, proper gas distribution, location of inlet/outlet nozzle, liquid holding capacity and method of liquid drainage so the mesh pad will function efficiently.
JFC manufactures all type of vane packs also known as Chevron vane mist eliminators. Vane consist of closely spaced corrugated plates that force the mist laden gas to follow the corrugated path. As the gas changes direction, the mist droplet momentum forces it to impact on the blades and coalesces to larger droplet and eventually drains off the blades. Vane packs are normally not efficient for mist droplets less than 20microns. However vanes are sturdier than mesh mist eliminators, provide a lower pressure drop and are less likely to plug. Vane blade spacing varies from 12 to 75mm depending on the dirt/solid loading. Vanes are available in all types of metal and plastic.

**BENEFITS**

1) Higher capacity than standard mesh mist eliminators
2) Lower pressure drop
3) Handles viscous or foaming liquids more efficiently
4) Dissipates slugs of liquid or high liquid mist loading
5) Resistant against violent upsets
6) Handles solids with minimal chance of plugging
Double Pocket Vane

To increase capacity on an existing separator or to reduce size of a new vessel, JFC’s Double Pocket Vane technology can be the answer. The unique geometry of this vane removes the collected liquids away from the gas. This design feature allows for twice the gas flow through the Double Pocket Vane versus a Standard Vane without any concern of liquid re-entrainment. The blade geometry in addition allows more efficient mist removal than the standard vane. In applications where a mesh type mist eliminator would plug due to the presence of solids, waxes or paraffin, Double Pocket Vanes are the preferred solution. The Double Pocket Vane is plugging resistant and has the efficiency of a mesh mist eliminator. Double Pocket Vanes are also the preferred technology with applications that require a smaller vessel footprint or a vessel with limited weight allowance. Double Pocket Vanes can be supplied in any types of metals.

BENEFITS

1) Increases capacity up to 100%
2) Reduces size and weight for new vessel, resulting in reduced cost
3) Increases efficiency versus standard vanes
4) Debottleneck existing separators for capacity and efficiency
Inlet Diffuser

Utilizing Inlet Diffusers are often overlooked, but yet an important device for designing efficient separators for the industry. JFC’s Inlet Diffuser, “Equal Flow” (EQF model) is designed to provide the latest technology to enhance the capacity and efficiency of separators 2~3 phases and for horizontal and vertical. Equal Flow can be manufactured with any type of metal.

BENEFITS

1) Removes high liquid loads from the incoming gas improving the downstream separation equipment efficiency

2) Dissipates high inlet gas velocities efficiently, avoiding localized high velocities

3) Evenly distributes the gas flow throughout the separator with minimal pressure drop

4) Prevents inlet gas to get into the bottom liquid level and re-entrain additional liquid droplets
   potentially flooding the downstream mist eliminator

5) Reduces vessel height or length

6) Allows higher gas flow in a smaller separator without creating localized channeling with intern caused liquid carry at the downstream mist elimination equipment

7) Removes mild foaming if present at the inlet gas
## JFC Coalescer / Separator / Filter Housing type

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<th>Model</th>
<th>Description</th>
<th>Model</th>
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<td>Vertical Type, Pad Type</td>
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<td>JC3</td>
<td>Vertical Type, Single Stage Cartridge</td>
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<td>Horizontal Type, Single Cartridge</td>
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*Images of the respective models are shown.*
Activated Carbon / Anthracite Filter System

JW-Type

It is Reverse Washing Type of Filtration System to use jointly physical absorption and a heap filter to insert a carbon or anthracite. In case of liquid phase, mainly it is used to clean water treatment.

In case of gas, it is utilized to remove an organic gas or bad material and is mainly a fixed bed type

Application

1. Liquid Filtration
   - Removes smell, taste, chlorine and iron of drink water
   - Refines water to make a soft drink or brewing, water to use in a boiler and industrial water.
   - Filtration of amine and glycol

2. Gas Filtration
   - Purifies hydrogen, carbonic acid gas, chloride gas and other inorganic gas
   - Purifies ethylene, acetylene, and other gas about petrochemical
   - Purifies gas for chemical industry exhaust
   - Removes radiation elements of exhaust of a pile and desulfurizes a combustion exhaust
   - It is possible to remove a chemical action gas if using a special filler of alkali metals
Auto Control Filter System

Porous Metal Blowback Filter System for Gaseous Service
Porous Metal Backwash Filter System for Liquid Service

- High Solids Recovery
  It has a high performance to capture over 99.999% of the solids to be critical or hazardous or valuable

- High Temperature Operation
  It endures to a temperature to 1700 °F (927 °C)

- Automated Operation
  It is fully automated system to be able to discharge solids periodically

- Low Replacement Costs
  JFC Precision Metal Filter Element is a permanent self-supporting system which process a consistent performance

- Long lasting Life time
  Downtime to wash is not necessary as it is washed by Blowback or Backwash based on the Venturi Pulse System
Application of Blowback / Backwash System

Gaseous Service
- Remove Solid particles in various gas streams to cover wide industries
- Catalyst Retention or Radioactive Waste Removal Performance is very excellent in wide industries to cover Nuclear Industry or Chemical Industry

Liquid Service
- Excellent Catalyst Retention from various Liquids
- Excellent Performance to remove Solid Particles from a liquid flow
- Excellent Filtration of a Polymer to have high viscosity

FIGURE 1. HYPOTHETICAL CAKE STRUCTURE
FIGURE 2. HYPOTHETICAL CAKE RELEASE
FIGURE 3. DIFFERENTIAL PRESSURE VS. TIME
Auto Strainer

JA-B Type
Brush Wash Type

It is possible to operate continuous with a simple instrumentation

- It is advantageous to a fluid of a high viscosity with mechanical washing method
- Retention capacity of particle pollution, flow loss is low
- Choice operation by a timer or by a switch for pressure drop is possible as Automatic Operation System
- To repair and maintain is convenient, as it is an open and shut system to have installed a bottom cover

JA-R Type
Backwash Type

Continuous operation is possible

- Filter granularity is delicate relatively comparing JA-B, as it is backwash system to utilize operation pressure
- It is advantageous when an condition of pressure drop is high as an element has a small bore and pressure resistance is good
- Choice operation by a timer or by a switch for pressure drop is possible as Automatic Operation System
Auto Strainer

JA-B Type

- Chemical Industry area
  - Chemical industry, Synthetic resin, pigment, paint, rubber, natural oil, oil refinery industry and etc.

- Other Industry Area
  - Cutting oil, paper coloring and breaching, bottle washing, removal of fat of wool and etc.

- Clean Water Treatment Area
  - Water Supply Facilities, Sewage Treatment Plant, Well and etc.

JA-R Type

- Clean Water Treatment Area
  - Waterworks Treatment Plant, Sewage Treatment Plant, Well, Boiler Water, Cooling Water, Waste Use in industry

- Industry Area of Fuel and Lubricating Oil
  - Lubrication oil, Natural oil, Gasoline, Diesel, Kerosene etc.

- Chemistry Solvent Area
STRAINER

JFC Corporation
**Strainer**

**JFC Strainer**
JFC Strainer is used widely to fluid and gas such as water, oil, air, gas in each field of Oil Refinery, Petrochemical Plant, Waterworks, Power Plant, Iron Manufacturing, Ship-building, Paper Manufacturing, Synthetic Fiber

**Material of JFC Strainer**
Carbon Steel
- ASME : A105, A216, A53, A234, A106, A516
Stainless Steel
- 304SS, 304LSS, 316SS, 316LSS
Alloy Steel and Special Steel
- Monel, Hastelloy, Aluminum, Bronze, Copper Alloy, Chrome Alloy, Nickel Alloy and etc.

**Strainer Element**
Elements is very important part as the heart of strainer. So, Corrosion Resistance, Filtration rate and Strength must be considered sufficiently and it must be a structure not to be bypassed the non-filtered fluid between element and body. JFC is manufacturing a high credible strainer that can’t compare with other production as it has a long experience and accumulated know-how in field of engineering

**Connection Style**
Flange Type / Socket Weld Type / Screw Type (PT,NPT) / Butt Weld Type

**Applicable Code**
ASME / DIN / BS / ISO / MSS / API
The Performance of Strainer is various and the summary is as followings:

1. Normally used for the protection of pipeline and petroleum process equipment installed downstream of strainers.
2. Filtration resistance of strainer shall be minimum. Specially, urgent filtration resistance shall not increase even after some using period passed.
   - There is no problem as the absolute value of initial pressure drop in filtration resistance is small. But till a pressure drop reaches the maximum value, the filtration resistance is influenced by time of washing cycle.
3. Must be a structure to be maintained airtightness between a contacting part of element and a parallel state of strainer.
4. Element and Strainer Body shall be endurable in the high-pressure-drop against internal, external pressure sufficiently

JFC Strainer is designed by the basis of the above requisition and JFC has a long experienced know-how and a lot of customers are recognizing the quality of the excellent strainer in domestic and oversea petrochemical and refinery project for long years from Super Low Temperature -196°C of the Ethylene Process till 350 °C, a temperature of Heavy Grade Oil Resolution Facilities and the high pressure of 2500 pound basis.
JS-B type strainers are used where the line can be shut down for short periods to clean or change baskets. And they are designed for installation in horizontal lines. They are commonly used for liquid service applications. JS-B type strainers are generally used where high flow capacity is required.

Unlike other types of strainer, the basket is removed and replaced through the top of the strainer body which prevents the spilling of liquid during the servicing of the strainer screen. Standard basket screen material is stainless steel. Standard screens are available from 1/4” (perforated) up to 100 mesh.
JS-Y Type Strainers are named after their shape and normally used for course filtration. But with large filtration area can be used with fine mesh also. The Strainer improves the clearance in the medium and prolongs the life of valves; protect expensive pumps, meters and other equipment. It is suitable for water, air, gas, petroleum, steam and other fluids.

A JS-Y type strainer can be installed in either a horizontal or vertical position (Downward flow) with the screen element pointing downward. This allows the strainer screen to collect material in the strainer at the lowest point of the screen.
JS-T type strainer is very compact, important in applications where spare is restricted. Unlike most other strainers JS-T type strainer can be used in both vertical or horizontal installations. JS-T type strainer can also be adapted for straight through or right angle flow.

JFC has advantages bending and cylindrical type element applied to improve the efficiency of JS-T type strainer.
JS-C type strainer are used for start-up of new or revamped piping systems. They will prevent construction debris from causing damage to downstream equipment. The screen is tig welded around entire circumference of the flange ring to provide and prevent unwanted bypass.
It is a strainer that is designed in order to operate continuous while cleaning the internal element as Duplex Strainer that two strainers connected in a row can convert a flow direction by a valve operation.

In case of a common Duplex Strainer. It can be operated with continuous fluid flow because valve of inlet side and outlet side must be connected.

But JS-D type install the 3-way Check Valve in outlet side and a control valve in inlet side. And it is a system that 3-way Check Valve in outlet side converts the fluid direction automatically by the difference of an internal pressure as soon as operating the converting control valve.
Standard Screen Micrometer Conversion Chart

### US and ASTM STD. Sieve Number
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<th>Sieve Number</th>
<th>Actual Opening (Inches)</th>
<th>Micrometer</th>
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### Relative Size of Particles
**Magnification 500 times**

- 2 Micrometers
- 5 Micrometers
- 8 Micrometers
- 14 Micrometers
- 25 Micrometers

### Linear Equivalents
- 1 inch = 25.4 millimeters = 25,400 micrometers
- 1 millimeter = 0.0394 inches = 1.000 micrometers
- 1 micrometer = 1/25,400 of an inch = 0.001 millimeters
- 1 Micrometer = 3.94 x 10^-5 inches

### Velocity (ft. per sec.)
\[ \text{velocity (ft. per sec.)} = \frac{0.4085 \times \text{gpm}}{d^2 (\text{in.})} \]

### Brake h.p.
\[ \text{brake h.p} = \frac{\text{gpm} \times (\text{total head in ft.}) \times (\text{specific gravity})}{(3960) \times (\text{pump efficiency})} \]

### Conversion Rates
- 1 cu. ft = 7.48 gal.
- 1 ga. = 231 cu.in.
- 1 cu ft water = 62.42 lb.
- 1 gal. water = 8.34 lb.
- 1 lb. water = 27.7 cu.in.
- 1 U.S. gal. = 0.833 Imp. gal.
- 1 lb./in^2 = 2.31 ft. of water = 2.2036 in. HG
- °F = 9/5°C + 32
- °C = 5/9 (°F - 32)

### Metric Conversion Formulas
- mm = inches x 25.4
- m = feet x 0.3048
- cm^3 = cu. in x 16.39
- m^3 = cu. ft. x 0.028
- kg = pounds x 0.454
- kPa = psi x 6.895
- lpm = gpm x 3.785
- °F = 9/5°C + 32
- °C = 5/9 (°F - 32)
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