General Catalog of FUJI Polymer Filters

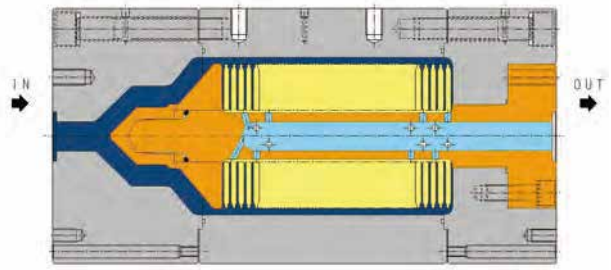
Removal of contaminants from polymer products and improvement of product quality

- Films, Sheets, Compounds, Granulation -

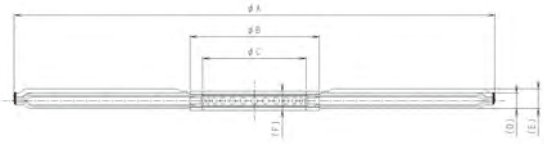
FUJI FILTER

– Types of Polymer Filters –

1. FUJI Leaf Disk Polymer Filter



TYPE	φA(mm)	φB(mm)	φC(mm)	Filtration surface area (㎡)
FL-3	78	36	30	0.0073
FL-4.4	111	50	38.1	0.012
FL-5.9	149	50	38.1	0.0264
FL-7A	178	59.6	47.6	0.0386
FL-7B	178	75.5	63.5	0.0352
FL-8.8A	222	59.6	47.6	0.0649
FL-8.8B	222	75.5	63.5	0.0615
FL-10	250	97	85	0.0756
FL-12A	305	75.5	63.5	0.12
FL-12B	305	97	85	0.117



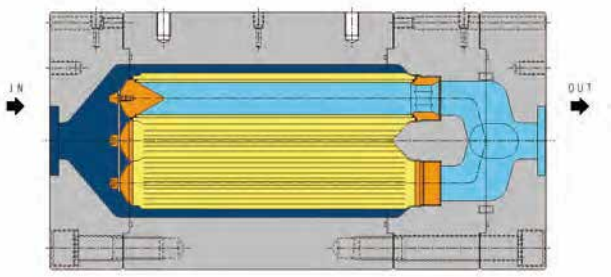
Features

FUJI Leaf Disk Polymer Filters are widely used in areas such as polymer granulation and film formings lines. Since it is a general-purpose filter and has been in wide use for a long time, this filter type has an impressive track record. In addition, the filter's large surface area makes a long-life operation possible.

<Main Applications>
Optical film, protective film, electronic film, polycarbonate granulation, compound processes

2. FUJI Pleated Polymer Filter

Single type



Filtration surface area (㎡)

φ \ L	250	330	500	750	1000
35	0.072	0.095	0.146	0.221	0.295
50	0.129	0.17	0.263	0.397	0.531
60	0.209	0.26	0.427	0.644	0.862

Features

Recently, Fuji Filter has been re-engineering FUJI Pleated Polymer Filters. This type of filter has an extensive track record of use in film manufacturing processes in which its use has been limited until recently. The simple structure of this type of filter means low introduction and maintenance costs compared to the leaf disk type. This filter is recommended for customers who need filters easy to handle and also for customers wishing to upgrade a little from screen changer filtration.

<Main Applications>
Optical sheets, protective film, shrink film, electronic film, lens grade granulation/compound, small to medium scale granulation, compound processes

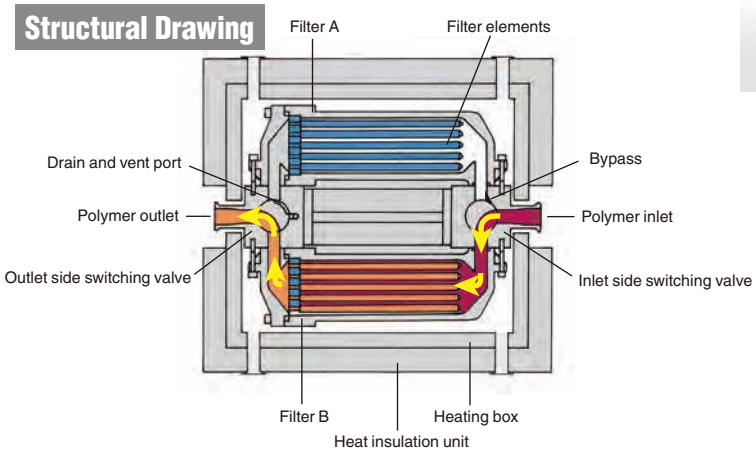
3. FUJI Polymer Filter (FPF) System (valve-switching type)

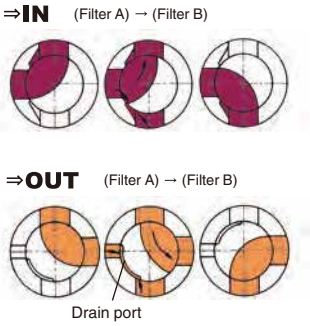
The FUJI Polymer Filter (FPF) System allows elements such as filtration and filters to be switched without affecting the temperature and is capable of continuous operation without interrupting the polymer manufacturing process for synthetic fiber, film and plastic products. The FPF system features a structure that minimizes stoppages of the polymer flow, a phenomenon that affects polymer quality, and, in particular, incorporates plug valves that enable realization of the ideal polymer flow channel.

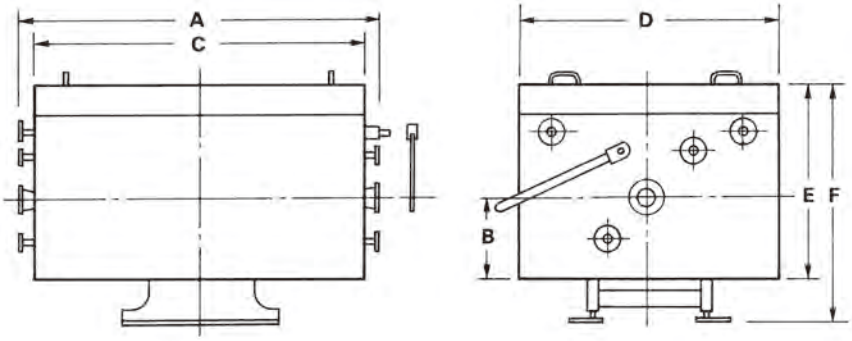
Features

- Ability to operate continuously, realizing an astonishing improvement in productivity
- Simple, compact structure that ensures ease of operation and maintenance
- Tribaloy alloy featuring outstanding friction resistance and self-lubricating performance is welded to the switching plug valve slides.

Structural Drawing







Model	*1 Maximum flow rate (kg/H)	*2 Filtration surface area (m²)	List of dimensions (mm)					
			A	B	C	D	E	F
FPF − 6N	140	0.32	1,250	590	1,090	820	600	950
FPF − 10N	190	0.42	1,250	590	1,090	820	600	950
FPF − 20NA	280	0.90	1,300	615	1,140	1,000	660	1,010
FPF − 20NB	385	0.90	1,300	615	1,140	1,000	660	1,010
FPF − 30N	555	1.20	1,300	615	1,140	1,000	660	1,010
FPF − 40N	950	2.10	1,340	650	1,160	1,110	760	1,110
FPF − 60N	1,300	2.90	1,430	705	1,250	1,310	805	1,155

*1: Maximum flow rate under the following conditions: Viscosity: 2,500Poise, Filtration accuracy: 20μm, Initial filtration pressure differential: 2.5MPa.
Conditions should be considered when selecting a model.
*2: Filtration surface area of 1 cartridge set using a tube element with a FUJIPLATE 14mm in diameter.
In addition, pleated candle and leaf disk type elements can be incorporated.
• The valve switching handle is removable. Since the handle is a ratchet type, it does not interfere with piping.
A terminal box is provided for electrical types.

4. FUJI Duplex Polymer Filter System (Valve-switching type)

The FUJI Duplex Polymer Filter (DPF) System is a leading filter system on polymer polymerization lines using FUJIPLATE (laminated metal sintered structure) and FUJI METAL FIBER (sintered metal non-woven fiber felt structure) as the filtration media. The vessel A or B filter is in constant operation, enabling uninterrupted operation. Extensive know-how based on technology and experience accumulated over many years is utilized in the system design to provide our users with an abundance of advantages.

Features

- Manufacture of filter systems matched to the needs of our customers
- Design that minimizes stoppages of the polymer flow (optimized flow balance design)
- Optimized element design and fabrication matched to applications and needs
- Use of valves and control system that ensure smooth switching

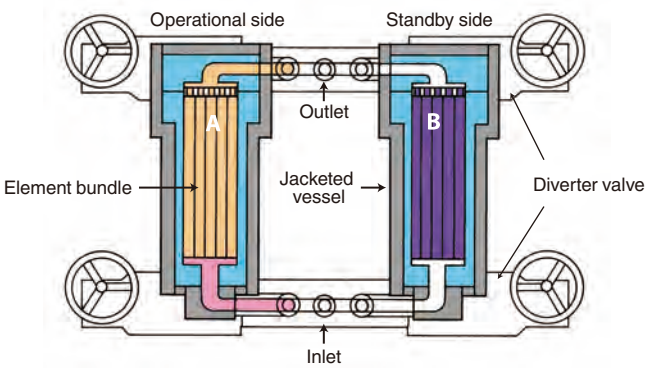
Applications

- Synthetic fiber polymerization lines
- Film chip polymerization lines
- Thermoplastic resin polymerization lines
- Engineering plastic polymerization lines
- Optical plastic lens polymerization lines
- Others

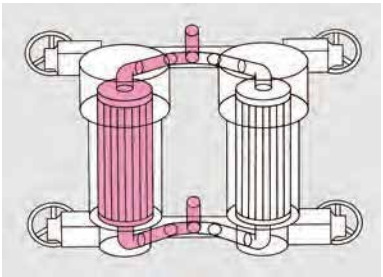
Specifications

MODEL	Connection Size	Minimum Filtration Area (㎡)
20D	6″ /8″	20≦
50D	8″ /10″	50≦
75D	10″ /12″	75≦

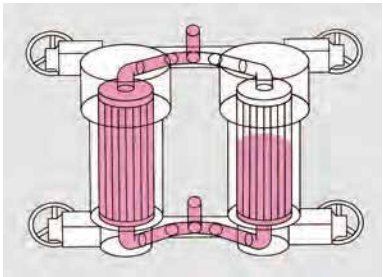
Structural Drawing



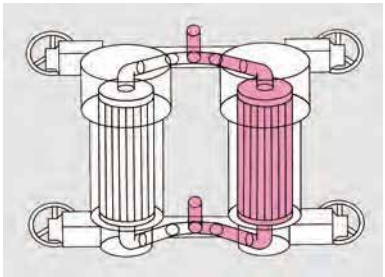
Flow



The vessel on the right side is in standby mode when the vessel on the left side is operating.



When the valve to the vessel on the right side opens, the valve on the left side gradually closes and the polymer begins to flow to the right.

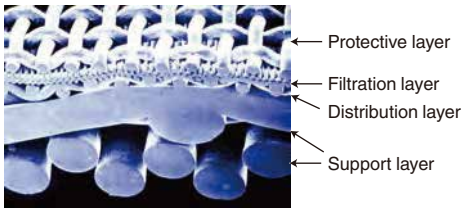


The vessel on the left side closes when the vessel on the right side operates.

– Filter Element Types –

FUJIPLATE / Laminated mesh

FUJIPLATE filter elements are made up of multiple layers of fine mesh that determines the filtration accuracy, support mesh and protective mesh matched to usage conditions, sintered together to form a fully integrated porous metal element. This is a surface filtration type with outstanding restorative cleaning performance that captures solid contaminants on the surface of the filtration control layer and is suitable for the removal of contaminants in polymer.
FUJIPLATE offers excellent heat, corrosion and pressure resistance with no delamination or mesh distortion, and can be readily machined. It is especially suitable for use with battery components where metallic contaminants must be avoided at all costs.



Cross-section of a five-layer structure

Features

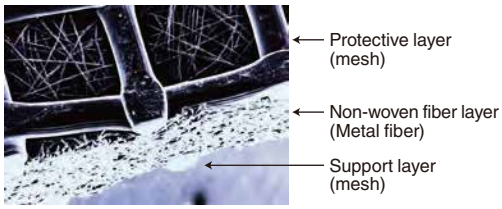
Effective for the removal of solid contaminants

Standard Specifications

- Material: SUS304, SUS316, SUS316L
  *Please ask about other materials.
- Base plate size: 300×500, 500×1000, 1200×1200
- Shapes
  <Cylindrical>: Dia. ϕ10.5, ϕ14, ϕ18, ϕ25, ϕ35, ϕ40, ϕ50mm
  Length: As required
  <Pleated>: Dia. ϕ35, ϕ50, ϕ60mm
  Length: As required
  <Disk>: Dia. ϕ2 ~ ϕ2000mm (As required)
  Length: 1.66mm
- Void rate: Approx. 35%
- Operating temperature: - 269 ~ 480
- Filtration accuracy: 0.5, 1, 2, 5, 10, 20, 40, 75, 100, 150, 200μm (nom)

FUJI METAL FIBER / Sintered metal non-woven fiber felt

FUJI METAL FIBER is a stainless steel (standard) non-woven filter made of laminated, sintered layers of metal fiber felt. This medium has excellent heat resistance, pressure resistance and corrosion resistance and is ideal for reducing fish eyes and thread severance during the filtration process. FUJI METAL FIBER has a deep filtration structure that realizes high filtration efficiency, low filtration resistance and a large contaminant retention capability. It provides outstanding performance, especially in the reduction and cutting of gel contaminants in high molecular polymers.



Cross-section

Features

Effective for gel cutting

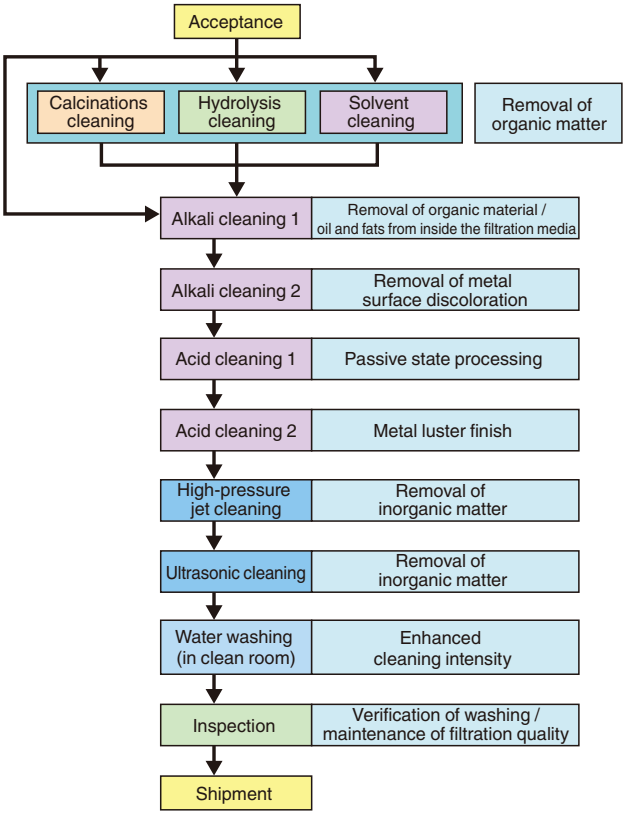
Standard Specifications

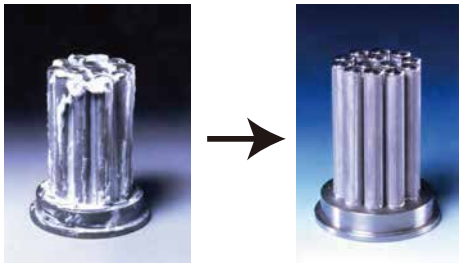
- Material: SUS316L
  *Please ask about other materials.
- Base plate size: 500×1000, 1000×1200
- Shapes
  <Cylindrical>: Dia. ϕ14, ϕ25, ϕ50, ϕ60mm
  Length: As required
  <Pleated>: Dia. ϕ35, ϕ50, ϕ60mm
  Length: As required
  <Disk>: Dia. ϕ30 ~ ϕ400mm (With frame)
  <Leaf disk>: FL-3 ~ FL-12
- Filtration material thickness: 0.30 ~ 0.65mm
- Operating temperature: - 269 ~ 480
- Filtration accuracy: 3, 5, 7, 10, 15, 20, 25, 30, 40, 60, 75, 80, 100μm (abs)

Restorative Cleaning of Polymer Filters

One of the features of polymer filters is that they can be cleaned and restored to enable repeated usage.
FUJI FILTER performs restorative cleaning of polymer filters in our own factory just like our costomer.

Restorative Cleaning procedure flow (example)





Before cleaning　　After cleaning

Heat treatment device

Heat treatment building at Plant No.3

(Examples of Cleaning Track Record) PET, PP, HDPE, LDPE, PS, EVA, PC, PMMA COP, COC, LCP

*Please ask about materials such as alloy polymers and resins other than the above.

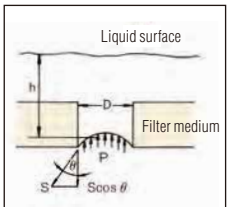
Valve Point Testing Procedure

● Valve Point Testing
(Reference standard: ASTM-E-128-61)

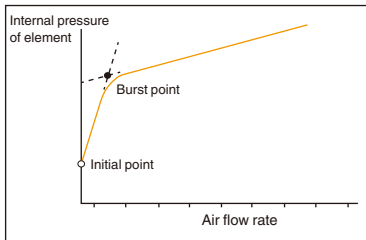
The filtration accuracy and the level of completeness of the product can be measured without destroying the filter elements. FUJI FILTER applies this testing during the inspection of products due to be shipped to guarantee quality.
The test-target filter is immersed in isopropyl alcohol and bubbles produced from the largest holes by gradually increasing the internal pressure of the filter from zero (initial point).
Comparison with the glass beads method at this point produces the following relationship:

$$\text{D (Filtration accuracy μm)} = \frac{3{,}700}{\text{Initial point P (Internal pressure mmH20 when the first bubble is produced)}}$$

In addition, increasing the internal pressure changes the air flow rate, making it possible to find the average filter hole diameter known as the “burst point.”

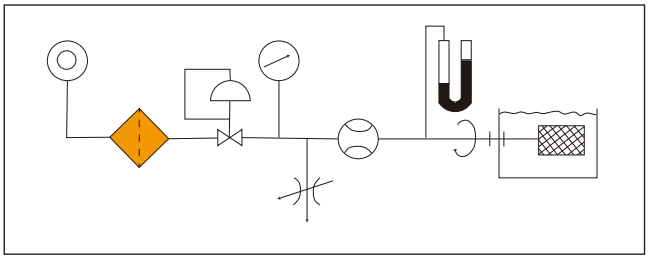


P: Pressure when bubbles are produced
S: Isopropyl alcohol interface tension
h: Liquid depth
y: Isopropyl alcohol density
θ: Wetting angle
D: Hole diameter



The method of finding the hole diameter is the same.

$$D(\mu m) = \frac{3{,}700}{P(mmH2O)}$$



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