are submitted for regular, comprehensive microscopic and chemical analysis to confirm they are completely contaminant free.

FSI is committed to remaining at the leading edge of innovation, as we continue to develop filtration products that revolutionize the industry. We were the first to introduce the Polyloc® bag ring, which completely eliminates the need for under-basket gaskets, as it hermetically seals to prevent liquid bypass. Our groundbreaking Polyweld® welded seam filter bag removes the risk of unfiltered bypass that needle holes on traditional filter bags allow through.

Our determination to lead rather than follow is one reason behind our vertically-integrated manufacturing process. Our emphasis on innovation and engineering expertise has helped us develop world-class filtration systems. The reason we do all this is simple – so that our customers can achieve the highest levels of product quality.
Our Experience Enables Us to:

- Assess the processing requirements of customer systems and fulfill them to our customers’ complete satisfaction.
- Provide the highest quality filtration products, filter bags and cartridge filters, and a wide range of filter vessels.
- Design and manufacture custom products to nearly any customer specification.
- Offer advanced filtration products, like the FSI BOS Polymicro® seamless design, and our Extended Life filter bags, which provide at least twice the dirt holding capacity of a standard felt bag, and which feature our no-bypass, welded seam design.
- Maintain a completely ISO 9000 certified North American network of manufacturing sources, where we create all elements of our filter and cartridge products, including the fiber for our in-house produced felts.
- Manufacture ASME code-compliant vessels designed to meet the needs and requirements of our clients’ most demanding liquid flows.
- Manufacture API compliant and NSF certified vessels.
- Meet custom filtration requirements by designing and manufacturing products to your particular specifications.

The FSI Quality Process at Work

Our worldwide FSI sales and distribution offices work with clients to determine the best product for their particular fluid application. Our experienced engineers and R&D staff then set out to create the best filters available on the market.

Next, our manufacturing locations in the United States, Mexico, Brazil, China and the U.K. take that data and create the perfect filtration solution to fit your needs.

Even after the sale, we continue to work with our clients. We continually check on how our products are performing, taking the feedback and data from those uses and applying them to update and improve our complete line of products. You can rely on FSI to work with you on your specific application requirements.
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Company Profile  Pages 3 - 4
Starting in 1972, FSI has earned a reputation for innovative designs and superior quality. Our patented Polyloc® ring system has set the standard for hermetically sealing collars, and the PolyWeld® process eliminates needle bypass.

Table of Contents  Pages 5 - 6
From bags to cartridges, from vessels to adsorbent material, it’s all here.

Our Quality Policy  Page 7
FSI is committed to quality, from our ASME code manufacturing to our ISO-9000 qualification. We meet or exceed all quality standards, and are committed to maintaining our quality.

Filter Bags  Pages 8 - 22
Our popular line of filter bags, including our Polymicro® seamless filter that eliminates unfiltered streams by eliminating needle holes.

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When your filtration needs create unique requirements, FSI can help. We make almost as many custom vessels as standard ones. Our engineers are well qualified to address your needs.

PPV Polypropylene Bag Filters 47
SBF Compact Bag Vessels 48
FMC Drum Filters 49
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Filter Vessels Duplex and Manifolded 51
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Accessories  Pages 53 - 54
Whether you need to compare specific non-hazardous substances or want to find a chart for the flow rate in pipe, you will find it here.

Glossary  Pages 62 - 69
From abrasion to woven, all the definitions needed to provide you with the fundamentals of filtration.
It’s well known that product quality and consistency are determined in the manufacturing process. By vertically integrating our production operations, we are able to maintain positive control, product quality and consistency over each step in the process.

During the production of fiber and felt, and then filter bags and cartridges, we assure strict product quality and consistency by exercising positive process control. At each step, we monitor the process against prescribed standards, providing the necessary feedback and documenting the results.

All steps taken throughout our manufacturing process are designed to ensure that our customers consistently receive the highest quality products to meet their filtration needs.

FSI filter media is identified and tracked with serialized, scannable barcode tags. Each tag’s information includes type of filter media, lot #, media quantity and date of manufacture, for absolute traceability on all media.

**ISO 9001/9002**

Filter Specialists, Inc. is ISO 9001/9002 certified for manufacture of specialized filters and accessories and non-code thermo plastic pressure vessels, manufacture of specialized filter system accessories, and the manufacture of ASME Section VII Division 1 & 2, and non-code pressure vessels, specializing in high pressure filters and filtration equipment.
Attention to Our Customers’ Needs

FSI is the leader in the industry for many reasons. First, FSI’s integrated technology manages the production of every filter bag, from fiber processing to the manufacture of the felt, to the final creation of the finished filter bag. Our state-of-the-art CNC cutting table produces a precision-cut bag for a uniform, consistent product. The increase in productivity and the dramatic reduction in scrap and waste also result in cost savings passed on to the customer.

Second, each filter bag we make is designed to meet the concerns our customers face every day: precise micron ratings, consistent performance, proper sealing, fiber migration and bag removal.

We also recognize that multiple filtration uses require multiple filter types. That’s why FSI manufactures both single- and multi-layered filter bags in a wide range of micron ratings, applicable for either vessel or open filtration systems.

Our felt bags come in a variety of materials: polyester, polypropylene, nylon, high temperature, and Teflon®. Our mono-filament mesh bags are constructed of single, untwisted threads, that are woven with evenly-spaced holes for better strength, perfectly suited for precise sifting, straining and classifying.

A wide assortment of collar and ring types are available to ensure compatibility with most bag vessels on the market. Most FSI filter bags come standard with the patented Polyloc® sealing ring, available in polypropylene, polyester and nylon. Our Polyloc ring provides a complete hermetic closure, and its self-aligning design eliminates the sealing concerns of traditional steel rings. Our Polyloc process even locks the fiber ends to virtually eliminate the possibility of migration. And we’ve designed built-in handles, to make bag removal easier, which helps prevent spillage.

For the filtration of liquids that contain more than one type of contaminant, FSI makes multi-layer filter bags, composed of different micron-rated material layers, to filter contaminants in graded stages from coarse to fine.

Features:

- Whether sewn or welded-seam, bags can be surface treated to reduce fiber migration. Glazed and singed finishes are available on most felt materials.
FILTER BAGS OVERVIEW

- FSI’s standard liquid filter bags of either polypropylene or polyester felt also incorporate the welded-seam design and the Polyloc® top for bypass-free filtration.

- Extended Life designs are available for longer life and fewer changeouts. Our Extended Life filter bags provide outstanding performance, twice the dirt holding capacity of a standard felt bag, and our famous no-bypass, welded-seam design. Its effectiveness is due to the increased thickness of material we use, and a graded pore structure that provides much greater depth than standard bags.

- Multilayer designs for more challenging applications. The FSI Polymicro® Microfiber multilayer filter bag provides for high contaminant loading and long service life.

- Absolute Rated filtration. The BOS Polymicro® filter bag offers absolute-rated filtration down to 3 microns, and offers an entirely seamless design for more precise filtration, better product cleanliness, higher flow rates and long service life.

- The Heavy Duty Extended Life seamless filter bag (BOSMAX) uses a semi-rigid cartridge inside a layered, graded-pore bag structure for much greater depth filtration than conventional filter bags and up to four times more than our standard bag.

- Another alternative to traditional bags is the PolyWeld® monofilament mesh, which offers high flow rates, long service life and consistent performance.

FSI Filter Bags come standard with the Polyloc® Snap Fit bag seal (far left), which creates a hermetic seal within the vessel housing, preventing liquid bypass. Polyloc rings are available in polypropylene, polyester and nylon. Many other ring options are available, such as a 304 Stainless Steel ring (near left).

FSI Multi-Layer Bags feature 2 or 3 layers of felt or mesh, providing greater depth filtration, as contaminants are removed in stages.

The PolyWeld® Monofilament Mesh Filter Bag offers higher flow rates, longer service life and more consistent performance, in nylon/polypropylene.
PolyWeld® CONSTRUCTION AND THE POLYLOC® RING

Introduction
FSI’s PolyWeld® filter bags hold a distinct advantage over all types of needle-sewn bags. The welded seams completely eliminate the possibility of unfiltered liquid bypass occurring due to needle holes. The result is a tighter seam, higher bag efficiencies and improved finish product yields. In addition, the fused edges of our PolyWeld bag provide a fiber-free finish and virtually eliminate unwanted fiber migration. Since the PolyWeld bag is not constructed with thread, the possibility of silicone contamination from this source is also removed. FSI’s PolyWeld filter bags are available in several different media: standard polypropylene felt, extended life polypropylene felt, and standard polyester felt.

Features of PolyWeld® Construction:
• A welded seam means no thread, and therefore, no additional source of silicone or other contaminants.

Polyloc® Ring
The top, together with the Polyloc® snap-fit ring, creates a hermetic seal within a vessel housing to prevent liquid bypass. The patented Polyloc ring fits securely over the lip of the restraining basket, eliminating the sealing concerns of ordinary steel ring bags. It is available in polypropylene, polyester and nylon materials. To facilitate bag removal, handles are built into the Polyloc ring. They provide a more stable grip to help prevent spillage during bag changeover.

The snap-fit ring can be installed in any new FSI FSPN/ BFN series housings, as well as previously installed FSP or FSPN housings. Made of 316SS, Teflon® coated, it is available for size 1 and 2 filter bags.
TABLES OF BAG SIZES AND OTHER DATA

**SAMPLE HOW TO ORDER**

*Example:* **BPONG10P2PWE**

- Type of Filter: 
- Material: 
- Micron Rating: 
- Cover: 
- Size: 
- Ring: 
- Suffix: (eg: WE = Welded seam construction)

**NOTE:**
A sample How To Order chart is depicted above to show how FSI part numbers are determined. Please refer to the specific How To Order chart for each section to determine the actual part number.

**FILTER FABRIC QUALITIES**

<table>
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<tr>
<th>Fabric</th>
<th>Cotton</th>
<th>Polyester</th>
<th>Glass</th>
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<td>Excellent</td>
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<td>Excellent</td>
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<td>Poor</td>
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<tr>
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**FILTER BAG DATA**

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<td>Volume Per Bag (gal/liter)</td>
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<td>Bag Diameter (inch/cm)</td>
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<td>7.0/17.8</td>
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<td>FSPN-40</td>
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<td>FSPN-20</td>
<td>FSPN-35</td>
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<td>and all multi-hole vessels</td>
<td>BFN-11</td>
<td>FSPN-250</td>
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**MICRON AVAILABILITY**

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<td>Teflon®</td>
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<td>Nylon</td>
<td>Monofilament Mesh</td>
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</table>

**Micron Rating**

- 001
- 003
- 005
- 007
- 010
- 015
- 025
- 030
- 040
- 050
- 060
- 070
- 080
- 090
- 100
- 125
- 150
- 175
- 200
- 250
- 300
- 400
- 600
- 700
- 800
- 1000
- 1500
FSI Felt Bags are the Answer

When it comes to felt filter bags, FSI has the answer. Our years of experience give us an advantage over our competitors, and our felt filter bags show it. Our felt bags are designed to withstand higher solid loading, and are suitable for applications using vessel or open filtration systems.

FSI’s “Comprehensive Manufacturing Control” philosophy insures that we will maintain our status as the industry leader in all phases of the filter business. Our integrated technology and superior control over our manufacturing and quality leads to consistent performance. With FSI filter bags, you can count on what you are getting.

We start with the finest material possible. FSI produces the felt material used in our felt filter bags in-house, guaranteeing the highest quality. Our Extended Life filter bag provides superior filtration of all sized particles over traditional filter bags, as well as up to twice the dirt holding capacity of a standard filter bag.

Features:
- We offer a full line of felt materials and micron ratings.
- Conventional sewn bags or the PolyWeld® welded seam bags available.
- Conventional bag rings or the FSI Polyloc® ring available on most bags.
- Heavy Duty and Extended Life designs available to suit your filtration needs.

Standard Bag Sizes

**SIZE 1:**
- Diameter: 7” (17.8 cm)
- Length: 16” (40.65 cm)

**SIZE 2:**
- Diameter: 7” (17.8 cm)
- Length: 32” (81.3 cm)
- Compatible with FSI Filter Models FSP/FSPN-45, FSP/FSPN-250, the BFN-12, and all multi-hole vessels.

Polymicro® material is a specially designed melt-blown polypropylene fiber with excellent oil-absorbing characteristics.

Synthetic felts provide depth filtration and higher solid loading capacity than comparable mesh fabric bags.

Our no-bypass welded seams eliminate the possibility of fluid bypass through needle holes. We provide a variety of glazed and singed finishes to inhibit fiber migration. FSI also offers polypropylene and polyester inserted felts. These inserted felts include a reinforcing scrim needled inside the felt material, to provide added strength and durability.
Providing Consistent Performance

The FSI PONG filter bag is one of the most versatile and popular bags on the market. Made from a non-inserted polypropylene felt with a glazed surface finish, the standard bag incorporates the PolyWeld® welded seam design. The Polyloc® ring provides hermetic sealing, preventing steel ring bypass problems. And the welded seam eliminates unfiltered liquid bypass occurring due to needle holes. The PENG filter bag is made from non-inserted polyester, and can be ordered with the polyester Polyloc ring.

These bags come in a variety of sizes and ring seals to suit your vessel requirements.

Standard Bag Sizes (Continued)

SIZE 3:
Diameter:  4" (10.2 cm)
Length:   8.25" (20.9 cm)
Compatible with FSI Filter Model FSP/FSPN-20
and the BFN-13.

SIZE 4:
Diameter:  4" (10.2 cm)
Length:   14" (35.5 cm)
Compatible with FSI Filter Model FSP/FSPN-35
and the BFN-14.

HOW TO ORDER

Example:  BPONG10P2PC

Type of Filter:
B = Bag

Material:
PE = Felt, Polyester
PO = Felt, Polypropylene
HT = Felt, High Temp.
TFE = Felt, Teflon
N = Felt, Nylon
N = Non-inserted felt
I = Inserted felt
G = Glazed finish (felt)
F = Fuzzy finish
(polyester felt only)

Micron Rating:
PO: 1, 3, 5, 10, 25, 50, and 100
PE: 1, 3, 5, 10, 25, 50, 75, 100, 200
(refer to Pg. 11 for other felt materials)

Cover:
P = Plain (no cover)
PEM = Polyester multifilament
NMO = Nylon monofilament

Size:
1:  7" x 16"
2:  7" x 32"
3:  4" x 8.25"
4:  4" x 14"
5*:  6 1/2" x 34"
6*:  6 1/2" x 16 1/2"
7:  5 1/2" x 16"
8:  5 1/2" x 22"
9:  5 1/2" x 33"

Ring:
P = Polyloc
PE = Polyester Polyloc
N = Nylon Polyloc
C = Cuno
S = Snap fit metal
SSS = Stainless steel snap fit
CO = Commercial steel ring
COP = Commercial plastic ring
RP = Ronningen-Petter snap fit
RPP = Ronningen-Petter plastic ring
RPF = Ronningen-Petter flange

Suffix:
WE** = Welded seam construction
A = Auto construction
LOOPS = Loops
C = Cotton handle
N = Nylon handle
W = DI Washed
R = Reverse collar

NOTE:
* = Sizes 5, 6, available with S ring only.
** = Available in Sizes 1 and 2, Polypropylene and Polyester non-inserted only.
The Extended Life Filter Bag (POEX/PEEX)

Introduction
The Extended Life filter bag (POEX and PEEX) provides outstanding performance on many types of contaminants such as gels, particles with wide ranges of sizes and particles with various irregular shapes. The coarse pre-filtering layer is designed to provide long service life, capturing a large amount of contaminants without excess surface loading. The POEX has been field-proven to hold up to twice the amount of contaminants as a standard felt bag, reducing waste volume and bag changes. The Extended Life filter bag is ideal for automotive coatings, chemicals, resins, edible oils and other fluid applications.

Features:
• With a coarse inner layer, a graded pore structure and much greater depth than a standard filter bag, the composite bag design captures a wide range of contaminant particle sizes.
• Twice the standard dirt holding capacity of traditional felt bags provides longer service life, fewer change-outs and reduced waste.

HOW TO ORDER

Example: BPOEX10P2PWE

- Type of Filter: B = Bag
- Material:
  - PEEX = Polyester extended life felt
  - POEX = Polypropylene extended life felt
- Micron Rating: 5, 10, 25, 50 and 100
- Cover: P = Plain (no cover)
- Size:
  - 1: 7” x 16”
  - 2: 7” x 32”
- Ring:
  - P = Polyloc
  - PE = Polyester Polyloc
  - COP = Commercial plastic ring
  - S = Snap fit (available with sewn seams only)
- Suffix: WE = Welded seam construction

• PolyWeld® seam construction in combination with the hermetically sealing Polyloc® top to eliminate liquid bypass.
• Glazed finish to virtually eliminate unwanted fiber migration.

Standard Bag Sizes
#1: 7” dia. x 16” long
#2: 7” dia. x 32” long
Suggested differential pressures:
- 35 PSIG maximum – dirty
- 10 –15 PSIG optimum change out
- 1 – 3 PSIG initial
Operating temp.: 200°F max. – polypropylene

The Extended Life Filter Bag, compared to a standard bag, shows its increased thickness.
**Polymicro® Microfiber Filter Bag (POMF)**

**Introduction**

The Polymicro® Microfiber Filter Bag (POMF) provides outstanding performance on contaminant applications where the minimalization of particle travel is important. The POMF contains three layers: a pre-filtering layer that removes coarse debris; the primary layer, composed of micro pores (for efficient particle retention); and an outer cover that prevents fiber migration. The finish-free fibers are non-foaming, which is ideal for food, beverage, water, chemical and coatings applications.

**Features:**

- The hydrophobic surfaces adsorb oil from air, gas and aqueous streams.
- Microfiber offers product cleanliness, higher through-put and longer service life.
- 80% + void volume means longer service life, higher contaminant loading and reduced waste loads.
- POMF 1A, 2A, 10A and 25A bags are made from FDA-compliant materials (OA bags also include an additional layer of oil removing material).

<table>
<thead>
<tr>
<th>HOW TO ORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example:</td>
</tr>
<tr>
<td>Type of Filter:</td>
</tr>
<tr>
<td>Material:</td>
</tr>
<tr>
<td>Cover:</td>
</tr>
<tr>
<td>Size:</td>
</tr>
<tr>
<td>Ring:</td>
</tr>
</tbody>
</table>

- The unit compacts to small volume to reduce disposal cost, or can be incinerated.
- The dimensionally stable material provides more consistent performance.
- The Polylcoc® top is standard on the FSI filter bag, creating a hermetic seal within a vessel housing to prevent liquid bypass.

**Standard Bag Sizes**

- #1: 7” dia. x 16” long, 65 GPM
- #2: 7” dia. x 32” long, 125 GPM
- #3: 4” dia. x 8.25” long, 20 GPM
- #4: 4” dia. x 14” long, 35 GPM (with Polylcoc or steel snap ring)

Suggested differential pressures:

- 35 PSIG maximum – dirty
- 10 –15 PSIG optimum change out
- 1 – 3 PSIG initial

Operating temp.: 200°F max. – polypropylene
**Introduction**

The Polymicro® seamless filter bag (BOS), constructed entirely without seams, is composed of continuous length microfibers which vary in diameter throughout the length of the filter medium. This unique property develops a higher efficiency, graded pore-size distribution for absolute filtration.

The reason this bag is so unique is due to its construction. The Polymicro® seamless bag is a hybrid, combining the best features of filter cartridges and conventional filter bags. The result is superior depth, pore gradient and of course, its seamless construction. This, coupled with the classic advantages of filter bags – lower pressure drop, higher throughput and easier change-out – result in lower operating costs.

Thermally bonded microfibers create a seamless filter bag that has exceptionally low tensile strength, providing superior resistance to channeling, unloading, bypass and other forms of traditional leakage that result from pulsating water (i.e. water hammer or cold starts). The benefits of using this advanced filter bag are larger dirt holding capacity, longer service life and more precise particle retention. All of FSI’s Polymicro® seamless filter bags have a durable multifilament mesh cover that provides structural support and abrasion resistance and facilitates installation and removal from the filter housing.

We manufacture the Polymicro® seamless bag from 100% polypropylene resin. This eliminates any need for fiber bonding agents such as resins and adhesives. FSI’s seamless filter bags are free of foreign substances which could contaminate your process fluid.

Standard on the Polymicro® seamless filter bag is the Polyloc® ring, sonically welded to the filter bag, providing a hermetic seal between the bag and the housing.

The Polymicro® seamless filter bag is an ideal product for use in a wide variety of high-purity applications, including edible oil, soft drinks, sugar syrup, paints, coatings, plating solutions, inks, cosmetics, pharmaceuticals, potable water and electronic-grade water used in semiconductor manufacturing. Overall, the finest filter bag you can buy.

**Features:**

- Seamless construction offers the unequalled benefit of eliminating fluid bypass through needle holes.
- The hydrophobic surfaces adsorb oil from air, gas and aqueous streams.
- The microfiber-graded pore design provides longer service life, higher dirt load and lower initial pressure drop.
- The dimensionally stable material provides more consistent performance.
- FSI’s pure fibers contain no sizing, bonding adhesive, resin or silicone, making them FDA compliant with a lower TOC content and a faster rinse-in to 18 MEGOHM.
- The unit compacts to small volume to reduce disposal cost, or can be incinerated.
- The Polyloc® top is standard on the FSI filter bag, creating a hermetic seal within a vessel housing to prevent liquid bypass.
POLYMICRO SEAMLESS FILTER BAGS (BOS)

FSI thoroughly tests the Polymicro® seamless (BOS) filter bag to ensure consistent quality and accurate filtration ratings. The integrity of the manufacturing process and the reliability of the BOS bag provides you with the assurance that the same high quality will extend to your product. This bag is designed for use in an FSI basket only.

Standard Bag Sizes
#1: 7” dia. x 16” long
#2: 7” dia. x 32” long
(all with Polyloc ring)
Suggested differential pressures:
35 PSIG maximum – dirty
10 – 15 PSIG optimum change out
1 – 3 PSIG initial
Operating temp.: 200°F max. – polypropylene

Micron Ratings

<table>
<thead>
<tr>
<th>Part #</th>
<th>98% Efficiency (Absolute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOS 3</td>
<td>3 µm</td>
</tr>
<tr>
<td>BOS 5</td>
<td>5 µm</td>
</tr>
<tr>
<td>BOS 10</td>
<td>10 µm</td>
</tr>
<tr>
<td>BOS 25</td>
<td>25 µm</td>
</tr>
<tr>
<td>BOS 35</td>
<td>35 µm</td>
</tr>
<tr>
<td>BOS 50</td>
<td>50 µm</td>
</tr>
<tr>
<td>BOS 75</td>
<td>75 µm</td>
</tr>
<tr>
<td>BOS 100</td>
<td>100 µm</td>
</tr>
</tbody>
</table>

HOW TO ORDER

Example: BOS5PM2P

- **Material:**
  - BOS = Polymicro seamless

- **Micron Rating:**
  - 3, 5, 10, 25, 35, 50, 75 and 100

- **Cover:**
  - PMO = Polypropylene
  - PM = Polyester
  - Standard

- **Size:**
  - #1: 7” x 16”
  - #2: 7” x 32”

- **Ring:**
  - P = Polyloc
BOS MAX Heavy Duty Extended Life Filter Bags

Introduction
The Heavy Duty Extended Life filter bag (BOSMAX) uses innovative construction and an advanced design to provide extended life and increased efficiency. A semi-rigid, graded density cartridge inserted in a layered, graded-pore bag structure utilizes increased thickness for much greater depth filtration than conventional filter bags, and up to four times more than even our standard BOS bag. The Heavy Duty Extended Life filter bag is ideal for high-purity applications, edible oils and syrups, paints, chemicals, coolants, pharmaceuticals and many water applications.

Features:
- Seamless construction eliminates unfiltered bypass through needle holes.
- Microfiber cartridge insert creates a larger dirt holding capacity and longer service life, while absorbing smaller particles and filtering a wider range of particle sizes.
- FSI’s pure 100% polypropylene fibers contain no sizing, bonding adhesive, resin or silicone, making them FDA compliant with a lower TOC content and a faster rinse-in to 18 MEGOHM.
- Durable multifilament mesh cover provides abrasion resistance and easier installation and removal from filter housing.
- The Polyloc® top is standard on the FSI filter bag, creating a hermetic seal within a vessel housing to prevent liquid bypass.

Standard Bag Sizes
#1: 7” dia. x 16” long
#2: 7” dia. x 32” long
Suggested differential pressures:
- 35 PSIG maximum – dirty
- 10 – 15 PSIG optimum change out
- 1 – 3 PSIG initial
Operating temp.: 200°F max. – polypropylene

Micron Ratings

<table>
<thead>
<tr>
<th>Part #</th>
<th>98% Efficiency (Absolute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOS 3</td>
<td>3 µm</td>
</tr>
<tr>
<td>BOS 5</td>
<td>5 µm</td>
</tr>
<tr>
<td>BOS 10</td>
<td>10 µm</td>
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<tr>
<td>BOS 25</td>
<td>25 µm</td>
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<tr>
<td>BOS 35</td>
<td>35 µm</td>
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<tr>
<td>BOS 50</td>
<td>50 µm</td>
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<tr>
<td>BOS 75</td>
<td>75 µm</td>
</tr>
<tr>
<td>BOS 100</td>
<td>100 µm</td>
</tr>
</tbody>
</table>

HOW TO ORDER

Example: BOS5PM2PMAX

Material:
BOS = Polymicro seamless
Micron Rating:
3, 5, 10, 25, 35, 50, 75 and 100
Cover:
PM = Standard polyester multifilament
PMO = Polypropylene multifilament
Size:
1: 7” x 16”
2: 7” x 32”
Ring:
P = Polyloc
Suffix:
MAX = Maximum life
**Introduction**

The PONG Heavy Duty Extended Life filter bag (MAX PONG) is the leader in high-efficiency, low-cost filtration. Its seamless micro-fiber graded density cartridge insert removes trace oils that frequently occur in process fluids, and provides four times the dirt-holding capacity of conventional polypropylene bags. Combined with its welded seam felt cover and Polyloc® ring for elimination of unfiltered bypass, it becomes the perfect choice for uses where longer-lasting, higher-efficiency filter bags are needed. The MAX PONG Heavy Duty Extended Life filter bag is ideal for continuous flow applications such as e-coat and phosphate baths, and batch applications including oils, edible oils and syrups, or any final or polishing filter requirements.

**Features:**

- Welded seam construction eliminates unfiltered bypass through needle holes.
- Seamless microfiber graded density cartridge insert creates a larger dirt holding capacity and longer service life, while absorbing smaller particles and filtering a wider range of particle sizes.

- FSI’s 100% pure polypropylene felt contains no sizing, bonding adhesive, resin, lubricant, silicone or antistatic chemicals, making it FDA compliant and non foaming with a lower pressure drop.
- The non-inserted glaze finish inhibits fiber migration.
- The Polyloc® top is standard on the FSI filter bag, creating a hermetic seal within a vessel housing to prevent liquid bypass.

**Standard Bag Sizes**

- **#1:** 7” dia. x 16” long
- **#2:** 7” dia. x 32” long

Suggested flow and pressure drop:
- **Size #1:** 45 GPM maximum
- **Size #2:** 85 GPM maximum
  - 35 PSIG maximum – dirty

Operating temp.: 200°F max. – polypropylene
**PolyWeld® Monofilament Mesh Filter Bags (NMO)**

**Introduction**

The PolyWeld® Monofilament Mesh Filter Bag (NMO) is constructed using a woven fabric. Each thread is a single filament, providing excellent strength with no fiber migration. The fabric is designed with evenly-spaced holes. The monofilament yarn used in the fabric is extremely abrasion resistant, resistant to a broad range of chemicals, unaffected by metal fatigue or corrosion, has no loose fibers and boasts high tensile strength.

**Features:**

- Welded seam construction (size 3 & 4 bags) eliminates fluid bypass through needle holes.
- Uniform mesh openings provide precise filtration.
- The mesh filaments will not shift or deform under pressure.
- The scoured finish means higher purity that is oil and lubricant free.
- The dimensionally stable material provides consistent performance.

- The unit compacts to small volume to reduce disposal cost.
- Smooth fiber surface provides excellent cake release and superior resistance to binding.
- The Polyloc® top is standard on the FSI filter bag, creating a hermetic seal within a vessel housing to prevent liquid bypass.

**Monofilament Mesh** is a woven fabric where each thread is a single filament, boasting excellent strength with no fiber migration.

**HOW TO ORDER**

*Example:*

BNMO150P4PWE

**Type of Filter:**

- B = Bag

**Material:**

- NMO = Mesh, Nylon monofilament

**Micron Rating:**

- NMO = 1, 5, 10, 25, 35, 45, 55, 65, 75, 100, 125, 150, 175, 200, 250, 300, 400, 600, 800, 1200.

**Cover:**

- P = Plain (no cover)

**Size:**

- 3: 4” x 6”
- 4: 4” x 12”

**Ring:**

- P = Polyloc

**Suffix:**

- WE = Welded seam construction
**OTHER MESH FILTER BAGS**

**FSI Makes Mesh Bags for all Needs**
All the FSI mesh bags are constructed using a woven or knitted fabric. Whether your particular environment requires a single filament mesh that provides excellent strength with no fiber migration, or a woven multi-strand mesh designed for low-cost, disposable bags, we have your needs covered. The yarn in all of our mesh filter bags is extremely abrasion resistant, resistant to a broad range of chemicals, unaffected by metal fatigue or corrosion and boasts high tensile strength.

**FSI Mesh Filter Options Include:**
- Nylon monofilament (NMO) filter bags.
- Polyester multifilament (PEM) filter bags.
- Polyester monofilament (PEMO) filter bags (requires special order).
- Polypropylene monofilament (PMO) filter bags

**Multifilament Mesh** is a woven fabric where each strand consists of many smaller diameter threads. Combines low-cost and disposability.

---

**HOW TO ORDER**

**Example:**

```
BPEM100P1P A
```

**Type of Filter:**
- B = Bag

**Material:**
- NMO = Mesh, Nylon monofilament
- PEM = Mesh, Polyester multifilament
- PEMO = Mesh, Polyester monofilament
- PMO = Mesh, Polypropylene multifilament

**Micron Rating:**
- NMO = 1, 5, 10, 25, 35, 45, 55, 65, 75, 100, 125, 150, 175, 200, 250, 400, 600, 800, 1200.
- PEM = 75, 100, 125, 150, 200, 250, 400, 800, 1500.
- PMO = 100, 150, 200, 250, 300, 600, 800.

**Cover:**
- P = Plain (no cover)

**Size:**
- 1: 7” x 16”
- 2: 7” x 32”
- 3: 4” x 8 ½”
- 4: 4” x 14”
- 5: 6 ½” x 16”
- 6: 6 ½” x 34”
- 7: 5 ½” x 16”
- 12X18D: 12” x 18” Drawstring
- 18X24D: 18” x 24” Drawstring
- 18X28D: 18” x 28” Drawstring

**Ring:**
- P = Polyloc
- PE = Polyester Polyloc
- C = Cuno
- N = Nylon Polyloc
- S = Snap fit metal ring
- SSS = Stainless steel snap fit
- CO = Commercial steel ring
- COP = Commercial plastic ring
- RP = Ronningen-Petter snap fit
- RPP = Ronningen-Petter plastic
- RPF = Ronningen-Petter 8” Flange Ring

**Suffix:**
- WE = Welded seam construction (available on sizes 3 & 4 NMO only)
- A = Auto construction
- LOOPS = Loops
- C = Cotton handles
- R = Reverse collar
- N = Nylon handles
- W = DI washed
CUSTOM FILTER BAG PRODUCTS

FSI Custom Capability
As a leader in the manufacturing of quality filtration products, FSI has the experience and insight to create specialty products for unique applications. FSI engineers assess the processing requirements of customers, so that custom designs may be created to provide accurate and efficient filtration under unusual conditions or circumstances.

FSI offers custom-sized and custom-shaped bags in a variety of materials. One of your best choices is our exclusive Polymicro® material, designed to removed tramp oil from liquids. Or you can choose any of our synthetic felt or mesh products for your filter material. Either way, you’ll have the same attention to detail and assurance of quality that comes with all of our standard filter bag products.

As one of the acknowledged leaders in bag filtration, FSI has provided more custom bag filters than any other manufacturer. From filter bags to 8x8 square filters, cone filters, and VORTI SIV screens, we specialize in custom built solutions. In addition to bag media, some of our other custom built solutions include:

- Jacketed bag filter vessels – designed to maintain the temperature of hot or cold liquids during processing.
- Portable filtration systems – self-contained units that may be installed in-line for batch processing during tank or field service.
- Duplex filter units – two units fitted together with valves to permit continuous use of either unit while servicing the other.

Please refer to the Bag Filter Vessels section for additional information on these products.
FILTER CARTRIDGE OVERVIEW

Advanced Design, Higher Efficiency
FSI filter cartridges are the result of extensive research and development, backed by state-of-the-art manufacturing. Unlike most other manufacturers, FSI makes most of its yarn and winds all of its cartridges in-house to meet the highest quality standards. We use an exclusive patented process to manufacture our Vorex filter cartridges. This unique process thermally bonds pure polypropylene microfibers into a graded pore structure. This process prevents surface loading and results in a true depth filter cartridge that is perfect for many high-end uses.

Whether you choose our Polywound®, Vorex or Vorex HP cartridges, you can count on our filter cartridges to perform efficiently and consistently.

FDA Compliant, NSF Certified Materials
FSI offers filter cartridges which meet FDA guidelines and are certified under NSF standards:

- FSI’s polypropylene microfiber media complies with the appropriate U.S. Food and Drug Administration guidelines, as outlined in the Code of Federal regulations, Title 21, Sections 177.1520 (a), (1) and Section 177.1520 (c), (1.1).

- FSI’s Vorex and Vorex HP (with silicone gaskets) microfiber cartridges are certified by NSF International under ANSI/NSF Standard 42.

- Vorex cartridges meet the requirements of a USP Plastic Class VI as demonstrated by USP Biological Reactivity Tests, In Vivo.

Additional Features:
- Our Polywound® cartridges provide an exceptional quality media filter option. Nominally rated Polywound cartridges are available in a wide array of yarn and core materials, and are designed to meet a variety of industrial processing needs.

- Polypropylene, tinned steel, 304 stainless steel or 316 stainless steel cores available on Polywound® cartridges. Extended core materials also available on request.

- Our standard Vorex cartridge is a nominally rated cartridge that supports many industrial and chemical applications.
FILTER CARTRIDGE OVERVIEW

• The graded pore design of our Vorex filter cartridges provides high void volume for maximum dirt loading, lower pressure drops, higher flow rates and longer service life.

• The filter media of our Vorex filter cartridges will absorb oil from air, gases and aqueous solutions, thereby separating oils more efficiently from processing fluids.

• The Vorex HP filter provides a particle retention rate of 99% for true absolute filtration.

• FSI offers the X20 filter, manufactured exclusively for our X100 convertible filter vessel. Made using the same advanced-design techniques as our Vorex cartridges, the X20 offers dirt holding capacity equivalent to twenty similar 10” cartridges for the best value in cartridge filtration.

It is clear that FSI has a filter to meet any filtration need you may encounter, ready when you need them. FSI’s line of filter cartridges offers the highest quality, economical cartridge filtration on the market.

And for your unique needs, FSI meets custom filtration requirements by designing and manufacturing cartridge filters to your specifications for I.D., length, material and core materials.

FSI offers a wide variety of core materials, including polypropylene, tinned steel and stainless steel, to meet a variety of industrial needs.
**Introduction**

FSI Polywound® filter cartridges are the result of years of experience, as well as extensive research and development, and state-of-the-art manufacturing technology. We start with most of our yarns made in-house, unlike other manufacturers. We then wind all our cartridges to meet the highest quality standards. This attention to quality creates one of the most reliable, affordable cartridge filters available.

**Features:**

- Our attention to detail allows us to create a high-quality cartridge filter with high particulate retention capabilities over an extended life, all at an economical price.
- The filter medium is nominally rated and supports a wide range of industrial and chemical applications.
- Wide selection available. Choose from bleached cotton, polyester and polypropylene media, and core materials including polypropylene, tinned steel, 304 and 316 stainless steel.
- Well suited for applications such as paints, coatings and high-viscosity chemicals that need large particle filtration.
- Extended core cartridges are available on request.

**HOW TO ORDER**

Example: CWPO010P10

<table>
<thead>
<tr>
<th>Type of Filter:</th>
<th>CW = Wound cartridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material:</td>
<td>PO = Polypropylene</td>
</tr>
<tr>
<td></td>
<td>PE = Polyester</td>
</tr>
<tr>
<td></td>
<td>BC = Bleached cotton</td>
</tr>
<tr>
<td>Micron Rating:</td>
<td>001, 005, 010, 025, 050, 075, 100 and 150</td>
</tr>
<tr>
<td>Core:</td>
<td>P = Polypropylene</td>
</tr>
<tr>
<td></td>
<td>S = 304 SS</td>
</tr>
<tr>
<td></td>
<td>T = Tinned steel</td>
</tr>
<tr>
<td></td>
<td>X = 316 SS</td>
</tr>
<tr>
<td>Length:</td>
<td>6” 9.75” 10” 19.5” 20” 29.25” 30” 39” 40”</td>
</tr>
</tbody>
</table>
Vorex Filter Cartridges

Introduction
The new and improved Vorex filter cartridge is designed for higher efficiency and fewer changeouts.

Our Vorex filters are manufactured through an exclusive process that thermally bonds pure polypropylene microfibers. Lower density fibers are at the surface and sequentially higher density fibers are used toward the center. This process traps particles more evenly throughout the cross section.

The Vorex is a nominally rated filter that works well as either a pre-filter or final filter in a wide range of applications including industrial, chemical process, food & beverage, cosmetics and water.

FDA Compliant, NSF Certified Materials
FSI offers filter cartridges which meet FDA guidelines and are certified under NSF standards:

- FSI’s polypropylene microfiber media complies with the appropriate U.S. Food and Drug Administration guidelines, as outlined in the Code of Federal regulations, Title 21, Sections 177.1520 (a), (1) and Section 177.1520 (c), (1.1).
- Vorex filter cartridges are certified by NSF International under ANSI/NSF Standard 42.

Features:
- Greater dirt holding – longer life
- Fewer filter changeouts
- No fiber migration
- 100% polypropylene
- High flow rates with lower pressure drops
- Easy disposal (incinerates to non-volatile trace ash)
- Supports a wide range of industrial and chemical applications
- Very competitive economical pricing

HOW TO ORDER

Example:
CMMF02520

Type of Filter:
CM = Meltblown cartridge

Material:
MF = Microfiber
MFGF = Microfiber, glazed finish

Micron Rating:
001, 005, 010, 025,
050, 075, 100 and 150

Length*:
9.75”
10”
19.5”
19.75”
20”
29.25”
30”
39”
39.5”
39.75”
40”


Vorex filter cartridges meet the requirements of a USP Plastic Class VI as demonstrated by USP Biological Reactivity Tests, In Vivo.
Introduction

The all new absolute-rated Vorex HP cartridge provides superior flow, increased dirt holding capacity and a lower pressure drop. The HP cartridge is manufactured with 100 percent polypropylene microfibers and core. Thermal bonding eliminates the need for bonding resins and adhesives, which may be contaminants themselves. The innovative core provides stability, which allows for the use of very fine microfibers to greatly improve the filtration efficiency. The microfibers vary in thickness throughout the depth of the cartridge to attain an optimal gradient density with a much larger void area. The benefit is substantially longer on-stream life, increased dirt holding, and a lower pressure drop. The new Vorex HP cartridge delivers a highly cost effective filtration solution.

The Vorex HP is excellent for many high purity and standard industrial applications including chemical process industry, pure water filtration, metal finishing, metal working, magnetic media, photographic, petrochemicals and potable water.

Features:

- Premium performance for the cost of lower rated cartridges.
- Absolute rated – 99 percent efficient.
- Up to twice the dirt holding capacity for longer life.
- Available in standard sizes and different end cap configurations.
CARTRIDGES

VorexHP Filter Cartridges

- Our thermally bonded microfiber is formed into a highly porous and rigid seamless tube with fixed-size pores and voids.
- The Vorex HP cartridge will not cause foaming because pure polypropylene microfibers have no extrusion oils, surfactants or antistatic chemicals.
- Our 100% polypropylene microfiber provides exceptionally low total organic carbon (TOC) contents and a fast rinse-in to 18 megohm D.I. water, making it an ideal filter for applications requiring stringent cleanliness.
- The Vorex HP is extremely resistant to collapse, channeling and bypass. The filter medium will not compress and unload trapped contaminants.
- The hydrophobic surfaces adsorb oil from air, gas and aqueous streams.
- Vorex HP cartridges meet FDA regulations for food contact under the Code of Federal Regulations, title 21, section 177.1520.
- Vorex HP cartridges with Silicone gaskets are certified by NSF International under ANSI/NSF Standard 42.
- Available with a variety of end fittings and sealing options (SOE/DOE) and O-ring or flat gaskets, to ensure bypass-free, absolute-rated filtration.

Suggested Differential Pressures

35 PSIG maximum – dirty
15 PSIG optimum change out
1 – 3 PSIG initial
Operating temp.: 200°F max. – polypropylene
We manufacture the highest-quality melt blown, graded density polypropylene cartridges in the size you need. Call FSI today.

Specialty Products Made Right
You can trust FSI when it comes to manufacturing filters for your unique needs. From our trained sales engineers to our dedicated material designers, we can create what you need, when you need it.
**Polysorb® cleans up oil spills**

FSI manufactures Polysorb® as an alternative to clean-up products. Polysorb is constructed from a melt-blown polypropylene fiber and is available in sheets, rolls and oil tubes. Compared to using sorbent granules, shop rags or solvents, Polysorb is more reliable, faster and easier to use and more cost-efficient.

Polysorb® also has low flammability, and resists temperature and humidity extremes. It won’t deteriorate when stored on the shelf or outside in exposed conditions.

Polysorb® has numerous applications, especially where speed, ease of use, storage space and disposal are a concern. Ideal in manufacturing environments for machine leaks, overspray, repair and maintenance, as well as oil production, agriculture, marinas and more. It’s the low-cost answer to troublesome oil spills, drips and leaks.

**Features**

- Polysorb® adsorbs 13 to 25 times its own weight in petroleum based liquids in a matter of seconds. Speed of adsorption depends upon the density and viscosity of the petroleum-based liquid.
- Polysorb® is water-repellent and buoyant, so it won’t sink, break down or lose its effectiveness.
- Easy and economical disposal. Can be incinerated, or buried in accordance with EPA regulations. When buried, it requires much less volume than sorbent granules.
- Easy to lay down where you want it, and stays together for easier pick-up.
- Completely reusable, Polysorb® may be wrung out and placed back into service almost immediately. And the sheet-manufactured Polysorb can be folded compactly for easier storage.
- Use Polysorb® to help skim oils off coolant tanks.
Vessel Overview

Efficiency and Productivity
There's a reason why FSI bag vessels are some of the most frequently specified filters on the market. Expertly engineered for reliability and ease of use, you'll find our filter vessels will make your fluid lines more productive and more effective. Our bag filter vessels are designed to make the most efficient use of FSI Polyloc® filter bags, providing bypass-free seals. They also accept conventional ring-type bags. And they're built to meet demanding ASME Code requirements in our own ASME-certified manufacturing facilities. We can also manufacture to various international and other regulatory requirements.

FSI is an ISO 9002-certified manufacturer. Our quality control engineers evaluate vessel performance at all phases of fabrication to ensure that FSI vessels will perform at their best under field conditions.

Bag Filter Vessels for all Uses
Our standard bag vessels feature single gasket sealing, permanent piping and perforated metal baskets. These vessels are ultra low-maintenance and easy to clean, with all parts designed to be easily accessible.

Whether you need a vessel for 1 bag or 99, if you're looking for vessels that are designed for durable and consistent performance, then FSI filter vessels are your best choice.

Filter Bag Vessel Features:
• Our patented-design lid provides positive bag hold down. Swing-out cover bolts with eyenuts simplify the bag-changing operation.
• Restrainer baskets are designed to eliminate the need for under-basket gaskets.
• Housings are available in a wide range of options, including internal coatings and housing materials, including carbon steel and stainless steel. Exotic materials such as Titanium, Hastelloy B&C, and Alloy 20 are also available upon request.
• FSI's Easy Open Lid option greatly reduces change-out time, improves safety and is available on all multi-bag units.
• FSI's product line includes vessels that are not ASME code compliant, offering effective filtration at economical prices. With the FSI name, you'll receive the highest quality and the best value.
Vessel Overview

The FSI X100 Convertible Filter Housing, made from lightweight polypropylene to accommodate a wide range of chemical resistance, is a low-cost alternative to metal housings, and works well with many types of fluid applications. It accepts the FSI X01-series polypropylene felt, polypropylene monofilament mesh, or Polymicro® microfiber filter bags to suit most any application.

Superior Cartridge Filter Vessels

FSI cartridge filter vessels are designed to make the most efficient use of FSI cartridge filters. Like our bag filters, we maintain the highest standards of engineering and manufacturing on ASME Code cartridge vessels in our ASME-certified manufacturing facilities.

Our cartridge filter vessels are constructed in a variety of piping sizes, connection styles and materials for your specific needs.

FSI engineers can evaluate your specific needs to determine the ideal size cartridge for your particular flow application. They can easily determine the quantity of cartridges and size of the housing necessary for the most efficient product flow.

Cartridge Filter Vessel Features:

- Housings are available in a wide range of options, including internal coatings and housing materials, including Carbon Steel and Stainless Steel. Exotic materials such as Titanium, Hastelloy B&C, and Alloy 20 are also available upon request.
- Housings can be sized to fit standard from 9.75” through 40”.
- Standard housing sizes range from one 9.75” (10”) cartridge (the FSC10) up to an eighty cartridge vessel (the FSC 8030 holding eighty 30” cartridges). Larger vessels are also available upon request.
- FSI’s universal cartridge seat offers improved cartridge sealing, and extends the life of all cartridge vessels.
- FSI’s universal cartridge seat will house DOE and 222 cartridges.
- The FSI X100 Convertible filter vessel, made from lightweight polypropylene to accommodate a wide range of chemical resistance, is a low-cost alternative to metal housings. It accepts the X20 cartridge, equivalent to twenty 10” conventional cartridges.
- The FSI X100 convertible filter housing also provides “easy clean” internal surfaces, and features bypass-free sealing with both bag filters and cartridge filters.
**Features:**

- Same side inlet/outlet configuration available (type 8) not standard
- Permanent piped housings
- Single gasket cover seal
- Models to fit your flow rate requirements:
  - BFN11 - 80 GPM
  - BFN12 - 200 GPM
  - BFN13 - 25 GPM
  - BFN14 - 40 GPM
- A variety of connections available in either NPT or flange:
  - BFN 11, 12: 1”, 1 1/4”, 1 1/2”, 2”, 2 1/2”, 3”, 4”
  - BFN 13, 14: 1”, 1 1/4”, 1 1/2”, 2”

**Material**

Available in carbon steel, 316/316L stainless steel. 304/304L stainless steel are available upon request.

**Gasket Material**

Available in BUNA-N, Teflon® (encapsulated) and Viton. Others are available upon request.

**Options**

Available with extra length legs and evacuation floats.

*NOTE: The maximum flow rate GPM is the MAXIMUM FLOW RATE recommended through the vessel WITHOUT filter bags installed using water as a base. Any increase in fluid viscosity, or the installation of filter bags, will reduce the maximum GPM figures significantly. Please consult your FSI representative when sizing these vessels.*

**Introduction**

When you are looking for a cost-effective filter vessel that is both durable and reliable, look to the FSI BFN series vessels. Although the BFN series vessels do not carry an ASME Code stamp, you can still realize the benefits of an economic filter vessel that is manufactured to the same high standards and engineering expertise that characterizes all of our other FSI vessels.
BFN VESSELS

HOW TO ORDER FOR BFN VESSEL MODELS

Coating/Lining Material:
- A = Electropolish
- F = Paint finish/prep
- N = None
- S = Special
- X = Passivation

Number of Bags:
- 0011 = (1) #1 bag
- 0012 = (1) #2 bag
- 0013 = (1) #3 bag
- 0014 = (1) #4 bag

Model Number:
- BFN

Example:
- BFN P 0012 A 0150 N 02 F 02 F 06 A 1 N

Bag Style:
- P = Polyloc
- S = Snap Ring

Vessel Material:
- A = Carbon Steel
- B = 304 Stainless Steel
- C = 316 Stainless Steel
- D = 304L Stainless Steel
- E = 316L Stainless Steel

Vessel Pressure Rating (PSI):
- 0150 (BFN11, 12, 13, 14)
- 0300 (BFN13, 14)

Inlet Size:
Use basic pipe size with the following exceptions:
- 0D = 0.5
- 0E = 0.75
- 1B = 1.25
- 1D = 1.5
- 2D = 2.5

Outlet Size:
See Inlet Size for codes

Outlet Type:
See Inlet Type for codes

Nozzel Configuration:
- 02 = Side In/Bottom Out
- 03 = Side In/Elbow Out/Opposite Sides
- 06 = Side In/Return Line
- 08 = Side In/Return Line/Bottom Out
- 12 = Side In/Same Side
- 13 = Side In/Return Line/Bottom Out
- 14 = Side In/Tangential/Bottom Out
- 15 = Side In/Elbow Out/Same Side

Jacket Type:
- N = None

Lid Opening Type:
- 1 = Hinge
- S = Other

Internal Usage:
- A = Standard
- S = Special, note on sheet

Inlet Type:
- C = Sanitary fitting
- D = Flange, din
- F = Flange, slip-on, raised face, std.
- H = Flange, weld neck, raised face
- I = Flange, weld neck, flat face
- K = Flange, lap joint
- M = Male NPT
- N = Female NPT
- P = Plain pipe
- S = Special
- T = Plain OD tube
- W = Socket weld
Introduction
As an alternative to our BFN series of high quality, low-cost filtration vessels, FSI offers the BFC series filter vessel. The BFC is completely ASME Code compliant, built to the same high standards as our other filter vessels. With pressure ratings up to 300 PSI, the BFC vessel is your answer to high quality, economical filtration.

You get an economical filtration vessel, built in our own ASME-certified manufacturing facilities.

Features:
- Same side inlet/outlet design for easier manifold hookup
- Permanent piped housing
- Single gasket cover seal
- Models to fit your flow rate requirements:
  * BFC11 - 80 GPM
  * BFC12 - 200 GPM
  * BFC13 - 25 GPM
  * BFC14 - 40 GPM
- A variety of connections available in either NPT or flange:
  - BFC11, 12: 1”, 1 1/4”, 1 1/2”, 2”, 2 1/2”, 3”, 4”
  - BFC13, 14: 1”, 1 1/4”, 1 1/2”, 2”

Material
Available in 304/304L stainless steel or 316/316L stainless steel.

Gasket Material
Available in BUNA-N, Teflon® (encapsulated) and Viton. Others are available on request.

Options
Available with extra length legs and evacuation floats.

*NOTE: The maximum flow rate GPM is the MAXIMUM FLOW RATE recommended through the vessel WITHOUT filter bags installed using water as a base. Any increase in fluid viscosity, or the installation of filter bags, will reduce the maximum GPM figures significantly. Please consult your FSI representative when sizing these vessels.
**BFC Vessels**

**How to Order for BFN Vessel Models**

- **Coating/Lining Material:**
  - A = Electropolish
  - F = Paint finish/prep
  - N = None
  - S = Special
  - X = Passivation

- **Number of Bags:**
  - 0011 = (1) #1 bag
  - 0012 = (1) #2 bag
  - 0013 = (1) #3 bag
  - 0014 = (1) #4 bag

- **Model Number:**
  - BFC

- **Example:**
  - BFC P 0011 B 0150 N 03 F 03 F 02 A 1 N

- **Inlet Size:**
  - Use basic pipe size with the following exceptions:
    - 0D = 0.5
    - 0E = 0.75
    - 1B = 1.25
    - 1D = 1.5
    - 2D = 2.5

- **Outlet Size:**
  - See Inlet Size for codes

- **Jacket Type:**
  - N = None

- **Bag Style:**
  - P = Polyloc
  - S = Snap Ring

- **Vessel Material:**
  - B = 304 Stainless Steel
  - C = 316 Stainless Steel
  - D = 304L S.S.
  - E = 316L S.S.

- **Vessel Pressure Rating (PSI):**
  - 0150 (BFC11, 12, 13, 14)
  - 0300 (BFC13, 14) optional

- **Inlet Type:**
  - C = Sanitary fitting
  - D = Flange, din
  - F = Flange, slip-on, raised face, std.
  - H = Flange, weld neck, raised face
  - I = Flange, weld neck, flat face
  - K = Flange, lap joint
  - M = Male NPT
  - N = Female NPT
  - P = Plain pipe
  - S = Special
  - T = Plain OD tube
  - W = Socket weld

- **Lid Opening Type:**
  - 1 = Hinge - STD.
  - 5 = Other

- **Outlet Type:**
  - See Inlet Type for codes

- **Nozzel Configuration:**
  - 02 = Side In/Bottom Out
  - 03 = Side In/Elbow Out/Opposite Sides
  - 06 = Side In/Return Line, Offset
  - 08 = Side In/Return Line, Bottom Out
  - 12 = Side In/Return Line, Same Side
  - 13 = Side In/Bottom Out
  - 14 = Side In/Tangential/Bottom Out
  - 15 = Side In/Elbow Out/Same Side

- **Internal Usage:**
  - S = Special, note on sheet
  - A = Standard
Introduction

When it comes to a line of filters that cover nearly every fluid application need, it has to be the FSI line of FSPN vessels. From the compact FSPN-35 miniature single bag filter vessel to the workhorse FSPN-40 and FSPN-85 vessels, or to the FSPN-250 dual filter vessel, we have exactly what your flow demands require. The FSPN vessels can also be equipped with a hydraulic lid lift.

All FSI filter vessels are designed, built and stamped to meet code requirements in our own ASME Code manufacturing facilities. Standard equipment features like the single-gasket seal and permanent piping, with sturdy perforated metal baskets provide durable and consistent performance. Order Information sheets are available.

Features:

- Completely cleanable with easy access to all cleanable parts.
- Full ports for unrestricted flow.
- Single gasket lid seal.
- Positive seating bag.
- Optional hydraulic lid lifts.
- NPT or flange connections.
- Standard materials for the FSPN vessel include Carbon Steel and 316 Stainless Steel.
- Optional materials include Hastelloy C, 304 Stainless Steel, 304L, 316L, Titanium, and Alloy 20.
- Vessels are designed and built to ASME code, where applicable. CRN & CE also available.
- All vessels conform to OSHA standards.
- Multiple bag vessels are available with in-line or offset connections. Flanged fittings are standard.
- On single bag units, side-in, bottom out designs are standard; other outlet configurations are available as options.
- On single bag units for sanitary or coated interior applications see our FSPN - 21, 31, 42 or 82 models.

Pressure Ratings

100, 150 or 300 PSI. Other ratings available as specified by customer.

Options

- Corrosion allowance, Partial Jacket or Full Jacket. Fully adjustable legs available on FSPN250 and smaller only.
- Different coatings are available.
- Mesh lined and heavy duty baskets are also available.
- Sanitary fittings
FSI Bag Filter Vessels are designed, built and stamped to meet code requirements in our own ASME code manufacturing facilities.

### STANDARD FSPN VESSEL MODELS

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<td>Surface Area per Bag, Ft²</td>
<td>0.5 1.0 2.0 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4</td>
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<td>Surface Area per Vessel, Ft²</td>
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<tr>
<td>Inlet and Outlet Size</td>
<td>1” 2” 2” 2” 3-4” 3-4” 4-6” 4-6” 6-8” 8-10” 8-10” 10-12” 10-12” 10-14” 10-14” 10-14” 10-14” 10-14”</td>
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</table>

*NOTE: The maximum flow rate GPM is the MAXIMUM FLOW RATE recommended through the vessel WITHOUT filter bags installed using water as a base. Any increase in fluid viscosity, or the installation of filter bags, will reduce the maximum GPM figures significantly. Please consult your FSI representative when sizing these vessels.*
# FSPN Vessels

**HOW TO ORDER FOR FSPN VESSEL MODELS**

**Outlet Type:**
See Inlet Type (below) for code letter

**Inlet Type:**
- C = Sanitary fitting
- D = Flange, din
- F = Flange, slip-on, raised face, std.
- H = Flange, weld neck, raised face
- I = Flange, weld neck, flat face
- K = Flange, lap joint
- N = Female NPT
- M = Male NPT
- P = Plain pipe
- S = Special
- T = Plain OD tube
- W = Socket weld

**Outlet Size:**
Use basic pipe size with the following exceptions:
- 0D = 0.5
- 0E = 0.75
- 1B = 1.25
- 1D = 1.5
- 2D = 2.5

**Vessel Pressure Rating (PSI):**
- 0100, 0150, 0300
- Per customer specification

**Model Number:**
Example: FSPN0800 A 0150 N 04 F 04 F 01 B 2 P 065 A

**Vessel Material:**
- A = Carbon steel
- B = 304 stainless steel
- C = 316 stainless steel
- D = 304L stainless steel
- E = 316L stainless steel
- F = Alloy 20
- G = Hastelloy C-276
- T = Titanium
- S = Special

**Coating/Lining Material:**
- A = Electropolish
- B = Buna-N
- E = EPR
- F = Paint finish/prep
- H = Hypalon
- J = Kynar or Halar
- L = Electroless nickel
- M = Prime electropolish
- N = None
- P = Plastic (epoxy)
- R = Natural rubber
- S = Special
- T = Teflon
- X = Passivation
- Y = Butyl

**THICKNESS**
- 1/16" or 1/8"
- 1/8" or 3/16"
- 1/4" or 5/32"
- 20 mil
- 10 mil
- 5 mil
- 10 mil

**Jacket Type:**
- N = None
- P = Partial
- F = Full

**Internal Usage:**
- A = Removable grate
- B = Modified basket seat
- F = Fixed grate
- R = Snap fit rings
- S = Special
  (Single Basket Housing)

**Jacket Pressure Rating:**
- 065 (standard), 100, 150
- Per customer specifications

**Lid Opening Type:**
1 = Hinge
2 = Manual davit
3 = Hydraulic davit
4 = Clamshell
5 = Other

**Outlet Size:**
Use basic pipe size with the following exceptions:
- 0D = 0.5
- 0E = 0.75
- 1B = 1.25
- 1D = 1.5
- 2D = 2.5

**Jacket Material:**
See Vessel Material group (left) for code letter

**Nozzle Configuration:**
See chart on page 59
(2 digits needed)

**Inlet Size:**
Use basic pipe size with the following exceptions:
- 0D = 0.5
- 0E = 0.75
- 1D = 1.5
- 2D = 2.5

**Outlet Type:**
See Inlet Type (below) for code letter

**Internal Usage:**
- A = Removable grate
- B = Modified basket seat
- F = Fixed grate
- R = Snap fit rings
- S = Special
  (Single Basket Housing)
FSC CARTRIDGE VESSELS

Introduction

A popular line of cartridge filter vessels is available in FSI’s FSC-series vessels. For the widest variety of filtration applications, they offer from one up to 88 cartridges. Larger vessels are available upon request. Standard materials for cartridge vessels include Carbon Steel, 304 and 316 Stainless Steel. Titanium, Hastelloy, Alloy 20 and other materials are also available.

Choose from a simple and versatile single cartridge model, such as the FSCN-30 (one 30” cartridge), the space saving six-around FSCN-600 series or the compact three-around FSCN-300 series. All housings are sized for the full range of filter cartridges, from 9.75” (10”) up through 40”. For higher flow rates, there’s the FSCN-1230: twelve 30” cartridges, closed with five eyebolts, and complete with davit arm cover and hand crank for quick cartridge changeout and minimal downtime. Order Information Sheets are available.

Features:

- Filter elements are top-loaded, so no sump disassembly is needed.
- Standard materials for the FSC vessel include Carbon Steel and 304 and 316 Stainless Steel.
- Optional materials include Hastelloy B & C, Titanium and Alloy 20
- Vessels are designed and built to ASME code, where applicable.
- All vessels conform to OSHA standards
- The Easy Open Lid option is available on all FSC-4000 and higher models, providing dramatic improvements in safety and a significant reduction in change-outs.
- Multiple cartridge vessels are available with in-line or offset feeds and with either NPT or flanged connections.
- Std. FSC vessels are designed with a universal cartridge seat that will house both the std. DOE or the 222 cartridges.
### FSC Vessels

#### How to Order for FSC Vessel Models

**Internal Usage:**
- A = Removable grate
- F = Fixed grate
- G = Angle post & spring seat assembly, std.
- H = Threaded rod both ends, screw down seat
- K = Threaded perforated with male thread seat
- S = Special, note on sheet

**Internal Finish:**
- A = Electropolish
- F = Paint finish/prep
- M = Prime electropolish
- N = None
- S = Special*
- X = Passivation

**Number of Cartridges:**
- 01, 03, 06, 09, 12, 15, 18, 20, 27, 30, 36, 40, 48, 55, 65, 80, 88

**Model Number:**
- OFSC
- FSCN

**Example:**

```
FSCN 06 20 C 0150 N 02 F 02 F 01 G 1 N CA
```

**Cartridge Length:**
9.75” thru 40”

**Vessel Material:**
- A = Carbon Steel
- B = 304 Stainless Steel
- C = 316 Stainless Steel
- D = 304L
- E = 316L
- F = Alloy 20
- T = Titanium
- S = Special

**Inlet Type:**
- C = Sanitary fitting
- D = Flange, din
- F = Flange, slip-on, raised face, std.
- H = Flange, weld neck, raised face
- I = Flange, weld neck, flat face
- K = Flange, lap joint
- M = Male NPT
- N = Female NPT
- P = Plain pipe
- S = Special
- T = Plain OD tube
- W = Socket weld

**Outlet Type:**
See Inlet Type for codes

**Outlet Size:**
- Use basic pipe size with the following exceptions:
  - 0A = 0.125
  - 0B = 0.25
  - 0C = 0.375
  - 0D = 0.5
  - 0E = 0.75
  - 1B = 1.25
  - 1D = 1.5
  - 2D = 2.5

**Inlet Size:**
Use basic pipe size with the following exceptions:
- 0D = 0.5
- 0E = 0.75
- 1B = 1.25
- 1D = 1.5
- 2D = 2.5

**Jacket Pressure Rating:**
- 0100, 0150, 0300
  - Per customer specification

**Jacket Type:**
- N = None
- P = Partial
- F = Full

**Nozzle Configuration:**
- 01 = Side In/Side Out, Inline
- 06 = Side In/Side Out, Offset
- 08 = Side In/Side Out, Same Side

**Lid Opening Type:**
- 1 = Hinge
- 2 = Manual davit
- 3 = Hydraulic davit
- 4 = Clamshell
- 5 = Other

**Options:**
- Corrosion Allowance

**Jacket Material:**
- A = Carbon Steel
- B = 304 Stainless
- C = 316 Stainless

**Jacket Pressure Rating:**
- 065 (standard), 100, 150
  - Per customer specifications

---

* Special Coatings Available
**FSC Cartridge Vessels**

**FSC is The Right Choice**

FSI Cartridge Vessels are designed to make the most efficient use of FSI Polymicro® and Polywound® filter cartridges. The FSI universal cartridge seat offers improved cartridge sealing and extends the life of all cartridge vessels. Housings are available for filter cartridges ranging from 10” to 40” models. The FSC line of Cartridge Filter Vessels can handle any of your cartridge filtration applications.

*The Graphs represent pressure drops for various rates. The information illustrates what can be expected when filtering water through a Standard Microfiber cartridge. You should consult your FSI representative for a full evaluation of your specific needs to determine the cartridge housing needed for your particular application. The quantity of cartridges and size of the housing is determined by the following four factors:*

1. Fluid Viscosity  
2. Maximum flow rate of the systems  
3. Allowable initial pressure drop  
4. Desired particle removal
Introduction
The FSI answer to time-saving operations is the new Easy Open Lid Vessel, the innovative alternative to manually opening and closing a filter vessel. Utilizing a unique sliding bracket retaining system, it’s operated simply by using the lid activator handle, and the Easy Open Lid rotates and raises to a locked position in the time it normally takes to loosen one or two eyebolts on a conventional vessel.

The Easy Open Lid takes the same amount of time to open, whether the vessel contains four bags or twenty-four, twenty cartridges or eighty-eight. It can be fully opened in well under thirty seconds, dramatically reducing change-out time. It significantly lowers the cost of operating your vessels, and makes the change-out procedure much easier and safer.

Features:
• Sliding retainer brackets promote easy opening and closing of vessel lid, with no eyebolts to replace.
• Replaceable wear pads reduce resistance on retainer brackets and extend vessel life.
• Available on multi-bag vessels FSPN800 through FSPN5000, and on multi-cartridge vessels FSC4000 through FSC8800. Custom designs available to fit your particular need.

Safety Features
• Splash shield comes as a standard item, attaching directly to the vessel lid.
• The manual pressure exhaust valve assures that the remaining pressure in the vessel is depleted prior to opening.
• The indicator/lock pin visually indicates whether the vessel is locked or unlocked.
• The lid safety latch locks the lid in the raised position, allowing lid swing-away for unobstructed access to filter medium.
• The alignment pin assures proper positioning for lid descent to the vessel body.

LID Material
Same material as vessel construction

Gasket Material
BUNA-N, EPDM or Viton

Pressure Ratings
Up to 150 PSI

Lid Activation
Hydraulic, or optional mechanical screw-type activator

Availability
The Easy Open Lid is available on FSI Filter Cartridge Vessels FSC4000 through FSC8800. FSI Filter Cartridge Vessels are designed, built and stamped to meet code requirements in our own ASME code manufacturing facility. Vessels are constructed with a variety of piping sizes, connection styles and materials. Custom designs are also available to fit your specific requirements.

Visit www.fsifilters.com to see a video demonstrating the Easy Open Lid.
**Introduction**

Different industrial applications can have different requirements in terms of equipment and filter media. That’s why we came up with our unique X100 Convertible Filter Housing. The strong, lightweight and economical filter vessel is resistant to a wide range of chemicals, and converts easily from filter bag usage to cartridge filters. It allows the user to choose the filter media and construction to precisely fit their particular needs.

The X100 is made from lightweight polypropylene, with a UV inhibitor for all-weather durability. The specially-designed threaded lid allows for sealing and unsealing without the need of other tools.

**Features:**

- The vessel’s 100% polypropylene construction is lightweight and is highly resistant to a wide range of chemicals.
- The “clean wall” design of the X100 is designed to provide easy access, allowing manual cleaning or in-place flushing.
- The versatile X100 is easily convertible between bag filters and cartridge filters depending on filtration requirements.
- The positive sealing of both bag and cartridge filters means no fluid by-pass will occur.
- The Differential Pressure Gauge provides an option for visually identifying proper filter element changeout.
- The Gauge mounts directly to the vessel’s appropriate mounting pad, and provides indication for either of two different pressure drop ranges: 6-8 PSID or 15-20 PSID.
- Before use, please refer to published reference materials for chemical compatibility.

**Housing Specifications**

**Model X-100B Plastic Bag Vessel**, includes housing, lid, basket and lid gasket (BUNA)

**Model X-100C Plastic Cartridge Vessel**, includes housing, lid, cartridge plate, lid gasket and plate gasket (BUNA)

Pressure rating: 100 PSIG @ 110°F water service

**Lid or Plate Gasket Options**

Viton, BUNA-N, EPR
**X100 CONVERTIBLE FILTER HOUSING**

**X01 Filter Bags**
Measuring 6” in diameter by a length of 20”, the FSI X01 filter bag has 2 square feet of surface area (0.186 square meters), making it equivalent to a Standard #1 size bag. The X01 is fitted with the patented Polyloc® ring which seals directly against the wall of the filter housing, thus eliminating the chance of by-pass. A heavy-duty polypropylene restrainer basket supports the X01. And the X01’s Polyloc ring sits directly against the basket collar for additional support.

**Available Filter Bag Models Include:**
- BPONG (polypropylene), micron ratings: 1, 5, 10, 25, 50 and 100.
- BPMO (polypropylene mesh), micron ratings: 100, 150, 200, 250, 300, 600 and 800.
- BPOMF (polypropylene microfiber), micron ratings: 1, 2, 10, 25, 90 and 0A.

**X20 Filter Cartridges**
The X20 Polyseal cartridge is a steep-pore gradient depth filter, designed to accept a large dirt loading capacity. It measures 5.5” in diameter by a length of 23.25”, yielding a total cartridge volume of 500 cubic inches. In lab tests, the X20 outperforms standard 10” cartridges by holding 20 times more dirt.

The design of the X20 Polyseal cartridge features a single open end that directs fluid from outside the cartridge in through the filter. A built-in handle on the cartridge top assists in seating and removing the X20. The cartridge bottom is equipped with the patented Polyseal end fitting, ensuring a complete seal without the need for double “O” rings or additional flat gaskets. The X20 fits securely into the cartridge plate and requires no springs or hold-down plates.

**Available Cartridge Models Include:**
- CMMF (polypropylene microfiber), micron ratings: 1, 5, 10, 25, 50, 75 and 100.
**X100 Options and Accessories**

**X100 Plastic Leg Stands**
Lightweight molded plastic leg assemblies designed to mount directly on the X100 vessel, form an economical means to help support the vessel during installation and operation.

**X100 Metal Leg Stands**
Tripod leg stands come in either Carbon Steel or 304 Stainless Steel for heavy-duty vessel support. Dual rubber-lined metal bands and bolt tightening assemblies help to form a secure fit.

**X100 Cone Base**
The X100 cone base comes with the option of 2” NPT elbow or a T-pipe fixture to suit different piping configurations. Made of 100% polypropylene, the cone base can be mounted onto the floor to form a secure-fitting stand for the vessel.

**DPGX100 Series Differential Pressure Gauge**
FSI offers a simple, effective and economical way to optimize the performance of the X100 filter system. This differential pressure gauge helps to assure performance levels by indicating the proper time to change out filter elements. The visual indicator changes from green (clean filter media) to red (dirty filter media), indicating time for change-out.

- Available in two pressure ranges: 6-8 PSID (DPG8X100V) and 15-20 PSID (DPG20X100V).
- Made from glass-filled nylon/stainless steel wetted materials (check for compatibility).
- Comes with a standard BUNA-N seal. Viton seal/Teflon®-coated spring model.

**Other X100 Accessories**
The X100 Convertible Filter Housing can be easily converted to accept either a filter bag or filter cartridge. Replacement lids and gaskets are available. To convert vessel for:

- Bag vessel applications: order the X100 plastic basket.
- Cartridge vessel applications: order the cartridge plate and plate gasket.
Introduction

Designed for demanding applications with special chemical compatibilities that are not suitable for steel housings, the PPV bag filter is made of 100% polypropylene and features a single piece polypropylene restrainer basket. The basket, together with FSI’s patented Polyloc® filter bag, forms a hermetic seal to eliminate unwanted liquid by-pass.

Bag Filter Vessel Features:

• All-polypropylene-wetted construction for superior corrosion resistance.

• Non-wetted structural framework is all 304 stainless steel, and includes six 1/2” reinforcing tie rods and two back-up plates at cover and bottom head.

• Integral stainless steel support legs.

• Both the PPV-11 and PPV-12 have 2” flanged inlet/outlet connections standard. Optional 3” flanged inlet/outlet connections are also available.

• All polypropylene fittings are fusion-welded to maximize strength, unlike glued joints.

• The innovative one-piece all propylene restrainer basket, secured by a Teflon-encapsulated Viton “O” ring, holds a standard #1 or #2 size filter bag that features our patented Polyloc® Snap-Fit collar designed to eliminate liquid by-pass.

• The cover is fitted with eye nuts for convenient opening and closure.

• The PPV filter housing features a cover with a removable splash shield.

• Maximum operating pressure is 100 PSIG, with recommended temperature range of 32˚F to 100˚F.

• PPV-11 (size 1 bag) has a 90 GPM flow rate, while the PPV-12 (size 2 bag) has a 180 GPM flow rate.

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<th>PPV ORDERING INFO</th>
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<td>------------------------</td>
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<tr>
<td>1</td>
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</table>
**SBF-75 Compact Bag Vessels**

**Introduction**

When space is an issue, look to FSI’s advanced-design compact bag filter. The SBF-75 is a reduced-size filter made with the same attention to detail that is in all of our larger designs. With dimensions of less than 10” high by 2 7/8”, you get a full-featured bag filter that provides a full range of micron ratings.

**Features:**

- Compact housing allows for filtering applications where space is limited.
- The single bag filter is ideal for low flow systems.
- The Teflon® gasket and the 316 stainless steel housing and basket are suited for a wide range of industrial applications.
- The stainless steel housing and basket are sanitary, and allow for a wide range of industrial applications.

- The top-mounted lid swings away for easy access to cleaning and filter bag changes and has an optional top inlet (in lid) for straight-through flow.
- The nylon monofilament filter bags offer a broad range of chemical resistance, are unaffected by metal fatigue and corrosion, and do not release fibers into the fluid flow.
- The welded seam construction of the bag filters contain no needle holes, so fluid will not bypass the media.
- Vessel rated at 300 PSI @ 250°F, 2½ GPM flow rate.
- Inlet/outlet connections are 3/8” NPT.

**Options**

- Basket and bag gasket materials include Teflon®, BUNA-N, ethylene propylene or Viton.

**How to Order Bags**

```
BNM001 SBF
```

- Type of Filter: B = Bag
- Material: NMO = Nylon Monofilament
- Micron Ratings: 1, 5, 10, 25, 35, 55, 75, 100, 125, 150, 200, 300 and 400
- Vessel Type: SBF = Single Bag Filter

For Vessel, order Part No. VBO19792S
FMC-22 DRUM FILTERS

Introduction
For filling lines, FSI offers the answer for the final filtration stage with the FMC-22, a light-weight, easily maneuvered, quick-disconnect filter. It’s a bag filter, positive gasket seal, restrainer basket, coupling and directional nozzle in one self-contained vessel. The unit even features built-in stops to limit insertion depth into closed head drums.

FSI offers this final stage drum filter in Stainless Steel or Carbon Steel, for applications ranging from chemicals, paints, inks, solvents and resins, to oil, petrochemicals and more viscous products as well.

Features:
- 1-10 GPM flow rate.
- FMC 1½” quick connect female coupling and BUNA-N gaskets come standard; optional 1½” male connector available.
- Popular nylon monofilament (NMO) bag features a molded plastic seal to prevent fluid bypass.
- Filter container made from 304 stainless steel or carbon steel (316 SS on request)
- Overall length of only 9¾”.
- Shell, collar, coupling, stop pins and all parts included.
- Units are also available without stop pins.
- Standard 304 stainless steel restrainer basket.
- Positive gasket seal.
- Gaskets are available in the following materials: BUNA-N, Neoprene, Viton.

HOW TO ORDER BAGS

Example: BNMO10FMC

Type of Filter:
B = Bag

Material:
NMO = Mesh, Nylon Monofilament

Micron Rating:
NMO = 1, 5, 10, 25, 35, 55, 75, 100, 125, 150, 200, 300, 400, 600, 800

Vessel Type:
FMC - 22 Drum Filter

For Vessel, order part no. VB407483N
**Introduction**

FSI strainers are designed and built to the same standards as other FSI vessels. Durable, ASME Code construction, an efficient in-line style design, and inlet/outlet ports up to 16” provide the economical solution to most industrial straining requirements. Typical applications include water and waste treatment industries, power generation plants, and the marine, paper, pharmaceutical and food industries.

Important design elements to consider in a basket strainer are: first, the free open area. This is the ratio of open area through the strainer basket to the cross sectional area of the pipeline. FSI strainers provide at least an 8 to 1 ratio. Anything less may cause excessive pressure drop.

Second, consider design size. While other basket strainers may be bulky and oversized, FSI features compact design, a big advantage for cleaning the baskets or when space is at a premium.

Finally, determine the right size strainer for your requirements. FSI manufactures a wide range of perforated or mesh-lined baskets. Whether standard model or custom-made, FSI basket strainers provide the answer.

**Features:**
- Removes foreign particles as small as 0.002” diameter from fluids.
- Standard 150 PSI ASME code construction. Other pressure rated vessels also available.
- FSI offers compact multi-basket designs, eliminating tall, difficult-to-remove baskets.
- Basket material is 316 stainless steel.
- Standard basket material has 9/64” diameter perforations, offering 50% more open area. Mesh lined baskets are also available.
- Easy-to-remove baskets and the quick opening, swing-type head cover make for faster cleaning and filter change out. An optional hydraulic lid lifter is also available.
- Single Basket strainers up to 8” pipe size also available.

**Specifications**
- 3” through 16” inlet-outlet ports.
- Custom strainers available upon request.
- Standard models from 6 to 12 strainer baskets, with flow rates up to 6000 gpm.
- Strainer baskets can be lined for ratings from 50 to 800 microns.
- Gasket materials include BUNA-N, EPR, Neoprene and Viton.
**Manifolded and Duplex Filter Vessels**

**Introduction**

FSI’s duplex filtration systems provide the flexibility and highest filtration quality that your process may require. Available in bag vessel or cartridge vessel designs, separately valved units operate independently, providing continuous service during media changes. Concurrent operation of both housings doubles the flow rate capacity of a single vessel.

Multiple-vessel filtration systems also allow for staged or series filtration, where the first vessel feeds the second, and so on. This allows for particle removal by descending particle size with each subsequent unit. The differences in solids concentration and particle size in a fluid can then be filtered for greater efficiency and accuracy.

Series filtration offers a particular advantage for applications where a process requires filtration for particles with unequal size, coarse filtration in first stages which provides longer service life for subsequent filters, and for improved performance and quality control.

**Features:**

- Ideal for continuous flow applications.
- Available in bag or cartridge filter units.
- Available with most vessel configurations for valved, parallel, and staged/series filtration.
- Systems feature the same durable, ASME Code construction as single vessels.
- Manifolded and Duplex custom vessels and systems are also available to fit your needs.
### Inlet-Outlet Configurations

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<th>Type 3</th>
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<td><img src="image15" alt="Diagram" /></td>
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</tbody>
</table>

**NOTE:** Inlet and outlet nozzles are shown in general positions. They can be rotated or relocated to meet customer requirements.
ACCESSORIES

Introduction
Along with our full line of filters, vessels and specialty products, FSI also offers a wide range of accessories. Authentic FSI product accessories enhance the performance of filtration products and systems. From bag magnets to evacuation floats, we’ve already anticipated your needs and have just what you need.

Filter Bag Seating Tool
The filter bag seating tool is constructed of light weight, corrosion resistant 6061 Aluminum, with a T-handle providing a no slip grip for ease of use. The rounded head assembly assures correct bag insertion and fit. Designed to eliminate bag bunching, shortening and unsupported bag fit in the basket.

Polyloc® Insertion Tool
This handy toll ensures that your Polyloc® filter bag is properly installed. An audible snap tells you that the Polyloc ring is securely in position over the lip of the restraining basket. Made of high impact plastic.

Polyloc® Snap-Fit Ring
When used with the FSI Polyloc® filter bag, the Polyloc snap-fit ring provides a positive seal, ensuring that 100% of the liquid that flows through your housing will be filtered directly through the bag. The Polyloc snap-fit ring is provided at NO CHARGE and can be installed into any existing FSP or FSPN filter housing with minimal downtime. The Polyloc snap-fit ring can also be installed into any new FSPN or BFN housing.

Magnets
FSI bag magnets use a powerful magnetic source to prevent tramp metal from plugging and slitting filter bags. The unique design features make installation, cleaning and removal easy and less time consuming. They can be ordered to fit either the standard #1 or #2 size bags, and come in 12” and 24” lengths standard.
ACCESSORIES

Evacuation Floats
FSI evacuation floats are used to displace liquid in filters during processing operations. They help to eliminate product loss due to spillage and reduce the volume of liquid moving through the bag at one time and lower bag weight. Constructed from 316 Stainless Steel, maximum operating pressures are 125 PSI and 270 PSI. Units come in 2 3/8”, 4 1/2” and 5” diameters. Evacuation floats fit all FSP and FSPN series filters, as well as most standard bag filter housings. Custom sizes are also available.

Adapter Heads
Adapter heads are available in a variety of pipe sizes and materials to be used with steel ring bags in open filter systems. Ideal for applications where vessels are impractical.

O-Rings
Depending on the product to be filtered, FSI filter vessels can feature a variety of O-ring materials, including BUNA-N, Viton, Teflon®-encapsulated Viton, Teflon®, and EPR.

Internal Vessel Treatments
FSI filter vessels can be internally treated with a variety of coatings, such as Plasite (epoxy), Halar, Kynar and Teflon®, to meet your unique application needs. FSI also offers electro-polished vessels.

Restrainer Baskets
FSI offers standard 316 stainless steel restrainer baskets; other materials are available upon request. Restrainer baskets are available for all FSI vessels as well as competitor’s units. Constructed from either woven wire mesh or perforated metal.
# Table of Contents for Technical Info and Glossary

**Technical** Pages 55 - 61
- Pressure Drop/Velocity to GPM Table
- Laws of Physics and Common Equations
- Water and Suspended Solid Conversions
- Decimal Equivalents of Fractions
- Decimal Equivalents of US Mesh Ratings
- Pressure Conversion Table
- Common Conversion Factors
- Typical Flow Rates of Bags and Cartridges

**Glossary** Pages 62 - 69
- Code Requirements
- Glossary

## Discharge (Gallons per Minute) and Velocity (Ft. per Second) in Schedule 40 Pipe for Water at 60°F

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## Pressure Drop/Velocity to GPM Table

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## Laws of Physics and Common Equations

- Code Requirements
- Glossary
Pascal’s Law
Pressure exerted on a confined fluid is transmitted undiminished in all directions, and acts with equal force on all equal areas and at right angles to them.

Hydraulics
Simply, a means of power transmission.

Work
Force acting through distance.
WORK = FORCE x DISTANCE
Example: Work = lbs. x inches,
or Force (lbs.) x Distance (ins.)

Power
The rate of doing work.
Power = \( \frac{\text{Work}}{\text{Time}} = \frac{\text{Force} \times \text{Distance}}{\text{Time}} \)

Force
The Force (pounds) exerted by a piston can be determined by multiplying the piston area (sq. inches) by the pressure applied (psi).
Force = Pressure x Area

Volume
To determine volume (cubic inches) required to move a piston a given distance, multiply the piston cross sectional area (sq. inches) by the stroke required (inches).
Volume = Area x L

Compression of Hydraulic Oil
Hydraulic oil serves as an excellent lubricant, is practically non-compressible. It will compress approximately 0.4 of 1% at 1000 psi and 1.1% at 3000 psi at 1200.

Weight of Hydraulic Oil
The weight of hydraulic oil may vary with a change in viscosity; however, 55 to 58 lbs. per cubic foot covers the viscosity range from 150 SSU to 900 SSU at 1000°F.

Pressure in a Column of Oil
The pressure at the bottom of a one-foot column of oil will be approximately 0.4 psi. To find the approximate pressure in psi at the bottom of any column of oil, multiply the height in feet by 0.4.

Atmospheric pressure
Equivalent to 14.7 PSIA at sea level. \( \Delta P \) means pressure difference.

Gage readings
Gage readings do not include atmospheric pressure unless marked PSIA.

Pressure drop
There must be a pressure drop (pressure difference) across an orifice or restriction to cause flow through it. Conversely, if there is no flow, there will be no pressure drop.

Pumps and fluids
Fluid is pushed, not drawn, into a pump. If pumping from an open reservoir, atmospheric pressure pushes the fluid into the pump. Some pumps are used specifically to create pressure. Any resulting flow is incidental. A pump does not pump pressure; its purpose is to create flow. A pump used to transmit power is usually positive displacement type.

Pressure
Pressure is caused by resistance to flow. A pressure gage indicates the pressure in a given unit, measured in PSI.
**Water and Suspended Solid Conversions**

### Water Pressure (PSI) to Feet of Head

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<thead>
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<th>Pounds per Square Inch</th>
<th>Feet Head</th>
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<td>2078.10</td>
</tr>
<tr>
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<td>2309.00</td>
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</tbody>
</table>

**NOTE:**

One pound of pressure per square inch of water is equal to 2.309 feet of water at 62°F.

To find the feet head of water for any pressure not given in the table, multiply the pressure pounds per square inch by 2.309.

### Water Feet of Head to PSI

<table>
<thead>
<tr>
<th>FEET HEAD</th>
<th>POUNDS PER SQUARE INCH</th>
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<tbody>
<tr>
<td>1</td>
<td>0.43</td>
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<tr>
<td>2</td>
<td>0.87</td>
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<tr>
<td>3</td>
<td>1.30</td>
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<td>4</td>
<td>1.73</td>
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<tr>
<td>5</td>
<td>2.17</td>
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<tr>
<td>6</td>
<td>2.60</td>
</tr>
<tr>
<td>7</td>
<td>3.03</td>
</tr>
<tr>
<td>8</td>
<td>3.46</td>
</tr>
<tr>
<td>9</td>
<td>3.90</td>
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<tr>
<td>10</td>
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<tr>
<td>800</td>
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</tr>
<tr>
<td>900</td>
<td>389.78</td>
</tr>
<tr>
<td>1000</td>
<td>433.00</td>
</tr>
</tbody>
</table>

**NOTE:**

One foot of water at 62°F is equal to 0.433 pounds of pressure per square inch.

To find the pressure per square inch for any feet head not given in the table, multiply the feet head by 0.433.

### Suspended Solid Conversion Table

<table>
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<th>%</th>
<th>LBS./1000 GAL.</th>
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<tr>
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<td>1.000</td>
<td>80.0</td>
</tr>
<tr>
<td>8,000</td>
<td>0.800</td>
<td>70.0</td>
</tr>
<tr>
<td>6,000</td>
<td>0.600</td>
<td>50.0</td>
</tr>
<tr>
<td>4,000</td>
<td>0.400</td>
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<tr>
<td>2,000</td>
<td>0.200</td>
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<td>0.002</td>
<td>0.175</td>
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<td>0.001</td>
<td>0.03</td>
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### Decimal Equivalents of Fractions

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<th>Decimal</th>
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<tr>
<td>1/32</td>
<td>.03125</td>
</tr>
<tr>
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<td>.078125</td>
</tr>
<tr>
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<td>9/64</td>
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</tr>
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<td>.15625</td>
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### Decimal Equivalents of US Mesh Ratings

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<tr>
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</tbody>
</table>
# Pressure Conversion Table

To use the above table, locate the initial measurement along the top of the table, and multiply by the number in the row that corresponds to the final measurement in the left column.

**For example:** to convert from Atmospheres to Pascals, locate the Atmospheres column at the top of the table and move down to the row that corresponds to Pascals on the left, which says to multiply Atmospheres by $1.01325 \times 10^{6}$ to obtain the equivalent measurement in Pascals.
## Conversion Factors

<table>
<thead>
<tr>
<th>MULTIPLY</th>
<th>BY</th>
<th>TO GET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheres</td>
<td>14.7</td>
<td>PSI</td>
</tr>
<tr>
<td>Barrels of Oil</td>
<td>42.0</td>
<td>Gallons (U.S.)</td>
</tr>
<tr>
<td>Centimeters</td>
<td>0.03281</td>
<td>Feet</td>
</tr>
<tr>
<td>Centimeters</td>
<td>0.3937</td>
<td>Inches</td>
</tr>
<tr>
<td>Centipoises</td>
<td>0.01</td>
<td>Poises</td>
</tr>
<tr>
<td>Centistokes</td>
<td>0.01</td>
<td>Stokes</td>
</tr>
<tr>
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<td>Cubic inches</td>
</tr>
<tr>
<td>Cubic centimeters</td>
<td>0.0002642</td>
<td>Gallons (liq.)</td>
</tr>
<tr>
<td>Cubic feet</td>
<td>7.4805</td>
<td>Gallons (liq.)</td>
</tr>
<tr>
<td>Cubic feet</td>
<td>0.1728</td>
<td>Cubic inches</td>
</tr>
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<td>Cubic feet/minute</td>
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<td>Gallons per minute</td>
</tr>
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<td>Gallons</td>
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<td>0.0005787</td>
<td>Cubic feet</td>
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<td>Cubic meters</td>
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<td>Gallons (liq.)</td>
</tr>
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<td>35.31</td>
<td>Cubic feet</td>
</tr>
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<td>30.48006</td>
<td>Centimeters</td>
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<td>Feet</td>
<td>0.3048006</td>
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<td>PSI</td>
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<td>Feet of water</td>
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<td>Inches of Hg</td>
</tr>
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<td>0.01136</td>
<td>Miles per hour</td>
</tr>
<tr>
<td>Feet/second</td>
<td>0.681818</td>
<td>Miles per hour</td>
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<td>Gallons</td>
<td>3,785.43</td>
<td>Cubic cm.</td>
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<td>Cubic inches</td>
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<td>Gallons</td>
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<td>Cubic feet</td>
</tr>
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<td>Cubic feet/minute</td>
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<td>Meters</td>
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</tr>
<tr>
<td>Kilograms</td>
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<td>Pounds (avdp.)</td>
</tr>
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<td>Kilograms/sq. cm.</td>
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<td>PSI</td>
</tr>
<tr>
<td>Kilograms/sq. mm</td>
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<td>PSI</td>
</tr>
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<td>Gallons</td>
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<td>Meters</td>
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<td>Square inches</td>
<td>6.5416</td>
<td>Square cm.</td>
</tr>
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</table>
Flow Rates of Bags and Cartridges

In most filtration applications, fluid viscosities do not exceed 50cps. Using the following **Flow Rates Per #2 Size Bag** as a guide, the suggested flow rates should result in a **CLEAN Pressure Drop under 2 PSID**.

<table>
<thead>
<tr>
<th>MATERIAL USED</th>
<th>MICRON RATING</th>
<th>FLOW RATE (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FELT</td>
<td>1 &amp; 3</td>
<td>80 GPM/#2 BAG</td>
</tr>
<tr>
<td>FELT</td>
<td>5 THRU 200</td>
<td>120 GPM/#2 BAG</td>
</tr>
<tr>
<td>MESH</td>
<td>1, 3, 5 &amp; 10</td>
<td>100 GPM/#2 BAG</td>
</tr>
<tr>
<td>MESH</td>
<td>25 THRU 100</td>
<td>125 GPM/#2 BAG</td>
</tr>
<tr>
<td>MESH</td>
<td>150 THRU 800</td>
<td>150 GPM/#2 BAG</td>
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<tr>
<td>MICROFIBER</td>
<td>1A AND 2 A</td>
<td>60 GPM/#2 BAG</td>
</tr>
<tr>
<td>MICROFIBER</td>
<td>10A, 25A, 90A &amp; 0A</td>
<td>80 GPM/#2 BAG</td>
</tr>
</tbody>
</table>

For **Cartridge** applications with **Water-Like Viscosities** the following rules of thumb can be followed for 10” equivalent length. These flow rates should keep the **CLEAN Pressure Drop under 3 PSID**.

<table>
<thead>
<tr>
<th>MATERIAL USED</th>
<th>MICRON RATING</th>
<th>FLOW RATE (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWPO/PE</td>
<td>1 &amp; 3</td>
<td>3 GPM/10”</td>
</tr>
<tr>
<td>CWPO/PE</td>
<td>5 THRU 50</td>
<td>4 GPM/10”</td>
</tr>
<tr>
<td>CWPO/PE</td>
<td>75 THRU 100</td>
<td>5 GPM/10”</td>
</tr>
<tr>
<td>CMMF</td>
<td>1, 3, &amp; 5</td>
<td>3 GPM/10”</td>
</tr>
<tr>
<td>CMMF</td>
<td>10, 25 &amp; 50</td>
<td>4 GPM/10”</td>
</tr>
<tr>
<td>CMMF</td>
<td>75, 100 &amp; 150</td>
<td>5 GPM/10”</td>
</tr>
<tr>
<td>CMHP</td>
<td>1 &amp; 3</td>
<td>2 GPM/10”</td>
</tr>
<tr>
<td>CMHP</td>
<td>5, 10, 25, 35 &amp; 50</td>
<td>3 GPM/10”</td>
</tr>
<tr>
<td>CMHP</td>
<td>75 &amp; 100</td>
<td>4 GPM/10”</td>
</tr>
</tbody>
</table>
Glossary

Code Requirements
Filter Specialists, Inc. can guarantee compliance with NDE requirements and ASME Code. It’s the policy of FSI to provide safe, reliable products which meet our customers’ needs as well as all applicable FSI, industry and regulatory requirements. If you have requirements that extend beyond Code, contact us and we will make every effort to meet your needs.

Abraslon
Migration of foreign material which enters the fluid stream from system components that wear from close tolerances, vibration or shock.

Absolute
An arbitrary term used to describe or define a degree of filtration. There are various methods used in the filtration industry to determine absolute ratings, which are not necessarily interchangeable. Generally, absolute means 100% removal of solids (glass beads) above a specified micron rating on a single pass. See nominal.

Absorb
To take up by cohesive, chemical or molecular action.

Absorbent
A filter medium that is similar to a sponge, drawing fluid and retaining it within its structure. In this sense it can act as a filter to remove (adsorb) and retain fluid.

Acidity
The quality, state or degree of being acidic. In lubricating oils, acidity denotes the presence of acid-type constituents whose concentration is usually defined in terms of a neutralization number. The constituents vary in nature and may or may not markedly influence the behavior of the fluid.

Additive
A supplementary material combined with a base material to provide special properties.

Adsorption
The attraction and/or the retention of particles by molecular attraction or electrostatic forces present between the particles and a filter medium. Also, the attraction of gases, liquids or solids to surface areas of textile fibers, yarns, fabrics, or any similar type of material.

Adsorbent
Any material which adsorbs: i.e., the solid which attracts and holds on its surface the gas, vapor or liquid. Also, a filter medium primarily intended to hold its soluble and insoluble contaminates on its surface by molecular adhesion – through no chemical change.

Agglomerate
A group of two or more particles combined, joined or clustered, by any means.

Aggregate
A relatively stable assembly of dry particles formed under the influence of physical forces.

Ambient
Surrounding. For example, the ambient operating temperature of a vessel is temperature that is essentially the same as that surrounding the vessel.

ASME
The American Society of Mechanical Engineers.

Atmospheric pressure
The force exerted on a unit area by the weight of the atmosphere.

Back pressure
In filter use, resistance offered by the filter, usually measured in PSI.

Backwash
To clean a filter element by reversing the direction of flow through it.
**GLOSSARY**

**Basket strainer**
A vessel for the removal of coarse bulk solids from liquid, air or gas. The element is usually a steel perforated basket, or a mesh lined basket.

**Beta (β) Ratio**
The Beta (β) Ratio is a rating system introduced with the object of giving both filter manufacturer and user an accurate representative comparison amongst filter media. Also, an indication of how a filter performs throughout the life of the filter. The Beta Ratio is an average filtration rating (single pass and multi-pass).

**Bleeder**
A valve which diverts part of the fluid from the main flow of the system.

**BUNA-N**
A synthetic rubber gasket material, used for vessel closures, flanges and filter elements.

**Burst**
An outward structural failure of the filter element caused by excessive differential pressure.

**By-pass**
A condition that occurs when:
a) a bag or cartridge is not seated or sealed properly in the filter housing; or
b) the filter media is violated and permits unfiltered fluid to pass through.

**Cake**
Solids deposited on the filter medium during filtration in sufficient thickness to be removed in sheets of sizeable pieces. In many cases, cake may provide its own filter media by adding to the surface of the media.

**Capacity**
The volume of product which a vessel will accommodate, expressed in gallons or similar units. Also, an amount which will filter at a given efficiency and flow rate, expressed in gallons per minute or similar units.

**Cartridge**
A filter for the clarification of process liquids containing small amounts of solids. Made of a porous medium, it is used in a vessel, which performs the actual filtration process.

**Center-rod/ post**
The component of a vessel used for mounting the cartridge in the vessel, usually made of a round bar material. A center pipe can also be used for the same purpose, but is made instead with perforated effect and directs flow through the cartridge.

**Centipoise**
One one-hundredth of a poise. A poise is the unit of viscosity expressed as one dyne per second per square centimeter.

**Centistoke**
One one-hundredth of a stoke. A stoke is equal to the viscosity in poises times the density of the fluid in grams per cubic centimeter.

**Clear water pressure drop**
Differential pressure across the filter as measured using clean water at a particular flow rate.

**Coagulant**
That which produces agglomeration of suspended solids.

**Coalescing**
The action of uniting of small droplets of one liquid preparatory to its being separated from another liquid.

**Contaminant**
Any undesirable particle or impurity in a stream.

**Core**
An inner material used for the center of an element as support, which may also be called a center tube when used with string-wound filters.
GLOSSARY

Corrosion
The conversion of metals into oxides, hydrated oxides, carbonates, or other compounds due to the action of air, water or both. Salts and sulphur are also important sources of corrosion. Removal of solids and water reduces the effect or speed of corrosion in many cases, and in other cases, corrosion inhibitors are used to reduce the effect of corrosion.

Degradation
The loss of desirable physical properties by a textile material as a result of some process or physical/chemical process. Also, the wearing down or reduction in the efficiency of a media.

Delta P (P)
A symbol (P) designating pressure drop. The difference in pressure between two points, generally measured at the inlet and outlet point of a filter, separator/filter, etc. Normally measured in pounds per square inch (psi), inches of mercury (in. Hg.), or inches of water (in. H20). Also known as pressure drop.

Density
The weight per unit volume of a substance (specific weight).

Depth
A filter medium which primarily retains contaminants with the tortuous passages within the thickness of the element wall.

Depth-type filtration
Filtration that is accomplished by flowing a fluid through a mass filter media, with a much longer and random path through the filter. The density of the structure can be density graded, which is of particular advantage where the particular sizes of the contaminant are widely distributed. Certain types of solids, or combinations of solids, do not work well with surface filtration, and depth filtration is found to be more suitable.

Dilatant
A flow condition where certain liquids will show an increase in viscosity as the rate of shear or flow is increased.

Discharge
The flow rate through a filter.

Effective area
The area of a medium that is exposed to the flow, and is usable for its intended purpose: coalescing, filtering or separating. This is the opposite of blind spots or dead area.

Effective open area
Area of the filtering medium through which the fluid may flow.

Efficiency
The degree to which an element will perform in removing solids and/or liquids, usually expressed as output divided by input.

Element
The medium used in a vessel to perform the function of filtration or separation. Also called the cartridge or filter. The porous device which performs the actual process of filtration.

Emulsion
A finely divided suspension of an oil in water or vice versa. Also, a dispersion of finely held particles in a stream which do not necessarily dissolve in each other, but are held in suspension.

Entrainment
Mist, fog or droplets of a liquid which are usually considered to be a contaminate when encountered in the filtration industry.

Feed
Liquid to be processed containing one or more liquid phases, such as an emulsion, and/or suspended solids, and/or insoluble solids.

Felt
A nonwoven sheet of fibers, made by a combination of mechanical and chemical actions, including pressure, moisture and heat.
Glossary

Fiber
A flexible material with two relatively small dimensions and one long dimension.

Fiber migration
Undesirable movement of filter material from the media into the feed stream.

Filter
A term generally applied to a device used to remove solid contaminants from a liquid or gas, or to separate one liquid from another liquid or gas. A filter, as referred to in the filtration industry, is a device which removes contaminants.

Filtration efficiency
Expressed as a percent of contaminant introduced to the system. It is the ability of a filter to remove specified contaminants at a given contaminant concentration under specified test conditions.

Filter element life
The span of operation from clean unit to a predetermined pressure drop build up, usually measured in elapsed time.

Filter medium
The porous material mounted on a plate or frame which separates the solids from the liquids in filtering. Also referred to as filter cloth, filter plate or septum. The material that performs the actual process of filtration.

Filtrate
Filtered fluid which flows out of a filter.

Filtration rating
The diameter of the largest hard spherical particle that will pass through a filter under specified test conditions. This is an indication of the largest opening in the filter medium.

Flow characteristics
The nature of fluid movement as being either turbulent, laminar, constant or of a variable rate, to various degrees.

Flow rate
The rate at which a product is passed through a vessel or system, generally expressed as gallons per minute, cubic feet per minute, per hour, per day, etc.

Fluid
A liquid or gas which can be filtered by passing through a filter.

Gage pressure
All pressure greater than atmospheric pressure, as read on a pressure gage.

Gel
A semi-solid that is susceptible to pressure deformation. Gels have the habit of sticking to other surfaces.

Glazed finish
A finishing process that produces a smooth, highly polished surface using extreme temperature. Eliminates filter fiber migration.

Gradient density
A media of different densities, with one media packed around the center tube and a media of less density around the outside. Both medias are tapered at opposite ends, which allows high flow through the less dense media, and tighter filtration through the dense media.

Housing
A container for a filter element(s). Also known as a vessel.

Hydraulics
The study of fluids at rest or in motion.

Hydrophilic
Having a strong affinity for or the ability to absorb water.

Hydrophobic
Lacking affinity for or the ability to absorb water.

Hydrostatic test
A test conducted with either air, water or other fluids at a given value over design pressure, to prove the structural integrity of a pressure vessel.
Glossary

Immiscible
Incapable of being mixed; insoluble; the opposite of miscible.

Impregnation
The process of treating a coarse filter medium with resins.

Impurity
Any undesirable material in the fluid. See contaminant.

Initial pressure drop
A loss in pressure between the inlet and the outlet connections upon the start of flow through a vessel using new elements.

In-line
When inlet and outlet connections are positioned at the same height on the opposite sides of a vessel so that an imaginary straight line can be drawn connecting one to the other.

Insoluble
Incapable of being dissolved in a fluid; the opposite of soluble.

Matrix
The structural support yarn or twine in wound elements, usually wound in a diamond pattern.

Maximum operating pressure
The highest pressure allowed in a system.

Media/ Medium
A porous or slotted mass in a filter element that separates solids from a fluid by a difference in the size of openings, and also through direct containment. A material of controlled pore size or mass through which a product is passed in order to remove foreign particles held in suspension, or to repel droplets of coalesced water; or a material without controlled pore size, such as glass fiber mats, which contribute to filtration, coalescence, or separation of two immiscible liquids.

Media migration/ Migration
The carry-over of fibers from the filter, separator elements or other filter, into the effluent. The contaminant or media released to pass downstream from the filter element.

Membrane
In the filtration industry, the term is used to describe the media through which the liquid stream is to be passed or exchanged. Membranes are usually associated with ion exchanged media such as dialysis, osmosis, diffusion, etc., although filter paper itself could be classified as a membrane.

Micron
A short unit of length in the metric system, equal to one-millionth of a meter, 10-4 centimeter, 10-3 millimeter, or 0.000039 of an inch. A micron is used as a criterion to evaluate the performance or efficiency of a filter media, or to describe the condition of either the influent or effluent. Usually stated in terms of being either absolute or nominal.

Modular
A filter element which has no separate housing of its own, but whose housing is incorporated into the equipment it services. It may also incorporate a suitable enclosure for the filter cavity.

Monofilament mesh
A woven fabric with evenly-spaced holes. Each thread is a single filament. The mesh combines excellent strength with little or no fiber migration.

Multifilament mesh
A type or woven fabric, where each thread consists of many smaller diameter threads twisted together.

Newtonian
A liquid which does not change in viscosity when faced with a change in rate of shear, agitation or flow rate.

Nominal rating
An arbitrary value determined by the filter manufacturer and expressed in terms of percentage retention by weight of a specified contaminant (usually glass beads) of a given size.

NPT
National Pipe Thread standard.
OPEN AREA RATIO
The ratio of pore area of a filter medium, expressed as a percent of total area.

OPERATING PRESSURE
The normal pressure at which a system operates.

PARTICLE COUNT
The practice of counting particles of solid matter in groups based on relative size. Frequently used in engineering, a filter to a specific task, or to evaluate the performance of a filter under specific operating conditions.

PARTICLE SIZE DISTRIBUTION
A tabulation resulting from a particle count of solids grouped by specified micron sizes to determine the condition of either the influent or effluent stream.

pH
The value indicating the acidity or alkalinity of a material. It is the negative logarithm of the effective hydrogen ion concentration. A pH of 7.0 is neutral, less than 7.0 is acidic, and greater than 7.0 is considered a base.

PLEATED
A filter element whose medium consists of a series of uniform folds and has the geometric shape of a cylinder, cone, disc, plate, etc.

PLUGGED
The condition of a filter when it has collected its full capacity of contaminants and will not pass any more fluid.

POROSITY
The property of a solid which contains many minute channels or open spaces. The fraction is a percentage of the total volume occupied by these channels or spaces. Also describes a filter media which may have larger pores than other media.

PREFILTER
A filter for removing gross contaminate before the product stream enters the separator.

PRESSURE
The force exerted per unit area by a fluid, typically measured in pounds per square inch (psi).

PRESSURE, ABSOLUTE
Gage pressure plus 14.7 psi.

PRESSURE, ATMOSPHERIC
The force exerted by the atmosphere at sea level, which is equivalent to 14.7 psi.

PRESSURE DROP
The difference in pressure between two points, generally at the inlet and outlet of a filter or a separator/filter. Measured in pounds per square inch gage, or inches of mercury. See delta P.

PSI
Pounds per square inch.

PSIA
Pounds per square inch absolute.

PSID
Pound per square inch differential.

PSIG
Pounds per square inch gage.

SAE
The Society of Automotive Engineers.

SAE NUMBER
A classification of lubricating oils for either crankcases or transmissions, in terms of viscosity, as standardized by the Society of Automotive Engineers.
**GLOSSARY**

**Saybold Seconds Universal (SSU)**
Units of viscosity as measured by observing the time in seconds required for 60 ml. of a fluid to drain through a tubular orifice 0.483 inches long by 0.0695 inches in diameter at stated conditions of temperature and pressure.

**SCFD**
Standard cubic feet per day.

**SCFH**
Standard cubic feet per hour.

**SCFM**
Standard cubic feet per minute.

**Separation**
The action of separating solids or liquids from fluids. May be accomplished by impingement, filtration or by coalescing.

**Separator/filter**
A vessel which removes solids and entrained liquids from another liquid or gas, using some combination of a baffle and/or coalescer, filter or separator element. A vessel may be single stage, two stage, or single or two stage with pre-filter section for gross solids removal. The usual application is the removal of water from gas or another immiscible liquid. General reference to term applies the equipment capable of both separation and filtration to specific degrees of efficiencies.

**Service life**
The length of time an element operates before reaching the maximum allowable pressure drop.

**Shell**
The outer wall of a vessel, usually referred to as the body.

**Singed finish**
The process of removing fibers from a cartridge or fabric by passing over a flame or other heat source. The process creates a smooth finish that inhibits fiber migration.

**Sintered**
Media, usually metallic, that is processed to cause diffusion bonds at all contacting points, retaining openings for the passage of filtrate.

**Skid mounted**
When one or more vessels with pumps and motors are mounted on a portable platform.

**Sludge**
Dirt, carbon, water and chemical compounds found in oils.

**Solids**
A mass or matter contained in a stream which is considered undesirable and should be removed.

**Solution**
A single phase combination of liquid and non-liquid substances, or two or more liquids.

**Specific gravity**
The ratio of a substance’s weight to that of some standard substance (water for liquids and solids, air or hydrogen for gases). This is by definition a unitless value.

**Surface area**
The total area of an element that is exposed to an approaching flow.

**Suspension**
Solids or liquids that are held in other liquids.

**Suspended solids**
Non-settled particles in a fluid.

**Tensile strength**
The maximum stress a material that is subjected to a stretching load can withstand, without tearing.
**Glossary**

**Thixotropic**
A liquid which shows a marked reduction in viscosity as the rate of shear, agitation or flow rate is increased.

**Tortuosity**
The ratio of the average effective flow path length to the minimum theoretical flow path length (thickness) of a filter medium.

**Turbidity**
A cloudy or hazy appearance in a naturally clear liquid, caused by the suspension of colloidal liquid droplets or fine solids.

**Turn-over**
The number of times the contents of the system pass through a filter per unit of time.

**Ultrafilter**
A type of membrane used to remove very fine suspended submicronic particles as well as some dissolved solids.

**Unloading**
The release downstream of trapped contaminant, due to a change in flow rate, mechanical shock and/or vibration, or as excessive pressure builds up, or due to a media failure.

**Vacuum**
A reference to a pressure that measures below atmospheric pressure.

**Vessel**
A container in which the filtration process occurs, through a filter media such as cartridges or bags that are installed inside.

**Viscosity**
The degree of fluidity; also, the property of a fluid's molecular structure by virtue of which they resist flow; the internal flow resistance of a fluid; or, the resistance of flow exhibited by a liquid resulting from the combined effects of cohesion and adhesion. The units of measurement are the poise and the stoke. A liquid has the viscosity of one poise if a force of one dyne per square centimeter causes two parallel liquid surfaces one square centimeter in area and one centimeter apart to move past each other at a rate of one centimeter per second. There are a great many crude and empirical methods for measuring viscosity, which generally involve measurements for the time of flow or movement of a ball, ring or other object in a specially shaped or sized apparatus.

**Wound**
A filter medium comprised of two or more layers of helical wraps of a continuous strand or filament in a predetermined pattern.

**Woven**
A filter medium made from strands of fiber, thread or wire, interlaced into a cloth through the action of a loom.
Manufacturing: ◇

Manufacturing: United States
Michigan City, IN
Grand Island, NE
Soddy Daisy, TN

Manufacturing: International
Sidney, Australia
Sao Paulo, Brazil
Shanghai, China
Cuernavaca, Mexico
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