FILTER SOLUTIONS INC.

INTRODUCTION

Filter Solutions Inc. (FSI) brings over 20 years of experience, knowledge and skill in the manufacture of innovative and cost-effective solutions to the large array of process fluid filtration challenges facing industry today.

FSI provides custom engineered and fabricated filtration equipment such as bag, cartridge, high flow & magnetic filtration units, pipeline strainers, and gas/liquid & liquid/liquid separators, to meet all industrial filtration needs. FSI also distributes a wide range of filter elements (absolute rating of 0.2 to 200 microns) from the most reputable manufacturers in North America.

FSI’s equipment, including 10 and 25ton cranes, welding positioners from 400lbs to 12ton capacity, Sub Arc, TIG, MIG and Stick welding machines, radial drill press, 65 ton press brake, water jet and plasma cutters, and 30,000 sq.ft of manufacturing area, consisting of 4,000 sq.ft of receiving, painting and assembly space, 6,000 sq.ft of stainless steel fabrication, 8,000 sq.ft of carbon steel fabrication, and 12,000 sq.ft of water jet & plasma cutting, are effectively employed to expedite production and allow FSI to provide the fastest deliveries. While FSI’s highly qualified staff and strict quality assurance program ensures steadfast conformance to all industry requirements.

All “U” or “UM” Code filter housings are designed, manufactured and tested in Canada in accordance with ASME Section VIII Division 1, certifying the highest level of quality and safety in all our products. FSI Code vessels can also be registered with CRN and National Board upon request. Non-Destructive Examination (NDE), such as radiography, ultrasonic, and magnetic particle testing, as well as others, can be utilized in compliance with Code or the industry’s most stringent requirements. All fabricated vessels are 100% tested and inspected to ensure that every product performs to design specifications before leaving our facility.

MISSION STATEMENT

It is Filter Solutions Inc.’s mission to provide the finest industrial fluid filtration products and the most comprehensive solutions for all the challenges faced in industry today. FSI is committed to become a world innovator in filtration engineering, design and manufacturing, and to cater to all the needs of the filtration industry. Through careful analysis, highest level customer support, and cost effective solutions, FSI strives to become a business that is highly respected in industry across the globe.

Filter Solutions Inc. continues to honour a tradition of quality, reliability and performance when serving the needs of our market. These guiding values will continue to be the driving force behind the success of the company, its employees and the clients we serve.
## OVERVIEW

### ENGINEERING CAPABILITIES
- Mechanical Calculation: Yes
- Process Calculation: Yes
- CAD: Yes
- Compress: Yes
- FEA: Yes

### DRAFTING CAPABILITIES
- Vessel: Yes
- Piping: Yes
- Structural Skid/Platform: Yes
- 3D: Yes

### CODE DESIGN CAPABILITIES
- ASME B31.1, B31.3, B31.4, B31.8
- ASME SECTION VIII DIV.1
- CSA B51
- Others

### CODE STAMP CAPABILITIES
- "U" and "UM"
- Others are available upon request

### MANUFACTURE QUALITY SYSTEM
- FSI's QS (ASME & TSSA approved)

### VESSEL REGISTRATION CAPABILITIES
- CRN registration
- National Board registration

### INDUSTRY COMPLIANCE CAPABILITIES
- Sour Service: NACE MR103, MR1075 & ISO-15156-1
- Sour Service Welding: NACE SP0472
- PIP Standard
- All Petroleum/Oil & Gas Specifications
- Sanitary finish (CIP & COP)

### WELDING CAPABILITIES
- SMAW: CS, SS, Alloy20, Hastelloy
- GTAW: CS, SS, Duplex SS, Alloy20, Hastelloy, Titanium, Aluminum
- GMAW: CS, SS, Duplex SS
- SAW: CS

### FINISHING CAPABILITIES
- Hydro test: Up to 5000 PSI(345 BAR)
- Paint: Yes
- Blasting/Electro Polish: Yes
- PWHT: Yes

### THIRD PARTY NON-DESTRUCTIVE EXAMINATION AVAILABLE
- RT, UT, PT, MT, WMT, HT and PMI

### PRODUCTS DESIGNED & MANUFACTURED
- Bag Filter Housing
- Cartridge Filter Housing
- High Flow Filter Housing
- Gas filter Separator
- Gas Coalescer Housing
- Liquid Separator Housing
- Carbon Canister Housing
- Basket Strainer Housing
- T-Strainer Housing
- Y-Strainer Housing
- Temporary Strainer
- Magnetic Filtration
- All custom skid package system

### PRODUCTS DISTRIBUTED
- Filter Elements: Absolute/Nominal rated 0.2 to 200 micron
- Activated Carbon Canister
TABLE OF CONTENTS

BHFS SERIES
BAG FILTER HOUSING

CHFS SERIES
CARTRIDGE FILTER HOUSING

HFFS SERIES
HIGH FLOW FILTER HOUSING

SPECIALTY SERIES

FSFS SERIES
FABRICATED/CAST STRAINER

CCFS SERIES
CARBON CANISTER HOUSING

COFS SERIES
GAS & LIQUID COALESCE/FILTER SEPARATOR

MAGNETIC SERIES
MAGNETIC FILTRATION

FILTER ELEMENTS SERIES
BAG, CARTRIDGE, HIGH FLOW AND CARBON CANISTER ELEMENTS

WEDGE WIRE SCREENS

GENERAL INFO
BHFS SERIES
BAG FILTER HOUSING

APPLICATIONS
- Oil and Gas Industry
- Adhesives and Resins
- Water & Waste Water
- Pharmaceutical and Cosmetics
- Chemical Industry
- Food and Beverages
- Petroleum Industry
- Power Industry

HOUSING MODELS
- BHFS - Single Bag Housing
- BHFS - Multi Bag Housing

CODE OF CONSTRUCTION
- ASME Sect. VIII Div.1 - Pressure Vessel Code
FSI’s Filter bag housings can effectively remove dirt, pipe scales and contaminants from process liquids in the chemical processing, petroleum, wastewater process industries and more. Creative innovation has allowed FSI to provide a broad range of filter bag vessels to meet the standards, as well as the most demanding applications, found in process industries.

**Housing Models**

- **BHFS90SE** - #1 Size Bag Housing
- **BHFS180SE** - #2 Size Bag Housing
- **BHFS20SE** - #3 Size Bag Housing
- **BHFS40SE** - #4 Size Bag Housing
- **BHFS360 TO 4320** - Multi Bag Housing (2 Rounds to 24 Rounds)

**Features**

1. All standard bag housings come with Swing Bolt Closures, with SA 193 B7/SA 194 2H (zinc plated) nuts and bolts, for quick and easy access.
2. All baskets come with an O-ring seal to prevent bypass.

**Housing Standard Specifications**

- **Design Code**: ASME Section VIII, Division 1
- **Design Pressure**: 150 PSIG / 1034 KPAG
- **Design Temperature**: -20°F/225°F (-29°C/107°C)
- **M.O.C**: CS, 304SS, 316SS and others
- **Closure**: Swing Bolt with EPDM O-ring seal
- **Exterior Finish**: (SS) Electro-polish
- **Exterior Finish**: (CS) Blue Enamel
# STANDARD SINGLE BAG FILTER HOUSING SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Housing M.O.C</th>
<th>Housing Size</th>
<th>Inlet/Outlet Size</th>
<th>Vent</th>
<th>Gauge Port</th>
<th>Design Pressure</th>
<th>Design Temp. Range</th>
<th>Approx Empty Weight</th>
<th>Max Flow Rate Through Housing with Bag</th>
<th>Pressure Drop Through Housing Without Bag @ Max Flow Rate</th>
<th>Housing External Surface Finish</th>
<th>Inlet/Outlet Configuration Style</th>
<th>Closure Style</th>
<th>Replacement Bag Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHFS20SE</td>
<td>CS/304SS/316SS</td>
<td>4”</td>
<td>1” FNPT/1” FNPT</td>
<td>N/A</td>
<td>N/A</td>
<td>150 PSIG/1034 KPA</td>
<td>-20°F/-29°C/-10°C</td>
<td>20/9/95</td>
<td>0.18/1.23</td>
<td>Electropolish/Blue Enamel</td>
<td>Stainless Steel/C/S</td>
<td>Style 1</td>
<td>Style 1</td>
<td>#3</td>
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<tr>
<td>BHFS40SE</td>
<td></td>
<td>4”</td>
<td>1.5” FNPT/1” FNPT</td>
<td>N/A</td>
<td>N/A</td>
<td>24/11/40/189</td>
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<td></td>
<td>0.71/4.90</td>
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<td></td>
<td>Style 1</td>
<td>Style 1</td>
<td>#4</td>
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<tr>
<td>BHFS90SE</td>
<td></td>
<td>8”</td>
<td>2” FNPT/1” FNPT</td>
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<td>80/36/90/303</td>
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<td>0.67/4.62</td>
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<td>Style 1</td>
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<td>BHFS180SE</td>
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<td>8”</td>
<td>2” FNPT/1” FNPT</td>
<td>N/A</td>
<td>N/A</td>
<td>95/43/180/568</td>
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<td></td>
<td>2.36/16.24</td>
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<td>Style 1</td>
<td>#2</td>
</tr>
</tbody>
</table>

# STANDARD MULTI BAG FILTER HOUSING SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Housing M.O.C</th>
<th>Housing Size</th>
<th>Inlet/Outlet Size</th>
<th>Vent</th>
<th>Gauge Port</th>
<th>Design Pressure</th>
<th>Design Temp. Range</th>
<th>Approx Empty Weight</th>
<th>Max Flow Rate Through Housing with Bag</th>
<th>Pressure Drop Through Housing Without Bag @ Max Flow Rate</th>
<th>Housing External Surface Finish</th>
<th>Inlet/Outlet Configuration Style</th>
<th>Closure Style</th>
<th>Replacement Bag Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHFS360</td>
<td></td>
<td>18”</td>
<td>3”-150#/1/4” FNPT</td>
<td>1” FNPT</td>
<td>(2)/1/2” FNPT</td>
<td>150 PSIG/1034 KPA</td>
<td>-20°F/-29°C/-10°C</td>
<td>430/195/360/1136</td>
<td>1.94/13.38</td>
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<td>Stainless Steel/C/S</td>
<td>Style 1</td>
<td>Style 2</td>
<td>#2</td>
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<tr>
<td>BHFS540</td>
<td></td>
<td>18”</td>
<td>4”-150#/1/2” FNPT</td>
<td>1” FNPT</td>
<td>(2)/1/2” FNPT</td>
<td>440/200/540/1703</td>
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<td>1.47/10.16</td>
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<td>Style 1</td>
<td>Style 1</td>
<td>#3</td>
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<tr>
<td>BHFS1080</td>
<td></td>
<td>24”</td>
<td>6”-150#/1/2” FNPT</td>
<td>1.5” FNPT</td>
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<td>Style 1</td>
<td>#4</td>
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<tr>
<td>BHFS1440</td>
<td>CS/304SS/316SS</td>
<td>30”</td>
<td>6”-150#/1/2” FNPT</td>
<td>1.5” FNPT</td>
<td>(2)/1/2” FNPT</td>
<td>930/423/1440/510</td>
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<td></td>
<td>2.57/17.75</td>
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<td>Style 1</td>
<td>#1</td>
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<tr>
<td>BHFS2160</td>
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<td>36”</td>
<td>8”-150#/1/2” FNPT</td>
<td>1.5” FNPT</td>
<td>(2)/1/2” FNPT</td>
<td>1350/614/2160/7949</td>
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<td></td>
<td>2.08/14.32</td>
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<td>Style 1</td>
<td>#2</td>
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<tr>
<td>BHFS3240</td>
<td></td>
<td>42”</td>
<td>10”-150#/1/2” FNPT</td>
<td>1.5” FNPT</td>
<td>(2)/1/2” FNPT</td>
<td>2350/1068/3240/1078</td>
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<td>1.54/10.62</td>
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<td>Style 1</td>
<td>#3</td>
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<tr>
<td>BHFS4320</td>
<td></td>
<td>48”</td>
<td>12”-150#/1/2” FNPT</td>
<td>1.5” FNPT</td>
<td>(2)/1/2” FNPT</td>
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<td>Style 1</td>
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</tbody>
</table>

**GENERAL NOTES**

1. Housing pressure drop is based on the flow of water through an 1/8” diameter perforated basket without a filter bag. The total system pressure drop is the sum of the housing and filter bag pressure drops. For optimal system flow rates, the type of fluid, housing pressure drop and filter element rating need to be taken into account. Increasing nozzle inlet/outlet connection sizes will decrease housing pressure drops at the same flow rate. All technical information in this bulletin are for use as a general guide only. Actual results may vary depending on the fluid being filtered, viscosity, dirt loading and temperature.

2. See housing ordering guide for options

3. Housing Model: BHFS90 & BHFS180 housings c/w C.S zinc plated adjustable legs. BHFS20 & BHFS40 adjustable legs are optional.
SINGLE BAG HOUSING DIMENSIONS

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>INLET C'L TO OUTLET FACE</th>
<th>VESSEL C'L TO INLET FACE</th>
<th>HOUSING (OAH)</th>
<th>HOUSING (OAL)</th>
<th>HOUSING (OAW)</th>
<th>BASKET REMOVAL CLEARANCE</th>
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<tr>
<td>BHFS20SE</td>
<td>11-5/8</td>
<td>295</td>
<td>3-1/4</td>
<td>83</td>
<td>17-1/4</td>
<td>6-5/16</td>
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<td>BHFS40SE</td>
<td>16-15/16</td>
<td>430</td>
<td>3-7/16</td>
<td>87</td>
<td>22-9/16</td>
<td>6-1/2</td>
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<td>BHFS90SE</td>
<td>20-1/16</td>
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<td>5-11/16</td>
<td>144</td>
<td>27-9/16</td>
<td>10-9/16</td>
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<td>BHFS180SE</td>
<td>34-1/16</td>
<td>865</td>
<td>5-11/16</td>
<td>144</td>
<td>41-9/16</td>
<td>10-9/16</td>
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</table>

Dimensions shown are for reference only. Consult FSI for certified drawing when required.
## Multi Bag Housing Dimensions

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Floor to C'L Inlet/Outlet</th>
<th>Vessel C'L to Inlet / Outlet Face</th>
<th>Floor to Drain Face</th>
<th>Housing (OAH)</th>
<th>Housing (OAL)</th>
<th>Housing (OAW)</th>
<th>Basket Removal Clearance</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>A(IN) A(mm)</td>
<td>B(IN)</td>
<td>B(mm)</td>
<td>C(IN)</td>
<td>C(mm)</td>
<td>D(IN)</td>
<td>D(mm)</td>
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<td>29</td>
<td>737</td>
<td>14</td>
<td>356</td>
<td>5-7/8</td>
<td>149</td>
<td>51</td>
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<td>737</td>
<td>14</td>
<td>356</td>
<td>5-7/8</td>
<td>149</td>
<td>51</td>
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<tr>
<td>BHFS1080</td>
<td>29</td>
<td>737</td>
<td>18</td>
<td>457</td>
<td>6-1/16</td>
<td>154</td>
<td>54-1/2</td>
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<td>BHFS1440</td>
<td>29</td>
<td>737</td>
<td>21</td>
<td>533</td>
<td>5-5/8</td>
<td>143</td>
<td>57-1/2</td>
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<tr>
<td>BHFS2160</td>
<td>29</td>
<td>737</td>
<td>24</td>
<td>610</td>
<td>6-1/16</td>
<td>154</td>
<td>60-1/2</td>
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<tr>
<td>BHFS3240</td>
<td>29</td>
<td>737</td>
<td>29</td>
<td>737</td>
<td>6-5/8</td>
<td>168</td>
<td>70</td>
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<tr>
<td>BHFS4320</td>
<td>29</td>
<td>737</td>
<td>32</td>
<td>813</td>
<td>5-15/16</td>
<td>151</td>
<td>71</td>
</tr>
</tbody>
</table>

Dimensions shown are for reference only. Consult FSI for certified drawing when required.
BAG HOUSING CLEAN PRESSURE DROP FOR 1.5"-4" INLET/OUTLET

FLOW IN GPM

PRESSURE DROP IN PSID

1.5" NPS
2" NPS
3" NPS
4" NPS

BAG HOUSING CLEAN PRESSURE DROP FOR 6"-12" INLET/OUTLET

FLOW IN GPM

PRESSURE DROP IN PSID

6" NPS
8" NPS
10" NPS
12" NPS
SINGLE BAG HOUSING ORDERING GUIDE

Housing Model
- BHFS90SE = #1 size bag housing
- BHFS180SE = #2 size bag housing
- BHFS20SE = #3 size bag housing
- BHFS40SE = #4 size bag housing

Inlet/Outlet - Type
- 1” FNPT
- 2” FNPT
- 3” FNPT
- 4” FNPT
- 1”-150#FL to 4”-150#FL
- Other

Code Stamping
- NC = Non-Code
- U = U Stamp
- UM = UM Stamp
- Other

Configuration
- ST1 = Style 1
- ST2 = Style 2
- ST3 = Style 3
- Other

Code Stamping
- NC = Non-Code
- U = U Stamp
- UM = UM Stamp
- Other

CRN
- Blank = None
- BC = 1
- AB = 2
- SK = 3
- MB = 4
- ON = 5
- QC = 6
- NB = 7
- NS = 8
- PEI = 9
- NF = 0
- Other

HOUSING OPTIONS
(Consult FSI)
- Pressure Class: Up to 2500# ANSI Flange
- Code Stamping: ASME "U", "UM" and National Board Stamp
- CRN Registration: All the applicable Canadian Jurisdiction
- NDE: RT, UT, LPT, MT, WFMT, PMI & HT
- PWHT: Per code or special requirement
- Sour Service: Nace MR-103 & MR-0175 Compliance
- Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
- Housing Material: Hastelloy, Alloy 20 and other
- Bolting Material: SA 193 B7M/2HM, Stainless 304SS or 316SS
- Adjustable Leg: Stainless Steel option
- Connection: Add and up size
- Configuration Style: All available styles and other such as duplex, Triplex etc.
- Surface Preparation: C/S interior blasting / SS interior mechanical polish & electro-polish
- Coating: Ext / Internal with special paint.
- O-Ring: Buna-N, EPR, Silicon, Viton, T.E.V, and other
- Closure: Clam Shell Style, Q.O.C, ANSI bolted type and other

HOUSING CONFIGURATION
- OTHERS CONFIGURATIONS
  - DUAL
  - TRIPLEX
  - QUADPLEX
  - THE ABOVE CAN BE CONNECTED IN SERIES OR PARALLEL AND SERIES/ PARALLEL.
MULTI BAG HOUSING ORDERING GUIDE

**Housing Series**
- BHFS = Multi Bag Series

**Number of Bags**
- 360 to 4320
- Example: 180 = one #2 size bag
- 540 = three #2 size bags
- Other

**Inlet/Outlet - Type**
- 3" - 150#FL
- 4" - 150#FL
- 6" - 150#FL
- 8" - 150#FL
- 10" - 150#FL
- 12" - 150#FL
- Other

**Housing Material**
- 304SS - 304 Stainless
- 316SS - 316 Stainless
- CS - Carbon Steel
- Other

**Configuration**
- ST1 = Style 1
- ST2 = Style 2
- ST3 = Style 3
- ST4 = Style 4
- Other

**Code Stamping**
- NC = Non-Code
- U = U Stamp
- UM = UM Stamp
- Other

**CRN**
- BC = 1
- AB = 2
- SK = 3
- MB = 4
- ON = 5
- QC = 6
- NB = 7
- NS = 8
- PEI = 9
- NF = 0
- Other

**HOUSING OPTIONS**
(Consult FSI)
- **Pressure Class**: Up to 2500# ANSI Flange
- **Code Stamping**: ASME "U", "UM" and National Board Stamp
- **CRN Registration**: All the applicable Canadian Jurisdiction
- **NDE**: RT, UT, LPT, MT, WFMT, PMI & HT
- **PWHT**: Per code or special requirement
- **Sour Service**: Nace MR-103 & MR-0175 Compliance
- **Corrosion Allowance**: 1/16" [1.6mm] to 1/4" [6mm]
- **Housing Material**: Hastelloy, Alloy 20 and other
- **Bolting Material**: SA 193 B7M/2HM, Stainless 304SS or 316SS
- **Adjustable Leg**: Stainless Steel option
- **Connection**: Add and up size
- **Configuration Style**: All available styles and other such as duplex, Triplex etc.
- **Surface Preparation**: C/S interior blasting / SS interior mechanical polish & electro-polish
- **Coating**: Ext / Internal with special paint.
- **O-Ring**: Buna-N, EPR, Silicon, Viton, T.E.V, and other

**HOUSING CONFIGURATION**

**OTHERS CONFIGURATIONS**
- DUPLEX
- TRIPLEX
- QUADPLEX

*THE ABOVE CAN BE CONNECTED IN SERIES OR PARALLEL AND SERIES/ PARALLEL.*
CHFS SERIES
CARTRIDGE FILTER HOUSING

APPLICATIONS
Oil and Gas Industry
Adhesives and Resins
Water, Pre-RO
Pharmaceutical and
Cosmetics
Chemical Industry
Food and Beverages
Petroleum Industry
Power Industry
Pulp & Paper Industry
Paints, Coatings & Ink
All Process Fluids

HOUSING MODELS
CHFS-1R to 55R: Single round to
55 round Cartridge Housing

CODE OF CONSTRUCTION
ASME Sect. VIII Div.1 - Pressure Vessel Code
FSI’s cartridge filter housing can be used in many areas of the process industries such as oil and gas, water treatment, adhesive, resin and more. FSI’s cartridge filter housing is furnished with a unique pedestal design which accommodates a variety of sealing mechanisms such as DOE with spring and seal, SOE with 222 O-ring, and positive-tied-down without the aid of a centering post.

HOUSING MODELS
- CHFS-1R - 1 ROUND CARTRIDGE HOUSING
- CHFS-6R - 6 ROUND CARTRIDGE HOUSING
- CHFS-10R - 10 ROUND CARTRIDGE HOUSING
- CHFS-12R - 12 ROUND CARTRIDGE HOUSING
- CHFS-22R - 22 ROUND CARTRIDGE HOUSING
- CHFS-28R - 28 ROUND CARTRIDGE HOUSING
- CHFS-55R - 55 ROUND CARTRIDGE HOUSING

FEATURES
1. All standard cartridge housings come with Swing Bolt Closures, with SA 193 B7/SA 194 2H (zinc plated) nuts and bolts, for quick and easy access.
2. Housings can accommodate various sealing mechanisms.

HOUSING STANDARD SPECIFICATIONS
- Design Code: ASME Section VIII, Division 1
- Design Pressure: 150 PSIG / 1034 KPAG
- Design Temperature: -20°F/225°F (-29°C/107°C)
- M.O.C: CS, 304SS, 316SS and others
- Closure: Swing Bolt with EPDM O-ring seal
- Exterior Finish: (SS) Electro-polish
- Exterior Finish: (CS) Blue Enamel
**STANDARD CARTRIDGE FILTER HOUSING SPECIFICATIONS**

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>HOUSING SIZE</th>
<th>2IN/OUTLET SIZE</th>
<th>3VENT</th>
<th>3DRAIN</th>
<th>3GAUGE PORT</th>
<th>APPROX EMPTY WEIGHT</th>
<th>1MAX. FLOW RATE</th>
<th>2PRESSURE DROP @ MAX FLOW RATE</th>
<th>3REPLACEMENT ELEMENT (QTY) - SIZE</th>
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<tbody>
<tr>
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<td>150.0</td>
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<tr>
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<td>1/2&quot;FNPT</td>
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<td>141.0</td>
<td>140.0</td>
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<tr>
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<td>1/2&quot;FNPT</td>
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<td>1/2&quot;FNPT</td>
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<td>425.0</td>
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**GENERAL NOTES**

1. Housing pressure drop is based on the flow of water through an open tube sheet and without filter elements. The total system pressure drop is the sum of the housing and filter element pressure drops. For optimal system flow rates, the type of fluid, housing pressure drop and filter element rating need to be taken into account. Increasing nozzle inlet/outlet connection sizes will decrease the housing pressure drop at the same flow rate. All technical information in this bulletin are for use as a general guide only. Actual results may vary depending on the fluid being filtered, viscosity, dirt loading and temperature.

2. See housing ordering guide for options.

3. Housing Model: CHFS-6R & CHFS-10R housing c/w C.S zinc plated adjustable legs. CHFS-1R adjustable legs are optional.
### 1R to 10R CARTRIDGE HOUSING DIMENSIONS

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>INLET C’L TO OUTLET FACE</th>
<th>VESSEL C’L TO INLET FACE</th>
<th>HOUSING (OAH)</th>
<th>HOUSING (OAL)</th>
<th>HOUSING (OAW)</th>
<th>ELEMENT REMOVAL CLEARANCE</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>A(IN)</td>
<td>A(mm)</td>
<td>B(IN)</td>
<td>B(mm)</td>
<td>C(IN)</td>
<td>C(mm)</td>
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<td>83</td>
<td>16-1/2</td>
<td>419</td>
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<td>CHFS-1R2H</td>
<td>21-5/16</td>
<td>541</td>
<td>3-1/4</td>
<td>83</td>
<td>26-1/2</td>
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<td>CHFS-1R3H</td>
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<td>3-1/4</td>
<td>83</td>
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<td>838</td>
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<tr>
<td>CHFS-6R3H</td>
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<td>146</td>
<td>43</td>
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Dimensions shown are for reference only. Consult FSI for certified drawing when required.
### 12R to 55R CARTRIDGE HOUSING DIMENSIONS

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<th>FLOOR TO INLET C'L</th>
<th>FLOOR TO OUTLET C'L</th>
<th>VESSEL C'L TO INLET FACE</th>
<th>VESSEL C'L TO OUTLET FACE</th>
<th>FLOOR TO CLEAN DRAIN C'L</th>
<th>HOUSING (OAH) IN OPERATING</th>
<th>HOUSING (OAL) IN OPERATING</th>
<th>HOUSING (OAW) IN OPERATING</th>
<th>ELEMENT REMOVAL CLEARANCE</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>A (IN)</td>
<td>A (mm)</td>
<td>B (IN)</td>
<td>B (mm)</td>
<td>C (IN)</td>
<td>C (mm)</td>
<td>D (IN)</td>
<td>D (mm)</td>
<td>E (IN)</td>
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<td>711</td>
<td>7-5/8</td>
<td>194</td>
<td>11-3/8</td>
<td>289</td>
<td>7-1/4</td>
<td>184</td>
<td>8-15/16</td>
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<tr>
<td>CHFS-12R3H</td>
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<td>711</td>
<td>7-5/8</td>
<td>194</td>
<td>11-3/8</td>
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<td>737</td>
<td>6-3/16</td>
<td>157</td>
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<td>330</td>
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<td>229</td>
<td>7-15/16</td>
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<tr>
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<td>7-3/16</td>
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<td>14</td>
<td>356</td>
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<td>197</td>
<td>18</td>
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Dimensions shown are for reference only. Consult FSI for certified drawing when required.
CHFS CARTRIDGE HOUSING ORDERING GUIDE

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<th>Cartridge Housing</th>
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<tr>
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<td>316SS</td>
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<tr>
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<td>304SS - 304 Stainless</td>
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<td>316SS - 316 Stainless</td>
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<td>CS - Carbon Steel</td>
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<td>3” FNPT</td>
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<tr>
<td>4” FNPT</td>
</tr>
<tr>
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<td>UM = UM Stamp</td>
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<tr>
<td>ST3 = Style 3</td>
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<td>ST4 = Style 4</td>
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<td>PEI = 9</td>
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<tr>
<td>NF = 0</td>
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<td>Other</td>
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<table>
<thead>
<tr>
<th>HOUSING OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Consult FSI)</td>
</tr>
</tbody>
</table>

- **Pressure Class:** Up to 2500# ANSI Flange
- **Code Stamping:** ASME *U*, “UM” and National Board Stamp
- **CRN Registration:** All the applicable Canadian Jurisdiction
- **NDE:** RT, UT, LPT, MT, WFMFT, PMI & HT
- **PWHT:** Per code or special requirement
- **Sour Service:** Nace MR-103 & MR-0175 Compliance
- **Corrosion Allowance:** 1/16”[1.6mm] to 1/4”[6mm]
- **Housing Material:** Hastelloy, Alloy 20 and other
- **Bolting Material:** SA 193 B7M/2HM, Stainless 304SS or 316SS
- **Adjustable Leg:** Stainless Steel option
- **Connection:** Add and up size
- **Configuration Style:** All available styles and other such as duplex, triplex etc.
- **Surface Preparation:** C/S interior blasting / SS interior mechanical polish & electro-polish
- **Coating:** Ext / Internal with special paint.
- **O-Ring:** Buna-N, EPR, Silicon, Viton, T.E.V, and other
- **Closure:** Clam Shell Style, Q.O.C, ANSI bolted type and other

<table>
<thead>
<tr>
<th>HOUSING CONFIGURATION</th>
</tr>
</thead>
</table>

**OTHERS CONFIGURATIONS**
- Duplex
- Triplex
- Quadruplex

THE ABOVE CAN BE CONNECTED IN SERIES OR PARALLEL AND SERIES/PARALLEL.
HFFS SERIES
HIGH FLOW FILTER HOUSING

HOUSING MODELS
HFFS-1R to 12R: Single round to 12 rounds High Flow Housing with vertical or horizontal configurations.

APPLICATIONS
- Oil and Gas Industry
- Adhesives and Resins
- Water, Pre-RO
- Pharmaceutical and Cosmetics
- Chemical Industry
- Food and Beverages
- Petroleum Industry
- Power Industry
- Pulp & Paper Industry
- Paints, Coatings & Ink
- All Process Fluids

CODE OF CONSTRUCTION
ASME Sect. VIII Div.1 - Pressure Vessel Code
FSI’s HFFS filter housing is designed to accommodate high flow rates ranging from 175 GPM to 3600 GPM. HFFS filter housing's compact design and versatile configuration allows for reduction in maintenance and disposal costs as a result of fewer element change outs.

**HOUSING STANDARD SPECIFICATIONS**

- **Design Code:** ASME Section VIII, Division 1
- **Design Pressure:** 150 PSIG / 1034 KPAG
- **Design Temperature:** -20°F/225°F(-29°C/107°C)
- **M.O.C:** CS, 304SS, 316SS and others
- **Closure:** Swing Bolt with EPDM O-ring seal
- **Exterior Finish:** (SS) Electro-polish
- **Exterior Finish:** (CS) Blue Enamel

**HOUSING MODELS**

- **HFFS-1R** - 1 ROUND HIGH FLOW CARTRIDGE HOUSING
- **HFFS-3R** - 3 ROUNDS HIGH FLOW CARTRIDGE HOUSING
- **HFFS-5R** - 5 ROUNDS HIGH FLOW CARTRIDGE HOUSING
- **HFFS-7R** - 7 ROUNDS HIGH FLOW CARTRIDGE HOUSING
- **HFFS-12R** - 12 ROUNDS HIGH FLOW CARTRIDGE HOUSING

**FEATURES**

1. Fewer elements and reduced change out interval.
2. All standard housings come with Swing Bolt Closures for quick and easy access.
3. Higher efficiency units reduce floor footprint.

**FILTER SYSTEM COMPARISON**

- **300GMP[1135LPM] SYSTEM**
  - (1) 600SF ELEMENT IN 6" NPS HOUSING
  - (6) 2" CARTRIDGE IN 12" NPS HOUSING
- **900GMP[3407LPM] SYSTEM**
  - (2) 600SF ELEMENT IN 10" NPS HOUSING
  - (6) 2" CARTRIDGE IN 24" NPS HOUSING
### STANDARD 1R HIGH FLOW FILTER HOUSING SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Housing Size</th>
<th>Inlet/Outlet Size</th>
<th>Vent</th>
<th>Drain</th>
<th>Gauge Port</th>
<th>Approx Empty Weight</th>
<th>Max. Flow Rate</th>
<th>Pressure Drop @ Max. Flow Rate</th>
<th>In/Outlet Configuration Style</th>
<th>Replacement Element (QTY) - Size</th>
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<tbody>
<tr>
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<td>3&quot;-150#</td>
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<td>68</td>
<td>175</td>
<td>175</td>
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### STANDARD MULTI ROUND HIGH FLOW FILTER HOUSING SPECIFICATIONS

<table>
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<tr>
<th>Model Number</th>
<th>Housing Size</th>
<th>Inlet/Outlet Size</th>
<th>Vent</th>
<th>Drain</th>
<th>Gauge Port</th>
<th>Approx Empty Weight</th>
<th>Max. Flow Rate</th>
<th>Pressure Drop @ Max. Flow Rate</th>
<th>In/Outlet Configuration Style</th>
<th>Replacement Element (QTY) - Size</th>
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<tr>
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<td>3600</td>
<td>13627</td>
<td>STYLE 2</td>
<td>(12) 6&quot;Dia. x 60&quot;LG.</td>
</tr>
</tbody>
</table>

### General Notes
1. Housing pressure drop is based on the flow of water through an open tube sheet and without filter elements. The total system pressure drop is the sum of the housing and filter element pressure drops. For optimal system flow rates, the type of fluid, housing pressure drop and filter element rating need to be taken into account. Increasing nozzle inlet/outlet connection sizes will decrease the housing pressure drop at the same flow rate. All technical information in this bulletin are for use as a general guide only. Actual results may vary depending on the fluid being filtered, viscosity, dirt loading and temperature.
2. See housing ordering guide for options.
3. Housing Model: HFFS-1R- housings c/w C.S zinc plated adjustable legs/saddles.
# 1R HFFS HOUSING DIMENSIONS

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>INLET C'L TO OUTLET FACE</th>
<th>VESSEL C'L TO INLET FACE</th>
<th>HOUSING (OAH) IN OPERATING</th>
<th>HOUSING (OAL) IN OPERATING</th>
<th>HOUSING (OAW) IN OPERATING</th>
<th>ELEMENT REMOVAL CLEARANCE</th>
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<td>B(IN)</td>
<td>B(mm)</td>
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<td>HFFS-1R-40V</td>
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<td>5-3/4</td>
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<td>54-1/2</td>
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Dimensions shown are for reference only. Consult FSI for certified drawing when required.
### MULTI ROUND VERTICAL HFFS HOUSING DIMENSIONS

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<th>F (mm)</th>
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### MULTI ROUND HORIZONTAL HFFS HOUSING DIMENSIONS

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Dimensions shown are for reference only. Consult FSI for certified drawing when required.
HFFS HOUSING ORDERING GUIDE

HFFS  3R  40V  316SS  4”-150#FL  ST1  UM  1

Housing Series
High Flow Housing

Element Length
- 40V = 40° LG. ELEMENT
- 40H = 40° LG. ELEMENT
- 60H = 60° LG. ELEMENT
- V = Vertical position
- H = Horizontal position

Inlet/Outlet - Type
- 2” FNPT
- 3” FNPT
- 2” to 12”-150#FL
- Other

Code Stamping
- NC = Non-Code
- U = U Stamp
- UM = UM Stamp
- Other

Housing Material
- 304SS - 304 Stainless
- 316SS - 316 Stainless
- CS - Carbon Steel
- Other

Configuration
- ST1 = Style 1
- ST2 = Style 2
- ST3 = Style 3
- ST4 = Style 4
- Other

CRN
- Blank = None
- BC = 1
- AB = 2
- SK = 3
- MB = 4
- ON = 5
- QC = 6
- NB = 7
- NS = 8
- PEI = 9
- NF = 0
- Other

HOUSING OPTIONS
(Consult FSI)

Pressure Class: Up to 2500# ANSI Flange
Code Stamping: ASME *U*, *UM* and National Board Stamp
CRN Registration: All the applicable Canadian Jurisdiction
NDE: RT, UT, LPT, MT, WFMT, PMI & HT
PWHT: Per code or special requirement
Sour Service: Nace MR-103 & MR-0175 Compliance
Corrosion Allowance: 1/16”[1.6mm] to 1/4”[6mm]
Housing Material: Hastelloy, Alloy 20 and other
Bolting Material: SA 193 B7M/2HM, Stainless 304SS or 316SS
Adjustable Leg: Stainless Steel option
Connection: Add and up size
Configuration Style: All available styles and other such as duplex, triplex etc.
Surface Preparation: C/S interior blasting / SS interior mechanical polish & electro-polish
Coating: Ext / Internal with special paint.
O-Ring: Buna-N, EPR, Silicon, Viton, T.E.V, and other
Closure: Clam Shell Style, Q.O.C, ANSI bolted type and other

HOUSING CONFIGURATION
SPECIALTY SERIES
SPECIALTY FILTER HOUSING

HOUSING MODELS
DFFS - Dual Function Filter Housing
MFFS - Multi Function Filter Housing
BHFSGN - Top Entry Bag Filter Housing

APPLICATIONS
Oil and Gas Industry
Adhesives and Resins
Water & Waste Water
Pharmaceutical and Cosmetics
Chemical Industry
Food and Beverages
Petroleum Industry
Power Industry
Pulp & Paper Industry
Paints, Coatings & Ink
All Process Fluids

CODE OF CONSTRUCTION
ASME Sect. VIII Div.1 - Pressure Vessel Code
DFFS DUOFX SERIES

FSI's DuoFx filter housing is specially designed for interchangeability between bag and cartridge elements and also can be used as a strainer for coarse filtration. The interchangeable feature is an added convenience for any application that requires coarse, nominal or absolute filtration in a single process line.

HOUSING STANDARD SPECIFICATIONS

Design Code: ASME Section VIII, Division 1
Design Pressure: 300 PSIG / 2068 KPAG
Design Temperature: -20°F/300°F(-29°C/149°C)
Configuration: Vertical
M.O.C: 304SS or 316SS
Housing Diameter: 4" NPS [DIN100]
Closure: Swing Bolt
O-ring Seal: EPDM
Exterior Finish: Electro-polish
Bolt/Nut: SA 193 B7/SA 194 2H (zinc plated)

APPLICATION

Chemical Processing
Pharmaceuticals
Food and Beverages
Industrial Water
Paints, Coatings and Inks
Adhesives and Resins
Coolant and Lubricants
Edible Oils
Beer and Wine

HOUSING MODEL AND ACCOMMODATIONS

DFFS20 - #3 size bag & single 2.5"O.D x 10" cartridge element
DFFS40 - #4 size bag & single 2.5"O.D x 20" cartridge element

MAXIMUM FLOW CAPACITY

DFFS20 - 25GPM[95LPM] for #3 Bag
DFFS20 - 5GPM[19LPM] for 10" Cartridge
DFFS40 - 50GPM[189LPM] for #4 Bag
DFFS40 - 10GPM[38LPM] for 20" Cartridge

FEATURES

1. Three applications in one (coarse, nominal or absolute filtration)
2. Interchangeable bag and cartridge element
3. All Stainless Steel construction
4. Stainless Steel hardware available
5. Swing Bolt Closure for quick and easy change out
6. Baskets with O-ring seals preventing bypass

HOUSING OPTIONS

Leg Type: Adjustable legs
O-Ring: Buna-N, Viton, Silicon, T.E.V
CRN: Any applicable Canadian Jurisdiction
Code Stamp: "UM" or "U"
Surface Finish: Sanitary

For all other requests consult with FSI
MFFS MULTI FX SERIES

FSI’s MultiFx filter housing is specially designed for interchangeability between bag, cartridge, high flow and custom filter elements and also can be used as a strainer for coarse filtration. The interchangeable feature is an added convenience for applications that may have coarse, nominal, absolute or special filtration requirements within a single process line.

HOUSING STANDARD SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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<tr>
<td>Design Code</td>
<td>ASME Section VIII, Division 1</td>
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<tr>
<td>Design Pressure</td>
<td>150 PSIG / 1034 KPAG</td>
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<tr>
<td>Design Temperature</td>
<td>-20°F/-29°C (-29°C/107°C)</td>
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<tr>
<td>Configuration</td>
<td>Vertical</td>
</tr>
<tr>
<td>M.O.C</td>
<td>304SS or 316SS</td>
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<tr>
<td>Housing Diameter</td>
<td>8” NPS [DIN200]</td>
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<tr>
<td>Closure</td>
<td>Swing Bolt</td>
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<td>O-ring Seal</td>
<td>EPDM</td>
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<td>Exterior Finish</td>
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<td>Bolt/Nut</td>
<td>SA 193 B7/SA 194 2H (zinc plated)</td>
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<tr>
<td>Leg Type</td>
<td>Adjustable</td>
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APPLICATION

Chemical Processing
Pharmaceuticals
Food and Beverages
Industrial Water
Paints, Coatings and Inks
Adhesives and Resins
Coolant and Lubricants
Edible Oils
Beer and Wine

HOUSING MODEL AND ACCOMMODATIONS

**MFFS180** - #2 size bag, #2 size Pleated bag element, 730 series High flow element and custom element up to 7”[178mm] O.D x 32”[ 813mm] in length.

**MFFS90** - #1 size bag, #1 size Pleated bag element, 720 series High flow element and custom element up to 7”[178mm] O.D x 20”[508mm] in length.

FEATURES

1. Various interchangeable elements and applications
2. 300 PSIG (2068 KPAG) design pressure
3. Stainless Steel construction
4. Stainless Steel hardware available
5. Swing Bolt Closure for quick and easy change out
6. Baskets with O-ring seals preventing bypass

FLOW CAPACITY

Ranges from 40 to 150GPM [151 to 568LPM] Due to various type and element sizes.

***Consult FSI to determine the flow capacity for your desired application***

HOUSING OPTIONS

**O-Ring:** Buna-N, Viton, Silicon, T.E.V
**CRN:** Any applicable Canadian Jurisdiction
**Code Stamp:** "UM" or "U"
**Surface Finish:** Sanitary

For all other requests consult with FSI
GOOSE NECK TOP ENTRY BAG HOUSING SERIES

FSI’s Top Entry Bag housings series has an ASME Code design and construction. Housings are designed with an 8"NPS body and closure & top inlet nozzles o-ring seals to provide a simple operational change out for all users.

HOUSING STANDARD SPECIFICATIONS

<table>
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<tr>
<th>Design Code:</th>
<th>ASME Section VIII, Division 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Pressure:</td>
<td>150 PSIG / 1034 KPAG</td>
</tr>
<tr>
<td>Design Temperature:</td>
<td>-20°F/150°F(-29°C/107°C)</td>
</tr>
<tr>
<td>Configuration:</td>
<td>Vertical</td>
</tr>
<tr>
<td>M.O.C:</td>
<td>CS, 304SS or 316SS</td>
</tr>
<tr>
<td>Housing Diameter:</td>
<td>8&quot; NPS [DIN200]</td>
</tr>
<tr>
<td>Inlet/Outlet Size:</td>
<td>2” FNPT</td>
</tr>
<tr>
<td>Closure:</td>
<td>Swing Bolt</td>
</tr>
<tr>
<td>O-ring Seal:</td>
<td>EPDM</td>
</tr>
<tr>
<td>Exterior Finish:</td>
<td>Electro-polish</td>
</tr>
<tr>
<td>Bolt/Nut:</td>
<td>SA 193 B7/SA 194 2H (zinc plated)</td>
</tr>
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</table>

APPLICATION

Automotive Industries
Pharmaceuticals
Food and Beverages
Industrial Water
Paints, Coatings and Inks
Adhesives and Resins
Coolant and Lubricants
Edible Oils
Beer and Wine

HOUSING MODEL AND ACCOMMODATIONS

BHFS90 - #1 size Top Entry bag housing
BHFS180 - #2 size Top Entry bag housing

MAXIMUM FLOW CAPACITY

BHFS90 - 90GPM[341LPM]
BHFS180 - 180GPM[681LPM]

FEATURES

1. 8"NPS Body
2. Easy change out & operational user friendly
3. Stainless Steel construction
4. Stainless Steel hardware available
5. No leakage at inlet nozzle

HOUSING OPTIONS

Leg Type: Adjustable legs
O-Ring: Buna-N, Viton, Silicon, T.E.V
CRN: Any applicable Canadian Jurisdiction
Code Stamp: "UM" or "U"
Surface Finish: Sanitary 120-180grit

For all other requests consult with FSI
FSFS SERIES
FABRICATED/CAST STRAINER

STRAINER MODELS
BSFS - Basket Strainer
FS-125CB - 125# Cast Basket Strainer
FS-150CB - 150# Cast Basket Strainer
TSFS - T-Strainer
YSFS - Y-Strainer
TCSFS - Temporary Cone Strainer
TBSFS - Temporary Basket Strainer
TPSFS - Temporary Plate Strainer

APPLICATIONS
Process Industry
Metal & Mining
Water & Waste Water
Chemical Industry
Oil and Gas Industry
Marine Industry
Petroleum Industry
Process Equipment
Power Industry
Pulp & Paper Industry
Pumps, Meters and Valves protections
All Process Fluids

CODE OF CONSTRUCTION
ASME B31.1 - Power Piping Code
ASME B31.3 - Process Piping Code
ASME Sect. VIII Div.1 - Pressure Vessel Code
Others are available upon request
# BASKET STRAINER
## BSFS MODEL

## TYPICAL APPLICATIONS
- Oil and Gas
- Chemical Process
- Steam
- Petroleum
- Water
- Other

## MATERIAL OF CONSTRUCTION
- 304/316 Stainless Steel
- Carbon Steel
- Carbon Steel L.T.
- Nace Compliance
- Other

## RATINGS
- ANSI Class 150
- ANSI Class 300
- ANSI Class 600
- ANSI Class 900
- ANSI Class 1500
- ANSI Class 2500
- Other

## END CONNECTIONS
- Buttweld
- Ring Type Joint
- Raised Face Flange
- Flat Face Flange
- Other

## SIZES
- 1.5”(DIN40) to 24”(DIN600)
- Larger sizes available upon request.

## FEATURES
- Large open area ratio.
- Duo-flo & Tri-flo optional basket.
- Filtration down to 40 microns.
# BASKET STRAINER ORDERING GUIDE

<table>
<thead>
<tr>
<th>Model</th>
<th>Inlet/Outlet Size</th>
<th>Class</th>
<th>Closure Type</th>
<th>Connection Type</th>
<th>Perf</th>
<th>Mesh</th>
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</thead>
<tbody>
<tr>
<td>BSFS</td>
<td>1.5”</td>
<td>150#</td>
<td>B = Bolted with blind</td>
<td>BW = Buttweld</td>
<td>3/64”</td>
<td>Blank = None</td>
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<tr>
<td>316SS</td>
<td>2”</td>
<td>300#</td>
<td>SB = Swing Bolt Closure</td>
<td>FF = Flat Face Flange</td>
<td>1/32”</td>
<td>10MESH</td>
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<tr>
<td>8”</td>
<td>4”</td>
<td>600#</td>
<td>QT = Q.O.C Twist Style</td>
<td>SW = Socketweld</td>
<td>1/16”</td>
<td>20MESH</td>
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<tr>
<td></td>
<td>6”</td>
<td>900#</td>
<td>QC = Q.O.C Clamp Style</td>
<td>RJ = Ring Joint Flange</td>
<td>3/32”</td>
<td>30MESH</td>
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<tr>
<td></td>
<td>8”</td>
<td>1500#</td>
<td>Other</td>
<td>RF = Raised Face Flange</td>
<td>1/8”</td>
<td>40MESH</td>
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<tr>
<td></td>
<td>10”</td>
<td>Other</td>
<td>Other</td>
<td>FNPT = Threaded</td>
<td>5/32”</td>
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<tr>
<td></td>
<td>12”</td>
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<td>Other</td>
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<td>Other</td>
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<tr>
<td></td>
<td>16”</td>
<td></td>
<td>Other</td>
<td>Other</td>
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<td>100MESH</td>
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<tr>
<td></td>
<td>18”</td>
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<td>Other</td>
<td>Other</td>
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<td></td>
<td>20”</td>
<td></td>
<td>Other</td>
<td>Other</td>
<td></td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>24”</td>
<td></td>
<td>Other</td>
<td>Other</td>
<td></td>
<td>Other</td>
</tr>
</tbody>
</table>

- **Material**
  - 304SS - 304 Stainless
  - 316SS - 316 Stainless
  - CS - Carbon Steel
  - CSLT - Carbon Steel - Low Temperature
  - MONEL
  - HASTELLOY
  - Other

- **Class**
  - 150#
  - 300#
  - 600#
  - 900#
  - 1500#

- **Perf**
  - 3/64”
  - 1/32”
  - 1/16”
  - 3/32”
  - 1/8”
  - 5/32”
  - 3/16”
  - Other

- **Mesh**
  - Blank = None
  - 10MESH
  - 20MESH
  - 30MESH
  - 40MESH
  - 50MESH
  - 60MESH
  - 80MESH
  - 100MESH
  - 120MESH
  - Other
BASKET STRAINER DATA SHEET

NOTES
1. Other screens, mesh liners and material available upon request. Consult FSI.
2. For Buttweld connection please specify mating pipe schedule.
3. Dimensions shown are subject to change. Contact FSI for certified drawing when required.

Materials of Construction
(\(^1\)Carbon Steel Shown)

<table>
<thead>
<tr>
<th>BODY</th>
<th>ASTM A106B / A53B / A516-70</th>
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<tbody>
<tr>
<td>NOZZLES</td>
<td>ASTM A106B</td>
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<tr>
<td>FLANGES / COUPLING</td>
<td>ASTM A105</td>
</tr>
<tr>
<td>BOTTOM HEADS</td>
<td>ASTM A516-70 / A234 WPB</td>
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<td>INT/EXT. ATTACHMENT</td>
<td>C/S</td>
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<tr>
<td>BASKET</td>
<td>304SS</td>
</tr>
<tr>
<td>GASKET</td>
<td>304SS Spiral Wound</td>
</tr>
<tr>
<td>STUD</td>
<td>ASTM A193-B7</td>
</tr>
<tr>
<td>NUT</td>
<td>ASTM A194-2H</td>
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### Basket Strainer Data Sheet

<table>
<thead>
<tr>
<th>INLET/OUTLET (N1/2)</th>
<th>HOUSING SIZE</th>
<th>VENT (N3)</th>
<th>DRAIN (N4)</th>
<th>A CLASS</th>
<th>B CLASS</th>
<th>C CLASS</th>
<th>D CLASS</th>
<th>WEIGHT</th>
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<tbody>
<tr>
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<td>4&quot;</td>
<td>1/4&quot;</td>
<td>1/2&quot;</td>
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<td>6-1/4</td>
<td>19-7/16</td>
<td>20-1/8</td>
<td>9-7/16</td>
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<tr>
<td>(DIN40) (DIN100)</td>
<td>(DIN8)</td>
<td>(DIN15)</td>
<td></td>
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<td>(494)</td>
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<td>1/2&quot;</td>
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<td>6-1/4</td>
<td>19-7/8</td>
<td>20-9/16</td>
<td>9-7/16</td>
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<tr>
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<td>(DIN15)</td>
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<td>15-15/16</td>
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<td>15-15/16</td>
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<td>(776)</td>
<td>(405)</td>
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<td>1/4&quot;</td>
<td>1/2&quot;</td>
<td>10-5/16</td>
<td>10-5/16</td>
<td>34-13/16</td>
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</tr>
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<td>10&quot;</td>
<td>16&quot;</td>
<td>1/2&quot;</td>
<td>1&quot;</td>
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<td>49-1/2</td>
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<td>18&quot;</td>
<td>1/2&quot;</td>
<td>1&quot;</td>
<td>17</td>
<td>17</td>
<td>56-1/2</td>
<td>58-1/16</td>
<td>31-11/16</td>
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<td>(DIN300) (DIN450)</td>
<td>(DIN15)</td>
<td>(DIN25)</td>
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<td>1/2&quot;</td>
<td>1.5&quot;</td>
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<td>(DIN350) (DIN500)</td>
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<td>(DIN40)</td>
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<td>(903)</td>
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<td>1.5&quot;</td>
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<td>72-7/16</td>
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<td>(1802)</td>
<td>(1840)</td>
<td>(1068)</td>
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<td>1.5&quot;</td>
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<td>22</td>
<td>72-15/16</td>
<td>74-7/16</td>
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<td>(1853)</td>
<td>(1891)</td>
<td>(1068)</td>
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<tr>
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<td>30&quot;</td>
<td>1/2&quot;</td>
<td>1.5&quot;</td>
<td>25</td>
<td>25</td>
<td>80-1/2</td>
<td>84-1/2</td>
<td>49-9/16</td>
</tr>
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<td>(2146)</td>
<td>(1259)</td>
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<td>1/2&quot;</td>
<td>1.5&quot;</td>
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<td>28</td>
<td>93</td>
<td>97-1/4</td>
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<td>(DIN600) (DIN900)</td>
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<td>(711)</td>
<td>(711)</td>
<td>(2362)</td>
<td>(2470)</td>
<td>(1449)</td>
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</tbody>
</table>

-All dimensions shown in inches with millimetres in brackets beneath.
**BASKET STRAINER CLEAN PRESSURE DROP FOR 14”-24” INLET/OUTLET**

**PRESSURE DROP IN PSD**

**FLOW IN GPM**

---

***PRESSURE DROP IS BASED ON FLUID OF WATER***
BASKET STRAINER
FS-125CB MODEL - ANSI CLASS 125LB.

FSI specializes in Industrial Filtration applications. We offer a wide range of filters, filter systems, strainers and separation equipment to service the Chemical, Environmental, Petroleum, Pulp and Paper and Pharmaceutical industries.

FEATURES
1. Flat faced flanged inlet/outlet connections in accordance with ASME B16.1.
2. ASME B16.1 wall thickness and pressure - temperature ratings.
3. Straight through flow design with angular basket minimizes flow obstruction resulting in low pressure drop.
4. Bolted cover flange with gasket. Cover flange meets the design requirements of ASME VIII-1 appendix II.
5. Plugs supplied installed in the drain/blow down connection.
6. Large straining capacity to minimize time between cleaning.
7. It is recommended that model FS-125CB basket strainers be used to filter/strain down to 250 microns minimum. For finer filtration requirements please contact FSI.

Materials of Construction
1. Body ASTM A126-B
2. Cover ASTM A126-B
3. Straining Element (1)/(2) TYPE 304SS
4. Gasket (1) GRAPHITE
5. NPT Plug (Blow-off) ASTM A126-B
6. Cover Studs (3) ASTM A307-B
7. Cover Nuts (3) ASTM A563

(1) Recommended Spares. (2) Maximum recommended differential pressure is 10 psid before cleaning. (3) Materials of equivalent strength may be substituted at manufacturer's option. (4) Contact FILTER SOLUTIONS INC. for special gaskets materials.

Pressure-Temperature Ratings
(in accordance with ASME B16.1)

<table>
<thead>
<tr>
<th>TEMPERATURE (°F)</th>
<th>Working Pressure (PSI)</th>
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<tbody>
<tr>
<td>-20 to 150</td>
<td>200</td>
</tr>
<tr>
<td>200</td>
<td>190</td>
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<tr>
<td>225</td>
<td>180</td>
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<td>250</td>
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<td>300</td>
<td>165</td>
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<tr>
<td>325</td>
<td>155</td>
</tr>
<tr>
<td>352 (2)</td>
<td>150</td>
</tr>
<tr>
<td>375</td>
<td>145</td>
</tr>
<tr>
<td>406 (1)/(3)</td>
<td>140</td>
</tr>
<tr>
<td>425</td>
<td>130</td>
</tr>
<tr>
<td>450</td>
<td>125</td>
</tr>
</tbody>
</table>

Notes:
1. Permissible for service temperature up to 400°F due to gasket material.
2. 353°F to reflect the temperature of saturated steam at 125 psi.
3. 408°F to reflect the temperature of saturated steam at 250 psi.
4. For intermediate temperatures, linear interpolation is permitted.
5. ASME B31.1, ASME B31.3 and other codes limit the maximum operating pressure and temperature of threaded connections and A126-B cast iron. Please consult these codes for your application.
Basket Strainers are suitable to be installed in pipelines to remove unwanted debris from the pipeline, while protecting downstream equipment such as valves, nozzles, compressors, fine filtration equipment and similar. Basket Strainers are suitable to be installed in horizontal pipelines only. FSI offers various mesh and perforation sizes to match your specific filtration requirements.

Basket Strainer
FS-125CB Model - ANSI Class 125LB.

Basket Strainers are suitable to be installed in pipelines to remove unwanted debris from the pipeline, while protecting downstream equipment such as valves, nozzles, compressors, fine filtration equipment and similar. Basket Strainers are suitable to be installed in horizontal pipelines only. FSI offers various mesh and perforation sizes to match your specific filtration requirements.

**STANDARD SCREENS**

<table>
<thead>
<tr>
<th>SIZE RANGE</th>
<th>OPENING</th>
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<tbody>
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<td>2&quot; - 3&quot;</td>
<td>3/64&quot; PERF.</td>
</tr>
<tr>
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<tr>
<td>50mm - 80mm</td>
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</tr>
<tr>
<td>4&quot; - 12&quot;</td>
<td>1/8&quot; PERF.</td>
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<tr>
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<td>0.125 INCH</td>
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<tr>
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<td>3.2mm</td>
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<table>
<thead>
<tr>
<th>NLET/OULET (N1/2)</th>
<th>DRAIN (H)</th>
<th>HOUSING SIZE F IN/ (mm)</th>
<th>A IN/ (mm)</th>
<th>B IN/ (mm)</th>
<th>C IN/ (mm)</th>
<th>D IN/ (mm)</th>
<th>E IN/ (mm)</th>
<th>G IN/ (mm)</th>
<th>SCREEN AREA (2) IN²/(cm²)</th>
<th>WEIGHT LB/(KG) COVER</th>
<th>WEIGHT LB/(KG) UNIT</th>
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<tbody>
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<td>(188)</td>
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<td>23</td>
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<td>(DIN100) (DIN25) (152)</td>
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<td>(432)</td>
<td>(1080)</td>
<td>(4219)</td>
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(1) Dimension “B” is +/- 0.13". (2) Screen Area values are equal to the total surface area of the basket strainer element. The screen open area is equal to the Screen Area multiplied by the Percentage Open Area of the basket strainer element material. (3) Filter Solutions Inc. makes every effort to ensure the information presented in this literature is accurate. Dimensions shown are subject to change. Contact FSI for certified prints when required.
BASKET STRAINER

FS-150CB MODEL - ANSI CLASS 150LB.

FSI specializes in Industrial Filtration applications. We offer a wide range of filters, filter systems, strainers and separation equipment to service the Chemical, Environmental, Petroleum, Pulp and Paper and Pharmaceutical industries.

FEATURES

1. Flanged inlet/outlet connections in accordance with ASME B16.5.
2. ASME B16.5 / B16.34 wall thickness and pressure - temperature ratings.
3. Straight through flow design with angular basket minimizes flow obstruction resulting in low pressure drop.
4. Bolted cover flange with the gasket retained in a recess machined into the body prevents leakage and gasket blow-out. Cover flange meets the design requirements of ASME VIII-1 appendix II.
5. Solid plugs supplied installed in the drain/blow down connection.
6. Large straining capacity to minimize time between cleancings
7. It is recommended that model FS-150CB basket strainers be used to filter/strain down to 250 microns minimum. For finer filtration requirements please contact FSI.

Pressure-Temperature Ratings
(in accordance with ASME B16.1)

<table>
<thead>
<tr>
<th>TEMPERATURE (°F)</th>
<th>Working Pressure (PSI) (WCB, CLASS 150)</th>
<th>Working Pressure (PSI) (CF8M, CLASS 150)</th>
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<td>215</td>
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<tr>
<td>400</td>
<td>200</td>
<td>195</td>
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1) Permissible for service temperature up to 200°F due to gasket material. When operating FILTER SOLUTIONS FS-150CB strainers at higher temperatures please consult FSI. (2) WCB lower temperature limit –20°F, CF8M lower temperature limit –50°F (WITH IMPACT TESTING SPECIFIED), otherwise CF8M lower temperature limit is –20°F. (3) WCB: WOG (Non-shock) = 285 psig @ 100°F, Saturated Steam = 150 psig @ 366°F, CF8M: WOG (Non-shock) = 275 psig @ 100°F, Saturated Steam = 150 psig at 100°F. (4) For intermediate temperatures, linear interpolation is permitted. (5) ASME B31.1, ASME B31.3 and other codes limit the maximum operating pressure and temperature of threaded connections. Please consult these codes for your application.

Materials of Construction

<table>
<thead>
<tr>
<th>MODEL FS-150CB-S CARBON STEEL</th>
<th>MODEL FS-150CB-SS STAINLESS STEEL</th>
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<tr>
<td>Body</td>
<td>ASTM A126-WCB</td>
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<td>TEFLO</td>
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<td>NPT Plug (Blow-off)</td>
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<td>Cover Studs (3)</td>
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<td>Cover Nuts (3)</td>
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(1) Recommended Spares. (2) Maximum recommended differential pressure is 10 psid before cleaning. (3) Materials of equivalent strength may be substituted at manufacturer’s option. (4) Contact FILTER SOLUTIONS INC. for special gaskets materials.
Basket Strainers are suitable to be installed in pipelines to remove unwanted debris from the pipeline, while protecting downstream equipment such as valves, nozzles, compressors, fine filtration equipment and similar. Basket Strainers are suitable to be installed in horizontal pipelines only. FSI offers various mesh and perforation sizes to match your specific filtration requirements.

**BASKET STRAINER**

**FS-150CB MODEL - ANSI CLASS 150LB.**

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<thead>
<tr>
<th>NLET/OUTLET (N1/2)</th>
<th>DRAIN (H)</th>
<th>HOUSING SIZE F IN (mm)</th>
<th>A IN (mm)</th>
<th>B IN (mm)</th>
<th>C IN (mm)</th>
<th>D IN (mm)</th>
<th>E IN (mm)</th>
<th>G IN (mm)</th>
<th>SCREEN AREA (2) in²/cm²</th>
<th>WEIGHT LB/(KG) COVER</th>
<th>WEIGHT LB/(KG) UNIT</th>
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(1) Dimension “B” is +/- 0.13”. (2) Screen Area values are equal to the total surface area of the basket strainer element. The screen open area is equal to the Screen Area multiplied by the Percentage Open Area of the basket strainer element material. (3) Filter Solutions Inc. makes every effort to ensure the information presented in this literature is accurate. Dimensions shown are subject to change. Contact FSI for certified prints when required.
T-STRAINER
TSFS MODEL

TYPICAL APPLICATIONS
- Oil and Gas
- Chemical Process
- Steam
- Petroleum
- Water
- Other

MATERIAL OF CONSTRUCTION
- 304/316 Stainless Steel
- Carbon Steel
- Carbon Steel L.T.
- Nace Compliance
- Other

RATINGS
- ANSI Class 150
- ANSI Class 300
- ANSI Class 600
- ANSI Class 900
- ANSI Class 1500
- ANSI Class 2500
- Other

END CONNECTIONS
- Buttweld
- Ring Type Joint
- Raised Face Flange
- Flat Face Flange
- Other

SIZES
- 2\"(DIN50) to 24\"(DIN600)
- Larger sizes available upon request.

FEATURES
- Heavy duty construction.
- Compact design.
- Standard stainless steel screens.
### T-STRAINER ORDERING GUIDE

<table>
<thead>
<tr>
<th>Model</th>
<th>Inlet/Outlet Size</th>
<th>Class</th>
<th>Closure Type</th>
<th>Connection Type</th>
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**Filter Solutions Inc**

649 Enfield Road, Burlington, Ontario L7T 2X9  Toll Free: 877-352-2301  Fax: 905-637-3031  info@filtersolutions.com  www.filtersolutions.com
T-STRAINER DATA SHEET

90° FLOW

INLINE FLOW

1STANDARD SCREEN

<table>
<thead>
<tr>
<th>SIZE</th>
<th>SCREEN</th>
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<tbody>
<tr>
<td>2” - 24”</td>
<td>1/8” Perf</td>
<td>304SS</td>
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NOTES

1. Other screens, mesh liners and material available upon request. Consult FSI.
2. For Buttweld connection please specify mating pipe schedule.
3. Dimensions shown are subject to change. Contact FSI for certified drawing when required.

Materials of Construction

(1Carbon Steel Shown)

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<th>Component</th>
<th>Material</th>
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<td>ASTM A234-WPB</td>
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<td>Flanges</td>
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<td>Screen</td>
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<td>Coupling/Threadolets</td>
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## T-STRAINER DATA SHEET

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</table>

-All dimensions shown in inches with millimetres in brackets beneath.

FILTER SOLUTIONS INC

649 Enfield Road, Burlington, Ontario L7T 2X9  Toll Free: 877-352-2301  Fax: 905-637-3031  info@filtersolutions.com  www.filtersolutions.com
T-STRAINER
TSFS MODEL

T-STRAINER CLEAN PRESSURE DROP FOR 2”-5” INLET/OUTLET

**PRESSURE DROP IS BASED ON FLUID OF WATER**

FLOW IN GPM

T-STRAINER PRESSURE DROP FOR 6”-12” INLET/OUTLET

**PRESSURE DROP IS BASED ON FLUID OF WATER**

FLOW IN GPM
Y-STRAINER
YSFS MODEL

TYPICAL APPLICATIONS
Oil and Gas
Chemical Process
Steam
Petroleum
Water
Other

MATERIAL OF CONSTRUCTION
304/316 Stainless Steel
Carbon Steel
Carbon Steel L.T.
Nace Compliance
Other

RATINGS
ANSI Class 150
ANSI Class 300
ANSI Class 600
ANSI Class 900
ANSI Class 1500
ANSI Class 2500
Other

END CONNECTIONS
Buttweld
Ring Type Joint
Raised Face Flange
Flat Face Flange
Other

SIZES
2"(DIN50) to 24"(DIN600)
Larger sizes available upon request.

FEATURES
-Heavy duty construction.
-Compact design.
-Standard stainless steel screens.
Y-STRAINER DATA SHEET

NOTES
1. Other screens, mesh liners and material available upon request. Consult FSI.
2. For Buttweld connection please specify mating pipe schedule.
3. Dimensions & Weights are shown for 150 Class and are subject to change. Contact FSI for certified drawing when required.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>¹A</th>
<th>¹B</th>
<th>¹C</th>
<th>Drain</th>
<th>³Weight LBS/kg</th>
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<td>49-1/2</td>
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-All dimensions shown in inches with millimetres in brackets beneath.

Materials of Construction
(¹Carbon Steel Shown)

<table>
<thead>
<tr>
<th>Pipe</th>
<th>A106B</th>
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<tbody>
<tr>
<td>Flanges</td>
<td>A105</td>
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<td>Coupling/Threadolets</td>
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<td>B.W Fittings</td>
<td>A234 WPB</td>
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<tr>
<td>Int/Ext. Attachment</td>
<td>C/S</td>
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<td>Screen</td>
<td>304SS</td>
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<td>Gasket</td>
<td>304SS Spiral Wound</td>
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<tr>
<td>Stud</td>
<td>A193-B7</td>
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<td>Nut</td>
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¹STANDARD SCREEN

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<thead>
<tr>
<th>SIZE</th>
<th>SCREEN</th>
<th>MATERIAL</th>
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</thead>
<tbody>
<tr>
<td>2&quot; - 24&quot;</td>
<td>1/8&quot; Perf</td>
<td>304SS</td>
</tr>
</tbody>
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Filter Solutions Inc
649 Enfield Road, Burlington, Ontario L7T 2X9
Toll Free: 877-352-2301 Fax: 905-637-3031 info@filtersolutions.com www.filtersolutions.com
Y-STRAINER
YSFS MODEL

Y-STRAINER CLEAN PRESSURE DROP FOR 2"-4" INLET/OUTLET

Y-STRAINER PRESSURE DROP FOR 6"-12" INLET/OUTLET

***PRESSURE DROP IS BASED ON FLUID OF WATER***
# Y-STRAINER ORDERING GUIDE

<table>
<thead>
<tr>
<th>YSFS</th>
<th>316SS</th>
<th>8&quot;</th>
<th>150#</th>
<th>RF</th>
<th>B</th>
<th>1/8&quot;</th>
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</table>

## Model
- YSFS = Y-Strainer

## Inlet/Outlet Size
- 2"
- 2.5"
- 3"
- 4"
- 5"
- 6"
- 8"
- 10"
- 12"
- 14"
- 16"
- 18"
- 20"
- 24"
- Other

## Class
- 150#
- 300#
- 600#
- 900#
- 1500#
- Other

## Closure Type
- B = Bolted with blind
- SB = Swing Bolt Closure
- QT = Q.O.C Twist Style
- QC = Q.O.C Clamp Style
- Other

## Connection Type
- BW = Butt weld
- FF = Flat Face Flange
- SW = Socket weld
- RJ = Ring Joint Flange
- RF = Raised Face Flange
- FNPT = Threaded
- Other

## Perf
- 3/64"
- 1/32"
- 3/32"
- 1/16"
- 5/32"
- 3/16"
- Other

## Material
- 304SS - 304 Stainless
- 316SS - 316 Stainless
- CS - Carbon Steel
- CSLT - Carbon Steel - Low Temperature
- MONEL
- HASTELLOY
- Other

## Mesh
- Blank = None
- 10MESH
- 20MESH
- 30MESH
- 40MESH
- 50MESH
- 60MESH
- 80MESH
- 100MESH
- 120MESH
- Other
TEMPORARY CONE STRAINER
TCSFS MODEL

TYPICAL APPLICATIONS
- Oil and Gas
- Chemical Process
- Steam
- Water
- Essentially any process fluid

MATERIAL OF CONSTRUCTION
- 304/316 Stainless Steel
- Carbon Steel
- Monel
- Hastelloy
- Other

RATINGS
- ANSI Class 150
- ANSI Class 300
- ANSI Class 600
- ANSI Class 900
- ANSI Class 1500
- ANSI Class 2500
- Other

END CONNECTIONS
- Wafer
- Lug
- RTJ
- Other

SIZES
- 1"(DIN25) to 24"(DIN600)
- Larger sizes available upon request

FEATURES
- Mesh lining from 10-120 mesh. Larger opening also available.
- Flow direction from in/out, out/in and bi-directional.
- Perforation from 3/64" to 3/8". Larger openings available upon request.
TEMPORARY CONE STRAINER DATA SHEET

NOTES
1. Other screens, thicker gauge and material available upon request. Please contact FSI.
2. Dimensions shown are subject to change. Contact FSI for certified drawing when required.
3. Dimensions shown using 1/8” perf and no mesh.
4. Changing in perforation size will affect the Open Area percentage.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>WEIGHT</th>
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<td>150/300#</td>
<td>600#</td>
<td>900#</td>
<td>1500#</td>
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<td>3-1/4 (70)</td>
<td>3 (76)</td>
<td>3 (78)</td>
<td>3/4 (19)</td>
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<tr>
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<td>3-3/4 (95)</td>
<td>3-3/4 (95)</td>
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<td>6-1/2 (165)</td>
<td>6-3/4 (172)</td>
<td>2-3/4 (70)</td>
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<tr>
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<td>6-3/4 (172)</td>
<td>7-1/2 (191)</td>
<td>8 (203)</td>
<td>8-1/8 (209)</td>
<td>3-3/4 (95)</td>
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<td>5-3/8 (137)</td>
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<td>17 (432)</td>
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<td>20-3/8 (518)</td>
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<td>22-1/2 (572)</td>
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<td>14 (356)</td>
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<tr>
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<td>32-7/8 (835)</td>
<td>35-3/8 (869)</td>
<td>21-1/4 (540)</td>
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</table>

The Open Area Ratio is calculated as follows:

\[ OA\% = \frac{\text{Screen area x free area %}}{100} \times \frac{\text{Cross sectional area of sch.std pipe}}{\text{Free area for 1/8" perf is 40%}} \]

- All dimensions shown in inches with millimetres in brackets beneath.

1STANDARD SCREEN

<table>
<thead>
<tr>
<th>SIZE</th>
<th>SCREEN</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1” - 8”</td>
<td>1/8” Perf</td>
<td>22 Gauge</td>
<td>304SS</td>
</tr>
<tr>
<td>10”-24”</td>
<td>1/8” Perf</td>
<td>16 Gauge</td>
<td>304SS</td>
</tr>
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</table>

TCSFS are designed to fit between Wafer Flat Faced Smooth, RF Flanges. Standard class 150# up to 2500#. Other custom sizes and connections are available upon request.
# Temporary Cone Strainer Ordering Guide

<table>
<thead>
<tr>
<th>TCSFS</th>
<th>316SS</th>
<th>3”</th>
<th>150#</th>
<th>200%</th>
<th>WAFER</th>
<th>1/16”</th>
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<tbody>
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<td>Model</td>
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<td></td>
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</tr>
</tbody>
</table>

**Material**
- 304SS - 304 Stainless
- 316SS - 316 Stainless
- MONEL
- HASTELLOY
- Other

**Connection**
- 1”
- 1.5”
- 2”
- 2.5”
- 3”
- 4”
- 5”
- 6”
- 8”
- 10”
- 12”
- 14”
- 16”
- 20”
- 24”

**Class**
- 150#
- 300#
- 600#
- 900#
- 1500#
- 2500#
- Other

**OA%**
- 100%
- 150%
- 200%
- 300%
- Other

**Con Type**
- WAFER
- LUG
- Other

**Perf**
- 3/64”
- 1/32”
- 1/16”
- 3/32”
- 1/8”
- 5/32”
- 3/16”
- Other
TEMPORARY BASKET STRAINER
TBSFS MODEL

TYPICAL APPLICATIONS
Oil and Gas
Chemical Process
Steam
Water
Essentially any process fluid

MATERIAL OF CONSTRUCTION
304/316 Stainless Steel
Carbon Steel
Monel
Hastelloy
Other

RATINGS
ANSI Class 150
ANSI Class 300
ANSI Class 600
ANSI Class 900
ANSI Class 1500
ANSI Class 2500
Other

END CONNECTIONS
Wafer
Lug
RTJ
Other

SIZES
1”(DIN25) to 24”(DIN600)
Larger sizes available upon request.

FEATURES
-Mesh lining from 10-120 mesh. Larger opening also available.
-Flow direction from in/out, out/in and bi-directional.
-Perforation from 3/64” to 3/8”. Larger openings available upon request.
# TEMPORARY BASKET STRAINER DATA SHEET

## NOTES

1. Alternative screens, mesh liners, thicker gauges and materials available upon request. Please contact FSI.
2. Dimensions shown are subject to change. Contact FSI for certified drawing when required.
3. Dimensions shown using 1/8" perf and no mesh.
4. Changing in perforation size will affect the Open Area percentage.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>150/300#</th>
<th>600#</th>
<th>900#</th>
<th>1500#</th>
<th>3/4</th>
<th>1&quot;</th>
<th>1-1/8</th>
<th>1-1/4</th>
<th>1-1/2</th>
<th>1-1/8</th>
<th>1-1/4</th>
<th>2-1/4</th>
<th>2-1/2</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>5&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
<th>12&quot;</th>
<th>14&quot;</th>
<th>16&quot;</th>
<th>18&quot;</th>
<th>20&quot;</th>
<th>24&quot;</th>
</tr>
</thead>
</table>

### The Open Area Ratio is calculated as follows:

\[
OA\% = \left(\frac{\text{Screen area} \times \text{free area} \%}{\text{Cross sectional area of sch.std pipe}}\right) \times 100\%
\]

Note: Free area for 1/8" perf is 40%.

### 1STANDARD SCREEN

<table>
<thead>
<tr>
<th>SIZE</th>
<th>SCREEN</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; - 8&quot;</td>
<td>1/8&quot; Perf</td>
<td>22 Gauge</td>
<td>304SS</td>
</tr>
<tr>
<td>10&quot;-24&quot;</td>
<td>1/8&quot; Perf</td>
<td>16 Gauge</td>
<td>304SS</td>
</tr>
</tbody>
</table>

TBFSFS are designed to fit between Wafer Flat Faced Smooth, RF Flanges. Standard class 150# up to 2500#. Other custom sizes and connections are available upon request.

---

**FILTER SOLUTIONS INC**

649 Enfield Road, Burlington, Ontario L7T 2X9  Toll Free: 877-352-2301  Fax: 905-637-3031  info@filtersolutions.com  www.filtersolutions.com

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TEMPORARY CONE & BASKET STRAINER
TCSFS & TBSFS MODEL

TCSFS & TBSFS CLEAN PRESSURE DROP FOR 1"-4" NPS CONNECTIONS

TCSFS & TBSFS CLEAN PRESSURE DROP FOR 6"-12" NPS CONNECTIONS

***PRESSURE DROP IS BASED ON FLUID OF WATER***
TEMPORARY BASKET STRAINER ORDERING GUIDE

TBSFS - 316SS - 3" - 150# - 200% - WAFER - 1/16" - 40 - I/O

Model
- TBSFS = Temporary Basket Strainer

Material
- 304SS - 304 Stainless
- 316SS - 316 Stainless
- MONEL
- HASTELLOY
- Other

Connection
- 1"
- 1.5"
- 2"
- 2.5"
- 3"
- 4"
- 5"
- 6"
- 8"
- 10"
- 12"
- 14"
- 16"
- 20"
- 24"
- Other

Class
- 150#
- 300#
- 600#
- 900#
- 1500#
- 2500#
- Other

OA%
- 100%
- 150%
- 200%
- 300%
- Other

Con Type
- WAFER
- LUG
- Other

Perf
- 3/64"
- 1/32"
- 1/16"
- 3/32"
- 1/8"
- 5/32"
- 3/16"
- Other

Mesh
- Blank = None
- 10MESH
- 20MESH
- 30MESH
- 40MESH
- 50MESH
- 60MESH
- 80MESH
- 100MESH
- 120MESH
- Other

Flow
- I/O - In/Out
- O/I - Out/In
- BI - Bi-directional
TEMPORARY PLATE STRAINER
TPSFS MODEL

TYPICAL APPLICATIONS
- Oil and Gas
- Chemical Process
- Steam
- Water
- Essentially any process fluid

MATERIAL OF CONSTRUCTION
- 304/316 Stainless Steel
- Carbon Steel
- Monel
- Hastelloy
- Other

RATINGS
- ANSI Class 150
- ANSI Class 300
- ANSI Class 600
- ANSI Class 900
- ANSI Class 1500
- ANSI Class 2500
- Other

END CONNECTIONS
- Wafer
- Lug
- RTJ
- Other

SIZES
- 1" (DIN25) to 24" (DIN600)
- Larger sizes available upon request.

FEATURES
- Mesh lining from 10-120 mesh. Larger opening also available.
- Flow direction from in/out, out/in and bi-directional.
- Perforation from 3/64" to 3/8". Larger openings available upon request.
TEMPORARY PLATE STRAINER DATA SHEET

NOTES
1. Alternative screens, mesh liners, thicker gauge and material available upon request. Please contact FSI.
2. Dimensions shown are subject to change. Contact FSI for certified drawing when required.
3. Dimensions shown using 1/8” perf and no mesh.
4. Changing in perforation size will affect the Open Area percentage.

The Open Area Ratio calculated as follows:

\[ OA\% = \frac{(Screen\ area \times \ free\ area\ %)}{(Cross\ sectional\ area\ of\ sch.\ std\ pipe)} \times 100 \]

**1STANDARD SCREEN**

<table>
<thead>
<tr>
<th>SIZE</th>
<th>SCREEN</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; - 8&quot;</td>
<td>1/8&quot; Perf</td>
<td>22 Gauge</td>
<td>304SS</td>
</tr>
<tr>
<td>10&quot;-24&quot;</td>
<td>1/8&quot; Perf</td>
<td>16 Gauge</td>
<td>304SS</td>
</tr>
</tbody>
</table>

TPSFS are designed to fit between Wafer Flat Faced Smooth, RF Flanges. Standard class 150# up to 2500#. Other custom sizes and connections are available upon request.
### TEMPORARY PLATE STRAINER ORDERING GUIDE

<table>
<thead>
<tr>
<th>Model</th>
<th>Connection</th>
<th>Class</th>
<th>Con Type</th>
<th>Perf</th>
<th>Mesh</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPSFS</td>
<td>□1”</td>
<td>□150#</td>
<td>□WAFER</td>
<td>□3/64”</td>
<td>□Blank</td>
<td>□I/O - In/Out</td>
</tr>
<tr>
<td></td>
<td>□1.5”</td>
<td>□300#</td>
<td>□LUG</td>
<td>□1/32”</td>
<td>□10MESH</td>
<td>□O/I - Out/In</td>
</tr>
<tr>
<td></td>
<td>□2”</td>
<td>□600#</td>
<td>□Other</td>
<td>□1/16”</td>
<td>□20MESH</td>
<td>□BI - Bi-directional</td>
</tr>
<tr>
<td></td>
<td>□2.5”</td>
<td>□900#</td>
<td>□Other</td>
<td>□3/32”</td>
<td>□30MESH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□3”</td>
<td>□1500#</td>
<td>□Other</td>
<td>□1/8”</td>
<td>□40MESH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□4”</td>
<td>□2500#</td>
<td>□Other</td>
<td>□5/32”</td>
<td>□50MESH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□5”</td>
<td></td>
<td>□Other</td>
<td>□3/32”</td>
<td>□60MESH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□6”</td>
<td></td>
<td>□Other</td>
<td>□3/32”</td>
<td>□80MESH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□8”</td>
<td></td>
<td>□Other</td>
<td>□7/32”</td>
<td>□100MESH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□10”</td>
<td></td>
<td>□3/8”</td>
<td>□1/4”</td>
<td>□120MESH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□12”</td>
<td></td>
<td>□Other</td>
<td>□3/8”</td>
<td>□Other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□14”</td>
<td></td>
<td></td>
<td>□Other</td>
<td>□Other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□16”</td>
<td></td>
<td></td>
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<td></td>
<td>□20”</td>
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</tr>
<tr>
<td></td>
<td>□24”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Material Options:
- □304SS - 304 Stainless Steel
- □316SS - 316 Stainless Steel
- □MONEL
- □HASTELLOY
- □Other

### Class Options:
- □150#
- □300#
- □600#
- □900#
- □1500#
- □2500#
- □Other

### Connection Options:
- □1”
- □1.5”
- □2”
- □2.5”
- □3”
- □4”
- □5”
- □6”
- □8”
- □10”
- □12”
- □14”
- □16”
- □20”
- □24”
- □Other

### Perforation Options:
- □3/64”
- □1/32”
- □1/16”
- □3/32”
- □1/8”
- □5/32”
- □3/16”
- □7/32”
- □1/4”
- □3/8”
- □Other

### Mesh Options:
- □Blank = None
- □10MESH
- □20MESH
- □30MESH
- □40MESH
- □50MESH
- □60MESH
- □80MESH
- □100MESH
- □120MESH
- □Other
TEMPORARY PLATE STRAINER

TPSFS MODEL

TEMPORARY PLATE STRAINER PRESSURE DROP FOR 1"-4" NPS CONNECTIONS

***PRESSURE DROP IS BASED ON FLUID OF WATER***

FLOW IN GPM

TEMPORARY PLATE STRAINER PRESSURE DROP FOR 6"-12" NPS CONNECTIONS

***PRESSURE DROP IS BASED ON FLUID OF WATER***

FLOW IN GPM
CCFS SERIES
CARBON CANISTER HOUSING

STRAINER MODELS
CCFS1 to CCFS5: Single round to 5 round Carbon Canister Housing

APPLICATIONS
Groundwater Remediation
Wastewater Treatment
Process Water Treatment
Glycol Purification and Recycling
Chemical or Product Purification
Corn and Cane Sugar Decolourization
Juice Decolourization/Deodorization
Amine Purification
Solvent Recovery
Industrial Oil Purification
Edible Oil Purification

CODE OF CONSTRUCTION
ASME Sect. VIII Div.1 - Pressure Vessel Code
FSI’s CCFS Activated Carbon Housing Series is designed to remove and capture contaminants, fouling and foaming agents, hydrocarbon and degradation products from process streams. CCFS housings come in various sizes and material of construction and can be custom-built to accommodate all processes and applications.

**FEATURES**
1. Available from very low to high flow ranges
2. All standard housings come with Swing Bolt Closures for quick and easy access.
3. Inline connection for minimal piping work.

**HOUSING STANDARD SPECIFICATIONS**
- **Design Code:** ASME Section VIII, Division 1
- **Design Pressure:** 150 PSIG / 1034 KPAG
- **Design Temperature:** -20°F/-29°C / 225°F / 107°C
- **M.O.C:** CS, 304SS, 316SS and others
- **Closure:** Swing Bolt with EPDM O-ring seal
- **Exterior Finish:** (SS) Electro-polish
- **Exterior Finish:** (CS) Blue Enamel

**HOUSING MODELS**
- **CCFS720** - ONE HIGH 720 CANISTER HOUSING
- **CCFS740** - TWO HIGH 720 CANISTER HOUSING
- **CCFS1** - 1 ROUND 1122 CANISTER HOUSING
- **CCFS3** - 3 ROUND 1122 CANISTER HOUSING
- **CCFS5** - 5 ROUND 1122 CANISTER HOUSING
### GENERAL NOTES
1. Housing pressure drop is based on the flow of water through an open tube sheet and without canisters.
2. See housing ordering guide for options.
CCFS720/740 SERIES - CARBON CANISTER
HOUSING DIMENSIONS

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>INLET C'L TO OUTLET FACE</th>
<th>VESSEL C'L TO INLET FACE</th>
<th>HOUSING (OAH)</th>
<th>HOUSING (OAL)</th>
<th>HOUSING (OAW)</th>
<th>ELEMENT REMOVAL CLEARANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A(IN)</td>
<td>A(mm)</td>
<td>B(IN)</td>
<td>B(mm)</td>
<td>C(IN)</td>
<td>C(mm)</td>
</tr>
<tr>
<td>CCFS720</td>
<td>20-7/16</td>
<td>519</td>
<td>5-1/2</td>
<td>140</td>
<td>27-3/8</td>
<td>695</td>
</tr>
<tr>
<td>CCFS740</td>
<td>40-7/16</td>
<td>1027</td>
<td>5-1/2</td>
<td>140</td>
<td>47-3/8</td>
<td>1203</td>
</tr>
</tbody>
</table>

Dimensions shown are for reference only. Consult FSI for certified drawing when required.
# CCFS1122 SERIES - CARBON CANISTER HOUSING DIMENSIONS

## Dimensions

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>FLOOR TO C'L INLET/OUTLET</th>
<th>VESSEL C'L TO INLET/OUTLET FACE</th>
<th>FLOOR TO DRAIN FACE</th>
<th>HOUSING (OAH)</th>
<th>HOUSING (OAL)</th>
<th>HOUSING (OAW)</th>
<th>ELEMENT REMOVAL CLEARANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A(IN)</td>
<td>A(mm)</td>
<td>B(IN)</td>
<td>B(mm)</td>
<td>C(IN)</td>
<td>C(mm)</td>
<td>D(IN)</td>
</tr>
<tr>
<td>CCFS-1-1122</td>
<td>15</td>
<td>381</td>
<td>11-3/8</td>
<td>289</td>
<td>6-3/16</td>
<td>157</td>
<td>56</td>
</tr>
<tr>
<td>CCFS-1-1144</td>
<td>15</td>
<td>381</td>
<td>11-3/8</td>
<td>289</td>
<td>6-3/16</td>
<td>157</td>
<td>76</td>
</tr>
<tr>
<td>CCFS-1-1166</td>
<td>15</td>
<td>381</td>
<td>11-3/8</td>
<td>289</td>
<td>6-3/16</td>
<td>157</td>
<td>96</td>
</tr>
<tr>
<td>CCFS-3-1144</td>
<td>18</td>
<td>457</td>
<td>17</td>
<td>432</td>
<td>6</td>
<td>152</td>
<td>83</td>
</tr>
<tr>
<td>CCFS-3-1166</td>
<td>18</td>
<td>457</td>
<td>17</td>
<td>432</td>
<td>6</td>
<td>152</td>
<td>103</td>
</tr>
<tr>
<td>CCFS-5-1144</td>
<td>20</td>
<td>508</td>
<td>20</td>
<td>508</td>
<td>6-1/2</td>
<td>165</td>
<td>87</td>
</tr>
<tr>
<td>CCFS-5-1166</td>
<td>20</td>
<td>508</td>
<td>20</td>
<td>508</td>
<td>6-1/2</td>
<td>165</td>
<td>107</td>
</tr>
</tbody>
</table>

Dimensions shown are for reference only. Consult FSI for certified drawing when required.
CCFS720 SERIES CARBON CANISTER HOUSING ORDERING GUIDE

<table>
<thead>
<tr>
<th>Housing Series</th>
<th>Inlet/Outlet - Type</th>
<th>Code Stamping</th>
<th>Configuration</th>
<th>CRN</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCFS 740 316SS 1”-150#FL ST1 UM 1</td>
<td>1” FNPT 2” FNPT 1”-150#FL 2”-150#FL Other</td>
<td>NC U UM Other</td>
<td>ST1 = Style 1 ST2 = Style 2 ST3 = Style 3 Other</td>
<td>Blank BC AB SK MB ON QC NB NS PEI NF Other</td>
</tr>
</tbody>
</table>

Number of Elements
- 720 = (1)6.75” O.D x 20” LG.
- 740 = (2)6.75” O.D x 20” LG.
- Other

Housing Material
- 304SS - 304 Stainless
- 316SS - 316 Stainless
- CS - Carbon Steel
- Other

Housing Options (Consult FSI)
- Pressure Class: Up to 2500# ANSI Flange
- Code Stamping: ASME "U", "UM" and National Board Stamp
- CRN Registration: All the applicable Canadian Jurisdiction
- NDE: RT, UT, LPT, MT, WFM, PMI & HT
- PWHT: Per code or special requirement
- Sour Service: Nace MR-103 & MR-0175 Compliance
- Corrosion Allowance: 1/16”[1.6mm] to 1/4”[6mm]
- Housing Material: Hastelloy, Alloy 20 and other
- Bolting Material: SA 193 B7M/2HM, Stainless 304SS or 316SS
- Adjustable Leg: Stainless Steel option
- Connection: Add and up size
- Configuration Style: All available styles and other such as duplex, Triplex etc.
- Surface Preparation: C/S interior blasting / SS interior mechanical polish & electro-polish
- Coating: Ext / Internal with special paint.
- O-Ring: Buna-N, EPR, Silicon, Viton, T.E.V, and other

Housing Configuration

OTHERS CONFIGURATIONS
- DUPLEX
- TRIPLEX
- QUADPLEX
THE ABOVE CAN BE CONNECTED IN SERIES OR PARALLEL AND SERIES PARALLEL.
CCFS1122 SERIES CARBON CANISTER HOUSING ORDERING GUIDE

**CCFS** | **1-1122** | **CS** | **2”-150#FL** | **ST1** | **UM** | **1**
---|---|---|---|---|---|---
**Housing Series**

- CCFS = Carbon Canister Series

**Number of Elements**

- 1-1122 = (1)11"x22"LG.
- 1-1144 = (2)11"x22"LG.
- 1-1166 = (3)11"x22"LG.
- 3-1144 = (6)11"x22"LG.
- 3-1166 = (9)11"x22"LG.
- 5-1144 = (10)11"x22"LG.
- 5-1166 = (15)11"x22"LG.
- Other

**Inlet/Outlet - Type**

- 1” FNPT
- 2” FNPT
- 1”-150#FL
- 2”-150#FL
- Other

**Housing Material**

- 304SS - 304 Stainless
- 316SS - 316 Stainless
- CS - Carbon Steel
- Other

**Configuration**

- ST1 = Style 1
- ST2 = Style 2
- ST3 = Style 3
- ST4 = Style 4
- ST5 = Style 5
- Other

**Code Stamping**

- NC = Non-Code
- U = U Stamp
- UM = UM Stamp
- Other

**CRN**

- Blank = None
- BC = 1
- AB = 2
- SK = 3
- MB = 4
- ON = 5
- QC = 6
- NB = 7
- NS = 8
- PEI = 9
- NF = 0
- Other

**HOUSING OPTIONS**

*(Consult FSI)*

**Pressure Class:** Up to 2500# ANSI Flange

**Code Stamping:** ASME "U", "UM" and National Board Stamp

**CRN Registration:** All the applicable Canadian Jurisdiction

**NDE:** RT, UT, LPT, MT, WFMT, PMI & HT

**PWHT:** Per code or special requirement

**Sour Service:** Nace MR-103 & MR-0175 Compliance

**Corrosion Allowance:** 1/16"[1.6mm] to 1/4"[6mm]

**Housing Material:** Hastelloy, Alloy 20 and other

**Bolting Material:** SA 193 B7M/2HM, Stainless 304SS or 316SS

**Adjustable Leg:** Stainless Steel option

**Connection:** Add and up size

**Configuration Style:** All available styles and other such as duplex, Triplex etc.

**Surface Preparation:** C/S interior blasting / SS interior mechanical polish & electro-polish

**Coating:** Ext / Internal with special paint.

**O-Ring:** Buna-N, EPR, Silicon, Viton, T.E.V, and other

**HOUSING CONFIGURATION**

![Housing Configuration Diagrams]

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FILTER SOLUTIONS INC

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COFS SERIES
GAS & LIQUID COALESCE, FILTER SEPARATOR

APPLICATIONS
Glycol Dehydrators
Amine Plants
Natural Gas
Gas Storage Facilities
Refrigeration Plants
Turbine Suction
Compressor Discharge

LIQUID APPLICATIONS
Jet Fuel/Kerosene
Gasoline, Diesel, and other fuels
Removal of emulsified water from Hydrocarbon fluids
Protection of Catalysts, Exchangers, and Equipment
GAS COALESKER

FSI’S CGFS Gas Coalescer Housing is designed with a vertical configuration in order to utilize reverse flow, thereby maximizing efficiency. The function of the first stage, the lower Knockout Stage, is to remove bulk liquids and heavy solid contaminants. The function of the second stage, the upper Element Coalescing Stage, is the removal of finer liquid droplets and solid contaminants as low as 0.3 microns in size.

KNOCKOUT STAGE

As wet gas enters the inlet of the Coalescer housing, the gas stream is turned upward. Gravitation force reduces the stream velocity, permitting larger droplets and solids to fall into the lower sump. The lower section also collects the liquids below the high velocity zone protecting the coalescer element from direct impingement and from flooding.

ELEMENT STAGE

The element stage of the coalescer unit is fitted with pleated cartridges or depth cartridges. The gas stream flows from inside the element outward, resulting in a reduction in gas velocity through the media of the element. Decreasing the gas stream velocity increases the transit time, allowing for the aerosol particles to collide and form droplets. The coalesced liquid droplets drain through the outer layer of the element and collect in the top sump. What remains is dry clean gas.
LIQUID/GAS COALESCELER and LIQUID/LIQUID COALESCELER
TYPICAL PLACEMENT IN A NATURAL GAS PROCESS LINE

CONDENSATE IS TRANSPORTED TO OIL REFINERY

AMINE REGENERATION → LIQUID/LIQUID COALESCELER → GLYCOL REGENERATION → REBOILER

FEED ➔ INLET SEPARATION ➔ RAW GAS ➔ LIQUID/GAS COALESCELER ➔ LIQUID/GAS COALESCELER

AMINE TREATING PROCESS (ACID GAS REMOVAL) OTHER PROCESSES SUCH AS BENFIELD, PSA UNIT, SULFUR, AND ETC., ARE USED AT THIS STAGE

GLYCOL UNIT OR PSA UNIT PSA - PRESSURE SWING ADSORPTION

DEHYDRATION PROCESS

GLYCOL CONTACTOR PROTECTION PREVENT AMINE, HYDROCARBON AND AEROSOLS FROM CONTAMINATING THE GLYCOL SYSTEM, WHICH CAN RESULTS IN FOAMING, SOLVENT LOSSES AND OFF-SPECIFICATION GAS. RECOVERED AMINE ARE RE-USED IN THE AMINE TREATING PROCESS

AMINE CONTACTOR PROTECTION: PREVENT HYDROCARBONS AND SOLID AEROSOLS FROM FOILING THE AMINE SYSTEM, WHICH CAN RESULT IN FOAMING, SOLVENT LOSSES AND OFF-SPECIFICATION GAS

PROTECTION OF AMINE REGENERATOR IMPROVE THE RELIABILITY OF THE AMINE REGENERATOR BY ELIMINATING CONTAMINATES IN THE AMINE SOLVENT. THE LIQUID/LIQUID COALESCELER REMOVES HYDROCARBONS FROM THE AMINE SOLVENT PRIOR TO THE REGENERATOR

COFS

NGL RECOVERY PROCESS

PROCESS INCLUDES TURBO-DIAPANDER, DEMETHANIZER AND ABSORPTION

MAIN LIGI HEAT EXCHANGER FOR LIQUIFICATION

COFS
### TYPICAL APPLICATIONS

**CONSIDERATIONS**
The Coalescer is primarily used in applications where fine mists are encountered in processes involving evaporation, condensation, cooling or flashing. The Coalescer is also typically placed within a process line to provide protection for process equipment and facilities from aerosol particles (mist), liquid hydrocarbons and other contaminants. Failure to remove the liquids from the gas stream before it enters the inlet of the process equipment can jeopardize the operation and efficiency of the equipment. Another function of a coalescer is to recover fluids from the gas stream that can be used or re-injected into the process line for support or assistance of process equipment i.e. lube oil.

**EQUIPMENTS**
- Screw & Reciprocating Compressors
- Amine Contactors
- Glycol Contactors
- Catalysts and Mole Sieve Towers
- Gas Turbines
- Metering Stations
- Burner Nozzles
- Molecular Sieve Beds
- Heat Exchangers
- Recovery equipment for lube oil downstream of a compressor
- Removal equipment for oil, condensate and water
- Removal equipment for particulate and aerosols

### HOUSING STANDARD SPECIFICATION

- **Designed to ASME Pressure Vessel Code, Section VIII, Division 1**
- **Pressure Class:** 150# to 600#
- **Design Temperature:** -20°F to 225°F (-29°C to 107°C)
- **Configuration:** Vertical
- **M.O.C:** Carbon Steel
- **Housing Diameter:** 8” to 54” NPS
- **Inlet/Outlet Size:** 2” to 24” RFWN
- **Closure Access:** Swing Bolts with EPDM O-ring Seal
- **Connections:** level control, high/low liquid level, vent, drains, DP port.
- **Leg Supports**
- **Exterior coating:** Blue enamel.

### INQUIRY AND ORDER INFORMATION

**Minimum info for Housing Sizing**
- Gas volumetric flow rate
- Gas specific gravity or molecular weight
- Gas operating pressure range
- Gas operating temperature range
- Contaminants to be filtered
- Amount of free and entrained liquid

**Minimum info for Vessel pricing inquiry**
- Design Pressure
- Design Temperature
- Corrosion Allowance requirement
- Material of Construction requirement
- NDE requirement
- Sweet or Sour design.

**Optional Instrumentation**
- Liquid Level Control
- Liquid level Gauge
- Drain Valve
- Differential Pressure Gauge
- Pressure Relief Valve
- Pressure Gauge
- Temperature Indicator

### HOUSING OPTIONS

- **Pressure Class:** 900# and above
- **Design Temperature:** above 225°F (107°C)
- **Closure Access:** O.C, ANSI Bolted type and other CRN
- **Registration:** Any applicable Canadian Jurisdiction
- **NDE:** RT, UT, LPT, MT, W/F, PMI & HT
- **PWHT:** Per code or required specification
- **Sour Service:** NACE MR-103 & MR-0175 Compliance
- **Corrosion Allowance:** 1/16”[1.6mm] to 1/4”[6mm]
- **M.O.C:** CS LT, 304SS, 316SS and other
- **O-Ring:** Buna-N, Viton, Silicon, T.E.V and other
- **Exterior coating:** special paint selected for application or per specification.
GAS COALESCER HOUSING DESIGNATION

<table>
<thead>
<tr>
<th>CGFS</th>
<th>5R</th>
<th>536</th>
<th>CS</th>
<th>8</th>
<th>18</th>
<th>1440</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Coalescer Housing Series</td>
<td>Number of Elements</td>
<td>Element Type</td>
<td>Housing M.O.C</td>
<td>Inlet/Outlet (NPS)</td>
<td>Housing Diameter in (Inches)</td>
<td>Design Pressure in (PSIG)</td>
<td>ASME Code Stamping</td>
</tr>
</tbody>
</table>

HOUSING STANDARD SPECIFICATION

The Pleated Micro Fiberglass Coalescer Element is designed to efficiently coalesce liquid droplets and to remove solid particulates down to 0.3 microns. Element construction consists of end caps, perforated cores, filter media, an outer cover, and an outer drain layer to facilitate uniform drainage of liquids. The coalescer element is available in various sizes and configuration to custom fit any application.

ELEMENT DATA

<table>
<thead>
<tr>
<th>Material of Construction</th>
<th>Min./Max temperature</th>
<th>Change Out Differential</th>
<th>Burst Pressure</th>
<th>Lowest Available Rating</th>
<th>Outer Diameter</th>
<th>OAL Length</th>
<th>Sealing method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleated Micro Fiberglass</td>
<td>-60°F/300°F</td>
<td>15 PSID</td>
<td>75 PSID</td>
<td>0.3 micron</td>
<td>4.5&quot;, 5.5, 6&quot;</td>
<td>Up to 40&quot;</td>
<td>D.O.E or S.O.E</td>
</tr>
</tbody>
</table>

UNDERSTANDING COALESCING

To coalesce means to grow or to unite as one body. A coalesce aids the process of bonding droplets together to form a droplet that is big enough to be settled by gravitational force. The growth of droplets is achieved by catching liquids with entrained particles within the matrix of the coalescer element and merging them together by mechanisms which facilitate collisions between particles.
FILTER SEPARATOR

FSI’s CGSFS Gas Filter Separator Housing is designed with Vertical and Horizontal double barrel configuration typically for solid and liquid removal in relatively low liquid loading applications. The Separator design consists of three stages; the knockout stage, the element stage (filtration/coalescing stage) and the separation stage (mesh pads/vane packs).

KNOCKOUT STAGE

As gas enters the inlet nozzle, it collides with the element support posts (aka “risers”). This collision causes any free water and heavier contaminants to drop out of the gas stream and collect in the first stage sump. The length of the risers is vital in ensuring that the gas stream does not collide directly with the elements.

ELEMENT STAGE

The elements’ primary function is to filter fine to medium solid contaminants and also provide the coalescing of small liquid droplets from the gas stream. Droplets will enter and be removed in the final stage of the separator. The flow direction of a filter separator is from outside to inside.

SEPARATION STAGE

The coalesced droplets pass through the filter riser and are carried into the Separation Stage, where a mist extractor or vane pack section will remove final liquid droplets from the gas stream. Liquid droplets drain into the second stage sump. The nature of the contaminant associated with the gas stream will determine the devices used in the separation stage.
MESH PAD MIST EXTRACTOR
Knitted Mesh pads are of varying thickness and density depending upon the particle size to be removed and desired efficiency of removal. Typically, various grades of stainless steel are used. Nonstandard materials are also available for special applications. Minimal pressure drop and cost effectiveness are two of the benefits of using wire mesh. Wire mesh is not recommended for sticky, fouling contaminants or for highly corrosive service.

VANE MIST EXTRACTOR
Vane pack mist eliminators are used in the separation stage. Vane packs are typically custom designed to suit the process conditions. A vane pack eliminator consists of an array of closely spaced corrugated plates that force the gas stream to follow its winding path. The design of the vane pack creates a very tortuous path for the gas to pass through. Typically, various grades of stainless steel are used. Some benefits associated with using a vane pack include, minimal pressure drop, compact design and long life. Sticky and fouling contaminants are best suited to a vane pack mist eliminator.

TYPICAL APPLICATIONS
Glycol Dehydrators
Amine Plants
Natural Gas Compressors
Gas Storage Facilities
Refrigeration Plants
Metering Stations
Turbine Suction
Fuel Gas
Compressor Discharge

TYPICAL CONTAMINANTS
Sand
Water
Corrosion compounds
Liquid hydrocarbons
Abrasives contaminants
Sticky fouling contaminants
Waxes and asphaltenes
FILTER SEPARATOR HOUSING DESIGNATION

<table>
<thead>
<tr>
<th>CGSFSH</th>
<th>Number of Elements</th>
<th>Element Type</th>
<th>Housing M.O.C</th>
<th>Inlet/Outlet (NPS)</th>
<th>Housing Diameter (Inches)</th>
<th>Design Pressure in (PSIG)</th>
<th>ASME Code Stamping</th>
</tr>
</thead>
<tbody>
<tr>
<td>7R</td>
<td>336</td>
<td>CS</td>
<td>8</td>
<td>18</td>
<td>1440</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Horizontal Filter Separator Series</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CGSFSV</th>
<th>Number of Elements</th>
<th>Element Type</th>
<th>Housing M.O.C</th>
<th>Inlet/Outlet (NPS)</th>
<th>Housing Diameter (Inches)</th>
<th>Design Pressure in (PSIG)</th>
<th>ASME Code Stamping</th>
</tr>
</thead>
<tbody>
<tr>
<td>3R</td>
<td>336</td>
<td>CS</td>
<td>6</td>
<td>12</td>
<td>150</td>
<td>UM</td>
<td></td>
</tr>
<tr>
<td>Vertical Filter Separator Series</td>
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</tbody>
</table>

HOUSING STANDARD SPECIFICATIONS

- Designed to ASME Pressure Vessel Code, Section VIII, Division 1
- Pressure Class: 150# to 600#
- Design Temperature: -20°F to 225°F (-29°C to 107°C)
- Configuration: Vertical / Horizontal
- M.O.C: Carbon Steel
- Housing Diameter: 8” to 54” NPS
- Inlet/Outlet Size: 2” to 24” RFVN
- Access Closure: Swing Bolt EPDM O-ring Seal
- Connections: level control, high/low liquid level, vent, drains, DP port.
- Leg / Saddle Support
- Lower Barrel Sump (horizontal configuration only)
- Exterior coating: Blue enamel.

INQUIRY AND ORDER INFORMATION

**Minimum info for Housing Sizing**
- Gas volumetric flow rate
- Gas specific gravity or molecular weight
- Gas operating pressure range
- Gas operating temperature range
- Contaminants to be filtered
- Amount of free and entrained liquid

**Minimum info for Vessel pricing inquiry**
- Design Pressure
- Design Temperature
- Corrosion Allowance requirement
- Material of Construction requirement
- NDE requirement
- Sweet or Sour design.

**Optional Instrumentation**
- Liquid Level Control
- Liquid level Gauge
- Drain Valve
- Differential Pressure Gauge
- Pressure Relief Valve
- Pressure Gauge
- Temperature Indicator

HOUSING OPTIONS

- Pressure Class: 900# and above
- Design Temperature: above 225°F (107°C)
- Access Closure: Q.O.C, ANSI Bolted type and other
- CRN
- Registration: All the applicable Canadian Jurisdiction
- NDE: RT, UT, LPT, MT, WFMT, PMI & HT
- PWHT: Per code or required specification
- Sour Service: NACE MR-103 & MR-0175 Compliance
- Corrosion Allowance: 1/16”[1.6mm] to 1/4”[6mm]
- M.O.C: CS LT, 304SS, 316SS and other
- O-Ring: Buna-N, Viton, Silicon, T.E.V and other
- Exterior coating: special paint selected for application or per specification
- Final Stage: Vane or Mesh Pad Mist Extractor
### ELEMENT DATA

<table>
<thead>
<tr>
<th>Material of Construction</th>
<th>Min./Max. temperature</th>
<th>Change Out Differential</th>
<th>Burst Pressure</th>
<th>Lowest Available Rating</th>
<th>Outer Diameter</th>
<th>OAL Length</th>
<th>Sealing method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molded fiberglass</td>
<td>-60°F/275°F</td>
<td>15 PSID</td>
<td>75 PSID</td>
<td>1 micron</td>
<td>3.5”, 4.5”, 5.5”</td>
<td>Up to 72”</td>
<td>D.O.E or S.O.E</td>
</tr>
</tbody>
</table>

### SEPARATOR ELEMENT

Molded fiberglass Gas Separator Elements are designed to efficiently coalesce free liquids for second stage removal while delivering high solid holding capacity. Element construction consists of end caps, perforated cores, filter media, and an outer cover to protect the element and the operator during installation. Gas Separator Elements available in various size and configurations to custom fit any application.

### GAS SEPARATOR ELEMENT CROSS SECTION

- Gasket
- Top End Cap
- Louvered Support Core
- Filter Media
- Outer Cover
- Bottom End Cap
LIQUID COALESCER/SEPARATOR

FSI's CLSFS Liquid Coalescer/Separator Housing is designed to remove contaminant and emulsify water from hydrocarbon fluid in the process stream. The housing design consists of two stages; the coalescing stage and the water separation stage.

1st COALESCING STAGE

As the emulsified water/hydrocarbon fluid flows inside the element outward, the small water droplets adhere to fibreglass strands and coalesced into larger water droplets. The large water droplets are then carried to the outside surface of the coalescer element and settle into the bottom of vessel or sump by gravitational force. The coalescer element also acts as a particulate filter and removes unwanted contaminants. The coalescer element is designed with inside/outside flow direction to minimize surface velocity and help prevent the water droplets from breaking up and being carried downstream.

2nd SEPARATOR STAGE

Separator elements are employed in the second stage, their outer surface made from hydrophobic material and their sole function is to repel water droplets, while allowing hydrocarbon fluids to freely pass through.

Typical Applications

- Jet Fuel/Kerosene, Gasoline, Diesel, and other fuels
- Wide variety of Hydrocarbons and Intermediates
- Lube Oil, Hydraulic Oil, Heat Transfer Fluids
- Removal of Dispersed Water, Haze Removal
- Protection Of Catalysts, Exchangers and Equipment

THINGS TO CONSIDER

Liquids have a higher probability of being separated when the mixture is immiscible, specific gravities differ and there are lower concentrations of surface active agents. In order to determine whether or not coalescing will work, take a sample of the mixture, if it separates within a 2 hour period coalescing will most likely work; if after 24 hours the mixture hasn't separated then coalescing will not likely work. Coalescing decreases its performance when interfacial tension significantly decreases due to surfactants. Surfactants commonly added are detergent dispersants (automotive gasoline), corrosion inhibitors (pipeline, lube and hydraulic oils) or can simply occur naturally (diesel fuel) When there are significantly high levels of containments, FSI recommend a pre-filter to be installed upstream of the coalescer to protect and extend the life of the coalescer elements.
HOUSING STANDARD SPECIFICATIONS

- Designed to ASME Pressure Vessel Code, Section VIII, Division 1
- Pressure Class: 150#
- Design Temperature: -20°F to 225°F (-29°C to 107°C)
- Configuration: Vertical
- M.O.C: Carbon Steel
- Housing Diameter: 8" to 48" NPS
- Inlet/Outlet Size: 2" to 10" RFWN
- Access Closure: Swing Bolts EPDM O-ring Seal
- Connections: level control, high/low liquid level, vent, drains, DP port.
- Leg Support
- Boot Sump: Horizontal configuration only
- Exterior coating: Blue enamel.

HOUSING OPTIONS

- Pressure Class: 300# and above
- Design Temperature: above 225°F (107°C)
- Configuration: Horizontal
- Access Closure: Q.O.C, ANSI Bolted type and other
- CRN Registration: Any applicable Canadian Jurisdiction
- NDE: RT, UT, LPT, MT, WFMT, PMI & HT
- PWHT: Per code or required specification
- Sour Service: NACE MR-103 & MR-0175 Compliance
- Corrosion Allowance: 1/16"[1.6mm] to 1/4"[6mm]
- M.O.C: CS LT, 304SS, 316SS and other
- O-Ring: Viton, Silicon, T.E.V, Buna-N and others
- Exterior coating: special paint selected for application or per specification

INQUIRY AND ORDER INFORMATION

Minimum info for Housing Sizing
- Fluid Volumetric Flow Rate
- Fluids
- Fluid Density
- Fluid Viscosity
- Contaminant (PPM)
- % of Water Concentration
- Interfacial Tension (ITF) Water Removal Efficiency

Minimum info for Vessel pricing inquiry
- Design Pressure
- Design Temperature
- Corrosion Allowance requirement
- Material of Construction requirement
- NDE requirement

Optional Instrumentation
- Level Control
- Level Gauge
- Drain Valve
- Differential Pressure Gauge
- Pressure Relief Valve
- Pressure Gauge
- Temperature Indicator
- Sump Heater
# LIQUID COALESCELER/SEPARATOR
## ORDERING GUIDE

<table>
<thead>
<tr>
<th>Housing Series</th>
<th>CLSFS</th>
<th>1X1</th>
<th>CS</th>
<th>2&quot;-150#FL</th>
<th>STV</th>
<th>UM</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td><strong>Number of Coalescer by Separator</strong></td>
<td>CLSFS = Liquid Coalescer Separator Housing</td>
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<tr>
<td>☐ 1x1 = 1 Cla'r by 1 Separator</td>
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<td>☐ 2x1 = 2 Cla'r by 1 Separator</td>
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<td>☐ 5x4 = 5 Cla'r by 4 Separator</td>
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<td>☐ 10x8 = 10 Cla'r by 8 Separator</td>
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<td>☐ 15x12 = 15 Cla'r by 12 Separator</td>
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<td>☐ Other configurations are available. Consult FSI</td>
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<td><strong>Housing Material</strong></td>
<td>304SS - 304 Stainless</td>
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<td>☐ 316SS - 316 Stainless</td>
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<tr>
<td>☐ CS - Carbon Steel</td>
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<tr>
<td><strong>Code Stamping</strong></td>
<td>NC = Non-Code</td>
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<td>☐ U = U Stamp</td>
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<tr>
<td><strong>Configuration</strong></td>
<td>STV = Vertical</td>
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<tr>
<td>☐ STH = Horizontal</td>
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<tr>
<td><strong>Inlet/Outlet - Type</strong></td>
<td>2&quot;-150#FL</td>
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<td>☐ 3&quot;-150#FL</td>
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<td>☐ 4&quot;-150#FL</td>
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<td>☐ 6&quot;-150#FL</td>
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<td>☐ 8&quot;-150#FL</td>
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<td>☐ 10&quot;-150#FL</td>
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<td><strong>CRN</strong></td>
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<td>☐ NS = 8</td>
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</tr>
</tbody>
</table>
APPLICATIONS
Glycol Dehydrators
Oil and Gas Industry
Adhesives and Resins
Water & Waste Water
Pharmaceutical and Cosmetics
Chemical Industry
Oil and Gas Industry
Food and Beverages
Petroleum Industry
Power Industry
Pulp & Paper Industry
Paints, Coating and Ink
All Process Fluids

CODE OF CONSTRUCTION
ASME Sect. VIII Div.1 - Pressure Vessel Code
MAGNETIC FILTRATION - HIGH EFFICIENCY, HIGH CAPACITY

- 12,000 Gauss Magnet Rating.
- High Intensity Rare Earth Neodymium Iron Boron Magnets. The STRONGEST Magnets available in the world.
- Large and sub-micron ferrous particles are retained.
- Magnetic cores pull ferrous material away from the filter media resulting in minimal flow restriction.
- Reduces the amount of consumable media used while increasing fluid quality.
- Stainless steel cores protect the magnetic assembly and isolate it from the flow stream.
- Reusable and Maintenance free during their expected ten (10) year plus lifespan.
- Routine inspection allows for indication of equipment wear of upstream equipment. Magnetic filtration can be used as a predictive maintenance tool.

MAGNETIC vs. MEDIA FILTRATION

**Magnetic Filtration**

1. All ferrous particle sizes are attracted to the magnetic core and retained.
2. Once a dense layer of contaminant is collected it can be easily disposed of or recycled and the magnetic core reused. Virtually no fluid is retained.
3. Proprietary core magnet configuration ensures a strong magnetic field resulting in heavy collection rates.

**Media Filtration**

1. Only particles larger than the media filtration rating are retained. Smaller particles pass downstream and remain in the fluid stream.
2. Once the pressure drop reaches an unacceptable value media disposal is required.
3. As contaminant is collected the pressure drop across the media increases resulting in decreased flow rates.
HOW IT WORKS

Magnetic filters work by producing a magnetic field or loading zone that collect ferrous particles. The magnets are arranged inside a non-ferrous core to form a magnetic field that has a non uniform flux density or magnetic strength. Particles are most effectively separated when there is a strong magnetic gradient from low to high. The higher the magnetic gradient, the stronger the attracting magnetic force acting on particles drawing them toward the loading zones.

The magnetic force acting on a particle is proportional to the volume of the particle, but is disproportional to the diameter of the particle. The magnetic force on a particle varies with the cube of the particle’s diameter. For example a two (2) micron particle is eight times more attracted to a magnetic field than a one (1) micron particle.

FILTER SOLUTIONS INC. uses magnets that have a flux density (magnetic strength) of 12,000 gauss (Compared to a ordinary refrigerator magnet of 80 gauss). Magnets are arranged in a non-ferrous tube to produce a large magnetic force and a resulting large magnetic gradient. The result is a magnetic assembly that successfully collects and removes ferrous material from a media stream in high collection volumes.

BLACK POWDER AND PIPELINES

Black Powder is a contaminant found in pipelines transporting natural gas, hydrogen condensates, and liquefied petroleum gas (LPG). It is, in most cases, a solid ferrous (magnetic) iron oxide or iron sulphide contaminant of various particle size distribution that can cause a range of problems. These include product and equipment contamination, erosion wear in compressors, instrument and filter clogging, erosion and sealing problems for valves, and equipment flow restriction and plugging.

Typical sources of black powder are:
- Pipe Mill Scale resulting from the pipe manufacturing process through the high temperature oxidation of steel.
- Flash rust formed from the presence of water during the pipeline hydro-test, or water moisture found in wet gas.
- Internal pipeline corrosion that is microbial induced when sulfate reducing bacteria (SRB) colonizes on a pipeline wall allowing for localized pitting corrosion, or that caused by Sour Gas (H2S) and it’s reaction with steel.
- The presence of oxygen, hydrogen sulfide and carbon dioxide have also been linked to creating favourable conditions for the corrosion of carbon steel pipe.

FILTER SOLUTIONS INC. manufactures magnetic filtration and separation equipment that removes Black Powder from pipelines down to sub-micron levels.

Our magnetic equipment installed before pumps, turbines, compressors and refineries offers long term equipment protection while improving gas or liquid hydrocarbon quality.
STANDARD PRODUCTS

1. FILTER SOLUTIONS INC. manufactures magnetic core tubes in various lengths and configurations. Core tube ends can be supplied with various connection details including lift handles, straight or tapered threads, magnetic base stands and others.

2. Magnetic core tubes can be supplied with racks that allow drop in installation into standard P1 and P2 bag filter baskets among other sizes. Racks can be provided to hold between one (1) and five (5) magnetic core tubes. These racks support the core tubes and, due to the high magnetic strength, act to safely retain the magnet in the fluid stream. The racks also ensure separation between the disposable bag and core tubes allowing for an uninterrupted flow path.

3. Complete bag filter assemblies can be supplied with core tubes and racks installed at the factory. FILTER SOLUTIONS INC. manufactures a complete line of bags, cartridges and filters housings.

4. Strainer assemblies and baskets can be supplied with removable magnetic cores. As well, FILTER SOLUTIONS INC. frequently retrofits existing strainer baskets with magnetic assemblies and/or can manufacture new baskets for existing housings that incorporate our magnetic filtration technology.
CUSTOM SOLUTIONS

FILTER SOLUTIONS INC. welcomes custom designs from our clients. Our ASME U-Stamp certification ensures you will receive quality magnetic filtration solutions.

Magnetic Coolant Rollers

FILTER SOLUTIONS INC. has designed and tested a magnetic coolant roller. Contaminated fluid is dumped into the basin where a rotating magnetic assembly collects the ferrous contaminant and discharges it into a discharge basin. Collected ferrous contaminant is automatically scrapped into a customer supplied collection container for recycling while clean coolant can be drained from the basin and reused.
FILTER ELEMENTS SERIES

FILTER MEDIA
Polypropylene
Polyester
Fiberglass
Stainless Steel
Nylon 6,6
Teflon
Polyphenaline Sulfide

ELEMENTS SERIES
Bag
Pleated Cartridge
Melt Blown Cartridge
String Wound Cartridge
Pleated Bag
Hi-Flow Cartridge
High Temperature Element
Gas Coalescer Element
Gas Separator Element
Liquid Coalescer Element
Carbon Canister Element

APPLICATIONS
All process fluids
FILTER BAGS

- High solids collection capacity with solids being contained in bag for easy disposal.
- Interior of vessel remains clean after bag removal. This reduces filter clean up time while minimizing filter downtime.
- Welded or sewn construction. Silicone Free.
- Bags are available with ring (metal or plastic) or molded plastic tops. Other bag sealing mechanisms are available.
- Multi-layer EXTENDED LIFE BAGS are available for increased dirt holding capacity. (2x the capacity of a standard felt bag)
- Multi-layer PLEATED BAGS are available for the highest dirt holding capacity in the industry. (Up to 20x the capacity of a standard felt bag)
- OIL ABSORB BAGS are available to remove trace amounts of oil and petroleum based products from paints, coatings and other fluids.

SPECIFICATIONS

FILTER GRADES:
Standard filters grades are 0.5 to 800 microns including 0.5, 1, 3, 5, 10, 15, 25, 50, 75, 100, 150, 200, 250, 300, 400, 600, 800 µm. Other filter grades are available.

BAG SIZES (In-Stock)
#1, #2, #3, #4, #5, #6, #7, #8, #9, #12, C1, C2 and RP Bags. Custom Bags are available. See Bag Dimensional Information (Page 95)

AVAILABLE BETA RATINGS:
2 To 5000

RECOMMENDED BAG SIZING DIFFERENTIAL PRESSURE:
Bag Only: 1.0 PSID (0.06 BAR) Max. Recommended in Clean Condition.
System, including housing, bag, bag retainer basket Max. Recommended: 2.0 PSID (0.14 BAR) in Clean Condition. See Bag Pressure Drop Curve (Page 96)

RECOMMENDED CHANGE-OUT DIFFERENTIAL PRESSURE:
25 PSID (1.7 BAR)

MAXIMUM TEMPERATURE RATING:
See Material Selection Guide (Page 94)

BAG MEDIA:
Polyester Felt, Polypropylene Felt, Polyester Multifilament, Nylon Monofilament Mesh, Polypropylene Microfiber, Polyester Microfiber, Oil Removal, Oiles, Cellulose, K-Media, Microglass and others.

* Bags constructed from FDA materials are available. FDA bags are manufactured of materials that comply with FDA requirements for food contact per CFR Title 21. Please consult factory.

APPLICATIONS

PAPER
- Clay Slurry
- Coatings
- Fresh water
- White water
- Showers
- Starch
- Water
- Additives
- Cooling Water
- Dyes
- Pump Seals

FOOD
- Peanut Butter
- Corn Syrup
- Lard
- Dextrose
- Chocolates
- Jelly
- Juices
- Milk Sugar
- Edible Oils
- Soybean
- Concentrate
- City and Well
- Water
- Tea Liquor
- Extracts

PETROLEUM
- Amine
- Crude
- Feedstock
- Pump Seals
- Water
- Fuel Oil
- Motor Oil
- Hydraulic Oil
- Synthetic
- Lubricants
- Completion Fluids
- Injection Fluids
- Cooling Tower Water

CHEMICAL
- Acetic Acid
- Brine
- Calcium Carbonate
- Ethylene Glycol
- Herbicides
- Hydrochloric Acid
- Polymers
- Resins
- Sulphuric Acid
BAG STYLES

FELT FILTER BAGS:
Felt filter bags are made from synthetic fibers of polypropylene or polyester. The gradient density fiber structure with the proper combination of fiber diameter, weight and thickness result is a economical depth type filter media. Bags are supplied with a glazed finish to reduce fiber migration.

Felt Filter Bags have a nominal micron rating and are available in micron ratings from 1 to 200 µm. Filter efficiency is between 50% and 95% depending on micron rating.

MULTIFILAMENT MESH BAGS:
Polyester multifilament mesh bags are suitable for surface filtration. This disposable fabric is woven from threads made of small fibers twisted together. Bags made from this material are low cost and are considered disposable.

Multifilament Bags are available in micron ratings from 100 to 800 µm. Filter efficiency is between 80% and 95% depending on micron rating.

MONOFILAMENT MESH BAGS:
Nylon Monofilament mesh bags have a woven fabric with evenly spaced holes. Each thread is a single filament resulting in excellent strength characteristics. Monofilament bags and considerably easier to clean than multifilament bags.

Multifilament Bags are available in micron ratings from 25 to 800 µm. Filter efficiency is about 90% or more.

EXTENDED LIFE BAGS:
Extended life bags are constructed from 100% polypropylene or polyester felt. They are a specially designed filter bag with a coarse inner layer and a middle layer of felt constructed with finer fibers, more pores and thicker media. The outside layer is glazed, by melting fibers together, to form a tight, secure downstream matrix which prevents fiber migration.

Extended life bags are available in micron ratings from 1 to 200 µm and have over 2x the capacity of a standard felt bag.
BAG STYLES

MICROFIBER OIL ABSORB BAGS:
Microfiber filter bags are constructed from polypropylene and provide high efficiency and high contaminant holding capacity.

Polypropylene microfiber repels water yet it will absorb up to 25 times its own weight in oil and other petrochemicals. It is the ideal solution for removing trace contaminants from water based products.

Microfiber oil absorption bags are available in micron ratings from 1-100 µm. Filter efficiency is 96% or more.

PLEATED BAGS:
Pleated bag elements have high flow capacity, high efficiency and inside to outside flow. By increasing the surface area through pleating and incorporating multiple layers of media the pleated bag design provides far longer life and superior dirt holding capacity when compared to a standard non-pleated bag.

Pleated bags are supported at both ends with one end being flanged and the other end being capped. The filtering media is then attached to the ends and core via a thermal bond to prevent any possibility of bypass at media sealing points. Outer supports in polypropylene or tinned steel prevent fiber migration while integral flange seals ensure easy replacement of standard #1 and #2 sized bags.

A wide array of filter media is available in the pleated bag design to suit each individual application. A 100% pure polypropylene element is available making incineration an option for disposal.

Pleated filter bags are available in micron ratings from 0.5-40 µm. Filter efficiency is 90% or more.

**BAG COMPATIBILITY**

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>ORGANIC SOLVENTS</th>
<th>ANIMAL, VEGETABLE &amp; PETRO OILS</th>
<th>MICRO-ORGANISMS</th>
<th>ALKALIES</th>
<th>ORGANIC AGENTS</th>
<th>OXIDIZING AGENTS</th>
<th>MINERAL ACIDS</th>
<th>TEMPERATURE LIMITATIONS °F / °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLYESTER</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>300°F / (149°C)</td>
</tr>
<tr>
<td>POLYPROPYLENE</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>200°F / (93°C)</td>
</tr>
<tr>
<td>NYLON</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
<td>Poor</td>
<td>Poor</td>
<td>325°F / (163°C)</td>
</tr>
</tbody>
</table>
### BAG SIZES

<table>
<thead>
<tr>
<th>BAG SIZE</th>
<th>DIAMETER IN/(MM)</th>
<th>LENGTH IN / (MM)</th>
<th>SURFACE AREA FT² / (CM²)</th>
<th>VOLUME USGAL / (LITRE)</th>
<th>INSTALL IN THE FOLLOWING MANUFACTURER’S BRANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>7.06/(179)</td>
<td>16.50/(420)</td>
<td>2.0/(1858)</td>
<td>2.1/(7.9)</td>
<td>Fits all standard length housings manufactured by FILTER SOLUTIONS, Eaton, FSI, GAF, Pentair, Rosedale, Strainrite and others.</td>
</tr>
<tr>
<td>#2</td>
<td>7.06/(179)</td>
<td>32.00/(813)</td>
<td>4.4/(4088)</td>
<td>4.6/(17.4)</td>
<td>Fits all double length housings manufactured by FILTER SOLUTIONS, Eaton, FSI, GAF, Pentair, Rosedale, Strainrite and others.</td>
</tr>
<tr>
<td>#3</td>
<td>4.13/(105)</td>
<td>8.00/(203)</td>
<td>0.5/(465)</td>
<td>0.5/(1.9)</td>
<td>Fits housings manufactured by FILTER SOLUTIONS, Eaton, FSI, Pentair, Rosedale Model 4-6 and others.</td>
</tr>
<tr>
<td>#4</td>
<td>4.13/(105)</td>
<td>14.00/(356)</td>
<td>1.0/(929)</td>
<td>1.0/(3.8)</td>
<td>Fits housings manufactured by FILTER SOLUTIONS, Eaton, FSI Model FS-35, Pentair, Rosedale Model 4-12 and others.</td>
</tr>
<tr>
<td>#7</td>
<td>5.63/(143)</td>
<td>15.00/(381)</td>
<td>1.3/(1208)</td>
<td>1.3/(4.9)</td>
<td>Fits housings manufactured by FILTER SOLUTIONS, Pentair, Rosedale Model 6-12 and others.</td>
</tr>
<tr>
<td>#8</td>
<td>5.63/(143)</td>
<td>32.00/(813)</td>
<td>4.4/(4088)</td>
<td>5.0/(19.1)</td>
<td>Fits all Commercial Parker Filters standard length housings.</td>
</tr>
<tr>
<td>#9</td>
<td>5.63/(143)</td>
<td>32.00/(813)</td>
<td>3.4/(3159)</td>
<td>3.0/(11.5)</td>
<td>Fits all Commercial Parker Filters standard length housings.</td>
</tr>
<tr>
<td>#11</td>
<td>8.38/(213)</td>
<td>16.50/(420)</td>
<td>2.9/(2695)</td>
<td>3.0/(11.3)</td>
<td>Fits housings manufactured by FILTER SOLUTIONS, Rosedale Model LLC-8-30 and others.</td>
</tr>
<tr>
<td>#12</td>
<td>8.38/(213)</td>
<td>32.00/(813)</td>
<td>5.6/(5203)</td>
<td>6.0/(22.7)</td>
<td>Fits housings manufactured by FILTER SOLUTIONS, Rosedale Model LLC-8-30 and others.</td>
</tr>
<tr>
<td>#C1</td>
<td>7.31/(186)</td>
<td>16.50/(419)</td>
<td>2.0/(1858)</td>
<td>2.6/(9.8)</td>
<td>Fits all Commercial Parker Filters standard length housings.</td>
</tr>
<tr>
<td>#C2</td>
<td>7.31/(186)</td>
<td>32.00/(813)</td>
<td>4.4/(4088)</td>
<td>5.0/(19.1)</td>
<td>Fits all Commercial Parker Filters standard length housings.</td>
</tr>
<tr>
<td>#PC1</td>
<td>9.00/(229)</td>
<td>20.00/(508)</td>
<td>2.5/(2323)</td>
<td>4.9/(18.6)</td>
<td>Fits Cuno Model PC1 housings.</td>
</tr>
<tr>
<td>#PC2</td>
<td>9.00/(229)</td>
<td>30.00/(762)</td>
<td>5.0/(4645)</td>
<td>7.4/(27.9)</td>
<td>Fits Cuno Model PC2 housings.</td>
</tr>
<tr>
<td>#RP1</td>
<td>8.00/(203)</td>
<td>30.00/(762)</td>
<td>3.5/(3252)</td>
<td>5.7/(21.7)</td>
<td>Fits Ronningen Petter Size #1</td>
</tr>
<tr>
<td>#RP2</td>
<td>8.00/(203)</td>
<td>40.00/(1016)</td>
<td>4.7/(4366)</td>
<td>7.7/(28.96)</td>
<td>Fits Ronningen Petter Size #2</td>
</tr>
</tbody>
</table>

Cuno is a registered trademark of 3M Company, Eaton is a registered trademark of Eaton Corporation, FSI is a registered trademark of Filter Specialists, Inc., GAF is a registered trademark of GAF Corporation, Parker is a registered trademark of Parker Hannifin Corporation, Pentair is a registered trademark of Pentair Ltd., Rosedale is a registered trademark of Rosedale Product, Inc., Ronningen Petter is a registered trademark of Eaton Corporation, Strainrite is a registered trademark of The Strainrite Companies.

### BAG MICRON RATINGS

| MICRON AVAILABILITY | TYPE | MATERIAL | 0.5 | 1 | 2 | 3 | 5 | 10 | 15 | 20 | 25 | 40 | 50 | 75 | 100 | 150 | 200 | 250 | 300 | 400 | 600 | 800 |
|---------------------|------|----------|-----|---|---|---|---|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Felt                | POLYESTER |          |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
|                     | POLYPROPYLENE |           |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
|                     | NYLON      |           |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
| Multifilament mesh  | POLYESTER |          |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
|                     | NYLON      |           |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
|                     | POLYPROPYLENE |         |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
| Extended life microfiber | POLYESTER |          |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
|                     | POLYPROPYLENE |         |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
| Oil absorb |             |           |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |
| Pleated             | VARIOUS   |           |     |   |   |   |   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |

FILTER SOLUTIONS INC

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**EXAMPLE PROCEDURE:**

Based on water flow at 80 GPM calculate the clean pressure drop through a #2 size 100µm (approx. 90% efficient) extended life bag.

**Step 1:** Using the above chart the pressure drop (psid/sq. ft.) of 100µm Filter Media at 80 GPM is 0.3 psid/Sq.

**Step 2:** For a #2 size bag the correction factor is 0.05. (0.3 x 0.05 = 0.015 psid)

**Step 3:** For an extended life bag the bag style correction factor is 15. (0.015 x 15 = 0.225 psid)

**Step 4:** Multiply the value obtained in step 3 by the Specific Gravity of the Fluid (Water = 1.0). (0.225 x 1.0 = 0.225 psid)

**Step 5:** Multiply the value obtained in step 4 by the viscosity correction factor (Water = 1.0). (0.225 psid x 1.0 = 0.225 psid)

The predicted pressure drop is 0.23 psid thru the bag.

The above chart is based on public information provided by filter media manufacturer's. Filter Solutions does not warrant the accuracy of the above information. User’s should perform their own tests to determine final suitability. The above information is to be used as a guide only.
### NON-PLEATED BAGS (EXAMPLE PE-25-P-2-S-H)

<table>
<thead>
<tr>
<th>MATERIAL—NOMINAL MICRON RATING</th>
<th>BAG FINISH OR COVER</th>
<th>BAG SIZE</th>
<th>BAG STYLE</th>
<th>OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE = Felt, Polyester</td>
<td>( P = ) None (Standard)</td>
<td>Dia. (in.)</td>
<td>Length (in.)</td>
<td></td>
</tr>
<tr>
<td>Microns: 1,3,5,10,15,25,50,75,100,150,200</td>
<td>1</td>
<td>7-1/16”</td>
<td>16-1/2”</td>
<td>Carbon steel plated ring</td>
</tr>
<tr>
<td>( G = ) Fiber free glazed</td>
<td>2</td>
<td>7-1/16”</td>
<td>16-1/2”</td>
<td>HH = Heavy duty handle</td>
</tr>
<tr>
<td>PEM = Polyester multilaminate mesh cover</td>
<td>3</td>
<td>4-1/8”</td>
<td>8”</td>
<td>SS = Stainless steel ring</td>
</tr>
<tr>
<td>( H = ) Handle</td>
<td>4</td>
<td>4-1/8”</td>
<td>14”</td>
<td>PP = Polypropylene ring</td>
</tr>
<tr>
<td>HMO = Nylon multilaminate mesh cover</td>
<td>5</td>
<td>4”</td>
<td>24”</td>
<td>N = Weld</td>
</tr>
<tr>
<td>( C = ) Cerex spun bonded nylon cover</td>
<td>7</td>
<td>5-5/8”</td>
<td>15”</td>
<td>PE = Polyester flange</td>
</tr>
<tr>
<td>( F = ) Oil Absorb</td>
<td>8</td>
<td>5-5/8”</td>
<td>21”</td>
<td>PM = Polypropylene flange</td>
</tr>
<tr>
<td>Microns: 25,50,75,100,150,200,250,300,400,600,800</td>
<td>9</td>
<td>5-5/8”</td>
<td>32”</td>
<td>P = Polypropylene flange</td>
</tr>
<tr>
<td>( P = ) Extended Life, Polypropylene</td>
<td>11</td>
<td>8-3/8”</td>
<td>16-1/2”</td>
<td>N = Nylon flange</td>
</tr>
<tr>
<td>Microns: 5-10,25,50,100</td>
<td>12</td>
<td>8-3/8”</td>
<td>32”</td>
<td>DS = Draw string</td>
</tr>
<tr>
<td>PEXL = Extended Life, Polyester</td>
<td>C1</td>
<td>7-5/16”</td>
<td>16-1/2”</td>
<td>DST = Draw strap</td>
</tr>
<tr>
<td>Microns: 5-10,25,50,100</td>
<td>C2</td>
<td>7-5/16”</td>
<td>32”</td>
<td>RP = Romminger-Petter</td>
</tr>
<tr>
<td>FOS = Oil Absorb</td>
<td>PC1</td>
<td>9”</td>
<td>20”</td>
<td>R = Tie On</td>
</tr>
<tr>
<td>Microns: 1,5,10,25</td>
<td>PC2</td>
<td>9”</td>
<td>30”</td>
<td>SP = 7” Plastic Internal Ring</td>
</tr>
<tr>
<td>OLX = Oilex</td>
<td>RP1</td>
<td>8”</td>
<td>30”</td>
<td></td>
</tr>
<tr>
<td>Microns: 1,5,10,25</td>
<td>RP2</td>
<td>8”</td>
<td>40”</td>
<td></td>
</tr>
</tbody>
</table>

### PLEATED BAGS (EXAMPLE JCX-P-732-02-C-B-F-P)

<table>
<thead>
<tr>
<th>BAG TYPE</th>
<th>MEDIA</th>
<th>BAG SIZE (Replace #1 and #2 size bags)</th>
<th>MICRON RATING</th>
<th>EFFICIENCY</th>
<th>SEAL</th>
<th>SEAL TYPE</th>
<th>END CAPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>JCX = Pleated</td>
<td>( P = ) Polypropylene</td>
<td>Symbol</td>
<td>Dia. (in.)</td>
<td>Length (in.)</td>
<td>A = 99.98%</td>
<td>B = 99.9%</td>
<td>D = 99%</td>
</tr>
<tr>
<td>( E = ) Polyester</td>
<td>716</td>
<td>7-1/16”</td>
<td>16”</td>
<td>0.5 µm</td>
<td>B = 99.9%</td>
<td>C = 99%</td>
<td>E = EPR</td>
</tr>
<tr>
<td>( N = ) Nylon</td>
<td>724</td>
<td>7-1/16”</td>
<td>24”</td>
<td>0.2 µm</td>
<td>C = 99%</td>
<td>D = 98%</td>
<td>F = 90%</td>
</tr>
<tr>
<td>( G = ) Microlon</td>
<td>726</td>
<td>7-1/16”</td>
<td>26”</td>
<td>0.5 µm</td>
<td>D = 98%</td>
<td>E = 95%</td>
<td>G = 99.5%</td>
</tr>
<tr>
<td>( C = ) Cellulose</td>
<td>728</td>
<td>7-1/16”</td>
<td>24”</td>
<td>10 µm</td>
<td>E = 95%</td>
<td>F = 90%</td>
<td></td>
</tr>
<tr>
<td>( K = ) K-Media</td>
<td>730</td>
<td>7-1/16”</td>
<td>30”</td>
<td>15 µm</td>
<td>F = 90%</td>
<td>G = 99.5%</td>
<td></td>
</tr>
<tr>
<td>( J = ) J-Media</td>
<td>732</td>
<td>7-1/16”</td>
<td>32”</td>
<td>40 µm</td>
<td>G = 99.5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
WOUND FILTER CARTRIDGES

- Precision winding patterns ensure filtration ratings that are accurate and result in high retention efficiency.
- In-house state-of-the-art production machinery ensures repeatable and consistent high quality products.
- Various fiber and core materials are available to suit a broad range of applications.
- Suitable for both liquid and gas filtration.
- Cost effective and proven versus melt blown, spun-bond and resin bonded cartridges.
- Available in standard 2-1/2" diameter and others.
- Many different cartridge sealing options and end configurations are available.

SPECIFICATIONS

FILTER GRADES:
0.5 to 150 microns including 0.5, 1, 3, 5, 10, 15, 20, 25, 30, 40, 50, 75, 100, 150 µm

LENGTHS:
9.75” to 40” including 9-3/4” (248 mm), 10” (254 mm), 19-1/2” (495 mm), 20” (508 mm), 29-1/4” (743 mm), 29-1/2” (749 mm), 30” (762 mm), 40” (1016 mm)

OUTSIDE DIAMETER:
Standard: 2-1/2” (64 mm) OD Nominal, Optional: 1-3/4” (44 mm), 2” (51 mm), 2-3/8” (60 mm), 2-1/2” (64 mm), 2-5/8” (67 mm), 2-3/4” (70 mm), 3” (76 mm), 3-1/2” (89 mm), 4” (102 mm), 4-1/4” (108 mm) OD Nominal

INSIDE DIAMETER:
Standard: 1” (25 mm) ID Nominal
Optional: 1.56” (40 mm) ID Nominal - Wildcat

RECOMMENDED CHANGE-OUT DIFFERENTIAL PRESSURE:
30 PSID (2.1 BAR)

MAXIMUM TEMPERATURE RATING:
See Material Selection Guide (Page 2)

FILTER MEDIA:
* FDA Bleached Cotton and FDA Polypropylene filters are manufactured of materials that comply with FDA requirements for food contact per CFR Title 21.

CENTER CORE:
Tin Plated Steel, Polypropylene, 304 Stainless Steel, 316 Stainless Steel.

CORE COVER (Optional):
Covers made from materials such as polypropylene, nylon and polyester can be installed to control the migration of fibers.

END MODIFIERS (Optional):
Various end modifiers are available to suit individual installation applications.

APPLICATIONS

- Chemicals: polishing of chemical solutions, solvents, acids, bulk industrial chemicals, monomers, process and cooling water.
- Air & Gas: instrument air, compressed air, most gases including hydrogen, nitrogen, freon, helium and most other corrosive gases.
- Photographic: chemicals, emulsions, wash & rinse water.
- Pre-filtration
- Water and Wastewater, Process Water
- Food and Beverage
- Other: mining, deep well disposal, plating solutions, cleaning fluids, lubricating oils, plating solutions, cleaning solutions, adhesives, paint, ink and coatings.
# MATERIAL SELECTION GUIDE

## FILTER MEDIUM

<table>
<thead>
<tr>
<th>FILTER MEDIUM</th>
<th>COTTON (1)</th>
<th>POLYPROPYLENE (1)</th>
<th>RAYON</th>
<th>FIBERGLASS</th>
<th>POLYESTER</th>
</tr>
</thead>
</table>

## MAX. TEMPERATURE

<table>
<thead>
<tr>
<th></th>
<th>with metal core</th>
<th>With polypropylene core</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>300°F (149°C)</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td></td>
<td>200°F (93°C)</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td></td>
<td>300°F (149°C)</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td></td>
<td>750°F (399°C)</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td></td>
<td>250°F (121°C)</td>
<td>140°F (60°C)</td>
</tr>
</tbody>
</table>

## COMPATIBLE WITH

<table>
<thead>
<tr>
<th>POTABLE LIQUIDS</th>
<th>Excellent</th>
<th>Excellent</th>
<th>Good</th>
<th>Poor</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORGANIC SOLVENTS</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
</tr>
<tr>
<td>OILS</td>
<td>Excellent</td>
<td>Fair</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
</tr>
<tr>
<td>ORGANIC ACIDS</td>
<td>Good</td>
<td>Excellent</td>
<td>Good</td>
<td>Poor</td>
<td>Good</td>
</tr>
<tr>
<td>OXIDIZING AGENTS</td>
<td>Excellent</td>
<td>Fair</td>
<td>Excellent</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>STEAM, NON-CONTINUOUS</td>
<td>N/R</td>
<td>Fair</td>
<td>N/R</td>
<td>N/R</td>
<td>Fair</td>
</tr>
<tr>
<td>STRONG INORGANIC ACIDS</td>
<td>N/R</td>
<td>Excellent</td>
<td>Poor</td>
<td>Excellent</td>
<td>Fair</td>
</tr>
<tr>
<td>DILUTE INORGANIC ACIDS</td>
<td>Fair</td>
<td>Excellent</td>
<td>Fair</td>
<td>Excellent</td>
<td>Good</td>
</tr>
<tr>
<td>MICROORGANISM RESISTANCE</td>
<td>Poor</td>
<td>Excellent</td>
<td>Poor</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

N/R = Not Recommended

NOTE 1: When using FDA grades please contact Filter Solutions to verify that the product conforms to your national legislation and/or regional authority requirements for water and food contact use.

## ORDERING GUIDE

### WOUND CARTRIDGES (EXAMPLE C20A30P--)

<table>
<thead>
<tr>
<th>MEDIA</th>
<th>MICRON RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>C = Bleached Cotton</td>
<td>0.5</td>
</tr>
<tr>
<td>CC = FDA Bleached Cotton</td>
<td>1.50&quot; (38 mm)</td>
</tr>
<tr>
<td>CN = Natural Cotton</td>
<td>T = 1.50&quot; (38 mm)</td>
</tr>
<tr>
<td>R = Rayon</td>
<td>10</td>
</tr>
<tr>
<td>F = Fiberglass</td>
<td>10</td>
</tr>
<tr>
<td>P = Polypropylene</td>
<td>10</td>
</tr>
<tr>
<td>PP = Polypropylene</td>
<td>T = Tin Plated Steel</td>
</tr>
<tr>
<td>FDAPE = Polyester</td>
<td>No Symbol = None</td>
</tr>
<tr>
<td>No Symbol = None</td>
<td>S = Poly Spring</td>
</tr>
</tbody>
</table>

### MODIFIERS (Optional)

- T = Tin Plated Steel
- P = Polypropylene
- A = 304 Stainless Steel
- S = 316 Stainless Steel
- C = Tin Wildcat
- No Symbol = None
- V = Specified Cover
- PE = Poly Extender
- S = Poly Spring
- E = S.S. Core Extender

The example shown below is a bleached cotton cartridge, 20 micron filtration, 2-1/2" (64 mm) OD, 30" Long with a Polypropylene core. No Options selected.
HIGH PERFORMANCE CARTRIDGE ELEMENTS

Product Description: High performance pleated high flow filter element 6” O.D up to 60” length high capacity filter element optimized for high flow rates.
Product Name: HF D-FLO
Rated Efficiency: 99.98% Absolute (β=5000)
Lowest Micron Rating: 0.45 μ
Type: Pleated media
Flow Direction: Inside to Outside
Length: 40-60in (1016-1524mm)
Outside Diameter: 6 in. (152mm)
M.O.C: Polypropylene, Polyester, Nylon 6,6 and Microfiberglass
Outer Cage: Polypropylene wrap, CS or SS Outer shell
Maximum D.P: 35 psi (2.41 bar) at 68°F/20°C
Feature: Long life and superior dirt holding.

ORDERING GUIDE
(EXAMPLE HF D-FLO-20-6-40-B-PP-CSO)

<table>
<thead>
<tr>
<th>SERIES</th>
<th>MICRON RATING</th>
<th>OD DIAMETER (INCH)</th>
<th>LENGTH</th>
<th>SEALING MATERIAL</th>
<th>MEDIA</th>
<th>MODIFIERS (Optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF D-FLO = High Performance Pleated High Flow Element</td>
<td>0.45</td>
<td>6 = 6” (152 mm)</td>
<td>40 = 40” (1016 mm)</td>
<td>60 = 60” (1524 mm)</td>
<td>B = Buna-N</td>
<td>PP = Polypropylene</td>
</tr>
<tr>
<td></td>
<td>0.8</td>
<td>2</td>
<td>5</td>
<td>6</td>
<td>E = EPDM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>10</td>
<td>20</td>
<td>50</td>
<td>T = TEV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>70</td>
<td></td>
<td></td>
<td>S = Silicon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The example shown below is a high performance pleated high flow filter element, 20 micron filtration, 6” (152 mm) OD, 40” Long with a Buna-N seal, polypropylene media, and optional carbon steel outershell.
HIGH PERFORMANCE
CARTRIDGE ELEMENTS

Product Description: 740 Style High Capacity filter cartridges are optimized for high dirt loading.

Product Name: 740 D-FLO

Rated Efficiency: 99.98% Absolute ($\beta$=5000)

Lowest Micron Rating: 0.45 μ

Type: Pleated media

Flow Direction: Outside to Inside

Length: 40in (1016mm) Custom length are available

Outside Diameter: 6 in. (152mm)

M.O.C: Polypropylene, Polyester, Nylon 6,6 and Microfiberglass

Outer Cage: Polypropylene wrap

Maximum D.P: 35 psi (2.41 bar) at 68°F/20°C


Feature: Superior dirt holding.

ORDERING GUIDE

(EXAMPLE C-20-6-40-B-PP)

The example shown below is a 740 style high capacity bleached cotton filter cartridge, 20 micron filtration, 6” (152 mm) OD, 40” Long with a Buna-N seal and polypropylene media.

<table>
<thead>
<tr>
<th>740 D-FLO</th>
<th>MICRON RATING</th>
<th>OD DIAMETER (INCH)</th>
<th>LENGTH</th>
<th>SEALING MATERIAL</th>
<th>MEDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>740 D-FLO = 740 Style High Capacity Filter Cartridge</td>
<td>0.5, 1, 3, 5, 10, 15, 20, 25, 30, 40, 50, 75, 100, 150-200</td>
<td>6” = 6” (152 mm)</td>
<td>40” = 40” (1016 mm) Custom lengths are available</td>
<td>B = Buna-N, E = EPDM, V = Viton, T = TEV, S = Silicon</td>
<td>PP = Polypropylene, PE = Polyester, N = Nylon 6,6, MG = Microfiberglass</td>
</tr>
</tbody>
</table>
LIQUID/GAS COALESCE
CARTRIDGE ELEMENTS

**Product Description:** Liquid/ Gas Coalescers are designed to remove aerosols and fine particulate contaminants from natural gas streams.

**Products Name:**
GCE- Gas Coalescer Element

**Application:**
- Liquid removal in a natural gas processing facility
- Compressor discharge lube oil removal
- Fuel gas purification
- Protection gas turbines
- Formation protection during gas flooding
- Catalyst bed protection
- Protecting Dehydration and Amine Systems

**Specifications:**
- Removes Aerosol sized droplets and particulate down to 0.3 μ
- Maximum Temperature: 300°F (149°C)
- Recommended change-out: 15psid (1barg)
- Media: Pleated Micro Fiberglass
- Outside diameter: Up to 6in (152mm), nominal
- Length: up to 40in (1016mm), nominal
- S.O.E with threaded base or D.O.E with end cap.
- Flow Inside to Outside
- Custom size and configuring available upon request
- Custom materials for various applications are available upon request

---

GAS SEPARATOR
CARTRIDGE ELEMENTS

**Product Description:** Gas Separator element is designed to efficiently coalesce free liquids for second stage removal while delivering high solids holding capacity.

**Products Name:**
GSE- Gas Separator Element

**Application:**
- Glycol Dehydrators
- Amine Plants
- Natural Gas Compressors
- Gas storage facilities
- Refrigeration Plants
- Metering Stations
- Turbine Suction
- Fuel Gas
- Compressor Discharge

**Specifications:**
- Removes particulate down to 1μ
- Maximum Temperature: 275°F (135°C)
- Recommended Change-out: 15psid (1barg)
- Media: Molded Fiberglass
- Outside diameter: Up to 5.5in (140mm) nominal
- Length: up to 72in (1830mm) nominal
- D.O.E with end cap.
- Flow Outside to Inside
- Custom size and configuring available upon request
- Custom materials for various applications are available upon request
HYDROCARBON COALESCER AND SEPARATOR
CARTRIDGE ELEMENTS

Product Description: Liquid Coalescers/ Separators are designed to remove dispersed and free water from hydrocarbons.

Products Name:
LCE- Hydrocarbon Coalescer Element
LSE- Hydrocarbon Separator Element

Application:
Jet Fuel/Kerosene, Gasoline, Diesel, and other fuels
Wide variety of Hydrocarbons and Intermediates
Lube Oil, Hydraulic Oil, Heat Transfer Fluids
Removal of Dispersed Water, Haze Removal
Protection of Catalysts, Exchangers and Equipment

Performance:
Removal Micron Rating: down to 0.3μ Water Droplets
Water Removal Efficiency: Up to 99.99%
100% removal of solids and liquids larger than 3μ
Removes water down to 10ppm, depending on application

Specifications:
Maximum Temperature: 200°F
Recommended Change-out: 12-15 psid
Inlet water concentration: up to 3% water (30,000 ppm)

LC Series Hydrocarbon Coalescers
Outside diameter: Up to 6 inches, nominal
Length: up to 56 inches, nominal
Flow Inside to Outside

LS Series Hydrocarbon Separators
Outside diameter: Up to 6 inches, nominal
Length of Separator: Up to 44 inches, nominal.
Media: Teflon Coated Mesh Media
Flow Outside to Inside

Sealing Mechanism
S.O.E with threaded base or D.O.E with end cap.

*Please contact NPT if you have any questions about your elements selections.
ACTIVATED CARBON

CARBON ELEMENTS

FSI's activated carbon products are specifically designed to attend to the toughest applications the oil and gas industry have to offer. By using only the highest quality materials and the most robust designs, FSI guarantees a finished product second to none.

NVF SERIES ACTIVATED CARBON CANISTERS

FSI's Vertical Flow Activated Carbon Canisters increase fluid contact by eliminating the potential bypass in using the relatively thin bed available in a radial flow configuration. FSI’s NVF 1120 and 1122 canisters outlast the radial flow design by 30%.

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>NVF1120</td>
</tr>
<tr>
<td>NVF1122</td>
</tr>
<tr>
<td>NVF636</td>
</tr>
</tbody>
</table>

NRF SERIES ACTIVATED CARBON CANISTERS

NPT’s Radial Flow Activated Carbon Canisters present a greater superficial area to the process fluid, lowering velocity to better deal with high solids contamination.

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>NRF1120</td>
</tr>
<tr>
<td>NRF1122</td>
</tr>
<tr>
<td>NRF720</td>
</tr>
</tbody>
</table>

BULK ACTIVATED CARBON

FSI’s Activated Carbon is specially selected to maximize performance in gas processing applications where the target contaminants are long chain hydrocarbon molecules. Used in all of FSI's Carbon Canisters, it is also available in bulk form, in 44 lb bags, and 880 lb super sacks.
HARDNESS

The hardness number is a standard test recognized by ASTM to determine the hardness of a given carbon. The leading lignite based carbon manufacturer does not use a specification per the ASTM standard test method and instead use a non-standard abrasion resistance test. Should an ASTM hardness number be tested on the leading lignite based activated carbon, a value of 60 should be expected. Therefore, the FSI activated carbon hardness number of 90 is significantly harder translating to less particle attrition and carbon fine generation during transportation, replacement, and use. Always remember to use an accepted rinsing procedure reducing procedure for the best service possible from your FSI activated carbon product. In the right quantity, coal fines can contribute to foaming issues. Don’t forget air can also be a potent contributor!

PORE STRUCTURE

While most carbon is used in water treatment, the primary function of FSI carbon in oil and gas applications is to remove long chain hydrocarbons. The molasses number is a good indicator for predicting how well an activated carbon will adsorb higher molecular weight organics. The leading lignite based carbon manufacturer uses a non-standard molasses test used by no other company, while the FSI molasses number is based on a more standard test. A molasses de-coloring efficiency (DE) of 85 converts to a molasses number of approximately 400. As both the FSI and leading lignite carbon manufacturer have a molasses number of approximately 400, one would expect similar performance in adsorbing higher molecular weight organics. The iodine number is an excellent parameter to determine the overall surface area of activated carbons, but it also is a great indicator of how well a carbon will adsorb organics. FSI activated carbon has a minimum iodine number of 1000, while the leading lignite based 8X30 mesh carbon is approximately 500. Our activated carbon has an iodine number, double to that of the leading lignite based 8X30 mesh allowing for superior adsorption capability.

### COMPARISON COAL BASED & LIGNITE BASED ACTIVATED CARBON

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>COAL BASED ACTIVATED CARBON</th>
<th>LIGNITE BASED ACTIVATED CARBON</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 8 MESH</td>
<td>5% MAX</td>
<td>5% MAX</td>
</tr>
<tr>
<td>&lt; 30 MESH</td>
<td>5% MAX</td>
<td>5% MAX</td>
</tr>
<tr>
<td>APPARENT DENSITY</td>
<td>21-23 LB/FT³</td>
<td>24 LB/FT³</td>
</tr>
<tr>
<td>BACKWASH AND DRAINED DENSITY</td>
<td>20 LB/FT³</td>
<td>21.5 LB/FT³</td>
</tr>
<tr>
<td>HARDNESS NUMBER</td>
<td>90</td>
<td>60</td>
</tr>
<tr>
<td>pH WATER EXTRACT</td>
<td>8-8.5</td>
<td>4.5</td>
</tr>
<tr>
<td>MOISTURE AS PACKED</td>
<td>5% MAX</td>
<td>12% MAX</td>
</tr>
<tr>
<td>IODINE NUMBER</td>
<td>1000 (mg/g) min.</td>
<td>500 (mg/g) min.</td>
</tr>
<tr>
<td>MOLASSES NUMBER</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>TOTAL ASH CONTENT</td>
<td>12%</td>
<td>20%</td>
</tr>
</tbody>
</table>

*Note: Above properties in consideration of particles of same size*
WHAT ELSE WILL I FIND IN MY ACTIVATED CARBON?

The leading lignite based activated carbon manufacturer acid washes their carbon with hydrochloric acid and rinses it. As a result, an acidic residual remains on the carbon leaving a typical pH value of 4.5. Because FSI’s activated carbon is not acid washed, it will not decrease the pH of an Amine stream. Total ash content measures the non-carbon portion of an activated carbon. As the ash content of the leading lignite based carbon is almost twice that of the FSI’s carbon, there is a much higher potential that compounds within this ash may dissolve within the fluid being treated. In addition to the above non-carbon contaminants, FSI’s activated carbon contains 7% less water than the leading lignite based activated carbon. Less water translates to more carbon in every shipment.

OPERATING CONDITIONS

Factors affecting carbon performance include temperature and contact time in addition to the type of carbon and the targeted contaminant. The maximum recommended operating temperature for carbon is generally 120 deg. F, exceeding 150 deg. F can greatly reduce capacity in hydrocarbon capture levels. Similarly, high rates of flow or reduced contact time diminish the ability of the carbon to capture and retain contaminants. Unnecessary abrasion can also be an additional side effect. A carbon unit should always be protected upstream and down by adequate particulate filtration to prevent fouling of the bed and to prevent any carbon fines from entering the system. In a properly designed system, the carbon unit should not develop any significant differential pressure over time.

*Please contact FSI if you have any questions about your activated carbon application.
WEDGE WIRE SCREENS

General Data
Standard Wound
External Axial
Inverted Wrap
Internal Axial
Reverse Formed
Wedge wire screens are manufactured by resistance welding vee-shaped wire on support rods. The distance between the vee-shaped wire is controlled accurately, as it forms the slot through which the filtrate flows. Welding is performed in a continuous rolled motion to join the wire and the rods. The welding process welds the continuous length of the wire to the rods as it circulates.

The Vee-shaped opening results in only two contact points between the retained particles and the slot. This minimizes clogging and increases backwashing efficiency.

FEATURES

- Screens are available in slot sizes from 0.001 in. (25µm) up to 1 in. (25 mm).
- The most common material of construction is 300 series stainless steel, however many exotic alloys are available such as 321SS, 347SS, Duplex SS, Alloy 20, Hastelloy C-76, Alloy B-3, Titanium, Monel 400, etc.
- Screen diameters from 0.787 in. (20 mm) and larger.

INDUSTRY APPLICATIONS

- Water and waste water
- Pulp and paper
- Chemical
- Petrochemical
- Water Supply
- Mineral and aggregate processing
- Plastics extrusion
- Machine coolant filtration
- Architectural applications
- Water Well
- Construction
- Drilling

APPLICATIONS

- Separating
- Filtering
- Media retention
- Sizing
- Dewatering
- Classifying
- Straining
- Drying
- Water Intake
- Fish diversion
- Backwashing
- Centrifuges
- Floor Grating

CUSTOM SOLUTIONS

- Flat Screens
- Support Grids
- Candle Filters
- Cartridges
- Nozzles
- Resin Traps
- Screen Lateral Systems
- Fractal Collectors and Distributors
- Sieve Bends and Boxes
- Cylindrical Baskets
- Conical Baskets
- Pressure Screens
- Screw Press Screens
- And much more....

Wedge wire products manufactured by Filter Solutions include:
OPEN AREA (%) = \frac{\text{SLOT SIZE} \times 100}{\text{SLOT SIZE} + \text{WIRE WIDTH}}

Screens can be made in various different configurations, including cylindrical, flat, or curved. Many different variations of wire and rod sizes and slot size (opening) can be chosen to develop the exact screen of your choice. A wide range of wire and rod shapes make it possible to achieve the optimum balance of strength, open area, abrasion resistance and filtration efficiency.

**STANDARD WOUND**

External circumferential wire and axial internal support rods.

**APPLICATIONS**

- Resin Traps
- Nozzles
- Header laterals
- Candle Filters

**EXTERNAL AXIAL**

Re-rolled construction. External axial wire with internal circumferential support rods.

**APPLICATIONS**

- Automatic Filters

**BENEFITS**

- Flow Outside to Inside
- Facilitates cleaning with an external axial-movement scraper

**APPLICATIONS**

- Resin Traps
- Nozzles
- Header laterals
- Candle Filters
INVERTED WRAP
External circumferential inverted wire and axial internal support rods.

**BENEFITS**
- Flow Outside to Inside
- Economical

**APPLICATIONS**
- Backwashing automatic strainers

INTERNAL AXIAL
Wire based construction. Internal axial wire with external circumferential support rods.

**BENEFITS**
- Flow Outside to Inside
- Smooth internal screen surface
- Facilitates cleaning with an internal axial-movement scraper.

**APPLICATIONS**
- Dewatering systems
- Baskets
- Systems with an internal rotor or screw

REVERSE FORMED
Re-rolled construction. Internal circumferential wire with external axial support rods.

**BENEFITS**
- Flow Outside to Inside
- Smooth internal screen surface
- Custom inner diameters can be manufactured

**APPLICATIONS**
- Strainer and Filter baskets
- Screw Press
SCREEN SELECTION CHART

The below chart outlines common screen diameter, wrap wire and support rod combinations to produce a screen that will fit over a ASME B36.10M standard pipe.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>NOMINAL SCREEN OD (IN.)</th>
<th>WRAP WIRE</th>
<th>SUPPORT ROD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>1.375</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>1.470</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>1&quot;</td>
<td>1.750</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>1-1/4&quot;</td>
<td>2.050</td>
<td>60</td>
<td>60</td>
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WIRE AND ROD PROFILES
GENERAL INFO

- General Data
- Bag & Cartridge Comparison
- Characteristic of Particle Size
- Chemical Resistance for Metal and Gaskets
- Conversion Factors
- Decimal Equivalents
- Pipe Chart
- Strainer Inquiry Checklist
- Water & Suspended Solid Conversions
- Glossary
CONSIDERATION FOR SELECTING THE RIGHT HOUSING AND ELEMENT

| INITIAL COST | The flow rate will determine the size of the housing required |
| HOUSING PRICE | The size and type of filter housing will determine the price of the housing |
| HOUSING SIZE | The housing size is based on the flow rate of the process stream |
| THE NUMBER OF ELEMENTS REQUIRED | The number of elements required is directly associated with the size of the housing and the flow rate |
| PRICE PER ELEMENT | The price per element determines the total cost of replacement per every change out |
| DIRT LOADING CAPACITY PER ELEMENT | The dirt loading capacity per element determines the frequency of change out required |
| NOMINAL OR ABSOLUTE RATINGS | Depending on the filter efficiency one wishes to acquire, a nominal or absolute ratings must be determined |
| CHANGEOUT TIME REQUIRED | The total dirt loading capacity will establish the amount of change out required at a given time |

| OPERATING COST | The labour cost associated with every change out |
| DISPOSAL COST | The disposal cost is based on the jurisdiction and type of waste (hazardous/non hazardous) being disposed |

| BAG, CARTRIDGE AND HIGH FLOW COMPARISON |
| FLOW RATE | HOUSING | ELEMENT | DIRT LOADING |
| GPM | HOUSING DIA | HOUSING PRICE RATIO | # OF ELEMENT | COST PER UNIT | ***TOTAL COST | DIRT LOADING PER ELEMENT | TOTAL DIRT LOADING CAPACITY | **CHANGEOUT TIME |
| BAG | 300 | 18" | 1.5 | 3 (P2) | $5 | $15.00 | 1 LB | 3 LBS |
| CARTRIDGE | 300 | 16" | 2 | 24 (3H) | $10 | $240.00 | 1 LB | 24 LBS |
| HIGH FLOW | 300 | 8" | 1 | 1 (660HF) | $300 | $300.00 | 20 LBS | 20 LBS |

*All material of construction is based on 316 Stainless Steel and pricing is based on NPT's general pricing **Change out requirement is based on fluid contamination @ 10 ppm ***Element unit price is based on NPT's general pricing

Filtration Cost Efficiency is based on the direct cost, indirect cost and total cost with removing one pound of solids from a process stream, disregarding equipment depreciation. Direct cost is the price of the filter element (P) and the indirect cost is the labor price during change out operation and the cost for disposal of the filtered waste. The lowest “E” value represents the lowest total cost of filtration.

\[
E = \frac{P}{H} + \frac{L}{H} + \frac{D}{H}
\]

Filtration Cost Efficiency

\[
E = \text{FILTRATION COST EFFICIENCY}
\]

H = DIRT HOLDING CAPACITY IN POUNDS
L = LABOR COST PER FILTER ELEMENT
P = FILTER ELEMENT PRICE
D = DISPOSAL COST PER FILTER ELEMENT

\[
\text{ALPHA FACTOR (A)} = \frac{\text{FILTER ELEMENT PRICE (P)}}{\text{DIRT HOLDING CAPACITY (H)}}
\]

\[
E = A + \frac{(L+D)}{H}
\]

The indirect costs shown in the equation are reduced as the dirt holding capacity of the filter increases. Therefore, the Alpha Factor becomes the dominant number in the equation. The lowest Alpha Factor results in the lowest filtration cost.
FILTER HOUSING INQUIRY CHECKLIST

Please have the information listed below ready to provide when placing an inquiry to allow us to better serve your filtration requirements.

1. Type of filter housing (Bag, Cartridge, Hi-Flow etc...) _____________________________
2. Operating/Design pressure (PSI or KPA) _________________________________________
3. Operating/Design temperature (°C or °F) _________________________________________
4. Corrosion allowance (in or mm) ________________________________________________
5. Code of construction (ASME Section 1 or others) ________________________________
6. NDE requirement (RT,MT,UT others) __________________________________________
7. Housing material of construction (CS,SS, others) _________________________________
8. Nozzle connection sizes/rating (NPS/DIN) ______________________________________
9. Flow rate (GPM or LPM) _____________________________________________________
10. Service fluid __________________________________________________________________
11. Fluid Density (lb/ft³ or kg/m³) ________________________________________________
12. Fluid Viscosity (cP or cSt) __________________________________________________
13. Desired particulate retention size (micron) ______________________________________ 
14. Nature/Type of contaminant (Solid, Gels etc...) ________________________________
15. Dirt loading concentration (PPM) _____________________________________________
16. Clean pressure drop requirement (PSI or KPA) _________________________________
17. Additional requirements ______________________________________________________
18. Company contact information ________________________________________________
**STRAINER HOUSING INQUIRY CHECKLIST**

Please have the information listed below ready to provide when placing an inquiry to allow us to better serve your filtration requirements.

1. Type of strainer (Basket, T-Strainer, Y-Strainer others)_____________________________
2. Operating/Design pressure (PSI or KPA)_____________________________________
3. Operating/Design temperature (°C or °F)_____________________________________
4. Corrosion allowance (in or mm)_____________________________________________
5. Code of construction (ASME Section 1, B31.3 others)___________________________
6. NDE requirement (RT,MT,UT others)________________________________________
7. Housing material of construction (CS,SS, others)______________________________
8. Basket material of construction(304SS,3016SS, others)_________________________
9. Nozzle connection sizes/rating (NPS/DIN)____________________________________
10. Mesh/Perforation size required(# / in or mm)_________________________________
11. Basket open area ratio(%)_______________________________________________
12. Flow rate (GPM or LPM)_________________________________________________
13. Service fluid________________________________________________________________
14. Fluid Density (lb/ft³ or kg/m³)_____________________________________________
15. Fluid Viscosity (cP or cSt)_________________________________________________
16. Nature/Type of contaminant (Solid, Gels etc...)_______________________________
17. Clearance limitation (in or mm)____________________________________________
18. Clean pressure drop requirement (PSI or KPA)________________________________
19. Additional requirements____________________________________________________
20. Company contact information______________________________________________
FILTER ELEMENTS INQUIRY CHECKLIST

Please have the information listed below ready to provide when placing an inquiry to allow us to better serve your filtration requirements.

1. Service fluid to be filtered__________________________________________________
2. Nature/Type of contaminant (Solid, Gels etc...)______________________________
3. Operating temperature (°C or °F)__________________________________________
4. Chemical compatibility issues____________________________________________
5. Filtration efficiency (Nominal or Absolute)__________________________________
6. Desired particulate retention size (micron)___________________________________
7. Dirt loading concentration (PPM)___________________________________________
8. Maximum Clean pressure drop (PSI or KPA)__________________________________
9. Fluid Density (lb/ft³ or kg/m³)______________________________________________
10. Fluid Viscosity (cP or cSt)________________________________________________
11. Other relevant information________________________________________________
12. Company contact information_____________________________________________
# A/SA 182F 304 Pressure/Temperature Ratings

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# A/SA 182F 316 Pressure/Temperature Ratings

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A/SA 105 and A/SA 350LF2 CL.1 PRESSURE/TEMPERATURE RATINGS

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***This Chart contains general information and is a general guide only***
### DECIMAL EQUIVALENTS

#### Decimal Equivalents of Fractions

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**Note:** This chart contains general information and is a general guide only.

#### Decimal Equivalents of US Mesh Ratings

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**Note:** This chart contains general information and is a general guide only.

#### Standard SS Sheet Metal Gauges

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**Note:** This chart contains general information and is a general guide only.
### WATER AND SUSPENDED SOLID CONVERSIONS

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#### SUSPENDED SOLID CONVERSION

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***This chart contains general information and is a general guide only***

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**Staggered pattern only**
### CHEMICAL RESISTANCES

#### CHEMICAL RESISTANCE OF METALS

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<th>TYPE 316 S.S.</th>
<th>TYPE 347 S.S.</th>
<th>CARPENTER &quot;20&quot; S.S.</th>
<th>HASTELLOY &quot;B&quot;/&quot;C&quot;</th>
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**NOTES:** RESISTANCE RATING: G = GOOD; F = FAIR; Y = CAUTION (DEPENDS ON CONDITIONS); X = NOT RECOMMENDED; N/A = NOT APPLICABLE

#### CHEMICAL RESISTANCE OF ELASTOMER GASKET

<table>
<thead>
<tr>
<th>CHEMICAL RESISTANCE OF METALS</th>
<th>CHEMICAL RESISTANCE OF ELASTOMER GASKET</th>
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**MIN/MAX OPERATING TEMPERATURE**

-60°F/300°F  -30°F/250°F  -60°F/250°F  -60°F/400°F  -15°F/400°F

***This chart contains general information and is a general guide only***
### CHARACTERISTICS OF PARTICLE SIZE

<table>
<thead>
<tr>
<th>PARTICLES NAME</th>
<th>PARTICLES SIZE RANGE (IN MICRON)</th>
<th>PARTICLES NAME</th>
<th>PARTICLES SIZE RANGE (IN MICRON)</th>
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<tr>
<td>FUME</td>
<td>0.001-1</td>
<td>CARBON BLACK</td>
<td>0.01-0.3</td>
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<tr>
<td>DUST</td>
<td>1-10,000</td>
<td>PULVERIZED COAL</td>
<td>3-500</td>
</tr>
<tr>
<td>MIST</td>
<td>0.001-10</td>
<td>PAINT PIGMENTS</td>
<td>0.1-5</td>
</tr>
<tr>
<td>SPRAY</td>
<td>10-10,000</td>
<td>FLOTATION ORES</td>
<td>10-200</td>
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<tr>
<td>CLAY</td>
<td>0.02-2</td>
<td>ZINC OXIDE FUME</td>
<td>0.01-0.3</td>
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<tr>
<td>SILT</td>
<td>2-20</td>
<td>INSECTICIDE DUSTS</td>
<td>0.5-10</td>
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<tr>
<td>FINE SAND</td>
<td>20-200</td>
<td>COLLOIDAL SILICA</td>
<td>0.02-0.05</td>
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<tr>
<td>COARSE SAND</td>
<td>200-2000</td>
<td>GROUND TALC</td>
<td>0.5-50</td>
</tr>
<tr>
<td>GRAVEL</td>
<td>2000-30,000 PLUS</td>
<td>SPRAY DRIED MILK</td>
<td>0.1-10</td>
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<tr>
<td>SMOG</td>
<td>0.001-2</td>
<td>PLANT SPORES</td>
<td>10-30</td>
</tr>
<tr>
<td>CLOUDS AND FOG</td>
<td>2-70</td>
<td>ALKALI FUME</td>
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<td>MIST</td>
<td>70-200</td>
<td>POLLENS</td>
<td>10-100</td>
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<td>DRIZZLE</td>
<td>200-500</td>
<td>AITKEN NUCLEI</td>
<td>0.005-0.2</td>
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<td>RAIN</td>
<td>500-10,000</td>
<td>MILLED FLOUR</td>
<td>1-80</td>
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<tr>
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<td>ATMOSPHERIC DUST</td>
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<tr>
<td>FERTILIZER, GROUND LIMESTONE</td>
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<td>SEA SALT NUCLEI</td>
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<td>OIL SMOKE</td>
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<tr>
<td>FLY ASH</td>
<td>1-200</td>
<td>HYDRAULIC NOZZLE DROPS</td>
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<tr>
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<td>COMBUSTION NUCLEI</td>
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<td>COAL DUST</td>
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<td>LUNG DAMAGING DUST</td>
<td>0.5-5</td>
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<tr>
<td>METALLURGICAL DUSTS AND FUMES</td>
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<td>PNEUMATIC NOZZLE DROPS</td>
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<td>RED BLOOD CELL DIAMETER (ADULTS)</td>
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<td>CEMENT DUST</td>
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<td>VIRUSES</td>
<td>0.003-0.05</td>
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<tr>
<td>SULFURIC CONCENTRATOR MIST</td>
<td>1-20</td>
<td>BACTERIA</td>
<td>0.3-30</td>
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<td>BEACH SAND</td>
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<td>CONTACT SULFURIC MIST</td>
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***This chart contains general information and is a general guide only***
### GENERAL DATA

#### COMMON MATERIAL

<table>
<thead>
<tr>
<th>PRODUCT FORM</th>
<th>CARBON STEEL</th>
<th>C/S LOW TEMP.</th>
<th>304 STAINLESS</th>
<th>316 STAINLESS</th>
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<td>SA 516 70N</td>
<td>SA 240 304</td>
<td>SA 240 316</td>
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<tr>
<td>PLATE (STRUCTURAL) SA 36/44W</td>
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<td>SA 240 304</td>
<td>SA 240 316</td>
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<td>FORGING (FLANGE/CPL’G) SA 105</td>
<td>SA 350LF2 CL.1</td>
<td>SA 182F 304</td>
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<td>SA 333 GR.6</td>
<td>SA 312TP 304 SMLS</td>
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<td>SA 420 WPL6</td>
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<td>BOLT/STUD SA 193 B7</td>
<td>SA 193 B7M</td>
<td>SA-193 B8 CL.1</td>
<td>SA-193 B8 CL.2</td>
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<td>NUT SA 194 2H</td>
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#### BOLT SIZE & T.P.I C.S ALLOWABLE STRESS @ TEMPERATURE

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#### SURFACE PREPARATION

- **CARBON STEEL:** SSPC-SP6 OR PEEN BLAST
- **STAINLESS STEEL:** BEAD BLAST OR ELECTRO POLISH

#### MATERIAL STRENGTH

<table>
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#### WELDING PROCESS

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<td>GMAW: GAS METAL ARC WELDING</td>
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<td>SAW: SUBMERGED ARC WELDING</td>
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#### WELDING PROCESS

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<td>UT= ULTRASONIC TESTING</td>
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<td>MT= MAGNETIC PARTICLE TESTING</td>
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<td>V= VISUAL INSPECTION</td>
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<td>HT= HARDNESS TESTING</td>
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<td>LPT= LIQUID PENETRANT TESTING</td>
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<td>PMI= POSITIVE MATERIAL IDENTIFICATION</td>
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#### DATA REPORT FORM

**CRN DESIGNATION**

- TXXXX.1 | BC=1
- TXXXX.2 | AB=2
- TXXXX.3 | SK=3
- TXXXX.4 | MB=4
- TXXXX.5 | ON=5
- TXXXX.6 | QC=6
- TXXXX.7 | NB=7
- TXXXX.0 | NL=0
- TXXXX.C | ALL CANADIAN PROVINCE=C

***This Chart contains general information and is a general guide only***

CRN TXXXX.21345, THE 1ST REGISTERED IN PROVINCE IS ALBERTA SINCE THE DIGIT AFTER THE DECIMAL IS "2"
### PIPE AND B.W FITTING WALL THICKNESS CHART

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<th>Nominal Pipe Size</th>
<th>Pipe O.D</th>
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* Light wall thicknesses are identical to stainless steel schedule 10S in sizes thru 12” and to Sch 10 in sizes 14” and larger.

** Standard wall thicknesses are identical to Stainless steel schedule 40S in sizes thru 12”

*** Extra Strong wall thicknesses are identical to Stainless steel schedule 80S in sizes thru 12”
GLOSSARY

CODE REQUIREMENTS

Filter Solutions 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.

Abrasion
The process of wearing away of material within a system which may lead to foreign materials entering the process fluid.

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.

Activated Carbon
Charcoal activated by heating to 1472-1652°F a material of high adsorptive gases, vapors, organics, etc. Has a large internal surface area. Removes dissolved color, odor and taste from liquids or gases. Commonly used in the pharmaceutical industry to remove organic contaminants.

Activated Sludge
Biologically active floc from aeration and settling sewage and/or organic matter.

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 gasses, 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 it’s soluble and insoluble contaminates on its surface by molecular adhesion — through no chemical change.

Aerobic Bacteria
Organisms requiring oxygen to live.

Aerosol
A dispersion of small liquid or solid particles suspended in air, gas or vapor.

Affluent (Influent)
Fluid entering the filter or filter system. Commonly described as influent, it is the opposite of effluent.

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.

Alkalinity
The capacity of water to neutralize acids, a property imparted by the water’s content of carbonates, bicarbonates, hydroxides and occasionally borates, silicates and phosphates. It is expressed in milligrams per liter of equivalent calcium carbonate.

Anaerobic
Organism capable of growing without the presence of oxygen.

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

Amine
A class of organic compounds that are basic in nature and combine with acids to form salts. Amines are used to sweeten hydrocarbons.

ANSI
American National Standards Institute.

ASME
The American Society of Mechanical Engineers.
GLOSSARY

ASTM
American Society for Testing and Materials.

Asymmetric Membrane
A membrane in which the pore size and structure are not the same from one side of the membrane to the other. These membranes are usually considered directional because of difference in flow characteristics depending on which side of the membrane faces the feed stream.

Assay
Analytical procedure to determine purity or concentration of a specific substance in a mixture.

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

Autoclave
A chamber for sterilizing with saturated steam filters or equipment by using constant high temperature and pressure.

B
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.

Bacteria
Free living simple celled, microscopic organisms having a cell wall, lacking a defined nucleus, shape and round, rod-like, spiral or filamentous.

Bacteria Challenge
Testing the bacterial retention of a filter.

Baffle
A deflector plate at the inlet of a filter or coalescer vessel to deflect flow to protect filters from damage and to provide flow distribution.

Bag Life
Time a bag filter performs effectively.

BAR
Unit of pressure. 1 bar = 14.5 psi.

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 (ß) Ratio
The Beta (ß) 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).

Biaxially Stretched Membrane
A micro porous membrane from either polypropylene or PTFE that has been stretched in both the MD and CD direction in a manner to form pores of a controlled size and possessing a narrow pore size distribution.

Bioburden
The load or level of microorganisms in a substance to be filtered.

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

Brownian Motion
The continuous zigzag motion of suspended minuscule particles. The motion is caused by impact of the molecules in the fluid upon the particles.

Blowdown
The use of pressure to remove liquids and/or solids from a vessel.

Breakthrough
Used to describe the passing of solids through the cake build up of a filter medium. Also called breakpoint.

Bridging
Material or particulate blockage across an opening, often of a pore or filter medium.

Bubble Point
The differential gas pressure at which the first steady stream of gas bubbles is emitted from a wetted filter element under specified test conditions. A form of filter element fabrication integrity test.

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.
**GLOSSARY**

**Calendering**
A manufacturing process where woven and/or nonwoven fabrics are pressed between heavy rollers compressing the fibers. The process reduces the filter medium void volume, pore size rating, flow-rate and dirt-hold capacity of the medium.

**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.

**Catalyst**
A substance that increases the rate of a reaction.

**Cationic**
Chemical that has a positive electrical charge.

**Cellulose**
A filter media of organic fibers such as wood, cotton, grass, and plant pulp.

**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.

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

**Centistokes**
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.

**Centrifugation**
Separating two substances of differing densities by high speed spinning to create centrifugal force. Generally used to separate suspended particles from liquid.

**Chromatography**
Separation of substances in a mixture based on their affinity for certain solvents and solid surfaces.

**Classification**
Condition in which larger particle settle out below the finer ones. Also referred to as stratification. May also be referred to as the action to sort out particles by various groups or to other established criteria.

**Cleanable**
A filter element which, when loaded with contaminant, can be cleaned by a suitable process and returned to service with an acceptable percentage of its original dirt holding capacity.

**Clear Water Pressure Drop**
Differential pressure across die 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.

**Collapse Pressure**
The maximum pressure that an element can withstand without permanent deformation.

**Colloid**
Very small, insoluble non-diffusible solid or liquid gelatinous particles that remain suspension in a surrounding liquid. Solids usually on the order of 0.2 μm or less.

**Compatibility**
Relation to the non-reactivity of filter materials with a substance to be filtered.

**Compressibility**
Degree of physical change in filter cake particles when subjected to normal pressures.

**Compression band**
Stainless steel band sewn into the end of a bag to provide a surface to clamp against in the bag house.

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

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

**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.
GLOSSARY

D

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. H2O). 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.

Desalination
Production of fresh (potable) water from sea water, salt or brackish water by one of several processes, e.g. distillation, flash distillation, electro dialysis or reverse osmosis if salt content is not too huge.

Dewatering
A physical process that removes sufficient water from sludge so that its physical form is changed from essentially that of a fluid to that of a slurry or damp solid.

Differential Pressure
The difference in pressure across any two points of a system or component.

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

Dirt (Holding/loading) Capacity
Amount of dirt or debris retained by a filter in grams per unit area of the filter medium.

Discharge
The flow rate through a filter.

Dispersion
Operation which results in solid or liquid particles entering into suspension in a fluid. Also applies to a two phase system in which one phase, known as the disperse phase, is distributed throughout the other, known as the continuous phase.

Disposable Filters
A filter which is intended to be discarded and replaced at the end of its service life.

Distillation
Process of vaporizing a liquid and collecting the vapor, which is then usually condensed into a liquid.

D.O.E.
Double Open Ended.

Downstream
The filtrate or product stream side of the filter. Fluid and/or solids that have passed through the filter.

E

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 die opposite of blind spots or dead area.

Effective Open Area
Area of die filtering medium through which die 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 die 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 die filtration industry.

Extractable
Chemicals leached from a filter during a filtration process; usually tested for by soaking in water under controlled conditions; may be removed by pre-flushing with suitable liquid.
Glossary

**F**

**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.

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

**Fiber Metal Felt**
A nonwoven media consisting of extremely fine metal fibers (2-20 micron in diameter) which are compressed and sintered. Used to filter molten polymers in the manufacture of fibers and films and hydraulic fluids for use in aerospace filters.

**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.

**Filter Cake**
The accumulation of particulate or solids on a surface. Can also mean a pre-coat for filtering.

**Filter Element Life**
The span of operation from clean unit to a predetermined pressure drop buildup, 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**
Removal of particles from a fluid by passing the fluid through a permeable material.

**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.

**Flocculation**
Growing together of minute size particles to form larger ones, called floc's.

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

**Flow Decay**
Decrease in flow rate caused by filter plugging or clogging.

**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.

**G**

**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 die dense media.

**Gravity Filter**
Filter in which the driving force for filtration is provided solely by the head of liquor above the filter medium.
GLOSSARY

H
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 die ability to absorb water.

Hydrophobic
Lacking affinity for or die ability to absorb water.

Hydrometer
An instrument used to measure the density of a liquid.

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.

I
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

Indicator, Differential Pressure
A device that signals the difference in pressure between two points, typically between the upstream and downstream sides of the filter element.

Initial Pressure Drop
A loss in pressure between the inlet and the outlet con-nections upon the start of flow through a vessel using new elements.

In-line Filter
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 die other.

Inlet Pressure
Pressure entering the inlet side of the filter. Also called upstream pressure or line pressure.

Isotropic (symmetric) Membrane
Membrane in which the pore openings are the same diameter throughout the thickness and on both sides of the membrane. Non-directional, their flow characteristics are independent of which side faces the feed stream.

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

L
Laminar Flow
Term synonymous with streamline flow and viscous flow. A flow regime which the flow characteristics are governed mainly by the viscosity of the fluid.

Line Pressure
Inlet pressure, upstream pressure. The pressure in the supply line.

M
Manometer
A U-shaped tube filled with a specific liquid. The difference in height between the liquid in each leg of the tube gives directly the differ-ence in pressure on each leg of the tube. Used to monitor differential pressure.

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.

Mean Filtration Rating
A measurement of the average size of the pores of the filter media.

Media/ Medium
A porous or slotted mass in a filter element that separates solids from a fluid by a difference in die size of openings, and also through direct containment. A material of con-trolled pore size or mass through which a product is passed in order to remove foreign parti-cles held in suspension, or to repel droplets of coalesced water; or a material with our 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.

Meltblown
A nonwoven manufacturing process for filtration media, where a molten polymer is extruded out of an orifice with high-velocity air to create fine fibers. The fibers can create roll stock or be spray-spun onto porous tubes to create a finished filter.

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.
GLOSSARY

Mesh
A term referring to a woven filtration medium, typically wire cloth or monofilament woven fabric.

Mesh Count
Number of openings or fractions of openings in a lineal inch of wire cloth or monofilament woven fabric.

Micrometer (mm)
A unit of length. A micrometer is a millionth of a meter or 0.000039" (29 millionths of an inch). 25 micrometers are approximately equal to a thousandth of an inch (.001").

Micron
A short unit of length in the metric system, equal to one-millionth of a meter, 10^-6 meter, 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.

Microfiltration
Used for clarification, sterilization, to detect or analyze bacteria and other organisms and particulate matter. Separation of particles ranging from 0.1 \( \mu \)m to 10 \( \mu \)m.

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.

Molarity
The term used to indicate the concentration of dissolved substance in a given solution. The measurement is in moles of dissolved substance per liter of solution.

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 of woven fabric, where each thread consists of many smaller diameter threads twisted together.

Multi-Pass Test
The test used to determine the beta ratio of an element.

N
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.

O
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.

Osmosis
Diffusion of a liquid through a semi-permeable membrane from a dilute solution into a more concentrated solution, thus tending to equalize the concentration of each side of the membrane.

Outlet Pressure
Downstream pressure. Pressure exiting the outlet side of the filter.

P
Packed Bed
Discrete particles such as sand, gravel, anthracite, fabricated rings or saddles, assembled in a confined space as a filtration medium for liquids and gases.

Paper
Filter medium used on filter elements. A general term applied to resin bonded cellulose.

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.

Particulate
Any solid or liquid material in the atmosphere.

Permeability
The relationship of flow per unit area to differential pressure across the filter medium.

Permeate
The fluid which passes through a membrane, a term usually used with ultrafiltration or R/O.

pH
The value indicating the die 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.
GLOSSARY

**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.

**Polypropylene**
A thermoplastic polymeric material, resistant to a broad range of chemicals. When used as a membrane, polypropylene is hydrophobic.

**Pore**
A small channel or opening in a filter medium which allows fluid to pass.

**Pore Size Distribution**
The ratio of the number of holes of a given size to the total number of holes per unit area expressed as a percent and as a function of hole size.

**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.

**Pre-Filter**
A filter for removing gross contaminates 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/finer. Measured in pounds per square inch gage, or inches of mercury. See delta P.

**Pretreatment**
Changing the properties of a liquid-solid mixture by physical or chemical means to improve its filterability.

**PSI**
Pounds per square inch

**PSIA**
Pounds per square inch absolute.

**PSID**
Pound per square inch differential.

**PSIG**
Pounds per square inch gage.

**Pulsing Backflow**
Intermittent, on-off blowing with or without cake discharge.

**Q**
Quiescent
State of rest of a body. In entrainment separation, the body would be a liquid. Also used to describe a sump containing evacuated liquids or solids.

**R**
Rated Flow
The optimum flow rate for which a filter is designed.

**Residue**
Solids deposited upon the filter medium during filtration in sufficient thickness to be removed in sizeable pieces. Sometimes referred to as a cake or discharge solids.

**Residual Dirt Capacity**
The dirt capacity remaining in a service loaded filter element after use, but before cleaning, measured under the same conditions as the dirt capacity of a new filter element.

**Retention**
Ability of a filter to retain particles suspended in a gas or liquid. A percentage of particles originally present.

**Reusable Filters**
Filters that are washed or cleaned of contaminates, either in-situ or off-line, for additional uses.

**Reverse Osmosis (RO)**
A water treatment method whereby water is forced through a semi-permeable membrane which filters out impurities, such as salt (NaCl) from seawater.

**S**
S.S.
Abbreviation for stainless steel.

**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.

**Sand Filter**
Filter composed of layers of sand, graded in particle size, so that the course particles face the unfiltered flow.
GLOSSARY

**Saybolt 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.

**Scavenger**
A filter or element in the bottom of a filter that recovers the liquid heel that remains in a filter tank at the end of a cycle.

**Screen**
Often a flat filter from wire cloth mesh or monofilament fabric filter used to classify particles of a certain size to "to screen out particles". Can also cover an element for protection; also used as a basic material for a separator element of basket in a basket strainer.

**Screw Base**
Element base which is threaded to mount by screwing the cartridge onto the cartridge adaptor.

**Scrim**
An open weave textile or nonwoven fabric used as a strengthening member incorporated within the matrix of a filtration medium to provide increased tensile or tear properties.

**Scrubber**
Any device in which a contaminant, solid or gaseous, is removed from a gas stream by impacting it with liquid droplets.

**SCFD**
Standard cubic feet per day.

**SCFH**
Standard cubic feet per hour.

**SCFM**
Standard cubic feet per minute.

**Sedimentation**
Action of settling of suspended solids.

**Self-Cleaning**
Filtering device designed to clean itself by the use of a blowdown or backwash action.

**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 die 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.

**Sieve**
A screen filter with straight-through capillary pores and identical dimension.

**Singed Finish**
The process of removing fibers from a cartridge or fabric by passing over a flame or another 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.

**S.O.E.**
Single Open Ended.

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

**Solute**
Liquid which has passed through a filter. Also referred to as discharge liquor, effluent, filtrate, mother liquor or strong liquor.

**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 unit less value.

**Stream**
Term sometimes used and synonymous with the words product, liquid, air, gas, fluid etc. in speaking of any matter processed by filtration or separation equipment.

**String Wound**
An inexpensive filter consisting of textile roving (yarn) wrapped around a center core to form a filter medium and filter cartridge (element).
GLOSSARY

Stoke’s Law
A physical law, which approximates the viscosity of a particle falling under the action of gravity through a fluid. Friction drag controls the rate of fall at a constant velocity known as the terminal or free-setting velocity.

Substrate
Substance or basic material as a filter media or to which a deposit is added.

Sump
Collecting area of a housing located downstream typically from a coalescer element, in which coalesced droplets of the dispersed phase are deposited; also called water leg. May also be used to collect solids in applications where gross solids are present in a stream; also called mud sump.

Supernatant
Liquid above settled solids.

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

Surface Filter
Filter medium that retains particles wholly on the surface and not in the depth of the cross-section of a filter medium e.g. plain weave wire cloth and monofilament woven fabrics or membrane.

Surface Filtration
A process that traps contaminants larger than the pore size on the top surface of the filter, usually a membrane, wire cloth or monofilmant fabric. Contaminants smaller than the specified pore size may pass through the medium or may be captured within the medium by some other mechanism, such as surface affinity, triboelectric potential or other means, which prevents particle penetration.

Surge
Peak system pressure measured as a function of restricting or blocking fluid flow.

Suspension
Solids or liquids that are held in other liquids.

Suspended Solids
Non-settled particles in a fluid.

Swing Bolt
Type of housing head closure which reduces service time. Opposite of thru-bolt flange where studs are used, such as with ASA type flanges.

System Silting
The agglomeration and settling of ultra-fine particles in a fluid system.

T

Teflon (PTFE)
Highly durable and resistant to range of temperatures and chemicals. PTFE is hydrophobic. Polytetrafluoroethylene is better known as Teflon.

T-Type Filter
A filter in which the inlet and outlet ports are located at one end of the filter with the major axes of its ports in a straight line and with the filter element axis perpendicular to this line.

Tensile Strength
The maximum stress a material that is subjected to a stretching bad can withstand, without tearing.

Tensiometer
Device used to read the surface tension of a liquid or to reading the interfacial tension between two immiscible liquids.

Terminal Pressure
Pressure drop across the unit at the time system is shut down or when the maximum allowable pressure drop is reached.

Terminal Velocity
Steady velocity achieved by a falling particle when gravitational forces are balanced by viscous forces.

Thermal Lockout
A device that prevents the actuation of the signal button in a differential pressure indicator below a preset temperature. Used to prevent false indicator actuations during periods of high fluid viscosity such as experienced in starting a cold system.

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

Three-Stage Filter Separators
Liquid prefilter coalescer separators containing three kinds or types of replaceable elements.

Throughput
The amount of solution which will pass through a filter prior to plugging.

Tipping Pan Filter
Process industry equipment which collects particulate from a liquid stream on a screen over a vacuum forming a dewatered cake and discharging the accumulation by tipping the collection screens.

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

True Density
Mass of a particle divided by its volume, pores etc. being excluded from the volume calculation.

Turbidimeter
An instrument for measurement of turbidity, in which a standard suspension usually is used for reference.

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

Turbulent Flow
Flow regime in which the flow characteristics are governed mainly by the inertia of the fluid. Turbulent flow in ducts is associated with high Reynolds Number (Re). It also gives rise to high drag.

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

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

Uniformity Coefficient
Separation factor applied to the sizing of the sand used in water filtration plants.

Uniformity Of Feed
Uniformity of the mixture of the solids in the feed liquid.

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.

Upstream Side
The feed side of the filter. Fluid that has not yet entered the filter.

Useful Life
Determined when contamination causes a filter or system to have an adverse (lower) flow rate, low efficiency or high differential pressure, providing for an inefficient operation.

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

Vent Filters
Filters that allow the passage of air while restricting the flow of fluid; typically containing low micron rated microporous membrane media. Common in medical devices and pharmaceutical tanks.

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, die property of a fluid's molecular structure by virtue of which they resist flow, die internal flow resistance of a fluid; or, die resistance of flow exhibited by a liquid resulting from die combined effects of cohesion and adhesion. The units of measurement are die poise and die stoke. A liquid has die 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 die time of flow or movement of a ball, ring or other object in a specially shaped or sized apparatus.

Void Volume
The amount of open or empty area across the full spectrum of a material or substance. A term often used to describe the amount of porosity in a filter medium.

Volumetric Flow Rate
Fluid flow expressed as a volume flowing per unit of time (cc/sec., ft³/min., etc.)

Wastewater
Effluent water carried downstream from a filtration or separation process.

Water Breakthrough Test (WBT)
An integrity test for hydrophobic filters or filter medium in which the resistance to water flow is overcome by a specific pressure such that water will flow through a specific pore size of the filter or filter medium. Also called Water Intrusion Test.

Water Flow/Flux
Measure of the amount of water that flows through a filter, a variable of time, the degree of contamination, differential pressure, total porosity and filter area.

Water head
The height of water in a column. Provides a defined amount of pressure on a surface.

Water Leg
Area of housing for collection of water.

Weight Of Solids
Measure of solid particulate matter contained in a fluid sample.

Wet Cast Membrane
A process to manufacture microporous membranes, typically from thermoplastic materials, solvents and non-solvents in the formation of a microporous membrane. 75 to 80% of all microporous membranes manufactured use this process.
GLOSSARY

Wet Strength
Strength of a medium when saturated with water.

Wetting Agent
A surfactant added to a filter medium to insure complete intrusion (wetting) by a high surface tension fluid such as water.

Wire Cloth
Woven fabric from metal wire used as a screen, surface filter or media support. Often used in sifting, belting, hydraulic filtration etc. Most common wire used is stainless steel.

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.

Y

Yoke
End cap used to hold a cartridge in place.

Z

Zeta Potential
The potential across the diffuse layer of ions surrounding a charged colloidal particle.
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