Automatic Self-Cleaning Strainers
Pressures to 740 PSIG (51 BARG)
Temperatures to 400°F (204°C)

Applications
• Water and Liquid service
• Power Industry – Cooling water
• Pulp & Paper – Removing fibers
• Process Equipment – Protect equipment
• Metal & Mining – Quenching, blast furnace cooling

Features
• Standard and Custom Engineered Designs
• Complete Control Systems
• Intermittent or Continuous Mode options
• Individual or Skid System designs
• High Strength reverse rolled wedge wire screens

Materials
• Carbon Steel
• Stainless Steel
• Other materials upon request

End Connections
• Flat Faced Flanged
• Raised Faced Flanged
• Ring Joint Flanged
• Buttweld

Ratings
• ASME Class 150
• ASME Class 300

Sizes
• 2” (50mm) to 36” (900 mm)
FA SERIES
FABRICATED AUTOMATIC SELF-CLEANING STRAINERS
Pressures to 740 PSIG (51 BARG)
Temperatures to 400°F (204°C)

APPLICATIONS
Water and Liquid service
Power Industry - cooling water
Pulp & Paper - Removing fibers
Process Equipment - Protect equipment
Metal & Mining – Quenching, blast furnace cooling
Water & Waste – Clean plant service water

APPLICABLE CODES
Designed/Manufactured to meet ASME B31.3 or
ASME B31.4 and/or ASME Section VIII, Div. 1.
Canadian Registration Numbers (CRN) upon request
Welders certified to ASME Section IX
ASME "U" Stamp upon request

PRESSURE/TEMPERATURE CHART
ASME B16.34

FA Series Ordering Code

Model - Position 1 - 3
FA1 – Inline, Side Backwash drain
(Sizes 10" - 36")
FA2 – Inline, Bottom Backwash
drain (Sizes 2" - 8")
FAZ – Custom Configuration

Body Material - Position 4
C - Carbon Steel
V - 304SS
T - 316SS
M - Monel
H - Hastelloy
Z - Other

Inlet Size - Position 5
H - 2
J - 2½
K - 3
M - 4
N - 5
P - 6
Q - 8
R - 10
S - 12
T - 14

Class - Position 6
1 - 150
3 - 300
Z - Other

Connection - Position 7
B - Butt Weld
F - Flat Face Flange
J - Ring Joint Flange
R - Raised Face Flange
Z - Other

Dash - Position 8
A - None
C - 1-phase, 110/120 VAC
E - 3-phase, 460/600 VAC
F - 3-phase, 575 VAC
Z - Other

Screen - Wedge Wire - Position 10
V - 304SS
T - 316SS
M - Monel
H - Hastelloy
Z - Other

Standard Slot Opening - Position 11
1 - .156" (1/8")
2 - .125" (1/8")
3 - .094" (1/32")
4 - .063" (1/16")
5 - .040" (3/32")
6 - .020" (1/32")
7 - .015" (1/32")
8 - .010" (1/64")
9 - .005" (1/64")
10 - .003" (1/64")
11 - .001" (1/64")

Screen - Edge Wire - Position 11
V - 304SS
T - 316SS
M - Monel
H - Hastelloy
Z - Other

Standard Slot Opening - Position 11
1 - .156" (1/8")
2 - .125" (1/8")
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9 - .005" (1/64")
10 - .003" (1/64")
11 - .001" (1/64")

1. For standard control system components see page 6. For all other please consult factory.
2. Standard Screen material is 304SS
For any variations, use the part numbering system above but clearly indicate the additional requirements.
FA1 SERIES
FABRICATED AUTOMATIC SELF-CLEANING STRAINERS

SPECIFICATION
Strainer shall be designed and manufactured to meet ASME B31.3 or ASME B31.4 and/or ASME Section VIII, Div 1. The strainer body shall be 1-piece construction, fabricated steel or other specified material and inlet/outlet connections shall be in-Line Design with a side backwash drain. The control system shall be capable of automatically controlling and monitoring the strainer’s operation. The strainer shall have a fail-safe mode to prevent internal damage from jamming of strainer shaft caused by large debris. The strainer shall have a Nema 4 control panel with an actuated valve to provide control of the backwash flow. The screen shall be size _______ wedge wire construction. The strainer shall have an inlet size of _______ and open area ratio of _______. The Automatic Strainer shall be SSI FA1____.

MATERIALS OF CONSTRUCTION*-
(Carbon Steel Shown*)
Body............................SA53 Gr B or SA106-B
Flanges .................................SA105
Nozzles .................SA53 Gr B or SA106-B
Heads ..................................SA234 WPB
Screen¹ ..........................SA240-304 SS
Backwash Arm ...............SA240-304 SS
Bearing¹ ..........................Varies upon temperatture
Gasket - Cover¹ .........Red rubber or BlueGuard
Gasket - Basket¹Gum Rubber or Viton
Gasket - Bearing¹............Gum Rubber or Viton
Packing¹ .....................TFE or Cotton Nitrile
Stud..................................SA 193-B7
Nut.....................................SA 194-2H

* Other Materials Available. Consult Factory.
1. Recommended Spare Parts

Materials specification will change dependent on customer design – contact factory for certified prints.

FA1 DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>BODY SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F (NPT)</th>
<th>G (Dia.)</th>
<th>H (NPT)</th>
<th>J (NPT)</th>
<th>K (B.C.)</th>
<th>L (Dia.)</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P (Dia.)</th>
<th>Q</th>
<th>R</th>
<th>WEIGHT</th>
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<td>24 (800)</td>
<td>36 (914)</td>
<td>19 (483)</td>
<td>53 (1346)</td>
<td>74% (1889)</td>
<td>111 (2819)</td>
<td>2 (2)</td>
<td>2 (5)</td>
<td>1/2 (1/2)</td>
<td>1/2 (1/2)</td>
<td>30% (767)</td>
<td>7/8 (688)</td>
<td>27 (888)</td>
<td>15 (381)</td>
<td>16 (405)</td>
<td>8 (293)</td>
<td>9 (299)</td>
<td>14 (356)</td>
<td>1200 (544)</td>
</tr>
<tr>
<td>12</td>
<td>24 (800)</td>
<td>36 (914)</td>
<td>19 (483)</td>
<td>53 (1346)</td>
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<td>24 (800)</td>
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<td>1200 (544)</td>
</tr>
</tbody>
</table>

*Dimensions shown are subject to change. Contact factory for certified prints when required.

SCREEN OPENINGS*

<table>
<thead>
<tr>
<th>SIZE</th>
<th>STANDARD SCREEN</th>
<th>STANDARD MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot;-36&quot;</td>
<td>.125&quot; (1/8&quot;)</td>
<td>304SS Wedge Wire</td>
</tr>
</tbody>
</table>

Connections: 10" - 36" RF, FF, RTJ or Buttweld

MINIMUM INLET PRESSURE
(I/O Differential)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot;-36&quot;</td>
<td>20 PSID</td>
</tr>
</tbody>
</table>
**FA2 SERIES**

**FABRICATED AUTOMATIC SELF-CLEANING STRAINERS**

**SPECIFICATION**

Strainer shall be designed and manufactured to meet ASME B31.3 or ASME B31.4 and/or ASME Section VIII, Div I. The strainer body shall be 1-piece construction, fabricated steel or other specified material and inlet/outlet connections shall be In-Line Design with a bottom backwash drain. The control system shall be capable of automatically controlling and monitoring the strainer's operation. The strainer shall have a fail-safe mode to prevent internal damage from jamming of strainer shaft caused by large debris. The strainer shall have a Nema 4 control panel with an actuated valve to provide control of the backwash flow. The screen shall be size ______ wedge wire construction. The strainer shall have an inlet size of ______ and open area ratio of ______. The Automatic Strainer shall be SSI FA2____.

**MATERIALS OF CONSTRUCTION**

(Carbon Steel Shown)

Body: SA53 Gr B or SA106-B
Flanges: SA105
Nozzles: SA53 Gr B or SA106-B
Heads: SA234 WPB
Screen*: SA240-304 SS
Backwash Arm: SA240-304 SS
Bearing*: Varies upon temperature
Gasket - Cover*: Red rubber or BlueGuard
Gasket – Basket: Gum Rubber or Viton
Gasket – Bearing*: Red Rubber or BlueGuard
Packings*: TFE or Cotton Nitrile
Stud: SA 193-B7

* Other Materials Available. Consult Factory
1. Recommended Spare Parts

Materials specification will change dependent on customer design – contact factory for certified prints.

**FA2 DIMENSIONS**

inches (mm) AND WEIGHTS pounds (kg)

<table>
<thead>
<tr>
<th>INLET SIZE</th>
<th>BODY SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F (NPT)</th>
<th>G (Dia.)</th>
<th>H (NPT)</th>
<th>J (NPT)</th>
<th>K (B.C.)</th>
<th>L (Dia.)</th>
<th>M</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 [50]</td>
<td>8 (200)</td>
<td>16</td>
<td>5</td>
<td>17%</td>
<td>38%</td>
<td>60</td>
<td>1/2</td>
<td>1</td>
<td>1/2</td>
<td>13%</td>
<td>9/16</td>
<td>13</td>
<td>300</td>
<td>310</td>
</tr>
<tr>
<td>3 [80]</td>
<td>8 (200)</td>
<td>16</td>
<td>5</td>
<td>17%</td>
<td>38%</td>
<td>62</td>
<td>1/2</td>
<td>1</td>
<td>1/2</td>
<td>13%</td>
<td>9/16</td>
<td>13</td>
<td>320</td>
<td>320</td>
</tr>
<tr>
<td>4 [100]</td>
<td>10 (250)</td>
<td>18</td>
<td>6%</td>
<td>23%</td>
<td>36%</td>
<td>70</td>
<td>1/2</td>
<td>1</td>
<td>1/2</td>
<td>13%</td>
<td>9/16</td>
<td>13</td>
<td>340</td>
<td>340</td>
</tr>
<tr>
<td>6 [150]</td>
<td>12 (300)</td>
<td>20%</td>
<td>8%</td>
<td>29%</td>
<td>57%</td>
<td>96</td>
<td>1/2</td>
<td>1/2</td>
<td>1</td>
<td>1/2</td>
<td>21%</td>
<td>9/16</td>
<td>23%</td>
<td>560</td>
</tr>
<tr>
<td>8 [200]</td>
<td>16 (400)</td>
<td>24</td>
<td>8%</td>
<td>38%</td>
<td>65%</td>
<td>100</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>21%</td>
<td>9/16</td>
<td>23%</td>
<td>875</td>
</tr>
</tbody>
</table>

*Dimensions shown are subject to change. Contact factory for certified prints when required.

**Connections: 2"-8"**

RF, FF, RTJ or Butt weld

**SCREEN OPENINGS**

<table>
<thead>
<tr>
<th>SIZE</th>
<th>STANDARD SCREEN</th>
<th>STANDARD MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;-8&quot;</td>
<td>.125&quot; (1/8&quot;)</td>
<td>304SS Wedge Wire</td>
</tr>
</tbody>
</table>

* See other screen sizes on page

**MINIMUM INLET PRESSURE**

(I/O Differential)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;-8&quot;</td>
<td>20 PSID</td>
</tr>
</tbody>
</table>

150# Class flanges shown (For 300# dimensions and weights-contact factory)
The Spence Strainer Fabricated Automatic Self-Cleaning Strainer utilizes the latest technology in backwash strainer design.

The strainer cleans itself using a backwash system which is continuous and/or controlled by an automatic control system. A tubular backwash assembly slowly rotates in close contact with the internal wedge-wire straining element, isolating only a small portion of the element at any given time. Debris is removed by a backwash flow which carries unwanted debris away from the internal element and out of the strainer. The operation is detailed as follows:

**Operation**

1. The unfiltered fluid enters the strainer inlet into the lower single chamber. This chamber acts to both slow the fluid prior to straining and to collect any settled debris.

2. The fluid passes upward and then radially outward through the wedge wire straining element. Debris larger than the wedge wire slot size is unable to pass through the straining element.

3. The clean fluid continues through the properly proportioned flow path and out the strainer outlet.

4. The strainer is controlled by an electrical panel, an actuated valve and a differential pressure switch. The cleaning cycle can be initiated manually or automatically by a timer with a differential pressure override.

5. When backwashing is initiated the motor begins to slowly turn the backwash assembly (approximately 2 rpm) and simultaneously the backwash valve is opened. The differential pressure between the line pressure and atmosphere is the driving force behind the backwashing process.

6. The hollow tubular backwash assembly, which is piped to the atmosphere, slowly rotates in close contact with the internal straining element. Only a small portion of the screen is isolated allowing for uninterrupted operation of the strainer during the backwashing process.

7. The pressure differential causes a large reverse flow across the screen and into the tubular backwash assembly. The change in velocity of the fluid entering the backwash assembly creates a vacuum and suction, cleaning the strainer element from the inside. A port shoe, interconnecting the tubular backwash assembly, optimizes the effectiveness of this backwash jet stream.

8. Unwanted debris is carried into the full port backwash manifold and out the backwash connection. During the whole operation the flow remains uninterrupted keeping flow loss at a minimum.

9. Upon completion of the cycle, the control panel initiates turning the motor off and simultaneously closing the backwash valve.
The Spence strainer control panels are designed for simple and reliable operation. The design allows for quick and easy field adjustments as required by the service conditions.

The FA Series strainers are manufactured complete with our standard control systems. Optional custom designs to meet specific customer and/or service requirements can be furnished.

Standard Control System Components – contact factory for other options
- Nema 4X rated panel box – UL/CSA approved
- Carbon steel, phosphate coated w/grey polyester powder coated panel box
- Adjustable timer (1-10 min on time, 10 min – 10 hr off time)
- Aluminum Nema 4 differential pressure override switch (0-15 psid)
- Control relay for backwash valve activation
- Three Indication panel lights – Power on, Backwash Valve Open, High Differential Pressure
- Selector Switch for Hand(On)/Off/Auto service
- Motor starters with Auxiliary contact
- Terminal block for external connections
- TEFC motor 110/120V, single phase 60Hz, 1/3 Hp - 110/120 VAC input
- Carbon steel electrically actuated ball valve for backwash (110/120 VAC/60 HZ) – Nema 4 actuator

Modes of Operation
The selector switch allows the customer to easily change between three modes: OFF, AUTO (Automatic Intermittent), or HAND (Continuous).

Automatic Intermittent (AUTO) – When the selector switch is in the AUTO position the strainer operates with the adjustable timer. An authorized operator can adjust the OFF time setting (the time after which it will initiate backwash – 10 min to 10 hour cycle) and ON time setting (the time interval for which it will keep backwash system ON – 1 to 10 min cycle) by adjusting the timer.

The differential pressure switch should be set at 2 psig over the anticipated clean pressure drop. An authorized operator can adjust OFF time setting on the differential pressure switch (the differential pressure at which it will initiate backwash – range 0 – 15 psid). This switch will override the time cycle and initiate backwash should the differential pressure rise above the programmed setting. After the differential pressure has been satisfied, the strainer will continue cleaning for 60 seconds beyond that point.

The settings are done depending on the quantity of debris collected and limiting value of the differential pressure. Experience will dictate the optimal settings for the timers.

Continuous (HAND) – When the selector switch is in the HAND position the strainer will operate in a continuous mode. In this mode the strainer will backwash continuously with the backwash valve open and the drive motor running. The continuous backwash mode may be desirable or necessary if the installation experiences high solid loadings.

Backwash Valve
Electrically actuated ball valves suitable for water service are standard on all FA Control Systems. Contact factory for other options. Standard sizes of backwash valves are as follows:

<table>
<thead>
<tr>
<th>Strainer Inlet/Outlet Size</th>
<th>Drain Valve Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot; - 4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>6&quot; - 8&quot;</td>
<td>1½&quot;</td>
</tr>
<tr>
<td>10&quot; - 12&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>14&quot; - 18&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>20&quot; - 36&quot;</td>
<td>4&quot;</td>
</tr>
</tbody>
</table>
FA SERIES
FABRICATED AUTOMATIC SELF-CLEANING STRAINERS
PRESSURE DROP - LIQUIDS

Water Service, Clean Basket .010" to .156" Slotted Wedge Wire*¹
(Sizes 2" - 36")

* For other fluids and/or special conditions, consult factory
1. For screen sizes below .010" contact factory.

SCREEN SIZES AND OPEN AREA RATIOS

<table>
<thead>
<tr>
<th>Slot Opening (inches)</th>
<th>Micron (Equivalent)</th>
<th>Mesh (Equivalent)</th>
<th>Open Area %</th>
</tr>
</thead>
<tbody>
<tr>
<td>.156</td>
<td>3962</td>
<td>N/A</td>
<td>71</td>
</tr>
<tr>
<td>.125 (1/8)</td>
<td>3175</td>
<td>N/A</td>
<td>67</td>
</tr>
<tr>
<td>.094</td>
<td>2350</td>
<td>N/A</td>
<td>61</td>
</tr>
<tr>
<td>.063 (1/16)</td>
<td>1600</td>
<td>10</td>
<td>51</td>
</tr>
<tr>
<td>.031 (1/32)</td>
<td>775</td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td>.020</td>
<td>500</td>
<td>30</td>
<td>25</td>
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<tr>
<td>.015</td>
<td>381</td>
<td>40</td>
<td>20</td>
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<tr>
<td>.010</td>
<td>254</td>
<td>60</td>
<td>14.3</td>
</tr>
<tr>
<td>.005</td>
<td>127</td>
<td>120</td>
<td>7.7</td>
</tr>
<tr>
<td>.003</td>
<td>75</td>
<td>200</td>
<td>4.7</td>
</tr>
</tbody>
</table>

* Contact factory for other screen sizes

For Installation and Maintenance Instructions – please contact the factory
The information below is the standard FA Series operating parameters and guidelines. Custom engineered designs are available on customer request. Please consult the factory for requirements outside of the normal operating parameters and guidelines below.

1. The strainer meets the design pressure and temperature of the required service application.
2. Determine the backwash discharge pressure, recommend backwash to atmospheric pressure.
3. Minimum inlet pressure (or differential pressure between inlet pressure and backwash discharge pressure) is 20 psid.
4. Review the quantity and type of debris to be removed. Suspended solids should not exceed 200 PPM or 2% of volume.
5. Select the correct screen size and open area for the application (See page 7)
6. Determine your acceptable maximum pressure drop across the strainer and review with the FA Series pressure drop curves on page 7
7. Strainer inlet velocity should be 6 to 10 feet/min.

### Sizing and Selection Worksheet – (Please submit with order and quotation requests)

**A. Sizing Requirements**

1. Fluid Service: ________________________
2. Specific Gravity (i.e water = 1): ________________________
3. Viscosity (CPS / SSU) ________________________
4. Inlet Pressure (PSI): Min ___________; Max ___________; Operating ____________
5. Temperature (F): Min ___________; Max ___________; Operating ____________
6. Flow Rate (GPM): Min ___________; Max ___________; Operating ____________
7. Max allowable Pressure drop (PSI): Clean __________; Dirty ____________
8. Backwash pressure (PSI) ______________________ (enter 0 for atmospheric)
9. Solids to be removed: □ Hard; □ Soft; □ Fibrous □ Sticky
10. Solid Concentration (PPM): ________________________
11. Solid Size: Inches ___________ or Microns ______________
12. Special: __________________________________________

**B. Strainer Construction**

1. Design Code: □ ASME VIII Non Code; □ ASME VIII Code “U” Stamp; □ Other ________
2. Inlet Size (inches): ________________________
3. Outlet Size (inches): ________________________
4. Body Material: □ CS; □ 304SS; □ 316SS □ Other ________________________
5. End Connections: □ 125# FF Flanged; □ 150# RF Flanged; □ Other___________
6. Basket Material: □ 304SS; □ 316SS □ Other ________________________
7. Screen Size (Slot Size): ________________________
8. Special: __________________________________________

**C. Controls**

1. Panel: □ Nema 4; □ Other ________________
2. Motor power supply (V, PH, Hz): □ 110/120V, 1PH, 60Hz; □ Other ________________________
3. Special: __________________________________________

**D. Other Special Requirements:** __________________________________________

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