

# Engineering Data Screen Openings for Strainers

### **Factors To Consider**

#### **Purpose**

If the basket strainer is being used for protection rather than direct filtration, IFC's standard screens will suffice in most applications.

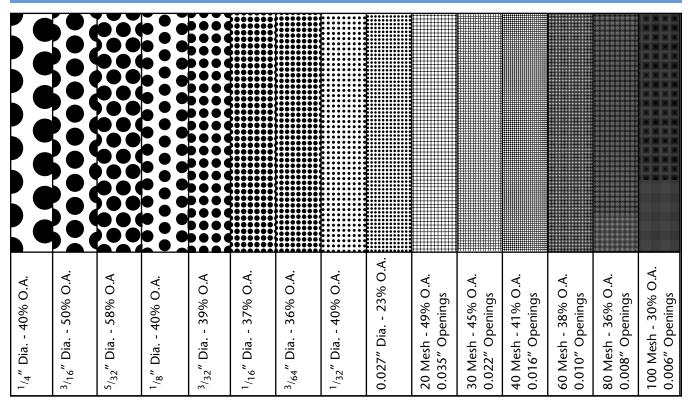
#### Service

With services that require extremely sturdy screens, such as high pressure/ temperature applications or services with high viscosities, IFC recommends that perforated screens without mesh liners be used. If mesh is required to obtain a certain level of filtration, then IFC recommends a trapped perf./ mesh/perf. combination.

### **Filtration Level**

When choosing a perf. or a mesh/perf. combination attention should be given to ensure overstraining does not occur. As a general rule the specified level of filtration should be no smaller than half the size of the particle to be removed. If too fine a filtration is specified the pressure drop through the strainer will increase very rapidly, possibly causing damage to the basket.

### **Screen Types/Dimensions**



Notes: I. Screen openings other than those shown above are readily available. IFC inventories

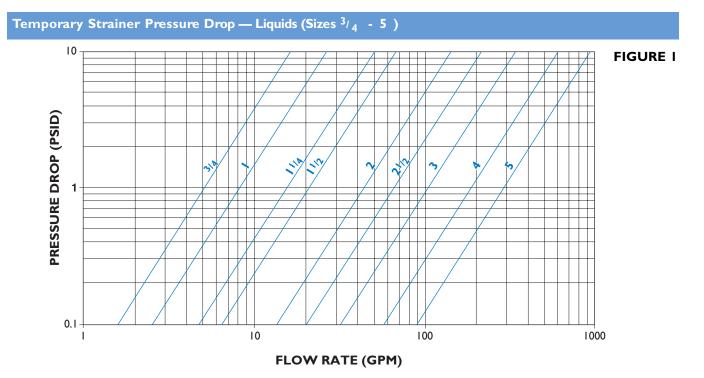
various mesh sizes as fine as 5 micron and perforated plate as coarse as 1/2" Dia.

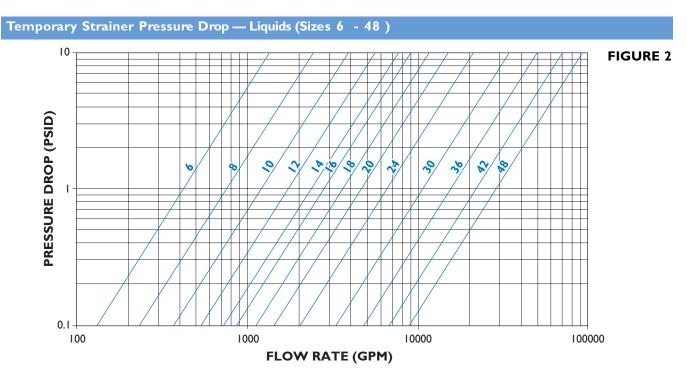
2. Screens are available in a wide range of materials. IFC inventories various screen material in

Carbon Steel, Stainless Steel (304, 316), Alloy 20, Monel 400, Hastalloy C and Titanium Grade 2.

3. Custom manufactured screens are available upon request. Please consult factory.



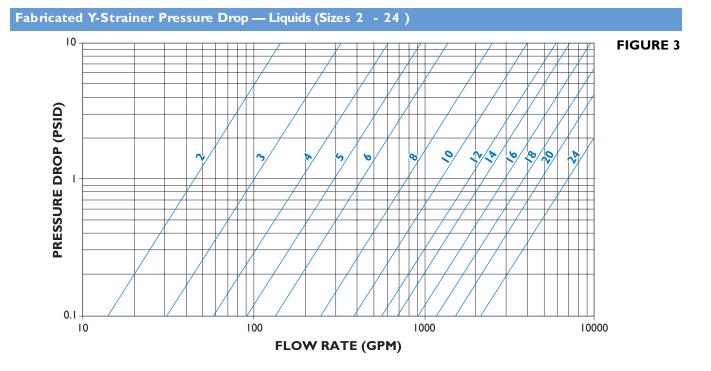


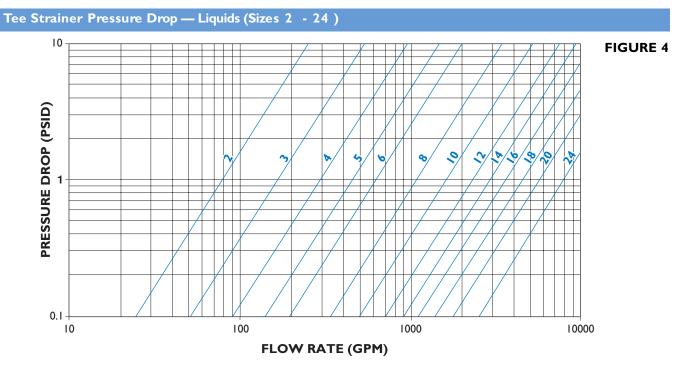


Notes: I. Pressure drop curves are based on water flow with standard screens. See page 28 for correction factors to be used with other fluids and/or screen openings.



# Engineering Data Fabricated Y and Tee Strainer Pressure Drop — Liquids

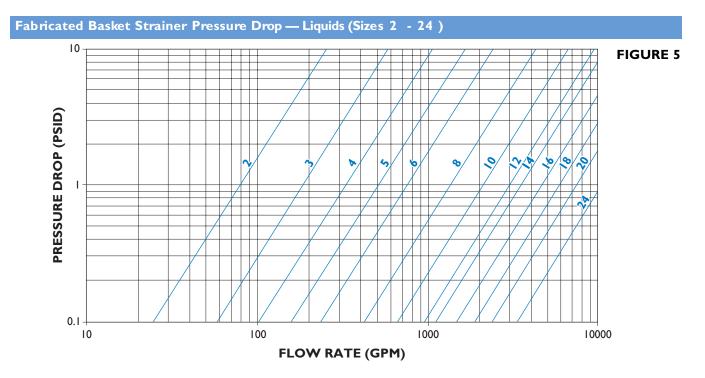


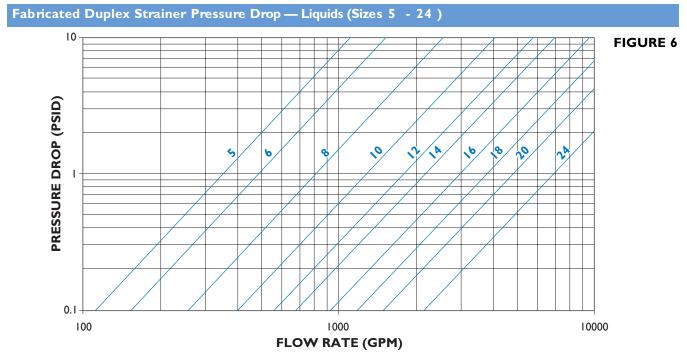


Notes: I. Pressure drop curves are based on water flow with standard screens. See page 28 for correction factors to be used with other fluids and/or screen openings.



# Engineering Data Fabricated Basket and Duplex Strainer Pressure Drop — Liquids





Notes: I. Pressure drop curves are based on water flow with standard screens. See page 28 for correction factors to be used with other fluids and/or screen openings.



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# **Engineering Data Correction Factor Charts**

#### Screen Correction Factor Chart (For Non-Standard and Mesh Lined Screens) .1

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*Multiply values obtained from figure 1 thru 6 by the appropriate values shown below Chart #							Chart #I		
Size	SCREEN OPENINGS								
Range	Perforated Plate % Screen Material Open Area					Mesh lined standard screens % Screen Material Open Area			
	60%	50%	40%	30%	20%	50%	40%	30%	
<sup> </sup> / <sub>4</sub> " -   <sup> </sup> / <sub>2</sub> "	0.45	0.55	0.7	I	1.15	1.05	1.05	1.2	
2" - 48"	0.65	0.8	I	1.4	2.15	1.05	1.05	1.2	

**Notes:** I. See page 24 for % Open Areas of IFC inventoried perforated plate.

2. Standard screens for sizes  ${}^{3}{}_{4}$ " to  ${}^{1}{}_{2}$ " is approximately a 30% open area screen media.

3. Standard screens for sizes 2" and larger is approximately a 40% open area screen media.

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### **Example:**

Strainer Size:		A)
IFC Model:	B150FSBW1 100 Mesh lined <sup>1</sup> / <sub>8</sub> " Perf. 3000 GPM Water	D)
Filtration:	100 Mesh lined <sup>1</sup> /8" Perf.	D)
Flow rate:	3000 GPM	C)
Service:	Water	D)

A) Using figure 5 the pressure drop is determined to be 2.0 psid with IFC's standard screen.

Looking at page 26 we find that the % Open area of 100 mesh is 30%.

Using chart I we read the correction factor to be 1.2 for 100 mesh lined  $\frac{1}{8}$  perf.

Total pressure drop equals  $2.0 \times 1.2 = 2.4$  psid clean.

Viscosity and Density Correction Factor Chart							
Chart #2 Chart #							
Size Component		Viscosity	<b>Body Loss</b>	Screen Loss Factor			
Range	Factor (CF)	Ср	Factor (BF)	Perf alone (PF)	20 Mesh Lined (MF)		60 to 300 Mesh Lined (MF)
<sup>3</sup> / <sub>4</sub> " - 1 <sup>1</sup> / <sub>2</sub> "	0.25	10	I	1.15	1.3	1.4	1.5
2" - 48"	0.35	25	1.2	1.25	2	2.2	2.5
<ul> <li>How to Use:</li> <li>I) Determine the pressure drop (P1) through the strainer with water flow and standard screens.</li> <li>2) If non-standard screens (i.e. 40 mesh, etc.) are being used, apply factors in</li> </ul>		100	1.6	1.4	3	4	6.5
		200	2.2	1.5	4.5	7	11.5
		500	4.4	1.6	10	15	25
		1000	8	1.7	15	30	50
		2000	15.2	1.9	30	60	100

Chart #1 to determine corrected pressure drop (P2).

3) Multiply PI or P2 (if used) by the specific gravity of the fluid actually flowing through the strainer to get P3.

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4) Using Chart #2 multiply P3 by the appropriate Component Factor (CF) to get P4.

5) Let P5 = P3 - P4.

6) Multiply P4 by the appropriate Body Loss Factor (BF) in Chart #3 to get P6.

7) Multiply P5 by the appropriate Screen Loss Factor (PF or MF) in Chart #3 to get P7.

8) Total pressure drop P8 = P6 + P7.

## Example

Example:		A) As shown in the above example, the corrected pressure drop $(P2) = 2.4$ psid
Strainer Size:	10"	<b>B)</b> Since S.G. = 1, P3 = P2 = 2.4 psid
IFC Model:	B150FSBVV1	<b>C)</b> Using Chart <sup>#</sup> 2 P4 = 0.35 x P3 = 0.84 psid
Filtration:	100 mesh lined $1/8$ " perf.	<b>D)</b> P5 = 2.4 - 0.84 = 1.56 psid
Flow rate:	3000 GPM	<b>E)</b> Using Chart <sup>#</sup> 3 P6 = 0.84 x 1.6 = 1.34 psid
Specific Gravit	t <b>y:</b> I	<b>F)</b> Again using Chart <sup>#</sup> 3 P7 = 1.56 x 6.5 = 10.14 psid
Viscosity:	100 cP	<b>G)</b> Total pressure drop P8 = 1.34 + 10.14 = 11.48 psid clean

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Correction Factors For Clogged Screens							
$^{st}$ Multiply values obtained from figures 1 thru 6 by the appropriate values shown below						Chart #4	
			Ratio of Free	e Screen Are	ea to Pipe Ar	rea	
% Clogged	10:1	8:1	6:1	<b>4:</b> I	3:1	2:1	1:1
10%	-	-	-	-	-	-	3.15
20%	-	-	-	-	-	1.15	3.9
30%	-	-	-	-	-	1.4	5
40%	-	-	-	-	-	1.8	6.65
50%	-	-	-	-	1.25	2.5	9.45
60%	-	-	-	1.15	1.8	3.7	14.5
70%	-	-	-	1.75	2.95	6.4	26
80%	-	1.1	1.75	3.6	6.25	14	58
90%	2.3	3.45	6	13.5	24	55	-

Notes: I. See page 35 for the ratio of free area to pipe area for IFC Strainers equipped with standard screens.

2. For screens other than IFC's standard, use the following formula to calculate the ratio free area to pipe area:

1.3:1 (1:1 approx.).

 $R = \frac{Ag \times OA}{100Ap} R = Ratio free area to pipe area$ Ag = Gross screen area, sq. in. (Sec. 1)

#### where;

Ag = Gross screen area, sq. in. (See page 35)

- OA = Open area of screen media, % (See page 24, i.e.  $\frac{1}{8}$ " perf. = 40%)
- Ap = Nominal area of pipe fitting, sq. in. (See page 35)

### Example #I

Strainer Size:	8"
IFC Model:	T150FSBW1
Filtration:	۱ <sub>/8</sub> " Perf.
Flow rate:	1000 GPM
Service:	Water
% Clogged:	20%

A) Using Figure #4 the pressure drop is determined to be 0.9 psid with IFC's standard screen. B) Looking at page 35 ratio of free area to pipe area for a 8" IFC series T strainer is equal to

### Example #2

- A) Using Figure #4 the pressure drop is determined to be 0.9 psid with IFC's standard screen.
- **B)** Looking at page 24 we find that the % Open area (OA) of  $\frac{5}{32}$  Perf. is 58%.

C) Using Chart #4 we read the correction factor to be 3.9 at 20% clogged. D) Total pressure drop equals 0.9 x 3.9 = 3.51 psid when 20% clogged.

- C) Using Chart <sup>#</sup>I we read the correction factor to be 0.65 for  $\frac{5}{32}$  Perf.
  - **D)** Total clean pressure drop equals  $0.9 \times 0.65 = 0.59$  psid.
- E) Since a non-standard screen is being used, we must calculate the Ratio free area to pipe area.
- F) Looking at page 35 we find Ag = 167 in2, Ap = 50.03 in2.
- G) The ratio free area to pipe area is calculated as 1.9:1. (2:1 approx.)
- H) Using Chart #4 we read the correction factor to be 3.7 at 60% clogged.
- I) Total pressure drop equals 0.59 x 3.7 = 2.2 psid when 60% clogged.

Strainer Size:	8"
IFC Model:	T150FSBVV1
Filtration:	<sup>5</sup> /32" Perf.
Flow rate:	1000 GPM
Service:	Water
% Clogged:	60%