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.

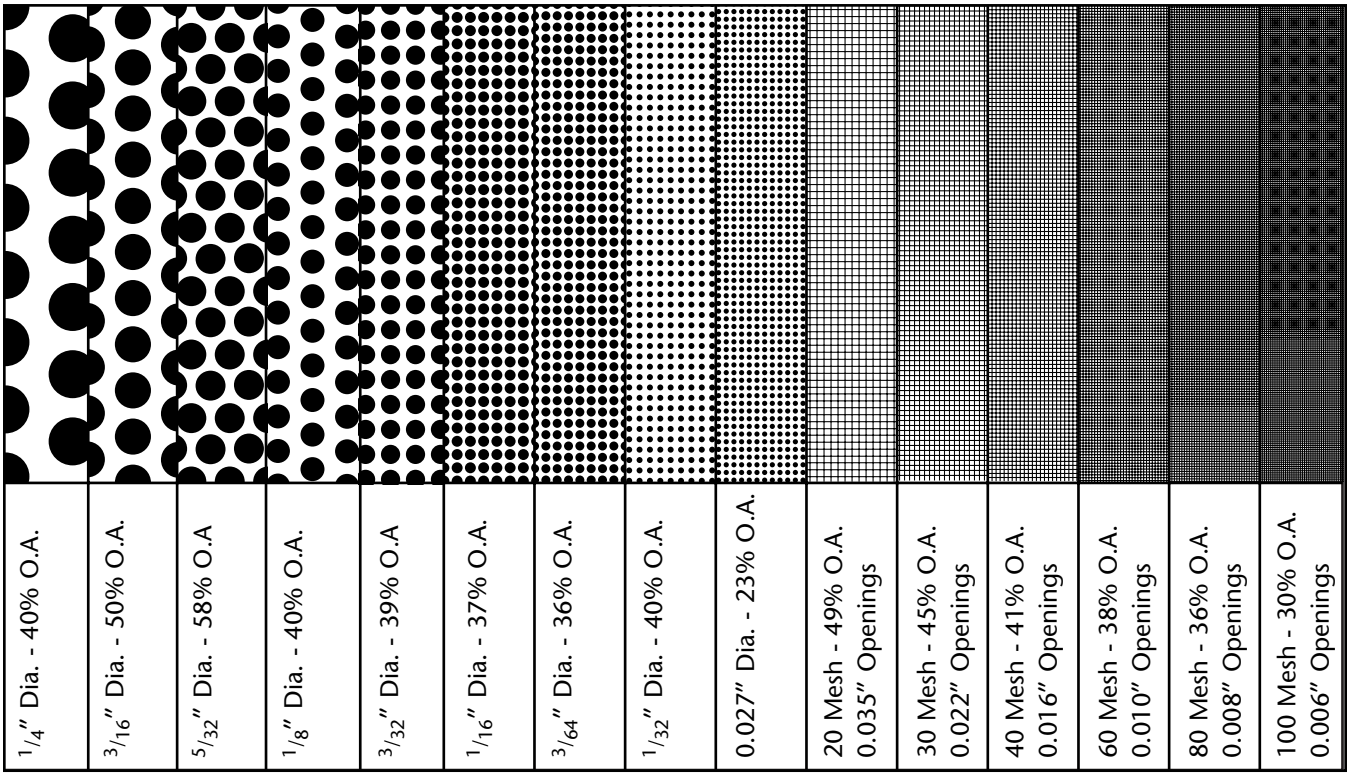
Service

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: 1. 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.

Y-Strainer Pressure Drop — Liquids (Sizes 1/4 - 1 1/2)

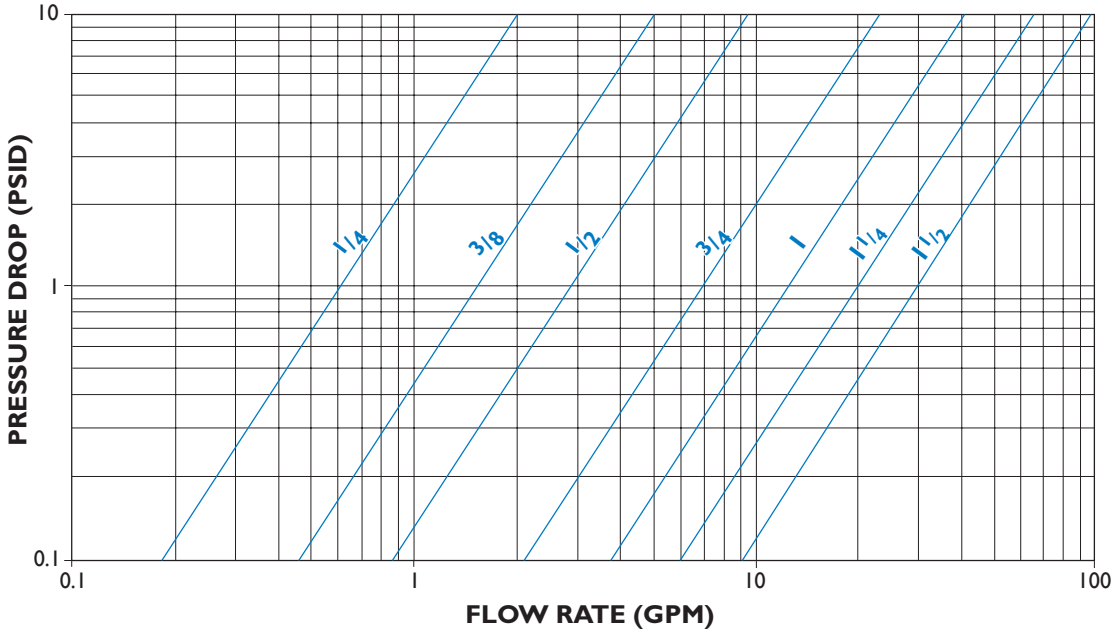


FIGURE 1

Y-Strainer Pressure Drop — Liquids (Sizes 2 - 16)

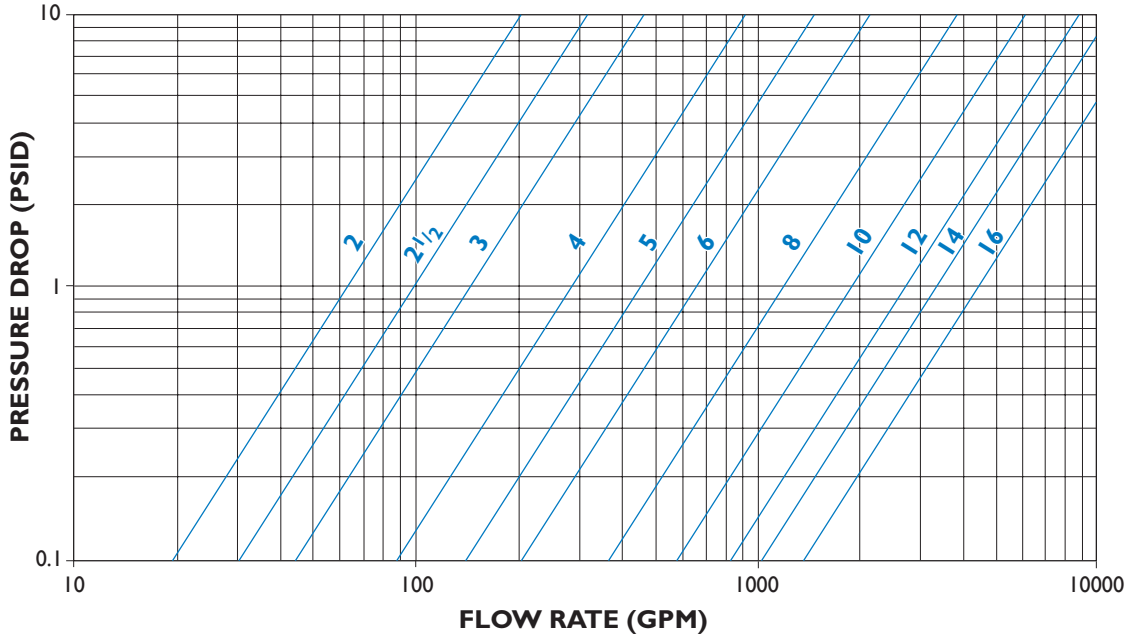


FIGURE 2

Notes: 1. Pressure drop curves are based on water flow with standard screens.
See page 22 for correction factors to be used with other fluids and/or screen openings.

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For Non-Standard and Mesh Lined Screens

*Multiply values obtained from figure 1 thru 4 by the appropriate values shown below

Chart #1

Size Range	SCREEN OPENINGS							
	Perforated Plate % Screen Material Open Area					Mesh lined standard screens % Screen Material Open Area		
	60%	50%	40%	30%	20%	50%	40%	30%
1/4" - 1 1/2"	0.45	0.55	0.7	1	1.15	1.05	1.05	1.2
2" - 16"	0.65	0.8	1	1.4	2.15	1.05	1.05	1.2

Notes: 1. See page 20 for % Open Area's of IFC inventoried perforated plate.
2. Standard screens for sizes 1/4" to 1 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.

Example:

Strainer Size: 1 1/4"
Filtration: 100 Mesh lined 1/32" Perf.
Flow rate: 30 GPM
Service: Water

A) Using figure 1 the pressure drop is determined to be 1.0 psid with IFC's standard screen.
B) Looking at page 20 we find that the % Open area of 100 mesh is 30%.
C) Using chart 1 we read the correction factor to be 1.2 for 100 mesh lined 1/32" perf.
D) Total pressure drop equals 1.0 x 1.2 = 1.2 psid clean.

Viscosity and Density Correction Factor Chart

* For use see instructions below.

Chart #2

Size Range	Component Factor (CF)
1/4" - 1 1/2"	0.25
2" - 16"	0.35

Chart #3

Viscosity Cp	Body Loss Factor (BF)	Screen Loss Factor			
		Perf alone (PF)	20 Mesh Lined (MF)	30, 40, Mesh Lined (MF)	60 to 300 Mesh Lined (MF)
10	1	1.15	1.3	1.4	1.5
25	1.2	1.25	2	2.2	2.5
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

How to Use:

1) Using figures 1 or 2 determine the pressure drop (P1) through the strainer with water flow and standard screens.
2) If non-standard screens (i.e. 40 mesh, etc.) are being used apply factors in Chart #1 to determine corrected pressure drop (P2).
3) Multiply P1 or P2 (is used) by the specific gravity of the fluid actually flowing through the strainer to get P3.
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.

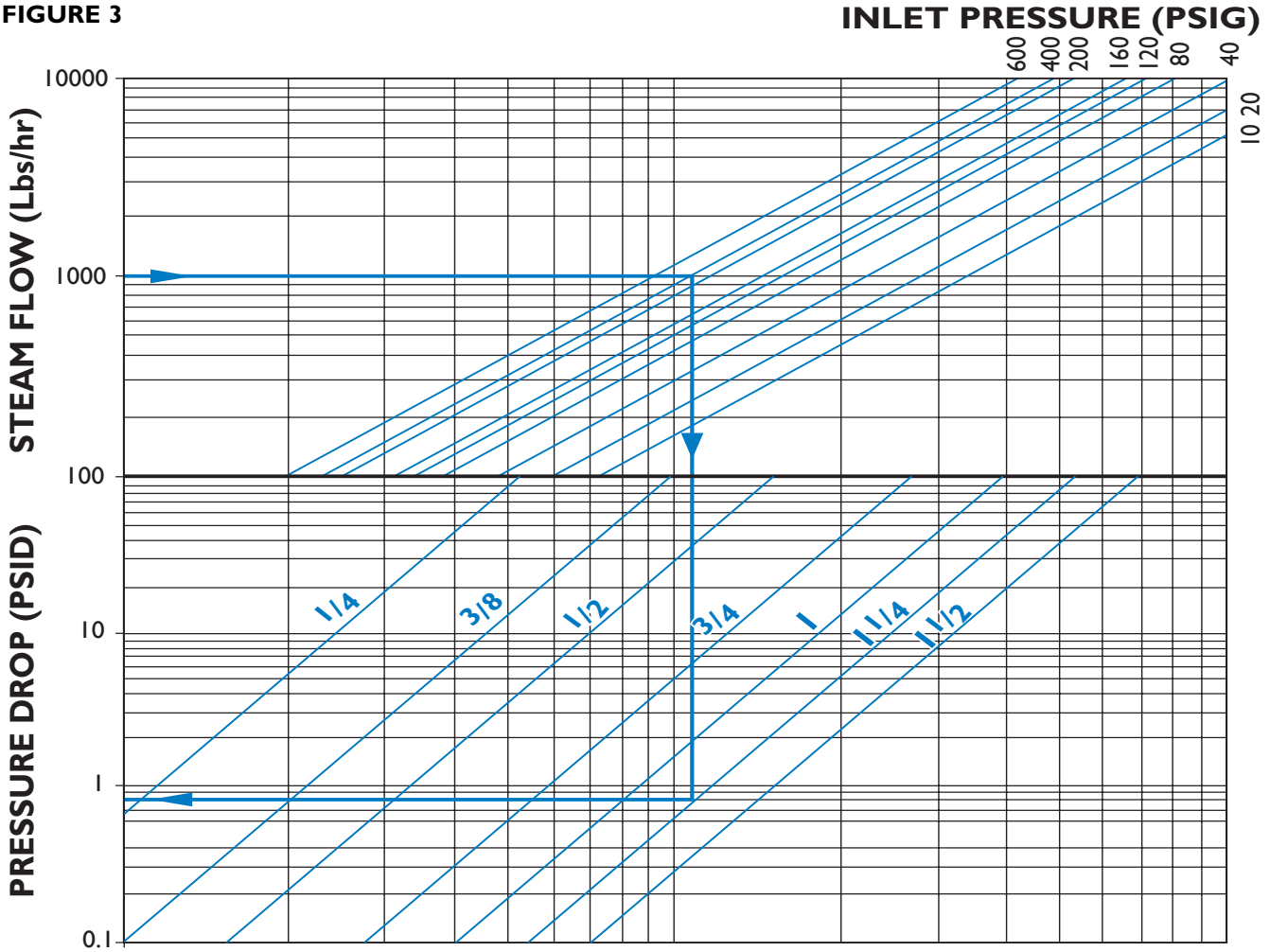
Example:

Strainer Size: 1 1/4"
Filtration: 100 Mesh lined 1/32" Perf.
Flow rate: 30 GPM
Specific Gravity: 1
Viscosity: 25 cP

A) As shown in the above example, the corrected pressure drop (P2) = 1.2 psid
B) Since S.G. = 1, P3 = P2 = 1.2 psid
C) Using Chart #2 P4 = 0.25 x P3 = 0.30 psid
D) P5 = 1.2 - 0.3 = 0.90 psid
E) Using Chart #3 P6 = 0.3 x 1.2 = 0.36 psid
F) Again using Chart #3 P7 = 0.9 x 2.5 = 2.25 psid
G) Total pressure drop P8 = 0.36 + 2.25 = 2.61 psid

Y-Strainer Pressure Drop — Saturated Steam (Sizes 1/4 - 1 1/2)

FIGURE 3



Notes: 1. Pressure drop curve is based on saturated steam flow with standard screens.
See page 20 for correction factors to be used with other fluids and/or screen openings.
2. Chart can be used for air and gas by using the following formula:

$$Qs = 0.138Qg\sqrt{\frac{(460+t)\ s.g.}{\left\{\frac{DP \leq 1.0}{P2}\right\}}}$$

FOR NON-CRITICAL FLOW

where;

Qs = Equivalent Steam Flow, lbs./hr.
Qg = Air or gas flow, SCFM.
t = Temperature, °F.
s.g. = Specific gravity (s.g. = 1 for air.)
DP = Pressure Drop, psid
P2 = Outlet Pressure

Example:

Service: Saturated Steam Flow
Pressure: 400 psig
Steam Flow: 1000 Lbs/hr
Size: 1 1/4"

- Locate steam flow
- Follow horizontal line to required pressure.
- Follow vertical line downwards to required strainer size.
- Follow horizontal line to read pressure drop.
- Pressure drop equals 0.8 psid.

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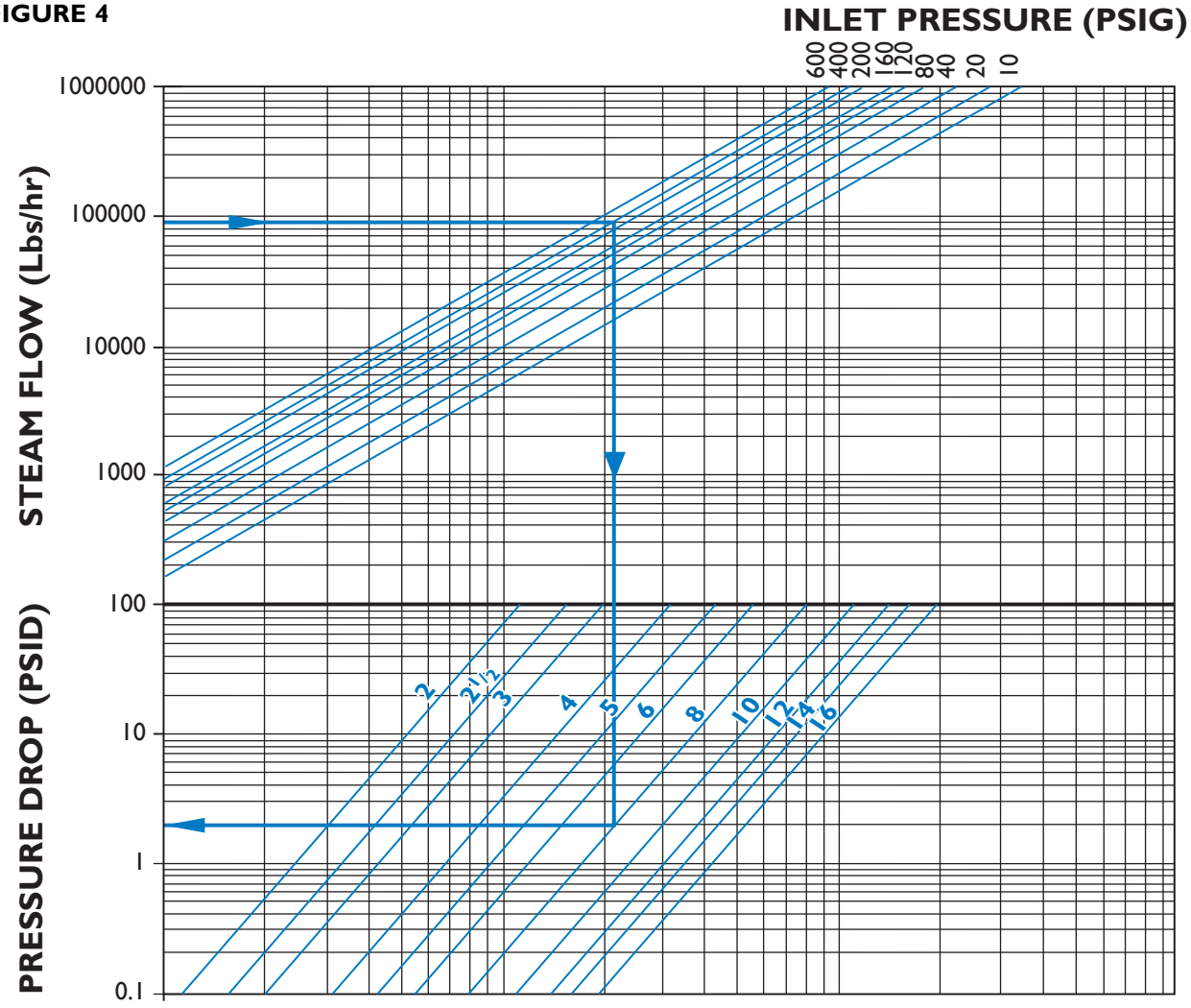
Y-Strainer Pressure Drop — Saturated Steam (Sizes 2 - 16)

FIGURE 4



Notes: 1. Pressure drop curve is based on saturated steam flow with standard screens.
See page 22 for correction factors to be used with other screen openings.
2. Chart can be used for air and gas by using the following formula:

$$Qs = 0.138Qg\sqrt{\frac{(460+t)}{s.g.}}\left\{\frac{DP}{P2}\right\}_{\text{FOR NON-CRITICAL FLOW}}^{1.0}$$

where;

Qs = Equivalent Steam Flow, lbs./hr.
Qg = Air or gas flow, SCFM.
t = Temperature, °F.
s.g. = Specific gravity (s.g. = 1 for air.)
DP = Pressure Drop, psid
P2 = Outlet Pressure

Example:

Service: Saturated Steam Flow
Pressure: 400 psig
Steam Flow: 90,000 Lbs/hr
Size: 8”

- Locate steam flow
- Follow horizontal line to required pressure.
- Follow vertical line downwards to required strainer size.
- Follow horizontal line to read pressure drop.
- Pressure drop equals 2.0 psid.

Correction Factors For Clogged Screens

* Multiply values obtained from figures 1 thru 4 and Charts #1, #2 and #3 (if used) by the appropriate values shown below

Chart #4

	Ratio of Free Screen Area to Pipe Area						
% Clogged	**10:1**	**8:1**	**6:1**	**4:1**	**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: 1. See page 27 for the Ratio of Free Area to Pipe Area for IFC Y-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.

$$R = \frac{Ag \times OA\square}{100Ap}$$

where;

R = Ratio Free Area to Pipe Area
Ag = Gross screen area, sq. in. (See page 27)
OA = Open area of screen media, % (See page 20, i.e. $^1/_8$" perf. = 40%)
Ap = Nominal area of pipe fitting, sq. in. (See page 27)

Example #1:

Strainer Size: 4"
IFC Series: Y150F
Filtration: $^1/_8$" Perf.
Flow rate: 300 GPM
Service: Water
% Clogged: 60%

A) Using Figure #1 the pressure drop is determined to be 1.1 psid with IFC's standard screen.
B) Looking at page 27 the Ratio of Free Area to Pipe Area for a 4" IFC series Y150F strainer is equal to 2.72:1 (3:1 approx.).
C) Using Chart #4 we read the correction factor to be 1.80 at 60% clogged.
D) Total pressure drop equals 1.1 x 1.8 = 1.98 psid when 60% clogged.

Example #2:

Strainer Size: 12"
IFC Series: Y300F
Filtration: $^3/_{16}$" Perf.
Flow rate: 2000 GPM
Service: Water
% Clogged: 70%

A) Using Figure #1 the pressure drop is determined to be 0.54 psid with IFC's standard screen.
B) Looking at page 20 we find that the % Open area (OA) of $^3/_{16}$" Perf. is 50%.
C) Using Chart #1 we read the correction factor to be 0.8 for $^3/_{16}$" Perf.
D) Total clean pressure drop equals 0.54 x 0.8 = 0.43 psid.
E) Since a non-standard screen is being used we must calculate the Ratio Free Area to Pipe Area using the above formula.
F) Looking at page 27 we find AG = 753.12 in2, Ap = 113.10 in2.
G) The Ratio Free Area to Pipe Area is calculated as 3.33:1. (3:1 approx.)
H) Using Chart #4 we read the correction factor to be 2.95 at 70% clogged.
I) Total pressure drop equals 0.43 x 2.95 = 1.27 psid when 70% clogged.

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