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# **BAG FILTER SYSTEM SIZING**

## **IMPORTANT FACTOR TO CONSIDER WHEN SIZING** FILTER BAG HOUSING APPLICATIONS

The system should be designed using a filter bag with as large a surface area as possible.

Increasing the area of a filter bag by 2 times = An increase in life for the filter bag of 3 to 4 times in addition to increasing the filter bag efficiency

# SYSTEM PRESSURE DROP

The most important factor in selecting a housing size for a filter bag application is the initial total clean pressure drop for the system,  $\Delta PS$ . The pressure drop,  $\Delta PS$ , consists of the pressure drop caused by the housing  $\Delta PH$  with the bag basket in place plus the pressure drop caused by the filter bag  $\Delta PB$ .

SYSTEM PRESSURE DROP =  $\Delta PS = \Delta PH + \Delta PB$ 

When sizing new applications, the  $\Delta PS$  should be 2.0 PSI or less. The lower this value is, the more contaminant a filter bag will hold. For high contaminant loading applications, this value should be as low as possible. For applications with nominal contaminants, this value can go to 3.0 psi or more.

#### HOUSING PRESSURE DROP - △PH

The graphs below give the clean pressure drops through the model's 50, 66, and 80 housings with a perforated filter bag basket without a filter bag installed for water, 1 cps @  $77^{\circ}$ F.



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To determine the pressure drop caused by the housing,  $\triangle PH$ , follow these steps:

- Step 1 Using the proper housing model number pipe size & flow rate, determine the pressure drop,  $\triangle$ PH, for water, 1 cps & 77°F
- Step 2 Multiply the value,  $\triangle$ PH, obtained in step 1 by the proper viscosity corrosion factor from the table below if the liquid has a viscosity greater than 1 cps.

Viscosity (cps)										
1 (H <sub>2</sub> O)	50	100	200	400	600	800	1000	2000		
1.0	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.8		

This is the  $\triangle$ PH, the pressure drop caused by the housing and basket without the filter bag installed for the specific housing pipe size, flow rate, and liquid. The  $\triangle$ PB, the pressure drop caused by the bag, must now be calculated and added to the value obtained in step 2 to obtain the system  $\triangle$ P- $\triangle$ PS.

# FILTER BAG PRESSURE DROP- rPB

Step 1 The graphs show the  $\triangle PB$  produced by a size number 2 bag filter for water (1 cps @ 77°F). The type of bag, the micron rating, and the flow rate determine the pressure drop.



Bag Size	Dimensions Dia x Length (in)	Correction factor			
2	7.06 x 32	1.00			
9	5.5 x 32	1.50			
1	7.06 x 16	2.25			
8	5.5 x 21	2.25			
7	5.5 x 15	3.00			
4	4.15 x 14	4.50			
3	4.15 x 8	9.00			

### Step 2 Correct the bag size from the table below if the bag filter size is not #2.

Step 3 If the viscosity of the liquid is greater than 1 cps (water @ 77°F) multiply the result from Step 2 by the following correction factor from the chart below.

Viscosity (cps)	50	100	200	400	800	1000	1500	2000	4000	6000	8000	10000
Correction Factor	4.5	8.3	16.6	27.7	50	56.2	77.2	113.6	161	250	325	430

The value obtained in Step 3,  $\Delta PB$  is the clean pressure drop caused by the filter bag.

#### SUMMARY

System pressure drop =  $\Delta PS = \Delta PH + \Delta PB$ 

For new applications,  $\triangle$  PS should be 2.0 PSI or less. For high contaminant loading, this value should be as low as possible. The lower this value is, the more contaminant the bag will hold. For bags with nominal contaminants, this value can go to 30 PSI or more. Consult us for specific recommendations when the clean  $\triangle$ PS exceeds 20 PSI.