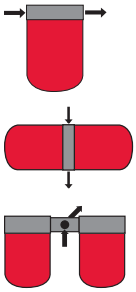
MF, MFD, MFDS Series

Spin-On Filters

250 PSI • up to 120 GPM





Features

- MF Filters are manufactured with an aluminum head.
- Choice of NPT, SAE straight thread O-ring boss, and SAE 4-bolt flange porting to allow easy installation without costly adapters.
- Quick easy element changeouts.
- MF Filters are designed to be used with hydrocarbon based fluids only – (not suitable for use with high water based fluids or phosphate esters)
- MF Filters are available in static and differential pressure sensing configurations.
- Static Indication for Mobile/Return Applications - Sizes 40/80/85/160/180
- Differential Indication for Inline Applications - Sizes 90/95/190/195

Refer to Configuration Chart after the Model Codes for porting options available, per size.

Applications



Agricultural



Automotive



Construction



Gearboxes



Industrial



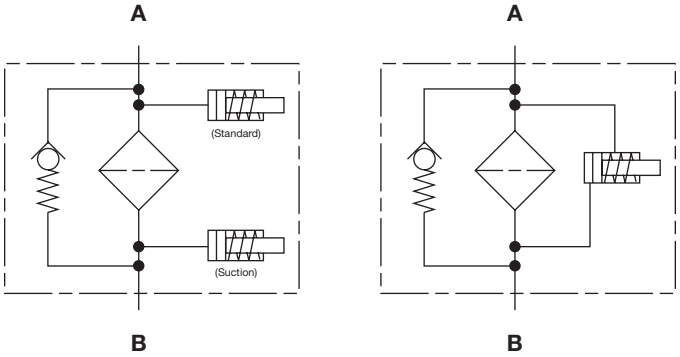
Pulp & Paper



Steel / Heavy Industry

Hydraulic Symbol

MF 80/85/160/180 MF 90/95/190/195



Technical Specifications

Mounting Method		
MF40/80/85	2 mounting holes	
MF90/95	3 mounting holes	
MF160/180	2 or 4 mounting holes	
MF190/195	2 or 3 mounting holes	
MFD	2 mounting holes	
MFDS	4 mounting holes	
Port Connection		
MF40	SAE-6	
MF80/85	3/4" NPT, SAE-12, 1" NPT, SAE-16	
MF90/95	3/4" NPT, SAE-12, 1" NPT	
MF160/180/190/195	1 1/4" NPT, SAE-20, 1 1/2" NPT, SAE-24 *(160/180 only)*	
MFD160/180	1 1/2" NPT, SAE-24	
MFDS160/180*	2" SAE Flange Code 61, 1 1/2" NPT Comb. Port	
MFDS190/195*	2" SAE Flange Code 61, 1 1/2" NPT Comb. Port	
**Note: Max. allowable torque for flanged ports is 26 ft-lbs (1/2" - 13 UNC bolts)*		
Flow Direction	Inlet: Side	Outlet: Side
Construc. Materials	Head: Aluminum	Can: Steel
Flow Capacity		
40	7 gpm (26 lpm)	
80	15 gpm (57 lpm)	
85	25 gpm (95 lpm)	
90	15 gpm (57 lpm)	
95	25 gpm (95 lpm)	
160,190	30 gpm (114 lpm) per can	
180,195	60 gpm (227 lpm) per can	
Housing Pressure Rating	MF40/80/85/160/180/190/195	MF90/95
Max. Allowable Working Pressure**	120 psi (8 bar)	250 psi (17 bar)
Fatigue Pressure	Contact HYDAC	
Burst Pressure	Contact HYDAC	
Element Collapse Pressure Rating		
BN, P, AM	80 psid (5.5 bar)	
Fluid Temp. Range	14°F to 212°F (-10°C to 100°C)	
Consult HYDAC for applications operating below 14°F (-10°C)		
Fluid Compatibility		
Compatible with all petroleum oils and synthetic fluids rated for use with Nitrile rubber (NBR) seals and aluminum and steel metals		
Indicator Trip Pressure	**ΔP Units *(Differential)***	
20 psid (1.4 bar) -10%	ΔP 14.5 psid (1 bar) - 10%	
25 psid (1.7 bar) -10%	ΔP 22 psid (1.5 bar) - 10%	
40 psid (2.7 bar) *(B3.4 Bypass)*	ΔP 44 psid (3 bar) - 10%	
Vacuum = 2 psid (0.1 bar) *(Suction)*		
Bypass Valve Cracking Pressure		
ΔP = 3 psid (0.2 bar) +10% *(for suction applications)*		
ΔP = 25 psid (1.7 bar) +10% *(standard for nominal/surface type filters)*		
ΔP = 50 psid (3.4 bar) +10% *(standard for absolute/depth filters)*		
(standard for absolute/depth type BN filters, MF 80/90/95/160/180/190/195, MFD 160/180, MFDS 160/180)		

**Note: All MF, MFD, MFDS MAWP reduce to 60 psi (4 bar) when using the following "VMF" indicators: B, BM, E, ES, GC, LE, LZ.

PN#02081318 / 06.24 / FIL1907-2109

Model Code

MF BN 80 A U C 5 A 1 . X / 3 B3.4

Filter Type
- MF = Single Element
- MFD = Dual Filter Heads & Elements *(End to End) (sizes 160, 180, 190, & 195 only)*
- MFDS = Dual Filter Heads & Elements *(Side by Side) (sizes 160, 180, 190, & 195 only)*

Element Media
- BN = Betamicron® *(Low Collapse)* P = Paper AM = Water Removal

Size
- 40, 80, 85, 90, 95, 160, 180, 190 *(uses size 160 element)*, 195 *(uses size 180 element)*

Pressure Rating
- A = 120 psi (8.3 bar) *(MF40/80/85/160/180, MFD160/180, MFDS160/180/190/195)*
- C = 250 psi (17.2 bar) *(MF90/95)*
- Y = 60 psi (4.1 bar) *(MF40/80/85/160/180, MFD160/180, MFDS160/180, when "E" type static pressure gauge is used) with a B1.7 bypass setting*
- W = Suction Operation *(when 0.2 bar bypass is specified for Suction Applications)*

Element Connection Type
- U = UN thread

Type of Connection
- A = 3/8" Threaded (SAE-6 or 3/8" NPT) *(MF40)*
- C = ¾" Threaded (SAE-12, ¾" NPT) *(MF80/85/90/95)*
- D = 1" Threaded (SAE-16, 1" NPT) *(MF80/85)*
- E = 1 ¼" Threaded (SAE-20, 1 ¼" NPT) *(MF160/180/190/195)*
- F = 1 ½" Threaded (SAE-24) , 1 1/2" NPT *(only for MF160/180)*
- LF = 1 ½" Threaded and 2" Flanged Combo (1 ½" NPT & 2" SAE Code 61) *(MFD160/180, MFDS160/180/190/195)*

Filtration Rating *(micron)*
- 3, 5, 10, 20 = BN/HC 3, 10, 25 = P 40 = AM

Type of Clogging Indicator
- A, B, C, E, ES *(Static - sizes 80, 85, 160, 180); (Differential - sizes 90, 95, 190, 195)*

Type Number

Modification Number *(latest version always supplied)*

Port Configuration
- 3 = NPT Tapered Thread Ports
- 12 = SAE O-Ring Boss Straight Thread Ports
- 16-3 = Combination NPT Tapered Thread Ports/SAE Code 61 Flanges *(MFDS160/180/190/195)*

Bypass Valve
- B0.2 = 3 psid/0.2 bar *(For Suction Applications)*
- B1.7 = 25 psid/1.7 bar *(Standard on paper filters sizes 80 - 195 and size 40 BN)*
- KB = No Bypass *(not available with NPT)*
- B1.3 = 18 psid/1.3 bar *(size 40 paper only)*
- B3.4 = 50 psid/3.4 bar *(Standard on BN & AM Series) (sizes MF 80/90/95/160/180/190/195 & MFD 160/180 only)*
- IP2 = Alternate Indicator Position 2 *(sizes MF190/195 or MFDS 190/195)*

Replacement Element Model Code

0080 MA 005 BN

Size
- 0040, 0080 - *(not available with 3 µm BN elements)*
- 0085 - §*(available only with 10 µm P elements)*
- 0090 - †*(not available in 3 µm or 25 µm P medias)*
- 0095 - ††*(not available with 20 µm BN or 25 µm P elements)*
- 0160, 0180 - (*available in all medias)*

Filtration Rating *(microns)*
- 3, 5, 10, 20 = BN 3, 10, 25 = P
- 40 = AM *(not available with size 0085)*

Element Media
- BN, P, AM

Supplementary Details
- Bypass settings for element 0040 only *(bypass valve is inside element can)*
- B1.3 = 18 PSID Bypass (P)
- B1.7 = 25 PSID Bypass (BN)
- *(Spin-on elements available with NBR seals only)*

Clogging Indicator Model Code

VMF 2 E . X / 3

Indicator Prefix
- VMF = Static *(sizes 80/85/160/180)*
- B = Differential *(sizes 90/95/190/195)*

Trip Pressure
- 1.4 = 20 psid (1.4 bar) standard
- 1.7 = 25 psid (1.7 bar) *(optional)*
- 2 = 29 psid (2 bar) *(optional)*

(Static)

Differential - Consult HYDAC

Type of Indicator
- A = No indicator - all available with plugged port
- B MF = Pop-up indicator *(auto reset) (ΔP sz. MF 90/95,190/195, MFDS 190/195)*
- C MF = Single terminal electric switch *(ΔP - sz. MF 90/95,190/195, MFDS 190/195)*
- C = 2 terminal electric switch *(Static - sz. MF 80/85, 160/180)*
- E = Visual Pressure Gauge *(Static - sz. MF 80/85, 160/180)*
- ES = Visual Pressure Gauge *(port bottom) (Static - sz. MF 80/85, 160/180)*

Modification Number

Supplementary Details

Seals
- (omit) = Nitrile rubber (NBR) *(standard)*
- 3 = NPT port adapter

(For additional details and options, see Clogging Indicators section.)

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

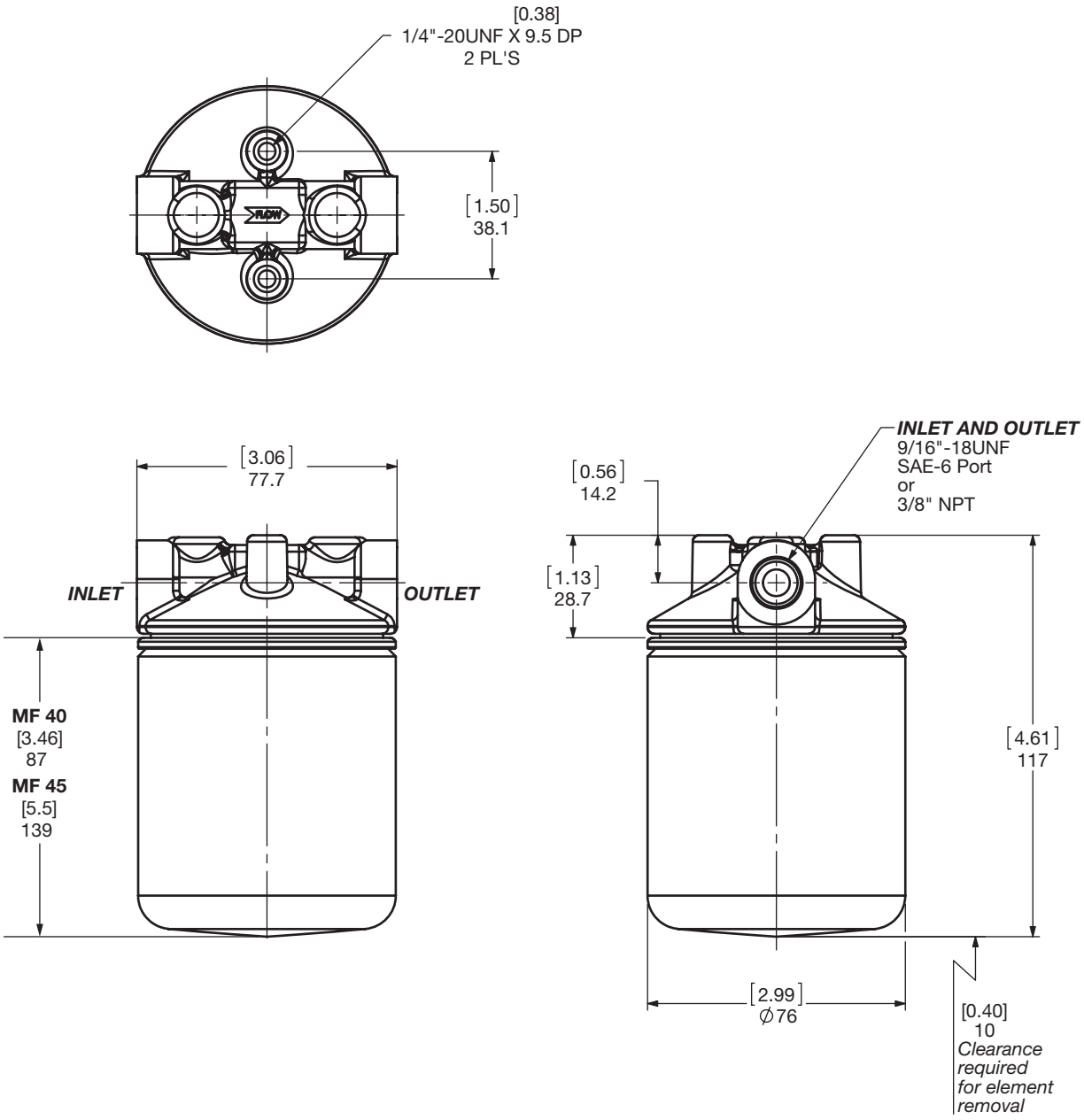
LOW PRESSURE FILTERS

Configuration Chart

Size	40	80/85				90/95			160/180				160/180 Dual	190/195		190/195 Dual *(MFDS only)*
Element Media	BN, P	BN, P, AM *(size 80)* P *(size 85)*				BN, P			BN, P, AM *(size160/180)* BN/AM *(size160)*					BN, P, AM *(190/195)* BN/AM *(190)*		
Connection Type																
NPT	—	3/4"	1"	—	—	3/4"	1"	—	1-1/4"	1-1/2"	—	—	—	1-1/4"	—	—
SAE	SAE-6	—	—	SAE-12	SAE-16	—	—	SAE-12	—	—	SAE-20	SAE-24	—	—	SAE-20	—
Combo NPT/ SAE *(Flange)*	—	—	—	—	—	—	—	—	—	—	—	—	1-1/2" NPT/ 2" SAE Code 61	—	—	1-1/2" NPT/ 2" SAE Code 61
Bypass																
B1.3	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B1.7	X	X	X	X	—	—	—	—	X	X	X	X	X	—	—	—
B3.4	—	X	—	X	—	X	X	X	—	X	X	—	X	X	X	X
B0.2	—	X	—	—	—	—	—	—	X	X	X	X	X	—	—	—
KB *(no— bypass)*	X	—	X	—	X	—	—	—	—	—	X	—	—	—	—	—
Indicator																
W *(no port)*	X	—	—	—	—	X	—	X	—	—	—	—	—	—	—	—
A *(plugged port)*	—	X	X	X	X	—	—	—	X	X	X	X	X	—	—	—
B	—	—	—	—	—	X	X	X	—	—	—	—	—	X	—	X
E	—	X	X	X	X	—	—	—	X	X	X	X	X	—	—	—
C	—	X	X	X	X	X	—	—	X	X	X	X	X	—	X	—

X = available option

Dimensions
MF 40 / 45

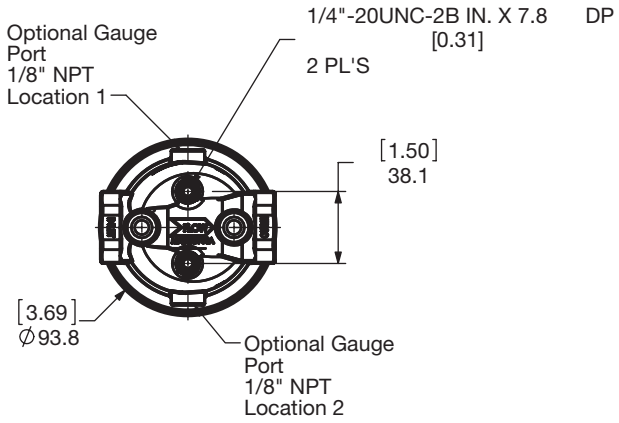


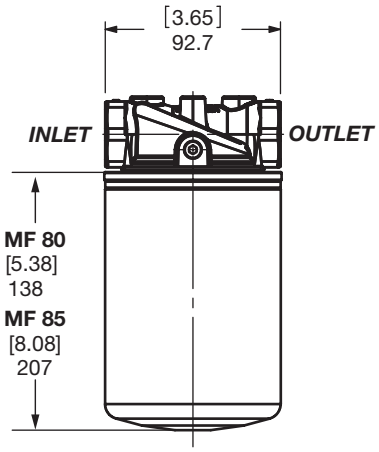
Size	40	45
Weight (lbs.)	1	1.5

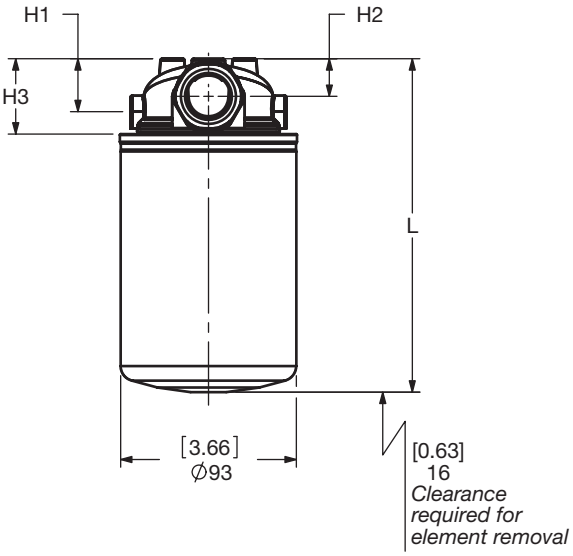
Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

LOW PRESSURE FILTERS

Dimensions
MF 80 / 85





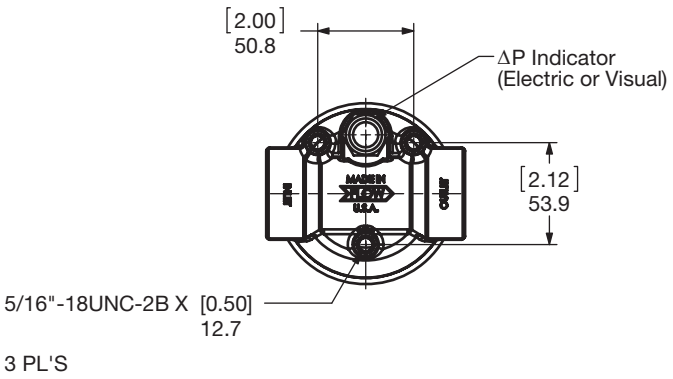


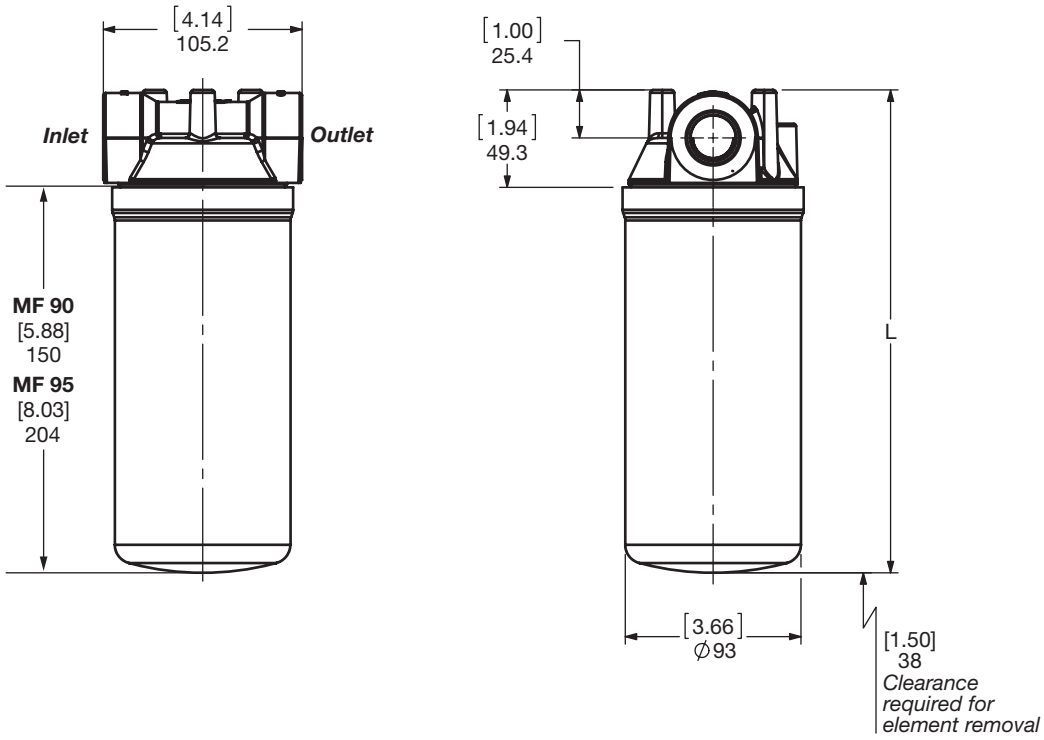
SIZE	PORT SIZE *(INLET & OUTLET)*	H1	H2	H3	L
MF80	3/4" NPT	[1.12] 28.4	[0.79] 20.1	[1.52] 38.6	[6.89] 175
	SAE-12				
	1" NPT	[1.42] 36.1	[1.91] 23.1	[1.83] 46.5	[7.20] 182.9
	SAE-16				
MF85	3/4" NPT	[1.12] 28.4	[0.79] 20.1	[1.52] 38.6	[9.61] 244.1
	SAE-12				
	1" NPT	[1.42] 36.1	[0.91] 23.1	[1.83] 46.5	[9.92] 252
	SAE-16				

Size	80	85
Weight (lbs.)	1.8	2.2

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

Dimensions
MF 90 / 95





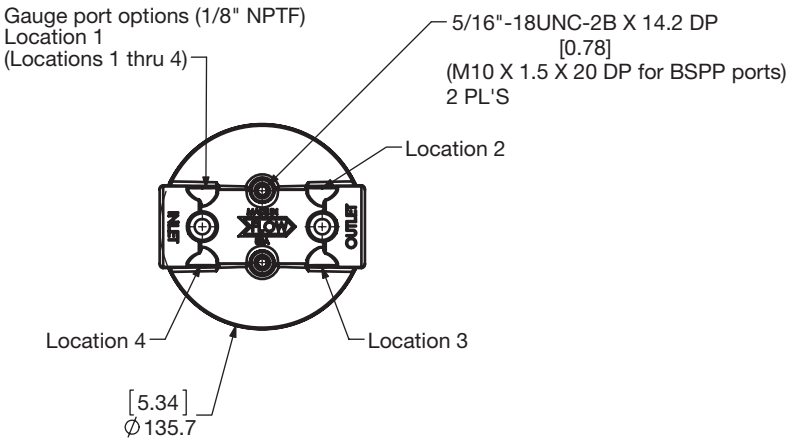
SIZE	PORT SIZE *(INLET & OUTLET)*	L
MF90	3/4" NPT	[5.88] 150
	SAE-12	
	1" NPT	
	SAE-16	
MF95	3/4" NPT	[8.03] 204
	SAE-12	
	1" NPT	
	SAE-16	

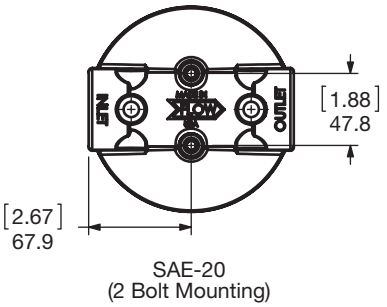
Size	90	95
Weight (lbs.)	2.7	3.2

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

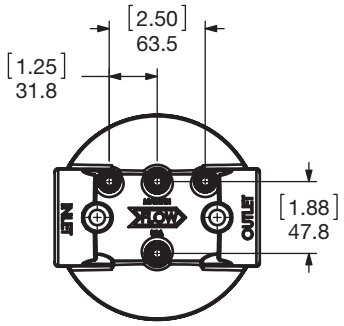
LOW PRESSURE FILTERS

Dimensions
MF 160 / 180

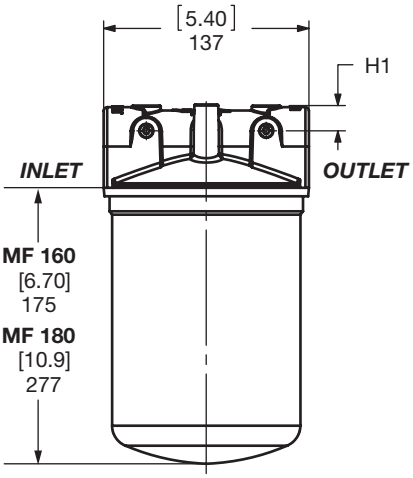


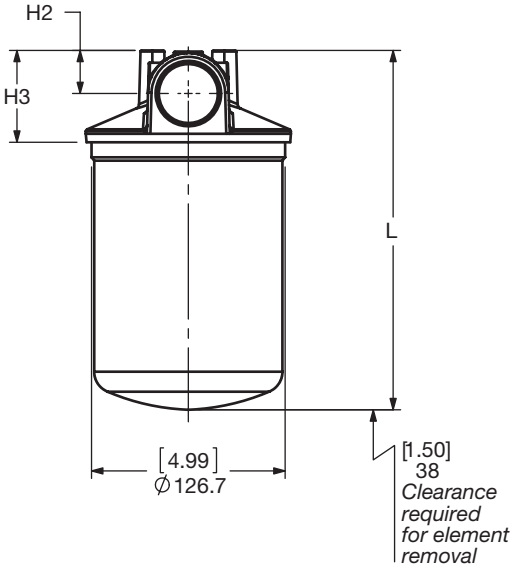


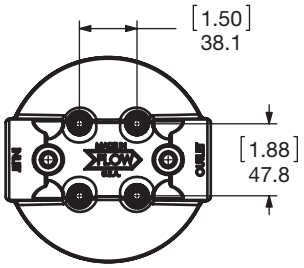
SAE-20
(2 Bolt Mounting)



1 1/2" NPTF
SAE-24
(3 Bolt Mounting)
(Special Order)







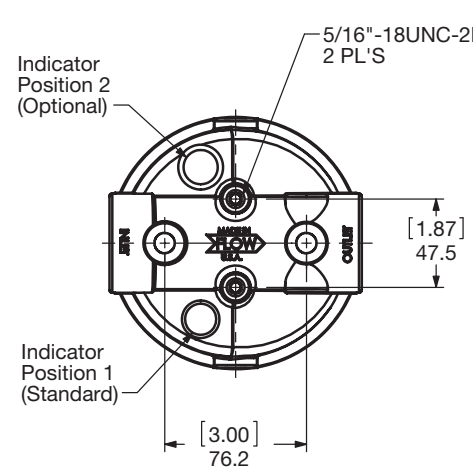
1 1/4" NPTF
SAE-20
(4 Bolt Mounting)

SIZE	PORT SIZE *(INLET & OUTLET)*	H1	H2	H3	L
MF160	1 1/4" NPT	[0.79] 20.1	[1.08] 27.4	[2.35] 59.7	[9.35] 237.5
	SAE-20				
	1 1/2" NPT	[1.10] 27.9	[1.30] 33	[2.80] 71.1	[9.80] 248.9
	SAE-24				
MF180	1 1/4" NPT	[0.79] 20.1	[1.08] 27.4	[2.35] 59.7	[13.35] 339.1
	SAE-20				
	1 1/2" NPT	[1.10] 27.9	[1.30] 33	[2.80] 71.1	[13.80] 350.5
	SAE-24				

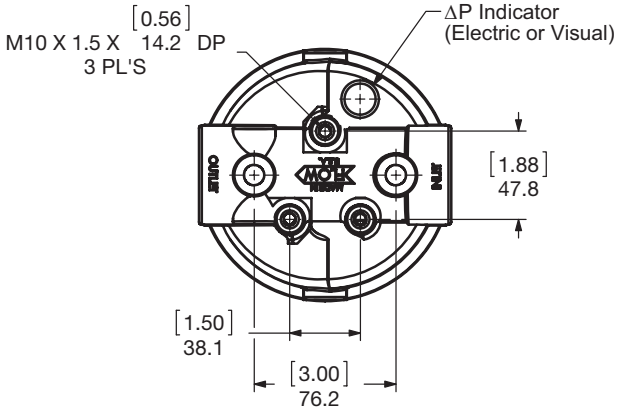
Size	160	180
Weight (lbs.)	5.1	7.3

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

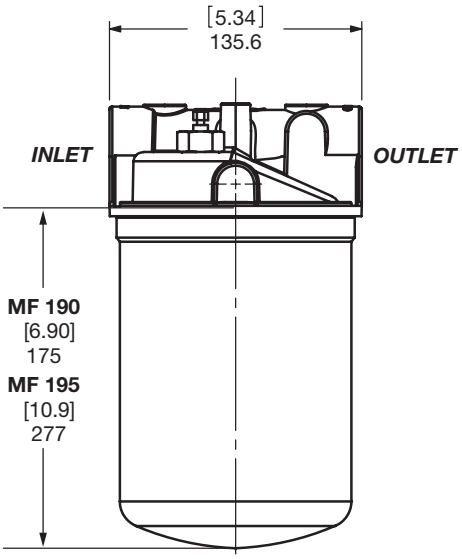
Dimensions
MF 190 / 195

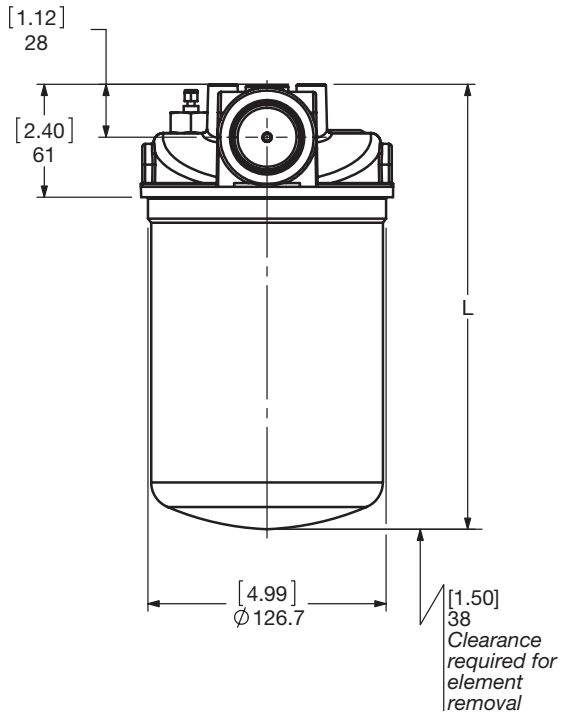


1 1/4" NPT
SAE-20
(2 Bolt Mounting)



1 1/4" BSPP - Discontinued
(3 Bolt Mounting)

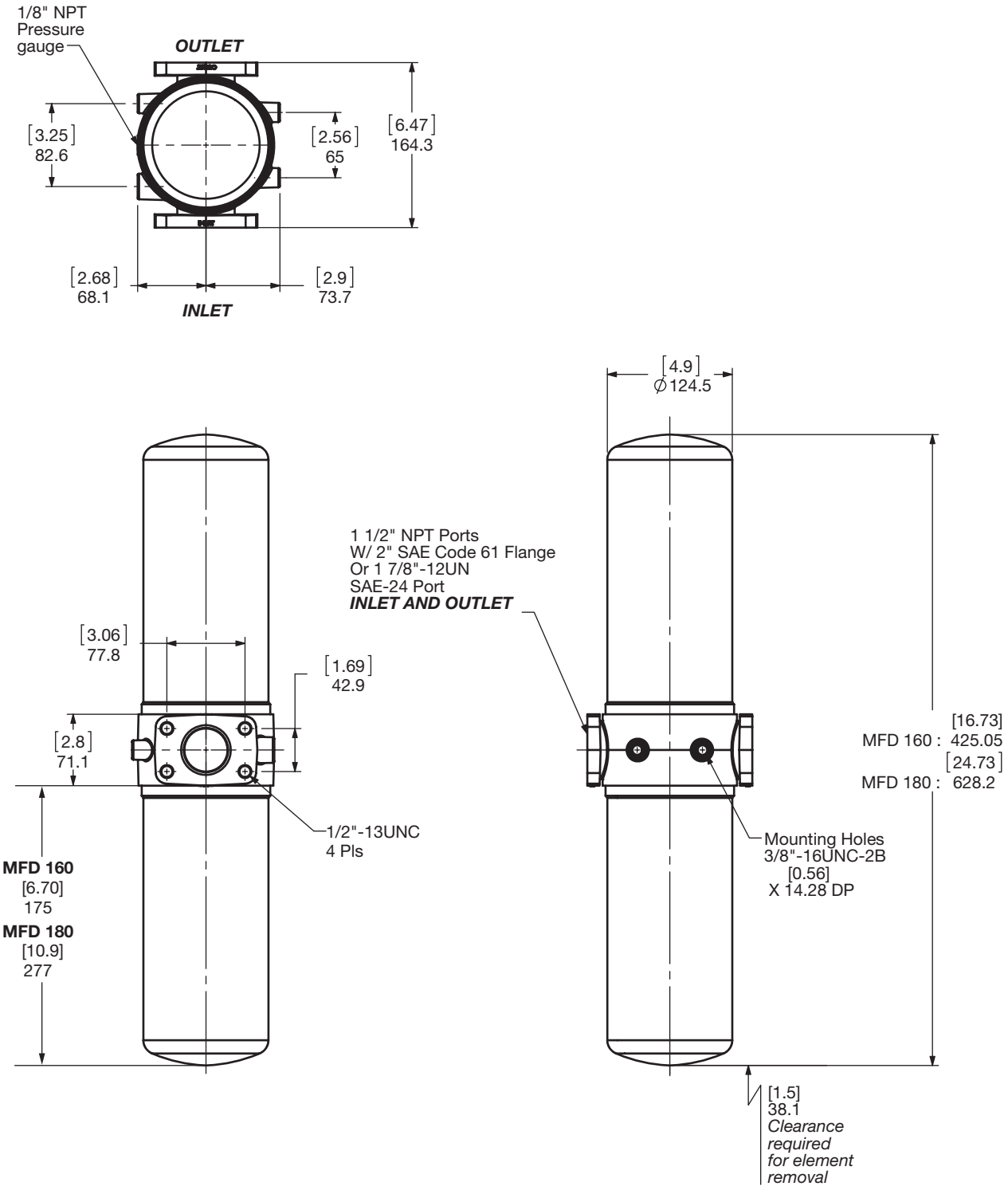




Size	190	195
Weight (lbs.)	4.3	5.4

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

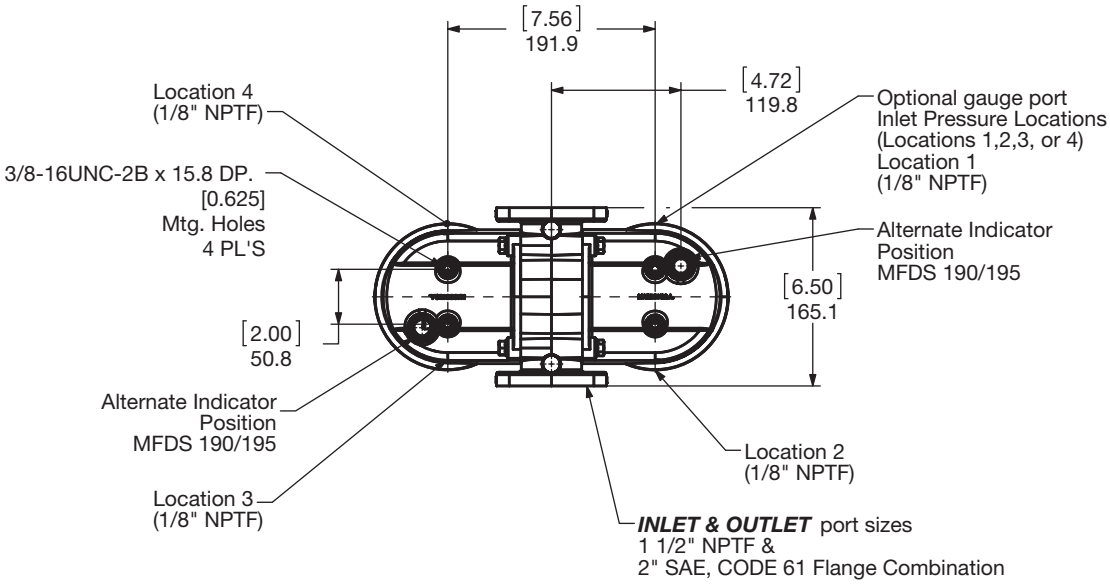
Dimensions
MFD 160 / 180

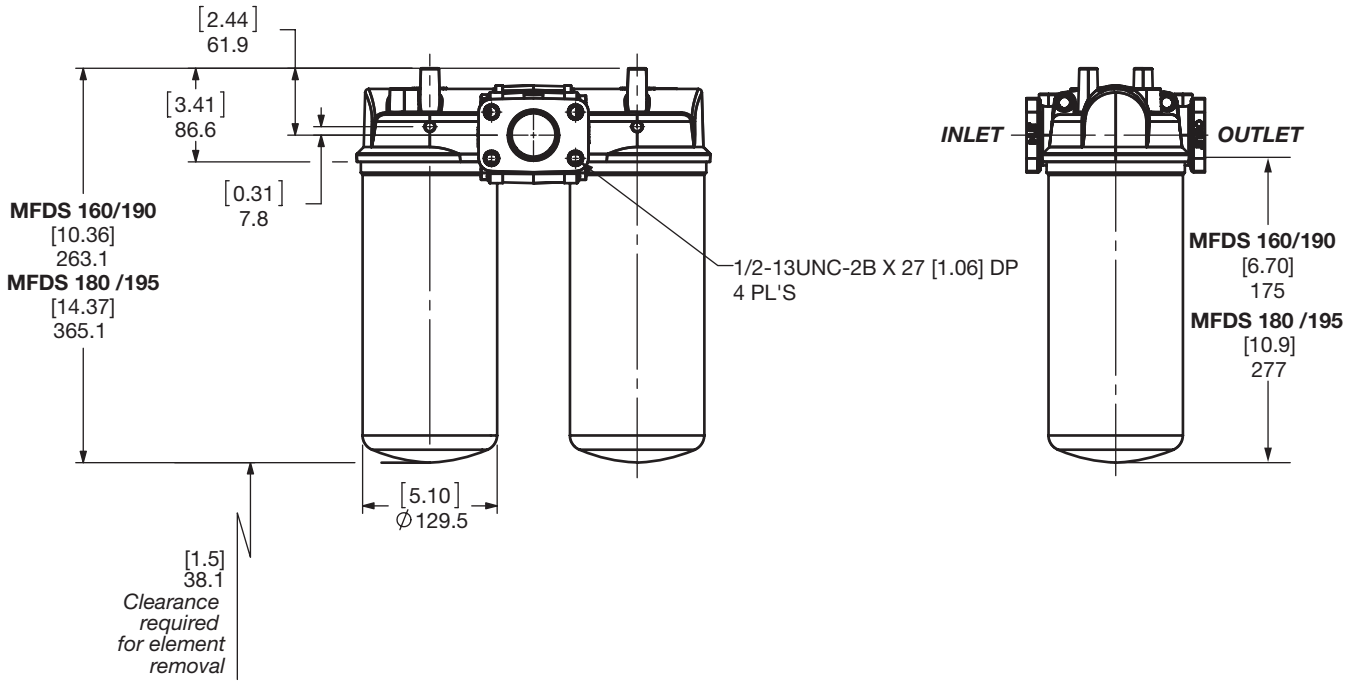


Size	160	180
Weight (lbs.)	8.8	11

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

Dimensions
MFDS 160 / 180 / 190 / 195





Size	160	180	190	195
Weight (lbs.)	11.6	13.8	8.8	11

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

LOW PRESSURE FILTERS

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

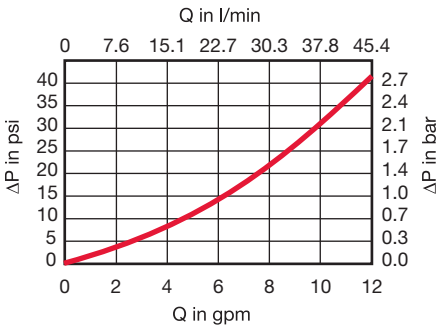
Housing Curve:

Pressure loss through housing is as follows:

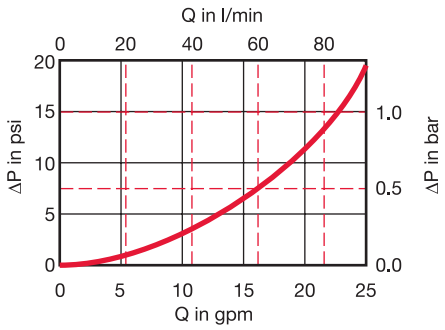
$$\text{Housing } \Delta P = \text{Housing Curve } \Delta P \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Adjustments must be made for viscosity & specific gravity of the fluid to be used! *(see "Sizing HYDAC Filter Assemblies" in Section B - Overview)*

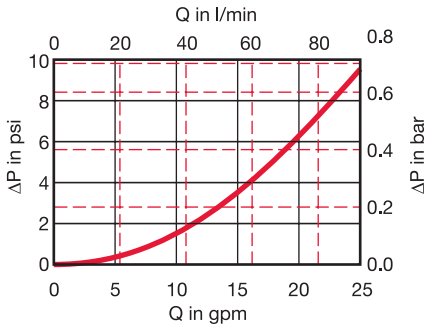
MF 40



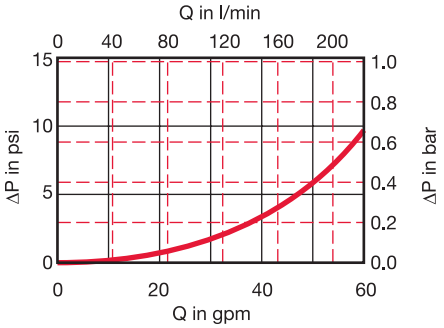
MF 80 / 85



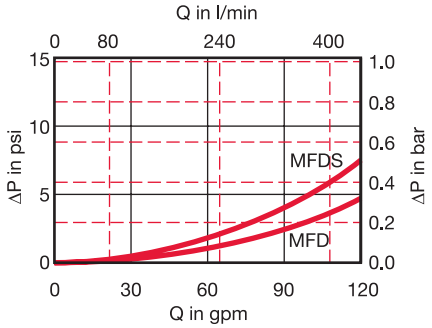
MF 90 / 95



MF 160 / 180 / 190 / 195



MFD / MFDS 160 / 180 / 190 / 195



Aquamicron Water Removal Element Capacity vs. Flow

Spin-On Element	Optimum Flow Rate		Maximum Flow Rate	
	Flow (gpm)	Capacity (quarts)	Flow (gpm)	Capacity (quarts)
0080MA010AM	2	0.12	6	0.08
0090MA010AM	2	0.12	6	0.08
0095MA010AM	4	0.17	8	0.11
0160MA040AM	4	0.23	8	0.16
0180MA040AM	6	0.45	15	0.32

Spin-on Connection Chart

Size	Can Connection Thread		
	MA	MG	MU
0040	3/4" - 16 UN - 2B	—	—
0080	—	3/4" BSPP	—
0080/0085	1" - 12 UN -2B	—	—
0090/0095	1-1/2" - 16 UN - 2B	—	—
0160	—	1-1/4" BSPP	—
0160/0180	1-1/2" - 16 UN - 2B	—	—

MA = UN Tap Plate Thread (standard); MG = BSPP Tap Plate Thread (special); MU = Metric Tap Plate Thread (special - consult HYDAC)

Element K Factors

$$\Delta P \text{ Elements} = \underset{\text{(From Tables Below)}}{\text{Elements (K) Flow Factor}} \times \text{Flow Rate (gpm)} \times \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Size	...MA...BN			
	3 µm	5 µm	10 µm	20 µm
0040	—	1.1799	0.6289	0.3613
0080	—	0.4423	0.2357	0.1354
0090	0.4841	0.3702	0.3451	0.1911
0095	0.2762	0.2112	0.1969	—
0160	0.2372	0.1983	0.1113	0.0625
0180	0.1231	0.1029	0.0577	0.0325

Size	...MA...P		
	3 µm	10 µm	25 µm
0040	7.763	2.348	1.516
0080	1.606	0.486	0.314
0085	—	0.351	—
0090	—	0.482	—
0095	0.894	0.270	—
0160	0.839	0.192	0.145
0180	0.443	0.134	0.087

Size	...MA...AM	
	010 µm	040 µm
0080	0.513	—
0085	—	—
0090	0.507	—
0095	0.284	—
0160	—	0.233
0180	—	0.136

All Element K Factors in psi / gpm.

Notes