

LF(M)

High Viscosity Filter Assemblies

Low pressure filter assemblies optimized for high flow hydraulic, high viscosity lube and heavily contaminated fuel applications.

Max Operating Pressure: 150 psi (10 bar)
Available options up to 1000 psi (68.9 bar)



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Filtration starts with the filter.

The oversized coreless filter element in every LF delivers lower ISO Codes over a long element lifespan to ensure low disposal impact, simultaneously reducing your environmental footprint and your bottom line. To top it off, select elements come standard with an integral zero-leak bypass so with every filter change you get a new bypass along with peace of mind.



Built for industrial use.

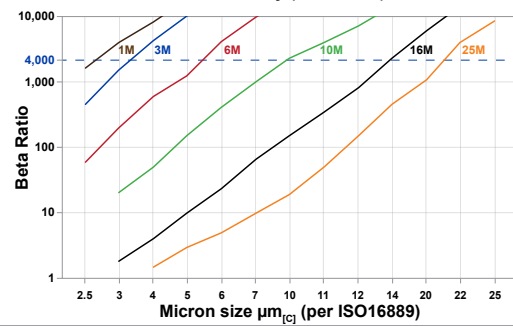
Constructed from heavy duty carbon steel (standard) or the optional 304 or 316 stainless steel, the LF filter housings are designed to excel in even the toughest industrial conditions. Multi-round units go even further to provide increased capacity whether you're operating with incredibly high viscosity oils, extreme flow rates or need extended service intervals.



Element configuration & media options.

With media options down to $\beta_{3, [C]} > 4000$, insoluble varnish removal and water absorbing options, you get the perfect element for your application, every time. Element configurations include Hy-Pro HP106 and HP107 coreless style elements with integral, zero-leak bypass valves. For those plants using 8314 style industry standard elements, the HP8314 offers an improved bypass valve design.

Glass Media Filtration Efficiency (Beta Ratio) vs Micron Size



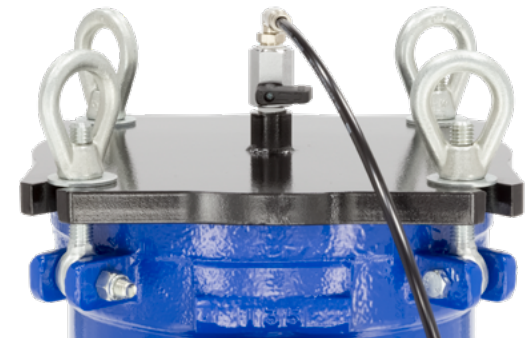
Setting the new standard.

Sampling and condition monitoring are no longer optional, they're a necessity. That's why every LF comes standard with sample ports and green to red true ΔP gages that indicate exact element condition at all times. With access to accurate system cleanliness conditions, you'll know exactly how well your filtration is performing.



Minimize the mess.

Top loading filter housings minimize the mess from element services and changes. And with the easy open swing bolt lid design, you'll be back to filtering your fluids without having to search for all those lost parts.



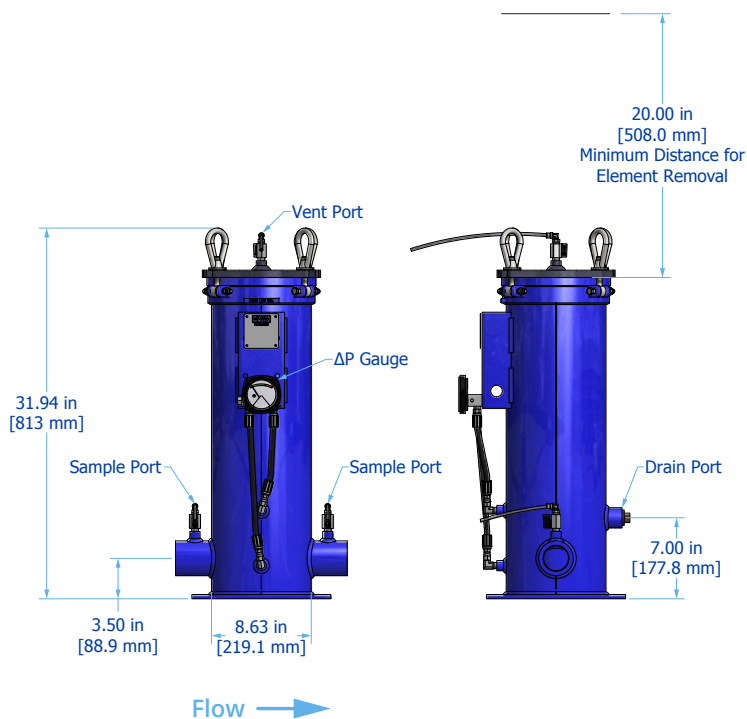
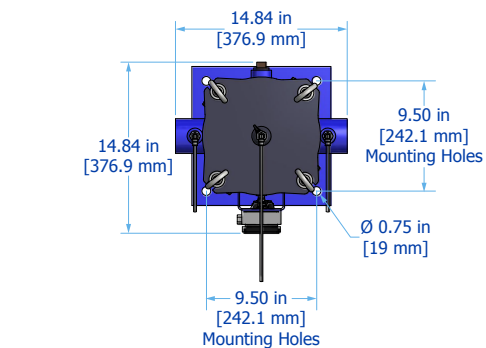
Seamlessly integrated into your systems.

Multiple connection options and port customization provide the flexibility to integrate LF directly into existing re-circulating or auxiliary side loop and dispensing lines to improve fluid cleanliness and optimize existing assets. Get filtration exactly where you need it without extra expense of installing new plumbing and electrical.

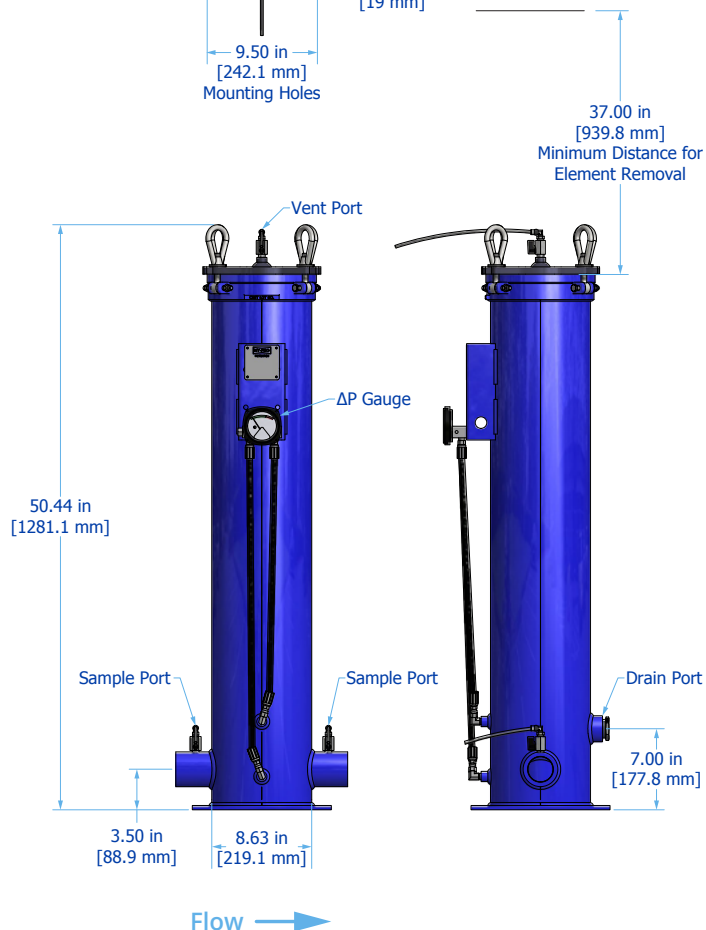
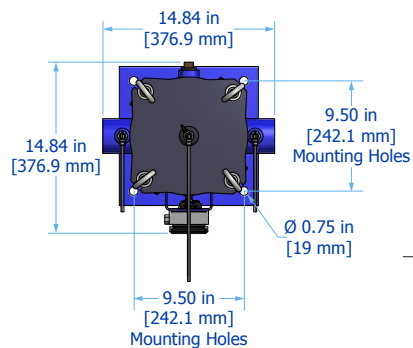


LF Installation Drawings

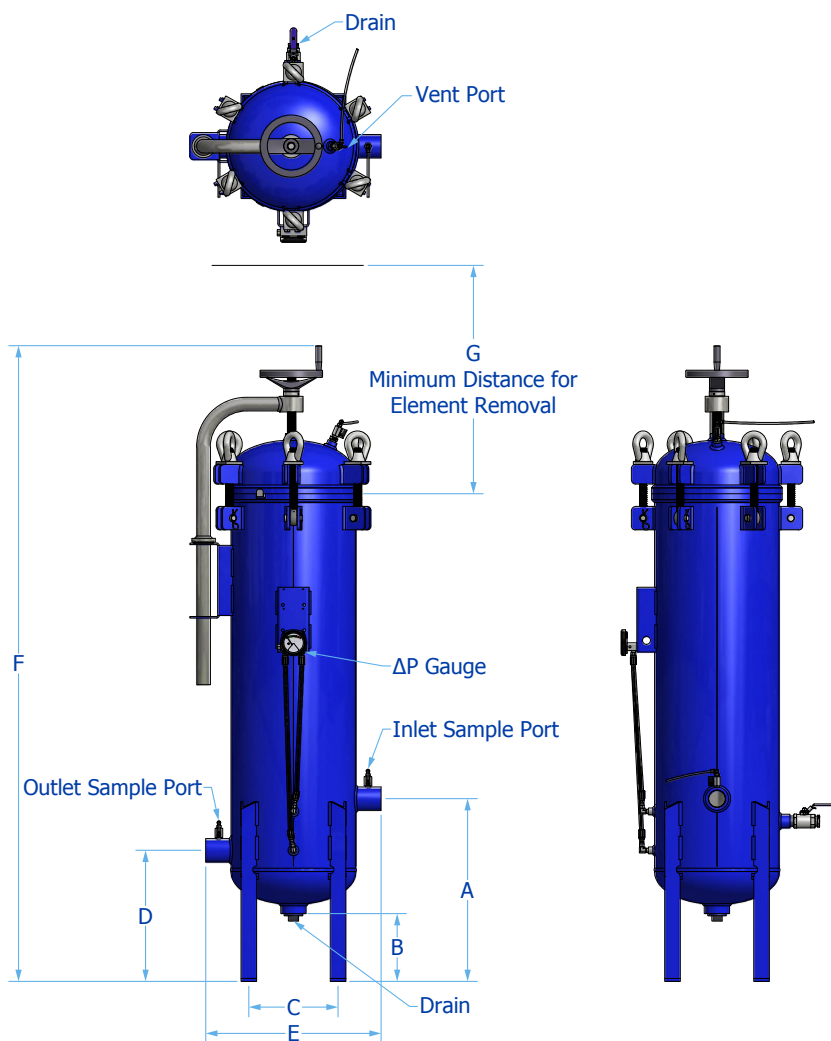
LF (L18) Installation Drawing



LF (L36) Installation Drawing



LFM Installation Drawings



Series	Number of Elements	Port Size	Vessel Diameter	A	B	C	D	E	F	G	Weight
LFM	3	2	16.0 in	19.1 in	8.0 in	10.4 in	12.4 in	29.0 in	74.0 in	37.0 in	465.0 lb
			40.6 cm	48.6 cm	20.3 cm	26.4 cm	31.4 cm	73.7 cm	187.9 cm	94.0 cm	210.9 kg
		3	16.0 in	20.1 in	8.0 in	10.4 in	12.4 in	29.0 in	74.0 in	37.0 in	465.0 lb
	4	3	40.6 cm	51.1 cm	20.3 cm	26.4 cm	31.4 cm	73.7 cm	187.9 cm	94.0 cm	210.9 kg
			16.0 in	22.6 in	8.0 in	10.4 in	12.4 in	29.0 in	74.0 in	37.0 in	465.0 lb
		4	40.6 cm	57.5 cm	20.3 cm	26.4 cm	31.4 cm	73.7 cm	187.9 cm	94.0 cm	210.9 kg
			16.0 in	57.5 cm	20.3 cm	26.4 cm	31.4 cm	73.7 cm	187.9 cm	94.0 cm	210.9 kg
		2	18.0 in	19.8 in	8.0 in	12.3 in	13.0 in	31.0 in	79.0 in	37.0 in	550.0 lb
			45.7 cm	50.2 cm	20.3 cm	31.1 cm	33.0 cm	78.7 cm	200.6 cm	94.0 cm	249.5 kg
			18.0 in	20.8 in	8.0 in	12.3 in	13.0 in	31.0 in	79.0 in	37.0 in	550.0 lb
		3	45.7 cm	52.7 cm	20.3 cm	31.1 cm	33.0 cm	78.7 cm	200.6 cm	94.0 cm	249.5 kg
			18.0 in	23.3 in	8.0 in	12.3 in	13.0 in	31.0 in	79.0 in	37.0 in	550.0 lb
	9	4	45.7 cm	59.1 cm	20.3 cm	31.1 cm	33.0 cm	78.7 cm	200.6 cm	94.0 cm	249.5 kg
			24.0 in	25.0 in	8.0 in	16.7 in	17.3 in	37.0 in	84.5 in	37.0 in	645.0 lb
			61.0 cm	63.5 cm	20.3 cm	42.4 cm	43.8 cm	93.9 cm	214.6 cm	94.0 cm	292.6 kg
		6	24.0 in	27.5 in	8.0 in	16.7 in	17.3 in	37.0 in	84.5 in	37.0 in	645.0 lb
			61.0 cm	69.9 cm	20.3 cm	42.4 cm	43.8 cm	93.9 cm	214.6 cm	94.0 cm	292.6 kg
			24.0 in	28.8 in	8.0 in	16.7 in	17.3 in	37.0 in	84.5 in	37.0 in	645.0 lb
		6	61.0 cm	73.0 cm	20.3 cm	42.4 cm	43.8 cm	93.9 cm	214.6 cm	94.0 cm	292.6 kg

*Dimensions are approximations taken from base model and will vary according to options chosen and customer sizing requirements.



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Filter Sizing Guidelines

Filter Assembly Sizing Guidelines

Effective filter sizing requires consideration of flow rate, viscosity (operating and cold start), fluid type and degree of filtration. When properly sized, bypass during cold start can be avoided/minimized and optimum element efficiency and life achieved. The filter assembly differential pressure values provided for sizing differ for each media code, and assume 32 cSt (150 SUS) viscosity and 0.86 fluid specific gravity. Use the following steps to calculate clean element assembly pressure drop.

Sizing recommendations to optimize performance and permit future flexibility

- To avoid or minimize bypass during cold start the actual assembly clean ΔP calculation should be repeated for start-up conditions if cold starts are frequent.
- Actual assembly clean ΔP should not exceed 10% of bypass ΔP gauge/indicator set point at normal operating viscosity.
- If suitable assembly size is approaching the upper limit of the recommended flow rate at the desired degree of filtration consider increasing the assembly to the next larger size if a finer degree of filtration might be preferred in the future. This practice allows the future flexibility to enhance fluid cleanliness without compromising clean ΔP or filter element life.
- Once a suitable filter assembly size is determined consider increasing the assembly to the next larger size to optimize filter element life and avoid bypass during cold start.
- When using water glycol or other specified synthetics, we recommend increasing the filter assembly by 1~2 sizes.

Step 1: Calculate ΔP coefficient for actual viscosity

Using Saybolt Universal Seconds (SUS)

$$\Delta P \text{ Coefficient} = \frac{\text{Actual Operating Viscosity}^1 \text{ (SUS)}}{150} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Using Centistokes (cSt)

$$\Delta P \text{ Coefficient} = \frac{\text{Actual Operating Viscosity}^1 \text{ (cSt)}}{32} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Step 2: Calculate actual clean filter assembly ΔP at both operating and cold start viscosity

$$\text{Actual Assembly Clean } \Delta P = \text{Flow Rate} \times \Delta P \text{ Coefficient (from Step 1)} \times \text{Assembly } \Delta P \text{ Factor (from sizing table)}$$

ΔP Factors¹

Model	Length	Units	Media									
			VTM	05M	1M	3M	6M	10M	16M	25M	**W	
LF	16/18	psid/gpm	0.0628	0.0473	0.0463	0.0391	0.0303	0.0271	0.0266	0.0256	0.0046	
		bard/lpm	0.0011	0.0009	0.0008	0.0007	0.0006	0.0005	0.0005	0.0005	0.0001	
	36/39	psid/gpm	0.0440	0.0331	0.0324	0.0273	0.0212	0.0190	0.0186	0.0179	0.0032	
		bard/lpm	0.0008	0.0006	0.0006	0.0005	0.0004	0.0003	0.0003	0.0003	0.0001	
LFM3	36/39	psid/gpm	0.0122	0.0092	0.0081	0.0055	0.0051	0.0045	0.0041	0.0035	0.0029	
		bard/lpm	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
LFM4	36/39	psid/gpm	0.0091	0.0069	0.0067	0.0048	0.0044	0.004	0.0037	0.0032	0.0025	
		bard/lpm	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.00005	
Model	Length	Units	Media									
			1A	3A	6A	10A	16A	25A				
LF	16/18	psid/gpm	0.0514	0.0434	0.0336	0.0302	0.0295	0.0284				
		bard/lpm	0.0009	0.0008	0.0006	0.0005	0.0005	0.0005				
	36/39	psid/gpm	0.0360	0.0304	0.0235	0.0211	0.0207	0.0199				
		bard/lpm	0.0007	0.0006	0.0004	0.0004	0.0004	0.0004				
LFM3	36/39	psid/gpm	0.0073	0.0049	0.0046	0.0040	0.0037	0.0031				
		bard/lpm	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001				
LFM4	36/39	psid/gpm	0.0060	0.0043	0.0040	0.0036	0.0033	0.0029				
		bard/lpm	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001				

¹Max flow rates and ΔP factors assume μ = 150 SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula on page 22 for viscosity change.

LF(M) Specifications

Dimensions	See Installation Drawings on page 182-183 for model specific dimensions.											
Operating Temperature	Fluid Temperature 30°F to 225°F (0°C to 105°C)						Ambient Temperature -4°F to 140°F (-20C to 60C)					
Operating Pressure	150 psi (10 bar) standard, see Special Options for additional pressure ratings.											
Element Collapse Rating	HP105 150 psi (10.3 bar)			HP106 150 psi (10.3 bar)			HP107 150 psi (10.3 bar)			HP8314 (All Codes) 150 psi (10.3 bar)		
Integral Bypass Setting	HP106 – integral element bypass 25 psid (1.7 bard)			HP107 – Integral element bypass 50 psid (3.4 bard)			HP8314 (Code 82) – Integral housing bypass 25 psid (1.7 bard)			HP8314 (Code 83) – Integral housing bypass 50 psid (3.4 bard)		
Materials of Construction	Housing Carbon steel with industrial coating Optional 304/316 stainless steel											
Media Description	M G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta_{x_{CQ}} \geq 4000$			A G8 Dualglass high performance media combined with water removal scrim. $\beta_{x_{CQ}} \geq 4000$			W Stainless steel wire mesh media $\beta_{x_{CQ}} \geq 2$ ($\beta_x \geq 2$)			VTM $\beta_{3_{CQ}} \geq 4000$ particulate, insoluble oxidation by-product and water removal media		
Replacement Elements	To determine replacement elements, use corresponding codes from your assembly part number:											
	Element Type Code			Filter Element Part Number						Example		
	5			HP105L[Length Code] – [Media Selection Code][Seal Code]						HP105L36–6AB		
	6			HP106L[Length Code] – [Media Selection Code][Seal Code]						HP106L18–10MV		
	7			HP107L[Length Code] – [Media Selection Code][Seal Code]						HP107L36–VTM710V		
	8X			HP8314L[Length Code] – [Media Selection Code][Seal Code]						HP8314L39–25WV		
	82			HP8314L[Length Code] – [Media Selection Code][Seal Code]						HP8314L16–12MB		
	85			HP8314L[Length Code] – [Media Selection Code][Seal Code]						HP8314L39–16ME–WS		
Fluid Compatibility	Petroleum and mineral based fluids, #2 diesel fuels (standard). For specified synthetics contact factory for compatibility with fluorocarbon seal option. For phosphate ester (P9) or skydrol fluid (S9) compatibility select fluid compatibility from special options.											
Filter Sizing ¹	Filter assembly clean element ΔP after actual viscosity correction should not exceed 10% of filter assembly bypass setting. See page 22 for filter assembly sizing guidelines & examples. For applications with extreme cold start condition contact Hy-Pro for sizing recommendations.											
ΔP Factors ¹	Model	Length	Units	Media								
				VTM	05M	1M	3M	6M	10M	16M	25M	**W
LF	16/18	psid/gpm	bard/lpm	0.0628	0.0473	0.0463	0.0391	0.0303	0.0271	0.0266	0.0256	0.0046
				0.0011	0.0009	0.0008	0.0007	0.0006	0.0005	0.0005	0.0005	0.0001
	36/39	psid/gpm	bard/lpm	0.0440	0.0331	0.0324	0.0273	0.0212	0.0190	0.0186	0.0179	0.0032
				0.0008	0.0006	0.0006	0.0005	0.0004	0.0003	0.0003	0.0003	0.0001
LFM3	36/39	psid/gpm	bard/lpm	0.0122	0.0092	0.0081	0.0055	0.0051	0.0045	0.0041	0.0035	0.0029
				0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
LFM4	36/39	psid/gpm	bard/lpm	0.0091	0.0069	0.0067	0.0048	0.0044	0.004	0.0037	0.0032	0.0025
				0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	Model	Length	Units	Media								
				1A	3A	6A	10A	16A	25A			
LF	16/18	psid/gpm	bard/lpm	0.0514	0.0434	0.0336	0.0302	0.0295	0.0284			
				0.0009	0.0008	0.0006	0.0005	0.0005	0.0005			
	36/39	psid/gpm	bard/lpm	0.0360	0.0304	0.0235	0.0211	0.0207	0.0199			
				0.0007	0.0006	0.0004	0.0004	0.0004	0.0004			
LFM3	36/39	psid/gpm	bard/lpm	0.0073	0.0049	0.0046	0.0040	0.0037	0.0031			
				0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
LFM4	36/39	psid/gpm	bard/lpm	0.0060	0.0043	0.0040	0.0036	0.0033	0.0029			
				0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			

¹Max flow rates and ΔP factors assume $u = 150$ SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula on page 22 for viscosity change.

LF(M) Part Number Builder

LF

					-		-	
Series	Connection	Element Type	Element Length	ΔP Indicator		Special Options		Media Seal

Series	Number of Elements		Max Flow Rate	
omit	1 element		200 gpm (757 lpm) ¹	
M3	3 elements		600 gpm (2271 lpm) ¹	
M4	4 elements		800 gpm (3028 lpm) ¹	
M9	9 elements		1800 gpm (6814 lpm) ¹	
M14	14 elements		2800 gpm (10,600 lpm) ¹	
M22	22 elements		4400 gpm (16,656 lpm) ¹	
M38	38 elements		7600 gpm (28,769 lpm) ¹	
Connection				
A2	2" ANSI flange – 150# standard		D8*	DN200 DIN flange – PN16 standard
A3	3" ANSI flange – 150# standard		D10*	DN250 DIN flange – PN16 standard
A4	4" ANSI flange – 150# standard		F2¹	2" Code 61 flange
A6	6" ANSI flange – 150# standard		F3¹	3" Code 61 flange
A8*	8" ANSI flange – 150# standard		G2	2" G thread (BSPP)
A10*	10" ANSI flange – 150# standard		G3	3" G thread (BSPP)
D2	DN50 DIN flange – PN16 standard		N2	2" NPT
D3	DN80 DIN flange – PN16 standard		N3	3" NPT
D4	DN100 DIN flange – PN16 standard		N4	4" NPT
D6	DN150 DIN flange – PN16 standard		S2²	2" SAE threaded O-ring boss
Element Type				
5	HP105 – no bypass		8X	HP8314 – no bypass
6	HP106 – 25 psid (1.7 bard) integral element bypass		82	HP8314 – 25 psid (1.7 bard) integral housing bypass
7	HP107 – 50 psid (3.4 bard) integral element bypass		85	HP8314 – 50 psid (3.4 bard) integral housing bypass
Element Length				
18³	L18 single length filter housing and coreless element		16³	L16 single length filter housing and coreless element
36³	L36 single length filter housing and coreless element		39³	L39 single length filter housing and coreless element
ΔP Indicator				
D	22 psid visual gauge + electric switch		H	65 psid visual gauge + electric switch (elements 5 or 8X only)
E	22 psid visual gauge		J	65 psid visual gauge (elements 5 or 8X only)
F	45 psid visual gauge + electric switch		P	2 pressure gages (industrial liquid filled)
G	45 psid visual gauge		X	None (ports plugged)
Special Options				
omit	150 psi (10.3 bar) max operating pressure, carbon steel		S4⁵	1000 psi (68.9 bar) max oper. pressure, 304 stainless steel
F	Filter element ΔP gauge with tattle tale follower needle		S9⁶	Skydrol fluid compatibility modification
G	Spill retention pan with fork guides (industrial coated steel)		U1	U Code (ASME U code certified)
P9⁴	Phosphate ester fluid compatibility modification		W	Automatic air bleed valve
S1⁵	150 psi (10.3 bar) max oper. pressure, 304 stainless steel		X	250 psi (17.2 bar) max oper. pressure, carbon steel
S2⁵	250 psi (17.2 bar) max oper. pressure, 304 stainless steel		Y	450 psi (31.0 bar) max oper. pressure, carbon steel
S3⁵	450 psi (31.0 bar) max oper. pressure, 304 stainless steel		Z	1000 psi (68.9 bar) max oper. pressure, carbon steel
Media Selection	G8 Dualglass		G8 Dualglass + water removal	
05M	β _{0.9} _{IC} ≥ 4000		1A	β ₃ _{IC} ≥ 4000
1M	β ₃ _{IC} ≥ 4000		3A	β ₅ _{IC} ≥ 4000
3M	β ₅ _{IC} ≥ 4000		6A	β ₇ _{IC} ≥ 4000
6M	β ₇ _{IC} ≥ 4000		10A⁷	β ₁₂ _{IC} ≥ 4000
10M⁷	β ₁₂ _{IC} ≥ 4000		25A	β ₂₂ _{IC} ≥ 4000
16M	β ₁₇ _{IC} ≥ 4000			
25M	β ₂₂ _{IC} ≥ 4000			
	VTM			
	VTM710⁸ β ₃ _{IC} ≥ 4000 particulate, insoluble oxidation by-product and water removal media			
Seals				
B	Nitrile (Buna)			
V	Fluorocarbon			
E-WS	EPR seals + stainless steel support mesh			

¹Maximum recommended flow rate based on velocity through port and internal flow path. Consult sizing guidelines or consult factory for sizing based on flow rate, viscosity, temperature, filter media selection.

²Code 61 flange and SAE connection options include all other ports with SAE connections. When selected, no NPT connections are present in the assembly.

³Compatibility will be based on Element Type selection. For elements HP105, HP106, and HP107, use Length Code 18 or 36. Length Codes 16 and 39 only compatible with HP8314 element.

⁴When selected, must be paired with Seal option "V." Contact factory for more information or assistance in fluid compatibility.

⁵Lid closure hardware is plated carbon steel.

⁶When selected, must be paired with Seal option "E-WS." Contact factory for more information or assistance in fluid compatibility.

⁷For elements HP8314, use 12M or 12A for respective media code in place of 10M or 10A.

⁸Only available on HP107 series elements. Max recommended flow rate 16 gpm (60 lpm) for HP107L36-VTM710* elements and 8 gpm (30 lpm) for HP107L18-VTM710* elements.

*Not available in single element configurations.

For all up to date option details and compatibilities, please reference our Contamination Solutions Price List or contact customer service.

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Filtration starts with the filter.

Lower ISO Codes: Lower Total Cost of Ownership Hy-Pro filter elements deliver lower operating ISO Codes so you know your fluids are always clean, meaning lower total cost of ownership and reducing element consumption, downtime, repairs, and efficiency losses.

DFE Rated Filter Elements DFE is Hy-Pro's proprietary testing process which extends ISO 16889 Multi Pass testing to include real world, dynamic conditions and ensures that our filter elements excel in your most demanding hydraulic and lube applications.

Upgrade Your Filtration Keeping fluids clean results in big reliability gains and upgrading to Hy-Pro filter elements is the first step to clean oil and improved efficiency.

Advanced Media Options DFE glass media maintaining efficiency to $\beta_{3, \mu} > 4000$, Dualglass + water removal media to remove free and emulsified water, stainless wire mesh for coarse filtration applications, and Dynafuzz stainless fiber media for EHC and aerospace applications.

Delivery in days, not weeks From a massive inventory of ready-to-ship filter elements to flexible manufacturing processes, Hy-Pro is equipped for incredibly fast response time to ensure you get your filter elements and protect your uptime.

More than just filtration Purchasing Hy-Pro filter elements means you not only get the best filters, you also get the unrivaled support, training, knowledge and expertise of the Hy-Pro team working shoulder-to-shoulder with you to eliminate fluid contamination.



Want to find out more? Get in touch.

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