DLF(M)

Low Pressure High Flow Duplex Filter Assembly

Designed to maintain continuous filtration, even throughout element servicing, the DLF series filter assemblies provide two high efficiency, high capacity filter housings coupled by a user-friendly 6-way, 3 position valve that completely seals the system from the atmosphere. Use the DLF(M) to remove particulate and water from a variety of fluids and maximize your uptime.

Ideal for systems where filters must be serviced without system interruption such as hydraulic, pulp and paper, rolling mill oil, bulk oil handling, critical process oil and fuel applications, and high flow turbine lube oil filtration.

Max Operating Pressure: 150 psi (10 bar)
Available options up to 450 psi (31 bar)

HY-PRO

hyprofiltration.com/

One assembly, twice the filtration.

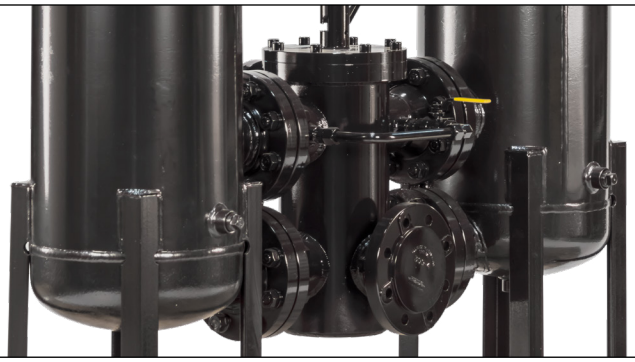
DLF assemblies combine two powerful LF housings to deliver lower ISO Codes faster than ever. With a turn of the lever, you'll introduce a new element to your fluid while simultaneously valving the used element out of service to easily change and replace, all while your system continues operating at full capacity.

Built for industrial use.

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

Filtration starts with the filter.

The oversized coreless filter element in every DLF 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.

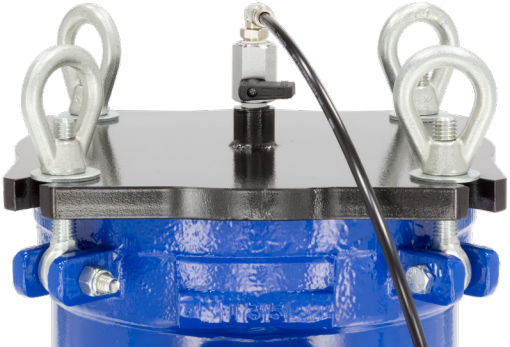


Seamlessly integrated into your systems.

Multiple connection options provide you with the ability to integrate the DLF directly in-line on your systems and get the most impact from your filtration directly where you need it.

Inherently safe.

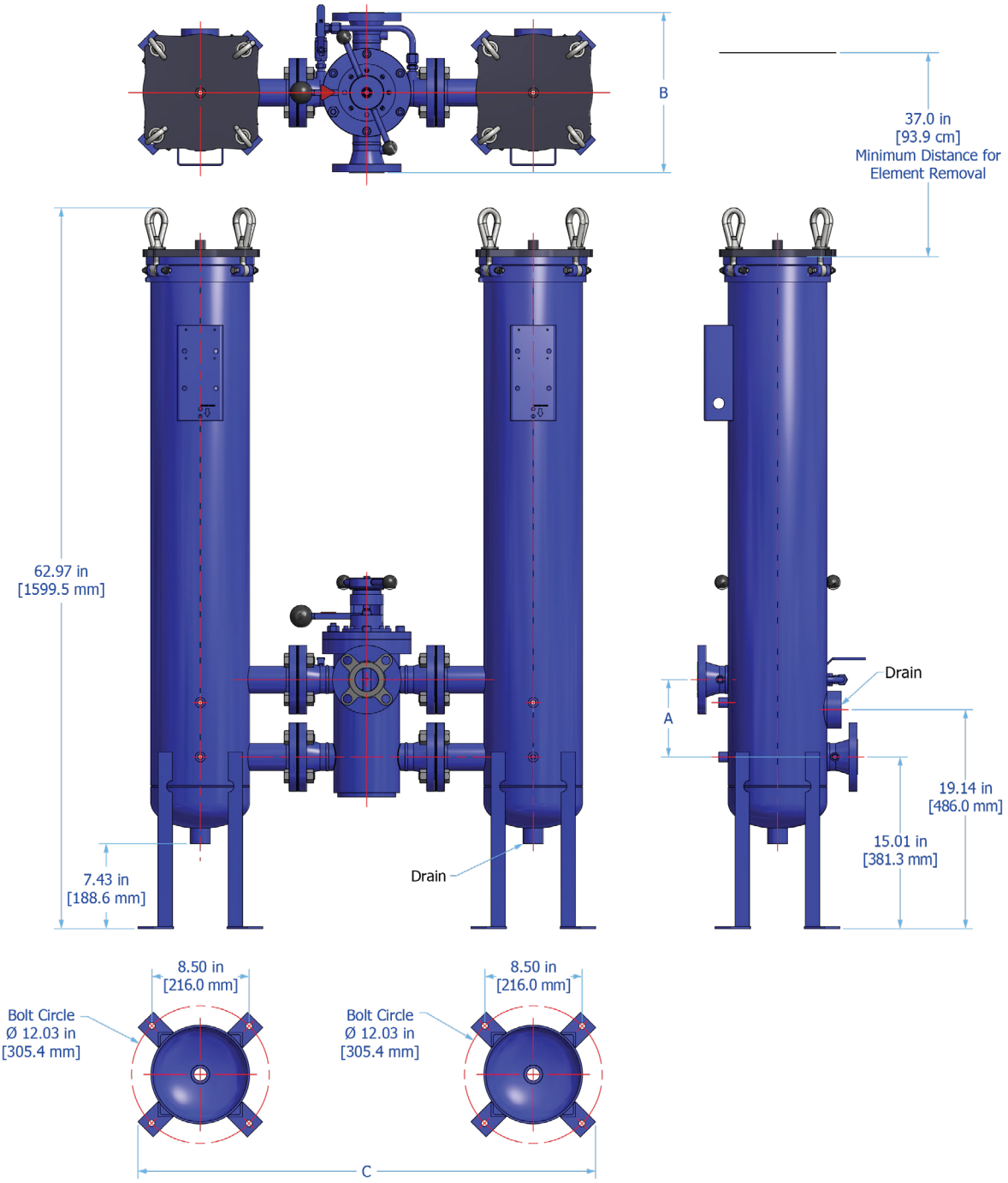
The true 6-way valve with internal pressure equalization and fill line allows for seamless transition of flow from one housing to the other. As the valve is repositioned, oil from the in-service housing is redistributed to the out-of-service housing to purge air before it can move downstream – meaning you maintain fluid levels, preserve system control and prevent cavitation of your components, all while ensuring your fluid stays remarkably clean.



Clean oil has never been easier.

Designed to combine incredible capacity and low maintenance, the oversized housing with secure swivel bolts allow for effortless element changes with all the parts kept right where they need to be. The top loading housing and post/nipple system provide incredible ease of use and make element installation and maintenance easier than ever.

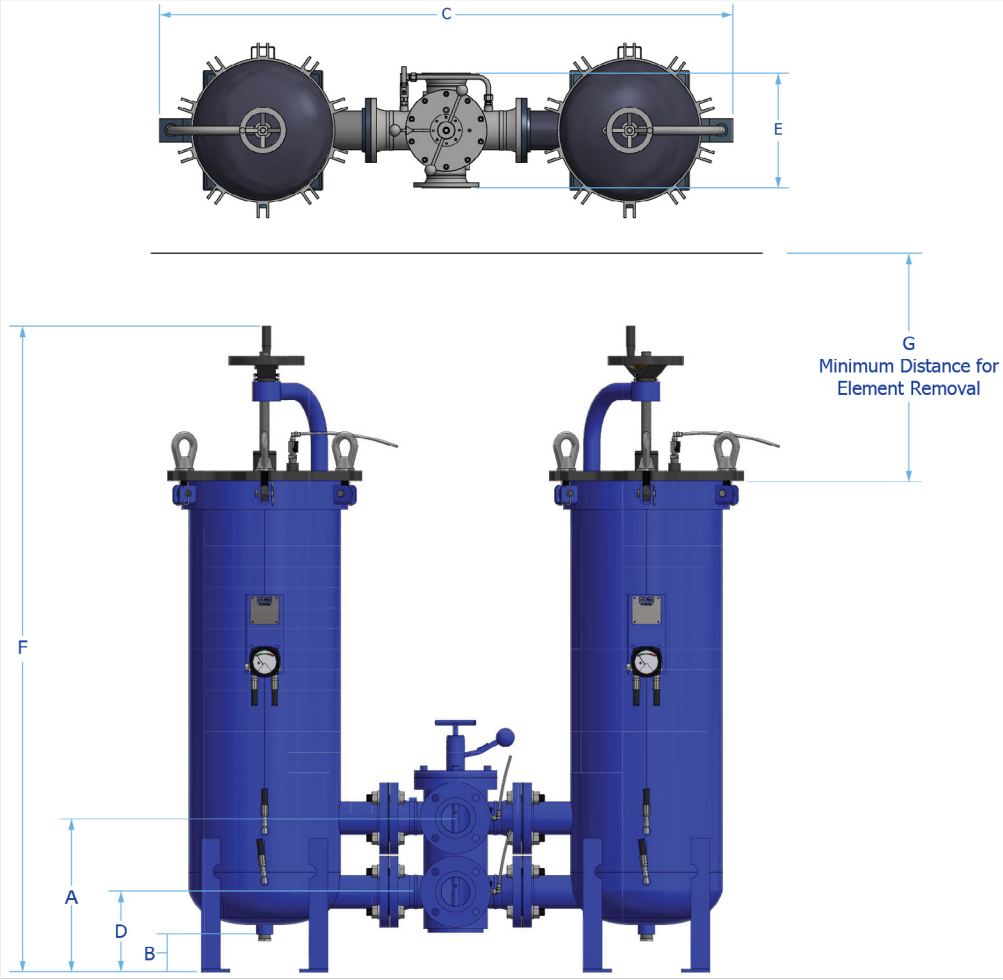
DLF Installation Drawing



Series	Port Size	Vessel Diameter	A	B	C	Weight
DLF	2	8.0 in 20.3 cm	11.7 in 29.7 cm	14.0 in 35.6 cm	41.4 in 105.2 cm	389.0 lb 176.4 kg
	3	8.0 in 20.3 cm	11.7 in 29.7 cm	14.0 in 35.6 cm	43.4 in 110.2 cm	451.0 lb 204.6 kg
	4	8.0 in 20.3 cm	15.2 in 38.6 cm	17.0 in 43.2 cm	50.7 in 128.8 cm	544.0 lb 246.8 kg

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

DLFM Installation Drawing



Series	Number of Elements	Port Size	Vessel Diameter	A	B	C	D	E	F	G	Weight
DLFM	3	2	16.0 in 40.6 cm	19.1 in 48.6 cm	8.4 in 21.3 cm	68.8 in 172.2 cm	12.4 in 31.4 cm	14.0 in 35.6 cm	74.0 in 187.9 cm	37.0 in 94.0 cm	774.0 lb 351.0 kg
		3	16.0 in 40.6 cm	20.1 in 51.1 cm	8.4 in 21.3 cm	69.8 in 177.3 cm	12.4 in 31.4 cm	14.0 in 35.6 cm	74.0 in 187.9 cm	37.0 in 94.0 cm	875.0 lb 397.0 kg
		4	16.0 in 40.6 cm	22.6 in 57.5 cm	8.4 in 21.3 cm	76.8 in 195.0 cm	12.4 in 31.4 cm	16.8 in 42.5 cm	74.0 in 187.9 cm	37.0 in 94.0 cm	988.0 lb 448.0 kg
	4	2	18.0 in 45.7 cm	19.1 in 48.6 cm	7.9 in 20.1 cm	71.8 in 182.4 cm	12.4 in 31.4 cm	14.0 in 35.6 cm	79.0 in 200.6 cm	37.0 in 94.0 cm	944.0 lb 428.0 kg
		3	18.0 in 45.7 cm	20.1 in 51.1 cm	7.9 in 20.1 cm	73.8 in 187.5 cm	12.4 in 31.4 cm	14.0 in 35.6 cm	79.0 in 200.6 cm	37.0 in 94.0 cm	1045.0 lb 474.0 kg
		4	18.0 in 45.7 cm	22.6 in 57.5 cm	7.9 in 20.1 cm	80.8 in 205.3 cm	12.4 in 31.4 cm	16.8 in 42.5 cm	79.0 in 200.6 cm	37.0 in 94.0 cm	1160.0 lb 526.0 kg
	9	3	24.0 in 61.0 cm	20.1 in 51.1 cm	7.5 in 19.1 cm	85.8 in 217.9 cm	12.4 in 31.4 cm	14.0 in 35.6 cm	81.5 in 207.0 cm	37.0 in 94.0 cm	1629.0 lb 739.0 kg
		4	24.0 in 61.0 cm	22.6 in 57.5 cm	7.5 in 19.1 cm	92.8 in 235.7 cm	12.4 in 31.4 cm	16.8 in 42.5 cm	81.5 in 207.0 cm	37.0 in 94.0 cm	1742.0 lb 791.0 kg
		6	24.0 in 61.0 cm	23.9 in 60.7 cm	7.5 in 19.1 cm	97.8 in 248.4 cm	12.4 in 31.4 cm	19.8 in 50.2 cm	81.5 in 207.0 cm	37.0 in 94.0 cm	2063.0 lb 936.0 kg

[1] Dimensions are approximations taken from base model and will vary according to options chosen and customer sizing requirements. Contact factory to request model specific drawings or for any models not listed above.
Dimensions shown are for 36" long filter elements.

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)

$$\text{ΔP Coefficient} = \frac{\text{Actual Operating Viscosity1 (SUS)}}{150} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Using Centistokes (cSt)

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

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

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

Filter Sizing[1]

Filter assembly clean element ΔP after actual viscosity correction should not exceed 10% of filter assembly bypass setting. See previous page 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 1M	3M	6L	10M	16M	25M	**W
DLF	L36/L39	psid/gpm	0.0324	0.0273	0.0212	0.0190	0.0186	0.0179	0.0032
		bard/lpm	0.0009	0.0008	0.0007	0.0007	0.0007	0.0007	0.0006
DLFM3	L36/L39	psid/gpm	0.0081	0.0055	0.0051	0.0045	0.0041	0.0035	0.0029
		bard/lpm	0.00015	0.0001	0.00009	0.00008	0.00007	0.00006	0.00005
DLFM4	L36/L39	psid/gpm	0.0067	0.0048	0.0044	0.004	0.0037	0.0032	0.0025
		bard/lpm	0.00012	0.00009	0.00008	0.00007	0.00007	0.00006	0.00005
DLFM9	L36/L39	psid/gpm	0.0034	0.0025	0.0022	0.002	0.0019	0.0016	0.0013
		bard/lpm	0.00006	0.00005	0.00004	0.00004	0.00003	0.00003	0.00002

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

DLF(M) Specifications

Dimensions

See Installation Drawing for model specific dimensions.

Operating Temperature

Fluid Temperature	Ambient Temperature
30°F to 225°F (0°C to 105°C)	-4°F to 140°F (-20C to 60C)

Operating Pressure

150 psi (10.3 bar) standard. See special options for additional pressure ratings.

Element Collapse Rating

HP105	HP106	HP107	HP8314 (All Codes)
150 psi (10.3 bar)	150 psi (10.3 bar)	150 psi (10.3 bar)	150 psi (10.3 bar)

Integral Element Bypass Setting

HP106	HP107	HP8314 (Code 82)	HP8314 (Code 83)
25 psid (1.7 bard)	50 psid (3.4 bard)	25 psid (1.7 bard)	50 psid (3.4 bard)

Materials of Construction

Housing
Industrial coated carbon steel

Media Description

M	A	W
G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta x_{[C]} \geq 4000$	G8 Dualglass high performance media combined with water removal scrim. $\beta x_{[C]} \geq 4000$	Stainless steel wire mesh media $\beta x_{[C]} \geq 2$ ($\beta x \geq 2$)

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]	HP107L36–25MB
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 or skydrol fluid 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.

DLF(M) Part Number Builder

DLF [ ] [ ] [ ] [ ] [ ] - [ ] - [ ] [ ]

Series | Port Configuration | Connection | Element Type | ΔP Indicator | Special Options | Media | Seal

Series

Number of Elements

omit	1 element
M3	3 elements
M4	4 elements
M9	9 elements
M14	14 elements
M22	22 elements

Max Flow Rate

200 gpm (757 lpm)[1]
600 gpm (2271 lpm)[1]
800 gpm (3028 lpm)[1]
1800 gpm (6814 lpm)[1]
2800 gpm (10,600 lpm)[1]
4400 gpm (16,656 lpm)[1]

Port Configuration

K	Opposite side porting (180°), same center line
O	Opposite side porting (180°), in-line (different center line)
S	Same side porting (standard)

Connections

A15	1.5" ANSI flange
A2	2" ANSI flange
A3	3" ANSI flange
A4	4" ANSI flange
A6	6" ANSI flange
D15	DN40 DIN flange
D2	DN50 DIN flange
D3	DN80 DIN flange
D4	DN100 DIN flange
D6	DN150 DIN flange
F15	1.5" Code 61 flange
F2	2" Code 61 flange
F3	3" Code 61 flange
F4	4" Code 61 Flange

Element Type

5	HP105 – no bypass
6	HP106 – 25 psid (1.7 bard) integral element bypass
7	HP107 – 50 psid (3.4 bard) integral element bypass
8X	HP8314 – no bypass
82	HP8314 – 25 psid (1.7 bard) integral housing bypass
85	HP8314 – 50 psid (3.4 bard) integral housing bypass

ΔP Indicator

D	22 psid visual gauge + electric switch
E	22 psid visual gauge
F	45 psid visual gauge + electric switch
G	45 psid visual gauge
H*	65 psid visual gauge + electric switch
J*	65 psid visual gauge (elements 5 or 8* only)
P	2 pressure gages (industrial liquid filled)
X	None (ports plugged)

Special Options

omit	150 psi (10.3 bar) max operating pressure, carbon steel
F	Filter element ΔP gauge with tattle tale follower needle
G	Spill retention pan with fork guides (industrial coated steel)
P9[2]	Phosphate ester fluid compatibility modification
S1[3]	150 psi (10.3 bar) max oper. pressure, 304 stainless steel
S2[3]	250 psi (17.2 bar) max oper. pressure, 304 stainless steel
S3[3]	450 psi (31.0 bar) max oper. pressure, 304 stainless steel
S9[4]	Skydrol fluid compatibility modification
U1[5]	U Code (ASME U code certified - only applies to vessels)
W	Automatic air bleed valve
X	250 psi (17.2 bar) max oper. pressure, carbon steel
Y	450 psi (31.0 bar) max oper. pressure, carbon steel

Media Selection

G8 Dualglass

1M	$\beta 3_{[C]} \geq 4000$
3M	$\beta 5_{[C]} \geq 4000$
6L	$\beta 7_{[C]} \geq 4000$
10M[6]	$\beta 12_{[C]} \geq 4000$
16M	$\beta 17_{[C]} \geq 4000$
25M	$\beta 22_{[C]} \geq 4000$

G8 Dualglass + water removal

3A	$\beta 5_{[C]} \geq 4000$
6A	$\beta 7_{[C]} \geq 4000$
10A[6]	$\beta 12_{[C]} \geq 4000$
25A	$\beta 22_{[C]} \geq 4000$

Stainless wire mesh

25W	25µ nominal
40W	40µ nominal
74W	74µ nominal
149W	149µ nominal

Seals

B	Nitrile (Buna)
V	Fluorocarbon

[1] Maximum 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.
[2] When selected, must be paired with Seal option "V." Contact factory for more information or assistance in fluid compatibility.
[3] Lid closure hardware is plated carbon steel.
[4] When selected, must be paired with Seal option "E-WS." Contact factory for more information or assistance in fluid compatibility.
[5] U1 option only applies to vessels not to transfer valve.
[6] For elements HP8314, use 12M or 12A for respective media code in place of 10M or 10A.
[*] 65psi indicator options are to only to be used with 3" connection and lower.

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

Filtration starts with the filter(s).

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 $\beta 3_{[c]} > 4000$, 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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