FSW

Wall Mounted Filtration Systems

A compact, dedicated off-line contamination solution ideal for small reservoirs, gearboxes and diesel engine crankcase conditioning. Element media options for every application including particulate removal, water absorption, varnish and acid removal.

Compact and compatible, the FSW is the perfect off-line filtration system for removing contamination from your systems and making sure they remain in peak operating condition.

Donaldson HY-PRO™ hyprofiltration.com/

User friendly on a whole new scale.

With everything you need together in one tiny little package, FSW service and operation couldn't be easier. From the top loading housing to sample ports, the FSW is built to match powerful filtration with your convenience. And with the no-tools-required swing bolt enclosure, worrying about lost parts during service becomes a thing of the past.

Elements that go beyond industry standard.

DFE rated advanced media technologies provide the highest level of particulate capture and retention capabilities so your equipment operates unimpeded by contamination. With media options down to $\beta 3_{[C]} > 4000$ + water absorption and integral element bypass valves, you get the perfect element for your application, every time.

ICB Advanced Resin Technologies.

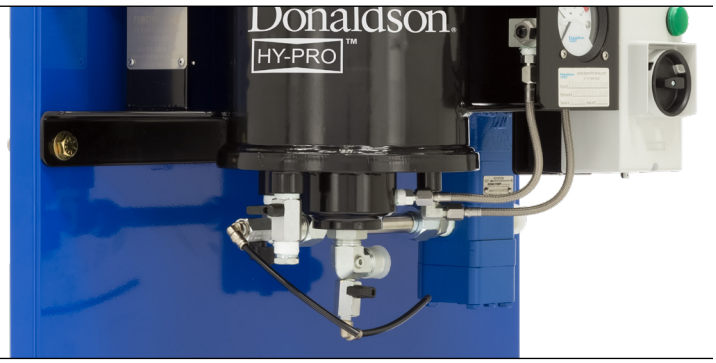
ICB canisters treat your oil on a molecular level removing acids, soluble oxidation by-products (varnish), dissolved metals, and extending useful fluid life by protecting AO additives or improving FRF resistivity. Let us help you pick the right ICB media for your turbine & compressor lube oil varnish challenges or to help you achieve trouble free phosphate ester maintenance.

AW oils, say goodbye to varnish.

FSW fitted with VTM media removes insoluble varnish and water while delivering incredibly low ISO Codes. Ideal for plastic injection molding and steel mill hydraulics with sensitive servo controls that fall victim to high temperature related insoluble varnish issues.

Dedicated to your success.

The FSW provides dedicated off-line filtration to help you stay in control of total system cleanliness and prolong the life of your critical components. And with standard sample ports in their proper positions, you'll be able to see just how good it can be running your equipment with clean oil.



Small size, huge results.

FSW provides world class filtration in all the tight spaces where you need it most with a compact wall mount arrangement. Combine FSW with a second LFW modular housing for multiple filtration passes, or to combine ICB and particulate removal technologies in series for the perfect comprehensive filtration system.

Filter Sizing Guidelines

Filter Sizing Guidelines and Viscosity Conversion

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.

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)

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

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

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

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.

FSW Quick Guide

FSW Filter Sizing Guidelines

ΔP Factors[1]	Units	Media VTM	1M	3M	6M	10M	16M	25M	**W
	psid/gpm	0.170	0.167	0.098	0.060	0.039	0.025	0.020	0.016
	bard/lpm	0.003	0.003	0.002	0.001	0.001	0.000	0.000	0.000

ICB Sizing

For all ICB applications, please contact factory regarding sizing and flow rate options.

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

Ease of Installation

Integrated versatility.

Easily configured to bolt into your existing infrastructure, the FSW is our most versatile fluid conditioning system built to tackle everything from varnish and acid remediation to delivering unimaginably low ISO codes on your small reservoir or gearbox. So whether installed on-board your service vessel in the North Sea or on each of your fuel delivery lines across Oklahoma, the FSW is perfect for keeping you operating as efficiently as possible.

FSW Specifications

Dimensions[1]	**Height** 22" (56 cm)	**Width** 22" (56 cm)	**Depth** 13" (33 cm)	**Weight** 138 lbs (63 kg)
Mounting & Clearance	Contact factory for detailed system and mounting dimensions.			
Connections	**Inlet** ¾" male JIC 37° flare		**Outlet** ¾" male JIC 37° flare	
Operating Temperature	**Dualglass, Stainless wire mesh, VTM** 30°F to 225°F (0°C to 105°C)	**ICB** 86°F to 176°F (30°C to 80°C)	**Ambient Temperature** -4°F to 104°F (-20C to 40C)	
Materials of Construction	**Vessel** Carbon steel with industrial coating			
Electric Motor	TEFC, 56 frame ½-1 hp, 1450-1750 RPM			
Motor Starter	Motor starter with overload protection.			
Pump	Cast iron, positive displacement gear pump with internal relief. Maximum pressure on pump inlet 15 psi (1 bar). Consult factory for higher pressures.			
Pump Bypass	Full bypass at 150 psi (10 bar)			
Pneumatic Option Air Consumption	~15 cfm @ 60 psi[2]			
Media Description	**M** G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta x_{[C]} \geq 4000$	**A** G8 Dualglass high performance media combined with water removal scrim. $\beta x_{[C]} \geq 4000$	**W** Stainless steel wire mesh media $\beta x_{[C]} \geq 2$ ($\beta x \geq 2$)	
	VTM $\beta 0.9_{[C]} \geq 4000$ particulate, insoluble oxidation by-product and water removal media	**ICB** Ion charge bonding resin media for molecular removal of acids, varnish deposits, soluble oxidation by-products and dissolved metal ions. Contact factory for fluid specification.		

Replacement Elements

To determine replacement elements, use corresponding codes from your equipment part number:

Element Type Code	Filter Element Part Number	Example
4	ICB – 601946 – [ICB Media Selection Code]	ICB-601946-J
6	HP106L10 – [Media Selection Code] [Seal Code]	HP106L10-10AB
7	HP107L10 – [Media Selection Code] [Seal Code]	HP107L10-3MV

Viscosity	10-5000 cSt[3]
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.
Hazardous Environment Options	Select pneumatic powered unit (Power Option 00) or explosion proof NEC Article 501, Class 1, Division 1, Group C+D. Call for IEC, Atex or other requirements. If Explosion Proof option (X--) selected, no electrical cord or cord reel will be included.
Filter Sizing Guidelines	See LFW filter sizing guidelines.

[1]Dimensions are approximations taken from base model and will vary according to options chosen.
[2]Air consumption values are estimated maximums and will vary with regulator setting.
[3]When sized and installed appropriately. Contact factory for applications above 800 cSt for sizing requirements.

FSW Part Number Builder

FSW [ ] [ ] [ ] [ ] [ ] - [ ] - [ ] [ ]

Flow Rate | Element Type | Element Length | Indicator | Power Options | Special Options | Media | Seal

Flow Rate[1]

05	0.5 gpm (1.7 lpm)
1	1 gpm (3.7 lpm)
2	2 gpm (7.5 lpm)
5	5 gpm (18.9 lpm)

Element Type

4[2]	ICB-601946
6	HP106 coreless element, 25 psid (1.7 bard) integral element bypass
7	HP107 coreless element, 50 psid (3.4 bard) integral element bypass

Element Length

10	L10 single length filter housing and element

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
P[3]	2 pressure gages (industrial liquid filled)

Power Options

Contact factory for options not listed

60 Hz, 1750 RPM

12	120 V ac, 1P
22	208-230 V ac, 1P
23	208-230 V ac, 3P
46	460-480 V ac, 3P
57	575 V ac, 3P

50 Hz, 1450 RPM

11	110 V ac, 1P
21	220 V ac, 1P
40	380-440 V ac, 3P
52	525 V ac, 3P

Pneumatic

00	Pneumatically driven air motor & PD pump. FRL & flow meter included.

Explosion proof - Class 1, Division 1, Group C+D per NEC 501 – Ready for outdoor use

X__	Add X prefix to power option listed above. Not available with (00) Pneumatic Option

Special Options

B	Complete filter bypass line
C	CE marked for machinery safety directive 2006/42/EC
F	Filter element ΔP gauge with tattle tale follower needle
J	Add pressure gauge between pump & filter assembly
O[4]	On-board PM-1 particle monitor & clean oil indicator light
P9[5]	Phosphate ester fluid compatibility modification
S2	51" (130 cm) Mounting stand – ships fully assembled
S9[6]	Skydrol fluid compatibility modification
U	CUL and/or CSA marked starter enclosure for Canada
V	Lifting eye kit
W	Automatic air bleed valve
Y[7]	VFD variable speed motor frequency control
Z	On site start-up training

Media Selection

G8 Dualglass

05M	$\beta 0.9_{[C]} \geq 4000$
1M	$\beta 3_{[C]} \geq 4000$
3M	$\beta 4_{[C]} \geq 4000$
6L	$\beta 6_{[C]} \geq 4000$
10M	$\beta 11_{[C]} \geq 4000$
16M	$\beta 16_{[C]} \geq 4000$
25M	$\beta 22_{[C]} \geq 4000$

G8 Dualglass + water removal

1A	$\beta 3_{[C]} \geq 4000$
3A	$\beta 4_{[C]} \geq 4000$
6A	$\beta 6_{[C]} \geq 4000$
10A	$\beta 11_{[C]} \geq 4000$
25A	$\beta 22_{[C]} \geq 4000$

Stainless wire mesh

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

VTM

VTM710[8]	$\beta 0.9_{[C]} \geq 4000$ particulate, insoluble oxidation by-product and water removal media

ICB – max reservoir size

ICBA[9]	Phosphate ester – 150 gal (567 liters)
ICBJ[9]	Jet lube aeroderivative – 100 gal (376 liters)
ICBT[9]	Specified fluids – 600 gal (2271 liters)
ICBV[9]	Mineral based R&O turbine/compressor lube oil – 400 gal (1514 liters)

Seals

B	Nitrile (Buna)
V	Fluorocarbon
E-WS	EPR seals + stainless steel support mesh

[1]Nominal flow rates at 60 Hz motor speeds.
[2]Compatible only with Flow Rate "05" and ICB Media Selection. "05" no "O" option or "x_", "y" included.
[3]Required when selected with ICB media from Element Type.
[4]Not available with "X_" electrical option or VFD "Y" option.
[5]When selected, must be paired with Seal option "V." Contact factory for more information or assistance in fluid compatibility.
[6]When selected, must be paired with Seal option "E-WS." Contact factory for more information or assistance in fluid compatibility.
[7]"Y" option not available with "O" option.
[8]Only available on HP107 series elements. Flow rate should not exceed 4 gpm (15 lpm) for HP107L10-VTM710* elements.
[9]Compatible only with Flow Rate "05" and Element Type "4"

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.

Lower ISO Codes: Lower Total Cost of Ownership Donaldson 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 Donaldson 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 Donaldson 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, Donaldson 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 Donaldson Hy-Pro filter elements means you not only get the best filters, you also get the unrivaled support, training, knowledge and expertise of the Donaldson 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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