

# FSLD

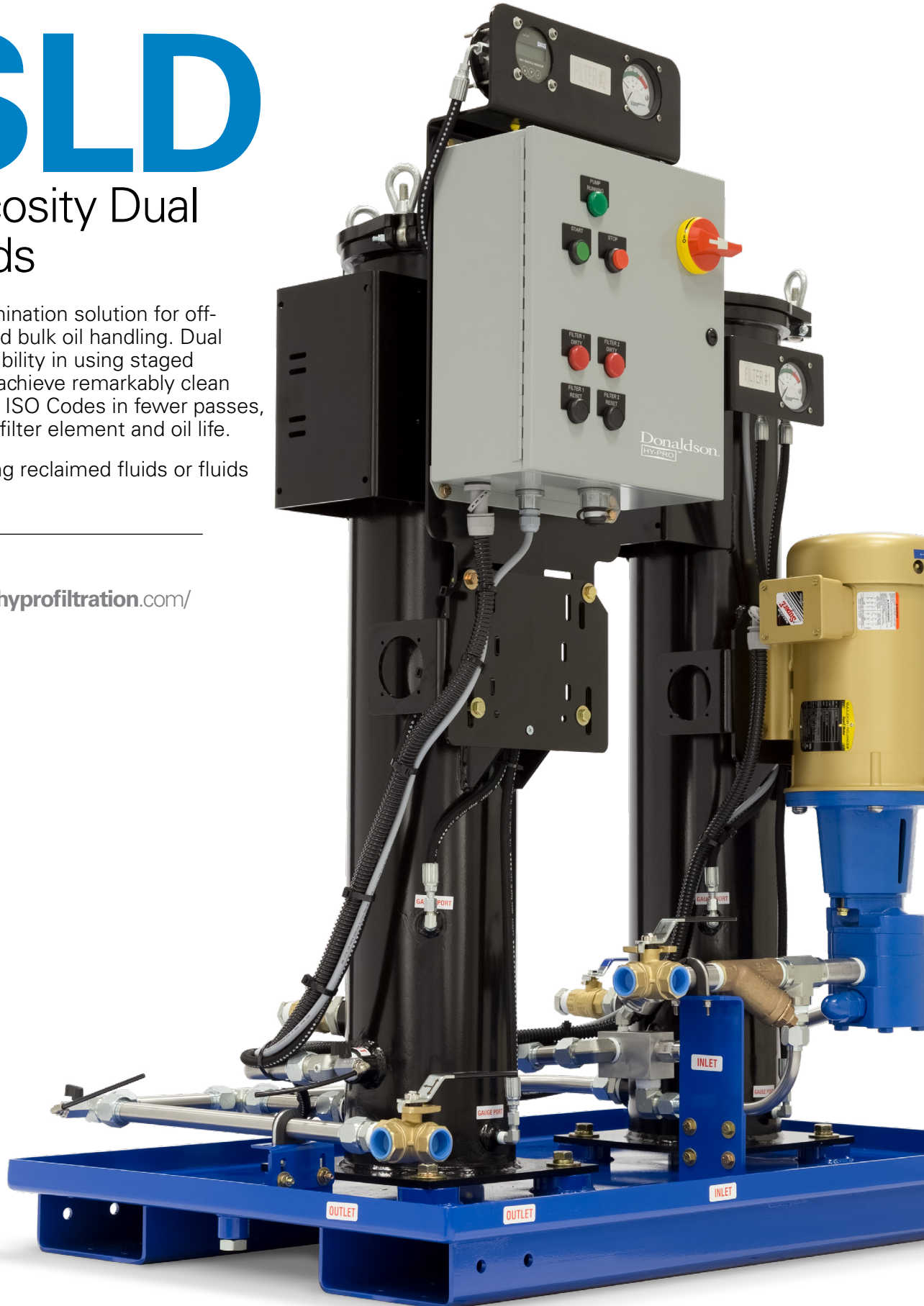
## High Viscosity Dual Filter Skids

A dedicated contamination solution for off-line conditioning and bulk oil handling. Dual housings allow flexibility in using staged element ratings to achieve remarkably clean fluids and hit target ISO Codes in fewer passes, all while extending filter element and oil life.

Ideal for conditioning reclaimed fluids or fluids with high dirt load.

Donaldson.  
HY-PRO™

[hyprofiltration.com/](http://hyprofiltration.com/)



## Dynamic duo.

Combine a number of media options in the dual FSL filter housings to maximize single pass efficiency and achieve lower ISO Codes even faster than you thought possible.

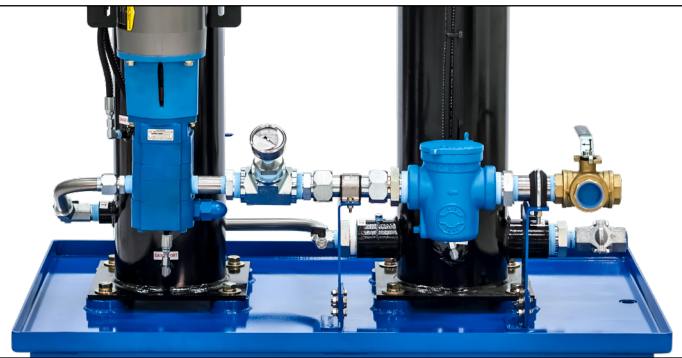


## Filtration starts with the filter(s).

The FSLD's dual oversized coreless filter elements deliver 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, giving you time back from unnecessary gearbox rebuilds and letting you focus on what really matters.

## Engineered for Industrial use.

Rugged construction and attention to the smallest of details come together remarkably so that nothing holds you or your equipment back. The standard spill retention pan and cast iron pump with internal relief mean you get the power and durability you want with the safety you have to have. To top it off, the standard 3-way inlet valve allows you to add new oil through the filter to stop contamination before it can ever enter your system.



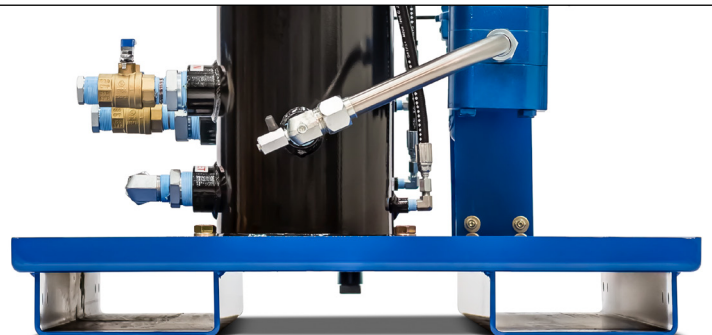
## Make your filtration count.

With the optional filter bypass line, cold starts and element change outs become easier than ever. Add to that the PM-1 Particle Monitor for real time cleanliness data and watch your ISO Codes drop like you'd never believe.



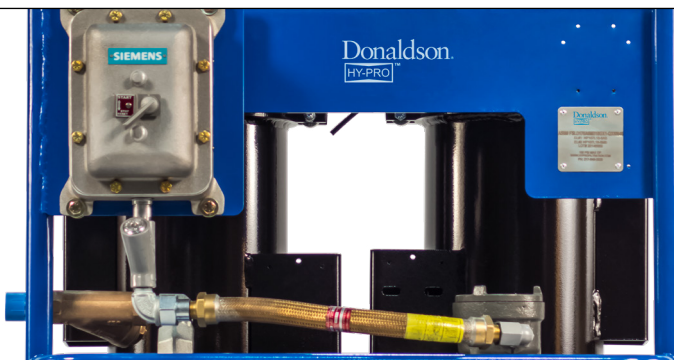
## Setting the new standard.

Every FSLD comes standard with sample ports in the proper locations to arm you with access to consistently accurate system conditions. And with true differential pressure gages, you'll always know exactly how well your filtration is performing.



## Completely customizable.

Every FSLD can be tailored specifically to your application whether you're dealing with high viscosities, cold weather, or temperature sensitive components so you get the perfect solution to your contamination problems.



# FSLD Reference Guide

FSLD10 model with PM-1 option shown

Filter #2 true green to red  $\Delta P$  gauge

Integrated PM-1 Particle Monitor

Top loading filter housing with secure swivel bolts

Air bleed valve

Machine E-stop

Machining running indicator light

Control panel

Filter #1 true green to red  $\Delta P$  gauge

Dirty filter indicator lights

Electric motor

Pressure gauge

Flow control needle valve

Pressure gauge

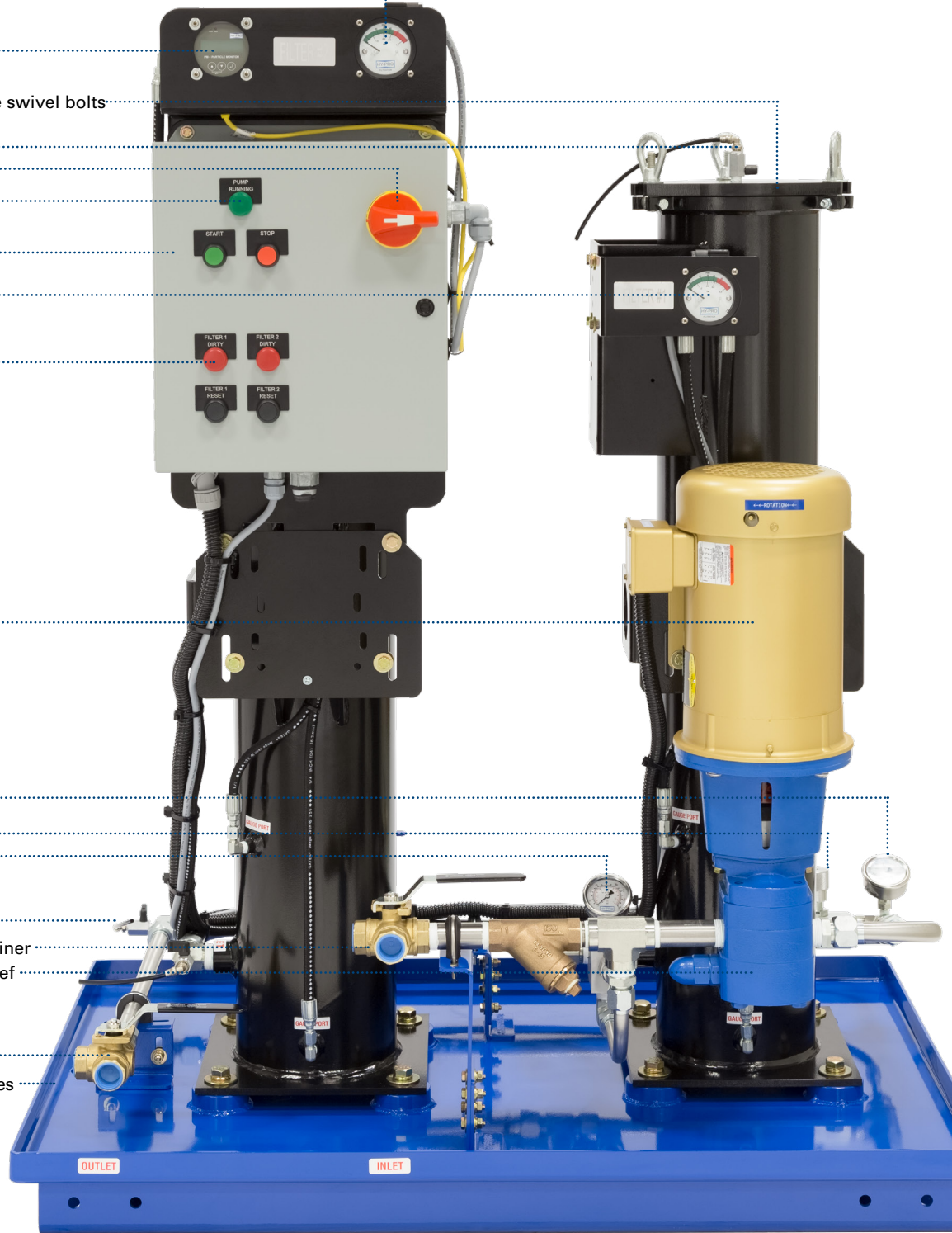
Outlet sample port

System inlet with 3-way valve + Y-strainer

Cast iron gear pump with internal relief

System outlet with 3-way valve

Powder coated steel tray with fork guides



# 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  $\Delta P$  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  $\Delta P$  at both operating and cold start viscosity

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

Sizing recommendations to optimize performance and permit future flexibility

- To avoid or minimize bypass during cold start the actual assembly clean  $\Delta P$  calculation should be repeated for start-up conditions if cold starts are frequent.
- Actual assembly clean  $\Delta P$  should not exceed 10% of bypass  $\Delta P$  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  $\Delta P$  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.

# FSLD Filter Sizing Guidelines

## Filter Sizing<sup>1</sup>

Filter assembly clean element  $\Delta P$  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 Donaldson Hy-Pro for sizing recommendations.

## $\Delta P$ Factors<sup>1</sup>

Length	Units	Media	05M	1M	3M	6M	10M	16M	25M	**W
		VTM								
16/18	psid/gpm	0.063	0.047	0.046	0.039	0.030	0.027	0.027	0.026	0.005
	bard/lpm	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000

36/39	psid/gpm	0.044	0.033	0.032	0.027	0.021	0.019	0.019	0.018	0.003
	bard/lpm	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000

Length	Units	Media	3A	6A	10A	16A	25A
		1A					
16/18	psid/gpm	0.051	0.043	0.034	0.030	0.030	0.028
	bard/lpm	0.001	0.001	0.001	0.001	0.001	0.001

36/39	psid/gpm	0.036	0.030	0.024	0.021	0.021	0.020
	bard/lpm	0.001	0.001	0.000	0.000	0.000	0.000

<sup>1</sup>Max flow rates and  $\Delta P$  factors assume  $\beta = 150$  SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula.

# FSLD Specifications

<b>Dimensions<sup>1</sup></b>	<b>Height</b> 55" (139 cm)	<b>Length</b> 48" (121 cm)	<b>Width</b> 32" (81 cm)	<b>Weight</b> 484 lbs (219 kg)
<b>Connections</b>	<b>Inlet with 3-Way Valve</b> FSLD05-FSLD10: 1" FNPT FSLD20-FSLD30: 1.5" FNPT		<b>Outlet</b> FSLD05-FSLD10: 1" FNPT FSLD20-FSLD30: 1.25" FNPT	
<b>Operating Temperature</b>	<b>Fluid Temperature</b> 30°F to 225°F (0°C to 105°C)		<b>Ambient Temperature</b> -4°F to 104°F (-20C to 40C)	
<b>Materials of Construction</b>	<b>Housings</b> Carbon steel with industrial coating	<b>Tray</b> Carbon steel with industrial coating		
<b>Electric Motor</b>	TEFC, 56-215 frame 1-5 hp, 1450-1750 RPM			
<b>Motor Starter</b>	MSP (motor starter/protector) in an IP65, aluminum enclosure with short circuit and overload protection.			
<b>Pump</b>	Cast iron, positive displacement gear pump with internal relief. Maximum pressure on pump inlet 15 psi (1 bar). Consult factory for higher pressures.			
<b>Pump Bypass</b>	Full bypass at 150 psi (10 bar) <sup>2</sup>			
<b>Pneumatic Option Air Consumption</b>	~40 cfm @ 80 psi <sup>3</sup>			
<b>Media Description</b>	<b>M</b> G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta_{x(c)} \geq 4000$	<b>A</b> G8 Dualglass high performance media combined with water removal scrim. $\beta_{x(c)} \geq 4000$	<b>W</b> Stainless steel wire mesh media $\beta_{x(c)} \geq 2$ ( $\beta_x \geq 2$ )	<b>VTM</b> $\beta_{0.9(c)} \geq 4000$ particulate, insoluble oxidation by-product and water removal media
<b>Replacement Elements</b>	<b>To determine replacement elements, use corresponding codes from your equipment part number:</b>			
	<b>Element Type Code</b>	<b>Filter Element Part Number</b>	<b>Example</b>	
	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	
<b>Viscosity</b>	2-5000 cSt <sup>4</sup>			
<b>Fluid Compatibility</b>	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.			
<b>Hazardous Environment Options</b>	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.			

<sup>1</sup>Dimensions are approximations taken from base model and will vary according to options chosen.

<sup>2</sup>10 GPM pump is rated for intermittent duty only at pressures above 100 psi. Continual operation with dual clogged filters resulting in operating pressures over 100 psi will reduce pump life and/or cause premature pump failure.

<sup>3</sup>Air consumption values are estimated maximums and will vary with regulator setting.

<sup>4</sup>When sized and installed appropriately. Contact factory for applications above 800 cSt for sizing requirements.

# FSLD Part Number Builder

**FSLD**

Flow Rate	Flow Type	Element Type	Element Length	Indicator	Power Options	Special Options	Media 1	Media 2	Seal	

<b>Flow Rate<sup>1</sup></b>	<b>05</b>	0.5 gpm (1.7 lpm)	<b>10</b>	10 gpm (37.9 lpm)
	<b>1</b>	1 gpm (3.7 lpm)	<b>20</b>	20 gpm (75.7 lpm)
	<b>2</b>	2 gpm (7.5 lpm)	<b>30</b>	30 gpm (114 lpm)
	<b>5</b>	5 gpm (18.9 lpm)		

<b>Flow Type</b>	<b>D<sup>2</sup></b>	Duplex
	<b>P<sup>2</sup></b>	Parallel
	<b>S</b>	Series

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

<b>Element Length</b>	<b>18<sup>3</sup></b>	L18 single length filter housing and coreless element	<b>16<sup>3</sup></b>	L16 single length filter housing and coreless element
	<b>36<sup>3</sup></b>	L36 single length filter housing and coreless element	<b>39<sup>3</sup></b>	L39 single length filter housing and coreless element

<b>ΔP Indicator</b>	<b>D</b>	22 psid visual gages + electric switches	<b>H</b>	65 psid visual gages + electric switches (elements 5 or 8X only)
	<b>E</b>	22 psid visual gages	<b>J</b>	65 psid visual gages (elements 5 or 8X only)
	<b>F</b>	45 psid visual gages + electric switches	<b>P</b>	2 pressure gages (industrial liquid filled)
	<b>G</b>	45 psid visual gages	<b>X</b>	None (ports plugged)

<b>Power Options Contact factory for options not listed</b>	<b>60 Hz, 1750 RPM</b>	<b>50 Hz, 1450 RPM</b>	<b>Pneumatic</b>	
	<b>12<sup>4</sup></b>	120 V ac, 1P	<b>11<sup>4</sup></b>	110 V ac, 1P
	<b>22</b>	208-230 V ac, 1P	<b>21</b>	220 V ac, 1P
	<b>23</b>	208-230 V ac, 3P	<b>40</b>	380-440 V ac, 3P
	<b>46</b>	460-480 V ac, 3P	<b>52</b>	525 V ac, 3P
	<b>57</b>	575 V ac, 3P		<b>00</b>

**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.

<b>Special Options</b>	<b>A</b>	Air cooled heat exchanger (consult factory)	<b>O</b>	On-board PM-1 particle monitor & clean oil indicator light
	<b>B</b>	Complete filter bypass line	<b>P9<sup>6</sup></b>	Phosphate ester fluid compatibility modification
	<b>C</b>	CE marked for machinery safety directive 2006/42/EC	<b>R</b>	Spill retention pan with wheels (industrial coated steel)
	<b>D<sup>5</sup></b>	High filter ΔP auto shutdown	<b>S<sup>7</sup></b>	All wetted components 304 or higher stainless steel
	<b>E</b>	100 mesh cast iron basket strainer	<b>S9<sup>8</sup></b>	Skydrol fluid compatibility modification
	<b>F</b>	Filter element ΔP gauge with tattle tale follower needle	<b>U</b>	CUL and/or CSA marked starter enclosure for Canada
	<b>J</b>	Add pressure gauge between pump & filter assembly	<b>V</b>	Lifting eye kit
	<b>K</b>	HP75L8-149W Spin-On suction strainer	<b>W</b>	Automatic air bleed valve
	<b>L<sup>5</sup></b>	High filter element ΔP indicator light	<b>Y</b>	VFD variable speed motor frequency control
	<b>M</b>	Total system flow meter (120 cSt max)	<b>Z</b>	On site start-up training

<b>Media Selection</b>	<b>G8 Dualglass</b>	<b>G8 Dualglass + water removal</b>	<b>Stainless wire mesh</b>	
	<b>05M</b>	β <sub>0.9</sub> (c) ≥ 4000	<b>3A</b>	β <sub>3</sub> (c) ≥ 4000
	<b>1M</b>	β <sub>3</sub> (c) ≥ 4000	<b>6A</b>	β <sub>6</sub> (c) ≥ 4000
	<b>3M</b>	β <sub>4</sub> (c) ≥ 4000	<b>10A<sup>9</sup></b>	β <sub>11</sub> (c) ≥ 4000
	<b>6L</b>	β <sub>6</sub> (c) ≥ 4000	<b>25A</b>	β <sub>22</sub> (c) ≥ 4000
	<b>10M<sup>9</sup></b>	β <sub>11</sub> (c) ≥ 4000		
	<b>16M</b>	β <sub>16</sub> (c) ≥ 4000		
	<b>25M</b>	β <sub>22</sub> (c) ≥ 4000		

<b>VTM</b>	<b>Bag filter</b>
<b>VTM710<sup>10</sup></b>	β <sub>0.9</sub> (c) ≥ 4000 particulate, insoluble oxidation by-product and water removal media
	<b>BAG<sup>11</sup></b>
	#2 size bag housing 25μ nominal

<b>Seals</b>	<b>B</b>	Nitrile (Buna)
	<b>V</b>	Fluorocarbon
	<b>E-WS</b>	EPR seals + stainless steel support mesh

<sup>1</sup>Nominal flow rates at 60 Hz motor speeds.

<sup>2</sup>When selected, omit Media 2 option from part number builder. Element chosen will be supplied for both filter housings.

<sup>3</sup>Compatibility will be based on Element Type selection. For elements HP105, HP106, and HP107, use Length code 36. Length code 39 only compatible with HP8314.

<sup>4</sup>High amp draw on 10 GPM models. Estimated FLA 18. See Appendix for details.

<sup>5</sup>Requires ΔP Indicator option with electric switch selected (options D, F, H).

<sup>6</sup>When selected, must be paired with Seal option "V." Contact factory for more information or assistance in fluid compatibility.

<sup>7</sup>With exception to cast iron gear pump.

<sup>8</sup>When selected, must be paired with Seal option "E-WS." Contact factory for more information or assistance in fluid compatibility.

<sup>9</sup>For elements HP8314, use 12M or 12A for respective media code in place of 10M or 10A.

<sup>10</sup>Only available on HP107 series elements. Flow rate should not exceed 16 gpm (60 lpm) for HP107L36-VTM710\* elements and 8 gpm (30 lpm) for HP107L18-VTM710\* elements.

<sup>11</sup>Available in series 1 housing only. Replaces Element Type in series 1 housing.

For all up to date option details and compatibilities, 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  $\beta_{3(\text{cl})} > 4000$ , 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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