FPL
Dedicated Off-line Filter Panel

A dedicated contamination solution for bulk oil handling, fluid transfer and reservoir or gearbox conditioning.

Enhance cleanliness by adding the FPL to an existing hydraulic system and extend the life of in-line filters.

HY-PRO  hyprofiltration.com/FPL
Ready when you are.
From the pump to the seals, every FPL arrives fully assembled and ready for installation so you can get straight to cleaning your fluids and improving the efficiency of your equipment.

The first stage of success.
Staged filtration allows a range of media selections for particulate and water removal to deliver ISO Codes right on target. Choose between dual MF3 cartridge or up to four Spin-On elements to tackle the most viscous fluids and achieve unimaginably low ISO Codes in a single pass.

Media matters.
DFE rated filter elements stay true to efficiency ratings and ensure the highest level of particulate capture and retention capabilities. And with media options down to $\beta_{2.5}=1000$, you can be sure contamination stays exactly where you want it: out of your system.

Setting the new standard.
Sample ports in the right locations arm you with access to consistently accurate system conditions which is why every FPL comes standard with upstream and downstream sample ports in their proper positions.

Engineered for industrial use.
Precision engineered and built from heavy gauge steel, the FPL is designed to be a powerhouse addition to your equipment. To top it off, the cast iron gear pump with internal relief gives you the durability you want with the safety you need.

From concept to creation.
Whether for plastic injection molding hydraulics with varnish issues or a wind turbine gearbox with small size restrictions, the FPL can be custom designed and built to meet the exact needs to solve your contamination problems.
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)

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

Using Centistokes (cSt)

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

Calculate actual clean filter assembly $\Delta P$ at both operating and cold start viscosity

Actual Assembly Clean $\Delta P$ = Flow Rate $\times$ $\Delta P$ Coefficient (from calculation above) $\times$ Assembly $\Delta P$ 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.
# FPL Filter Sizing Guidelines

## MF3 Options

| Series | Length | Units   | Media 1M | Media 3M | Media 6M | Media 12M | Media 16M | Media 25M | **W  
|--------|--------|---------|---------|---------|---------|-----------|-----------|-----------|---
| MF3    | L13    | psid/gpm | 0.237   | 0.200   | 0.155   | 0.139     | 0.136     | 0.131     | 0.024     |
|        |        | bard/lpm | 0.006   | 0.005   | 0.004   | 0.003     | 0.003     | 0.003     | 0.000     |

## S75 Options

| Series | Length | Units   | Media 1M | Media 3M | Media 6M | Media 12M | Media 16M | Media 25M | **W  
|--------|--------|---------|---------|---------|---------|-----------|-----------|-----------|---
| S75    | L8     | psid/gpm | 0.183   | 0.155   | 0.120   | 0.107     | 0.105     | 0.101     | 0.018     |
|        |        | bard/lpm | 0.003   | 0.003   | 0.002   | 0.001     | 0.002     | 0.002     | 0.000     |
| S75D   | L8     | psid/gpm | 0.092   | 0.077   | 0.060   | 0.054     | 0.053     | 0.051     | 0.009     |
|        |        | bard/lpm | 0.002   | 0.001   | 0.001   | 0.001     | 0.001     | 0.001     | 0.000     |

## Series Length Units Media

| Series | Length | Units | Media 3A | Media 6A | Media 12A | Media 25A | Media 3C | Media 10C | Media 25C | **W  
|--------|--------|-------|----------|----------|-----------|-----------|----------|-----------|-----------|---
| S75    | L8     | psid/gpm | 0.172   | 0.133   | 0.119     | 0.113     | 0.247     | 0.161     | 0.157     | 0.003     |
|        |        | bard/lpm | 0.003   | 0.002   | 0.002     | 0.002     | 0.005     | 0.003     | 0.003     | 0.003     |
| S75D   | L8     | psid/gpm | 0.086   | 0.067   | 0.060     | 0.056     | 0.124     | 0.081     | 0.078     | 0.001     |
|        |        | bard/lpm | 0.002   | 0.001   | 0.001     | 0.001     | 0.002     | 0.001     | 0.001     | 0.001     |

## DFN39 Option

| Series  | Length | Units   | Media 1M | Media 3M | Media 6M | Media 12M | Media 16M | Media 25M | **W  
|---------|--------|---------|---------|---------|---------|-----------|-----------|-----------|---
| DFN39N  | L15    | psid/gpm | 0.463   | 0.391   | 0.301   | 0.266     | 0.218     | 0.210     | 0.117     |
|         |        | bard/lpm | 0.008   | 0.007   | 0.005   | 0.005     | 0.004     | 0.004     | 0.002     |

## PFH419 Option

| Series  | Length | Units   | Media 1M | Media 3M | Media 6M | Media 12M | Media 16M | Media 25M | **W  
|---------|--------|---------|---------|---------|---------|-----------|-----------|-----------|---
| PFH419N | L13    | psid/gpm | 0.236   | 0.200   | 0.155   | 0.139     | 0.136     | 0.131     | 0.024     |
|         |        | bard/lpm | 0.004   | 0.004   | 0.003   | 0.003     | 0.002     | 0.002     | 0.000     |

1Max flow rates and ΔP factors assume $u = 150$ SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula.
# FPL Specifications

## Dimensions
<table>
<thead>
<tr>
<th></th>
<th>Height</th>
<th>Length</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22” (58 cm)</td>
<td>42” (107 cm)</td>
<td>12” (31 cm)</td>
<td>138 lbs (63 kg)</td>
</tr>
</tbody>
</table>

## Connections
- **Inlet with 3-way valve**
  - 1” FNPT
- **Outlet**
  - 1” FNPT

## Operating Temperature
- **Fluid Temperature**
  - 30°F to 225°F
  - (0°C to 105°C)
- **Ambient Temperature**
  - -4°F to 104°F
  - (-20°C to 40°C)

## ΔP Indicator Trigger
- **Standard MF3 Assemblies**
  - 22 psi (1.5 bar)
- **Special Options D1 + S1 (S75/D)**
  - 22 psi (1.5 bar)
- **Special Option D2 (DFN)**
  - 32 psid (2.2 bar)
- **Special Option P1 (PFH)**
  - 73 psid (5 bard)

## Filter Assembly Bypass
- **Standard MF3 Assemblies**
  - 25 psid (1.7 bard)
- **Special Options D1 + S1 (S75/D)**
  - 25 psid (1.7 bard)
- **Special Option D2 (DFN)**
  - 50 psid (3.4 bard)
- **Special Option P1 (PFH)**
  - 102 psid (7 bard)

## Materials of Construction
- **Frame**
  - Carbon steel with industrial coating
- **Electric Motor**
  - TEFC, 56-14S frame
  - 1 hp, 1450-1750 RPM
- **Motor Starter**
  - MSP (motor starter/protector) in an IP65, aluminum enclosure with short circuit and 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
- ~40 cfm @ 80 psi

## Media Description
- **M**
  - G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta x_{w,d} = 1000$ ($\beta x = 200$)
- **A**
  - G8 Dualglass high performance media combined with water removal scrim. $\beta x_{w,d} = 1000$ ($\beta x = 200$)
- **W**
  - Stainless steel wire mesh media $\beta x = 2$ ($\beta x = 2$)

## Replacement Elements
To determine replacement elements, use corresponding codes from your equipment part number:
- **Model**
  - Standard FPL (2x MF3 13” bowls)
  - Special Option D1
  - Special Option D2
  - Special Option P1
  - Special Option S1
- **Filter Element Part Number**
  - HP60L13 - [Media Selection Code] [Seal Code]
  - HP75L8 - [Media Selection Code] [Seal Code]
  - HP39NL15 - [Media Selection Code] [Seal Code]
  - HP419NL13 - [Media Selection Code] [Seal Code]
  - HP75L8 - [Media Selection Code] [Seal Code]
- **Example**
  - HP60L13-12MV
  - HP75L8-25MB
  - HP39NL15-10AB
  - HP419NL13-10MV
  - HP75L8-3AB

## Viscosity
- 2-5000 cSt

## 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 skiodfil (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 will be included.

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1Dimensions are approximations taken from base model and will vary according to options chosen.
210 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.
3Air consumption values are estimated maximums and will vary with regulator setting.
4When sized and installed appropriately. Contact factory for applications above 800 cSt for sizing requirements.

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