



# Hydraulic Filtration Product Guide

Spin-ons • Cartridges • In-tank • Low Pressure • Medium Pressure • High Pressure • Duplex • Accessories



## **Donaldson Delivers Performance Under Any Pressure!**

Clean, dry oil is essential for your equipment. Donaldson Company, a leader in filtration for over 90 years, has proven performance in thousands of applications – offering the industry's largest selection of replacement hydraulic, lube and gear oil filtration products for contamination control.

Distributed by:

# Hydraulic Filter Housing Selection Guide

Locate the Donaldson model closest to the intersection of the maximum operating pressure and maximum flow rate. If there is not a model at the exact intersection, select the nearest series to the right or above the intersection to ensure a filter that is adequate to handle the maximum operating pressure and flow rate has been selected.

Pressure families are color coded in the selection chart for low, medium and high model series. Filter housing styles are identified by their shape.

## Filter Housing Style Code



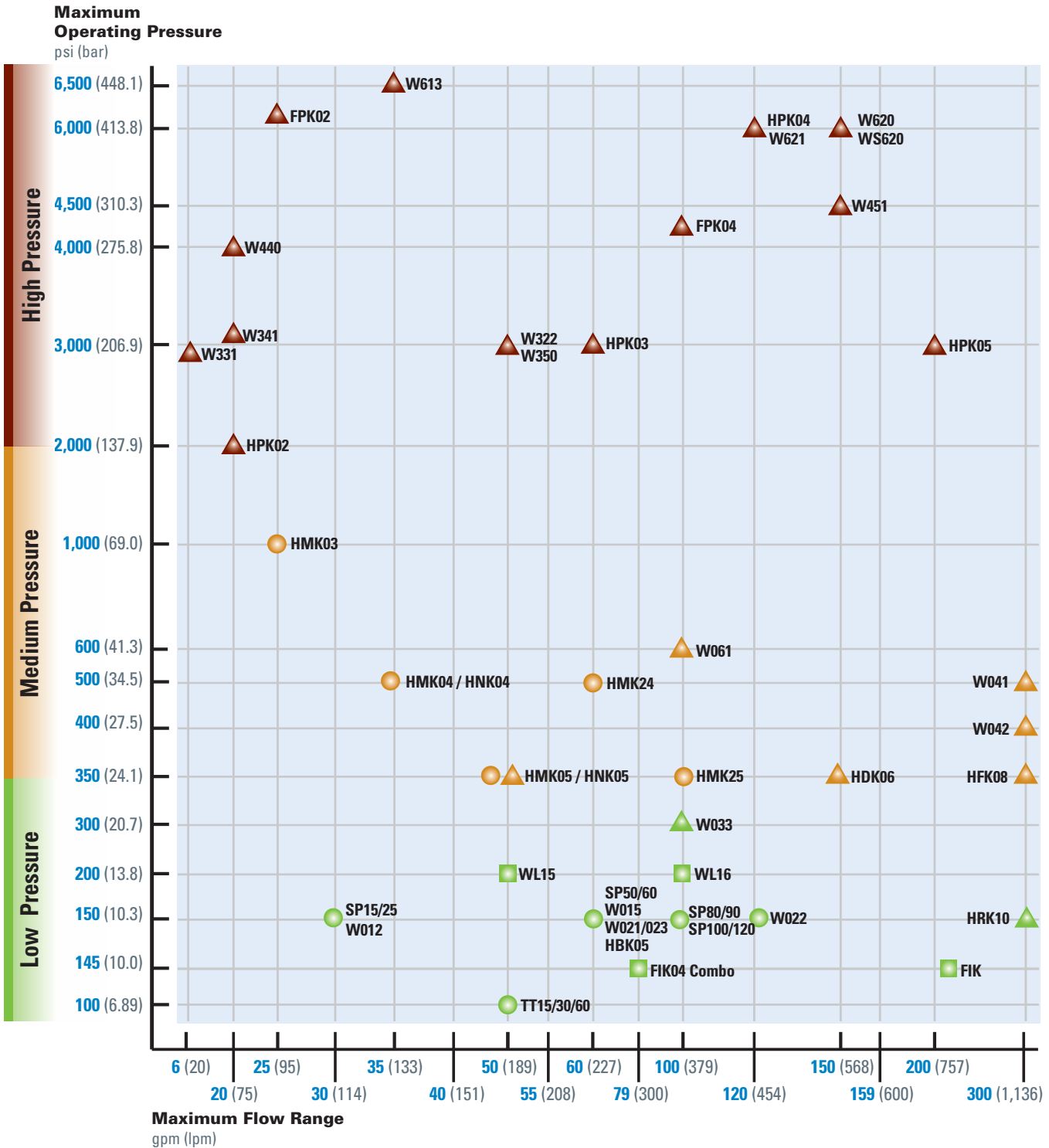
Spin-on



In-tank Housing / Cartridge



In-line Housing / Cartridge



# Selecting the Proper Hydraulic Filter

Sensitive hydraulic circuits are vulnerable to a variety of contaminants that result in inefficiency, downtime and excessive repair costs. It is important to remember that protecting and maintaining the most sensitive components within a circuit will result in effective contamination control.

With the broad range of housing styles and filters available from Donaldson, how do you choose the right filter to reliably protect your systems and equipment? Follow these recommended steps to identify the correct Donaldson filter and parts required for efficient contamination control.

## 1 Determine the system operating pressure and flow rate

**Start by identifying two key factors in the hydraulic system operating environment for the component being protected.**

- nominal and maximum operating pressure
- nominal and maximum flow rate

## 2 Select the filter housing model

**Refer to the *Hydraulic Filter Model Series Selection Guide* on the left to select the filter housing that meets your requirements.**

- Pressure families are color coded for low, medium and high models.
- Housing styles are identified by their shape code: spin-on, in-tank and in-line
- Porting type options – see page 3 for model series details.

## 3 Consider application factors when selecting the filter

**After the appropriate housing is identified, other application factors must be considered when selecting the appropriate filter. Use the filter choice tables to determine a specific part number.**

- ISO Code
- fluid type
- oil viscosity (SUS/cSt) & temperature
- components being protected
- flow rate (GPM/LPM)
- maximum allowable pressure drop
- efficiency / beta rating
- seal options
- standard vs. high-performance filters
- servicing and installation convenience

## 4 Choose the appropriate line and reservoir accessories

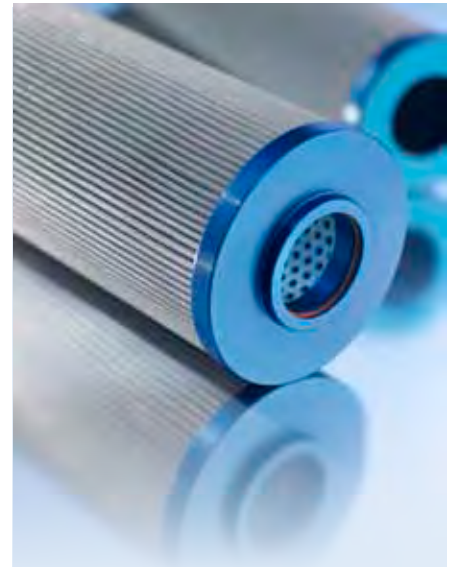
**Items such as breathers, suction strainers, and gauges are important parts of an overall hydraulic system.**

Refer to the Accessories Section for more information.

## 5 On-going contamination control practices

**To optimize system performance and lengthen component life, new oil should be filtered before being transferred into a reservoir or gearbox. Monitor the condition of fluids and identify wear and contamination with regular fluid analysis.**

Refer to the Off-Line Filtration and Fluid Analysis Sections for more information.



### Looking for a Replacement Cartridge Filter?

Donaldson high-performance DT filters extend filter life, allow higher initial cleanliness and provide superior system protection.

DT cartridges are engineered to fit many competitive applications and are constructed to meet application housing requirements:

- standard collapse
- high collapse
- coreless

See the DT numberfinder cross reference on page 213.



# How Donaldson Displays Filter Flow versus Pressure Loss Data

## Pressure Drop (ΔP) Correction Formulae

To properly calculate pressure loss for viscosity and/or specific gravity, use the filter and housing formulae below to determine the clean filter assembly pressure drop.

### Filter Correction Calculation

$$\Delta P \text{ Filter} = \Delta P \text{ from graph} \times \frac{\text{New Saybolt Seconds Universal Viscosity (SSU)}}{150} \times \frac{\text{New Specific Gravity (S.G.)}}{.90}$$

- or -

$$\Delta P \text{ Filter} = \Delta P \text{ from graph} \times \frac{\text{New Centistokes Viscosity (cSt)}}{32} \times \frac{\text{New Specific Gravity (S.G.)}}{.90}$$

### Housing Correction Calculation

$$\Delta P \text{ Housing} = \Delta P \text{ from graph} \times \frac{\text{New Saybolt Seconds Universal Viscosity (SSU)}}{150} \times \frac{\text{New Specific Gravity (S.G.)}}{.90}$$

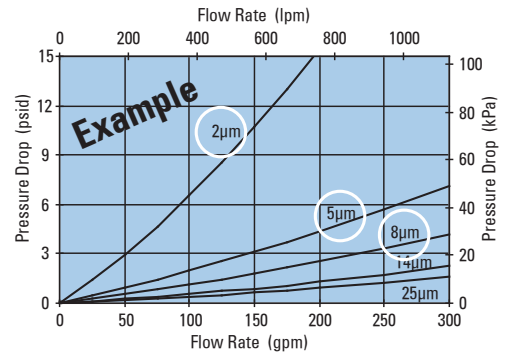
- or -

$$\Delta P \text{ Housing} = \Delta P \text{ from graph} \times \frac{\text{New Centistokes Viscosity (cSt)}}{32} \times \frac{\text{New Specific Gravity (S.G.)}}{.90}$$

### Clean Filter Assembly Pressure Drop (ΔP) Calculation

$$\Delta P \text{ Clean Filter Assembly} = \Delta P \text{ head} + \Delta P \text{ filter}$$

## Filter, Head or Housing/Assembly Reference



### Performance Curve Notes

- All flow measurements were made with 32cSt [150 SSU] hydraulic oil at 100°F (37.7°C), fluid specific gravity of 0.9.
- The performance curves displayed are for the filter, head or housing assembly.
- Filter performance curves will either list media numbers or beta ratings (see circled areas on chart above). These labels correspond with the filter choice tables.

## The Importance of Temperature in Determining Pressure Drop

Fluid viscosity plays an important role in restricting the flow through filters. It's crucial to select the proper filter to maintain adequate flow and avoid excessive pressure drops. Measured in centiStokes (cSt) or Saybolt Seconds Universal (SSU or SUS), fluid viscosity is the resistance of a fluid to flow (thickness of fluid). Low viscosity fluids pass through filters with less resistance than high viscosity fluids. Higher fluid viscosities have higher pressure drops due to higher resistance passing through the media. The colder the fluid, the higher the viscosity, so the lowest potential temperature of the fluid is the best measure for calculating pressure drop.

Use the chart below to determine the viscosity of the fluid to be filtered.

### Oil Kinematic Viscosity Combined With Temperature in centiStokes (cSt)

SAE Gear Oil		75W			80W	85W	90W			140W		
Hydraulic Oil ISO Grade		15	22	32	46	68	100	150	220	320	460	680
°F	°C											
248	120			3.7	3.5	5.7	7.3	9.3	11.7	14.7	18.2	22.9
230	110			4.4	5.5	7.0	9.0	11.7	14.9	18.9	23.7	30.2
212	100	1	4.5	5.4	6.8	8.8	11.4	15.0	19.4	25.0	31.8	41.1
194	90	3	5.3	6.7	8.5	11.2	14.8	19.8	26.0	34.1	44.0	57.9
176	80	5	6.5	8.5	11.0	14.8	19.9	27.1	36.2	48.2	63.3	84.8
158	70	6.2	8.5	11.1	14.8	20.2	27.7	38.5	52.4	71.1	95.2	130
140	60	8	12	15.1	20.6	28.7	40.2	57.2	79.6	110	151	211
122	50	11	15	21.5	29.9	42.9	61.5	98.7	128	181	254	365
104	40	15	22	32	46	68	100	150	220	320	460	680
86	30	21	32	50.7	75.6	116	175	271	409	613	907	1380
68	20	33	51	86.7	135	214	334	536	838	1290	1980	3130
50	10	52	87	162	264	438	711	1190	1920	3070	4870	8020
32	0	85	180	340	585	1020	1720	2990	5060	8400	13900	23900
14	-10	185	375	820	1500	2770	4880	8890	15700	27200	47000	85000
-4	-20	400	800	2350	4650	9120	16800	32300	60000			



This publication contains a wide selection of standard, stocked and custom hydraulic housing models and replacement filters for both original equipment manufacturers and stationary equipment that operate in today's mobile and industrial environments. For variations on a hydraulic filtration system design, please contact your Donaldson supplier.

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### PRODUCT INFORMATION



[www.donaldsonfilters.com](http://www.donaldsonfilters.com)

# Product Line Overview

## Comprehensive Hydraulic Filtration Solutions

### Low Pressure Filtration

Max operating pressure < 350 psi (24 bar)



Low pressure filters are the most commonly used type of filter in hydraulic circuits, used most often in return line applications.

Donaldson low pressure filters are rated for working pressures up to 350 psi (2400 kPa). In-tank and in-line configurations are available to accommodate virtually any application.

### Medium Pressure Filtration

Max operating pressure < 2,000 psi (138 bar)



Medium pressure filters can be used in applications up to 2000 psi (13790 kPa). Donaldson offers both spin-on and in-line cartridge-style filters.

Donaldson Duramax® filters are the highest rated medium pressure spin-on filters available. Duramax filters are proven, reliable, long-lived and easy to install.

### High Pressure Filtration

Max operating pressure < 6,500 psi (450 bar)



High pressure filters are positioned between pumps and critical components such as cylinders, motors and valves. They help protect these critical components from catastrophic failure.

Donaldson heavy-duty high pressure filters are rated for working pressures up to 6500 psi (44818 kPa). Various porting sizes and types, including manifold style, are available for a wide range of applications.

# Product Line Overview

## Comprehensive Hydraulic Filtration Solutions

**Low Pressure Filtration**  
Pages 29-92

Model Series	Max Flow gpm (lpm)	Max Pressure psi (kPa) / bar	Porting Size Options	Page #
<b>Spin-on Filters</b>				
SP15/25	30 (114)	150 (1034) / 10.3	½", ¾" NPT, SAE-8, -12 O-ring	30
W012	30 (114)	150 (1034) / 10.3	¾" NPT, SAE-12 O-ring	34
W015	60 (227)	150 (1034) / 10.3	SAE-20 O-ring	38
W021/023	60 (227)	150 (1034) / 10.3	1¼" NPT, SAE-20 O-ring	42
HBK05	60 (227)	150 (1034) / 10.3	1¼" NPT, SAE-20 O-ring	46
SP50/60	60 (227)	150 (1034) / 10.3	1¼" NPT, SAE-20 O-ring	50
SP80/90	100 (380)	150 (1034) / 10.3	1½" NPT, SAE-24 O-ring, 2" SAE 4-Bolt Flange Code 61	54
SP100/120	100 (380)	150 (1034) / 10.3	1½" NPT	58
W022	120 (454)	150 (1034) / 10.3	1½" NPT, SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61	62
TT15/30/60	50 (190)	100 (689) / 6.89	¾", 1½" NPT	66
<b>In-tank Filters</b>				
WL15	50 (190)	200 (1379) / 13.8	SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61	68
WL16	100 (380)	200 (1379) / 13.8	1½" NPT, SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61	72
FIK	170 (639)	145 (1000) / 10.0	½", ¾", 1" NPT, SAE-8,-12,-16,-20,-24 O-ring, 2" SAE 4-Bolt Flange Code 61	76
FIK04 Combo	79 (300)	145 (1000) / 10.0	Inlet: SAE-16, -20 O-ring, Outlet: SAE-16 O-Ring	82
<b>In-line Cartridge Filters</b>				
W033	100 (380)	300 (2068) / 20.7	1½" NPT, SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61	84
HRK10	300 (1136)	150 (2413) / 10.3	4" ANSI Flange, 8-bolt 150#	88

**Medium Pressure Filtration**  
Pages 93-130

<b>Spin-on Filters</b>				
HMK03	25 (95)	1000 (6895) / 69.0	SAE-12 O-ring	94
HMK04	35 (130)	500 (3448) / 34.5	¾", 1" NPT, SAE-12, -16 O-ring	98
HNK04	35 (130)	500 (3448) / 34.5	SAE-12, -16 O-ring	106
HMK05	50 (189)	350 (2413) / 24.1	1¼" NPT, SAE-20 O-ring	102
HNK05	50 (189)	350 (2413) / 24.1	SAE-20 O-ring	106
HMK24	60 (230)	500 (3450) / 34.5	SAE-20 O-ring, 1¼" SAE 4-Bolt Flange Code 61	98
HMK25	100 (378)	350 (2413) / 24.1	1½" NPT, SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61	102
<b>In-line Cartridge Filters</b>				
W061	100 (379)	600 (4137) / 41.3	SAE-12, -16, -20 O-ring	110
HDK06	150 (568)	350 (2413) / 24.1	2½" NPT	114
W041	300 (1136)	500 (3450) / 34.5	SAE-24 O-ring, 2" or 2½" SAE 4-Bolt Flange Code 61	118
W042	300 (1136)	400 (2757) / 27.5	3" SAE 4-Bolt Flange Code 61	122
HFK08	300 (1136)	350 (2413) / 24.1	3" NPT, SAE-20 O-ring	126

**High Pressure Filtration**  
Pages 131-212

<b>In-line Cartridge Filters</b>				
W331	6 (23)	3000 (20685) / 206.9	SAE-8 O-ring	132
HPK02	20 (75)	2000 (13790) / 137.9	SAE-12 O-ring	136
W341	20 (75)	3000 (20685) / 206.9	SAE-12 O-ring	142
W440	20 (75)	4000 (27580) / 275.8	SAE-12 O-ring or Manifold Mounting	146
FPK02	25 (95)	6090 (42000) / 420.0	SAE-12 O-ring	150
W613	35 (130)	6500 (44818) / 448.1	SAE-12, -16 O-ring, 1" SAE 4-Bolt Flange Code 61 or 62	156
W322	50 (190)	3000 (20685) / 206.9	SAE-16 O-ring	160
W350	50 (190)	3000 (20685) / 206.9	SAE-12, -16 O-ring	164
HPK03	60 (227)	3000 (20685) / 206.9	SAE-12, -16 O-Ring	168
FPK04	100 (379)	4350 (29993) / 299.9	SAE-20 O-ring	174
HPK04	120 (454)	6000 (41370) / 413.8	SAE-20 O-ring, 1¼" or 1½" SAE 4-Bolt Flange Code 61 or 62	180
W621	120 (454)	6000 (41370) / 413.8	SAE-20,-24 O-ring, 1¼" or 1½" SAE 4-Bolt Flange Code 61 or 62	188
W451	150 (568)	4500 (31027) / 310.3	SAE-24 O-ring, 1½" SAE 4-Bolt Flange Code 61 or 62, Manifold Mounting	193
W620	150 (568)	6000 (41370) / 413.8	SAE-16,-20, -24 O-ring, 1¼" SAE 4-Bolt Flange Code 61 or 62 or 1½" Code 61	197
WS620	150 (568)	6000 (41370) / 413.8	Manifold Mounting	202
HPK05	200 (757)	3000 (20685) / 206.9	2" SAE 4-Bolt Flange Code 61	207

# Product Line Overview

## Comprehensive Hydraulic Filtration Solutions

### Off-Line Filtration

The Donaldson Filter Cart, Filter Panel and Filter Buddy™ offer convenient off-line filtration, flushing and fluid transfer. Use them with your industrial and mobile equipment to achieve and maintain proper ISO cleanliness levels.

#### Filter Cart

Designed with performance, convenience and safety in mind. Includes value-added features to protect your machinery and equipment from breakdowns caused by contamination.

#### Filter Panel

Provides fixed/mounted offline filtration and a turn-key approach to supplemental filtration.

#### Filter Buddy™

This handheld portable system provides the capability to kidney loop reservoirs that you normally cannot reach with larger filter carts. Its small size and light weight allow for carrying up and down stairs and access into tight or confined spaces.



### Replacement Filters

#### The Industry's Largest Selection of In-Stock Replacement Filters!

Donaldson offers a complete line of hydraulic filter heads and housings for low, medium, and high pressure applications. Spin-ons and cartridges are available in a wide range of filter medias.

When replacing another filter brand, our comprehensive and up-to-date cross-reference guide, available at [crossreference.donaldson.com](http://crossreference.donaldson.com), can guide you through performance improvement possibilities.

Our worldwide network of authorized distributors is ready to serve you with their extensive experience with hydraulic circuits and with Donaldson filters. Most distributors stock our filters, and we have quick-ship programs so you can get the filter you need, when you need it.

To find a distributor near you, visit [www.buydonaldson.com](http://www.buydonaldson.com).





# Product Line Overview

## Comprehensive Hydraulic Filtration Solutions

### Accessories

Accessories for hydraulic circuits, lines and reservoirs that will help you maintain proper ISO cleanliness levels.

#### Filter Service Indicators

- Service indicators to maximize filter life

#### Hydraulic Line Accessories

- Pressure gauges for monitoring system pressure
- Hoses and test points for sampling oil and determining ISO cleanliness levels
- Flanges to connect components
- Valves for system control

#### Reservoir Accessories

- Suction strainers help protect pumps from damage
- Diffusers for reducing aeration, foaming, turbulence and noise caused by return lines
- Sight and level gauges available, including plastic or steel screw-in styles for use in a variety of applications
- Plugs, caps and vents for small power units and gearboxes
- Filler breathers and caps come in chrome, zinc, epoxy-coated weatherproof finishes, and corrosion-resistance techno polymer – lockable, dipsticks and side-mount versions available.



#### T.R.A.P.™ Breather Technology (Thermally Reactive Advanced Protection)

T.R.A.P. breathers provide fast-acting protection against airborne moisture and particulate contamination. They stop solid particulate down to 3  $\mu\text{m}$  at 97% efficiency and prevent moisture from entering the reservoir. Water-holding capacity is regenerated with every oil return phase. This self-regenerating capability enables extended breather life.



# Hydraulic Filtration Solutions

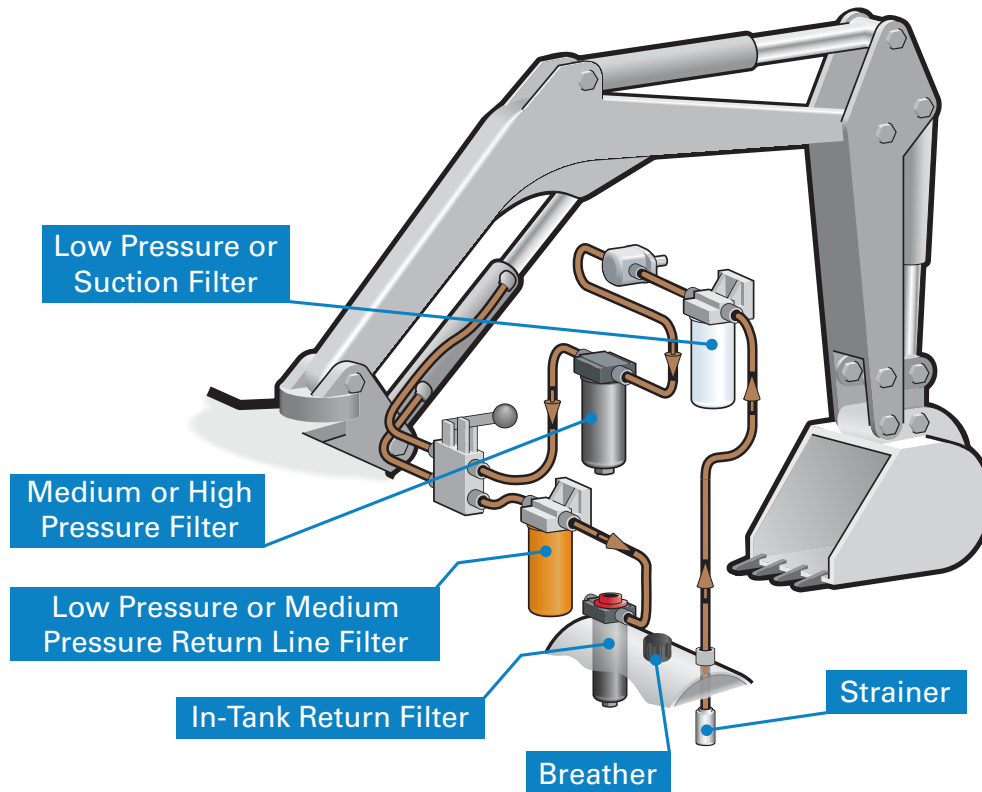
## Engineered for Today's Industrial & Mobile Equipment



## The best solutions for clean, dry oil.

Count on Donaldson to have the right filters, contamination control products and services to protect critical components in hundreds of applications – in the factory and on heavy-duty mobile equipment.

*When you need hydraulic filtration, Donaldson delivers.*



### Full-Product Range

The industry's largest selection of in-stock filters and accessories – manufactured with consistent, high-quality performance.

### Expert Technical Support

Prompt, accessible and knowledgeable customer service experts.

### High-Performance Filtration

Increase dirt-holding capacity and lower  $\Delta P$  with Donaldson high-performance DT filters.

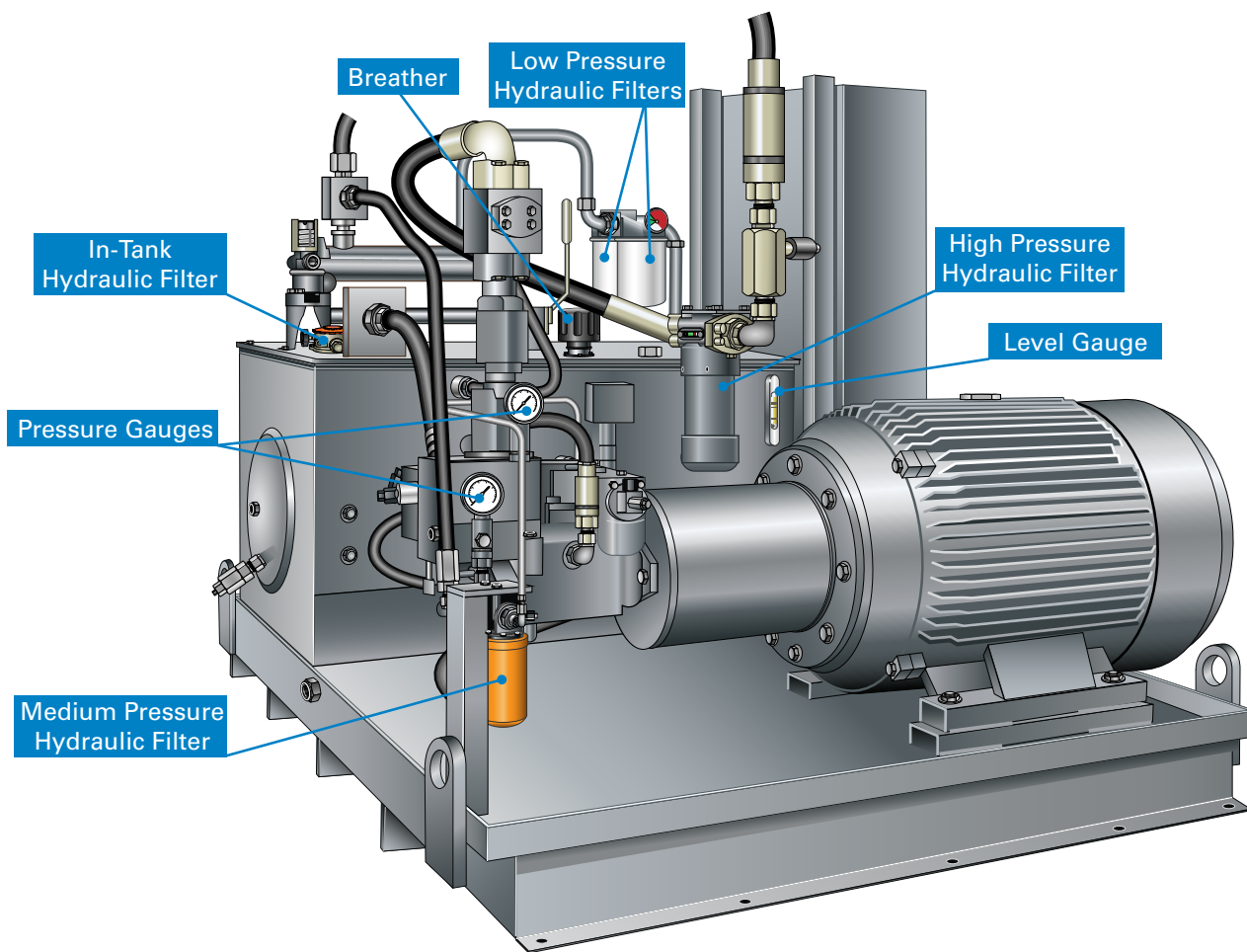
# Hydraulic Filtration Solutions

## Engineered for Today's Industrial & Mobile Equipment



## any Performance Under Pressure

- Low, medium and high pressure filtration
- Spin-on, cartridge and in-tank style filters
- Hydraulic line and reservoir accessories
- T.R.A.P.™ reservoir breather technology



### Off-Line Filtration

Filter carts, filter panels and Filter Buddy™ handheld filtration.

### Water Removal

Systems and products designed to prevent water ingress and remove entrained water.


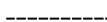
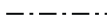



### Vacuum Dehydrators & Coalescers

Quick removal of free water, dissolved water, particles and gases.




# Common Fluid Power Symbols and Circuit Diagrams

## Instrumentation and Pipeline Components

### Lines

-  Continuous Line: Flow Line, Symbol Enclosure
-  Dashed Line: Pilot Line, Drain Line
-  Symbol Enclosure: Long and Short Dashes around Two or More Component Symbols
-  Flexible Hose
-  Lines Connecting
-  Lines Crossing



### Circular

-  Large Circle: Pump, Motor
-  Small Circle: Measuring Devices
-  Semi-Circle: Rotary Actuator



### Square

-  One Square: Pressure Control Function
-  Two or Three Adjacent Squares: Directional Control




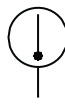


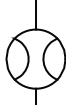

### Diamond

-  Diamond: Fluid Conditioner (filter, separator, lubricator, heat exchanger)
-  Diamond with Dashed Line: Filter







### Triangle

-  Solid: Direction of Hydraulic Fluid Flow
-  Open: Direction of Pneumatic Flow

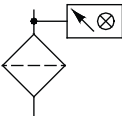
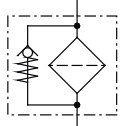
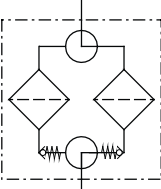
### Miscellaneous Symbols

-  Spring
-  Flow Restriction
-  Connections to Tank
-  Temperature Gauge
-  Pressure Gauge
-  Test Point
-  Flow Meter
-  Gas Loaded Accumulator



### Isolation and Flow Control Valves

-  Isolator (Open)
-  Isolator (Closed)
-  Diverter Valve
-  Orifice (Jet)
-  Throttle Valve
-  Check Valve

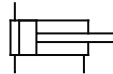

### Filters

-  Filter with Visual Clogging Indicator
-  Filter with Bypass Valve
-  Duplex Filter with Check Valve

### Pumps and Motors

-  Fixed Displacement Pump  
Uni-directional Flow  
Anti-clockwise Rotation
-  Fixed Displacement Motor  
Anti-clockwise Rotation

### Cylinders and Semi-rotary Actuators

-  Double Acting Cylinder
-  Bi-directional  
Semi-rotary Actuator

# Hydraulic Filter Locations

## Comprehensive Selection of Filtration Solutions

### Typical Hydraulic Circuit and Filter Locations



**Filter Symbol in a Circuit**



**Pressure Line Filter**

Protects high-pressure side components. Helps prevent component wear or failure brought about by debris in the system.



**Suction Line Filter**

Designed to remove particles in the 5 to 150 micron range. Easy to service and less expensive than other types of filters. Low by-pass valve use recommended to prevent pump starvation.



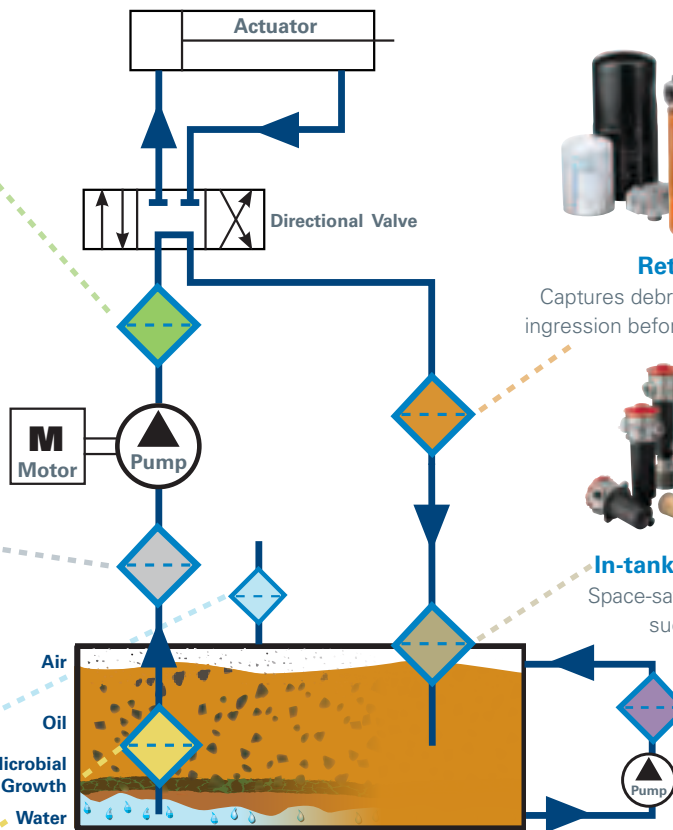
**Reservoir Air Breather**

Prevents ingress of airborne contaminants from entering the reservoir tank.



**Suction Strainer**

Removes large particles or objects built into the system during assembly or introduced during standard maintenance. Prevents catastrophic failure.



**Reservoir Tank**

Water in reservoir tanks is a serious threat to hydraulic systems. Dirt, particles and microbial growth are also common contaminants existing in tanks.



**In-Line Accessories**

Pressure gauges for monitoring system pressure. Hoses and test points for sampling oil and determining ISO cleanliness levels. Flanges and valves for system control.



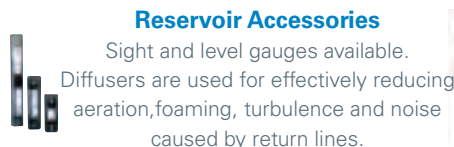
**Return Line Filter**

Captures debris from component wear or ingestion before it travels into the reservoir.



**In-tank Return Line Filter**

Space-saving in-tank return and suction line filters.



**Reservoir Accessories**

Sight and level gauges available. Diffusers are used for effectively reducing aeration, foaming, turbulence and noise caused by return lines.



**Kidney Loop Filters**

Off-line filtration supplements system cleanliness. Use with industrial and mobile equipment to achieve and maintain proper ISO cleanliness levels.

# Industry Shaping Technology

## Advanced Media Technology for Optimal Filtration Performance

### Donaldson Media Formulations Set the Standard for Filtration Performance!

Donaldson offers extensive filter media technology choices for hydraulic filters – over 35 different formulations. These multiple formulations enable our engineers to develop filtration systems that meet or exceed a wide variety of customer specifications.



Synthetic media captures more and contaminants smaller than cellulose media. When an application requires higher efficiency filtration than what cellulose filter media can deliver, Donaldson uses Synteq™ synthetic media technology.

We use a variety of techniques to enhance filter media so it can withstand the high differential pressures found in typical hydraulic systems. Oven-curing, wire backing and multiple layers all contribute to our media integrity.

More detailed information on filtration media is available in the technical reference guide.

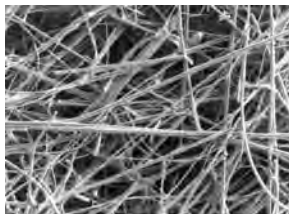
#### DT Synteq™ Synthetic Media (High-Performance)

DT grades of Synteq media utilize a blend of borosilicate glass fiber whose matrix is bonded together with an epoxy-based resin system. Donaldson filter media scientists found this to provide the best available chemical resistance for the broadest array of hydraulic applications. DT Synteq is ideal for use with phosphate ester and water glycol fluids.



#### Synteq™ Synthetic Media

This media's uniform synthetic fiber structure delivers higher filtration efficiency and longer filter life. Synteq™ filter media technology is ideal for synthetic fluids, water glycols, water/oil emulsions, HWCF (high water content fluids) and petroleum-based fluids. The smooth rounded fibers provide low resistance to fluid flow.



#### Cellulose Media

This media often has lower beta ratings, providing effective filtration for a wide variety of petroleum-based fluids. The smaller pores result in greater flow resistance, in turn causing higher pressure drop.

#### Water Removal Media

This media is formulated with dessicants and resins to remove moisture and condensation from petroleum-based fluids.

#### Wire-Mesh Media

Wire-mesh media consists of stainless steel, epoxy-coated wire mesh. This media is used to catch very large, harsh particulate that would rip up a normal filter. This media is also useful as a coarse filter in viscous fluid applications.

### Filter Media Design & Development

From traditional cellulose to synthetic – the development of proprietary filtration substrates is at the heart of every Donaldson filtration system. If one of our existing media formulations does not meet our customer's specifications, our scientists use our in-house media development laboratory to develop new formulations that meet or exceed your requirements.

#### Media Characterization Testing

- Proprietary formulations
- Permeability
- Tensile strength
- Mullen burst
- Basis weight
- Pore size
- Thickness
- Gurley stiffness
- LEFS bench
- 3-Point bend

#### In-House Media Mill

- For application development
- Trial media production runs
- Development of proprietary formulations



#### Filtration Performance Testing

- Particle counting
- Multi-pass testing
- Water removal efficiency



# Industry Shaping Technology Hydraulic Filtration Trends and Evolution

## Hydraulic Filtration System Trends

Today's hydraulic systems are intolerant of corrosion, require higher cleanliness standards, and demand increased filtration performance. Hydraulic-powered vehicles and equipment owners desire the assumption of lower operation and ownership costs – a unique challenge that Donaldson understands.

## Unique Filtration Systems

Donaldson continually strives to introduce new and effective filtration technologies that work within your engineering specifications and add customer value.

### Low Pressure Systems

- Sensors, valves, and switches in a variety of styles and port sizes
- Unique filtration performance options
- Integrated mounting brackets
- Broad range of package sizes
- Custom design options

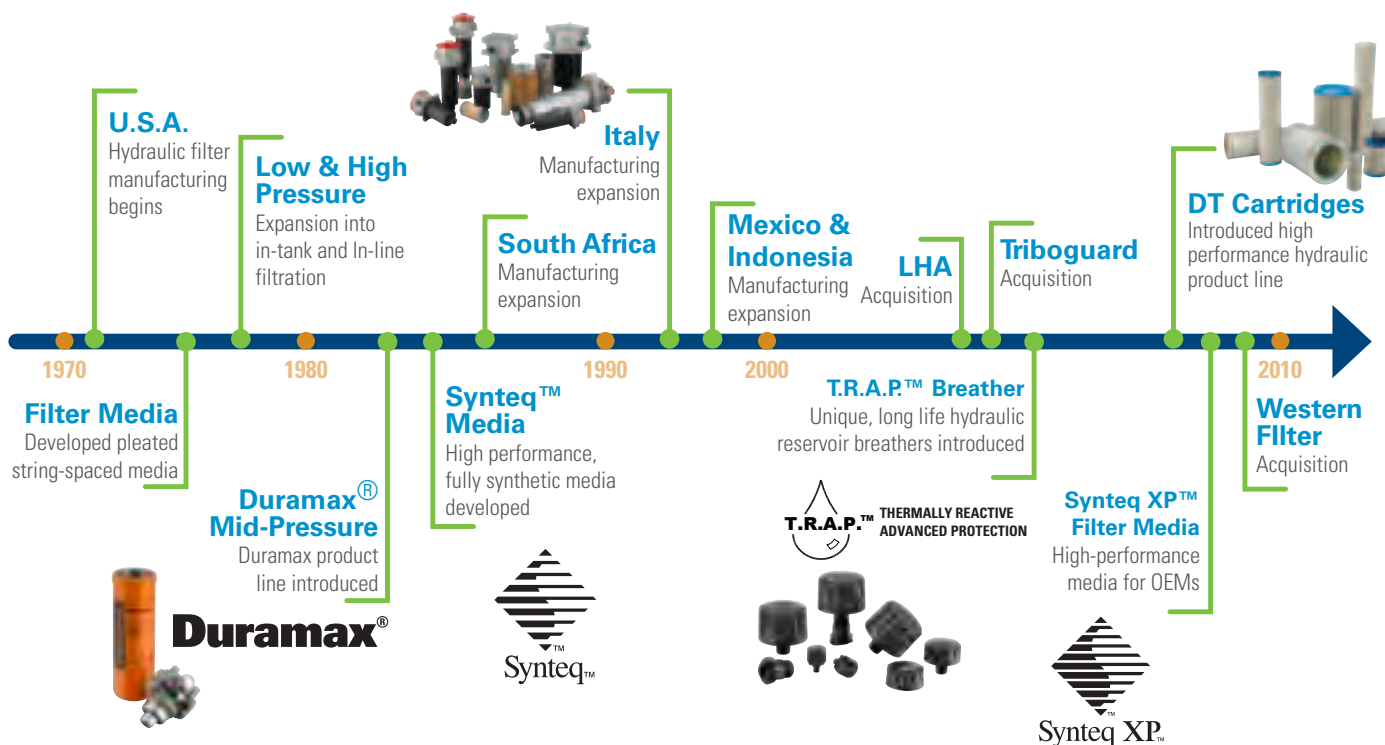
### Medium Pressure Systems

- Die-cast and sand-cast custom head assemblies integrated into systems
- Enhanced system component protection
- Customized to existing filter interface – no system modification required

### High Pressure Systems

- High-performance media options
- Synteq™ Filtration Media
- Material options - metal or plastic
- Multiple head interfaces

## Hydraulic Filtration Design & Manufacturing Experience



# Industry Shaping Technology

## Global Design & Logistic Capabilities

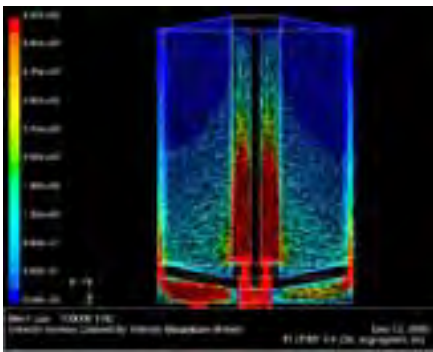
Donaldson has pioneered the use of a wide range of engineering, design and testing tools used during the product development and validation process.

### Engineering Capabilities

- Design centers in three key regions – United States, Asia and Europe

#### Prediction and Simulation

- CAD
- Media modeling
- Fluid mechanics
- Structural analysis
- Thermal analysis



### Development and Validation

#### Filter Durability

- Filtration performance testing per applicable SAE and ISO standards
- Fabrication integrity
- Environmental conditions
  - Salt spray and thermal cycling
- Pressure fatigue
- Flow fatigue
- Hydrostatic burst
- Flow benches
- Vibration benches
- Gravimetric analysis

#### Rapid Prototyping

- SLA, SLS
- Investment casting
- RTV molding

### Test & Evaluation Tools

#### Structural Analysis

- Per SAE, ISO, and NFPA standards
- Burst
- Collapse
- Pressure impulse and fatigue

#### Tensile Compression

- Used to test material, component and assembly properties

#### Environmental Chambers

- Allows testing at hot or cold temperature, with humidity control

#### Flow Test Benches

- Allows measurement of static and dynamic flow and restriction for a device
- Allows calculation of device restriction at varying flows and temperatures
- System simulation

#### Filtration Performance Testing

- ISO, SAE, NFPA
- Customer standards
- Contaminant (particle or water) removal efficiency
- Contaminant capacity



#### Analytical Chemistry Laboratory

- Optical microscopy
- Scanning electron microscopy (SEM)
- Chemical analysis
- Fourier transform infrared (FTIR)
- Gas chromatography (GC/MS)
- Thermal analysis (DSC, TGA)
- Liquid chromatography



### Design Validation

- Test cell locations in three key regions
  - United States, Asia and Europe
- High viscosity  $\Delta P$
- High temperature
- Flow fatigue
- Used oil analysis
- Component durability
- 24/7 durability testing
- Web-based test cell monitoring access
- Fluid compatibility



### Vibration/Shaker

- Multiple benches
- Performance vibration with flow test
- Can apply random, shock or custom variable vibration profiles
- Capable of hot or cold tests

### Field Testing

- On and off highway
- Heavy-duty
- Tests conducted on both end user and OEM applications

### Field Data Acquisition

- Real time measurements
- Remote communications
- On-line collection tools
- Review daily, weekly and monthly reports to analyze operational trends

### Quality Certified

- All facilities are ISO/TS certified

### Quality Controls

- Consistent, reliable product
- On-site verification test units and equipment
- Part number specific PLC controls
- Manufacturing dates for tracking and warranty

### Manufacturing

#### Locations for Liquid Filtration

- United States, Canada, Mexico, Europe and Asia-Pacific
- Located strategically with global partners



#### Base Component Materials

- Built for long-life, durability, corrosion resistance and liquid compatibility
- Metal and non-metal materials
- Methods to enhance media durability include oven-curing, wire backing and multiple layered media



### Packaging Options

- Returnable packaging
- Heavy-duty packaging
- Pallets ISPM-15 compliant for international routing

### Logistics / Distribution

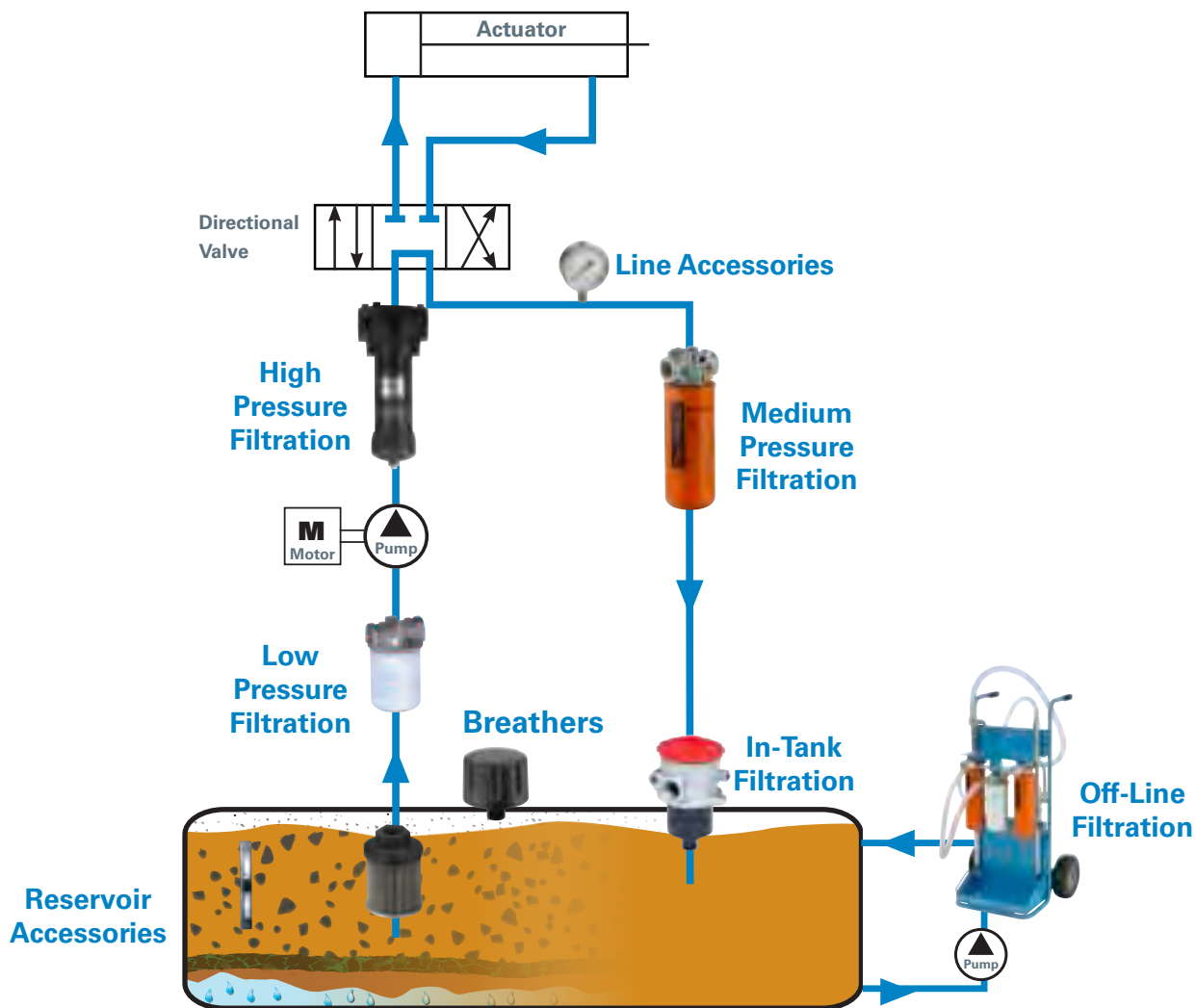
Donaldson has established a global distribution network to serve our customers locally and around the world. We operate as a global company with a network of primary distribution locations that support a mature hub of regional distribution centers and warehouses.

Donaldson distribution centers are strategically located around the globe to quickly and accurately deliver filtration and exhaust products wherever replacement products are needed. We work with a network of transportation, third party logistics companies, consolidators and cross-docking facilities to meet or exceed our customers' requirements.

Customers around the world benefit from our umbrella of distribution centers. We focus our efforts on local support and the capabilities of our staff. We continue to make significant investments in facilities, systems, supply chain relationships and staffing to offer the best order fulfillment options available.

## Performance Under <sup>any</sup> Pressure

Donaldson hydraulic filters and accessories reduce a broad range of contaminants to keep sophisticated equipment running smoothly, resulting in efficient systems with superior performance. Whether it's located outdoors on equipment or inside a crowded manufacturing plant, hydraulic components need clean hydraulic and lubrication oil for maximum life and optimal productivity.





# Tech-Tips for Hydraulic-Powered Vehicles and Equipment Owners

## Catch-up on the latest information!

The Shoptalk section contains maintenance tips, cost reduction ideas, product features and benefits.

If you're interested in receiving Shoptalk, sign up at [www.shoptalk.donaldson.com](http://www.shoptalk.donaldson.com). Shoptalk is available as direct mail cards or email. New topics and tech-tips are sent out 3-4 times a year.

### 3.5" x 7" card deck sent out in packs of 4



### Email Version



### On-line Collection [www.shoptalk.donaldson.com](http://www.shoptalk.donaldson.com)



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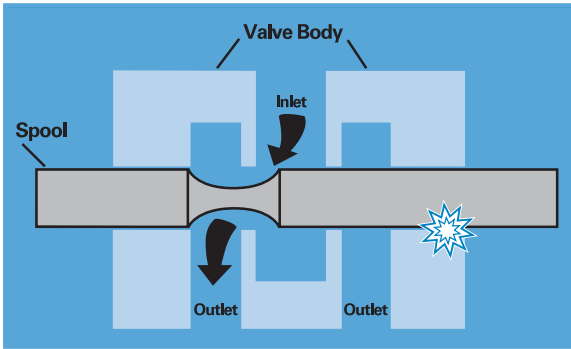
### SHOPTALK INFORMATION



[www.shoptalk.donaldson.com](http://www.shoptalk.donaldson.com)



## Hydraulic Components Need Protection



This illustration of a simple hydraulic valve shows how particles damage components. If a particle lodges between the spool and valve body, it will erode small flakes from the metal surfaces. As these flakes are moved back and forth by the action of the spool, they can roll into a burr that jams the spool and disables the valve.

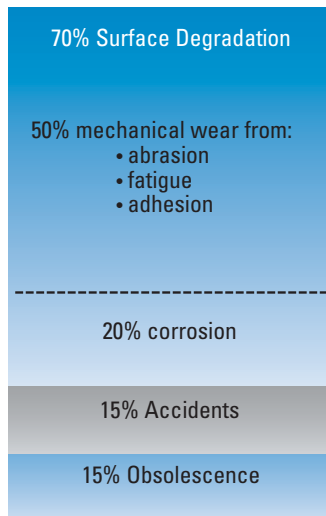
### Protect Precision Parts from Contamination Damage and Hydraulic Failures

Good filtration needs to be an integral part of the hydraulic circuit to ensure long life and the proper operation of pumps, valves and motors. Hydraulic circuits are designed in all shapes and sizes, both simple and complex in design, and they all need protection from damaging contamination. Abrasive particles enter the system and, if unfiltered, damage sensitive components like pumps, valves and motors. It is the job of the hydraulic filter to remove these particles from the oil flow to help prevent premature component wear and system failure. As the sophistication of hydraulic systems increases, the need for reliable filtration protection becomes ever more critical.

### Typical Factors in Component Life

Studies show that most (typically 70%) of hydraulic component replacement is necessary because of surface degradation, and most of that is due to mechanical wear.

Proper filtration of hydraulic fluids can lengthen component life. Don't cut costs by eliminating hydraulic filters. It could cost you more in the long run in major component repair!



Ref: Shoptalk Card F115306

## Where does Hydraulic System Contamination Come From?

### Sources of Hydraulic System Contamination

New oil out of shipping containers is usually contaminated to a level above what is acceptable for most hydraulic systems. Never assume your oil is clean until it has been filtered. There are a surprising number of different sources of system contamination in hydraulic filtration.

**New Fluid** – most new fluid is not acceptable for use in hydraulic systems and must be filtered first. Learn how in the off-line filtration section (page 299).

**Built-In** – contamination introduced into the system during the manufacture, assembly and testing of components

**Ingressed** – external ingress of atmospheric contamination; air condenses and water is released into the reservoir

**Induced** – particles introduced during normal maintenance or system operation

**In-Operation** – wear generation contamination caused by the pump, actuators, cylinder or the hydraulic motor

**Rubber and Elastomers** – degradation of rubber compounds and elastomers products

**High Water Based Fluids** – supports biological growth

**Replacement of Failed Components** – failure to thoroughly clean conductor lines after replacing a failed pump

### Types of Contaminant

Many different types of contamination may be present in hydraulic fluid. Contaminants grind and wear at the surface of moving parts, introducing even more particles into the system. These contaminants cause more than 70% of all hydraulic system downtime.

- particulate – ingressed and built-in (dust, dirt, sand, rust, fibers, elastomers, paint chips)
- wear metals, silicon, and excessive additives (aluminum, chromium, copper, iron, lead, tin, silicon, sodium, zinc, barium, phosphorous)
- water
- sealant (tape, pastes)
- sludge, oxidation, and other corrosion products
- acids and other chemicals
- biological and microbial



Scratches along the inside surface of a hydraulic cylinder reveal component damage caused by contaminants.

Ref: Shoptalk Card F115305

## Understanding the Beta Rating System

This information is provided as an aid to understanding fluid filter efficiency terminology based on current ISO, ANSI and NFPA test standards. It is not proprietary and may be reproduced or distributed in any manner for educational purposes.

### What Is Beta Ratio?

Beta ratio (symbolized by  $\beta$ ) is a formula used to calculate the filtration efficiency of a particular fluid filter using base data obtained from multi-pass testing.

In a multi-pass test, fluid is continuously injected with a uniform amount of contaminant (i.e., ISO medium test dust) then pumped through the filter unit being tested. Filter efficiency is determined by monitoring fluid contamination levels upstream and downstream of the test filter at specific times. An automatic particle counter is used to determine the contamination level. Through this process an upstream to downstream particle count ratio is developed, known as the beta ratio.

The formula used to calculate the beta ratio is:

$$\text{Beta ratio}_{(x)} = \frac{\text{particle count in upstream fluid}}{\text{particle count in downstream fluid}}$$

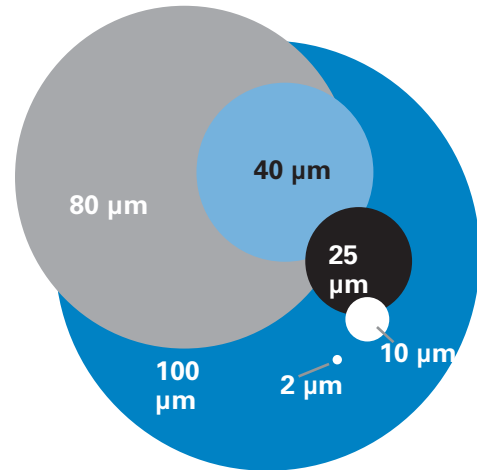
where (x) is a given particle size

Indicates that testing was done with APC's calibrated with NIST fluid

$$\beta_{10(c)} = 1000$$

1000 times more particles upstream than downstream that are 10  $\mu\text{m}$  and larger

## How Big is a Micron?



### Micron Sizes of Familiar Particles

Grain of table salt	100 $\mu\text{m}$
Human hair	80 $\mu\text{m}$
Lower limit of visibility	40 $\mu\text{m}$
White blood cell	25 $\mu\text{m}$
Talcum powder	10 $\mu\text{m}$
Red blood cell	8 $\mu\text{m}$
Bacteria	2 $\mu\text{m}$
Silt	<5 $\mu\text{m}$

### Hydraulic Oil Test Kits

The Advanced Fluid Analysis Kit is designed to monitor component wear, contamination and fluid condition.

#### Advanced Hydraulic Oil Test Kit

Kit X009330

24 Metals by ICP
Water by Karl Fischer, ppm
Viscosity at 40°C or 100°C
Oxidation/Nitration by FTIR
Total Acid Number
ISO Particle Count/Particle Quantifier
Sample Extraction Pump      Part #P176431
Sample Extraction Tubing      Part #P176433

Our basic hydraulic oil kit reports TAN (total acid number), water in PPM and ISO particle count.

#### Basic Hydraulic Oil Test Kits

- 1- Basic Use Kit X007374
- 2- Correct Drain and ISO use Kit X007377

	1	2
Metals, ppm by wt	◆	◆
Viscosity, cSt.	◆	◆
Water %	◆	
TAN (Total Acid #)		◆
Water, ppm		◆
ISO Particle Count		◆



Kit X007377 for basic hydraulic oil analysis

#### Recommended Sampling Interval

##### Industrial / Stationary

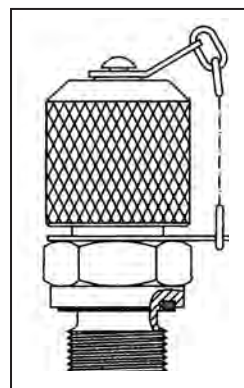
Transmissions	500 hours / monthly
Geared Drives	500 hours / monthly
Bearings	500 hours / monthly
Hydraulics	500 hours /monthly

#### Oil Sampling Accessories

These accessories can simplify your oil analysis during normal maintenance routines.



Sampling Pump (P176431) & Plastic Tubing (P176433) sold separately in 100 ft. rolls



Quick Sampling Metal Valve for test point. 1/8" NPT (P563212)  
Working Pressure 5800 psi / 400 bar

Ref: Shoptalk Card F11523

### Watch Out for Dents on Liquid Filters!



Dents in a steel filter canister create a concentration of stress—making the canister more susceptible to fatigue.

#### Dents May Cause Cracks

Cracked filters can be caused by dents made during improper installation. Filters that are dented prior to or during installation should not be used. Filters dented after installation should be replaced immediately. The cost of replacing a dented filter is much less than the cost of the damages that could result from a dented filter that fails during service.

Filter fatigue results from pressure pulses within the system. Pressure is regulated by a pressure regulating valve. This valve is spring operated and intermittently opens and closes to regulate pressure. Once pressure exceeds the setting of the spring in the regulating valve, the valve will open and relieve pressure until the spring can expand and close the valve. This function is repeated continuously during operation of the system, creating a pulsing effect. Filter canisters are subjected to the same pulsation. However, unlike the spring in the pressure regulating valve, canister material is susceptible to failure after such fatigue.

Filters are designed with a low carbon steel to resist fatigue and are formed so the stress created by the pulses in the system are equalized over the surface area of the canister. A dent provides an area of stress concentration where pressure pulses can greatly shorten the fatigue life of the canister.

If you receive filters that were dented prior to your receipt, you should contact Donaldson customer support for corrective action.

More information is available through the Filter Manufacturers Council at:  
<http://www.filtercouncil.org/techdata/tsbs/97-8R1.html>

Ref: Shoptalk Card F115275

## Watch Out for Old Compression Gaskets!



When changing any filter that has a gasket — use caution as old gaskets may stick!

A compression seal is a means of preventing migration of liquids, gases or solid contaminants across a joint or opening in an assembly or housing. A seal not only prevents the escape of fluid from inside and foreign material from entering the system from outside, but it must provide for easy installation and removal. A new gasket is critical for proper filter function.

### Remember ...

- Remove used gaskets and clean the sealing area thoroughly
- Always use a new gasket with a replacement filter
- Over-tightening the filter may damage the head
- Dispose of used filters properly

More information on compression gaskets can be found at the Filter Manufacturers Council at [www.filtercouncil.org/uploads/docs/TSB/English/94-4R2.pdf](http://www.filtercouncil.org/uploads/docs/TSB/English/94-4R2.pdf)

Ref: Shoptalk Card F115233

## How Clean is Your Oil?

**Donaldson Hydraulic Filter**  
Synteq™ Media

**Standard Hydraulic Filter**  
Cellulose Filter Media

**New, Unfiltered Hydraulic Oil**



### Amount of contaminant in 100 gallons hydraulic oil

ISO 14/9/3	ISO 19/17/14	ISO 22/21/18
.004 gram dust	.363 gram dust	4.73 grams dust

### Contamination Levels of Different ISO 4406 Codes Vary Dramatically.\*

New, unfiltered hydraulic oil can contain 1,000 times more contaminant than oil that has passed through filter media.

Protect your hydraulic system from costly repairs and downtime with Donaldson hydraulic products with Synteq™ filter media technology – designed to meet equipment filtration requirements and strength needs!

### Prevent Catastrophic Damage to Your Expensive Equipment

#### Hydraulic Pump Exposure to Dirt

Synteq™ Media	Cellulose Media	New Hydraulic Oil
ISO 14/9/3	ISO 19/17/14	ISO 22/21/18
.03 lbs	2.5 lbs	32.5 lbs
12.5 grams	1,125 grams	4,750 grams

### Amount of contaminant that passes through a 25 gallon hydraulic reservoir with a 25 gpm pump running for a period of 500 hours.

\* Derived from the ISO 16889 test standard with NIST certified on-line automatic particle counters and ISO medium test dust (assumes spherical particle shape and lower bound diameter for test dust). Actual results may vary.

\*\* Achieved with B4 (c)  $\mu\text{m}$  > 1000 Synteq™ media technology.

Ref: Shoptalk Card F115284

## High-Performance DT Cartridges Deliver Uptime Protection



Using Donaldson Synteq™ media technology, DT filters extend filter life, allow for higher initial cleanliness and provide superior system protection.

### Premium Uptime Protection

Every hydraulic system has suspended particles in its fluid. Contaminants grind and wear at the surface of moving parts, introducing even more particles into the system. These contaminants cause more than 70% of all hydraulic system downtime.

Donaldson high-performance DT cartridge filters provide better protection from the particles and contaminants that reduce the effectiveness of lubricant and hydraulic fluid.

### DT filters are ideally suited for a variety of demanding applications, including:

- heavy-duty mobile equipment
- in-plant hydraulics
- transmissions
- bearing lube oil systems

DT high-performance hydraulic cartridges provide 73% higher dirt-holding capacity and 47% lower initial pressure drop than traditional filters – with micron ratings down to 2 µm.

Donaldson DT filters are engineered to fit many competitive applications, including Fairey Arlon, Hydac, Pall, Parker, PTI/Mahle and Schroeder.

For a complete list of replacement part numbers, visit [www.crossreference.donaldson.com](http://www.crossreference.donaldson.com).

Ref: Shoptalk Card F115304

## T.R.A.P.™ Moisture Vapor with Breathers for Hydraulic Reservoirs



Water has a way of sneaking into hydraulic circuits, which can cause damage. Minimize moisture with the Donaldson Thermally Reactive Advanced Protection (T.R.A.P.™) Breather.

### Features and Benefits

- Minimize water in your system – T.R.A.P. breather strips moisture from the incoming air, allowing only dry air to enter the hydraulic circuits
- Maximize system uptime – T.R.A.P. media regenerates its water holding capacity for longer service life
- Hydraulic reservoir can breathe – the T.R.A.P. doesn't restrict air flow

### Fast-acting Breather Eliminates Moisture from Hydraulic Reservoirs

- Extended service life (exhales moisture and refreshes its holding capacity on each cycle)
- Reacts instantly to conditions in the hydraulic circuit, creating a moisture barrier without impeding airflow
- Reduced maintenance costs
- Thermally reactive barrier that removes moisture at relative humidity levels as low as 15%
- Superior moisture blocking and particulate filtration down to 3 µm at 97%
- Will not freeze in winter

Ref: Shoptalk Card F115241



## Filter Recycling

Donaldson encourages all individuals and businesses to recycle their used hydraulic filters. Recycling used hydraulic filters helps divert waste from landfills while providing a valuable resource for recycling. We encourage you to check your local disposal regulations for proper disposal and recycling.

### Industry Resource: The Filter Manufacturers Council

Established in 1971, the Filter Manufacturers Council represents North American manufacturers of vehicular and industrial filtration products. Initially developed to monitor regulatory and technological developments that affect the industry, the Council has since expanded its activities substantially.



[www.filtercouncil.org](http://www.filtercouncil.org)

The Council has undertaken several environmental initiatives including partnering with states to promote the proper management of used oil filters. In addition, the operation of the hotline and web site provide valuable information regarding state regulations and companies that transport, process and recycle used oil filters.

Donaldson Company is a member of the Filter Manufacturers Council.

## Do You Store or Warehouse Filters On-Site?

Whether it's an empty trailer or building, it's important to practice good storage and handling techniques when it comes to filters.

Before installing any filter on a piece of equipment make sure the filter is clean, unused and free of damage.

### Filter Storage Tips and Recommendations for Contamination Control

- Never store a filter on a shelf without it being in a box or totally sealed from outside contaminant.
- When you see an open box of filters on the shelf, tape it shut—unless the filters inside the box are individually sealed.
- Handle filters with care to prevent filter damage; for example, don't throw filters into the back of a truck.
- If transporting filters from one job site to another, don't let them roll around on the floorboard or in the back of a truck as it may damage the filter.
- Metal storage shelves may cause condensation to form on filters if sitting directly on metal. Over time the filter may get rusty. This is another good reason to store filters in boxes.
- If a product box has layers of contaminant, take care that the contaminant doesn't get on the new filter as you remove it from the box.
- Practice "first-in, first-out" with your inventory. When possible, always use the oldest inventory first.
- Make sure labels with product information and manufacturing dates are visible to personnel selecting from the shelves.

Ref: Shoptalk Card F115285

## HRK10 at a Paper Mill



### HRK10 Duplex

- Industry:** Paper
- Problem:** Collapsing Competitive Filter Elements on PMO Circuit
- Solution:** Donaldson HRK10 Duplex  
Donaldson High-Performance DT Cartridges

Donaldson Company was contacted by an upper Midwestern paper mill. This paper mill called Donaldson and our Distribution Partner for assistance with filter collapse in existing competitive filter housings that resulted in contamination of the main lube circuit. In addition, the filtration system, using 8300 competitive style housings, was inefficient and didn't offer a bypass option. The mill runs a demanding 24/7 operation with minimal shutdown opportunities, but the company had a major maintenance shutdown (20 hours max) scheduled, which provided a narrow window of opportunity for Donaldson and our Distribution Partner to shine.

The mill found a solution in Donaldson's new HRK10 filter housings and Donaldson high-performance DT filters. Four HRK10 units were configured in a duplex arrangement. Donaldson DT B5(c)=1000 filter elements were installed and are currently achieving an ISO cleanliness level of 16/14/11. Routine oil samplings upstream and downstream continue to confirm great results. Through the joint efforts of Donaldson Company and our Distribution Partner, we delivered an economical solution which created a new relationship and happy customer.

## T.R.A.P.™ at a Coal Plant



### T.R.A.P. Breathers

- Industry:** Power Generation
- Problem:** Short Life of Desiccant Breathers and High Maintenance
- Solution:** Donaldson T.R.A.P. Breathers

A coal-fired power plant in northeast Florida is always looking for a better way to protect its equipment and reduce downtime. The desiccant breathers that this around-the-clock operating facility was using to keep water and dirt out of its gearboxes required frequent change-outs. Gearboxes in the hot, humid air of the southeastern United States need robust and reliable protection against atmospheric moisture. The plant needed a breather that would work better and last longer than the desiccant breathers they were using. The plant's Predictive Maintenance Technician found a solution in Donaldson's T.R.A.P. breather – an advanced breather technology that provides unbeatable system protection and lasts longer.

By installing T.R.A.P. breather filters on its gearboxes, the power plant has extended breather filter life by over 50%. "We test our oil frequently, our current breathers are working well, but the T.R.A.P. breathers are working longer," says the PdM Tech. Unlike desiccant breathers that absorb and hold moisture resulting in shorter life, Donaldson's Thermally Reactive Advanced Protection (T.R.A.P.) senses and begins to remove moisture at only 15% relative humidity. Unlike desiccant breathers that require frequent changeouts, a T.R.A.P. breather exhales moisture with every flow cycle, regenerating its water-holding capacity and resulting in longer breather life.

## HMK25 at a Gold Mine



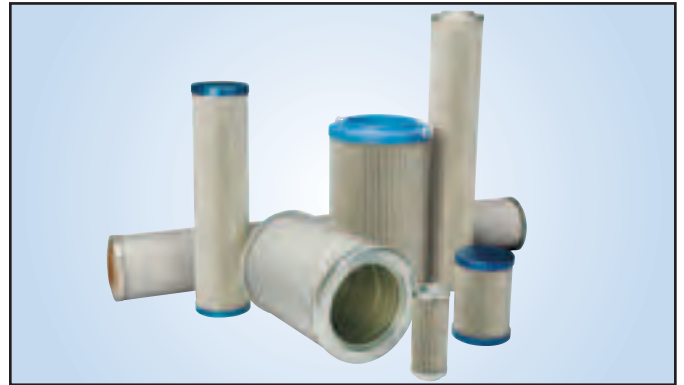
### HMK25 Spin-On Filter

- Industry:** Mining  
**Problem:** Gyro Crusher Seizure due to Oil Starvation  
**Solution:** Donaldson HMK Duramax

The relationship between a rock crusher rebuilder and Donaldson began after a 36" Telsmith gyro crusher was reconditioned and put back into service at a South African gold mine. Within weeks of its return (and while still under warranty), the crusher seized. It happened on a cold morning shortly after start-up. There was no warning of any oil pressure problem and no obvious reason for the failure. Oil starvation was quickly identified as the cause of seizure—but what was the cause of the oil starvation? The first part of the investigation determined that a pressure switch was on the pump side of the filter instead of beyond the filter. Donaldson redesigned the entire filtration system.

"We went for a double head HMK25 filter system, 380 lpm at 24 bar. We also dropped the filter media from 60 µm down to 20 µm." The oil used was a non-foaming 150 cSt gear oil. However, at 0°C the viscosity is 2990 cSt. "The viscosity goes up exponentially. On a cold morning, if the guys start up their crusher straight away, that oil is not going through the filters easily." The Donaldson-modified system was implemented and the crusher was successfully put back into service. "It has worked 100% for a year now. They are changing the Donaldson filters at 1000 hour intervals on restriction. Changing the filtering system and the filtering points made all the difference."

## DT Filters at an Injection Molder



### Donaldson High-Performance DT Filters

- Industry:** Injection Molding  
**Problem:** Short Servo Valve Life  
**Solution:** Donaldson DT High-Performance Filter

Donaldson DT elements were recently installed on injection molding equipment at a Midwestern molder's facility. This molder was running nine machines that make plastic components for the product security industry. Their normal operating procedure included regularly sampling and analyzing their hydraulic oil (ISO VG 46), and they were not satisfied with their ISO cleanliness codes or their short servo valve life. Servo valve life (lasting only a few months) led to a drastic change to their maintenance procedures, including: new oil, moisture removal breathers, side-loop cleanup systems, and Donaldson DT pressure line filters.

In side-by-side tests the injection molder compared their existing supplier's hydraulic pressure line elements with Donaldson DT <4 µm(c) rated filters. Oil analysis proved that by using the Donaldson DT filters, they could regularly achieve as much as a one to two ISO code improvement in particulate cleanliness over the filters they had used in the past. With a target of 17/14/11, they were regularly able to achieve 14/12/9. At the time of this writing, the injection molder's maintenance manager reported, "we have not had to replace servo valves in over one year." As a result of the change in pressure line filters and their other improved practices, they are expecting extended servo valve life and greater uptime.

## Shoptalk Simple Facts about Hydraulic Filtration

### Will Using Aftermarket Filters Void My Warranty?

#### Answer:

Good News! No need to worry about voiding your warranty – you can use aftermarket products! You still need to follow your manufacturer's recommended maintenance practices, but your warranty is protected under the Magnuson-Moss Warranty Act. Information on the Magnuson-Moss Warranty Act is available at <http://www.ftc.gov/bcp/edu/pubs/business/adv/bus01.shtm#Magnuson-Moss>.

In addition, Donaldson warrants its aftermarket products against failure due to defects in materials and workmanship for the period specified under the Terms and Conditions for the particular product. More information is available at [www.donaldson.com/en/engine/support/datalibrary/000194.pdf](http://www.donaldson.com/en/engine/support/datalibrary/000194.pdf).



### Filtration Service Videos now on YouTube®!

[www.youtube.com/user/donaldsonengine](http://www.youtube.com/user/donaldsonengine)

Thirty Donaldson Academy filter servicing videos are now available as a resource for understanding filtration selection and maintenance. They cover detailed hydraulic filter service steps and best practices. Air, lube, fuel and coolant training modules are also available.

These videos are easily accessible from smart phones – making them a great tool for mobile training!

YouTube® is a registered trademark of Google Inc.



SERVICE TRAINING VIDEOS



[youtube.com/user/donaldsonengine](http://youtube.com/user/donaldsonengine)

### Filter Installation and Servicing Icons



Donaldson spin-on filters have pictograms on the sides to define the proper servicing steps.



## Maintenance Practices for Contamination Control

Here are recommended practices from Donaldson about hydraulic filter servicing and handling. These steps are universal to many hydraulic systems. This servicing information is provided as a best practices guide. Donaldson recommends that where possible, follow the filter service instructions supplied by your original equipment manufacturer. It is not however intended to replace or supersede the service instructions supplied by your equipment or vehicle manufacturer.

### Spin-On Filter Servicing



#### Check the filter service indicator.

- Check to see that the OEM specified service interval has been reached or that the service indicator shows that the filter is due for servicing.



#### Turn system off and release pressure.

- Ensure that the hydraulic system is turned off.
- Check that there is no pressure present.



#### Unscrew and remove old filter and gasket.

- Properly dispose of the filter as may be required by local regulations or recycle it.



#### Wipe filter head with clean cloth.

- Clean the filter head or cover surfaces
- When performing a hydraulic oil change, it is best to use a clean cloth.



#### Inspect the new filter for damage.

- Check the new filter you will be installing for any shipping and handling damage.
- Do not install a dented filter since the canister has been weakened.



#### Lubricate the threads.

- Lubricate threads of filter head.



#### Apply thin film of clean motor oil to gasket.

- Lubricate seal(s) with clean system oil.



#### Align threads. Spin filter until gasket contacts.

- Spin the new filter on until the top of the gasket first contacts the sealing surface.



#### Hand tighten the filter.

- Tighten per the guidance of the icons which appear on the filter housing. Do not over-tighten.



#### Bleed the system and check for leaks.

# Shoptalk

## Simple Facts about Hydraulic Filtration

### Cartridge Filter Servicing



#### Check the filter service indicator.

- Check to see that the OEM specified service interval has been reached or that the service indicator shows that the filter is due for servicing.



#### Turn system off and release pressure.

- Ensure that the hydraulic system is turned off.
- Check that there is no pressure present.



#### Unscrew the cartridge housing.



#### Remove the used filter and gasket, if applicable.



#### Clean out the housing seal area and cap.

- Clean out any sediment from the inside of the filter housing.
- Properly dispose of the cartridge according to local regulations.



#### Inspect the new filter cartridge for damage.

- Check the new filter you will be installing for any shipping and handling damage.



#### Lubricate seals, gaskets and threads. Install new cartridge.

- Lubricate the o-rings, gaskets, housing seals and threads with clean system oil.



- Install filter into the housing.



#### Align threads. Spin filter until gasket contacts.

- Fit the housing to the filter head as instructions on the housing.



#### Hand tighten the filter.

- Tighten per the guidance of the icons which appear on the filter housing.
- Do not over-tighten.



#### Bleed the system and check for leaks.

## In-tank Filter Servicing



### Check the filter service indicator.

- Check to see that the OEM specified service interval has been reached or that the service indicator shows that the filter is due for servicing.

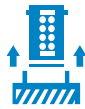


### Turn system off and release pressure.

- Ensure that the hydraulic system is turned off.
- Check that there is no pressure present.



### Remove the housing cover.



### Remove the used filter, gasket and spring, if applicable.

- Remove the filter as gently as possible.
- Avoid contaminant dropping into the clean side of the housing.
- Properly dispose of the cartridge, seal and spring.



### Clean the filter mount, cap, inside of the housing and cover.

- Clean out any sediment from the inside of the filter housing.



- Wipe away any sediment on the outside of the filter cover.



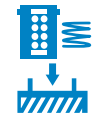
### Inspect the new filter cartridge for damage.

- Check the new filter you will be installing for any shipping and handling damage.



### Lubricate the filter gasket and cover seal.

- Lubricate the new filter cartridge O-ring and cover seal with clean system oil.



### Install new filter and spring, if applicable.



### Reinstall the housing cover.

- Refit the cover following any instructions given.



### Bleed the system and check for leaks.



# Donaldson's Commitment to Quality & Continuous Improvement

## Donaldson Quality Commitment

Our employees are committed to providing our Customers with products and services that consistently meet or exceed their expectations.

### We will work towards:

- Continuous improvement of products, processes, and services for the benefit of our Customers;
- Complete Customer satisfaction;
- Elimination of waste and variation;
- World-class standards and benchmarks.

### We believe in:

- The development and empowerment of our people;
- Standardization of processes and measurement of progress;
- Simplicity, visibility and capability of all activities;
- Continuous improvement in our management and quality systems.

For the long-term success of our company, our first operating priority is the satisfaction of our Customers. Understanding their needs and serving them will benefit both our shareholders and our employees. Our management is responsible for ensuring that this policy is understood, implemented and maintained at all levels of our organization.

*Bill Cook*  
Chairman, President, CEO







## Low Pressure Filters

Low pressure filters are the most commonly used type of filter in hydraulic circuits – used most often in return line applications.

Donaldson low pressure filters are rated for working pressures up to 350 psi (2400 kPa). In-tank and in-line configurations are available to accommodate virtually any application.



## Section Index

**Max Operating Pressure < 350 psi (24 bar)**  
*Models arranged from low to maximum flow rates*

### Spin-on Filters

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SP15/25

Max Flow: 30 gpm (114 lpm)

## SP15/25 Spin-On Filters

**Maximum Working Pressures to:** 150 *psi*  
1034 kPa  
10.3 bar

**Rated Static Burst to:** 375 *psi*  
2590 kPa  
25.9 bar

**Flow Ranges to:** 30 *gpm*  
114 *lpm*



### Features

The SP15/25 series are economical, low pressure filters with spin-on convenience and a wide range of cleanliness ratings. Filters are available with the bypass ratings of your choice – 25 psi, 15 psi, 5 psi or no bypass. Take advantage of our mix and match system of in-stock heads and filters, so you can get exactly what you need. Choose the media type and configuration that's best for your application. Options include Donaldson's exclusive Synteq™, natural fiber cellulose, stainless steel wire-mesh or water absorbing media.

#### Beta Rating

- Performance to  $\beta_{6(c)}=1000$

#### Porting Size Options

- 1/2", 3/4" NPT
- SAE-8, -12 O-ring

#### Replacement Filter Lengths

- Synteq™ 5.35" / 136 mm  
7.87" / 200 mm
- Cellulose 5.35" / 136 mm  
7.87" / 200 mm
- Wire Mesh 5.35" / 136 mm
- Water Removal 5.35" / 136 mm

#### Standard Bypass Ratings

- 25 *psi* / 172.5 kPa / 1.7 bar
- 15 *psi* / 97 kPa / .97 bar
- 5 *psi* / 34.5 kPa / .34 bar
- No Bypass

#### Assembly Weight

- 5.35": 1.6 lbs / .7 kg (approximately)
- 7.87": 2.2 lbs / 1 kg (approximately)

#### Operating Temperatures

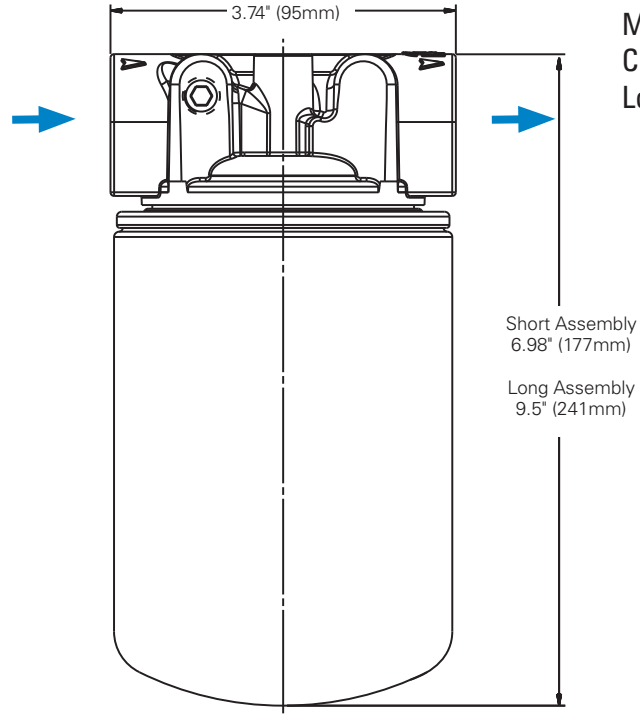
- -20°F to 225°F / -27°C to 107°C

#### Collapse Ratings

- 100 *psid* / 690 kPa / 6.9 bar (standard)

**SP15/25 Specification Illustrations**

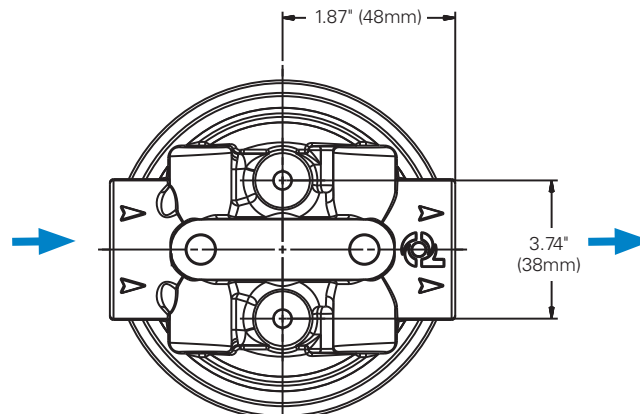
**Assembly - Side View**



**Applications:**

- In-Plant Systems
- Agriculture Equipment
- Mining
- Construction
- Logging

**Head - Top View**





SP15/25

Max Flow: 30 gpm (114 lpm)



## SP15/25 Components

### Filter Choices

Media Type	Beta <sub>(c)</sub> <sub>200</sub> Rating	Beta <sub>(c)</sub> <sub>1000</sub> Rating	Length (in./mm)	Donaldson Part No.	Comments
Synteq Media # 1		5 µm	5.35/136	P564967	Synthetic Media
Synteq Media # 2		9 µm	7.87/200	P564357	Synthetic Media
Synteq Media # 2-1/2		10 µm	5.35/136	P560693	Synthetic Media
Synteq Media # 2-1/2		10 µm	7.87/200	P179089	Synthetic Media
Synteq Media # 9		23 µm	5.35/136	P560694	Synthetic Media
Cellulose Media # 10		23 µm	5.35/136	P551551	
Cellulose Media # 10		23 µm	7.87/200	P565059	
Cellulose Media # 3		24 µm	5.35/136	P565061	
Cellulose Media # 25	32 µm		5.35/136	P551553	
Cellulose Media # 25	32 µm		7.87/200	P565060	
Water Absorbing Media	32 µm		5.35/136	P565062	Absorbs Approx. 6 oz/170 ml of water @ 20 psid/1.4 bar
Wiremesh Media # 149	150 µm		5.35/136	P550274	100 mesh

\* Thread size 1"-12 UNF

## Head Choices

Port Size	Bypass Range	Gauge ports (drill, tap, plug)	Gauge Port Location	Donaldson Part No.
½" NPT	15 psi / 103.4 kPa / 1.34 bar	(2) 1/8" NPT	upstream side	P563288
¾" NPT	25 psi / 172.5 kPa / 1.72 bar	(2) 1/8" NPT	upstream side	P561131
¾" NPT	5 psi / 34.5 kPa / .34 bar	(2) 1/8" NPT	downstream side	P561132
¾" NPT	25 psi / 172.5 kPa / 1.72 bar	none	na	P561134
¾" NPT	5 psi / 34.5 kPa / .34 bar	none	na	P561135
¾" NPT	none	none	na	P561136
¾" NPT	15 psi / 103.4 kPa / 1.34 bar	none	na	P563278
SAE-12	none	none	na	P561133
SAE-12	none	(1) SAE-4	upstream side, LH	P561137
SAE-12	5 psi / 34.5 kPa / .34 bar	none	na	P561140
SAE-12	25 psi / 172.5 kPa / 1.72 bar	none	na	P561141
SAE-12	15 psi / 103.4 kPa / 1.34 bar	none	na	P563279
SAE-12	25 psi / 172.5 kPa / 1.72 bar	(2) 1/8" NPT	upstream side	P563280
SAE-12	15 psi / 103.4 kPa / 1.34 bar	none	M6 mtg. threads	P563287
SAE-8	25 psi / 172.5 kPa / 1.72 bar	none	na	P561138



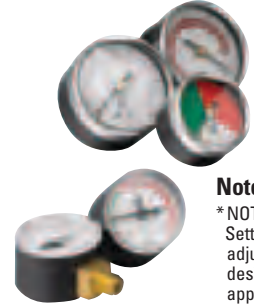
### Mix and Match

Donaldson's mix and match system provides the great performance and functional advantages of custom-engineered filters with the convenience and speedy delivery of in-stock parts. Choose your options and build a filter model to suit your specifications.



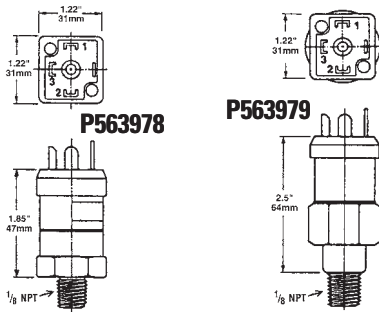
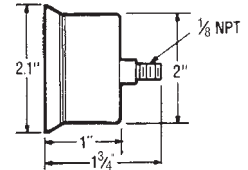
## Filter Service Gauges - Visual Indicators

Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi field adj.*	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, electrical
P563979	-5 to 15 in Hg	5 psi / 34.5 kPa / .34 bar Hg field adj.* or No Bypass	Suction indicator, electrical
P563296	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, numeric scale
P563297	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar Bypass	Return indicator, color coded
P563298	0 to 100 psi	25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, color-coded
P563299	0 to -20 Hg	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, numeric scale



**Notes**  
\*NOT PRESET:  
Setting adjustable for desired application

**P563296 - P563299**



#1 Common; #2 Normally Closed;  
#3 Normally Open

### Instructions

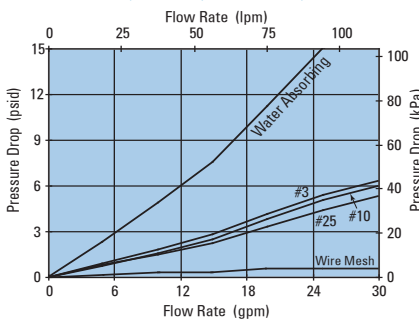
1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

Adjustment screw located in center of electronic prongs

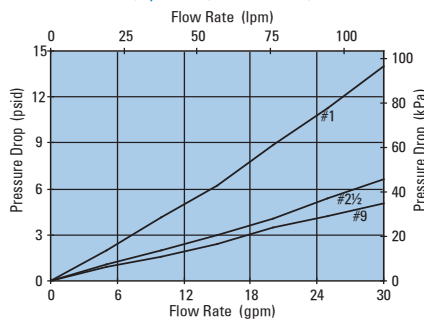


## Performance Data

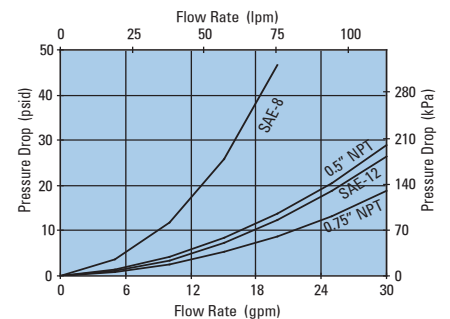
**SP15 Filter Only**  
(Cellulose, 5.35"/136mm)



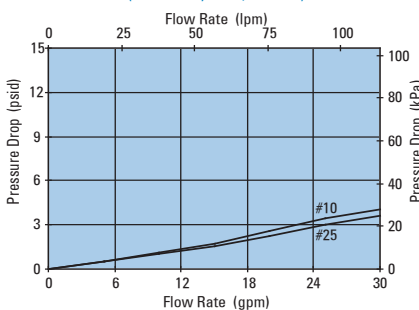
**SP15 Filter Only**  
(Synthetic, 5.35"/136mm)



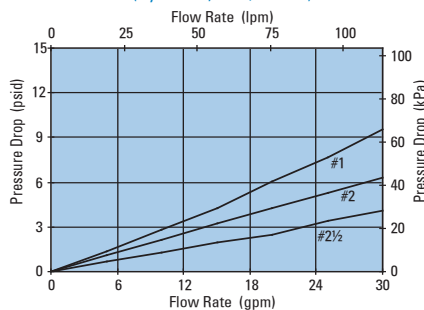
**SP15/25 Head Only**



**SP25 Filter Only**  
(Cellulose, 7.87"/200mm)



**SP25 Filter Only**  
(Synthetic, 7.87"/200mm)





W012

Max Flow: 30 gpm (114 lpm)



## W012 Spin-On Filters

**Working Pressures to:** 150 *psi*  
10.3 bar

**Rated Static Burst to:** 300 *psi*  
20.7 bar

**Flow Range to:** 30 *gpm*  
114 *lpm*



### Features

The W012 series are economical, low pressure filters with spin-on convenience and a wide range of cleanliness ratings. Heads are available bypass ratings of your choice – 25 psi or no bypass. Take advantage of our mix and match system of heads and filters, so you get exactly what you need. You can choose the media type and configurations that's best for your application. Options include Donaldson's exclusive Synteq™, natural fiber cellulose, stainless steel wiremesh or water absorbing media.

#### Beta Rating (per ISO 16889)

- Performance to  $\beta_{4(c)}=1000$

#### Porting Size Options

- 3/4" NPT
- SAE-12 O-ring

#### Replacement Filter Lengths

- Synteq™ 5.35" / 136 mm  
7.87" / 200 mm
- Cellulose 5.35" / 136 mm  
7.87" / 200 mm
- Wiremesh 5.35" / 136 mm
- Water Removal 5.35" / 136 mm

#### Standard Bypass Rating

- 25 psi / 172 kPa / 1.7 bar
- No Bypass

#### Assembly Weight

- 5.35": 1.6 lbs / .7 kg (approximately)
- 7.87": 2.2 lbs / 1 kg (approximately)

#### Operating Temperatures

- -20°F to 225°F / -27°C to 107°C

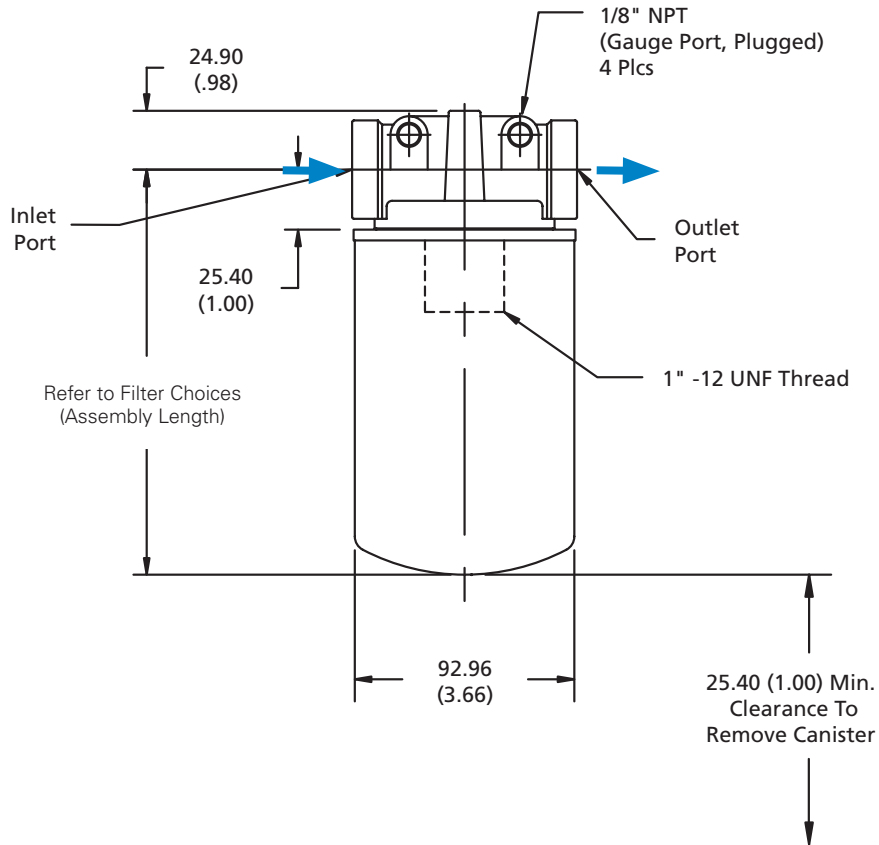
#### Collapse Ratings

- 100 *psid* / 690 kPa / 6.9 bar (standard)

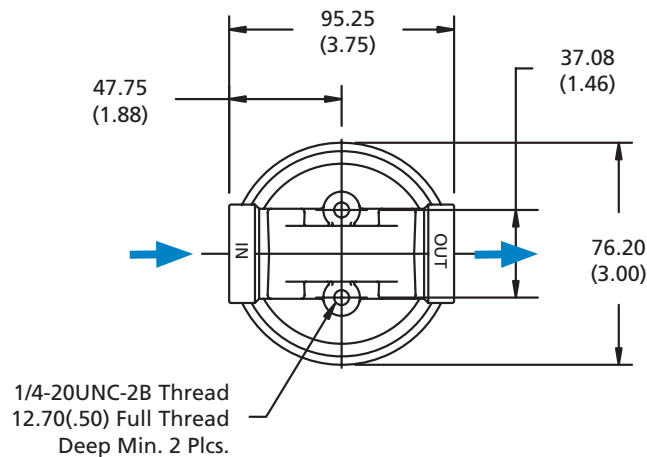
### W012 Specification Illustrations

All dimensions are shown in millimeters [inches].

#### Assembly - Side View



#### Head - Top View





W012

Max Flow: 30 gpm (114 lpm)

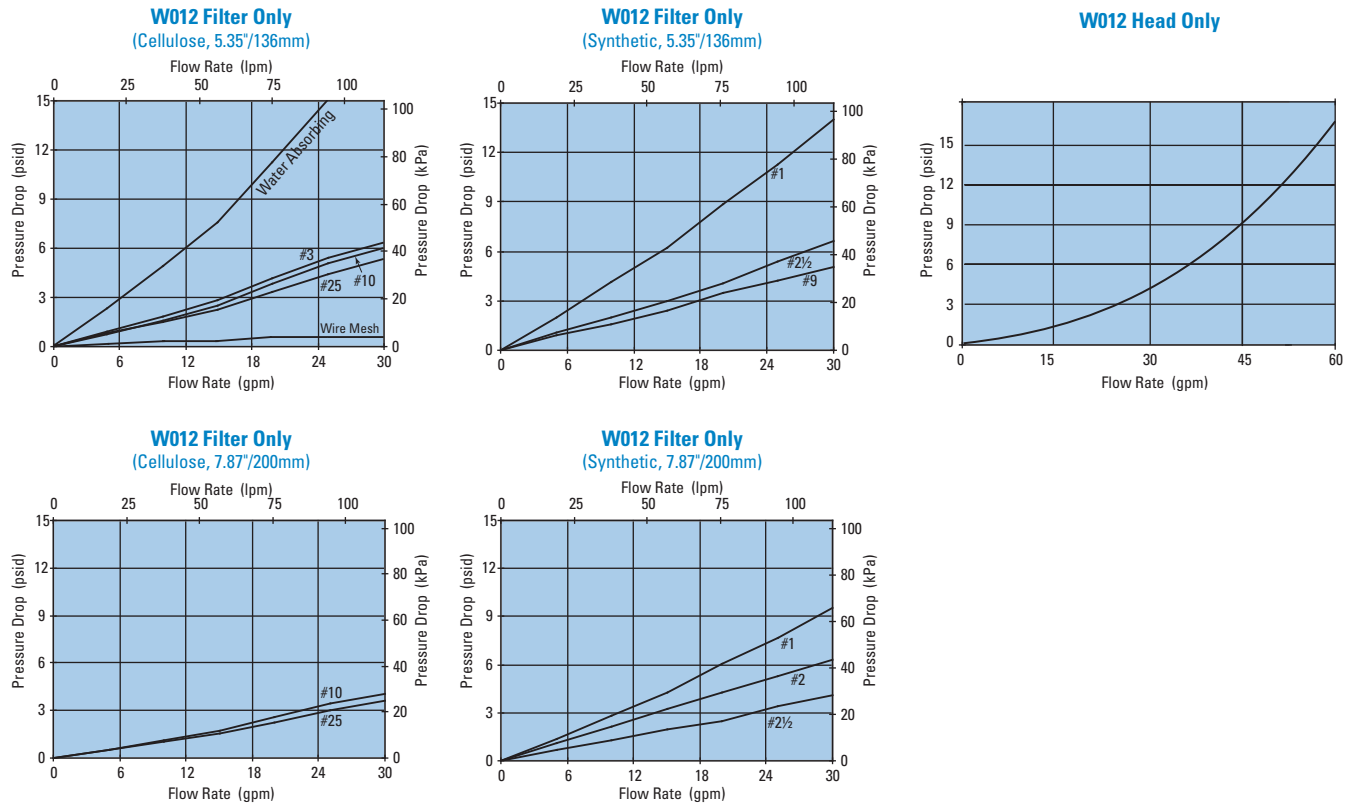


## W012 Components Filter Choices

Media Type	Beta <sub>(fc)</sub> =200 Rating	Beta <sub>(fc)</sub> =1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
Synteq Media # 1		5 μm	5.35/136	P564967	Synthetic Media
Synteq Media # 2		9 μm	7.87/200	P564357	Synthetic Media
Synteq Media # 2-1/2		10 μm	5.35/136	P560693	Synthetic Media
Synteq Media # 2-1/2		10 μm	7.87/200	P179089	Synthetic Media
Synteq Media # 9		23 μm	5.35/136	P560694	Synthetic Media
Cellulose Media # 10		23 μm	5.35/136	P551551	
Cellulose Media # 10		23 μm	7.87/200	P565059	
Cellulose Media # 3		24 μm	5.35/136	P565061	
Cellulose Media # 25	32 μm		5.35/136	P551553	
Cellulose Media # 25	32 μm	740 μm	7.87/200	P565060	
Water Absorbing Media	32 μm	730 μm	5.35/136	P565062	Absorbs Approx. 6 oz/170 ml of water @ 20 psid/1.4 bar
Wiremesh Media # 149	150 μm		5.35/136	P550274	100 mesh

\* Thread size 1"-12 UNF

## Performance Data







## Filter Head Ordering Guide

Filter Assembly	W012	1	A	3	4	B
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6

Service Filter  
Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly / Service Filter	
CODE	DESCRIPTION
W012	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid

**Table 3**

Port Size Options	
CODE	PORT SIZE
A	SAE-12 O-ring
I	3/4" NPT

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass (blocked)*
3	25 psid

\*80 psid maximum operating pressure

**Table 5**

Upstream Pressure Gauge and Switch Option	
CODE	INDICATOR STYLE & SETTING
1	Gauge ports drilled, tapped and plugged
4	0-60 psi pressure gauge
6	Pressure switch 18 psi Brad Harrison® (5-pin)
8	Pressure switch 18 psi Hirschmann® (4-pin)

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®

### Media Ratings

Western Filter spin-ons have been replaced by Donaldson spin-on filters.

WESTERN MEDIA CODE	DONALDSON MEDIA
P10	#10
P20	#25
R10	#2½

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).



W015

Max Flow: 60 gpm (227 lpm)

## W015 Spin-On Filters

**Working Pressures to:** 150 *psi*  
10.3 bar

**Rated Static Burst to:** 250 *psi*  
17.2 bar

**Flow Range to:** 60 *gpm*  
227 *lpm*



### Features

The W015 series are economical, low pressure filters with spin-on convenience and a wide range of cleanliness ratings. The die-cast aluminum heads are available with the bypass rating of your choice – 25 psi or no bypass. Take advantage of our mix and match system of heads and filters, so you get exactly what you need. You can choose the media type and configurations that's best for your application. Options include Donaldson's exclusive Synteq™, natural fiber cellulose, stainless steel wiremesh or water absorbing media.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-20 O-ring

#### Replacement Filter Lengths

- 6.7" / 170 mm
- 10.7" / 271 mm

#### Standard Bypass Ratings

- 25 psi / 172.5 kPa / 1.7 bar
- No bypass

#### Assembly Weight

- 4.7 lbs / 2.1 kg (short)
- 5.6 lbs / 2.5 kg (long)

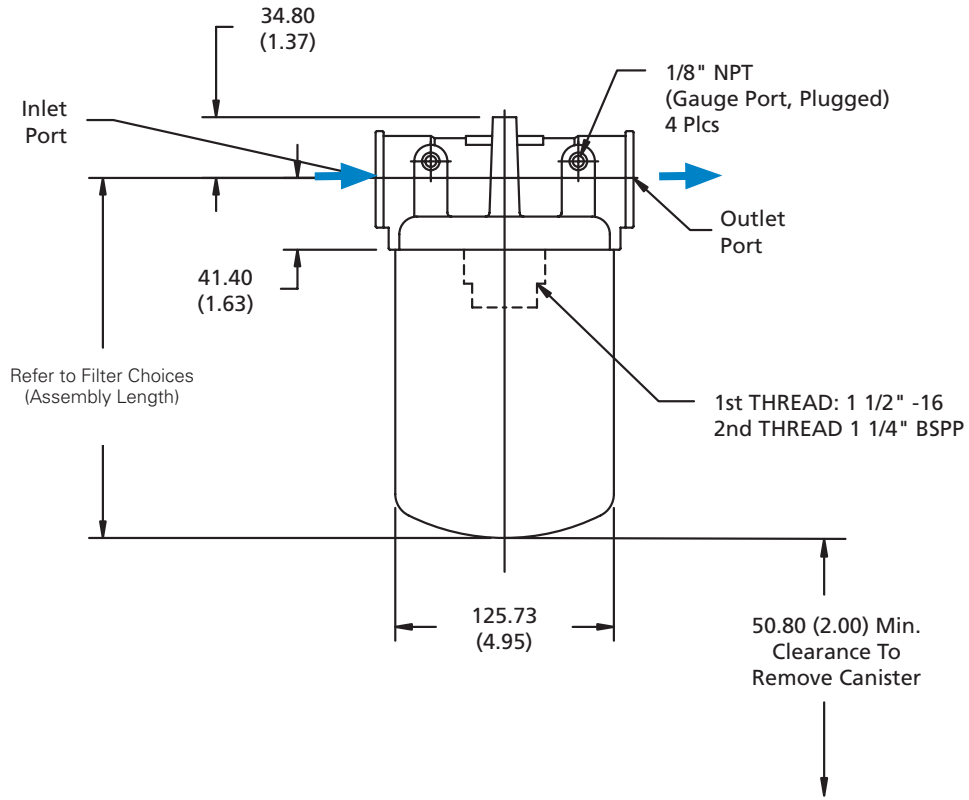
#### Operating Temperatures

- -22°F to 250°F / -30°C to 121°C

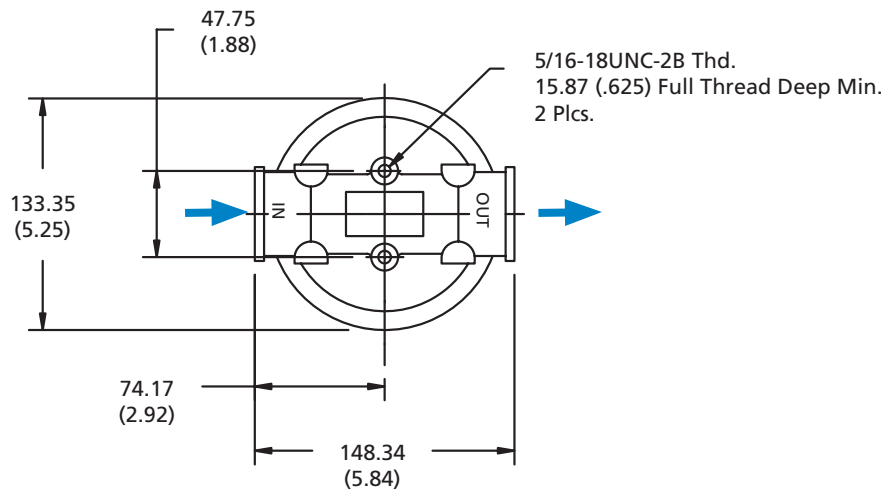
### W015 Specification Illustrations

All dimensions are shown in millimeters [inches].

#### Assembly - Side View



#### Head - Top View





W015

Max Flow: 60 gpm (227 lpm)



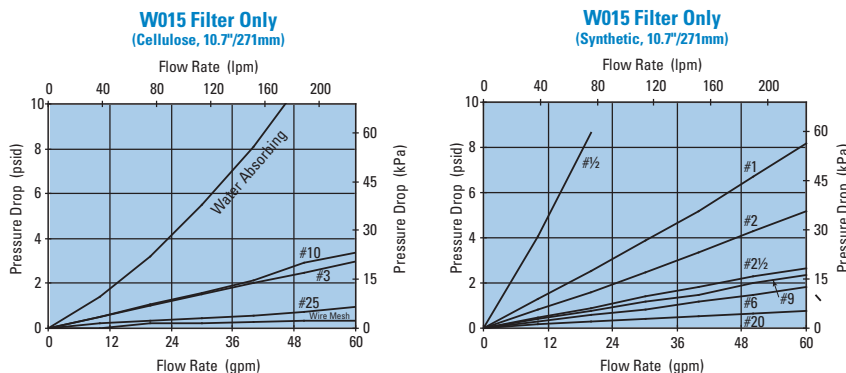
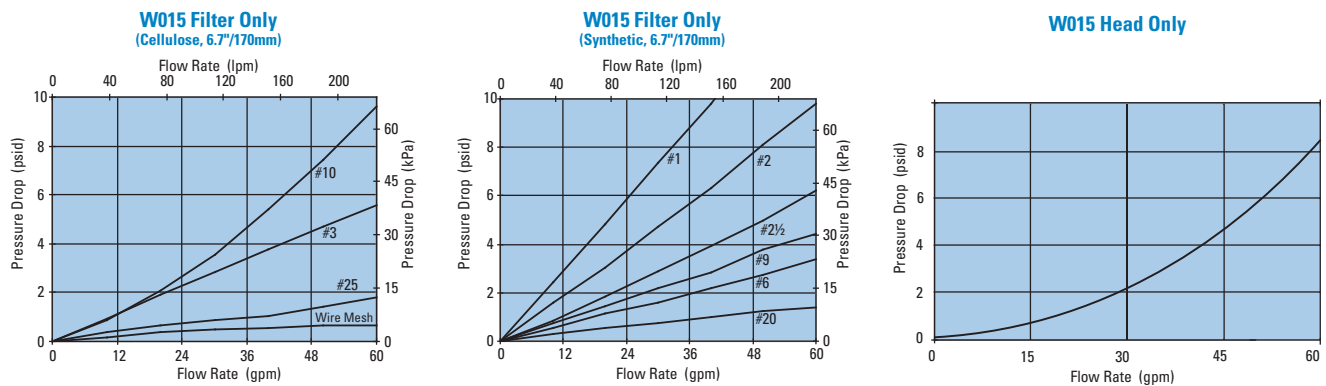
## W015 Components

### Filter Choices

Media Type	Beta <sub>x(c)</sub> =200 Rating	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
No. 1/2		<4 μm	10.7/271	P167796	Synthetic, Viton® O-ring & square seal kit
No. 1		5 μm	6.7/170	P169430	Synthetic, 3-seal kit
			10.7/271	P167832	Synthetic, 3-seal kit
No. 2		9 μm	6.7/170	P167162	Synthetic, 3-seal kit
			10.7/271	P165762	Synthetic, 3-seal kit
No. 2 1/2		10 μm	6.7/170	P165875	Synthetic, 3-seal kit
			10.7/271	P165876	Synthetic, 3-seal kit
No. 6		13 μm	6.7/170	P167944	Synthetic, Viton O-ring & square seal kit
			10.7/271	P167945	Synthetic, Viton O-ring & square seal kit
No. 9		23 μm	6.7/170	P165877	Synthetic, 3-seal kit
			10.7/271	P165878	Synthetic, 3-seal kit
No. 20		>50 μm	6.7/170	P165879	Synthetic, 3-seal kit
			10.7/271	P165880	Synthetic, 3-seal kit
No. 3		24 μm	6.7/170	P550386	Cellulose, 3-seal kit
			10.7/271	P550250	Cellulose, 3-seal kit
No. 10		23 μm	6.7/170	P550388	Cellulose, 3-seal kit
			10.7/271	P550251	Cellulose, 3-seal kit
			7.00/178	P565245	Cellulose, square-seal, 1/4" BSP thread
No. 25	32 μm		6.7/170	P550387	Cellulose, 3-seal kit
			10.7/271	P550252	Cellulose, 3-seal kit
			7.00/178	P171616	Cellulose, square-seal, 1/4" BSP thread
Water Absorbing*	10 μm		10.7/271	P561183	Cellulose, "L" & square-seal kit
Wire Mesh	150 μm nom		6.7/170	P550275	SS Wire Mesh, 3-seal kit
			10.7/271	P550276	SS Wire Mesh, 3-seal kit

All models have 1/2-16 UNF threads except where otherwise noted. All models measure 5.0"/127 mm outer diameter. \* Absorbs 350 ml water.

## Performance Data



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## Filter Head Ordering Guide

Filter Assembly	W015	1	A	3	4	B
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6

Service Filter  
Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly / Service Filter	
CODE	DESCRIPTION
W015	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
C	SAE-20 O-ring

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass (blocked)*
3	25 psid

\*80 psid maximum operating pressure

**Table 5**

Upstream Pressure Gauge and Switch Option	
CODE	INDICATOR STYLE & SETTING
1	Gauge ports drilled, tapped and plugged
2	0-200 psi pressure gauge**
3	0-60 psi pressure gauge**
4	0-60 psi pressure gauge*
6	Pressure switch 18 psi Brad Harrison® (5-pin)
7	Pressure switch 35 psi Brad Harrison® (5-pin)
8	Pressure switch 18 psi Hirschmann® (4-pin)
9	Pressure switch 35 psi Hirschmann® (4-pin)

\*Bypass setting option code 3 only

\*\*Bypass setting option code 4 only

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®

### Media Ratings

Western Filter spin-ons have been replaced by Donaldson spin-on filters.

WESTERN MEDIA CODE	DONALDSON MEDIA
P10	#10
P20	#25
R03	#1
R05	#2
R10	#2½
R20	#9
W10	WA

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



W021/023

Max Flow: 60 gpm (227 lpm)

## W021/023 Spin-On Filters

**Working Pressures to:** 150 *psi*  
10.3 bar

**Rated Static Burst to:** 250 *psi*  
17.2 bar

**Flow Range to:** 60 *gpm*  
227 *lpm*

### Features

This versatile spin-on series is an excellent choice for use in high corrosion environments. The gray iron head construction can be ordered with gauge or differential pressure indicator ports. Take advantage of our mix and match system of heads and filters, so you get exactly what you need. You can choose the media type and configurations that's best for your application.



#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- 1¼" NPT
- SAE-20 O-ring

#### Replacement Filter Lengths

- 6.7" / 170 mm
- 7.0" / 178 mm
- 10.7" / 271 mm

#### Filter Collapse Ratings

- 100 *psid* / 690 kPa / 6.9 bar

#### Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- 25 psi / 172.5 kPa / 1.72 bar
- No bypass

#### Assembly Weight

- 7.0lbs / 3.2 kg (short)
- 8.0 lbs / 3.6 kg (long)

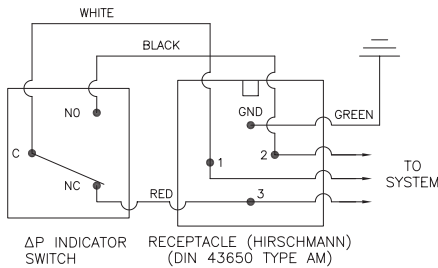
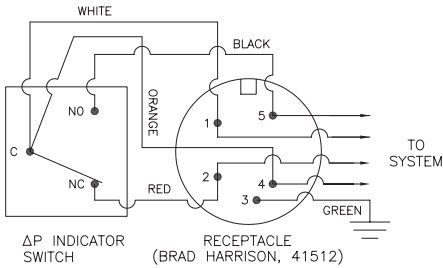
#### Operating Temperatures

- -22°F to 250°F / -30°C to 121°C

## W021/023 Specification Illustrations

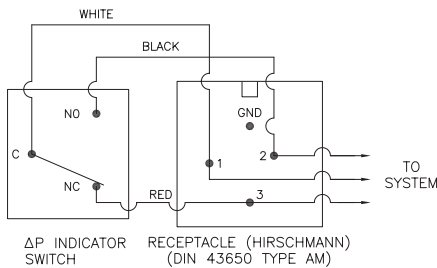
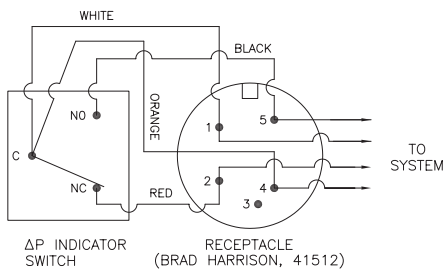
All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



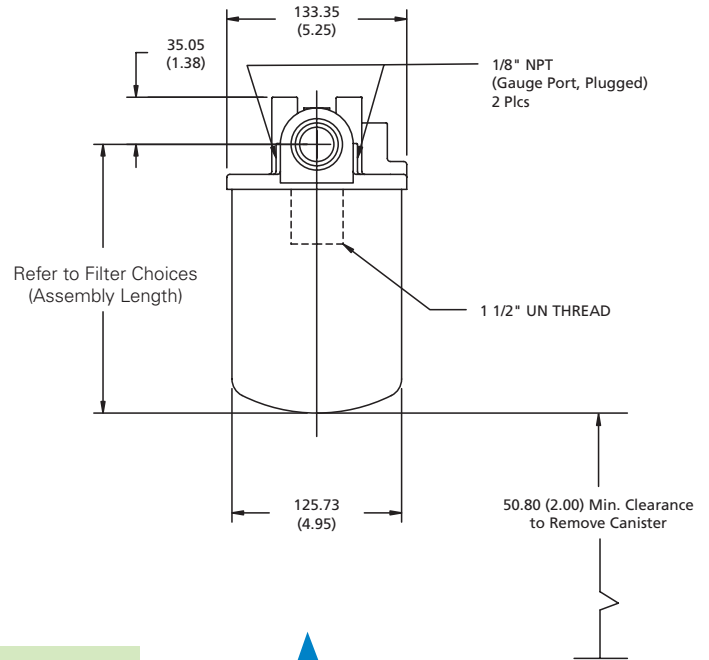
Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings

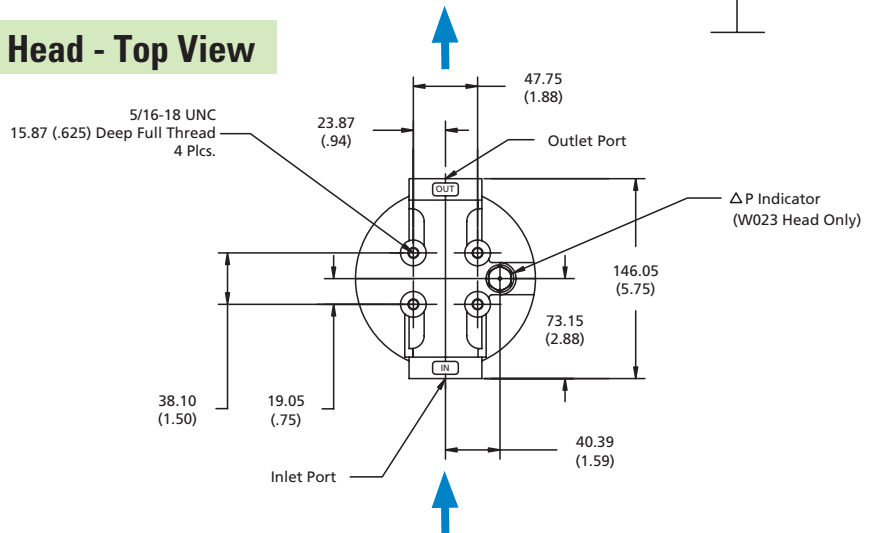


Note: The female plug (connector) is to be furnished by customer.

### Assembly - Side View



### Head - Top View



#### Differential Indicators:

Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

#### Surge Control:

This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

#### Thermal Lockout:

The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80° F.



W021/023

Max Flow: 60 gpm (227 lpm)



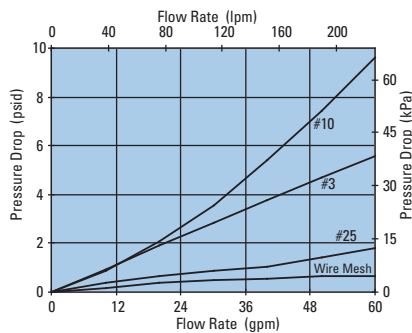
## W021/23 Components Filter Choices

Media Type	Beta <sub>x(c)</sub> =200 Rating	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
No. 1/2		<4 µm	10.7/271	P167796	Synthetic, Viton® O-ring & square seal kit
No. 1		5 µm	6.7/170	P169430	Synthetic, 3-seal kit
			10.7/271	P167832	Synthetic, 3-seal kit
No. 2		9 µm	6.7/170	P167162	Synthetic, 3-seal kit
			10.7/271	P165762	Synthetic, 3-seal kit
No. 2 1/2		10 µm	6.7/170	P165875	Synthetic, 3-seal kit
			10.7/271	P165876	Synthetic, 3-seal kit
No. 6		13 µm	6.7/170	P167944	Synthetic, Viton O-ring & square seal kit
			10.7/271	P167945	Synthetic, Viton O-ring & square seal kit
No. 9		23 µm	6.7/170	P165877	Synthetic, 3-seal kit
			10.7/271	P165878	Synthetic, 3-seal kit
No. 20		>50 µm	6.7/170	P165879	Synthetic, 3-seal kit
			10.7/271	P165880	Synthetic, 3-seal kit
No. 3		24 µm	6.7/170	P550386	Cellulose, 3-seal kit
			10.7/271	P550250	Cellulose, 3-seal kit
No. 10		23 µm	6.7/170	P550388	Cellulose, 3-seal kit
			10.7/271	P550251	Cellulose, 3-seal kit
			7.00/178	P565245	Cellulose, square-seal, 1 1/4" BSP thread
No. 25	32 µm		6.7/170	P550387	Cellulose, 3-seal kit
			10.7/271	P550252	Cellulose, 3-seal kit
			7.00/178	P171616	Cellulose, square-seal, 1 1/4" BSP thread
Water Absorbing*	10 µm		10.7/271	P561183	Cellulose, "L" & square-seal kit
Wire Mesh	150 µm nom		6.7/170	P550275	SS Wire Mesh, 3-seal kit
			10.7/271	P550276	SS Wire Mesh, 3-seal kit

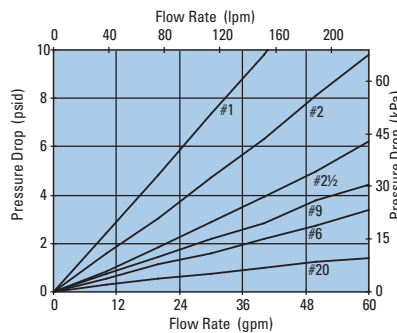
All models have 1/2-16 UNF threads except where otherwise noted. All models measure 5.0"/127 mm outer diameter. \* Absorbs 350 ml water.

## Performance Data

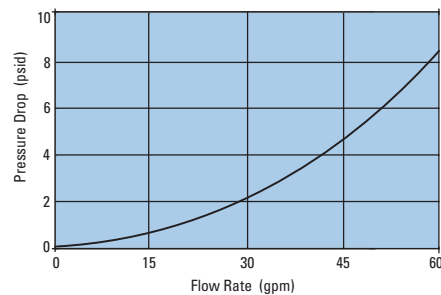
**W012/23 Filter Only**  
(Cellulose, 6.7"/170mm)



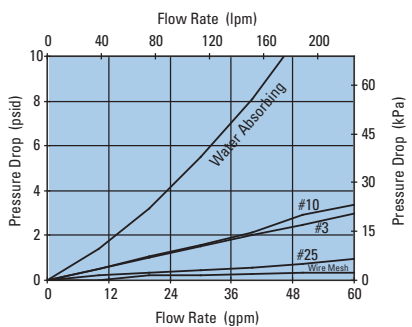
**W012/23 Filter Only**  
(Synthetic, 6.7"/170mm)



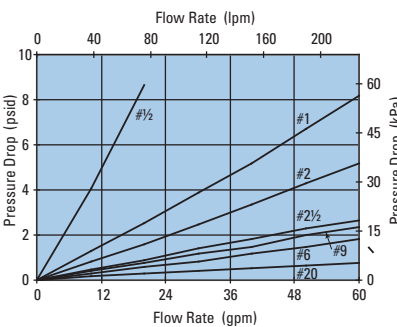
**W012/23 Head Only**



**W012/23 Filter Only**  
(Cellulose, 10.7"/271mm)



**W012/23 Filter Only**  
(Synthetic, 10.7"/271mm)



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## Filter Head Ordering Guide

Filter Assembly	W021	1	C	3	4 N	B
	TABLE 1	TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6

Service Filter  
Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W021	Machined for pressure gauge only
W023	Machined for ΔP indicator only

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid

**Table 3**

Port Size Options	
CODE	PORT SIZE
C	SAE-20 O-ring
P	1¼" NPT

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypassed (plugged)*
3	25 psid
4	50 psid

\*80 psid maximum operating pressure

**Table 5 (Primary W023 only)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
C	Electrical/visual 15 psid
D	Electrical/visual 35 psid
F	Electrical/visual 15 psid & TL
G	Electrical/visual 35 psid & TL
H	Electrical/visual 15 psid with 12" 3-wire flying lead
J	ΔP indicator plug
K	Visual indicator 15 psid
L	Visual indicator 35 psid
M	Visual indicator 35 psid with TL and surge
N	Electrical/visual 35 psid with 12" 3-wire flying lead
Q	Electrical switch 15 psid
R	Electrical switch 35 psid
X	Electrical/visual 15 psid with TL and surge
Y	Electrical/visual 35 psid with TL and surge

TL (thermal lockout)

**Table 5 (W021 only)**

Upstream Pressure Gauge and Switch Option	
CODE	INDICATOR STYLE & SETTING
1	Gauge ports drilled, tapped and plugged
2	0-200 psi pressure gauge**
3	0-60 psi pressure gauge**
4	0-60 psi pressure gauge*
6	Pressure switch 18 psi Brad Harrison (5-pin)
8	Pressure switch 18 psi Hirschmann (4-pin)
9	Pressure switch 35 psid Hirschmann (4-pin)

\*Bypass setting option code 3 only

\*\*Bypass setting option code 4 only

**Table 5 (Secondary W023 only)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®

### Media Ratings

Western Filter spin-ons have been replaced by Donaldson spin-on filters.

WESTERN MEDIA CODE	DONALDSON MEDIA
P10	#10
P20	#25
R03	#1
R05	#2
R10	#2½
R20	#9
W10	WA

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).





HBK05

Max Flow: 60 gpm (227 lpm)



## HBK05 Spin-On Filters

**Working Pressures to:** 150 *psi*  
1034 kPa  
10.3 bar

**Rated Static Burst to:** 250 *psi*  
1724 kPa  
17.2 bar

**Flow Ranges to:** 60 *gpm*  
227 *lpm*

### Features

HBK05 is a strong and durable low pressure filter with a spin-on design that simplifies servicing and reduces maintenance costs. Its heavy-duty steel canister has a rigid steel attachment plate for added strength. The head-to-canister O-ring seal is designed to ensure seal integrity beyond 250 psi/17 bar. The head is made of die-cast aluminum.

Take advantage of our mix and match system of in-stock heads and filters—so you can get exactly what you need, HBK05 is available with your choice of visual or electrical service indicators, and bypass ratings of 25 psi or 5 psi. The filter media is Synteq™, our proprietary synthetic media specifically designed for liquid filtration.

HBK05 filters ship with "L", square, and O-ring gaskets (unless noted with Viton® seals, then with square and o-ring gaskets). All HBK05 filters are interchangeable with SP50/60, SP80/90 and SP100/120 spin-ons, and have 1½" - 16 UN threads.

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### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

### Porting Size Options

- 1¼" NPT
- SAE-20 O-ring

### Replacement Filter Lengths

- 6.7" / 170 mm (short)
- 10.7" / 271 mm (long)

### Standard Bypass Ratings

- 25 *psi* / 172.5 kPa / 1.7 bar
- 5 *psi* / 34.5 kPa / .34 bar

### Assembly Weight

- 6.9 lbs / 3.1 kg (long)
- 5.7 lbs / 2.6 kg (short)

### Operating Temperatures

- -20°F to 225°F / -29°C to 107°C

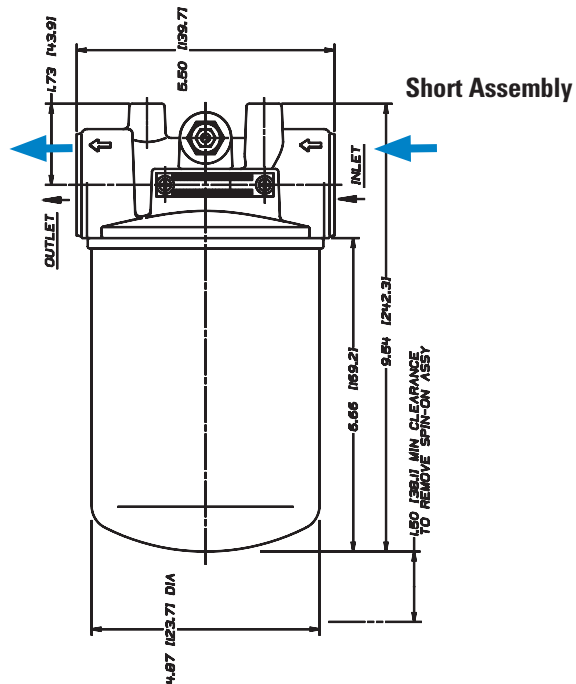
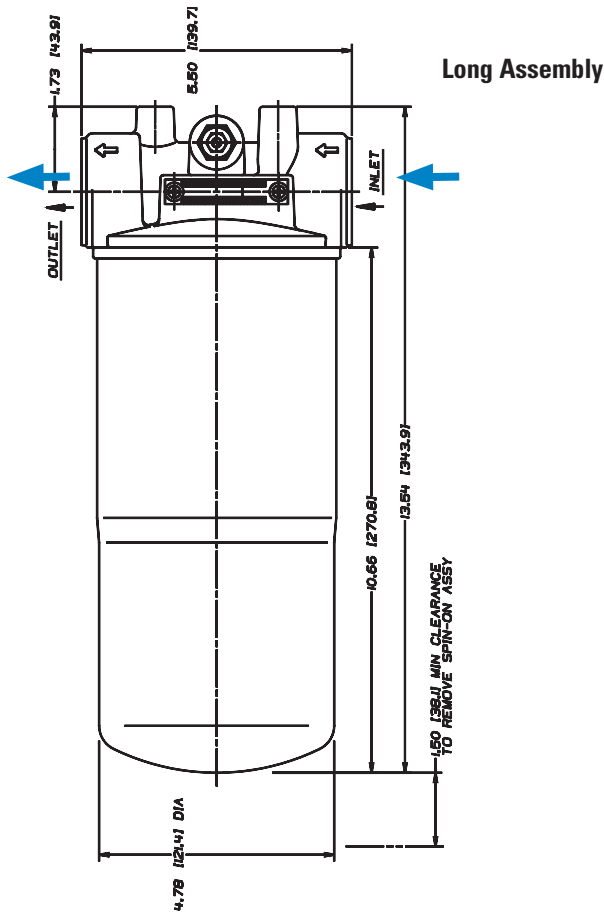
### Filter Collapse Ratings

- 125 *psid* / 863 kPa / 8.6 bar

**HBK05 Specification Illustrations**

All dimensions are shown in inches [millimeters].

**Assembly - Side View**

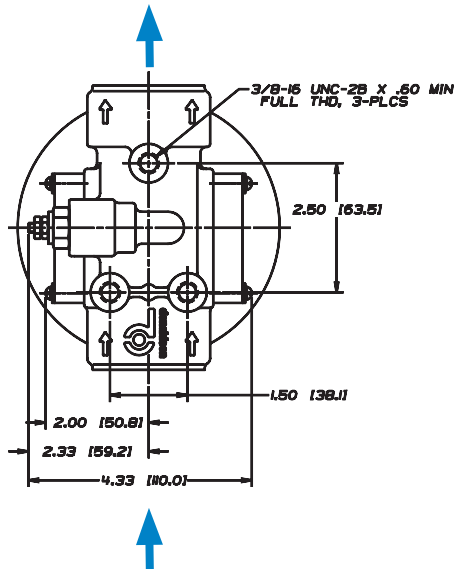


**Applications:**

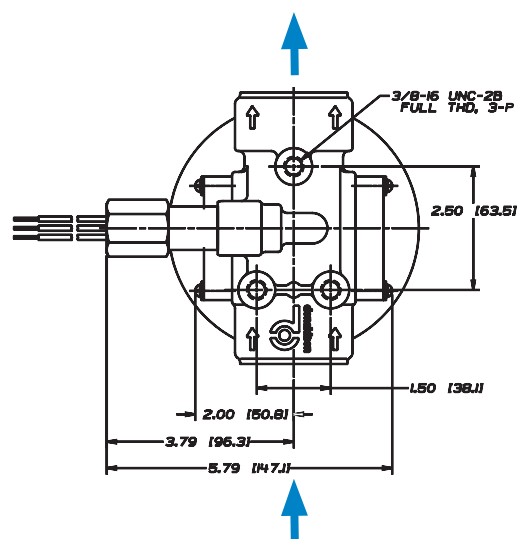
- Fluid Conditioning
- Return-Line/Side-Loop
- Hydrostatic Charge Pump Suction
- Lube Oil & Process Systems
- Power Transmissions
- Cooling Circuits

**Head - Top View**

with DC Electrical Service Indicator



with AC/DC Electrical Service Indicator





HBK05

Max Flow: 60 gpm (227 lpm)



## HBK05 Components

### Filter Choices

Media Rating	B <sub>(c)</sub> = 1000	Length (in.)	Length (mm)	Part No.
No. ½	<4 µm	10.7	271	P167796 with Viton® Seal
No. 1	5 µm	6.7	170	P169430
		10.7	271	P167832
No. 2	9 µm	6.7	170	P167162
		10.7	271	P165762
No. 2½	10 µm	6.7	170	P165875
		10.7	271	P165876
No. 6	13 µm	6.7	170	P167944 with Viton Seal
		10.7	271	P167945 with Viton Seal
No. 9	23 µm	6.7	170	P165877
		10.7	271	P165878
No. 20	>50 µm	6.7	170	P165879
		10.7	271	P165880

\* Thread size 1½"-16 UNF

### Head Choices

Port Size	Bypass Rating	Indicator Style & Location	Part No.
1¼" NPT 345 kPa	50 psi	Visual, Both Sides	P172953
1¼" NPT 172 kPa	25 psi	Visual, Both Sides	P166418
1¼" NPT 34 kPa	5 psi	Visual, Both Sides	P166665
SAE-20 O-Ring	25 psi 172 kPa	Visual, Both sides	P166439

#### Note

\* Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port.

## Service Indicator Options

### Electric Models<sup>(1)</sup>

Use with Bypass Valve Pressure of:	Indicator Part No.	Style <sup>(3)</sup>	Description
5 psi / 34.5 kPa	P163642	A	Single post DC. Normally open.
15 psi / 103 kPa	P163601	A	Single post DC. Normally open.
25 psi / 172.5 kPa	P163839	A	Single post DC. Normally closed.
25 psi / 172.5 kPa	P162400	A	Single post DC. Normally open.
25 psi / 172.5 kPa	P171143	B	2-wire with Cannon connector. Normally open.
25 psi / 172.5 kPa	P173944	C	3-wire: White = normally open Red = normally closed Black = common

### Visual Models (Non-Electric)<sup>(2)</sup>

Use with Bypass Valve Pressure of:	Indicator Part No.	Style <sup>(3)</sup>
5 psi / 34.5 kPa	P162694	D
15 psi / 103 kPa	P162642	D
25 psi / 172.5 kPa	P162696	D
N/A	P165984	(blank plate)

#### Indicator Notes

- <sup>(1)</sup> All electric models have a maximum operating temperature of 250°F/ 121°C.
- <sup>(2)</sup> All non-electric models have a maximum operating temperature of 180°F/ 82°C.
- <sup>(3)</sup> See indicator illustrations on facing page.



### Mix and Match

Donaldson's mix and match system provides the great performance and functional advantages of custom-engineered filters with the convenience and speedy delivery of in-stock parts. Choose your options and build an HBK05 filter to suit your specifications.

## HBK05 Service Parts

### SERVICE PARTS NOTE:

Some service parts may not be stocked. Please contact your Donaldson sales representative for lead time details.

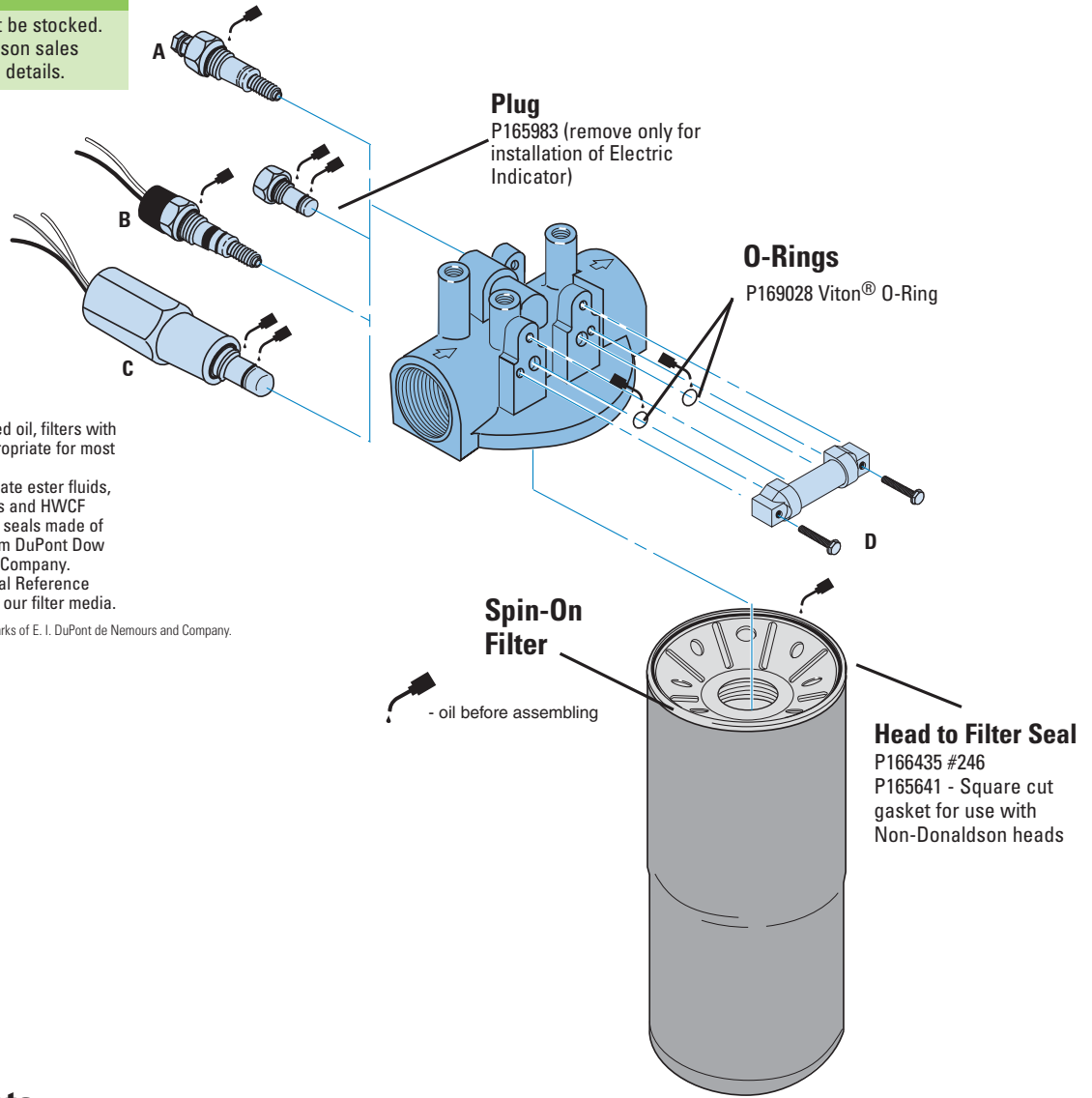
### Service Indicator Styles

(See table on opposite page)

### Filter Notes

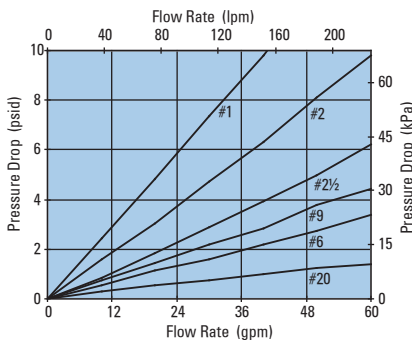
- If you're filtering petroleum-based oil, filters with seals made of Buna-N® are appropriate for most applications.
- If you're filtering diester, phosphate ester fluids, water glycol, water/oil emulsions and HWCF over 150°F/ 83°C, use filters with seals made of fluorocarbon, such as Viton® from DuPont Dow Elastomers, or Fluorel® from 3M Company.
- Refer to the table in the Technical Reference Guide for fluid compatibility with our filter media.

Viton® and Buna-N® are registered trademarks of E. I. DuPont de Nemours and Company.

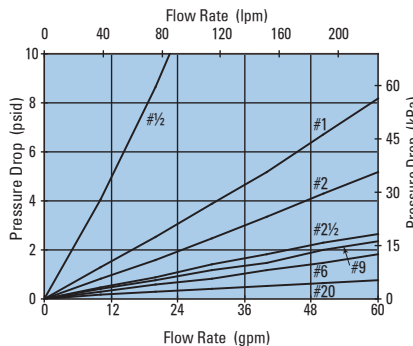


## Performance Data

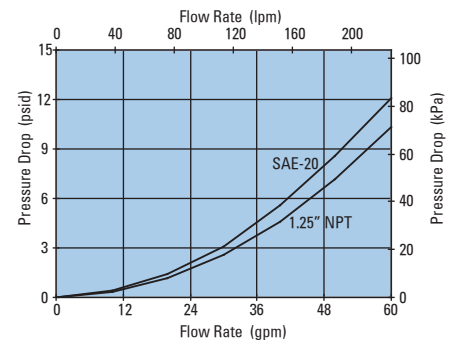
**HBK05 Filter Only**  
(Synthetic, 6.7"/170mm)



**HBK05 Filter Only**  
(Synthetic, 10.7"/271mm)



**HBK05 Head Only**





SP50/60

Max Flow: 60 gpm (227 lpm)

## SP50/60 Spin-On Filters

**Working Pressures to:** 150 *psi*  
1035 kPa  
10.3 bar

**Rated Static Burst to:** 250 *psi*  
1725 kPa  
17.2 bar

**Flow Range to:** 60 *gpm*  
227 *lpm*



### Features

The SP50/60 spin-on filter is an economical, low-pressure model with a broad selection of media ratings. The die cast aluminum head and steel body ensure strength and durability—perfect for a wide variety of mobile and in-plant applications.

Take advantage of Donaldson's mix and match system of in-stock heads and filter choices—so you can get exactly what you need. Filter options include: synthetic media, natural-fiber cellulose, water-absorbing cellulose media and wire mesh media. SP50/60 spin-on filters are interchangeable with HBK05 filters, as listed on page 46. Please note gasket options on page 52.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- 1¼" NPT
- SAE-20 O-ring

#### Replacement Filter Lengths

- 6.7" / 170 mm
- 7.0" / 178 mm
- 10.7" / 271 mm

#### Outer Diameter

- 5" / 127 mm

#### Filter Collapse Ratings

- 100 *psid* / 690 kPa / 6.9 bar

#### Standard Bypass Ratings

- 25 *psi* / 172.5 kPa / 1.7 bar
- 15 *psi* / 103.4 kPa / 1.03 bar
- 5 *psi* / 34.5 kPa / .34 bar
- 2.5 *psi* / 17.2 kPa / .17 bar
- No Bypass

#### Assembly Weight

- 4.7 lbs / 2.1 kg (short)
- 5.6 lbs / 2.5 kg (long)

#### Operating Temperatures

- -22°F to 250°F / -30°C to 121°C



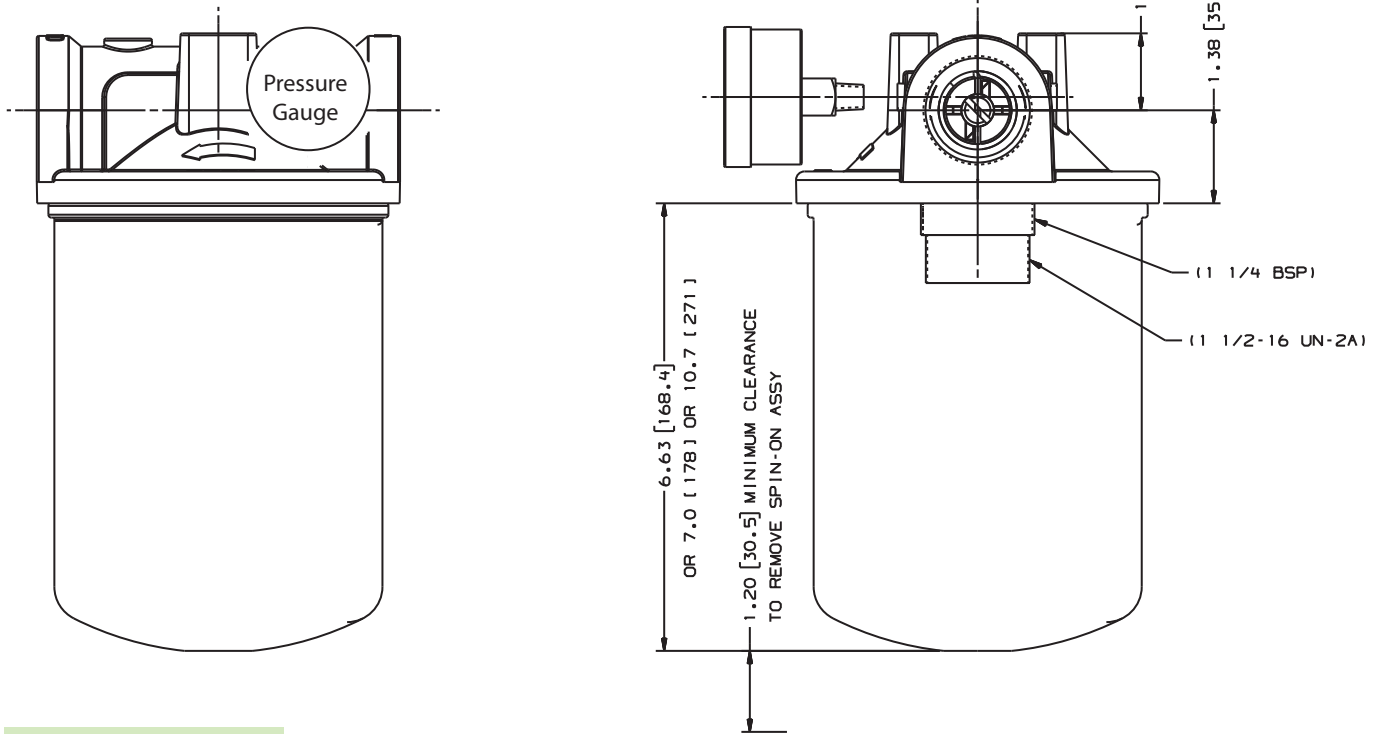
**SP50/60 Specification Illustrations**

All dimensions are shown in inches [millimeters].

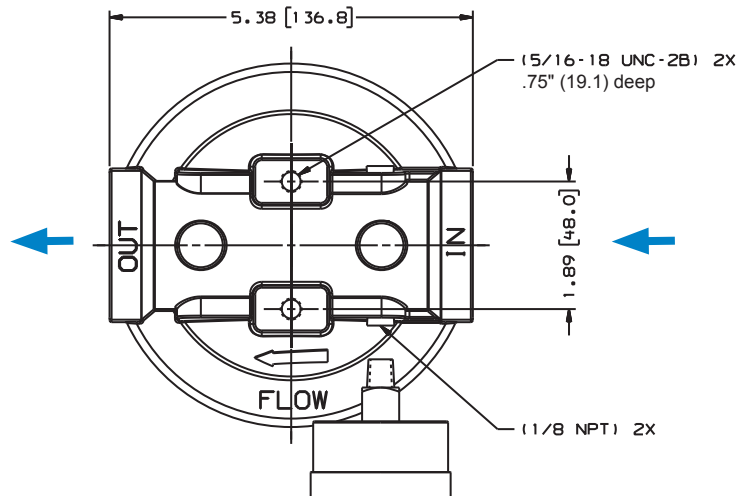
**Applications:**

- Process Systems
- Fluid Conditioning
- In-Plant & Mobile Equipment
- Power Transmissions
- Filter Cart

**Assembly - Side View**



**Head - Top View**





SP50/60

Max Flow: 60 gpm (227 lpm)



## SP50/60 Components

### Filter Choices

Media Type	Beta <sub>w(c)</sub> =200 Rating	Beta <sub>w(c)</sub> =1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
No. ½		<4 µm	10.7/271	P167796	Synthetic, Viton® O-ring & square seal kit
No. 1		5 µm	6.7/170	P169430	Synthetic, 3-seal kit
			10.7/271	P167832	Synthetic, 3-seal kit
No. 2		9 µm	6.7/170	P167162	Synthetic, 3-seal kit
			10.7/271	P165762	Synthetic, 3-seal kit
No. 2½		10 µm	6.7/170	P165875	Synthetic, 3-seal kit
			10.7/271	P165876	Synthetic, 3-seal kit
No. 6		13 µm	6.7/170	P167944	Synthetic, Viton O-ring & square seal kit
			10.7/271	P167945	Synthetic, Viton O-ring & square seal kit
No. 9		23 µm	6.7/170	P165877	Synthetic, 3-seal kit
			10.7/271	P165878	Synthetic, 3-seal kit
No. 20		>50 µm	6.7/170	P165879	Synthetic, 3-seal kit
			10.7/271	P165880	Synthetic, 3-seal kit
No. 3		24 µm	6.7/170	P550386	Cellulose, 3-seal kit
			10.7/271	P550250	Cellulose, 3-seal kit
No. 10		23 µm	6.7/170	P550388	Cellulose, 3-seal kit
			10.7/271	P550251	Cellulose, 3-seal kit
			7.00/178	P565245	Cellulose, square-seal, 1¼" BSP thread
No. 25	32 µm		6.7/170	P550387	Cellulose, 3-seal kit
			10.7/271	P550252	Cellulose, 3-seal kit
			7.00/178	P171616	Cellulose, square-seal, 1¼" BSP thread
Water Absorbing*	10 µm		10.7/271	P561183	Cellulose, "L" & square-seal kit
Wire Mesh	150 µm nom		6.7/170	P550275	SS Wire Mesh, 3-seal kit
			10.7/271	P550276	SS Wire Mesh, 3-seal kit

All models have 1½-16 UNF threads except where otherwise noted.  
All models measure 5.07/127 mm outer diameter.

\* Absorbs 350 ml water.


Viton® is a registered trademark of E. I. DuPont de Nemours and Company.


### Head Choices

Port Size	Bypass Rating	Gauge Ports (drill, tap, plug)	Gauge Port Location	DCI Part No.
1¼" NPT	15 psi / 103.4 kPa / 1.34 bar	(2) 1/8" NPT	upstream side	P563267
1¼" NPT	25 psi / 172.5 kPa / 1.72 bar	(2) 1/8" NPT	upstream side	P563268
1¼" NPT	5 psi / 34.5 kPa / .34 bar	(2) 1/8" NPT	downstream side	P563269
1¼" NPT	15 psi / 103.4 kPa / 1.34 bar	none	na	P563270
1¼" NPT	Blocked	(2) 1/8" NPT	downstream side	P561952
1¼" NPT	2.5 psi / 17.3 kPa / .17 bar	none	na	P563490
1¼" NPT	2.5 psi / 17.3 kPa / .17 bar	(2) 1/8" NPT	downstream side	P563491
1¼" NPT	25 psi / 172.5 kPa / 1.72 bar	none	na	P563492
SAE-20	15 psi / 103.4 kPa / 1.34 bar	(2) 1/8" NPT	upstream side	P563271
SAE-20	25 psi / 172.5 kPa / 1.72 bar	(2) 1/8" NPT	upstream side	P563272
SAE-20	Blocked	(2) 1/8" NPT	upstream side	P564147

### Gaskets

SP spin-on filters can be used with three gasket styles. Donaldson filters ship with a 3-seal kit, containing an "L" shaped, a square cut, and an O-ring gasket seal, unless otherwise noted. Individual gaskets can be ordered separately using the part numbers below:

P569908 L Shaped   
Use with Donaldson SP50/60 head and some non-Donaldson heads. Shipped with each Donaldson-branded spin-on filter.

P165641-Nitrile Square Cut   
P169027-Fluorocarbon  
Use with SP50/60, SP80/90, SP100/120 and some non-Donaldson heads. Shipped with each Donaldson-branded spin-on filter.

P166435-Nitrile O-Ring -246   
Use with Donaldson HBK05 head.

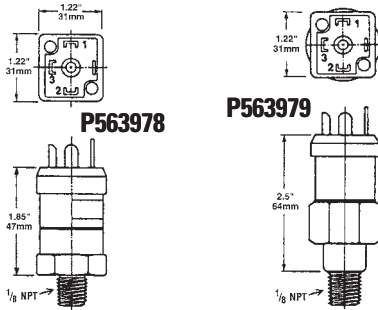
## Optional Filter Service Indicators

This handy pressure gauge, mounted on the side of an SP50/60 filter head, will tell you when it's time to service the filter.

Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi	15 psi / 103.4 kPa / 1.34 bar field adj.* or No Bypass	Return indicator, electrical or 25 psi / 172.5 kPa / 1.72 bar
P563979	-5 to 15 in Hg field adj.*	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, electrical
P563296	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, numeric scale
P563297	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar Bypass	Return indicator, color coded
P563298	0 to 100 psi	25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, color-coded
P563299	0 to -20 Hg	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, numeric scale



**Notes**  
\*NOT PRESET:  
Setting adjustable for desired application

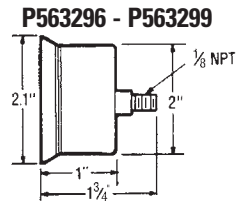


#1 Common; #2 Normally Closed;  
#3 Normally Open

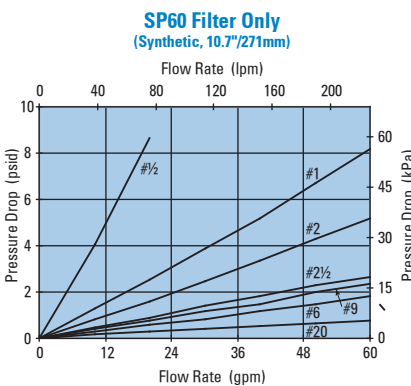
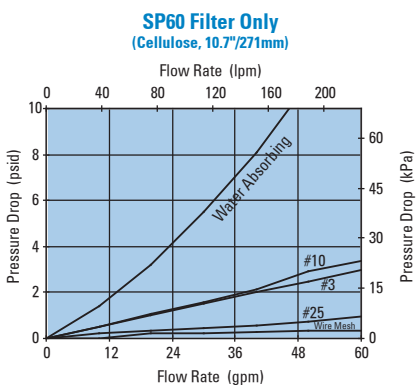
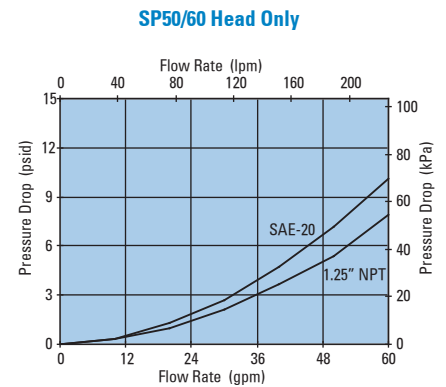
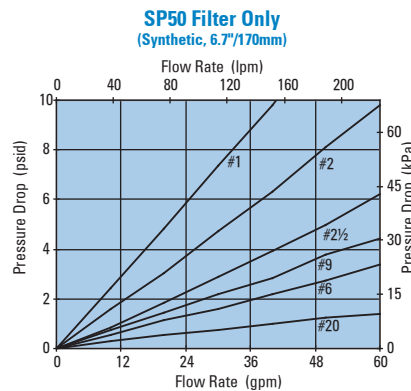
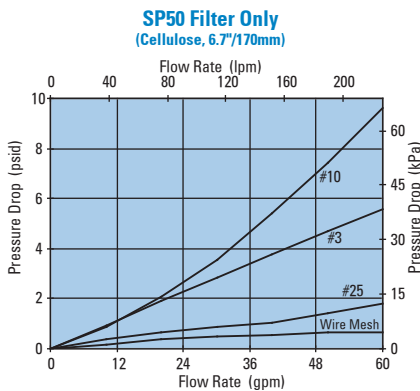
### Instructions

1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

Adjustment screw located in center of electric prongs



## Performance Data





SP80/90

Max Flow: 100 gpm (380 lpm)



## SP80/90 Spin-On Filters

**Working Pressures to:** 150 *psi*  
1035 kPa  
10.3 bar

**Rated Static Burst to:** 250 *psi*  
1725 kPa  
17.2 bar

**Flow Range to:** 100 *gpm*  
380 *lpm*



### Features

SP80/90 double filter head allows for double the flow capacity, with two filters to hold more contaminant. Aluminum casting and Buna-N® seals standard. SP80/90 filters are interchangeable with SP50/60 filters.

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- 1½" NPT
- SAE-24 O-ring
- 2" SAE 4-Bolt Flange Code 61

#### Replacement Filter Lengths

- 6.7" / 170 mm
- 7.0" / 178 mm
- 10.7" / 271 mm

#### Filter Collapse Ratings

- 100 *psid* / 690 kPa / 6.9 bar

#### Standard Bypass Ratings

- 25 psi / 172.5 kPa / 1.72 bar
- 15 psi / 103.4 kPa / 1.34 bar
- 5 psi / 34.5 kPa / .34 bar
- No Bypass

#### Operating Temperatures

- -22°F to 250°F / -30°C to 121°C

#### Assembly Weight

- 10.0 lbs / 4.5 kg (short) - approximate
- 11.8 lbs / 5.4 kg (long)

**SP80/90 Specification Illustrations**

All dimensions are shown in inches [millimeters].

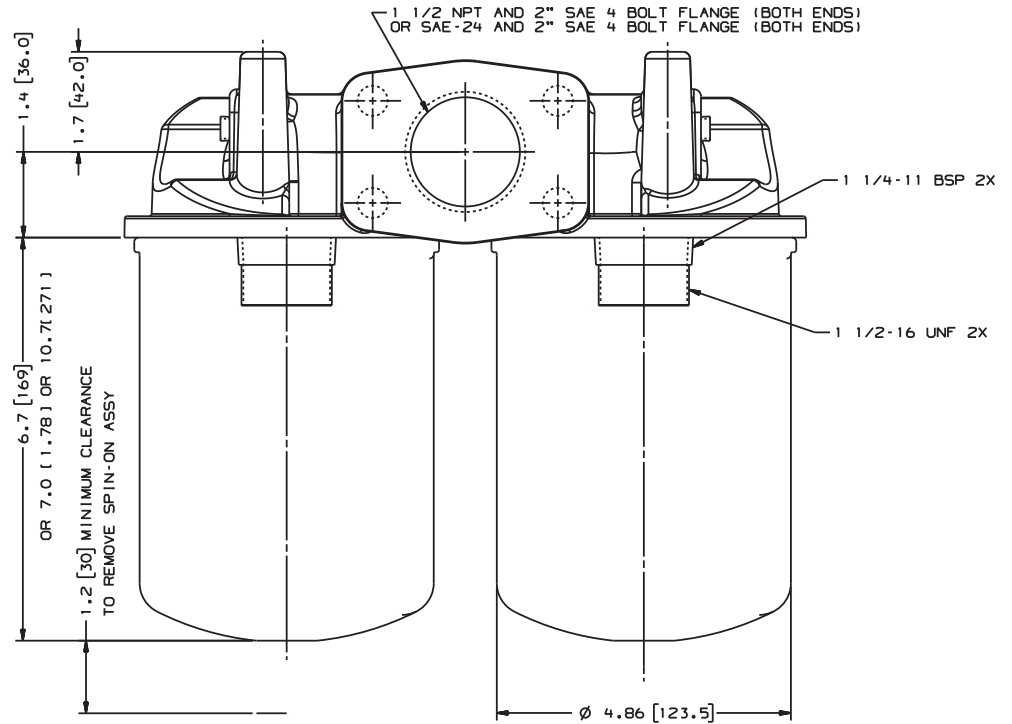
**Assembly - Side View**

**Combination**

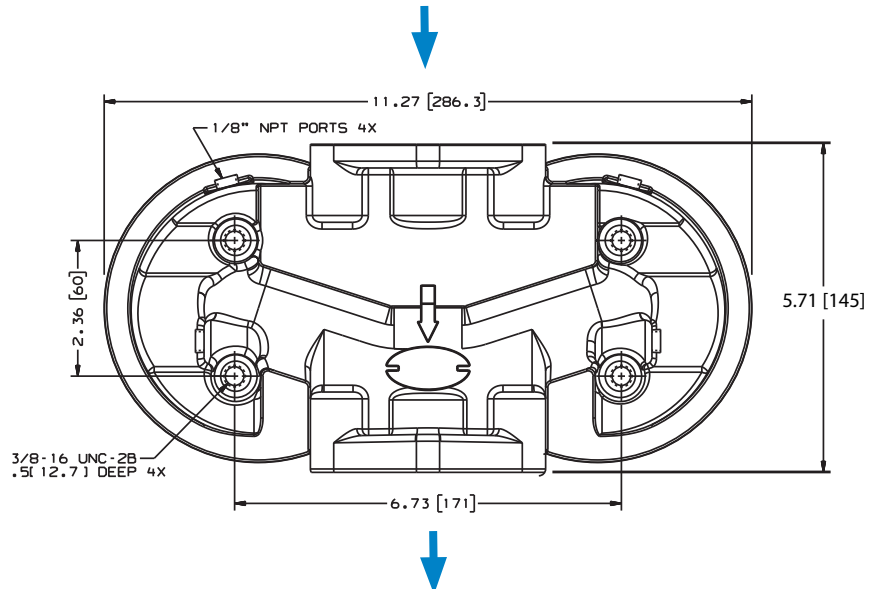
1 1/2" NPT and 2" SAE

4-Bolt Flange (Both Ends) or

SAE-24 & 2" SAE-4 Bolt



**Head - Top View**







SP80/90

Max Flow: 100 gpm (380 lpm)



## SP80/90 Components

### Filter Choices

Media Type	Beta <sub>(c)</sub> =200 Rating	Beta <sub>(c)</sub> =1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
No. ½		<4 µm	10.7/271	P167796	Synthetic, Viton® O-ring & square seal kit
No. 1		5 µm	6.7/170	P169430	Synthetic, 3-seal kit
			10.7/271	P167832	Synthetic, 3-seal kit
No. 2		9 µm	6.7/170	P167162	Synthetic, 3-seal kit
			10.7/271	P165762	Synthetic, 3-seal kit
No. 2½		10 µm	6.7/170	P165875	Synthetic, 3-seal kit
			10.7/271	P165876	Synthetic, 3-seal kit
No. 6		13 µm	6.7/170	P167944	Synthetic, Viton O-ring & square seal kit
			10.7/271	P167945	Synthetic, Viton O-ring & square seal kit
No. 9		23 µm	6.7/170	P165877	Synthetic, 3-seal kit
			10.7/271	P165878	Synthetic, 3-seal kit
No. 20		>50 µm	6.7/170	P165879	Synthetic, 3-seal kit
			10.7/271	P165880	Synthetic, 3-seal kit
No. 3		24 µm	6.7/170	P550386	Cellulose, 3-seal kit
			10.7/271	P550250	Cellulose, 3-seal kit
No. 10		23 µm	6.7/170	P550388	Cellulose, 3-seal kit
			10.7/271	P550251	Cellulose, 3-seal kit
			7.00/178	P565245	Cellulose, square-seal, 1¼" BSP thread
No. 25	32 µm		6.7/170	P550387	Cellulose, 3-seal kit
			10.7/271	P550252	Cellulose, 3-seal kit
			7.00/178	P171616	Cellulose, square-seal, 1¼" BSP thread
Water Absorbing*	10 µm		10.7/271	P561183	Cellulose, "L" & square-seal kit
Wire Mesh	150 µm nom		6.7/170	P550275	SS Wire Mesh, 3-seal kit
			10.7/271	P550276	SS Wire Mesh, 3-seal kit

All models have 1½"-16UNF threads except where otherwise noted.  
All models measure 5.0"/127 mm outer diameter.

\* Absorbs 350 ml water.

Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

## Head Choices

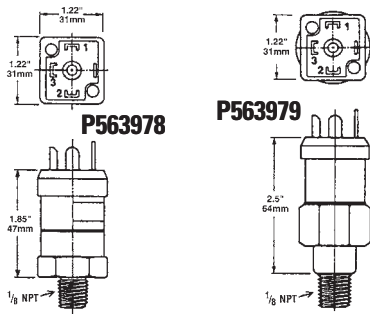
Port Size	Bypass Rating	Gauge Ports (drill, tap, plug)	Gauge Port Location	DCI Part No.
1½" NPT & 2" SAE 4 BOLT	15 psi / 103.4 kPa / 1.34 bar	(4) 1/8" NPT	upstream & downstream sides	P563273
1½" NPT & 2" SAE 4 BOLT	25 psi / 172.5 kPa / 1.72 bar	(4) 1/8" NPT	upstream & downstream sides	P563274
1½" NPT & 2" SAE 4 BOLT	Blocked	(4) 1/8" NPT	upstream & downstream sides	P563275
1½" NPT & 2" SAE 4 BOLT	5 psi / 34.5 kPa / .34 bar	(4) 1/8" NPT	upstream & downstream sides	P563276
SAE-24 O-Ring	25 psi / 172.5 kPa / 1.72 bar	(4) 1/8" NPT	upstream & downstream sides	P564892

## Optional Filter Service Indicators

Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi field adj.*	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, electrical
P563979	-5 to 15 in Hg field adj.*	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, electrical
P563296	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, numeric scale
P563297	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar Bypass	Return indicator, color coded
P563298	0 to 100 psi	25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, color-coded
P563299	0 to -20 Hg	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, numeric scale



**Notes**  
\*NOT PRESET: Setting adjustable for desired application



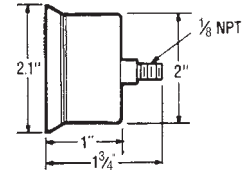
#1 Common; #2 Normally Closed;  
#3 Normally Open

### Instructions

1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

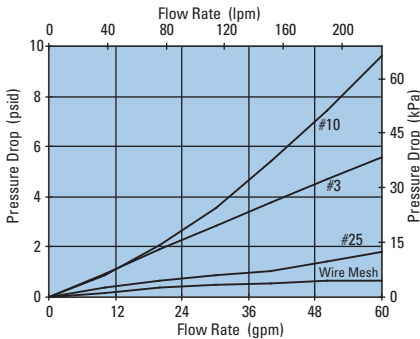
Adjustment screw located in center of elec. prongs

**P563296 - P563299**

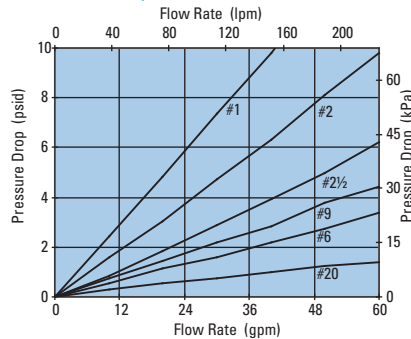


## Performance Data

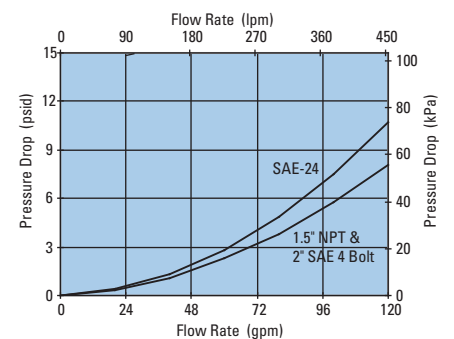
**SP80 Filter Only**  
(Cellulose, 6.7"/170mm)



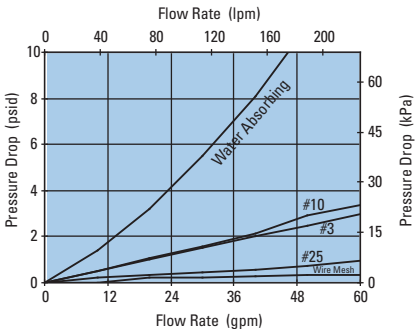
**SP80 Filter Only**  
(Synthetic, 6.7"/170mm)



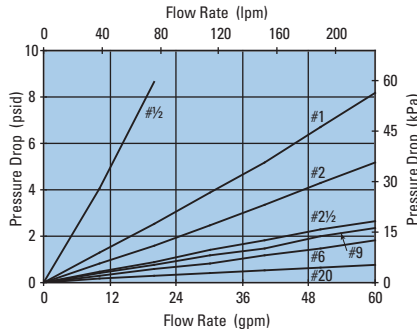
**SP80/90 Head Only**



**SP90 Filter Only**  
(Cellulose, 10.7"/271mm)



**SP90 Filter Only**  
(Synthetic, 10.7"/271mm)





SP100/120

Max Flow: 100 gpm (380 lpm)

## SP100/120 Spin-On Filters

**Working Pressures to:** 150 *psi*  
1035 kPa  
10.3 bar

**Rated Static Burst to:** 250 *psi*  
1725 kPa  
17.2 bar

**Flow Range to:** 100 *gpm*  
380 *lpm*

### Features

SP100/120 double filter head allows for double the flow capacity and a unique, space-saving configuration. Aluminum casting and Buna-N® seals standard. SP100/120 filters are interchangeable with SP50/60 filters.

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- 1½" NPT

#### Replacement Filter Lengths

- 6.7" / 170 mm
- 7.0" / 178 mm
- 10.7" / 271 mm

#### Standard Bypass Ratings

- 25 psi / 172.5 kPa / 1.72 bar

#### Operating Temperatures

- -22°F to 250°F / -30°C to 121°C

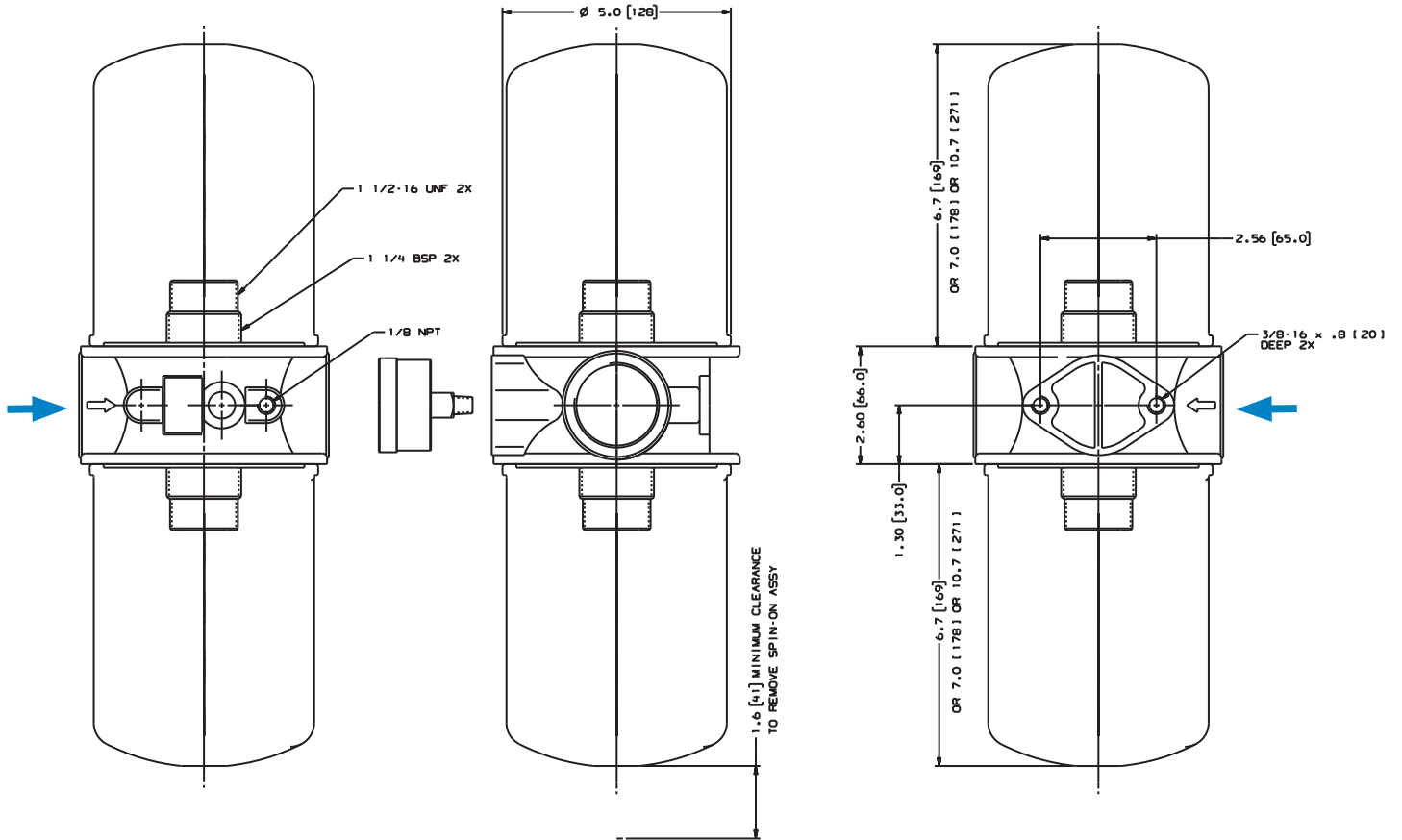
#### Assembly Weight

- 7.0 lbs / 3.2 kg (short)
- 8.8 lbs / 4.0 kg (long)

### SP100/120 Specification Illustrations

All dimensions are shown in inches [millimeters].

#### Assembly - Side View





SP100/120

Max Flow: 100 gpm (380 lpm)



## SP100/120 Components

### Filter Choices

Media Type	Beta <sub>x(c)</sub> =200 Rating	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
No. ½		<4 µm	10.7/271	P167796	Synthetic, Viton® O-ring & square seal kit
No. 1		5 µm	6.7/170	P169430	Synthetic, 3-seal kit
			10.7/271	P167832	Synthetic, 3-seal kit
No. 2		9 µm	6.7/170	P167162	Synthetic, 3-seal kit
			10.7/271	P165762	Synthetic, 3-seal kit
No. 2½		10 µm	6.7/170	P165875	Synthetic, 3-seal kit
			10.7/271	P165876	Synthetic, 3-seal kit
No. 6		13 µm	6.7/170	P167944	Synthetic, Viton O-ring & square seal kit
			10.7/271	P167945	Synthetic, Viton O-ring & square seal kit
No. 9		23 µm	6.7/170	P165877	Synthetic, 3-seal kit
			10.7/271	P165878	Synthetic, 3-seal kit
No. 20		>50 µm	6.7/170	P165879	Synthetic, 3-seal kit
			10.7/271	P165880	Synthetic, 3-seal kit
No. 3		24 µm	6.7/170	P550386	Cellulose, 3-seal kit
			10.7/271	P550250	Cellulose, 3-seal kit
No. 10		23 µm	6.7/170	P550388	Cellulose, 3-seal kit
			10.7/271	P550251	Cellulose, 3-seal kit
			7.00/178	P565245	Cellulose, square-seal, 1¼" BSP thread
No. 25	32 µm		6.7/170	P550387	Cellulose, 3-seal kit
			10.7/271	P550252	Cellulose, 3-seal kit
			7.00/178	P171616	Cellulose, square-seal, 1¼" BSP thread
Water Absorbing*	10 µm		10.7/271	P561183	Cellulose, "L" & square-seal kit
Wire Mesh	150 µm nom		6.7/170	P550275	SS Wire Mesh, 3-seal kit
			10.7/271	P550276	SS Wire Mesh, 3-seal kit

Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

All models use L-shaped gaskets.

All models have 1½"-16UNF threads except where otherwise noted.

All models measure 5.0"/127 mm outer diameter.

\* Absorbs 350 ml water.

### Head Choice

Port Size	Bypass Rating	Gauge Ports (drill, tap, plug)	Gauge Port Location	Donaldson Part No.
1½" NPT	25 psi / 172.5 kPa / 1.72 bar	(2) 1/8" NPT	upstream & downstream sides	P563277



## Optional Filter Service Indicators

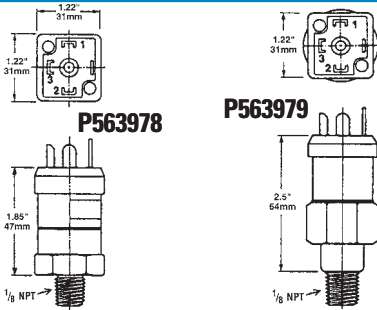
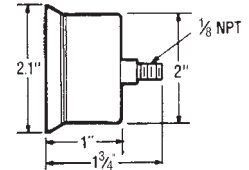
This handy pressure gauge, mounted on the side of an SP100/120 filter head, will tell you when it's time to service the filter.

Donaldson Part No.	Pressure Range	Use With Bypass Valve Rating	Type
P563978	5 to 30 psi field adj.*	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, electrical
P563979	-5 to 15 in Hg field adj.*	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, electrical
P563296	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar or 25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, numeric scale
P563297	0 to 100 psi	15 psi / 103.4 kPa / 1.34 bar Bypass	Return indicator, color coded
P563298	0 to 100 psi	25 psi / 172.5 kPa / 1.72 bar or No Bypass	Return indicator, color-coded
P563299	0 to -20 Hg	5 psi / 34.5 kPa / .34 bar or No Bypass	Suction indicator, numeric scale



**Notes**  
\*NOT PRESET: Setting adjustable for desired application

**P563296 - P563299**



#1 Common; #2 Normally Closed;  
#3 Normally Open

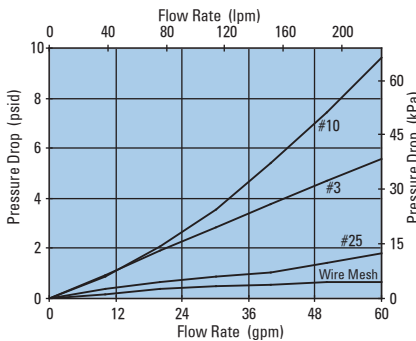
### Instructions

1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

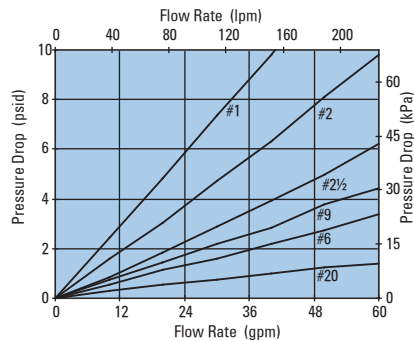
Adjustment screw located in center of elec. prongs

## Performance Data

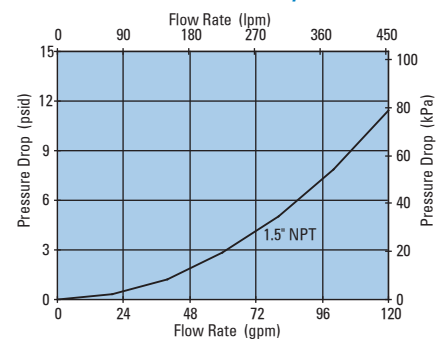
**SP100 Filter Only**  
(Cellulose, 6.7"/170mm)



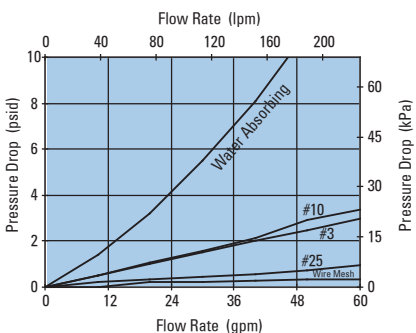
**SP100 Filter Only**  
(Synthetic, 6.7"/170mm)



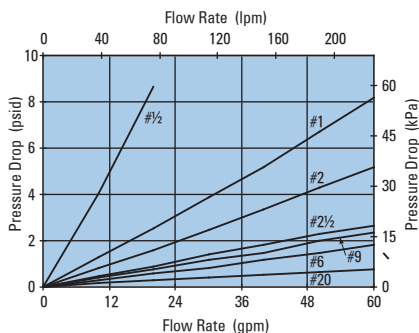
**SP100/120 Head Only**



**SP120 Filter Only**  
(Cellulose, 10.7"/271mm)



**SP120 Filter Only**  
(Synthetic, 10.7"/271mm)





W022

Max Flow: 120 gpm (454 lpm)



## W022 Spin-On Filters

**Working Pressures to:** 150 *psi*  
10.3 bar

**Rated Static Burst to:** 250 *psi*  
17.2 bar

**Flow Range to:** 120 *gpm*  
454 *lpm*



### Features

W022 double filter head allows for double the flow capacity, with two filters to hold more contaminant. Take advantage of our mix and match system of head and filters, so you get exactly what you need. You can choose the media type and configurations that's best for your application. What sets this apart from the SP80/90 is the cast iron head, which is especially desirable for mobile equipment and high vibration applications.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- 1½" NPT
- SAE-24 O-ring
- 1½" SAE 4-Bolt Flange Code 61

#### Replacement Filter Lengths

- 6.7" / 170 mm
- 7.0" / 178 mm
- 10.7" / 271 mm

#### Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- 25 psi / 172.5 kPa / 1.72 bar
- No bypass

#### Operating Temperatures

- -22°F to 250°F / -30°C to 121°C

#### Assembly Weight

- 19.0 lbs / 4.5 kg (short)
- 20.6 lbs / 5.4 kg (long)

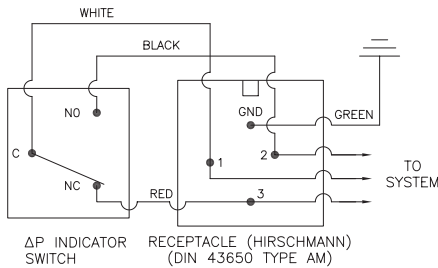
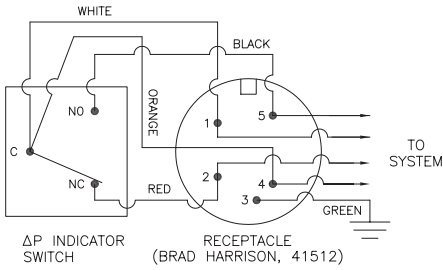
#### Filter Collapse Ratings

- 100 *psid* / 690 kPa / 6.9 bar

## W022 Specification Illustrations

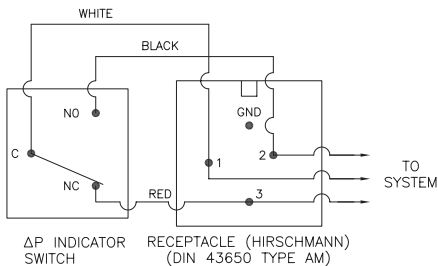
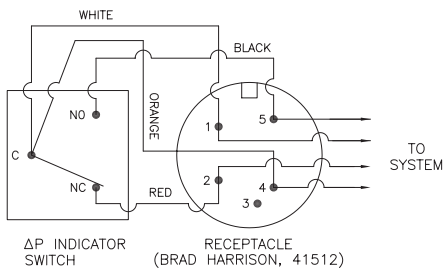
All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



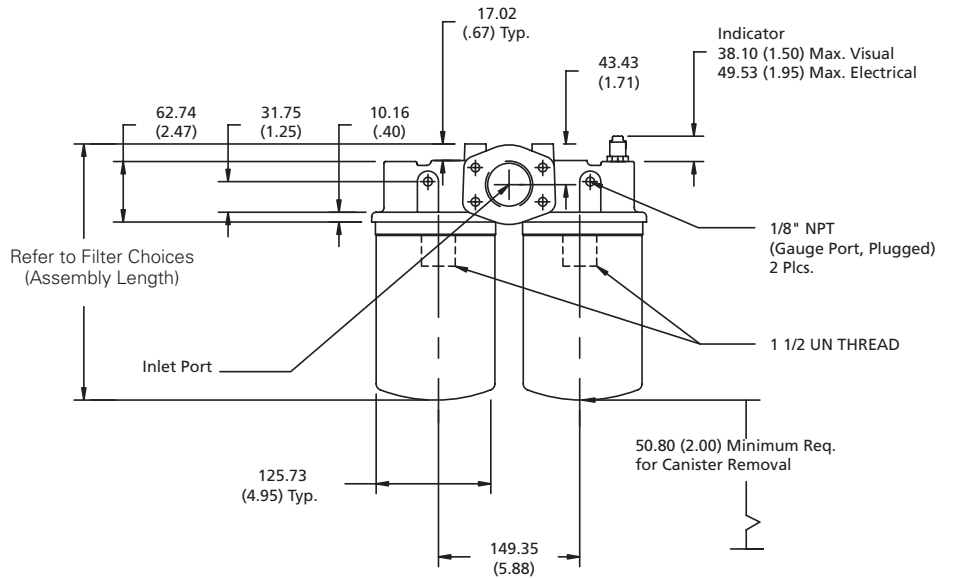
Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings

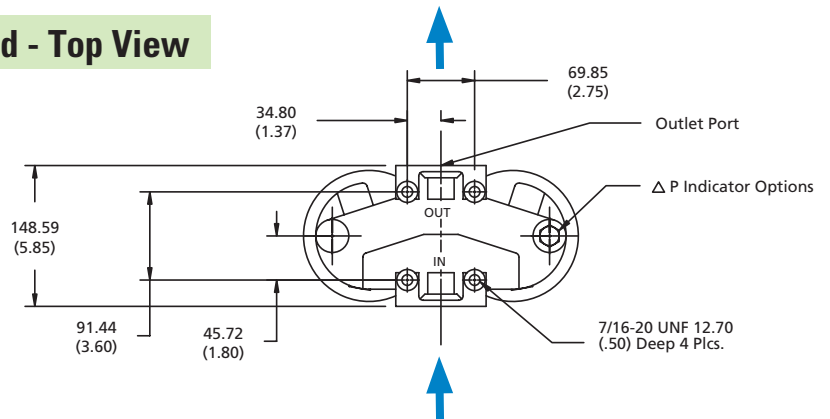


Note: The female plug (connector) is to be furnished by customer.

### Assembly - Side View



### Head - Top View



#### Differential Indicators:

Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

#### Surge Control:

This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

#### Thermal Lockout:

The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.



W022

Max Flow: 120 gpm (454 lpm)



## W022 Components Filter Choices

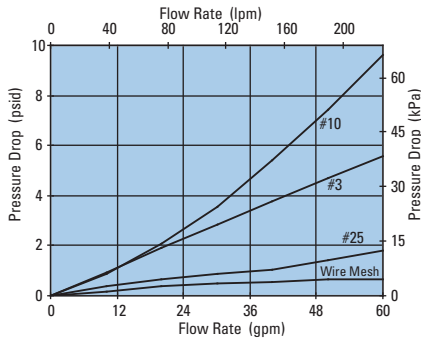
Media Type	Beta <sub>x(e)</sub> =200 Rating	Beta <sub>x(e)</sub> =1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
No. ½		<4 µm	10.7/271	P167796	Synthetic, Viton® O-ring & square seal kit
No. 1		5 µm	6.7/170	P169430	Synthetic, 3-seal kit
			10.7/271	P167832	Synthetic, 3-seal kit
No. 2		9 µm	6.7/170	P167162	Synthetic, 3-seal kit
			10.7/271	P165762	Synthetic, 3-seal kit
No. 2½		10 µm	6.7/170	P165875	Synthetic, 3-seal kit
			10.7/271	P165876	Synthetic, 3-seal kit
No. 6		13 µm	6.7/170	P167944	Synthetic, Viton O-ring & square seal kit
			10.7/271	P167945	Synthetic, Viton O-ring & square seal kit
No. 9		23 µm	6.7/170	P165877	Synthetic, 3-seal kit
			10.7/271	P165878	Synthetic, 3-seal kit
No. 20		>50 µm	6.7/170	P165879	Synthetic, 3-seal kit
			10.7/271	P165880	Synthetic, 3-seal kit
No. 3		24 µm	6.7/170	P550386	Cellulose, 3-seal kit
			10.7/271	P550250	Cellulose, 3-seal kit
No. 10		23 µm	6.7/170	P550388	Cellulose, 3-seal kit
			10.7/271	P550251	Cellulose, 3-seal kit
No. 25	32 µm		6.7/170	P550387	Cellulose, 3-seal kit
			10.7/271	P550252	Cellulose, 3-seal kit
			7.00/178	P171616	Cellulose, square-seal, 1¼" BSP thread
Water Absorbing*	10 µm		10.7/271	P561183	Cellulose, "L" & square-seal kit
Wire Mesh	150 µm nom		6.7/170	P550275	SS Wire Mesh, 3-seal kit
			10.7/271	P550276	SS Wire Mesh, 3-seal kit

All models have 1½"-16UNF threads except where otherwise noted. All models measure 5.0"/127 mm outer diameter.

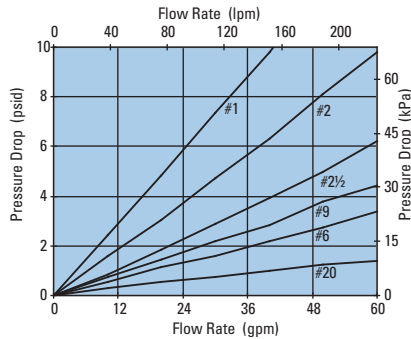
\* Absorbs 350 ml water.

## Performance Data

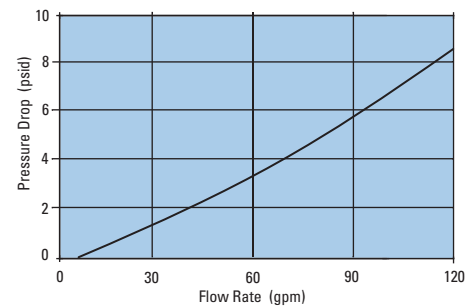
**W022 Filter Only**  
(Cellulose, 6.7"/170mm)



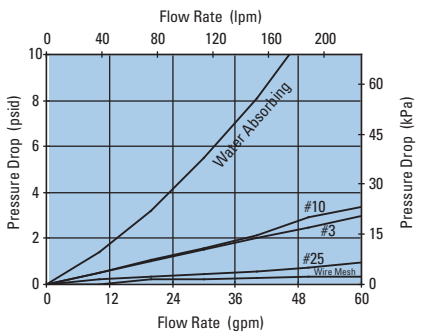
**W022 Filter Only**  
(Synthetic, 6.7"/170mm)



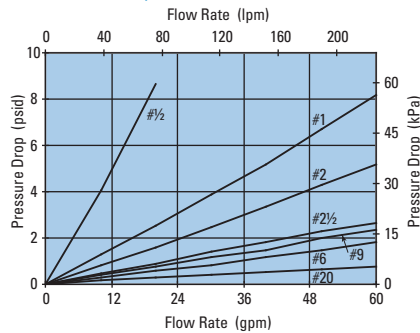
**W022 Head Only**



**W022 Filter Only**  
(Cellulose, 10.7"/271mm)



**W022 Filter Only**  
(Synthetic, 10.7"/271mm)



Viton® is a registered trademark of E. I. DuPont de Nemours and Company.



# Filter Head Ordering Guide

Filter Assembly	W022 TABLE 1	1 TABLE 2	D TABLE 3	4 TABLE 4	L N TABLE 5	B TABLE 6
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Service Filter: Filters ordered separately. See previous page for filter options.

**LEAD TIME NOTE:**

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W022	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid

**Table 3**

Port Size Options	
CODE	PORT SIZE
D	SAE-24 O-ring
E	1½" SAE 4-Bolt Flange Code 61
U	1½" NPT

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypassed (plugged)*
3	25 psid
4	50 psid

\*80 psid maximum operating pressure

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
C	Electrical/visual 15 psid
D	Electrical/visual 35 psid
F	Electrical/visual 15 psid & TL
G	Electrical/visual 35 psid & TL
H	Electrical/visual 15 psid with 12" 3-wire flying lead
J	ΔP indicator plug
K	Visual indicator 15 psid
L	Visual indicator 35 psid
M	Visual indicator 35 psid with TL and surge
N	Electrical/visual 35 psid with 12" 3-wire flying lead
Q	Electrical switch 15 psid
R	Electrical switch 35 psid
X	Electrical/visual 15 psid with TL and surge
Y	Electrical/visual 35 psid with TL and surge

TL (thermal lockout)

**Media Ratings**

Western Filter spin-ons have been replaced by Donaldson spin-on filters.

WESTERN MEDIA CODE	DONALDSON MEDIA
P10	#10
P20	#25
R03	#1
R05	#2
R10	#2½
R20	#9
W10	WA

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

**Table 5**

Upstream Pressure Gauge and Switch Option	
CODE	INDICATOR STYLE & SETTING
1	Gauge ports drilled, tapped and plugged
2	0-200 psi pressure gauge**
3	0-60 psi pressure gauge**
4	0-60 psi pressure gauge*
6	Pressure switch 18 psi Brad Harrison® (5-pin)
7	Pressure switch 35 psid Brad Harrison® (5-pin)
8	Pressure switch 18 psi Hirschmann® (4-pin)
9	Pressure switch 35 psid Hirschmann® (4-pin)

\*Bypass setting option code 3 only  
\*\*Bypass setting option code 4 only

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.





TT15/30/60

Max Flow: 50 gpm (190 lpm)



## TT15/30/60 Tank Top Return Spin-On Filters

**Working Pressures to:** 100 *psi*  
690 *kPa*  
6.9 *bar*

**Flow Range to:** 50 *gpm*  
190 *lpm*



### Features

TT15/30/60 Tank Top filters are designed for industrial service. Aluminum casting and Buna-N® seals standard. For use with mineral and synthetic based fluids. These return filters conveniently mount to tank tops with four screws. Common holes are used to mount the filter head to the reservoir without welding. A down pipe is attached to a threaded port and the gasket surface provides a watertight seal. Each filter provides a new bypass valve and anti-drainback valve for easy filter change.

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.

#### Beta Rating

- Performance to  $\beta_{23(c)}=1000$

#### Porting Size Options

- 3/4", 1 1/2" NPT

#### Replacement Filter Lengths

- 5.83" / 148mm TT15
- 7.05" / 179mm TT30
- 9.29" / 236mm TT60

#### Standard Bypass Ratings

- 22 *psi* / 150 *kPa* / 1.5 *bar*

#### Operating Temperatures

- -22°F to 250°F / -30°C to 121°C

#### Assembly Weight

- 2.0 lbs / 0.9 kg TT15
- 4.3 lbs / 2.0 kg TT30
- 5.2 lbs / 2.4 kg TT60

## TT15/30/60 Components

### Filter Choices

Media Type	Beta <sub>23(c)</sub> =1000 Rating	Length (in./mm)	Donaldson Part #	Filter Thread	Description
10 Micron Nominal Cellulose	23 µm	5.36 / 136	P565242	3/4" BSP	TT15 Series
10 Micron Nominal Cellulose	23 µm	7.05 / 179	P550269	1 1/4" BSP	TT30 Series
10 Micron Nominal Cellulose	23 µm	9.29 / 236	P171640	1 1/4" BSP	TT60 Series

## Head Choices

Port Size	Bypass Rating*	Gauge Ports (drill, tap, plug)	Gauge Port Location	Donaldson Part No.	Description	Head to Tank** Seal Part No.
3/4" NPT	22 psi / 150 kPa / 1.5 bar	(2) 1/8" NPT	upstream side	P564038	TT15 Series	P563975
1 1/2" NPT	22 psi / 150 kPa / 1.5 bar	(2) 1/8" NPT	upstream side	P563973	TT30/60 Series	P563976

### Note

\* Bypass valve is integral part of replacement filter.

\*\* Included with head.

## Optional Filter Service Indicators

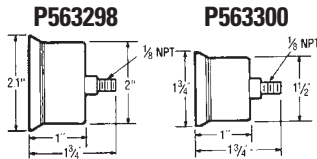
Donaldson Part No.	Pressure Range	Use With Series	Type
P563300	0 to 30 psi	TT15/30/60	Return indicator, color-coded
P563978	5 to 30 psi field adj.*	TT15/30/60	Return indicator, electrical
P563298	0 to 100 psi	TT15/30/60	Return indicator, color-coded

### Note

\* NOT PRESET: Setting adjustable for desired application.

### 1/8" - 27 NPTF threads

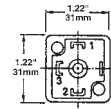
- Built in snubber to minimize damage caused by pressure surges
- Compatible with petroleum and mineral-based fluids
- Anti-splash



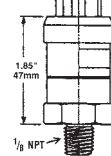
### Instructions

1. Remove DIN adaptor
2. Remove small brass screw
3. Using 1/8" allen wrench adjust clockwise to increase set point/counter-clockwise to decrease set point
4. NO / NC

- #1 Common
- #2 Normally Closed
- #3 Normally Open



**P563978**

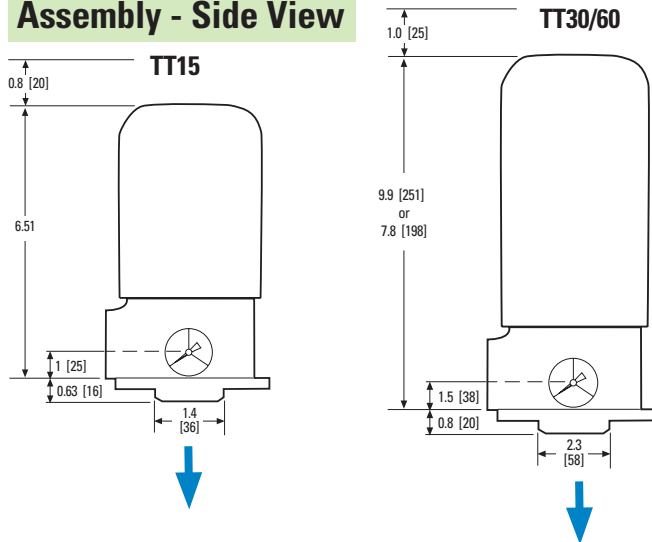


Adjustment screw located in center of elec. prongs

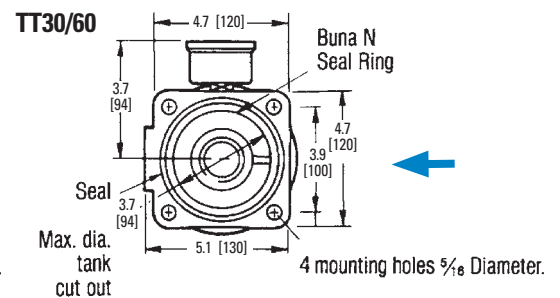
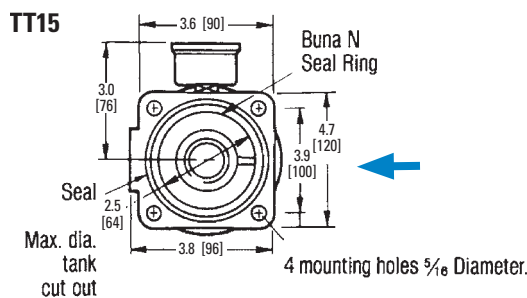
## TT/15/30/ Specification Illustrations

All dimensions are shown in inches [millimeters].

### Assembly - Side View

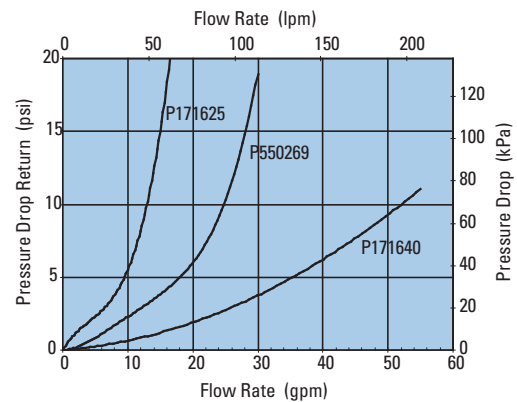


### Head - Top View



## Performance Data

### TT Filters Only





# WL15

Max Flow: 50 gpm (190 lpm)



## WL15 In-Tank Filters

**Working Pressures to:** 200 *psi*  
1,400 *kPa*  
14 *bar*

**Rated Static Burst to:** 300 *psi*  
2,100 *kPa*  
20.7 *bar*

**Flow Range to:** 50 *gpm*  
190 *lpm*



### Features

WL15 in-tank filter meets HF4 automotive standard. The quick disconnect cover allows for easy and efficient filter change outs. An optional secondary inlet port offers the use of a second return line. DT high-performance replacement filters are available in five different media grades to fit any application.

#### Beta Rating (per ISO 16889)

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-24 O-ring
- 1½" SAE 4-Bolt Flange Code 61

#### Replacement Filter Lengths

- 9" / 229 *mm*

#### Assembly Weight

- Code 3: 5.25 lbs / 2.38 kg
- Code 9 (with 12" extension tube):  
6.25 lbs / 2.84kg

#### Standard Bypass Ratings

- 50 *psi* / 345 *kPa* / 3.5 *bar*
- 25 *psi* / 172.5 *kPa* / 1.72 *bar*

#### Operating Temperatures

- -45° to 250°F (-43° to 121°C)

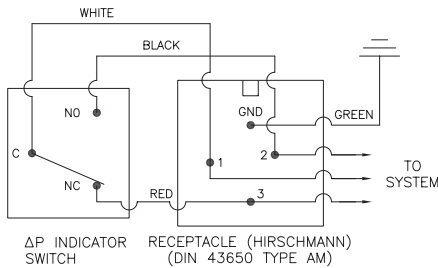
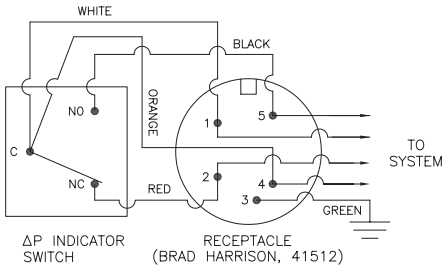
#### Filter Collapse Ratings

- 150 *psi* / 1034 *kPa* / 10.3 *bar*

## WL15 Specification Illustrations

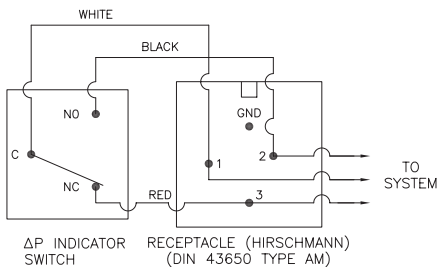
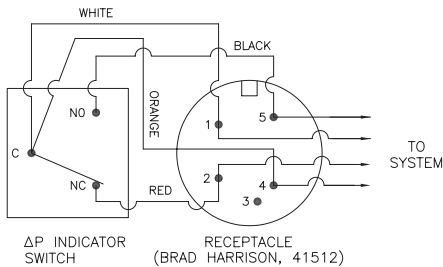
All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



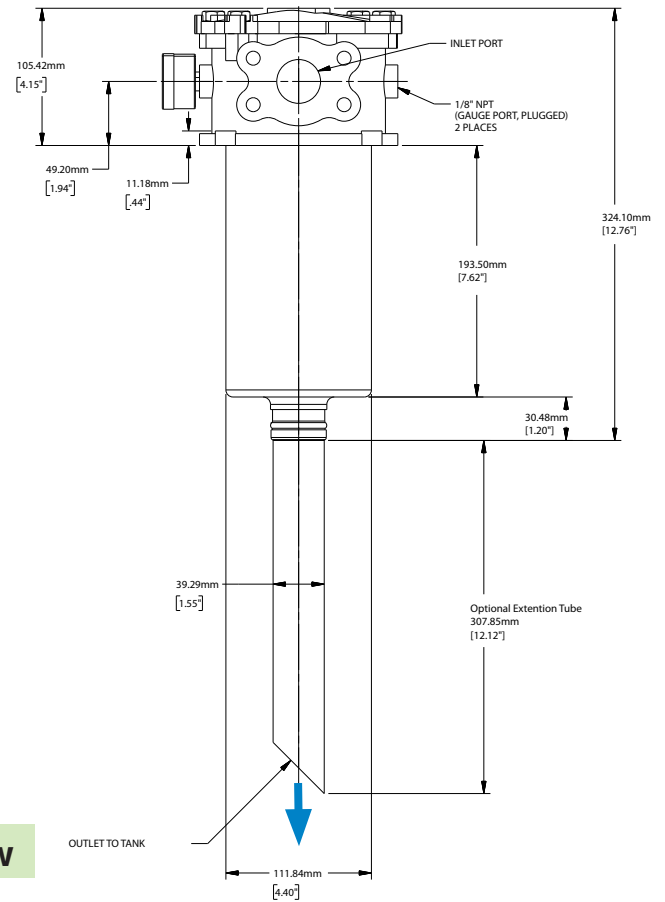
Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings

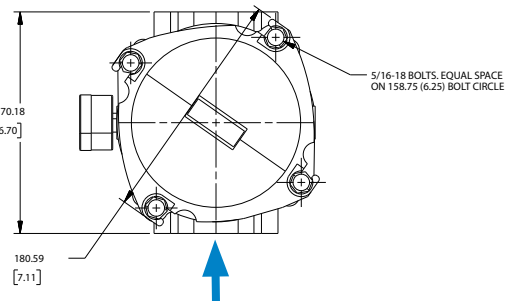


Note: The female plug (connector) is to be furnished by customer.

### Assembly - Side View



### Head - Top View



#### Differential Indicators:

Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

#### Surge Control:

This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

#### Thermal Lockout:

The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80° F.



# WL15

Max Flow: 50 gpm (190 lpm)



## WL15 Components High-Performance DT Filter Choices

Media Number	Beta <sub>x10</sub> <sub>(c)</sub> Rating	Length (in./mm)	Donaldson DT Part No.	Comments
5 μm	5 μm	9/231.8	P566270	DT-HF4-9-5UM
8 μm	8 μm	9/231.8	P566271	DT-HF4-9-8UM
14 μm	14 μm	9/231.8	P566272	DT-HF4-9-14UM
25 μm	25 μm	9/231.8	P566273	DT-HF4-9-25UM

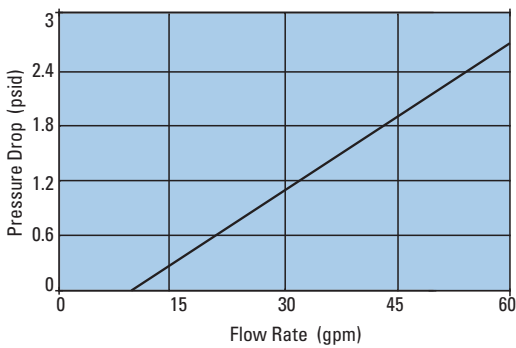


### Filter Notes

- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

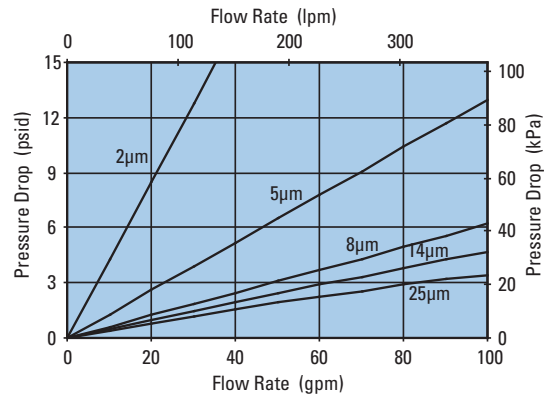
## Performance Data

WL15 Housing Only



WL15 9" DT Filter Only

DT-HF-9, 9"/229mm





## Filter Head Ordering Guide

Filter Assembly	WL15 TABLE 1	1 TABLE 2	D TABLE 3	3 TABLE 4	4 TABLE 5	3 TABLE 6	N TABLE 7	B TABLE 8
-----------------	-----------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------

Service Filter: Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
WL15	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid

**Table 3**

Port Size Options	
CODE	PORT SIZE
D	SAE-24 O-ring
E	1½"SAE 4-Bolt Flange Code 61

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
3	25 psid
4	50 psid

**Table 5**

Upstream Pressure Gauge and Switch Option	
CODE	INDICATOR STYLE & SETTING
1	No indicator
3	0-60 psi pressure gauge**
4	0-60 psi pressure gauge*
6	Pressure switch 18 psi Brad Harrison® (5-pin)
7	Pressure switch 35 psid Brad Harrison® (5-pin)
8	Pressure switch 18 psi Hirschmann® (4-pin)
9	Pressure switch 35 psid Hirschmann® (4-pin)

\*Bypass setting option code 3 only

\*\*Bypass setting option code 4 only

**Table 6**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
3 (12.76")	9.0"
9 (24.88")*	9.0"

\*With 12" extension tube

**Table 7**

Secondary Port Options	
CODE	PORT SIZE
T	1-7/8" - 12 UN (SAE-24)
Z	1-1/2" SAE 4-Bolt Flange Code 61
N	None

**Table 8**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

## Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2µm
03	DT 5µm
05	DT 8µm
10	DT 14µm
20	DT 25µm

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).





# WL16

Max Flow: 100 gpm (380 lpm)

## WL16 In-Tank Filters

**Working Pressures to:** 200 *psi*  
13.8 bar

**Rated Static Burst to:** 300 *psi*  
21 bar

**Flow Range to:** 100 *gpm*  
380 *lpm*



### Features

WL16 in-tank filters meet the HF-4 automotive standard. The quick disconnect cover allows for easy and efficient filter change-outs. An optional secondary inlet port offers the use of a second return line. These units can be top or side reservoir mounted. Use the optional anti-backflow valve when installing this filter assembly to the side of a reservoir. DT high-performance replacement filters are available in five different media grades to fit any application.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- 1½" NPT
- SAE-24 O-ring
- 1½" SAE 4-Bolt Flange Code 61

#### Replacement Filter Lengths

- 9" / 229 mm
- 18" / 457 mm
- 27" / 686 mm

#### Filter Collapse Ratings

- 150 *psid* / 1034 kPa / 10.3 bar

#### Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- 25 psi / 172.5 kPa / 1.72 bar

#### Assembly Weight

- Length 3, 5.25 lbs / 2.3 kg
- Length 6, 16 lbs / 7.3 kg
- Length 7, 23 lbs / 10 kg

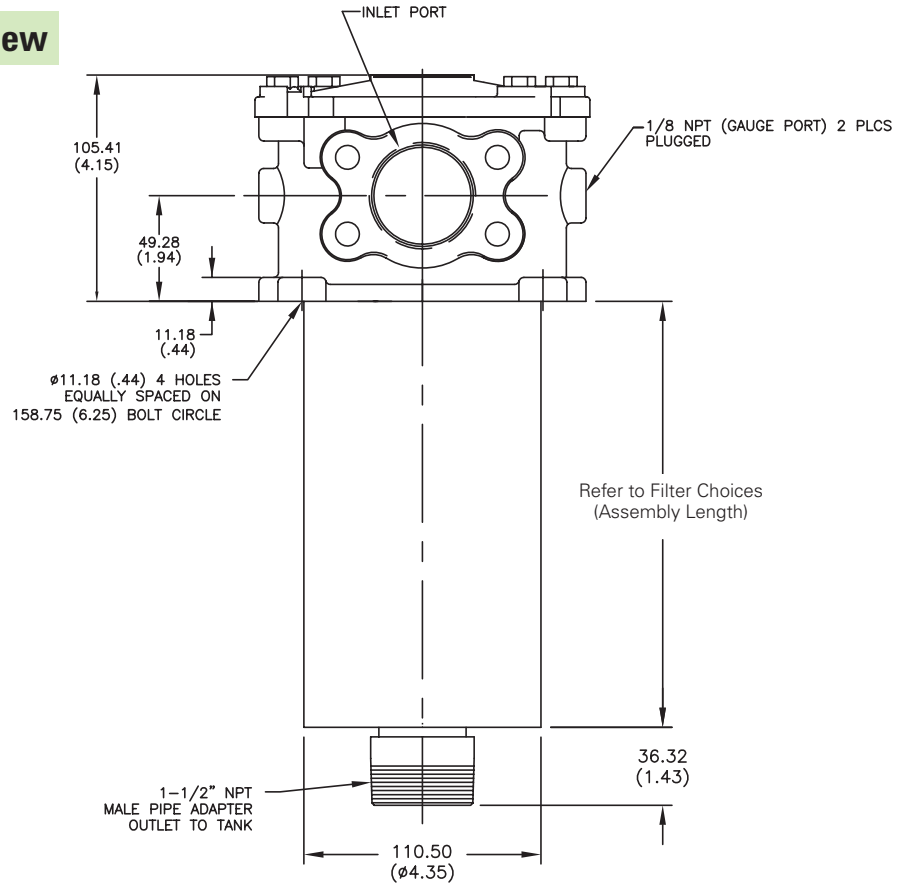
#### Operating Temperatures

- -45° to 250°F (-43° to 121°C)

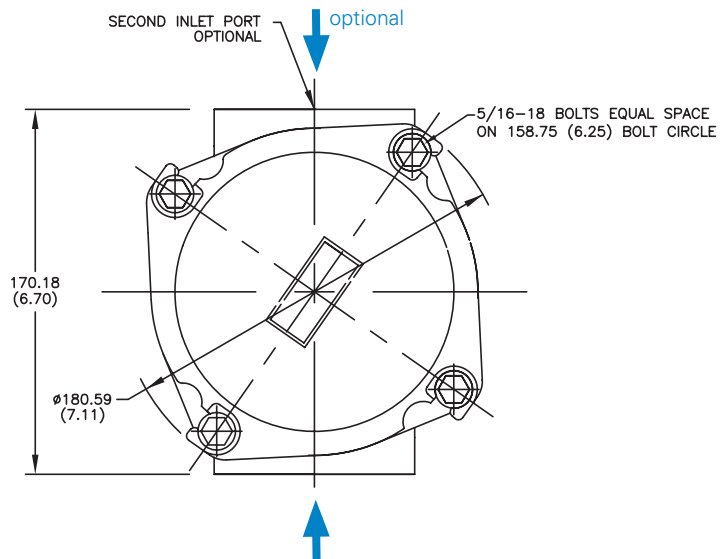
**WL16 Specification Illustrations**

All dimensions are shown in millimeters [inches].

**Assembly - Side View**



**Head - Top View**





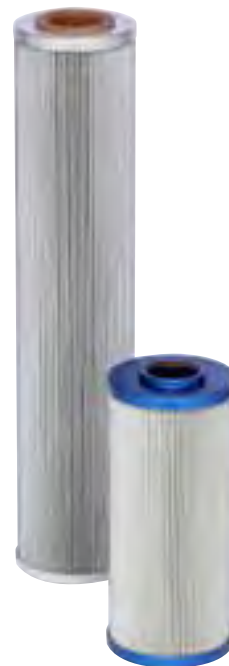
**WL16**  
Max Flow: 100 gpm (380 lpm)



## WL16 Components

### High-Performance DT Filter Choices

Media Number	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
5 μm	5 μm	9/231.8	P566270	DT-HF4-9-5UM
8 μm	8 μm	9/231.8	P566271	DT-HF4-9-8UM
14 μm	14 μm	9/231.8	P566272	DT-HF4-9-14UM
25 μm	25 μm	9/231.8	P566273	DT-HF4-9-25UM
5 μm	5 μm	18/462.3	P566274	DT-HF4-18-5UM
8 μm	8 μm	18/462.3	P566275	DT-HF4-18-8UM
14 μm	14 μm	18/462.3	P566276	DT-HF4-18-14UM
25 μm	25 μm	18/462.3	P566277	DT-HF4-18-25UM
5 μm	5 μm	27/702.5	P566278	DT-HF4-27-5UM
8 μm	8 μm	27/702.5	P566279	DT-HF4-27-8UM
14 μm	14 μm	27/702.5	P566280	DT-HF4-27-14UM
25 μm	25 μm	27/702.5	P566281	DT-HF4-27-25UM



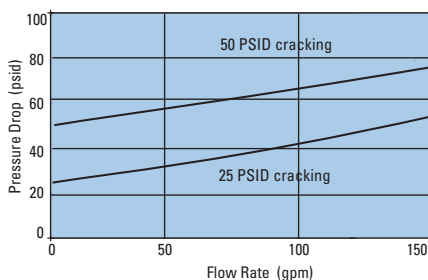
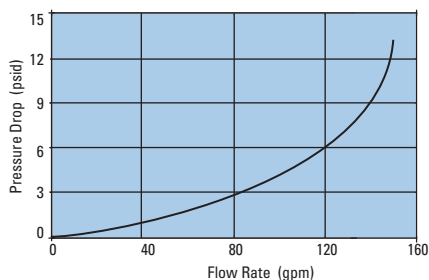
#### Filter Notes

- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

## Performance Data

**WL16 Housing Only**

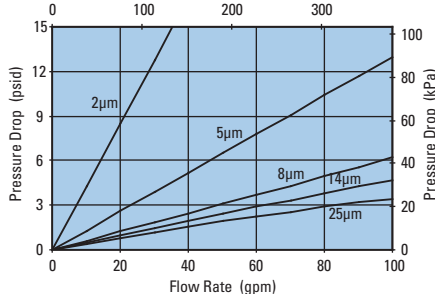
**WL16 Bypass Valve**



**WL16 9" DT Filter Only**

DT-HF4-9, 9"/229mm

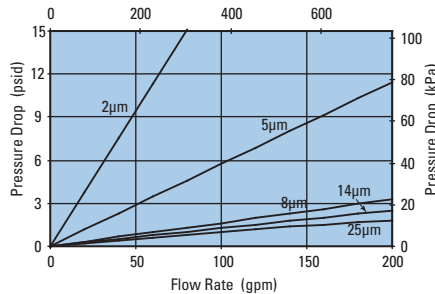
Flow Rate (lpm)



**WL16 18" DT Filter Only**

DT-HF4-18, 18"/457mm

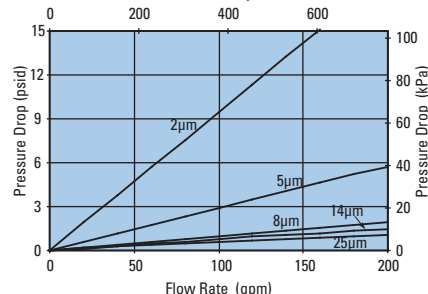
Flow Rate (lpm)



**WL16 27" DT Filter Only**

DT-HF4-27, 27"/686mm

Flow Rate (lpm)





## Filter Head Ordering Guide

Filter Assembly

WL16

1

D

4

2

6

N

TABLE 1

TABLE 2

TABLE 3

TABLE 4

TABLE 5

TABLE 6

TABLE 7

Service Filter

Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
WL16	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid

**Table 3**

Port Size Options	
CODE	PORT SIZE
D	SAE-24 O-ring
E	1½" SAE 4-Bolt Flange Code 61
U	1½" NPT

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
3	25 psid
4	50 psid

**Table 5**

Upstream Pressure Gauge and Switch Option	
CODE	INDICATOR STYLE & SETTING
1	No indicator
2	0-200 psi pressure gauge**
3	0-60 psi pressure gauge**
4	0-60 psi pressure gauge*
6	Pressure switch 18 psi Brad Harrison® (5-pin)
7	Pressure switch 35 psi Brad Harrison® (5-pin)
8	Pressure switch 18 psi Hirschmann® (4-pin)
9	Pressure switch 35 psi Hirschmann® (4-pin)

\*Bypass setting option code 3 only  
\*\*Bypass setting option code 4 only

**Table 6**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
3 (12.76")	9"
6 (16.94")	18"
7 (26.31")	27"

Note: Code length 6, 7 & 9 may be stacked using connector part # P167324 and code length 3 filters

**Table 7**

Secondary Port Options	
CODE	PORT SIZE
T	1-7/8" - 12 UN (SAE-24)
Z	1-1/2" SAE 4 Bolt Flange Code 61
N	None
V	1-1/2" NPT

**Table 8**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

### Metric Porting Available

Change WL16 to GL16  
Porting code E becomes 1-1/2"  
SAE 4 bolt flange with M12 threads

### Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2µm
03	DT 5µm
05	DT 8µm
10	DT 14µm
20	DT 25µm

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).



FIK

Max Flow: 170 gpm (639 lpm)



## FIK In-Tank Filters

**Working Pressures to:** 145 *psi*  
1000 kPa  
10 bar

**Rated Static Burst to:** 217 *psi*  
1500 kPa  
15 bar

**Flow Range to:** 170 *gpm*  
639 *lpm*

### Features

FIK in-tank filters are economical, space-saving units with simple screw-on covers, ideal for low pressure in-tank applications. This is a heavy-duty filter, with a die cast aluminum head and a steel or nylon canister. The head (and inlet) sit above the tank, with the housing in the tank. Filter flow is outside to inside. Three service indicators are available: pressure gauge, visual indicator, and electrical indicator. Optional air breathers are also available. FIK filter assemblies are provided from the factory with cellulose or Synteq™ filter media. Replacement cartridges are offered in a range of media types and performance ratings.



#### Beta Rating

- Performance to  $\beta_{8(c)}=1000$

#### Porting Size Options

- 1/2", 3/4", 1" NPT
- SAE-8,-12,-16,-20,-24 O-ring
- 2" SAE 4-Bolt Flange Code 61

#### Standard Bypass Ratings

- 22 *psi* / 150 kPa / 1.5 bar

#### Operating Temperatures

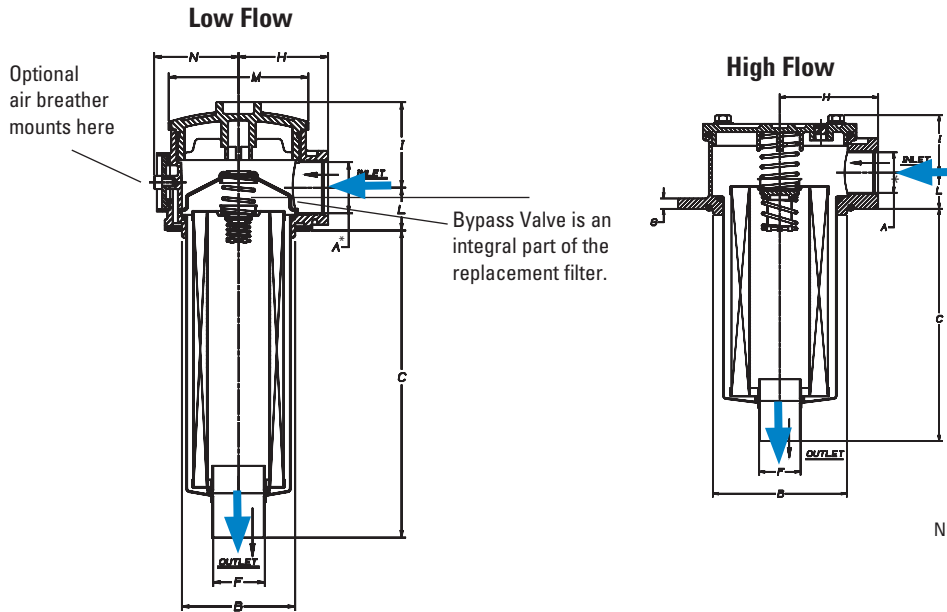
- -4°F to 194°F / -20°C to 90°C

#### Collapse Ratings

- 145 *psid* / 1000 kPa / 10 bar

**SP15/25 Specification Illustrations**

**Assembly - Side View**



**Applications:**

- Return Lines
- Side Loop Systems
- Fluid Conditioning Systems
- Process Systems
- Cooling Circuits
- Lube Oil Systems

NOTE: \* For "A" dimensions see next page.

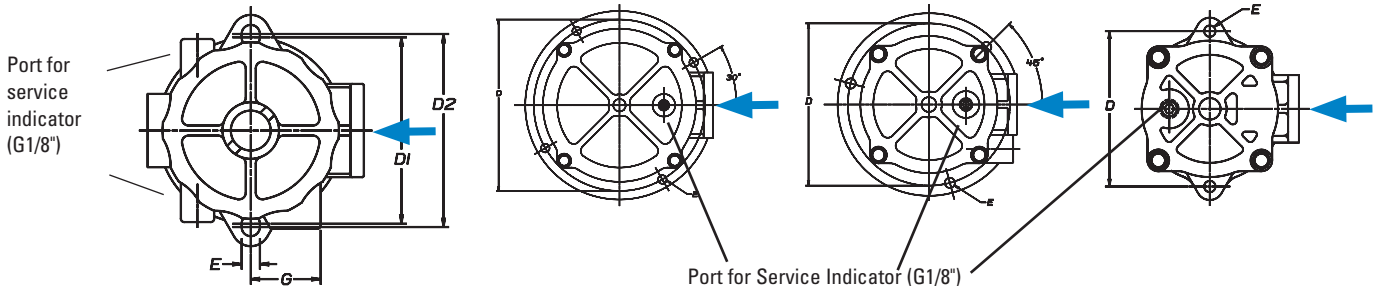
**Head - Top View**

FIK-030319, FIK-040811,  
FIK-040812, FIK-040813,

FIK-070248, FIK-070249,  
FIK-070250, FIK-071001,  
FIK-071002, FIK-071003

FIK-051204, FIK-052053

FIK-040799, FIK-041771,  
FIK-041772, FIK-041773,  
FIK-041774, FIK-041769,  
FIK-041770



FIK Model	K030319		K040811		K040812		K040813		K031027		K041769 K041770		K040799 K041771 K041772 K041773 K041774		K051204 K052053		K070248 K071001		K070249 K071002		K070250 K071003	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
<b>B</b>	2.4	60	3.4	89	3.4	86	3.4	86	2.6	67	3.5	90	3.54	90	5.2	131	6.9	175	6.8	174	6.8	174
<b>C</b>	7.2	184	4.1	104	5.9	150	9.3	235	3.1	78	3.9	100	5.7	145	9	230	9.5	242	11.7	297	15.9	405
<b>D1</b>	3.3	84	4.4	112	4.4	112	4.4	112	3.54	90	4.53	115	4.52	115	6.9	175	8.66	220	8.66	220	8.66	220
<b>D2</b>	3.46	88	4.56	116	4.56	116	4.56	116	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>E</b>	0.4	10	0.43	11	0.43	11	0.43	11	0.25	6.4	0.33	8.4	0.33	8.4	0.4	10.5	0.4	10.5	0.4	10.5	0.4	10.5
<b>F</b>	0.87	22	1.1	28	1.1	28	1.6	40	1.0	25	1.1	28	1.1	28	1.57	40	1.97	50	2.5	63.5	2.5	63.5
<b>G</b>	NA	NA	0.47	42	0.47	42	0.47	42	0.35	9	0.39	10	0.4	10	0.4	10	0.4	10	0.4	10	0.4	10
<b>H</b>	1.9	48	2.67	68	2.67	68	2.67	68	1.9	49	2.6	66	2.6	66	3.7	95	4.7	119	4.7	119	4.7	119
<b>I</b>	1.85	47	2.56	65	2.56	65	2.56	65	1.2	30	1.7	43	1.7	43	2.1	53	2.5	64	2.5	64	2.5	64
<b>L</b>	0.82	21	1.26	32	1.26	32	1.26	32	0.87	22	1.1	28	1.1	28	1.4	35	1.6	41	1.6	41	1.6	41
<b>M</b>	2.9	74	4.2	106	4.2	106	4.2	106	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>N</b>	2.4	60	3.4	86	3.4	86	3.4	86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Weight</b>	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lb	kg	lb	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg
	1.8	0.8	2.1	0.95	3.2	1.45	4.1	1.86	1.1	0.5	1.8	0.8	2.1	0.95	7.0	3.2	10.0	4.5	13.1	5.9	18.6	8.4




**FIK**

Max Flow: 170 gpm (639 lpm)



## FIK Components

### Assemblies & Service Part Choices

Port Size	Bypass Rating*	FIK Assembly Number	Bx(c) = 1000 Rating	Filter Media	Provided with this Filter	Filter Diameter (in./mm)	Filter Length (in./mm)	Flow Range (@~5 psid / 34.5 kPa)
SAE 8 O-Ring	22 psi/1.5 bar	K030319	36 µm	Cellulose	P171839	1.69 / 43	6.38 / 162	10 gpm / 38 lpm
SAE 12 O-Ring	22 psi/1.5 bar	K040811	36 µm	Cellulose	P171527	2.76 / 70	3.23 / 82	14 gpm / 53 lpm
SAE 16 O-Ring	22 psi/1.5 bar	K040812	36 µm	Cellulose	P171533	2.76 / 70	5.04 / 128	23 gpm / 86 lpm
SAE 20 O-Ring	22 psi/1.5 bar	K040813	36 µm	Cellulose	P171840	2.76 / 70	8.27 / 210	32 gpm / 120 lpm
1/2" NPT	22 psi/1.5 bar	K031027	36 µm	Cellulose	P171503	2.05 / 52	2.64 / 67	5 gpm / 18 lpm
SAE 12 O-Ring	22 psi/1.5 bar	K041769	11 µm	Synteq	P171525	2.76 / 70	3.23 / 82	9.5 gpm / 36 lpm
1" NPT	22 psi/1.5 bar	K041770	36 µm	Cellulose	P171527	2.76 / 70	3.23 / 82	15 gpm / 56 lpm
SAE 12 O-Ring	22 psi/1.5 bar	K041773	36 µm	Cellulose	P171533	2.76 / 70	5.04 / 128	18 gpm / 68 lpm
SAE 12 O-Ring	22 psi/1.5 bar	K041774	11 µm	Synteq	P171531	2.76 / 70	5.04 / 128	13 gpm / 49 lpm
3/4" NPT	22 psi/1.5 bar	K041771	36 µm	Cellulose	P171533	2.76 / 70	5.04 / 128	18 gpm / 68 lpm
SAE 16 O-Ring	22 psi/1.5 bar	K040799	36 µm	Cellulose	P171533	2.76 / 70	5.04 / 128	21 gpm / 79 lpm
1" NPT	22 psi/1.5 bar	K041772	36 µm	Cellulose	P171533	2.76 / 70	5.04 / 128	21 gpm / 79 lpm
SAE 20 O-Ring	22 psi/1.5 bar	K051204	36 µm	Cellulose	P171539	3.74 / 95	7.49 / 203	47 gpm / 177 lpm
SAE 20 O-Ring	22 psi/1.5 bar	K052053	11 µm	Synteq	P171537	3.74 / 95	7.49 / 203	32 gpm / 120 lpm
SAE 24 O-Ring	22 psi/1.5 bar	K070248	36 µm	Cellulose	P171557	5.51 / 140	7.49 / 203	66 gpm / 248 lpm
SAE 24 O-Ring	22 psi/1.5 bar	K071001	11 µm	Synteq	P171555	5.51 / 140	7.49 / 203	44 gpm / 165 lpm
2" SAE 4-Bolt	22 psi/1.5 bar	K070249	36 µm	Cellulose	P171575	5.51 / 140	9.84 / 250	106 gpm / 399 lpm
2" SAE 4-Bolt	22 psi/1.5 bar	K071002	11 µm	Synteq	P171573	5.51 / 140	9.84 / 250	74 gpm / 278 lpm
2" SAE 4-Bolt	22 psi/1.5 bar	K070250	36 µm	Cellulose	P171581	5.51 / 140	15.75 / 400	170 gpm / 639 lpm
2" SAE 4-Bolt	22 psi/1.5 bar	K071003	11 µm	Synteq	P171579	5.51 / 140	15.75 / 400	120 gpm / 451 lpm

#### Note

\*Bypass valve is an integral part of the replacement filter.  
Service indicator port available for all assemblies.

#### Filter Notes

- FIK filters utilize either glass fiber, cellulose, or wire mesh media.
- All FIK filters are potted with polyurethane adhesives.
- Synteq media designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- Buna-N® seals are standard on all FIK filters. Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.

## Service Indicators

### Pressure Gauges P171956

G 1/8  
(center back)



### P171953

G 1/8  
(bottom mount)

-14.5 to 72 psi  
-1 to +5 bar

### DC Electrical Indicator P171966

17 psi  
1.2 bar  
(48V AC/DC)



G 1/8 →

### Visual Indicator P171958

17 psi  
1.2 bar



G 1/8 →

## Optional Air Breathers

Part No.	Beta Rating	Fits Assembly Models:
P172434	10 µm	K040811, K040812, K040813
P173330	10 µm	K030319



Optional air breather is easily installed on filter head.

## Filter Choices - Low Flow Assemblies

Media Type	Beta Rating	K030319	K040811	K040812	K040813
Synteq	β8 = 1000	P569273	P569274	P569275	P569276
Synteq	β11 = 1000	P171845	P171525	P171531	P171846
Synteq	β23 = 1000	P171842	P171526	P171532	P171843
Cellulose	β36 = 1000	P171839	P171527	P171533	P171840
Cellulose	β40 = 1000	P171836	P171528	P171534	P171837
Wire Mesh	60 µm	P171833	P171529	P171535	P171834
Wire Mesh	90 µm	P171830	P171524	P171530	P171831

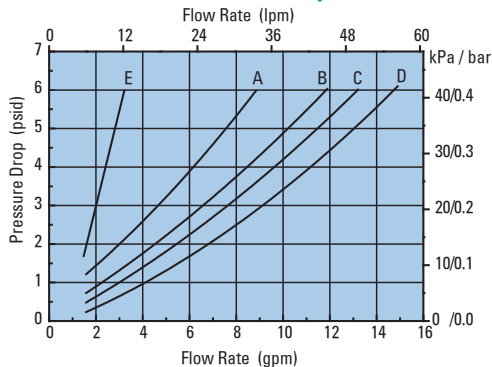
## Filter Choices - High Flow Assemblies

Media Type	Beta Rating	K031027	K041769 K041770	K040799 K041771 K041772	K051204 K052053	K070248 K071001	K070249 K071002	K070250 K071003
				K041773 K041774				
Synteq	β8 = 1000	P569277	P569274	P569275	P569278	P569279	P569280	P176749
Synteq	β11 = 1000	P171501	P171525	P171531	P171537	P171555	P171573	P171579
Synteq	β23 = 1000	P171502	P171526	P171532	P171538	P171556	P171574	P171580
Cellulose	β36 = 1000	P171503	P171527	P171533	P171539	P171557	P171575	P171581
Cellulose	β40 = 1000	P171504	P171528	P171534	P171540	P171558	P171576	P171582
Wire Mesh	60 µm	P171505	P171529	P171535	P171541	P171559	P171577	P171583
Wire Mesh	90 µm	P171500	P171524	P171530	P171536	P171554	P171572	P171578



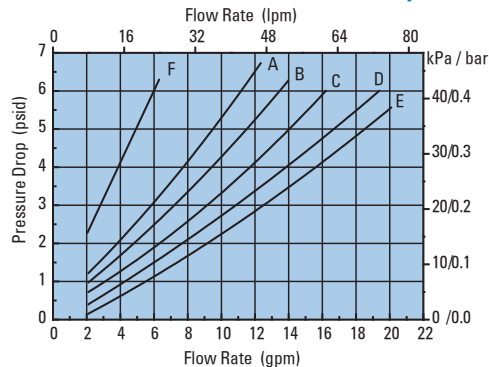
## Performance Data

**K030319 Assembly**



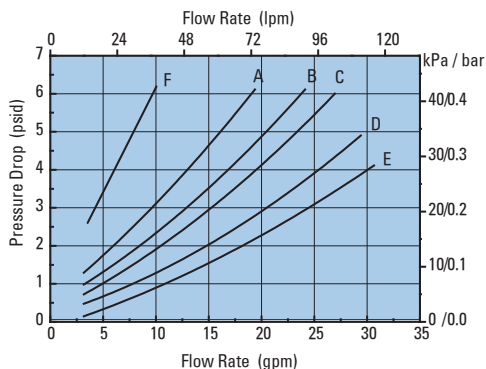
- A. P171845 (Synthetic)
- B. P171839 (Cellulose)
- C. P171836 (Cellulose)
- D. P171833, P171830 (Wiremesh)
- E. P569273 (Synthetic)

**K040811/K041769/K041770\* Assembly**



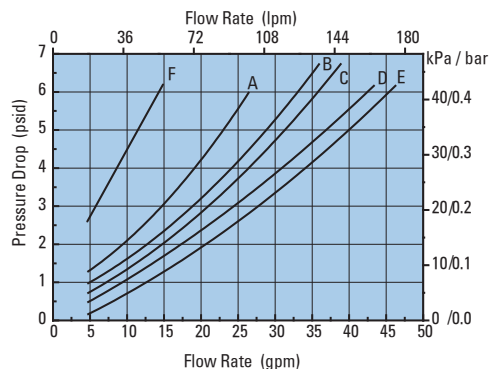
- A. P171525 (Synthetic)
- B. P171526 (Synthetic)
- C. P171527 (Cellulose)
- D. P171528 (Cellulose)
- E. P171529, P171524 (Wiremesh)
- F. P569274 (Synthetic)

**K040812 Assembly**



- A. P171531 (Synthetic)
- B. P171532 (Synthetic)
- C. P171533 (Cellulose)
- D. P171534 (Cellulose)
- E. P171535, P171530 (Wiremesh)
- F. P569275 (Synthetic)

**K040813 Assembly**

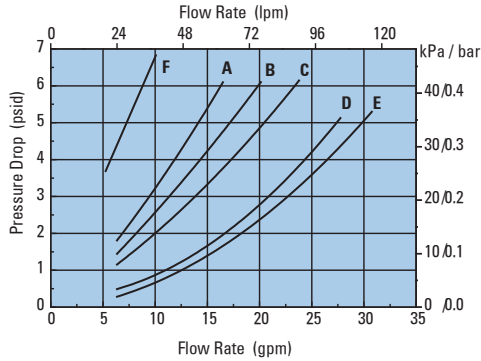


- A. P171846 (Synthetic)
- B. P171843 (Synthetic)
- C. P171840 (Cellulose)
- D. P171837 (Cellulose)
- E. P171834, P171831 (Wiremesh)
- F. P569276 (Synthetic)

NOTE:  
\* subtract ½ psi  
\*\* add ½ psi

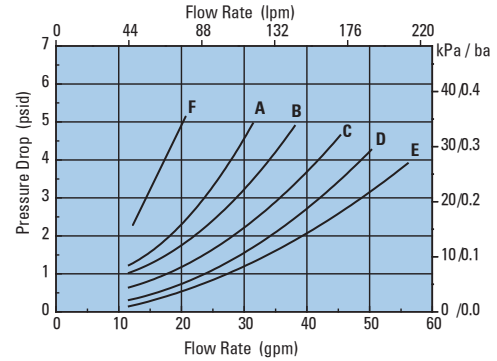
## Performance Data

**K040799, K041771\*\*, K041772, K041773\*\*, K041774\*\* Assembly**



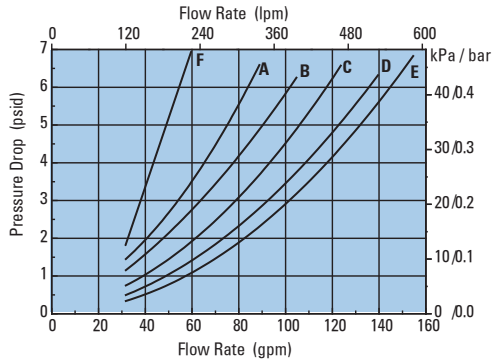
- A. P171531 (Synthetic)
- B. P171532 (Synthetic)
- C. P171533 (Cellulose)
- D. P171534 (Cellulose)
- E. P171535, P171530 (Wiremesh)
- F. P569275 (Synthetic)

**K051204/K052053 Assembly**



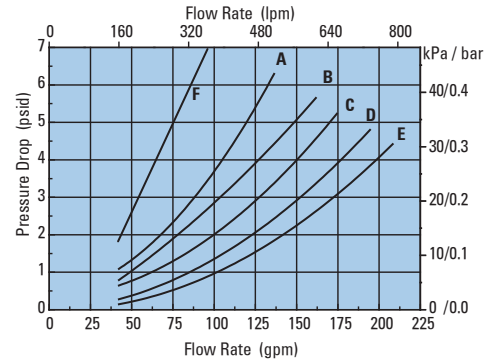
- A. P171537 (Synthetic)
- B. P171538 (Synthetic)
- C. P171539 (Cellulose)
- D. P171540 (Hvy Duty Cellulose)
- E. P171541, P171536 (Wiremesh)
- F. P569278 (Synthetic)

**K070249/K071002 Assembly**



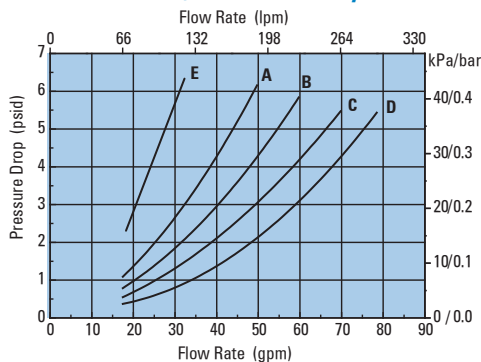
- A. P171573 (Synthetic)
- B. P171574 (Synthetic)
- C. P171575 (Cellulose)
- D. P171576 (Cellulose)
- E. P171572 (Wiremesh)
- F. P569280 (Synthetic)

**K070250/K071003 Assembly**



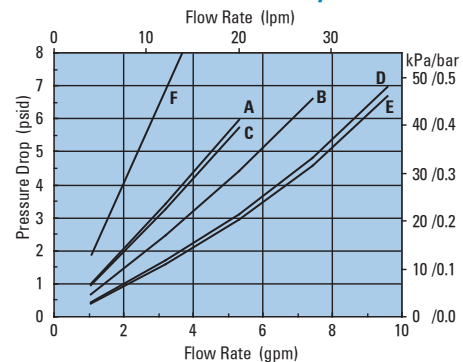
- A. P171579 (Synthetic)
- B. P171580 (Synthetic)
- C. P171581 (Cellulose)
- D. P171582 (Cellulose)
- E. P171583 (Wiremesh)
- F. P176749 (Synthetic)

**K070248/K071001 Assembly**



- A. P171555 (Synthetic)
- B. P171556 (Synthetic)
- C. P171557 (Cellulose)
- D. P171558 (Cellulose)
- E. P569279 (Synthetic)

**K031027 Assembly**



- A. P171501 (Synthetic)
- B. P171502 (Synthetic)
- C. P171503 (Cellulose)
- D. P171504 (Cellulose)
- E. P171505 (Wiremesh)
- F. P569277 (Synthetic)

NOTE:  
\* subtract 1/2 psi  
\*\* add 1/2 psi



## FIK04 Combo

Max Flow: 79 gpm (300 lpm)

# FIK04 Suction/Return Combination In-Tank Filters

**Working Pressures to:** 145 *psi*  
10 bar

**Rated Static Burst to:** 217 *psi*  
15 bar

**Flow Range to:** 79 *gpm*  
300 *lpm*

## Features

The FIK04 series of tank-mounted suction and return filters are popular choices for hydrostatic transmissions. The filtered flow is maintained at a slight backpressure to provide clean, pressurized oil, mainly for charge pumps in hydrostatic transmission systems. The pressurized flow is designed to reduce cavitation risks. This patented design uses an integrated main flow and bypass flow filter filter, which is capable of delivering filtered and pressurized oil, even in bypass situations. Emergency suction flow is also filtered. The FIK04 operates in a standard flow (outside to inside) configuration. SAE O-Ring ports are standard to meet popular application requirements.



- 4-point mounting
- Head material: aluminum
- Housing material: steel
- Cover material: glass-filled nylon
- Buna-N<sup>®</sup> seals standard
- Main filters include integrated bypass filters

Buna-N<sup>®</sup> is a registered trademark of E. I. DuPont de Nemours and Company.

### Beta Rating (per ISO 16889)

- Performance to  $\beta_{11(c)}=1000$

### Porting Size Options

- Inlet: SAE-16, -20 O-ring
- Outlet: SAE-16 O-Ring

### Assembly Weight

- 10.8 lbs / 4.9 kg

### Replacement Filter Lengths

- 18.6"/472 mm

### Standard Bypass Rating

- 36 *psi* / 250 kPa / 2.5 bar

### Standard Backpressure Rating

- 7.3 *psi* / 50 kPa / 0.5 bar

### Operating Temperatures

- -22°F to 212°F / -30°C to 100°C

### Filter Collapse Pressure

- 145 *psid* / 1000 kPa / 10 bar

### Return Flow Rate

- 79 *gpm* (300 *lpm*)

### Emergency Suction Flow Rate

- 27 *gpm* (100 *lpm*)

## FIK04 Filter Assemblies

Donaldson Part No.	Inlet Port Connections	Outlet Port Connections	Bypass Valve	Emergency Suction	Comments	Indicator Includes
K041634	SAE-20 & SAE-16	(2) - SAE-16	36 psi (2.5 bar)	125 µm Wire	Combo 300	None, see below

## Filter Choices

Media Type	$\beta_{x(c)} = 1000$	Length (in./mm)	Part Number	Bypass	Comments
Synteq	11 µm	18.6"/472 mm	P765457	125 µm Wire	For Combo 300 Assemblies

### Filter Notes

- All  $\beta=1000$  filters utilize glass fiber media.
- Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- All FIK04 filters are standard flow (outside to inside).
- Buna-N seals are standard on all FIK04 filters.

## Suction Filter Choices

Media Type	$\beta_{x(c)} = 1000$	Length (in./mm)	Part Number	Comments
Wire Mesh	125 µm wire mesh	50.2 mm	P764183	For Combo 300 Assemblies

## Indicator Options

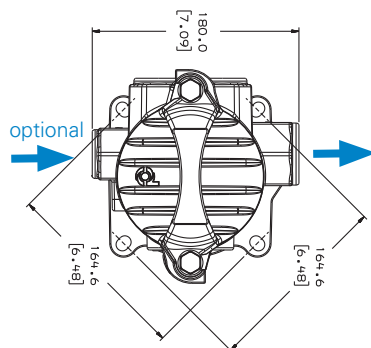
Part Number	Set Point	Style	Connection	Comments
P764467	36 psi (2.5 bar)	30 VDC, N.O.	G1/8"	for FIK Combo 300
P764613	36 psi (2.5 bar)	30 VDC, N.C.	G1/8"	for FIK Combo 300
P764612	36 psi (2.5 bar)	Visual	G1/8"	for FIK Combo 300

## Assembly - Side View

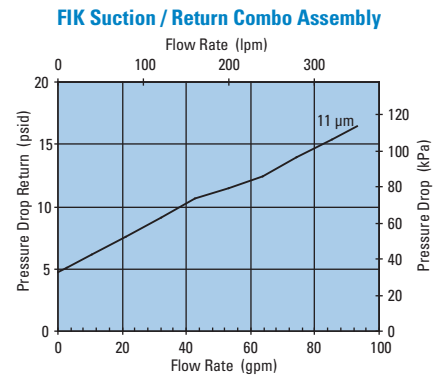
All dimensions are shown in millimeters [inches].



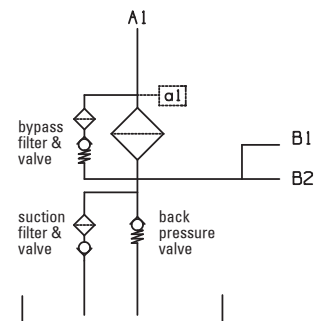
## Head - Top View



## Performance Data



## Flow Schematic







W033

Max Flow: 100 gpm (380 lpm)



## W033 In-Line Cartridge Filters

**Working Pressures to:** 300 *psi*  
20 bar

**Rated Static Burst to:** 1000 *psi*  
70 bar

**Flow Range to:** 100 *gpm*  
380 *lpm*



### Features

The W033 filter assembly features a heavy duty steel canister with an aluminum head. Donaldson DT high-performance 4-layer media is offered in five different media grades. The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features incorporated in many of the differential indicators.

- Conforms to HF4 specifications
- Head material: Aluminum
- Housing material: Steel
- Three housing length options

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- 1½" NPT
- SAE-24 O-ring
- 1½" SAE 4-Bolt Flange Code 61

#### Replacement Filter Lengths

- 9" / 229 mm
- 18" / 457 mm
- 27" / 686 mm

#### Filter Collapse Ratings

- 150 *psid* / 1034 kPa / 10.3 bar

#### Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- 25 psi / 172.5 kPa / 1.72 bar

#### Assembly Weight

- Code 3, 15.5 lbs / 7.0 kg
- Code 6, 18.7 lbs / 8.5 kg
- Code 7, 22.0 lbs / 10.0 kg

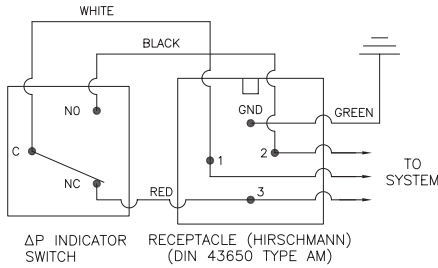
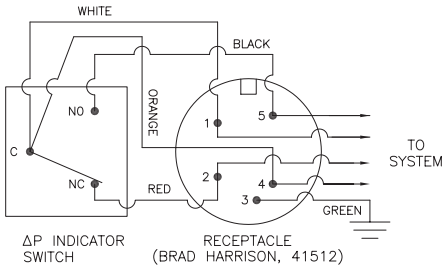
#### Operating Temperatures

- -45° to 250°F (-43° to 121°C)

## W033 Specification Illustrations

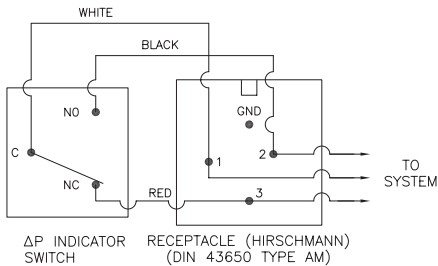
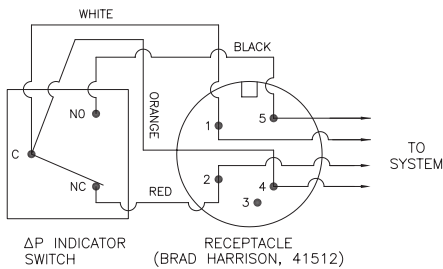
All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



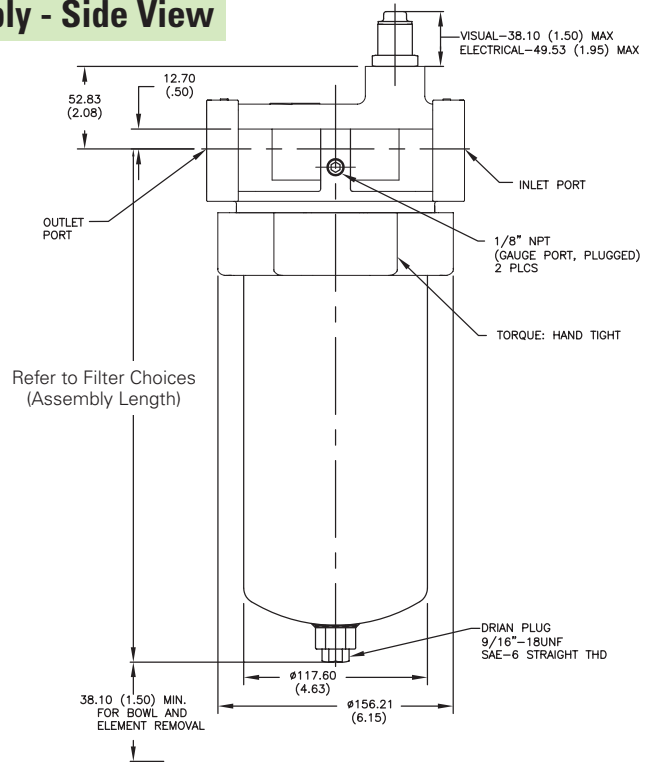
Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings

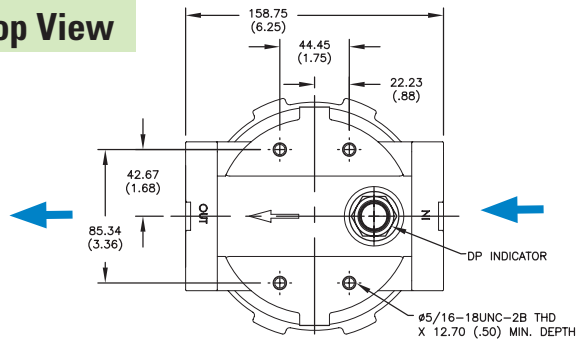


Note: The female plug (connector) is to be furnished by customer.

### Assembly - Side View



### Head - Top View



#### Differential Indicators:

Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

#### Surge Control:

This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

#### Thermal Lockout:

The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80° F.



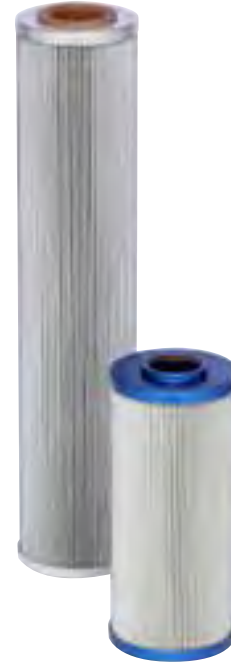
W033

Max Flow: 100 gpm (380 lpm)



## W033 Components High-Performance DT Filter Choices

Media Number	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
5 μm	5 μm	9/231.8	P566270	DT-HF4-9-5UM
8 μm	8 μm	9/231.8	P566271	DT-HF4-9-8UM
14 μm	14 μm	9/231.8	P566272	DT-HF4-9-14UM
25 μm	25 μm	9/231.8	P566273	DT-HF4-9-25UM
5 μm	5 μm	18/462.3	P566274	DT-HF4-18-5UM
8 μm	8 μm	18/462.3	P566275	DT-HF4-18-8UM
14 μm	14 μm	18/462.3	P566276	DT-HF4-18-14UM
25 μm	25 μm	18/462.3	P566277	DT-HF4-18-25UM
5 μm	5 μm	27/702.5	P566278	DT-HF4-27-5UM
8 μm	8 μm	27/702.5	P566279	DT-HF4-27-8UM
14 μm	14 μm	27/702.5	P566280	DT-HF4-27-14UM
25 μm	25 μm	27/702.5	P566281	DT-HF4-27-25UM
WA	B>30(c) = 200	9/233.5	P569527	Absorbs 250 ml water @ 25 psid



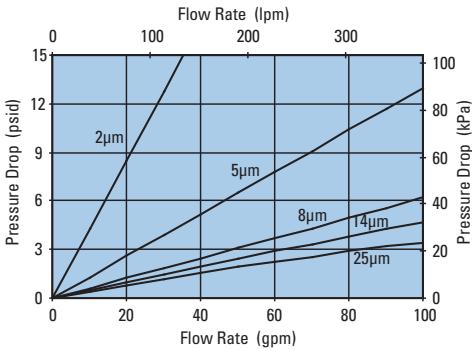
### Filter Notes

- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

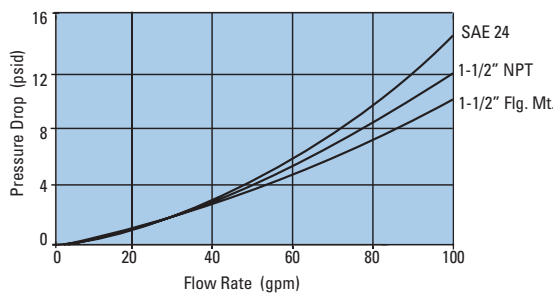
## Performance Data

### W033 9" DT Filter Only

DT-HF4-9, 9"/229mm

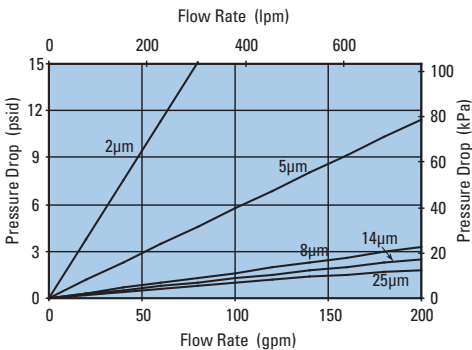


### W033 Housing Only



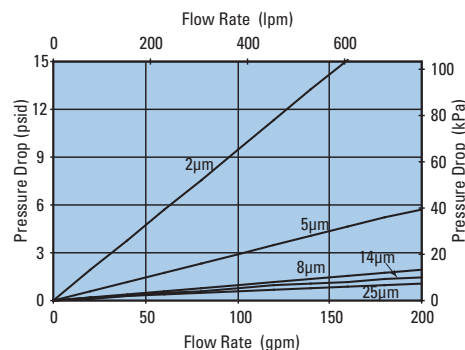
### W033 18" DT Filter Only

DT-HF4-18, 18"/457mm



### W033 27" DT Filter Only

DT-HF4-27, 27"/687mm





# Filter Head Ordering Guide

Filter Assembly	W033 TABLE 1	1 TABLE 2	D TABLE 3	4 TABLE 4	L N TABLE 5	B TABLE 6	3 TABLE 7
Service Filter	Filters ordered separately. See previous page for filter options.						

**LEAD TIME NOTE:**  
This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W033	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid

**Table 3**

Port Size Options	
CODE	PORT SIZE
D	SAE 24 O-ring
E	1½"SAE 4-bolt flange Code 61
U	1½" NPT

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
3	25 psid
4	50 psid

**Table 5 (Primary)**

Upstream Pressure Gauge and Switch Option	
CODE	INDICATOR STYLE & SETTING
C	Electrical/visual 15 + 4 psid
D	Electrical/visual 35 + 5 psid
F	Electrical/visual 15 + 4 psid with TL
G	Electrical/visual 35 + 5 psid with TL
H	Electrical/visual 15 + 4 psid with 12" 3-wire flying lead
J	No indicator
K	Visual 15 + 4 psid
L	Visual 35 + 5 psid with TL
M	Visual 35 + 5 psid with TL and surge
N	Electrical/visual 35 + 5 psid with 12" 3-wire flying lead
Q	Electrical switch 15 + 4 psid
R	Electrical switch 35 + 5 psid
X	Electrical/visual 15 + 4 psid with TL and surge
Y	Electrical/visual 35 + 5 psid with TL and surge

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
3 (12.81")*	9.0"
6 (22.17")	18.0"
7 (31.54")	27.0"

**Metric Porting Available**  
Change W033 to G033  
Porting code D becomes 1-1/2" ISO 228 BSPD  
Porting code E becomes 1-1/2" SAE 4 bolt flange with M12 threads

## Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2µm
03	DT 5µm
05	DT 8µm
10	DT 14µm
20	DT 25µm

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Company.



# HRK10

Max Flow: 300 gpm (1135 lpm)



## HRK10 In-Line Cartridge Filters

**Working Pressures to:** 150 *psi*  
10.3 bar

**Rated Static Burst to:** 500 *psi*  
34.5 bar

**Flow Range to:** 300 *gpm*  
1135 *lpm*



### Features

The HRK10 high flow filter combines the best features of its predecessor, the HEK11: ANSI inlet port options, top cover filter servicing for ease of maintenance, and a selection of service indicators. The HRK10 all-steel housing design provides a strong, durable, and dependable unit. It offers standard features like deep pleat filters for higher dirt holding capacity and standard Donaldson DT 4-layer media filter construction. This technology, combined with many other standard features, is ideal for today's applications in pulp and paper, power generation and steel mill applications. Six standard grades of media are offered. A port for an electrical indicator is incorporated into the differential indicator block.

- Robust "Twist & Lift" cover for simplified servicing
- Multiple bypass valves design assure proper operation
- Wide variety of bypass valve ratings
- Reverse flow (inside to outside) filters for positive contamination containment
- Fluorocarbon seals standard
- Housing & cover material: steel
- Drain plug in bottom
- Bleed valve in cover
- Fill plug in cover

#### Beta Rating (per ISO 16889)

- Performance to  $\beta_{<4} (c)=1000$

#### Porting Size Option

- 4" ANSI Flange, 8-bolt 150#

#### Assembly Weight

- 140 lbs / 64 kg

#### Replacement Filter Lengths

- 22" / 559 mm

#### Standard Bypass Rating

- No Bypass
- 5 *psi* / 34.5 kPa / 0.34 bar
- 25 *psi* / 172 kPa / 1.7 bar
- 50 *psi* / 345 kPa / 3.4 bar

#### Operating Temperatures

- -20°F to 250°F ( -29° to 121°C)

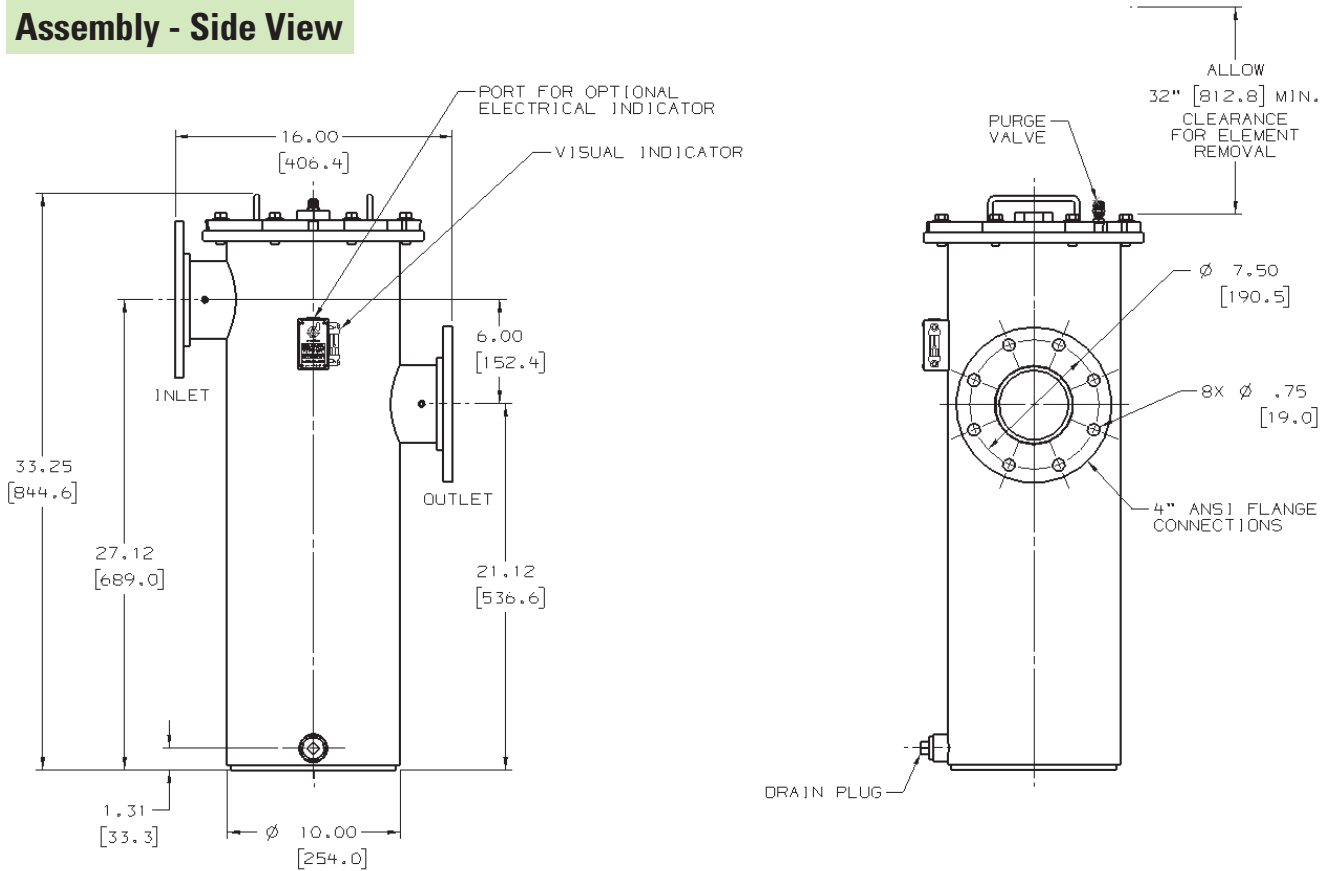
#### Filter Collapse Pressure

- 100 *psid* / 689 kPa / 6.9 bar

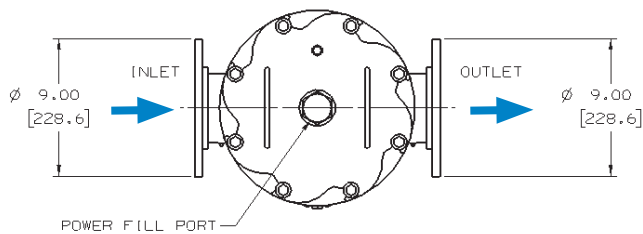
**HRK10 Specification Illustrations**

All dimensions are shown in inches [millimeters].

**Assembly - Side View**



**Head - Top View**







HRK10

Max Flow: 300 gpm (1135 lpm)



## HRK10 Components Housing Choices

Note: Filters ordered separately. See below for filter options.

Part No.	Port Connections	Bypass Valve	Indicator Options
K100001*	4" ANSI Flange	No bypass	Visual standard, electrical optional
K100002*	4" ANSI Flange	5 psi (0.34 bar) bypass	Visual standard, electrical optional
K100003*	4" ANSI Flange	25 psi (1.7 bar) bypass	Visual standard, electrical optional
K100004*	4" ANSI Flange	50 psi (3.4 bar) bypass	Visual standard, electrical optional

## Electrical Indicator Options

Part No.	Set Point	Bypass Valve
P173944	20 psi (1.4 bar)	AC/DC, 3-wire
P174396	40 psi (2.8 bar)	AC/DC, 3-wire

## High-Performance DT Filter Choices

Media Number	$B_{x(c)} = 1000$	Length (in./mm)	DT Part Number	Comments	Replaces old HEK11 Filters
2 $\mu\text{m}$	<4 $\mu\text{m}$	22/559	P566187	HRK10 Series	P163472
5 $\mu\text{m}$	5 $\mu\text{m}$	22/559	P566188	HRK10 Series	none
8 $\mu\text{m}$	8 $\mu\text{m}$	22/559	P566189	HRK10 Series	P176417* or P176223**
14 $\mu\text{m}$	14 $\mu\text{m}$	22/559	P566190	HRK10 Series	P165449
25 $\mu\text{m}$	25 $\mu\text{m}$	22/559	P566191	HRK10 Series	P164707
150 $\mu\text{m}$	N/A	22/559	P566192	HRK10 Series: Wire mesh media	P160078
WA	$B > 30_{(c)} = 200$	22/559	P569531	Absorbs 1800 ml water @ 25 psid	N/A



Use HRK10 in place of previous HEK11 housings.

For better performance use HRK10 filters in existing HEK11 housings.

\* 9  $\mu\text{m}$  rating

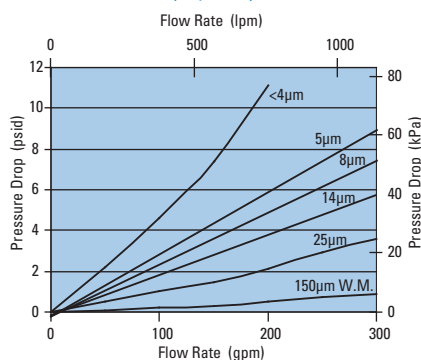
\*\* 10  $\mu\text{m}$  rating

### Filter Notes:

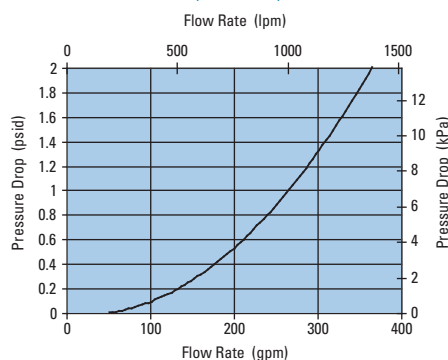
- All  $\beta=1000$  filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson HRK10 filters are potted with epoxy-based adhesives.
- All HRK10 filters are reserve flow (inside to outside), keeping contaminants contained during servicing.
- Viton® seals are standard on all HRK10 filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

## Performance Data

HRK10 Filter Only  
(22"/559mm)



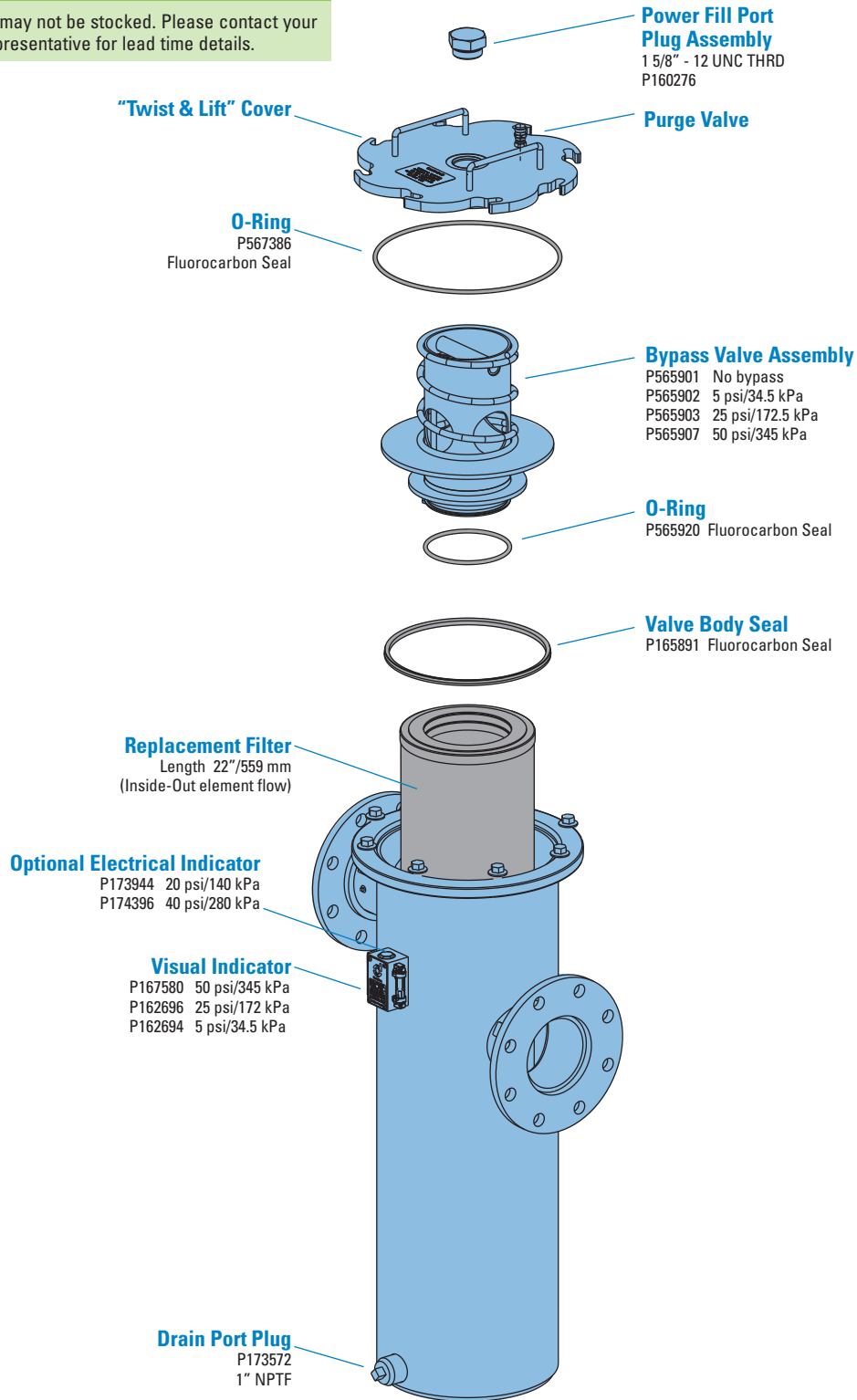
HRK10 Housing Only  
(with 4" Port)



## HRK10 Service Parts

### SERVICE PARTS NOTE:

Some service parts may not be stocked. Please contact your Donaldson sales representative for lead time details.



Even More  
^

# Donaldson Delivers Innovative Filtration Solutions for Engines, Equipment and the People Who Use Them

## Fuel Filtration

- Expanded line of fuel filters protect engine components and extend equipment life.
- Includes a full complement of filters to fit Stanadyne® and Racor® fuel systems, and Cummins® engines.
- Twist&Drain™ valves turn the complicated task of removing water into an easy process.



Stanadyne® is a registered trademark of Stanadyne Corporation. Racor® is a registered trademark of Parker Hannifin Corporation. Cummins® is a registered trademark of Cummins Inc.

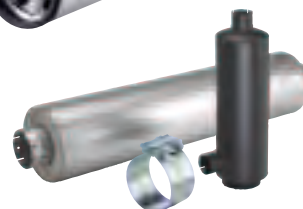
## Lube Filtration

- Donaldson lube filters keep engine oil clean by capturing contaminants that can cause engine damage.
- With coverage for a full range of popular engines, Donaldson lube filters meet or exceed application requirements.
- Donaldson Endurance™ lube filters – with Synteq™ media – deliver improved lubricant flow, improved cold start performance and a higher level of engine protection to prolong engine and equipment life.



## Mufflers & Exhaust Accessories

- For more than 50 years, Donaldson has been a leading supplier of exhaust systems, components and accessories for medium and heavy-duty diesel powered trucks and equipment.



## Air Filtration

- Delivering an expansive line of two-stage filtration systems, including our industry shaping PowerCore® Air Cleaner housings that pack big performance in a small, compact size. PowerCore® air cleaners are easily adaptable to a scavenge air system for higher pre-cleaner efficiency.
- Standard and extended life filter options are available for nearly all Donaldson air cleaners - both axial and RadialSeal™ filters.
- Extend air filter life with long life filters, pre-cleaners, scavenged / pre-cleaners systems, filter service indicators, Dust Dumpa tube extensions and kits that convert older SRG housings to Donaldson RadialSeal™ filters.
- High efficiency Donaldson Endurance™ filters offer improved engine protection for work trucks.



PowerCore®



## Coolant Filtration

- Donaldson coolant filters remove contaminants and maintain cooling system balance – keeping today's hot-running engines cool and reducing downtime.
- Donaldson Endurance™ coolant filters allow you to extend filter life while maintaining coolant condition.





## Medium Pressure Filters

Medium pressure filters can be used in applications up to 2000 psi (13790 kPa). Donaldson offers both spin-on and in-line cartridge-style filters.

Donaldson Duramax® filters are the highest rated medium pressure spin-on filters available. Duramax filters are proven, reliable, long-lived and easy to install.



### Section Index

Max Operating Pressure < 2000 psi (138 bar)

Models arranged from low to maximum flow rates

#### Spin-on Filters

HMK03 .....	94
HMK04 .....	98
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HNK05 .....	106
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#### In-line Cartridge Filters

W061 .....	110
HDK06 .....	114
W041 .....	118
W042 .....	122
HFK08 .....	126



HMK03

Max Flow: 25 gpm (95 lpm)



## HMK03 DURAMAX® Spin-On Filters

**Working Pressures to:** 1000 *psi*  
6895 kPa  
69 bar

**Rated Static Burst to:** 2000 *psi*  
13790 kPa  
138 bar

**Flow Range to:** 25 *gpm*  
95 *lpm*



### Features

HMK03 Series Duramax® spin-on filters offer twice the capacity of competitive filters, yet they are physically smaller than traditional housing/cartridge filter assemblies. It features a die cast aluminum head and a unique radial seal O-ring gasket design that eliminates leakage.

Take advantage of Donaldson's mix and match system of in-stock heads, housings and media choices – so you can get exactly what you need. A full range of media options are available, using Donaldson's exclusive Synteq™ synthetic media designed especially for liquid filtration. You can also select the exact indicator types and bypass options to suit your application.

#### Beta Rating

- Performance to  $\beta_{6(c)}=1000$

#### Porting Size Option

- SAE-12 O-ring

#### Assembly Weight

- Short: 3.3 lbs / 1.5 kg
- Long: 4.2 lbs / 1.9 kg

#### Replacement Filter Lengths

- 5.5" / 140mm
- 9.5" / 242mm

#### Standard Bypass Ratings

- 50 *psi* or No Bypass

#### Operating Temperatures

- -20°F to 250°F / -29°C to 121°C

#### Housing Fatigue Strength Ratings\*

- 100,000 Cycles: 0-1000 *psi* / 0-6895 kPa / 68 bar
- 300,000 Cycles: 0-800 *psi* / 0-5516 kPa / 55 bar
- 1,000,000 Cycles: 0-700 *psi* / 0-4826 kPa / 48 bar

\*Per T3.10.17 NFPA

#### Filter Collapse Rating

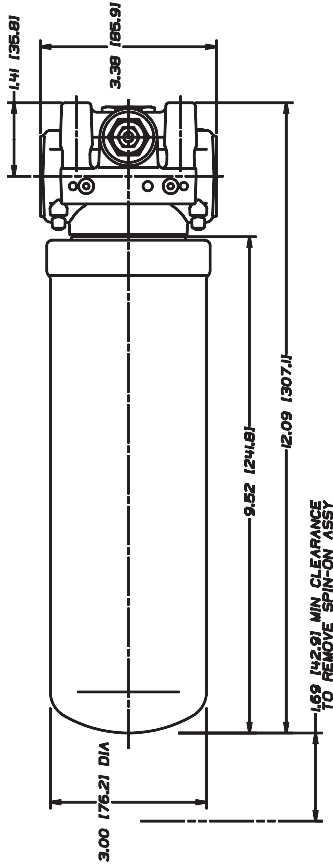
- 290 psid / 20 bar

**HMK03 Specification Illustrations**

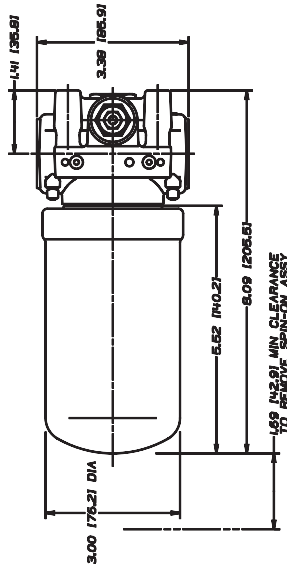
All dimensions are shown in inches [millimeters].

**Assembly - Side Views**

Long Assembly



Short Assembly

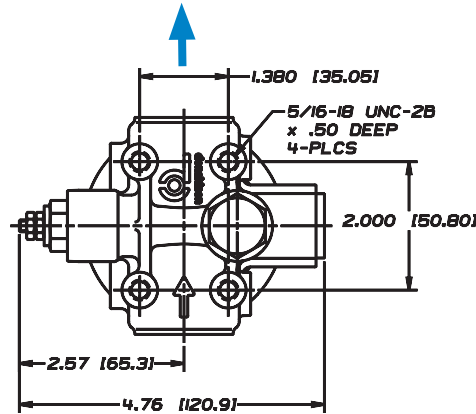


**Applications:**

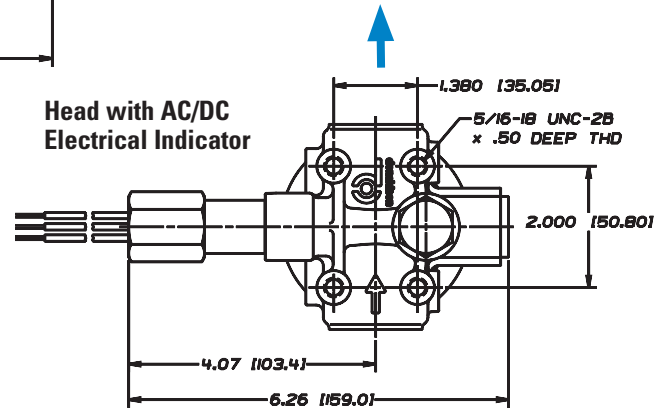
- Pilot Control Circuits
- Refrigeration Compressor Circuits
- Hydrostatic Transmission
- Charge Pumps

**Head - Top View with Indicators**

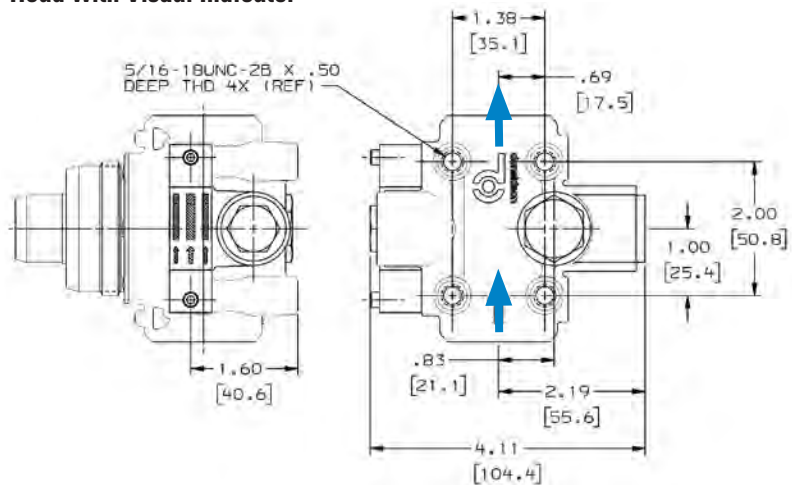
Head with DC Electrical Indicator



Head with AC/DC Electrical Indicator



Head with Visual Indicator







HMK03

Max Flow: 25 gpm (95 lpm)



## HMK03 Components

### Filter Choices

Media No.	Media Tech	B <sub>(c)</sub> = 1000 Rating	Length (in.) (mm)		Part No.	Seal Material
No. 1	Synteq™	5 μm	5.5	140	P170306	Buna-N®
			9.5	242	P170307	Buna-N
No. 2	Synteq	9 μm	5.5	140	P170308	Buna-N
			9.5	242	P170309	Buna-N
No. 2½	Synteq	10 μm	9.5	242	P176107	Buna-N
No. 3	Synteq	10 μm	9.5	242	P173702	Buna-N
No. 4	Synteq	10 μm	5.5	140	P170310	Buna-N
			9.5	242	P170311	Buna-N
No. 9	Synteq	23 μm	5.5	140	P170312	Buna-N
			9.5	242	P170313	Buna-N

#### Filter Notes

- Synteq™ filter media is compatible with petroleum based fluids, most phosphate esters, water oil emulsions, and HWCF (high water content fluids).
- All models have 2"-12 threads
- Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



### HMK03 Head

Port Size	Bypass Rating	Indicator	Head Part No.
¾" SAE-12	No Bypass	None*	P170327
O-Ring	50 psi 345 kPa	None*	P170773
		Visual*	P179460

\*Head is machined to accept optional electrical indicators.  
See Indicator list at right for the available choices.

### In-Oil Service Indicator Choices

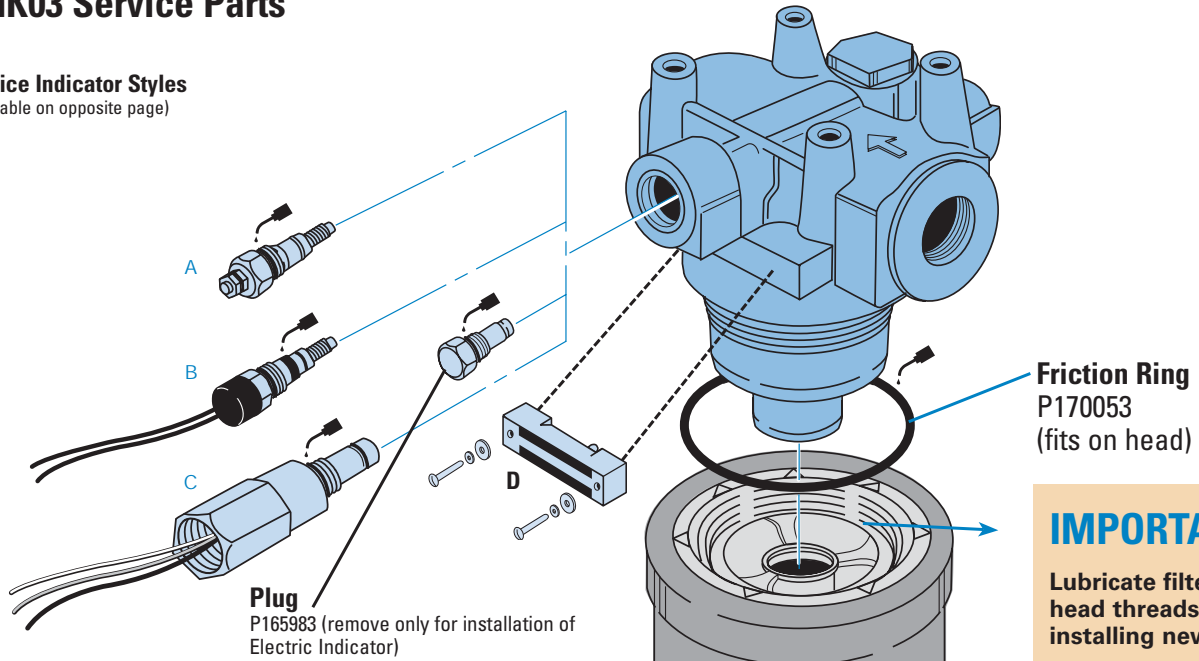
Use with Bypass Valve Pressure of:	Part No.	Style <sup>2</sup>	Description <sup>1</sup>
25 psi / 172.5 kPa	P171143	B	Electric 2-wire DC
	P173944	C	Electric 3-wire AC/DC
50 psi / 345 kPa	P165194	A	Electric Single post DC
	P171087	B	Electric 2-wire DC
	P174396	C	Electric 3-wire AC/DC
	P165965	D	Visual

<sup>1</sup> All electric models have a maximum operating temperature of 250°F/121°C.

<sup>2</sup> See illustration of indicator styles on next page and complete details on all service indicators on pages 236-238.

## HMK03 Service Parts

**Service Indicator Styles**  
(See table on opposite page)



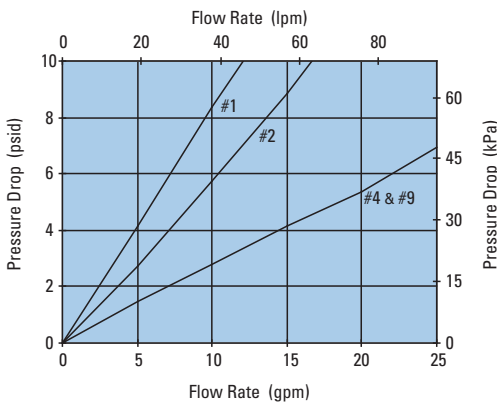
**IMPORTANT:**

Lubricate filter-to-head threads when installing new filter.

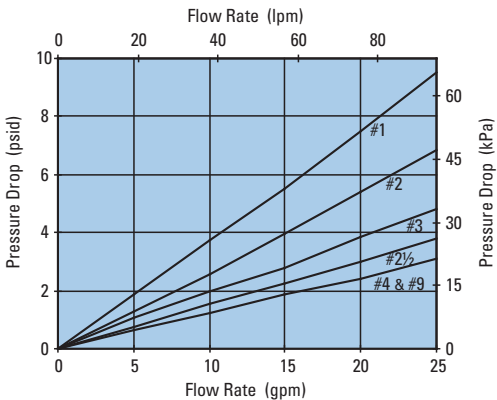
EP2 moly-type grease, is recommended.

## Performance Data

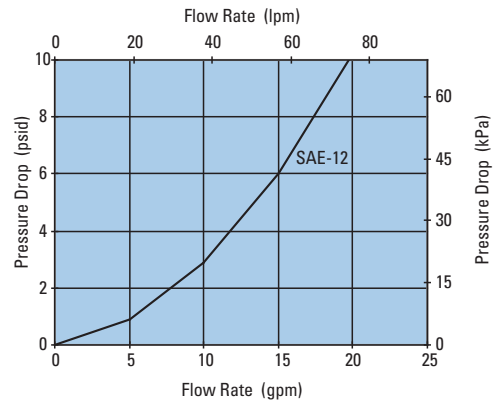
**HMK03 Filter Only**  
(Synthetic, 5.5"/140mm)



**HMK03 Filter Only**  
(Synthetic, 9.5"/242mm)



**HMK03 Head Only**





HMK04/24

Max Flow: 35 gpm (130 lpm)/60 gm (230)



## HMK04/24 DURAMAX® Spin-On Filters

**Working Pressures to:** 500 *psi*  
3450 kPa  
34.5 bar

**Rated Static Burst to:** 1000 *psi*  
6900 kPa  
69 bar

Flow Range to:	HMK04	HMK24
	35 <i>gpm</i>	60 <i>gpm</i>
	130 <i>lpm</i>	230 <i>lpm</i>



### Features

HMK04 (single) and HMK24 (double) Duramax® spin-on filters both feature a die-cast aluminum head, a heavy-duty steel body, with diecast aluminum top plate for added strength. A special head-to-canister O-Ring seal prevents leakage. Buna-N seals are standard; Viton® seals are available on some models.

Since both HMK04 and HMK24 models use the same replacement filters, they make a great team for your application. Both filters feature identical pressure ratings, but HMK24 handles double the flow capacity as HMK04, so there's no need to inventory two different part numbers for replacement filters. A full range of media options are available, using Donaldson's exclusive Synteq™ synthetic media designed especially for liquid filtration. You can also select the exact indicator types and bypass options to suit your application.

Buna-N® Viton® are a registered trademarks of E. I. DuPont de Nemours and Company.

### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

### Porting Size Options

- | HMK04                | HMK24                           |
|----------------------|---------------------------------|
| • ¾", 1" NPT,        | • SAE-20 O-ring                 |
| • SAE-12, -16 O-ring | • 1¼" SAE 4-Bolt Flange Code 61 |

### Assembly Weight

- HMK04 with short filter: 3.9 lbs/1.8 kg
- HMK04 with long filter: 4.8 lbs/2.2 kg
- HMK24: with short filter: 7.8 lbs/3.5 kg
- HMK24: with short filter: 9.6 lbs/4.4 kg

### Replacement Filter Lengths

- 6" / 152mm
- 9.4" / 240mm

### Standard Bypass Ratings

- 25 *psi*, 50 *psi*, No Bypass

### Operating Temperatures

- -20°F to 250°F / -29°C to 121°C (synthetic)
- -20°F to 225°F / -29°C to 107°C (cellulose)

### Housing Fatigue Strength Ratings\*

- 100,000 Cycles: 0-500 *psi*/ 0-3450 kPa /34.5 bar
- 300,000 Cycles: 0-400 *psi*/ 0-2758 kPa /27.6 bar
- 1,000,000 Cycles: 0-350 *psi*/ 0-2415 kPa /24 bar

\*Per T3.10.17 NFPA

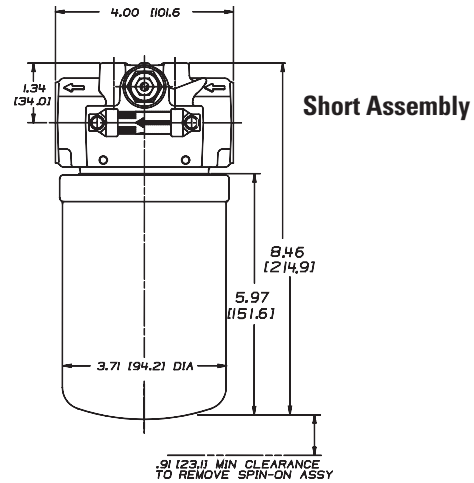
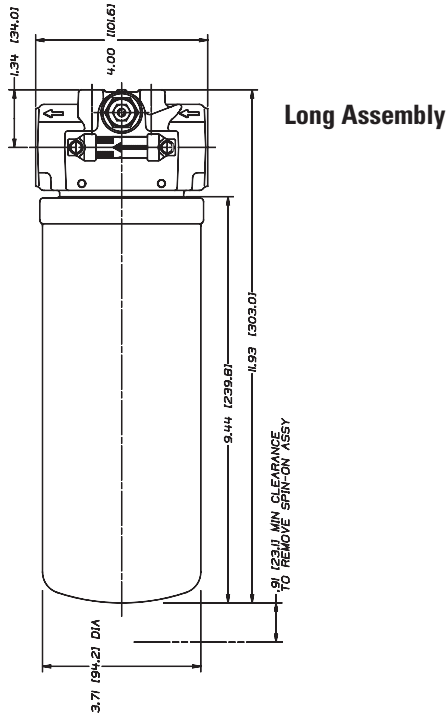
### Filter Collapse Rating

- 150 psid / 10 bar
- 300 psid / 20 bar also available

**HMK04/24 Specification Illustrations**

All dimensions are shown in inches [millimeters].

**Assembly - Side Views**

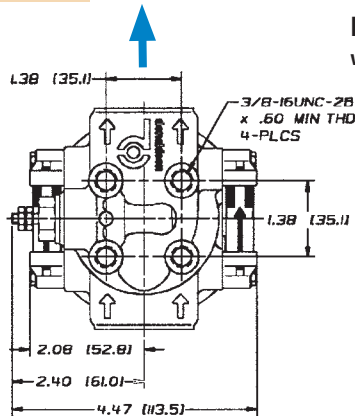


**Applications:**

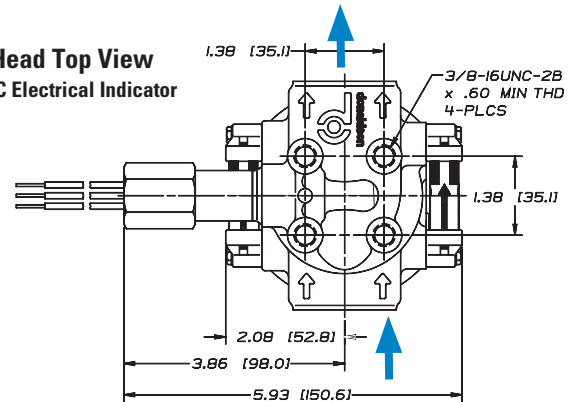
- Return-Lines
- Case Drains
- Side Loop Systems
- Bearing/Gear Lube Systems
- Hydrostatic Charge Pumps
- Power Transmissions
- Cooling Circuits
- Fuel Transfer

**Heads - Top & Side Views**

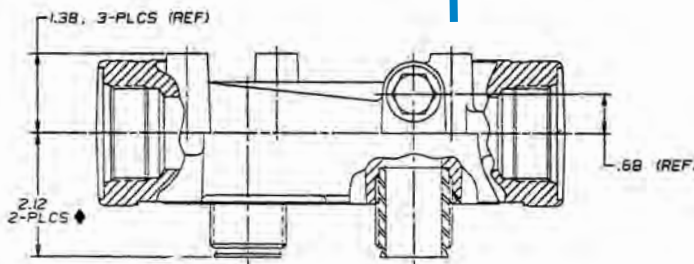
**HMK04 Head Top View with DC Electrical Indicator**



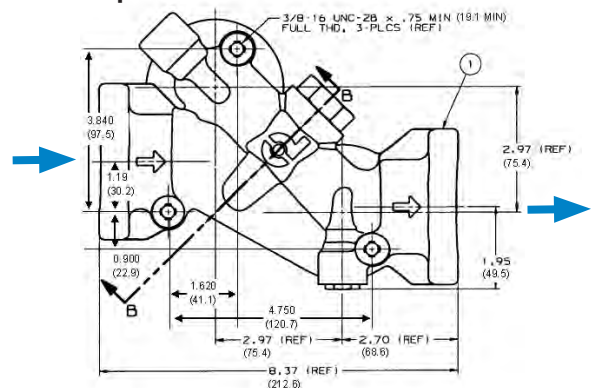
**HMK04 Head Top View with AC/DC Electrical Indicator**



**HMK24 Head Side View**



**HMK24 Head Top View**





# HMK04/24

Max Flow: 35 gpm (130 lpm)/60 gm (230)



## HMK04/24 Components

### Filter Choices for both HMK04 and HMK24

Media	B <sub>x10</sub> = 1000 Rating	Media Technology	Length (in.)		Part No.		
No. 1/2	<4 μm	Synteq™	9.4	240	P165185 <sup>1</sup> Viton® Seal		
No. 1	5 μm	Synteq	9.4	240	P167590		
No. 2	9 μm	Synteq	6	52	P165354		
			9.4	240	P165332		
No. 2 1/2	10 μm	Synteq	6	152	P176565		
			9.4	240	P176566		
			300 psi collapse		9.4	240	P173737
No. 3	10 μm	Synteq	300 psi collapse		11.6	295	P179343
			9.4	240	P170950		
No. 4	10 μm	Synteq	300 psi collapse		6	152	P163542
			9.4	240	P163555		
			6	152	P164375		
			9.4	240	P164378		
No. 6	13 μm	Synteq	9.4	240	P164056 <sup>1</sup> Viton Seal		
No. 7	33 μm	Synteq	6	152	P164381		
			9.4	240	P164384		
No. 9	23 μm	Synteq	6	152	P163315		
			9.4	240	P163567		
No. 16	22 μm	Synteq	9.4	240	P164059 <sup>1</sup> Viton Seal		
			6	152	P165335		
No. 20	>50 μm	Synteq	9.4	240	P165338		
			9.4	240	P560584		
WA	na	Water Removal	9.4	240	P560584		

#### Notes

- Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.
- Standard filter collapse rating is 150 psi, except as noted.
- Thread size is 1 3/8"-12 UNF-2B

<sup>1</sup> Filters with seals made of Buna-N® are appropriate for most applications involving petroleum oil. Filters with seals made of Viton® (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions and HWCF (high water content fluids) over 150°F. Donaldson offers both types.  
 Buna-N® Viton® are a registered trademarks of E. I. DuPont de Nemours and Company.

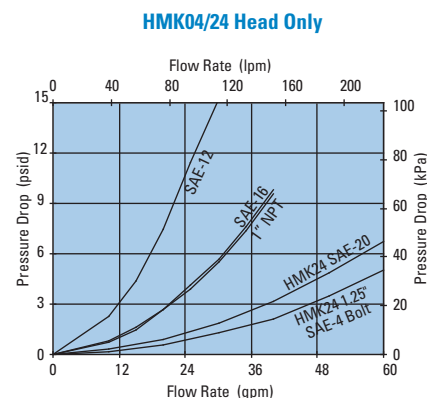
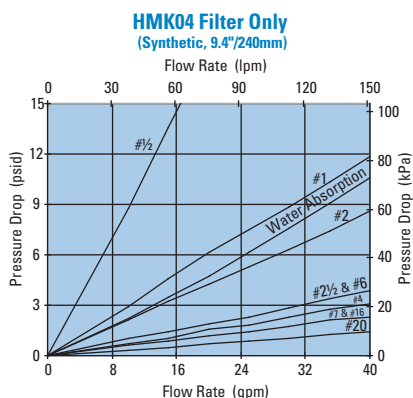
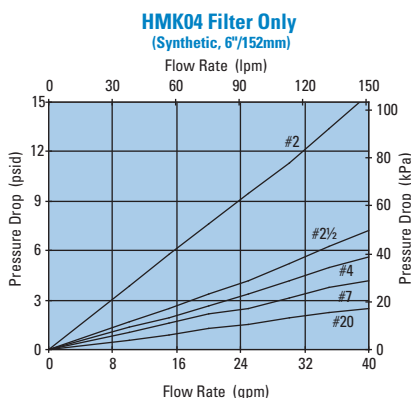
## Head Choices for HMK24 (double)



Port Size	Bypass Rating	Indicator Options <sup>1</sup>	Part No.
SAE-20 O-Ring	None	A,B,C	P179609
1 1/4" SAE 4-Bolt	50 psi	A,B,C	P179582

<sup>1</sup> Reference illustration on next page for service indicator styles.

## Performance Data



### Mix and Match to Get What You Need

Donaldson's mix and match system provides the great performance and functional advantages of custom-engineered filters with the convenience and speedy delivery of in-stock parts. Choose your options and build a filter to meet your cleanliness requirements.

## IMPORTANT:

The filter head snout/post must be lubricated before spinning on a new filter to prevent thread damage.



## Head Choices for HMK04 (single)

Port Size	Bypass Rating	Standard Indicator Style & Location <sup>1,2</sup>	Indicator Options	Head Part No.
¾" NPT	25 psi	None	None	P169317
	172 kPa	D (Visual), Left Side	None	P169310
SAE-12 O-Ring	25 psi	None	None	P167473
	172 kPa	D (Visual), Left Side	None	P166387
	No Bypass	D (Visual), Left Side (25 psi)	None	P169320
		None	None	P165434
SAE-12 O-Ring (3 ports)	No Bypass	D (Visual), Left Side (50 psi)	None	P173750
	50 psi / 345 kPa	A (Electrical, P161594)	B, C	P167529
1" NPT	25 psi	D (Visual), Both Sides	A, B, C	P166086
	172 kPa	None	None	P169309
		D (Visual), Left Side	None	P166416
SAE-16 O-Ring	15 psi / 100 kPa	None	A	P176569
SAE-16 O-Ring	25 psi / 172 kPa	None	None	P163681
		D (Visual), Left Side	None	P166417
		D (Visual), Both Sides	A, B, C	P166088
		E (Electrical, P177361)	None	P176568
		A (Electrical, P162400)	B, C	P165537
	No Bypass	D (Visual), Both Sides (25 psi)	A, B, C	P166664
		A (Electrical, P162400)	B, C	P166902
	50 psi	D (Visual, Right Side)	All	P179381
	No Bypass	None	None	P164667
	50 psi / 345 kPa	None	None	P167201
	A (Electrical, P165194)	B, C	P166862	
SAE-16 O-Ring	5 psi	D (Visual), Both Sides	All	P564850
1" NPT	No Bypass	D (Visual), Left Side (25 psiD)	None	P564484
1" NPT	25 psi	D (Visual), Left Side (25 psiD)	None	P564485

## IMPORTANT:

The filter head snout/post must be lubricated before spinning on a new filter to prevent thread damage.



### Head Notes

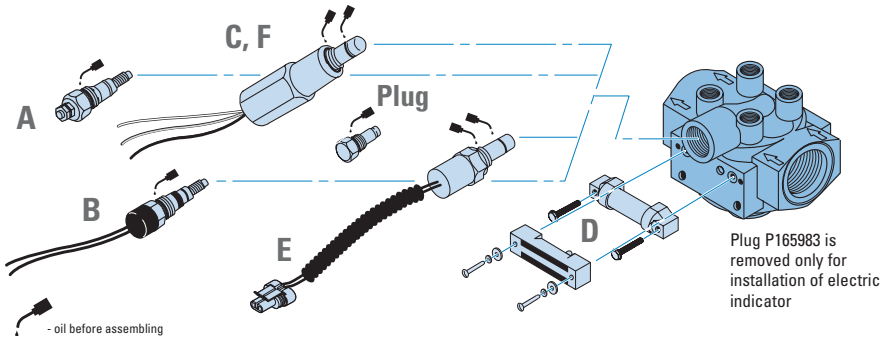
- 1 Reference illustration below for indicator styles.
- 2 Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port.

## 3-Port Head for Charge Pumps



The **P167529** head is designed with a 50 psi / 3.45 bar third port bypass valve that diverts all bypass flow back to the reservoir, instead of going straight through the head and into the system as it does in 2-ported heads. Unfiltered fluid is NOT allowed into the system in the case of plugged filters. Designed primarily for charge pump applications.

## Service Indicator Choices



Electric Models <sup>1</sup>			Visual Models (non-electric) <sup>2</sup>		
Use with Bypass Valve Pressure of:	Indicator Part No.	Style <sup>3</sup> Description	Use with Bypass Valve Pressure of:	Indicator Part No.	Style <sup>3</sup>
5 psi / 34.5 kPa	P163642	A Single post DC.	15 psi / 103 kPa	P162642	D
15 psi / 103 kPa	P163601	A Single post DC.	25 psi / 172. kPa	P162696	D
25 psi / 172.5 kPa	P163839	A Single post DC. N.C.	50 psi / 345 kPa	P167580	D
25 psi / 172.5 kPa	P162400	A Single post DC. N.O.	n/a (blank plate)	P165984	n/a
25 psi / 172.5 kPa	P171143	B DC 2-wire.	NOTE: PSI is marked on the face of the visual indicators.		
25 psi / 172.5 kPa	P173944	C AC/DC 3-wire.			
50 psi / 345 kPa	P165194	A Single post DC. N.O.			
50 psi / 345 kPa	P167455	A Single post DC. N.C.			
50 psi / 345 kPa	P171087	B DC 2-wire.			
50 psi / 345 kPa	P170926	E DC 2-wire.			
50 psi / 345 kPa	P173893	F DC 3-wire.			
50 psi / 345 kPa	P174396	C AC/DC 3-wire.			

### Indicator Notes

- <sup>1</sup> All electric models have a maximum operating temperature of 250°F / 121°C.
- <sup>2</sup> All non-electric models have a maximum operating temperature of 180°F / 82°C.
- <sup>3</sup> Complete details on all service indicators on pages 236-238.





HMK05/25

Max Flow: 50 gpm (189 lpm)/100 gpm (378 lpm)



## HMK05/25 DURAMAX® Spin-On Filters

**Working Pressures to:** 350 *psi*  
2413 kPa  
24.1 bar

**Rated Static Burst to:** 800 *psi*  
5520 kPa  
55.2 bar

Flow Range to:	HMK05	HMK25
	50 <i>gpm</i> 189 <i>lpm</i>	100 <i>gpm</i> 378 <i>lpm</i>



### Features

HMK05 (single) and HMK25 (double) Duramax spin-on filters are perfect for high-flow applications, featuring a heavy-duty steel body and diecast top plate for added strength. A special head-to-canister O-Ring seal prevents leakage. Buna-N® seals are standard. Viton® seals made of fluorocarbon are available. Since both HMK05 and HMK25 models use the same replacement filters, they make a great team within your application. Both filters feature identical pressure ratings, but the HMK25 double filter head means double flow capability, with two filters to hold more contaminant. So there's no need to inventory two different part numbers for replacement filters.

Take advantage of Donaldson's mix and match system of in-stock heads, housings and media choices – so you can get exactly what you need. Media options include wire mesh and Donaldson's exclusive Synteq™ synthetic media designed especially for liquid filtration.

Viton® and Buna-N® are registered trademarks of E. I. DuPont de Nemours and Company.

### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

### Porting Size Options

- | HMK05           | HMK25                              |
|-----------------|------------------------------------|
| • 1¼" NPT       | • 1½" NPT                          |
| • SAE-20 O-ring | • SAE-24 O-ring                    |
|                 | • 1½" SAE 4-Bolt<br>Flange Code 61 |

### Assembly Weight

- 7.5 lbs / 3.4 kg (single)
- 16 lbs / 7.3 kg (double)

### Replacement Filter Lengths

- 7.6" / 193mm
- 11.63" / 295.4mm
- 14.2" / 361mm

### Standard Bypass Ratings

- 25 *psid* / 1.72 *bar* or No Bypass

### Operating Temperatures

- -20°F to 250°F / -29°C to 121°C (synthetic)
- -20°F to 225°F / -29°C to 107°C (cellulose)
- -20°F to 250°F / -29°C to 121°C (wire mesh)

### Housing Fatigue Strength Ratings\*

- 100,000 Cycles: 0-350 *psi* / 0-2413 kPa / 24.1 bar
- 300,000 Cycles: 0-300 *psi* / 0-2068 kPa / 20.7 bar
- 1,000,000 Cycles: 0-250 *psi* / 0-1734 kPa / 17.3 bar

\*Per T3.10.17 NFPA

### Filter Collapse Ratings

- 200 *psi* / 13.8 *bar*

### Filter Head Construction

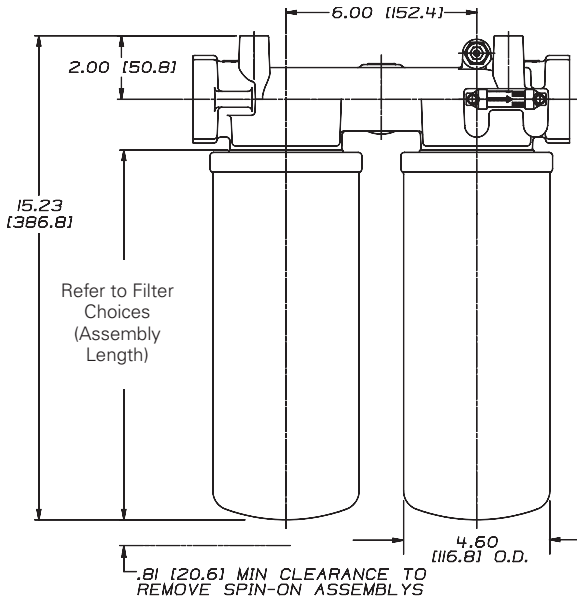
- Standard Head Cast Aluminum
- Ductile Iron Available in HMK25

**HMK05/25 Specification Illustrations**

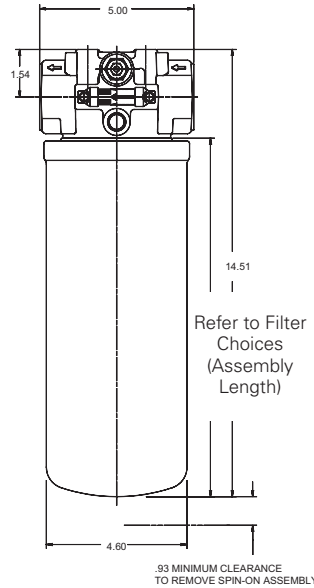
All dimensions are shown in inches [millimeters].

**Assembly - Side Views**

**HMK25**



**HMK05**

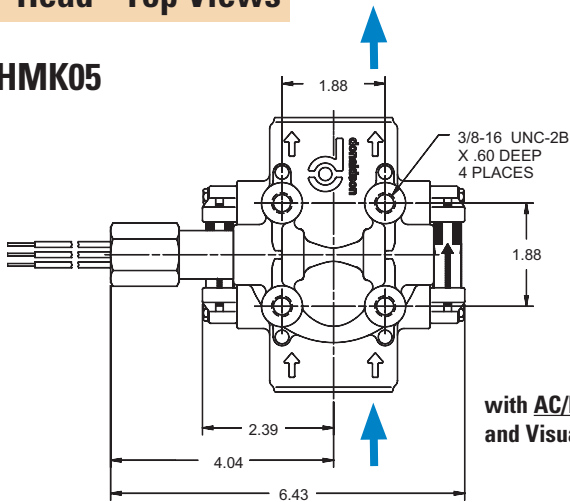


**Applications:**

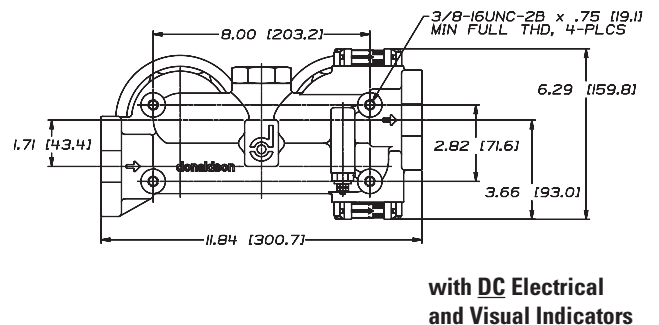
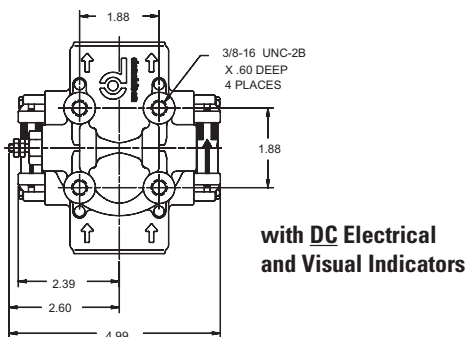
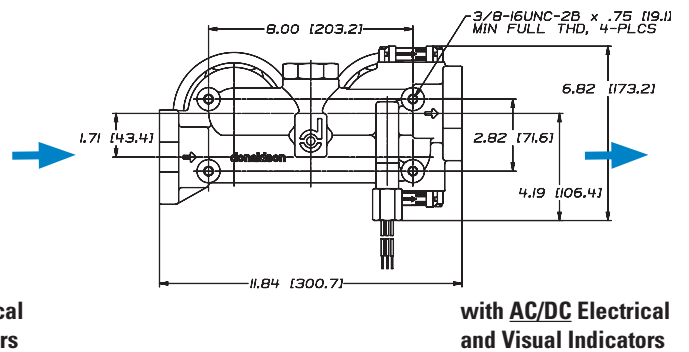
- Case Drains
- Fluid Conditioning
- Power Transmissions
- Return-Line & Side Loop Systems
- Hydrostatic Charge Pumps
- Lube Oil Systems
- Cooling Circuits
- Fuel Transfer

**Head - Top Views**

**HMK05**



**HMK25**





# HMK05/25

Max Flow: 50 gpm (189 lpm)/100 gpm (378 lpm)



## HMK05/25 Components

### Filter Choices for HMK05 and HMK25

Media Number	Media Type	B <sub>x</sub> = 1000 Rating	Length (in./mm)	Part No.
No. ½	Synteq™	<4 µm	14.2/361	P564468
No. 1	Synteq	5 µm	11.6/294	P170906
			11.6/294	P171273; Viton®, Epoxy
No. 2	Synteq	9 µm	11.6/294	P165675
			11.6/294	P171274; Viton, Epoxy
			14.2/361	P179763
			11.6/294	P165659
No. 2½	Synteq	10 µm	11.6/294	P176567
No. 3	Synteq	10 µm	14.2/361	P170949
No. 4	Synteq	10 µm	7.6/193	P176207
			11.6/294	P165659
			11.6/294	P171275; Viton, Epoxy
			11.6/294	P165569
No. 9	Synteq	23 µm	7.6/193	P176208
			11.6/294	P165569
			11.6/294	P171276; Viton, Epoxy
			14.2/361	P173789
No. 20	Synteq	>50 µm	11.6/294	P165672
			14.2/361	P170546
No. 149	Wiremesh	150 µm nominal	11.6/294	P173943
			11.6/294	P179075
	Water Removal	N/A	11.6/294	P179075

#### Filter Notes

- Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.
- Thread size is 1 3/4"-12 UNF-2B
- <sup>1</sup> Filters with seals made of Buna-N<sup>®</sup> are appropriate for most applications involving petroleum oil. Filters with seals made of Viton<sup>®</sup> (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F. Donaldson offers both types, as shown in the table above. Filters with seals made of Buna-N<sup>®</sup> are appropriate for most applications involving petroleum oil. Viton<sup>®</sup> and Buna-N<sup>®</sup> are registered trademarks of E. I. DuPont de Nemours and Company.

## In-Oil Service Indicator Options

### Electric Models<sup>1</sup>

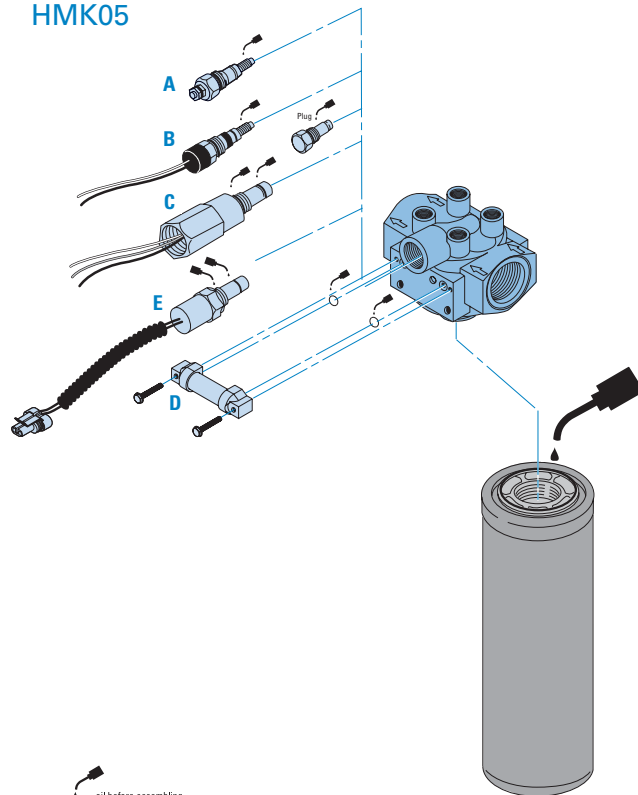
Use with Bypass Valve Pressure of:	Indicator Part No.	Style <sup>3</sup>	Description
5 psi / 34.5 kPa	P163642	A	Single post DC
15 psi / 103 kPa	P163601	A	Single post DC.
25 psi / 172.5 kPa	P163839	A	Single post DC. N.C.
25 psi / 172.5 kPa	P162400	A	Single post DC. N.O.
25 psi / 172.5 kPa	P171143	B	DC 2-wire
25 psi / 172.5 kPa	P173944	C	AC/DC 3-wire
50 psi / 345 kPa	P165194	A	Single post DC. N.O.
50 psi / 345 kPa	P167455	A	Single post DC. N.C
50 psi / 345 kPa	P171087	B	DC 2-wire
50 psi / 345 kPa	P170926	E	DC 2-wire
50 psi / 345 kPa	P173893	F	DC 3-wire
50 psi / 345 kPa	P174396	C	AC/DC 3-wire

### Visual Models (Non-Electric)<sup>2</sup>

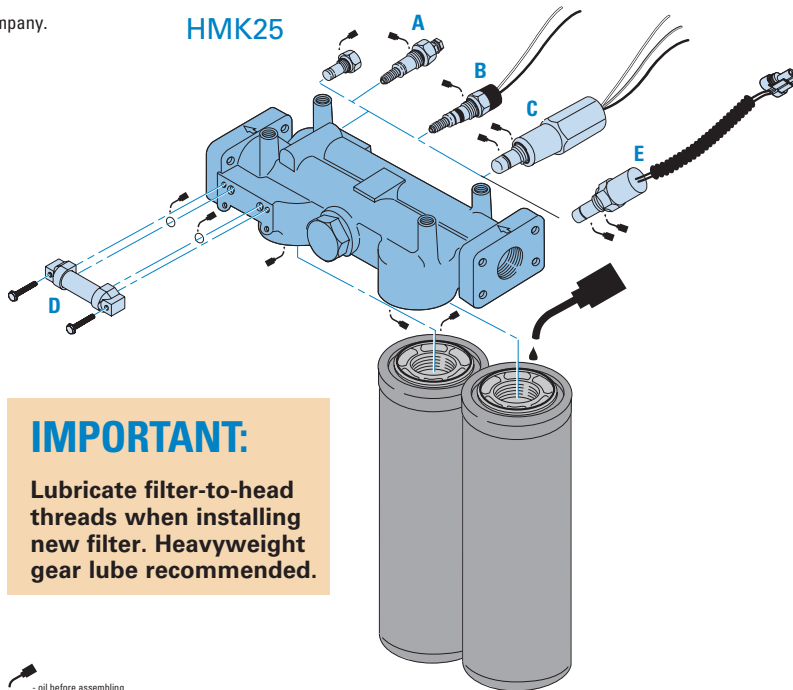
Use with Bypass Valve Pressure of:	Indicator Part No.	Style <sup>3</sup>
15 psi / 103 kPa	P162642	D
25 psi / 172.5 kPa	P162696	D
50 psi / 345 kPa	P167580	D
n/a	P165984	(blank plate)

## Service Parts

### HMK05



### HMK25



## IMPORTANT:

Lubricate filter-to-head threads when installing new filter. Heavyweight gear lube recommended.



#### Indicator Notes

- <sup>1</sup> All electric models have a maximum operating temperature of 250°F/ 114°C.
- <sup>2</sup> All non-electric models have a maximum operating temperature of 180°F/ 82°C.
- <sup>3</sup> Indicator styles are illustrated above and detailed on pages 236-238.

### Head Choices for HMK05 (single)

Port Size	Bypass Rating	Standard Indicator Style & Location <sup>1</sup>	Indicator Options <sup>2</sup>	Part No.
1¼" NPT	25 psi / 172 KPa	D (Visual), Both Sides (25 psi)	A, B, C, E, F	P167294
	25 psi / 172 kPa	A (Electrical) (25 psi)	A, B, C, E, F	P167621
1¼" NPT	25 psi / 172 KPa	D (Visual), Left Side (25 psi)	D	P167622
SAE-20	25 psi / 172 KPa	D (Visual), Both Sides (25 psi)	A, B, C, E, F	P165973
O-Ring	25 psi / 172 KPa	None	None	P167619
	50 psi / 345 KPa	D (Visual), Left Side, Blank Plate Right Side	A, B, C, E, F	P561885
	No Bypass	D (Visual), Both Sides (25 psi)	A, B, C, E, F	P166663
	No Bypass	D (Visual), Right Side (25 psi)	D	P564486
	No Bypass	D (Visual), Both Sides (50 psi)	A, B, C, E, F	P564858



Single Head

### Head Choices for HMK25 (double)

Port Size	Bypass Rating	Indicator Style & Location <sup>1</sup>	Indicator Options <sup>2</sup>	Part No.
1½" NPT	25 psi / 172 KPa	D (Visual), Left side only	A,B,C,E,F	P169985
1½" SAE 4-Bolt	25 psi / 172 kPa	D (Visual), Both sides	A,B,C,E,F	P167296
Flange	No Bypass	D (Visual), Both Sides	A,B,C,E,F	P169984
1½" SAE O-Ring	25 psi / 172 kPa	D (Visual), Both sides	A,B,C,E,F	P167297
1½" SAE 4-Bolt Flange	50 psi / 345 kPa	Visual RH	A,B,C,E,F	P560855*



Dual Head

### IMPORTANT:

The filter head snout/post must be lubricated before spinning on a new filter to prevent thread damage.

\* Ductile Iron Construction

### Head Choice for HMK05 (3rd port return)

Port Size	Bypass Rating	Indicator Style & Location <sup>1</sup>	Indicator Options <sup>2</sup>	Part No.
1¼" SAE 4-Bolt Flange (3rd port: 1" SAE 4-Bolt)	50 psi / 345 kPa	None	A,B,C,E,F	P561924



3-Port Head

The **P561924** head is designed with a 50 psi / 3.45 bar third port bypass valve that diverts all bypass flow back to the reservoir, instead of going straight through the head and into the system as it does in 2-ported heads. Unfiltered fluid is NOT allowed into the system in the case of plugged filters. Designed primarily for charge pump applications.

### Head Notes

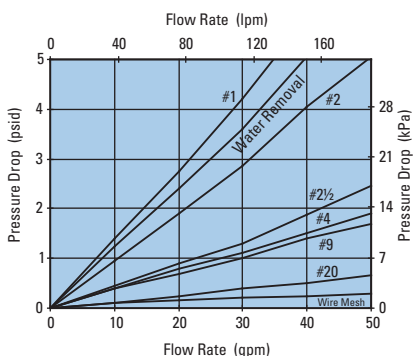
<sup>1</sup> Donaldson uses the inlet port as the reference point. "Left side," for instance, means the indicator mounts on the Left side when you face the inlet port.

<sup>2</sup> May be purchased separately.

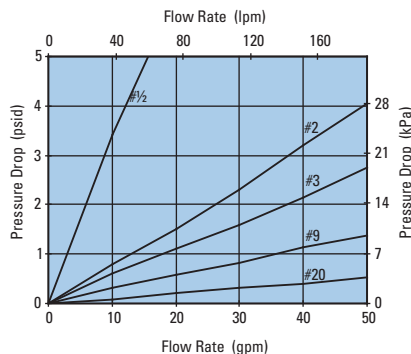
<sup>3</sup> Complete details on all service indicators on pages 236-238.

### Performance Data

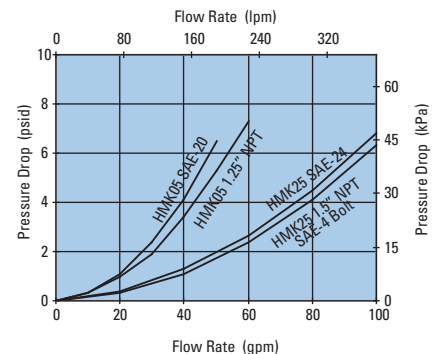
HMK05 Filter Only (Synthetic, 11.6"/294mm)



HMK05 Filter Only (Synthetic, 14.2"/361mm)



HMK05 Head Only





HNK04/05

Max Flow: 35 gpm (130 lpm)/50 gpm (189 lpm)



## HNK04/05 DURAMAX<sup>®</sup> Spin-On Filters

**Working Pressures to:** 500 *psi*  
3450 kPa  
34.5 bar

**Rated Static Burst to:** 1000 *psi*  
6895 kPa  
69 bar

Flow Range to:	HNK04	HNK05
	35 <i>gpm</i>	50 <i>gpm</i>
	130 <i>lpm</i>	189 <i>lpm</i>



### Features

HNK Duramax<sup>®</sup> filters utilize a RadialSeal<sup>™</sup> design – making servicing easier and providing a more reliable seal without having to torque to specification. A unique head-to-filter interface accepts either a spin-on or aluminum housing with cartridge filter.

- Applications include hydrostatic charge side filtration, pilot circuits, powershift transmissions and mid-pressure kidney loop circuits.
- Utilizes Synteq<sup>™</sup> filter media for high filtration efficiency and higher dust-holding capacity.
- Improved performance including higher burst, greater fatigue strength and longer filter life.
- Multi-purpose design – one head assembly fits both spin-on and cartridge filter.

#### Beta Rating

- Performance to  $\beta_{9(c)}=1000$

#### Porting Size Options

- HNK04: SAE-12, -16 O-ring
- HNK05: SAE-20 O-ring

#### Assembly Weight

- HNK04 spin-on: 5.3 lbs / 2.4 kg
- HNK05 spin-on: 7.5 lbs / 3.4 kg

#### Replacement Spin-On Lengths

- 04 short: 5.97" / 151.7 mm
- 04 long: 9.44" / 239.8 mm
- 05 short: 11.63" / 295.4 mm
- 05 long: 14.24" / 361.7 mm

#### Replacement Cartridge Length

- 05 short: 10.54" / 267.8 mm

#### Standard Bypass Ratings

- No Bypass
- 50 psi / 345 kPa / 3.5 bar

#### Operating Temperatures

- -20° to 250°F (-29° to 121°C)

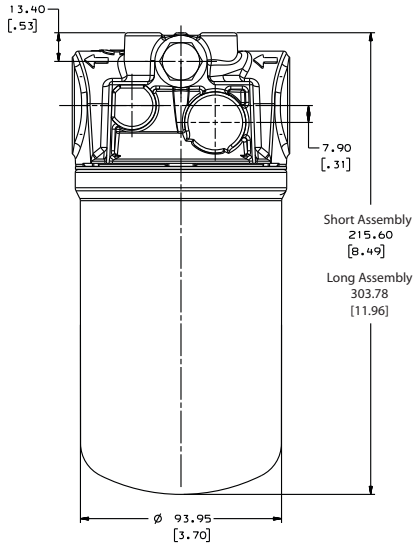
#### Filter Collapse Ratings

- 235 psi / 1621 kPa / 16.2 bar

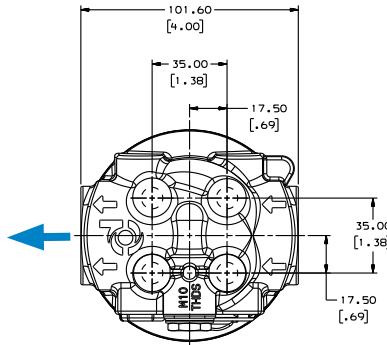
**HNK04/05 Specification Illustrations**

*All dimensions are shown in inches [millimeters].*

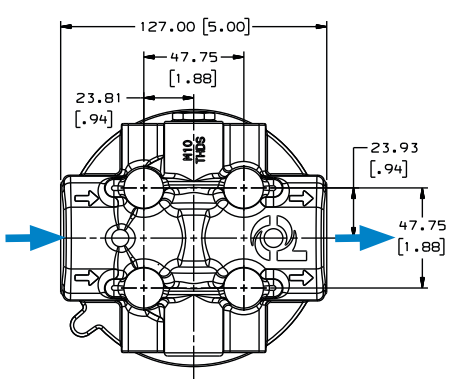
**HNK04 Spin-on Assembly - Side View**



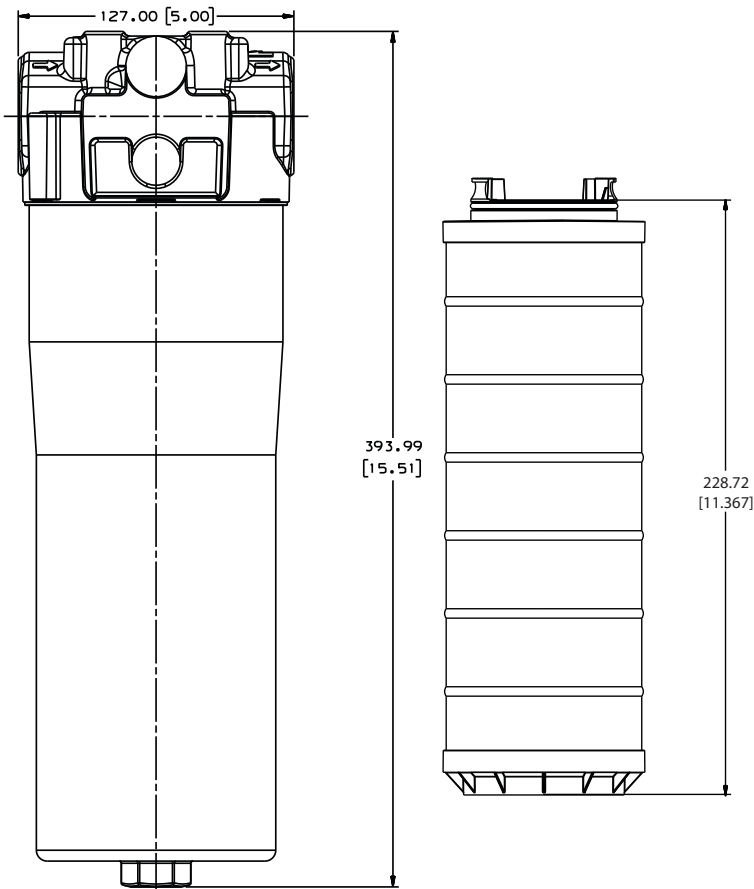
**HNK04 Head - Top View**



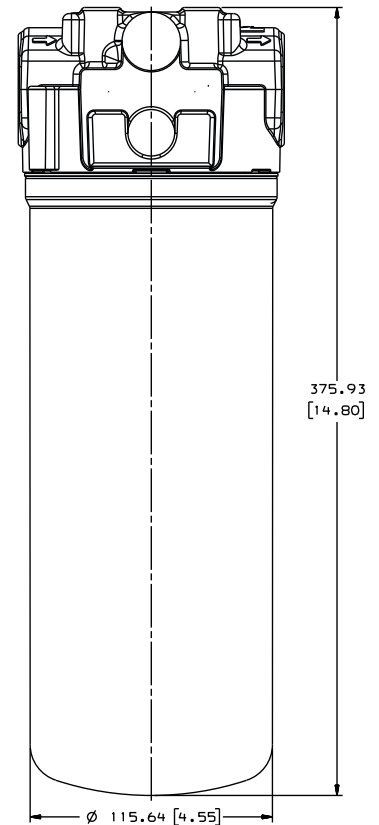
**HNK05 Head - Top View**



**HNK05 Housing Assembly & Cartridge - Side View**



**HNK05 Spin-on Assembly - Side View**







# HNK04/05

Max Flow: 35 gpm (130 lpm)/50 gpm (189 lpm)



## HNK04/05 Components Head Choices for HNK04

Port Size	Bypass Rating	Part Number	Indicators	Style	Mounting Threads
SAE-12	50 psi / 3.5 bar	P568856	none	optional elect.	3/8-16 UNC
SAE-12	No bypass	P568857	none	optional elect.	3/8-16 UNC
SAE-16	50 psi / 3.5 bar	P568858	none	optional elect.	3/8-16 UNC
SAE-16	No bypass	P568859	none	optional elect.	3/8-16 UNC

## Head Choices for HNK05

Port Size	Bypass Rating	Part Number	Indicators	Style	Mounting Threads
SAE-20	50 psi / 3.5 bar	P568860	none	optional elect.	3/8-16 UNC
SAE-20	No bypass	P568861	none	optional elect.	3/8-16 UNC

## Indicator Choices

Set Point/ Type	Part No.	Description
50 psi / 345 kPa	P165194	Electric Single post DC

## HNK04/05 Spin-on Filter Choices

Media Number	B <sub>10</sub> = 1000 Rating	Length (in./mm)	Part No.	Comments
#1	5 µm	5.97/151.7	P569203	HNK04
#1	5 µm	9.44/239.8	P569204	HNK04
#3	10 µm	5.97/151.7	P569205	HNK04
#3	10 µm	9.44/239.8	P569206	HNK04
#1	5 µm	11.63/295.4	P569209	HNK05
#1	5 µm	14.24/361.7	P569210	HNK05
#3	10 µm	11.63/295.4	P569211	HNK05
#3	10 µm	14.24/361.7	P569212	HNK05

## HNK05 Housing

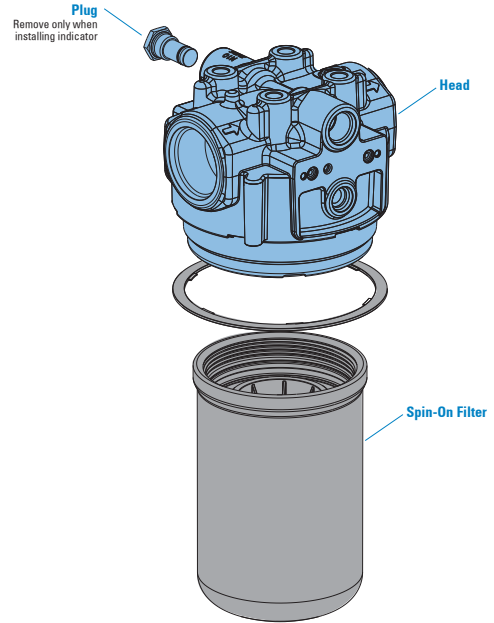
Length (in./mm)	Part No.	Comments
10.54/267.8	P568848	HNK05 includes 2 seals (P567364)

## HNK05 Cartridge Filter Choices

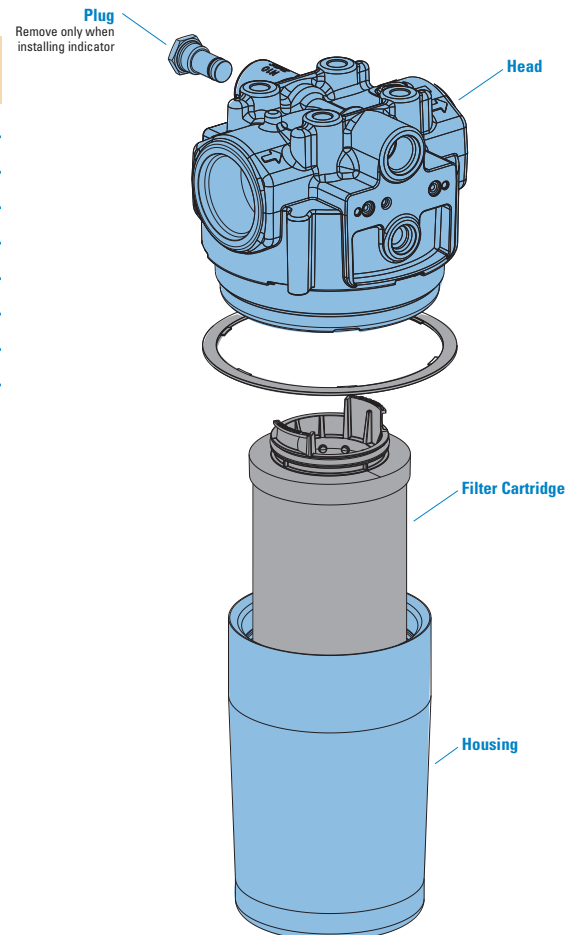
Media Number	B <sub>10</sub> (c) = 1000 Rating	Length (in./mm)	Part No.	Comments
#2	9 µm	10.54/267.8	P568850	HNK05
#3	10 µm	10.54/267.8	P568852	HNK05

## Service Parts

### HNK04/05 Spin-On



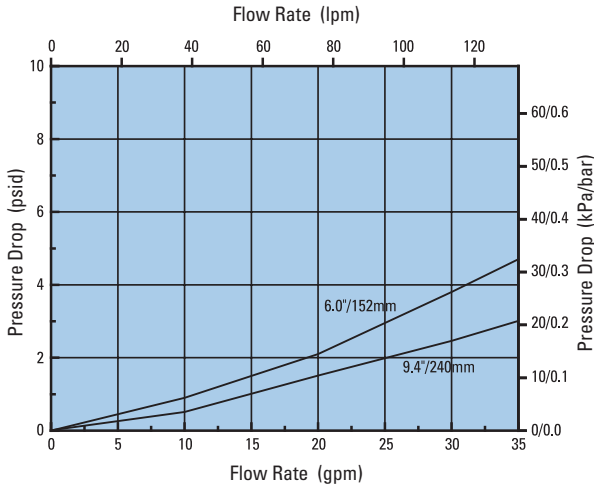
### HNK05 Housing & Cartridge



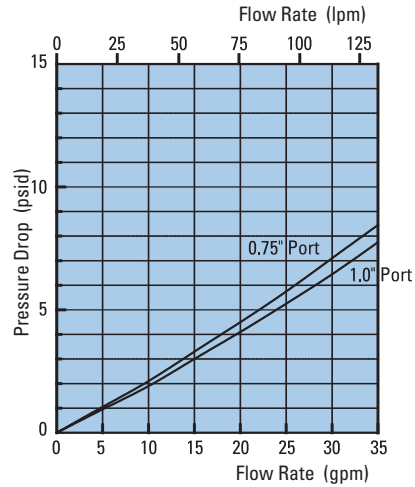


## Performance Data

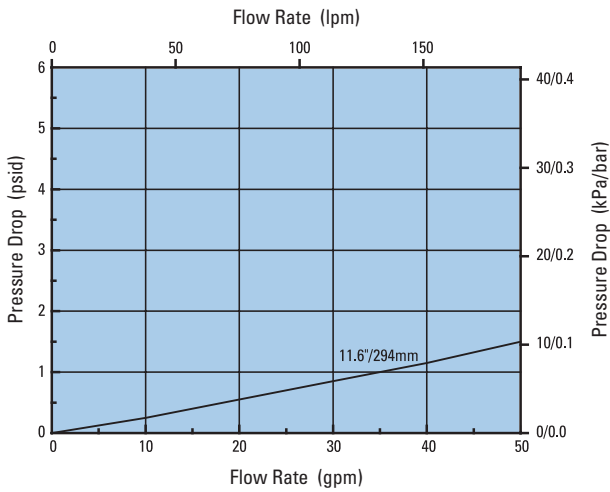
**HNK04 Spin-On Filters Only**



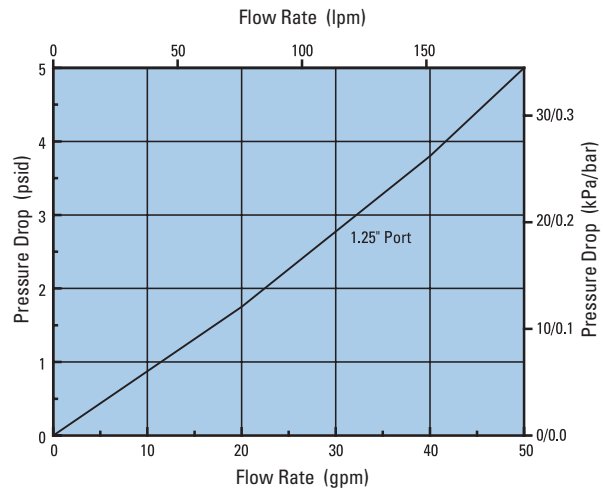
**HNK04 Head Only**



**HNK05 Spin-On Filter Only**



**HNK05 Head Only**



**Notes**

All flow measurements were made with 150 SSU hydraulic oil at 100°F (37.7°C)



W061

Max Flow: 100 gpm (379 lpm)

## W061 In-Line Cartridge Filters

**Working Pressures to:** 600 *psi*  
4137 kPa  
41 bar

**Rated Static Burst to:** 1500 *psi*  
10,342 kPa  
100 bar

**Fatigue Pressure Rating:** 300 *psi*  
21 bar

**Flow Range to:** 100 *gpm*  
379 *lpm*



### Features

The W061 filter assembly contains the popular HF3 filter. Quick filter change outs are accomplished with the use of our easily serviceable ring assembly. Donaldson DT high-performance 4-layer media is offered in a variety of designs. Five different media grades are offered. Donaldson filters core collapse options range from 150/10 bar to 3,000/210 bar psi. The differential pressure indicator line is designed to work with a wide assortment of bypass valves. Thermal lockout and surge control are two key features available in the differential indicators.

- Assembly length code 2 conforms to HF3 specifications
- Wide range of indicator options
- Three housing length options for design flexibility
- Head material: cast iron
- Housing material: steel
- Bleed plug in head

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-12, -16, -20 O-ring

#### Assembly Weight

- 4": 7.9 lbs / 3.6 kg
- 8": 8.9 lbs / 4.0 kg
- 13": 10.2 lbs / 4.6 kg

#### Replacement Filter Lengths

- 4.59" / 116.7 mm
- 8.22" / 208.8 mm
- 12.91" / 327.8 mm

#### Standard Bypass Ratings

- No Bypass
- 50 psi / 345 kPa / 3.5 bar

#### Operating Temperatures

- -20° to 250°F (-29° to 121°C)

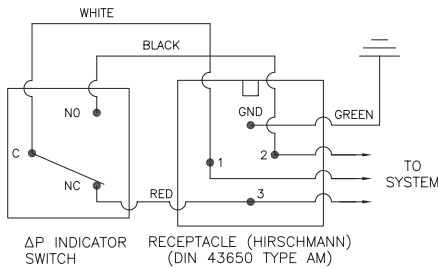
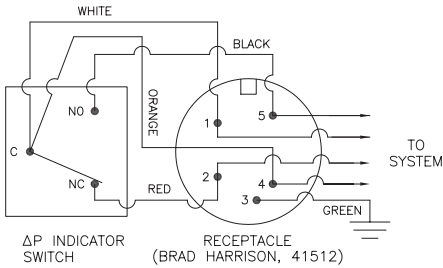
#### Filter Collapse Ratings

- 150 psi / 1034 kPa / 10.3 bar (standard)

**W061 Specification Illustrations**

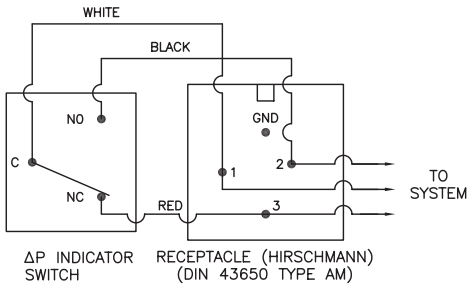
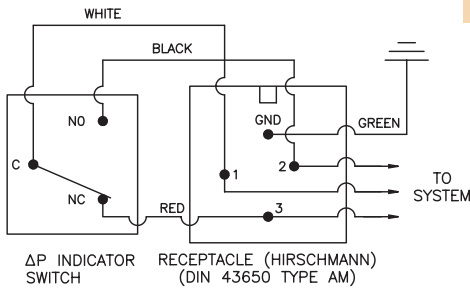
All dimensions are shown in millimeters [inches].

**Indicator Switch  
Schematic Wiring Diagram  
Aluminum Electrical Housings**



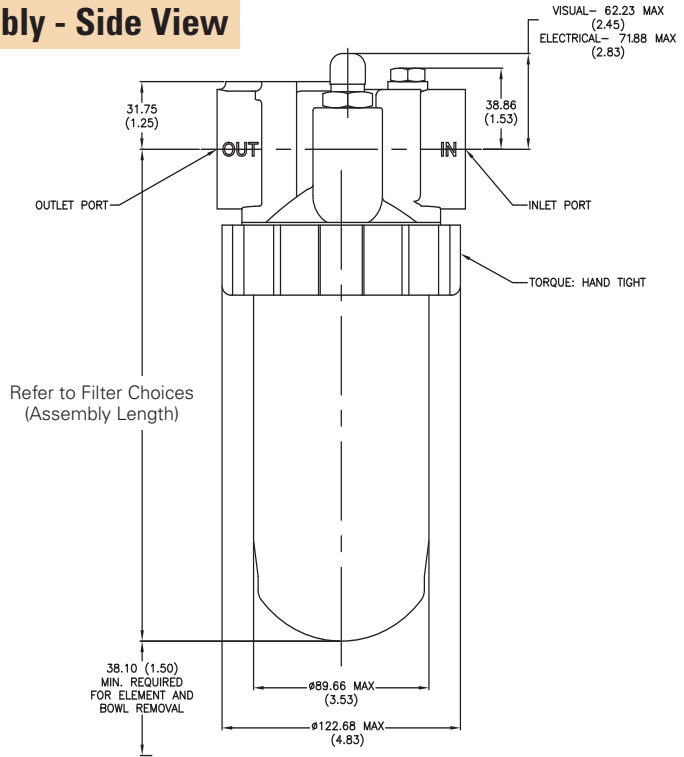
Note: The female plug (connector) is to be furnished by customer.

**Plastic Electrical Housings**

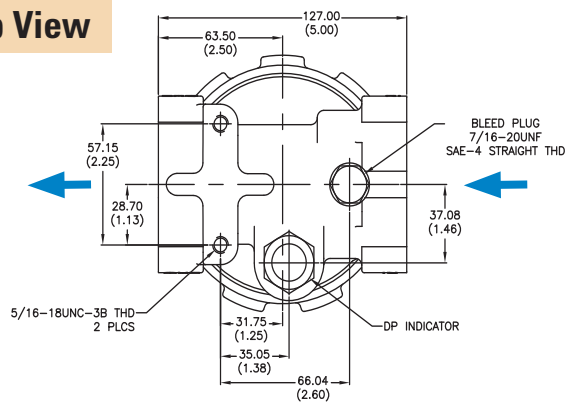


Note: The female plug (connector) is to be furnished by customer.

**Assembly - Side View**



**Head - Top View**



**Differential Indicators:**

Indicators are designed to actuate at approximately 80% bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

**Surge Control:**

This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:**

The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.



W061

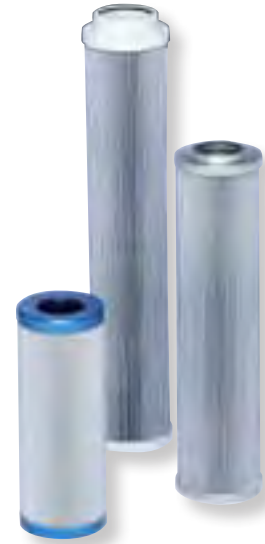
Max Flow: 100 gpm (379 lpm)



## W061 Components

### High-Performance DT Filter Choices

Media Number	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 μm	<4 μm	4/116.7	P566204	DT-9600-4-2UM
5 μm	5 μm	4/116.7	P566205	DT-9600-4-5UM
8 μm	8 μm	4/116.7	P566206	DT-9600-4-8UM
14 μm	14 μm	4/116.7	P566207	DT-9600-4-14UM
25 μm	25 μm	4/116.7	P566208	DT-9600-4-25UM
5 μm	5 μm	4/116	P566364	DT-9601-4-5UM
14 μm	14 μm	4/116	P566365	DT-9601-4-14UM
2 μm	<4 μm	8/208.8	P566209	DT-9600-8-2UM
5 μm	5 μm	8/208.8	P566210	DT-9600-8-5UM
8 μm	8 μm	8/208.8	P566211	DT-9600-8-8UM
14 μm	14 μm	8/208.8	P566212	DT-9600-8-14UM
25 μm	25 μm	8/208.8	P566213	DT-9600-8-25UM
5 μm	5 μm	8/208	P566366	DT-9601-8-5UM
14 μm	14 μm	8/208	P566367	DT-9601-8-14UM
2 μm	<4 μm	13/327	P567875	DX2-9600-8-2UM
5 μm	5 μm	8/209	P565122	DX2-9600-8-5UM
8 μm	8 μm	8/209	P565123	DX2-9600-8-8UM
14 μm	14 μm	8/209	P564936	DX2-9600-8-14UM
2 μm	<4 μm	13/327.8	P566214	DT-9600-13-2UM
5 μm	5 μm	13/327.8	P566215	DT-9600-13-5UM
8 μm	8 μm	13/327.8	P566216	DT-9600-13-8UM
14 μm	14 μm	13/327.8	P566217	DT-9600-13-14UM
25 μm	25 μm	13/327.8	P566218	DT-9600-13-25UM
5 μm	5 μm	13/326.3	P566368	DT-9601-13-5UM
14 μm	14 μm	13/326.3	P566369	DT-9601-13-14UM
2 μm	<4 μm	13/327	P567876	DX2-9600-13-2UM
5 μm	5 μm	13/327	P565188	DX2-9600-13-5UM
8 μm	8 μm	13/327	P565189	DX2-9600-13-8UM
14 μm	14 μm	13/327	P565187	DX2-9600-13-14UM
WA	B>30 <sub>(c)</sub> = 200	8/209	P569528	Absorbs 130 ml water @ 25 psid
WA	B>30 <sub>(c)</sub> = 200	13/327	P569529	Absorbs 220 ml water @ 25 psid



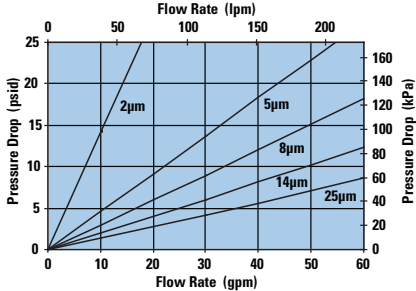
#### Filter Notes:

- All Donaldson DT and DX2 filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT and DX2 filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- DT high collapse designs are potted into machined aluminum end caps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT and DX2 filters.
- DX2 filters utilize nylon mesh for pleat support.

## Performance Data

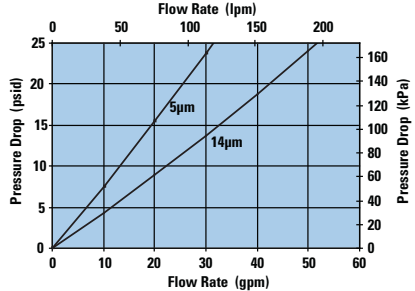
W061 4" DT Filter Only

DT-9600-4, 4"/102mm

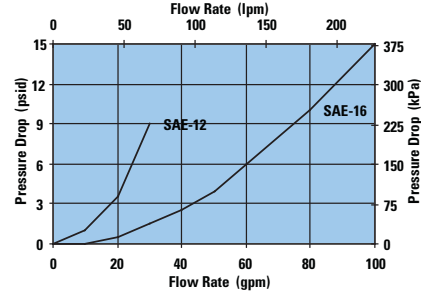


W061 4" DT Filter Only

DT-9601-4, 4"/102mm

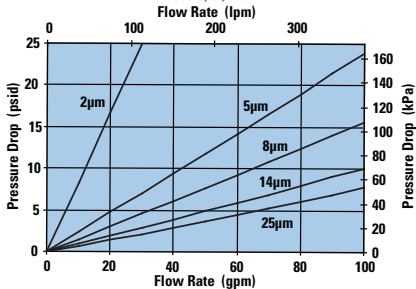


W061 Housing Only



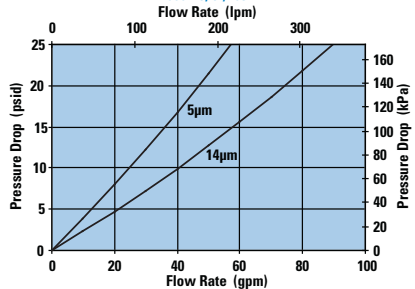
W061 8" DT Filter Only

DT-9600-8, 8"/203mm



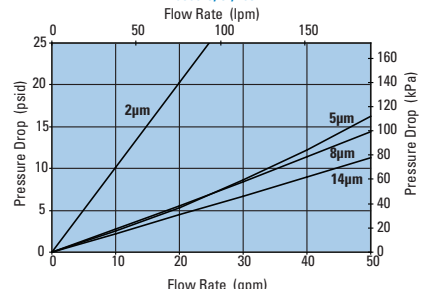
W061 8" DT Filter Only

DT-9601-8, 8"/203mm



W061 8" DX2 Filter Only

DX2-9600-8, 8"/203mm





# Housing Ordering Guide

Filter Assembly	W061 TABLE 1	1 TABLE 2	A TABLE 3	4 TABLE 4	L N TABLE 5	B TABLE 6	2 TABLE 7
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Service Filter: Filters ordered separately. See previous page for filter options.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W061	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psid for housing without bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
A	SAE-12 O-ring
B	SAE-16 O-ring
C	SAE-20 O-ring

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
3	25 psid / 172 kPa
4	50 psid / 345 kPa

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
C	Electrical/visual 15 psid
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
F	Electrical/visual 15 psid w/TL
G	Electrical/visual 35 psid w/TL
H	Electrical/visual 15 psid w/12" 3-wire flying lead
J	ΔP indicator plug
K	Visual indicator 15 psid
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3-wire flying lead
O	Visual indicator 100 psid
P	Visual indicator 100 psid w/TL and surge
Q	Electrical switch 15 psid
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3-wire flying lead
T	Electrical switch 100 psid
W	Electrical/visual 100 psid w/TL
X	Electrical/visual 15 psid w/TL and surge
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

Brad Harrison® is a registered trademark of Woodhead Industries, Inc. Hirschmann® is a registered trademark of Richard Hirschmann of America Inc. Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Company.

**LEAD TIME NOTE:**

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
1 (7.43")	4.0"
2 (11.06")	8.0"
4 (15.82")	13.0"

**METRIC PORTING AVAILABLE**

Change W061 to G061  
Porting code B becomes 1" ISO 228 BSPP  
Porting code C becomes 1-1/4" ISO 228 BSPP

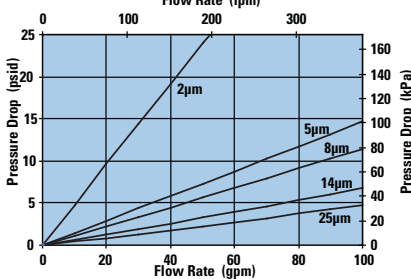
**Media Ratings**

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

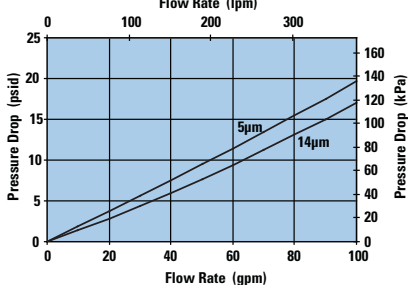
WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2μm
03	DT 5μm
05	DT 8μm
10	DT 14μm
20	DT 25μm

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

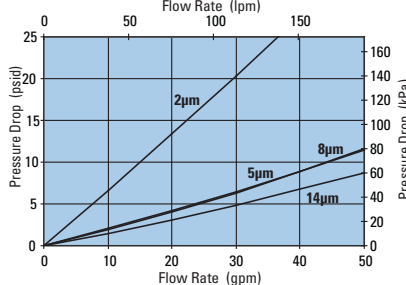
**W061 13" DT Filter Only**  
DT-9600-13, 13"/330mm



**W061 13" DT Filter Only**  
DT-9601-13, 13"/330mm



**W061 13" DX2 Filter Only**  
DX2-9600-13, 13"/330mm







HDK06

Max Flow: 150 gpm (568 lpm)



## HDK06 In-Line/Tank Mount Filters

**Working Pressures to:** 350 *psi*  
2413 kPa  
24.1 bar

**Rated Static Burst to:** 500 *psi*  
3448 kPa  
34.5 bar

**Flow Ranges to:** 150 *gpm*  
568 *lpm*



*In-line model shown*

### Features

HDK06 low pressure filters come in two styles: In-line and tank mount. Both styles feature a die cast aluminum head and steel body for strength and durability; service is made easier with a single, center retention bolt on top of the head. Filter flow is inside to outside. Buna-N® seals are standard.

HDK06 assemblies come complete with our  $\beta_{10(c)}=1000$  rated Synteq™ filter cartridge. Other ratings are available, depending on your cleanliness requirements. HDK06 comes with an easy-to-read visual service indicator.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Option

- 2½" NPT

#### Assembly Weight

- 39.25 lbs / 18 kg

#### Replacement Filter Length

- 16" / 406mm

#### Standard Bypass Rating

- 25 *psi* / 172.5 kPa / 1.7 bar

#### Operating Temperatures

- -20°F to 250°F  
-29°C to 121°C

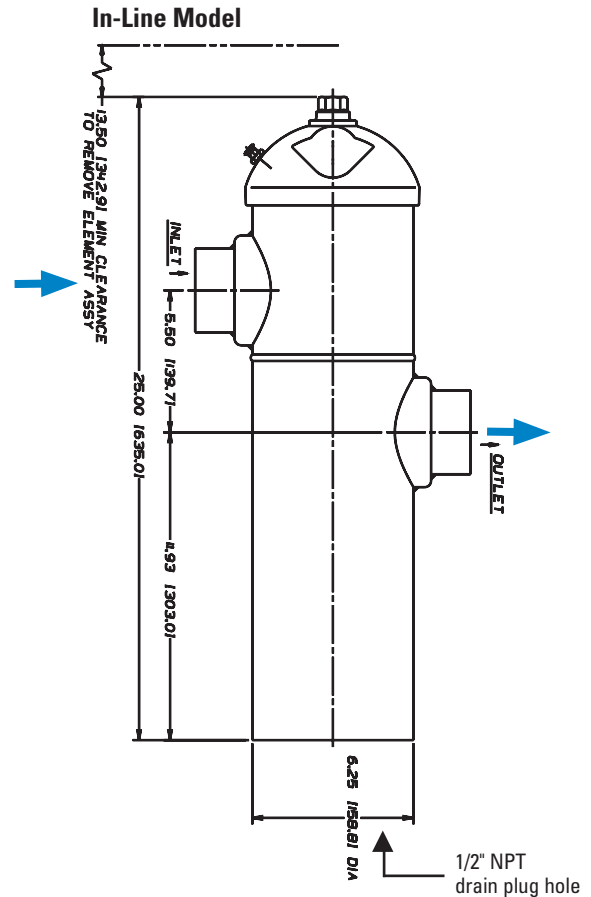
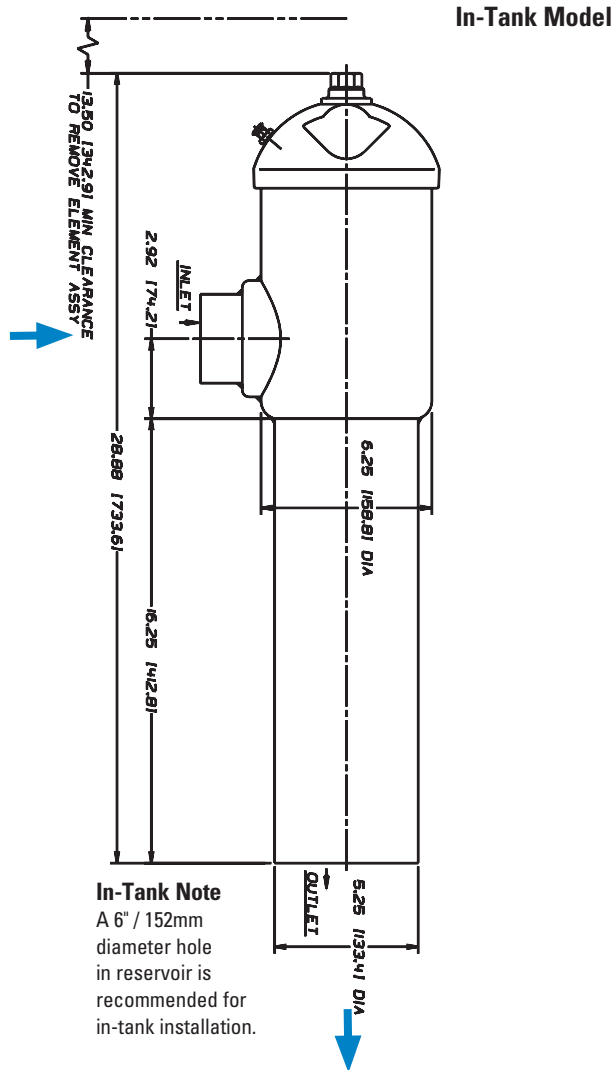
#### Filter Burst Ratings

- 100 *psid* / 690 kPa / 6.9 bar

**HDK06 Specification Illustrations**

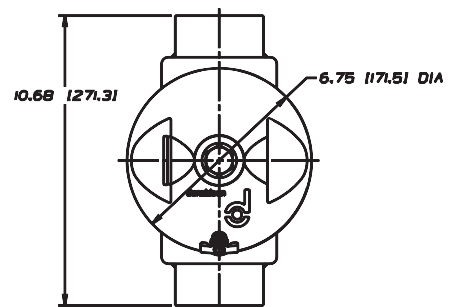
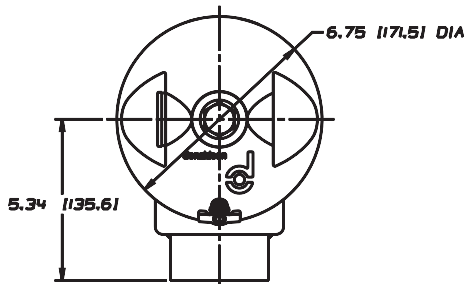
All dimensions are shown in inches [millimeters].

**Assembly - Side Views**



**Head - Top Views**

See page 116 for information on how to read the visual service indicators.





HDK06

Max Flow: 150 gpm (568 lpm)



## HDK06 Components Assembly Choices

Style	Part No.	Port Size	Bypass Rating	Indicator	Includes Filter Cartridge
In-Tank	K060173	2½" NPT	25 psi / 172.5 kPa	Visual	P176221
In-Line	K060160				

## Filter Choices

All HDK06 filter cartridges are 16"/406mm in length.

Media Number	Media Technology	B <sub>10</sub> = 1000 Rating	Part No.
No. ½	Synteq™	<4 µm	P161016
No. 2	Synteq	9 µm	P165628
No. 2½	Synteq	10 µm	P176221
No. 9	Synteq	23 µm	P164699
No. 16	Synteq	22 µm	P161571
No. 20	Synteq	>50 µm	P166597

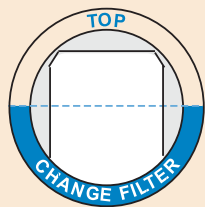
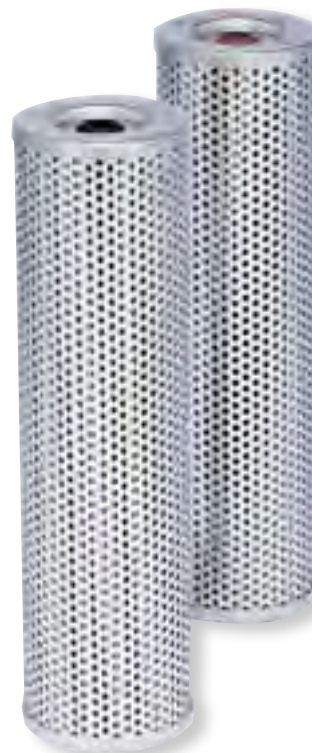
Media Number	Media Technology		Part No.
No. 149	Wiremesh	150 µm nominal	P160700

### Filter Notes

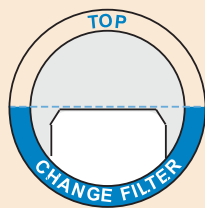
- Standard HDK06 replacement filters have Buna-N® seals, which are appropriate for most applications involving petroleum oil. Filters with seals made of fluorocarbon elastomer (such as Viton® and Fluorel®) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F.
- HDK06 filters are inside to outside reverse flow 4.39" (112mm) OD.
- Refer to the table in the Technical Reference Guide for fluid compatibility with our filter media.

Viton® is a registered trademarks of E. I. DuPont de Nemours and Company.

Fluorel® is a registered trademark of 3M Company.



Filter OK



Filter Needs Service

### How to Read the Visual Indicator

This simple device will tell you when the filter needs to be changed. Always check when the fluid is at operating temperature and the system is at normal operating flow.

If the top of the white panel is below the lower half of the window, the filter needs servicing.

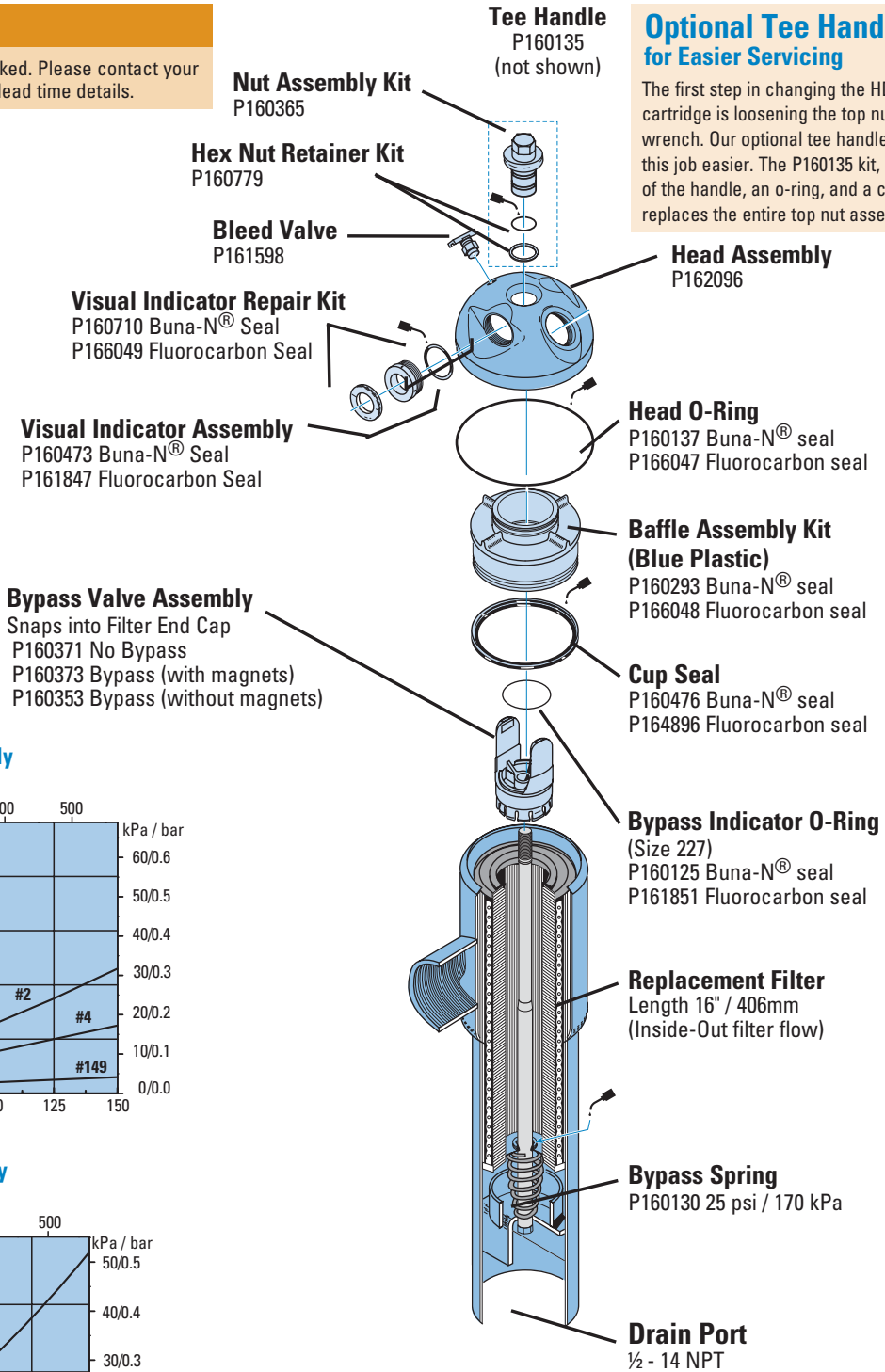
## HDK06 Service Parts

### SERVICE PARTS NOTE:

Some service parts may not be stocked. Please contact your Donaldson sales representative for lead time details.

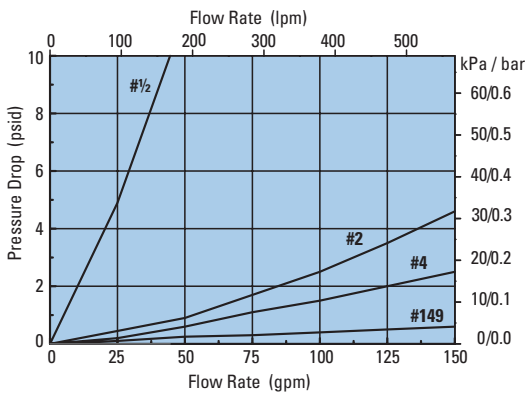
### Optional Tee Handle for Easier Servicing

The first step in changing the HDK06 cartridge is loosening the top nut with a wrench. Our optional tee handle makes this job easier. The P160135 kit, comprised of the handle, an o-ring, and a clip ring, replaces the entire top nut assembly.

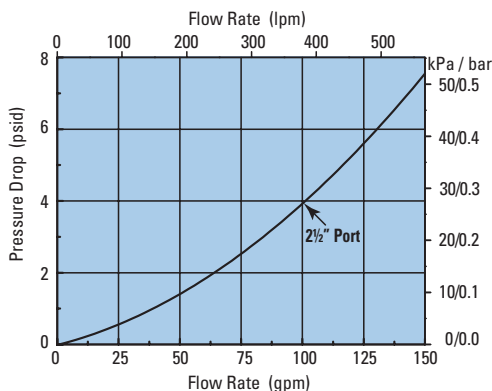


## Performance Data

**HDK06 Filters Only**



**HDK06 Head Only**



Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



W041

Max Flow: 300 gpm (1135 lpm)



## W041 In-Line Cartridge Filters

**Working Pressures to:** 500 *psi*  
34.5 bar

**Rated Static Burst to:** 1500 *psi*  
103 bar

**Flow Range to:** 300 *gpm*  
1135 *lpm*

### Features

The W041 high flow filter combines the best features of a base-mounted assembly; several inlet port options, top cover filter servicing for ease of maintenance and a wide selection of service indicators. The W041 all-aluminum head design and plated steel cylinder provides a strong, durable, and dependable unit. We offer standard features like deep pleat filters for higher dirt holding capacity and our standard Donaldson DT 4-layer media filter construction. This technology, combined with many other standard features, is ideal for today's applications in pulp and paper, power generation and steel mill applications. Five standard grades of media are offered. Thermal lockout and surge control are two key features available in the differential indicators.

- Large T-handle for fast servicing without tools
- Wide range of indicator options
- Two filter length options for design flexibility
- Base material: aluminum
- Cylinder material: steel
- Cover material: cast iron
- Two drain plugs in base
- Bleed/fill plug in cover



### Beta Rating (per ISO 16889)

- Performance to  $\beta_{4(c)}=1000$

### Porting Size Options

- SAE-24 O-ring
- 2" or 2½" SAE 4-Bolt Flange Code 61

### Housing Weight

- 16": 48.5 lbs / 22.0 kg
- 39": 86.2 lbs / 39.2 kg

### Replacement Filter Lengths

- 16.74" / 425.3 mm
- 38.62" / 980.9 mm

### Standard Bypass Rating

- No Bypass
- 50 *psi* / 345 kPa / 3.5 bar

### Operating Temperatures

- -20°F to 250°F / -29° to 121°C

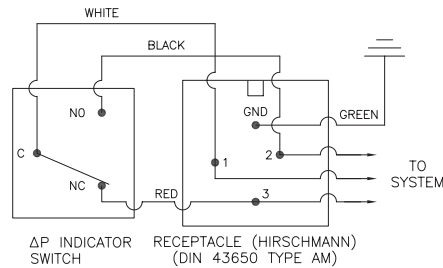
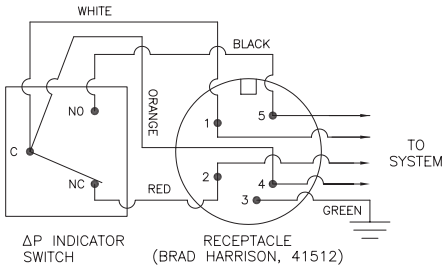
### Filter Collapse Pressure

- 150 *psid* / 1034 kPa / 10.3 bar (standard)

**W041 Specification Illustrations**

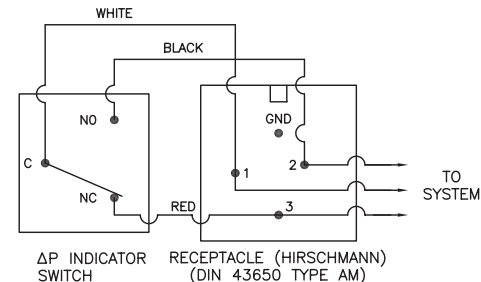
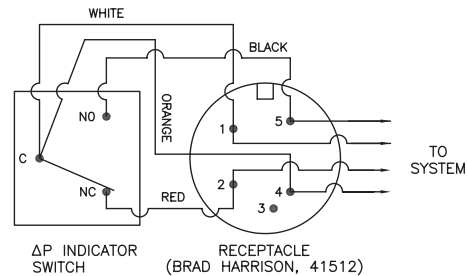
All dimensions are shown in millimeters [inches].

**Indicator Switch  
Schematic Wiring Diagram  
Aluminum Electrical Housings**



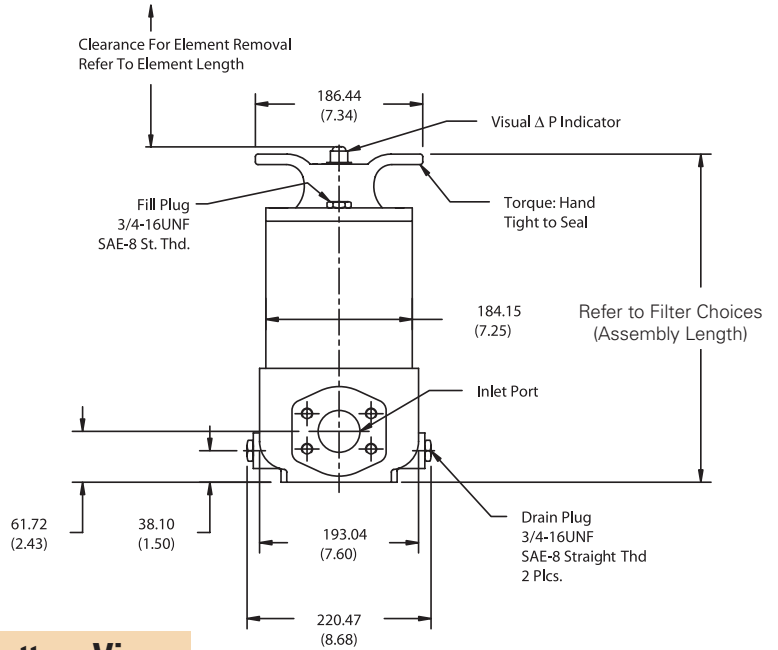
Note: The female plug (connector) is to be furnished by customer.

**Plastic Electrical Housings**

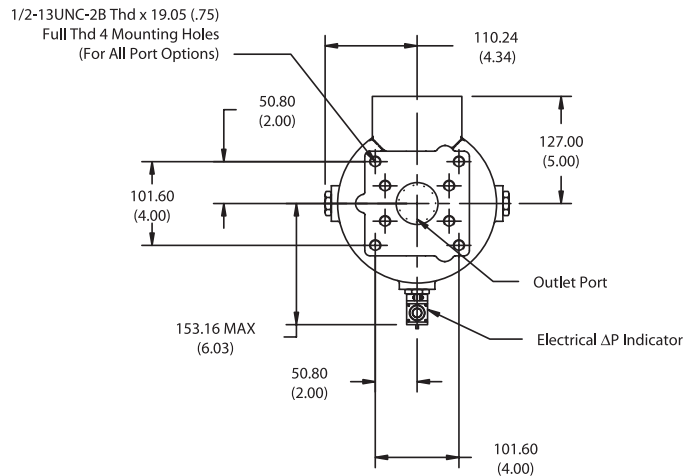


Note: The female plug (connector) is to be furnished by customer.

**Assembly - Side View**



**Head - Bottom View**



**Differential Indicators:**

Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

**Surge Control:**

This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:**

The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.





W041

Max Flow: 300 gpm (1135 lpm)



## W041 Components

### High-Performance DT Filter Choices

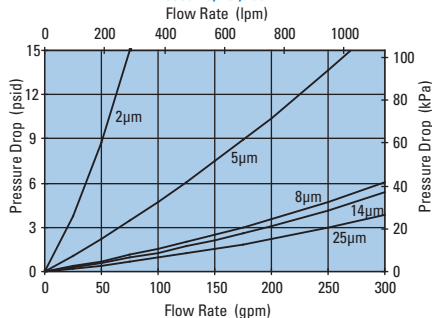
Media Number	B <sub>x(c)</sub> = 1000	Length (in./mm)	Donaldson DT Part Number	Comments
2 μm	<4 μm	16/425.3	P566239	DT-8300-16-2UM
5 μm	5 μm	16/425.3	P566240	DT-8300-16-5UM
8 μm	8 μm	16/425.3	P566241	DT-8300-16-8UM
14 μm	14 μm	16/425.3	P566242	DT-8300-16-14UM
25 μm	25 μm	16/425.3	P566243	DT-8300-16-25UM
2 μm	<4 μm	39/980.9	P566244	DT-8300-39-2UM
5 μm	5 μm	39/980.9	P566245	DT-8300-39-5UM
8 μm	8 μm	39/980.9	P566246	DT-8300-39-8UM
14 μm	14 μm	39/980.9	P566247	DT-8300-39-14UM
25 μm	25 μm	39/980.9	P566248	DT-8300-39-25UM
2 μm	<4 μm	16/408.8	P566249	DT-8310-16-2UM
5 μm	5 μm	16/408.8	P566250	DT-8310-16-5UM
8 μm	8 μm	16/408.8	P566251	DT-8310-16-8UM
14 μm	14 μm	16/408.8	P566252	DT-8310-16-14UM
25 μm	25 μm	16/408.8	P566253	DT-8310-16-25UM
2 μm	<4 μm	39/963.6	P566254	DT-8310-39-2UM
5 μm	5 μm	39/963.6	P566255	DT-8310-39-5UM
8 μm	8 μm	39/963.6	P566256	DT-8310-39-8UM
14 μm	14 μm	39/963.6	P566257	DT-8310-39-14UM
25 μm	25 μm	39/963.6	P566258	DT-8310-39-25UM
WA	B>30 <sub>(c)</sub> = 200	16/408.8	P569533	Absorbs 1000 ml water @ 25 psid
WA	B>30 <sub>(c)</sub> = 200	39/963.6	P569534	Absorbs 2000 ml water @ 25 psid

#### Filter Notes

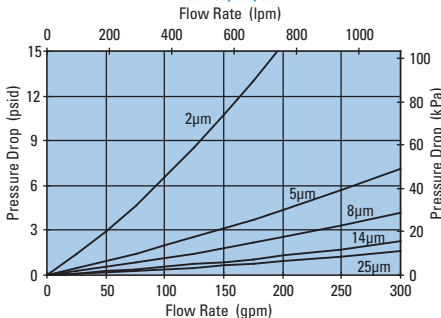
- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted and seam-sealed with epoxy-based adhesives.
- Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- Extended life designs are double wire-backed using epoxy-coated steel mesh.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademarks of E. I. DuPont de Nemours and Company.

## Performance Data

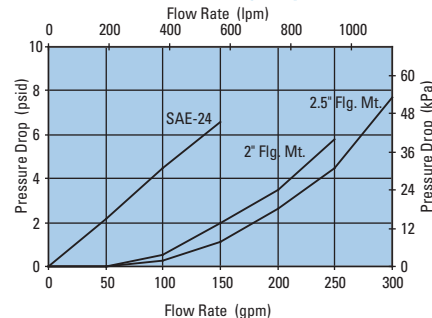
W041 16" DT Filter Only  
DT-8300-16, 16"/406mm



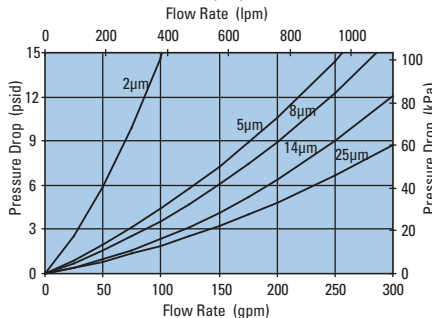
W041 39" DT Filter Only  
DT-8300-39, 39"/991mm



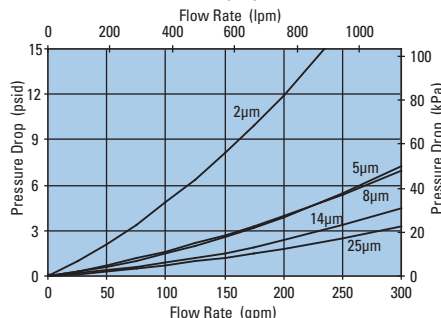
W041 Housing Only



W041 16" DT Filter Only  
DT-8310-16, 16"/406mm



W041 39" DT Filter Only  
DT-8310-39, 39"/991mm





## Housing Ordering Guide

Filter Assembly

W041 TABLE 1	1 TABLE 2	D TABLE 3	4 TABLE 4	L N TABLE 5	B TABLE 6	5 TABLE 7
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Service Filter

Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W041	Assembly (L porting)

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
D	SAE-24 O-ring
J	2" SAE 4-Bolt Flange Code 61
K	2½" SAE 4-Bolt Flange Code 61

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
3	25 psid
4	50 psid

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
A	Visual indicator 70 psid w/TL & surge
B	Electrical/visual 70 psid w/TL and surge
C	Electrical/visual 15 psid
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
F	Electrical/visual 15 psid w/TL
G	Electrical/visual 35 psid w/TL
H	Electrical/visual 15 psid w/12" 3-wire flying lead
I	Visual indicator 70 psid
J	ΔP indicator plug
K	Visual indicator 15 psid
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3-wire flying lead
O	Visual indicator 100 psid
Q	Electrical switch 15 psid
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3-wire flying lead
T	Electrical switch 100 psid
U	Electrical switch 70 psid
V	Electrical/visual 70 psid w/TL
W	Electrical/visual 100 psid w/TL
X	Electrical/visual 15 psid w/TL and surge
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LENGTH)	FILTER LENGTH
5 (26.45")	16.0"
8 (48.27")	39.0"

### METRIC PORTING AVAILABLE

Change W041 or W051 to G041 or G051  
Porting code D becomes 1-1/2" ISO 228 BSPP  
Porting code J becomes 2" SAE 4 bolt flange with M12 threads  
Porting code K becomes 2½" SAE 4 bolt flange with M12 threads

### Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2µm
03	DT 5µm
05	DT 8µm
10	DT 14µm
20	DT 25µm

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Company.



W042

Max Flow: 300 gpm (1135 lpm)



## W042 In-Line Cartridge Filters

**Working Pressures to:** 400 *psi*  
27.6 bar

**Rated Static Burst to:** 1500 *psi*  
103 bar

**Flow Range to:** 300 *gpm*  
1135 *lpm*

### Features

W042 duplex filters insure continuous filtration is maintained while servicing filters, thus avoiding machine shutdown. The W042 all-aluminum head design and plated steel cylinders provide a strong, durable and dependable unit. We offer standard features like deep pleat filters for higher dirt holding capacity and our standard Donaldson DT 4-layer media filter construction. This technology, combined with many other standard features, is ideal for today's applications in pulp and paper, power generation and steel mill applications. Five standard grades of media are offered. Thermal lockout and surge control are two key features available in the differential indicators.



- Hydrostatically-balanced, cam-operated, positive sealing valve for low torque shifting
- Dual poppet outlet checks for positive isolation during filter replacement
- Large T-handles for fast servicing without tools
- Wide range of indicator options
- Two filter length options for design flexibility

- Base & valve body material: aluminum
- Cylinder material: steel
- Cover material: cast iron
- Two drain plugs in each base
- Bleed/fill plug in each cover

### Beta Rating (per ISO 16889)

- Performance to  $\beta_{<4 (c)}=1000$

### Porting Size Option

- 3" SAE 4-Bolt Flange Code 61

### Housing Weight

- 16": 234 lbs / 106.4 kg
- 39": 308 lbs / 140 kg

### Replacement Filter Lengths

- 16.74" / 425.3 mm
- 36.62" / 980.9 mm

### Standard Bypass Rating

- No Bypass
- 50 *psi* / 345 kPa / 3.5 bar

### Operating Temperatures

- -20°F to 250°F ( -29° to 121°C)

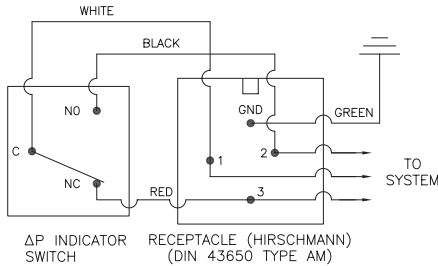
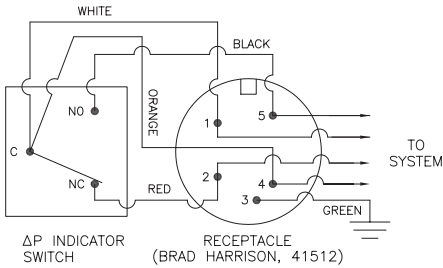
### Filter Collapse Pressure

- 150 *psid* / 1034 kPa / 10.3 bar (standard)

## W042 Specification Illustrations

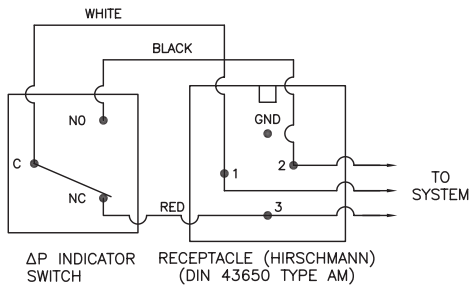
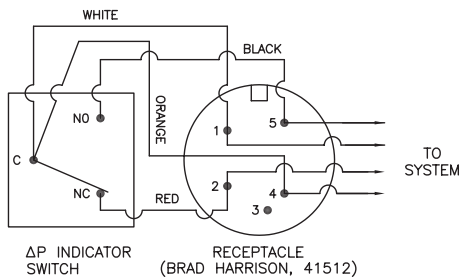
All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



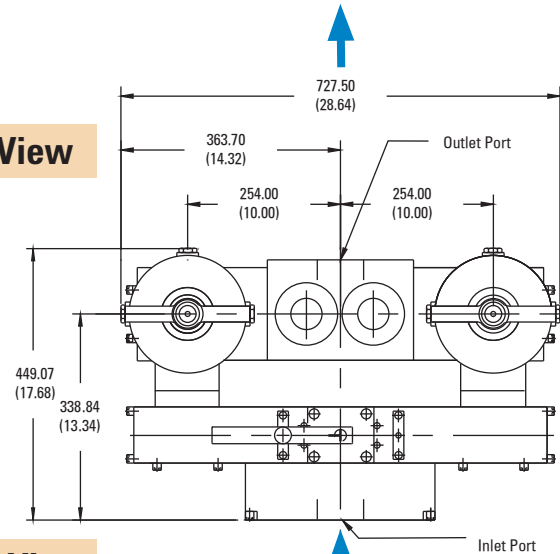
Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings

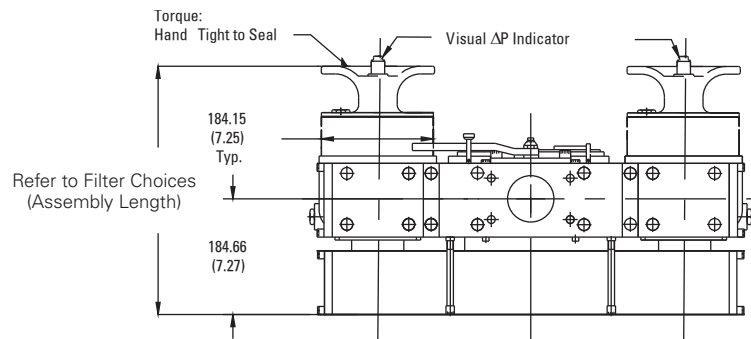


Note: The female plug (connector) is to be furnished by customer.

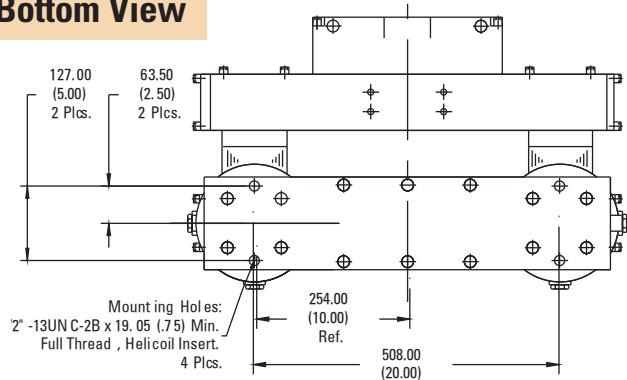
### Assembly - Top View



### Assembly - Side View



### Head - Bottom View



Dimensions: millimeters/(inches)

#### Differential Indicators:

Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

#### Surge Control:

This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

#### Thermal Lockout:

The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.



W042

Max Flow: 300 gpm (1135 lpm)



## W042 Components High-Performance DT Filter Choices

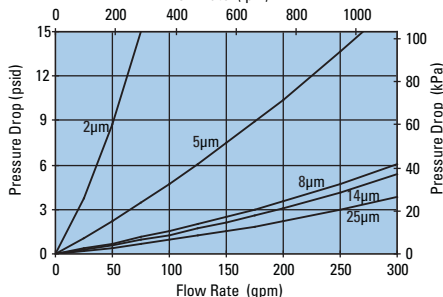
Media Number	B <sub>x(c)</sub> = 1000	Length (in./mm)	Donaldson DT Part Number	Comments
2 μm	<4 μm	16/425.3	P566239	DT-8300-16-2UM
5 μm	5 μm	16/425.3	P566240	DT-8300-16-5UM
8 μm	8 μm	16/425.3	P566241	DT-8300-16-8UM
14 μm	14 μm	16/425.3	P566242	DT-8300-16-14UM
25 μm	25 μm	16/425.3	P566243	DT-8300-16-25UM
2 μm	<4 μm	39/980.9	P566244	DT-8300-39-2UM
5 μm	5 μm	39/980.9	P566245	DT-8300-39-5UM
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14 μm	14 μm	39/980.9	P566247	DT-8300-39-14UM
25 μm	25 μm	39/980.9	P566248	DT-8300-39-25UM
2 μm	<4 μm	16/408.8	P566249	DT-8310-16-2UM
5 μm	5 μm	16/408.8	P566250	DT-8310-16-5UM
8 μm	8 μm	16/408.8	P566251	DT-8310-16-8UM
14 μm	14 μm	16/408.8	P566252	DT-8310-16-14UM
25 μm	25 μm	16/408.8	P566253	DT-8310-16-25UM
2 μm	<4 μm	39/963.6	P566254	DT-8310-39-2UM
5 μm	5 μm	39/963.6	P566255	DT-8310-39-5UM
8 μm	8 μm	39/963.6	P566256	DT-8310-39-8UM
14 μm	14 μm	39/963.6	P566257	DT-8310-39-14UM
25 μm	25 μm	39/963.6	P566258	DT-8310-39-25UM
WA	B>30(c) = 200	16/408.8	P569533	Absorbs 1000 ml water @ 25 psid
WA	B>30(c) = 200	39/963.6	P569534	Absorbs 2000 ml water @ 25 psid

### Filter Notes

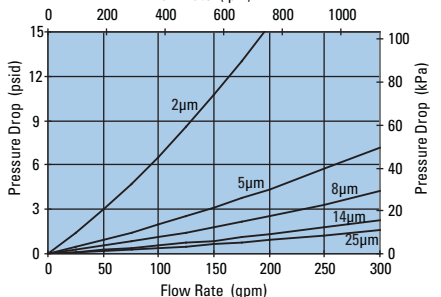
- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted and seam-sealed with epoxy-based adhesives.
- Standard collapse designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- Extended life designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademarks of E. I. DuPont de Nemours and Company.

## Performance Data

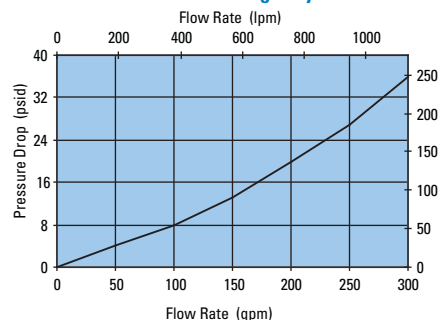
**W042 16" DT Filter Only**  
DT-8300-16, 16"/406mm  
Flow Rate (lpm)



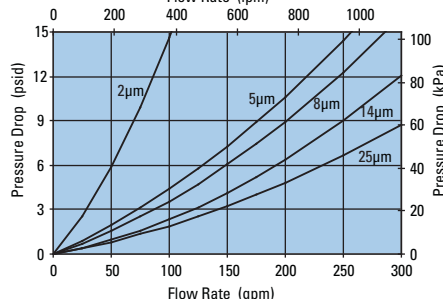
**W042 39" DT Filter Only**  
DT-8300-39, 39"/991mm  
Flow Rate (lpm)



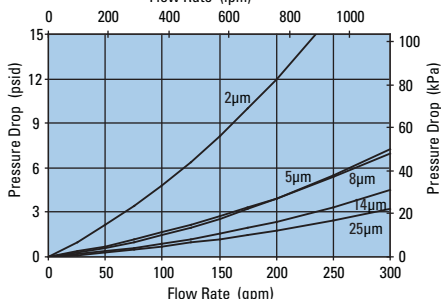
**W042 Housing Only**



**W042 16" DT Filter Only**  
DT-8310-16, 16"/406mm  
Flow Rate (lpm)



**W042 39" DT Filter Only**  
DT-8310-39, 39"/991mm  
Flow Rate (lpm)





## Housing Ordering Guide

Filter Assembly	<b>W042</b> TABLE 1	<b>1</b> TABLE 2	<b>L</b> TABLE 3	<b>4</b> TABLE 4	<b>L N</b> TABLE 5	<b>B</b> TABLE 6	<b>5</b> TABLE 7
-----------------	------------------------	---------------------	---------------------	---------------------	-----------------------	---------------------	---------------------

Service Filter: Filters ordered separately. See previous page for filter options.

**LEAD TIME NOTE:**

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W042	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
L	3" SAE 4-Bolt Flange Code 61

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
3	25 psid
4	50 psid

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
A	Visual indicator 70 psid w/TL & surge
B	Electrical/visual 70 psid w/TL and surge
C	Electrical/visual 15 psid
D	Electrical/visual 35 psid
F	Electrical/visual 15 psid w/TL
G	Electrical/visual 35 psid w/TL
H	Electrical/visual 15 psid w/12" 3-wire flying lead
I	Visual indicator 70 psid
J	ΔP indicator plug
K	Visual indicator 15 psid
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3-wire flying lead
P	Visual indicator 100 psid w/TL and surge
Q	Electrical switch 15 psid
R	Electrical switch 35 psid
T	Electrical switch 100 psid
U	Electrical switch 70 psid
V	Electrical/visual 70 psid w/TL
X	Electrical/visual 15 psid w/TL and surge
Y	Electrical/visual 35 psid w/TL and surge

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LENGTH)	FILTER LENGTH
5 (25.4")	16.0"
8 (47.4")	39.0"

**METRIC PORTING AVAILABLE**

Change W042 to G042  
Porting code L becomes 3" SAE 4 bolt flange with M16 threads

**Media Ratings**

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2 $\mu$ m
03	DT 5 $\mu$ m
05	DT 8 $\mu$ m
10	DT 14 $\mu$ m
20	DT 25 $\mu$ m

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Company.





HFK08

Max Flow: 300 gpm (1135 lpm)

## HFK08 In-Line/Tank Mount Filters

**Working Pressures to:** 350 *psi*  
2413 kPa  
24.1 bar

**Rated Static Burst to:** 500 *psi*  
3448 kPa  
34.5 bar

**Flow Ranges to:** 300 *gpm*  
1135 *lpm*

### Features

HFK08 is available in two styles: in-line and in-tank. Both styles feature a cast aluminum head and steel body for maximum strength and durability. Its single, center retention bolt simplifies servicing. Flow is from inside to outside of the filter cartridge.

Three in-stock HFK08 models offer our proprietary Synteq™ synthetic media designed especially for liquid filtration. A wider range of filter media is available to purchase separately, as are fluor elastomer seals. A visual service indicator is built into the HFK08 head; see the service parts list on page 129.



*In-line model shown*

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- 3" NPT
- SAE-20 O-ring

#### Assembly Weight

- 55.4 lbs / 25.12 kg

#### Replacement Filter Length

- 18" / 457mm

#### Standard Bypass Ratings

- 25 *psi* / 172.5 kPa / 1.7 bar

#### Operating Temperatures

- -20°F to 250°F  
-29°C to 121°C

#### Filter Burst Ratings

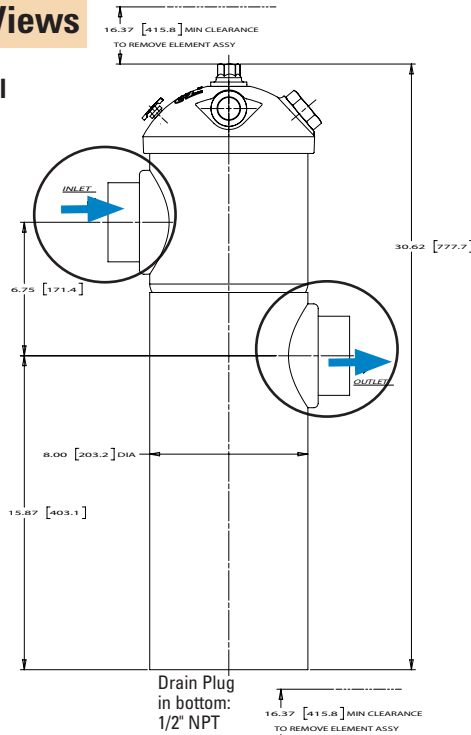
- 75 *psi* / 517 kPa / 5.2 bar (synthetic)
- 100 *psi* / 689 kPa / 6.9 bar (wiremesh)

**HFK08 Specification Illustrations**

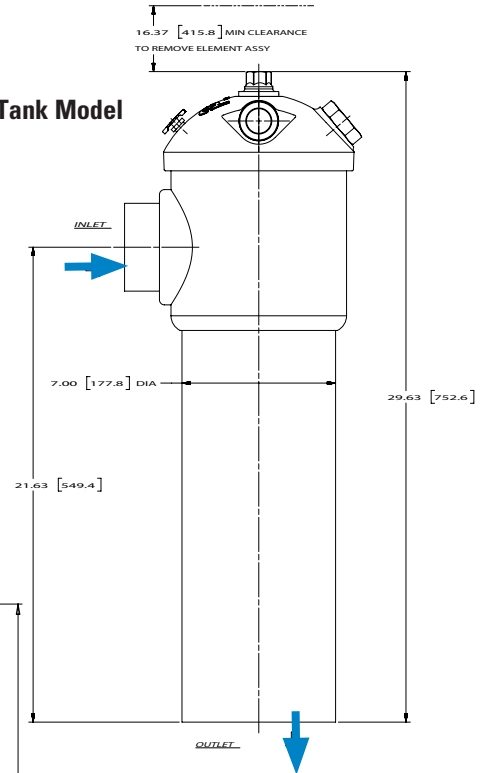
All dimensions are shown in inches [millimeters].

**Assembly - Side Views**

**In-Line Model**

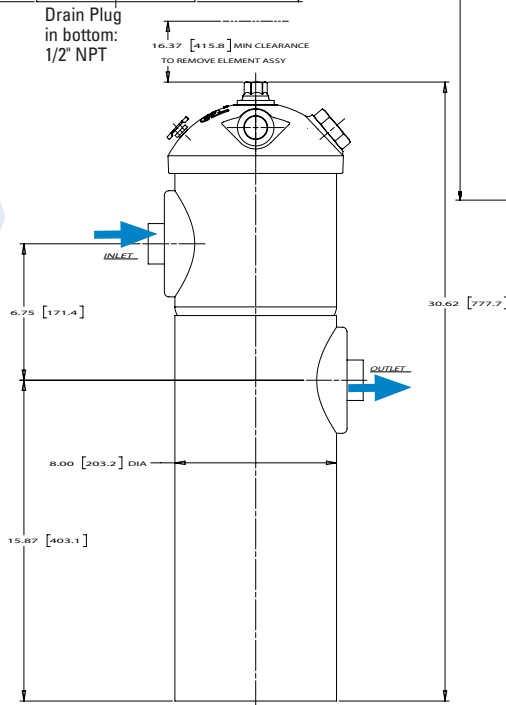


**In-Tank Model**

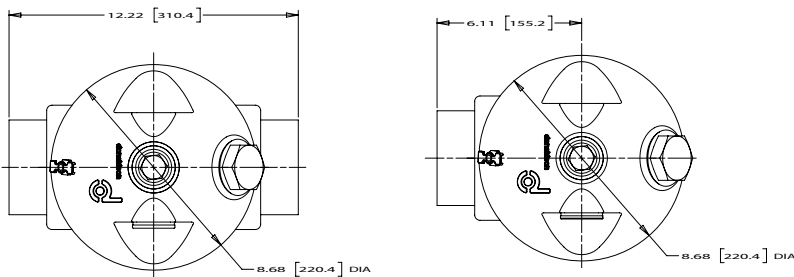


**K080087 In-Line Model**

Smaller port size (SAE-20) works well for kidney loop filtration.



**Head - Top View**



**Applications:**

- Return Lines
- Lube Oil Systems
- Kidney Loop Systems
- Fluid Conditioning
- Suction Lines



HFK08

Max Flow: 300 gpm (1135 lpm)

## HFK08 Components

### Filter Assemblies

Port Size	Bypass Rating	Indicator Style <sup>1</sup> & Location	Assembly Part No.	Media	Length (in./mm)	Filter Part No.
3" NPT	25 psi / 172.5 kPa	Visual, Left side	K080051, In-Tank	No. 9	18"/457mm	P164703
		Visual, Right side	K080033, In-Line	No. 9	18"/457mm	P164703
			K080085, In-Line	No. 6	18"/457mm	P164407 all seals are Viton®
SAE-20	25 psi / 172.5 kPa	Visual, Right side	K080087, In-Line	No. ½	18"/457mm	P164405

#### Assembly Notes

<sup>1</sup> Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port. Viton® is a registered trademarks of E. I. DuPont de Nemours and Company.

### Filter Choices

Media Number	Media Technology	B <sub>x10</sub> = 1000 Rating	Part No.
No. ½	Synteq™	<4 µm	P164405
No. 2	Synteq	9 µm	P166462
No. 2½	Synteq	10 µm	P176222
No. 6	Synteq	13 µm	P164407 w/Viton seal
No. 9	Synteq	23 µm	P164703
No. 44	Wiremesh	45 µm nominal	P173573
No. 149	Wiremesh	150 µm nominal	P163945

#### Filter Notes

- HFK08 replacement filters have seals made of Buna-N®, except as noted above, which is a material appropriate for most applications involving petroleum oil. Filters with seals made of Viton® (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F.
- Refer to the table in the Technical Reference Guide for fluid compatibility with our filter media.

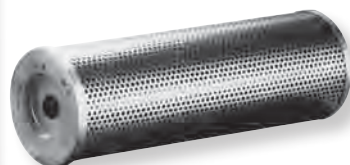


The K080087 model has features that are perfect for kidney loop filtration:

- SAE-20 port size
- 50 gpm/189 lpm flow capacity (enables constant face velocity and prevents sloughing)
- High-efficiency Synteq™ media



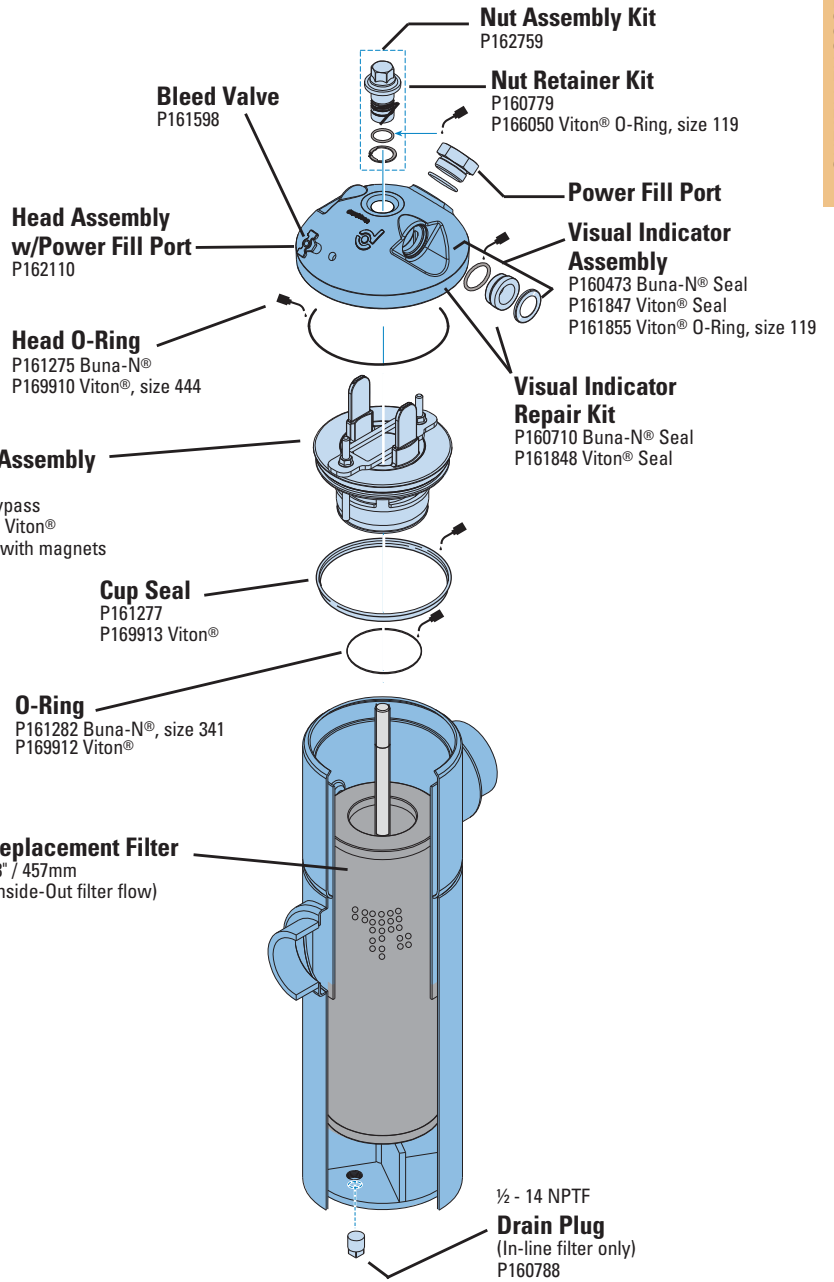
HFK08 replacement filters are available with synthetic or wire mesh media.



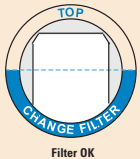
## HFK08 Service Parts

### SERVICE PARTS NOTE:

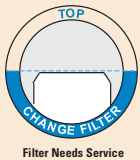
Some service parts may not be stocked. Please contact your Donaldson sales representative for lead time details.



### How to Read the Visual Indicator



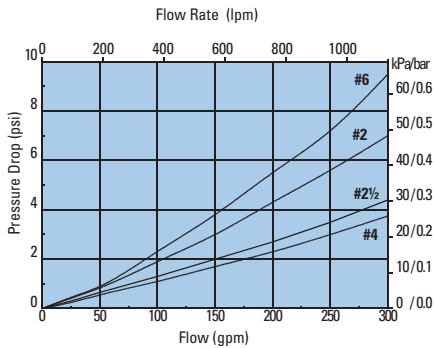
This simple device will tell you when the filter needs to be changed. Always check when the fluid is at operating temperature and the system is at normal operating flow.



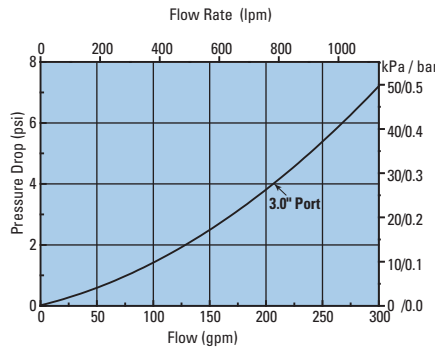
If the top of the white panel is below the lower half of the window, the filter needs servicing.

## Performance Data

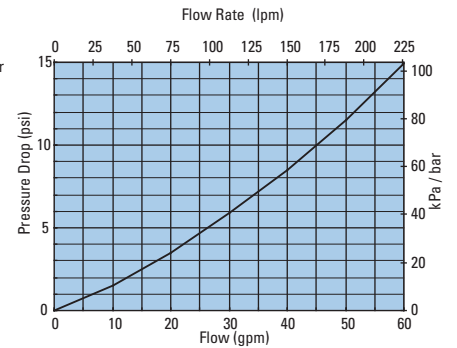
**HFK08 Filter Only**



**HFK08 Filter Only**



**K080087 Assembly**

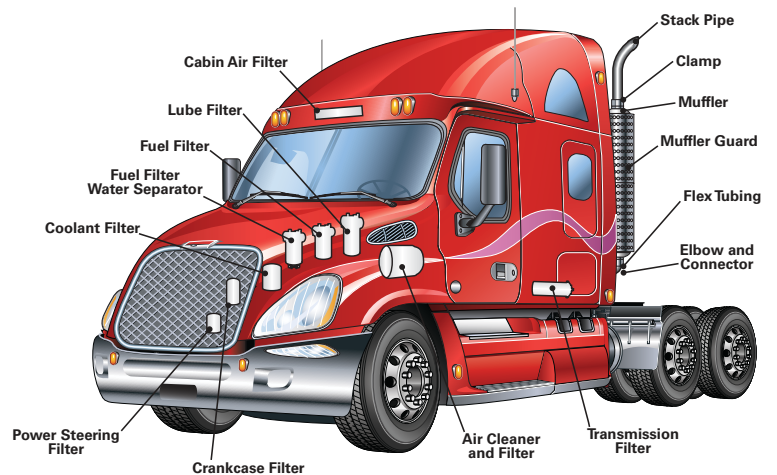
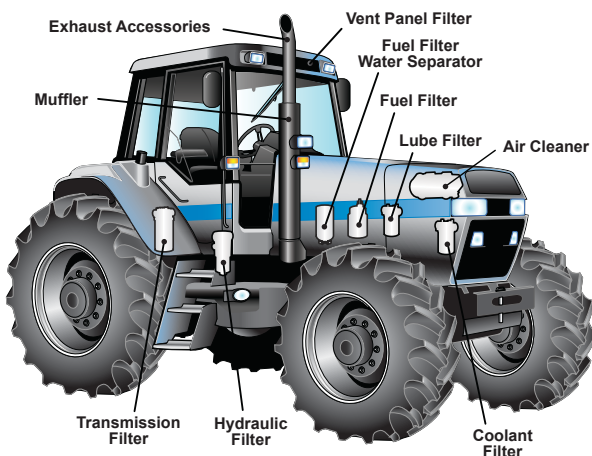
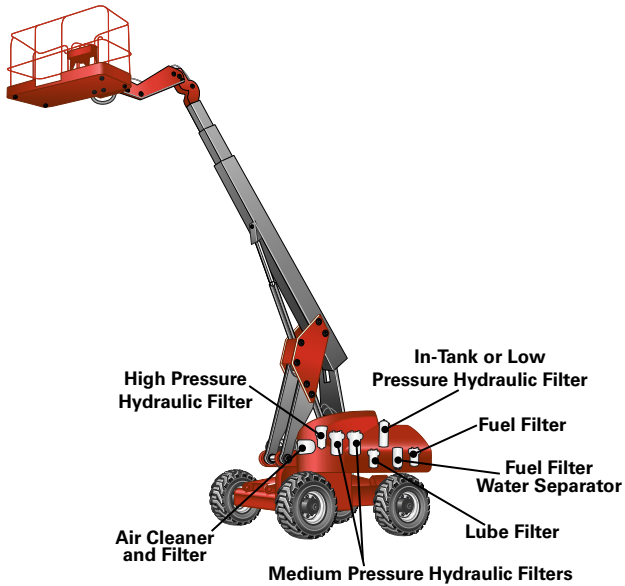
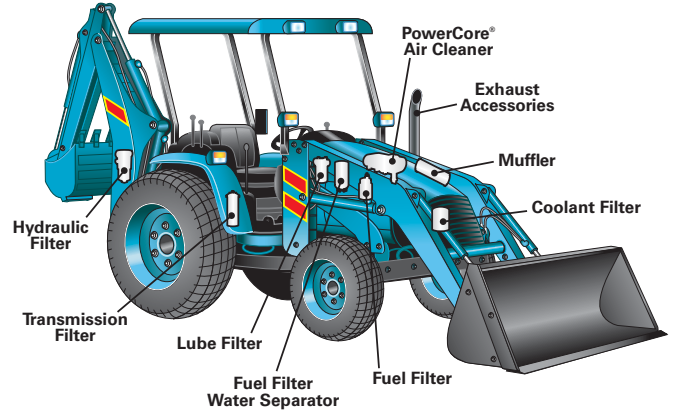
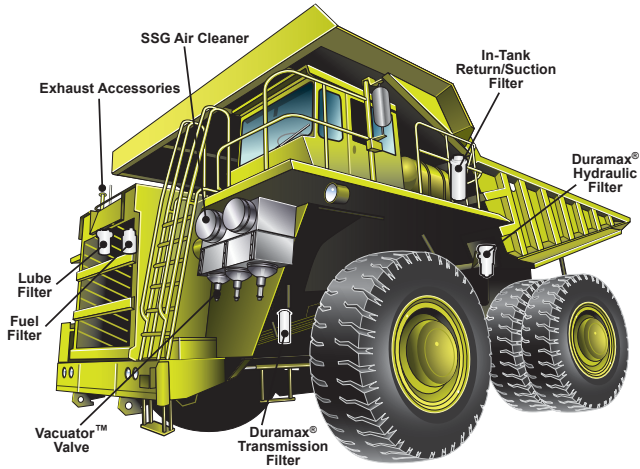


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# Total Filtration Solutions

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## High Pressure Filters

High pressure filters are positioned between pumps and critical components such as cylinders, motors and valves. They help protect these critical components from catastrophic failure.

Donaldson heavy-duty high pressure filters are rated for working pressures up to 6500 psi (44818 kPa). Various porting sizes and types, including manifold style, are available for a wide range of applications.



## Section Index

Max Operating Pressure < 6500 psi (450 bar)

Models arranged from low to maximum flow rates

### In-line Cartridge Filters

W331 .....	132
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W331

Max Flow: 6 gpm (23 lpm)

## W331 In-Line Cartridge Filters

**Working Pressures to:** 3000 *psi*  
21,000 kPa  
210 bar

**Rated Static Burst to:** 7500 *psi*  
51,700 kPa  
517 bar

**Fatigue Pressure Rating:** 1500 *psi*  
10,000 kPa  
100 bar

**Flow Range to:** 6 *gpm*  
23 *lpm*



### Features

The W331 in line filter assembly offers all aluminum construction with a positive sealing poppet type bypass for reliability and zero leakage. Donaldson DT high-performance 4-layer media is offered in five different media grades. The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features incorporated in many of the valves.

- Aluminum head and housing
- Compact design for use with servo or proportional valve
- Positive sealing poppet for zero leakage

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-8 O-ring

#### Assembly Weight

- 4.25 lbs / 1.9 kg

#### Replacement Filter Lengths

- 3.44" / 87.3mm

#### Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -45° to 250°F (-43° to 121°C)

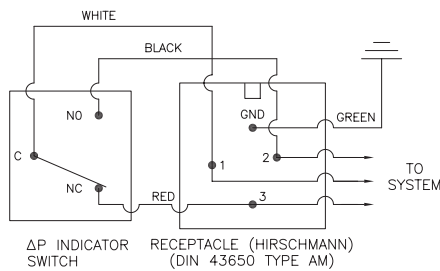
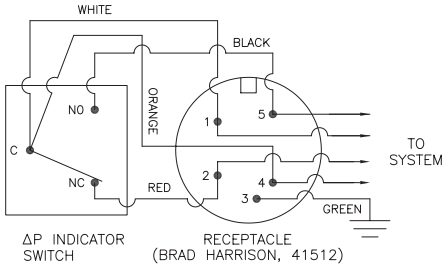
#### Filter Collapse Ratings

- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

## W331 Specification Illustrations

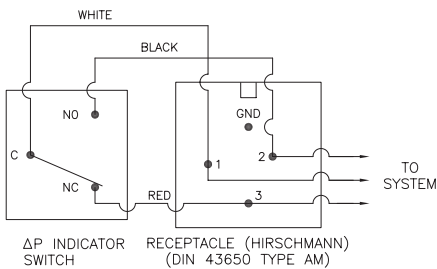
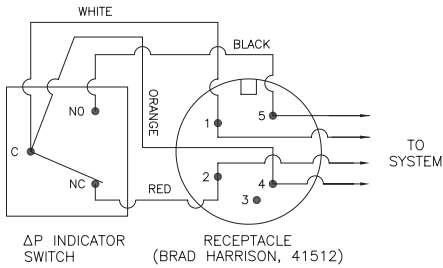
All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings



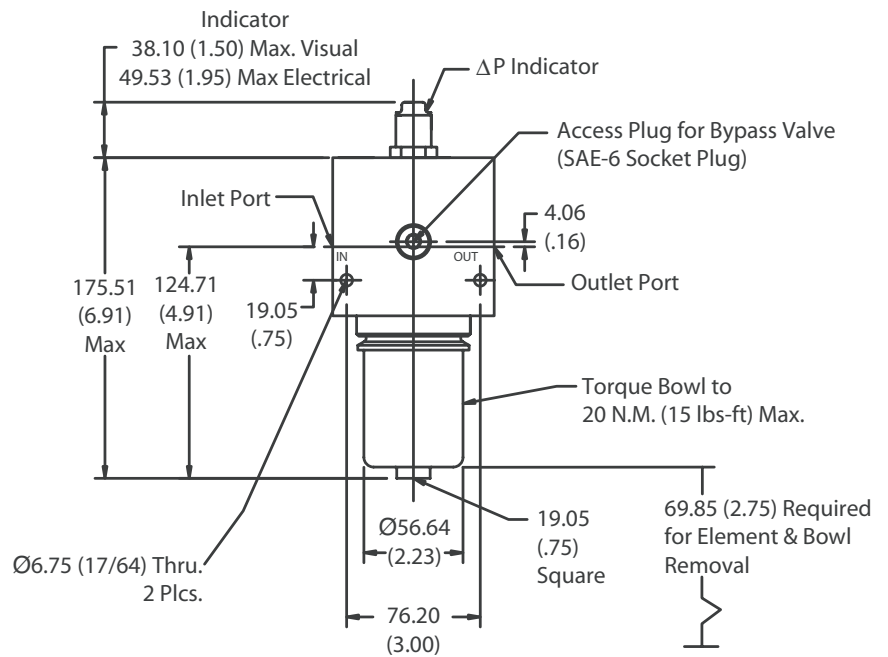
Note: The female plug (connector) is to be furnished by customer.

**Differential Indicators:** Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

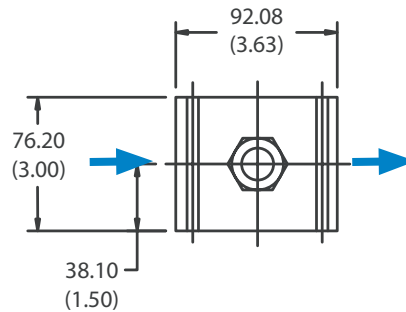
**Surge Control:** This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:** The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.

### Assembly - Side View



### Head - Top View



**CAUTION**  
Before Servicing the element, the bleed plug in filter housing must be loosened to relieve pressure



W331

Max Flow: 6 gpm (23 lpm)



## W331 Components

### Filter Choices

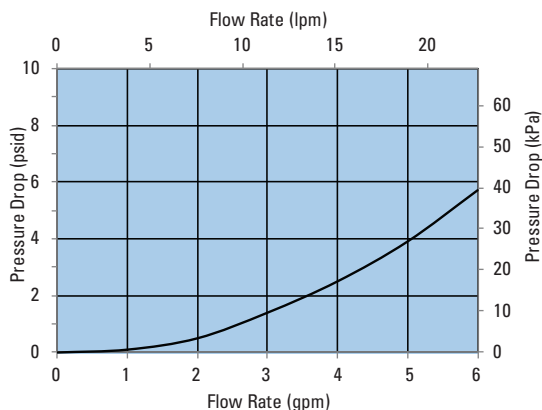
Media Number	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson Part No.	Comments
5	5	3.44/87.3	P572298	AN6235-3A
8	8	3.44/87.3	P572299	AN6235-3A
14	14	3.44/87.3	P572300	AN6235-3A
5	5	3.44/87.3	P572301	AN6235-3A, High collapse
14	14	3.44/87.3	P572302	AN6235-3A, High collapse

#### Filter Notes

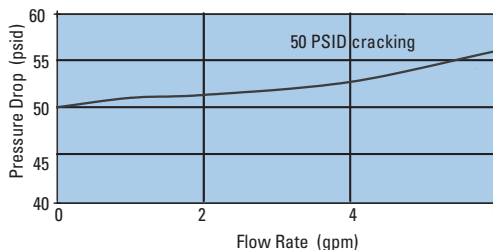
- All Donaldson W331 filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson W331 filters are potted with epoxy-based adhesives.
- Standard collapse W331 designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson W331 filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

## Performance Data

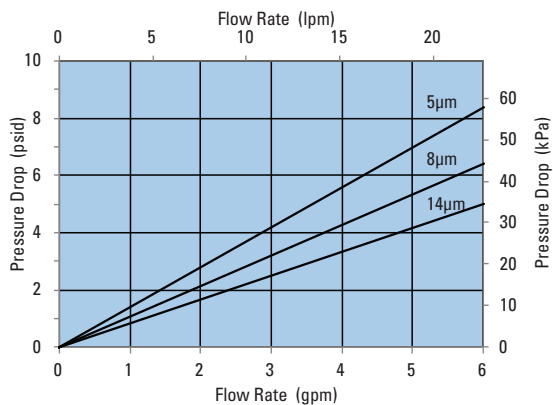
W331 Housing Only



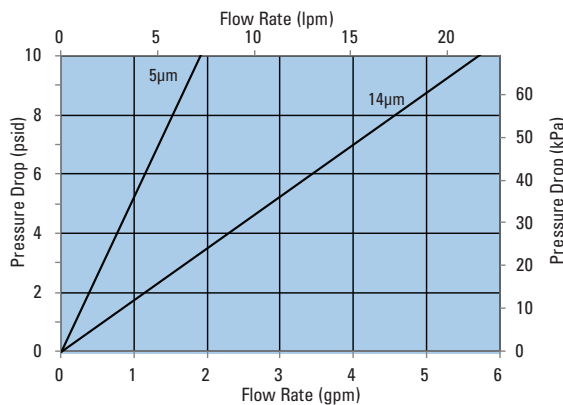
W331 Bypass Valve



W331 Filter Only



W331 High Collapse Filter Only





## Housing Ordering Guide

Filter Assembly	W331 TABLE 1	1 TABLE 2	0 TABLE 3	4 TABLE 4	L N TABLE 5	B TABLE 6
-----------------	-----------------	--------------	--------------	--------------	----------------	--------------

Service Filter  
Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W331	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psi for housing w/o bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
0	SAE-8 O-ring

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
4	50 psid

Note: Use option 1 code only with 3000 psid collapse filter.

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
G	Electrical/visual 35 psid w/TL
J	ΔP indicator plug
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3 wire flying lead
O	Visual indicator 100 psid
P	Visual indicator 100 psid w/ TL and surge
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3 wire flying lead
T	Electrical switch 100 psid
W	Electrical/visual 100 psid w/TL
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

### METRIC PORTING AVAILABLE

Change W331 to G331  
Porting code 0 becomes 1/2"  
ISO 228 BSPP

### Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
03	DT 5 $\mu$ m
05	DT 8 $\mu$ m
10	DT 14 $\mu$ m

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.



HPK02

Max Flow: 20 gpm (75 lpm)

## HPK02 In-Line Cartridge Filters

**Working Pressures to:** 2000 *psi*  
13,790 kPa  
137.9 bar

**Rated Static Burst to:** 4500 *psi*  
31,030 kPa  
310.3 bar

**Flow Range to:** 20 *gpm*  
75 *lpm*



### Features

The HPK02 is a heavy-duty filter built for high pressure applications, with cast aluminum head and impact-extruded aluminum housing for strength and durability at relatively lightweight.

Take advantage of our mix and match system of in-stock heads, housings and cartridges – so you can get exactly what you need. HPK02 is available with your choice of visual or AC/DC electrical indicators. Likewise, choose the bypass option that's right for your application – 50 psi (3.5 bar) bypass, or no bypass. Seals made of fluorocarbon (such as Viton® and Fluorel®) or Buna-N are available with HPK02.

All HF2-sized HPK02 filters contain Synteq™, our synthetic filter media designed especially for hydraulic filtration.

Viton® is a registered trademark of E. I. DuPont de Nemours and Company.  
Fluorel® is a registered trademark of 3M Company.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-12 O-ring

#### Assembly Weight

- 4.3 lbs / 1.95 kg (short)
- 5.5 lbs / 2.49 kg (long)

#### Replacement Filter Lengths

- 4.37" / 111mm
- 8.12" / 206mm

#### Standard Bypass Ratings

- 50 *psi* / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -45° to 250°F (-43° to 121°C)

#### Filter Collapse Ratings

- 150 *psi* / 1035 kPa / 10.6 bar (standard)
- 3000 *psi* / 20,700 kPa / 206.9 bar (high collapse)

**HPK02 Specification Illustrations**

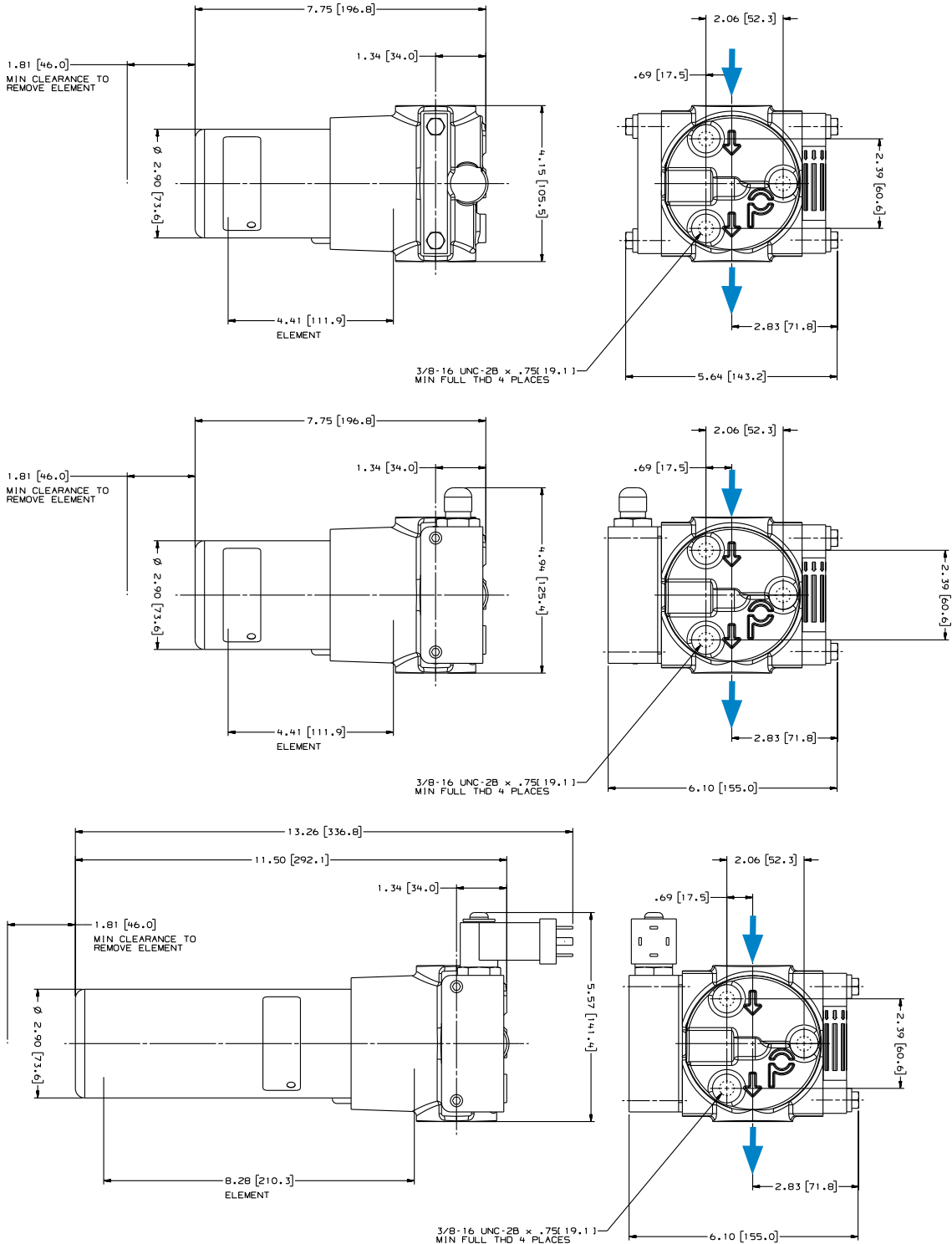
All dimensions are shown in inches [millimeters].

**Applications:**

- Servo Valve Circuits
- In-Plant & Mobile Equipment
- Meets HF2 Specification
- Power Steering Circuits
- High Pressure Circuits

**Assembly - Side View**

**Head - Top View**







HPK02

Max Flow: 20 gpm (75 lpm)

## HPK02 Components

### Standard Filter Choices

Media Number	B <sub>v(c)</sub> = 1000 Rating	Length (in./mm)	Part No.	Comments
No. 1	5 µm	4.37/111	P169429	Buna-N® Seal
			P167180	Fluorocarbon Seal High Collapse
		8.12/203	P167838	Buna-N Seal
			P167182	Fluorocarbon Seal High Collapse
No. 2	9 µm	4.37/111	P165041	Buna-N Seal
		8.12/203	P165043	Buna-N Seal
No. 2½	10 µm	4.37/111	P165006	Buna-N Seal
			P167181	Fluorocarbon Seal High Collapse
		8.12/203	P165015	Buna-N Seal
			P167183	Fluorocarbon Seal High Collapse
No. 9	23 µm	4.37/111	P165136	Buna-N Seal
		8.12/203	P165138	Buna-N Seal

#### Filter Notes

- Refer to the table in the Technical Reference Guide for fluid compatibility with our filter media.
- If filtering petroleum-based oil, filters with seals made of Buna-N® are appropriate for most applications.
- If filtering diester, phosphate ester fluids, water glycol, water/oil emulsions, or HWCF over 150°F/83°C, use filters with seals made of fluorocarbon, such as Viton®.
- Donaldson "high collapse" filters, with their steel endcaps and wire-backed media, are rated to withstand up to 3000 psi/ 20,700 kPa before collapsing.
- The fluorocarbon seal/high collapse filters also use epoxy potting and media seam seals for added chemical compatibility.
- Viton® and Buna-N® registered trademarks of E. I. DuPont de Nemours and Company.

## Housing Choices

Length*	Part No.
short	P167443
long	P167452

\* See dimensional drawings on page 137.

## Head Choices

Port Size	Bypass Rating	Indicators <sup>1</sup>	Part No.
SAE-12 O-Ring	50 psi/3.5 bar	Visual indicator, left side	P167728
SAE-12 O-Ring	No bypass	Visual indicator, left side	P167730

#### Notes on Indicators

<sup>1</sup> Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port.



## High-Performance DT Filter Choices

Media Number	Beta <sub>1000</sub> Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 µm	<4 µm	4/111.9	P566194	DT-9020-4-2UM
5 µm	5 µm	4/111.9	P566195	DT-9020-4-5UM
8 µm	8 µm	4/111.9	P566196	DT-9020-4-8UM
14 µm	14 µm	4/111.9	P566197	DT-9020-4-14UM
25 µm	25 µm	4/111.9	P566198	DT-9020-4-25UM
2 µm	<4 µm	8/210.3	P566199	DT-9020-8-2UM
5 µm	5 µm	8/210.3	P566200	DT-9020-8-5UM
8 µm	8 µm	8/210.3	P566201	DT-9020-8-8UM
14 µm	14 µm	8/210.3	P566202	DT-9020-8-14UM
25 µm	25 µm	8/210.3	P566203	DT-9020-8-25UM
5 µm	5 µm	4/113.2	P566335	DT-9021-4-5UM, High collapse
14 µm	14 µm	4/113.2	P566336	DT-9021-4-14UM, High collapse
5 µm	5 µm	8/207.2	P566337	DT-9021-8-5UM, High collapse
14 µm	14 µm	8/207.2	P566338	DT-9021-8-14UM, High collapse

### Filter Notes

- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity. High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

## Service Indicator Options

### Visual Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description
P569632	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button
P569633	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button
P567988	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button with thermal lockout and surge control
P567989	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button with thermal lockout and surge control

### AC/DC Visual/Electrical Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description
P569634	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps
P569635	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps
P567986	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650
P567987	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650

\* Note: above choices include indicator and mounting block.

## Indicator Service Parts

### Replacement Indicators Only

Part No.	Description
P567458	Visual/Electrical indicator with thermal lockout and surge, 35 psid/2.4 bar
P567459	Visual/Electrical indicator, with thermal lockout and surge 70 psid/4.8 bar
P567456	Pop-Up Visual Indicator, with thermal lockout and surge 35 psid/2.4 bar
P567457	Pop-Up Visual Indicator, with thermal lockout and surge 70 psid/4.8 bar
P569636	Pop-Up Visual Indicator, 35 psid/2.4 bar
P569637	Pop-Up Visual Indicator, 70 psid/4.8 bar
P569638	Visual/Electrical Indicator, 35 psid/2.4 bar
P569639	Visual/Electrical Indicator, 70 psid/4.8 bar
P164315	Visual Indicator, bar style, 35 psid/2.4 bar
P166603	Visual Indicator, bar style, 70 psid/4.8 bar
P166134	Blanking plate

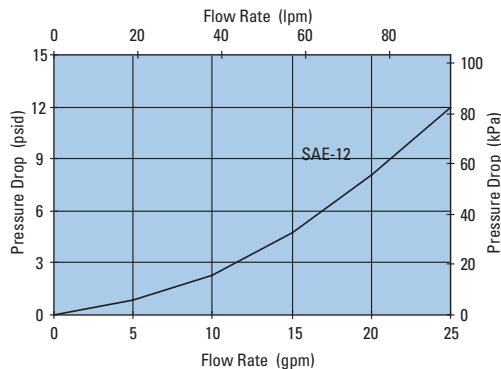


**HPK02**  
Max Flow: 20 gpm (75 lpm)

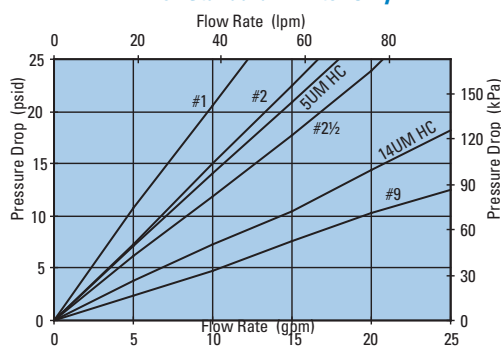


## Performance Data

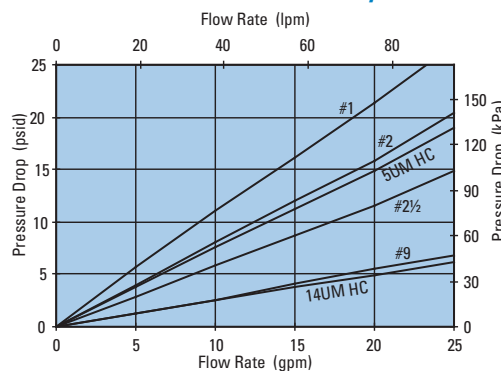
**HPK02 Housing Only**



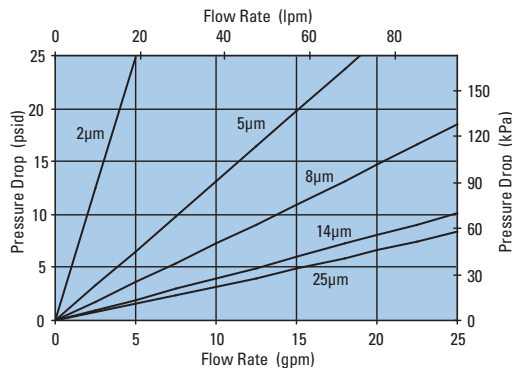
**HPK02 Standard 4" Filter Only**



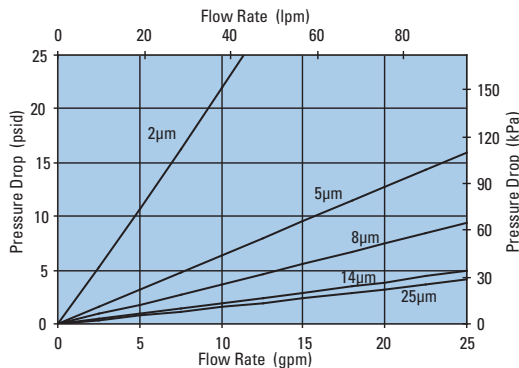
**HPK02 Standard 8" Filter Only**



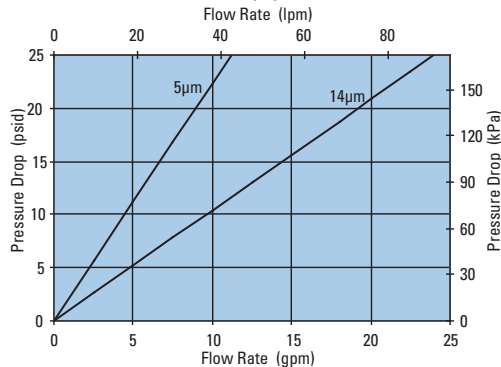
**HPK02 4" DT Filter Only**  
DT-9020-4, 4"/102mm



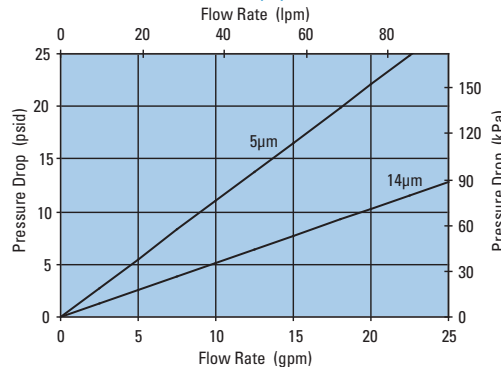
**HPK02 8" DT Filter Only**  
DT-9020-8, 8"/203mm



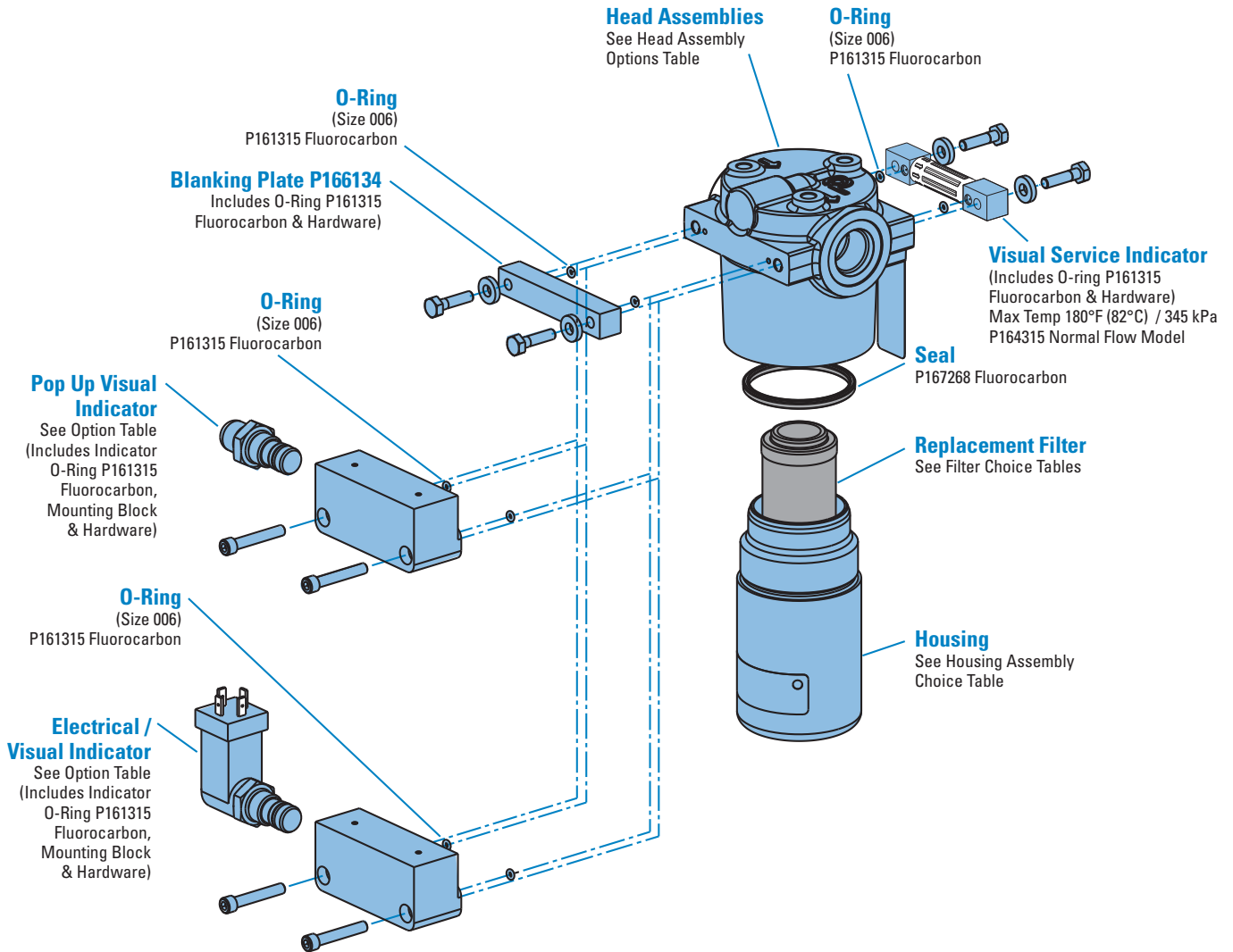
**HPK02 4" DT Filter Only**  
DT-9021-4, 4"/102mm



**HPK02 8" DT Filter Only**  
DT-9021-8, 8"/203mm



## HPK02 Service Parts





W341

Max Flow: 20 gpm (75 lpm)

## W341 In-Line Cartridge Filters

**Working Pressures to:** 3000 *psi*  
20,700 kPa  
207 bar

**Rated Static Burst to:** 7,500 *psi*  
51,700 kPa  
517 bar

**Fatigue Pressure Rating:** 1500 *psi*  
10,300 kPa  
103 bar

**Flow Range to:** 20 *gpm*  
75 *lpm*



### Features

The W341 in line filter assembly offers all aluminum construction with a positive sealing poppet type bypass for reliability and zero leakage. Donaldson DT high-performance 4-layer media is offered in five different media grades. The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features incorporated in many of the valves.

- Aluminum head and housing
- Compact design for use with servo or proportional valve
- Positive sealing poppet for zero leakage

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-12 O-ring

#### Assembly Weight

- 7.28": 5.3 lbs / 2.4 kg
- 10.03": 5.7 lbs / 2.6 kg

#### Replacement Filter Lengths

- 5.06" / 128.6mm
- 7.81" / 198.3mm

#### Standard Bypass Ratings

- 50 psi / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -45° to 250°F (-43° to 121°C)

#### Filter Collapse Ratings

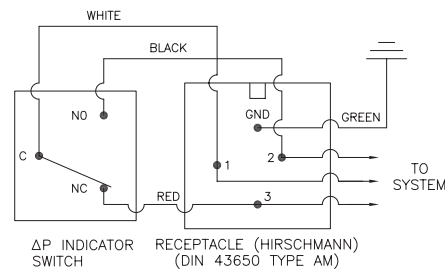
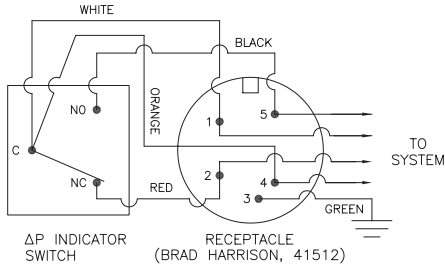
- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

## W341 Specification Illustrations

All dimensions are shown in millimeters [inches].

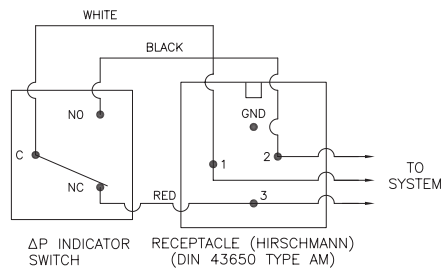
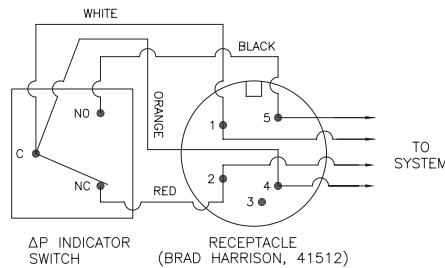
### Indicator Switch Schematic Wiring Diagram

#### Aluminum Electrical Housings



Note: The female plug (connector) is to be furnished by customer.

#### Plastic Electrical Housings



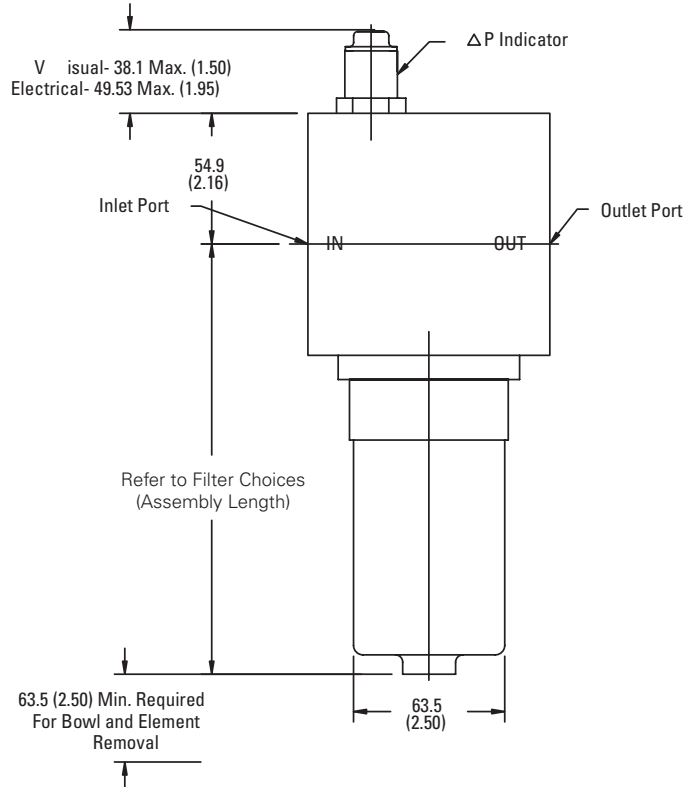
Note: The female plug (connector) is to be furnished by customer.

**Differential Indicators:** Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

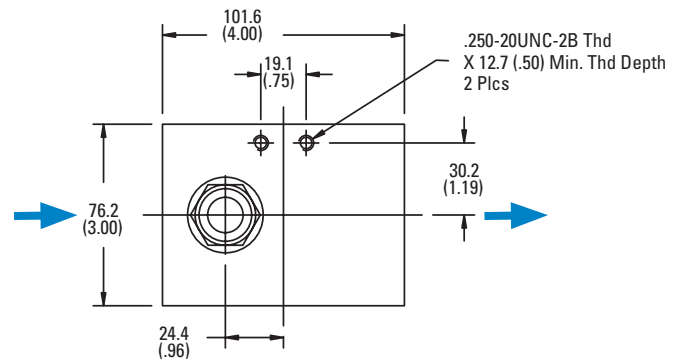
**Surge Control:** This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:** The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.

### Assembly - Side View



### Head - Top View







W341  
Max Flow: 20 gpm (75 lpm)



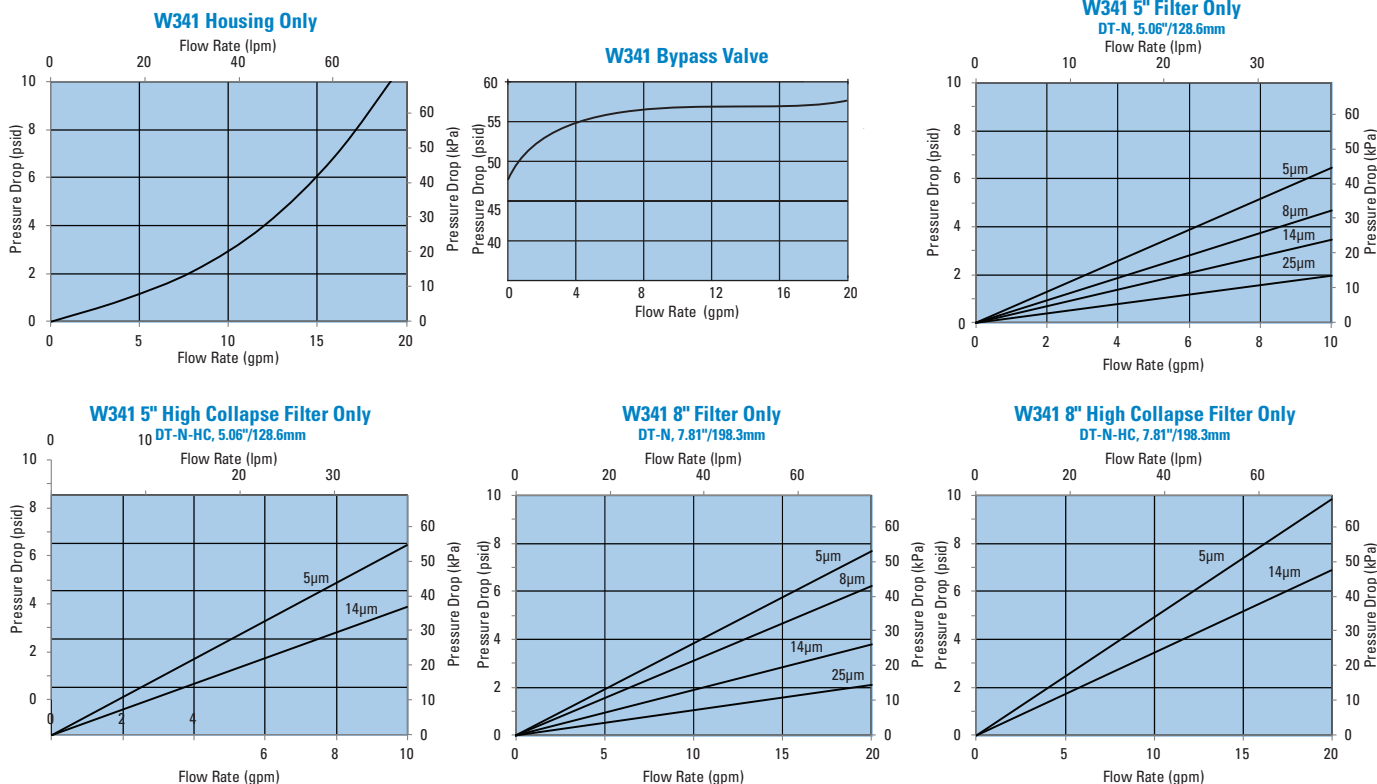
## W341 Components High-Performance DT Filter Choices

Media Number	Beta <sub>(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
5	5	5.06/128.6	P567065	DT-N-1-5UM
8	8	5.06/128.6	P567066	DT-N-1-8UM
14	14	5.06/128.6	P567067	DT-N-1-14UM
25	25	5.06/128.6	P567068	DT-N-1-25UM
5	5	7.81/198.3	P567069	DT-N-2-5UM
8	8	7.81/198.3	P567070	DT-N-2-8UM
14	14	7.81/198.3	P567071	DT-N-2-14UM
25	25	7.81/198.3	P567072	DT-N-2-25UM
5	5	5.06/128.6	P572303	DT-N-HC-1-5UM, high collapse
14	14	5.06/128.6	P572304	DT-N-HC-1-14UM, high collapse
5	5	7.81/198.3	P572305	DT-N-HC-2-5UM, high collapse
14	14	7.81/198.3	P572306	DT-N-HC-2-14UM, high collapse

### Filter Notes

- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

## Performance Data





## Housing Ordering Guide

Filter Assembly	W341 TABLE 1	1 TABLE 2	A TABLE 3	1 TABLE 4	M N TABLE 5	B TABLE 6	1 TABLE 7
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Service Filter  
Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W341	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psid for housing without bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
A	SAE-12 O-ring

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
4	50 psid

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
D	Electrical/visual 35 + 5 psid
E	Electrical/visual 100 + 12 psid
G	Electrical/visual 35 + 5 psid w/TL
J	No indicator
L	Visual indicator 35 + 5 psid
M	Visual indicator 35 + 5 psid w/ TL and surge
N	Electrical/visual 35 + 5 psid w/12" 3 wire flying lead
O	Visual indicator 100 + 12 psid
P	Visual indicator 100 + 12 psid w/ TL and surge
R	Electrical switch 35 + 5 psid
S	Electrical/visual 100 + 12 psid w/12" 3 wire flying lead
T	Electrical switch 100 + 12 psid
W	Electrical/visual 100 + 12 psid w/TL
Y	Electrical/visual 35 + 5 psid w/TL and surge
Z	Electrical/visual 100 + 12 psid

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
1 (7.28")	4.0"
2 (10.03")	8.0"

### METRIC PORTING AVAILABLE

Change W341 to G341  
Porting code A becomes G-3/4"  
ISO 228 BSPP

### Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
03	DT 5μm
05	DT 8μm
10	DT 14μm
20	DT 25μm

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.



W440

Max Flow: 20 gpm (75 lpm)

## W440 In-Line Cartridge Filters

**Working Pressures to:** 4000 *psi*  
27,600 kPa  
276 bar

**Rated Static Burst to:** 10,000 *psi*  
69,000 kPa  
690 bar

**Fatigue Pressure Rating:** 2450 *psi*  
16,900 kPa  
169 bar

**Flow Range to:** 20 *gpm*  
75 *lpm*



### Features

The W440 filter assembly can be manifold mounted to the hydraulic system. The size and material configuration are well-suited for today's demanding proportional and servo valve applications. Our standard housing drain plug helps relieve system pressure during filter change-outs. DT 4-layer media is offered in a variety of designs. Five different media grades are offered. Donaldson filters core collapse options range from 150 to 3,000 psi. The differential pressure indicator line is designed to work with a wide assortment of bypass valves. Thermal lockout and surge control are two key features available in the differential indicators.

- Conforms to HF2 specifications
- High collapse filter available for use with non-bypass applications
- Positive sealing poppet bypass for reliability and zero leakage
- Wide range of indicator options
- Compact design for use with servo or proportional valve
- Two housing length options for design flexibility
- Head material: cast iron
- Housing material: steel
- Drain plug in housing

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-12 O-ring
- Manifold mounting  
Top-ported for subplate mounting  
0.69" (17.5 mm) holes,  
1.25" (31.8 mm) centers

#### Assembly Weight

- 4": 8.4 lbs / 3.8 kg
- 8": 10.6 lbs / 4.8 kg

#### Replacement Filter Lengths

- 4.41" / 111.9mm
- 4.46" / 113.2mm

• 8.16" / 207.2mm

• 8.28" / 210.3mm

#### Standard Bypass Ratings

- No Bypass
- 50 psi / 345 kPa / 3.5 bar
- 90 psi / 621 kPa / 6.2 bar

#### Operating Temperatures

- -20° to 250°F (-29° to 121°C)

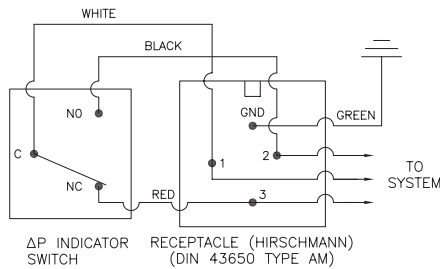
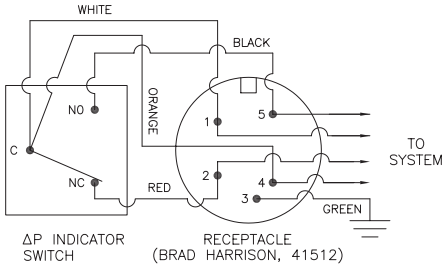
#### Filter Collapse Ratings

- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

## W440 Specification Illustrations

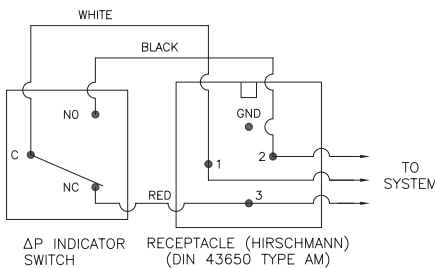
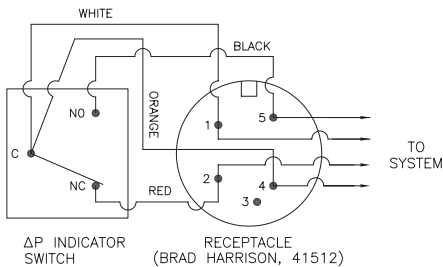
All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



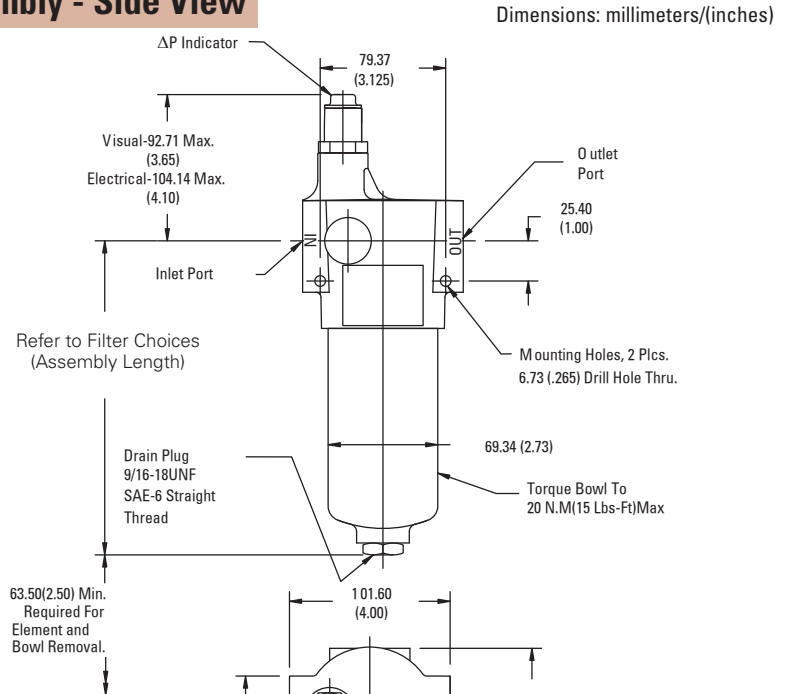
Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings

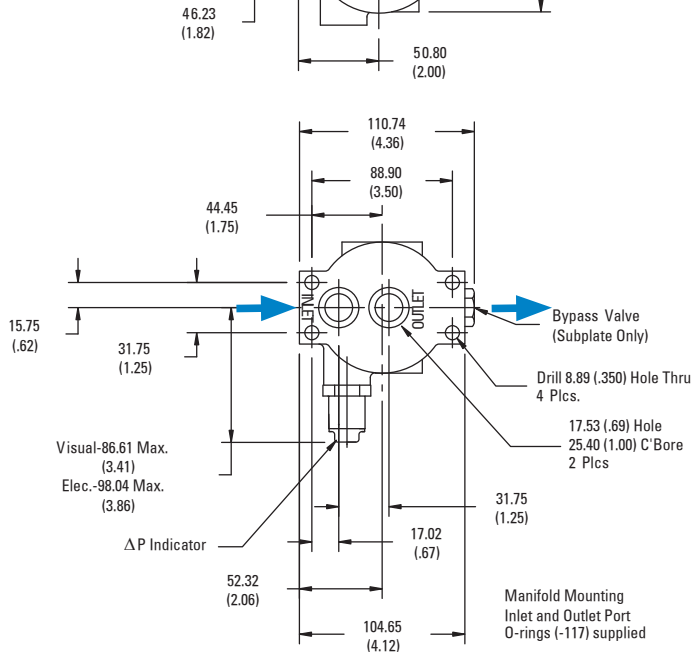


Note: The female plug (connector) is to be furnished by customer.

### Assembly - Side View



### Head - Top View



**Differential Indicators:** Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

**Surge Control:** This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:** The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.



W440  
Max Flow: 20 gpm (75 lpm)



## W440 Components High-Performance DT Filter Choices

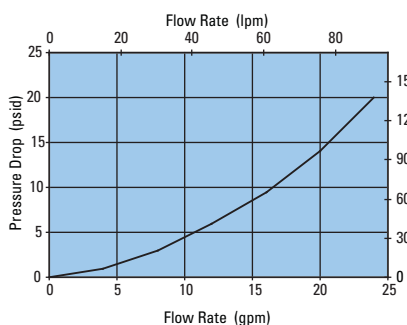
Media Number	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 μm	<4 μm	4.41/111.9	P566194	DT-9020-4-2UM
5 μm	5 μm	4.41/111.9	P566195	DT-9020-4-5UM
8 μm	8 μm	4.41/111.9	P566196	DT-9020-4-8UM
14 μm	14 μm	4.41/111.9	P566197	DT-9020-4-14UM
25 μm	25 μm	4.41/111.9	P566198	DT-9020-4-25UM
2 μm	<4 μm	8.28/210.3	P566199	DT-9020-8-2UM
5 μm	5 μm	8.28/210.3	P566200	DT-9020-8-5UM
8 μm	8 μm	8.28/210.3	P566201	DT-9020-8-8UM
14 μm	14 μm	8.28/210.3	P566202	DT-9020-8-14UM
25 μm	25 μm	8.28/210.3	P566203	DT-9020-8-25UM
5 μm	5 μm	4.46/113.2	P566335	DT-9021-4-5UM, High collapse
14 μm	14 μm	4.46/113.2	P566336	DT-9021-4-14UM, High collapse
5 μm	5 μm	8.16/207.2	P566337	DT-9021-8-5UM, High collapse
14 μm	14 μm	8.16/207.2	P566338	DT-9021-8-14UM, High collapse

### Filter Notes

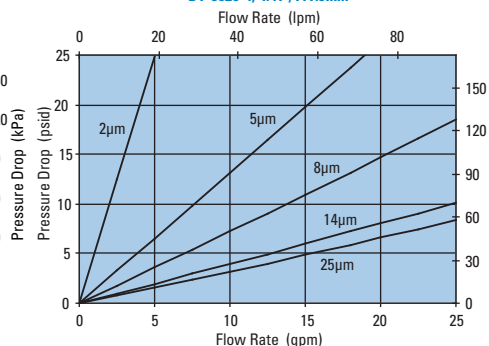
- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademarks of E. I. DuPont de Nemours and Company.

## Performance Data

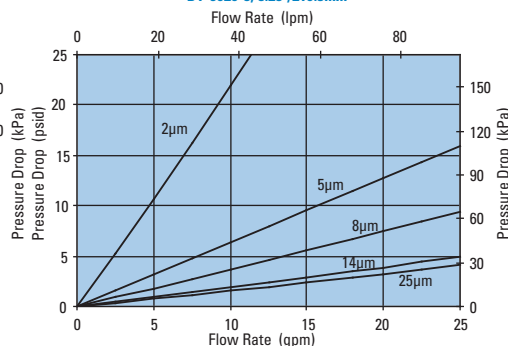
W440 Housing Only



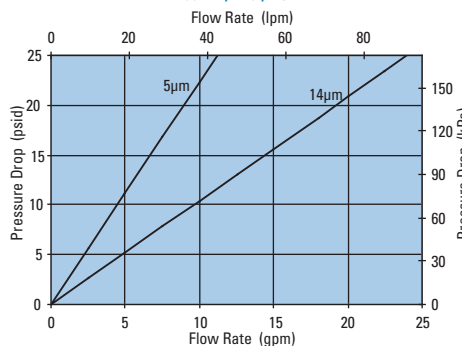
W440 4" DT Filter Only  
DT-9020-4, 4.41"/111.9mm



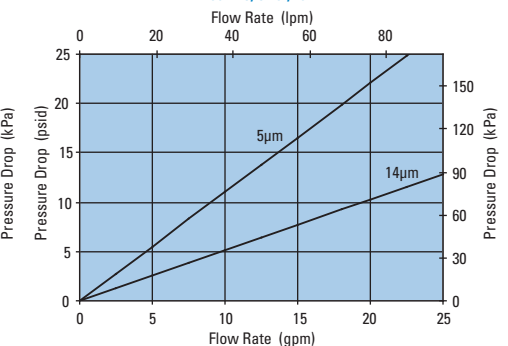
W440 8" DT Filter Only  
DT-9020-8, 8.28"/210.3mm



W440 4" DT Filter Only  
DT-9021-4, 4.46"/113.2mm



W440 8" DT Filter Only  
DT-9021-8, 8.16"/207.2mm





## Housing Ordering Guide

Filter Assembly	W440 TABLE 1	1 TABLE 2	S TABLE 3	1 TABLE 4	J N TABLE 5	B TABLE 6	1 TABLE 7
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Service Filter  
Filters ordered separately. See previous page for filter options.

**LEAD TIME NOTE:**  
This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W440	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psi for housing w/o bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
A	SAE-12 O-ring
S	Manifold mounting

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
4	50 psid
6	90 psid

Note: Use option 1 code only with 3000 psid collapse filter.

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
A	Visual indicator 70 psid w/TL & surge
B	Electrical/visual 70 psid w/TL and surge
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
G	Electrical/visual 35 psid w/TL
I	Visual indicator 70 psid
J	ΔP indicator plug
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3-wire flying lead
O	Visual indicator 100 psid
P	Visual indicator 100 psid w/TL and surge
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3-wire flying lead
T	Electrical switch 100 psid
U	Electrical switch 70 psid
W	Electrical/visual 100 psid w/TL
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
E	E.P.R.
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
1 (7.18")	4.0"
2 (10.8")	8.0"*

\*HF2

**METRIC PORTING AVAILABLE**  
Change W440 to G440  
Porting code A becomes G-3/4"  
ISO 228 BSPP

### Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2 $\mu$ m
03	DT 5 $\mu$ m
05	DT 8 $\mu$ m
10	DT 14 $\mu$ m
20	DT 25 $\mu$ m

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Company.





FPK02

Max Flow: 25 gpm (95 lpm)

## FPK02 In-Line Cartridge Filters

**Working Pressures to:** 6090 *psi*  
42,000 kPa  
420 bar

**Rated Static Burst to:** 9135 *psi*  
63,000 kPa  
630 bar

**Flow Range to:** 25 *gpm*  
95 *lpm*



### Features

The FPK02 is built to withstand pressures upwards of 6000 psi (420 bar). It features a cast iron head and cold-extruded steel housing for ultimate strength and durability. This filter meets the HF2 in-plant automotive specification.

Bypass options include 87 psi/6 bar bypass, bypass with reverse-flow check valve, or no bypass.

Take advantage of our mix and match system of in-stock heads, housings and cartridges, so you can get exactly what you need. You can also choose the media type and configuration that's best for your application. All FPK02 filters contain Synteq™, Donaldson's exclusive synthetic fiber media formulated especially for hydraulic filtration.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-12 O-ring

#### Assembly Weight

- 4" Assembly: 9.2 lbs / 4.2 kg
- 8" Assembly: 13.2 lbs / 6.0 kg

#### Replacement Filter Lengths

- 4.41" / 111.9mm
- 4.46" / 113.2mm
- 8.16" / 207.2mm
- 8.28" / 210.3mm

#### Standard Bypass Ratings

- 87 *psi* / 600 kPa / 6 bar
- 87 *psi* Bypass with reverse-flow check valve
- No Bypass

#### Operating Temperatures

- -20°F to 250°F / -29°C to 120°C

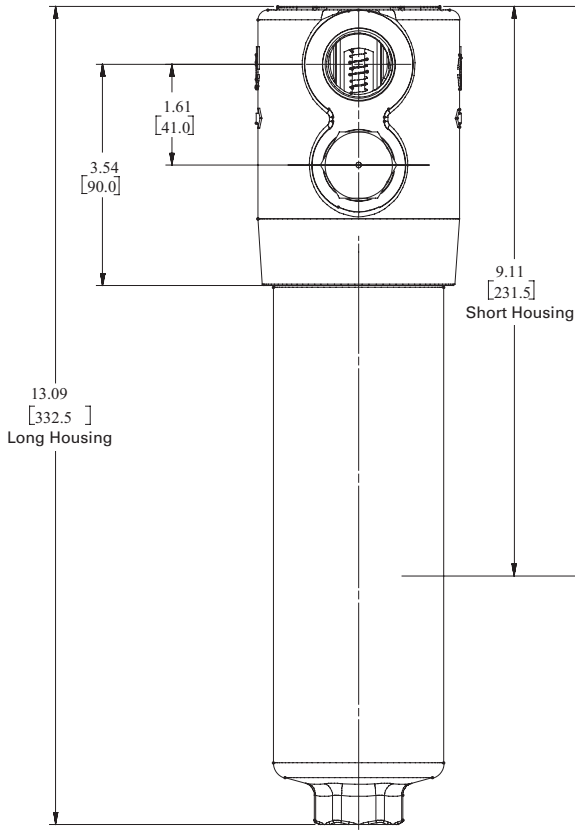
#### Filter Collapse Ratings

- 290 *psi* / 2000 kPa / 20 bar (standard)
- 3000 *psi* / 20,700 kPa / 207 bar (high collapse)

## FPK02 Specification Illustrations

All dimensions are shown in inches [millimeters].

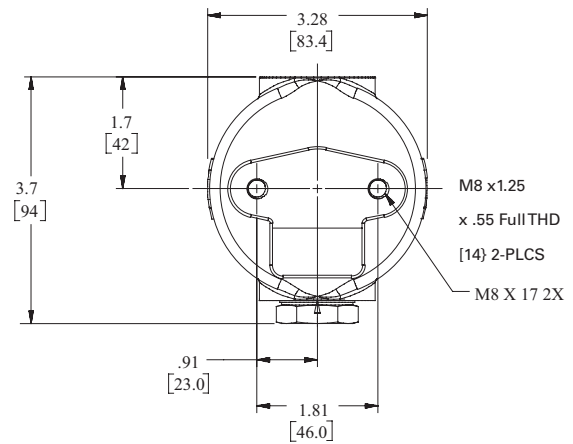
### Assembly - Side View



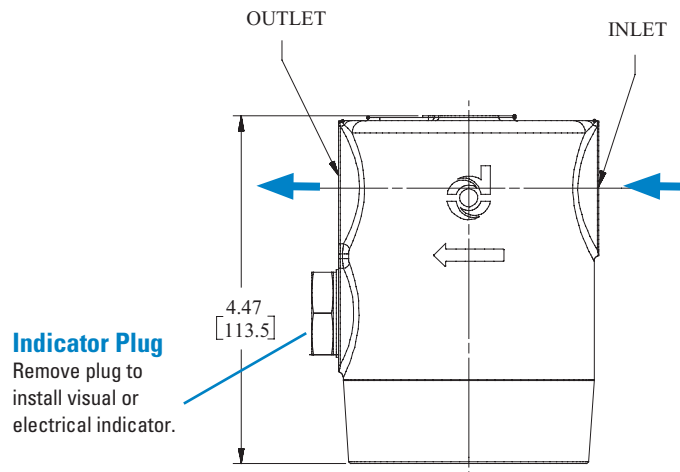
### Applications:

- Servo Valve Circuits
- In-Plant & Mobile Equipment
- Power Steering Circuits
- High Pressure Circuits
- Meets HF2 Specification

### Head - Top View



### Head - Side View



All dimensions above are shown in inches [millimeters]



# FPK02

## Max Flow: 25 gpm (95 lpm)

## FPK02 Components Standard Filter Choices

Media	B <sub>μ(c)</sub> = 1000	Length	Part	Comments
No. 1	5 μm	4.37/111	P169429	Buna-N® Seal
			P167180	Fluorocarbon Seal High Collapse
		8.12/203	P167838	Buna-N Seal
			P167182	Fluorocarbon Seal High Collapse
No. 2	9 μm	4.37/111	P165041	Buna-N Seal
		8.12/203	P165043	Buna-N Seal
No. 2½	10 μm	4.37/111	P165006	Buna-N Seal
			P167181	Fluorocarbon Seal High Collapse
		8.12/203	P165015	Buna-N Seal
			P167183	Fluorocarbon Seal High Collapse
No. 9	23 μm	4.37/111	P165136	Buna-N Seal
		8.12/203	P165138	Buna-N Seal

### Filter Notes

- Refer to the table in the Technical Reference Guide for fluid compatibility with our filter media.
- If you're filtering petroleum-based oil, filters with seals made of Buna-N are appropriate for most applications.
- If you're filtering diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF over 150°F/83°C, use filters with seals made of fluorocarbon, such as Viton® from DuPont Dow Elastomers, or Fluorel® from 3M Company.
- Donaldson "high collapse" filters, with their steel end caps and wire-backed media, are rated to withstand up to 3000 psi/ 20,700 kPa before collapsing.
- The fluorocarbon seal/high collapse filters also use epoxy potting and media seam seals for added chemical compatibility.
- Viton® and Buna-N® registered trademarks of E. I. DuPont de Nemours and Company.



## Housing Choices

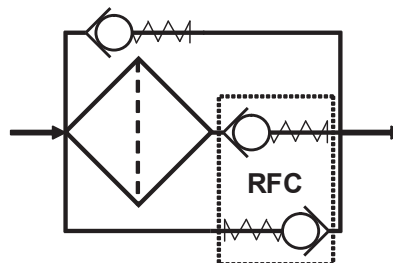
Length (in.)	Part No.
4" filter	P762769
8" filter	P762770

## Head Choices

Port Size	Bypass Rating	Part No.
SAE-12 O-Ring	87 psi / 6 bar	P762766
SAE-12 O-Ring with reverse-flow check valve	87 psi / 6 bar	P762767
SAE-12 O-Ring	No Bypass	P762768

**NOTE:** Indicator port is machined and plugged. Replace plug with indicator of choice: P171945 (visual) or P761056 (electrical). See illustration on page 155 for details.

### Reverse Flow Check Schematic



## High-Performance DT Filter Choices

Media Number	Beta <sub>(10)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 µm	<4 µm	4.41/111.9	P566194	DT-9020-4-2UM
5 µm	5 µm	4.41/111.9	P566195	DT-9020-4-5UM
8 µm	8 µm	4.41/111.9	P566196	DT-9020-4-8UM
14 µm	14 µm	4.41/111.9	P566197	DT-9020-4-14UM
25 µm	25 µm	4.41/111.9	P566198	DT-9020-4-25UM
2 µm	<4 µm	8.28/210.3	P566199	DT-9020-8-2UM
5 µm	5 µm	8.28/210.3	P566200	DT-9020-8-5UM
8 µm	8 µm	8.28/210.3	P566201	DT-9020-8-8UM
14 µm	14 µm	8.28/210.3	P566202	DT-9020-8-14UM
25 µm	25 µm	8.28/210.3	P566203	DT-9020-8-25UM
5 µm	5 µm	4.46/113.2	P566335	DT-9021-4-5UM, High collapse
14 µm	14 µm	4.46/113.2	P566336	DT-9021-4-14UM, High collapse
5 µm	5 µm	8.16/207.2	P566337	DT-9021-8-5UM, High collapse
14 µm	14 µm	8.16/207.2	P566338	DT-9021-8-14UM, High collapse

### Filter Notes

- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.





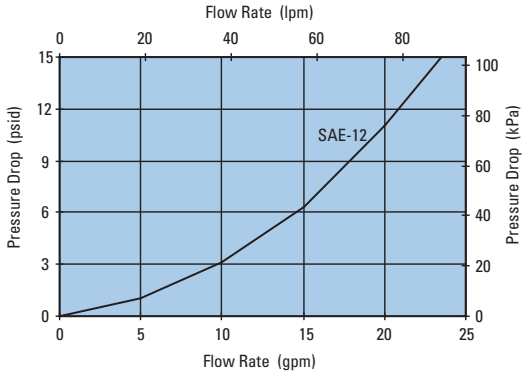
# FPK02

Max Flow: 25 gpm (95 lpm)



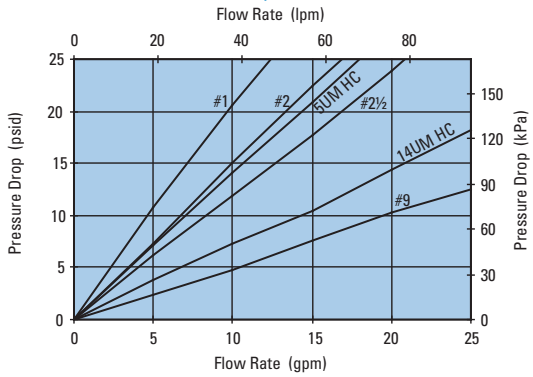
## Performance Data

**FPK02 Housing Only**



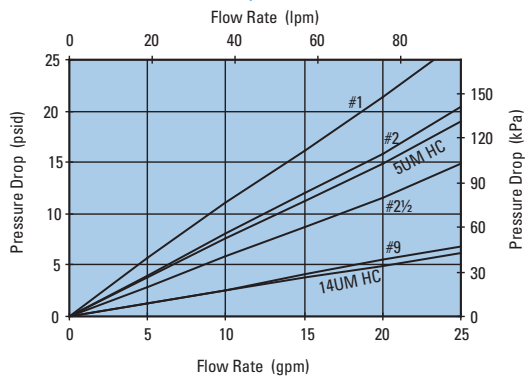
**FPK02 Standard 4" Filter Only**

4.37"/111mm



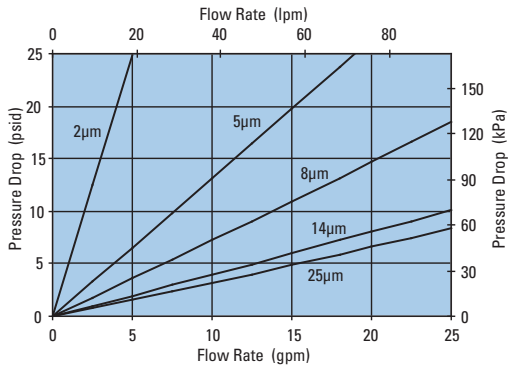
**FPK02 Standard 8" Filter Only**

8.12"/203mm



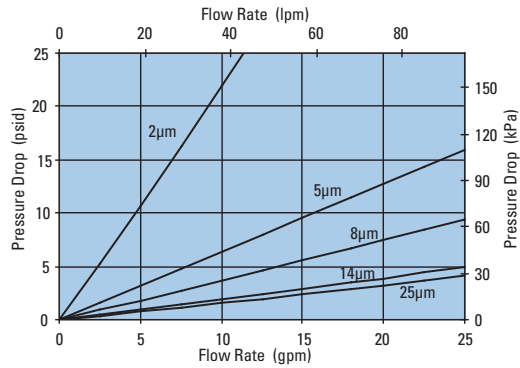
**FPK02 4" DT Filter Only**

DT-9020-4, 4.41"/111.9mm



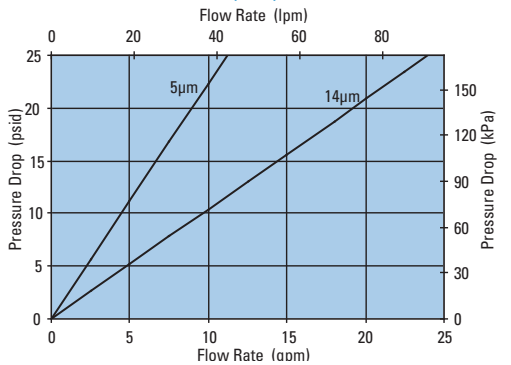
**FPK02 8" DT Filter Only**

DT-9020-8, 8.28"/210.3mm



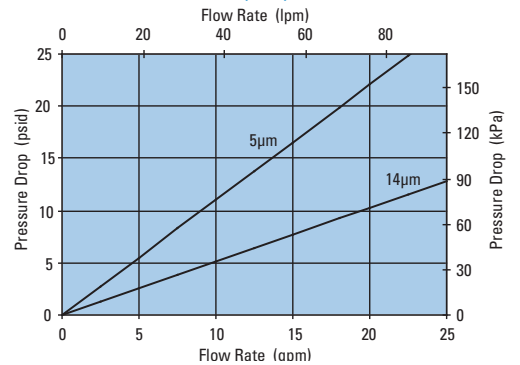
**FPK02 4" DT Filter Only**

DT-9021-4, 4.46"/113.2mm



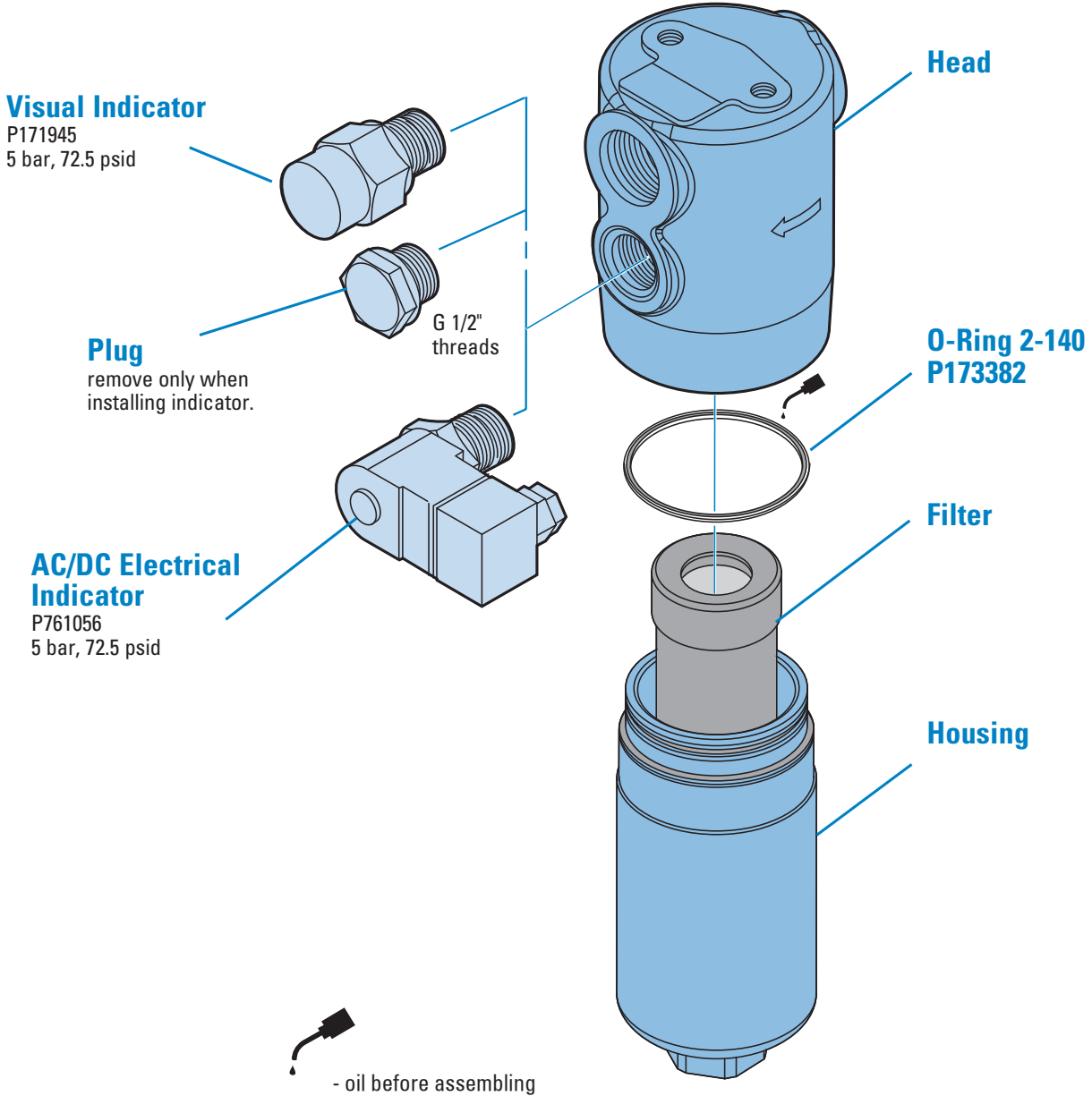
**FPK02 8" DT Filter Only**

DT-9021-8, 8.16"/207.2mm



## FPK02 Service Parts

When installing the FPK02 housing onto an installed head, torque it to 15 ft-lbs./2.1 kg-m.







W613

Max Flow: 35 gpm (130 lpm)

## W613 In-Line Cartridge Filters

**Working Pressures to:** 6500 *psi*  
44,800 kPa  
448 bar

**Rated Static Burst to:** 20,000 *psi*  
138,000 kPa  
1380 bar

**Fatigue Pressure Rating:** 3250 *psi*  
22,400 kPa  
224 bar

**Flow Range to:** 35 *gpm*  
130 *lpm*



### Features

The W613 with the T-Type port arrangement is an alternative to the W610 L-Type porting. These are offered with the same housing, filter and indicators used in our W610 filter assemblies. Donaldson DT high-performance 4-layer media is offered in five different media grades. The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features incorporated in many of the valves.

- Head material: cast iron
- Housing material: steel

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE- 12, -16 O-ring
- 1" SAE 4-Bolt Flange Code 61 or 62

#### Assembly Weight

- 8.1": 19.4 lbs / 8.8 kg
- 11.75": 21.5 lbs / 9.8 kg

#### Replacement Filter Lengths

- 4.41" / 111.9mm
- 4.46" / 113.2mm
- 8.16" / 207.2mm
- 8.28" / 210.3mm

#### Standard Bypass Ratings

- 90 psi / 621 kPa / 6.2 bar
- 50 psi / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -20° to 250°F (-29° to 121°C)

#### Filter Collapse Ratings

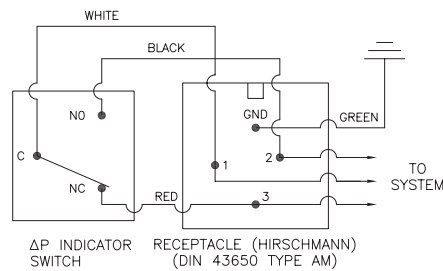
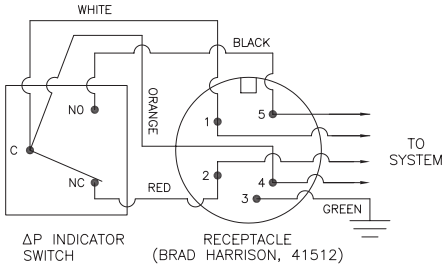
- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

## W613 Specification Illustrations

All dimensions are shown in millimeters [inches].

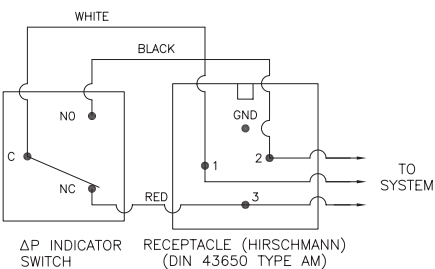
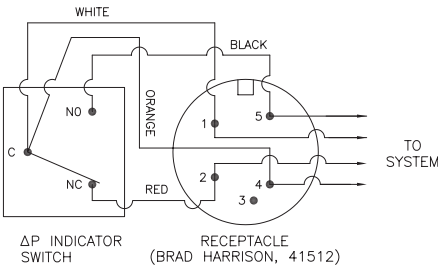
### Indicator Switch Schematic Wiring Diagram

#### Aluminum Electrical Housings



Note: The female plug (connector) is to be furnished by customer.

#### Plastic Electrical Housings



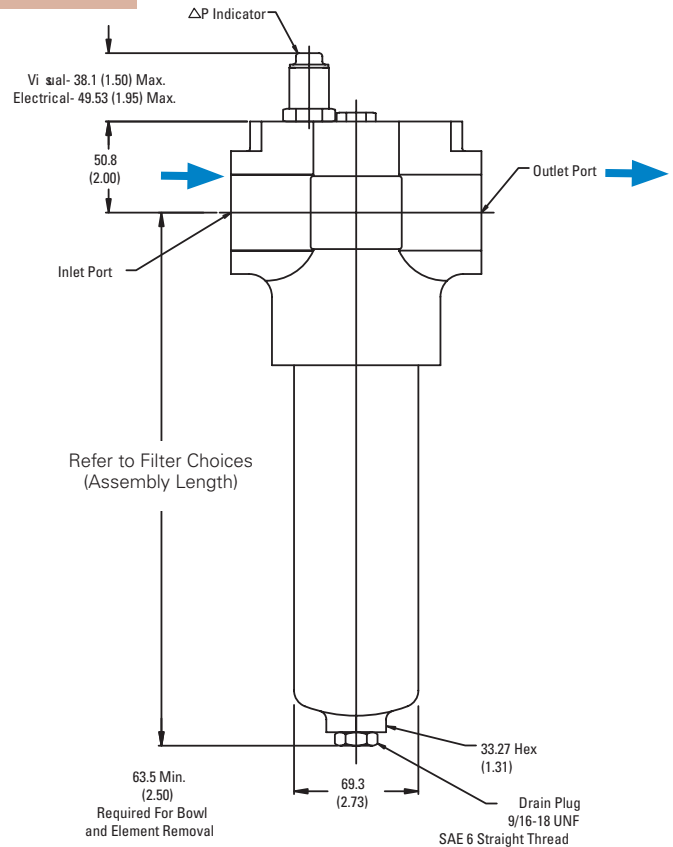
Note: The female plug (connector) is to be furnished by customer.

**Differential Indicators:** Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

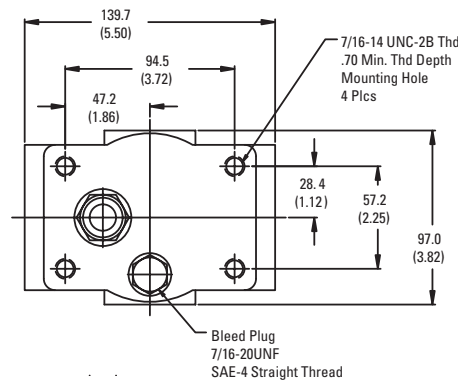
**Surge Control:** This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:** The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.

### Assembly - Side View



### Head - Top View





W613

Max Flow: 35 gpm (130 lpm)



## W613 Components

### High-Performance DT Filter Choices

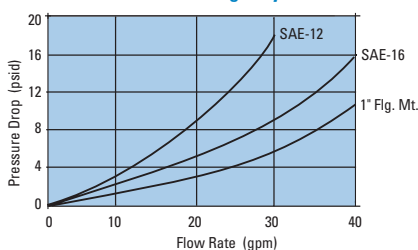
Media Number	Beta <sub>w(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 μm	<4 μm	4.41/111.9	P566391	DT-9800-4-2UM
5 μm	5 μm	4.41/111.9	P566392	DT-9800-4-5UM
8 μm	8 μm	4.41/111.9	P566393	DT-9800-4-8UM
14 μm	14 μm	4.41/111.9	P566394	DT-9800-4-14UM
25 μm	25 μm	4.41/111.9	P566395	DT-9800-4-25UM
2 μm	<4 μm	8.28/210.3	P566396	DT-9800-8-2UM
5 μm	5 μm	8.28/210.3	P566397	DT-9800-8-5UM
8 μm	8 μm	8.28/210.3	P566398	DT-9800-8-8UM
14 μm	14 μm	8.28/210.3	P566399	DT-9800-8-14UM
5 μm	5 μm	4.46/113.2	P566406	DT-9801-4-5UM, High collapse
14 μm	14 μm	4.46/113.2	P566407	DT-9801-4-14UM, High collapse
5 μm	5 μm	8.16/207.2	P566408	DT-9801-8-5UM, High collapse
14 μm	14 μm	8.16/207.2	P566409	DT-9801-8-14UM, High collapse

#### Filter Notes

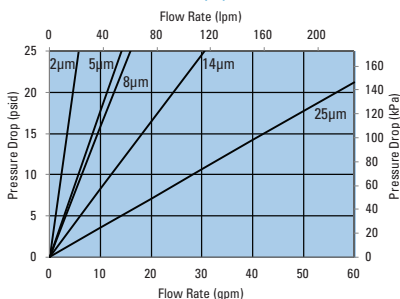
- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademarks of E. I. DuPont de Nemours and Company.

## Performance Data

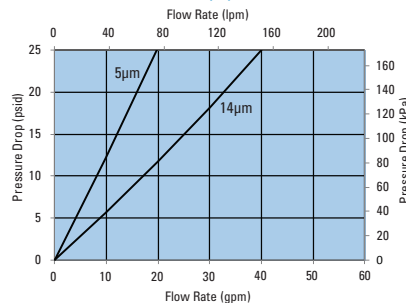
W613 Housing Only



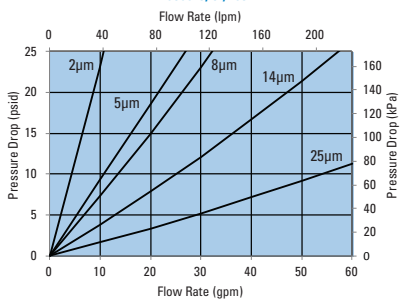
W613 4" DT Filter Only  
DT-9800-4, 4"/102mm



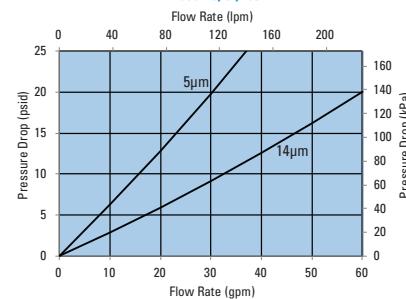
W613 4" DT Filter Only  
DT-9801-4, 4"/102mm



W613 8" DT Filter Only  
DT-9800-8, 8"/203mm



W613 8" DT Filter Only  
DT-9801-8, 8"/203mm





## Housing Ordering Guide

Filter Assembly	W613 TABLE 1	1 TABLE 2	B TABLE 3	4 TABLE 4	M N TABLE 5	B TABLE 6	2 TABLE 7
-----------------	-----------------	--------------	--------------	--------------	----------------	--------------	--------------

Service Filter  
Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W613	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psid for housing without bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
A	SAE-12 O-ring
B	SAE-16 O-ring
F	1" SAE 4-Bolt Flange Code 61
M	1" SAE 4-Bolt Flange Code 62

### Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2 $\mu$ m
03	DT 5 $\mu$ m
05	DT 8 $\mu$ m
10	DT 14 $\mu$ m
20	DT 25 $\mu$ m

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
4	50 psid
6	90 psid

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	$\Delta$ P INDICATOR STYLE & SETTING
A	Visual indicator 70 + 10 psid w/TL and surge
B	Electrical/visual 70 + 10 psid w/TL and surge
D	Electrical/visual 35 + 5 psid
E	Electrical/visual 100 + 12 psid
G	Electrical/visual 35 + 5 psid w/TL
I	Visual indicator 70 + 10 psid
J	No indicator
L	Visual indicator 35 + 5 psid
M	Visual indicator 35 + 5 psid w/ TL and surge
N	Electrical/visual 35 + 5 psid w/12" 3 wire flying lead
O	Visual indicator 100 + 12 psid
P	Visual indicator 100 + 12 psid w/TL and surge
R	Electrical switch 35 + 5 psid
S	Electrical/visual 100 + 12 psid w/12" 3 wire flying lead
T	Electrical switch 100 + 12 psid
U	Electrical switch 70 + 10 psid
V	Electrical/visual 70 + 10 psid w/TL
W	Electrical/visual 100 + 12 psid w/TL
Y	Electrical/visual 35 + 5 psid w/TL and surge
Z	Electrical/visual 100 + 12 psid w/TL and surge

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual $\Delta$ P indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
1 (8.10")	4.0"
2 (11.75")	8.0"

### METRIC PORTING AVAILABLE

Change W613 to G613  
Porting code A becomes 3/4" ISO 228 BSPP  
Porting code B becomes 1" ISO 228 BSPP  
Porting code F becomes 1" SAE 4 bolt flange with M10 mounting threads  
Porting code M becomes 1" SAE 4 bolt flange with M12 mounting threads

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Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.



W322

Max Flow: 50 gpm (190 lpm)

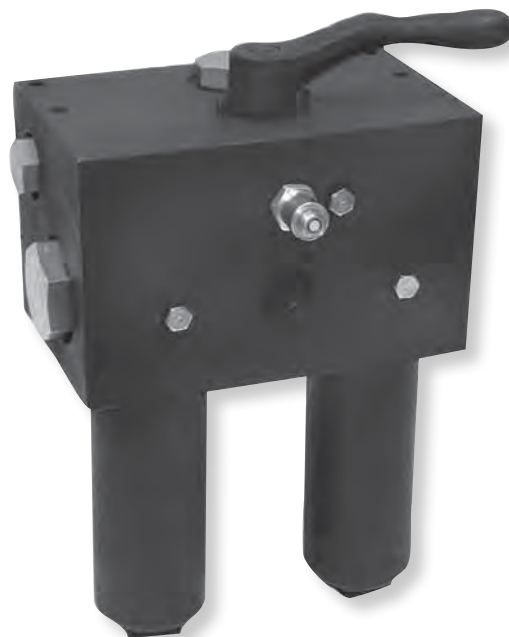
## W322 In-Line Cartridge Filters

**Working Pressures to:** 3000 *psi*  
20,700 kPa  
207 bar

**Rated Static Burst to:** 7,500 *psi*  
51,700 kPa  
517 bar

**Fatigue Pressure Rating:** 2000 *psi*  
13,800 kPa  
138 bar

**Flow Range to:** 50 *gpm*  
190 *lpm*



### Features

The W322 duplex filter assembly provides continuous, uninterrupted filtering of flows up to 50 gpm. The proprietary housing check valves insure leak free maintenance during replacement filter cycle. The high density aluminum material provides for a compact and lightweight filter design. Donaldson DT high-performance 4-layer media is offered in five different media grades. The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features incorporated in many of the valves.

- Anodized aluminum head and housing
- Duplex offers continuous filtration
- Two housing length options

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-16 O-ring

#### Assembly Weight

- 6.88": 34 lbs / 15.5 kg
- 9.86": 36 lbs / 16.4 kg

#### Replacement Filter Lengths

- 4.41" / 111.9mm
- 4.46" / 113.2mm
- 8.16" / 207.2mm
- 8.28" / 210.3mm

#### Standard Bypass Ratings

- 90 psi / 621 kPa / 6.2 bar
- 50 psi / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -20° to 250°F (-29° to 121°C)

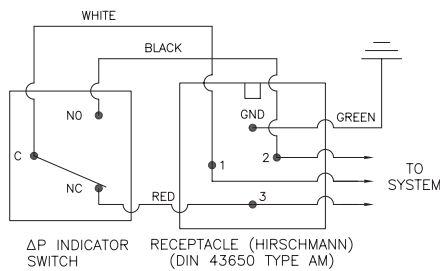
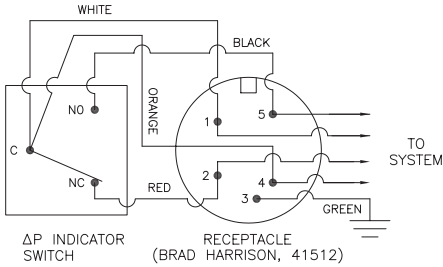
#### Filter Collapse Ratings

- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

## W322 Specification Illustrations

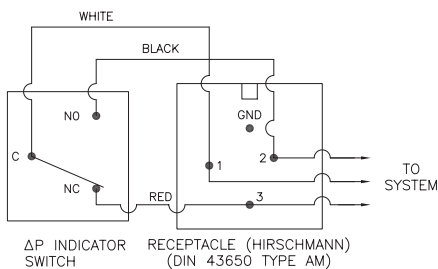
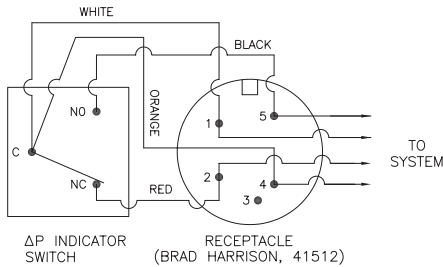
All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings



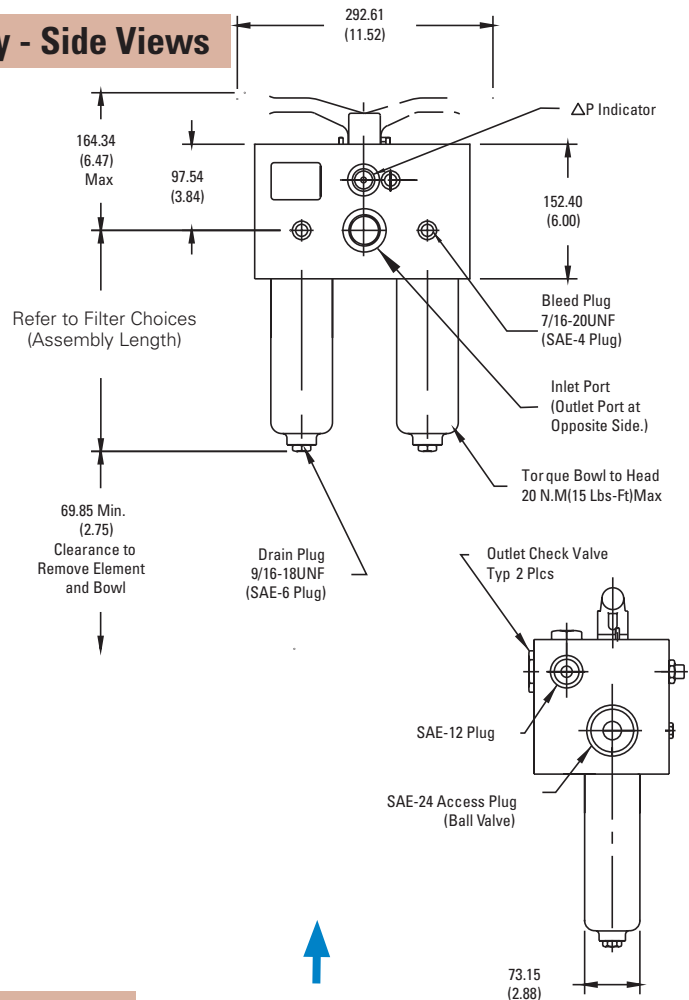
Note: The female plug (connector) is to be furnished by customer.

**Differential Indicators:** Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

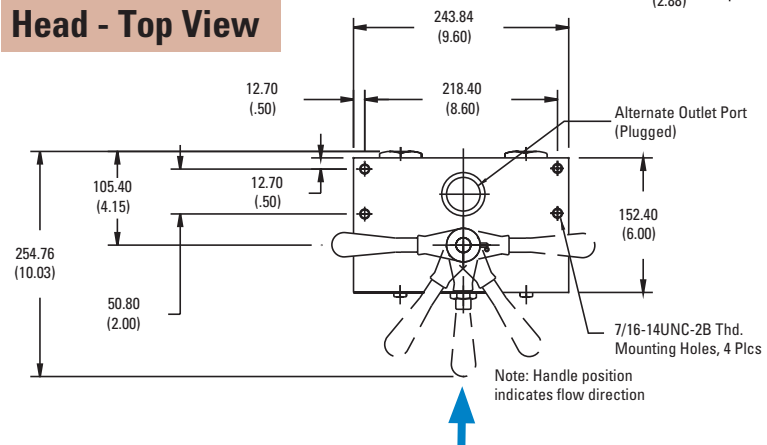
**Surge Control:** This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:** The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.

### Assembly - Side Views



### Head - Top View







W322  
Max Flow: 50 gpm (190 lpm)



## W322 Components High-Performance DT Filter Choices

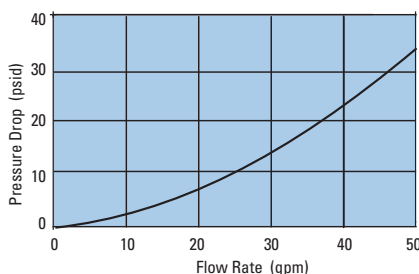
Media Number	Beta <sub>w(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 μm	<4 μm	4.41/111.9	P566391	DT-9800-4-2UM
5 μm	5 μm	4.41/111.9	P566392	DT-9800-4-5UM
8 μm	8 μm	4.41/111.9	P566393	DT-9800-4-8UM
14 μm	14 μm	4.41/111.9	P566394	DT-9800-4-14UM
25 μm	25 μm	4.41/111.9	P566395	DT-9800-4-25UM
2 μm	<4 μm	8.28/210.3	P566396	DT-9800-8-2UM
5 μm	5 μm	8.28/210.3	P566397	DT-9800-8-5UM
8 μm	8 μm	8.28/210.3	P566398	DT-9800-8-8UM
14 μm	14 μm	8.28/210.3	P566399	DT-9800-8-14UM
25 μm	25 μm	8.28/210.3	P566400	DT-9800-8-25UM
5 μm	5 μm	4.46/113.2	P566406	DT-9801-4-5UM, High collapse
14 μm	14 μm	4.46/113.2	P566407	DT-9801-4-14UM, High collapse
5 μm	5 μm	8.16/207.2	P566408	DT-9801-8-5UM, High collapse
14 μm	14 μm	8.16/207.2	P566409	DT-9801-8-14UM, High collapse

### Filter Notes

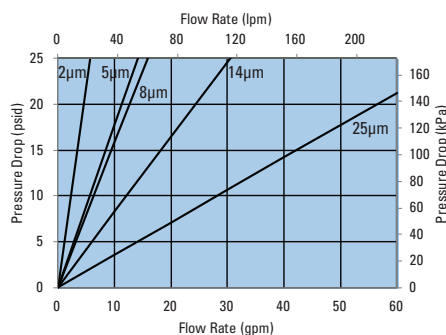
- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

## Performance Data

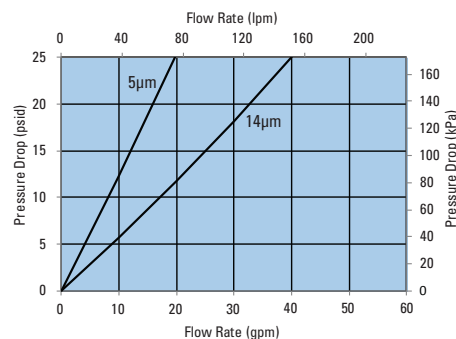
W322 Housing Only



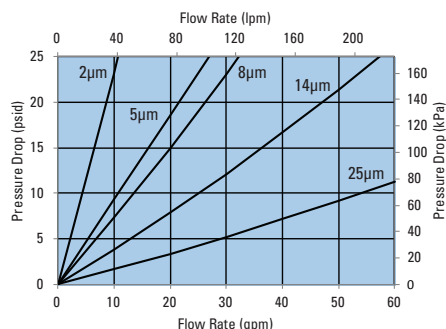
W322 4" DT Filter Only  
DT-9800-4, 4"/102mm



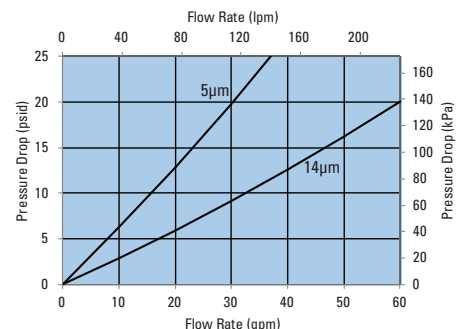
W322 4" DT Filter Only  
DT-9801-4, 4"/102mm



W322 8" DT Filter Only  
DT-9800-8, 8"/203mm



W322 8" DT Filter Only  
DT-9801-8, 8"/203mm





## Housing Ordering Guide

Filter Assembly	W322 TABLE 1	1 TABLE 2	B TABLE 3	4 TABLE 4	D   N TABLE 5	B TABLE 6	2 TABLE 7
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Service Filter  
Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W322	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psid for housing without bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
B	SAE-16 O-ring

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
4	50 psid
6	90 psid

\*Note: Use option 1 code only with 3000 psid collapse filter.

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
A	Visual indicator 70 psid w/TL and surge
B	Electrical/visual 70 psid w/TL and surge
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
G	Electrical/visual 35 psid w/TL
I	Visual indicator 70 psid
J	ΔP indicator plug
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/TL and surge
N	Electrical/visual 35 psid w/12" 3-wire flying lead
O	Visual indicator 100 psid
P	Visual indicator 100 psid w/TL and surge
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3-wire flying lead
T	Electrical switch 100 psid
U	Electrical switch 70 psid
V	Electrical/visual 70 psid w/TL
W	Electrical/visual 100 psid w/TL
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
1 (6.88")	4.0"
2 (9.86")	8.00"

### METRIC PORTING AVAILABLE

Change W322 to G322  
Porting code B becomes 1"  
ISO 228 BSPP

### Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2 $\mu$ m
03	DT 5 $\mu$ m
05	DT 8 $\mu$ m
10	DT 14 $\mu$ m
20	DT 25 $\mu$ m

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.



W350

Max Flow: 50 gpm (190 lpm)

## W350 In-Line Cartridge Filters

**Working Pressures to:** 3000 *psi*  
21,000 kPa  
210 bar

**Rated Static Burst to:** 7500 *psi*  
51,700 kPa  
517 bar

**Fatigue Pressure Rating:** 1500 *psi*  
10,000 kPa  
100 bar

**Flow Range to:** 50 *gpm*  
190 *lpm*



### Features

The W350 T-type ported series offers flows to 50 gpm (190 lpm) with 3 bypass options and conforms to the HF3 automotive standard. Our standard housing drain plug helps relieve system pressure during filter changeouts. DT 4-layer media is offered in a variety of designs. Five different media grades are offered. Donaldson filters core collapse options range from 150 to 3,000 psi (10 to 210 bar). The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features available in the differential indicators.

- Conforms to HF3 specifications
- High collapse filter available for use with non-bypass applications
- Wide range of indicator options
- Two housing length options for design flexibility
- Head material: cast iron
- Housing material: steel
- Drain plug in housing
- Bleed plug in head

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-12, -16 O-ring

#### Assembly Weight

- 4": 20 lbs / 9.07 kg
- 8": 26 lbs / 11.79 kg

#### Replacement Filter Lengths

- 4.59" / 116.7mm
- 8.22" / 208.8mm

#### Standard Bypass Ratings

- 90 psi / 621 kPa / 6.2 bar
- 50 psi / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -20° to 250°F (-29° to 121°C)

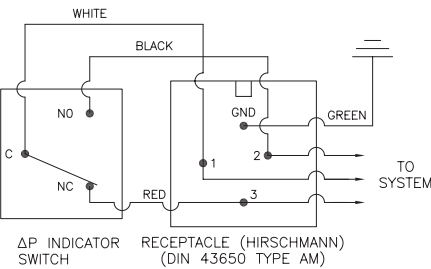
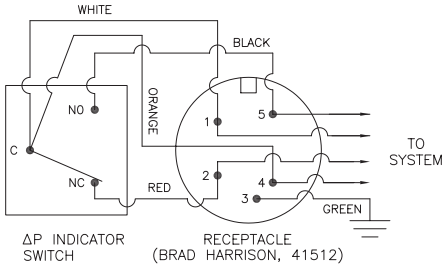
#### Filter Collapse Ratings

- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

## W350 Specification Illustrations

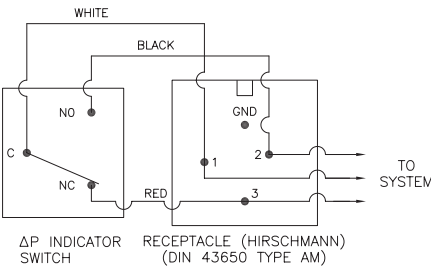
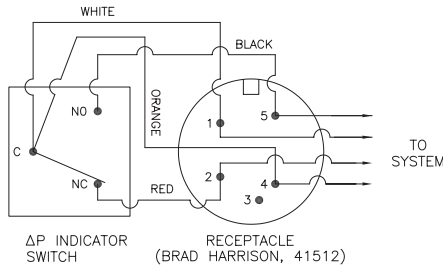
All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



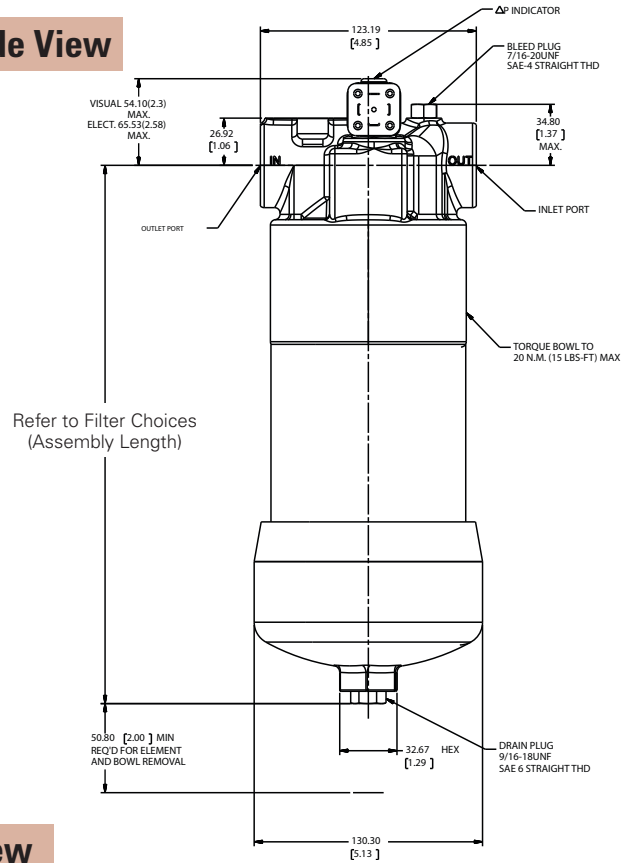
Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings

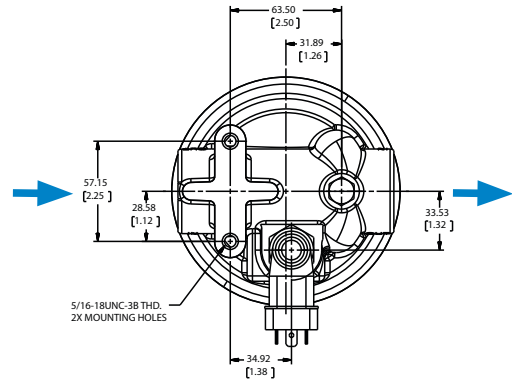


Note: The female plug (connector) is to be furnished by customer.

### Assembly - Side View



### Head - Top View



### Differential Indicators:

Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

### Surge Control:

This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

### Thermal Lockout:

The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.



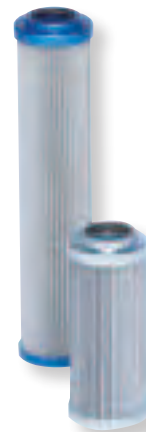
W350  
Max Flow: 50 gpm (190 lpm)



## W350 Components

### High-Performance DT Filter Choices

Media Number	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 μm	<4 μm	4/116.7	P566204	DT-9600-4-2UM
5 μm	5 μm	4/116.7	P566205	DT-9600-4-5UM
8 μm	8 μm	4/116.7	P566206	DT-9600-4-8UM
14 μm	14 μm	4/116.7	P566207	DT-9600-4-14UM
25 μm	25 μm	4/116.7	P566208	DT-9600-4-25UM
5 μm	5 μm	4/116	P566364	DT-9601-4-5UM, High collapse
14 μm	14 μm	4/116	P566365	DT-9601-4-14UM, High collapse
2 μm	<4 μm	8/208.8	P566209	DT-9600-8-2UM
5 μm	5 μm	8/208.8	P566210	DT-9600-8-5UM
8 μm	8 μm	8/208.8	P566211	DT-9600-8-8UM
14 μm	14 μm	8/208.8	P566212	DT-9600-8-14UM
25 μm	25 μm	8/208.8	P566213	DT-9600-8-25UM
5 μm	5 μm	8/208	P566366	DT-9601-8-5UM, High collapse
14 μm	14 μm	8/208	P566367	DT-9601-8-14UM, High collapse
2 μm	<4 μm	8/209	P567875	DX2-9600-8-2UM
5 μm	5 μm	8/209	P565122	DX2-9600-8-5UM
8 μm	8 μm	8/209	P565123	DX2-9600-8-8UM
14 μm	14 μm	8/209	P564936	DX2-9600-8-14UM
WA	B>30 <sub>(c)</sub> = 200	8/209	P569528	Absorbs 130 ml water @ 25 psid

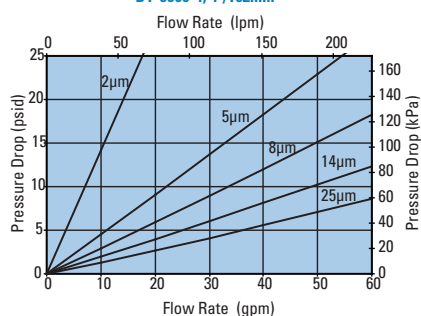


#### Filter Notes

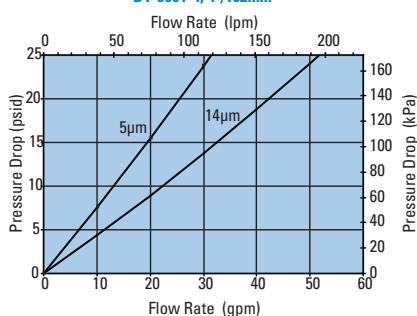
- All Donaldson DT and DX2 filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT and DX2 filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT and DX2 filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.
- DX2 filters utilize nylon mesh for pleat support.

## Performance Data

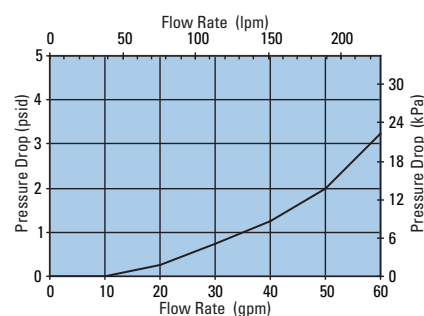
W350 4" DT Filter Only  
DT-9600-4, 4"/102mm



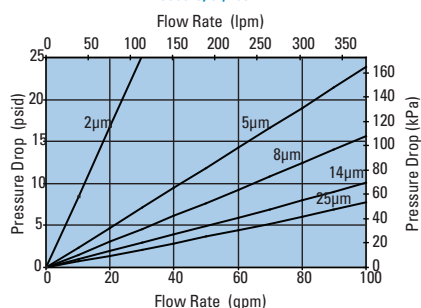
W350 4" DT Filter Only  
DT-9601-4, 4"/102mm



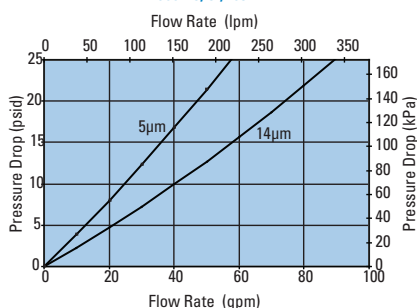
W350 Housing Only



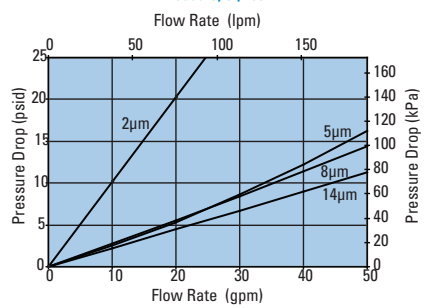
W350 8" DT Filter Only  
DT-9600-8, 8"/203mm



W350 8" DT Filter Only  
DT-9601-8, 8"/203mm



W350 8" DT Filter Only  
DX2-9600-8, 8"/203mm





## Housing Ordering Guide

Filter Assembly	W350 TABLE 1	1 TABLE 2	B TABLE 3	1 TABLE 4	J N TABLE 5	B TABLE 6	1 TABLE 7
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Service Filter  
Filters ordered separately. See previous page for filter options.

**LEAD TIME NOTE:**  
This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W350	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psi for housing w/o bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
A	SAE-12 O-ring
B	SAE-16 O-ring

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
3	25 psid
4	50 psid
6	90 psid

Note: Use option 1 code only with 3000 psid collapse filter.

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
A	Visual indicator 70 psid w/TL & surge
B	Electrical/visual 70 psid w/TL and surge
C	Electrical/visual 15 psid
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
F	Electrical/visual 15 psid w/TL
G	Electrical/visual 35 psid w/TL
H	Electrical/visual 15 psid w/12" 3-wire flying lead
I	Visual indicator 70 psid
J	ΔP indicator plug
K	Visual indicator 15 psid
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3-wire flying lead
O	Visual indicator 100 psid
P	Visual indicator 100 psid w/TL and surge
Q	Electrical switch 15 psid
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3-wire flying lead
T	Electrical switch 100 psid
U	Electrical switch 70 psid
W	Electrical/visual 100 psid w/TL
X	Electrical/visual 15 psid w/TL and surge
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
E	E.P.R.
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LENGTH)	FILTER LENGTH
1 (8.5")	4.0"
2 (12.0")	8.0"

**METRIC PORTING AVAILABLE**

Change W350 to G350  
Porting code B becomes G-1"  
ISO 228 BSPP

**Media Ratings**

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2 $\mu$ m
03	DT 5 $\mu$ m
05	DT 8 $\mu$ m
10	DT 14 $\mu$ m
20	DT 25 $\mu$ m

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.





HPK03

Max Flow: 60 gpm (227 lpm)



## HPK03 In-Line Cartridge Filters

**Working Pressures to:** 3000 *psi*  
20,700 kPa  
206.9 bar

**Rated Static Burst to:** 6000 *psi*  
41,400 kPa  
413.8 bar

**Flow Range to:** 60 *gpm*  
227 *lpm*



### Features

The sturdy HPK03 filter is constructed of ductile iron for durability in high pressure applications. Standard housing drain plug means simplified servicing. Housing includes a fluoroelastomer head-to-housing seal. Meets HF3 specification.

Take advantage of our mix and match system of in-stock heads and cartridges—so you can get exactly what you need. HPK03 is available with your choice of visual or AC/DC electrical indicators. Likewise, choose the bypass option that's right for your application—50 psi (3.5 bar) or no bypass. Seals made of fluorocarbon (such as Viton® and Fluorel®) or Buna-N are available with HPK03.

All HPK03 filters contain Synteq™, our synthetic filter media designed especially for hydraulic filtration. Upgraded Donaldson DT filters are also offered for superior performance.

Viton® is a registered trademark of E. I. DuPont de Nemours and Company.  
Fluorel® is a registered trademark of 3M Company.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-12, -16 O-ring

#### Assembly Weight

- 26 lbs / 11.8 kg

#### Replacement Filter Lengths

- 8.22" / 208.8mm

#### Standard Bypass Ratings

- 50 *psi* / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -20°F to 250°F / -29°C to 121°C

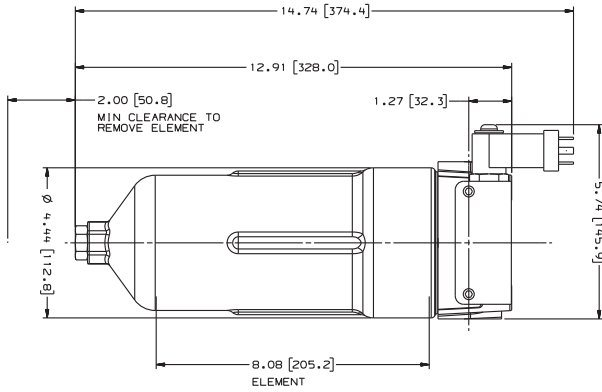
#### Filter Collapse Ratings

- 200 *psi* / 1380 kPa / 13.8 bar (standard)
- 3000 *psi* / 20,700 kPa / 206.9 bar (high collapse)

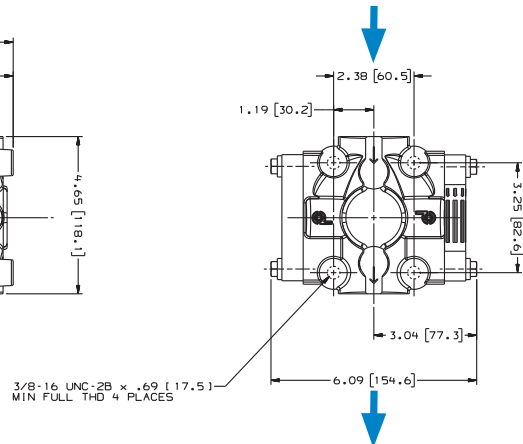
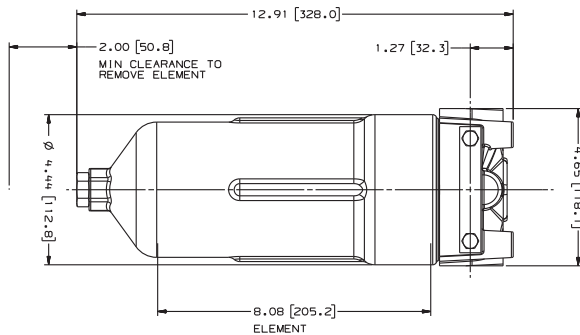
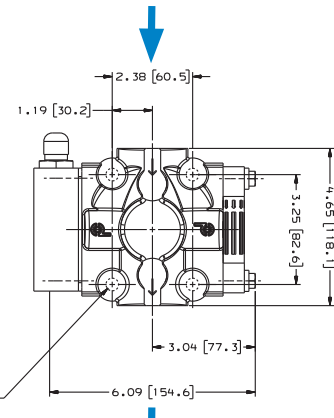
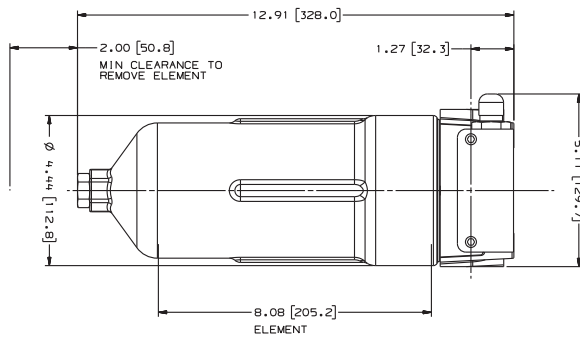
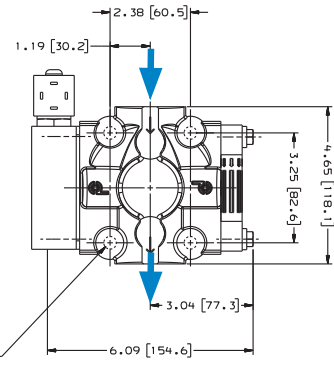
**HPK03 Specification Illustrations**

All dimensions are shown in inches [millimeters].

**Assembly - Side View**



**Head - Top View**





HPK03

Max Flow: 60 gpm (227 lpm)



## HPK03 Components

### Standard Filter Choices

Media Number	B <sub>x(c)</sub> = 1000 Rating	Part No.	Comments
No. 1	5 µm	P167842	Buna-N®
No. 1	5 µm	P167185	Viton® High Collapse for No Bypass applications.
No. 2	9 µm	P164594	Buna-N
No. 2½	10 µm	P164166	Buna-N
No. 2½	10 µm	P167186	Viton High Collapse for No Bypass applications.
No. 9	23 µm	P164174	Buna-N
No. 20	>50 µm	P165319	Buna-N
WA	B>30 <sub>(c)</sub> = 200	P569528	Buna-N Absorbs 130 ml water @ 25 psid
No. 74	75 µm nominal	P162233	Buna-N Seal Wire Mesh Media

#### Filter Notes

- SEALS: Filters with seals made of Buna-N® are appropriate for most applications involving petroleum oil. Filters with seals made of Viton® (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F/83°C.
- Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.
- Donaldson high collapse filters are physically designed to withstand up to 3000 psi / 20,700 kPa before collapsing.
- The Viton® high collapse filter versions also use epoxy potting and media seam seals for added chemical compatibility.
- Viton® and Buna-N® registered trademarks of E. I. DuPont de Nemours and Company.



### Housing Choices

Length (in.)	Part No.
8" filter	P179579

The **P179579** housing is 10.73 inches (273mm) long and accepts the filter that is 8 inches (203mm) long. It includes a head-to-housing seal.

### Head Choices

Port Size	Bypass Rating	Indicators <sup>1</sup>	Part No.
SAE-16 O-Ring	50 psi / 3.5 bar	Visual indicator, left side	P166353
SAE-12 O-Ring	50 psi / 3.5 bar	Visual indicator, left side	P170489
SAE-12 O-Ring	No bypass	Visual indicator, left side	P170491

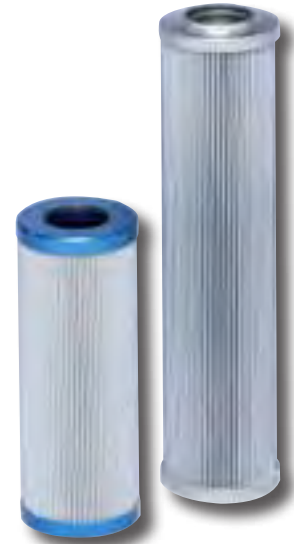
#### Notes

<sup>1</sup> Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port.



## High-Performance DT Filter Choices

Media Number	Beta <sub>1000</sub> Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 µm	<4 µm	8.22/208.8	P566209	DT-9600-8-2UM
5 µm	5 µm	8.22/208.8	P566210	DT-9600-8-5UM
8 µm	8 µm	8.22/208.8	P566211	DT-9600-8-8UM
14 µm	14 µm	8.22/208.8	P566212	DT-9600-8-14UM
25 µm	25 µm	8.22/208.8	P566213	DT-9600-8-25UM
5 µm	5 µm	8.22/208.8	P566366	DT-9601-8-5UM, High collapse
14 µm	14 µm	8.22/208.8	P566367	DT-9601-8-14UM, High collapse
2 µm	<4 µm	8.22/208.8	P567875	DX2-9600-8-2UM
5 µm	5 µm	8.22/208.8	P565122	DX2-9600-8-5UM
8 µm	8 µm	8.22/208.8	P565123	DX2-9600-8-8UM
14 µm	14 µm	8.22/208.8	P564936	DX2-9600-8-14UM



### Filter Notes

- All Donaldson DT and DX2 filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT and DX2 filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT and DX2 filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.
- DX2 filters utilize nylon mesh for pleat support.

## Service Indicator Options

### Visual Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description
P569632	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button
P569633	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button
P567988	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button with thermal lockout and surge control
P567989	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button with thermal lockout and surge control

### AC/DC Visual/Electrical Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description
P569634	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps
P569635	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps
P567986	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650
P567987	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650

\* Note: Above choices include indicator and mounting block.

## Indicator Service Parts

### Replacement Indicators Only

Part No.	Description
P567458	Visual/Electrical indicator with thermal lockout and surge, 35 psid/2.4 bar
P567459	Visual/Electrical indicator, with thermal lockout and surge 70 psid/4.8 bar
P567456	Pop-Up Visual Indicator, with thermal lockout and surge 35 psid/2.4 bar
P567457	Pop-Up Visual Indicator, with thermal lockout and surge 70 psid/4.8 bar
P569636	Pop-Up Visual Indicator, 35 psid/2.4 bar
P569637	Pop-Up Visual Indicator, 70 psid/4.8 bar
P569638	Visual/Electrical Indicator, 35 psid/2.4 bar
P569639	Visual/Electrical Indicator, 70 psid/4.8 bar
P164315	Visual Indicator, bar style, 35 psid/2.4 bar
P166603	Visual Indicator, bar style, 70 psid/4.8 bar
P166134	Blanking plate

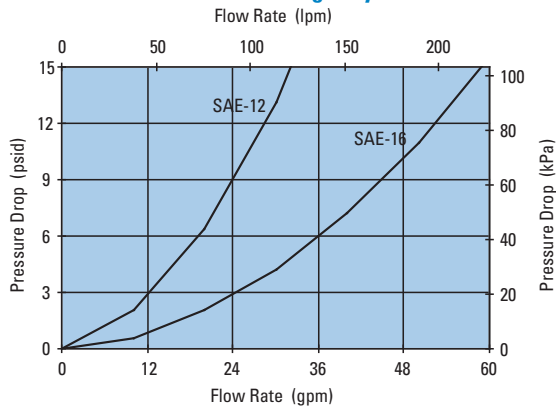


**HPK03**  
Max Flow: 60 gpm (227 lpm)

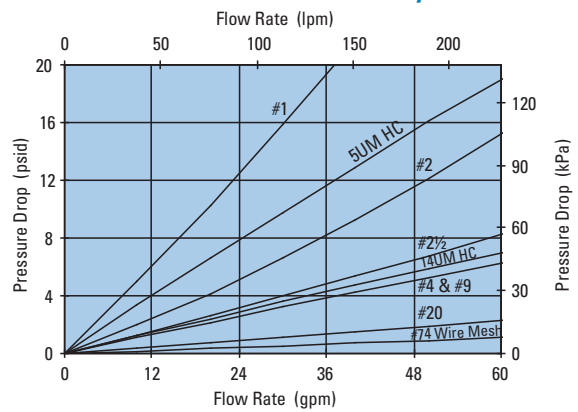


## Performance Data

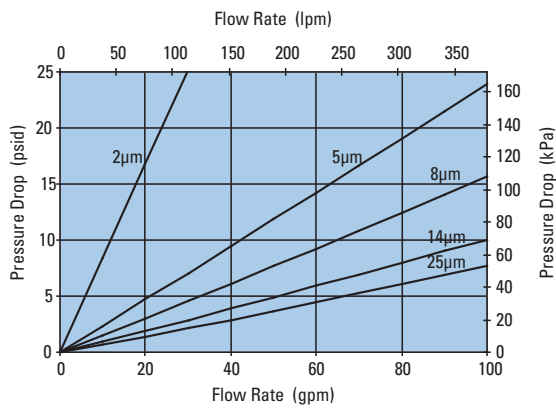
**HPK03 Housing Only**



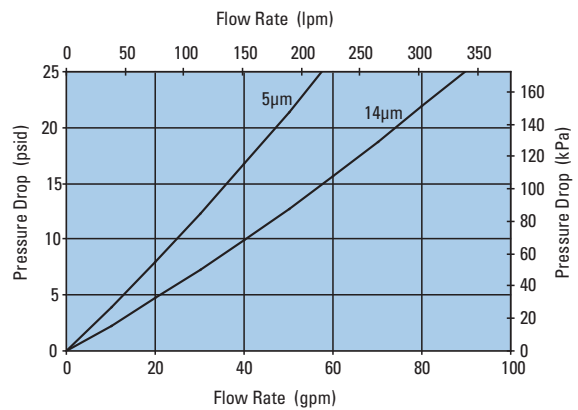
**HPK03 8" Standard Filter Only**



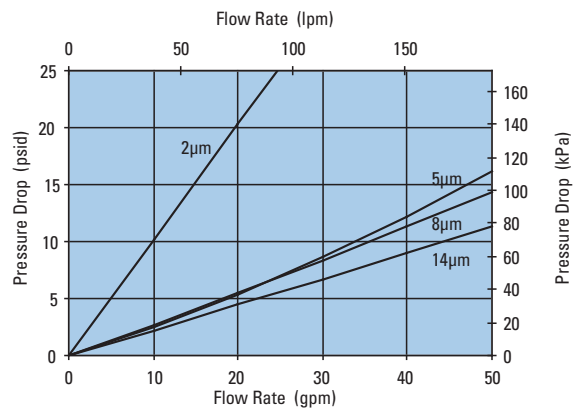
**HPK03 8" DT Filter Only**  
DT-9600-8, 8.22"/208.8mm



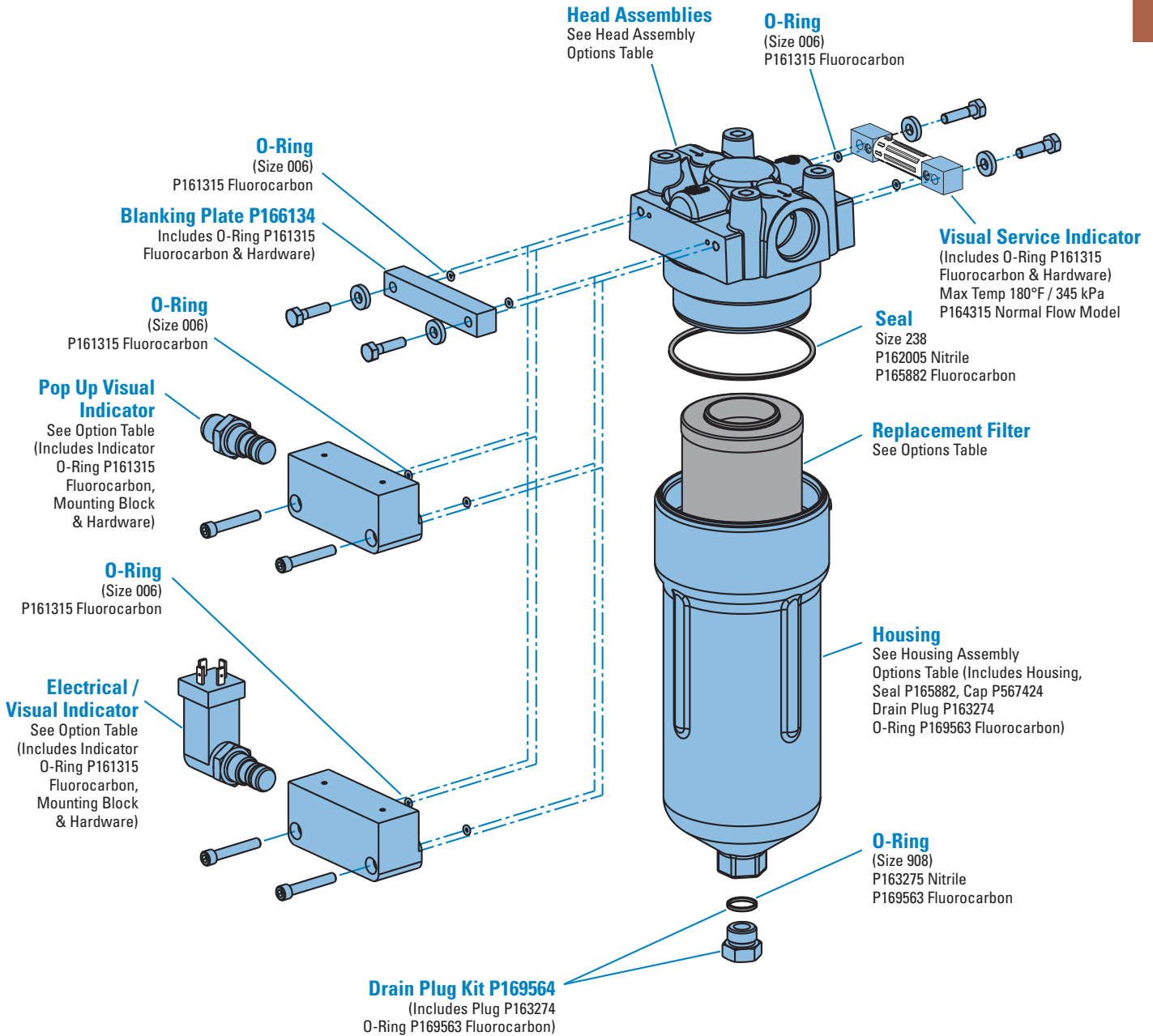
**HPK03 8" DT Filter Only**  
DT-9601-8, 8.22"/208.8mm



**W350 8" DX2 Filter Only**  
DX2-9600-8, 8.22"/208.8mm



## HPK03 Service Parts







FPK04

Max Flow: 100 gpm (379 lpm)

## FPK04 In-Line Cartridge Filters

**Working Pressures to:** 4350 *psi*  
30,000 *kPa*  
300 *bar*

**Rated Static Burst to:** 9135 *psi*  
69,300 *kPa*  
6930 *bar*

**Flow Range to:** 100 *gpm*  
379 *lpm*



### Features

The FPK04 T-type ported series offers flows to 100 gpm (379 lpm) with a bypass option and conforms to the HF3 automotive standard.

Donaldson Synteq™ media is offered in a variety of designs. Upgraded Donaldson high-performance DT filters are also offered for superior performance. The differential pressure indicator line is designed to work with the bypass valve options.

- Conforms to HF3 specifications
- High collapse filters available for use with non-bypass applications
- Wide range of indicator options
- Three housing length options for design flexibility
- Buna-N® seals standard, Viton® available
- Head material: cast iron
- Housing material: steel

Viton® and Buna-N® are registered trademarks of E. I. DuPont de Nemours and Company.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-20 O-Ring

#### Assembly Weight

- 4": 26.4 lbs / 12.0 kg
- 8": 33 lbs / 15.0 kg
- 13": 33 lbs / 15.0 kg

#### Standard Replacement Filter Lengths

- 4.58" / 116.3mm
- 4.62" / 117.3mm
- 8.20" / 208.3mm
- 12.88" / 327.2mm
- 12.93" / 328.4mm

#### DT Replacement Filter Lengths

- 4.56" / 116mm
- 4.59" / 116.7mm
- 8.19" / 208mm
- 8.22" / 208.8mm
- 8.23" / 209mm
- 12.85" / 326.3mm
- 12.87" / 327mm
- 12.91" / 327.8mm

#### Standard Bypass Ratings

- No Bypass
- 87 psi / 600 kPa / 6.0 bar

#### Operating Temperatures

- -4° to 248°F (-20° to 120°C)

#### Filter Collapse Ratings

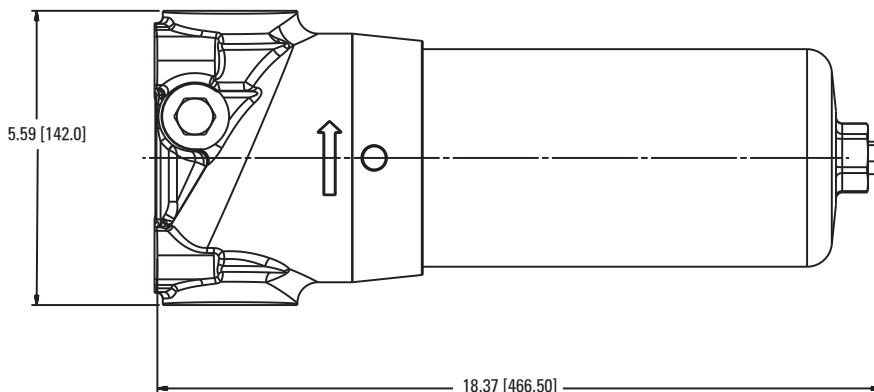
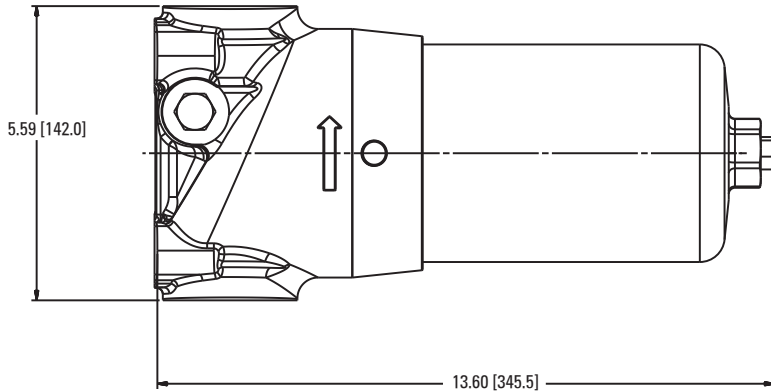
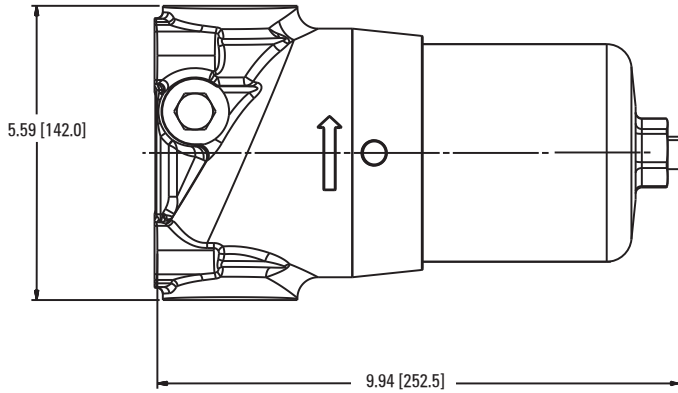
- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Company.

**FPK04 Specification Illustrations**

*All dimensions are shown in inches [millimeters].*

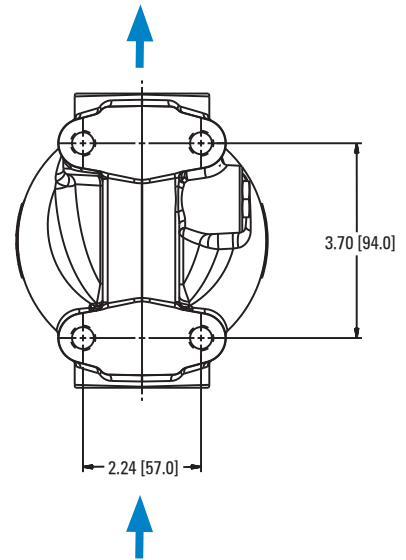
**Assembly - Side View**



**Applications:**

- High Pressure Circuits
- In-Plant & Mobile Equipment
- Servo Valve Circuits

**Head - Top View**





FPK04

Max Flow: 100 gpm (379 lpm)



## FPK04 Components

### Standard Filter Choices

Media Number	Beta <sub>x(c)</sub> =1000 Rating	Part No.	Length (in./mm)	Series	Comments
No. 1	5 µm	P169431	4.62/117.3	9600	
5 UM	5 µm	P167184	4.58/116.3	9601	Viton®, High collapse
No. 2	9 µm	P164592	4.62/117.3	9600	
No. 2½	10 µm	P164164	4.62/117.3	9600	
14 UM	14 µm	P167843	4.58/116.3	9601	Viton®, High collapse
No. 9	23 µm	P164172	4.62/117.3	9600	
No. 9	23 µm	P164368	4.62/117.3	9600	Viton
No. 1	6 µm	P167842	8.20/208.3	9600	Buna-N
5 UM	5 µm	P167185	8.20/208.3	9601	Viton, High collapse
No. 2	9 µm	P164594	8.20/208.3	9600	Buna-N
14 UM	14 µm	P167186	8.20/208.3	9601	Viton, High collapse
No. 9	23 µm	P164174	8.20/208.3	9600	Buna-N
No. 20	>50 µm	P165319	8.20/208.3	9600	Buna-N
No. 74	75 µm nom.	P162233	8.20/208.3	9600	Buna-N, Wire mesh
No. 1	5 µm	P169432	12.93/328.4	9600	Buna-N
5 UM	5 µm	P167411	12.88/327.2	9601	Viton, High collapse
No. 2	9 µm	P164596	12.93/328.4	9600	Buna-N
No. 2	9 µm	P166254	12.93/328.4	9600	Viton
No. 2½	10 µm	P164168	12.93/328.4	9600	Buna-N
14 UM	14 µm	P167412	12.88/327.2	9601	Viton, High collapse
No. 4	10 µm	P166255	12.93/328.4	9600	Viton
No. 9	23 µm	P164176	12.93/328.4	9600	Buna-N
WA	B>30(c) = 200	P569528	8.20/208.3	9600	Absorbs 180 ml of water @ 25 psid
WA	B>30(c) = 200	P569529	12.93/328.4	9600	Absorbs 220 ml of water @ 25 psid

#### Filter Notes

- Refer to the table in the Technical Reference Guide for fluid compatibility with our filter media.
- If you're filtering petroleum-based oil, filters with seals made of Buna-N are appropriate for most applications.
- If you're filtering diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF over 150°F/83°C, use filters with seals made of fluorocarbon, such as Viton® from DuPont Dow Elastomers, or Fluorel® from 3M Company.
- Donaldson "high collapse" filters, with their steel end caps and wire-backed media, are rated to withstand up to 3000 psi/ 20,700 kPa before collapsing.
- The fluorocarbon seal/high collapse filters also use epoxy potting and media seam seals for added chemical compatibility.
- Viton® is a registered trademark of E. I. DuPont de Nemours and Company. Fluorel® is a registered trademark of 3M Company.

### Head Choices

Port Size	Bypass Rating	Indicators	Part No.
SAE-20	87 psi / 6 bar	plugged only	P568720
SAE-20	No bypass	plugged only	P568721

### Housing Choices

Filter Length (in.)	Part No.
4"	P568722
8"	P568723
13"	P568724

### Indicator Choices

Set Point / Type	Part No.
39 psi/2.7 bar ele N.O.	P165194
39 psi/2.7 bar ele N.C.	P167455

#### Notes

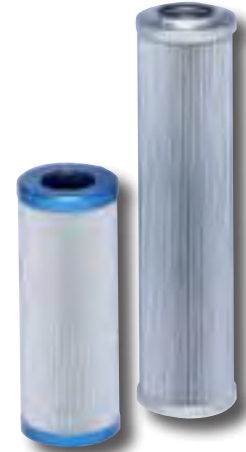
Housings include the head to housing seal.

## High-Performance DT Filter Choices

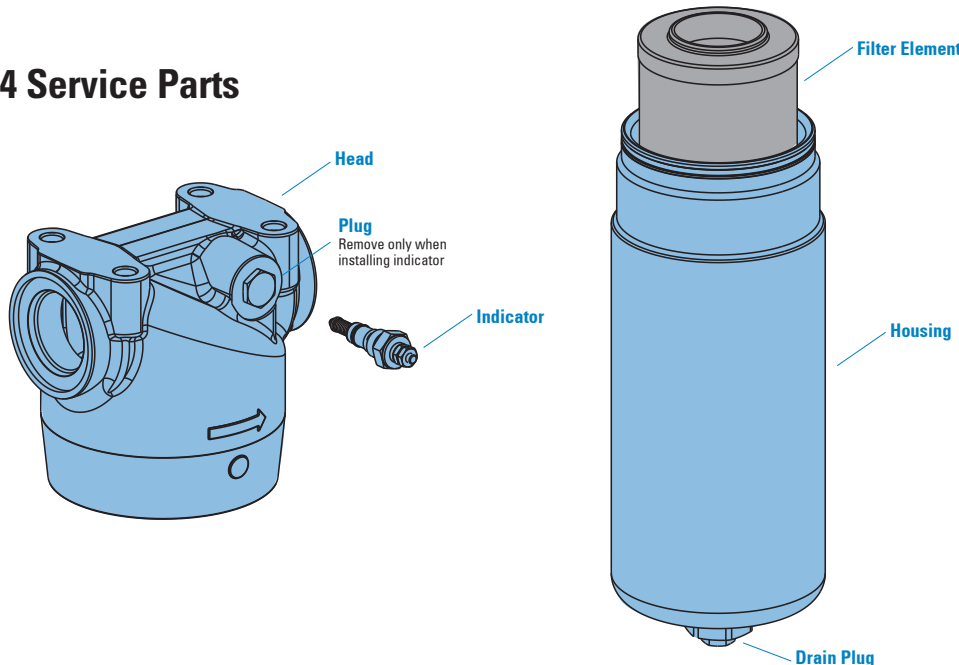
Media Number	Beta <sub>w(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 μm	<4 μm	4.59/116.7	P566204	DT-9600-4-2UM
5 μm	5 μm	4.59/116.7	P566205	DT-9600-4-5UM
8 μm	8 μm	4.59/116.7	P566206	DT-9600-4-8UM
14 μm	14 μm	4.59/116.7	P566207	DT-9600-4-14UM
25 μm	25 μm	4.59/116.7	P566208	DT-9600-4-25UM
5 μm	5 μm	4.56/116	P566364	DT-9601-4-5UM, High collapse
14 μm	14 μm	4.56/116	P566365	DT-9601-4-14UM, High collapse
2 μm	<4 μm	8.22/208.8	P566209	DT-9600-8-2UM
5 μm	5 μm	8.22/208.8	P566210	DT-9600-8-5UM
8 μm	8 μm	8.22/208.8	P566211	DT-9600-8-8UM
14 μm	14 μm	8.22/208.8	P566212	DT-9600-8-14UM
25 μm	25 μm	8.22/208.8	P566213	DT-9600-8-25UM
5 μm	5 μm	8.19/208	P566366	DT-9601-8-5UM, High collapse
14 μm	14 μm	8.19/208	P566367	DT-9601-8-14UM, High collapse
2 μm	<4 μm	8.19/208	P567875	DX2-9600-8-2UM
5 μm	5 μm	8.23/209	P565122	DX2-9600-8-5UM
8 μm	8 μm	8.23/209	P565123	DX2-9600-8-8UM
14 μm	14 μm	8.23/209	P564936	DX2-9600-8-14UM
2 μm	<4 μm	12.91/327.8	P566214	DT-9600-13-2UM
5 μm	5 μm	12.91/327.8	P566215	DT-9600-13-5UM
8 μm	8 μm	12.91/327.8	P566216	DT-9600-13-8UM
14 μm	14 μm	12.91/327.8	P566217	DT-9600-13-14UM
25 μm	25 μm	12.91/327.8	P566218	DT-9600-13-25UM
5 μm	5 μm	12.85/326.3	P566368	DT-9601-13-5UM, High collapse
14 μm	14 μm	12.85/326.3	P566369	DT-9601-13-14UM, High collapse
5 μm	5 μm	12.87/327	P565188	DX2-9600-13-5UM
8 μm	8 μm	12.87/327	P565189	DX2-9600-13-8UM
14 μm	14 μm	12.87/327	P565187	DX2-9600-13-14UM

### Filter Notes

- All Donaldson DT and DX2 filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT and DX2 filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT and DX2 filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.
- DX2 filters utilize nylon mesh for pleat support.



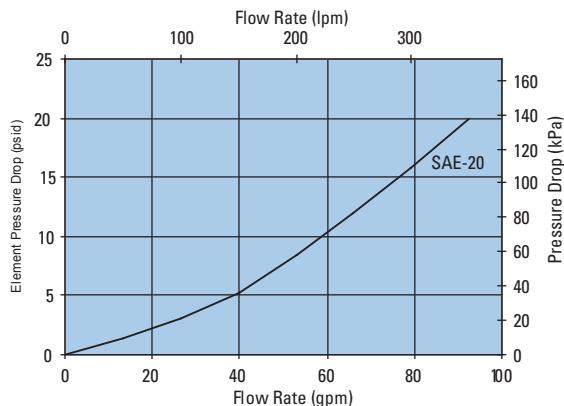
## FPK04 Service Parts



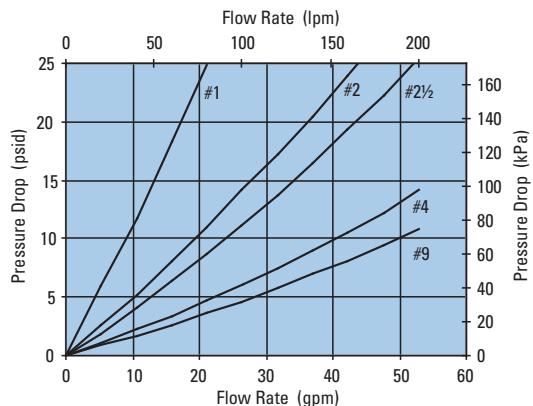


## Performance Data

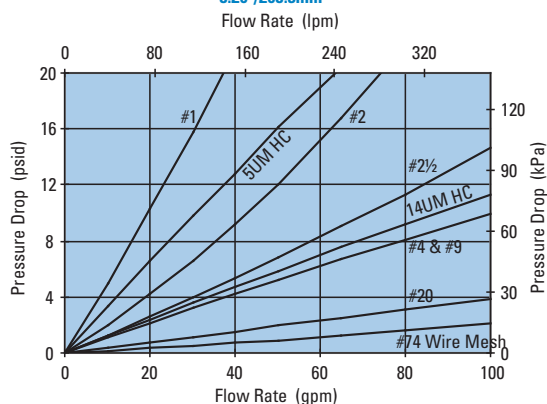
**FPK04 Housing Only**



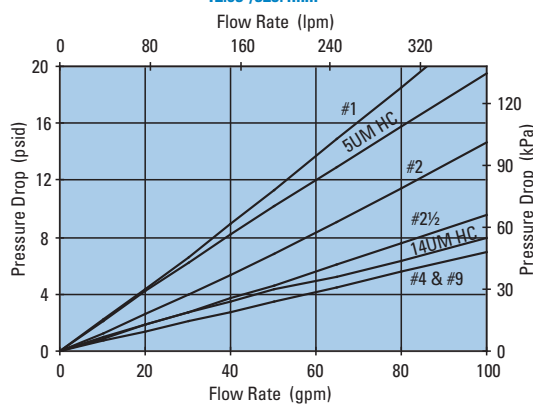
**FPK04 4" Standard Filter Only**  
4.62"/117.3mm



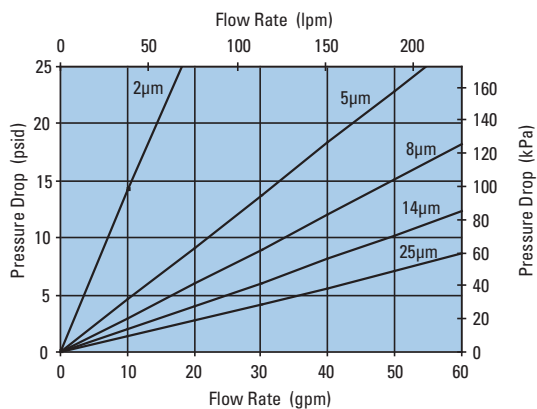
**FPK04 8" Standard Filter Only**  
8.20"/208.3mm



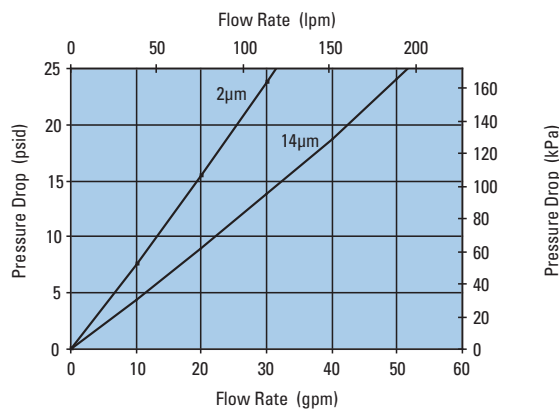
**FPK04 13" Standard Filter Only**  
12.93"/328.4mm



**FPK04 4" DT Filter Only**  
DT-9600-4, 4.59"/116.7mm



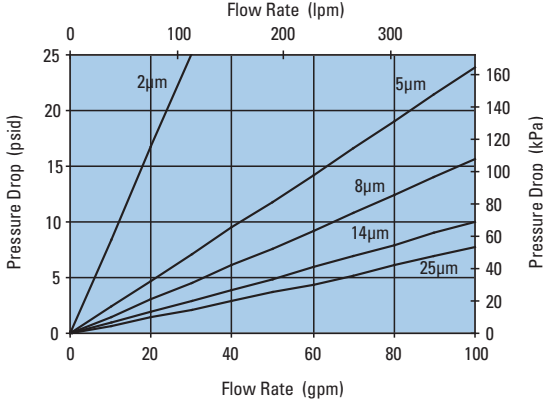
**FPK04 4" DT Filter Only**  
DT-9601-4, 4.57"/116mm



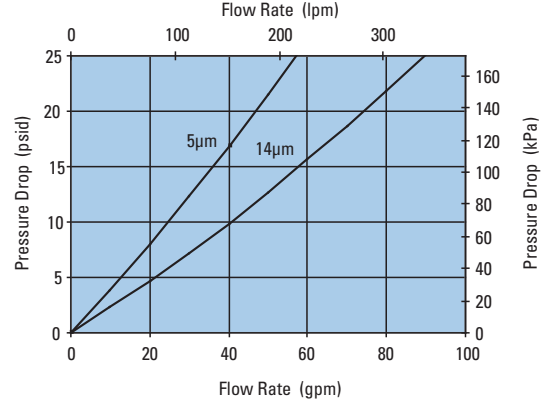


**Performance Data**

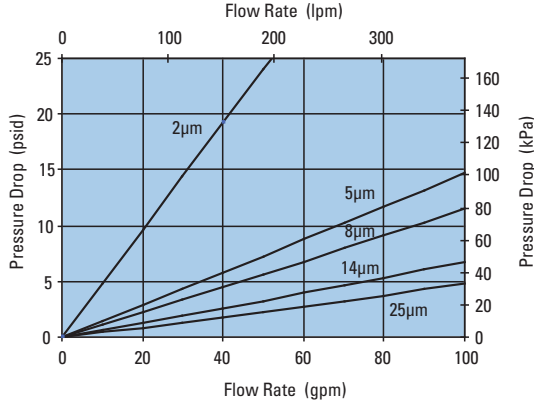
**FPK04 8" DT Filter Only**  
DT-9600-8, 8.22"/208.8mm



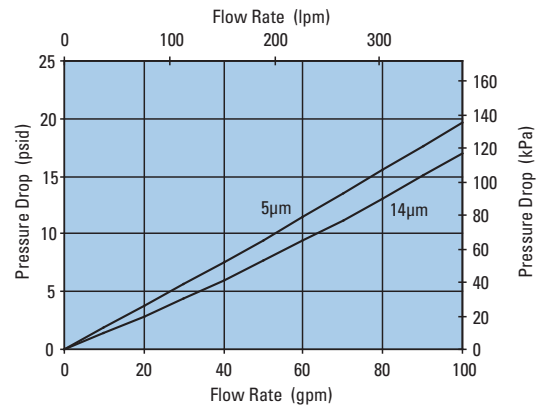
**FPK04 8" DT Filter Only**  
DT-9601-8, 8.19"/208mm



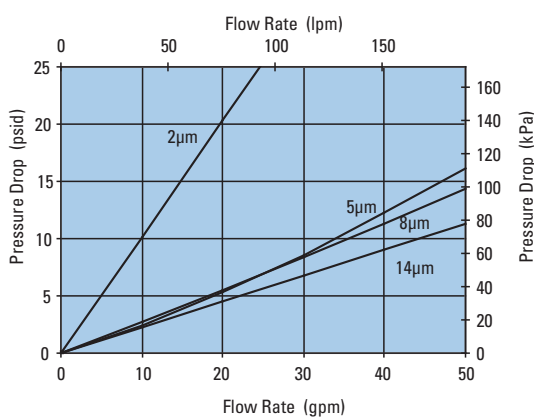
**FPK04 13" DT Filter Only**  
DT-9600-13, 12.91"/327.8mm



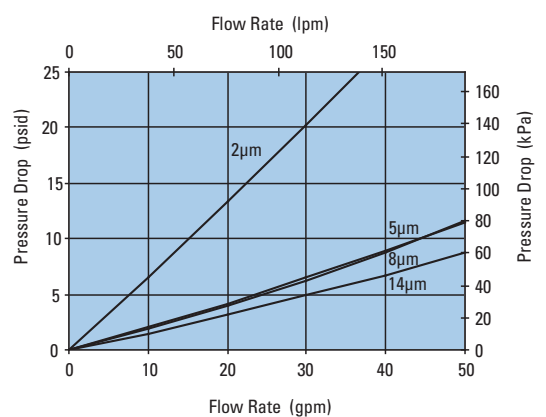
**FPK04 13" DT Filter Only**  
DT-9601-13, 12.91"/327.8mm



**FPK04 8" DX2 Filter Only**  
DX2-9600-8, 8.22"/208.8mm



**FPK04 13" DX2 Filter Only**  
DX2-9600-13, 12.87"/327mm





HPK04

Max Flow: 120 gpm (454 lpm)



## HPK04 In-Line Cartridge Filters

**Working Pressures to:** 6000 *psi*  
41,400 kPa  
413.8 bar

**Rated Static Burst to:** 17000 *psi*  
117,000 kPa  
1170 bar

**Flow Range to:** 120 *gpm*  
454 *lpm*



### Features

The HPK04 high pressure filter series is made of ductile iron and steel for strength and durability. Machined bypass valves are case-hardened at critical points to provide maximum strength and reliability. Reverse flow bypass valve allows bi-directional flow through the filter head, and filter changeout is simplified with standard housing drain plug. Meets HF3 specification.

Take advantage of our mix and match system of in-stock heads, housings and cartridges – so you can get exactly what you need. Likewise, choose the media type and configuration that's best for your application. Filter cartridges for HPK04 contain Synteq™, Donaldson's exclusive synthetic fiber media formulated specially for liquid filtration. Upgraded Donaldson high-performance DT filters are also offered for superior performance.

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-20 O-ring
- 1¼" or 1½" SAE 4-Bolt Flange  
Code 61 or 62

#### Assembly Weight

- 8" Assembly: 41 lbs / 19 kg
- 13" Assembly: 48 lbs / 22 kg
- 16" Assembly: 52 lbs / 24 kg

#### Replacement Filter Lengths

- 8" / 203mm
- 13" / 328mm
- 16" / 406mm

#### Standard Bypass Ratings

- 60 *psi* / 414 kPa / 4.1 bar
- 90 *psi* / 621 kPa / 6.2 bar with reverse-flow check valve
- No Bypass

#### Operating Temperatures

- -20°F to 250°F / -27°C to 121°C

#### Filter Collapse Ratings

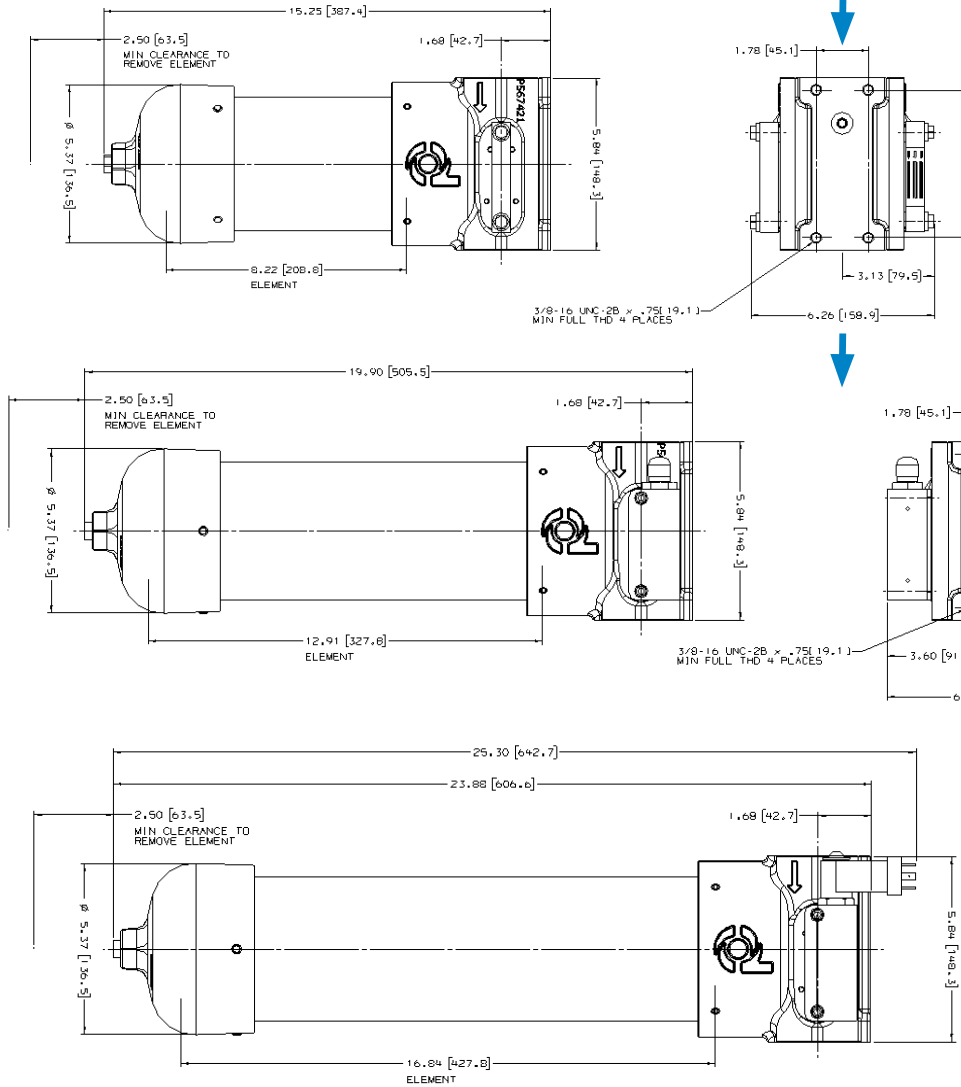
- 200 *psi* / 1380 kPa / 13.8 bar  
(standard)
- 3000 *psi* / 20,700 kPa / 206.9 bar  
(high collapse)



**HPK04 Specification Illustrations**

All dimensions are shown in inches [millimeters].

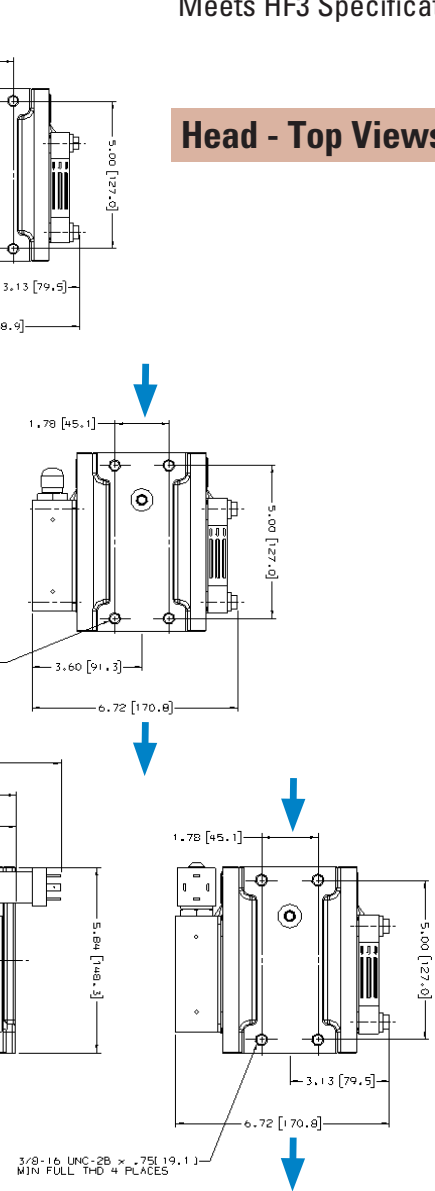
**Assembly - Side Views**



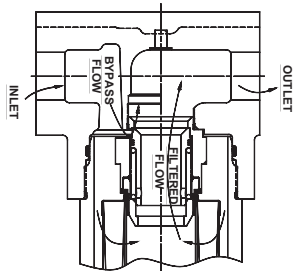
**Applications:**

- High Pressure Circuits
- Hydrostatic Transmissions
- Servo Valve Circuits
- Meets HF3 Specifications

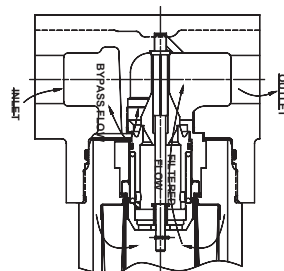
**Head - Top Views**



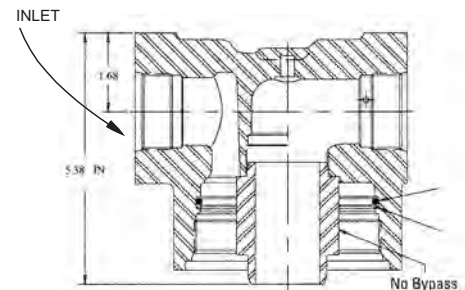
**Bypass Valve Alternatives**



**60 psi / 414 kPa  
Bypass Valve**



**90 psi / 621 kPa  
Bypass Valve with  
Reverse Flow Check Valve**



**No Bypass**



HPK04  
Max Flow: 120 gpm (454 lpm)



## HPK04 Components

### Standard Filter Choices

Media Number	Beta <sub>(c)</sub> =1000 Rating	Part No.	Length (in./mm)	Series	Comments
No. 1	5 µm	P167842	8.20/208.3	9600	Buna-N®
5 UM	5 µm	P167185	8.20/208.3	9601	Viton®, High collapse
No. 2	9 µm	P164594	8.20/208.3	9600	Buna-N
No. 2½	10 µm	P164166	8.20/208.3	9600	Buna-N
14 UM	14 µm	P167186	8.20/208.3	9601	Viton, High collapse
No. 9	23 µm	P164174	8.20/208.3	9600	Buna-N
No. 20	>50 µm	P165319	8.20/208.3	9600	Buna-N
No. 74	75 µm nom.	P162233	8.20/208.3	9600	Buna-N , Wire mesh
No. 1	5 µm	P169432	12.93/328.4	9600	Buna-N
5 UM	5 µm	P167411	12.88/327.2	9601	Viton, High collapse
No. 2	9 µm	P164596	12.93/328.4	9600	Buna-N
No. 2	9 µm	P166254	12.93/328.4	9600	Viton
No. 2½	10 µm	P164168	12.93/328.4	9600	Buna-N
14 UM	14 µm	P167412	12.88/327.2	9601	Viton, High collapse
No. 4	10 µm	P166255	12.93/328.4	9600	Viton
No. 9	23 µm	P164176	12.93/328.4	9600	Buna-N
No. 1	5 µm	P169433	16.84/427.7	9600	Buna-N
5 UM	5 µm	P167187	16.83/427.5	9601	Viton, High collapse
No. 2	9 µm	P164598	16.84/427.7	9600	Buna-N
No. 2½	10 µm	P164170	16.84/427.7	9600	Buna-N
No. 2½	10 µm	P164367	16.84/427.7	9600	Viton
14 UM	14 µm	P167188	16.83/427.5	9601	Viton, High collapse
No. 9	23 µm	P164178	16.84/427.7	9600	Buna-N
WA	B>30 <sub>(c)</sub> = 200	P569528	8.20/208.3	9600	Absorbs 180 ml water @ 25 psid
WA	B>30 <sub>(c)</sub> = 200	P569529	12.93/328.4	9600	Absorbs 220 ml water @ 25 psid
WA	B>30 <sub>(c)</sub> = 200	P569530	16.83/427.5	9600	Absorbs 300 ml water @ 25 psid

#### Filter Notes

- **SEALS:** Filters with seals made of Buna-N® are appropriate for most applications involving petroleum oil. Filters with seals made of Viton® (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F/83°C.
- The Viton seal, high collapse filters also use epoxy potting and media seam seals for added chemical compatibility.
- Donaldson high collapse filters are physically designed to withstand up to 3000 psi/ 20,700 kPa before collapsing.
- Viton® and Buna-N® are registered trademarks of E. I. DuPont de Nemours and Company.

## Housing Choices

Length (in./mm)	Part No.
8/203	P567650
13/330	P567649
16/406	P567648



Head assemblies include head to housing seal.

## Head Choices

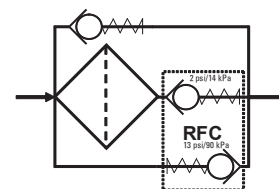
Port Size	Working Pressure	Bypass Rating	Indicators <sup>1</sup>	Part No.
1½" SAE 4-Bolt (Code 61) with SAE-20 O-Ring	3000 psi/207 bar	50 psi/3.5 bar	Visual left side, blank plate right side	P567639
1½" SAE 4-Bolt (Code 61) with SAE-20 O-Ring	3000 psi/207 bar	90 psi/6.2 bar with reverse flow check valve	Visual left side, blank plate right side	P567640
1½" SAE 4-Bolt (Code 61) with SAE-20 O-Ring	3000 psi/207 bar	no bypass	Visual left side, blank plate right side	P567641
1½" SAE 4-Bolt (Code 62)	6000 psi/414 bar	50 psi/3.5 bar	Visual left side, blank plate right side	P567642
1½" SAE 4-Bolt (Code 62)	6000 psi/414 bar	90 psi/6.2 bar with reverse flow check valve	Visual left side, blank plate right side	P567643
1¼" SAE 4-Bolt (Code 62)	6000 psi/414 bar	90 psi/6.2 bar with reverse flow check valve	Visual left side, blank plate right side	P567644

#### Notes on Indicators

<sup>1</sup> Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port.

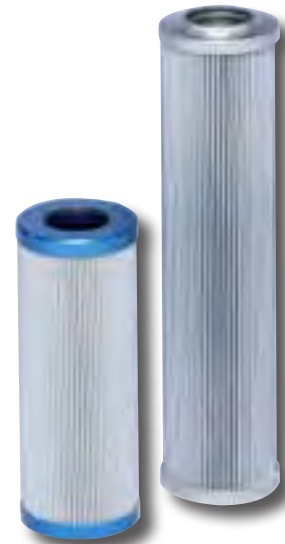
#### Reverse Flow

#### Check Schematic



## High-Performance DT Filter Choices

Media Number	Beta <sub>1000</sub> Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 µm	<4 µm	4/116.7	P566204	DT-9600-4-2UM
5 µm	5 µm	4/116.7	P566205	DT-9600-4-5UM
8 µm	8 µm	4/116.7	P566206	DT-9600-4-8UM
14 µm	14 µm	4/116.7	P566207	DT-9600-4-14UM
25 µm	25 µm	4/116.7	P566208	DT-9600-4-25UM
5 µm	5 µm	4/116	P566364	DT-9601-4-5UM, High collapse
14 µm	14 µm	4/116	P566365	DT-9601-4-14UM, High collapse
2 µm	<4 µm	8/208.8	P566209	DT-9600-8-2UM
5 µm	5 µm	8/208.8	P566210	DT-9600-8-5UM
8 µm	8 µm	8/208.8	P566211	DT-9600-8-8UM
14 µm	14 µm	8/208.8	P566212	DT-9600-8-14UM
25 µm	25 µm	8/208.8	P566213	DT-9600-8-25UM
5 µm	5 µm	8/208	P566366	DT-9601-8-5UM, High collapse
14 µm	14 µm	8/208	P566367	DT-9601-8-14UM, High collapse
2 µm	<4 µm	8/208	P567875	DX2-9600-8-2UM
5 µm	5 µm	8/209	P565122	DX2-9600-8-5UM
8 µm	8 µm	8/209	P565123	DX2-9600-8-8UM
14 µm	14 µm	8/209	P564936	DX2-9600-8-14UM
2 µm	<4 µm	13/327.8	P566214	DT-9600-13-2UM
5 µm	5 µm	13/327.8	P566215	DT-9600-13-5UM
8 µm	8 µm	13/327.8	P566216	DT-9600-13-8UM
14 µm	14 µm	13/327.8	P566217	DT-9600-13-14UM
25 µm	25 µm	13/327.8	P566218	DT-9600-13-25UM
5 µm	5 µm	13/326.3	P566368	DT-9601-13-5UM, High collapse
14 µm	14 µm	13/326.3	P566369	DT-9601-13-14UM, High collapse
5 µm	5 µm	13/327	P565188	DX2-9600-13-5UM
8 µm	8 µm	13/327	P565189	DX2-9600-13-8UM
14 µm	14 µm	13/327	P565187	DX2-9600-13-14UM
5 µm	5 µm	16/427	P565196	DX2-9600-16-5UM
8 µm	8 µm	16/427	P565197	DX2-9600-16-8UM
14 µm	14 µm	16/427	P565195	DX2-9600-16-14UM



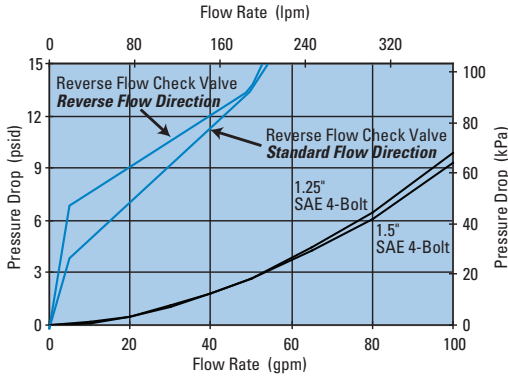
### Filter Notes

- All Donaldson DT and DX2 filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT and DX2 filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT and DX2 filters.
- DX2 filters utilize nylon mesh for pleat support.

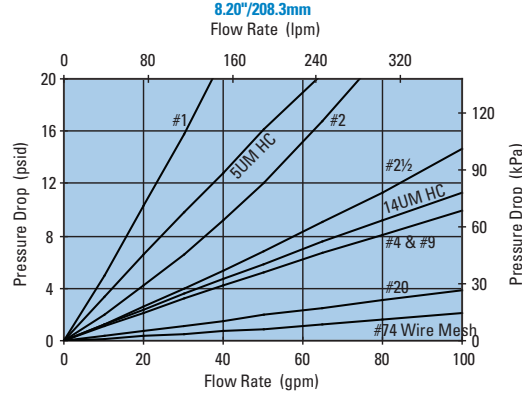


# Performance Data

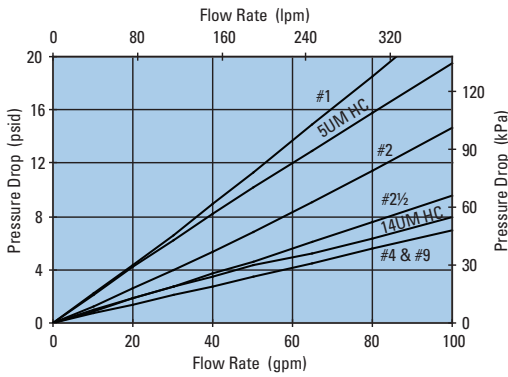
**HPK04 Housing Only**



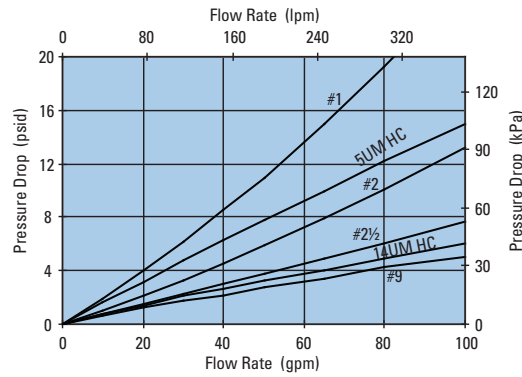
**HPK04 8" Standard Filter Only**



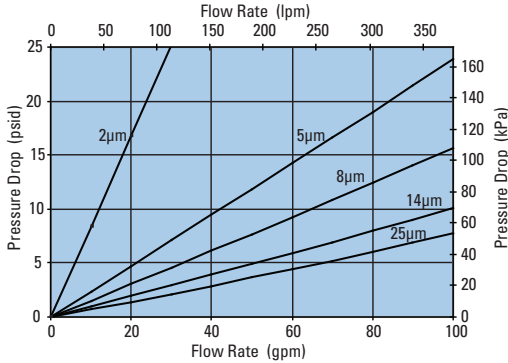
**HPK04 13" Standard Filter Only**



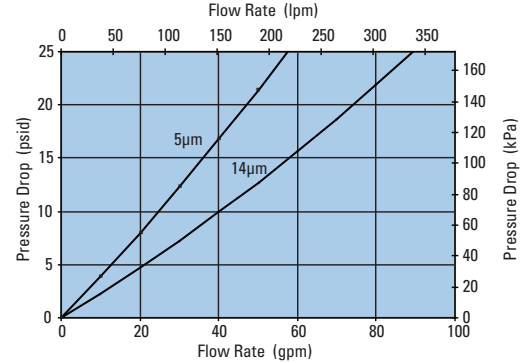
**HPK04 16" Standard Filter Only**



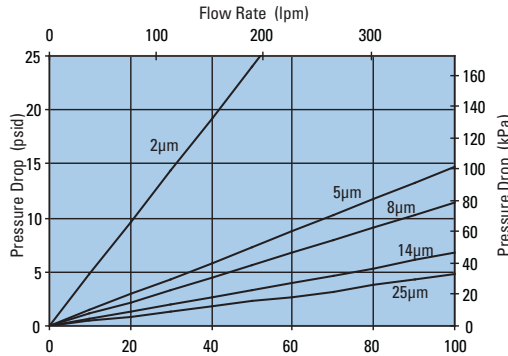
**HPK04 8" DT Filter Only**



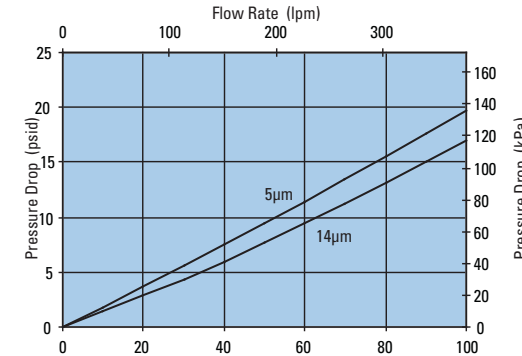
**HPK04 8" DT Filter Only**



**HPK04 13" DT Filter Only**



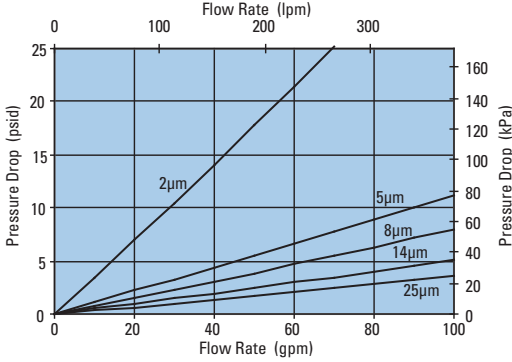
**HPK04 13" DT Filter Only**



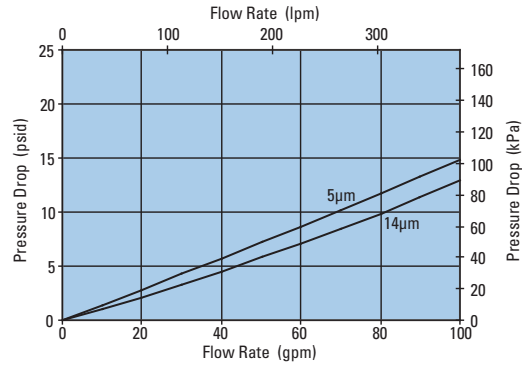


**Performance Data**

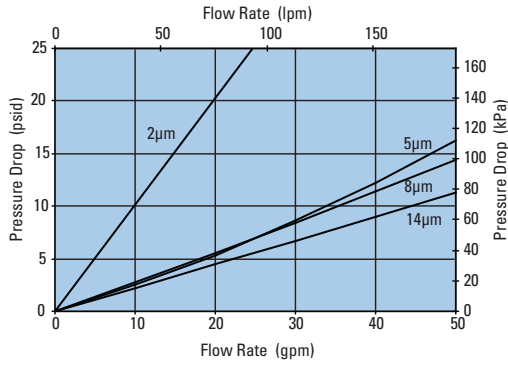
**HPK04 16" DT Filter Only**  
DT-9600-16, 16.84"/427.8mm



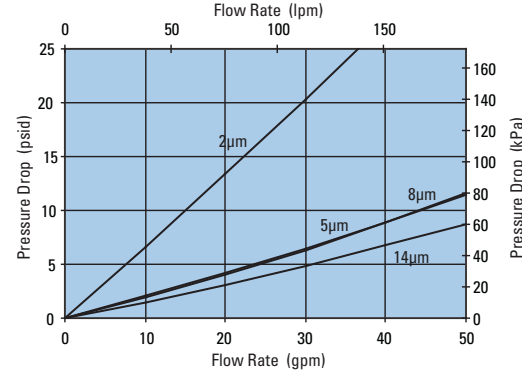
**HPK04 16" DT Filter Only**  
DT-9601-16, 16.82"/427.1mm



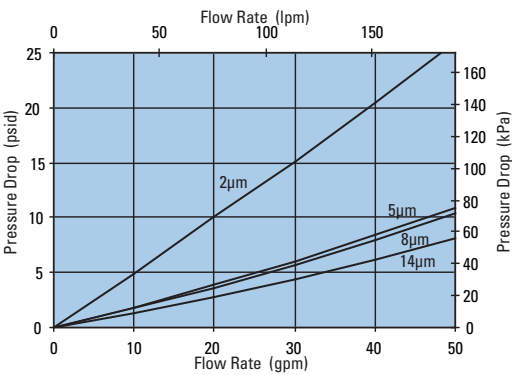
**HPK04 8" DX2 Filter Only**  
DX2-9600-8, 8.19"/208mm



**HPK04 13" DX2 Filter Only**  
DX2-9600-13, 12.87"/327mm



**HPK04 16" DX2 Filter Only**  
DX2-9600-16, 16.81"/427mm





HPK04

Max Flow: 120 gpm (454 lpm)



## HPK04 Components

### Service Indicator Options

#### Visual Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description
P569632	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button
P569633	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button
P567988	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button with thermal lockout and surge control
P567989	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button with thermal lockout and surge control

#### AC/DC Visual/Electrical Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description
P569634	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps
P569635	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps
P567986	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650
P567987	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650

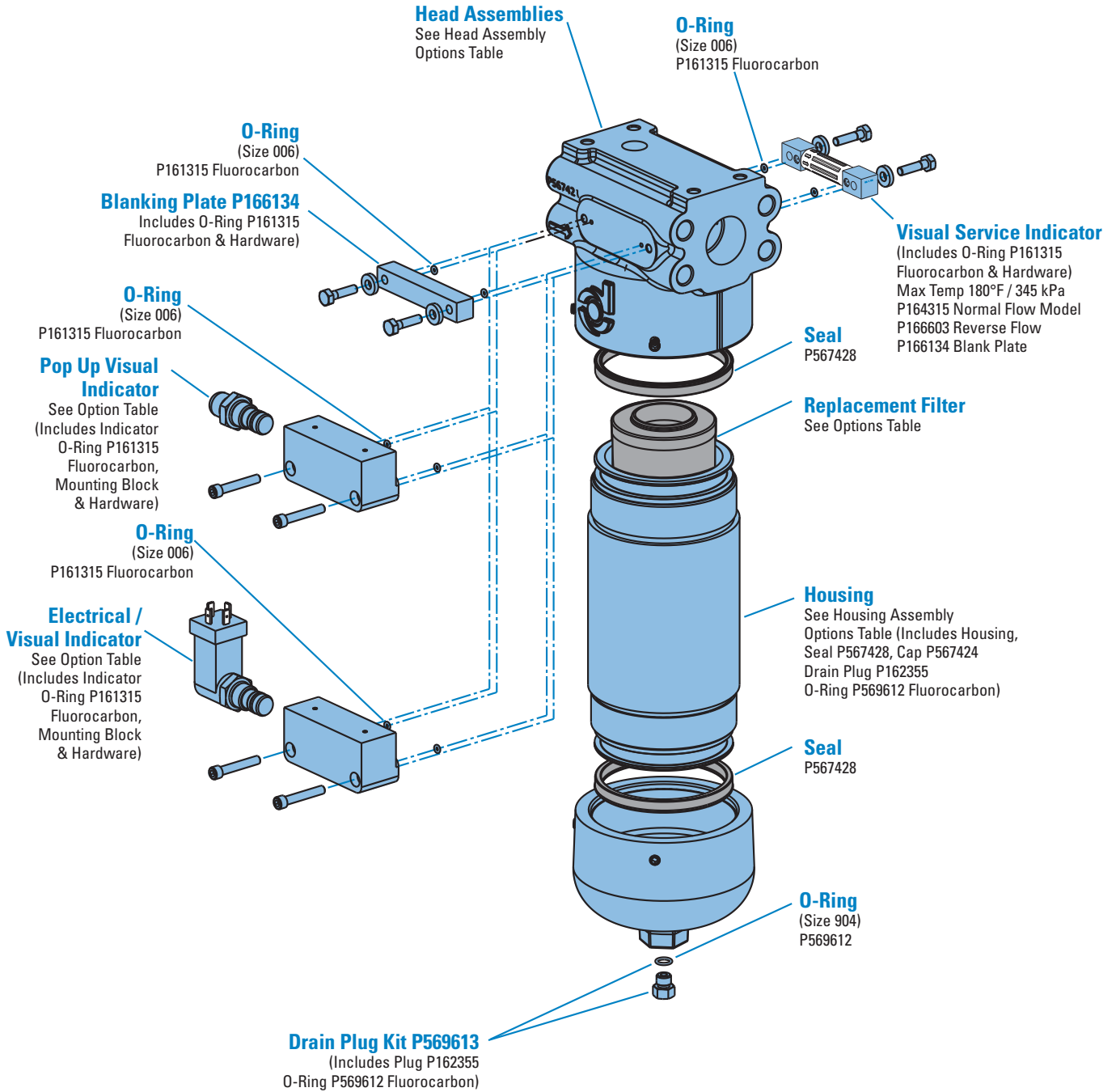
\* Note: Above choices include indicator and mounting block.

### Indicator Service Parts

#### Replacement Indicators Only

Part No.	Description
P567458	Visual/Electrical indicator with thermal lockout and surge, 35 psid/2.4 bar
P567459	Visual/Electrical indicator, with thermal lockout and surge 70 psid/4.8 bar
P567456	Pop-Up Visual Indicator, with thermal lockout and surge 35 psid/2.4 bar
P567457	Pop-Up Visual Indicator, with thermal lockout and surge 70 psid/4.8 bar
P569636	Pop-Up Visual Indicator, 35 psid/2.4 bar
P569637	Pop-Up Visual Indicator, 70 psid/4.8 bar
P569638	Visual/Electrical Indicator, 35 psid/2.4 bar
P569639	Visual/Electrical Indicator, 70 psid/4.8 bar
P164315	Visual Indicator, bar style, 35 psid/2.4 bar
P166603	Visual Indicator, bar style, 70 psid/4.8 bar
P166134	Blanking plate

**HPK04 Service Parts**







W621

Max Flow: 120 gpm (454 lpm)

## W621 In-Line Cartridge Filters

**Working Pressures to:** 6000 *psi*  
41,400 kPa  
414 bar

**Rated Static Burst to:** 15,000 *psi*  
103,400 kPa  
1034 bar

**Fatigue Pressure Rating:** 4000 *psi*  
27,600 kPa  
276 bar

**Flow Range to:** 120 *gpm*  
454 *lpm*



### Features

The W621 filter assembly is manufactured to meet the HF3 specification. This T-type head design offers an option to the W620 L-type port option. Our standard housing drain plug helps relieve system pressure during filter change outs. Donaldson DT high-performance 4-layer media is offered in five different media grades. The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features incorporated in many of the valves.

- Conforms to HF3 specifications
- Head material: cast iron
- Three housing lengths available
- Housing material: steel

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-20, -24 O-ring
- 1¼" or 1½" SAE 4-Bolt Flange  
Code 61 or 62

#### Assembly Weight

- 8.04": 60 lbs / 27.22 kg
- 11.67": 68 lbs / 30.84 kg
- 16.39": 75 lbs / 34.02 kg

#### Replacement Filter Lengths

- 4" / 101.6mm
- 8" / 203.2mm
- 13" / 330.2mm

#### Standard Bypass Ratings

- 90 psi / 621 kPa / 6.2 bar
- 50 psi / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -20° to 250°F (-29° to 121°C)

#### Filter Collapse Ratings

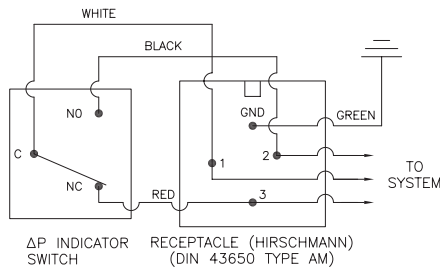
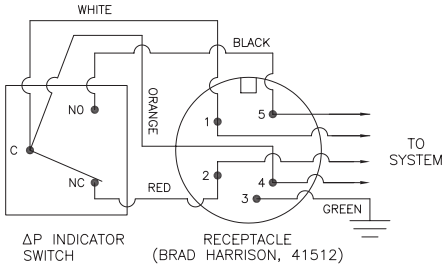
- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

## W621 Specification Illustrations

All dimensions are shown in millimeters [inches].

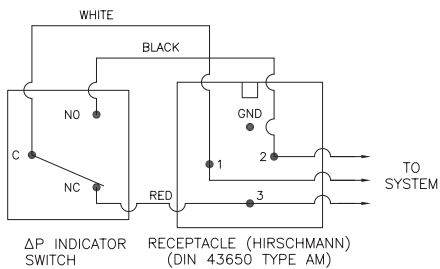
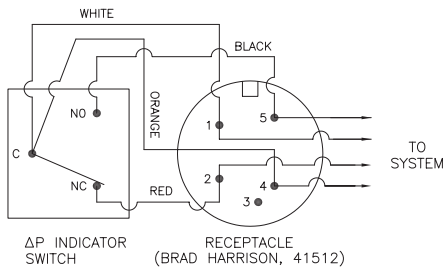
### Indicator Switch Schematic Wiring Diagram

#### Aluminum Electrical Housings



Note: The female plug (connector) is to be furnished by customer.

#### Plastic Electrical Housings



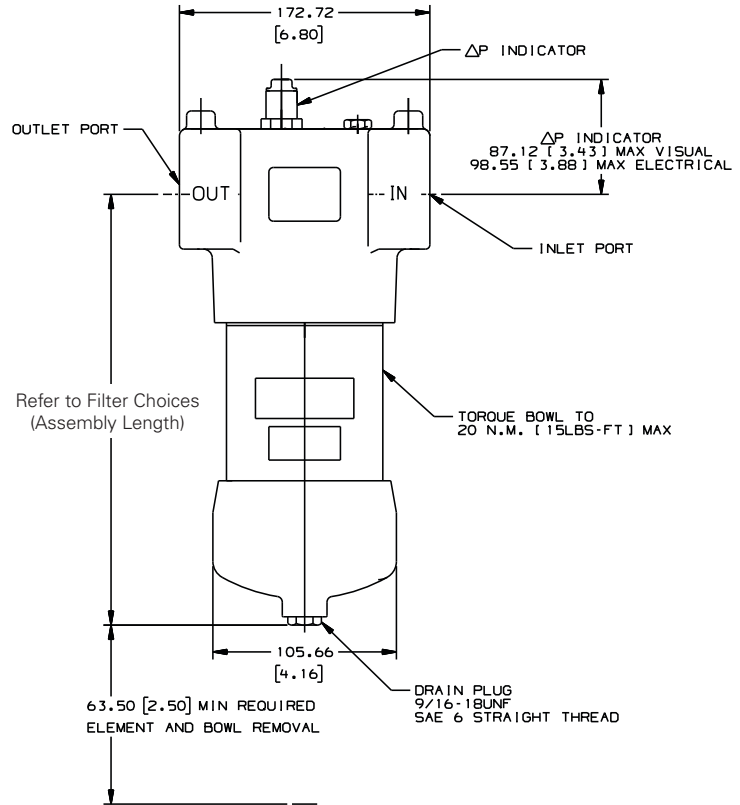
Note: The female plug (connector) is to be furnished by customer.

**Differential Indicators:** Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

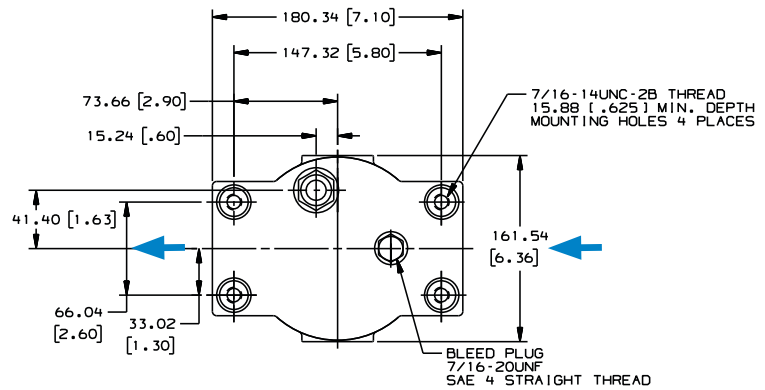
**Surge Control:** This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:** The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.

### Assembly - Side View



### Head - Top View





W621

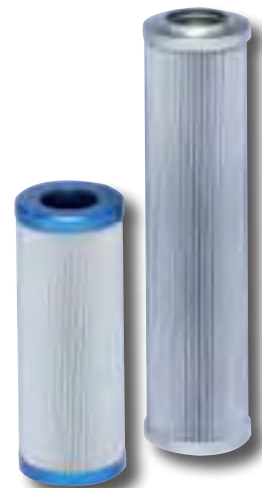
Max Flow: 120 gpm (454 lpm)



## W621 Components

### High-Performance DT Filter Choices

Media Number	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 µm	<4 µm	4/116.7	P566204	DT-9600-4-2UM
5 µm	5 µm	4/116.7	P566205	DT-9600-4-5UM
8 µm	8 µm	4/116.7	P566206	DT-9600-4-8UM
14 µm	14 µm	4/116.7	P566207	DT-9600-4-14UM
25 µm	25 µm	4/116.7	P566208	DT-9600-4-25UM
5 µm	5 µm	4/116	P566364	DT-9601-4-5UM, High collapse
14 µm	14 µm	4/116	P566365	DT-9601-4-14UM, High collapse
2 µm	<4 µm	8/208.8	P566209	DT-9600-8-2UM
5 µm	5 µm	8/208.8	P566210	DT-9600-8-5UM
8 µm	8 µm	8/208.8	P566211	DT-9600-8-8UM
14 µm	14 µm	8/208.8	P566212	DT-9600-8-14UM
25 µm	25 µm	8/208.8	P566213	DT-9600-8-25UM
5 µm	5 µm	8/208	P566366	DT-9601-8-5UM, High collapse
14 µm	14 µm	8/208	P566367	DT-9601-8-14UM, High collapse
2 µm	<4 µm	8/208	P567875	DX2-9600-8-2UM
5 µm	5 µm	8/209	P565122	DX2-9600-8-5UM
8 µm	8 µm	8/209	P565123	DX2-9600-8-8UM
14 µm	14 µm	8/209	P564936	DX2-9600-8-14UM
2 µm	<4 µm	13/327.8	P566214	DT-9600-13-2UM
5 µm	5 µm	13/327.8	P566215	DT-9600-13-5UM
8 µm	8 µm	13/327.8	P566216	DT-9600-13-8UM
14 µm	14 µm	13/327.8	P566217	DT-9600-13-14UM
25 µm	25 µm	13/327.8	P566218	DT-9600-13-25UM
5 µm	5 µm	13/326.3	P566368	DT-9601-13-5UM, High collapse
14 µm	14 µm	13/326.3	P566369	DT-9601-13-14UM, High collapse
5 µm	5 µm	13/327	P565188	DX2-9600-13-5UM
8 µm	8 µm	13/327	P565189	DX2-9600-13-8UM
14 µm	14 µm	13/327	P565187	DX2-9600-13-14UM



#### Filter Notes

- All Donaldson DT and DX2 filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT and DX2 filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT and DX2 filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.
- DX2 filters utilize nylon mesh for pleat support.



## Housing Ordering Guide

Filter Assembly	W621 TABLE 1	1 TABLE 2	C TABLE 3	4 TABLE 4	D   B TABLE 5	B TABLE 6	2 TABLE 7
-----------------	-----------------	--------------	--------------	--------------	------------------	--------------	--------------

Service Filter  
Filters ordered separately. See previous page for filter options.

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W621	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psid for housing without bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
C	SAE-20 O-ring
D	SAE-24 O-ring
E	1-1/2" 4-Bolt Flange Code 61
G	1-1/4" 4-Bolt Flange Code 61
Q	1-1/4" 4-Bolt Flange Code 62
R	1-1/2" SAE 4 -Bolt Flange Code 62

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
4	50 psid
6	90 psid

Note: Use option 1 code only with 3000 psid collapse filter.

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
A	Visual indicator 70 psid w/TL and surge
B	Electrical/visual 70 psid w/TL and surge
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
G	Electrical/visual 35 psid w/TL
I	Visual indicator 70 psid
J	ΔP indicator plug
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3-wire flying lead
O	Visual indicator 100 psid
P	Visual indicator 100 psid w/ TL and surge
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3-wire flying lead
T	Electrical switch 100 psid
U	Electrical switch 70 psid
W	Electrical/visual 100 psid w/TL
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

### METRIC PORTING AVAILABLE

Change W621 to G621  
Porting code C becomes G1-1/4" ISO 228 BSPP  
Porting code D becomes G1-1/2" ISO 228 BSPP  
Porting code E becomes 1-1/2" SAE 4 bolt flange with M12 mounting threads  
Porting code G becomes 1-1/4" SAE 4 bolt flange with M10 mounting threads  
Porting code Q becomes 1-1/4" SAE 4 bolt flange with M14 mounting threads  
Porting code R becomes 1-1/2" SAE 4 bolt flange with M16 mounting threads

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
E	E.P.R.
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
1 (8.04")	4.0"
2 (11.67")*	8.0"*
4 (16.39")	13.0"

\*HF3

### Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2μm
03	DT 5μm
05	DT 8μm
10	DT 14μm
20	DT 25μm

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.



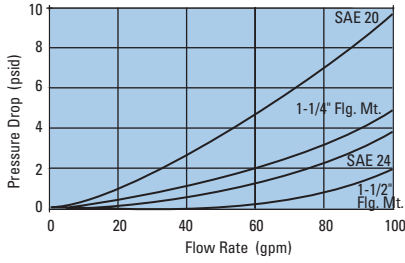
# W621

Max Flow: 120 gpm (454 lpm)

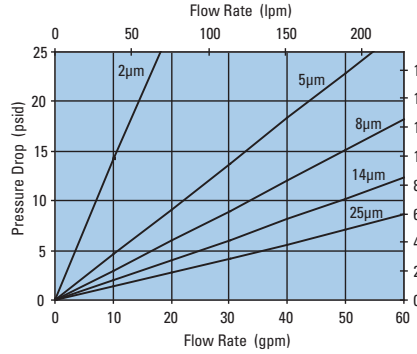


## Performance Data

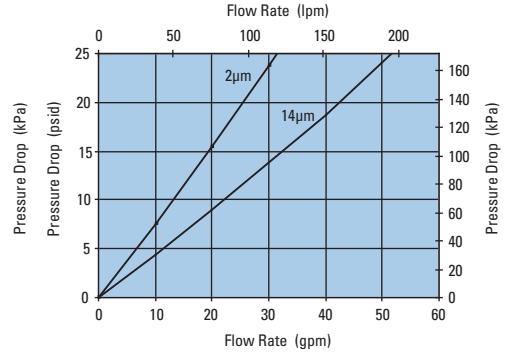
W621 Housing Only



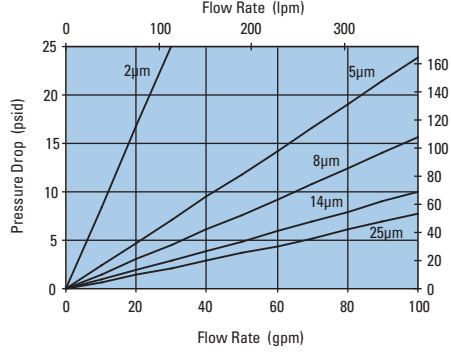
W621 4" DT Filter Only  
DT-9600-4, 4.59"/116.7mm



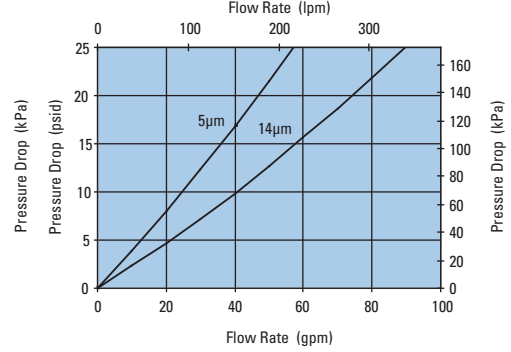
W621 4" DT Filter Only  
DT-9601-4, 4.57"/116mm



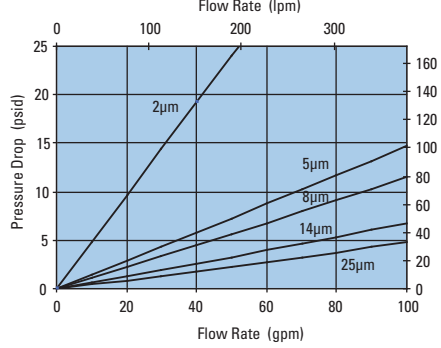
W621 8" DT Filter Only  
DT-9600-8, 8.22"/208.8mm



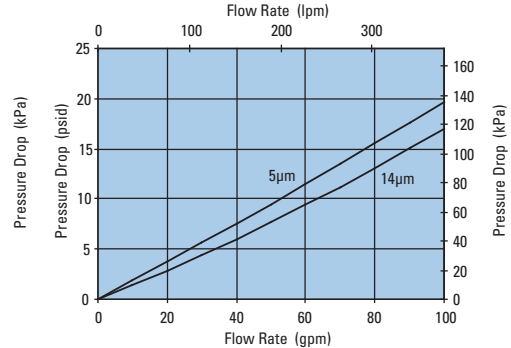
W621 8" DT Filter Only  
DT-9601-8, 8.19"/208mm



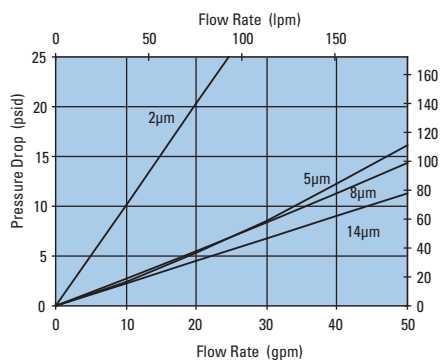
W621 13" DT Filter Only  
DT-9600-13, 12.913"/327.8mm



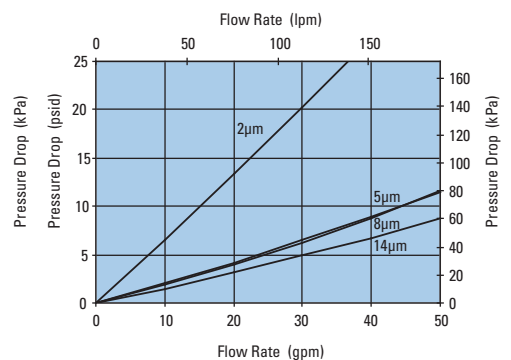
W621 13" DT Filter Only  
DT-9601-13, 12.85"/326.3mm



W621 8" DX2 Filter Only  
DX2-9600-8, 8.23"/209mm



W621 13" DX2 Filter Only  
DX2-9600-13, 12.87"/327mm



## W451 In-Line Cartridge Filters

**Working Pressures to:** 4000 *psi*  
31,000 kPa  
310 bar

**Rated Static Burst to:** 13,500 *psi*  
93,100 kPa  
931 bar

**Fatigue Pressure Rating:** 3000 *psi*  
20,700 kPa  
207 bar

**Flow Range to:** 150 *gpm*  
568 *lpm*



### Features

The W451 base-mounted filter series provides for easy servicing featuring top cover access for filter changeout. The ductile iron filter head design provides for SAE ports along with optional space saving manifold mounting. This product features the popular HF4 automotive filter. DT 4-layer media is offered in a variety of designs. Five different media grades are offered. Filter core collapse options range from 150 to 3,000 psi. The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features available in all of the indicators.

- Conforms to HF4 specifications
- High collapse filter available for use with non-bypass applications
- Wide range of indicator options
- Three housing length options for design flexibility
- Base & cover material: cast iron
- Cylinder material: steel
- Drain plug in base
- Bleed/fill plug in cover

#### Beta Rating (per ISO 16889)

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-20 O-ring
- 1½" SAE 4-Bolt Flange Code 61 or 62
- Manifold Mounting

#### Assembly Weight

- 9": 56 lbs / 25.4 kg
- 18": 82 lbs / 37.5 kg
- 27": 109 lbs / 49.5 kg

#### Replacement Filter Lengths

- 9.12" / 231.8mm
- 18.20" / 462.3mm
- 27.66" / 702.5mm

#### Standard Bypass Ratings

- No Bypass
- 50 psi / 345 kPa / 3.5 bar
- 90 psi / 621 kPa / 6.2 bar

#### Operating Temperatures

- -45° to 250°F (-43° to 121°C)

#### Filter Collapse Ratings

- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)



**W451**  
Max Flow: 150 gpm (568 lpm)

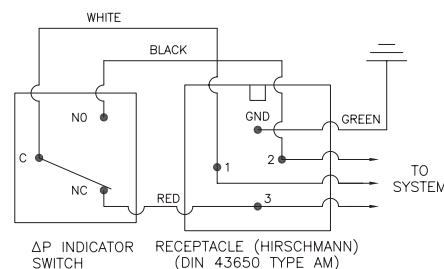
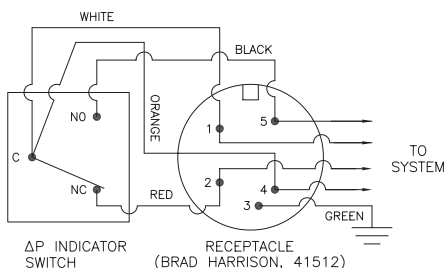


## W451 Specification Illustrations

All dimensions are shown in millimeters [inches].

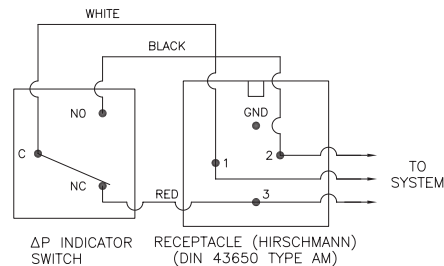
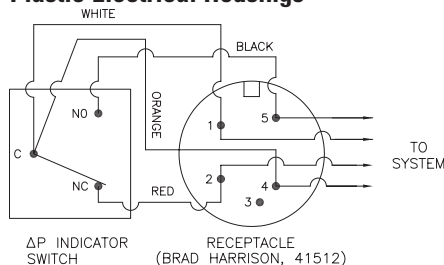
### Indicator Switch Schematic Wiring Diagram

#### Aluminum Electrical Housings



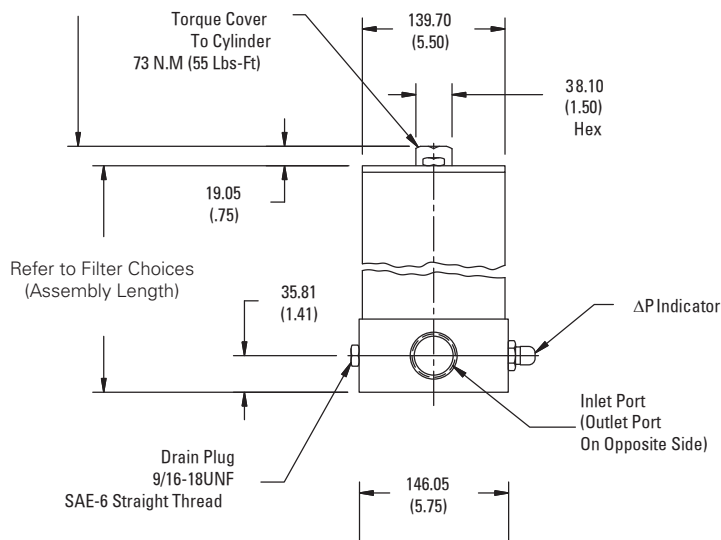
Note: The female plug (connector) is to be furnished by customer.

#### Plastic Electrical Housings

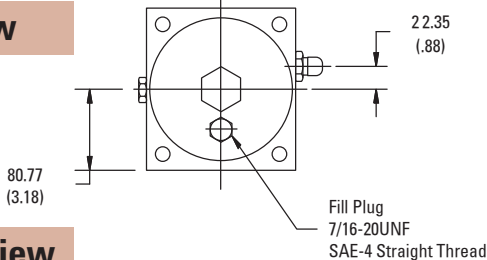


Note: The female plug (connector) is to be furnished by customer.

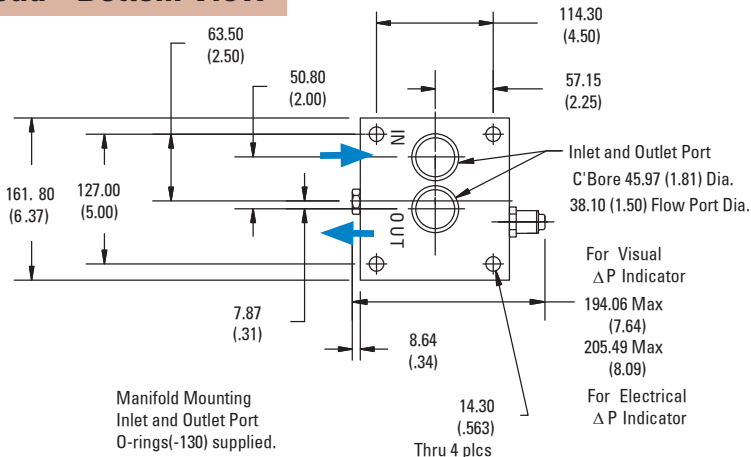
### Assembly - Side View



### Head - Side View



### Head - Bottom View



#### Differential Indicators:

Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

#### Surge Control:

This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

#### Thermal Lockout:

The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.





## W451 Components High-Performance DT Filter Choices

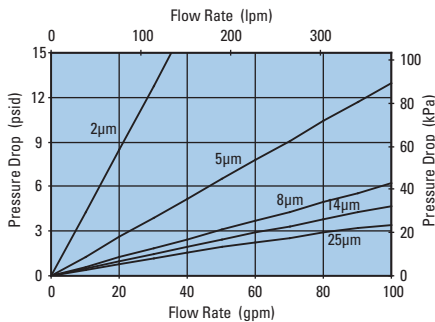
Media Number	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
5 μm	5 μm	9/231.8	P566270	DT-HF4-9-5UM
8 μm	8 μm	9/231.8	P566271	DT-HF4-9-8UM
14 μm	14 μm	9/231.8	P566272	DT-HF4-9-14UM
25 μm	25 μm	9/231.8	P566273	DT-HF4-9-25UM
5 μm	5 μm	18/462.3	P566274	DT-HF4-18-5UM
8 μm	8 μm	18/462.3	P566275	DT-HF4-18-8UM
14 μm	14 μm	18/462.3	P566276	DT-HF4-18-14UM
25 μm	25 μm	18/462.3	P566277	DT-HF4-18-25UM
5 μm	5 μm	27/702.5	P566278	DT-HF4-27-5UM
8 μm	8 μm	27/702.5	P566279	DT-HF4-27-8UM
14 μm	14 μm	27/702.5	P566280	DT-HF4-27-14UM
25 μm	25 μm	27/702.5	P566281	DT-HF4-27-25UM
5 μm	5 μm	9/233.5	P566412	DT-HF4HC-9-5UM, High collapse
14 μm	14 μm	9/233.5	P566413	DT-HF4HC-9-14UM, High collapse
WA	B>30 <sub>(c)</sub> = 200	9/233.5	P569527	Absorbs 250 ml water @ 25 psid

### Filter Notes

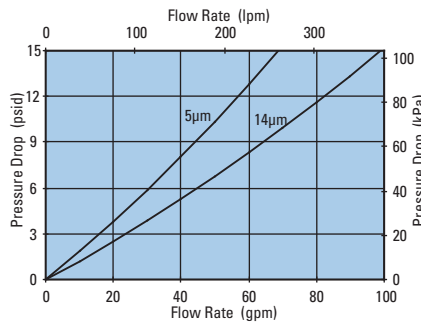
- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum end caps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.

## Performance Data

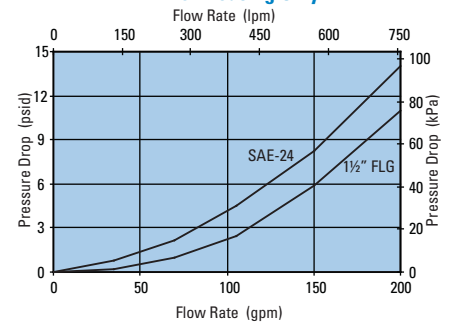
**W451 9" DT Filter Only**  
DT-HF-9, 9.13"/231.8mm



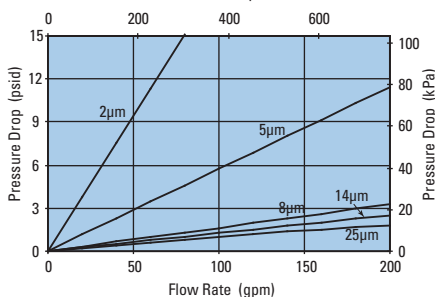
**W451 9" DT High Collapse Filter Only**  
DT-HF4HC-9, 9.19"/233.5mm



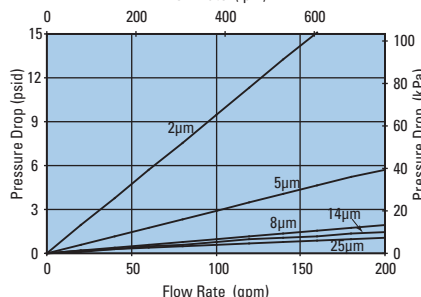
**W451 Housing Only**



**W451 18" DT Filter Only**  
DT-HF4-18, 18.20"/462.3mm



**W451 27" DT Filter Only**  
DT-HF4-27, 27.66"/702.5mm





W451

Max Flow: 150 gpm (568 lpm)



## Housing Ordering Guide

Filter  
Assembly

W451

TABLE 1

1

TABLE 2

D

TABLE 3

4

TABLE 4

J | N

TABLE 5

B

TABLE 6

3

TABLE 7

Service  
Filter

Filters ordered separately. See previous page for filter options.

**LEAD TIME NOTE:**

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
W451	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psi for housing w/o bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
D	SAE-24 O-ring
E	1½" 4-Bolt Flange Code 61
R	1½" 4-Bolt Flange Code 62
S	Manifold Mounting

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
4	50 psid
6	90 psid

Note: Use option 1 code only with 3000 psid collapse filter.

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
A	Visual indicator 70 psid w/TL and surge
B	Electrical/visual 70 psid w/TL and surge
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
G	Electrical/visual 35 psid w/TL
I	Visual indicator 70 psid
J	ΔP indicator plug
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3-wire flying lead
O	Visual indicator 100 psid
P	Visual indicator 100 psid w/TL and surge
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3-wire flying lead
T	Electrical switch 100 psid
U	Electrical switch 70 psid
W	Electrical/visual 100 psid w/TL
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

**METRIC PORTING AVAILABLE**

Change W451 to G451  
 Porting code D becomes 1-1/2" ISO 228 BSPP  
 Porting code E becomes 1-1/2" SAE 4 bolt flange with M12 mounting threads  
 Porting code R becomes 1-1/2" SAE 4 bolt flange with M16 mounting threads

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
E	E.P.R.
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
3 (15.31")	9.0"
6 (24.70")	18.0"*
7 (34.00")	27.0"

Note: Code lengths 6, 7 &amp; 8 media filters may be stacked using connector part # P167324.

**Media Ratings**

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
03	DT 5μm
05	DT 8μm
10	DT 14μm
20	DT 25μm

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
 Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
 Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.

## W620 In-Line Cartridge Filters

**Working Pressures to:** 6000 *psi*  
41,400 kPa  
414 bar

**Rated Static Burst to:** 15,000 *psi*  
103,400 kPa  
1034 bar

**Fatigue Pressure Rating:** 3000 *psi*  
20,700 kPa  
207 bar

**Flow Range to:** 150 *gpm*  
568 *lpm*



### Features

The W620 filter assembly contains the popular HF3 filter. It offers a reverse flow bypass valve option available for hydrostatic transmissions. Donaldson DT high-performance 4-layer media is offered in five different media grades. The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features incorporated in many of the valves.

- Conforms to HF3 specifications
- Head material: cast iron
- Housing material: steel
- Reverse flow bypass valve option available

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- SAE-16, -20, 24 O-ring
- 1¼" SAE 4-Bolt Flange Code 61 or 62
- 1½" SAE 4-Bolt Flange Code 61

#### Assembly Weight

- 9": 26 lbs / 11.79 kg
- 13": 33 lbs / 14.97 kg
- 18": 42 lbs / 19.05 kg
- 22": 48 lbs / 21.77 kg

#### Replacement Filter Lengths

- 4" / 101.6mm
- 8" / 203.2mm
- 13" / 330.2mm
- 16" / 406.4mm

#### Standard Bypass Ratings

- 90 psi / 621 kPa / 6.2 bar
- 50 psi / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -20° to 250°F (-29° to 121°C)

#### Filter Collapse Ratings

- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)



W620  
Max Flow: 150 gpm (568 lpm)

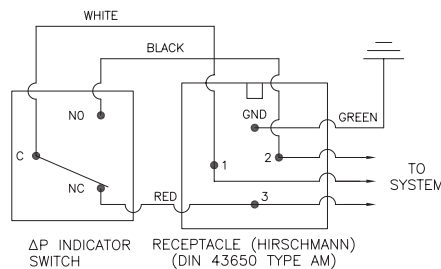
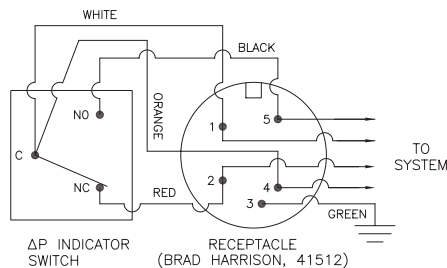


## W620 Specification Illustrations

All dimensions are shown in millimeters [inches].

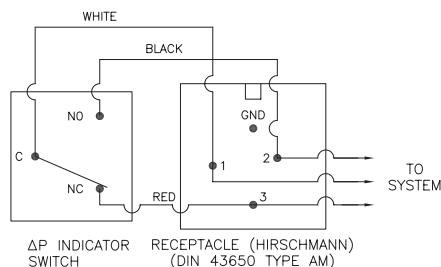
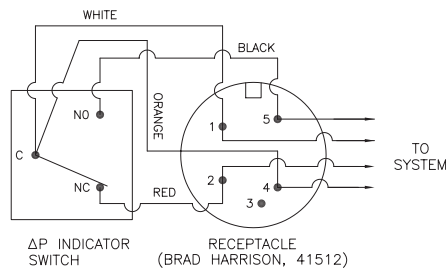
### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings

### Assembly - Side View



Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings

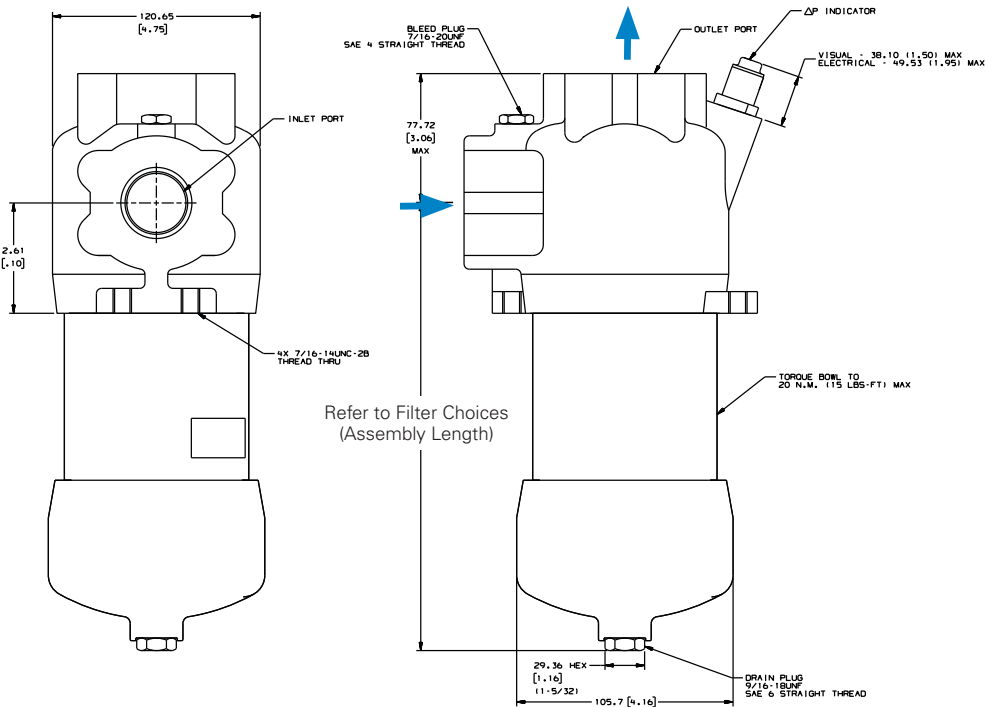


Note: The female plug (connector) is to be furnished by customer.

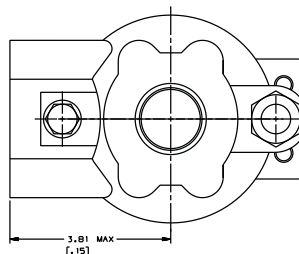
**Differential Indicators:** Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

**Surge Control:** This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:** The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.



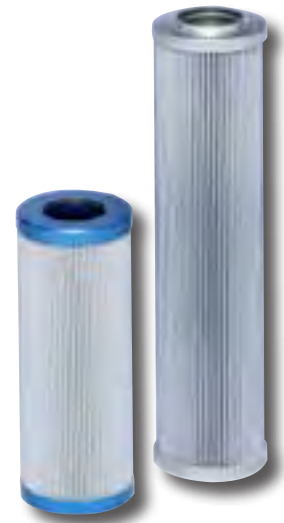
### Head - Top View



## W620 Components

### High-Performance DT Filter Choices

Media Number	Beta <sub>1000</sub> Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 µm	<4 µm	4/116.7	P566204	DT-9600-4-2UM
5 µm	5 µm	4/116.7	P566205	DT-9600-4-5UM
8 µm	8 µm	4/116.7	P566206	DT-9600-4-8UM
14 µm	14 µm	4/116.7	P566207	DT-9600-4-14UM
25 µm	25 µm	4/116.7	P566208	DT-9600-4-25UM
5 µm	5 µm	4/116	P566364	DT-9601-4-5UM, High collapse
14 µm	14 µm	4/116	P566365	DT-9601-4-14UM, High collapse
2 µm	<4 µm	8/208.8	P566209	DT-9600-8-2UM
5 µm	5 µm	8/208.8	P566210	DT-9600-8-5UM
8 µm	8 µm	8/208.8	P566211	DT-9600-8-8UM
14 µm	14 µm	8/208.8	P566212	DT-9600-8-14UM
25 µm	25 µm	8/208.8	P566213	DT-9600-8-25UM
5 µm	5 µm	8/208	P566366	DT-9601-8-5UM, High collapse
14 µm	14 µm	8/208	P566367	DT-9601-8-14UM, High collapse
2 µm	<4 µm	8/208	P567875	DX2-9600-8-2UM
5 µm	5 µm	8/209	P565122	DX2-9600-8-5UM
8 µm	8 µm	8/209	P565123	DX2-9600-8-8UM
14 µm	14 µm	8/209	P564936	DX2-9600-8-14UM
2 µm	<4 µm	13/327.8	P566214	DT-9600-13-2UM
5 µm	5 µm	13/327.8	P566215	DT-9600-13-5UM
8 µm	8 µm	13/327.8	P566216	DT-9600-13-8UM
14 µm	14 µm	13/327.8	P566217	DT-9600-13-14UM
25 µm	25 µm	13/327.8	P566218	DT-9600-13-25UM
5 µm	5 µm	13/326.3	P566368	DT-9601-13-5UM, High collapse
14 µm	14 µm	13/326.3	P566369	DT-9601-13-14UM, High collapse
5 µm	5 µm	13/327	P565188	DX2-9600-13-5UM
8 µm	8 µm	13/327	P565189	DX2-9600-13-8UM
14 µm	14 µm	13/327	P565187	DX2-9600-13-14UM
5 µm	5 µm	16/427	P565196	DX2-9600-16-5UM
8 µm	8 µm	16/427	P565197	DX2-9600-16-8UM
14 µm	14 µm	16/427	P565195	DX2-9600-16-14UM



#### Filter Notes

- All Donaldson DT and DX2 filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT and DX2 filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT and DX2 filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.
- DX2 filters utilize nylon mesh for pleat support.



W620

Max Flow: 150 gpm (568 lpm)



## Housing Ordering Guide

Filter Assembly

W620

TABLE 1

1

TABLE 2

B

TABLE 3

4

TABLE 4

L|N

TABLE 5

B

TABLE 6

2

TABLE 7

### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

Service Filter

Filters ordered separately. See previous page for filter options.

### Table 1

Filter Assembly	
CODE	DESCRIPTION
W620	Assembly

### Table 2

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psi for housing w/o bypass valve

### Table 3

Port Size Options	
CODE	PORT SIZE
B	SAE-16 O-ring
C	SAE-20 O-ring
D	SAE-24 O-ring
E	1½" 4 Bolt Flange Code 61
G	1¼" 4-Bolt Flange Code 61
Q	1¼" 4-Bolt Flange Code 62

### Table 4

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
4	50 psid
6	90 psid
7	90 psid w/reverse flow valve
8	Non-bypass w/reverse flow valve
9	50 psid w/reverse flow valve

Note: Use option 1 & 8 only with 3000 psid collapse filter.

### Table 5 (Primary)

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
A	Visual indicator 70 psid w/TL & surge
B	Electrical/visual 70 psid w/TL & surge
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
G	Electrical/visual 35 psid w/TL
I	Visual indicator 70 psid
J	ΔP indicator plug
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3 wire flying lead
O	Visual indicator 100 psid
P	Visual indicator 100 psid w/TL and surge
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3 wire flying lead
T	Electrical switch 100 psid
U	Electrical switch 70 psid
W	Electrical/visual 100 psid w/TL
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

### Table 5 (Secondary)

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

### Table 6

Seal Options	
CODE	MATERIAL
B	Buna-N®
E	E.P.R.
V	Viton®

### Table 7

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
1 (9.0")	4.0"
2 (13.0")*	8.0"*
4 (18.0")	13.0"
5 (22.0")	16.0"

\*HF3

### METRIC PORTING AVAILABLE

Change W620 to G620  
 Porting code B becomes 1" ISO 228 BSPP  
 Porting code C becomes 1-1/4" ISO 228 BSPP  
 Porting code D becomes 1-1/2" ISO 228 BSPP  
 Porting code E becomes 1-1/2" SAE 4 bolt flange with M12 mounting threads  
 Porting code G becomes 1-1/4" SAE 4 bolt flange with M10 mounting threads  
 Porting code Q becomes 1-1/4" SAE 4 bolt flange with M14 mounting threads

### Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2μm
03	DT 5μm
05	DT 8μm
10	DT 14μm
20	DT 25μm

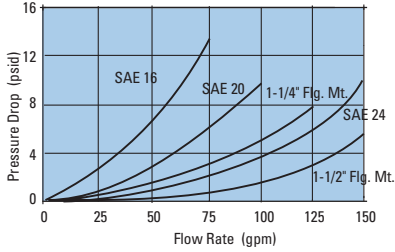
For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
 Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
 Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.

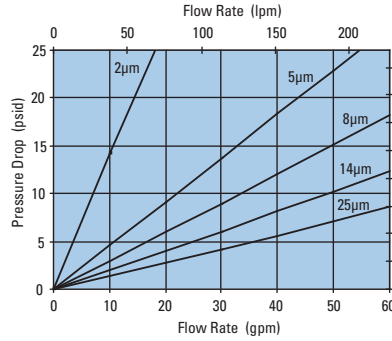


**Performance Data**

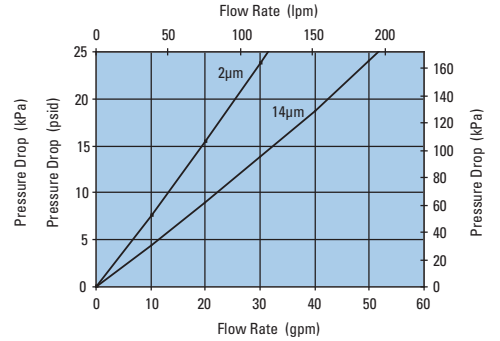
**W620 Housing Only**



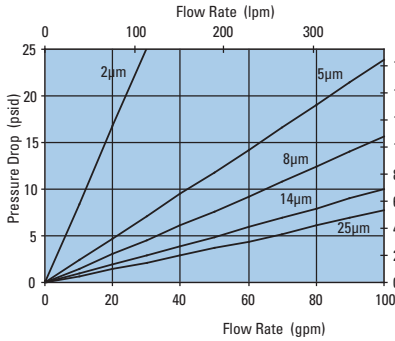
**W620 4" DT Filter Only**  
DT-9600-4, 4.59"/116.7mm



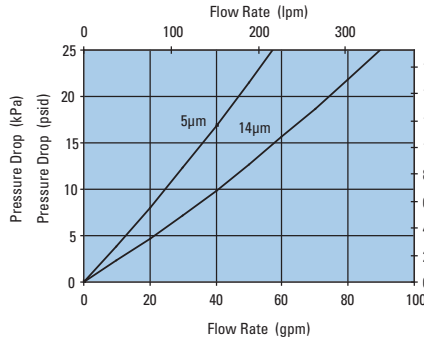
**W620 4" DT Filter Only**  
DT-9601-4, 4.59"/116.2mm



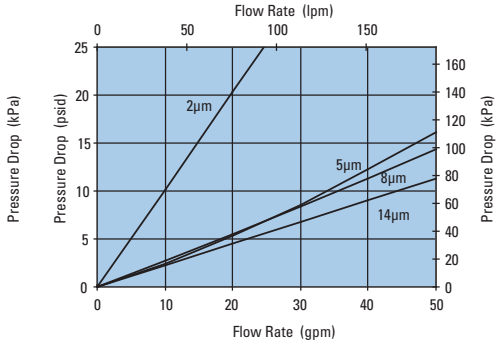
**W620 8" DT Filter Only**  
DT-9600-8, 8.22"/208.8mm



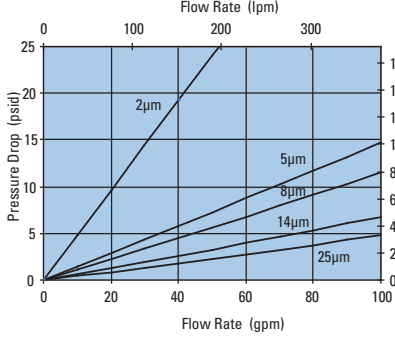
**W620 8" DT Filter Only**  
DT-9601-8, 8.19"/208mm



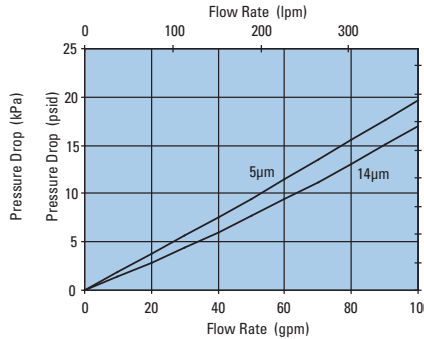
**W620 8" DX2 Filter Only**  
DX2-9600-8, 8.19"/208mm



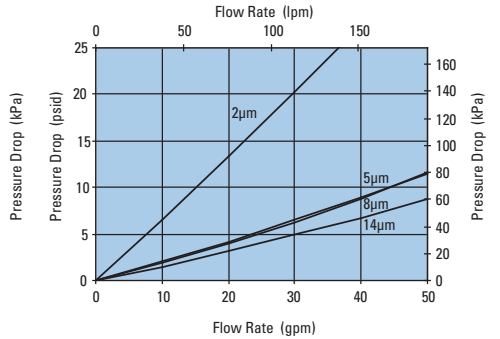
**W620 13" DT Filter Only**  
DT-9600-13, 12.91"/327.8mm



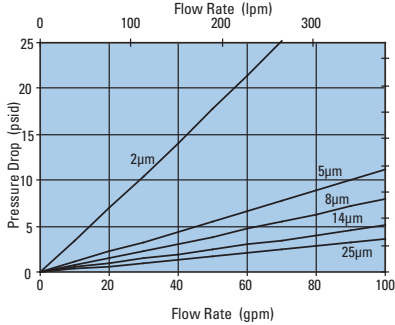
**W620 13" DT Filter Only**  
DT-9601-13, 12.85"/326.3mm



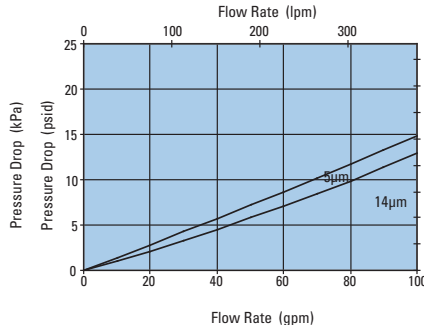
**W620 13" DX2 Filter Only**  
DX2-9600-13, 12.87"/327mm



**W620 16" DT Filter Only**  
DT-9600-16, 16.84"/427.8mm



**W620 16" DT Filter Only**  
DT-9601-16, 16.82"/427.1mm







WS620

Max Flow: 150 gpm (568 lpm)

## WS620 In-Line Cartridge Filters

**Working Pressures to:** 6000 *psi*  
41,400 kPa  
414 bar

**Rated Static Burst to:** 15,000 *psi*  
103,400 kPa  
1034 bar

**Fatigue Pressure Rating:** 3000 *psi*  
20,700 kPa  
207 bar

**Flow Range to:** 150 *gpm*  
568 *lpm*



### Features

The WS620 filter assembly is manufactured to meet the HF3 specification. The flange mounted design is an ideal choice for direct mounting to the hydraulic system. Our standard housing drain plug helps relieve system pressure during filter change outs. Donaldson DT high-performance 4-layer media is offered in five different media grades. The differential pressure indicator line is designed to work with the wide assortment of bypass valves. Thermal lockout and surge control are two key features incorporated in many of the valves.

- Conforms to HF3 specifications
- Manifold mounting
- Head material: cast iron
- Housing material: steel

#### Beta Rating

- Performance to  $\beta_{<4(c)}=1000$

#### Porting Size Options

- Manifold mounting

#### Assembly Weight

- 11.8": 37 lbs / 16.78 kg
- 15.5": 43 lbs / 19.50 kg
- 20.2": 52 lbs / 23.59 kg
- 24.1": 59 lbs / 26.76 kg

#### Replacement Filter Lengths

- 4" / 101.6mm
- 8" / 203.2mm
- 13" / 330.2mm
- 16" / 406.4mm

#### Standard Bypass Ratings

- 90 psi / 621 kPa / 6.2 bar
- 50 psi / 345 kPa / 3.5 bar
- No Bypass

#### Operating Temperatures

- -20° to 250°F (-29° to 121°C)

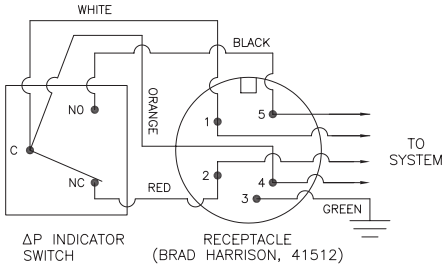
#### Filter Collapse Ratings

- 150 psi / 1034 kPa / 10.3 bar (standard)
- 3000 psi / 20,700 kPa / 206.8 bar (high collapse)

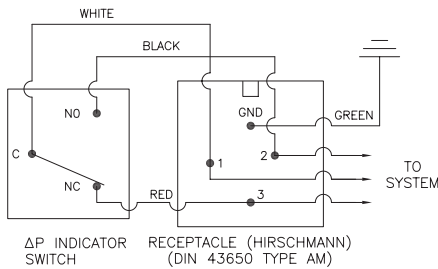
## WS620 Specification Illustrations

All dimensions are shown in millimeters [inches].

### Indicator Switch Schematic Wiring Diagram Aluminum Electrical Housings



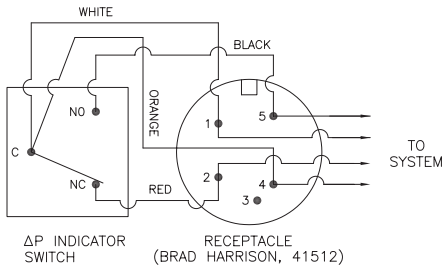
ΔP INDICATOR SWITCH RECEPTACLE (BRAD HARRISON, 41512)



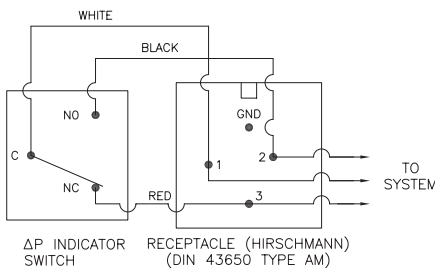
ΔP INDICATOR SWITCH RECEPTACLE (HIRSCHMANN) (DIN 43650 TYPE AM)

Note: The female plug (connector) is to be furnished by customer.

### Plastic Electrical Housings



ΔP INDICATOR SWITCH RECEPTACLE (BRAD HARRISON, 41512)



ΔP INDICATOR SWITCH RECEPTACLE (HIRSCHMANN) (DIN 43650 TYPE AM)

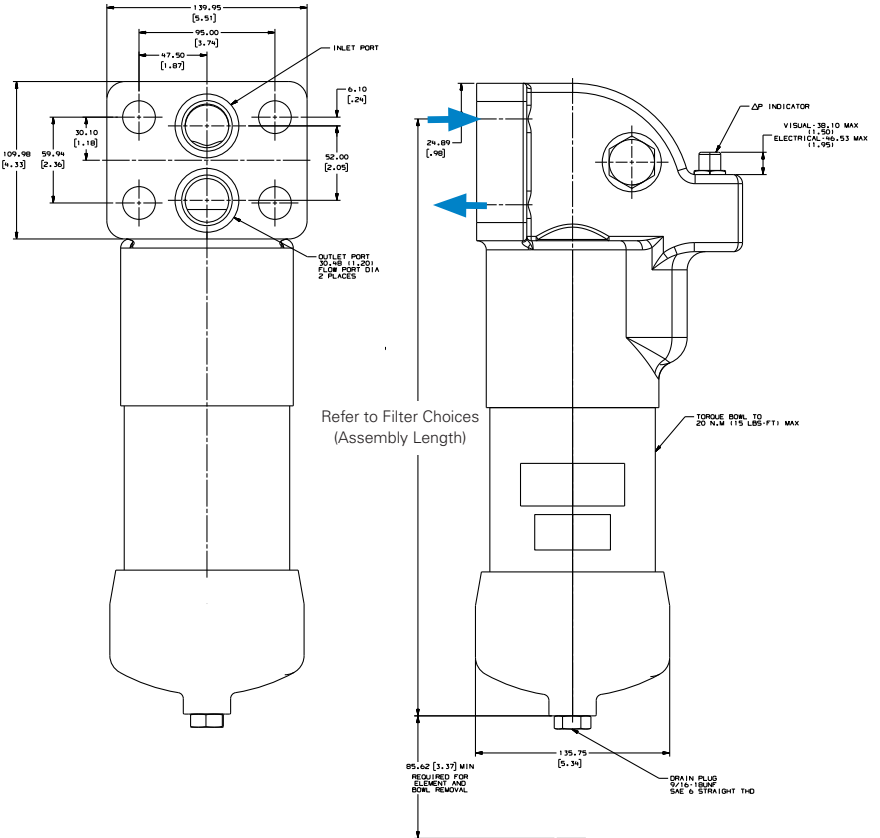
Note: The female plug (connector) is to be furnished by customer.

**Differential Indicators:** Indicators are designed to actuate at approximately 80% of bypass valve cracking pressure. It is recommended that an indicator with a bypass setting of 100 psid is used with a non-bypass housing.

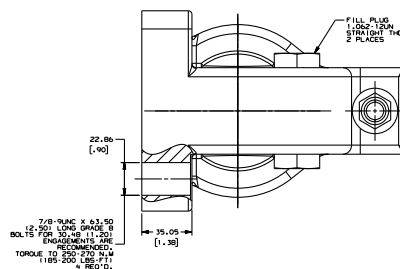
**Surge Control:** This optional feature is used to dampen pressure surges or spikes to avoid premature actuation of the indicator. Surge control delays the indicator response.

**Thermal Lockout:** The Thermal Lockout prevents premature signaling of a bypass condition created by viscous fluid during cold start-ups. Normal indicator actuation capability is resumed once the operating temperature of the fluid reaches approximately 80°F / 27°C.

### Assembly - Side View



### Head - Top View





WS620

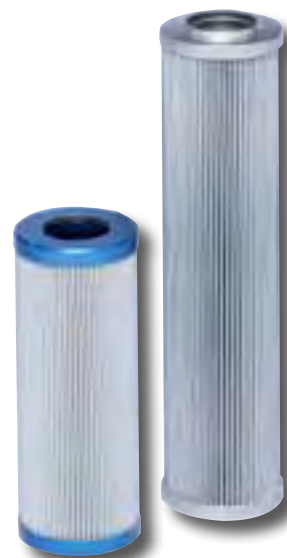
Max Flow: 150 gpm (568 lpm)



## WS620 Components

### High-Performance DT Filter Choices

Media Number	Beta <sub>w(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2 µm	<4 µm	4/116.7	P566204	DT-9600-4-2UM
5 µm	5 µm	4/116.7	P566205	DT-9600-4-5UM
8 µm	8 µm	4/116.7	P566206	DT-9600-4-8UM
14 µm	14 µm	4/116.7	P566207	DT-9600-4-14UM
25 µm	25 µm	4/116.7	P566208	DT-9600-4-25UM
5 µm	5 µm	4/116	P566364	DT-9601-4-5UM, High collapse
14 µm	14 µm	4/116	P566365	DT-9601-4-14UM, High collapse
2 µm	<4 µm	8/208.8	P566209	DT-9600-8-2UM
5 µm	5 µm	8/208.8	P566210	DT-9600-8-5UM
8 µm	8 µm	8/208.8	P566211	DT-9600-8-8UM
14 µm	14 µm	8/208.8	P566212	DT-9600-8-14UM
25 µm	25 µm	8/208.8	P566213	DT-9600-8-25UM
5 µm	5 µm	8/208	P566366	DT-9601-8-5UM, High collapse
14 µm	14 µm	8/208	P566367	DT-9601-8-14UM, High collapse
2 µm	<4 µm	8/208	P567875	DX2-9600-8-2UM
5 µm	5 µm	8/209	P565122	DX2-9600-8-5UM
8 µm	8 µm	8/209	P565123	DX2-9600-8-8UM
14 µm	14 µm	8/209	P564936	DX2-9600-8-14UM
2 µm	<4 µm	13/327.8	P566214	DT-9600-13-2UM
5 µm	5 µm	13/327.8	P566215	DT-9600-13-5UM
8 µm	8 µm	13/327.8	P566216	DT-9600-13-8UM
14 µm	14 µm	13/327.8	P566217	DT-9600-13-14UM
25 µm	25 µm	13/327.8	P566218	DT-9600-13-25UM
5 µm	5 µm	13/326.3	P566368	DT-9601-13-5UM, High collapse
14 µm	14 µm	13/326.3	P566369	DT-9601-13-14UM, High collapse
5 µm	5 µm	13/327	P565188	DX2-9600-13-5UM
8 µm	8 µm	13/327	P565189	DX2-9600-13-8UM
14 µm	14 µm	13/327	P565187	DX2-9600-13-14UM
5 µm	5 µm	16/427	P565196	DX2-9600-16-5UM
8 µm	8 µm	16/427	P565197	DX2-9600-16-8UM
14 µm	14 µm	16/427	P565195	DX2-9600-16-14UM



#### Filter Notes

- All Donaldson DT and DX2 filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT and DX2 filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT and DX2 filters. Viton® is a registered trademark of E. I. DuPont de Nemours and Company.
- DX2 filters utilize nylon mesh for pleat support.



# Housing Ordering Guide

Filter Assembly	WS620 TABLE 1	1 TABLE 2	S TABLE 3	4 TABLE 4	D   H TABLE 5	B TABLE 6	2 TABLE 7
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Service Filter: Filters ordered separately. See previous page for filter options.

**LEAD TIME NOTE:**  
This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

**Table 1**

Filter Assembly	
CODE	DESCRIPTION
WS620	Assembly

**Table 2**

Filter Collapse Options	
CODE	DESCRIPTION
1	150 psid for housing w/bypass valve
4	3000 psi for housing w/o bypass valve

**Table 3**

Port Size Options	
CODE	PORT SIZE
S	Manifold Mounting

**Table 4**

Bypass Setting Options	
CODE	BYPASS SETTING
1	Non-bypass
4	50 psid
6	90 psid
7	90 psid w/reverse flow valve
8	Non-bypass w/reverse flow valve
9	50 psid w/reverse flow valve

Note: Use option 1 & 8 only with 3000 psid collapse filter.

**Table 5 (Primary)**

Indicator Style and Setting	
CODE	ΔP INDICATOR STYLE & SETTING
A	Visual indicator 70 psid w/TL and surge
B	Electrical/visual 70 psid w/TL and surge
D	Electrical/visual 35 psid
E	Electrical/visual 100 psid
G	Electrical/visual 35 psid w/TL
I	Visual indicator 70 psid
J	ΔP indicator plug
L	Visual indicator 35 psid
M	Visual indicator 35 psid w/ TL and surge
N	Electrical/visual 35 psid w/12" 3-wire flying lead
O	Visual indicator 100 psid
P	Visual indicator 100 psid w/TL and surge
R	Electrical switch 35 psid
S	Electrical/visual 100 psid w/12" 3-wire flying lead
T	Electrical switch 100 psid
U	Electrical switch 70 psid
V	Electrical/visual 70 psid w/TL
W	Electrical/visual 100 psid w/TL
Y	Electrical/visual 35 psid w/TL and surge
Z	Electrical/visual 100 psid w/TL and surge

TL (thermal lockout)

**Table 5 (Secondary)**

Receptacle Options	
CODE	ELECTRICAL STYLE
B	Brad Harrison® (5-pin)
H	Hirschmann® (4-pin)
N	None, for visual ΔP indicator

**Table 6**

Seal Options	
CODE	MATERIAL
B	Buna-N®
E	E.P.R.
V	Viton®

**Table 7**

Assembly & Filter Length	
CODE (LGTH)	FILTER LENGTH
1 (11.8")	4.0"
2 (15.5")*	8.0"*
4 (20.2")	13.0"
5 (24.1")	16.0"

\*HF3

## Media Ratings

Western Filter elements have been replaced by Donaldson DT high-performance cartridges.

WESTERN MEDIA CODE	DONALDSON DT MEDIA
01	DT 2μm
03	DT 5μm
05	DT 8μm
10	DT 14μm
20	DT 25μm

For a complete filter interchange, visit [crossreference.donaldson.com](http://crossreference.donaldson.com).

Brad Harrison® is a registered trademark of Woodhead Industries, Inc.  
Hirschmann® is a registered trademark of Richard Hirschmann of America Inc.  
Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Co.



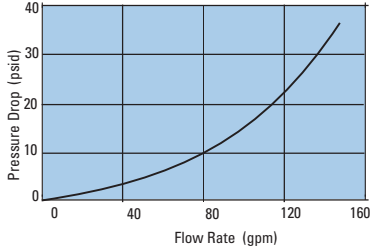
WS620

Max Flow: 150 gpm (568 lpm)

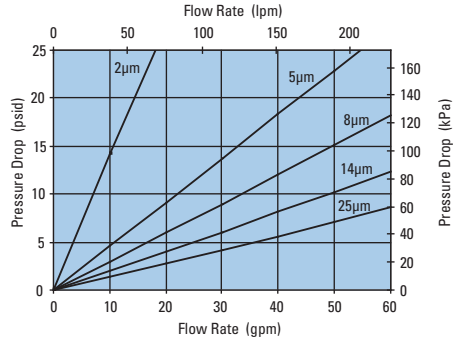


# Performance Data

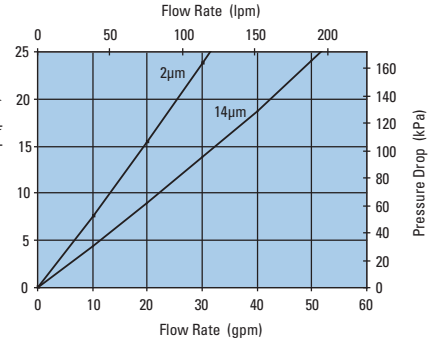
**WS620 Housing Only**



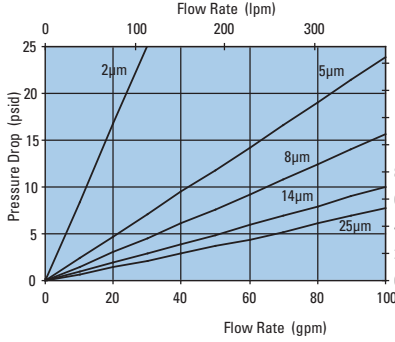
**WS620 4" DT Filter Only**  
DT-9600-4, 4.59"/116.7mm



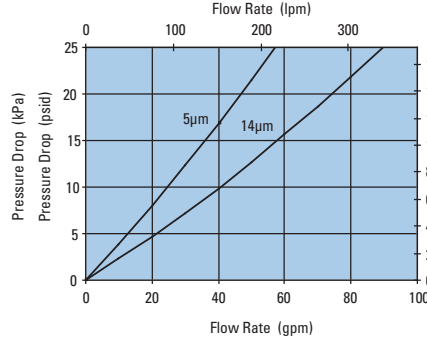
**WS620 4" DT Filter Only**  
DT-9601-4, 4.59"/116.2mm



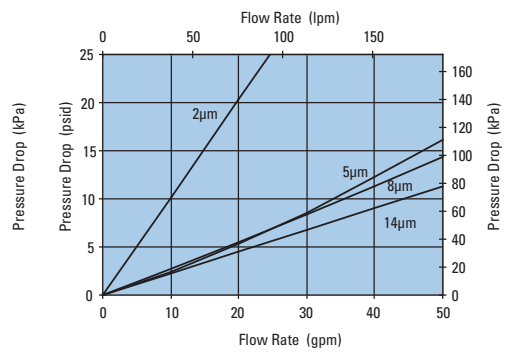
**WS620 8" DT Filter Only**  
DT-9600-8, 8.22"/208.8mm



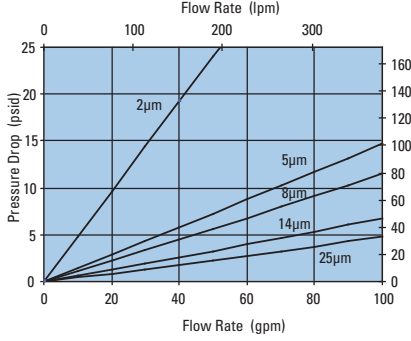
**WS620 8" DT Filter Only**  
DT-9601-8, 8.19"/208mm



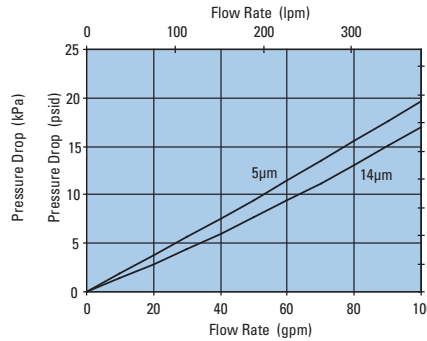
**WS620 8" DX2 Filter Only**  
DX2-9600-8, 8.19"/208mm



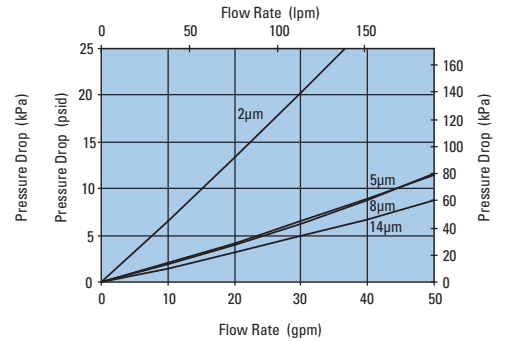
**WS620 13" DT Filter Only**  
DT-9600-13, 12.91"/327.8mm



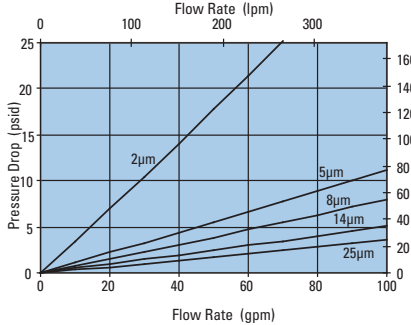
**WS620 13" DT Filter Only**  
DT-9601-13, 12.85"/326.3mm



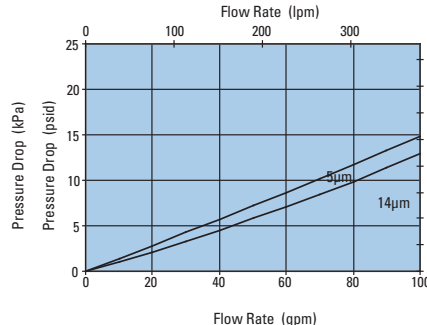
**WS620 13" DX2 Filter Only**  
DX2-9600-13, 12.87"/327mm



**WS620 16" DT Filter Only**  
DT-9600-16, 16.84"/427.8mm



**WS620 16" DT Filter Only**  
DT-9601-16, 16.82"/427.1mm



## HPK05 In-Line Cartridge Filters

**Working Pressures to:** 3000 *psi*  
20,700 kPa  
206.9 bar

**Rated Static Burst to:** 6000 *psi*  
41,400 kPa  
413.8 bar

**Flow Range to:** 200 *gpm*  
757 *lpm*



### Features

The HPK05 high pressure filter series is made of ductile iron and steel for strength and durability. Machined bypass valves are case-hardened at critical points to provide maximum strength and reliability.

Reverse flow bypass valve allows bi-directional flow through the filter head, with head-up or head-down mounting capabilities. Available with your choice of visual or AC/DC electrical service indicator; choose Viton® or Buna-N® seals. The HPK05 filters contain Synteq™, Donaldson’s exclusive synthetic fiber media formulated especially for hydraulic filtration. Upgraded Donaldson high-performance DT filters are also offered for superior performance.

Viton® and Buna-N® are registered trademarks of E. I. DuPont de Nemours and Company.

#### Beta Rating

- Performance to  $\beta_{4(c)}=1000$

#### Porting Size Options

- 2" SAE 4-Bolt Flange Code 61

#### Assembly Weight

- 63 lbs / 28.5

#### Replacement Filter Length

- 25.53"/648mm
- 25.9"/657.9mm

#### Standard Bypass Ratings

- 60 *psi* / 414 kPa / 4.1 bar with reverse-flow check valve
- No Bypass

#### Operating Temperatures

- -20°F to 250°F / -29°C to 121°C

#### Filter Collapse Ratings

- 200 *psi* / 1380 kPa / 13.8 bar (standard)
- 3000 *psi* / 20,700 kPa / 206.9 bar (high collapse)



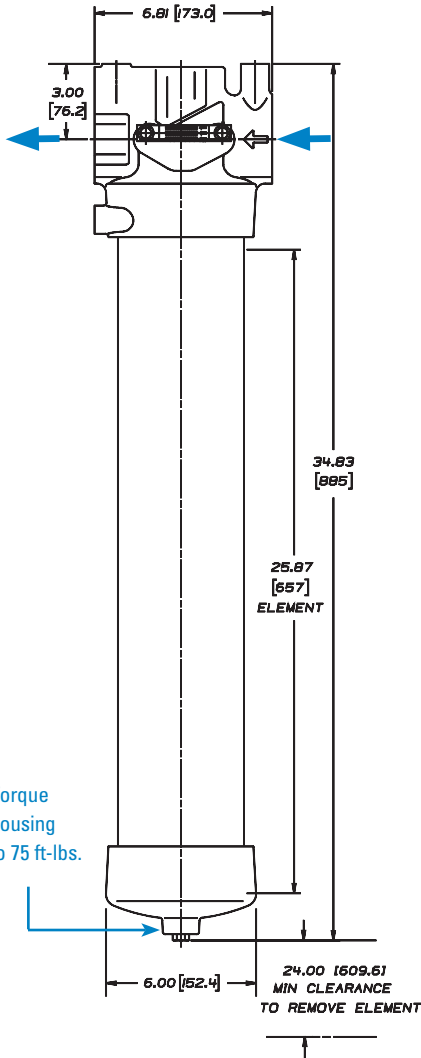
**HPK05**  
 Max Flow: 200 gpm (757 lpm)



**HPK05 Specification Illustrations**

All dimensions are shown in inches [millimeters].

**Assembly - Side View**

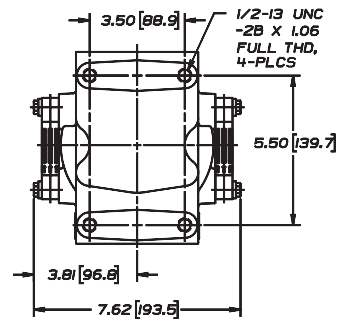


**Applications:**

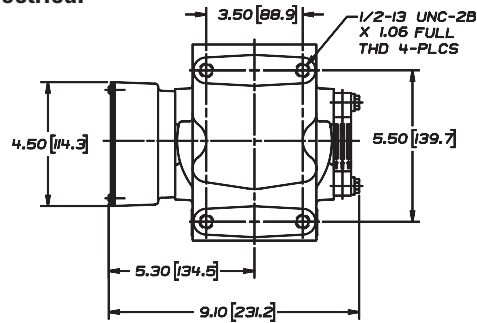
- High Pressure Circuits
- In-Plant & Mobile Equipment
- Hydrostatic Transmissions
- Centralized Lube Systems

**Head - Top View**

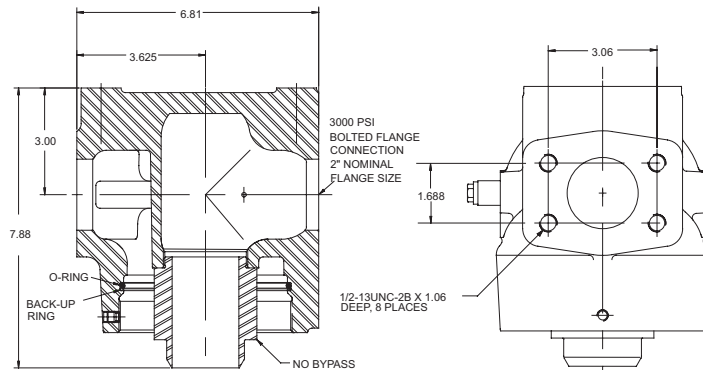
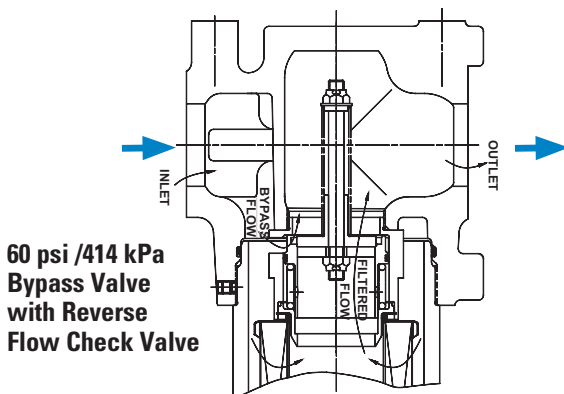
With 2 Visual Indicators



With Visual & Electrical Indicators



**Bypass Valve Alternatives**



No Bypass



## HPK05 Components Assembly Choices

Port Size <sup>4</sup>	Bypass Rating	Indicator Style/Location <sup>1</sup>	Assembly Number	Media Number	Filter Part No.
2" SAE 4-Bolt Flange (Code 61)	60 psi / 414 kPa / 4.1 bar	Visual, Left side	K052024	No. 9	P164229
	Reverse flow check valve				
	No Bypass	Visual & Electrical <sup>2</sup>	K052039	No. 9	P171037 <sup>3</sup>

### Assembly Notes

- Donaldson uses the inlet port as the reference point. "Left side," for instance, means that the indicator mounts on the side of the filter head that is on your left when you face the inlet port.
- Visual indicator is mounted on left side of the head; electrical indicator (P173929- 72 psid) is mounted on the right side.
- Rated as high collapse (3000 psi / 20700 kPa); has Viton® seals.

## Standard Filter Choices with Synteq™ Media Technology

Media Number	B <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Part No.	Seal & Comments
No. 1	5 µm	25.5 / 648	P167841	Buna-N®
No. 2	9 µm	25.5 / 648	P164585	Buna-N
No. 2½	10 µm	25.5 / 648	P164227	Buna-N
			P164435	Viton®
			Built to order	
No. 9	23 µm	25.5 / 648	P164229	Buna-N

### Filter Notes

- Filters with seals made of Buna-N are appropriate for most applications involving petroleum oil. Filters with seals made of fluoroelastomer (such as Viton® or Fluorel®) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F/83°C. (Viton® is a registered trademark of DuPont Dow Elastomers and Fluorel is a registered trademark of the 3M Company.)
- Donaldson high collapse filters, with their steel end caps and reinforcing wire-backed media, are rated to withstand up to 3000 psi / 20,700 kPa before collapsing.
- Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.
- Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Company.

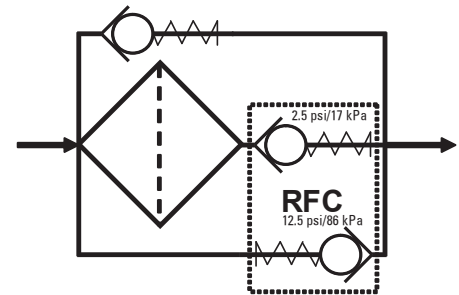
## High-Performance DT Filter Choices

Media Number	Beta <sub>x(c)</sub> =1000 Rating	Length (in./mm)	Donaldson DT Part No.	Comments
2.5 µm	<4 µm	25.9/657.9	P566449	DT-9400-26-2UM
5 µm	5 µm	25.9/657.9	P566450	DT-9400-26-5UM
8 µm	8 µm	25.9/657.9	P566451	DT-9400-26-8UM
14 µm	14 µm	25.9/657.9	P566452	DT-9400-26-14UM
25 µm	25 µm	25.9/657.9	P566453	DT-9400-26-25UM
5 µm	5 µm	25.9/657.9	P566642	DT-9901-26-5UM, High collapse
14 µm	14 µm	26/657.2	P566643	DT-9901-26-14UM, High collapse

### Filter Notes

- All Donaldson DT filters utilize glass fiber media with an epoxy-based resin system for the ultimate in chemical compatibility.
- All Donaldson DT filters are potted with epoxy-based adhesives.
- Standard collapse DT designs are double wire-backed using epoxy-coated steel mesh for maximum pleat support and dirt capacity.
- High collapse designs are double wire-backed using stainless steel mesh.
- High collapse designs are also potted into machined aluminum endcaps for greater filter integrity in critical applications.
- Viton® seals are standard on all Donaldson DT filters.

### Reverse Flow Check Schematic





HPK05

Max Flow: 200 gpm (757 lpm)



## Service Indicator Options

### Visual Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description
P569632	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button
P569633	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button
P567988	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button with thermal lockout and surge control
P567989	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button with thermal lockout and surge control

### AC/DC Visual/Electrical Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description
P569634	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps
P569635	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps
P567986	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650
P567987	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650

\* Note: Above choices include indicator and mounting block.

## Indicator Service Parts

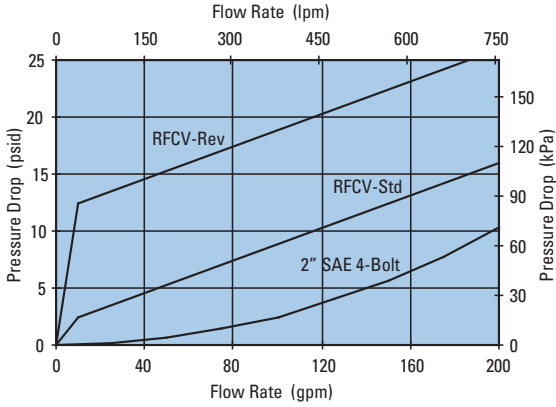
### Replacement Indicators Only

Part No.	Description
P567458	Visual/Electrical indicator with thermal lockout and surge, 35 psid/2.4 bar
P567459	Visual/Electrical indicator, with thermal lockout and surge 70 psid/4.8 bar
P567456	Pop-Up Visual Indicator, with thermal lockout and surge 35 psid/2.4 bar
P567457	Pop-Up Visual Indicator, with thermal lockout and surge 70 psid/4.8 bar
P569636	Pop-Up Visual Indicator, 35 psid/2.4 bar
P569637	Pop-Up Visual Indicator, 70 psid/4.8 bar
P569638	Visual/Electrical Indicator, 35 psid/2.4 bar
P569639	Visual/Electrical Indicator, 70 psid/4.8 bar
P164315	Visual Indicator, bar style, 35 psid/2.4 bar
P166603	Visual Indicator, bar style, 70 psid/4.8 bar
P166134	Blanking plate

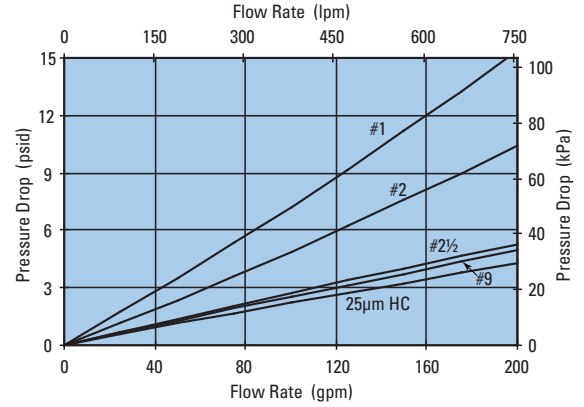


**Performance Data**

**HPK05 Housing Only**

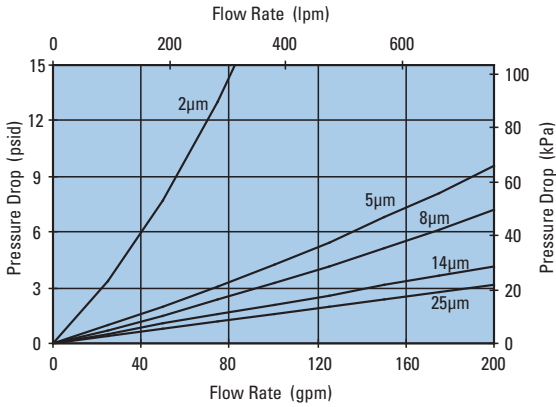


**HPK05 26" Standard Filter Only**



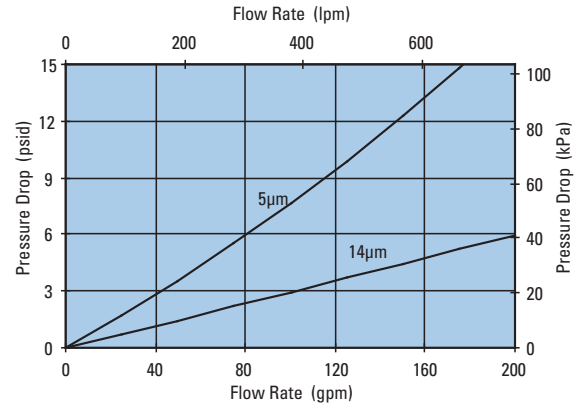
**HPK05 26" DT Filter Only**

DT-9400-26, 26"/660mm



**HPK05 26" DT Filter Only**

DT-9901-26, 26"/660mm

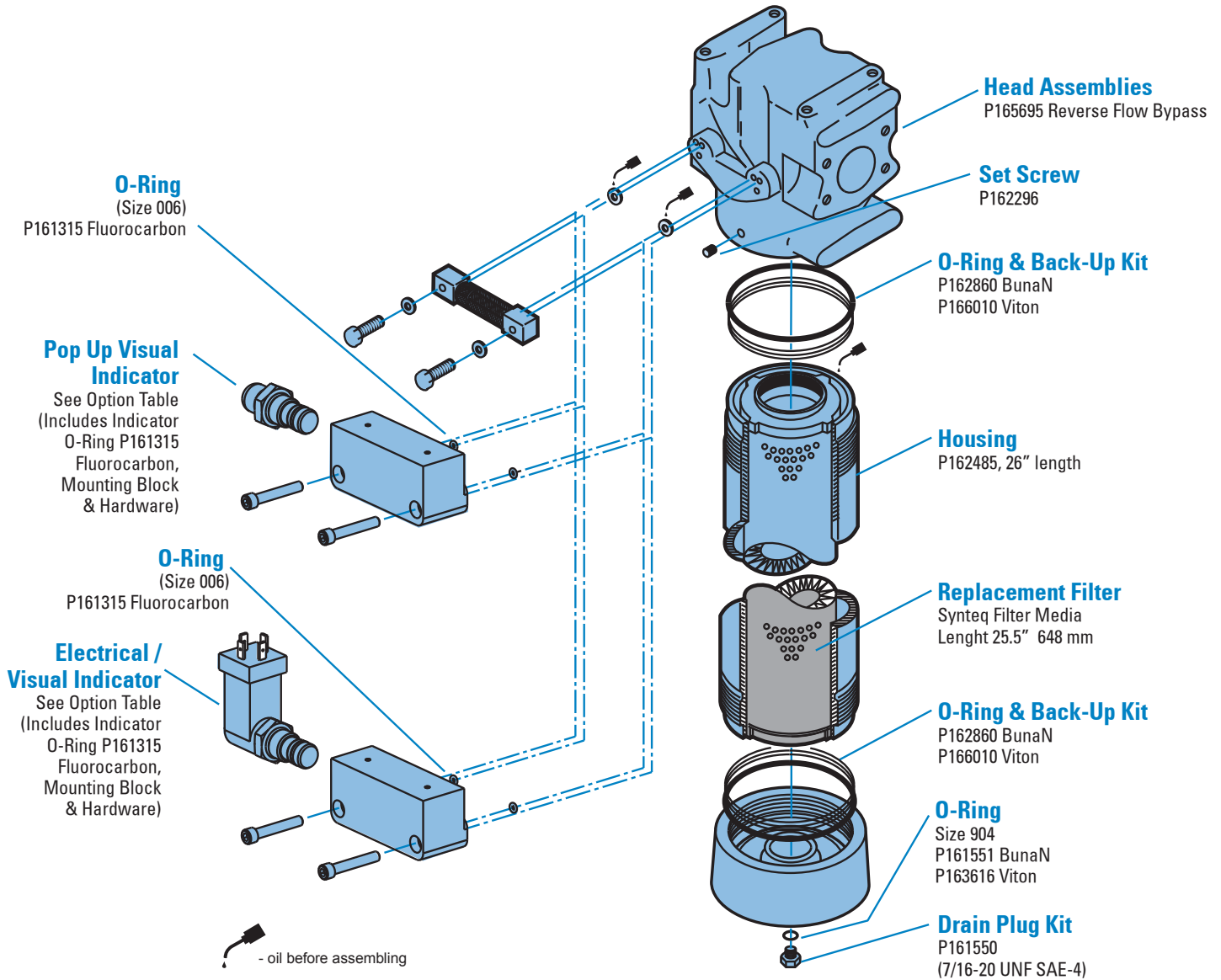




**HPK05**  
Max Flow: 200 gpm (757 lpm)



**HPK05 Service Parts**

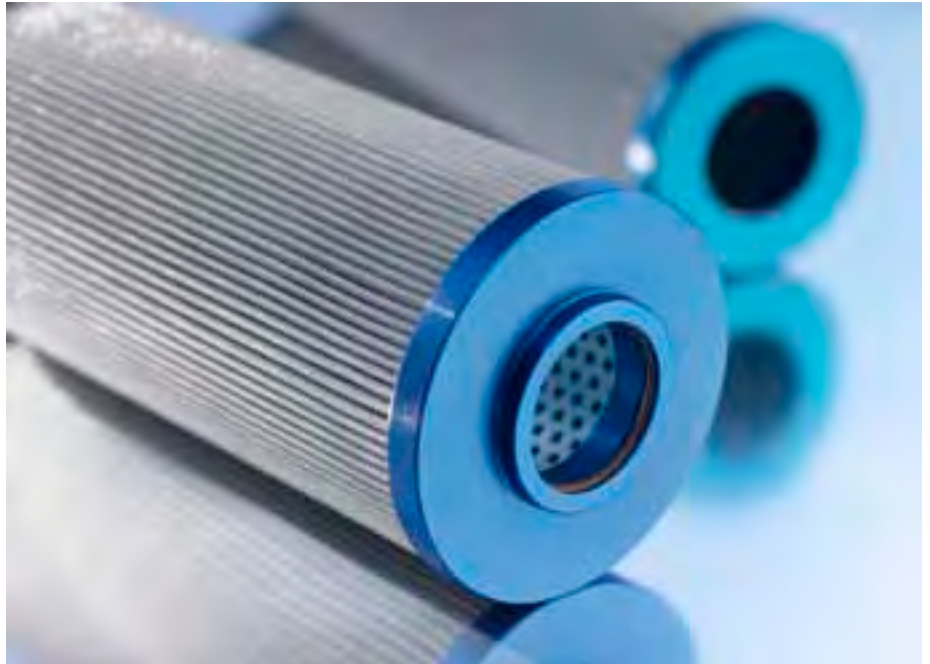


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## High-Performance DT Hydraulic Cartridges

Using Donaldson Synteq™ media technology, DT filters extend filter life, allow higher initial cleanliness and provide superior system protection.



### Manufacturer's Code Index

BDWN.....Baldwin	NORM.....Norman
BSCH.....Bosch	Ultraporous
EPPE.....Eppensteiner	PALL.....Pall
FAIR.....Fairey Arlon	PORO.....Porous Media
FINN.....Finn Equipment	PRKR.....Parker
FLTC.....Filtrec/Main Filter	PTI.....PTI
FNEQ.....Finn Filter	PUPR.....Purolator
FTGD.....Fleetguard	SPTC.....Separation
HCHN.....Hydac/Hycon	Technologies
HEIL.....Heil	SRDR.....Schroeder
HLKO.....Hilco	STFF.....Stauff
HYPO.....Hy Pro	UFI.....UFI
INMN.....Internormen	VKRS.....Vickers
KDON.....Kaydon	WESF.....Western Filter
MHLE.....Mahle	Wix.....Wix
MOOG.....Moog	Zinga.....Zinga
MPPF.....MP Filtri	

### Numberfinder Index

0.....216	G.....221
1.....217	H.....222
2.....218	K.....230
3.....218	M.....230
5.....219	N.....230
6.....219	P.....230
7.....219	R.....231
8.....219	S.....232
9.....219	V.....234
A.....220	W.....234
B.....220	X.....234
D.....220	Y.....234
E.....220	
F.....221	

For the most current part interchanges and application information, visit [crossreference.donaldson.com](http://crossreference.donaldson.com)



## Donaldson has the Industry's Largest Selection of Replacement Filters

*In stock and ready to ship!*

For a complete list of replacement part numbers, visit [crossreference.donaldson.com](http://crossreference.donaldson.com)



## High-performance DT filters provide superior hydraulic system protection.

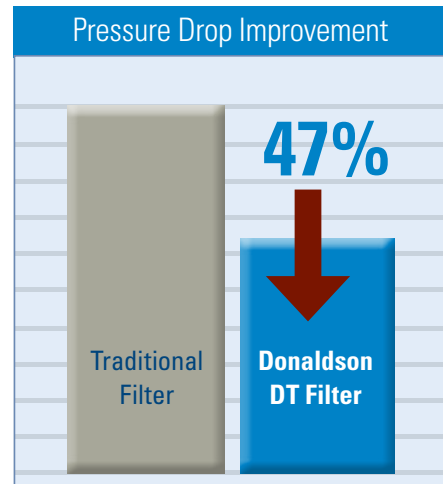
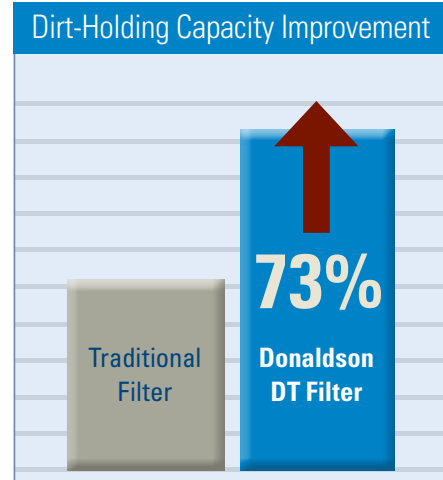
### Premium Uptime Protection

Every hydraulic system has suspended particles in its fluid. Contaminants grind and wear at the surface of moving parts, introducing even more particles into the system. These contaminants cause more than 70% of all hydraulic system downtime.

Donaldson high-performance DT cartridge filters provide better protection from the particles and contaminants that reduce the effectiveness of lubricant and hydraulic fluid. Using Donaldson Synteq™ media technology, these filters extend filter life, allow higher initial cleanliness and provide superior system protection.

### Donaldson DT filters are ideally suited for a variety of demanding applications, including:

- heavy-duty mobile equipment
- in-plant hydraulics
- transmissions
- bearing lube oil systems

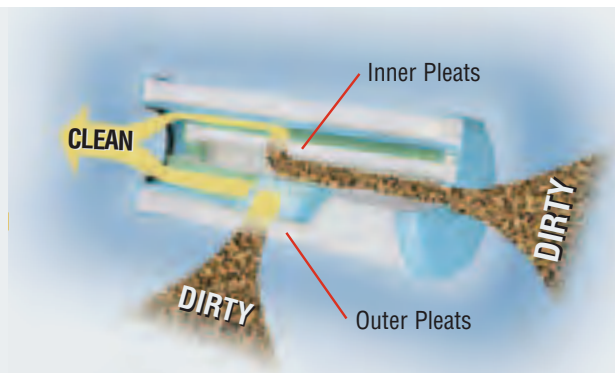


Donaldson DT filters are stocked and ready to ship!

### DT DX<sup>2</sup> Coreless Filters

Unlike traditional filters, this high-performance filtration solution features an innovative 2-in-1 filter design that increases dirt-holding capacity by 91% compared to traditional filters. It has all the features of a coreless design –without the expense of housing modifications. These filters are environmentally friendly and fully disposable – reducing waste and disposal costs. Increased dirt holding capacity extends filter life and reduces maintenance costs.

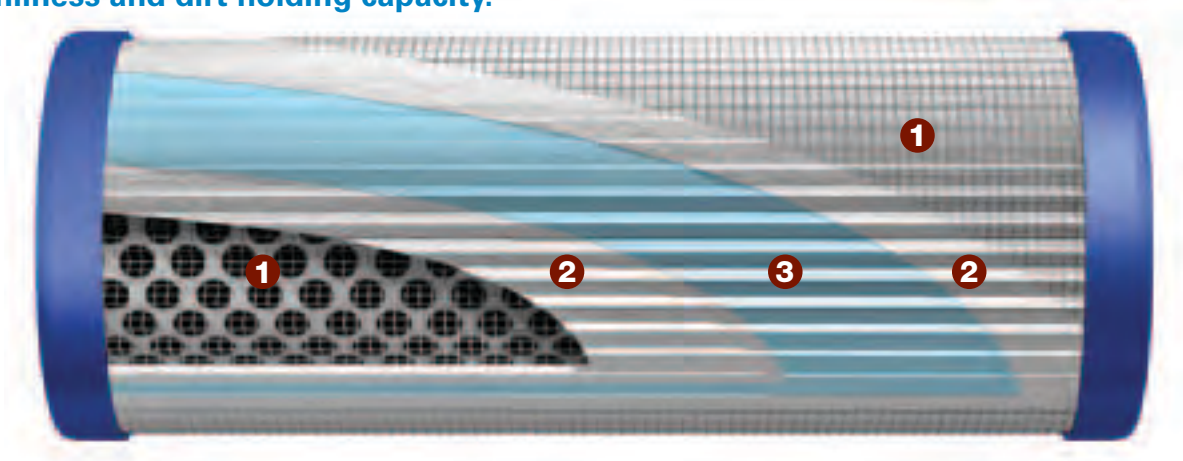
*DX2 filters are available in HF3 (9600) style filters.*





## See How Donaldson DT Filters Work

DT cartridge filters feature an advanced pleat pack design that provides higher initial cleanliness and dirt holding capacity.



### 1 Epoxy-Coated Steel Support Mesh (Upstream and Downstream Sides)

- Provides excellent pleat support and spacing, which allows for maximum effective media area
- Protects against media damage during handling and installation

### 2 Media Support Layers (Upstream and Downstream Sides)

- Optimizes media support
- Protects media during pressure surges

### 3 Synteq™ Media Technology

Donaldson-developed Synteq synthetic filter media has smooth, rounded fibers for low resistance to fluid flow. Synteq media is ideal for filtering synthetic fluids, water glycols, water/oil emulsions, HWCF (high water content fluids) and petroleum-based fluids.



- High-efficiency media grades with performance to  $\beta < 4(c) = 1000$  (per ISO 16889)
- Exceptionally low flow resistance
- Consistent performance throughout filter life
- Excellent fluid compatibility

Donaldson DT replacement filters are engineered to fit many competitive applications, including:

<b>Fairey Arlon</b>	170, 270, 370
<b>Hydac</b>	0030D, 0060D/R, 0075D, 0110D/R, 0140D, 0160D/R, 0240D/R, 0280D, 0330D/R, 0660D/R, 0850R, 0950R, 1300R, 2600R
<b>Pall</b>	2544, 8200, 8300, 8310, 8314, 8800, 8900, 8904, 9020, 9021, 9024, 9100, 9101, 9104, 9400, 9404, 9600, 9601, 9604, 9650, 9651, 9800, 9801, 9804, 9901
<b>Parker</b>	25P, 31P, 61P, RF2/IL2
<b>PTI/Mahle</b>	015/Pi X105, 025/Pi X108, 030/Pi X111, 050/Pi X115, 080/Pi X130, 120/Pi X145
<b>Schroeder</b>	A, K, KK, KKK, N, NN





# DT High-Performance Filters

## Numberfinder Cross Reference



Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
<b>0</b>														
01250487	P566652	.HCHN	02060615	P566220	.HCHN	02062360	P567021	.HCHN	0060R010BN3HC	P566963	.HCHN	0160D003BH	P566694	.HCHN
01250488	P566660	.HCHN	02060616	P566221	.HCHN	02062362	P567023	.HCHN	0060R010BN4HC	P566963	.HCHN	0160D003BH3HC	P566694	.HCHN
01250490	P566668	.HCHN	02060617	P566222	.HCHN	02062363	P567024	.HCHN	0060R010BNHC	P566963	.HCHN	0160D003BHHC	P566694	.HCHN
01250491	P566672	.HCHN	02060618	P566223	.HCHN	02062364	P567025	.HCHN	0060R020BN3HC	P566964	.HCHN	0160D003BN	P566666	.HCHN
01253050	P566691	.HCHN	02060637	P566245	.HCHN	02062365	P567026	.HCHN	0060R020BN4HC	P566964	.HCHN	0160D003BN3HC	P566666	.HCHN
01253074	P566697	.HCHN	02060638	P566246	.HCHN	02062366	P567027	.HCHN	0060R020BNHC	P566964	.HCHN	0160D003BN4HC	P566666	.HCHN
01253082	P566699	.HCHN	02060639	P566247	.HCHN	02062367	P567028	.HCHN	0075D003BN3HC	P566654	.HCHN	0160D003BNHC	P566666	.HCHN
01253106	P566703	.HCHN	02060640	P566248	.HCHN	02062368	P567029	.HCHN	0075D003BN4HC	P566654	.HCHN	0160D005BH4HC	P566694	.HCHN
01260885	P566673	.HCHN	02060676	P566406	.HCHN	02062370	P567031	.HCHN	0075D003BNHC	P566654	.HCHN	0160D005BN	P566667	.HCHN
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01262934	P566964	.HCHN	02060678	P566411	.HCHN	02062410	P566368	.HCHN	0075D005BN4HC	P566655	.HCHN	0160D005BN4HC	P566667	.HCHN
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01267794	P571238	.HCHN	02060810	P566338	.HCHN	0030D003BH3HC	P566686	.HCHN	0075D020BNHC	P566657	.HCHN	0160D010BN4HC	P566668	.HCHN
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01268885	P567099	.HCHN	02060818	P566339	.HCHN	0030D003BN4HC	P566646	.HCHN	0110D003BHHC	P566690	.HCHN	0160D020BN3HC	P566669	.HCHN
01268886	P567084	.HCHN	02060827	P566370	.HCHN	0030D003BNHC	P566646	.HCHN	0110D003BN	P566658	.HCHN	0160D020BN4HC	P566669	.HCHN
01269140	P567081	.HCHN	02060830	P566371	.HCHN	0030D005BH4HC	P566686	.HCHN	0110D003BNHC	P566658	.HCHN	0160D020BNHC	P566669	.HCHN
01269141	P567082	.HCHN	02060836	P566200	.HCHN	0030D005BN	P566647	.HCHN	0110D003BN3HC	P566658	.HCHN	0160R003BN3HC	P566969	.HCHN
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01269143	P567084	.HCHN	02060838	P566202	.HCHN	0030D005BN4HC	P566647	.HCHN	0110D005BH4HC	P566690	.HCHN	0160R005BN3HC	P566970	.HCHN
01269144	P567085	.HCHN	02060839	P566203	.HCHN	0030D005BNHC	P566647	.HCHN	0110D005BN	P566659	.HCHN	0160R005BN4HC	P566970	.HCHN
01269145	P567086	.HCHN	02060844	P566255	.HCHN	0030D010BH	P566687	.HCHN	0110D005BN3HC	P566659	.HCHN	0160R005BNHC	P566970	.HCHN
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01269151	P567094	.HCHN	02060868	P566230	.HCHN	0030D010BNHC	P566648	.HCHN	0110D010BN	P566660	.HCHN	0160R020BN4HC	P566972	.HCHN
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01269153	P567097	.HCHN	02060870	P566232	.HCHN	0030D020BN3HC	P566649	.HCHN	0110D010BN4HC	P566660	.HCHN	0160R020BN3HC	P566972	.HCHN
01269154	P567098	.HCHN	02060871	P566233	.HCHN	0030D020BN4HC	P566649	.HCHN	0110D020BN	P566661	.HCHN	0160R020BN4HC	P566972	.HCHN
01269158	P567102	.HCHN	02060876	P566240	.HCHN	0030D020BNHC	P566649	.HCHN	0110D020BN3HC	P566661	.HCHN	0160R020BN4HC	P566972	.HCHN
01269159	P567103	.HCHN	02060877	P566241	.HCHN	0030EAH034F1	P566686	.PUPR	0110D020BN4HC	P566661	.HCHN	0160R030BN3HC	P566972	.HCHN
02055595	P566984	.HCHN	02060878	P566242	.HCHN	0060D003BH	P566688	.HCHN	0110D020BNHC	P566661	.HCHN	01NR100025VG10BP	P571241	.INMN
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02056824	P566364	.HCHN	02060902	P566195	.HCHN	0060D003BHHC	P566688	.HCHN	0110D020BN4HC	P566661	.HCHN	01NR10006VG10BP	P571239	.INMN
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02060430	P566274	.HCHN	02060904	P566197	.HCHN	0060D003BN4HC	P566650	.HCHN	0110R003BN3HC	P566965	.HCHN	02006R10VG30	P566963	.INMN
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02060433	P566277	.HCHN	02060934	P566205	.HCHN	0060D005BH4HC	P566688	.HCHN	0110R003BN4HC	P566965	.HCHN	0240D003BH	P566696	.HCHN
02060528	P566270	.HCHN	02060935	P566206	.HCHN	0060D005BN	P566651	.HCHN	0110R005BNHC	P566966	.HCHN	0240D003BH3HC	P566696	.HCHN
02060529	P566271	.HCHN	02060936	P566207	.HCHN	0060D005BN3HC	P566651	.HCHN	0110R005BN4HC	P566966	.HCHN	0240D003BHHC	P566696	.HCHN
02060530	P566272	.HCHN	02060937	P566208	.HCHN	0060D005BN4HC	P566651	.HCHN	0110R005BNHC	P566966	.HCHN	0240D003BN	P566670	.HCHN
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02060533	P566235	.HCHN	02060946	P566394	.HCHN	0060D010BH	P566689	.HCHN	0110R020BN4HC	P566968	.HCHN	0240D005BH4HC	P566696	.HCHN
02060534	P566236	.HCHN	02060947	P566395	.HCHN	0060D010BH3HC	P566689	.HCHN	0110R020BNHC	P566968	.HCHN	0240D005BN	P566671	.HCHN
02060535	P566237	.HCHN	02060952	P566397	.HCHN	0060D010BHHC	P566689	.HCHN	0140D003BH	P566692	.HCHN	0240D005BN3HC	P566671	.HCHN
02060536	P566238	.HCHN	02060953	P566398	.HCHN	0060D010BN	P566652	.HCHN	0140D003BH3HC	P566692	.HCHN	0240D005BN4HC	P566671	.HCHN
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Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
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03														



# DT High-Performance Filters

## Numberfinder Cross Reference

Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	
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1457311911.....	P567103	...BSCH	181145P10E000P.....	P567103	...EPPE	2056396.....		P566698	.HCHN	2073488.....	P566279	.HCHN	27KZ3.....	P566412	...SRDR
1457431108.....	P567087	...BSCH	182105H3SLE000P.....	P567081	...EPPE	2056398.....		P566699	.HCHN	2073700.....	P566456	.HCHN			
1457431907.....	P567083	...BSCH	182108H3SLE000P.....	P567085	...EPPE	2056416.....		P566702	.HCHN	2080D03BN.....	P567085	.HCHN			
1457431909.....	P567095	...BSCH	182111H3SLE000P.....	P567089	...EPPE	2056418.....		P566703	.HCHN	2080D05BN.....	P567086	.HCHN			
1457431910.....	P567099	...BSCH	182115H3SLE000P.....	P567093	...EPPE	2056437.....		P566700	.HCHN	2080D10BN.....	P567087	.HCHN			
14VZ10.....	P567079	...SRDR	182130H3SLE000P.....	P567097	...EPPE	2056439.....		P566701	.HCHN	2080D20BN.....	P567088	.HCHN			
14VZ10V.....	P567079	...SRDR	182145H3SLE000P.....	P567101	...EPPE	2056541.....		P566646	.HCHN	21046MV.....	P566196	...HYPO			
14VZ25.....	P567080	...SRDR	184130H20SLE000P.....	P567100	...EPPE	2056542.....		P566647	.HCHN	2100D03BN.....	P567089	.HCHN			
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14VZ3.....	P567077	...SRDR	185108H6SLE000P.....	P567086	...EPPE	2056543.....		P566686	.HCHN	2100D20BN.....	P567092	.HCHN			
14VZ3V.....	P567077	...SRDR	185111H6SLE000P.....	P567090	...EPPE	2056690.....		P566887	.HCHN	2110D05BN.....	P567090	.HCHN			
14VZ5.....	P567078	...SRDR	185115H6SLE000P.....	P567094	...EPPE	2057041.....		P566997	.HCHN	2150D03BN.....	P567093	.HCHN			
14VZ5V.....	P567078	...SRDR	185130H6SLE000P.....	P567098	...EPPE	2059098.....		P566970	.HCHN	2150D06BN.....	P567094	.HCHN			
16300H03HLL428UP.....	P566240	...EPPE	185145H6SLE000P.....	P567102	...EPPE	2059102.....		P566979	.HCHN	2150D10BN.....	P567095	.HCHN			
16QCL10V.....	P566263	...SRDR	1HF411H10SLA000P.....	P566272	...EPPE	2059105.....		P566987	.HCHN	2150D25BN.....	P567096	.HCHN			
16QCL25V.....	P566264	...SRDR	1HF411H10SCLA000P.....	P566413	...EPPE	2059107.....		P566994	.HCHN	2300D03BN.....	P567097	.HCHN			
16QCL3V.....	P566261	...SRDR	1HF411H20SLA000P.....	P566273	...EPPE	2059108.....		P566995	.HCHN	2300D03BN.....	P567098	.HCHN			
16QCL5V.....	P566262	...SRDR	1HF411H3SLA000P.....	P566270	...EPPE	2059111.....		P566999	.HCHN	2300D10BN.....	P567099	.HCHN			
16QPM1Z10V.....	P566252	...SRDR	1HF411H6SCLA000P.....	P566412	...EPPE	2059112.....		P567000	.HCHN	2300D25BN.....	P567100	.HCHN			
16QPM1Z1V.....	P566249	...SRDR	1HF411H6SLD000P.....	P566412	...EPPE	2059294.....		P566482	.HCHN	2450D03BN.....	P567101	.HCHN			
16QPM1Z25V.....	P566253	...SRDR				20502BN.....		P567084	.HCHN	2450D05BN.....	P567102	.HCHN			
16QPM1Z3V.....	P566250	...SRDR				2050D03BN.....		P567081	.HCHN	2450D06BN.....	P567102	.HCHN			
16QPM1Z5V.....	P566251	...SRDR				2050D05BN.....		P567082	.HCHN	2450D10BN.....	P567103	.HCHN			
16OZ10V.....	P566252	...SRDR				2050D10BN.....		P567083	.HCHN	2450D25BN.....	P567104	.HCHN			
16OZ11.....	P566252	...SRDR	20415075.....	P567095	...INMN	2060430.....		P566274	.HCHN	2600R003BN3HC.....	P567001	.HCHN			
16OZ12V.....	P566253	...SRDR	20415076.....	P567091	...INMN	2060652.....		P566445	.HCHN	2600R003BN3HC.....	P570314	.HCHN			
16OZ13V.....	P566250	...SRDR	2050826.....	P566365	.HCHN	2060653.....		P566446	.HCHN	2600R003BN4HC.....	P567001	.HCHN			
16OZ15V.....	P566251	...SRDR	2055592.....	P566983	.HCHN	2060654.....		P566447	.HCHN	2600R003BN4HC.....	P570314	.HCHN			
170L105A.....	P567007	...FAIR	2055736.....	P566678	.HCHN	2060655.....		P566448	.HCHN	2600R003BNHC.....	P567001	.HCHN			
170L120A.....	P567005	...FAIR	2055737.....	P566679	.HCHN	2060656.....		P566450	.HCHN	2600R005BN3HC.....	P567002	.HCHN			
170L121A.....	P567006	...FAIR	2055738.....	P566680	.HCHN	2060657.....		P566451	.HCHN	2600R005BNHC.....	P567002	.HCHN			
170L122A.....	P567007	...FAIR	2055739.....	P566681	.HCHN	2060658.....		P566452	.HCHN	2600R010BN3HC.....	P567003	.HCHN			
170L123.....	P567008	...FAIR	2055745.....	P566682	.HCHN	2060659.....		P566453	.HCHN	2600R010BN3HC.....	P570315	.HCHN			
170L123A.....	P567008	...FAIR	2055746.....	P566683	.HCHN	2060660.....		P566485	.HCHN	2600R010BN4HC.....	P570315	.HCHN			
170L205A.....	P567011	...FAIR	2055747.....	P566684	.HCHN	2060969.....		P566486	.HCHN	2600R010BNHC.....	P567003	.HCHN			
170L210A.....	P567012	...FAIR	2055748.....	P566685	.HCHN	2060971.....		P566487	.HCHN	2600R020BN3HC.....	P567004	.HCHN			
170L220A.....	P567009	...FAIR	2055750.....	P566666	.HCHN	2060972.....		P566488	.HCHN	2600R020BN4HC.....	P567004	.HCHN			
170L221A.....	P567010	...FAIR	2055751.....	P566667	.HCHN	2062041.....		P566471	.HCHN	2600R020BNHC.....	P567004	.HCHN			
170L222A.....	P567011	...FAIR	2055752.....	P566668	.HCHN	2062138.....		P567014	.HCHN	270L101A.....	P567014	...FAIR			
170Z105A.....	P567007	...FAIR	2055753.....	P566669	.HCHN	2062193.....		P566486	.HCHN	270L120A.....	P567013	...FAIR			
170Z110A.....	P567008	...FAIR	2055754.....	P566670	.HCHN	2062217.....		P566497	.HCHN	270L122A.....	P567015	...FAIR			
170Z120.....	P567005	...FAIR	2055755.....	P566671	.HCHN	2062321.....		P566472	.HCHN	270L1FFA.....	P567013	...FAIR			
170Z120A.....	P567005	...FAIR	2055756.....	P566672	.HCHN	2062352.....		P567013	.HCHN	270L220A.....	P567017	...FAIR			
170Z121.....	P567006	...FAIR	2055757.....	P566673	.HCHN	2062353.....		P567005	.HCHN	270L221A.....	P567018	...FAIR			
170Z121H.....	P567006	...FAIR	2055758.....	P566674	.HCHN	2062366.....		P567026	.HCHN	270L222A.....	P567019	...FAIR			
170Z122A.....	P567007	...FAIR	2055759.....	P566675	.HCHN	2062370.....		P567030	.HCHN	270Z101A.....	P567014	...FAIR			
170Z122H.....	P567007	...FAIR	2055760.....	P566676	.HCHN	2062444.....		P566495	.HCHN	270Z120.....	P567013	...FAIR			
170Z123A.....	P567008	...FAIR	2055761.....	P566677	.HCHN	2062445.....		P566500	.HCHN	270Z120A.....	P567013	...FAIR			
			2055898.....	P566648	.HCHN	2062446.....		P566501	.HCHN	270Z120H.....	P567013	...FAIR			

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30082.....	P567100	...INMN
30084.....	P567093	...INMN
300815.....	P567097	...INMN
300817.....	P567083	...INMN
300818.....	P567091	...INMN
300819.....	P567099	...INMN
301039.....	P567095	...INMN
301040.....	P567103	...INMN
301046.....	P567084	...INMN
301047.....	P567088	...INMN
302240.....	P567081	...INMN
303025.....	P567101	...INMN
303313.....	P567087	...INMN
303318.....	P567096	...INMN
306470.....	P567085	...INMN





Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
370Z223H	P567028	FAIR	60204D03BN	P567013	HCHN	930100	P566208	PRKR	926888Q	P566222	PRKR	932610Q	P566195	PRKR
370Z320A	P567029	FAIR	60204D05BN	P567014	HCHN	930192	P566397	PRKR	926890Q	P566221	PRKR	932611Q	P566196	PRKR
370Z320H	P567029	FAIR	60208D03BN	P567017	HCHN	930198	P566397	PRKR	926988Q	P566226	PRKR	932612Q	P566197	PRKR
370Z321A	P567030	FAIR	60208D05BN	P567018	HCHN	930268	P566397	PRKR	926990Q	P566227	PRKR	932614Q	P566335	PRKR
370Z321H	P567030	FAIR	60208D10BN	P567019	HCHN	931017	P567043	PRKR	926992Q	P566225	PRKR	932615Q	P566336	PRKR
370Z322A	P567031	FAIR	60208D20BN	P567020	HCHN	932016	P567044	PRKR	926994Q	P566231	PRKR	932616Q	P566200	PRKR
370Z322H	P567031	FAIR	60304D03BN	P567021	HCHN	932362	P567033	PRKR	926996Q	P566232	PRKR	932617Q	P566201	PRKR
370Z323A	P567032	FAIR	60304D05BN	P567022	HCHN	932362	P567034	PRKR	926998Q	P566230	PRKR	932618Q	P566202	PRKR
370Z323H	P567032	FAIR	60304D10BN	P567023	HCHN	932368	P567035	PRKR	927169Q	P566365	PRKR	932620Q	P566337	PRKR
3960GGCB08	P566210	SPTC	60304D20BN	P567024	HCHN	932369	P567034	PRKR	927170Q	P566364	PRKR	932621Q	P566338	PRKR
390QLZ10V	P566268	SRDR	60308D03BN	P567025	HCHN	9327444	P566397	PUPR	927175Q	P566367	PRKR	932622Q	P567041	PRKR
390QLZ25V	P566269	SRDR	60308D05BN	P567026	HCHN	9327445	P566397	PUPR	927176Q	P566366	PRKR	932623Q	P567042	PRKR
390QLZ3V	P566266	SRDR	60308D10BN	P567027	HCHN	932409	P567035	PRKR	927181Q	P566369	PRKR	932624Q	P567043	PRKR
390QLZ5V	P566267	SRDR	60308D20BN	P567028	HCHN	932410	P567039	PRKR	927182Q	P566368	PRKR	932628Q	P567045	PRKR
390PMLZ10V	P566257	SRDR	60312D03BN	P567029	HCHN	932467	P567039	PRKR	927661Q	P566237	PRKR	932629Q	P567046	PRKR
390PMLZ1V	P566254	SRDR	60312D05BN	P567030	HCHN	932470	P567038	PRKR	927663Q	P566235	PRKR	932630Q	P567047	PRKR
390PMLZ25V	P566258	SRDR	60312D10BN	P567031	HCHN	932472	P567039	PRKR	927723Q	P566337	PRKR	932634Q	P567049	PRKR
390PMLZ3V	P566255	SRDR	60312D20BN	P567032	HCHN	934234	P567003	PRKR	927725Q	P566335	PRKR	932635Q	P567050	PRKR
390PMLZ5V	P566256	SRDR				934236	P566999	PRKR	927861Q	P566236	PRKR	932636Q	P567051	PRKR
390Z10V	P566247	SRDR				934477	P566997	PRKR	928142Q	P566371	PRKR	932640Q	P567053	PRKR
390Z10V	P566257	SRDR				934478	P566998	PRKR	928143Q	P566370	PRKR	932641Q	P567054	PRKR
390Z1V	P566244	SRDR				934479	P567000	PRKR	928150Q	P566388	PRKR	932642Q	P567055	PRKR
390Z1V	P566254	SRDR				934570	P567001	PRKR	928152Q	P566387	PRKR	932647Q	P566206	PRKR
390Z25V	P566248	SRDR				934571	P567002	PRKR	928154Q	P566390	PRKR	932650Q	P566206	PRKR
390Z25V	P566258	SRDR				934572	P567004	PRKR	928156Q	P566389	PRKR	932651Q	P566207	PRKR
390Z3V	P566245	SRDR				935112	P569091	PRKR	928642Q	P566336	PRKR	932653Q	P566210	PRKR
390Z3V	P566255	SRDR				935112	P569092	PRKR	928643Q	P566338	PRKR	932654Q	P566211	PRKR
390Z5V	P566246	SRDR				935113	P569093	PRKR	929099Q	P566238	PRKR	932655Q	P566212	PRKR
390Z5V	P566256	SRDR				935114	P569094	PRKR	929882Q	P566450	PRKR	932658Q	P566492	PRKR
						935195	P566640	PRKR	929884Q	P566445	PRKR	932661Q	P566492	PRKR
						935197	P566642	PRKR	929885Q	P566447	PRKR	932662Q	P566495	PRKR
						935198	P566643	PRKR	929886Q	P566446	PRKR	932663Q	P566496	PRKR
						935199	P566644	PRKR	929889Q	P566445	PRKR	932664Q	P566497	PRKR
						935202	P567014	PRKR	929890Q	P566450	PRKR	932665Q	P566494	PRKR
						935217	P567081	PRKR	929891Q	P566452	PRKR	932666Q	P566496	PRKR
						935218	P567082	PRKR	929892Q	P566451	PRKR	932667Q	P566497	PRKR
						935219	P567084	PRKR	929893Q	P566451	PRKR	932669Q	P566271	PRKR
						935223	P567085	PRKR	929895Q	P566450	PRKR	932670Q	P566272	PRKR
						935224	P567086	PRKR	929921Q	P566497	PRKR	932674Q	P566412	PRKR
						935225	P567088	PRKR	929923Q	P566498	PRKR	932675Q	P566412	PRKR
						935229	P567089	PRKR	929927Q	P566498	PRKR	932676Q	P566413	PRKR
						935230	P567090	PRKR	929933Q	P566498	PRKR	932677Q	P566274	PRKR
						935231	P567092	PRKR	930099Q	P566208	PRKR	932678Q	P566275	PRKR
						935235	P567093	PRKR	930100Q	P566208	PRKR	932679Q	P566276	PRKR
						935236	P567094	PRKR	930118Q	P566213	PRKR	932687Q	P567034	PRKR
						935237	P567096	PRKR	930119Q	P566213	PRKR	932688Q	P566205	PRKR
						935241	P567097	PRKR	930162Q	P566218	PRKR	932689Q	P567033	PRKR
						935242	P567098	PRKR	930164Q	P566223	PRKR	932690Q	P567034	PRKR
						935243	P567100	PRKR	930189Q	P566392	PRKR	932692Q	P567037	PRKR
						935247	P567101	PRKR	930190Q	P566394	PRKR	932693Q	P567038	PRKR
						935248	P567102	PRKR	930191Q	P566395	PRKR	932694Q	P567039	PRKR
						935249	P567104	PRKR	930191Q	P566397	PRKR	932695Q	P567037	PRKR
						936178	P567067	PRKR	930193Q	P566399	PRKR	932872Q	P566245	PRKR
						976191	P567050	PRKR	930194Q	P566400	PRKR	932872Q	P566245	PRKR
						976211	P567054	PRKR	930197Q	P566393	PRKR	932873Q	P566246	PRKR
						982131	P567055	PRKR	930198Q	P566398	PRKR	932873Q	P566256	PRKR
						983061	P567051	PRKR	930218Q	P566475	PRKR	932874Q	P566247	PRKR
						925580Q	P566197	PRKR	930219Q	P566477	PRKR	932874Q	P566257	PRKR
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						925600Q	P566202	PRKR	930222Q	P566480	PRKR	932875Q	P566258	PRKR
						925602Q	P566200	PRKR	930223Q	P566482	PRKR	933044Q	P566240	PRKR
						926696Q	P566205	PRKR	930224Q	P566483	PRKR	933044Q	P566250	PRKR
						926697Q	P566210	PRKR	930226Q	P566485	PRKR	933045Q	P566241	PRKR
						926698Q	P566215	PRKR	930227Q	P566487	PRKR	933045Q	P566251	PRKR
						926699Q	P566220	PRKR	930228Q	P566488	PRKR	933046Q	P566242	PRKR
						926835Q	P566207	PRKR	930369Q	P566198	PRKR	933046Q	P566252	PRKR
						926837Q	P566212	PRKR	930370Q	P566203	PRKR	933047Q	P566243	PRKR
						926839Q	P566217	PRKR	931020Q	P566277	PRKR	933047Q	P566253	PRKR
						926841Q	P566206	PRKR	932017Q	P567043	PRKR	933116Q	P567036	PRKR
						926843Q	P566211	PRKR	932266Q	P566461	PRKR	933117Q	P567040	PRKR
						926845Q	P566216	PRKR	932349Q	P566213	PRKR	933118Q	P567036	PRKR



# DT High-Performance Filters

## Numberfinder Cross Reference



Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
9331190	P567040	..PRKR	9640509152	P567084	..PUPR	D650G10B	P566413	..FLTC	DHD160G10B	P566668	...FLTC	DHD660G03B	P566682	...FLTC
9331350	P567044	..PRKR	9640510150	P567085	..PUPR	D650G25A	P566273	..FLTC	DHD160G10V	P566668	...FLTC	DHD660G03V	P566682	...FLTC
9331360	P567048	..PRKR	9640510151	P567087	..PUPR	D651D03AV	P566274	..FLTC	DHD160G20B	P566669	...FLTC	DHD660G05B	P566683	...FLTC
9331930	P566490	..PRKR	9640510152	P567088	..PUPR	D651G01A	P568817	..FLTC	DHD160G20V	P566669	...FLTC	DHD660G05V	P566683	...FLTC
9331940	P566491	..PRKR	9640511150	P567089	..PTI	D651G03A	P566274	..FLTC	DHD160H03B	P566694	...FLTC	DHD660G10B	P566684	...FLTC
9331950	P566492	..PRKR	9640512105	P567093	..PTI	D651G03AV	P566274	..FLTC	DHD160H03V	P566694	...FLTC	DHD660G10V	P566684	...FLTC
9331960	P566493	..PRKR	9640513103	P567100	..PTI	D651G06A	P566275	..FLTC	DHD160H10B	P566695	...FLTC	DHD660G20B	P566685	...FLTC
9332020	P566495	..PRKR	9640513150	P567098	..PTI	D651G06AV	P566275	..FLTC	DHD160H10V	P566695	...FLTC	DHD660G20V	P566685	...FLTC
9332030	P566496	..PRKR	9640513150	P567097	..PUPR	D651G10A	P566276	..FLTC	DHD240G03B	P566670	...FLTC	DHD660H03B	P566702	...FLTC
9332040	P566497	..PRKR	9640513151	P567099	..PTI	D651G10AV	P566276	..FLTC	DHD240G03V	P566670	...FLTC	DHD660H03V	P566702	...FLTC
9332050	P566498	..PRKR	9640513151	P567099	..PUPR	D651G25A	P566277	..FLTC	DHD240G05B	P566671	...FLTC	DHD660H10B	P566703	...FLTC
9332100	P566500	..PRKR	9640513152	P567100	..PTI	D651G25AV	P566277	..FLTC	DHD240G05V	P566671	...FLTC	DHD660H10V	P566703	...FLTC
9332110	P566501	..PRKR	9640513152	P567100	..PUPR	D652G01A	P568818	..FLTC	DMD001E05B	P566672	...FLTC	DMD001E05B	P567090	...FLTC
9332120	P566502	..PRKR	9640514103	P567103	..PTI	D652G03A	P566278	..FLTC	DMD001E20B	P567096	...FLTC	DMD001E20B	P567096	...FLTC
9332130	P566503	..PRKR	9640514150	P567101	..PTI	D652G03AV	P566278	..FLTC	DP33DHL1412MV	P566703	..HYPO			
9332180	P566505	..PRKR	9640514151	P567102	..PTI	D652G06A	P566279	..FLTC						
9332190	P566506	..PRKR	9640514152	P567104	..PUPR	D652G06AV	P566279	..FLTC						
9332200	P566507	..PRKR	9VZ10	P567075	..SRDR	D652G10A	P566280	..FLTC						
9332210	P566508	..PRKR	9VZ10V	P567075	..SRDR	D652G10AV	P566280	..FLTC						
9332340	P566486	..PRKR	9VZ25	P567076	..SRDR	D652G25A	P566281	..FLTC						
9332390	P566196	..PRKR	9VZ25V	P567076	..SRDR	D652G25AV	P566281	..FLTC						
9332460	P566201	..PRKR	9VZ3	P567073	..SRDR	D720G03AV	P567041	..FLTC						
9332530	P566448	..PRKR	9VZ3V	P567073	..SRDR	D720G06AV	P567042	..FLTC						
9332580	P566453	..PRKR	9VZ5	P567074	..SRDR	D720G10AV	P567043	..FLTC						
9332630	P566455	..PRKR	9VZ5V	P567074	..SRDR	D720G25AV	P567044	..FLTC						
9332640	P566456	..PRKR				D721G03AV	P567045	..FLTC						
9332640	P566457	..PRKR				D721G06AV	P567046	..FLTC						
9332650	P566457	..PRKR				D721G10AV	P567047	..FLTC						
9332660	P566458	..PRKR				D721G25AV	P567048	..FLTC						
9332950	P566228	..PRKR	A31375	P566397	MOOG	D732G10AV	P567055	..FLTC						
9333020	P566233	..PRKR	A32155	P566397	MOOG	D921G03A	P567017	..FLTC						
9333630	P566460	..PRKR	A37011	P566397	MOOG	D921G25A	P567020	..FLTC						
9333640	P566462	..PRKR	ABZFEH0080101XMA	P566691	..BSCH	D930G03A	P567021	..FLTC						
9333650	P566463	..PRKR	ABZFEN0040101XMA	P566652	..BSCH	D930G06A	P567022	..FLTC						
9333770	P566476	..PRKR	ABZFER0050101XMA	P566967	..BSCH	D930G10A	P567023	..FLTC						
9333780	P566481	..PRKR	AN62354A	P566198	..PUPR	D931G03A	P567025	..FLTC						
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9334870	P566279	..PRKR	AZ10V	P569093	..SRDR	D931G10A	P567027	..FLTC						
9334880	P566280	..PRKR	AZ25	P569094	..SRDR	D932G03A	P567029	..FLTC						
9334890	P566281	..PRKR	AZ25V	P569094	..SRDR	D932G06A	P567030	..FLTC						
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9335790	P566338	..PRKR	AZ3V	P569091	..SRDR	D932G25A	P567032	..FLTC						
9337820	P566402	..PRKR	AZ5	P569092	..SRDR	DHD030H03B	P566686	..FLTC						
9337840	P566403	..PRKR	AZ5V	P569092	..SRDR	DHD110G03B	P566658	..FLTC						
9337860	P566404	..PRKR				DHD110G03V	P566659	..FLTC						
9337880	P566405	..PRKR				DHD110G05B	P566659	..FLTC						
9339190	P566711	..PRKR				DHD110G05V	P566659	..FLTC						
9339200	P566712	..PRKR	B645722	P566397	MOOG	DHD110G10B	P566660	..FLTC						
9339210	P566713	..PRKR				DHD110G10V	P566660	..FLTC						
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9341230	P566268	..PRKR				DHD110G20V	P566661	..FLTC						
9341240	P566269	..PRKR	DF601805	P566705	KDON	DHD110H03V	P566690	..FLTC						
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9343080	P566261	..PRKR	D112G03A	P566200	..FLTC	DHD140G03B	P566662	..FLTC						
9343090	P566262	..PRKR	D112G10AV	P566202	..FLTC	DHD140G03V	P566662	..FLTC						
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9351920	P566407	..PRKR	D140G10BV	P566365	..FLTC	DHD140G20B	P566665	..FLTC						
9351930	P566408	..PRKR	D140G25A	P566208	..FLTC	DHD140G20V	P566665	..FLTC						
9351940	P566409	..PRKR	D140G25AV	P566208	..FLTC	DHD140H03B	P566692	..FLTC						
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9600EAH034N2	P566366	..PUPR	D143G25A	P566223	..FLTC	DHD160G03B	P566666	..FLTC						
9800EAH034N2	P566408	..PUPR	D143G25AV	P566223	..FLTC	DHD160G05B	P566667	..FLTC						
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9800EAL122N3	P566404	..PUPR	D650G03A	P566270	..FLTC	DHD160G05B	P566667	..FLTC						
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9640509150	P567081	..PTI	D650G06A	P566271	..FLTC	DHD160G05B	P566667	..FLTC						
9640509151	P567083	..PUPR	D650G10A	P566272	..FLTC	DHD160G05V	P566667	..FLTC						

**A****B****D****E**

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E0101B5C05	P566706	..WESF
E0101B5C10	P566707	..WESF
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E0101B8C05	P566711	..WESF
E0101B8C10	P566712	..WESF
E0112B2C03	P566658	..WESF
E0112B2C05	P566659	..WESF
E0112B2C10	P566660	..WESF
E0114B2H03	P566690	..WESF
E0114B2H10	P566691	..WESF
E0162B1C03	P566666	..WESF
E0162B1C05	P566667	..WESF
E0162B1C10	P566668	..WESF
E0164B1H03	P566694	..WESF
E0164B1H10	P566695	..WESF
E0172B1C03	P567005	..WESF
E0172B1C05	P567006	..WESF
E0172B1C10	P567007	..WESF
E0172B2C03	P567009	..WESF
E0172B2C05	P567010	..WESF
E0172B2C10	P567011	..WESF
E0242B2C03	P566670	..WESF
E0242B2C05	P566671	..WESF
E0242B2C10	P566672	..WESF
E0244B2H03	P566696	..WESF
E0244B2H10	P566697	..WESF
E0272B1C03	P567013	..WESF
E0272B1C05	P567014	..WESF
E0272B1C10	P567015	..WESF
E0272B2C03	P567017	..WESF
E0272B2C05	P567018	..WESF
E0272B2C10	P567019	..WESF
E0272B2C20	P567020	..WESF
E0332B2C03	P566678	..WESF
E0332B2C05	P566679	..WESF
E0332B2C10	P566680	..WESF
E0334B2H03	P566700	..WESF
E0334B2H10	P566701	..WESF
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E0372B1C05	P567023	..WESF
E0372B1C10	P567024	..WESF
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E0372B2C05	P567026	..WESF
E0372B2C10	P567027	..WESF
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E0372B3C10	P567031	..WESF
E0372B3C20	P567032	..WESF
E0372V2C20	P567028	..WESF
E0411B2C03	P566235	..WESF



Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
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E0411B5C10	P566242	. WESF	E2054B5H10	P566390	. WESF	E4051B6C20	P566277	. WESF	E6021B4E10	P566380	. WESF	ER0952B4C10	P566995	. WESF
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F270030HFB	P567018	.. PTI
F270030JFB	P567020	.. PTI
F270030KFB	P567019	.. PTI
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F370015HFB	P567022	.. PTI
F370015JFB	P567024	.. PTI
F370015KFB	P567023	.. PTI
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F370030KFB	P567027	.. PTI
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FC5012F005BS	P567094	.. FINN
FC5012F010BS	P567095	.. FINN
FC5012F025BS	P567096	.. FINN
FC5012Q003BS	P567093	.. PRKR
FC5012Q005BS	P567094	.. PRKR
FC5014F003BS	P567101	.. FINN
FC7008Q010BK	P566222	.. PRKR
FC7008Q020BK	P566223	.. PRKR
FC		









Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
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HC2216FUT4H	P566669	PALL	HC2233FKT6H	P566681	PALL	HC2252FDT19H	P567040	PALL						



DT High-Performance Filters
Numberfinder Cross Reference



Table with 15 columns: Mfgs. No., Our No., Mfg. Code, Mfgs. No., Our No., Mfg. Code, Mfgs. No., Our No., Mfg. Code, Mfgs. No., Our No., Mfg. Code, Mfgs. No., Our No., Mfg. Code. It lists numerous filter models and their corresponding product codes across various sizes and types.



Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
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# DT High-Performance Filters

## Numberfinder Cross Reference



Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
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HC9020FKZ4H	...	P566194	...	PALL	HC9100FKS13H	...	P566638	...	PALL	HC9400FKS13Z	...	P566347	...	PALL
HC9020FKZ4Z	...	P566194	...	PALL	HC9100FKS13Z	...	P566638	...	PALL	HC9400FKS16Z	...	P566352	...	PALL
HC9020FKZ8H	...	P566199	...	PALL	HC9100FKS8H	...	P566633	...	PALL	HC9400FKS26H	...	P566357	...	PALL
HC9020FKZ8Z	...	P566199	...	PALL	HC9100FKS8Z	...	P566633	...	PALL	HC9400FKS26Z	...	P566357	...	PALL
HC9020FUN4H	...	P566196	...	PALL	HC9100FKT13H	...	P566639	...	PALL	HC9400FKS39H	...	P566362	...	PALL
HC9020FUN4Z	...	P566196	...	PALL	HC9100FKT13Z	...	P566639	...	PALL	HC9400FKS39Z	...	P566362	...	PALL
HC9020FUN8H	...	P566201	...	PALL	HC9100FKT8H	...	P566634	...	PALL	HC9400FKS8H	...	P566342	...	PALL
HC9020FUN8Z	...	P566201	...	PALL	HC9100FKT8Z	...	P566634	...	PALL	HC9400FKT13Z	...	P566348	...	PALL
HC9020FUP4H	...	P566195	...	PALL	HC9100FKZ13H	...	P566635	...	PALL	HC9400FKT16Z	...	P566353	...	PALL
HC9020FUP4Z	...	P566195	...	PALL	HC9100FKZ13Z	...	P566635	...	PALL	HC9400FKT26H	...	P566358	...	PALL
HC9020FUP8H	...	P566200	...	PALL	HC9100FKZ8H	...	P566630	...	PALL					
HC9020FUP8Z	...	P566200	...	PALL										





Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
HC9600FKP8Z	P566210	PALL	HC9601FDP4H	P566364	PALL	HC9650FDS8H	P566227	PALL	HC9700FDN18H	P566275	PALL	HC9800FDS4H	P566394	PALL
HC9600FKS13H	P566217	PALL	HC9601FDP4Z	P566364	PALL	HC9650FDS8Z	P566227	PALL	HC9700FDN18Z	P566275	PALL	HC9800FDS8H	P566399	PALL
HC9600FKS13Z	P566217	PALL	HC9601FDP8H	P566366	PALL	HC9650FDT16H	P566233	PALL	HC9700FDN27H	P566279	PALL	HC9800FDS8Z	P566399	PALL
HC9600FKS16H	P566222	PALL	HC9601FDP8Z	P566366	PALL	HC9650FDT16Z	P566233	PALL	HC9700FDN27Z	P566279	PALL	HC9800FDT13H	P566405	PALL
HC9600FKS16Z	P566222	PALL	HC9601FDT13H	P566369	PALL	HC9650FDT8H	P566228	PALL	HC9700FDN9H	P566271	PALL	HC9800FDT13Z	P566405	PALL
HC9600FKS4H	P566207	PALL	HC9601FDT13Z	P566369	PALL	HC9650FDT8Z	P566228	PALL	HC9700FDN9Z	P566271	PALL	HC9800FDT4H	P566395	PALL
HC9600FKS4Z	P566207	PALL	HC9601FDT16H	P566371	PALL	HC9650FDZ16H	P566229	PALL	HC9700FDP18H	P566274	PALL	HC9800FDT4Z	P566395	PALL
HC9600FKS8H	P566212	PALL	HC9601FDT16Z	P566371	PALL	HC9650FDZ16Z	P566229	PALL	HC9700FDP18Z	P566274	PALL	HC9800FDT8H	P566400	PALL
HC9600FKS8Z	P566212	PALL	HC9601FDT4H	P566365	PALL	HC9650FDZ8H	P566224	PALL	HC9700FDP27H	P566278	PALL	HC9800FDT8Z	P566400	PALL
HC9600FKT13H	P566218	PALL	HC9601FDT4Z	P566365	PALL	HC9650FDZ8Z	P566224	PALL	HC9700FDP27Z	P566278	PALL	HC9800FDZ13H	P566401	PALL
HC9600FKT13Z	P566218	PALL	HC9601FDT8H	P566367	PALL	HC9650FKN16H	P566231	PALL	HC9700FDP9H	P566270	PALL	HC9800FDZ13Z	P566401	PALL
HC9600FKT16H	P566223	PALL	HC9601FDT8Z	P566367	PALL	HC9650FKN16Z	P566231	PALL	HC9700FDP9Z	P566270	PALL	HC9800FDZ4H	P566391	PALL
HC9600FKT16Z	P566223	PALL	HC9601FUP13H	P566368	PALL	HC9650FKN8H	P566228	PALL	HC9700FDS18H	P566276	PALL	HC9800FDZ4Z	P566391	PALL
HC9600FKT4H	P566208	PALL	HC9601FUP13Z	P566368	PALL	HC9650FKN8Z	P566228	PALL	HC9700FDS18Z	P566276	PALL	HC9800FDZ8H	P566396	PALL
HC9600FKT4Z	P566208	PALL	HC9601FUP16H	P566370	PALL	HC9650FKN16H	P566230	PALL	HC9700FDS27H	P566280	PALL	HC9800FDZ8Z	P566396	PALL
HC9600FKT8H	P566213	PALL	HC9601FUP16Z	P566370	PALL	HC9650FKP16Z	P566230	PALL	HC9700FDS27Z	P566280	PALL	HC9800FKDS4H	P566394	PALL
HC9600FKT8Z	P566213	PALL	HC9601FUP4H	P566364	PALL	HC9650FKP8H	P566225	PALL	HC9700FDS9H	P566272	PALL	HC9800FKDS4Z	P566394	PALL
HC9600FKZ13H	P566214	PALL	HC9601FUP4Z	P566364	PALL	HC9650FKP8Z	P566225	PALL	HC9700FDS9Z	P566272	PALL	HC9800FKN13H	P566403	PALL
HC9600FKZ13Z	P566214	PALL	HC9601FUP8H	P566366	PALL	HC9650FKS16H	P566232	PALL	HC9700FDT18H	P566277	PALL	HC9800FKN13Z	P566403	PALL
HC9600FKZ16H	P566219	PALL	HC9601FUP8Z	P566366	PALL	HC9650FKS16Z	P566232	PALL	HC9700FDT18Z	P566277	PALL	HC9800FKN4H	P566393	PALL
HC9600FKZ16Z	P566219	PALL	HC9601FUT13H	P566369	PALL	HC9650FKS8H	P566227	PALL	HC9700FDT27H	P566281	PALL	HC9800FKN4Z	P566393	PALL
HC9600FKZ4H	P566204	PALL	HC9601FUT13Z	P566369	PALL	HC9650FKS8Z	P566227	PALL	HC9700FDT27Z	P566281	PALL	HC9800FKN8H	P566398	PALL
HC9600FKZ4Z	P566204	PALL	HC9601FUT16H	P566371	PALL	HC9650FKT16H	P566233	PALL	HC9700FDT9H	P566273	PALL	HC9800FKN8Z	P566398	PALL
HC9600FKZ8H	P566209	PALL	HC9601FUT16Z	P566371	PALL	HC9650FKT16Z	P566233	PALL	HC9700FDT9Z	P566273	PALL	HC9800FKP13H	P566402	PALL
HC9600FKZ8Z	P566209	PALL	HC9601FUT4H	P566365	PALL	HC9650FKT8H	P566228	PALL	HC9700FKN18H	P566275	PALL	HC9800FKP13Z	P566402	PALL
HC9600FUN13H	P566216	PALL	HC9601FUT4Z	P566365	PALL	HC9650FKT8Z	P566228	PALL	HC9700FKN18Z	P566275	PALL	HC9800FKP4H	P566392	PALL
HC9600FUN13Z	P566216	PALL	HC9601FUT8H	P566367	PALL	HC9650FKZ16H	P566229	PALL	HC9700FKN27H	P566279	PALL	HC9800FKP4Z	P566392	PALL
HC9600FUN16H	P566221	PALL	HC9601FUT8Z	P566367	PALL	HC9650FKZ16Z	P566229	PALL	HC9700FKN27Z	P566279	PALL	HC9800FKP8H	P566397	PALL
HC9600FUN16Z	P566221	PALL	HC9604FKN13H	P566379	PALL	HC9650FKZ8H	P566224	PALL	HC9700FKN9H	P566271	PALL	HC9800FKP8Z	P566397	PALL
HC9600FUN4H	P566206	PALL	HC9604FKN13Z	P566379	PALL	HC9650FKZ8Z	P566224	PALL	HC9700FKN9Z	P566271	PALL	HC9800FKS13H	P566404	PALL
HC9600FUN4Z	P566206	PALL	HC9604FKN16H	P566384	PALL	HC9650FKN16H	P566231	PALL	HC9700FKP18H	P566274	PALL	HC9800FKS13Z	P566404	PALL
HC9600FUN8H	P566211	PALL	HC9604FKN16Z	P566384	PALL	HC9650FKN8Z	P566228	PALL	HC9700FKP18Z	P566274	PALL	HC9800FKS4H	P566394	PALL
HC9600FUN8Z	P566211	PALL	HC9604FKN8H	P566374	PALL	HC9650FKN8Z	P566228	PALL	HC9700FKP27H	P566278	PALL	HC9800FKS4Z	P566394	PALL
HC9600FUP13H	P566215	PALL	HC9604FKN8Z	P566374	PALL	HC9650FUP16H	P566230	PALL	HC9700FKP27Z	P566278	PALL	HC9800FKS8H	P566399	PALL
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HC9600FUP16H	P566220	PALL	HC9604FKP13Z	P566378	PALL	HC9650FUP8H	P566225	PALL	HC9700FKP9Z	P566270	PALL	HC9800FKT13H	P566405	PALL
HC9600FUP16Z	P566220	PALL	HC9604FKP16H	P566383	PALL	HC9650FUP8Z	P566225	PALL	HC9700FKS18H	P566276	PALL	HC9800FKT14Z	P566405	PALL
HC9600FUP4H	P566205	PALL	HC9604FKP16Z	P566383	PALL	HC9650FUS16H	P566232	PALL	HC9700FKS27H	P566280	PALL	HC9800FKT4Z	P566395	PALL
HC9600FUP4Z	P566205	PALL	HC9604FKP8Z	P566373	PALL	HC9650FUS16Z	P566232	PALL	HC9700FKS27Z	P566280	PALL	HC9800FKT8H	P566400	PALL
HC9600FUP8H	P566210	PALL	HC9604FKP8Z	P566373	PALL	HC9650FUS8H	P566227	PALL	HC9700FKS27Z	P566280	PALL	HC9800FKT8Z	P566400	PALL
HC9600FUP8Z	P566210	PALL	HC9604FKS13H	P566380	PALL	HC9650FUS8Z	P566227	PALL	HC9700FKS9Z	P566272	PALL	HC9800FKT13Z	P566401	PALL
HC9600FUS13H	P566217	PALL	HC9604FKS13Z	P566380	PALL	HC9650FUT16H	P566233	PALL	HC9700FKS9Z	P566272	PALL	HC9800FKZ13Z	P566401	PALL
HC9600FUS13Z	P566217	PALL	HC9604FKS16H	P566385	PALL	HC9650FUT16Z	P566233	PALL	HC9700FKT18H	P566277	PALL	HC9800FKZ13Z	P566401	PALL
HC9600FUS16H	P566222	PALL	HC9604FKS16Z	P566385	PALL	HC9650FUT8H	P566228	PALL	HC9700FKT18Z	P566277	PALL	HC9800FKZ4H	P566391	PALL
HC9600FUS16Z	P566222	PALL	HC9604FKS8H	P566375	PALL	HC9650FUT8Z	P566228	PALL	HC9700FKT27H	P566281	PALL	HC9800FKZ4Z	P566391	PALL
HC9600FUS4H	P566207	PALL	HC9604FKS8Z	P566375	PALL	HC9650FUZ16H	P566229	PALL	HC9700FKT27Z	P566281	PALL	HC9800FKZ8H	P566396	PALL
HC9600FUS4Z	P566207	PALL	HC9604FKT13H	P566381	PALL	HC9650FUZ16Z	P566229	PALL	HC9700FKT9H	P566273	PALL	HC9800FKZ8Z	P566396	PALL
HC9600FUS8H	P566212	PALL	HC9604FKT13Z	P566381	PALL	HC9650FUZ8H	P566224	PALL	HC9700FKT9Z	P566273	PALL	HC9800FUDS4H	P566394	PALL
HC9600FUS8Z	P566212	PALL	HC9604FKT16H	P566386	PALL	HC9650FUZ8Z	P566224	PALL	HC9700FUP9H	P566270	PALL	HC9800FUDS4Z	P566394	PALL
HC9600FUT13H	P566218	PALL	HC9604FKT16Z	P566386	PALL	HC9651FDP16H	P566389	PALL	HC9700FUP9Z	P566270	PALL	HC9800FUDS4Z	P566394	PALL
HC9600FUT13Z	P566218	PALL	HC9604FKT8H	P566376	PALL	HC9651FDP16Z	P566389	PALL	HC9730FKP5H	P569091	PALL	HC9800FUDS8H	P566399	PALL
HC9600FUT16H	P566223	PALL	HC9604FKT8Z	P566376	PALL	HC9651FDP8H	P566387	PALL	HC9730FKP5H	P569091	PALL	HC9800FUD4H	P566393	PALL
HC9600FUT16Z	P566223	PALL	HC9604FKZ13H	P566377	PALL	HC9651FDP8Z	P566387	PALL	HC9730FKS5H	P569093	PALL	HC9800FUD4Z	P566393	PALL
HC9600FUT4H	P566208	PALL	HC9604FKZ13Z	P566377	PALL	HC9651FDT16H	P566390	PALL	HC9730FKS5V	P569093	PALL	HC9800FUP8H	P566397	PALL
HC9600FUT4Z	P566208	PALL	HC9604FKZ16H	P566382	PALL	HC9651FDT16Z	P566390	PALL	HC9800FND13H	P566403	PALL	HC9800FUP8Z	P566397	PALL
HC9600FUT8H	P566213	PALL	HC9604FKZ16Z	P566382	PALL	HC9651FDT8H	P566388	PALL	HC9800FND13Z	P566403	PALL	HC9800FUP8Z	P566397	PALL
HC9600FUT8Z	P566213	PALL	HC9604FKZ8H	P566372	PALL	HC9651FDT8Z	P566388	PALL	HC9800FND4H	P566393	PALL	HC9800FUP8Z	P566397	PALL
HC9600FUZ13H	P566214	PALL	HC9650FDN16H	P566231	PALL	HC9651FKP8H	P566387	PALL	HC9800FND4Z	P566393	PALL	HC9800FUP8Z	P566397	PALL
HC9600FUZ13Z	P566214	PALL	HC9650FDN16Z	P566231	PALL	HC9651FKP8Z	P566387	PALL	HC9800FND8H	P566398	PALL	HC9800FUP8Z	P566397	PALL
HC9600FUZ16H	P566219	PALL	HC9650FDN8H	P566226	PALL	HC9651FUP16H	P566389	PALL	HC9800FND8Z	P566398	PALL	HC9800FUP8Z	P566397	PALL
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HC9600FUZ4H	P566204	PALL	HC9650FDP16H	P566230	PALL	HC9651FUP8H	P566387	PALL	HC9800FDP13Z	P566402	PALL	HC9800FUS13H	P566404	PALL
HC9600FUZ4Z	P566204	PALL	HC9650FDP16Z	P566230	PALL	HC9651FUP8Z	P566387	PALL	HC9800FDP13Z	P566402	PALL	HC9800FUS13Z	P566404	PALL
HC9600FUZ8H	P566209	PALL	HC9650FDP8H	P566225	PALL	HC9651FUT16H	P566390	PALL	HC9800FDP18H	P566274	PALL	HC9800FUS8H	P566399	PALL
HC9600FUZ8Z	P566209	PALL	HC9650FDP8Z	P566225	PALL	HC9651FUT16Z	P566390	PALL	HC9800FDP18Z	P566274	PALL	HC9800FUS8Z	P566399	PALL
HC9601FDP13H	P566368	PALL	HC9650FDP8Z	P566225	PALL	HC9651FUT8H	P566388	PALL	HC9800FDP4H	P566392	PALL	HC9800FUT13H	P566405	PALL
HC9601FDP13Z	P566368	PALL	HC9650FDS16H	P566232	PALL	HC9651FUT8Z	P566388	PALL	HC9800FDP4Z	P566392	PALL	HC9800FUT13Z	P566405	PALL
HC9601FDP16H	P566370	PALL	HC9650FDS16Z	P566232	PALL				HC9800FDP4Z	P566392	PALL	HC9800FUT4H	P566395	PALL
HC9601FDP16Z	P566370	PALL							HC9800FDP4Z	P566392	PALL	HC9800FUT4Z	P566395	PALL
									HC9800FDP4Z	P566392	PALL	HC9800FUT8H	P566400	PALL



# DT High-Performance Filters

## Numberfinder Cross Reference



Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
HC9800FUT8Z	P566400	PALL	HC9901FUT26H	P566643	PALL	HP0653A03AH	P566337	MPFP	HP101318L183MB	P568570	HYPO	HP16RNL512MB	P566971	HYPO
HC9800FUZ13H	P566401	PALL	HC9901FUT26Z	P566643	PALL	HP0653A03AN	P566200	MPFP	HP101318L186MB	P568570	HYPO	HP16RNL512MV	P566971	HYPO
HC9800FUZ13Z	P566401	PALL				HP0653A06AN	P566201	MPFP	HP101318L363MB	P568862	HYPO	HP16RNL525MB	P566972	HYPO
HC9800FUZ4H	P566391	PALL	HE8308LL12B	P566237	PORO	HP0653A10AH	P566338	MPFP	HP101318L363MV	P568862	HYPO	HP16RNL525MV	P566972	HYPO
HC9800FUZ4Z	P566391	PALL	HE8316LL12B	P566242	PORO	HP0653A10AN	P566202	MPFP	HP101318L366MB	P568862	HYPO	HP16RNL53MB	P566969	HYPO
HC9800FUZ8H	P566396	PALL	HE8339LL03B	P566245	PORO	HP0653A25AN	P566203	MPFP				HP16RNL53MV	P566969	HYPO
HC9800FUZ8Z	P566396	PALL	HE8339LL25B	P566248	PORO				HP101L1812MB	P566707	HYPO	HP16RNL56MB	P566970	HYPO
			HE9204HL03V	P566335	PORO	HP06DHL412MB	P566689	HYPO	HP101L1812MV	P566707	HYPO	HP16RNL56MV	P566970	HYPO
HC9801FDP13H	P566410	PALL	HE9616LL03B	P566220	PORO	HP06DHL412MV	P566689	HYPO	HP101L1825MB	P566708	HYPO	HP16RNL812MB	P566979	HYPO
HC9801FDP13Z	P566410	PALL				HP06DHL43MB	P566688	HYPO	HP101L1825MV	P566708	HYPO	HP16RNL812MV	P566979	HYPO
HC9801FDP4H	P566406	PALL	HF28658	P566983	FTGD	HP06DHL43MV	P566688	HYPO	HP101L183MB	P566705	HYPO	HP16RNL825MB	P566980	HYPO
HC9801FDP4Z	P566406	PALL				HP06DHL712MB	P566691	HYPO	HP101L186MB	P566706	HYPO	HP16RNL825MV	P566980	HYPO
HC9801FDP8H	P566408	PALL	HF30077	P566461	FTGD	HP06DHL712MV	P566691	HYPO	HP101L186MV	P566706	HYPO	HP16RNL83MB	P566977	HYPO
HC9801FDP8Z	P566408	PALL	HF30218	P566660	FTGD	HP06DHL73MB	P566690	HYPO	HP101L3612MB	P566712	HYPO	HP16RNL83MV	P566977	HYPO
HC9801FDT13H	P566411	PALL	HF3030KFB	P566212	PTI	HP06DHL73MV	P566690	HYPO	HP101L3612MV	P566712	HYPO	HP16RNL86MB	P566978	HYPO
HC9801FDT13Z	P566411	PALL	HF30346	P566457	FTGD	HP06DHL812MB	P566693	HYPO	HP101L3625MB	P566713	HYPO	HP16RNL86MV	P566978	HYPO
HC9801FDT4H	P566407	PALL	HF30442	P566397	FTGD	HP06DHL812MV	P566693	HYPO	HP101L3625MV	P566713	HYPO			
HC9801FDT4Z	P566407	PALL	HF30693	P566653	FTGD	HP06DHL83MB	P566692	HYPO	HP101L363MB	P566710	HYPO	HP170L1012MB	P567047	HYPO
HC9801FDT8H	P566409	PALL	HF30748	P566213	FTGD	HP06DHL83MV	P566692	HYPO	HP101L363MV	P566710	HYPO	HP170L1012MV	P567047	HYPO
HC9801FDT8Z	P566409	PALL	HF30758	P567020	FTGD				HP101L366MB	P566711	HYPO	HP170L1025MB	P567048	HYPO
HC9801FKP13H	P566410	PALL				HP06DNL412MB	P566652	HYPO	HP101L366MV	P566711	HYPO	HP170L1025MV	P567048	HYPO
HC9801FKP13Z	P566410	PALL	HF4L10VQ	P566271	PRKR	HP06DNL412MV	P566652	HYPO				HP170L103MB	P567045	HYPO
HC9801FKP8H	P566408	PALL	HF4L15VQ	P566272	PRKR	HP06DNL425MB	P566653	HYPO	HP102L1812MB	P566707	HYPO	HP170L106MB	P567046	HYPO
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									HP16DNL86MB	P566671	HYPO	HP21L82MV	P566337	HYPO
									HP16DNL86MV	P566671	HYPO			





Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
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HP250L725M	P567088	..HYPO	HP33DNL725MB	P566681	..HYPO	HP60L1612MB	P566222	..HYPO	HP80L83MB	P566397	..HYPO	HP83L166MV	P566241	..HYPO
HP250L73M	P567085	..HYPO	HP33DNL725MV	P566681	..HYPO	HP60L1612MV	P566222	..HYPO				HP83L3912MB	P566247	..HYPO
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HP33DNL146MV	P566683	..HYPO	HP60L136MB	P566216	..HYPO									
HP33DNL712MB	P566680	..HYPO												



# DT High-Performance Filters

## Numberfinder Cross Reference



Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	
HP94L1312MB	P566447	.HYPO	HPAL512MB	P569093	.HYPO	HYU177	P566223	NORM	MP11015	P567044	.MPFF	NZ5V	P567066	.SRDR	
HP94L1325MB	P566448	.HYPO	HPAL525MB	P569094	.HYPO	HYU616	P566689	NORM	MP11129	P566987	.MPFF	<b>P</b>	P83250HFB	P566246	.PTI
HP94L133MV	P566445	.HYPO	HPAL53MB	P569091	.HYPO	HYU650	P566680	NORM	MP11401	P567049	.MPFF		P83250JFB	P566248	.PTI
HP94L2612MB	P566452	.HYPO	HPAL53MB	P569093	.HYPO	HYU657	P566987	NORM	MP12001	P567081	.MPFF		P83250KFB	P566247	.PTI
HP94L2625MB	P566453	.HYPO	HPK3L912MV	P566413	.HYPO				MP12002	P567083	.MPFF		P89200GFB	P566510	.PTI
HP94L263MV	P566450	.HYPO	HPK3L93MV	P566412	.HYPO				MP12003	P567084	.MPFF		P89200JFB	P566513	.PTI
HP94L3912MB	P566457	.HYPO							MP12007	P567085	.MPFF		P96030HFB	P566226	.PTI
HP94L3912MV	P566457	.HYPO							MP12008	P567087	.MPFF		P96030HFV	P566226	.PTI
HP94L3925MB	P566458	.HYPO	HPKL1812MB	P566276	.HYPO				MP12009	P567088	.MPFF		P97100GFB	P566274	.PTI
HP94L3925MV	P566458	.HYPO	HPKL1812MV	P566276	.HYPO				MP12012	P567089	.MPFF		P97100HFV	P566275	.PTI
HP94L393MV	P566455	.HYPO	HPKL181MB	P568817	.HYPO				MP12014	P567091	.MPFF		P98030GGB	P566397	.PTI
HP94L393MV	P566455	.HYPO	HPKL181MV	P568817	.HYPO				MP12015	P567092	.MPFF	P98050GUB	P566410	.PTI	
HP94L396MB	P566456	.HYPO	HPKL1825MB	P566277	.HYPO				MP12025	P567097	.MPFF	PG015GH	P567082	.PTI	
			HPKL1825MV	P566277	.HYPO				MP12026	P567099	.MPFF	PG015HH	P567082	.PTI	
HP95RNL1412MB	P566995	.HYPO	HPKL183MB	P566274	.HYPO				MP12027	P567100	.MPFF	PG015JH	P567084	.PTI	
HP95RNL1412MV	P566995	.HYPO	HPKL183MV	P566274	.HYPO				MP12031	P567101	.MPFF	PG015KH	P567083	.PTI	
HP95RNL1425MB	P566996	.HYPO	HPKL186MB	P566275	.HYPO				MP12032	P567102	.MPFF	PG015VH	P567081	.PTI	
HP95RNL1425MV	P566996	.HYPO	HPKL186MV	P566275	.HYPO				MP12033	P567104	.MPFF	PG025CH	P567087	.PTI	
HP95RNL143MB	P566993	.HYPO	HPKL2712MB	P566280	.HYPO				MP1307	P567020	.MPFF	PG025GH	P567085	.PTI	
HP95RNL143MV	P566993	.HYPO	HPKL271MB	P568818	.HYPO				MP15003	P567067	.MPFF	PG025JH	P567088	.PTI	
HP95RNL146MB	P566994	.HYPO	HPKL2725MB	P566281	.HYPO				MP3288	P567103	.MPFF	PG025KH	P567087	.PTI	
HP95RNL146MV	P566994	.HYPO	HPKL2725MV	P566281	.HYPO				MP3294	P567082	.MPFF	PG030GH	P567090	.PTI	
HP95RNL1812MB	P566999	.HYPO	HPKL273MB	P566278	.HYPO				MP3607	P566497	.MPFF	PG030HH	P567090	.PTI	
HP95RNL1812MV	P566999	.HYPO	HPKL276MB	P566279	.HYPO				MP3808	P567042	.MPFF	PG030JH	P567092	.PTI	
HP95RNL1812MV	P566999	.HYPO	HPKL912MB	P566272	.HYPO				MP3822	P567045	.MPFF	PG030KH	P567091	.PTI	
HP95RNL1825MV	P567000	.HYPO	HPKL912MV	P566272	.HYPO				MP3824	P567046	.MPFF	PG030VH	P567089	.PTI	
HP95RNL183MB	P566997	.HYPO	HPKL91MB	P568816	.HYPO				MP3825	P567046	.MPFF	PG050DH	P567093	.PTI	
HP95RNL183MV	P566997	.HYPO	HPKL925MB	P566273	.HYPO				MP3826	P567047	.MPFF	PG050GH	P567094	.PTI	
HP95RNL186MB	P566998	.HYPO	HPKL925MV	P566273	.HYPO				MP3827	P567047	.MPFF	PG050HH	P567094	.PTI	
HP95RNL186MV	P566998	.HYPO	HPKL93MB	P566270	.HYPO				MP3828	P567048	.MPFF	PG050JH	P567096	.PTI	
HP95RNL3612MB	P567003	.HYPO	HPKL93MV	P566270	.HYPO				MP3828	P567048	.MPFF	PG050KH	P567095	.PTI	
HP95RNL3612MV	P567003	.HYPO	HPKL96MB	P566271	.HYPO				MP3828	P567048	.MPFF	PG050VH	P567093	.PTI	
HP95RNL3625MB	P567004	.HYPO	HPKL96MV	P566271	.HYPO				MP3828	P567048	.MPFF	PG080CH	P567100	.PTI	
HP95RNL3625MV	P567004	.HYPO	HPNL1012MB	P567071	.HYPO				MP3890	P567086	.MPFF	PG080GH	P567098	.PTI	
HP95RNL363MB	P567001	.HYPO	HPNL1012MV	P567071	.HYPO				MP3911	P566457	.MPFF	PG080HH	P567098	.PTI	
HP95RNL363MV	P567001	.HYPO	HPNL1012MV	P567072	.HYPO				MP4040	P567090	.MPFF	PG080JH	P567100	.PTI	
HP95RNL366MB	P567002	.HYPO	HPNL1025MB	P567072	.HYPO				MP4048	P567050	.MPFF	PG080KH	P567099	.PTI	
HP95RNL366MV	P567002	.HYPO	HPNL1025MV	P567072	.HYPO				MP4050	P567051	.MPFF	PG080VH	P567097	.PTI	
			HPNL103MB	P567069	.HYPO				MP4052	P567052	.MPFF	PG120GH	P567102	.PTI	
HP96L1312MB	P566380	.HYPO	HPNL103MV	P567069	.HYPO				MP4058	P567053	.MPFF	PG120HH	P567102	.PTI	
HP96L1312MV	P566380	.HYPO	HPNL106MB	P567070	.HYPO				MP4060	P567054	.MPFF	PG120JH	P567104	.PTI	
HP96L131MB	P566377	.HYPO	HPNL106MV	P567070	.SRDR				MP4061	P567054	.MPFF	PG120KH	P567103	.PTI	
HP96L131MV	P566377	.HYPO	HPNL106MV	P567070	.SRDR				MP4062	P567055	.MPFF	PG120VH	P567101	.PTI	
HP96L1325MB	P566381	.HYPO	HPNL512MB	P567067	.HYPO				MP4063	P567055	.MPFF	PH71801C	P566705	.HLKO	
HP96L1325MV	P566381	.HYPO	HPNL512MV	P567067	.HYPO				MP4064	P567056	.MPFF	PH71803C	P566706	.HLKO	
HP96L133MB	P566378	.HYPO	HPNL525MB	P567068	.HYPO				MP4065	P567056	.MPFF	PH71805C	P566707	.HLKO	
HP96L133MV	P566378	.HYPO	HPNL525MV	P567068	.HYPO				MP4065	P567056	.MPFF	PH71810C	P566708	.HLKO	
HP96L136MB	P566379	.HYPO	HPNL53MB	P567065	.HYPO				MP4374	P567033	.MPFF	PH1005KSMIC3	P567081	.MHLE	
HP96L136MV	P566379	.HYPO	HPNL53MV	P567065	.HYPO				MP4376	P567034	.MPFF	PH1015MIC25	P567093	.MHLE	
HP96L1612MB	P566385	.HYPO	HPNL56MB	P567066	.HYPO				MP5147	P567098	.MPFF	P11130MIC10	P567100	.MHLE	
HP96L1612MV	P566385	.HYPO	HPNL56MV	P567066	.HYPO				MP8001	P569093	.MPFF	P113100RNV	P571240	.MHLE	
HP96L161MB	P566382	.HYPO	HPVL1412MB	P567079	.HYPO				MP8002	P569094	.MPFF	P12105SM3	P567081	.MHLE	
HP96L161MV	P566382	.HYPO	HPVL1412MV	P567079	.HYPO				MP9453	P566971	.MPFF	P12105SM3	P567085	.MHLE	
HP96L1625MB	P566386	.HYPO	HPVL1425MB	P567080	.HYPO				MP9705	P566683	.MPFF	P12108SM3	P567085	.MHLE	
HP96L1625MV	P566386	.HYPO	HPVL1425MV	P567080	.HYPO				MPAL512MB	P569094	.HYPO	P12108SM3	P567085	.MHLE	
HP96L163MB	P566383	.HYPO	HPVL143MB	P567077	.HYPO							P121100RN	P571238	.MHLE	
HP96L163MV	P566383	.HYPO	HPVL143MV	P567077	.HYPO							P12115SM3	P567093	.MHLE	
HP96L166MB	P566384	.HYPO	HPVL146MB	P567078	.HYPO							P12115SM6	P567094	.MHLE	
HP96L166MV	P566384	.HYPO	HPVL146MV	P567078	.HYPO							P12155SM3	P567093	.MHLE	
HP96L812MB	P566375	.HYPO	HPVL93MB	P567073	.HYPO							P12130SM3	P567098	.MHLE	
HP96L812MV	P566375	.HYPO	HPVL93MV	P567073	.HYPO							P12130SMX3	P567097	.MHLE	
HP96L81MB	P566372	.HYPO	HPVL96MB	P567074	.HYPO							P12145SM3	P567101	.MHLE	
HP96L81MV	P566372	.HYPO	HPVL96MV	P567074	.HYPO										
HP96L825MB	P566376	.HYPO													
HP96L825MV	P566376	.HYPO	HU8900FUP8H	P566490	.PALL										
HP96L83MB	P566373	.HYPO	HU8900FUP8Z	P566490	.PALL										
HP96L83MV	P566373	.HYPO	HU8900FUZ8H	P566489	.PALL										
HP96L85MV	P566373	.HYPO	HU8900FUZ8Z	P566489	.PALL										
HP96L86MB	P566374	.HYPO													
HP96L86MV	P566374	.HYPO	HYU1035	P566685	NORM										



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PI2145SMX3	P567101	MHLE	PR3037	P566687	PRKR	PR3389	P567029	PRKR	R890H3903H	P566510	FAIR	R980H0403A	P566392	FAIR			
PI22100RN	P571239	MHLE	PR3056	P566650	PRKR	PR3943	P566485	PRKR	R890H3906H	P566511	FAIR	R980H0406A	P566393	FAIR			
PI22100RNV	P571239	MHLE	PR3057	P566651	PRKR	PR3944	P566486	PRKR	R890H3912H	P566512	FAIR	R980H0412A	P566394	FAIR			
PI23100RN	P571240	MHLE	PR3058	P566652	PRKR	PT8458MPG	P567047	BOWN	R890H3925H	P566513	FAIR	R980H0425A	P566395	FAIR			
PI23100RNV	P571240	MHLE	PR3059	P566653	PRKR	PT8985MPG	P567020	BOWN	R910H1303H	P566636	FAIR	R980H0803A	P566397	FAIR			
PI25100RN	P571241	MHLE	PR3064	P566688	PRKR	PT9298MPG	P566670	BOWN	R910H1306H	P566637	FAIR	R980H0806A	P566398	FAIR			
PI25100RNV	P571241	MHLE	PR3066	P566689	PRKR	<b>R</b>			R910H1312H	P566638	FAIR	R980H0812A	P566399	FAIR			
PI3105PS10	P567083	MHLE	PR3085	P566658	PRKR				R160HBH03H	P566666	FAIR	R910H1325H	P566639	FAIR	R980H0825A	P566400	FAIR
PI3105SM10	P567083	MHLE	PR3086	P566659	PRKR				R160HBH05A	P566667	FAIR	R920H0403A	P566195	FAIR	R980H1303A	P566402	FAIR
PI3105SMX10	P567083	MHLE	PR3087	P566660	PRKR				R160HBH10A	P566668	FAIR	R920H0803A	P566200	FAIR	R980H1306A	P566403	FAIR
PI3108SM10	P567087	MHLE	PR3088	P566661	PRKR				R160HBH20H	P566669	FAIR	R920H0806A	P566201	FAIR	R980H1312A	P566404	FAIR
PI3108SMX10	P567087	MHLE	PR3093	P566690	PRKR				R161HBH03A	P566694	FAIR	R920H0812A	P566202	FAIR	R980H1325A	P566405	FAIR
PI3111PS10	P567091	MHLE	PR3095	P566691	PRKR				R161HBH15A	P566695	FAIR	R940H1303H	P566445	FAIR	R980Z0803A	P566397	FAIR
PI3111SMX10	P567091	MHLE	PR3114	P566666	PRKR				R240HBH03H	P566670	FAIR	R940H1306H	P566446	FAIR	R981H0403A	P566406	FAIR
PI3115PS10	P567095	MHLE	PR3115	P566667	PRKR				R240HBH05A	P566671	FAIR	R940H1312H	P566447	FAIR	R981H0415A	P566407	FAIR
PI3115SM10	P567095	MHLE	PR3116	P566668	PRKR				R240HBH10A	P566672	FAIR	R940H1325H	P566448	FAIR	R981H0803A	P566408	FAIR
PI3115SMX10	P567095	MHLE	PR3117	P566669	PRKR	R240HBH20A	P566673	FAIR	R940H2603H	P566450	FAIR	R981H0815A	P566409	FAIR			
PI3130PS10	P567099	MHLE	PR3122	P566694	PRKR	R241HBH10A	P566672	FAIR	R940H2606H	P566451	FAIR	R981H0815A	P566409	FAIR			
PI3130SM10	P567099	MHLE	PR3124	P566695	PRKR	R241HBH15A	P566697	FAIR	R940H2612H	P566452	FAIR	R981H1303A	P566410	FAIR			
PI3130SMX10	P567099	MHLE	PR3143	P566670	PRKR	R241HBH15A	P566697	FAIR	R940H2625H	P566453	FAIR	R981H1315A	P566411	FAIR			
PI3145SM10	P567103	MHLE	PR3144	P566671	PRKR	R330HBH03H	P566678	FAIR	R940H3903H	P566455	FAIR	R991H2603H	P566642	FAIR			
PI3145SMX10	P567103	MHLE	PR3145	P566672	PRKR	R330HBH05A	P566679	FAIR	R940H3906H	P566456	FAIR	R991H3903H	P566644	FAIR			
PI4105SM25	P567084	MHLE	PR3151	P566696	PRKR	R330HBH10A	P566680	FAIR	R940H3912H	P566457	FAIR						
PI4105SMX25	P567084	MHLE	PR3153	P566697	PRKR	R330HBH20H	P566681	FAIR	R940H3925H	P566458	FAIR						
PI4108SM25	P567088	MHLE	PR3172	P566678	PRKR	R331HBH03A	P566700	FAIR									
PI4108SMX25	P567088	MHLE	PR3173	P566679	PRKR	R331HBH15A	P566701	FAIR	R950H0803A	P566225	FAIR	RE014E05B	P566962	STFF			
PI4111SMX25	P567092	MHLE	PR3174	P566680	PRKR	R660HBH03H	P566682	FAIR	R950H0806A	P566226	FAIR	RE014E10B	P566963	STFF			
PI4115SM25	P567096	MHLE	PR3175	P566681	PRKR	R660HBH05A	P566683	FAIR	R950H0812A	P566227	FAIR	RE014G05B	P566962	STFF			
PI4115SMX25	P567100	MHLE	PR3180	P566700	PRKR	R660HBH10A	P566684	FAIR	R950H0825A	P566228	FAIR	RE014G10B	P566963	STFF			
PI4130SM25	P567100	MHLE	PR3182	P566701	PRKR	R660HBH20H	P566685	FAIR	R950H1603A	P566230	FAIR	RE014G20B	P566964	STFF			
PI4130SMX25	P567100	MHLE	PR3201	P566682	PRKR	R661HBH03A	P566702	FAIR	R950H1606A	P566231	FAIR	RE030E05B	P566966	STFF			
PI4145SM25	P567104	MHLE	PR3202	P566683	PRKR	R661HBH15A	P566703	FAIR	R950H1612A	P566232	FAIR	RE030E10B	P566967	STFF			
PI4145SMX25	P567104	MHLE	PR3203	P566684	PRKR	R820H0803A	P566460	FAIR	R950H1625A	P566233	FAIR	RE030G05B	P566966	STFF			
PI5105SMX6	P567086	MHLE	PR3204	P566685	PRKR	R820H0806A	P566461	FAIR				RE030G10B	P566967	STFF			
PI5108SMX6	P567090	MHLE	PR3209	P566702	PRKR	R820H0812A	P566462	FAIR	R951H0803A	P566387	FAIR	RE030G20B	P566968	STFF			
PI5115SMX6	P567094	MHLE	PR3211	P566703	PRKR	R820H0825A	P566463	FAIR	R951H0815A	P566388	FAIR	RE045E10B	P566971	STFF			
PI5130SMX6	P567098	MHLE	PR3239	P566961	PRKR	R820H1303A	P566465	FAIR	R951H1603A	P566389	FAIR	RE045E20B	P566972	STFF			
PI5145SM6	P567102	MHLE	PR3240	P566962	PRKR	R820H1306A	P566466	FAIR	R951H1615A	P566390	FAIR	RE045G10B	P566971	STFF			
PI5145SMX6	P567102	MHLE	PR3241	P566963	PRKR	R820H1312A	P566467	FAIR				RE045G20B	P566972	STFF			
PR2751	P566397	PRKR	PR3242	P566964	PRKR	R820H1325A	P566468	FAIR	R960H0403A	P566205	FAIR	RE070E05B	P566978	STFF			
PR2785	P566452	PRKR	PR3256	P566965	PRKR	R830H0803A	P566235	FAIR	R960H0406A	P566206	FAIR	RE070E10B	P566979	STFF			
PR2786	P566453	PRKR	PR3257	P566966	PRKR	R830H1603A	P566240	FAIR	R960H0412A	P566207	FAIR	RE070E20B	P566980	STFF			
PR2828	P567083	PRKR	PR3258	P566967	PRKR	R830H1606A	P566241	FAIR	R960H0425A	P566208	FAIR	RE070G05B	P566978	STFF			
PR2829	P567084	PRKR	PR3259	P566968	PRKR	R830H3903A	P566245	FAIR	R960H0803A	P566210	FAIR	RE070G10B	P566979	STFF			
PR2830	P567081	PRKR	PR3273	P566969	PRKR	R830H3906A	P566246	FAIR	R960H0806A	P566211	FAIR	RE070G20B	P566980	STFF			
PR2831	P567083	PRKR	PR3274	P566970	PRKR	R830H3925A	P566248	FAIR	R960H0812A	P566212	FAIR	RE090E05B	P566982	STFF			
PR2836	P567087	PRKR	PR3275	P566971	PRKR	R831H1603A	P566250	FAIR	R960H0825A	P566213	FAIR	RE090E10B	P566983	STFF			
PR2837	P567088	PRKR	PR3276	P566972	PRKR	R831H1606A	P566251	FAIR	R960H1303A	P566215	FAIR	RE090E20B	P566984	STFF			
PR2838	P567085	PRKR	PR3290	P566977	PRKR	R831H1612A	P566252	FAIR	R960H1306A	P566216	FAIR	RE090G05B	P566982	STFF			
PR2839	P567087	PRKR	PR3291	P566978	PRKR	R831H1625A	P566253	FAIR	R960H1312A	P566217	FAIR	RE090G10B	P566983	STFF			
PR2840	P567088	PRKR	PR3292	P566979	PRKR	R880H1303A	P566480	FAIR	R960H1325A	P566218	FAIR	RE090G10B2	P566983	STFF			
PR2844	P567091	PRKR	PR3293	P566980	PRKR	R880H1306A	P566481	FAIR	R960H1603A	P566220	FAIR	RE090G10V	P566983	STFF			
PR2845	P567092	PRKR	PR3307	P566981	PRKR	R880H1312A	P566482	FAIR	R960H1606A	P566221	FAIR	RE090G10V2	P566983	STFF			
PR2846	P567089	PRKR	PR3308	P566982	PRKR	R880H1603A	P566485	FAIR	R960H1612A	P566222	FAIR	RE090G20B	P566984	STFF			
PR2854	P567093	PRKR	PR3309	P566983	PRKR	R880H1606A	P566486	FAIR	R960H1625A	P566223	FAIR	RE160E05B	P566986	STFF			
PR2855	P567095	PRKR	PR3310	P566984	PRKR	R880H1612A	P566487	FAIR				RE160E10B	P566987	STFF			
PR2856	P567096	PRKR	PR3324	P566985	PRKR	R890H1303H	P566495	FAIR	R961H0403A	P566364	FAIR	RE160E20B	P566988	STFF			
PR2860	P567099	PRKR	PR3325	P566986	PRKR	R890H1306H	P566496	FAIR	R961H0415A	P566365	FAIR	RE160G05B	P566986	STFF			
PR2860	P567100	PRKR	PR3326	P566987	PRKR	R890H1312H	P566497	FAIR	R961H0803A	P566366	FAIR	RE160G10B	P566987	STFF			
PR2862	P567097	PRKR	PR3327	P566988	PRKR	R890H1325H	P566498	FAIR	R961H0815A	P566367	FAIR	RE200G05B	P566990	STFF			
PR2868	P567103	PRKR	PR3362	P567007	PRKR	R890H1603H	P566500	FAIR	R961H1303A	P566368	FAIR	RE200G10B	P566991	STFF			
PR2869	P567103	PRKR	PR3363	P567008	PRKR	R890H1606H	P566501	FAIR	R961H1315A	P566369	FAIR	RE200G20B	P566992	STFF			
PR2870	P567101	PRKR	PR3368	P567023	PRKR	R890H1612H	P566502	FAIR	R961H1603A	P566370	FAIR	RE250G10B	P566995	STFF			
PR2872	P567104	PRKR	PR3374	P567005	PRKR	R890H1625H	P566503	FAIR	R961H1615A	P566371	FAIR	RE250G20B	P566996	STFF			
PR3031	P566646	PRKR	PR3375	P567007	PRKR	R890H2603H	P566505	FAIR				RE300E10B	P566999	STFF			
PR3032	P566647	PRKR	PR3376	P567008	PRKR	R890H2606H	P566506	FAIR				RE300G03B	P566997	STFF			
PR3033	P566648	PRKR	PR3377	P567013	PRKR	R890H2612H	P566507	FAIR				RE300G10B	P566999	STFF			
PR3034	P566649	PRKR	PR3383	P567021	PRKR	R890H2625H	P566508	FAIR									
PR3035	P566686	PRKR	PR3386	P567025	PRKR							RF2AH0903A	P567033	FAIR			



# DT High-Performance Filters

## Numberfinder Cross Reference



Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
RF2AH0910A	P567035	FAIR	RHR80G05V	P566962	FLTC	S1310HN	P566411	Zinga	SBF0111DZ3B	P566690	S.RDR	SBF0331DZ10V	P566701	S.RDR
RF2AH0925A	P567036	FAIR	RHR80G10B	P566963	FLTC	S1310LN	P566404	Zinga	SBF0111DZ3V	P566690	S.RDR	SBF0331DZ3B	P566700	S.RDR
RF2AH1803A	P567037	FAIR	RHR80G10V	P566963	FLTC	S1320LN	P566405	Zinga				SBF0331DZ3V	P566700	S.RDR
RF2AH1810A	P567039	FAIR	RHR80G20B	P566964	FLTC	SA080E10B	P567027	STFF	SBF0160DS15B	P566669	S.RDR	SBF0660DS15B	P566685	S.RDR
RF2AH1825A	P567040	FAIR	RHR80G20V	P566964	FLTC	SA100E10B	P567031	STFF	SBF0160DS15V	P566669	S.RDR	SBF0660DS15V	P566685	S.RDR
RHR0160G05V	P566970	FLTC	RHR860G03B	P566985	FLTC	SBF0030DS15B	P566649	S.RDR	SBF0160DS1B	P566666	S.RDR	SBF0660DS1B	P566682	S.RDR
RHR110G03B	P566965	FLTC	RHR860G03V	P566985	FLTC	SBF0030DS15V	P566649	S.RDR	SBF0160DS1V	P566666	S.RDR	SBF0660DS1V	P566682	S.RDR
RHR110G03V	P566965	FLTC	RHR860G05B	P566986	FLTC	SBF0030DS1B	P566646	S.RDR	SBF0160DZ10B	P566668	S.RDR	SBF0660DZ10B	P566684	S.RDR
RHR110G05B	P566966	FLTC	RHR860G05V	P566986	FLTC	SBF0030DS1V	P566646	S.RDR	SBF0160DZ25B	P566669	S.RDR	SBF0660DZ10V	P566684	S.RDR
RHR110G05V	P566966	FLTC	RHR860G10B	P566987	FLTC	SBF0030DZ10B	P566648	S.RDR	SBF0160DZ25V	P566669	S.RDR	SBF0660DZ25B	P566685	S.RDR
RHR110G10B	P566967	FLTC	RHR860G10V	P566987	FLTC	SBF0030DZ10V	P566648	S.RDR	SBF0160DZ3B	P566666	S.RDR	SBF0660DZ25V	P566685	S.RDR
RHR110G10V	P566967	FLTC	RHR860G20B	P566988	FLTC	SBF0030DZ25B	P566649	S.RDR	SBF0160DZ3V	P566666	S.RDR	SBF0660DZ3B	P566682	S.RDR
RHR110G20B	P566968	FLTC	RHR860G20V	P566988	FLTC	SBF0030DZ25V	P566649	S.RDR	SBF0160DZ5B	P566667	S.RDR	SBF0660DZ3V	P566682	S.RDR
RHR110G20V	P566968	FLTC				SBF0030DZ3B	P566646	S.RDR	SBF0160DZ5V	P566667	S.RDR	SBF0660DZ5B	P566683	S.RDR
RHR1300G03B	P566997	FLTC	RHR850G03B	P566989	FLTC	SBF0030DZ3B	P566646	S.RDR	SBF0160RZ10B	P566971	S.RDR	SBF0660DZ5V	P566683	S.RDR
RHR1300G03V	P566997	FLTC	RHR850G03V	P566989	FLTC	SBF0030DZ5B	P566647	S.RDR	SBF0160RZ10V	P566971	S.RDR	SBF0660RZ10B	P566987	S.RDR
RHR1300G05B	P566997	FLTC	RHR850G05B	P566990	FLTC	SBF0030DZ5V	P566647	S.RDR	SBF0160RZ25B	P566972	S.RDR	SBF0660RZ10V	P566987	S.RDR
RHR1300G05V	P566998	FLTC	RHR850G05V	P566990	FLTC	SBF0031DZ10B	P566687	S.RDR	SBF0160RZ25V	P566972	S.RDR	SBF0660RZ25B	P566988	S.RDR
RHR1300G10B	P566999	FLTC	RHR850G10B	P566991	FLTC	SBF0031DZ10V	P566687	S.RDR	SBF0160RZ3B	P566969	S.RDR	SBF0660RZ25V	P566988	S.RDR
RHR1300G10V	P566999	FLTC	RHR850G10V	P566991	FLTC	SBF0031DZ25B	P566688	S.RDR	SBF0160RZ3V	P566969	S.RDR	SBF0660RZ3B	P566985	S.RDR
RHR1300G10B	P566999	FLTC	RHR850G20B	P566992	FLTC	SBF0031DZ3V	P566686	S.RDR	SBF0160RZ5B	P566970	S.RDR	SBF0660RZ3V	P566985	S.RDR
RHR1300G10V	P566999	FLTC	RHR850G20V	P566992	FLTC				SBF0160RZ5V	P566970	S.RDR	SBF0660RZ5B	P566986	S.RDR
RHR1300G20B	P567000	FLTC				SBF0060DS15B	P566653	S.RDR	SBF0161DZ10B	P566695	S.RDR	SBF0660RZ5V	P566986	S.RDR
RHR1300G20V	P567000	FLTC	RHR950G03B	P566993	FLTC	SBF0060DS15V	P566653	S.RDR	SBF0161DZ10V	P566695	S.RDR	SBF0661DZ10B	P566703	S.RDR
RHR160G03B	P566969	FLTC	RHR950G03V	P566993	FLTC	SBF0060DS1B	P566650	S.RDR	SBF0161DZ3B	P566694	S.RDR	SBF0661DZ10V	P566703	S.RDR
RHR160G03V	P566969	FLTC	RHR950G05B	P566994	FLTC	SBF0060DS1V	P566650	S.RDR	SBF0161DZ3V	P566694	S.RDR	SBF0661DZ3B	P566702	S.RDR
RHR160G05B	P566970	FLTC	RHR950G05V	P566994	FLTC	SBF0060DZ10B	P566652	S.RDR				SBF0661DZ3V	P566702	S.RDR
RHR160G10B	P566971	FLTC	RHR950G10B	P566995	FLTC	SBF0060DZ10V	P566652	S.RDR	SBF0240DS1B	P566670	S.RDR	SBF0850RZ10B	P566991	S.RDR
RHR160G10V	P566971	FLTC	RHR950G10V	P566995	FLTC	SBF0060DZ25B	P566653	S.RDR	SBF0240DS1V	P566670	S.RDR	SBF0850RZ10V	P566991	S.RDR
RHR160G20B	P566972	FLTC	RHR950G20B	P566996	FLTC	SBF0060DZ25V	P566653	S.RDR	SBF0240DZ10B	P566672	S.RDR	SBF0850RZ25B	P566992	S.RDR
RHR160G20V	P566972	FLTC	RHR950G20V	P566996	FLTC	SBF0060DZ3B	P566650	S.RDR	SBF0240DZ10V	P566672	S.RDR	SBF0850RZ25V	P566992	S.RDR
			RKH0903A	P566270	FAIR	SBF0060DZ5B	P566651	S.RDR	SBF0240DZ25B	P566673	S.RDR	SBF0850RZ5B	P566990	S.RDR
			RKH0906A	P566271	FAIR	SBF0060DZ5V	P566651	S.RDR	SBF0240DZ25V	P566673	S.RDR	SBF0850RZ5V	P566990	S.RDR
			RKH0912A	P566272	FAIR	SBF0060RZ10B	P566963	S.RDR	SBF0240RZ10B	P566670	S.RDR			
			RKH0925A	P566273	FAIR	SBF0060RZ10V	P566963	S.RDR	SBF0240RZ10V	P566670	S.RDR	SBF0950RZ10B	P566995	S.RDR
			RKH1803A	P566274	FAIR	SBF0060RZ25B	P566964	S.RDR	SBF0240RZ25B	P566671	S.RDR	SBF0950RZ10V	P566995	S.RDR
			RKH1806A	P566275	FAIR	SBF0060RZ25V	P566964	S.RDR	SBF0240RZ5B	P566671	S.RDR	SBF0950RZ25B	P566996	S.RDR
			RKH1812A	P566276	FAIR	SBF0060RZ3B	P566961	S.RDR	SBF0240RZ5V	P566671	S.RDR	SBF0950RZ25V	P566996	S.RDR
			RKH1825A	P566277	FAIR	SBF0060RZ3B	P566961	S.RDR	SBF0240RZ10B	P566979	S.RDR			
			RKH2703A	P566278	FAIR	SBF0060RZ3V	P566961	S.RDR	SBF0240RZ25B	P566979	S.RDR	SBF100014Z15B	P567056	S.RDR
			RKH2706A	P566279	FAIR	SBF0060RZ5B	P566962	S.RDR	SBF0240RZ25V	P566980	S.RDR	SBF100014Z15V	P567056	S.RDR
			RKH2712A	P566280	FAIR	SBF0060RZ5V	P566962	S.RDR	SBF0240RZ3B	P566977	S.RDR	SBF100014Z1B	P567055	S.RDR
			RKH2725A	P566281	FAIR				SBF0240RZ3B	P566977	S.RDR	SBF100014Z1V	P567055	S.RDR
			RKX0903A	P566412	FAIR	SBF0061DZ10B	P566689	S.RDR	SBF0240RZ5B	P566978	S.RDR	SBF100014Z3B	P567053	S.RDR
			RKX0915A	P566413	FAIR	SBF0061DZ10V	P566689	S.RDR	SBF0240RZ5V	P566978	S.RDR	SBF100014Z3V	P567053	S.RDR
			RTE48G03B	P566270	STFF	SBF0061DZ3B	P566688	S.RDR	SBF0241DZ10B	P566697	S.RDR	SBF100014Z5B	P567054	S.RDR
			RTE48G05B	P566271	STFF	SBF0061DZ3V	P566688	S.RDR	SBF0241DZ10V	P566697	S.RDR	SBF100014Z5V	P567054	S.RDR
			RTE48G10B	P566272	STFF				SBF0241DZ3B	P566696	S.RDR	SBF1000710B	P567051	S.RDR
			RTE48G25B	P566273	STFF	SBF0110DS1B	P566658	S.RDR	SBF0241DZ3V	P566696	S.RDR	SBF1000710V	P567051	S.RDR
						SBF0110DS1V	P566658	S.RDR				SBF1000725V	P567052	S.RDR
						SBF0110DZ10B	P566660	S.RDR	SBF0330DS1B	P566678	S.RDR	SBF10007Z3B	P567049	S.RDR
						SBF0110DZ10V	P566660	S.RDR	SBF0330DS1V	P566678	S.RDR	SBF10007Z3V	P567049	S.RDR
						SBF0110DZ25B	P566661	S.RDR	SBF0330DZ10B	P566680	S.RDR	SBF10007Z5B	P567050	S.RDR
						SBF0110DZ25V	P566661	S.RDR	SBF0330DZ10V	P566680	S.RDR	SBF10007Z5V	P567050	S.RDR
						SBF0110DZ3B	P566658	S.RDR	SBF0330DZ25B	P566681	S.RDR			
						SBF0110DZ3V	P566658	S.RDR	SBF0330DZ5B	P566681	S.RDR	SBF100218Z10B	P567039	S.RDR
						SBF0110RZ25B	P566659	S.RDR	SBF0330DZ5V	P566678	S.RDR	SBF100218Z10V	P567039	S.RDR
						SBF0110RZ25V	P566659	S.RDR	SBF0330DZ5B	P566678	S.RDR	SBF100218Z25B	P567040	S.RDR
						SBF0110RZ3B	P566967	S.RDR	SBF0330DZ5B	P566679	S.RDR	SBF100218Z25V	P567040	S.RDR
						SBF0110RZ3V	P566967	S.RDR	SBF0330DZ5B	P566679	S.RDR	SBF100218Z3B	P567037	S.RDR
						SBF0110RZ5B	P566968	S.RDR	SBF0330RZ10B	P566983	S.RDR	SBF100218Z3V	P567037	S.RDR
						SBF0110RZ5V	P566968	S.RDR	SBF0330RZ10V	P566983	S.RDR	SBF100218Z5B	P567038	S.RDR
						SBF0110RZ25B	P566965	S.RDR	SBF0330RZ25B	P566984	S.RDR	SBF100218Z5V	P567038	S.RDR
						SBF0110RZ25V	P566965	S.RDR	SBF0330RZ25V	P566984	S.RDR	SBF10029Z10B	P567035	S.RDR
						SBF0110RZ3B	P566965	S.RDR	SBF0330RZ25V	P566984	S.RDR	SBF10029Z10V	P567035	S.RDR
						SBF0110RZ3V	P566965	S.RDR	SBF0330RZ3B	P566981	S.RDR	SBF10029Z25B	P567036	S.RDR
						SBF0110RZ5B	P566966	S.RDR	SBF0330RZ3B	P566981	S.RDR	SBF10029Z25V	P567036	S.RDR
						SBF0110RZ5V	P566966	S.RDR	SBF0330RZ5B	P566982	S.RDR	SBF10029Z3B	P567033	S.RDR
						SBF0111DZ10B	P566691	S.RDR	SBF0330RZ5B	P566982	S.RDR	SBF10029Z3V	P567033	S.RDR
						SBF0111DZ10V	P566691	S.RDR	SBF0331DZ10B	P566701	S.RDR			

**S**

S0403HN	P566406	Zinga
S0403LN	P566392	Zinga
S0406LN	P566393	Zinga
S0410HN	P566407	Zinga
S0410LN	P566394	Zinga
S0420LN	P566395	Zinga
S0803HN	P566408	Zinga
S0803LN	P566397	Zinga
S0806LN	P566398	Zinga
S0810HN	P566409	Zinga
S0810LN	P566399	Zinga
S0820LN	P566400	Zinga
S1303HN	P566410	Zinga
S1303LN	P566402	Zinga
S1306LN	P566403	Zinga





Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
SBF10029Z5B	P567034	.SRDR	SBF83008Z25V	P566238	.SRDR	SBF890039Z3B	P566510	.SRDR	SBF90208Z25B	P566203	.SRDR	SBF960016Z25V	P566223	.SRDR
SBF10029Z5V	P567034	.SRDR	SBF83008Z3V	P566235	.SRDR	SBF890039Z3V	P566510	.SRDR	SBF90208Z25V	P566203	.SRDR	SBF960016Z3B	P566220	.SRDR
			SBF83008Z5V	P566236	.SRDR	SBF890039Z5B	P566511	.SRDR	SBF90208Z3B	P566200	.SRDR	SBF960016Z3V	P566220	.SRDR
SBF10505Z10BV	P567043	.SRDR				SBF890008Z25B	P566493	.SRDR	SBF90208Z5B	P566201	.SRDR	SBF960016Z5B	P566221	.SRDR
SBF10505Z10V	P567043	.SRDR	SBF880013S1	P566480	.SRDR	SBF890008Z25V	P566493	.SRDR	SBF90208Z5V	P566201	.SRDR	SBF96004Z10B	P566207	.SRDR
SBF10505Z25V	P567044	.SRDR	SBF880013S3	P566481	.SRDR	SBF891413Z10B	P566522	.SRDR	SBF90214Z10B	P566336	.SRDR	SBF96004Z10V	P566207	.SRDR
SBF1050Z10BV	P567047	.SRDR	SBF880013S7	P566482	.SRDR	SBF891413Z10V	P566522	.SRDR	SBF90214Z3B	P566335	.SRDR	SBF96004Z11V	P566204	.SRDR
SBF1050Z10V	P567047	.SRDR	SBF880013Z10B	P566482	.SRDR	SBF891413Z10V	P566522	.SRDR	SBF90214Z3B	P566335	.SRDR	SBF96004Z21V	P566204	.SRDR
SBF1050Z25V	P567048	.SRDR	SBF880013Z10V	P566482	.SRDR	SBF891413Z1B	P566519	.SRDR	SBF90214Z3V	P566335	.SRDR	SBF96004Z25B	P566208	.SRDR
SBF1300RZ10B	P566999	.SRDR	SBF880013Z1B	P566479	.SRDR	SBF891413Z1B	P566519	.SRDR	SBF90218Z10B	P566338	.SRDR	SBF96004Z25V	P566208	.SRDR
SBF1300RZ10V	P566999	.SRDR	SBF880013Z1V	P566479	.SRDR	SBF891413Z1V	P566519	.SRDR	SBF90218Z10V	P566338	.SRDR	SBF96004Z25V	P566208	.SRDR
SBF1300RZ25B	P567000	.SRDR	SBF880013Z2B	P566483	.SRDR	SBF891413Z25B	P566523	.SRDR	SBF90218Z3B	P566337	.SRDR	SBF96008Z25B	P566211	.SRDR
SBF1300RZ25V	P567000	.SRDR	SBF880013Z2V	P566483	.SRDR	SBF891413Z25V	P566523	.SRDR	SBF90218Z3V	P566337	.SRDR	SBF96008Z5V	P566211	.SRDR
			SBF880013Z3B	P566480	.SRDR	SBF891413Z3B	P566520	.SRDR						
			SBF880013Z3V	P566480	.SRDR	SBF891413Z3V	P566520	.SRDR						
SBF2235Z10V	P567099	.SRDR	SBF880013Z5B	P566481	.SRDR	SBF891413Z5B	P566521	.SRDR	SBF940013S1	P566445	.SRDR	SBF96008Z10B	P566212	.SRDR
SBF25449Z10V	P569233	.SRDR	SBF880013Z5V	P566481	.SRDR	SBF891413Z5V	P566521	.SRDR	SBF940013S1	P566448	.SRDR	SBF96008Z10V	P566212	.SRDR
SBF25449Z25V	P569234	.SRDR	SBF880016S1	P566485	.SRDR	SBF891416Z10B	P566536	.SRDR	SBF940013S3	P566446	.SRDR	SBF96008Z11V	P566209	.SRDR
SBF25449Z3V	P569231	.SRDR	SBF880016S3	P566486	.SRDR	SBF891416Z10V	P566536	.SRDR	SBF940013S7	P566447	.SRDR	SBF96008Z21V	P566209	.SRDR
SBF25449Z5V	P569232	.SRDR	SBF880016S7	P566487	.SRDR	SBF891416Z10V	P566536	.SRDR	SBF940013Z10B	P566447	.SRDR	SBF96008Z25B	P566213	.SRDR
SBF2600RZ10B	P567003	.SRDR	SBF880016Z10B	P566487	.SRDR	SBF891416Z1V	P566524	.SRDR	SBF940013Z10V	P566447	.SRDR	SBF96008Z25V	P566213	.SRDR
SBF2600RZ10V	P567003	.SRDR	SBF880016Z10V	P566487	.SRDR	SBF891416Z3B	P566534	.SRDR	SBF940013Z2B	P566448	.SRDR	SBF96008Z3B	P566210	.SRDR
SBF2600RZ25B	P567004	.SRDR	SBF880016Z1B	P566484	.SRDR	SBF891416Z3V	P566534	.SRDR	SBF940013Z2V	P566448	.SRDR	SBF96008Z3V	P566210	.SRDR
SBF2600RZ25V	P567004	.SRDR	SBF880016Z1V	P566484	.SRDR	SBF891416Z5B	P566535	.SRDR	SBF940013Z3B	P566445	.SRDR	SBF96008Z5B	P566211	.SRDR
			SBF880016Z2B	P566488	.SRDR	SBF891416Z5V	P566535	.SRDR	SBF940013Z3V	P566445	.SRDR	SBF96008Z5V	P566211	.SRDR
			SBF880016Z2V	P566488	.SRDR	SBF891426Z10B	P566541	.SRDR	SBF940013Z5B	P566446	.SRDR			
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SBF600018Z1B	P566704	.SRDR	SBF880016Z5B	P566486	.SRDR	SBF891426Z25B	P566542	.SRDR	SBF940026S3	P566451	.SRDR	SBF960113Z3V	P566368	.SRDR
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SBF600018Z25V	P566708	.SRDR	SBF88008S7	P566477	.SRDR	SBF891426Z3V	P566539	.SRDR	SBF940026Z10V	P566452	.SRDR	SBF960116Z3B	P566370	.SRDR
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SBF600036Z10V	P566712	.SRDR	SBF88008Z25V	P566478	.SRDR	SBF891439Z10V	P566546	.SRDR	SBF940026Z2B	P566453	.SRDR	SBF96014Z210B	P566365	.SRDR
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SBF82008Z10V	P566462	.SRDR	SBF890016Z1V	P566499	.SRDR	SBF891482Z5V	P566518	.SRDR	SBF940039Z3V	P566455	.SRDR	SBF965016Z5V	P566233	.SRDR
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			SBF890026Z10V	P566507	.SRDR	SBF90204Z21V	P566194	.SRDR	SBF960013Z25V	P566218	.SRDR	SBF96508Z3V	P566225	.SRDR
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SBF830039Z10V	P566247	.SRDR	SBF890026Z5V	P566506	.SRDR	SBF90204Z5V	P566196	.SRDR	SBF960016Z10B	P566222	.SRDR	SBF965116Z10B	P566390	.SRDR
SBF830039Z10V	P566244	.SRDR	SBF890039Z10B	P566512	.SRDR	SBF90204Z5V	P566196	.SRDR	SBF960016Z10V	P				



# DT High-Performance Filters

## Numberfinder Cross Reference



Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code	Mfgs. No.	Our No.	Mfg. Code
SBF96518Z3B	P566387	.SRDR	SL014D20B	P567084	..STFF	ST1453	P567089	..SPTC	V3RB2C05	P566671	..VKRS	<b>Y</b>		
SBF96518Z3V	P566387	.SRDR	SL014E03B	P567081	..STFF	ST1454	P567101	..SPTC	V3RB2C10	P566672	..VKRS			
			SL014E05B	P567082	..STFF	ST1457	P567104	..SPTC	V3RB2C20	P566673	..VKRS			
SBF980013Z10B	P566404	.SRDR	SL014E20V	P567084	..STFF	ST1512	P567096	..SPTC	V3RB2H03	P566696	..VKRS			
SBF980013Z10V	P566404	.SRDR				ST1515	P567092	..SPTC	V3RB2H10	P566697	..VKRS			
SBF980013Z1B	P566401	.SRDR	SL020D10V	P567087	..STFF	ST1516	P567093	..SPTC	V3RB4C03	P566674	..VKRS			
SBF980013Z1V	P566401	.SRDR	SL020D20V	P567088	..STFF	ST1517	P567097	..SPTC	V3RB4C05	P566675	..VKRS			
SBF980013Z25B	P566405	.SRDR	SL020E03B	P567085	..STFF	ST1522	P567084	..SPTC	V3RB4C10	P566676	..VKRS			
SBF980013Z25V	P566405	.SRDR	SL020E03V	P567085	..STFF	ST1529	P567098	..SPTC	V3RB4C20	P566677	..VKRS			
SBF980013Z3B	P566402	.SRDR	SL020E05B	P567086	..STFF	ST1530	P567086	..SPTC	V3RB4H03	P566698	..VKRS			
SBF980013Z3V	P566402	.SRDR	SL020E20V	P567088	..STFF	ST1531	P567090	..SPTC	V3RB4H10	P566699	..VKRS			
SBF980013Z5B	P566403	.SRDR	SL020W10V	P567087	..STFF	ST1532	P567094	..SPTC	V6011B2V03	P566397	..VKRS			
SBF980013Z5V	P566403	.SRDR	SL030D10V	P567091	..STFF	ST1533	P567098	..SPTC	V6011B4C03	P566402	..VKRS			
SBF98004Z10B	P566394	.SRDR	SL030D20V	P567092	..STFF	ST1534	P567102	..SPTC	V6011B4C05	P566403	..VKRS			
SBF98004Z10V	P566394	.SRDR	SL030E03V	P567089	..STFF	ST438P	P567051	..SPTC	V6011B4C10	P566404	..VKRS			
SBF98004Z1B	P566391	.SRDR	SL030E05B	P567090	..STFF	ST440P	P567055	..SPTC	V6011B4C20	P566405	..VKRS			
SBF98004Z1V	P566391	.SRDR	SL030E20V	P567092	..STFF	ST453P	P567041	..SPTC	V6011B4H03	P566410	..VKRS			
SBF98004Z25B	P566395	.SRDR				ST461P	P567053	..SPTC	V6011B4H10	P566411	..VKRS			
SBF98004Z25V	P566395	.SRDR	SL045D10V	P567095	..STFF	ST566P	P567047	..SPTC	<b>W</b>					
SBF98004Z3B	P566392	.SRDR	SL045D20B	P567093	..STFF	ST567P	P567045	..SPTC						
SBF98004Z3V	P566392	.SRDR	SL045D20V	P567096	..STFF	ST7722	P567056	..SPTC						
SBF98004Z5B	P566393	.SRDR	SL045E03V	P567093	..STFF	ST7724	P567052	..SPTC						
SBF98004Z5V	P566393	.SRDR	SL045E05B	P567094	..STFF	ST7736	P567043	..SPTC						
SBF98008S1B	P566397	.SRDR	SL045E10B	P567095	..STFF	ST7737	P567042	..SPTC						
SBF98008Z10B	P566399	.SRDR				<b>V</b>								
SBF98008Z10V	P566399	.SRDR	SL045E20B	P567096	..STFF									
SBF98008Z1B	P566396	.SRDR	SL090D10V	P567099	..STFF									
SBF98008Z1V	P566396	.SRDR	SL090D20V	P567100	..STFF									
SBF98008Z25B	P566400	.SRDR	SL090E03V	P567097	..STFF									
SBF98008Z25V	P566400	.SRDR	SL090E05B	P567098	..STFF									
SBF98008Z3B	P566397	.SRDR	SL090E10B	P567099	..STFF									
SBF98008Z3V	P566397	.SRDR	SL090E20V	P567100	..STFF									
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SBF980113Z10B	P566411	.SRDR	SL125D10B	P567103	..STFF	V0172B1C03	P567005	..VKRS						
SBF980113Z10V	P566411	.SRDR	SL125D20B	P567104	..STFF	V0172B1C05	P567006	..VKRS						
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SBF980113Z3V	P566410	.SRDR	SL125E03V	P567101	..STFF	V0172B2C03	P567009	..VKRS						
SBF98014Z10B	P566407	.SRDR	SL125E05B	P567102	..STFF	V0172B2C05	P567010	..VKRS						
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SBF98014Z3V	P566406	.SRDR				V0272B1C03	P567013	..VKRS						
SBF98018Z10B	P566409	.SRDR	SP010E10V	P566197	..STFF	V0272B2C03	P567017	..VKRS						
SBF98018Z10V	P566409	.SRDR	SP010F03V	P566335	..STFF	V0272B2C10	P567019	..VKRS						
SBF98018Z3B	P566408	.SRDR	SP020E03B	P566200	..STFF	V0272B2C20	P567020	..VKRS						
SBF98018Z3V	P566408	.SRDR	SP020E10B	P566202	..STFF	V0372B1C03	P567021	..VKRS						
			SP020E10V	P566202	..STFF	V0372B1C05	P567022	..VKRS						
SBF990113Z3B	P566640	.SRDR	SP020E20V	P566203	..STFF	V0372B1C10	P567023	..VKRS						
SBF990113Z3V	P566640	.SRDR	SP020F03V	P566337	..STFF	V0372B1C20	P567024	..VKRS						
SBF990126Z3B	P566642	.SRDR	SP020F10V	P566338	..STFF	V0372B2C03	P567025	..VKRS						
SBF990126Z3V	P566642	.SRDR	SP020F20V	P566338	..STFF	V0372B2C05	P567026	..VKRS						
SBF990139Z3B	P566644	.SRDR				V0372B2C10	P567027	..VKRS						
SBF990139Z3V	P566644	.SRDR	SP030E003B	P566397	..STFF	V0372B2C20	P567028	..VKRS						
			SP030E010B	P566397	..STFF	V0372B3C05	P567030	..VKRS						
SBFAB29667	P569233	.SRDR	SP030E03B	P566397	..STFF	V0372B3C10	P567031	..VKRS						
SBFHF4Z10B	P566272	.SRDR	SP250E010B	P566457	..STFF	V0372B3C20	P567032	..VKRS						
SBFHF4Z25B	P566273	.SRDR				V0372V3C03	P567029	..VKRS						
SBFHF4Z3B	P566270	.SRDR	ST1221	P566652	..FTGD	V0411B8C03	P566245	..VKRS						
SBFHF4Z5B	P566271	.SRDR	ST1265	P566983	..FTGD	V0411B8C05	P566246	..VKRS						
SE008F10B	P566687	..STFF	ST1355	P567100	..SPTC	V0411B8C10	P566247	..VKRS						
SE014G05B	P566651	..STFF	ST1405	P567083	..SPTC	V0411B8C20	P566248	..VKRS						
SE030C10B	P566691	..STFF	ST1406	P567087	..SPTC	V0411B8L01	P566254	..VKRS						
SE045G03B	P566666	..STFF	ST1407	P567091	..SPTC	V0603B3H05	P566686	..VKRS						
SE070F03B	P566696	..STFF	ST1408	P567095	..SPTC	V3045V1H03	P566335	..VKRS						
SE070F10B	P566697	..STFF	ST1409	P567099	..SPTC	V3045V1H10	P566336	..VKRS						
SE070G10B	P566672	..STFF	ST1448	P567088	..SPTC	V3045V1H15	P566336	..VKRS						
SE160H03B	P566702	..STFF	ST1449	P567096	..SPTC	V3045V2H03	P566337	..VKRS						
SE160H10B	P566703	..STFF	ST1450	P567083	..SPTC	V3045V2H10	P566338	..VKRS						
SL014D10B	P567083	..STFF	ST1452	P567085	..SPTC	V3RB1C03	P566666	..VKRS						
SL014D10V	P567083	..STFF				V3RB1C05	P566667	..VKRS						
						V3RB1C10	P566668	..VKRS						
						V3RB1C20	P566669	..VKRS						
						V3RB1H03	P566694	..VKRS						
						V3RB1H10	P566695	..VKRS						
						V3RB2C03	P566670	..VKRS						
						<b>X</b>								



## Accessories

Donaldson offers an extensive line of accessories for hydraulic circuits, lines and reservoirs that will help you maintain proper ISO cleanliness levels.



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### T.R.A.P.™ Breather Technology (Thermally Reactive Advanced Protection)

T.R.A.P. breathers provide fast-acting protection against airborne moisture and particulate contamination. It stops solid particulate down to 3 µm at 97% efficiency as well as prevents moisture from entering the reservoir. Water-holding capacity is regenerated with every oil return phase for long service life. Its self-regenerating capability enables extended life.

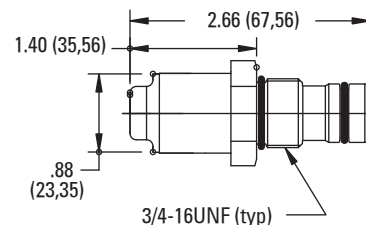
*Learn more on page 264.*

## Filter Service Indicators

### Visual Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description	Where Used
P569632	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button	HPK02, HPK03, HPK04, HPK05
P569633	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button	HPK02, HPK03, HPK04, HPK05
P567988	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* auto reset pop-out button with thermal lockout and surge control	HPK02, HPK03, HPK04, HPK05
P567989	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* auto reset pop-out button with thermal lockout and surge control	HPK02, HPK03, HPK04, HPK05

### Visual (mechanical) Indicators (with auto reset pop-out button)



## Differential Indicators and Switches

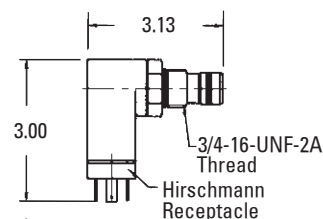
### AC/DC Visual/Electrical Service Indicators

Part No.	Use with Bypass Valve Pressure of:	Description	Where Used
P569634	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps	HPK02, HPK03, HPK04, HPK05
P569635	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* Hirschmann receptacle 115 VAC/28 VDC, 2 amps	HPK02, HPK03, HPK04, HPK05
P567986	50 psi / 3.5 bar	35 psi/2.4 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650	HPK02, HPK03, HPK04, HPK05
P567987	90 psi / 6.2 bar	70 psi/4.8 bar indicator kit* with thermal lockout and surge control, Hirschmann receptacle, 115 VAC/28 VDC, 2 amps, 4 pin DIN 43650	HPK02, HPK03, HPK04, HPK05

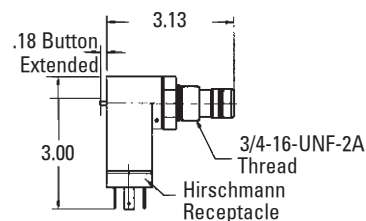
\* Note: Above choices include indicator and mounting block.

### AC/DC/Electrical Indicators (with aluminum electrical housing)

Electric ΔP indicator



Electric ΔP indicator with pop-up visual button and manual reset



## Replacement Indicators (Visual and Differential)

Part No.	Description
P567458	Visual/Electrical indicator with thermal lockout and surge, 35 psid/2.4 bar
P567459	Visual/Electrical indicator, with thermal lockout and surge 70 psid/4.8 bar
P567456	Pop-Up Visual Indicator, with thermal lockout and surge 35 psid/2.4 bar
P567457	Pop-Up Visual Indicator, with thermal lockout and surge 70 psid/4.8 bar
P569636	Pop-Up Visual Indicator, 35 psid/2.4 bar
P569637	Pop-Up Visual Indicator, 70 psid/4.8 bar
P569638	Visual/Electrical Indicator, 35 psid/2.4 bar
P569639	Visual/Electrical Indicator, 70 psid/4.8 bar
P164315	Visual Indicator, bar style, 35 psid/2.4 bar
P166603	Visual Indicator, bar style, 70 psid/4.8 bar
P166134	Blanking plate

# Electrical Filter Service Indicators

All electric models have a maximum operating temperature of 250°F/ 114°C.

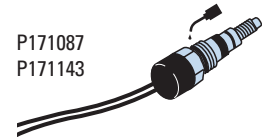
Part No.	Use with Bypass Valve Pressure of:	Description	Where Used	Illustration
P162400	25 psi/ 172 kPa	DC/single post. Normally open.	HBK04, HBK05, HMK04/24, HMK05/25	Style A
P163601	15 psi/ 103 kPa	DC/single post. Normally open.	HBK04, HBK05, HMK04/24, HMK05/25	Style A
P163642	5 psi/ 34 kPa	DC/single post. Normally open.	HBK04, HBK05, HMK04/24, HMK05/25	Style A
P163839	25 psi/ 172 kPa	DC/single post. Normally closed.	HBK04, HBK05, HMK04/24, HMK05/25	Style A
P165194	50 psi/ 345 kPa	DC/single post. Normally open.	HMK03, HMK04/24, HMK05/25, FPK04	Style A
P167455	50 psi/ 345 kPa	DC/single post. Normally closed.	HMK04/24, HMK05/25, FPK04	Style A
P170926	50 psi/ 345 kPa	DC 2-wire. Normally closed. Gold contacts. Microprocessor compatible.	HMK04/24, HMK05/25	Style E
P171087	50 psi/ 345 kPa	DC 2-wire. Packard Weatherpack connector. Normally open.	HMK03, HMK04/24, HMK05/25	Style B
P171143	25 psi/ 172 kPa	DC 2-wire. Cannon connector. Normally open.	HBK04, HBK05, HMK03, HMK04/24, HMK05/25	Style B
P171966	22 psi/ 150 kPa	AC/DC. 0.5A resistive, 0.2A inductive. Normally open.	FIK	at right
P173893	50 psi/ 345 kPa	DC 3-wire. Gold alloy contacts. Microprocessor compatible. White: normally open; red: normally closed; black: common.	HMK04/24, HMK05/25	Style F
P173944	25 psi/ 172 kPa	AC/DC 3-wire. Silver alloy contacts. White: normally open; red: normally closed; black: common.	HBK04, HBK05, HMK03, HMK04/24, HMK05/25	Style C
P174396	50 psi/ 345 kPa	AC/DC 3-wire. Silver alloy contacts. White: normally open; red: normally closed; black: common.	HMK03, HMK04/24, HMK05/25	Style C
P761056	87 psi/ 592 kPa	AC/DC Normally open or closed. 30 VAC or 30 VDC max. 0.5A resistive, 0.2A inductive.	FPK02	page 155

## Style A



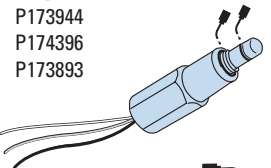
P162400  
P163601  
P163642  
P163839  
P165194  
P167455

## Style B



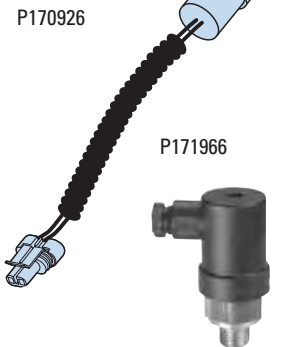
P171087  
P171143

## Styles C & F



P173944  
P174396  
P173893

## Style E

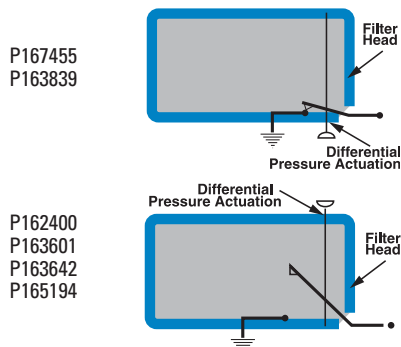


P170926

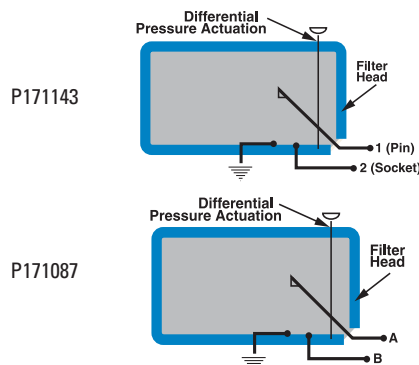
P171966

## Electrical Schematics

### Style A: Single Post DC Indicator (Maximum: 200 mA DC @ 30 VDC)



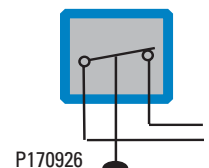
### Style B: DC 2-Wire Indicator (Maximum: 200 mA DC @ 30 VDC)



### Style C, F: AC/DC 3-Wire Indicator (Maximums: 2 amps @ 24 VDC or 2 amps @ 110 VAC)



### Style E: DC 2-Wire Indicator (Maximum: 100 mA DC @ 30 VDC)



# Visual Service Indicators

## Visual Electrical Indicators

All non-electric models have a maximum operating temperature of 180°F/ 82°C.

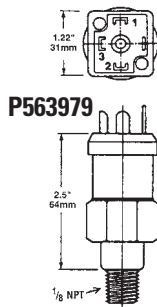
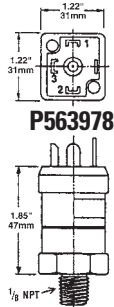
Part No.	Use with Bypass Valve Pressure of:	Where Used	Illustration
P162642	15 psi/103 kPa	HBK04, HBK05, HMK04/24, HMK05/25	Style D
P162694	5 psi/34 kPa	HBK04, HBK05	Style D (old style)
P162696	25 psi/172 kPa	HBK04, HBK05, HMK04/24, HMK05/25	Style D
P164315	50 psi/345 kPa	HPK02, HPK03, HPK04, HPK05	page 141
P165965	25 psi/345 kPa	HMK03	Style D
P166603	50 psi/345 kPa (reverse flow)	HPK04	page 185
P167580	50 psi/345 kPa	HMK04/24, HMK05/25	Style D
P171958	17 psi/116 kPa	FIK	at left
P171945	72 psi/493 kPa	FPK02	page 155

**Style D**  
P162642  
P162694  
P162696  
P165965  
P167580

**P171958**

**NOTE on Style D Indicators:**  
Our old square-style visual indicator has been improved in a design revision. If you have this style and order a replacement, you will receive the new rounded Style D shown above. **Exception:** P162694 is still made per the old style.

#1 Common; #2 Normally Closed;  
#3 Normally Open



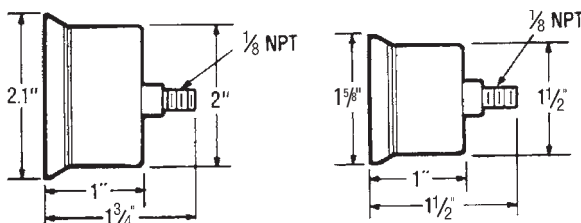
- Instructions**
1. Remove DIN adaptor
  2. Remove small brass screw
  3. Using 1/8" allen wrench adjust clockwise to increase set point/ counter-clockwise to decrease set point
  4. NO / NC

Part No.	Pressure Range	Function
P563978	5 to 30 PSI Field Adj.	Return
P563979	-5 to 15 in. Hg Field Adj.	Suction

Adjustment screw located in center of elec. prongs

## Visual Pressure Gauges

Part No.	Pressure Range	Function
P563296	0 to 100 PSI Numeric Scale	Return
P563297	0 to 100 PSI Color Coded (15 PSI)	Return
P563298	0 to 100 PSI Color Coded (25 PSI)	Return
P563299	0 to -20 Hg	Suction
P563300	0 to 30 PSI Color Coded (15 PSI)	Return



**P171956**  
for FIK series  
-1 to +5 bar  
14.5 to 72.5 psi  
-100 to +500 kPa

**P171953**  
G 1/8"

### In-Line Accessories

- Pressure gauges for monitoring system pressure
- Hoses and test points for sampling oil and determining ISO cleanliness levels
- Flanges to connect components
- Valves for system control



## In-Line Pressure Gauges

### Specifications

- Stainless steel (304SS)
- Phosphor bronze bourdon tube
- Acrylic lenses
- Built-in snubber
- Glycerin Filled



### Features

Donaldson Pressure Gauge Liquid-filled (PGL) series gauges are mechanical bourdon tube pressure gauges. Each gauge has a glycerin filled stainless steel bezel and case that is robust and will not discolor or rust. The bourdon tube and movement is constructed from brass and bronze alloys. PGL series gauges are easy to install for continuous readings with face diameters of 2½" (63 mm) and 4" (100 mm).

#### Operating Temperature

- 30°F to 160°F (-1°C to 71°C)

#### Accuracy

- +/- 3% of full scale

#### Scale

- *psi*
- *bar*

#### Dial Sizes

- 2½" (63 mm) and 4" (100 mm)

#### Mounting

- Stem, Panel, Front Flange

#### Thread Type

- 2½" size    ¼" NPT, ¼" SAE, ¼" BSP
- 4"            ½" NPT

# In-Line Pressure Gauges

## Pressure Range Options

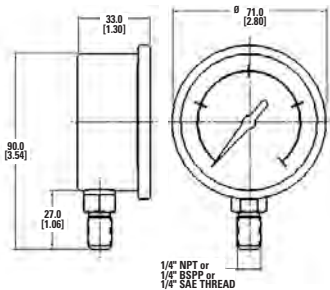
PGL-A	30 Hg-20 psi	0-30 in. Hg	0-30 psf	0-60 psf	0-100 psi	0-160 psi	0-300 psi	0-500 psi	0-600 psi	0-1000 psi	0-1500 psi	0-2000 psi	0-3000 psi	0-4000 psi	0-5000/345-psi	0-6000 psi	0-10000 psi
2½" Stem	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2½" SAE Stem									•	•	•	•	•	•	•	•	
2½" Panel	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
4" Stem								•	•	•	•	•	•	•	•	•	•
4" Panel								•	•	•	•	•	•	•	•	•	•

### Front Flange Options

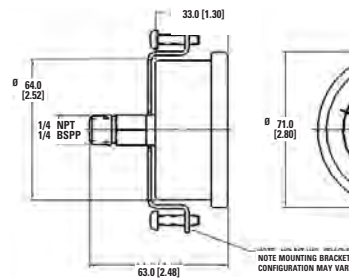
Donaldson Part No.	Description	Dial Size
P562699	PGL-A-63-FF	2-1/2" (63 mm)
P562671	PGL-A-100-FF	4" (100 mm)

## 2½" Diameter Gauges

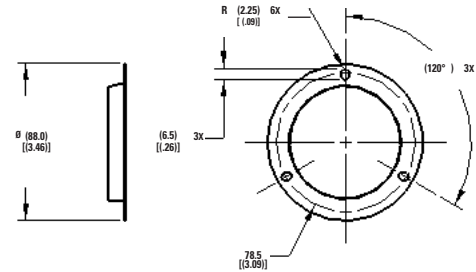
### Stem Mount



### Panel Mount



### With Front Flange



### 2½" Stem Mount

Donaldson Part No.	Description	Pressure Range (psi/bar)	Thread Type
P562718	PGL-A-63-N-B-30-CS	-30" Hg + 20/1	1/4" NPT
P562719	PGL-A-63-N-B-30-S	0 - 30/2	1/4" NPT
P562721	PGL-A-63-N-B-30-VS	0 - 30" Hg Vac	1/4" NPT
P562733	PGL-A-63-N-B-60-S	0 - 60/4	1/4" NPT
P562705	PGL-A-63-N-B-100-S	0 - 100/7	1/4" NPT
P562709	PGL-A-63-N-B-160-S	0 - 160/11	1/4" NPT
P562717	PGL-A-63-N-B-300-S	0 - 300/20	1/4" NPT
P562727	PGL-A-63-N-B-500-S	0 - 500/35	1/4" NPT
P562731	PGL-A-63-N-B-600-S	0 - 600/40	1/4" NPT
P562703	PGL-A-63-N-B-1000-S	0 - 1,000/70	1/4" NPT
P562707	PGL-A-63-N-B-1500-S	0 - 1,500/100	1/4" NPT
P562711	PGL-A-63-N-B-2000-S	0 - 2,000/125	1/4" NPT
P562713	PGL-A-63-N-B-3000-S	0 - 3,000/200	1/4" NPT
P562723	PGL-A-63-N-B-4000-S	0 - 4,000/275	1/4" NPT
P562725	PGL-A-63-N-B-5000/345-S	0 - 5,000/350	1/4" NPT
P562729	PGL-A-63-N-B-6000-S	0 - 6,000/400	1/4" NPT
P562701	PGL-A-63-N-B-10,000-S	0 - 10,000/700	1/4" NPT
P562696	PGL-A-63-B-B-1500-S	0 - 1,500/100	1/4" BSP
P562739	PGL-A-63-S-B-500-S	0 - 500/35	1/4" SAE
P562734	PGL-A-63-S-B-1000-S	0 - 1,000/70	1/4" SAE
P562735	PGL-A-63-S-B-1500-S	0 - 1,500/100	1/4" SAE
P562736	PGL-A-63-S-B-2000-S	0 - 2,000/125	1/4" SAE
P562737	PGL-A-63-S-B-3000-S	0 - 3,000/200	1/4" SAE
P562738	PGL-A-63-S-B-5000/345-S	0 - 5,000/350	1/4" SAE
P562740	PGL-A-63-S-B-6000-S	0 - 6,000/400	1/4" SAE

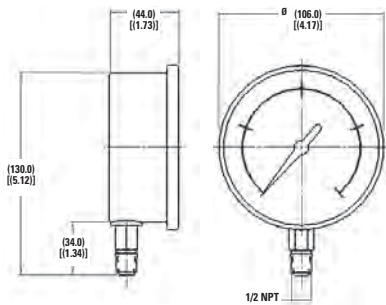
### 2½" Panel Mount

Donaldson Part No.	Description	Pressure Range (psi/bar)	Thread Type
P562720	PGL-A-63-N-B-30-VP	0 - 30" Hg Vac	1/4" NPT
P562732	PGL-A-63-N-B-60-P	0 - 60/4	1/4" NPT
P562704	PGL-A-63-N-B-100-P	0 - 100/7	1/4" NPT
P562708	PGL-A-63-N-B-160-P	0 - 160/11	1/4" NPT
P562716	PGL-A-63-N-B-300-P	0 - 300/20	1/4" NPT
P562726	PGL-A-63-N-B-500-P	0 - 500/35	1/4" NPT
P562730	PGL-A-63-N-B-600-P	0 - 600/40	1/4" NPT
P562702	PGL-A-63-N-B-1000-P	0 - 1,000/70	1/4" NPT
P562706	PGL-A-63-N-B-1500-P	0 - 1,500/100	1/4" NPT
P562710	PGL-A-63-N-B-2000-P	0 - 2,000/125	1/4" NPT
P562712	PGL-A-63-N-B-3000-P	0 - 3,000/200	1/4" NPT
P562722	PGL-A-63-N-B-4000-P	0 - 4,000/275	1/4" NPT
P562724	PGL-A-63-N-B-5000/345-P	0 - 5,000/350	1/4" NPT
P562728	PGL-A-63-N-B-6000-P	0 - 6,000/400	1/4" NPT
P562700	PGL-A-63-N-B-10,000-P	0 - 10,000/700	1/4" NPT
P562697	PGL-A-63-B-B-3000-P	0 - 3,000/200	1/4" BSP
P562698	PGL-A-63-B-B-4000-P	0 - 4,000/275	1/4" BSP

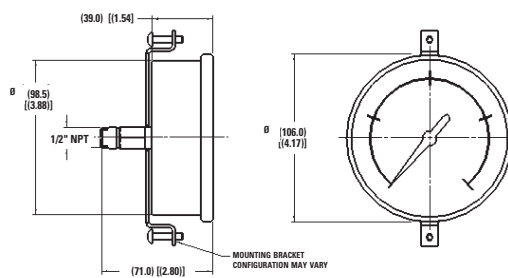


### 4" Diameter Gauges

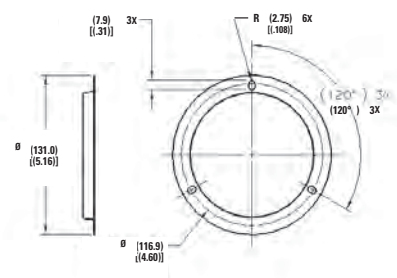
#### Stem Mount



#### Panel Mount



#### With Front Flange



#### 4" Stem Mount

Donaldson Part No.	Description	Pressure Range (psi/bar)	Thread Type
P562683	PGL-A-100-N-B-300-S	0 - 300/20	1/2" NPT
P562688	PGL-A-100-N-B-600-S	0 - 600/40	1/2" NPT
P562675	PGL-A-100-N-B-1000-S	0 - 1,000/70	1/2" NPT
P562677	PGL-A-100-N-B-1500-S	0 - 1,500/100	1/2" NPT
P562679	PGL-A-100-N-B-2000-S	0 - 2,000/125	1/2" NPT
P562681	PGL-A-100-N-B-3000-S	0 - 3,000/200	1/2" NPT
P562685	PGL-A-100-N-B-5000	0 - 5,000/350	1/2" NPT
P562686	PGL-A-100-N-B-6000-S	0 - 6,000/400	1/2" NPT
P562673	PGL-A-100-N-B-10,000-S	0 - 10,000/700	1/2" NPT

#### 4" Panel Mount

Donaldson Part No.	Description	Pressure Range (psi/bar)	Thread Type
P562682	PGL-A-100-N-B-300-P	0 - 300/20	1/2" NPT
P562687	PGL-A-100-N-B-600-P	0 - 600/40	1/2" NPT
P562674	PGL-A-100-N-B-1000-P	0 - 1,000/70	1/2" NPT
P562676	PGL-A-100-N-B-1500-P	0 - 1,500/100	1/2" NPT
P562678	PGL-A-100-N-B-2000-P	0 - 2,000/125	1/2" NPT
P562680	PGL-A-100-N-B-3000-P	0 - 3,000/200	1/2" NPT
P562684	PGL-A-100-N-B-5000	0 - 5,000/350	1/2" NPT
P562672	PGL-A-100-N-B-10,000-P	0 - 10,000/700	1/2" NPT

# Test Points

## Specifications

- Working Pressure: 9000 *psi* /630 *bar*
- Seals: Buna-N®
- Caps: Plastic or metal
- Leak-free connection at full pressure

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



## Features

Test points can be used as a connection into the hydraulic system on the suction side, pressure side or return. They allow connection for pressure and temperature transducers and provide ports for fluid sampling (so you can monitor cleanliness and keep your system operating optimally). If you have filters installed in hard-to-access locations, test points and hose assemblies can be used to plumb up a bulkhead to read pressure differentials.

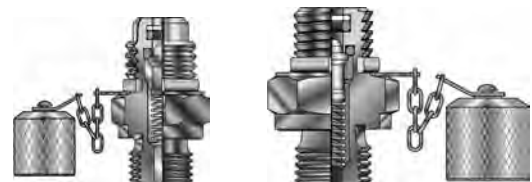
*For Test Point Adapters, see page 244.*

*For Test Point Hose Assemblies, see page 245.*

**TPP-1215**



**TPM-1620**



## Styles

- Pressure and/or Temperature

## Applications

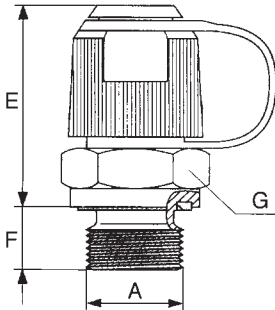
- Fluid or gas

## Temperature Range

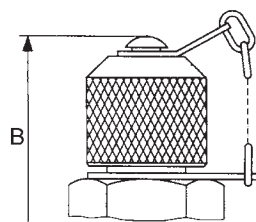
- Metal cap:  
-22°F to 248°F / -30°C to 120°C
- Plastic cap:  
-22°F to 212°F / -30°C to 100°C

### TPM/TPP-1215 Assembly Views M12x1.5 Thread

Plastic Cap



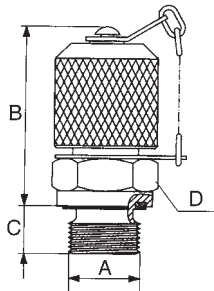
Metal Cap



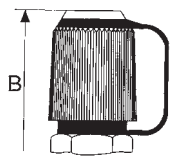
Donaldson Part No.	Description	Working Pressure psi/bar	A Thread Type	E (in./mm)	F (in./mm)	G (in./mm)	Cap
P563192	TPM-1215-04G	9000/630	1/4" BSPP, Form G	1.30/33	.33/8.5	0.55/14	Metal
P563197	TPP-1215-02N	5800/400	1/8" NPTF	1.14/29	.47/12	0.55/14	Plastic
P563193	TPM-1215-04N	9000/630	1/4" NPTF	1.14/29	.59/15	0.55/14	Metal
P563199	TPP-1215-03S	9000/630	3/8"-24 UNF (#3 SAE)	1.42/36	.39/10	0.87/22	Plastic
P563206	TPP-1215-04S	9000/630	7/16"-20 UNF (#4 SAE)	1.26/32	.35/9	0.67/17	Plastic
P563207	TPP-1215-06S	9000/630	9/16"-18 UNF (#6 SAE)	1.22/31	.39/10	0.75/19	Plastic

### TPM/TPP-1620 Assembly Views M16x2 Thread

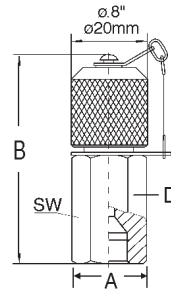
TPM Metal Cap



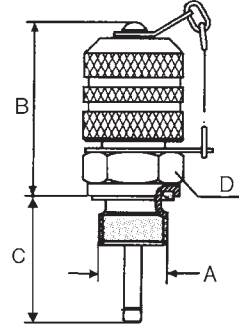
TPP Plastic Cap



JIC Style

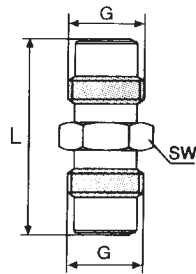


Pressure/Temperature



Donaldson Part No.	Description	Working Pressure psi/bar	A Thread Type	B (in./mm)	C (in./mm)	D (mm)	Cap
P563210	TPM-1620-02B	5800/400	ISO 228-G 1/8" BSPP	1.5/38	0.31/8	17	Metal
P563215	TPM-1620-04B	9000/630	ISO 228-G 1/4" BSPP	1.42/36	0.39/10	19	Metal
P563987	TPM-1620-06B	9000/630	ISO 228-G 3/8" BSPP	1.42/36	0.39/10	22	Metal
P563219	TPM-1620-04J	8100/600	#4 37° JIC Female	2.17/55	-	17	Metal
P563231	TPM-1620-06J	4500/315	#6 37° JIC Female	2.26/57.5	-	19	Metal
P563212	TPM-1620-02N	5800/400	1/8" NPTF	1.3/33	0.51/13	17	Metal
P563220	TPM-1620-04N	9000/630	1/4" NPTF	1.3/33	0.65/16.5	17	Metal
P563224	TPM-1620-04S	9000/630	7/16"-20 UNF (#4 SAE)	1.46/37	0.35/9	17	Metal
P563232	TPM-1620-06S	9000/630	9/16"-18 UNF (#6 SAE)	1.42/36	0.39/10	19	Metal

# Test Point Adapters



A variety of adapters to suit your application.

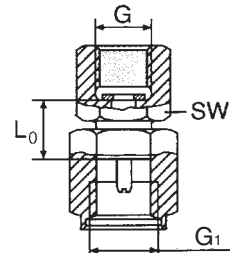


## Hose Union Gauge

Donaldson Part No.	Description	G Thread	psi/bar	L (in./mm)	SW (in./mm)
P563263	AHU-1215	M12 x 1.5	9000/630	1.14/29	.55/14
P563264	AHU-1620	M16 x 2	9000/630	1.65/42	.67/17

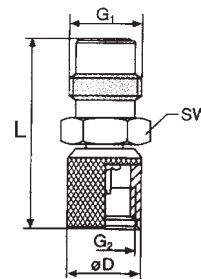
## Direct Gauge Adapter

Donaldson Part No.	Description	G Int. Thread	G <sub>1</sub> Thread	psi/bar	L <sub>0</sub> (in./mm)	SW (in./mm)
P563808	ADG-1215-04N	1/4" NPT	M12 x 1.5	9000/630	1.14/29	.55/14
P563809	ADG-1620-04N	1/4" NPT	M16 x 2	9000/630	.55/14	.75/19



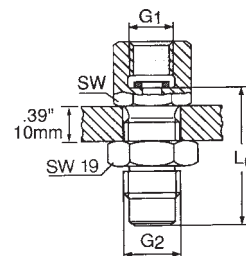
## Series Converter

Donaldson Part No.	Description	G <sub>1</sub> Thread	G <sub>2</sub> Thread	ØD (in./mm)	L (in./mm)	SW (in./mm)
P563265	ASC-1215	M16 x 2	M12 x 1.5	.67/17	1.30/33	.67/17
P563266	ASC-1620	M12 x 1.5	M16 x 2	.79/20	1.04/26.5	.67/17



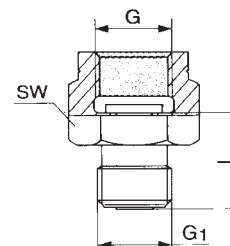
## Bulkhead Gauge Adapter

Donaldson Part No.	Description	G <sub>1</sub> Thread	G <sub>2</sub> Thread	L (in./mm)	SW (in./mm)
P563800	ABH-1215-04N	1/4" NPT	1215M 12 x 1.5	1.52/39.5	.75/27
P563807	ASC-1620-04N	1/4" NPT	1620/M16 x 2	1.52/38.5	.75/19



## Pressure Gauge Connection

Donaldson Part No.	Description	G Thread	G <sub>1</sub> Thread	psi/bar	L (in./mm)	SW (in./mm)
P563262	AHG-1215-04N	1/4" NPT	M12 x 1.5	9000/630	.71/18	.74/19



# Test Point Hose Assemblies

## Specifications

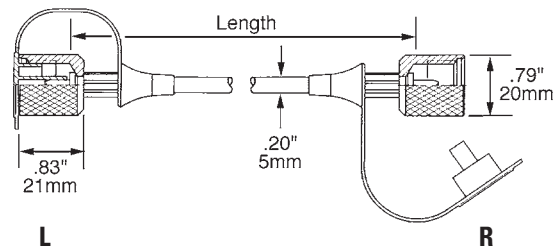
- Working Pressure to: 9000 *psi* / 630 bar
- Temperature Range: -4°F to 212°F / -20°C to 100°C
- Length: 12" to 180" / 305 to 4570



## Features

Donaldson test point hoses are made of Polyamide II core with polyester braid reinforcement and Polyamid11 cover. They are suitable for use with petroleum-based fluids. Hoses are standard straight on both ends and include plastic dust caps.

For hydraulic filters installed in hard-to-access locations, hose assemblies and test points can be used to plumb up a bulkhead to read pressure differentials.



### 1215 Series M12x1.5 Thread

Donaldson Part No.	Description	Length (in/mm)
P563240	H-1215-B-0101-012	12/305
P563243	H-1215-B-0101-024	24/610
P563244	H-1215-B-0101-036	36/915
P563245	H-1215-B-0101-048	48/1220
P563246	H-1215-B-0101-072	72/1830
P563247	H-1215-B-0101-096	96/2440
P563248	H-1215-B-0101-120	120/3050
P563249	H-1215-B-0101-180	80/4570

### 1620 Series M16x2 Thread

Donaldson Part No.	Description	Length (in/mm)
P563250	H-1620-B-0101-012	12/305
P563251	H-1620-B-0101-018	18/460
P563252	H-1620-B-0101-024	24/610
P563254	H-1620-B-0101-036	36/915
P563255	H-1620-B-0101-048	48/1220
P563256	H-1620-B-0101-072	72/1830
P563257	H-1620-B-0101-096	96/2440
P563259	H-1620-B-0101-120	120/3050
P563260	H-1620-B-0101-144	144/3660
P563261	H-1620-B-0101-180	180/4570

# In-Line Check Valves

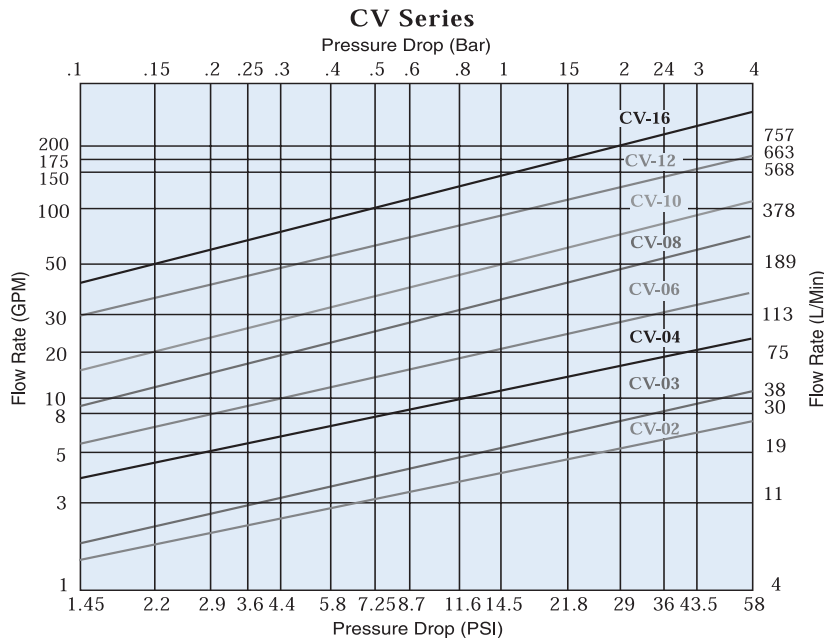
## Specifications

- Working Pressure to: 9000 *psi* / 630 bar
- Flow Range: 200 *gpm* 757 *lpm*



## Features

Steel constructed check valves are compatible with all non-corrosive liquids. Valves contain no elastomeric seals. Restricted orifice (.062) option available on some models.



**The above chart is based on  
Hydraulic Oil 100 SUS, S.G. = 0.86**

### Sizes

- 1/4", 3/8", 1/2", 3/4", 1", 1 1/4", 1 1/2" and 2" NPT
- #4, #6, #8, #12, #16, #20, #24 and #32 SAE

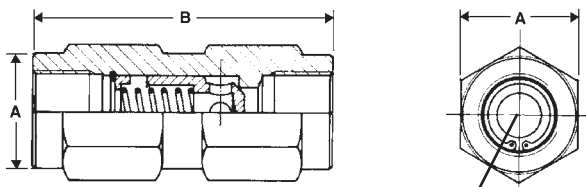
### Opening Pressure (Cracking)

- 5 *psi* / 0.34 bar or 65 *psi* / 4.5 bar



### In-Line Check Valve Options

Donaldson Part No.	Reference	Max Working Pressure (psi/bar)	Max. Rated Flow (gpm/lpm)	Opening Pressure (psi/bar)	Port	A (in./mm)	B (in./mm)
P562297	CV-02P-5	4350/300	6/23	5/0.34	1/4" NPT	0.75/19	2.17/55
P562298	CV-02P-65	4350/300	6/23	65/4.5	1/4" NPT	0.75/19	2.17/55
P562299	CV-02S-5	4350/300	6/23	5/0.34	#4 SAE	0.75/19	2.17/55
P562301	CV-03P-5	4350/300	10/38	5/0.34	3/8" NPT	0.98/25	2.68/68
P562302	CV-03P-65	4350/300	10/38	65/4.5	3/8" NPT	0.98/25	2.68/68
P562303	CV-03S-5	4350/300	10/38	5/0.34	#6 SAE	0.75/19	2.29/58
P562305	CV-04P-5	4350/300	16/60	5/0.34	1/2" NPT	1.06/27	2.95/75
P562306	CV-04P-65	4350/300	16/60	65/4.5	1/2" NPT	1.06/27	2.95/75
P562307	CV-04S-5	4350/300	16/60	5/0.34	#8 SAE	0.98/25	2.72/69
P562308	CV-04S-65	4350/300	16/60	65/4.5	#8 SAE	0.98/25	2.72/69
P562309	CV-06P-5	4350/300	25/94	5/0.34	3/4" NPT	1.38/35	3.48/88
P562311	CV-06P-65	4350/300	25/94	65/4.5	3/4" NPT	1.38/35	3.48/88
P562312	CV-06S-5	4350/300	25/94	5/0.34	#12 SAE	1.38/35	3.48/88
P562313	CV-06S-65	4350/300	25/94	65/4.5	#12 SAE	1.38/35	3.48/88
P562314	CV-08P-5	4350/300	45/169	5/0.34	1" NPT	1.61/41	4.33/110
P562316	CV-08P-65	4350/300	45/169	65/4.5	1" NPT	1.61/41	4.33/110
P562317	CV-08S-5	4350/300	45/169	5/0.34	#16 SAE	1.61/41	4.33/110
P563307	CV-08S-65	4350/300	45/169	65/4.5	#16 SAE	1.61/41	4.33/110
P562319	CV-10P-5	4350/300	95/357	5/0.34	1-1/4" NPT	2.16/55	4.72/120
P562320	CV-10P-65	4350/300	95/357	65/4.5	1-1/4" NPT	2.16/55	4.72/120
P562321	CV-10S-5	4350/300	95/357	5/0.34	#20 SAE	2.16/55	4.72/120
P562322	CV-10S-65	4350/300	95/357	65/4.5	#20 SAE	2.16/55	4.72/120
P562323	CV-12P-5	4350/300	130/489	5/0.34	1-1/2" NPT	2.56/65	5.43/138
P562324	CV-12P-65	4350/300	130/489	65/4.5	1-1/2" NPT	2.56/65	5.43/138
P562325	CV-12S-5	4350/300	130/489	5/0.34	#24 SAE	2.56/65	5.43/138
P562326	CV-12S-65	4350/300	130/489	65/4.5	#24 SAE	2.56/65	5.43/138
P562327	CV-16P-5	2900/200	200/752	5/0.34	2" NPT	2.56/65	5.43/138
P562328	CV-16P-65	2900/200	200/752	65/4.5	2" NPT	2.56/65	5.43/138



Optional Orifice

# Ball Valves - Low Pressure

## Specifications

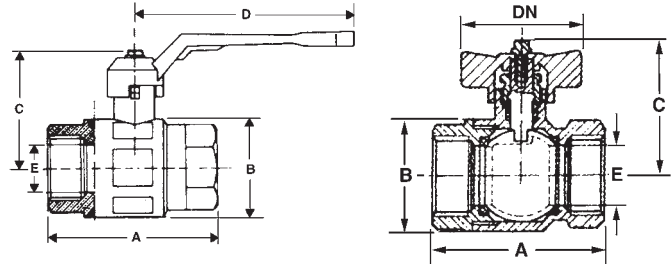
- Hot pressed brass body and ball OT 58
- Materials (ball and body): BV Series chromium plated
- Steel handle
- Teflon<sup>®</sup> seals (ball and stem)

Teflon<sup>®</sup> is a registered trademark of E. I. DuPont de Nemours and Company.



## Features

Low pressure ball valves are rated for water, oil or gas (WOG) applications. Two-way/two-position, quarter turn operation. Full-ported sizes from 1/4" to 2" NPT. T-handle available on some models. Suitable for temperatures from -22°F to 350°F (-30°C to 162°C).



Donaldson Part No.	Description	Max. Working Pressure (psi/bar)	Port Thread	A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)	E (in./mm)
P562331	BV-04-N	710/49	1/4" NPT	1.89/48	0.98/25	1.69/43	3.15/80	0.40/10
P562333	BV-06-N	710/49	3/8" NPT	1.89/48	0.98/25	1.69/43	3.15/80	0.40/10
P562336	BV-08-N	710/49	1/2" NPT	2.00/51	1.22/31	1.77/45	3.15/80	0.60/15
P563311	BV-12-N	570/39	3/4" NPT	2.24/57	1.46/37	2.36/60	4.44/113	0.80/20
P562338	BV-16-N	570/39	1" NPT	2.75/70	1.81/46	2.48/63	4.44/113	1.00/25
P562339	BV-20-N	430/30	1-1/4" NPT	3.15/80	2.24/57	3.11/79	5.43/138	1.25/32
P562341	BV-24-N	430/30	1-1/2" NPT	3.66/93	2.75/70	3.27/83	5.43/138	1.57/40
P562343	BV-32-N	360/25	2" NPT	4.41/112	3.31/84	3.94/100	6.22/158	1.97/50
P562345	BV-40-N	260/18	2-1/2" NPT	5.31/135	3.82/97	3.98/101	7.75/197	2.12/54
P562346	BV-48-N	230/16	3" NPT	6.25/159	4.80/122	5.08/129	9.84/250	2.56/65

# Ball Valves - Medium/High Pressure

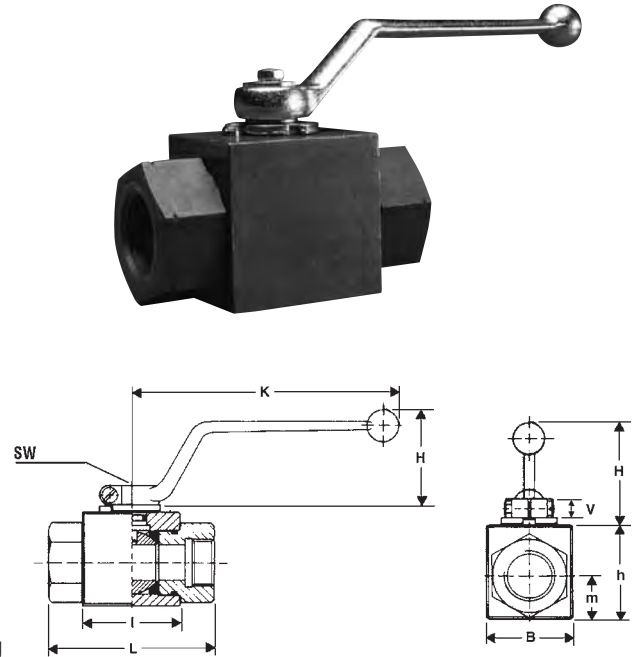
## Specifications

- Steel body
- Brass ball with chrome plating (MBV-04 thru MBV-16)
- Steel ball with chrome plating (HBV, MBV-20 thru MBV-32)
- Steel zinc stem (MBV)
- Delrin ball seal
- Stem seal: Buna-N® (MBV); Viton (HBV)
- Aluminum handles on HBV larger sizes

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.

## Features

Medium duty (MBV) and high pressure (HBV) ball valves are compatible with petroleum-based fluids. Two-way, two-position valves are suited for on/off control. Optional locking tabs provide added safety. Valves come standard with bent handles; straight handles are available for some models. Operating temperatures from -22°F to 212°F / -30°C to 100°C.



## Medium Duty Ball Valves - MBV

Donaldson Part No.	Description	Port Thread	Pressure (psi/bar)	L (in./mm)	I (in./mm)	B (in./mm)	H (in./mm)	h (in./mm)	m (in./mm)	V (in./mm)	SW (in./mm)	K (in./mm)
P562387	MBV-04-N	1/4" NPT	7250/500	2.7/69	1.4/36	1.0/26	1.7/43	1.3/32	0.5/12.5	0.4/11	0.4/9	4.6/118
P562388	MBV-04-S	7/16"-20 SAE	7250/500	2.7/69	1.4/36	1.0/26	1.7/43	1.3/32	0.5/12.5	0.4/11	0.4/9	4.6/118
P563308	MBV-06-N	3/8" NPT	7250/500	3.1/79	1.7/43	1.3/32	1.7/43	1.5/38	0.7/17.5	0.4/11	0.4/9	4.6/118
P562389	MBV-06-S	9/16"-18 SAE	7250/500	3.1/79	1.7/43	1.3/32	1.7/43	1.5/38	0.7/17.5	0.4/11	0.4/9	4.6/118
P562390	MBV-08-N	1/2" NPT	7250/500	4.1/104	1.9/48	1.4/35	1.7/43	1.6/40	0.75/19	0.4/11	0.4/9	4.6/118
P563309	MBV-08-S	3/4"-16 SAE	7250/500	4.1/104	1.9/48	1.4/35	1.7/43	1.6/40	0.75/19	0.4/11	0.4/9	4.6/118
P562391	MBV-12-N	3/4" NPT	5800/400	4.3/109	2.4/62	1.9/49	2.3/58	2.2/57	1.0/24.5	0.6/14	0.6/14	7.2/182
P562392	MBV-12-S	1-1/16"-12 SAE	5800/400	4.3/109	2.4/62	1.9/49	2.3/58	2.2/57	1.0/24.5	0.6/14	0.6/14	7.2/182
P562394	MBV-16-N	1" NPT	4500/310	4.6/117	2.6/66	2.3/58	2.3/58	2.6/65	1.2/29.5	0.6/14	0.6/14	7.2/182
P562395	MBV-16-S	1-5/16"-12 SAE	4500/310	4.6/117	2.6/66	2.3/58	2.3/58	2.6/65	1.2/29.5	0.6/14	0.6/14	7.2/182
P562396	MBV-20-N	1-1/4" NPT	4500/310	4.3/110	3.2/80	3.0/76	2.3/58	3.3/84	1.5/38	0.6/15	0.7/17	8.5/218
P562397	MBV-20-S	1-5/8"-12 SAE	4500/310	4.3/110	3.2/80	3.0/76	2.3/58	3.3/84	1.5/38	0.6/15	0.7/17	8.5/218
P562398	MBV-24-N	1-1/2" NPT	3625/250	5.1/130	3.3/85	3.6/92	2.3/58	3.9/99	1.8/46	0.6/15	0.7/17	8.5/218
P563310	MBV-24-S	1-7/8"-12 SAE	3625/250	5.1/130	3.3/85	3.6/92	2.3/58	3.9/99	1.8/46	0.6/15	0.7/17	8.5/218
P562399	MBV-32-N	2" NPT	3625/250	5.5/140	3.9/100	4.2/106	2.3/58	4.4/111	2.1/53	0.6/15	0.7/17	8.5/218

## High Pressure Ball Valves

Donaldson Part No.	Description	Port Thread	Pressure (psi/bar)	L (in./mm)	I (in./mm)	B (in./mm)	H (in./mm)	h (in./mm)	m (in./mm)	V (in./mm)	SW (in./mm)	K (in./mm)
P562356	HBV-04-N	1/4" NPT	7250/500	2.7/69	1.4/36	1.0/26	1.7/43	1.3/32	0.5/12.5	0.4/11	0.4/9	4.6/118
P562357	HBV-04-S	7/16"-20 SAE	7250/500	2.7/69	1.4/36	1.0/26	1.7/43	1.3/32	0.5/12.5	0.4/11	0.4/9	4.6/118
P562358	HBV-06-N	3/8" NPT	7250/500	3.1/79	1.7/43	1.3/32	1.7/43	1.5/38	0.7/17.5	0.4/11	0.4/9	4.6/118
P562359	HBV-06-S	9/16"-18 SAE	7250/500	3.1/79	1.7/43	1.3/32	1.7/43	1.5/38	0.7/17.5	0.4/11	0.4/9	4.6/118
P562360	HBV-08-N	1/2" NPT	7250/500	4.1/104	1.9/48	1.4/35	1.7/43	1.6/40	0.75/19	0.4/11	0.4/9	4.6/118
P562361	HBV-08-S	3/4"-16 SAE	7250/500	4.1/104	1.9/48	1.4/35	1.7/43	1.6/40	0.75/19	0.4/11	0.4/9	4.6/118
P562362	HBV-12-N	3/4" NPT	5800/400	4.3/109	2.4/62	1.9/49	2.3/58	2.2/57	1.0/24.5	0.6/14	0.6/14	7.2/182
P562363	HBV-12-S	1-1/16"-12 SAE	5800/400	4.3/109	2.4/62	1.9/49	2.3/58	2.2/57	1.0/24.5	0.6/14	0.6/14	7.2/182
P562364	HBV-16-N	1" NPT	4500/310	4.6/117	2.6/66	2.3/58	2.3/58	2.6/65	1.2/29.5	0.6/14	0.6/14	7.2/182
P562365	HBV-16-S	1-5/16"-12 SAE	4500/310	4.6/117	2.6/66	2.3/58	2.3/58	2.6/65	1.2/29.5	0.6/14	0.6/14	7.2/182
P562368	HBV-20-N	1-1/4" NPT	4500/310	4.3/110	3.2/80	3.0/76	2.3/58	3.3/84	1.5/38	0.6/15	0.7/17	8.5/218
P562369	HBV-20-S	1-5/8"-12 SAE	4500/310	4.3/110	3.2/80	3.0/76	2.3/58	3.3/84	1.5/38	0.6/15	0.7/17	8.5/218

## Replacement Parts for High Pressure Ball Valves

### Handles

Donaldson Part No.	Description	Style	Valve Size
P562376	HBVH-040608	Bent Handle	04, 06, 08
P562377	HBVH-1216	Bent Handle	12, 16
P562378	HBVH-202432	Bent Handle	20, 24, 32

### Lock Device Kits

Donaldson Part No.	Description	Valve Size
P562332	LD-1	04, 06, 08
P562335	LD-2	12, 16
P562340	LD-3	20, 24, 32

For use on MBV, HBV and 3W-HBV

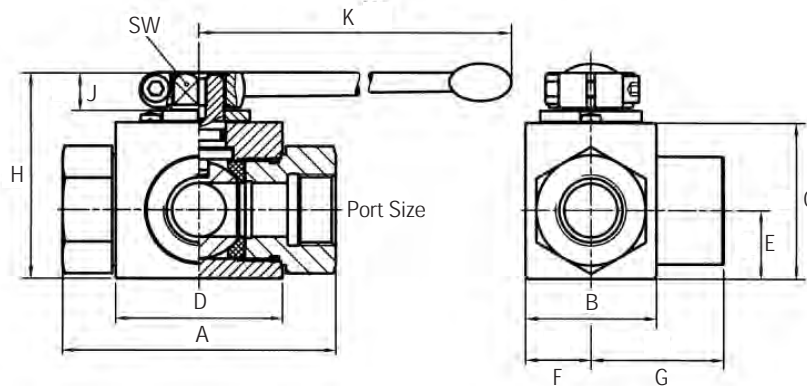
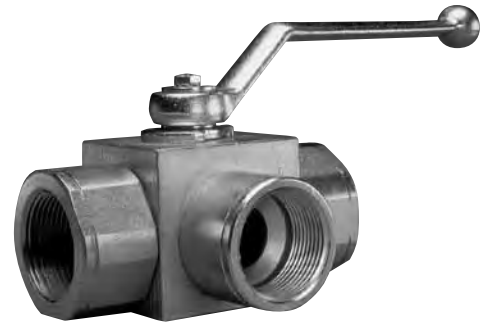
### Seal Kit

Donaldson Part No.	Description	Valve Size
P562379	HBV-SK-04	04
P562380	HBV-SK-06	06
P562629	HBV-SK-08	08
P562630	HBV-SK-12	12
P562381	HBV-SK-16	16
P562382	HBV-SK-20	20
P562383	HBV-SK-24	24

# Three-Way Selector Ball Valve

## Specifications

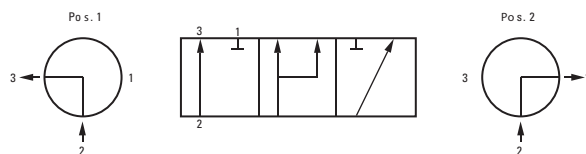
- Maximum pressure 7250 *psi* / 500 bar
- Steel construction
- Operating temperature -22°F to 212°F / -30°C to 100°C



Donaldson Reference Part No.	Port Size	Max Pressure	A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)	E (in./mm)	F (in./mm)	G (in./mm)	H (in./mm)	J (in./mm)	K (in./mm)	SW (in./mm)
P562342	3W-HBV-08-N 1/2" NPT	7250 <i>psi</i> 50000 kPa	4.09 104	1.50 38	1.57 40	1.89 48	0.75 19	0.69 17.5	1.63 41.5	2.13 54	0.43 11	4.53 115	0.3 9
P562344	3W-HBV-12-N 3/4" NPT	4500 <i>psi</i> 31028 kPa	4.02 102	2.05 52	2.24 57	2.44 62	0.96 24.5	0.96 24.5	1.87 47.5	2.95 75	0.55 14	7.87 200	0.55 14
P562404	3W-HBV-16-N 1" NPT	4500 <i>psi</i> 31028 kPa	4.69 119	2.40 61	2.56 65	2.60 66	1.16 29.5	1.14 29	2.22 56.5	3.27 83	0.55 14	7.87 200	0.55 14
P562405	3W-HBV-16-S SAE-16	4500 <i>psi</i> 31028 kPa	4.72 120	2.80 71	3.33 84.5	3.19 81	1.54 39	1.54 39	2.36 60	4.17 106	0.65 16.5	12.60 320	0.67 17
P562406	3W-HBV-20-N 1-1/4" NPT	5000 <i>psi</i> 34500 kPa	4.72 120	2.80 71	3.33 84.5	3.19 81	1.54 39	1.54 39	2.36 60	4.17 106	0.65 16.5	12.60 320	0.67 17
P562407	3W-HBV-24-N 1-1/2" NPT	5000 <i>psi</i> 34500 kPa	5.51 140	3.74 95	4.17 106	4.09 104	2.09 53	2.09 53	2.76 70	5.00 127	0.65 16.5	12.60 320	0.67 17

## Operation:

Open cross-over (no zero position)  
Pressure inlet only from port 2

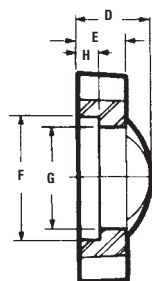
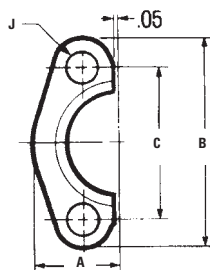


# Split Flanges

## Specifications

- Code 61 and Code 62
- Buna-N<sup>®</sup> O-Ring

Each kit includes:  
 2 split flange halves  
 4 hex head mounting bolts  
 and lockwashers  
 1 Buna-N<sup>®</sup> O-Ring



Buna-N<sup>®</sup> is a registered trademark of E. I. DuPont de Nemours and Company.

## Code 61

Donaldson Part No.	Reference	Flange Size	Dimensions (in./mm)									Mounting Hardware		
			A	B	C	D	E	F	G	H	J (Dia.)	O-Ring	Hex Head Cap Screw	Maximum Working Pressure
P563042	L-12SF-3	0.75	0.98	2.56	1.875	0.88	0.56	1.531	1.265	0.245	0.406	-214	3/8"-16x11/4	5000 34500kPa
		19	25	65	48	22	14	39	32	6	10			
P563044	L-16SF-3	1.00	1.11	2.75	2.062	0.94	0.62	1.781	1.515	0.295	0.406	-219	3/8"-16x11/4	5000 34500kPa
		25	28	70	52	24	16	45	38	7	10			
P563047	L-20SF-3	1.25	1.39	3.12	2.312	0.88	0.56	2.031	1.720	0.295	0.469	-222	7/16"-14x11/2	4000 psi 27580 kPa
		32	35	79	59	22	14	52	44	7	12			
P563050	L-24SF-3	1.50	1.58	3.69	2.750	1.00	0.62	2.406	2.000	0.295	0.531	-225	1/2"-13x11/2	3000 psi 20685 kPa
		38	40	94	70	25	16	61	51	8	13			
P563053	L-32SF-3	2.00	1.86	4.00	3.062	1.03	0.62	2.844	2.470	0.355	0.531	-228	1/2"-13x11/2	3000 psi 20685 kPa
		51	47	102	78	26	16	72	63	9	13			
P563056	L-40SF-3	2.50	2.09	4.50	3.500	1.50	0.75	3.344	2.950	0.355	0.531	-232	1/2"-13x13/4	2500 psi 17240 kPa
		64	53	114	89	38	19	85	75	9	13			

## Code 62

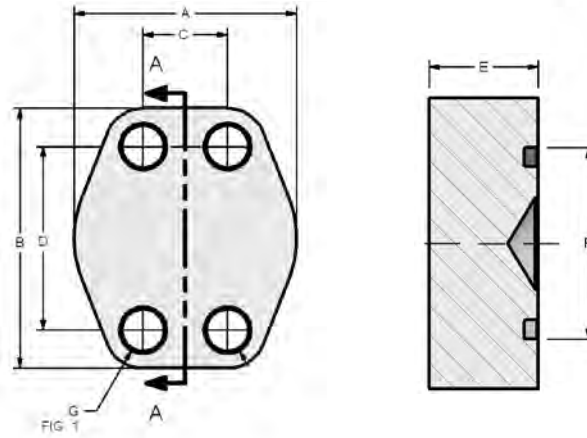
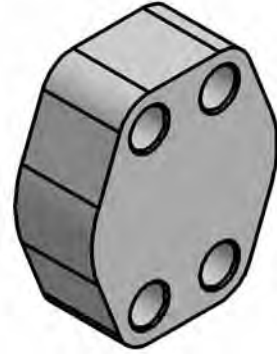
Donaldson Part No.	Reference	Flange Size (in./mm)	Dimensions (in./mm)									Mounting Hardware		
			A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)	E (in./mm)	F (in./mm)	G (in./mm)	H (in./mm)	J (Dia.) (in./mm)	O-Ring	Hex Head Cap Screw	Maximum Working Pressure
P563046	L-16SFX-6	1.00	1.33	3.19	2.250	1.31	0.94	1.906	1.530	0.355	0.469	-219	7/16"-14x13/4	6000 psi 41370kPa
		25	34	81	57	33	24	48	39	9	12			
P563049	L-20SFX-6	1.25	1.48	3.75	2.625	1.50	1.06	2.156	1.750	0.385	0.531	-222	1/2"-13x13/4	6000 psi 41370kPa
		32	38	95	67	38	27	55	44	10	13			
P563051	L-24SFX-6	1.50	1.83	4.44	3.125	1.69	1.19	2.531	2.030	0.475	0.656	-225	5/8"-11x21/4	6000 psi 41370kPa
		38	46	113	79	43	30	64	52	12	17			
P563054	L-32SFX-6	2.00	2.20	5.25	3.812	2.06	1.44	3.156	2.660	0.475	0.781	-228	3/4"-10x23/4	6000 psi 41370kPa
		51	56	133	97	52	37	80	68	12	20			



# Blanking Flanges

## Specifications

- Code 61 and 62
- O-Ring



## Blanking Flanges, Code 61

Donaldson Part No.	Reference	Pad Size	Dimensions (in./mm)							Mounting Hardware	
			A	B	C	D	E	F	G	O-Ring	SHCS
P563061	LIB-16-16-30	1"/25mm	2.313/59	2.750/70	1.031/26	2.063/52	0.88/22	1.560/40	0.406/10	-219	3/8"-16x1.75
P563063	LIB-20-20-30	1-1/4"/32mm	2.875/73	3.125/79	1.188/30	2.313/59	0.94/24	1.750/44	0.469/12	-222	7/16"-14x1.75
P563065	LIB-24-24-30	1-1/2"/38mm	3.250/83	3.688/94	1.406/36	2.750/70	1.19/30	2.115/54	0.531/13	-225	1/2"-13x2.25
P563067	LIB-32-32-30	2"/51mm	3.813/97	4.000/102	1.688/43	3.063/78	1.44/37	2.490/63	0.531/13	-228	1/2"-13x2.50

## Blanking Flanges, Code 62

Donaldson Part No.	Reference	Pad Size	Dimensions (in./mm)							Mounting Hardware	
			A	B	C	D	E	F	G	O-Ring	SHCS
P563064	LIB-20-20-60	1-1/4"/32mm	3.060/78	3.750/95	1.250/32	2.625/67	1.43/36	1.750/44	0.531/13	-222	1/2"-13x2.50

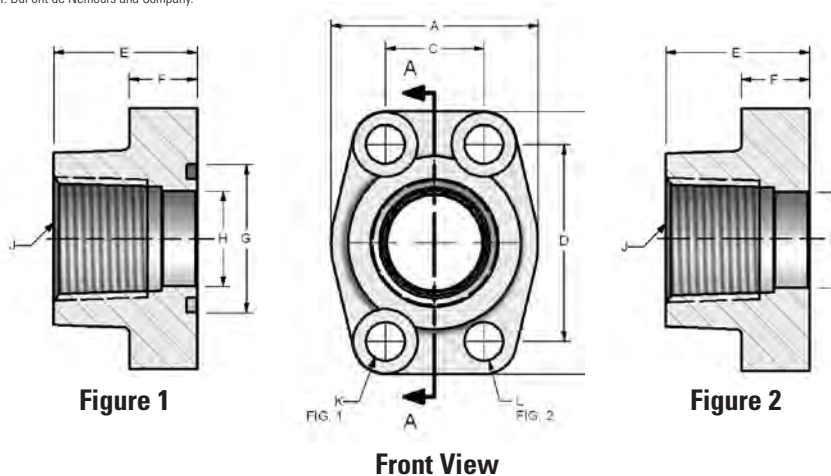
# 4-Bolt NPTF Threaded Flange



## Specifications

- Code 61 and 62
- NPT Thread
- Buna-N® O-Ring
- Mounting hardware and O-Ring included on O-Ring models
- Maximum temperature with O-Ring 250°F / 121°C

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



## Code 61 NPTF Thread, O-Ring (Figure 1)

Donaldson Part No.	Desc.	Port Size	Pad Size	A	B	C	Dimensions (in./mm)			G	H	J NPTF	K (dia.) Drill	Mounting Hardware O-Ring	SHCS
P563088	LI-12-12P-30	0.75 19	0.75 19	1.97 50	2.56 65	0.875 22	1.875 48	1.42 36	0.71 18	1.250 32	0.752 19	3/4"-14 10	0.406 10	-214	3/8"-16 x 1.25
P563093	LI-16-16P-30	1.00 25	1.00 25	2.17 55	2.75 70	1.031 26	2.062 52	1.50 38	0.71 18	1.560 40	1.002 25	1"-11.5 10	0.406 10	-219	3/8"-16 x 1.50
P563100	LI-20-20P-30	1.25 32	1.25 32	2.68 68	3.12 79	1.188 30	2.312 59	1.61 41	0.83 21	1.750 44	1.252 32	1-1/4"-11.5 12	0.469 12	-222	7/16"-14 x 1.50
P563107	LI-24-24P-30	1.50 38	1.50 38	3.07 78	3.66 93	1.406 36	2.750 70	1.77 45	0.98 25	2.115 54	1.502 38	1-1/2"-11.5 13	0.531 13	-225	1/2"-13 x 1.75
P563113	LI-32-32P-30	2.00 51	2.00 51	3.54 90	4.00 102	1.688 43	3.062 78	1.77 45	0.98 25	2.490 63	2.002 51	2"-11.5 13	0.531 13	-228	1/2"-13 x 1.75
P563117	LI-40-40P-30	2.50 64	2.50 64	4.09 104	4.49 114	2.000 51	3.500 89	1.97 50	0.98 25	2.995 76	2.502 64	2-1/2"-8 13	0.531 13	-232	1/2"-13 x 2.25
P563118	LI-48-48P-30	3.00 76	3.00 76	4.88 124	5.28 134	2.438 62	4.188 106	1.97 50	1.06 27	3.615 92	3.002 76	3"-8 17	0.656 17	-237	5/8"-11 x 2.50

## 4-Bolt NPTF Threaded Flange

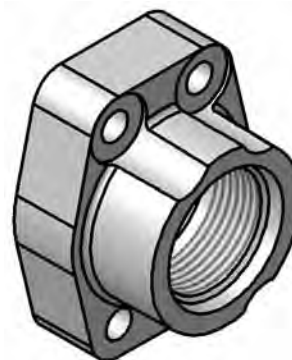
### Code 61 NPTF Thread, Flat Face (Figure 2)

Donaldson Part No.	Description	Port Size	Pad Size	Dimensions (in./mm)									J NPTF	L Tap UNC-2B
				A	B	C	D	E	F	G	H			
P563163	LIC-16-16P-30	1.00	1.00	2.17	2.75	1.031	2.062	1.50	0.71	1.560	1.002	1"-11.5	3/8"-16	
		25	25	55	70	26	52	38	18	40	25			
P563166	LIC-20-20P-30	1.25	1.25	2.68	3.12	1.188	2.312	1.61	0.83	1.750	1.252	1-1/4"-11.5	7/16"-14	
		32	32	68	79	30	59	41	21	44	32			
P563171	LIC-32-32P-30	2.00	2.00	3.54	4.00	1.688	3.062	1.77	0.98	2.490	2.002	2"-11.5	1/2"-13	
		51	51	90	102	43	78	45	25	63	51			

### Code 62 NPTF Thread, O-Ring (Figure 1)

Donaldson Part No.	Description	Port Size	Pad Size	Dimensions (in./mm)									J NPTF	K (Dia.) Drill	Mounting Hardware	
				A	B	C	D	E	F	G	H	O-Ring			SHCS	
P563094	LI-16-16P-60	1.00	1.00	2.56	3.19	1.093	2.250	1.65	0.98	1.560	1.002	1-11.5	0.492	-219	7/16"-14 x 1.50	
		25	25	65	81	28	57	42	25	40	25		12			
P563101	LI-20-20P-60	1.25	1.25	3.07	3.75	1.250	2.625	1.77	1.06	1.750	1.252	1-1/4-11.5	0.531	-222	1/2"-13 x 1.50	
		32	32	78	95	32	67	45	27	44	32		13			
P563108	LI-24-24P-60	1.50	1.50	3.70	4.41	1.437	3.125	1.97	1.18	2.115	1.502	1-1/2-11.5	0.656	-225	5/8"-11 x 1.75	
		38	38	94	112	36	79	50	30	54	38		17			

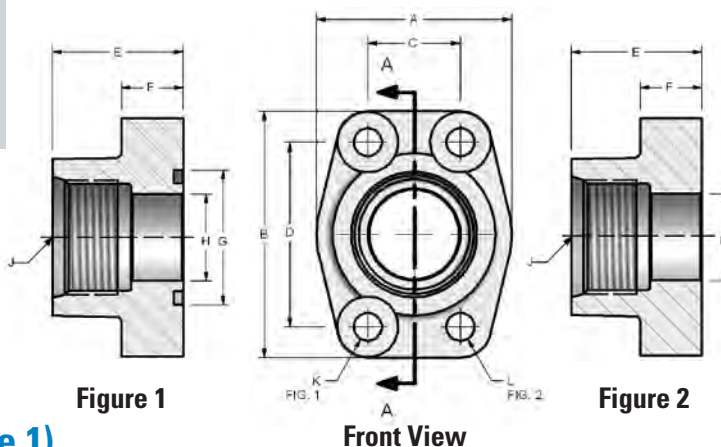
# 4-Bolt SAE Threaded Flange



## Specifications

- Code 61 and 62
- SAE Straight Thread
- Buna-N® O-Ring
- Mounting hardware and O-Ring included on O-Ring models
- Maximum temperature with O-Ring 250°F/ 121°C

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



## Code 61 Straight Thread, O-Ring (Figure 1)

Donaldson Part No.	Reference	Port Size	Pad Size	A	B	C	Dimensions (in./mm)					J UN/UNF-2B	K (Dia.) Drill	Mounting Hardware O-Ring	SHCS
							D	E	F	G	H				
P563090	LI-12-12S-30	0.75/19	0.75/19	1.97/50	2.56/65	0.875/22	1.875/48	1.42/36	0.71/18	1.250/32	0.752/19	1 1/16"-12	0.406/10	-214	3/8"-16 x 1.25
P563095	LI-16-16S-30	1.00/25	1.00/25	2.17/55	2.75/70	1.031/26	2.062/52	1.50/38	0.71/18	1.560/40	1.002/25	1 5/16"-12	0.406/10	-219	3/8"-16 x 1.50
P563102	LI-20-20S-30	1.25/32	1.25/32	2.68/68	3.12/79	1.188/30	2.312/59	1.61/41	0.83/21	1.750/44	1.252/32	1 5/8"-12	0.469/12	-222	7/16"-14 x 1.50
P563109	LI-24-24S-30	1.50/38	1.50/38	3.07/78	3.66/93	1.406/36	2.750/70	1.77/45	0.98/25	2.115/54	1.502/38	1 7/8"-12	0.531/13	-225	1/2"-13 x 1.75
P563115	LI-32-32S-30	2.00/51	2.00/51	3.54/90	4.00/102	1.688/43	3.062/78	1.77/45	0.98/25	2.490/63	2.002/51	2 1/2"-12	0.531/13	-228	1/2"-13 x 1.75

## Code 61 Straight Thread, Flat Face (Figure 2)

Donaldson Part No.	Reference	Port Size	Pad Size	A	B	C	Dimensions (in./mm)					J UN/UNF-2B	L Tap UNC-2B
							D	E	F	G	H		
P563162	LIC-12-12S-30	0.75/19	0.75/19	1.97/50	2.56/65	0.875/22	1.875/48	1.42/36	0.71/18	1.250/32	0.752/19	1 1/16"-12	3/8"-16
P563165	LIC-16-16S-30	1.00/25	1.00/25	2.17/55	2.75/70	1.031/26	2.062/52	1.50/38	0.71/18	1.560/40	1.002/25	1 5/16"-12	3/8"-16
P563168	LIC-20-20S-30	1.25/32	1.25/32	2.68/68	3.12/79	1.188/30	2.312/59	1.61/41	0.83/21	1.750/44	1.252/32	1 5/8"-12	7/16"-14

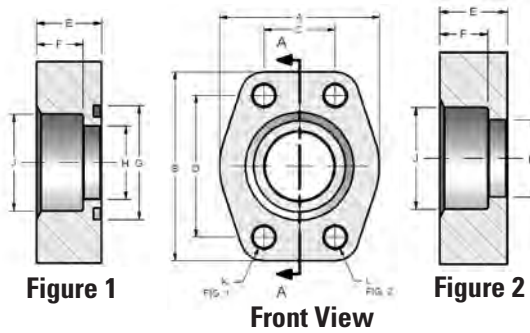
## Code 62 Straight Thread, O-Ring (Figure 1)

Donaldson Part No.	Reference	Port Size	Pad Size	A	B	C	Dimensions (in./mm)					J UN/UNF-2B	K (Dia.) Drill	Mounting Hardware O-Ring	SHCS
							D	E	F	G	H				
P563096	LI-16-16S-60	1.00/25	1.00/25	2.56/65	3.19/81	1.093/28	2.250/57	1.65/42	0.98/25	1.560/40	1.002/25	1 5/16"-12	0.492/12	-219	7/16"-14 x 1.50
P563103	LI-20-20S-60	1.25/32	1.25/32	3.07/78	3.75/95	1.250/32	2.625/67	1.77/45	1.06/27	1.750/44	1.252/32	1 5/8"-12	0.531/13	-222	1/2"-13 x 1.75
P563110	LI-24-24S-60	1.50/38	1.50/38	3.70/94	4.41/112	1.437/36	3.125/79	1.97/50	1.18/30	2.115/54	1.502/38	1 7/8"-12	0.656/17	-225	5/8"-11 x 2.25

## Flat Socket Weld Flange

### Specifications

- Code 61 and 62



### Code 61, O-Ring (Figure 1)

Donaldson Part No.	Desc.	Pipe Size	Pad Size	Dimensions (in./mm)										Mounting Hardware	
				A	B	C	D	E	F	G	H	J	K	O-Ring	SHCS
P563119	LI-08-08W-30	0.50/13	0.50/13	1.813/46	2.125/54	0.688/17	1.500/38	0.75/19	0.560/14	1.000/25	0.502/13	0.855/22	0.344/9	-210	5/16"-18x1.5
P563120	LI-12-12W-30	0.75/19	0.75/19	2.063/52	2.563/65	0.875/22	1.875/48	0.75/19	0.560/14	1.250/32	0.752/19	1.062/27	0.406/10	-214	3/8"-16x1.5
P563121	LI-16-16W-30	1.00/25	1.00/25	2.313/59	2.750/70	1.031/26	2.063/52	0.88/22	0.630/16	1.560/40	1.002/25	1.328/34	0.406/10	-219	3/8"-16x1.75
P563122	LI-20-20W-30	1.25/32	1.25/32	2.875/73	3.125/79	1.188/30	2.313/59	0.94/24	0.690/18	1.750/44	1.252/32	1.672/42	0.469/12	-222	7/16"-14x1.75
P563123	LI-24-24W-30	1.50/38	1.50/38	3.250/83	3.688/94	1.406/36	2.750/70	1.19/30	0.750/19	2.115/54	1.502/38	1.922/49	0.531/13	-225	1/2"-13x2.25
P563124	LI-32-32W-30	2.00/51	2.00/51	3.813/97	4.000/102	1.688/43	3.063/78	1.38/35	0.875/22	2.495/63	2.002/51	2.406/61	0.531/13	-228	1/2"-13x2.5
P563127	LI-48-48W-30	3.00/76	3.00/76	5.156/131	5.313/135	2.438/62	4.188/106	2.12/54	1.250/32	3.615/92	3.002/76	3.547/90	0.656/17	-237	5/8"-11x3.5

### Code 61, Flat Face (Figure 2)

Donaldson Part No.	Desc.	Pipe Size	Pad Size	Dimensions (in./mm)										L UNC-2B
				A	B	C	D	E	F	G	H	J		
P563176	LIC-12-12W-30	0.75/19	0.75/19	2.063/52	2.563/65	0.875/22	1.875/48	0.75/19	0.560/14	1.250/32	0.752/19	1.062/27	3/8"-16	
P563177	LIC-16-16W-30	1.00/25	1.00/25	2.313/59	2.750/70	1.031/26	2.063/52	0.88/22	0.630/16	1.560/40	1.002/25	1.328/34	3/8"-16	
P563178	LIC-20-20W-30	1.25/32	1.25/32	2.875/73	3.125/79	1.188/30	2.313/59	0.94/24	0.690/18	1.750/44	1.252/32	1.672/42	7/16"-14	
P563179	LIC-24-24W-30	1.50/38	1.50/38	3.250/83	3.688/94	1.406/36	2.750/70	1.19/30	0.750/19	2.115/54	1.502/38	1.922/49	1/2"-13	
P563180	LIC-32-32W-30	2.00/51	2.00/51	3.813/97	4.000/102	1.688/43	3.063/78	1.38/35	0.875/22	2.490/63	2.002/51	2.406/61	1/2"-13	
P563181	LIC-40-40W-30	2.50/64	2.50/64	4.281/109	4.500/114	2.000/51	3.500/89	1.75/44	1.000/25	2.995/76	2.502/64	2.906/74	1/2"-13	

## Reservoir Accessories

- Suction strainers protect pumps from damage
- Diffusers for effectively reducing aeration, foaming, turbulence and noise caused by return lines
- Sight and level gauges available, including standard length, screw-in styles in plastic and steel for use in a variety of applications
- Plugs, caps and vents for small power units and gearboxes
- Filler breathers and caps in chrome, zinc epoxy-coated weatherproof finishes and corrosion-resistance technopolymer – lockable, dipsticks and side-mount versions available



**T.R.A.P.**™  
THERMALLY REACTIVE  
ADVANCED PROTECTION

### T.R.A.P.™ Breather Technology (Thermally Reactive Advanced Protection)

T.R.A.P. breathers provide fast-acting protection against airborne moisture and particulate contamination. It stops solid particulate down to 3 µm at 97% efficiency as well as prevents moisture from entering the reservoir. Water-holding capacity is regenerated with every oil return phase for long service life. Its self-regenerating capability enables extended life.

**Learn more on page 264.**



# Suction Strainers

**Flow Range:** 0-300 gpm / 0-1,140 lpm

**Outlet Port Size:** 3/8" NPT to 4" NPT

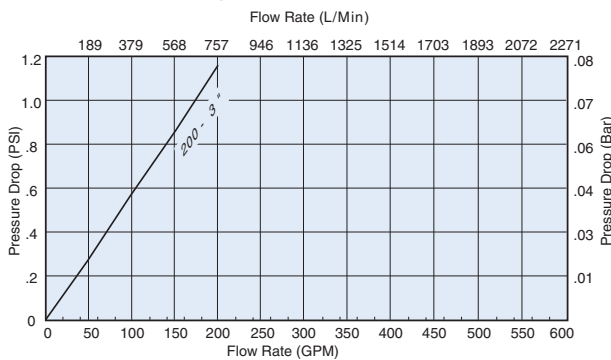
- Stainless Steel Mesh
- Steel or nylon fittings
- Operating temperatures:  
Steel fitting to 250°F / 121°C  
Nylon fitting to 210°F / 100°C
- Relief valve available



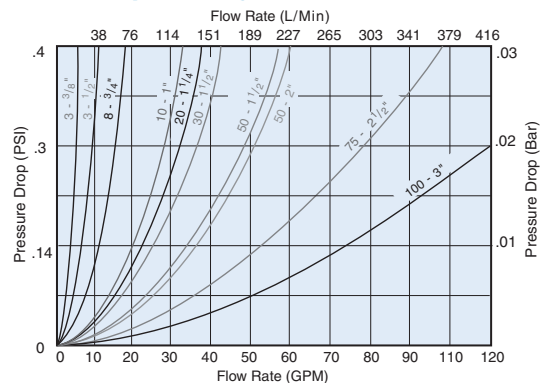
## Features

Donaldson suction strainers are zinc-plated, with stainless steel mesh screens and rugged steel core centers epoxy bonded to heavy gauge connector and end caps. Suction strainers filter petroleum-based hydraulic fluids, phosphate esters, water glycols, lubricating oils, coolants, fuels and water in fluid reservoirs, sumps and similar applications. They are cleanable and reusable. Clean by swishing in non-caustic solvent, then blow dry from inner diameter to outer diameter with compressed air.

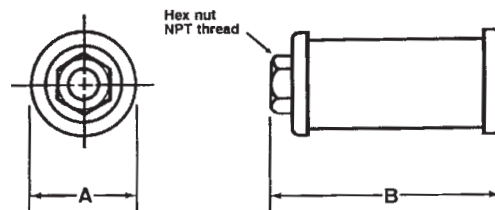
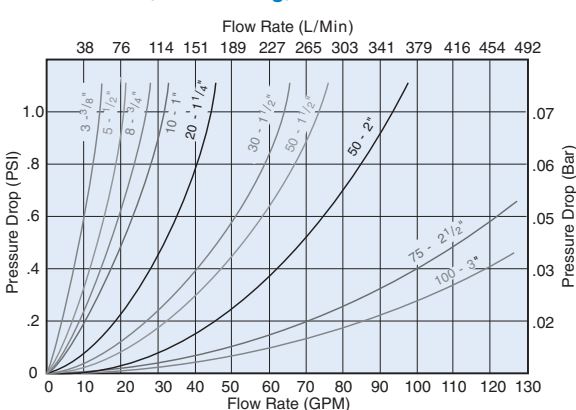
**SEC (Steel Fitting) 200-300**



**PEC (Nylon Fitting) 3-100**



**SEH/SEC (Steel Fitting) 3-100**



**Note:** PEC and SEH model strainers have hex nut style outlet fittings. SEC model strainers have pipe coupling style (round) outlet fittings. All styles have NPT threads inside.

## Suction Strainer Choices

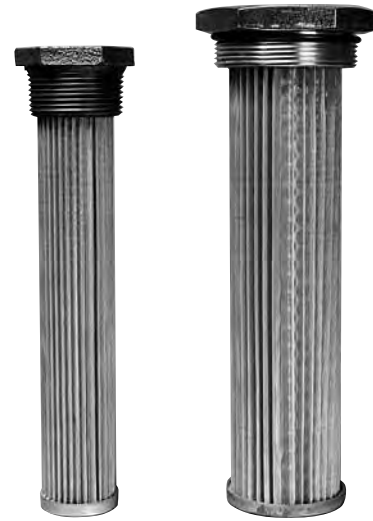
	Donaldson Part No.	Description	Relief Valve Setting	Outlet Pipe Size	Wire Mesh Size	Dim. A (in./mm)	Dim. B (in./mm)	Screen Area (sq. in./sq. cm)	Max. Flow (gpm/lpm)	
NYLON FITTING	P562235	PEC-3-3/8-100	n/a	3/8" NPT	100	1.9/48	2.7/69	20/129	3/11	
	P562240	PEC-5-1/2-100	n/a	1/2" NPT	100	1.9/48	4.3/109	25/161	5/19	
	P562245	PEC-8-3/4-100	n/a	3/4" NPT	100	2.7/69	4.3/109	40/258	8/30	
	P562246	PEC-8-3/4-100-RV3	3 psid/0.2 bar	3/4" NPT	100	2.7/69	4.3/109	40/258	8/30	
	P562244	PEC-8-1-100	n/a	1" NPT	100	2.7/69	4.3/109	40/258	8/30	
	P562226	PEC-10-1-100	n/a	1" NPT	100	2.7/69	5.6/142	70/452	10/38	
	P562227	PEC-10-1-100-RV3	3 psid/0.2 bar	1" NPT	100	2.7/69	5.6/142	70/452	10/38	
	P562228	PEC-20-1.1/4-100	n/a	1-1/4" NPT	100	3.4/86	5.6/142	128/826	20/75	
	P562229	PEC-20-1.1/4-100-RV3	3 psid/0.2 bar	1-1/4" NPT	100	3.4/86	5.6/142	128/826	20/75	
	P562231	PEC-20-1.1/4-200	n/a	1-1/4" NPT	200	3.4/86	5.6/142	128/826	20/75	
	P562232	PEC-30-1.1/2-100	n/a	1-1/2" NPT	100	3.4/86	5.6/142	128/826	30/113	
	P562233	PEC-30-1.1/2-100-RV3	3 psid/0.2 bar	1-1/2" NPT	100	3.4/86	5.6/142	128/826	30/113	
	P562236	PEC-50-1.1/2-100	n/a	1-1/2" NPT	100	4/102	8/203	200/1290	50/188	
	P562237	PEC-50-1.1/2-100-RV3	3 psid/0.2 bar	1-1/2" NPT	100	4/102	8/203	200/1290	50/188	
	P562238	PEC-50-2-100	n/a	2" NPT	100	4/102	10.4/264	200/1290	50/188	
	P562239	PEC-50-2-100-RV3	3 psid/0.2 bar	2" NPT	100	4/102	10.4/264	200/1290	50/188	
	P562242	PEC-75-2.1/2-100	n/a	2-1/2" NPT	100	5.2/132	8.5/216	316/2039	75/282	
	P562243	PEC-75-2.1/2-100-RV3	3 psid/0.2 bar	2-1/2" NPT	100	5.2/132	8.5/216	316/2039	75/282	
	P562223	PEC-100-3-100	n/a	3" NPT	100	5.2/132	11.5/292	379/2445	100/376	
	P562224	PEC-100-3-100-RV3	3 psid/0.2 bar	3" NPT	100	5.2/132	11.5/292	379/2445	100/376	
	P562225	PEC-100-3-100-SST	n/a	3" NPT	100	5.2/132	11.5/292	379/2445	100/376	
	STEEL FITTING	P562221	SEH-3-3/8-100	n/a	3/8" NPT	100	1.9/48	2.5/64	34/219	3/11
		P169012	SEH-5-1/2-100	n/a	1/2" NPT	100	2.63/67	3.1/79	62/400	5/19
		P563305	SEH-5-1/2-100-RV3	3 psid/0.2 bar	1/2" NPT	100	2.7/69	3.1/79	62/400	5/19
		P169013	SEH-8-3/4-100	n/a	3/4" NPT	100	2.63/67	3.55/90	68/439	8/30
P173910		SEH-8-3/4-100-RV3	3 psid/0.2 bar	3/4" NPT	100	2.63/67	3.55/90	68/439	8/30	
P169014		SEH-10-1-100	n/a	1" NPT	100	2.63/67	5.35/136	110/710	10/38	
P173911		SEH-10-1-100-RV3	3 psid/0.2 bar	1" NPT	100	2.63/67	5.35/136	110/710	10/38	
P169015		SEH-20-1.1/4-100	n/a	1-1/4" NPT	100	3.38/86	6.85/174	162/1045	20/75	
P173912		SEH-20-1.1/4-100-RV3	3 psid/0.2 bar	1-1/4" NPT	100	3.38/86	6.85/174	162/1045	20/75	
P169016		SEH-30-1.1/2-100	n/a	1-1/2" NPT	100	3.38/86	8.01/203	225/1452	30/113	
P173913		SEH-30-1.1/2-100-RV3	3 psid/0.2 bar	1-1/2" NPT	100	3.38/86	8.01/203	225/1452	30/113	
P169017		SEH-50-1.1/2-100	n/a	1-1/2" NPT	100	3.94/100	9.8/249	340/2194	50/188	
P173914		SEH-50-1.1/2-100-RV3	3 psid/0.2 bar	1-1/2" NPT	100	3.94/100	9.8/249	340/2194	50/188	
P562222		SEH-50-1.1/2-60	n/a	1-1/2" NPT	60	3.94/100	9.8/249	340/2194	50/188	
P169018		SEH-50-2-100	n/a	2" NPT	100	3.94/100	9.8/249	340/2194	50/188	
P173915		SEH-50-2-100-RV3	3 psid/0.2 bar	2" NPT	100	3.94/100	9.8/249	340/2194	50/188	
P169019		SEC-75-2.1/2-100	n/a	2-1/2" NPT	100	5.12/130	10.1/257	400/2581	75/282	
P173916		SEC-75-2.1/2-100-RV3	3 psid/0.2 bar	2-1/2" NPT	100	5.12/130	10.1/257	400/2581	75/282	
P169020		SEC-100-3-100	n/a	3" NPT	100	5.12/130	11.78/299	500/3226	100/376	
P173917		SEC-100-3-100-RV3	3 psid/0.2 bar	3" NPT	100	5.12/130	11.78/299	500/3226	100/376	
P562211		SEC-100-3-60	n/a	3" NPT	60	5.12/130	11.78/299	500/3226	100/376	
P562212		SEC-100-3-60-RV3	3 psid/0.2 bar	3" NPT	60	5.12/130	11.78/299	500/3226	100/376	
P562213		SEC-200-3-100	n/a	3" NPT	100	8.1/206	11.3/287	965/6226	200/752	
P562214		SEC-300-4-100	n/a	4" NPT	100	8.1/206	15/381	1370/8839	300/1128	
P171861		FIOA 20	n/a	G3/8"	90	2.05/52	3.03/77	29/184	2.7/10	
P171869		FIOA 50	n/a	G3/4"	90	2.95/75	3.74/95	54/348	6.6/25	
P171877		FIOA 90	n/a	G1"	90	2.95/75	5.55/141	86/554	12.0/45	
P171885		FIOA 130	n/a	G1 1/4"	90	3.74/95	7.24/184		17.3/65	
P171889		FIOA 175	n/a	G1 1/2"	90	5.51/140	4.45/113	183/1178	22.6/85	

## Tank Mounted Strainers

**Flow Range:** 0-100 gpm / 0-380 lpm

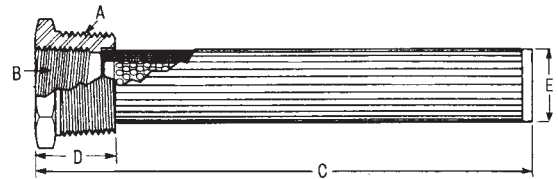
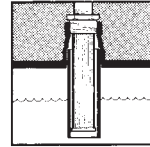
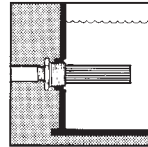
**Outlet Port Size:** 3/8" NPT to 1 1/4" NPT  
or SAE-8 to SAE-20

- 140 Micron Stainless Steel Mesh
- Steel SAE bushing
- Cast iron NPT bushing
- Operating temperatures to 250°F / 121°C
- Relief valve available



### Features

Tank mounted strainers offer easy installation. Access to reservoir interior is not needed. You can mount these units through a sidewall or through the tank top and into a standpipe.



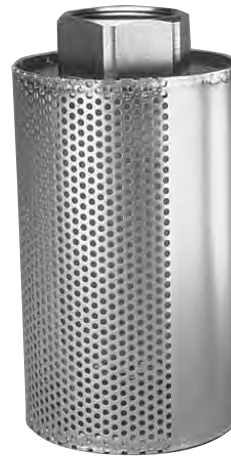
Donaldson Part No.	Description	Relief Valve Setting	Wire Mesh Size	Dim. A	Dim. B	Dim. C (in./mm)	Dim. D (in./mm)	Dim. E (in./mm)	Screen Area (sq. in./sq. cm)	Max. Flow (gpm/lpm)
P562270	TM-3-100	n/a	100	3/4" NPT	1/2" NPT	4/102	0.97/25	0.87/22	29/187	3/11
P562274	TM-5-100	n/a	100	1" NPT	1/2" NPT	5.34/136	1.06/27	1.17/30	35/226	5/19
P562275	TM-5-100-RV5	5 psid/0.35 bar	100	1" NPT	1/2" NPT	5.34/136	1.06/27	1.17/30	35/226	5/19
P562256	TM-10-100	n/a	100	1-1/4" NPT	3/4" NPT	8.17/208	1.2/30	1.36/35	64/413	10/38
P562257	TM-10-100-RV5	5 psid/0.35 bar	100	1-1/4" NPT	3/4" NPT	8.17/208	1.2/30	1.36/35	64/413	10/38
P562259	TM-10-60-RV5	5 psid/0.35 bar	60	1-1/4" NPT	3/4" NPT	8.17/208	1.2/30	1.36/35	64/413	10/38
P562260	TM-15-100	n/a	100	1-1/2" NPT	1" NPT	8.2/208	1.22/31	1.66/42	86/555	15/56
P562264	TM-15-100-RV5	5 psid/0.35 bar	100	1-1/2" NPT	1" NPT	8.2/208	1.22/31	1.66/42	86/555	15/56
P562265	TM-15-200-RV5	5 psid/0.35 bar	200	1-1/2" NPT	1" NPT	8.2/208	1.22/31	1.66/42	86/555	15/56
P562266	TM-25-100	n/a	100	2" NPT	1-1/4" NPT	9.04/230	1.35/34	2.12/54	125/806	25/94
P562267	TM-25-100-RV5	5 psid/0.35 bar	100	2" NPT	1-1/4" NPT	9.04/230	1.35/34	2.12/54	125/806	25/94
P562269	TM-25-200-RV5	5 psid/0.35 bar	200	2" NPT	1-1/4" NPT	9.04/230	1.35/34	2.12/54	125/806	25/94
P562271	TM-50-100	n/a	100	3" NPT	2" NPT	9.7/246	1.7/43	3/76	260/1677	50/188
P562272	TM-50-100-RV3	3 psid/0.2 bar	100	3" NPT	2" NPT	9.7/246	1.7/43	3/76	260/1677	50/188
P562273	TM-50-100-RV5	5 psid/0.35 bar	100	3" NPT	2" NPT	9.7/246	1.7/43	3/76	260/1677	50/188
P563306	TM-100-100	n/a	100	4" NPT	3" NPT	11.3/287	1.8/46	4/102	315/2032	100/376
P562255	TM-100-100-RV5	5 psid/0.35 bar	100	4" NPT	3" NPT	11.3/287	1.8/46	4/102	315/2032	100/376
P562253	STM-5-100	n/a	100	1-5/16" - 12 UN	3/4" - 16 UN	5.34/136	1.06/27	1.17/30	35/226	5/19
P562254	STM-5-100-RV5	5 psid/0.35 bar	100	1-5/16" - 12 UN	3/4" - 16 UN	5.34/136	1.06/27	1.17/30	35/226	5/19
P562247	STM-10-100	n/a	100	1-5/8" - 12 UN	1-1/16" - 12 UN	8.17/208	1.2/30	1.36/35	64/413	10/38
P562248	STM-10-100-RV5	5 psid/0.35 bar	100	1-5/8" - 12 UN	1-1/16" - 12 UN	8.17/208	1.2/30	1.36/35	64/413	10/38
P562249	STM-15-100	n/a	100	1-7/8" - 12 UN	1-5/16" - 12 UN	8.2/208	1.22/31	1.66/42	86/555	15/56
P562250	STM-15-100-RV5	5 psid/0.35 bar	100	1-7/8" - 12 UN	1-5/16" - 12 UN	8.2/208	1.22/31	1.66/42	86/555	15/56
P562251	STM-25-100	n/a	100	2-1/2" - 12 UN	1-5/8" - 12 UN	9.04/230	1.35/34	2.12/54	125/806	25/94
P562252	STM-25-100-RV5	5 psid/0.35 bar	100	2-1/2" - 12 UN	1-5/8" - 12 UN	9.04/230	1.35/34	2.12/54	125/806	25/94

### Diffusers

#### Specifications

- Perforated Steel
- Cast iron bushings (TMD-tank mount)
- Zinc-plated steel (DFD-return line)
- Operating temperatures to 250°F / 121°C

**Flow Range:** 0-450 gpm / 0-1,710 lpm



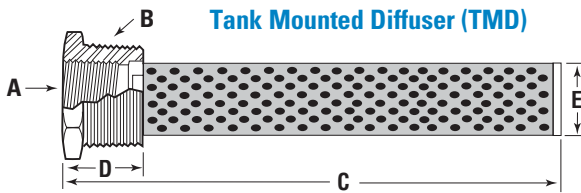
DFD



TMD

#### Features

Diffusers are highly effective in reducing aeration, foaming, turbulence and noise caused by return lines. Reservoir baffles can usually be eliminated, provided that the holes in the tube are positioned facing away from the pump suction inlet and below the reservoir oil level. Can be vertically or horizontally mounted with discharge side directed away from suction and preferably toward a tank wall or bottom.

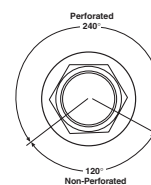


#### TMD - Tank Mount Diffusers

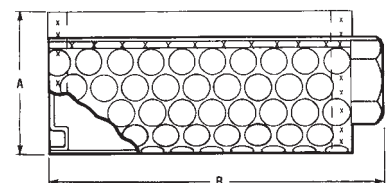
Donaldson Part No.	Desc.	Rated Flow gpm/l/min	Dim. A Pipe Size	Dim. B Pipe Size	C (in./mm)	D (in./mm)	E (in./mm)
P562281	TMD-5	5/19	1/2" NPT	1" NPT	5.34/135	1.06/28	1.17/29
P562282	TMD-10	10/38	3/4" NPT	1-1/4" NPT	8.17/207	1.2/30	1.36/34
P562283	TMD-15	15/59	1" NPT	1-1/2" NPT	8.2/208	1.22/31	1.66/42
P562284	TMD-25	25/95	1-1/4" NPT	2" NPT	9.04/229	1.35/34	2.12/53
P562285	TMD-50	50/189	2" NPT	3" NPT	9.7/246	1.7/43	3.0/76

#### DFD - Line Mount Diffusers

Donaldson Part No.	Desc.	Rated Flow gpm/l/min	Pipe Size	A (in./mm)	B (in./mm)
P562287	DFD-30	33/125	3/4" NPT	3.4/86.3	3.0/76
P562288	DFD-60	53/201	1" NPT	3.4/86.3	4.2/107
P562289	DFD-90	93/342	1-1/4" NPT	3.4/86.3	6.5/165
P562290	DFD-120	126/479	1-1/2" NPT	4.5/114.3	6.6/168
P562291	DFD-200	209/794	2" NPT	4.5/114.3	10.3/262
P562292	DFD-250	300/1140	2-1/2" NPT	5.25/133.4	13.0/330
P562293	DFD-300	450/1748	3" NPT	5.25/133.4	15.5/394



#### Line Mounted Diffuser (DFD)



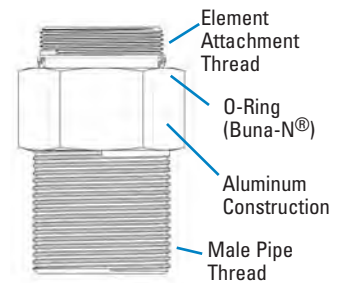
## Breathers

Breathers are available in a variety of styles, materials and sizes. Breathers provide clean airflow into reservoirs and other storage containers where there is an exchange of air during changing fluid levels. In high moisture environments or applications with large changes in machine attitudes, breather caps with pressure relief and vacuum breakers limit air exchange and provide a positive suction head at the pump inlet.



### Threaded Adapters for Creating Tank Breathers

Donaldson Part No.	LHA Part No.	Male Pipe Thread	Element Attachment Thread	Length (in./mm)	Material
P173544	GBF-15	3/4" NPT	1"-12 UN	2.50/64	Aluminum
P173545	GBF-50/60	1-1/4" NPT	1-1/2"-16 UN	3.00/76	Aluminum
P562627	GBF-10	3/4" NPT	1-1/8"-16 UN	1.65/42	Steel
P562628	ABGBA	Bayonet Fitting	1-1/8"-16 UN	1.36/35	Technopolymer
P570353	NA	Bayonet Fitting	1-1/2"-16 UN	2.74/695	Technopolymer



Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.

### Direct Replacements for Schroeder Breathers

A replacement for Schroeder part ABF-3/10 is available as a breather+adapter set. For other Schroeder replacements and as an alternative on the ABF-3/10, you may purchase adapters and spin-on filters as separate items.

Schroeder Part No.	Donaldson Spin-On Breather + Adapter Set	Adapter	Spin-On Breather
ABF-3/10	P564425	P562627	P564424
ABF-3/10-F	NA	P562628	P564424
MBF-3-M-P20	NA	P173545	P550386
MBF-10-M-P20	NA	P173545	P550388

### Replacement for Schroeder ABF3/10

P564425 Spin-On Breather & Adapter  
P564424 Spin-On Breather only

#### Specifications:

Diameter: 3.69" / 93.7mm  
Height: 3.6" / 91mm  
Threads on adaptor: 3/4"-14 NPT



### Spin-On Breather Filters

Donaldson Part No.	Use with Adapter	Micron Rating	Length (in./mm)	Diameter (in./mm)	Flow (scfm/gpm/lpm)
P564424	P562627 or P562628	10 micron nom.	3.6/91	3.7/94	15/112/421
P556005	P562627 or P562628	10 micron nom.	5.4/137	3.7/94	23/172/647
P551551	P173544	10 micron nom.	5.4/137	3.7/94	23/172/647
P560693	P173544	10 micron abs.	5.4/137	3.7/94	23/172/647
P564357	P173544	5 micron abs.	7.9/200	3.7/94	28/216/812
P179089	P173544	10 micron abs.	7.9/200	3.7/94	28/216/812
P169430	P173545	3 micron abs.	6.7/170	5.0/127	35/262/985
P167832	P173545	3 micron abs.	10.7/272	5.0/127	42/314/1181
P550386	P173545	3 micron nom.	6.7/170	5.0/127	35/262/985
P550250	P173545	3 micron nom.	10.7/272	5.0/127	42/314/1181
P167162	P173545	5 micron abs.	6.7/170	5.0/127	59/440/1654
P165762	P173545	5 micron abs.	10.7/272	5.0/127	64/479/1801
P550388	P173545	10 micron nom.	6.7/170	5.0/127	59/440/1654
P550251	P173545	10 micron nom.	10.7/272	5.0/127	64/479/1801
P165875	P173545	10 micron abs.	6.7/170	5.0/127	59/440/1654
P165876	P173545	10 micron abs.	10.7/272	5.0/127	64/479/1801



## T.R.A.P.™ Breather

**Flow Rates to:** 45 cfm  
1270 lpm

**Particulate Removal to:** 3 μm

**Moisture Removal:** Reversible  
Adsorption



### Features

Donaldson breathers with Thermally Reactive Advanced Protection (T.R.A.P.™) provide fast-acting protection for hydraulic reservoirs against airborne moisture and particulate contamination. Donaldson T.R.A.P. technology strip moisture vapor from intake air and expel the moisture back to the atmosphere. Moisture is prevented from entering and is actually “pumped” out with each flow cycle. T.R.A.P. media regenerates its water-holding capacity, which leads to longer service life – 3 to 4 times the life of conventional desiccant breathers.

- **Electronic Indicator**

Actuated by pressure differential, flashes red to indicate changeout is needed. Indicator setting, 1 psid/6.9 kPa. Indicator power source: 3V lithium battery CR2032.

- **Mechanical Indicator Kits**

Install kit between reservoir and T.R.A.P. breather. Lock-up style indicator with manual reset. Highly visible, bright red band shows when restriction limit is reached. Indicator setting, 20" H<sub>2</sub>O/5.0 kPa.

- **Oil Splash and Mist Containment**

Keeps oil inside reservoir.

- **Easy To Install**

Lightweight—simply hand tighten.

- **Rugged Design**

Effective to -40°F (-40°C). Robust housing protects media. Because it withstands high vibration, T.R.A.P. is suitable for both stationary and mobile applications.

### Operating Temperature

- -40°F to 200°F / -40°C to 93°C
- Intermittent operation to 250°F / 121°C

### Particulate Removal Efficiency

- 3 μm at 97%

### Connection Sizes

- 1" and 3/4" NPT, 3/4" BSP Bayonet
- 1/4" and 3/8" NPT, 9/16"-18UN

### Flow Rates

- 45 cfm / 1274 lpm
- 25 cfm / 708 lpm
- 3 cfm / 85 lpm

### Indicator Setpoint

- 1 psid / 6.9 kPa

### Materials

- Large - ABS
- Medium - Steel
- Mini - Glass-filled Nylon



### Self-Regenerating T.R.A.P. Breather Choices

Donaldson Part Number	Description	Connection	Maximum Flow (cfm/lpm)	Indicator	Moisture Removal	Oil/Splash Containment	Diameter (in./mm)	Total Height (in./mm)
X920006	X-Large-Urethane	1½" NPT Female	67/1893	std mechanical	Yes	No	6.50/165	16/407
P566151	Large-ABS	1" NPT	45/1274	opt mechanical	Yes	Yes	4.50/114	4.52/115
P566156	Large-ABS	Bayonet	45/1274	none	Yes	Yes	4.50/114	6.56/166.5
P564669	Large-ABS	1" NPT	45/1274	electronic	Yes	Yes	4.50/114	4.52/115
P565616	Large-ABS	Bayonet	45/1274	electronic	Yes	Yes	4.50/114	6.56/166.5
P565857	Medium-Steel	¾" NPT	25/708	opt mechanical	Yes	Yes	3.18/80.8	2.87/72.9
P565858	Medium-Steel	Bayonet	25/708	none	Yes	Yes	3.18/80.8	1.70/43.2
P566037	Medium-Steel	¾" BSP	25/708	none	Yes	Yes	3.18/80.8	2.87/72.9
P566174	Mini-Nylon	9/16"-18 UNF	3/85	none	Yes	Yes	1.65/41.9	2.18/55.4
P567390	Mini-Nylon	3/8" NPT	3/85	none	Yes	Yes	1.65/41.9	2.18/55.4
P567392	Mini-Nylon	¼" NPT	3/85	none	Yes	Yes	1.65/41.9	2.18/55.4

#### Mini Particulate Breathers

P567931	Mini-Nylon	9/16"-18 UNF	3/85	none	No	Yes	1.65/41.9	2.18/55.4
P567932	Mini-Nylon	3/8" NPT	3/85	none	No	Yes	1.65/41.9	2.18/55.4
P567933	Mini-Nylon	¼" NPT	3/85	none	No	Yes	1.65/41.9	2.18/55.4

#### Mechanical Indicator Kit - For use with P566151 & P565857\* (\*requires customer-supplied ¾"x1" NPT reducer)

P566168	Mechanical Indicator Kit	1" NPT coupling		20" H2O/5 kPa trip point			n/a	2.41/61.2
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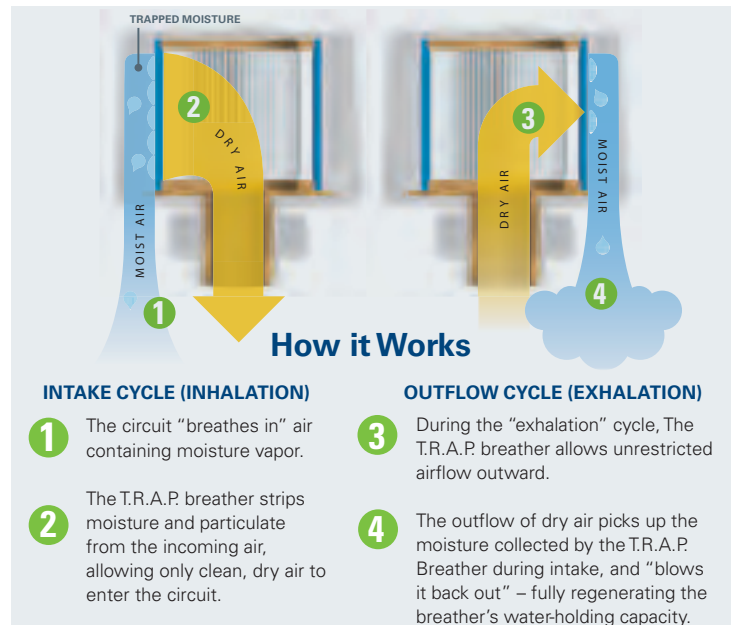
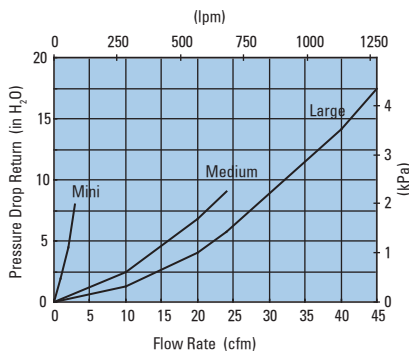
#### Bayonet Style Filler Basket / Flange Kits - For use with bayonet style T.R.A.P. Breathers

P566321	3" SS basket	6-bolt 2.81/71.4 circle					3.38/85.9	3.66/93.1
P563874	4" Nylon basket	6-bolt 2.81/71.4 circle					3.38/85.9	4.59/117
P563453	6" SS basket	6-bolt 2.81/71.4 circle					3.38/85.9	6.74/172

### T.R.A.P. Breather Sizing

Trap Model	Hydraulic System (gal/l)	In-plant Lube (gal/l)	Outside (gal/l)
Standard	100/375	500/1875	250/938
Metal	40/150	200/750	100/375
Mini	4/15	20/75	10/38

### T.R.A.P. Performance Data



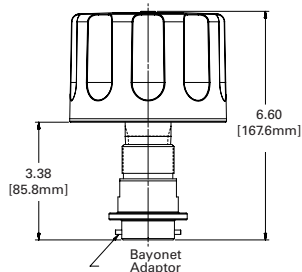
# T.R.A.P.™ Breather Specifications

See page 322 for more details on the X920006 X-Large Urethane breather.

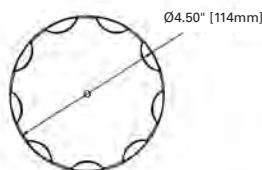
## Standard P565616

P566156 (no indicator version)

Available with or without electronic indicator

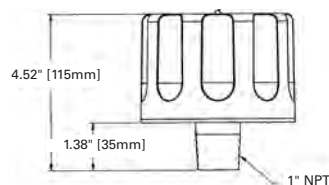


## Top View

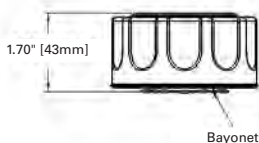


## P564669 (optional mechanical)

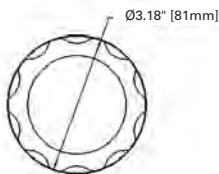
P566151 (no indicator version)



## Metal P565858

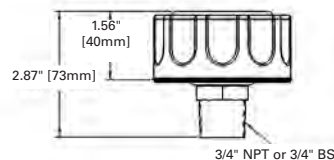


## Top View

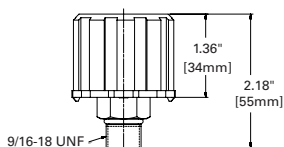


## P565857 (3/4" NPT version, optional mechanical)

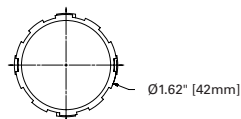
P566037 (3/4" BSP version)



## Mini P566174 P567390 P567392



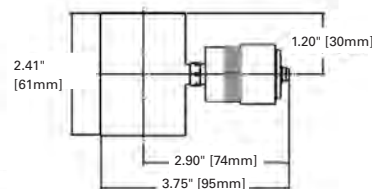
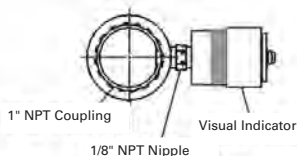
## Top View



## Mechanical Indicator Kit P566168

Suitable for use with P566151 and P565857\*

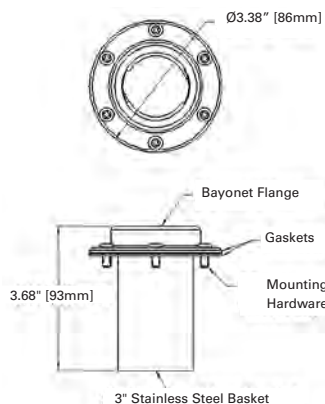
\*Requires additional 3/4" x 1" reducer bushing (supplied by customer)



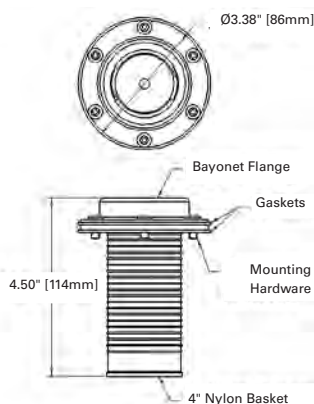
## Bayonet Style Filler Basket/Flange Kits

Use with any bayonet style T.R.A.P. Breather

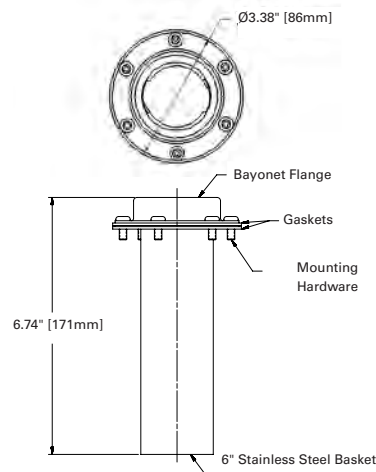
### P566321



### P563874



### P563453



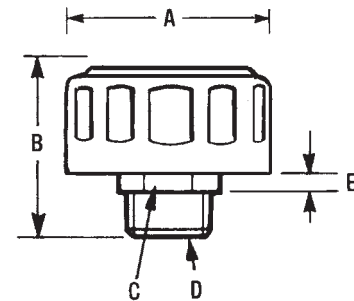
## ABS, MBS Series

### Specifications

- Chrome plated, epoxy coated or zinc plated steel cap
- Airflow to 30 cfm/850 lpm
- Compatible with petroleum based fluids
- Temperature to 212°F / 100°C
- 1/2", 3/4" and 1" NPT on ABS
- 1/4" and 3/8" NPT on MBS

### Options

- 3, 10 and 40 micron (ABS), 10 and 40 micron (MBS)
- Dipstick available on some ABS models
- Zinc and epoxy coated weather-proof cap versions



Donaldson Part No.	Reference	Micron Rating	Airflow Capacity (cfm/lpm)	A (in./mm)	B (in./mm)	C (in./mm)	D	E (in./mm)	Finish
P562510	MBS-10-N04	10 µm	10/283	1.85/47	2.0/51	.75/19	1/4" NPT	.2/5	Chrome Plated
P562511	MBS-10-N06	10 µm	10/283	1.85/47	2.0/51	.75/19	3/8" NPT	.2/5	Chrome Plated
P562512	MBS-40-N04	40 µm	10/283	1.85/47	2.0/51	.75/19	1/4" NPT	.2/5	Chrome Plated
P562514	MBS-40-N06	40 µm	10/283	1.85/47	2.0/51	.75/19	3/8" NPT	.2/5	Chrome Plated
P562516	MBS-Z-10-N06	10 µm	10/283	1.85/47	2.0/51	.75/19	3/8" NPT	.2/5	Zinc Plated
P562517	ABS-03-N12	3 µm	30/850	3.15/80	2.8/71	1.18/30	3/4" NPT	.5/13	Chrome Plated
P562518	ABS-10-B12	10 µm	30/850	3.15/80	2.8/71	1.18/30	3/4" BSP	.5/13	Chrome Plated
P562519	ABS-10-N08	10 µm	30/850	3.15/80	2.8/71	1.18/30	1/2" NPT	.5/13	Chrome Plated
P562520	ABS-10-N12	10 µm	30/850	3.15/80	2.8/71	1.18/30	3/4" NPT	.5/13	Chrome Plated
P562521	ABS-10-N16	10 µm	30/850	3.15/80	2.8/71	1.18/30	1" NPT	.5/13	Chrome Plated
P562522	ABS-40-N08	40 µm	30/850	3.15/80	2.8/71	1.18/30	1/2" NPT	.5/13	Chrome Plated
P562523	ABS-40-N12	40 µm	30/850	3.15/80	2.8/71	1.18/30	3/4" NPT	.5/13	Chrome Plated
P562524	ABS-40-N16	40 µm	30/850	3.15/80	2.8/71	1.18/30	1" NPT	.5/13	Chrome Plated
P562525	ABS-W-03-N12	3 µm	30/850	3.15/80	2.8/71	1.18/30	3/4" NPT	.5/13	Epoxy Coated Black
P562526	ABS-W-10-N08	10 µm	30/850	3.15/80	2.8/71	1.18/30	1/2" NPT	.5/13	Epoxy Coated Black
P562527	ABS-W-10-N12	10 µm	30/850	3.15/80	2.8/71	1.18/30	3/4" NPT	.5/13	Epoxy Coated Black
P562528	ABS-W-10-N16	10 µm	30/850	3.15/80	2.8/71	1.18/30	1" NPT	.5/13	Epoxy Coated Black
P563901	ABS-W-40-B12	40 µm	30/850	3.15/80	2.8/71	1.18/30	3/4" BSP	.5/13	Epoxy Coated Black
P562529	ABS-W-40-N12	40 µm	30/850	3.15/80	2.8/71	1.18/30	3/4" NPT	.5/13	Epoxy Coated Black
P562530	ABS-W-40-N16	40 µm	30/850	3.15/80	2.8/71	1.18/30	1" NPT	.5/13	Epoxy Coated Black
P562531	ABS-Z-10-N16	10 µm	30/850	3.15/80	2.8/71	1.18/30	1" NPT	.5/13	Zinc Plated
P562532	ABS-Z-40-N08	40 µm	30/850	3.15/80	2.8/71	1.18/30	1/2" NPT	.5/13	Zinc Plated
P562533	ABS-Z-40-N12	40 µm	30/850	3.15/80	2.8/71	1.18/30	3/4" NPT	.5/13	Zinc Plated

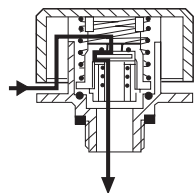
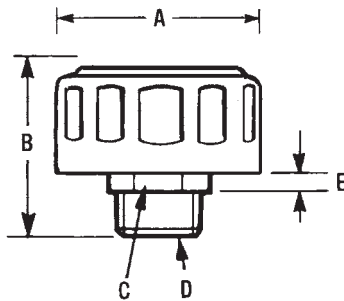
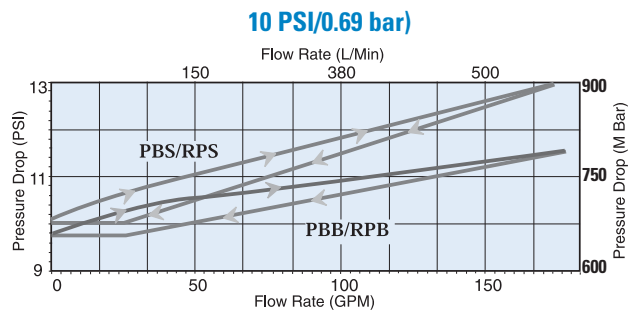
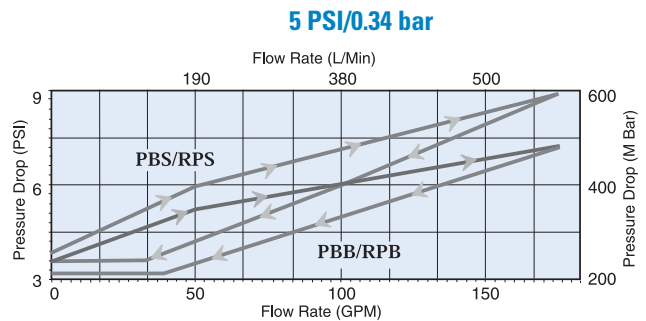
# PBS Series Pressure Filler Breather Cap - Screw In Style



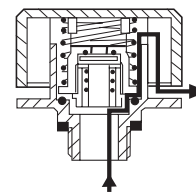
## Specifications

- Chrome plated or epoxy coated steel cap
- Air intake valve opens at 0.435 *psi* / 3 *kPa*
- Compatible with petroleum based fluids
- Temperature range  
-22°F to +240°F / -30°C to 115°C
- Buna-N® gaskets standard
- 10 and 40 micron available
- Relief valve settings at 5 *psi* / 0.34 bar or 10 *psi* / 0.69 bar full rate flow

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



Air intake in the reservoir through vacuum breaker when pressure decreases (.435 psi)



Venting to atmosphere through relief valve to maintain a 5 or 10 psi full rated flow

Donaldson Part No.	Description	Micron Rating	Airflow Capacity (cfm/lpm)	Relief Valve Setting (psi/bar)	Dim. A (in./mm)	Dim. B (in./mm)	Dim. C (in./mm)	Dim. D (in./mm)	Dim. E (in./mm)	Finish
P563362	PBS-10-10-N12	10 µm	30/850	10/0.69	3.15 / 80	2.8 / 71	1.18 / 30	3/4" NPT	.5 / 13	Chrome Plated
P563363	PBS-10-10-N16	10 µm	30/850	10/0.69	3.15 / 80	2.8 / 71	1.18 / 30	1" NPT	.5 / 13	Chrome Plated
P563365	PBS-10-5-N12	10 µm	30/850	5/0.34	3.15 / 80	2.8 / 71	1.18 / 30	3/4" NPT	.5 / 13	Chrome Plated
P563366	PBS-10-5-N16	10 µm	30/850	5/0.34	3.15 / 80	2.8 / 71	1.18 / 30	1" NPT	.5 / 13	Chrome Plated
P563367	PBS-40-10-N12	40 µm	30/850	10/0.69	3.15 / 80	2.8 / 71	1.18 / 30	3/4" NPT	.5 / 13	Chrome Plated
P563368	PBS-40-5-N12	40 µm	30/850	5/0.34	3.15 / 80	2.8 / 71	1.18 / 30	3/4" NPT	.5 / 13	Chrome Plated
P563369	PBS-40-5-N16	40 µm	30/850	5/0.34	3.15 / 80	2.8 / 71	1.18 / 30	1" NPT	.5 / 13	Chrome Plated
P563370	PBS-W-10-5-N12	10 µm	30/850	5/0.34	3.15 / 80	2.8 / 71	1.18 / 30	3/4" NPT	.5 / 13	Epoxy Coated Black
P563371	PBS-W-40-10-N12	40 µm	30/850	10/0.69	3.15 / 80	2.8 / 71	1.18 / 30	3/4" NPT	.5 / 13	Epoxy Coated Black
P563372	PBS-W-40-5-N12	40 µm	30/850	5/0.34	3.15 / 80	2.8 / 71	1.18 / 30	3/4" NPT	.5 / 13	Epoxy Coated Black

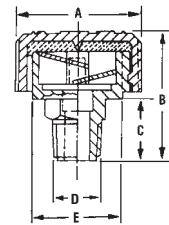
# Filler Breather Caps

## Specifications

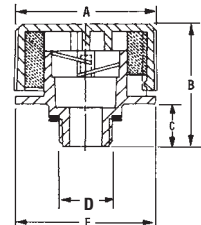
- High impact-resistant technopolymer construction
- Cap diameters 1.22"/31mm, 1.65"/42 mm, 2.24"/57 mm and 2.75"/70 mm
- Compatible with petroleum and water based fluids
- Temperature range  
-22°F to +240°F / -30°C to +115°C
- Displacements to 250 gpm/946 lpm without baffle
- Displacements to 144 gpm/547 lpm with anti-splash baffle



CPS / DPS / LPS



BPS / RPS

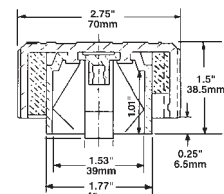


Donaldson Part No.	Description*	Micron Rating	Airflow Capacity (cfm/lpm)	Relief Valve Setting (psi/bar)	Dim. A (in./mm)	Dim. B (in./mm)	Dim. C (in./mm)	Dim. D (in.)	Dim. E (in./mm)
P562494	DPS-40-N04	40 µm	4.9/139	n/a	1.65/42	2.05/52	.71/18	1/4" NPT	1.2/30
P562495	DPS-40-N04-A	40 µm	2.1/59	n/a	1.65/42	2.05/52	.71/18	1/4" NPT	1.2/30
P563614	DPS-40-N06	40 µm	11.7/331	n/a	1.65/42	2.05/52	.71/18	3/8" NPT	1.2/30
P562497	DPS-40-N06-A	40 µm	5/142	n/a	1.65/42	2.05/52	.71/18	3/8" NPT	1.2/30
P562502	DPS-40-N12	40 µm	12.5/354	n/a	1.65/42	2.05/52	.71/18	3/4" NPT	1.2/30
P562503	DPS-40-N12-A	40 µm	5.4/153	n/a	1.65/42	2.05/52	.71/18	3/4" NPT	1.2/30
P562483	CPS-40-N12	40 µm	27/765	n/a	2.24/57	1.85/47	.87/22	3/4" NPT	1.53/39
P562484	CPS-40-N12-A	40 µm	13.5/382	n/a	2.24/57	1.85/47	.87/22	3/4" NPT	1.53/39
P562480	BPS-10-N12-A	10 µm	19.3/547	n/a	2.75/70	2.48/63	.83/21	3/4" NPT	2.68/68
P562481	BPS-40-N12	40 µm	33.4/946	n/a	2.75/70	2.48/63	.83/21	3/4" NPT	2.68/68
P562482	BPS-40-N12-A	40 µm	19.3/547	n/a	2.75/70	2.48/63	.83/21	3/4" NPT	2.68/68
P562492	RPS-40-5-N12	40 µm	30/850	5/0.34	2.75/70	2.48/63	.83/21	3/4" NPT	2.68/68

\* -A = anti-splash

Donaldson Part No.	Desc.	Micron Rating	Airflow Capacity (cfm.lpm)	Dim. A (in./mm)	Dim. B (in./mm)	Dim. C (in./mm)	Dim. D (in./mm)	Comment
P562476	ABO-10	10 µm	30/850	2.75/70	1.5/39	.25/7	1.77/45	Fits over 1.50" OD tube
P562477	ABO-40	40 µm	30/850	2.75/70	1.5/39	.25/7	1.77/45	Fits over 1.50" OD tube

ABO



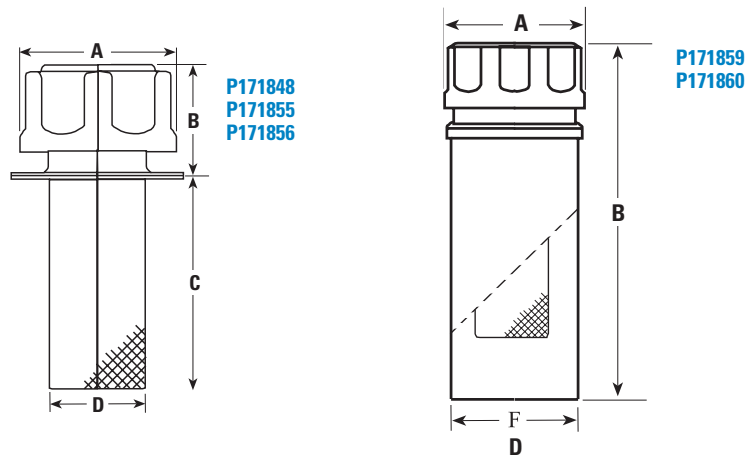
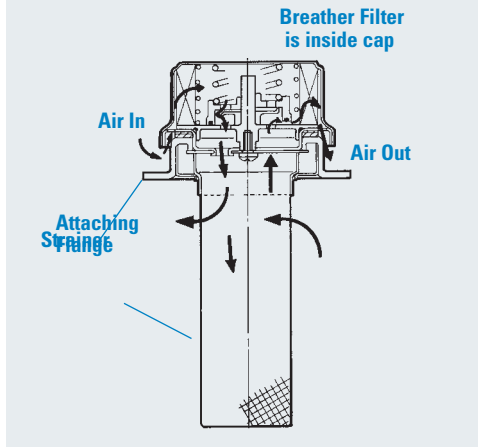
# Filler Breather Assemblies

## Features

- Removable 500 µm mesh strainer. (Except model P171848, which has a non-removable strainer.)
- 10 µm air breather/filter.
- Models P171855 & P171848 include drilled flanges with attaching screws.

## How it Works

As fluid levels rise and fall inside the reservoir, air flows in and out through the strainer and breather as shown below. The breather filter inside the cap removes contaminants as small as 10 µm from the air to keep airborne contaminant from entering the fluid. The strainer removes large particles from fluid as it is added to the reservoir.



## Filler Breather Specifications

Part No.	FLANGE SPECIFICATIONS				Flow (gpm/lpm)	FILLER BREATHER SPECIFICATIONS			
	Outer Dia. (in./mm)	No. of Holes	Hole Dia. (in./mm)	Bolt Circle		A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)
P171848	2.01/51	3	.22/5.5	1.61/41	70/270	1.81/45	1.38/35	2.48/63	1.1/28
P171855	3.31/84	6	.22/5.5	2.88/73	124/470	2.76/70	1.81/46	3.94/100	1.5/38
P171856	3.31/84	n/a	n/a		124/470	2.76/70	1.81/46	3.94/100	1.15/38
P171859		n/a - weldable			124/470	2.76/70	7.09/180	2.50/64	
P171860 *		n/a - weldable			124/470	2.76/70	7.09/180	2.50/64	

\* For pressurized reservoirs at 5.8 psi/0.4 bar relief pressure.

## Filler Cap Only (Replacement)

P173292 — fits P171855, P171856, P171859

P173364 for pressurized reservoir — fits P171860



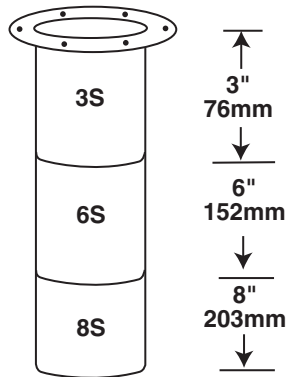
# ABB Series Filler Breathers - Bayonet Style

## Specifications

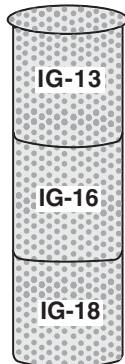
- Chrome plated, epoxy coated or zinc plated steel caps
- Airflow to 30 cfm/850 lpm
- Compatible with petroleum based fluids
- 30 mesh technopolymer basket
- Self tapping screws for flange mount
- Cork gaskets
- 3, 10, or 40 micron



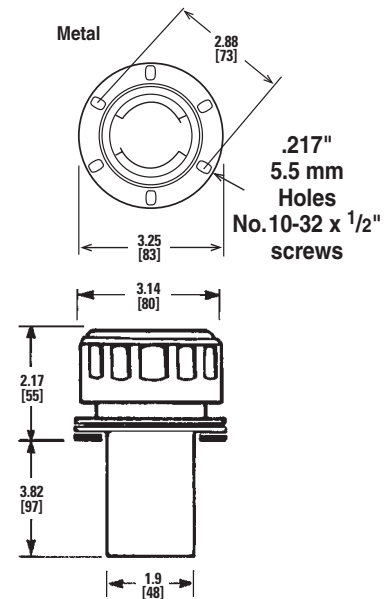
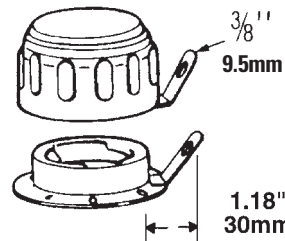
### 30 MESH STAINLESS STEEL BASKETS



### INNER GUARDS



### LOCKING TABS (AB ONLY)

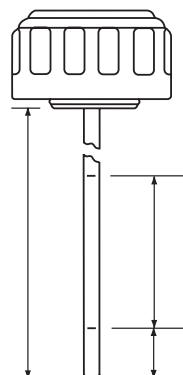
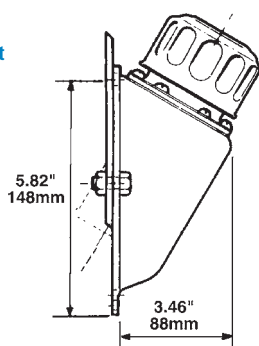


Donaldson Part No.	Reference	Features	Micron Rating	Finish
P562610	ABB-W-03-8S-IG	8" STAINLESS BASKET, INNER GUARD	3 µm	Epoxy Coated, Black
P562611	ABB-W-10-3S	3" STAINLESS BASKET	10 µm	Epoxy Coated, Black
P562612	ABB-W-10-3S-LT	3" STAINLESS BASKET, LOCK TAB	10 µm	Epoxy Coated, Black
P562614	ABB-W-10-N	NYLON BASKET	10 µm	Epoxy Coated, Black
P562616	ABB-W-10-N-R	NYLON BASKET, BUNA-N® GASKET	10 µm	Epoxy Coated, Black
P562618	ABB-W-40-3S	3" STAINLESS BASKET	40 µm	Epoxy Coated, Black
P562619	ABB-W-40-6S	6" STAINLESS BASKET	40 µm	Epoxy Coated, Black
P562620	ABB-W-40-N	NYLON BASKET	40 µm	Epoxy Coated, Black
P562623	ABB-Z-40-3S	3" STAINLESS BASKET	40 µm	Zinc Plated
P562624	ABB-Z-40-3S-LT	3" STAINLESS BASKET, LOCK TAB	40 µm	Zinc Plated
P562625	ABB-Z-40-N	NYLON BASKET	40 µm	Zinc Plated
P562626	ABB-Z-40-N-R	NYLON BASKET, BUNA-N GASKET	40 µm	Zinc Plated

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**Side Mount**

Can be used with all Bayonet and Threaded Flange Breathers (except MBB & Pressurized Breathers). Maximum torque for fastening 112 in. lbs. with washers.



Dipsticks available for some models. See Features section on assembly tables.

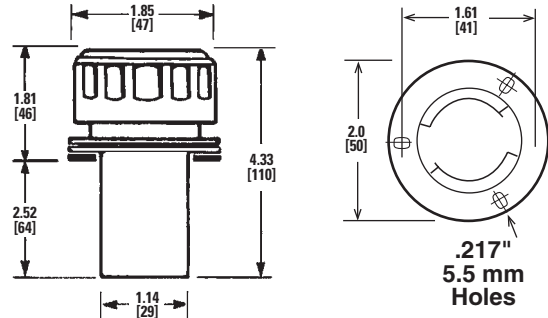
**Chrome ABB Series Filler Breathers - Bayonet Style**

Airflow to 30 cfm/850 lpm

Donaldson Part No.	Description	Features	Micron Rating
P562573	ABB-03-N	NYLON BASKET	3 µm
P562574	ABB-10	FLANGE, SCREWS & GASKET, NO BASKET	10 µm
P562575	ABB-10-3S	3" STAINLESS BASKET	10 µm
P562576	ABB-10-3S-LT	3" STAINLESS BASKET, LOCK TAB	10 µm
P562577	ABB-10-3S-R	3" STAINLESS BASKET, BUNA-N GASKET	10 µm
P562578	ABB-10-3S-SMB	3" STAINLESS BASKET, SIDE MOUNT KIT	10 µm
P562579	ABB-10-6S	6" STAINLESS BASKET	10 µm
P562580	ABB-10-6S-LT	6" STAINLESS BASKET, LOCK TAB	10 µm
P562581	ABB-10-6S-R	6" STAINLESS BASKET, BUNA-N GASKET	10 µm
P562582	ABB-10-8S	8" STAINLESS BASKET	10 µm
P562583	ABB-10-8S-D-IG	8" STAINLESS BASKET, DIPSTICK, INNER GUARD	10 µm
P562584	ABB-10-N	NYLON BASKET	10 µm
P562585	ABB-10-N-LT	NYLON BASKET, LOCK TAB	10 µm
P562587	ABB-10-N-R	NYLON BASKET, BUNA-N GASKET	10 µm
P562589	ABB-40	FLANGE, SCREWS & GASKET, NO BASKET	40 µm
P562590	ABB-40-3S	3" STAINLESS BASKET	40 µm
P562592	ABB-40-3S-R	3" STAINLESS BASKET, BUNA-N GASKET	40 µm
P562593	ABB-40-3S-SMB	3" STAINLESS BASKET, SIDE MOUNT KIT	40 µm
P562594	ABB-40-6S	6" STAINLESS BASKET	40 µm
P562595	ABB-40-6S-D	6" STAINLESS BASKET, DIPSTICK	40 µm
P562596	ABB-40-6S-LT	6" STAINLESS BASKET, LOCK TAB	40 µm
P562598	ABB-40-8S	8" STAINLESS BASKET	40 µm
P562599	ABB-40-8S-D	8" STAINLESS BASKET, DIPSTICK	40 µm
P562600	ABB-40-8S-LT	8" STAINLESS BASKET, LOCK TAB	40 µm
P562601	ABB-40-CWOF	CAP ONLY	40 µm
P562602	ABB-40-LT	LOCK TAB, NO BASKET	40 µm
P562603	ABB-40-N	NYLON BASKET	40 µm
P562605	ABB-40-N-LT	NYLON BASKET, LOCK TAB	40 µm
P562608	ABB-40-N-R	NYLON BASKET, BUNA-N GASKET	40 µm
P562609	ABB-40-N-SMB	NYLON BASKET, SIDE MOUNT KIT	40 µm

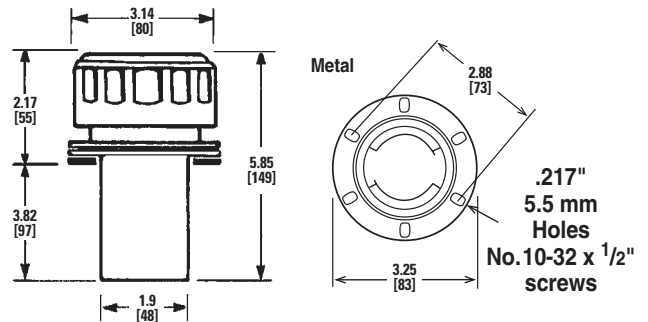
### Mini Filler Breather

Donaldson Part No.	Description	Micron Rating	Airflow Capacity (cfm/lpm)	Finish
P562561	MBB-10-N	10 µm	10/283	Chrome
P562562	MBB-40-N	40 µm	10/283	Chrome



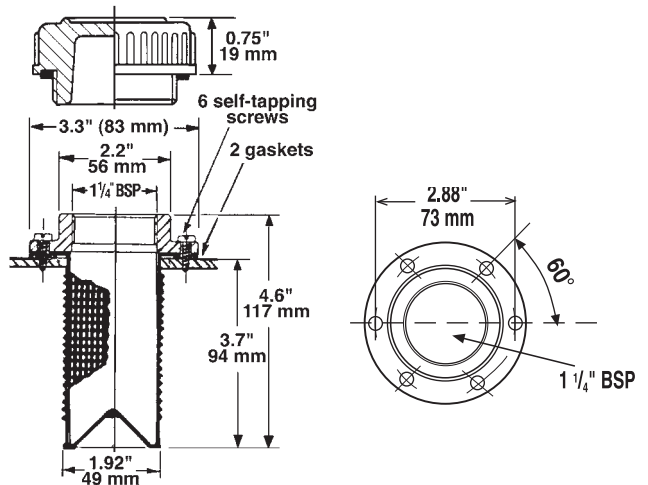
### Non-Vent Filler Cap, Bayonet

Donaldson Part No.	Description	Feature	Finish
P562563	NVB-00-3S	FILLER CAP ASSY W/3" STAINLESS BASKET	Chrome
P562564	NVB-00-N	FILLER CAP ASSY W/ NYLON BASKET	Chrome
P562565	NVB-W-00-8S	FILLER CAP ASSY W/8" STAINLESS BASKET	Epoxy coated, Black



### Non-Vent Filler Cap, Threaded

Donaldson Part No.	Description	Feature	Finish
P562550	NVT-00-N	FILLER CAP ASSY W/ NYLON BASKET	Black Technopolymer



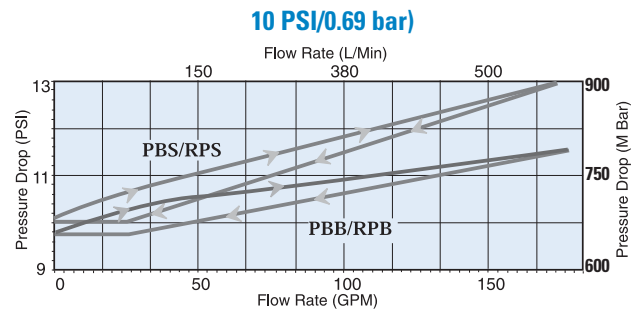
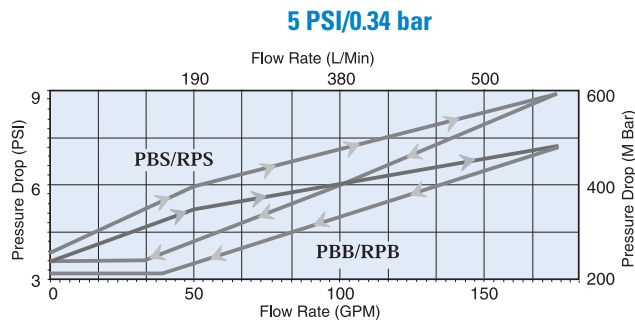
## Filler Breathers

### Specifications

- High impact black technopolymer
- Temperature range -22°F to +240°F / -30°C to +115 °C
- 2.75" diameter cap
- Available with bayonet or threaded flange
- Airflow to 30 cfm/850 lpm
- Compatible with petroleum and water based fluids
- 30 mesh technopolymer basket

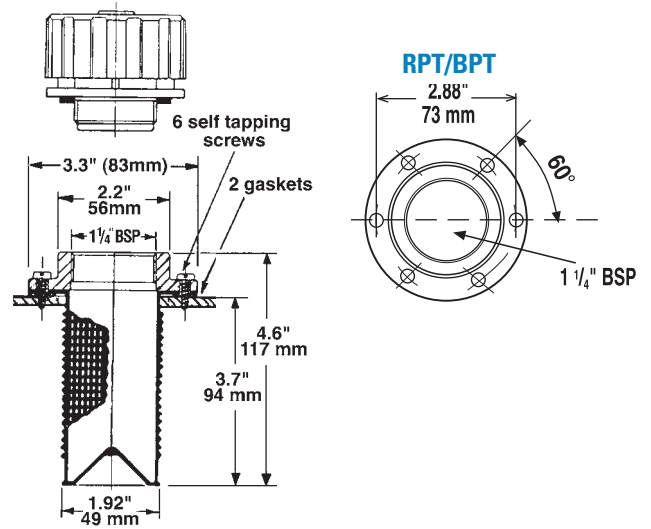
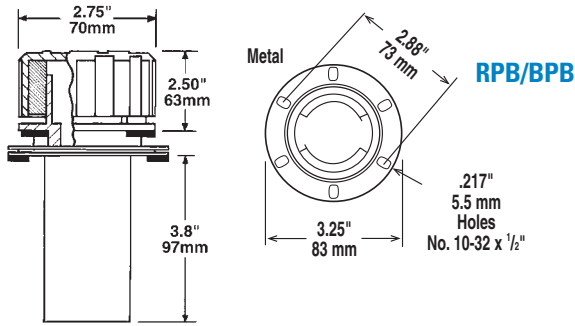
### Options

- Dipstick 3"/76 mm, 6"/152 mm and 8"/ 203 mm stainless steel baskets



### Bayonet Style (RPB) (BPB)

Donaldson Part No.	Description	Feature	Micron Rating	Airflow Capacity (cfm/lpm)	Relief Valve Setting (psi/bar)
P562552	RPB-10-5-N	NYLON BASKET	10 µm	30/850	5/0.34
P562553	RPB-10-5-N-D-TAD	NYLON BASKET, DIPSTICK	10 µm	30/850	5/ 0.34
P562554	RPB-40-5-3S	3" STAINLESS BASKET	40 µm	30/850	5/0.34
P562555	RPB-40-5-6S	6" STAINLESS BASKET	40 µm	30/850	5/0.34
P562556	RPB-40-5-N	NYLON BASKET	40 µm	30/850	5/0.34
P562534	BPB-10-A CAP ONLY	BREATHER CAP	10 µm	30/850	N/A
P562536	BPB-10-N-A	BREATHER	10 µm	30/850	N/A
P563813	BPB-40 CAP ONLY	BREATHER CAP	40 µm	30/850	N/A
P562537	BPB-40-3S	BREATHER W/3" STEEL BASKET	40 µm	30/850	N/A
P562538	BPB-40-3S-A	BREATHER	40 µm	30/850	N/A
P562539	BPB-40-6S-D	FILLER BREATHER W/DIP STICK	40 µm	30/850	N/A
P562540	BPB-40-A CAP ONLY	BREATHER CAP	40 µm	30/850	N/A
P562541	BPB-40-N	BREATHER	40 µm	30/850	N/A
P562542	BPB-40-N-A	BREATHER	40 µm	30/850	N/A
P562544	BPB-40-N-SMB	BREATHER W/SIDE MOUNT KIT	40 µm	30/850	N/A

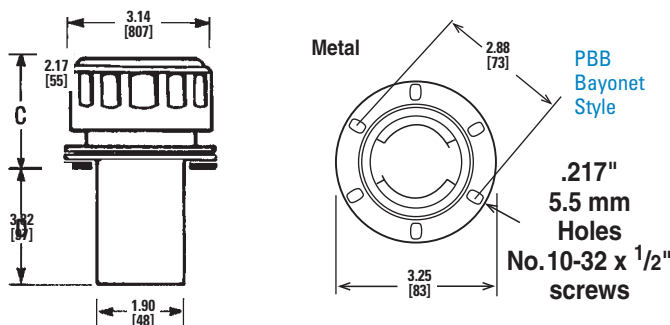


## PBB Series Pressure Filler Breather Cap - Bayonet Style

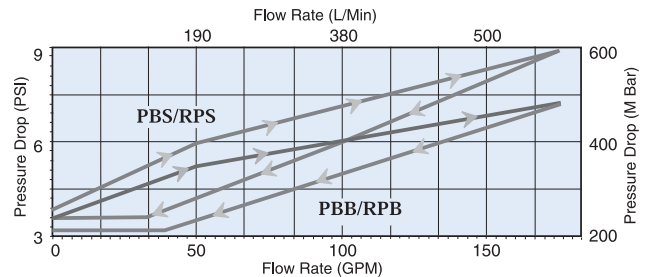
### Specifications

- Chrome plated, epoxy coated or zinc plated steel cap
- Air intake valve opens at 0.435 psi/3 kPa
- Compatible with petroleum based fluids
- Temperature range -22°F to +240°F / -30°C to 115°C
- Buna-N® gaskets standard
- 10 and 40 micron available
- Relief valve settings at 5 or 10 psi/0.34 or 0.69 bar full rate flow

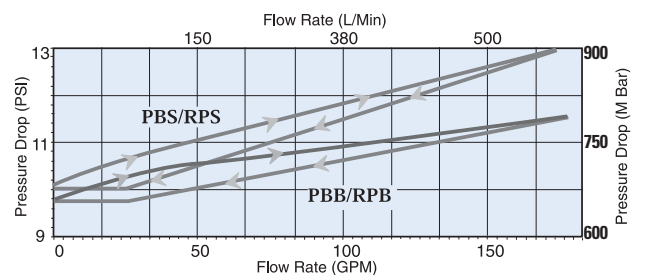
Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



**5 psi/0.34 bar**

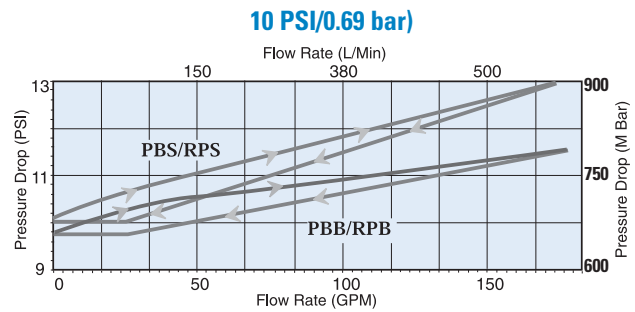
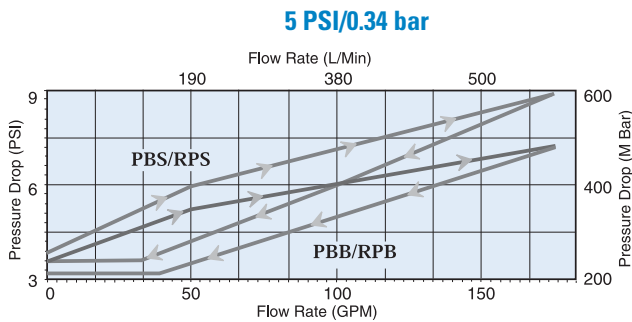


**10 psi/0.69 bar**



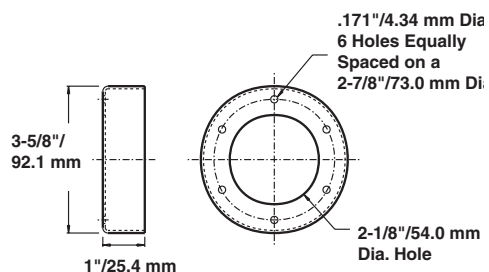
# PBB Series Pressure Filler Breather Cap - Bayonet Style

Donaldson Part No.	Description	Feature	Micron Rating	Airflow Capacity (cfm/lpm)	Relief Valve Setting (psi/mm)	Finish
P563346	PBB-10-5-3S	3" STAINLESS BASKET	10 µm	30/850	5/0.34	Chrome
P563347	PBB-10-5-6S	6" STAINLESS BASKET	10 µm	30/850	5/0.34	Chrome
P563348	PBB-10-5-N	NYLON BASKET	10 µm	30/850	5/0.34	Chrome
P563349	PBB-10-5-N-LT	NYLON BASKET, LOCK TAB	10 µm	30/850	5/0.34	Chrome
P563350	PBB-40-10-N	NYLON BASKET	40 µm	30/850	10/0.69	Chrome
P563351	PBB-40-5	FLANGE, SCREWS & GASKET, NO BASKET	40 µm	30/850	5/0.34	Chrome
P563352	PBB-40-5-3S	3" STAINLESS BASKET	40 µm	30/850	5/0.34	Chrome
P563353	PBB-40-5-6S	6" STAINLESS BASKET	40 µm	30/850	5/0.34	Chrome
P563354	PBB-40-5-8S	8" STAINLESS BASKET	40 µm	30/850	5/0.34	Chrome
P563355	PBB-40-5-N	NYLON BASKET	40 µm	30/850	5/0.34	Chrome
P563356	PBB-W-10-5-N	NYLON BASKET	10 µm	30/850	5/0.34	Epoxy Coated, Black
P563357	PBB-W-10-5-N-LT	NYLON BASKET, LOCK TAB	10 µm	30/850	5/0.34	Epoxy Coated, Black
P563358	PBB-W-40-5-3S	3" STAINLESS BASKET	40 µm	30/850	5/0.34	Epoxy Coated, Black
P563360	PBB-Z-10-10-N	NYLON BASKET	10 µm	30/850	10/0.69	Zinc Plated
P563361	PBB-Z-10-5-N	NYLON BASKET	10 µm	30/850	5/0.34	Zinc Plated
P563326		3" STAINLESS BASKET ONLY				
P563465		6" STAINLESS BASKET ONLY				
P563466		8" STAINLESS BASKET ONLY				
P563322		4" NYLON BASKET ONLY				



## Weld Risers for Filler Breathers

Donaldson Part No.	Description	Height (in./mm)
P562668	WR-5565	1"/25.4



Steel stamped construction  
 Predrilled holes align  
 with standard breather  
 tank flanges  
 Provides for easy installation  
 of filler breathers



## ARV™ Active Reservoir Vent™

The Donaldson Active Reservoir Vent™ (ARV™) is an effective dry air purging system for minimizing water contamination in fluids. It continuously supplies dry air to reservoirs and other vented components. Slight pressurization of the reservoir head space with dry air prevents ingress of humidity, therefore eliminating a common source of water contamination. In addition, as dry air sweeps over the surface of the oil, water evaporates and the oil dries to beneficial low levels. Through efficient and user-friendly water contamination control, the ARV's unique dry air purging system provides a wide range of benefits, including longer component life, extended fluid change intervals, and greater system uptime and reliability.



### Do you have challenges with water in oil?

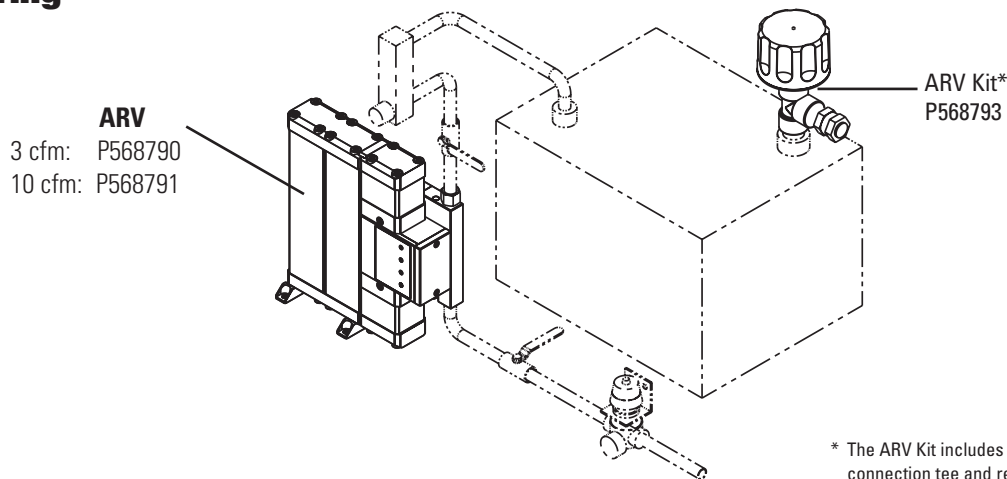
- Is your operation in a high humidity environment?
- Do you operate around wash water, spray down maintenance, or marine and off-shore environments?
- Do you get regular condensation in your reservoirs?
- Are you using a desiccant breather now?
  - How often do you change your desiccant?
  - Do you require frequent service maintenance / short life with your desiccant?
  - Are you concerned that your desiccant is saturated with water until it is too late?

Water is a frequent and damaging contaminant in hydraulic and lubrication systems, and water contamination causes a host of problems including corrosion, component seizure, microbial growth, additive dumping, and accelerated oil oxidation. The ARV will help prevent the chain of damage caused by water contamination.

Features	Benefits
Purges wet, humid air from reservoir head space	Greater uptime, longer bearing life, lower energy consumption, fewer parts replacement, and greater machine efficiency
Minimal annual maintenance	Low maintenance costs
Prefilter and afterfilter for particle removal	Added protection from particulate wear
Applications	
Hydraulic System Reservoirs	Small Storage tanks
Gear boxes	Multiple Tanks
Lube System Reservoirs	Lube Rooms

# ARV™ Active Reservoir Vent™

## Ordering



\* The ARV Kit includes the T.R.A.P. breather assembly, connection tee and relief vent.

## Specifications

### ARV

Part Number	Flow Rate (scfm /lpm)	Recommended for Reservoir Size (gallons/liters)	NPTF Connection (inches)	Dimensions (in./mm)			Weight (lbs/kg)
				Height	Width	Depth	
P568790	3 / 85	up to 2,700 / 10,271	1/2"	13.7 / 348	11.8 / 300	4.7 / 120	15 / 6.8
P568791	10 / 283	up to 9,000 / 34,069	1/2"	34.8 / 884	11.8 / 300	4.7 / 120	33 / 14.9

- Electrical Requirements: 110 V/50-60 Hz AC, Approx. 4 W
- Medium: Compressed air/nitrogen
- Operating Pressure: 60 to 100 psig
- Medium Temperature: maximum = 122°F
- Ambient Temperature: minimum =39°F; maximum = 122°F

### ARV Kit\*\* Breather Assembly

Part Number	Flow Rate (scfm)	Recommended for Reservoir Size (gallons/liters)	NPTM Connection (inches)	T.R.A.P. Breather Assembly (in./mm)		
				Height	Width	Depth
P568793	up to 10	up to 9,000 / 34,049	1	9 / 229	6.5 / 165	4.5 / 120

\*\* Kit includes breather assembly, connection and relief vent.

## Replacement/Maintenance Parts & Schedule

Description	Recommended Change Interval	Part Number
T.R.A.P.™ reservoir breather	6 months	P564669
Service Kit (includes prefilter element, afterfilter element, desiccant cartridges, set of seals) for ARV adsorption dryer	1 year	ARV-3: P568796 ARV-10: P568797

## How the Active Reservoir Vent Works



- 1 Dryer Inlet
- 2 Processor Control
- 3 Prefilter
- 4 Lower Shuttle Valve
- 5 Desiccant Cartridges
- 6 Upper Shuttle Valve
- 7 Afterfilter
- 8 Dryer Outlet
- 9 Condensate Drain

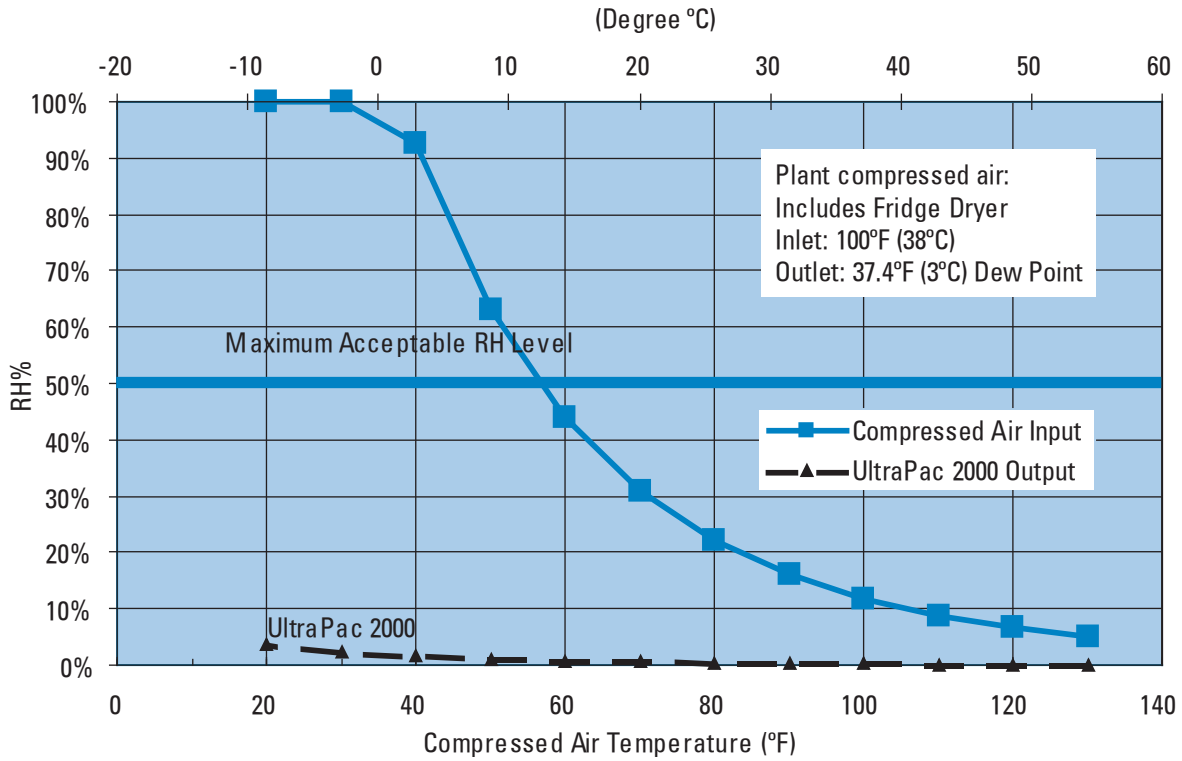
## Small, Compact Point-of-Use Dryers

Heatless desiccant dryers, like all adsorption type dryers, use a desiccant to adsorb the water vapor in the airstream. In the most commonly used twin-tower design, one tower dries the air from the compressor, while the desiccant in the other tower is being regenerated to provide continuous operation. In the heatless desiccant dryer design, no internal or external heaters are used. Regeneration is achieved by using a partial stream of the dried air, expanding it to atmospheric pressure, and running it through the desiccant bed that is being regenerated. The standard regenerative desiccant dryer at 100 psig has a standard pressure dew point rating of  $-40^{\circ}\text{F}/^{\circ}\text{C}$  and a dew point down to  $-100^{\circ}\text{F}$  ( $-73^{\circ}\text{C}$ ) is available as an option.



Performance Data

Donaldson Active Reservoir Vent Performance



# Sight Glasses

## Specifications

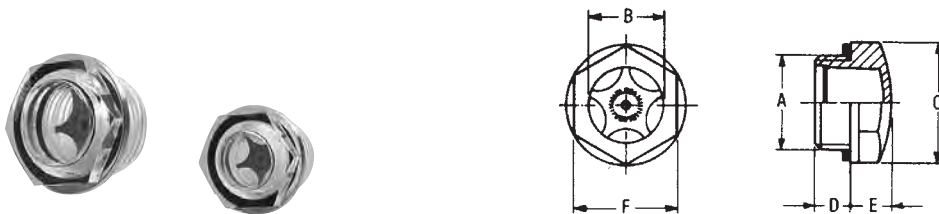
- Transparent polyamid lens
- Shock resistant
- Anodized aluminum reflector
- Operating temperature 210°F / 100°C
- Buna-N® seal
- For use with mineral, petroleum and water-based fluids
- Any contact with alcohol or solvents must be avoided
- Design HFTX

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.



## Features

Leak-free sight glasses come in plastic or metal with a variety of threads, seals and lenses. In low visibility areas, prism lens sight glasses are a good solution for quick and accurate readings. In applications involving high pressure or temperatures, steel sight glasses are preferred. Locking nuts provide mounting into sheet metal with minimum thickness and without welding.



Donaldson Part No.	Description	A - Thread Size	B	Dimensions (in./mm)			
				C	D	E	F
P562419	SG-04	1/4" BSP	.35/9	.71/18	.28/7	.24/6	.59/15
P562420	SG-06	3/8" BSP	.43/11	.87/22	.32/8	.28/7	.75/19
P562421	SG-08	1/2" BSP	.55/14	1.02/26	.32/8	.32/8	.87/22
P562423	SG-08-S	3/4" - 16 UN	.51/13	1.02/26	.59/15	.32/8	.87/22
P562426	SG-12	3/4" BSP	.79/20	1.22/31	.35/9	.39/10	1.06/27
P562427	SG-12-S	1-1/16" - 12 UN	.75/19	1.38/35	.59/15	.39/10	1.18/30
P562428	SG-16	1" BSP	1.00/25	1.58/40	.43/11	.39/10	1.34/34
P562430	SG-20	1-1/4" BSP	1.18/30	1.85/47	.47/12	.51/13	1.61/41

## Prism Sight Glasses

### Specifications

- Prism lenses: special translucent polyamide technopolymer
- For low light applications
- Body: special black polyamide technopolymer
- Available in 3/4" and 1" NPT sizes
- Resistant to solvents, oils, greases, alkaline acids
- Avoid alcohol and detergents containing alcohol
- Flat Buna-N<sup>®</sup> seal

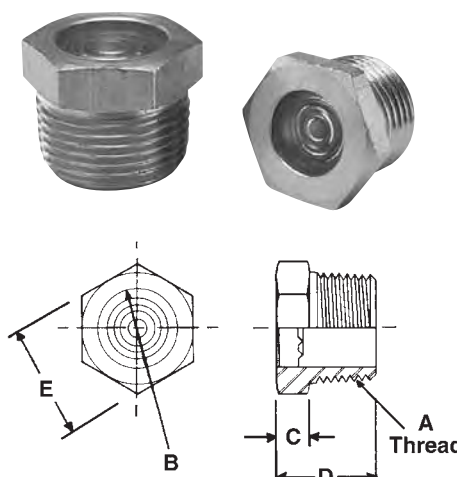


Buna-N<sup>®</sup> is a registered trademark of E. I. DuPont de Nemours and Company.

Donaldson Part No.	Description	A - Thread Size	B	Dimensions (in./mm)			
				C	D	E	F
P562417	PSG-12	3/4" NPT	0.70/18	1.38/35	0.40/10	0.33/8.5	1.26/32
P562418	PSG-16	1" NPT	0.90/23	1.70/43	0.43/11	0.36/9	1.50/38

### Specifications

- All nickel-plated steel construction
- Glass prism lenses hermetically sealed
- Leak-proof service
- Greater mechanical strength
- Easy installation
- Reflects light in the presence of any liquid
- Maximum operating temp. 500°F / 260°C
- Suitable for petroleum and water based fluids



Donaldson Part No.	Description	A - Thread Size	B	Dimensions (in./mm)		
				C	D	E
P562408	SVM-04	1/4" NPT	0.34/8	0.19/5	0.44/11	0.63/16
P562409	SVM-06	3/8" NPT	0.44/11	0.22/6	0.5/13	0.75/19
P562410	SVM-08	1/2" NPT	0.56/14	0.22/6	0.56/14	0.94/24
P562411	SVM-12	3/4" NPT	0.75/19	0.31/8	0.63/16	1.06/27
P562412	SVM-16	1" NPT	0.94/24	0.31/8	0.94/24	1.38/35
P562413	SVM-20	1-1/4" NPT	1.19/30	0.41/10	0.81/21	1.75/44
P562414	SVM-24	1-1/2" NPT	1.44/37	0.41/10	0.81/21	2.00/51
P562415	SVM-32	2" NPT	1.88/48	0.41/10	0.88/22	2.50/64



## Fluid Level Gauges

### Specifications

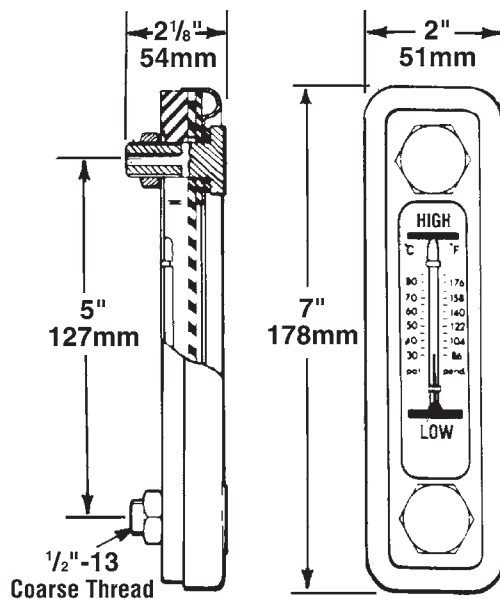
- Steel frame
- Acrylic lens
- Steel zinc plated bolts
- 5" (127 mm) mounting bolt centers
- Maximum wall thickness: 1/2"/12.7 mm
- Maximum temperature:  
SLT 225°F / 107°C; SLG 180°F / 80°C

### Features

Donaldson offers a wide variety of fluid level gauges that let you accurately measure fluid levels in your tanks and reservoirs. Gauges are made with transparent lens material and are suitable for lubricants, mineral, petroleum and water based fluids. They offer 180° visibility of fluid level.



**SLT-1214**  
**P562433**



Donaldson Part No.	Desc.	Feature	Seals
P562433	SLT-1214	5"/127 mm Level Gauge w/ Red Thermometer, Chrome Steel Frame	Neoprene

Bolt torque: 15 ft.-lbs./20 Nt-m. Do not exceed 20 ft.-lbs./27 Nt-m.

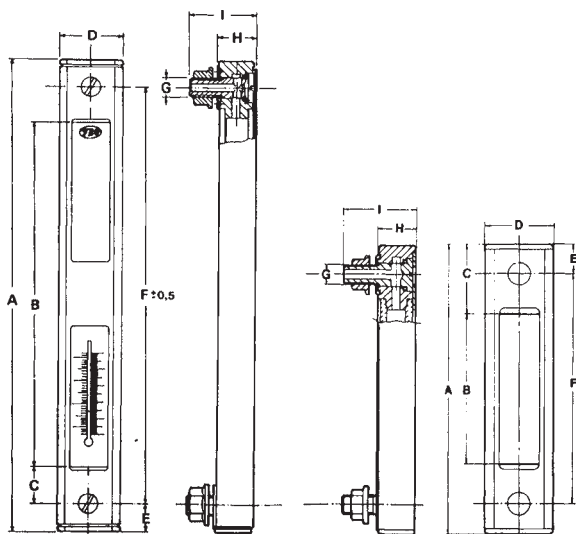
# Fluid Level Gauges

## Specifications

- Transparent lens material
- Buna-N<sup>®</sup> seals
- Maximum working pressure for pressurized tanks:  
14.5 psi / 1 bar / 100 kPa.
- Oil level and temperature or oil level only
- Temperature scale:  
35° to 210°F / 0° to 100°C.



Buna-N<sup>®</sup> is a registered trademark of E. I. DuPont de Nemours and Company.



**Bolt torque:** 10 ft.-lbs/Nt-m.  
Inside nut for tightening directly on the tank.  
Suggested mounting hole diameter: 11mm or 13mm.

## Oil Level/Temperature Gauge Specifications (35° - 210°F / 0° - 100°C)

(shown above left)

Part No.	Dimensions (in./mm)									
	A	B	C	D	E	F	G-Thread	H	I	
P171920	6.22/158	3.22/82	.89/22.5	1.57/40	.61/15.5	5/127	M12 x 1.75	.78/20	1.57/40	
P171922	11.22/285	8.23/209	.89/22.5	1.57/40	.61/15.5	10/254	M12 x 1.75	.78/20	1.57/40	

## Oil Level Gauge Specifications

(shown above right)

Part No.	Dimensions (in./mm)									
	A	B	C	D	E	F	G-Thread	H	I	
P171918	6.22/158	3.23/82	.89/22.5	1.57/40	.61/15.5	5/127	M12 x 1.75	.78/20	1.57/40	
P171913	4.21/107	1.22/31	.89/22.5	1.57/40	.61/15.5	3/76	M10 x 1.5	.78/20	1.57/40	

# Fluid Level Gauges

## Specifications

- Ultrasonically welded polyamide
- Suitable for pressurized reservoirs
- Maximum operating temperature: 212°F / 100°C
- Scale: 32°F to 212°F / 0°C to 100°C
- Maximum wall thickness:  
LG-3 - 1/2"/12.7 mm,  
LG-5/LG-10 - 3/8"/8.3 mm
- Buna-N® O-ring seals
- Zinc plated bolts
- Metric bolts

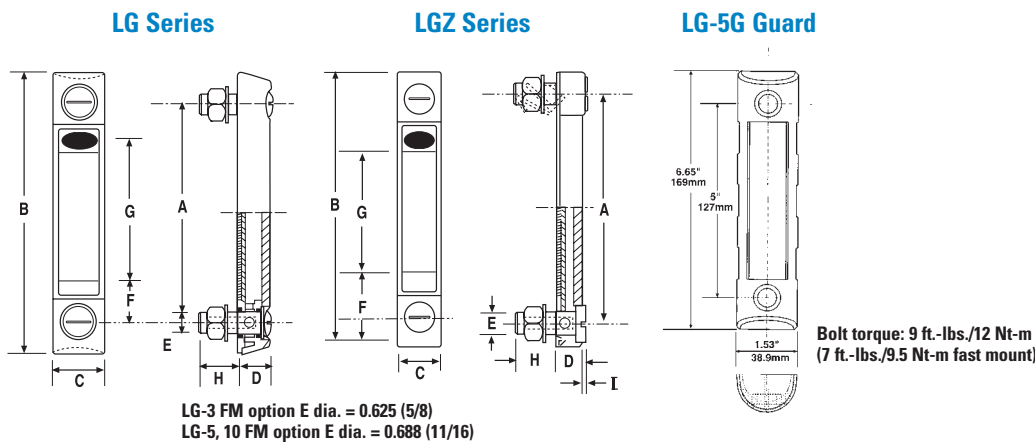


Note: Any contact with alcohol, alcohol-based washing fluids, or petroleum distillates must be avoided. Do not chamfer tank mounting holes. Not for water-glycol applications

Buna-N® is a registered trademark of E. I. DuPont de Nemours and Company.

## Options:

- 1/2"-13 bolts (LG-5)
- Protective guard (LG-5)
- Viton seals
- Red and blue thermometers
- Alcohol resistant version
- Fast mount kit (requires no internal access or threads to mount)



## Fluid Level Gauge Guard (LG-5 Series only)

Donaldson Part No.	Description	Feature	Bolt Center A (in./mm)	B (in./mm)	C (in./mm)	D (in./mm)
P562453	LG-G	5"/127 mm Level Gauge Guard	5.00/127	6.65/169	1.53/39	.98/25

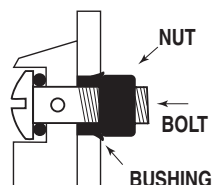
### Transparent Polyamide Fluid Level Gauges

Donaldson Part No.	Description	Feature	Bolt Center			Dimensions (in./mm)						
			A	B	C	D	Hole Dia. E	Bolt Size	F	G	H	I
P562438	LG-3	3" Level Gauge	3.00/76	4.17/106	1.06/27	.63/16	.42/10	M10 x 1.5	.71/18	1.31/33	.83/21	
P562440	LG-3-FM	3" Level Gauge w/ Fast Mount kit	3.00/76	4.17/106	1.06/27	.63/16	.625/16	M10 x 1.5	.71/18	1.31/33	.83/21	
P562441	LG-3-T	3" Level Gauge w/ Red Thermometer	3.00/76	4.17/106	1.06/27	.63/16	.42/10	M10 x 1.5	.71/18	1.31/33	.83/21	
P562442	LG-3-TB	3" Level Gauge w/ Blue Thermometer	3.00/76	4.17/106	1.06/27	.63/16	.42/10	M10 x 1.5	.71/18	1.31/33	.83/21	
P562454	LG-Z-3	3" Level Gauge	3.00/76	3.90/99	.90/22	.57/14.5	.42/10	M10 x 1.5	.70/18	1.30/33.6	.90/23	0.06/1.5
P562444	LG-5	5" Level Gauge	5.00/127	6.34/161	1.22/31	.71/18	.47/12	M12 x 1.75	.90/23	2.91/74	.90/23	
P562445	LG-5-13	5" Level Gauge w/ 1/2" -13 bolt kit	5.00/127	6.34/161	1.22/31	.71/18	.50/13	1/2" - 13 UNC	.90/23	2.91/74	.90/23	
P562447	LG-5-FM	5" Level Gauge w/ Fast Mount kit	5.00/127	6.34/161	1.22/31	.71/18	.688/17.5	M12 x 1.75	.90/23	2.91/74	.90/23	
P562448	LG-5-T	5" Level Gauge w/ Red Thermometer	5.00/127	6.34/161	1.22/31	.71/18	.47/12	M12 x 1.75	.90/23	2.91/74	.90/23	
P562449	LG-5-T-13	5" Level Gauge w/ Red Thermometer & 1/2"-13 bolt kit	5.00/127	6.34/161	1.22/31	.71/18	.50/13	1/2" - 13 UNC	.90/23	2.91/74	.90/23	
P562450	LG-5-TB	5" Level Gauge w/ Blue Thermometer	5.00/127	6.34/161	1.22/31	.71/18	.47/12	M12 x 1.75	.90/23	2.91/74	.90/23	
P562451	LG-5-T-FM	5" Level Gauge w/ Red Thermometer & Fast Mount kit	5.00/127	6.34/161	1.22/31	.71/18	.688/17.5	M12 x 1.75	.90/23	2.91/74	.90/23	
P563913	LG-5-T-G	5" Level Gauge w/ Red Thermometer & Guard	5.00/127	6.34/161	1.22/31	.71/18	.47/12	M12 x 1.75	.90/23	2.91/74	.90/23	
P562452	LG-5-T-SS	5" Level Gauge w/ Red Thermometer, Stainless Bolt kit	5.00/127	6.34/161	1.22/31	.71/18	.47/12	M12 x 1.75	.90/23	2.91/74	.90/23	
P562456	LG-Z-5	5" Level Gauge	5.00/127	5.9/150	.90/22	.57/14.5	.47/12	M12 x 1.75	.93/23.5	2.90/73.7	.90/23	0.06/1.5
P562458	LG-Z-5-V	5" Level Gauge w/ Viton seals	5.00/127	5.9/150	.90/22	.57/14.5	.47/12	M12 x 1.75	.93/23.5	2.90/73.7	.90/23	0.06/1.5
P562434	LG-10	10" Level Gauge	10.00/254	11.42/290	1.38/35	.71/18	.47/12	M12 x 1.75	1.02/26	7.60/193	.90/23	
P562435	LG-10-LF	10" Level Gauge w/ Level Float	10.00/254	11.42/290	1.38/35	.71/18	.47/12	M12 x 1.75	1.02/26	7.60/193	.90/23	
P562436	LG-10-T	10" Level Gauge w/ Red Thermometer	10.00/254	11.42/290	1.38/35	.71/18	.47/12	M12 x 1.75	1.02/26	7.60/193	.90/23	
P562437	LG-10-TB	10" Level Gauge w/ Blue Thermometer	10.00/254	11.42/290	1.38/35	.71/18	.47/12	M12 x 1.75	1.02/26	7.60/193	.90/23	
P563909	LG-10-TB-SS	10" Level Gauge w/ Blue Thermometer & Stainless Bolt kit	10.00/254	11.42/290	1.38/35	.71/18	.47/12	M12 x 1.75	1.02/26	7.60/193	.90/23	

### Fast-Mount Kits

Donaldson Part No.	Description
P563513	LG-3/3T
P563514	LG-5/5T, 10/10T

### Fast Mount Assembly Instructions



**Installation:** Tighten nuts on bolts to the point where nuts are snug against bushings. Apply one drop of thread lock to last exposed thread at end of bolts. Mount on tank and tighten to 7 ft.-lbs./1kg-m. (**DO NOT OVER-TIGHTEN**).

**Removal:** Loosen bolts and remove. (**IMPORTANT: THREAD LOCK PREVENTS OVER-LOOSENING OF BOLTS TO POINT WHERE NUTS DROP OFF INTO TANK.**)

## What Can the Donaldson Fluid Analysis Program Do For You?

Fluid analysis is a snapshot of what is happening inside your equipment. It tells you the condition of the lubricant and identifies component wear and contamination in virtually any application so that you can:

- Identify opportunities for optimizing filtration performance
- Safely extend drain intervals
- Minimize downtime by identifying minor problems before they become major failures
- Maximize asset reliability
- Extend equipment life

## Test Kits and Sampling Products Outside of North America

The fluid sampling program featured in this section is used by North American customers. If you're located outside of North America, we recommend you contact your local Donaldson distributor about the fluid sampling kits available.



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## Suggested Sampling Intervals and Methods

Fluid analysis is most effective when samples are representative of typical operating conditions. Always take samples at regularly scheduled intervals and from the same sampling point each time. How critical a piece of equipment is to production should be a major consideration for determining sampling frequency.

Hydraulic	250-500 hours	By vacuum pump through oil fill port of system reservoir at mid-level
Gearboxes	750 hours	By vacuum pump through oil level plug or dipstick retaining tube
Compressors	Monthly or at least every 500 hours	By vacuum pump through oil fill port of system reservoir at mid-level
Turbines	Monthly or at least every 500 hours	By vacuum pump through oil level plug or dipstick retaining tube

## Fluid Analysis Products

The Donaldson Advanced Fluid Analysis Kit is designed to monitor component wear, contamination and fluid condition.

### Benefits of the Fluid Analysis Program

- Partnership with a total filtration solutions provider
- High quality testing by an ISO 17025 A2LA accredited laboratory
- Results available immediately upon sample processing completion
- Innovative data management tools that will help you affect change in daily maintenance practices.

Fluid Sampling Products	Part No.
Fluid Analysis Service	X009330
<ul style="list-style-type: none"> <li>• 24 Metals by ICP</li> <li>• Water by Karl Fischer, ppm</li> <li>• Viscosity at 40°C or 100°C</li> <li>• Oxidation/Nitration by FTIR</li> <li>• Total Acid Number</li> <li>• ISO Particle Count/Particle Quantifier</li> </ul>	
Sample Extraction Pump	P176431
Sample Extraction Tubing	P176433

## Sending Samples to your Donaldson Laboratory

### Step 1

Fill out the Component Registration Form and include it with your sample in the shipping container provided. Use this form only when sampling a component for the first time or when submitting changes in component or fluid information already submitted to the laboratory.

### Step 2

Fill out the sample jar label completely and accurately, including unit ID, time on both the fluid and the unit and whether or not fluid has been added or changed.

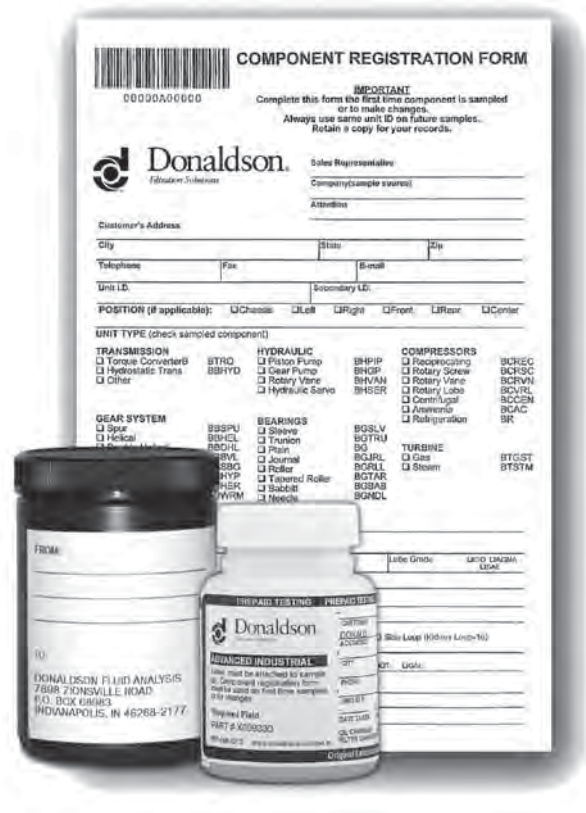
### Step 3

Complete the return address shipping label and apply it to the shipping container. Use only a trackable shipping service such as UPS or FedEx to send samples to the laboratory at:

Donaldson Fluid Analysis Laboratory  
7898 Zionsville Road  
Indianapolis, IN 46268-2177

### Step 4

Set up your account and receive your username and password for easy access to your test results by calling the laboratory's Customer Service at 877-458-3313. Go to [www.donaldson.com](http://www.donaldson.com), click on Industrial Hydraulics, and locate View Fluid Analysis Reports. Log in with your assigned username and password given to you by the laboratory.

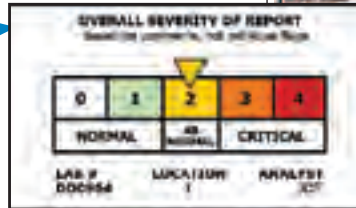


[www.donaldson.com/en/ih/fluidAnalysis.html](http://www.donaldson.com/en/ih/fluidAnalysis.html)



## Test Results / Reports from Your Sample

Your Donaldson test report color codes individual results by severity for a better understanding of the overall severity of the report. It also provides a graphical representation of the cleanliness level of the fluid with a photo micropatch accompanied by the Target ISO Chart done on each sample.




With Donaldson, you're also on track for total program management with problem summary reports, sample processing turnaround tracking and data mining capabilities that allow you to affect positive change in your daily maintenance practices.

- Get test results almost immediately – online
- Identify significant trends in fluid cleanliness
- Use management reports to pinpoint problems with critical units
- Identify bottlenecks in sample turnaround time
- Influence equipment purchasing decisions
- Access your information from anywhere there is an internet connection

## Test Points, Adapter and Hose Assemblies

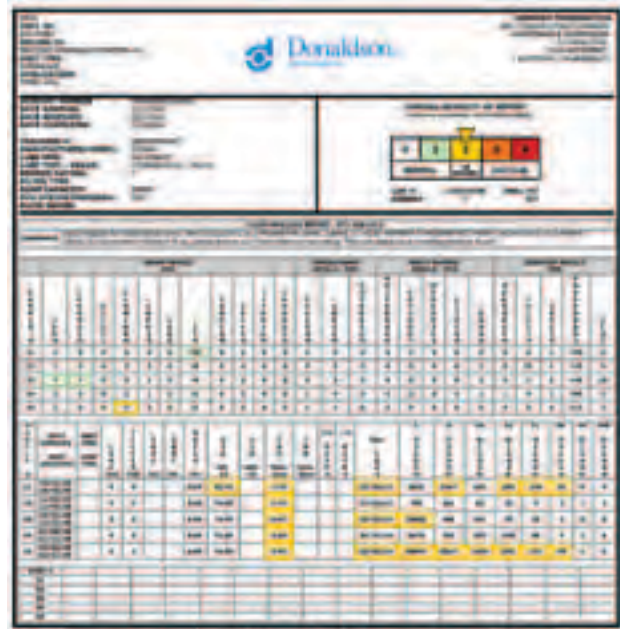
If you have filters installed in hard-to-access locations, test points and hose assemblies can be used to plumb up a bulkhead to read pressure differentials.

*See the Accessories Section to view extensive offering!*



# How to Read the Donaldson Fluid Analysis Report

Reading a fluid analysis report can be an overwhelming and sometimes seemingly impossible task without an understanding of the basic fundamentals for interpreting laboratory results and recommendations. Referring to the report descriptions and explanations below will help you better understand your results and, ultimately, better manage a productive, cost-saving reliability program.



## Customer, Equipment and Sample Information

The information submitted with a sample is as important to who is reading the report as it is to the analyst interpreting the test results and making recommendations. Know your equipment and share this information with your laboratory. Accurate, thorough and complete lube and equipment information not only allows for in-depth analysis, but can eliminate confusion and the difficulties that can occur when interpreting results.

### Unit, Lube, Turnaround Time and Account

information are listed on the left side of the report emphasizing the data most critical to laboratory processing and data interpretation. Details such as what kind of compressor, gearbox, engine, etc. influences flagging parameters and depth of analysis.

**Second ID** is each customer's opportunity to uniquely identify units being tested and their location.

**Application** identifies in what type of environment the equipment operates and is useful in determining exposure to possible contaminants.

Make note of the difference between the Date Sampled and the Date Received by the lab. Turnaround issues may point to storing samples too long before shipping or shipping service problems.

**Severity** is represented on a sliding scale and is color-coded so that critical units are more apparent at first glance. Overall severity is based on report Comments—not individually flagged results.

- 0—Normal
  - 1—At least one or more items have violated initial flagging points yet are still considered minor.
  - 2—A trend is developing.
  - 3— Simple maintenance and/or diagnostics are recommended.
  - 4—Failure is eminent if maintenance not performed.
- Occasionally, a test result can violate the S4 excursion level. But, if there is no supporting data or a clear indicator of what is actually happening within the unit, maintenance action may not be recommended.

**Manufacturer and Model** can also identify metallurgies involved as well as the OEM's standard maintenance guidelines and possible wear patterns to expect.

**UNIT ID:** AP3-4HS4  
**SECOND ID:** PROCESS HYDRAULIC STATION #4  
**UNIT TYPE:** HYDRAULIC  
**APPLICATION:** STEEL MILL

**ACCOUNT NUMBER:** 00000000000000  
**DATE SAMPLED:** 02/19/06  
**DATE RECEIVED:** 02/27/06  
**DATE COMPLETED:** 02/28/06

**TRACKING #:**  
**MANUFACTURER/MODEL:** DEMAG DA STUART  
**LUBE MFR:** HYDRASHIELD 150 68  
**LUBE TYPE - GRADE:** 0  
**FILTER TYPE:**  
**SUMP CAPACITY:** 00035  
**HYD SYSTEM PRESSURE:** 500  
**FLUID ADDED:**

**OVERALL SEVERITY OF REPORT**  
Based on comments, not individual flags

**LAB #:** DD0964  
**LOCATION:** I  
**ANALYST:** 3DT

**Data Analyst Initials**

**Lube Manufacturer, Type and Grade** identifies a lube's properties and its viscosity and is critical in determining if the right lube is being used.

**Fluid Added** is how much oil has been added since the last sample was taken.

**Filter Types and their Micron Ratings** are important in analyzing particle count—the higher the micron rating, the higher the particle count results.

**Sump Capacity** identifies the total volume of oil (in gallons) in which wear metals are suspended and is critical to trending wear metal concentrations.

The laboratory at which testing was completed is denoted by an **I for Indianapolis** and an **H for Houston**. The following Lab # is assigned to the sample upon entry for processing and should be the reference number used when notifying the lab with questions or concerns.

## Recommendations

A data analyst's job is to explain and, if necessary, recommend actions for rectifying significant changes in a unit's condition. Reviewing comments before looking at the actual test results will provide a roadmap to the report's most important information. Any actions that need to be taken are listed first in order of severity. Justifications for recommending those actions immediately follow.

FLUID ANALYSIS REPORT - 877-458-3313	
<b>COMMENTS</b>	Data flagged for observation only; Particle Count is at a MODERATE LEVEL (LEVEL 2); ACID NUMBER is MODERATELY HIGH; Aluminum is at a MINOR LEVEL; Is this system filtered? If so, please inform us of the filter micron rating. This will assist us in trending Particle Count;

**4**

"Highlighted" numbers denote test results the analyst has flagged because they exceed pre-set warning parameters and warrant closer examination or require action. Individual results are flagged by severity color to better explain the overall severity assigned to the sample.

SAMPLE #	WEAR METALS - PPM						CONTAMINANT METALS - PPM						MULTI-SOURCE METALS - PPM				ADDITIVE METALS - PPM					
	IRON	CHROMIUM	NICKEL	ALUMINUM	COPPER	LEAD	SILICON	SODIUM	POTASSIUM	MOLYBDENUM	ANTIMONY	MANGANESE	LITHIUM	BORON	MAGNESIUM	CALCIUM	BARIUM	PHOSPHORUS	ZINC			
30	1	0	0	0	0	0	157	0	0	0	0	6	0	0	0	0	0	0	135	4		
31	2	0	0	0	0	0	166	0	0	0	0	2	0	0	0	0	0	0	150	5		
32	1	0	0	2	0	0	28	0	0	0	0	0	3	0	0	0	0	2	10	1	126	5
33	4	4	0	0	1	0	44	0	0	0	0	0	0	0	0	1	0	1	0	140	10	
34	3	0	0	2	1	0	32	0	0	0	0	1	0	0	0	5	1	1	0	1	109	0
35	3	0	0	3	0	0	31	0	0	0	0	1	4	0	0	0	0	0	0	0	112	2

## Elemental Analysis

Elemental Analysis, or Spectroscopy, identifies the type and amount of wear particles, contamination and additives. Determining metal content can alert you to the type and severity of wear occurring in the unit. Measurements are expressed in parts per million (ppm).

Combinations of these Wear Metals can identify components within the machine that are wearing. Knowing what metals a unit is made of can greatly influence an analyst's recommendations and determine the value of elemental analysis.

Knowledge of the environmental conditions under which a unit operates can explain varying levels of Contaminant Metals. Excessive levels of dust and dirt can be abrasive and accelerate wear.

Additive and Multi-Source Metals may turn up in test results for a variety of reasons. Molybdenum, antimony and boron are additives in some oils. Magnesium, calcium and barium are often used in detergent/dispersant additives. Phosphorous is used as an extreme pressure additive in gear oils. Phosphorous, along with zinc, are used in anti-wear additives (ZDP).

SAMPLE #	WEAR METALS - PPM						CONTAMINANT METALS - PPM						MULTI-SOURCE METALS - PPM				ADDITIVE METALS - PPM					
	IRON	CHROMIUM	NICKEL	ALUMINUM	COPPER	LEAD	SILICON	SODIUM	POTASSIUM	MOLYBDENUM	ANTIMONY	MANGANESE	LITHIUM	BORON	MAGNESIUM	CALCIUM	BARIUM	PHOSPHORUS	ZINC			
30	1	0	0	0	0	0	157	0	0	0	0	6	0	0	0	0	0	0	135	4		
31	2	0	0	0	0	0	166	0	0	0	0	2	0	0	0	0	0	0	150	5		
32	1	0	0	2	0	0	28	0	0	0	0	0	3	0	0	0	0	2	10	1	126	5
33	4	4	0	0	1	0	44	0	0	0	0	0	0	0	0	1	0	1	0	140	10	
34	3	0	0	2	1	0	32	0	0	0	0	1	0	0	0	5	1	1	0	1	109	0
35	3	0	0	3	0	0	31	0	0	0	0	1	4	0	0	0	0	0	0	0	112	2

**Iron (Fe)**  
Definition: Iron is a wear metal detected with elemental analysis by ICP (Inductively Coupled Plasma), which detects up to 26 metals, measuring less than 200 sizes, that can be present in used oil due to wear, contamination or additives. Wear Metals include Iron, Chromium, Nickel, Aluminum, Copper, Lead, Cadmium, Silver, Titanium, Vanadium, Silicon, Sulfur, Phosphorus, and Boron. Additive Metals include Boron, Phosphorus, Calcium, Magnesium, Zinc, Barium, and Sodium. Elemental Analysis is instrumental in determining the type and severity of wear occurring in the unit.

**Standard Test Method Used:** ASTM D5185  
**Reporting Measurement:** ppm  
**Amount of Sample Needed:** 2 ml  
**Test Limitation:**

**Possible Sources:**  
**Recirculating Compressors:** Shafts, Rotors, Crankshaft, Piston Rings, Valves, Housing, Cartridge, Valves  
**Rotary Compressors:** Gears, Shafts, Bearings, Casing  
**Turbines / Centrifugal Compressors:** Shafts, Inlets, Bearings, Valves  
**Hydraulics:** Rods, Cylinders, Gears, Shafts, Valves  
**Recirculating Engines:** Crankshaft, Piston Rings, Gears, Crankshaft, Camshaft, Inlet, Valve Train, Oil Pan/Gear, Main Bearings

When reviewing your report online, you can click on the metal to see its definition, the ASTM test method used, how the results are reported, the amount of sample needed to perform the test, possible sources as to where the metal is coming from, and an illustration of the test equipment.



## Test Data

Test results are listed according to age of the sample—oldest to most recent, top to bottom—so that trends are apparent. Significant changes are flagged and printed in the gray areas of the report.

Samples\* appear in an oldest to newest **numbered sequence** so that results are easily associated with them throughout the report and depth of analysis.

**Viscosity** measures a lubricant's resistance to flow at temperature and is considered its most important physical property. Depending on lube grade, it is tested at 40 and/or 100 degrees Centigrade and reported in centistokes.

**Oxidation** measures the breakdown of a lubricant due to age and operating conditions. Oxidation prevents additives from working and therefore promotes increased acid content, as well as increased viscosity. **Nitration** is an indication of excessive "blow-by" from cylinder walls and/or compression rings and indicates the presence of nitric acid, which speeds up oxidation. Too much disparity between oxidation and nitration can indicate air to fuel ratio problems. As Oxidation/Nitration increases, TAN will also increase and TBN will begin to decrease.

The **ISO Code** is an index number that represents a range of particles within a specific micron range, i.e. 4, 6, 14. Each class designates a range of measured particles per one ml of sample. The particle count is a cumulative range between 4 and 6 microns. This test is valuable in determining large particle wear in filtered systems.

SAMP #	DATE SAMPLED DATE RECEIVED	UNIT TIME LUBE TIME	FUEL		SOOT	WATER		VISC		TAN	TBN	I-R OXIDA	I-R NITRA	ISO	4		6		10		14		21		38		70		100			
			CHG	CHG		Vol.	Vol.	Vol.	40C CS						100C CS	Total Acid	Total Base	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON	MICRO CON
30	09/05/05 09/14/05		N	N		0.00		82.10		6.78				17/16/14	786	387	171	87	25	3	1	0										
31	10/15/05 10/19/05		N	N		0.00		82.70		7.79				19/18/15	3805	1467	590	283	120	29	8	4										
32	11/07/05 11/10/05		N	N		0.00		70.60		3.34				17/15/11	788	261	82	20	5	2	1	1										
33	12/21/05 12/27/05		N	N		0.00		74.70		6.05				21/16/13	18836																	
34	01/08/06 01/11/06		N	N		0.00		71.50		2.53				19/17/14	2670																	
35	02/19/06 02/27/06		U	U		0.00		72.90		3.62				22/20/16	20844																	

SAMP #	DATE SAMPLED	DATE RECEIVED	UNIT TIME	LUBE TIME	FUEL	SOOT	WATER	VISC	TAN	TBN	I-R	I-R	ISO	4	6	10	14	21	38	70	100	
30																						
31																						
32																						
33																						
34																						
35																						

**TESTING SERVICES**

**Acid Number**

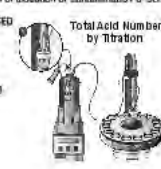
DEFINITION  
Acid Number is the amount of acid present. Numbers higher than that of new lubricants is an indication of oxidation or contamination of some kind.

STANDARD TEST METHOD USED  
ASTM D518

REPORTING MEASUREMENT  
mg KOH/g

AMOUNT OF SAMPLE NEEDED  
4g

TEST LIMITATION



Total Acid Number by Titration

**Fuel** and **Soot** results are all reported in % of volume. High fuel dilution decreases unit load capacity. Excessive soot is a sign of reduced combustion efficiency.

**Water** in oil decreases lubricity, prevents additives from working and furthers oxidation. Its presence can be determined by crackle or FTIR and is reported in % of volume. Water by Karl Fischer determines the amount of water present. These results appear in the Special Testing section of your report.

**TAN: Total Acid Number** is the amount of acid present in the lubricant. Numbers higher than that of new lube indicate oxidation or some type of contamination. **Total Base Number (TBN)** measures the lube's alkalinity, or ability to neutralize acid. When TAN and TBN approach the same number, the lube should be changed or "sweetened," meaning more lube could be added.

**Online Tip:** When reviewing your report online, you can click on the test name to see its definition, the ASTM test method used, how the results are reported, the amount of sample needed to perform the test and an illustration of the test equipment.

\* Providing your lab with a new sample allows the analyst to verify product integrity and establishes a guideline for analyzing subsequent used oil samples. A new sample will appear first on all reports for the unit maintenance guidelines and possible wear patterns to expect.

## Special Testing

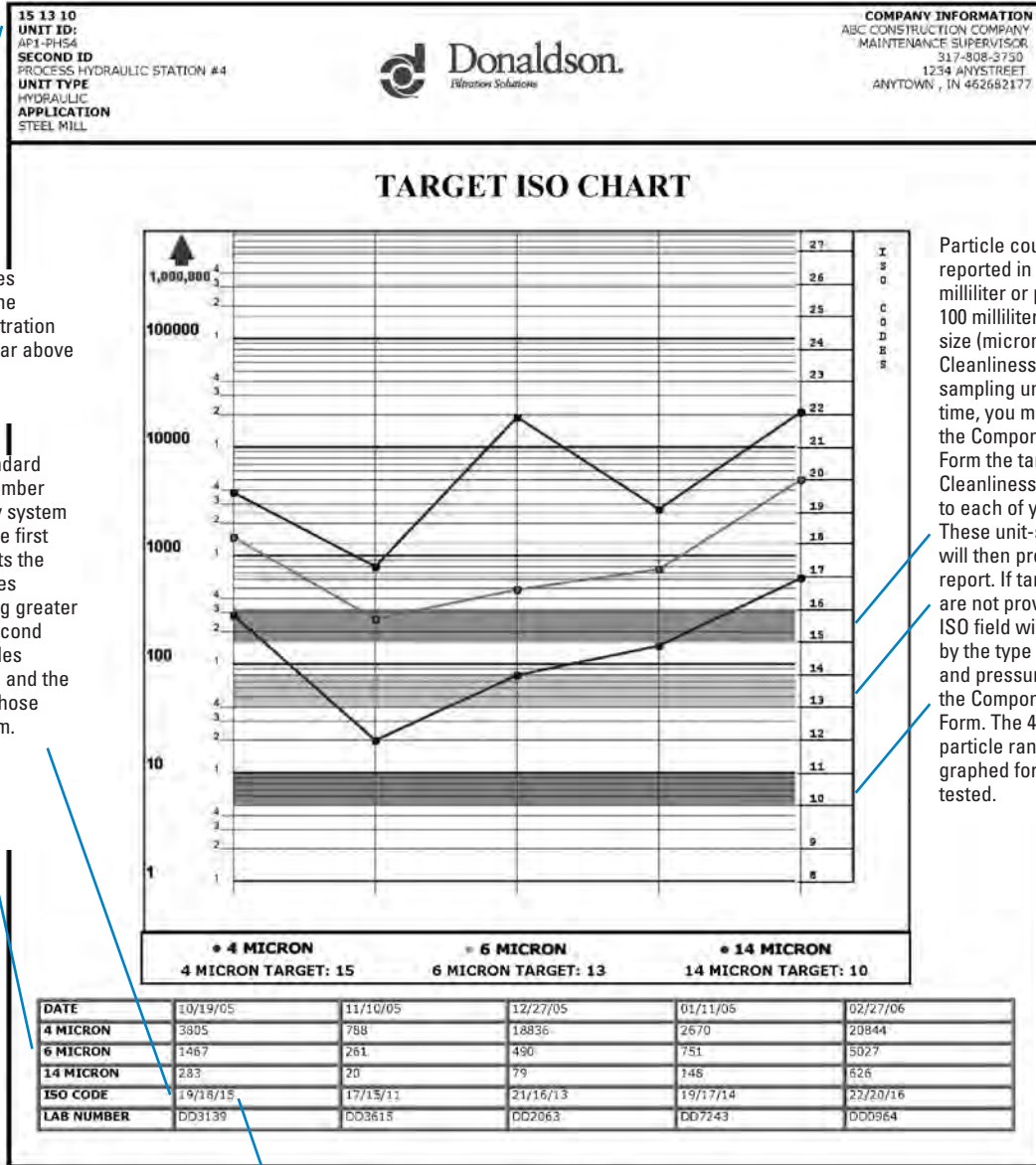
Special testing is often done when additional, or more specific, information is needed. For example, an Analytical Ferrograph might be requested when a ferrous metal larger than 5 microns has been detected by Direct Read Ferrography. The AF can determine actual size of the particle, its composition—iron, copper, etc.—and the type of wear it's creating—rubbing, sliding, cutting, etc. Additional special testing could include, Water by Karl Fischer and RPVOT (Rotating Pressure Vessel Oxidation Test).

### Photo Micropatch

A photo Micropatch is included with each test report and provides digital imagery of the wear debris, contamination and/or filter media particles found in each fluid sample. It is taken at a 100x magnification and includes the sample's ISO code and a 10 micrometer scale for particle size comparison.



### Target ISO Chart





## Portable Fluid Analysis Kit

The **Donaldson Portable Fluid Analysis Kit** (Part No. X009329) allows you to conduct immediate on-site particulate and water analysis in as little as ten minutes.

Using the patch test method, you can quickly and reliably assign a three-digit cleanliness code per ISO 4406-1999 to a given fluid sample. Simply pull a 25 ml fluid sample through a patch membrane filter and compare oil sample particle distribution with the Fluid Cleanliness Comparison Guide (included) to assign an ISO Cleanliness Code.

Also included is a water test kit that can be used to determine the percentage of water in hydraulic and lubrication oils. The water test kit has five ranges from .005% to 12% water. Measurements can be in parts per million or as a percentage of volume.

- Use this kit to determine which systems need improved filtration.
- When improvements are made, use it to monitor the cleanliness status of the system.
- A great alternative to expensive, portable electronic devices.

***Kit content details on the next page.***



The **Donaldson Portable Fluid Analysis Kit** includes enough supplies for 100 fluid samples. All apparatus is securely packaged and well-protected with laser-etched foam in a sturdy carrying case.

### Benefits

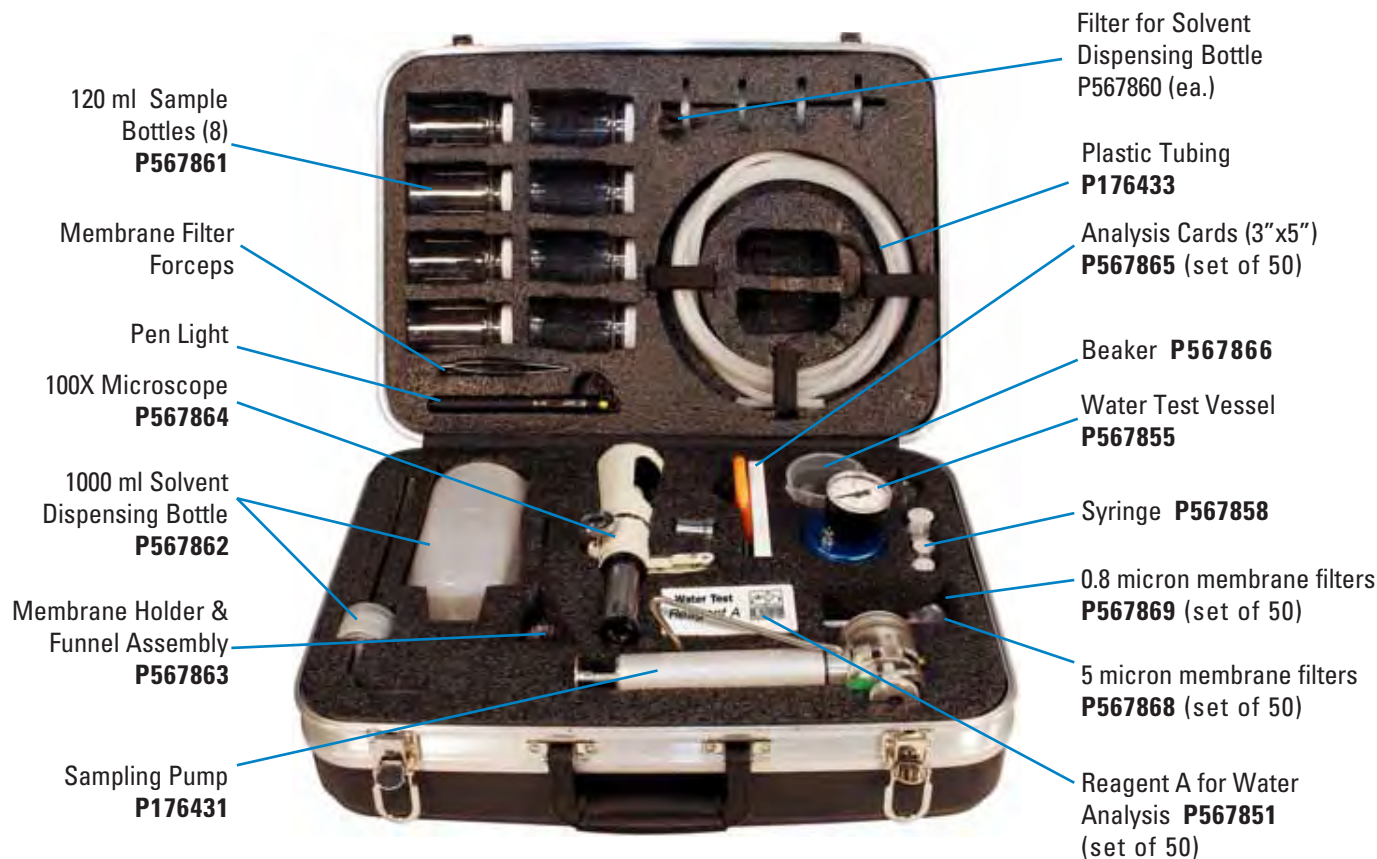
- Easy to use
- Results in as little as 10 minutes
- Measures particulate and water contamination levels
- Provides reliable results

## Kit Content and Physical Size:

**Case Size:** Height: 14.5"/368.3mm    Width: 19.25"/489mm    Depth: 7.75"/197mm

**Case Weight:** 9.95 lbs./4.51 kg

**Kit Part Number X009329**



120 ml Sample Bottles (8) **P567861**

Membrane Filter Forceps

Pen Light

100X Microscope **P567864**

1000 ml Solvent Dispensing Bottle **P567862**

Membrane Holder & Funnel Assembly **P567863**

Sampling Pump **P176431**

Filter for Solvent Dispensing Bottle **P567860** (ea.)

Plastic Tubing **P176433**

Analysis Cards (3"x5") **P567865** (set of 50)

Beaker **P567866**

Water Test Vessel **P567855**

Syringe **P567858**

0.8 micron membrane filters **P567869** (set of 50)

5 micron membrane filters **P567868** (set of 50)

Reagent A for Water Analysis **P567851** (set of 50)

## Basic Steps for Use

Kit includes detailed operating instructions and visual comparison guide.

1. Assemble the pump and funnel assembly and screw on empty sample bottle.
2. Place solvent dispensing bottle filter on spout of solvent dispensing bottle.
3. Wash funnel with solvent\* and pull solvent through assembly with hand-operated vacuum pump.
4. Place a patch membrane in the funnel assembly.
5. Pour the fluid sample into the funnel and fill to the 25 ml level.
6. Pull sample through patch membrane with hand-operated vacuum pump.
7. Wash funnel with solvent and pull through patch membrane with hand-operated vacuum pump.
8. When sample passes completely through patch membrane, remove membrane with forceps, place on clean index card and immediately cover with adhesive analysis lamination cover.
9. View patch membrane through microscope and compare sight screen from 100x microscope to various pictures shown in the Comparison Guide (included in kit) to assign the appropriate ISO cleanliness code.

\* Odorless mineral spirits

## Portable Oil Diagnostic System (PODS)

Donaldson Part Number: P567843

Intelligent and robust, the Portable Oil Diagnostic System measures, stores and reports oil condition parameters essential for reliable hydraulic systems operation. The unit analyzes fluids and lubricants in online or bottle sampling modes to determine the machine's operating condition immediately. This instant analysis is as accurate and precise as traditional laboratory analysis that normally takes weeks. Thus, providing a real-time assessment of the oil under operating conditions.

The PODS monitors the dirtiest of fluids due to its concentration limit of 30,000 particles/ml. Superior optics and design provide eight channels for particle counting, as well as measurement of viscosity and temperature to assess fluid conditions. Versatile in operation, the PODS offers compatibility with standard hydraulic fluids, oils and phosphate esters. A rugged carrying case ensures durability and the convenience of portability. The PODS contains a buffer for 500 records. The control analysis software provides real-time data download and visualization, as well as data analysis, formatting and reporting.

The PODS features a wide array of reporting formats, including ISO 4406, NAS 1638 and SAE AS 4059. The PODS can report to both the new MTD  $\mu\text{m}(c)$  sizes (4/6/14) or to the previous ACFTD  $\mu\text{m}$  sizes (2/5/15). Unlike other portable particle counters on the market, the PODS unit fully supports the ISO 11171 standard. Whether calibrated to the new ISO 11171 standard or the optional ISO 4402 standard, the PODS meets industry demands.



This unit is available only in North America. Not available for export through Donaldson.

### Features

- Efficient and intuitive to use
- Immediate laboratory-quality on site results
- Reports SAE and ISO cleanliness classifications, 4/6/14  $\mu\text{m}(c)$
- Harmonizes NAS 1638 to new MTD calibration
- Full ISO 11171 calibration options
- Standard bottle and online modes
- Multiple language support

### Applications

- Allows for proactive maintenance
- Monitor system operations
- Extend system reliability
- Certify manufacturing "roll off"
- Identify maintenance cycles
- Schedule repair periods
- Track online system cleanliness

## Technical Specifications

Donaldson Part Number: **P567843**

Number of Channels	8
Size Channels	ISO-MTD (standard) : 4, 4.6, 6, 9.8, 14, 21.2, 38, 68 $\mu\text{m}$
	ACFTD (optional): ~1, 2, 5, 10, 15, 25, 50, 100 $\mu\text{m}$
Flow Rate	50 ml/min standard (consult factory for optional offerings down to 15 mL/min)
Light Source	Laser diode
Calibration	ISO MTD (based on ISO 11171)
	Full ISO 11171 or ISO 4402 optional
Counting Efficiency	Meets JIS B9925:1997
Concentration Limit	20,000 particles/ml at 5% coincidence loss (per ISO 11171)
	30,000 particles/ml at 10% coincidence
Sample Volume	3 runs (averaged) of 5, 10 or 20 ml (programmable)
Fluid Temp Range	0 to 90°C at 25°C ambient (32 to 194°F at 77°F ambient)
Measured Fluid Temperature	0 to 100°C, $\pm 0.5^\circ\text{C}$ (32 to 212°F, $\pm 0.9^\circ\text{F}$ )
Viscosity Range	10 to 424 cSt
Measurement	10 to 424 cSt $\pm 20\%$ at value
Wetted Materials	Aluminum, stainless steel, sapphire, PTFE and Aflas®
Cleanliness Classification	ISO 4406-1991, ISO 4406.2-1999, NAS 1638,
	MIL-STD-1246C, NAVAIR 01-1A-1, SAE AS 4059
Data Storage	500 Sample Records
Dimensions	17.8 D x 33.0 W x 35.6 H cm (7 x 12.5 x 14 inches)
Weight	9.5 kg (21 lbs)
Input/Output	Serial Communication RS-232
Bottle Operation	Purge Volume 15 to 30 ml programmable
	Cartridge: CO <sub>2</sub> , replaceable, rechargeable
	Operating Capacity: 60 samples per cartridge (120 ml sample bottle)
	Shop Air : 60 to 110 psi (4.1 to 7.6 bar) clean, dry
Online Operation	Fluid Pressure: 40 to 6000 psi (2.75 to 413.7 bar)
	Purge Volume: 15 to 999 ml programmable
Power	DC Input: +24 VDC, 2A
	AC/Battery Adapter: Universal 100 to 240 VAC, 50 to 60 Hz, 60 W
	Rechargeable Battery: Nickel-Metal Hydride
	Operating Time: 100 samples or 4 hours continuous
	Recharge Time: 2.5 Hours
Environment	Ambient Temperature: 0 to 50°C (32 to 122°F); 20 to 85% relative humidity, non-condensing
	Storage: -40 to 70°C (-40 to 158°F), up to 98% relative humidity, non-condensing
Accessories Included	Carrying Case, High Pressure Hose Adapter, CO <sub>2</sub> Bottles, Sample Bottles, PODS Control Software
Optional Accessories	Ultrasonic Bath, Additional Sample Bottles and CO <sub>2</sub> Bottles

**N. America Technical Support 1-800-866-7889**





**Off-Line Filtration:**

**Where and Why Used**

The Donaldson Filter Cart, Filter Panel and Filter Buddy™ offer convenient off-line filtration, flushing and fluid transfer.\* Use them with your in-plant machinery and mobile hydraulic equipment to achieve and maintain proper ISO cleanliness levels.

\*Not for use with diesel fuel or gasoline.


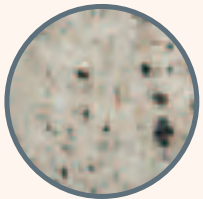
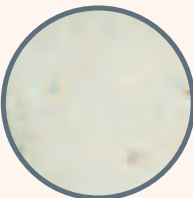


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**New oil isn't clean oil.**

To optimize system performance and lengthen component life, new oil should be filtered before being transferred into a reservoir or gearbox.

Typical Fluid Applications	Viscosity	Target ISO Cleanliness & Photo Micropatch	
Hydraulic Oil Transmission Oil Glycols (<150°F) Hydraulic Based Water Emulsions	0-500 cSt	<b>16/14/11</b> 	<b>ISO 22/21/18</b> Typical Cleanliness of New, Delivered Fluids 
Gear Oils Glycols Phosphate Esters	0-6000 cSt	<b>18/16/13</b> 	

# Filter Cart

The Donaldson filter cart provides a convenient portable mode of off-line filtration, flushing and fluid transfer.\* Use it with your in-plant machinery and hydraulic equipment to achieve and maintain proper ISO cleanliness levels.

Two in-series pressure filters can provide coarse/fine particle removal or, install a water absorbing filter to obtain particulate and water removal. The powerful one horsepower motor won't bog down and when coupled with a 10 gpm/38 lpm pump it provides efficient fluid transfer and filtration. Convenience features include a rear mounted motor for better balance, a removable angled drip tray and clear braided hoses.

The Donaldson filter cart is designed with performance, convenience and safety in mind. Its value added features make it the best choice to protect your machinery and equipment from breakdowns caused by contamination.

\*Not for use with diesel fuel or gasoline.



Features	Benefits
<b>Rugged and durable frame</b>	Enables long service life
<b>High efficiency media</b>	Cost effective filtration
<b>Two pressure filters</b>	Two-stage filtration – coarse/fine or particulate/water
<b>Safety relief valve</b>	Prevents over pressurizing and damage to pump, hoses and filters
<b>Overload protected switch</b>	Prevents motor/pump from overheating

## Applications

<b>Filter new fluid</b>	New fluids are usually above the recommended ISO cleanliness levels
<b>Offline filtration</b>	Filter cart can be used to supplement existing filtration
<b>Water removal</b>	Using Donaldson water removal filters to remove free water from the system.
<b>Transferring fluid</b>	Fluid is transferred from a storage container (tote, drum, tank, etc.) to a machine's reservoir
<b>Flushing</b>	After repairs & builds machines need to be flushed thoroughly before returning to service. During equipment commissioning, new machines have original fabrication debris and dirt that has ingressed during transport and storage.



**Filter Cart Features**

**Stainless steel wands**

- Will not break, corrosion resistant

**Differential pressure indicators**

- Lets you know when to change filters

**Two pressure filters mounted in series**

- Allows for particulate/water removal or coarse/fine particle removal

**Removable angled drip tray**

- Easy clean up, fluid will not leak out when tipped back

**Clear braided hoses**

- Visually shows fluid flowing

**Suction filter**

- Protects pump



**Oil sampling valve**

- Monitors filter performance and cleanliness of oil

**Motor/Pump**

- Industrial brand  
10 gpm / 38 lpm flow

**Motor mounted on back**

- Better balance
- Fluid will not drip on motor when changing filters

**Overload protected switch**

- Protects motor and pump from overheating

**Integrated safety relief valve**

- Protects against over pressurizing

**Foam filled tires**

- Tires will not go flat

**Available March 2012**  
Please contact your Donaldson sales representative for details.

## Filter Cart Assembly Choices

### Assembly Notes

Pressure and Suction Filters must be ordered separately.

Fluid Viscosity Type & Part Number *	Low Viscosity X011297 Reference: DFC-10-P1-WM	High Viscosity X011298 Reference: DFC-HV-2-P1
Maximum Recommended Fluid Viscosity:	500 SUS or 108 cSt*	8000 SUS or 1700 cSt*
Filter Bypass Valve Settings:	Suction – 5 psid/0.34 bar Pressure – 25 psid/1.7 bar	Suction – Y strainer Pressure – 25 psid/1.7 bar
Dry Weight:	approx. 140 lbs. (63.5 kg)	approx. 175 lbs. (79.38 kg)
Electrical Service:	115 volts: 14 amp, single phase	
Cord Length:	7 ft. /2.1 m cord with storage for 50 ft./15 m	
Gear Pump:	60 Hz: 10.4 gpm/38 lpm*	
Motor:	1 hp TEFC**	
Compatibility:	Mineral-based fluids, water glycols, polyol esters	
Operating Temperature:	-10° F to 150° F (-23° C to 65° C)	
Dimensions:	Height: 47" (1194 mm) Width: 24" (610 mm) Depth: 23" (585 mm) Hose/Wand assembly length: 10' (3.05 m)	
Notes:	Requires three filters	Requires six filters

## Pressure Filter Choices

Media Number	Media Type	B <sub>1000</sub> = 1000 Rating	Length (in./mm)	Part No.
No. ½	Synteq™	<4 µm	14.2/361	P564468
No. 1	Synteq	5 µm	11.6/294	P170906
			11.6/294	P171273; Viton®, Epoxy
No. 2	Synteq	9 µm	11.6/294	P165675
			11.6/294	P171274; Viton, Epoxy
			14.2/361	P179763
No. 2½	Synteq	10 µm	11.6/294	P176567
No. 3	Synteq	10 µm	14.2/361	P170949
No. 4	Synteq	10 µm	7.6/193	P176207
			11.6/294	P165659
			11.6/294	P171275; Viton, Epoxy
No. 9	Synteq	23 µm	7.6/193	P176208
			11.6/294	P165569
			11.6/294	P171276; Viton, Epoxy
No. 20	Synteq	>50 µm	14.2/361	P173789
			11.6/294	P165672
N/A	Water Removal	N/A	14.2/361	P170546
			11.6/294	P179075

## Suction Filter Choices

Media Type	Beta <sub>200</sub> = 200 Rating	Length (in./mm)	Part No.
Wire	150 µm	6.7/170	P550275
Mesh	nominal	10.7/271	P550276

\*Contact Donaldson for special order options

\*\*Totally Enclosed Fan-Cooled

\*\*\* Same filters applied to HMK05/25 Models

### Filter Notes

• Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.

• Thread size is 1 3/4"-12 UNF-2B

<sup>1</sup> Filters with seals made of Buna-N® are appropriate for most applications involving petroleum oil. Filters with seals made of Viton® (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F. Donaldson offers both types, as shown in the table above. Filters with seals made of Buna-N® are appropriate for most applications involving petroleum oil. Viton® and Buna-N® are registered trademarks of E. I. DuPont de Nemours and Company.

## Calculating the Time Required for Single-Pass Filtration

When using the filter cart for offline filtration the fluid will need to pass through the filter cart approximately seven times to achieve single-pass filtration. Use the following formula to calculate the amount of time needed to achieve single-pass filtration:

$$\text{(Reservoir Size x 7) / Filter Cart Flow Rate} = \text{Time}^{***}$$

**For example:** if you have a 50 gallon reservoir it will take approximately 35\* minutes to achieve single-pass filtration.  
(50 gallons x 7) / 10 gpm = 35 minutes

\*\*\*Times will vary depending on initial cleanliness of oil, system ingress, choice of media grades and other variables.



**Donaldson High Viscosity  
Filter Cart  
X011298**

## Filter Buddy

### Handheld Portable Filtration System

The Donaldson Filter Buddy™ is a 2 gpm (7.6 l/min) handheld portable system allowing you to kidney loop reservoirs that you normally cannot with larger filter carts.\* Its small size and light weight (approx. 45 lbs.) allows carrying up and down stairs and into tight or confined spaces. It also fits on top of a drum for convenient transferring and filtering from a drum to a reservoir.

The Filter Buddy features dual HMK04 filtration utilizing Donaldson's exclusive high efficiency Synteq™ media. The filters are plumbed in series giving you the option of coarse/fine particle removal or install a water absorbing filter for water/ particle removal.

There are two models available: a standard (low viscosity) version for fluids up to 900 SUS and a high viscosity version for fluids up to 8000 SUS.

\*Not for use with diesel fuel or gasoline.



Features	Benefits
Rugged and durable frame	Enables long service life
Compact size	Allows filtration in hard to reach locations
High efficiency media grades	Cost effective filtration
Dual stage filtration	Coarse/fine or water/particulate removal
Overload protected switch	Prevents motor/pump from overheating
Sample ports	Enables system cleanliness measurements

Applications	
Fluid transfer	Ensure that the fluid you are transferring from a drum or tote is clean.
Offline filtration	Supplement existing filtration to achieve target ISO cleanliness levels.
Water removal	Using Donaldson water removal filters to remove free water from the system.
Filter new fluid	Clean up new fluids because they are usually highly contaminated. Don't contaminate your equipment with new fluids. Protect your equipment with proper filtration.

**Available March 2012**  
Please contact your Donaldson sales representative for details.

## Filter Buddy™ Assembly Choices

### Assembly Notes

Filters must be ordered separately.

Fluid Viscosity Type & Part Number*	Low Viscosity X011303 Reference: DFB-2-P1	High Viscosity X011304 Reference: DFB-HV-2-P1
<b>Electrical Service:</b>	115 volts: 8.4 amp, single phase,	230 volts: 4.2 amp, single phase
<b>Pump:</b>	2 gpm (7.6 lpm)	1.8 gpm (6.8 lpm)
<b>Motor:</b>	½ hp TEFC**	¾ hp TEFC
<b>Maximum Recommended Viscosity:</b>	900 SUS (200 cSt)	8000 SUS (1700 cSt)
<b>Compatibility:</b>	Mineral-based fluids, Water glycols, Polyol esters	
<b>Hose:</b> terminated with male NPT connections	<b>Suction:</b> 4' (1.2m) Length, ¾" (1.9 cm) OD	<b>Suction:</b> 4' (1.2m) Length, 1" (2.5cm) OD
	<b>Discharge:</b> 7' (2.1m) Length, ½" (1.3 cm) OD	<b>Discharge:</b> 7' (2.1m) Length, ¾" (1.9 cm) OD
<b>P573154 Stainless Steel Wand Kit (optional):</b>	<b>Suction:</b> 40" (1.0 m) Length	<b>Discharge</b> 20" (.5 m) Length
<b>Dry Weight:</b>	Approx. 55 lbs. (25 kg)	Approx. 65 lbs. (29 kg)
<b>Dimensions:</b>	<b>Height:</b> 21" (533 mm)	<b>Height:</b> 25" (635 mm)
	<b>Width:</b> 13" (330 mm)	<b>Width:</b> 13" (330 mm)
	<b>Length:</b> 26" (660 mm)	<b>Length:</b> 26" (660 mm)
<b>Notes:</b>	Requires two filters	Requires two filters

## Pressure Filter Choices

Media	B <sub>10</sub> = 1000 Rating	Media Technology	Length (in.)		Part No.	
No. ½	<4 µm	Synteq™	9.4	240	P165185; Viton® Seal	
No. 1	5 µm	Synteq	9.4	240	P167590	
No. 2	9 µm	Synteq	6	52	P165354	
			9.4	240	P165332	
No. 2½	10 µm	Synteq	6	152	P176565	
			9.4	240	P176566	
			9.4	240	P173737	
No. 2	10 µm	300 psi collapse	11.6	295	P179343	
			9.4	240	P170950	
No. 3	10 µm	Synteq	300 psi collapse	9.4	240	P163542
				9.4	240	P163555
				6	152	P164375
				9.4	240	P164378
No. 6	13 µm	Synteq	9.4	240	P164056; Viton Seal	
No. 7	33 µm	Synteq	6	152	P164381	
			9.4	240	P164384	
No. 9	23 µm	Synteq	6	152	P163315	
			9.4	240	P163567	
No. 16	22 µm	Synteq	9.4	240	P164059; Viton Seal	
No. 20	>50 µm	Synteq	6	152	P165335	
			9.4	240	P165338	
WA	na	Water Removal	9.4	240	P560584	

\*Contact Donaldson for special order options

\*\*Totally Enclosed Fan-Cooled

### Notes

- Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.
- Standard filter collapse rating is 150 psi, except as noted.
- Thread size is 1 3/8"-12 UNF-2B

<sup>1</sup> Filters with seals made of Buna-N® are appropriate for most applications involving petroleum oil. Filters with seals made of Viton® (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions and HWC (high water content fluids) over 150°F. Donaldson offers both types.

Buna-N® Viton® are a registered trademarks of E. I. DuPont de Nemours and Company.



## Filter Panels

### Fixed-Mounted Off-Line Filtration

The Donaldson filter panels provide fixed-mount offline filtration and a turnkey approach to supplemental filtration.\* It isn't necessary for you to design and build a system, simply choose the desired flow rate and media grades, and let Donaldson build one for you.

Machinery and equipment are often designed with inadequate filtration, which will greatly decrease the life of your equipment and increase maintenance costs. Donaldson filter panels provide supplemental filtration for your in-plant machinery and hydraulic equipment helping to reduce costs and achieve and maintain proper ISO cleanliness levels.

Donaldson filter panels are offered in 3 gpm, 5 gpm and 10 gpm (11.4, 18.9 and 37.9 lpm) models. Reservoir size, fluid viscosity and fluid temperature will help determine the correct flow rate. Filter panels feature dual HMK05 filtration utilizing Donaldson's exclusive high efficiency Synteq™ media. The filters are plumbed in series giving you the option of coarse/fine particle removal or install a water absorbing filter for water/particle removal.



\*Not for use with diesel fuel or gasoline.

Features	Benefits
High efficiency media grades	Cost effective filtration
Dual-stage filtration	Coarse/Fine or Water/Particulate removal
Differential pressure indicators	Alerts you when to change filters
Optional overload protected switch	Prevents motor/pump from overheating
Sample port	Enables system cleanliness measurements

Applications	
Offline filtration	Supplement existing filtration to achieve target ISO cleanliness levels.
Water removal	Using Donaldson water removal filters to remove free water from the system.
Filter new fluid	Clean up new fluids because they are usually highly contaminated. Don't contaminate your equipment with new fluids. Protect your equipment with proper filtration.



**Available March 2012**  
Please contact your Donaldson sales representative for details.

## Filter Panel Assembly Choices

### Assembly Notes

Filters must be ordered separately.

Fluid Viscosity Type & Part Number*	Low Viscosity Maximum 500 SUS (108 cSt)			High Viscosity Maximum 8000 SUS (1700 cSt)
	X011299 Ref: DFP-3-P1	X011300 Ref: DFP-5-P1	X011301 Ref: DFP-10-P1	X011302 Ref: DFP-HV-2-P1
<b>Gear Pump Flow Rate:</b>	3 gpm (11.4 lpm)	5 gpm (18.9 lpm)	10 gpm (37.9 lpm)	2 gpm (7.57 lpm)
<b>TEFC** Motor:</b>	½ hp	¾ hp	1 hp	1 hp
<b>Compatibility:</b>	Mineral-based fluids, water glycols, polyol esters			
<b>Connections</b>	Inlet (pump) : SAE 12 O-Ring Outlet: SAE 20 O-Ring			Inlet (pump) : SAE 12 O-Ring Outlet: SAE 20 O-Ring
<b>Electrical Service: 115 volts</b>	8.4 amp	14 amp	14 amp	14 amp
<b>230 volts</b>	4.2 amp	7 amp	7 amp	7 amp
<b>Dry Weight:</b>	Approx. 95 lbs. (43 kg)			Approx. 120 lbs. (54 kg)
<b>Dimensions:</b>	<b>Height:</b> 20" (508 mm)		<b>Width:</b> 36" (915 mm)	<b>Depth:</b> 8" (203 mm)
<b>Notes:</b>	Requires 2 Filters			Requires 4 Filters

\*Contact Donaldson for special order options

\*\*Totally Enclosed Fan-Cooled

## Filter Choices

Media Number	Media Type	B <sub>et</sub> = 1000 Rating	Length (in./mm)	Part No.
No. ½	Synteq™	<4 µm	14.2/361	P564468
No. 1	Synteq	5 µm	11.6/294	P170906
			11.6/294	P171273 <sup>1</sup> Viton, Epoxy
No. 2	Synteq	9 µm	11.6/294	P165675
			11.6/294	P171274 <sup>1</sup> Viton, Epoxy
			14.2/361	P179763
No. 2½	Synteq	10 µm	11.6/294	P176567
No. 3	Synteq	10 µm	14.2/361	P170949
No. 4	Synteq	10 µm	7.6/193	P176207
			11.6/294	P165659
			11.6/294	P171275 <sup>1</sup> Viton, Epoxy
No. 9	Synteq	23 µm	7.6/193	P176208
			11.6/294	P165659
			11.6/294	P171276 <sup>1</sup> Viton, Epoxy
No. 20	Synteq	>50 µm	14.2/361	P173789
			11.6/294	P165672
	Water Removal	N/A	11.6/294	P170546
			11.6/294	P179075

### Filter Notes

- Refer to table in the Technical Reference Guide for fluid compatibility with our filter media.
- Thread size is 1 3/4"-12 UNF-2B

<sup>1</sup> Filters with seals made of Buna-N® are appropriate for most applications involving petroleum oil. Filters with seals made of Viton® (a fluoroelastomer) are required when using diester, phosphate ester fluids, water glycol, water/oil emulsions, and HWCF (high water content fluids) over 150°F. Donaldson offers both types, as shown in the table above. Filters with seals made of Buna-N® are appropriate for most applications involving petroleum oil. Viton® and Buna-N® are registered trademarks of E. I. DuPont de Nemours and Company.

## VDOPS Vacuum Dehydration Oil Purification System

### Features

- Variable frequency drive to improve inlet condition and performance
- Claw vacuum pump for superior performance and long life
- All controls and system function viewable from the front
- Alarm when filter is plugged and needs to be changed
- Upstream & downstream oil sample ports
- Custom options
- Space efficient
- High water extraction rates



### Example Model Number: VDOPS-50VFD-840X-64kW-AWD-480-N4-V

Classification	Code	Description
Product Type	VDOPS	Vacuum Dehydration Oil Purification System
Flow Rate	50VFD	50 GPM (189 lpm) Variable Frequency Drive (Variable Flow)
Housing Size and Style	840X	840X Carbon Steel Filter Housing
Heater Size	64kW	64 Kilowatt Heater
Optional Equipment	AWD	Auto Water Drain
Electrical Requirement	480	480 Volts
NEMA Rating	N4	NEMA 4
Seal Material	V	Viton

#### Installation Requirements

Input Voltage	480 V / 3 Phase / 60 Hz
Designed FLA (Full Load Amps)	98 AMPS
Inlet Connection Size	2" Female Camlock
Outlet Connection Size	2" Male Camlock

#### Electrical Operating Specifications

Oil Pump Motor	(Nameplate Rating)
Vacuum Pump Motor	(Nameplate Rating)

#### Mechanical Operating Specifications

Flow Rate	50 GPM (189 lpm)
Maximum Discharge Pressure	100 PSI (6.9 bar)
Normal Discharge Press	30 PSI (2.1 bar)
Maximum Vacuum Setting	27" Hg (686 mm Hg)
Minimum Vacuum Setting	15" Hg (381 mm Hg)
Normal Heater Set Point Setting	150° F (66° C)
Maximum Oil Viscosity	1500 SSU (323 cSt)
Seal Material	Viton

### IMPORTANT Product Restriction

The **Vacuum Dehydration Oil Purification System** should never be used to remove particulates from volatile fluids such as gasoline since the pump cannot be used for solvents with low lubricity. In addition, the unit should not be used on liquids with a flash point below 200°F (93°C).

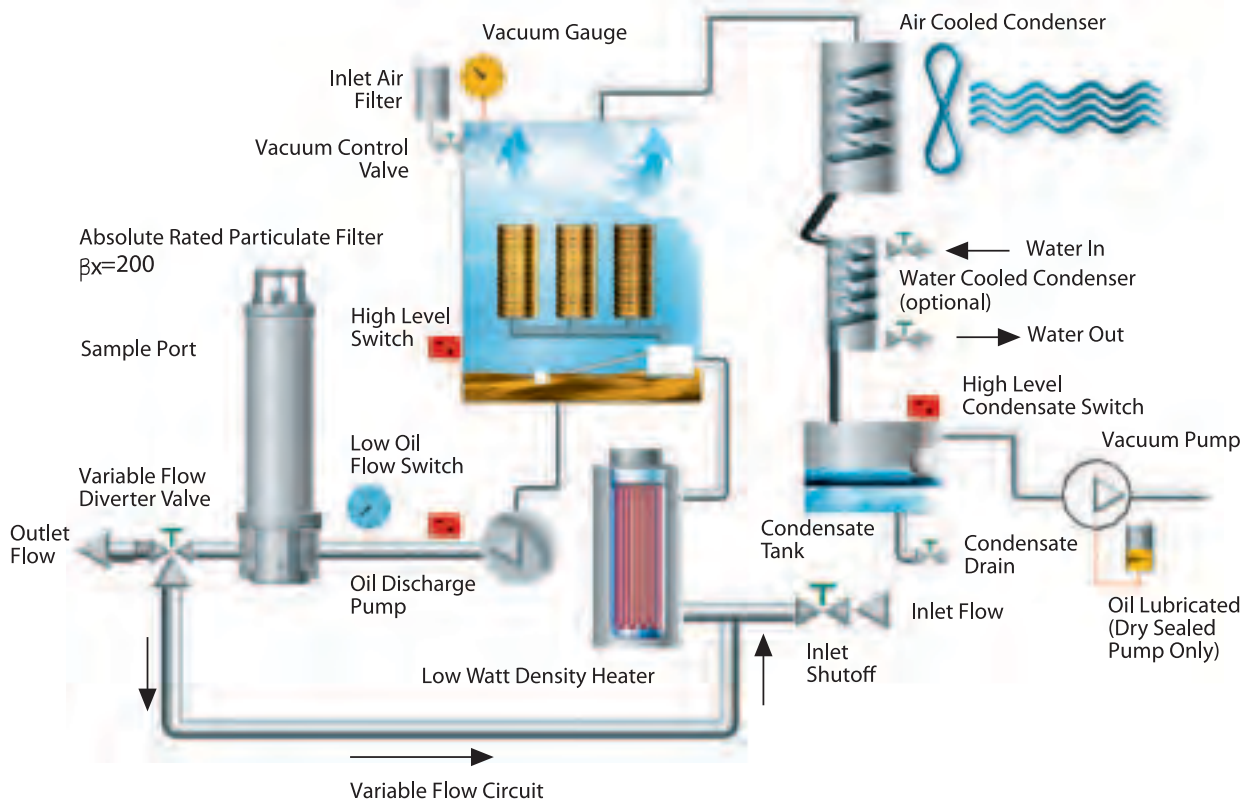
### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

## Vacuum Dehydrators

The ultimate piece of equipment to effectively remove particulate, water and dissolved gases from petroleum and synthetically based fluids. This system removes 100% of free and emulsified water from oils, and 90% of dissolved water from oils to as low as 20 ppm. It also removes particulate to as low as ISO 12/10/9. In addition, this system removes 90% of dissolved gases. It is available in flow rates from 1-200 gpm (4-760 lpm), NEMA 4 and 7 Explosion Proof with custom options.

### VDOPS Schematic



The water removal principle used in the Vacuum Dehydrators dependably removes water well below the oil saturation point, even when tightly bound in an emulsion. A vacuum pump draws fluid into the unit where it is heated and then flows through dispersal filters inside the vacuum tower. Contaminated oil flows through the pores of these filters, is exposed to the vacuum and dehydrated. Dried oil is removed, filtered and pumped back into the reservoir.

## COPS Coalescer Oil Purification System

### Features

- Variable frequency drive to improve inlet condition and performance
- Positive displacement pump for superior performance
- All controls and system function viewable from the front
- Auto mode for auto water drain
- Upstream and downstream oil sample ports
- Custom options
- Space efficient
- High free water extraction rates



### Coalescers

Designed to rapidly remove free water and particulates from diesel fuel, fuel oil and most other hydraulic/lubricating oils. Coalescing technology outperforms centrifuges, are simpler to use, cost less to maintain and are lower in initial purchase price. Designed to run continuously in an outdoor environment, virtually no mechanical maintenance is needed. Flow rates available from 20-275 gpm (76-1041 lpm).

#### Example Model Number: COPS-20VFD-840X/2-24kW-480-TS-N4-B

Classification	Code	Description
Product Type	COPS	Coalescer Oil Purification System
Flow Rate	20VFD	20 GPM (76 lpm), Variable Flow Drive
Housing Size and Style	840X/2	Qty (2) 840X Housings in Series
Heater Size	24kW	24 kilowatts
Electrical Requirement	480	480 / 3 Phase / 60 Hz
Optional Equipment	TS	Touch Screen
NEMA Rating	N4	NEMA 4
Seal Material	B	Buna-N
<b>Installation Requirements</b>		
Input Voltage		480 / 3 Phase / 60 Hz
Designed FLA (Full Load Amps)		35 AMPS
Inlet Connection Size		2" Flanged
Outlet Connection Size		1-1/2" Flanged
<b>Mechanical Operating Specifications</b>		
Flow Rate		20 GPM (76 lpm)
Maximum Discharge Pressure		100 PSI (6.9 bar)
Maximum Oil Viscosity		1500 SSU (323 cSt)
Seal Material		Buna-N®

#### IMPORTANT Product Restriction

**The Coalescer Oil Purification System** should never be used to remove particulates from volatile fluids such as gasoline since the pump cannot be used for solvents with low lubricity.

#### LEAD TIME NOTE:

This product is configured with the specifications and features of your choice. Please contact your Donaldson sales representative for lead time details.

## Fluid Purification Systems

### LTC Transformer Filtration

Bolt this system onto a transformer and continuously remove particulate (carbon) and water contamination, maintaining high dielectric values. Ideally suited for kidney loop filtration applications.



### Bearing Lubrication

This system will remove particulate and heat from bearing lube oils to increase bearing life. It will achieve particulate removal from fluids to as low as ISO 12/10/9. It is available with optional flow and temperature monitoring devices.

### High Flow Filter Skids

This system is ideal for rapidly removing particulate contamination from large reservoirs. Furthermore, this system creates turbulent flows in piping for oil flushing and efficiently removes particulate contamination to as low as ISO 12/10/9 levels. Flow rates are available from 50–2000 gpm (190–7600 lpm) with many quality features and additional options to increase its capabilities.



### Common Fluid Purification Applications:

Turbine Lube Oil / Petro-Chemical Compressors / Diesel and Gas Fired Engines /  
Substation Maintenance Transformer Oil / EHC Speed Control Systems /  
Hydraulic Power Units for All Industries





The Donaldson Filter Buddy™ in use – cleaning up dirty oil in a small power unit.

Donaldson Delivers *any*  
**Performance Under Pressure**







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 **Clean. Protect.  
Polish.™**



# Bulk Fuel and Lube Filtration Systems

## Why Filter Bulk Fluids?

For filtration challenges downstream of the refinery, from delivery to the bulk tank right up to the final point of use.

### Filters

Max. Working Pressure: 350 PSI/24.1 bar  
 Rated Static Burst: 800 PSI/55.2 bar  
 Operating Temperature: -40°F - 190°F/ -40°C - 88°C

Part Number	Fluid Type	Max. Flow Range	Target Iso Cleanliness	Filter Efficiency
P568664	Engine Oil and Gear Oil	65 gpm/246 lpm	18/16/13	25 micron @ Beta 2000
P568665	Transmission Oil and Hydraulic Oil	65 gpm/246 lpm	16/14/11	7 micron @ Beta 2000
P568666	All Fuels	65 gpm/246 lpm	14/13/11	4 micron @ Beta 2000
P570248	Ethanol-Free Fluids*	65 gpm/246 lpm	18/16/13	20 micron @ Beta 2000

\*Designed with expanding, water-absorbing media that prevents water from entering storage or equipment tanks.



### Filter Heads

Max. Working Pressure: 350 PSI/24.1 bar  
 Rated Static Burst: 800 PSI/55.2 bar

Part Number	Filter Qty	Mounting Connection	Max. Flow Range
P570329	1	SAE-20 O-Ring	65 gpm/246 lpm
P570330	1	1 1/4" NPT	65 gpm/246 lpm
P568583	2	1 1/2" SAE 4-Bolt	125 gpm/473 lpm



### Filter Manifolds

Part Number	Filter Qty	Mounting Connection	Max. Flow Range
P561880	4	2" ANSI 150 Flange	250 gpm/946 lpm
P568932	8	4" ANSI 150 Flange	500 gpm/1893 lpm
P568933	10	4" ANSI 150 Flange	600 gpm/2271 lpm

### T.R.A.P.™ Breathers

T.R.A.P. breathers prevent dirt and moisture from entering storage tanks from the vent.

Assembly Part Number	Mounting Connection	Max. Flow Range	Filter Efficiency	Replacement Part Number
X920006	1.5" NPT Female	500 gpm/1893 lpm	>97% @ 3 micron	P923075



P570248 T.R.A.P.™ ARV™

Water absorbing filters (P570248), T.R.A.P.™ breathers, and Active Reservoir Vent™ products are used together to prevent moisture and contaminants from entering a bulk storage tank ensuring fluids are kept clean and dry.

### Active Reservoir Vents (ARV)™

The ARV blows a blanket of dry, compressed air over fluids in storage to remove, free, and dissolve water.

Electrical Requirements: 110 V/50-60 Hz AC, Approx. 4W

Part Number	Flow Rate (scfm)	Mounting Connection	Max. Tank Size
P568790	3	1/2" NPTF	10,000 Gal/37,900 Liters
P568791	10	1/2" NPTF	30,000 Gal/113,700 Liters

### Point-of-Use Filters

#### High-Pressure Filtration for Point-of-Use Applications

Designed for high pressure delivery systems out of bulk storage tanks, typically on air pump fed hose reels in lube shops.

Element Collapse Rating: 300 PSI/20 Bar  
 Max. Working Pressure: 800 PSI/55 Bar  
 Rated Static Burst: 1700 PSI/117 Bar

Part Number	Fluid Type	Max. Flow Range	Filter Efficiency
P565183	For Hydraulic, Gear, Transmission and Engine Oils	50 gpm/189 lpm	15 micron @ Beta 2000
P565185	For Hydraulic, Gear, Transmission and Engine Oils	50 gpm/189 lpm	7 micron @ Beta 2000
P565184	For Hydraulic, Gear, Transmission and Engine Oils	50 gpm/189 lpm	4 micron @ Beta 2000

### Point-of-Use Filter Heads

Max. Working Pressure: 800 PSI/55 Bar  
 Rated Static Burst: 1700 PSI/117 Bar

Part Number	Filter Qty	Mounting Connection	Max. Flow Range	Bypass Included?
P566023	1	SAE-16 O-Ring	50 gpm/189 lpm	No
P566024	1	SAE-16 O-Ring	50 gpm/189 lpm	Yes



Plastic point-of-use filter cartridges and metal housings are easily separated for recycling.

# Bulk Fuel and Lube Filtration Systems

The sophistication of today's equipment, such as the increase in injection pressures on diesel engines, requires higher cleanliness levels than ever before.

Donaldson bulk filtration systems can save on costly component replacement and minimize equipment and vehicle downtime.

**In short, Donaldson reduces your total cost of ownership.**



Typical storage tank contaminated with dirt, water and microbial growth

Fuels and oils are transported from the refinery to the bulk tank storage site by truck, rail or pipeline.



From there it is loaded into another truck and delivered to your site.



Contaminants and water are the enemies of fuels and lubricants, robbing vehicles and equipment of performance and longevity.

Once in storage at your site, it can either be transferred to smaller tanks or dispensed directly into equipment.



Removing contaminants with bulk filtration prior to pumping fluids into equipment allows on-board filtration systems to do their job better, while supporting the advanced system technology required to meet new regulations.

Each time fluids are transferred, more contamination can be introduced.



## Clean.

**1** Donaldson single-pass filtration on the inlet reduces the risk of contamination in bulk storage tanks and helps maintain desired cleanliness levels.

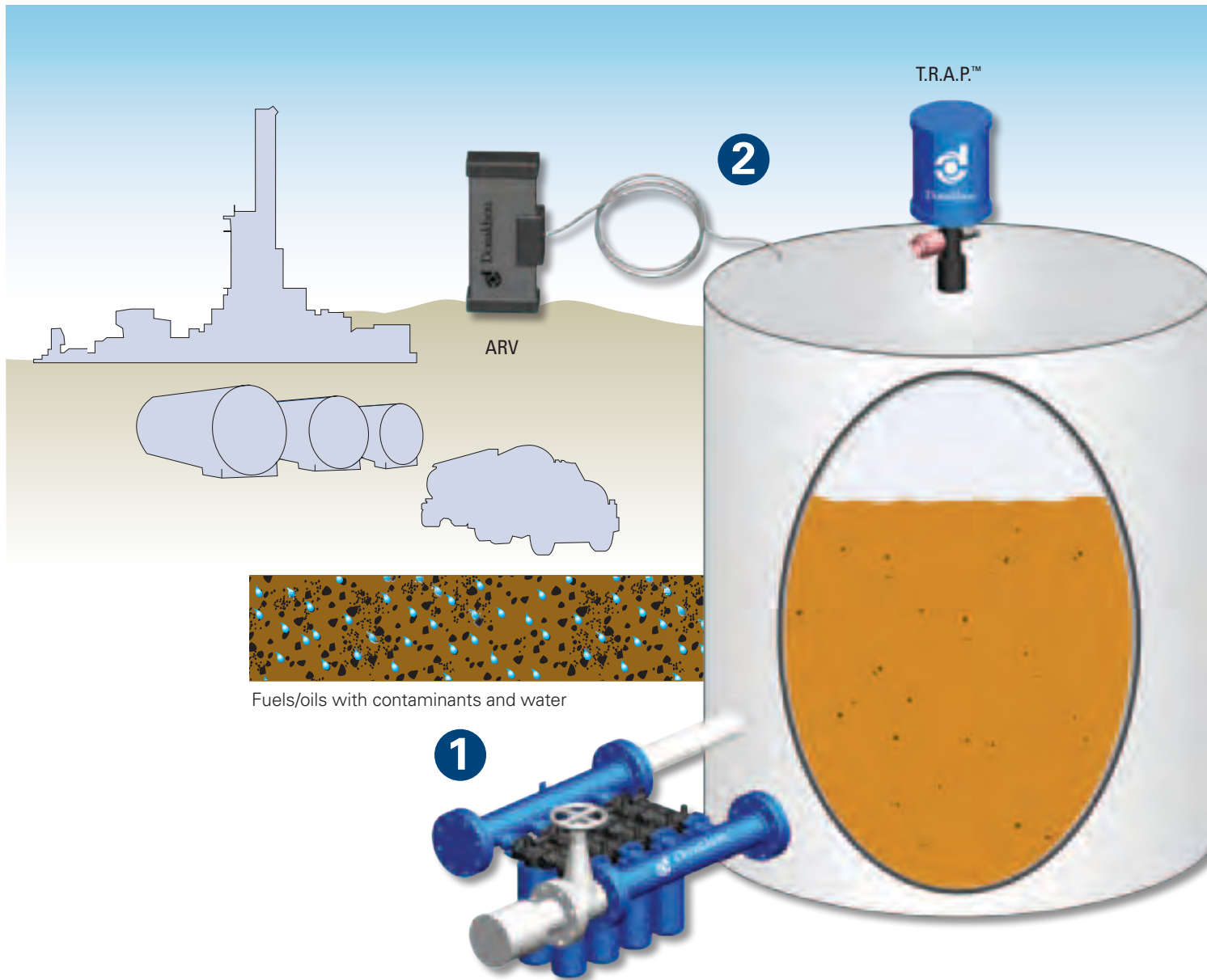
Compact and easy to replace, Donaldson filters are an important line of defense in maintaining fluid quality, and can be configured for high flow rates while minimizing pressure drop.

## Protect.

**2** Water absorbing filters, T.R.A.P.<sup>™</sup> breathers and Active Reservoir Vent<sup>™</sup> (ARV) products reduce the risk of moisture and contaminants entering a bulk storage tank so that fluids are kept clean and dry. Used together, they'll help guard fluids from free water, airborne contamination and microbial growth for as long as they stay in storage.

## Polish.

**3** Because unstable fluids and the tank itself can be a source of contamination, final filtration on the outlet with Donaldson filters ensures that targeted ISO cleanliness levels are achieved.







## Donaldson Delivers Superior Bulk Fluid Filtration

Reduced downtime

Lower total cost of ownership

Modular solutions

Custom designs

Compact installation

Low installation costs

Easily serviced

Easily shipped

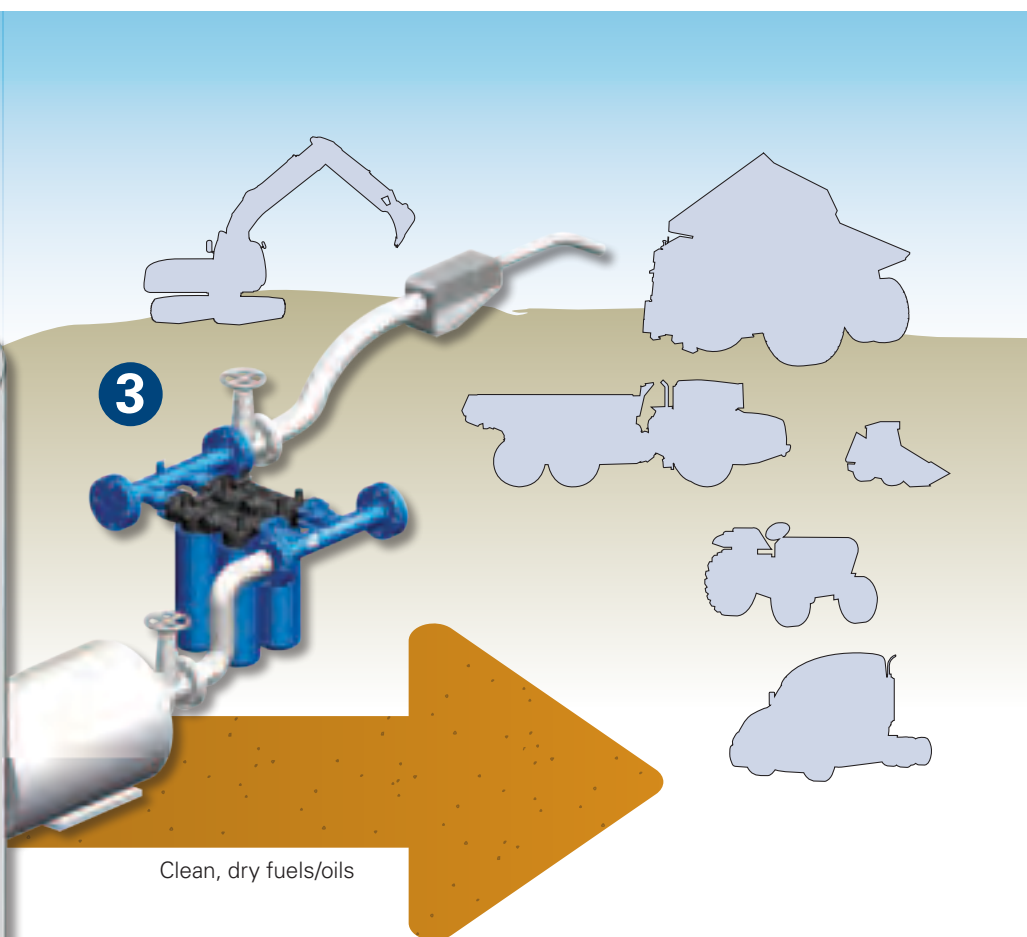
Variable flow rates

Minimal pressure drop

Material compatibility

Low inventory costs

Global presence



Clean, dry fuels/oils



Clean. Protect. Polish.™

# Choosing the Right Filter

## Choosing the Ideal Filters for Your System Doesn't Need to be Complicated

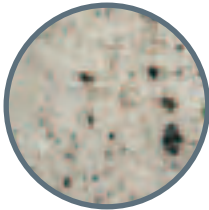
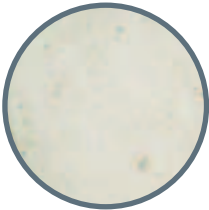
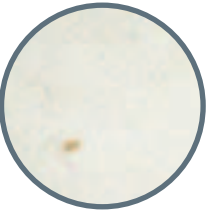

**Just remember a few key principles:**

Fluid viscosity plays an important role in restricting the flow through filters. It's crucial to select the proper filter to maintain adequate flow and avoid excessive pressure drops (see page 325 for viscosity data).

Selecting the right micron rating to achieve targeted ISO cleanliness without overbuilding the system will help avoid unnecessary cost.

Different types of oil have different properties. Choose a filter with the most compatible media-to-fluid properties.

## Common Industry ISO Cleanliness Ratings

<b>ISO 22/21/18</b>	<b>ISO 18/16/13</b>	<b>ISO 16/14/11</b>	<b>ISO 14/13/11</b>
			
Typical cleanliness of delivered fluids	Target rating for heavy gear/engine oils	Target rating for hydraulic/transmission oils	Target rating for diesel fuel

Typical Fluid Applications	Viscosity	Target ISO Cleanliness	FILTERS
Diesel Fuel	0-100 cSt	14/13/11	<b>P568666</b>
Transmission Oil Hydraulic Oil Glycols <150°F Hydraulic Based Water Emulsions	0-500 cSt	16/14/13	<b>P568665</b>
Engine Lube Oils Gear Oils Glycols Phosphate Esters	0-6000 cSt	18/16/13	<b>P568664</b>



## Donaldson Delivers Water Detection



**Are your bulk fluids passing large amounts of free water downstream – contaminating vehicles and equipment?**

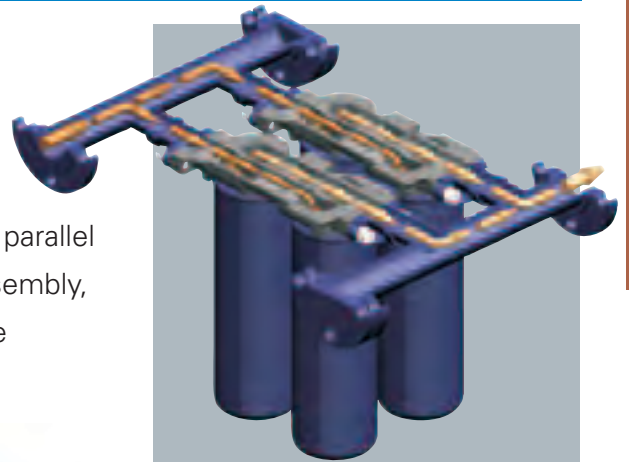
Water detection filters and systems, constructed with super absorbent media, will help you prevent downstream contamination. Installation of Donaldson's water absorbing filter (P570248) will stop flow if large amounts of free water are detected in your fluids. Designing systems with water detection filters requires careful sizing considerations. A Donaldson specialist will assist in configuring a system that meets your specific needs for flow and pressure drop.



# Single Pass Filtration

## Designed for Systems of any Size, with Minimal Pressure Drop

Donaldson bulk assemblies are manufactured and piped in parallel flow configurations to reduce pressure drop across the assembly, providing single-pass filtration performance, resulting in the targeted fluid cleanliness.



The flow is split between the two filters shown. Half of the flow travels through the first filter and the remaining flow travels through the second filter. Flow does not travel through both filters in sequence.

Fluids pass through the media and cleanliness targets are achieved in a single pass.



Clean fluid is pushed out of the filter, through the head and out into storage or for use.

## Donaldson Delivers Material Compatibility

Donaldson bulk heads are constructed of aluminum with steel inserts to prevent excessive metal-to-metal bonding, or galling, between the head and the filter.

Viton® seals are used in all designs (unless otherwise specified) to maintain compatibility with most fluids.

Manifolds are constructed of painted carbon steel pipe with SAE 150 flanges. Manifolds are used to plumb together multiple dual heads (P568583) to handle high flow rates.

Viton is a registered trademark of E. I. du Pont de Nemours and Company.

# Clean

## Filters and Filter Heads

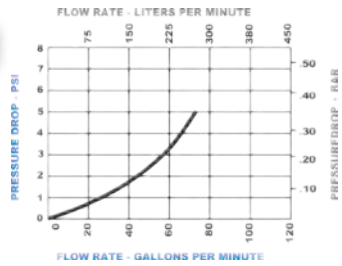
Clean fuels and oils on the inlet side to maintain cleanliness levels in bulk storage tanks. These products can also be used on the outlet side.

FILTERS	Typical Fluid Applications	Max. Working Pressure	Rated Static Burst	Max. Flow Range	Operating Temperature	Target ISO Cleanliness	ISO Filter Efficiency
P568664	Engine Oil and Gear Oil	350 PSI/24.1 Bar	800 PSI/55.2 Bar	65 gpm/246 lpm	-40°F-190°F/40°C -88°C	18/16/13	25 micron@Beta 2000
P568665	Transmission Oil and Hydraulic Oil					16/14/11	7 micron @Beta 2000
P568666	All Fuels					14/13/11	4 micron@Beta 2000
P570248	Water-Absorbing for Ethanol-Free Fluids*						20 micron@Beta 2000

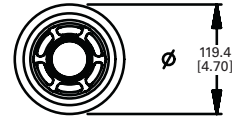
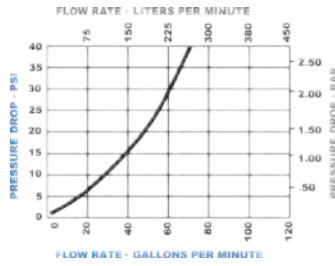
\*Designed with expanding media that prevents water from entering storage or equipment tanks. Not recommended for contamination removal.



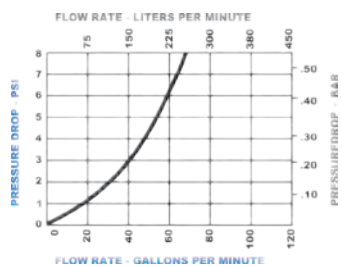
**P568664**



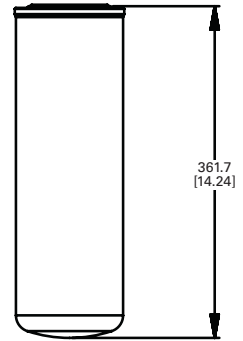
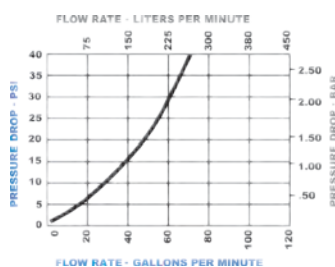
**P568666**



**P568665**



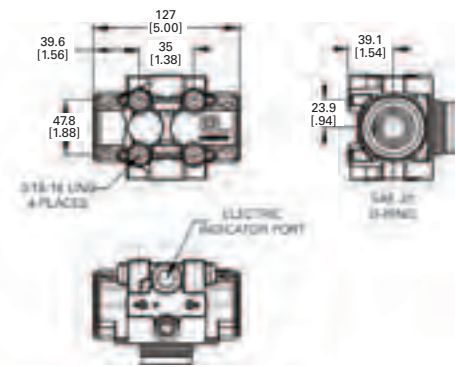
**P570248**



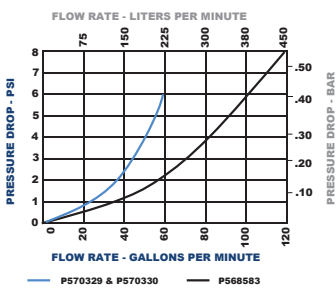
### FILTER HEADS

	Filter Quantity	Mounting Connection	Max. Working Pressure	Rated Static Burst	Max. Flow Range
P570329	1	SAE-20 O-Ring	350 PSI/24 Bar	800 PSI/55 Bar	65 gpm/246 lpm
P570330	1	1 1/4" NPT			65 gpm/246 lpm
P568583	2	1 1/2" SAE 4-Bolt			125 gpm/473 lpm

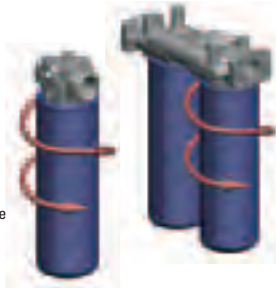
**P570329**



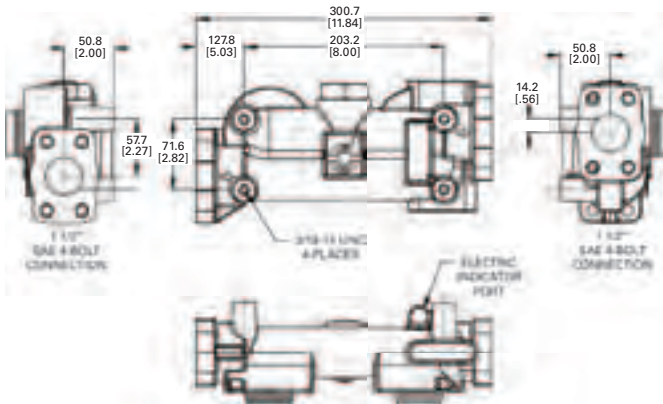
### All Filter Heads



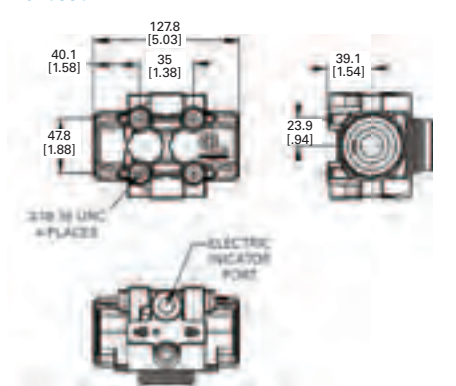
Rotate clockwise to install filter. 2" clearance necessary to change filter



**P568583**



**P570330**

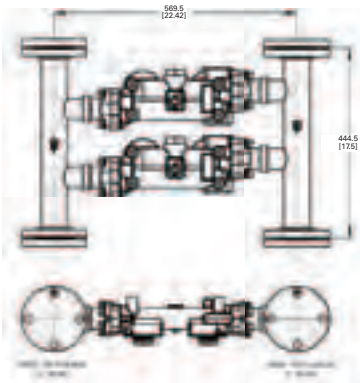
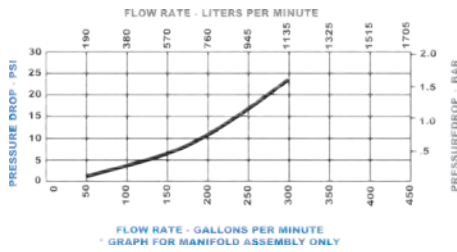


## Manifold Assemblies

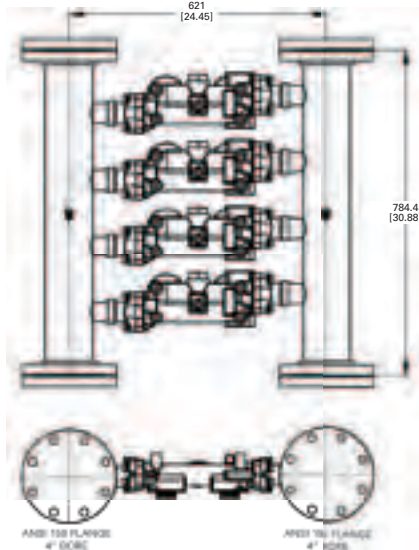
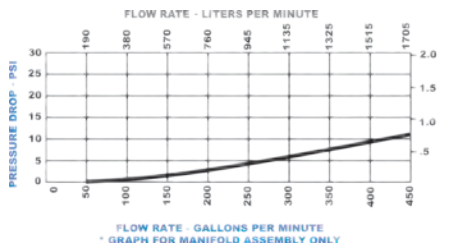


MANIFOLDS	Filter Quantity	Mounting Connection	Max. Flow Range
<b>P561880</b>	4	2" 150 Flange	250 gpm/946 lpm
<b>P568932</b>	8	4" ANSI 150 Flange	500 gpm/1893 lpm
<b>P568933</b>	10	4" ANSI 150 Flange	600 gpm/2271 lpm

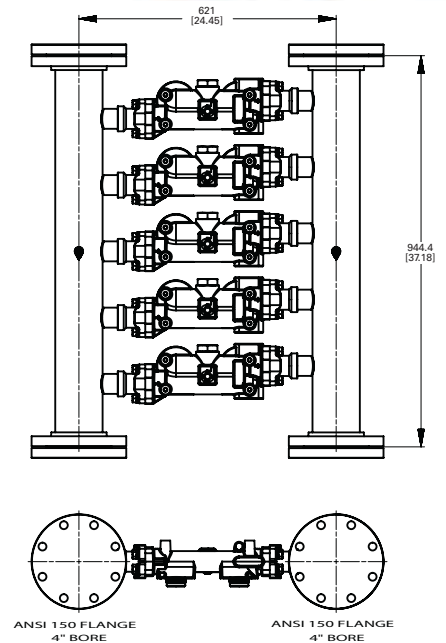
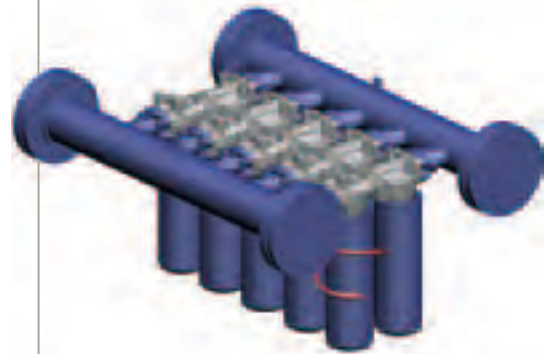
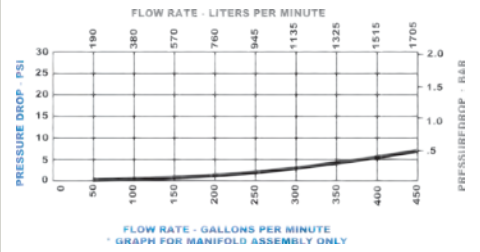
**P561880**



**P568932**



**P568933**





# Protect

## Protect Your Investment While It's in Storage

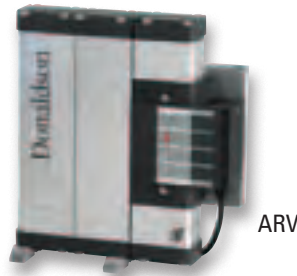
The Donaldson T.R.A.P.<sup>™1</sup> breather reduces the risk of dust and moisture entering storage tanks from the vent while allowing high flow rates of fluid into and out of the tank.

Protect fluids in storage from moisture with Active Reservoir Vent<sup>™</sup> (ARV). It draws moisture from fluids with dry compressed air<sup>2</sup>.

<sup>1</sup>Thermally Reactive Advanced Protection

<sup>2</sup>Compressed air and power not provided by Donaldson

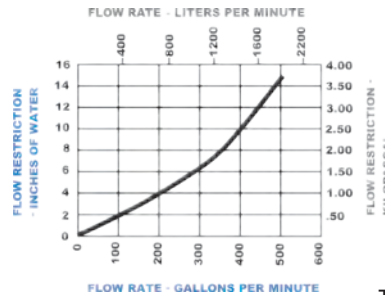
An **ARV** blows a blanket of dry air over fluids in storage to remove free and emulsified water.



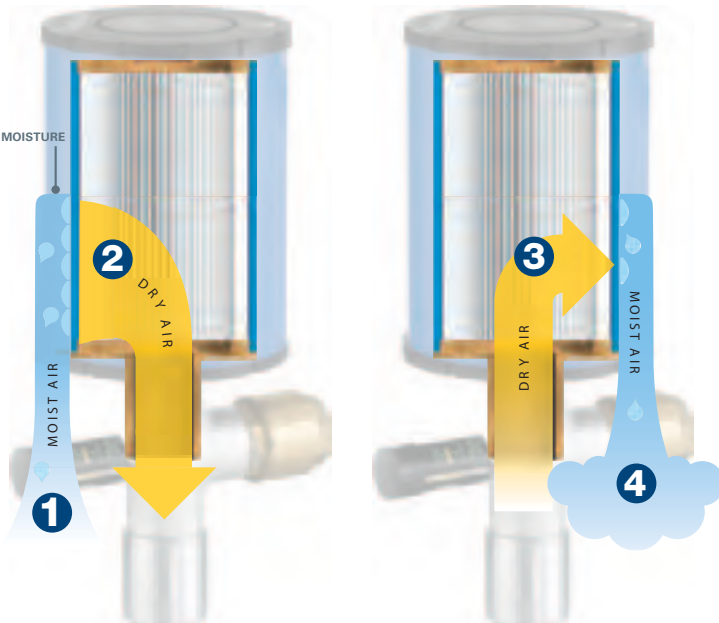
ARV	Flow Rate (scfm)	Recommended Maximum Reservoir Size	Height	Width	Depth	Weight	Medium	Mounting Connection	Electrical Requirements
<b>P568790</b>	3	10,000 Gal/37,900 Liters	14"/355 mm	12"/300 mm	5"/127 mm	15 lbs/7 kg	Compressed Air/Nitrogen	1/2" NPTF	110 V/50-60 Hz AC, Approx.4W
<b>P568791</b>	10	30,000 Gal/113,700 Liters	35"/889 mm			33 lbs/15 kg			

**T.R.A.P.<sup>™</sup> breathers** prevent dirt and moisture from entering storage tanks from the vent, resulting in cleaner, drier air.

T.R.A.P. BREATHER	Max. Flow Range	Filter Efficiency	Replacement filter	Connection
<b>X920006</b>	500 gpm/1893 lpm	>97% at 3 micron	P923075	1.5" NPT Female



## How a T.R.A.P.<sup>™</sup> Breather Works



### Intake Cycle (Inhalation)

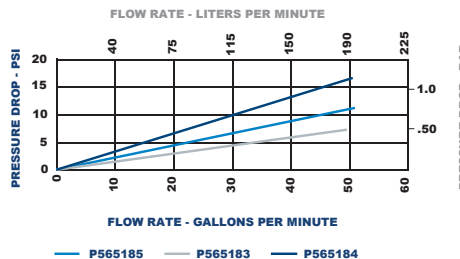
- 1 The circuit "breathes in" air containing moisture vapor.
- 2 The T.R.A.P. breather strips moisture and particulate from the incoming air, allowing only clean, dry air to enter the circuit.

### Outflow Cycle (Exhalation)

- 3 During the "exhalation" cycle, the T.R.A.P. breather allows unrestricted airflow outward.
- 4 The outflow of dry air picks up the moisture collected by the T.R.A.P. breather during intake, and "blows it back out" – fully regenerating the T.R.A.P. breather's water-holding capacity.

## Designed for High Pressure Delivery Systems out of Bulk Storage Tanks

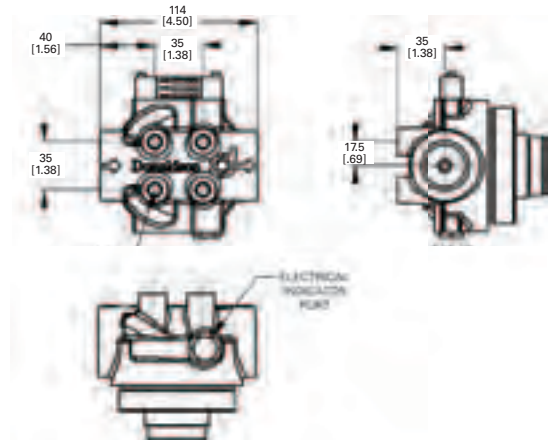
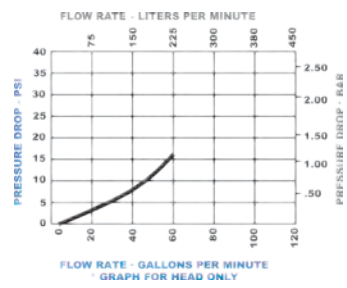
Point-of-use products “polish” or remove any contaminants that may have been picked up in storage or during final transfer. Heads, filters and manifolds highlighted in the “Clean” section (on pgs 320-321) are also used to polish fluids as they come out of storage. For higher-pressure delivery systems refer to the products below.



Rotate clockwise to install filter  
2" clearance necessary to change filter

POINT-OF-USE FILTERS	Typical Fluid Applications	Element Collapse Rating	Max. Working Pressure	Rated Static Burst	Max. Flow Range	Operating Temperature	Micron	Seals
P565184	For Hydraulic, Gear, Transmission and Engine Oils	300 PSI/20 Bar	800 PSI/55 Bar	1700 PSI/117 Bar	50 gpm/189 lpm	-20°F-250°F/-29°C-121°	4	Viton®
P565185							7	
P565183							15	
P569826	For Skydrol®	300 PSI/20 Bar	800 PSI/55 Bar	1700 PSI/117 Bar	50 gpm/189 lpm	-20°F-250°F/-29°C-121°	2	EPDM
P569824							5	
P569823							8	
P569825							14	

POINT-OF-USE FILTER HEADS	Max. Working Pressure	Rated Static Burst	Max. Flow Range	Filter Quantity	Operating Temperature	Material	Compatible Filters	Mounting Connection
P566023	800 PSI/55 Bar	1700 PSI/117 Bar	50 gpm/189 lpm	1	-40DF-250DF/-40DC-121 DC	Aluminum head with Viton seals	P565183	Single Head SAE-16 O-Ring
P566024							P565184 P565185	Single Head with 50 PSI //3.5 Bar Bypass SAE-16 O-Ring
P569830						P569826 P569824	Single Head SAE-16 O-Ring	
P569831						P569823 P569825	Single Head with 50 PSI //3.5 Bar Bypass SAE-16 O-Ring	



Metal housings and plastic point-of-use filters are both single-use and are easily separated for recycling.

Skydrol is a registered trademark of Solutia Inc.

# Understanding ISO Codes

## Achieving the Target Cleanliness of a Fluid

**ISO 4406 contamination codes** consist of three numbers corresponding to the number of particles of 4 microns and larger, 6 microns and larger, and 14 microns and larger present in the fluid. This page illustrates what it means to start with a contamination of ISO 22/21/18 and target a cleanliness of ISO 14/13/11.

### Data Necessary for Sizing Filtration Systems

#### Fluid usage

Fluid properties to determine viscosity at transfer temperature

Flow rate and pressure

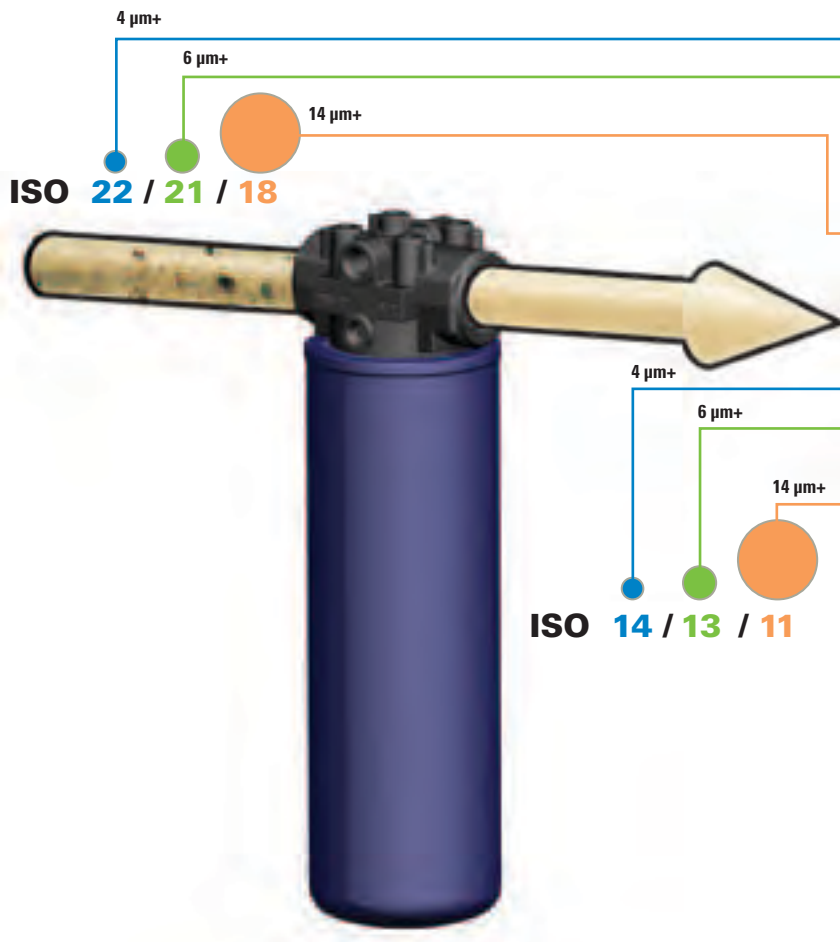
### Sizes of Familiar Particles in Microns

Grain of table salt	100 µm	Talcum powder	10 µm
Human hair	80 µm	Red blood cell	8 µm
Lower limit of visibility	40 µm	Bacteria	2 µm
White blood cell	25 µm	Silt	<5 µm

### ISO 4406 Contamination Codes

#### Range of number of particles per 100 milliliters

Code	More Than	Up to & Including
24	8,000,000	16,000,000
23	4,000,000	8,000,000
22	2,000,000	4,000,000
21	1,000,000	2,000,000
20	500,000	1,000,000
19	250,000	500,000
18	130,000	250,000
17	64,000	130,000
16	32,000	64,000
15	16,000	32,000
14	8,000	16,000
13	4,000	8,000
12	2,000	4,000
11	1,000	2,000
10	500	1,000
9	250	500
8	130	250
7	64	130
6	32	64
5	16	32
4	8	16
3	4	8
2	2	4
1	1	2





## The Importance of Temperature in Sizing Your Filtration System

**Fluid viscosity**, measured in centiStokes (cSt) or Saybolt Seconds Universal (SSU or SUS), is the resistance of a fluid to flow (thickness of fluid). Low viscosity fluids pass through filters with less resistance than high viscosity fluids. Higher fluid viscosities have higher pressure drops due to higher resistance passing through the media.

The colder the fluid, the higher the viscosity, so the lowest potential temperature of the fluid is the best measure for sizing a bulk filtration system. Due to the high specific heat capacity of fluids, the lowest ambient temperature may not be an accurate reflection of the actual fluid temperature. Avoid over sizing your system by using the stored fluid temperature and not the lowest ambient temperature, which tends to be lower than the temperature of the fluid in storage or transport.

### Data Necessary for Sizing Filtration Systems

Fluid usage

**Fluid properties to determine viscosity at transfer temperature**

Flow rate and pressure

### Fuel/Oil Kinematic Viscosity Combined With Temperature in centiStokes (cSt)

SAE Gear Oil			75W			80W	85W	90			140		
SAE Engine Oil			5W	10W	20		30	40	50				
ISO Grade			15	22	32	46	68	100	150	220	320	460	680
°F	°C	Diesel											
248	120				3.7	3.5	5.7	7.3	9.3	11.7	14.7	18.2	22.9
230	110				4.4	5.5	7.0	9.0	11.7	14.9	18.9	23.7	30.2
212	100		1	4.5	5.4	6.8	8.8	11.4	15.0	19.4	25.0	31.8	41.1
194	90		3	5.3	6.7	8.5	11.2	14.8	19.8	26.0	34.1	44.0	57.9
176	80		5	6.5	8.5	11.0	14.8	19.9	27.1	36.2	48.2	63.3	84.8
158	70		6.2	8.5	11.1	14.8	20.2	27.7	38.5	52.4	71.1	95.2	130
140	60		8	12	15.1	20.6	28.7	40.2	57.2	79.6	110	151	211
122	50		11	15	21.5	29.9	42.9	61.5	98.7	128	181	254	365
104	40	1	15	22	32	46	68	100	150	220	320	460	680
86	30	2	21	32	50.7	75.6	116	175	271	409	613	907	1380
68	20	3	33	51	86.7	135	214	334	536	838	1290	1980	3130
50	10	4	52	87	162	264	438	711	1190	1920	3070	4870	8020
32	0	5	85	180	340	585	1020	1720	2990	5060	8400	13900	23900
14	-10	9	185	375	820	1500	2770	4880	8890	15700	27200	47000	85000
-4	-20	15	400	800	2350	4650	9120	16800	32300	60000			

# Flow Rate and Pressure

Bulk filtration systems need to be designed properly in order to meet a desired cleanliness rating. Choosing the correct filter and applying the right number of filters for a specific viscosity to maintain minimal pressure drop is critical to configure an efficient system for a given application.

Increased **flow rate** increases resistance as fluids pass through filters, making it harder to maintain ideal system pressure. Combined with viscosity, targeted flow rate is another critical factor in designing filtration systems.

These charts demonstrate the pressure drop experienced by fluids of various viscosities as the flow rate increases through a selected filter. The more vertical the line, the more filters need to be added to the system to distribute the volume of fluid, effectively reducing the flow rate through each filter and maintaining optimal pressure.

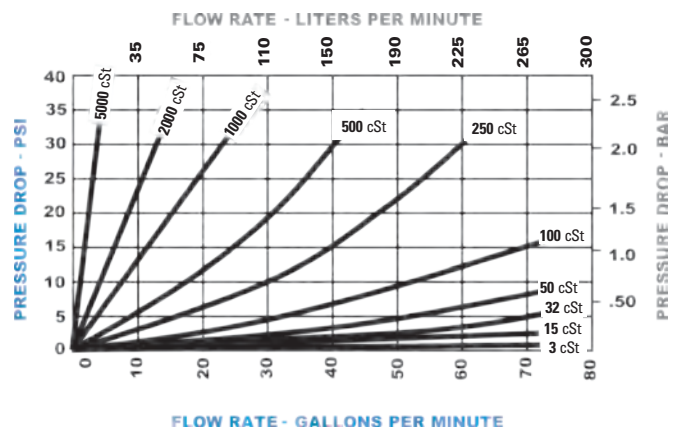
## Data Necessary for Sizing Filtration Systems

Fluid usage

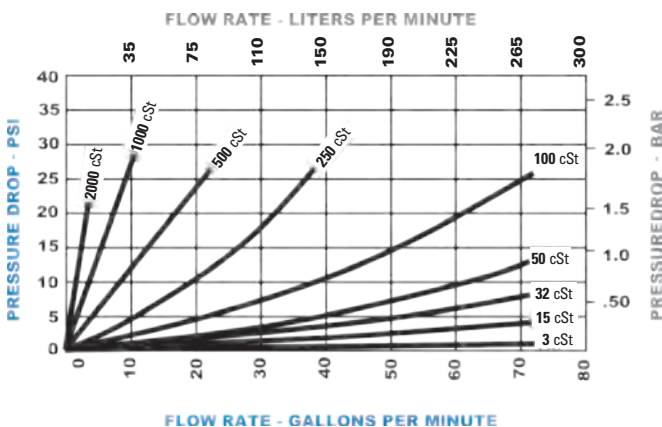
Fluid properties to determine viscosity at transfer temperature

### Flow rate and pressure

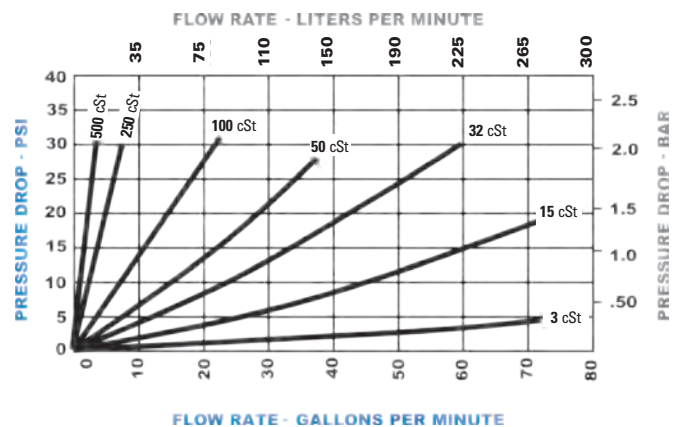
**P568664** Engine Oil and Gear Oil



**P568665** Transmission Oil and Hydraulic Oil



**P568666** All Fuels



## Customizing Your System

### Steps to Sizing a Bulk Application

### Example

1	Define product flow rate, fluid type and pressure drop restriction. <i>New systems should ideally have less than 15 PSI/1 Bar pressure drop.</i>	Flow rate	40 gpm/151 lpm
		Fluid type	ISO 68 hydraulic/transmission fluid
		System Pressure Drop	10 PSI/.7 Bar
2	Use the table on the previous page to determine fluid viscosity using the fluid type and temperature.	Temperature at transfer	68°F/20°C
		Viscosity of ISO 68 at 68°F/20°C	214 cSt
3	Select the appropriate filter (see pgs 320-323).	P568665	
4	Determine the pressure drop using the flow rate and the fluid viscosity, according to the appropriate chart. <i>This number will be the pressure drop through one filter.</i>	20 PSI/1.4 Bar is the approximated pressure drop for ISO 68 at 68°F/20°C through a P568665 filter.	
5	Divide the pressure drop resulting from step 4 by the desired system pressure drop. This number is the number of filters necessary to clean the fluid properly at the determined flow rate.	20 (total PSI) / 10 (system pressure drop) 1.4 (total Bar) / 0.7 (system pressure drop) = 2	
		Result: <b>This application requires two P568665 filters.</b>	

## There's No Need to Do It Alone

Let a Donaldson specialist assist you by providing recommendations on sizing and positioning of Donaldson filters. You can help us design your system by providing:

Responses to steps 1-5 above.

A schematic of your fluid transfer process (hand sketches work great), and/or

Photographs of your site (tanks, inlets and outlets).

**To get started, contact Donaldson:**  
[bulk.filtration@donaldson.com](mailto:bulk.filtration@donaldson.com)  
[www.donaldsonbulkfiltration.com](http://www.donaldsonbulkfiltration.com)  
 1-800-846-1846 or 1-952-703-4670



Donaldson Delivers  
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Under **Any**  
Pressure.



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PRODUCT INFORMATION



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Donaldson provides this technical reference as a short course in “Hydraulic Filtration 101” — for those who want to gain a better understanding of hydraulic filtration.

In industrial and mobile applications at factories all over the world, we too often see hydraulic circuits that don’t include proper fluid filtration, or include it as an afterthought. Good filtration needs to be an integral part of the hydraulic circuit to ensure the long life and proper operation of the pumps, valves and motors. A \$100 filter protects your \$100,000 equipment.

This section is offered to aid in choosing the filter that will help you achieve the ideal cleanliness levels and longest life for your critical components.

## Topics

- Why Hydraulic Components Need Protection.....330
- How Contamination Damages Precision Parts .....330
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## Symbols Used

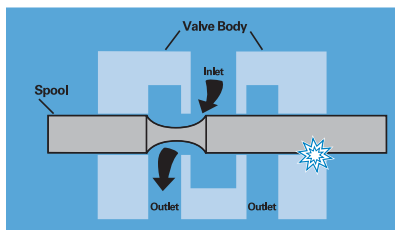
$\beta$	Beta Ratio
cSt	Centistokes
$\Delta P$	Pressure Drop or Differential Pressure
ISO	International Standards Organization
$\mu m$	Micron or micrometer
ppm	Parts per million
SSU SUS	Saybolt Seconds Universal

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## Hydraulic Components Need Protection

Fluid power circuits are designed in all shapes and sizes, both simple and complex in design, and they all need protection from damaging contamination. Abrasive particles enter the system and, if unfiltered, damage sensitive components like pumps, valves and motors. It is the job of the hydraulic filter to remove these particles from the oil flow to help prevent premature component wear and system failure. As the sophistication of hydraulic systems increases, the need for reliable filtration protection becomes ever more critical.

## How Contamination Damages Precision Parts



This illustration of a simple hydraulic valve illustrates how particles damage components. In normal operation, the spool slides back and forth in the valve

body, diverting oil to one side of the valve or the other. If a particle lodges between the spool and valve body, it will erode small wear particles from the metal surfaces. As these wear particles are moved back and forth by the action of the spool, they can roll into a burr that jams the spool and disables the valve.



### Component Damage

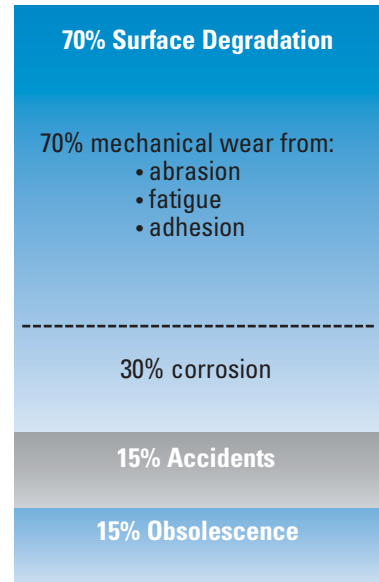
Looking down the barrel of an hydraulic cylinder, we can see the scratches along the inside surface. Don't cut costs by eliminating hydraulic filters. It could cost you more in the long run in major component repairs.

## Types of Contaminant

- Many different types of contamination may be present in hydraulic fluid, causing various problems. Some are:
- Particulate (dust, dirt, sand, rust, fibers, elastomers, paint chips)
- Wear metals, silicon, and excessive additives (aluminum, chromium copper, iron, lead, tin, silicon, sodium, zinc, barium, phosphorous)
- Water
- Sealants (Teflon®\* tape, pastes)
- Sludge, oxidation, and other corrosion products
- Acids and other chemicals
- Biological, microbes (in high water based fluids)

## Typical Factors in Component Life

Studies show that most (typically 70%) of hydraulic component replacement is necessary because of surface degradation, and most of that is due to mechanical wear. Proper filtration of hydraulic fluids can lengthen component life.



### Disaster Strikes

When filters are not a main component of the hydraulic circuit, disaster awaits. Here, piston rings were eaten away by contaminants.

\* Teflon is a registered trademark of E.I. DuPont de Nemours & Co., Inc.



## Where Contamination Comes From

There are a surprising number of contaminated sources in a hydraulic system or circuit.

### New Hydraulic Fluid

Adding new fluid can be a source; even though it's fresh from the drum, new hydraulic fluid isn't clean. (It may look clean, but, remember, the human eye can only see a particle the size of about 40  $\mu\text{m}$ .) Oil out of shipping containers is usually contaminated to a level above what is acceptable for most hydraulic systems: typically, new fluid has a cleanliness level about the same as ISO Code 23/21/19, and water content is typically 200 to 300 ppm. Never assume your oil is clean until it has been filtered. One very effective way of ensuring thorough fluid conditioning is with a dedicated off-line circulation loop, or "kidney" loop filtration. Learn more on page 299.

### Built-In

Built-in contamination, also called primary contamination, is caused during the primary manufacture, assembly and testing of hydraulic components. Metal filings, small burrs, pieces of Teflon tape, sand and other contaminants are routinely found in initial clean up filtration of newly manufactured systems.

### Ingressed

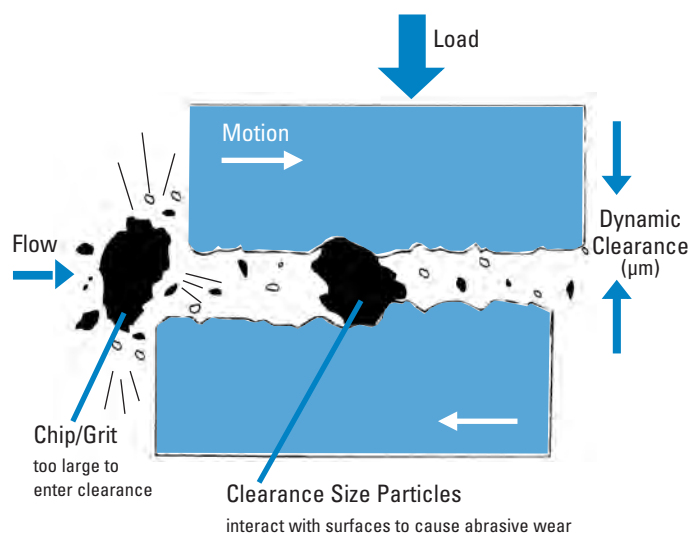
Ingressed or external contamination comes from the environment surrounding the system. Dirt can enter the hydraulic fluid supply through leaking seals, reservoir breather caps, and worn cylinder rod seals. Ingressed moisture, particularly, can cause long-term problems. As a hot system cools at night, cool moisture-laden air can be drawn into the reservoir; as the air condenses, water is released into the reservoir. Water in excess of 0.5% by volume in a hydrocarbon-based fluid accelerates the formation of acids, sludge and oxidation that can attack internal components, cause rust, and adversely affect lubrication properties. The severity of ingression and type of contaminant are dictated by the applications and environment.

### Induced

Maintenance procedures can introduce contamination into the system. Opening the system allows airborne particles to enter. Leaving the system open during operation provides continuous ambient particle ingression. Keep your system closed as much as possible.

### In-Operation

The major source of contamination are the pump and actuators, the hydraulic cylinder, or the hydraulic motor. Wear-generated contaminants are a hazard during normal hydraulic system operation. The circuit actually generates additional particles as the fluid comes into contact with the precision machined surfaces of valves, motors and pumps. Contaminant levels can keep doubling with every new particle generated. The result can be catastrophic if these contaminants are not properly filtered out of the system.



### Rubber & Elastomers

Due to temperature, time, and high-velocity fluid streams, rubber compounds and elastomers degrade—thus releasing particulates into the fluid. This may be from hoses, accumulator bladders, seals, or other elastomer products.

### High Water Based Fluids

The water in HWBF tends to support biological growth and generate organic contamination and microbes.

### Replacement of Failed Components

Failure to thoroughly clean fluid conductor lines after replacing a failed hydraulic pump will cause premature catastrophic failure.

Donaldson recommends frequent oil sampling to ensure proper contamination control. Sample test points should be close to hydraulic pumps and at other key locations that provide safe, reliable access to the fluid while under full system pressure.

## Fluid Conditioning

Fluid Conditioning is the term for the overall conditioning of the fluid in the hydraulic system, and encompasses particulate removal via filters along with other various methods for removing silt, air, water, heat, acid, sludge or chemicals.

### Particulate Removal

Particulate removal is usually done with mechanical filters. A well designed reservoir that allows settling will also help in keeping particulates out of the mainstream fluid. For ferrous particulates and rust, reservoir magnets or strainer band magnets can also be used. Other methods such as centrifuging or electrostatic filtration units can also be used, particularly in continuous batch processing and fluid reclamation.

### Removal of Silt

Silt, defined as very fine particulate under 5 µm in size, requires very fine filtration or “oil polishing.”

### Air Removal

Getting air out of the system is best done by adding 100 mesh screen in the reservoir, approximately 30° from horizontal to coalesce entrained air and allow larger bubbles to rise to the surface when reservoir velocities are low.

### Water Removal

A number of techniques exist to prevent water or moisture ingress or to remove water once it is present in a hydraulic or lube oil system. The best choice of technique for removal is dependent on the whether or not the water exists as a separate phase (dissolved or free), and also on the quantity of water present. For example, the presence of water or moisture can be reduced or prevented from entering a fluid reservoir through the use of absorptive breathers or active venting systems. However once free water is present in small quantities, water absorbing filters or active venting

systems usually provide adequate removal means. For large quantities of water, vacuum dehydration, coalescence, and centrifuges are appropriate techniques for its removal. However, as each of these techniques operates on different principles, they have various levels of water removal effectiveness. The chart below provides comparative information on these techniques and their relative effectiveness. Care should be taken to apply the best technique to a given situation and its demands for water removal.

### Chemical Removal

Removal of acids, sludge, gums, varnishes, soaps, oxidation products and other chemicals generally requires an adsorbent (active) filter with Fuller Earth, active type clays, charcoal, or activated alumina.

### Heat Removal

Removing heat is important to maintain viscosity and prevent fluid breakdown. Usually performed with heat exchangers, including air-to-oil and water-to-oil types, finned coolers, or refrigerated units.

### Heat Addition

Added heat is used for cold temp start-up to get fluid viscosities within operational limits. Use heaters, immersion or in-line.

### Kidney Loop Filtration

One very effective way of ensuring thorough fluid conditioning is with a dedicated off-line circulation loop, or “kidney” loop. This system uses a separate circulation pump that runs continuously, circulating and conditioning the fluid. Multiple stages and types of filters can be included in the circuit, as well as heat exchangers and in-line immersion heaters.

*For further information on fluid conditioning, reference the off-line filtration section on page 299.*

### Water Prevention and Removal Techniques

	Usage	Prevents Humidity Ingression	Removes Dissolved Water	Removes Free Water	Removes Large Quantities of Free Water	Limit of Water Removal
Adsorptive Passive Breather	prevention	Y				n/a
Active Venting System	prevention and removal	Y	Y	Y		down to <10% saturation
Water Absorbing Cartridge Filter	removal			Y		only to 100% saturation
Centrifuge	removal			Y	Y	only to 100% saturation
Coalescer	removal			Y	Y	only to 100% saturation
Vacuum Dehydrator	removal		Y	Y	Y	down to ~20% saturation

## Proper Filter Application

When selecting a new filter assembly or replacement filter, it's important to first answer some basic questions about your application. Where will the filter be used? What is the required cleanliness level (ISO code) of your system? What type of oil are you filtering? Are there specific problems that need to be addressed?

It's also important to think about the viscosity of the fluid in your system. In some machinery lubrication applications, for example, the oil is very thick and has a tougher time passing through the layer of media fibers. Heating techniques and the addition of polymers can make the liquid less viscous and therefore easier to filter. Another option is to install a filter with larger media surface area, such as the Donaldson W041 or HRK10 low pressure filters, that can accommodate more viscous fluids.

Next, think about duty cycle and flow issues. Working components such as cylinders often create wide variations in flow—also called pulsating flow—that can be problematic for filters with higher efficiency ratings. On the other hand, dedicated off-line filtration (also called “kidney loop”) produces a very consistent flow, so it makes sense to use a more efficient filter. Learn more about off-line filtration on page 352.

Filters used in applications with steady, continuous operation at lower pressures will last longer than filters that must endure cycles of high pressure pulsating flow. Generally, the lower the micron rating of a filter, the more often it needs to be changed since it is trapping more particles.

Finally, it's wise to ask yourself, “How much is my equipment worth?” Calculate how much it would cost to replace the equipment in your system, in case of component failure, and make sure those areas are well protected with proper filtration. (For example, high performance servo valves are very sensitive, costly components that need to be protected with finer filtration media.)

Minimizing maintenance costs through good contamination control practices requires proper filter application based on the specific contamination problems. Good contamination control means cost-effective filtration. When looking for a filter, first assess the needs of your system and any problem areas.

*Learn more about proper filter positioning on page 352.*

## Characteristics to Consider When Specifying a Filtration System

- 1) Oil Viscosity
- 2) Flow
- 3) Pressure
- 4) What Components will be protected by the filter
- 5) Cleanliness level required (expressed in ISO code)
- 6) Type of oil/fluid
- 7) Environment (the system, the surrounding conditions, etc.)
- 8) Duty cycle
- 9) Operating Temperature

*A Hydraulic System Design Worksheet is available on page 335.*

## Fluid Properties

**Lubricity** The property of the fluid that keeps friction low and maintains an adequate film between moving parts.

**Viscosity** The thickness of the fluid as measured by resistance to flow. The fluid must be thin enough to flow freely, heavy enough to prevent wear and leakage. Hydraulic fluids thicken when they cool and thin out as they heat up. Because some hydraulic systems work under wide temperature extremes, viscosity can be an important factor.

**Viscosity Index (VI)** The rate of viscosity change with temperature: the higher the index, the more stable the viscosity as temperature varies. VI can sometimes be improved by additives, usually polymers.

**Rust Resistance** Rust inhibiting chemicals in hydraulic fluids help overcome the effects of moisture from condensation.

**Oxidation Resistance** Oxidation inhibitors delay the sludgy/acidic effects of air, heat, and contamination in the system.

**Foaming Resistance** Although control of foaming depends largely on reservoir design, anti-foaming additives in the fluid also help.

## Types of Hydraulic Fluid

There are many kinds of fluids used for power, but they can basically be called petroleum-based fluids, biodegradable fluids, and fire-resistant fluids. A brief description of some of the types in each category are listed below; for details on these or others, consult your filter supplier or refer to a reputable manual on hydraulics, such as the *Lightning Reference Handbook*, published by Berendsen Fluid Power, Whittier, CA 90601.

### Petroleum Based (Hydrocarbon)

These are the most commonly used fluids in hydraulic systems. Their major advantages are low cost, good lubricity, relatively low/non-toxicity, and common availability. This type of fluid is not just plain oil; rather, it is a special formulation with additives that make it suitable for hydraulic systems. Mostly, the additives inhibit or prevent rust, oxidation, foam and wear.

#### Variations:

- Straight oils: same as petroleum-based oil but without the additives.
- Automatic transmission fluids (ATF): excellent low temp viscosity and very high VI.
- Military hydraulic fluids (ie: MIL-H-5606 and MIL-H-83282): also called 'red oil' because of the color. Low viscosity, good for cold temp operations, but may have to be modified for pumps.

### Fire Resistant Fluids

There are two types of fire-resistant fluids commonly used in hydraulic applications: Phosphate Esters and High Water Based Fluids (HWBF). Although generally not as viscous at cold temperatures as petroleum-based fluids, they are fire resistant due to their high content of noncombustible material. Very useful in overcoming the likelihood of fire caused by a broken hydraulic line spraying petroleum fluid into a pit of molten metal, onto a hot manifold, into a heat-treating furnace, or other ignition source.

#### Some types of HWBF:

- Oil-in-water emulsions (HFA): typically 95% water and 5% oil, with the oil droplets dispersed throughout the water. Provide some fire resistance, but due to oil content, other fluids are superior.
- Water-in-oil emulsions (invert emulsion HFB): typically 40% water and 60% oil, with the water dispersed in the oil. Provide some fire resistance, but due to oil content, other fluids are superior.
- Water-glycol (HFC): typically 40% water and 60% glycol. Excellent fire resistance. Since glycol is an antifreeze, water-glycol can be used at lower temps.

NOTE: HWBF may require reduced pressure rating of pumps and other components.

### HFD Fluids

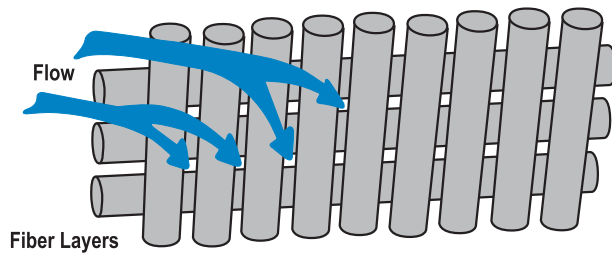
The HFD group is a classification given to several different types of synthetic products that do not contain petroleum oil or water. Phosphate ester fluids were the first HFD fluids and are the most fire resistant within the HFD family. Not as popular today, their use declined due to poor environmental performance, limited compatibility, and high cost. Certain phosphate esters have very high auto-ignition temperatures and are still used in specific applications, such as aircraft and power generation. A common brand is known as Sydol® (registered trademark of Solution, Inc.). Skydrol requires EPR seal for chemical compatibility. Today most phosphate esters have been replaced by polyol esters. Based on organic esters, polyol esters are the most common HFD fluids used today. They offer good inherent fire resistance, good compatibility with system materials, excellent hydraulic fluid performance, and easy conversion from petroleum oil. In addition, the organic nature of these fluids gives them good environmental performance in biodegradability and aquatic toxicity. Another type of synthetic, fire resistant fluids have been formulated for certain niche markets. Water free polyalkylene glycols (PAGs) feature extended fluid life and good environmental performance. Technically an HFD fluid, PAGs (also known as polyalphaolefins (PAOs) are more often used for their biodegradability and overall environmental friendliness. This group also contains the synthetic silicone (siloxane) oils, known for their anti-foaming properties.

### Biodegradable

With increasing concern about the environmental impact of hydraulic system leaks and spills, biodegradable fluids are receiving expanded usage, particularly in Europe. There are two types of common biodegradable hydraulic fluids: 1) vegetable-based oils, such as sunflower or rapeseed oils, and 2) synthetic oils like diesters, etc. Generally, systems using biodegradable fluids are derated for maximum and minimum temperatures. Users who replace standard hydraulic oils with biodegradable oils must check with filtration component manufacturers to confirm that the fluid and components are compatible.

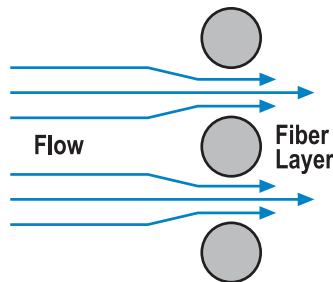
## How Filter Media Functions In a Filtration System

The job of the media is to capture particles and allow the fluid to flow through. For fluid to pass through, the media must have holes or channels to direct the fluid flow and allow it to pass. That's why filter media is a porous mat of fibers that alters the fluid flow stream by causing fluid to twist, turn and accelerate during passage.



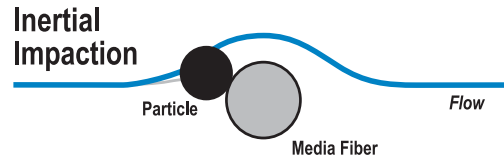
The fluid changes direction as it comes into contact with the media fibers, as illustrated above. As the fluid flows through the media, it changes direction continuously as it works its way through the maze of media fibers. As it works its way through the depths of the layers of fibers, the fluid becomes cleaner and cleaner. Generally, the thicker the media, the greater the dirt-holding capacity it has.

Looking at a cross-section view of the fibers, we can see how the flowstream is accelerated as it flows into the spaces between the fibers.

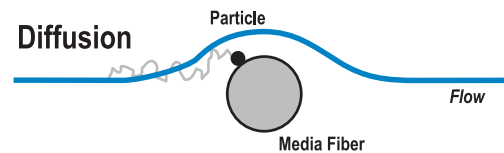


## How Filter Media Collects Particles There are four basic ways media captures particles.

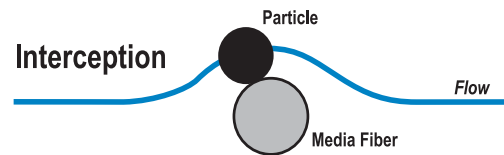
The first, called **inertia**, works on large, heavy particles suspended in the flow stream. These particles are heavier than the fluid surrounding them. As the fluid changes direction to enter the fiber space, the particle continues in a straight line and collides with the media fibers where it is trapped and held.



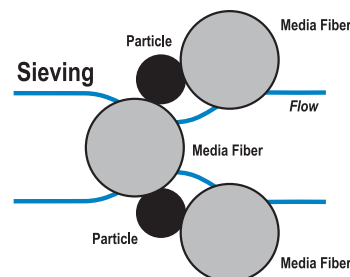
The second way media can capture particles is by **diffusion**. Diffusion works on the smallest particles. Small particles are not held in place by the viscous fluid and diffuse within the flow stream. As the particles traverse the flow stream, they collide with the fiber and are collected.



The third method of particle entrapment is called **interception**. Direct interception works on particles in the mid-range size that are not quite large enough to have inertia and not small enough to diffuse within the flow stream. These mid-sized particles follow the flow stream as it bends through the fiber spaces. Particles are intercepted or captured when they touch a fiber.



The fourth method of capture is called **sieving** and is the most common mechanism in hydraulic filtration. As shown at right, this is when the particle is too large to fit between the fiber spaces.





## Basic Types of Hydraulic Filter Media

### Filter Media

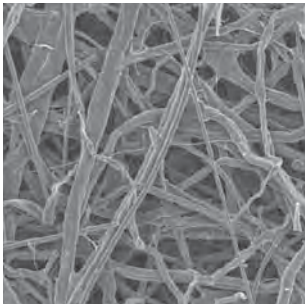
Media is a term used to describe any material used to filter particles out of a fluid flow stream. There are six basic types used to remove contamination in hydraulic applications:

### Cellulose Media (Traditional)

Cellulose fibers are actually wood fibers, microscopic in size and held together by resin. Fibers are irregular in both shape and size. Cellulose often has lower beta ratings, which means there are smaller pores in the media. Smaller media pores cause more flow resistance, resulting higher pressure drop.

While cellulose provides effective filtration for a wide variety of petroleum-base fluids, in certain applications it results in poor filtration performance as compared to synthetic media.

SEM 100X



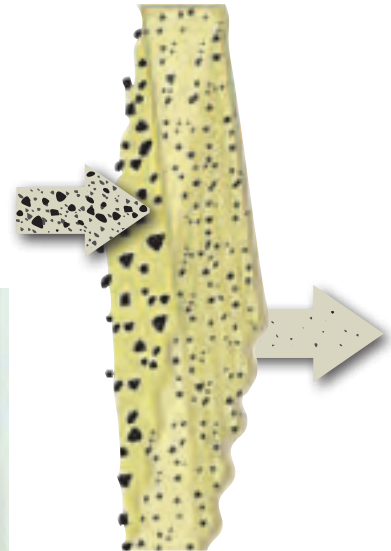
SEM 600X



MEDIA IMAGE



### HOW IT WORKS



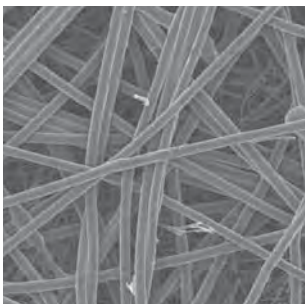
### Synteq™ Media (Full Synthetic)

Synthetic fibers are man-made, smooth, rounded and provide the least resistance to flow. Their consistent shape allows for control of the fiber size and distribution pattern throughout the media mat to create the smoothest, least inhibited fluid flow. Consistency of fiber shape allows the maximum amount of contaminant-catching surface area and specific pore size control. The result is media with predictable filtration efficiencies removing specified contaminants and maximum dirt holding capacity.

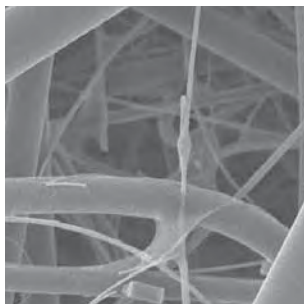
The low resistance of synthetic media to fluid flow makes it ideal for use with synthetic fluids, water glycols, water/oil emulsions, HWCF and petroleum-based fluids.



SEM 100X



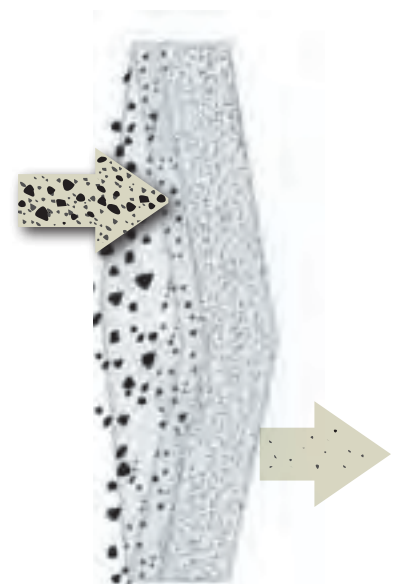
SEM 600X



MEDIA IMAGE



### HOW IT WORKS



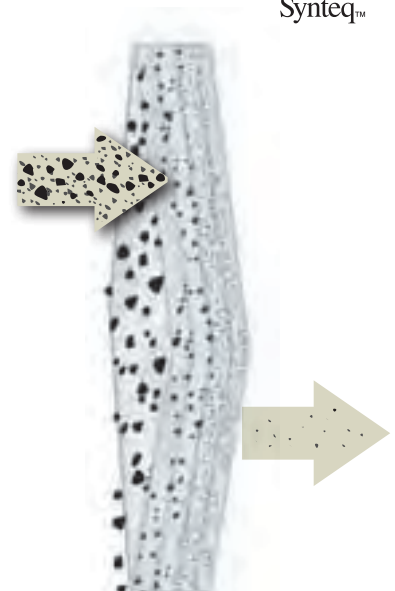


### DT Synteq™ Media (High-Performance)

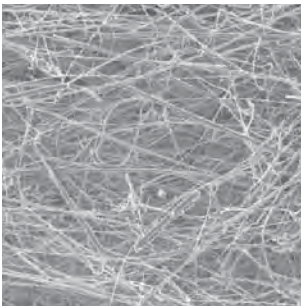
Donaldson high-performance DT grades of Synteq media utilize a blend of borosilicate glass fiber whose matrix is bonded together with an epoxy-based resin system. Donaldson filter media scientists found this to provides the best available chemical resistance for the broadest array of hydraulic applications.

DT Synteq is ideal for use with phosphate ester and water glycol fluids.

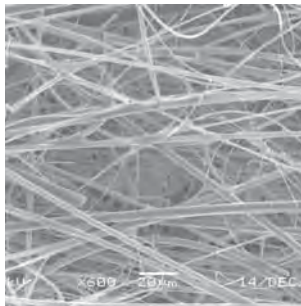
#### HOW IT WORKS



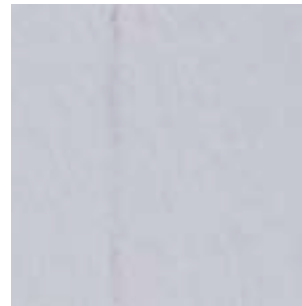
SEM 100X



SEM 600X



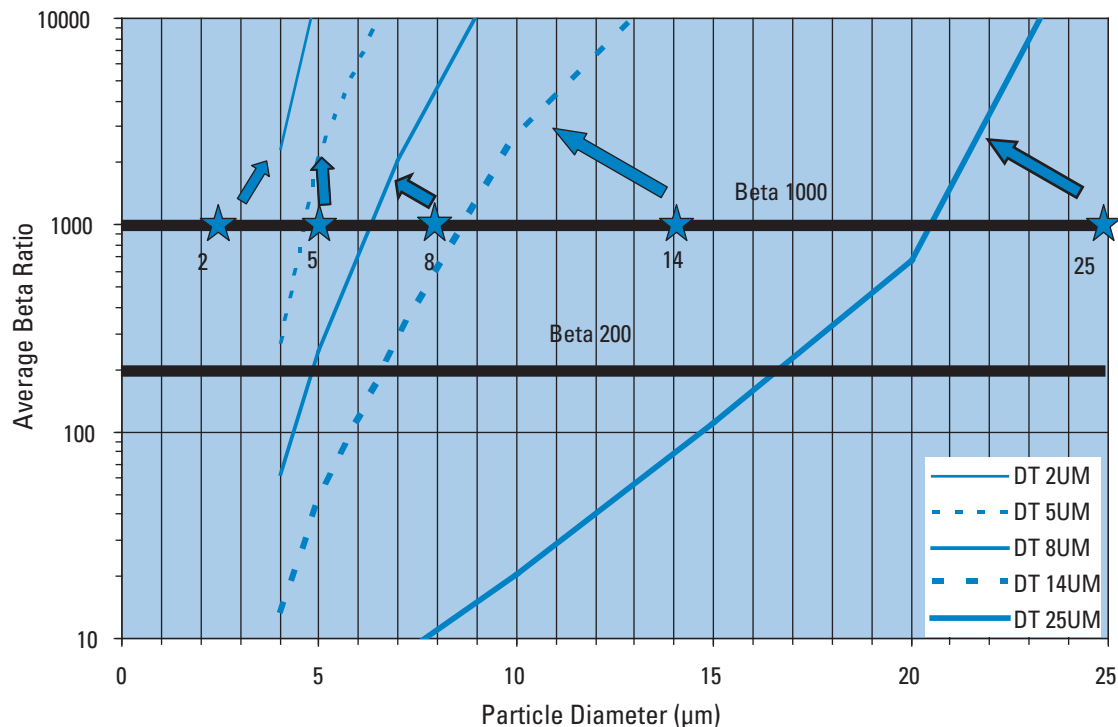
MEDIA IMAGE



The chemical and thermal compatibility of fluid filters is an increasingly difficult design challenge due to the complex variety of fluid systems. Today's fluid systems are often tailored towards the special needs fire resistance, biodegradability, and electrical insulating ability. Fortunately, there are chemical solutions available to meet these challenges.

Donaldson DT grades of Synteq media utilize a blend of borosilicate glass fiber whose matrix is bonded together with an epoxy-based resin system. Donaldson filter media scientists found this to provide the best available chemical resistance for the broadest array of hydraulic, fuel, and lube oil filtration applications.

### Donaldson DT Synteq™ Media



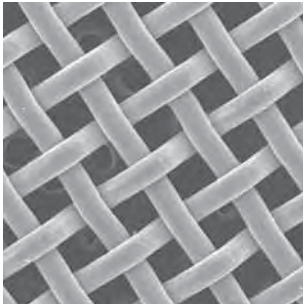
## Wire-Mesh Media

Wire-mesh media consists of stainless steel, epoxy-coated wire mesh available in 3 mesh sizes:

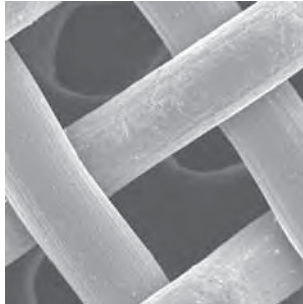
- 100 mesh yields 150  $\mu\text{m}$  filtration
- 200 mesh yields 74  $\mu\text{m}$  filtration
- 325 mesh yields 44  $\mu\text{m}$  filtration

Typically wire-mesh filters will be applied to catch very large, harsh particulate that would rip up a normal filter. You may also find this media useful as a coarse filter in viscous fluid applications.

SEM 60X



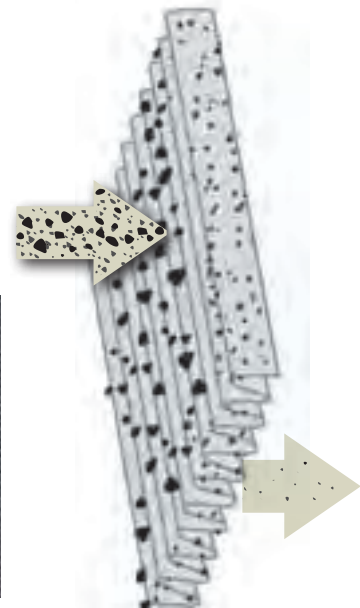
SEM 100X



MEDIA IMAGE



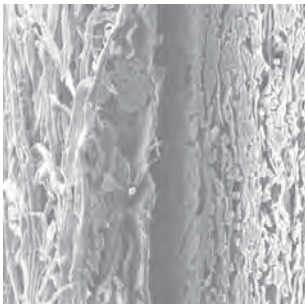
### HOW IT WORKS



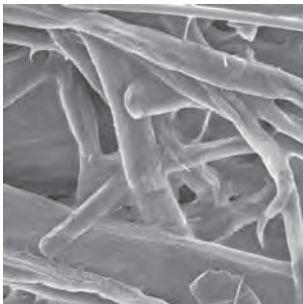
## Water Absorbing Media

Water absorption media quickly and effectively removes free water from hydraulic systems. Using super-absorbent polymer technology with a high affinity for water absorption, this media alleviates many of the problems associated with water contamination found in petroleum-based fluids.

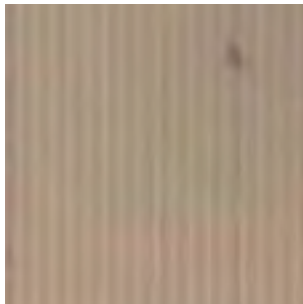
SEM 100X



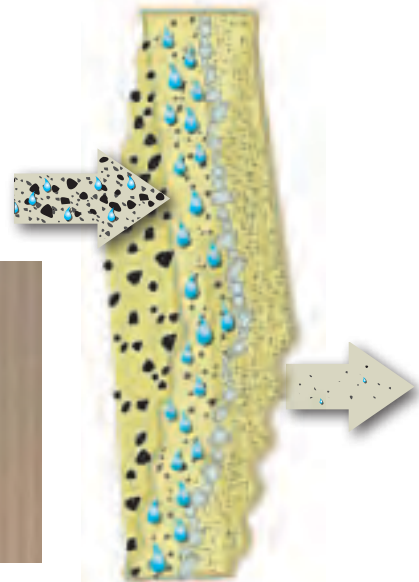
SEM 600X



MEDIA IMAGE



### HOW IT WORKS



## Donaldson Filter Media Efficiency Ratings per ISO 16889 Test Standards

ISO 16889 is the international standard for Multi-Pass Testing to determine the efficiency (beta rating or beta ratio) and the dirt-holding capacity of the filter. It replaced the ISO 4572 test standard.

Donaldson filter media has been re-tested per the new standard and the current beta ratios are shown at right. New beta ratios are shown at 200 and 1000, with a (c) to indicate test adherence to the ISO 16889 standard and traceability to NIST test dust.

<b>Fluid to be Filtered</b>	<b>Recommended Media</b>
Petroleum-based.....	Synteq or Cellulose
Phosphate Ester .....	DT Synteq
Diester .....	Synteq
Water Glycol .....	DT Synteq
Water-Oil Emulsion .....	Synteq
Biodegradable Fluid .....	Synteq
HWCF (high water content fluids) .....	Synteq
Coarse Filtration.....	Wire Mesh

### Donaldson Filter Media Efficiency Ratings Per ISO 16889 Test Standards

Media Number	FORMER Rating	NEW Rating	NEW Rating
	Beta <sub>x</sub> =75 per ISO 4572	Beta <sub>x(c)</sub> =200 per ISO 16889	Beta <sub>x(c)</sub> =1000 per ISO 16889
<b>Donaldson Synteq™ Synthetic Media</b>			
No. ½	2 µm	<4 µm <sub>(c)</sub>	<4 µm <sub>(c)</sub>
No. 1	3 µm	4 µm <sub>(c)</sub>	5 µm <sub>(c)</sub>
No. 2	5 µm	5 µm <sub>(c)</sub>	9 µm <sub>(c)</sub>
No. 2½	10 µm	8 µm <sub>(c)</sub>	10 µm <sub>(c)</sub>
No. 3	10 µm	8 µm <sub>(c)</sub>	10 µm <sub>(c)</sub>
No. 4	10 µm	8 µm <sub>(c)</sub>	10 µm <sub>(c)</sub>
No. 6	13 µm	10 µm <sub>(c)</sub>	13 µm <sub>(c)</sub>
No. 7	22 µm	18 µm <sub>(c)</sub>	33 µm <sub>(c)</sub>
No. 9	22 µm	18 µm <sub>(c)</sub>	23 µm <sub>(c)</sub>
No. 16	37 µm	16 µm <sub>(c)</sub>	22 µm <sub>(c)</sub>
No. 20	40 µm	>50 µm <sub>(c)</sub>	>50 µm <sub>(c)</sub>
<b>Donaldson DT Synteq Synthetic Media</b>			
DT 2µm	N/A	<4 µm <sub>(c)</sub>	<4 µm <sub>(c)</sub>
DT 5µm	N/A	4 µm <sub>(c)</sub>	5 µm <sub>(c)</sub>
DT 8µm	N/A	6 µm <sub>(c)</sub>	8 µm <sub>(c)</sub>
DT 14µm	N/A	10 µm <sub>(c)</sub>	14 µm <sub>(c)</sub>
DT 25µm	N/A	20 µm <sub>(c)</sub>	25 µm <sub>(c)</sub>
<b>Donaldson Cellulose Media</b>			
No. 3	16 µm	18 µm <sub>(c)</sub>	24 µm <sub>(c)</sub>
No. 10	25 µm	19 µm <sub>(c)</sub>	23 µm <sub>(c)</sub>
No. 20	35 µm	>40 µm <sub>(c)</sub>	>40 µm <sub>(c)</sub>
No. 25	N/A	32 µm <sub>(c)</sub>	>40 µm <sub>(c)</sub>
<b>Donaldson Wire Mesh Media</b>			
No. 44	45 µm nominal	325 mesh	N/A
No. 74	75 µm nominal	200 mesh	N/A
No. 149	150 µm nominal	100 mesh	N/A
<b>Donaldson Water Absorbing Media</b>			
WA	N/A	>30 µm(c)	>30 µm(c)

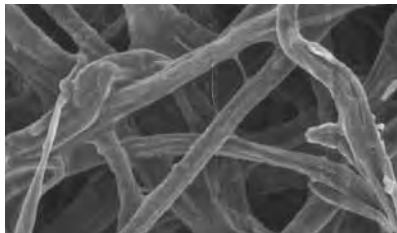
## Hydraulic Filtration Pressure Drop

The difference between the inlet pressure and the outlet pressure is called pressure drop or differential pressure. It's symbolized by  $\Delta P$ .  $\Delta P$  is an irrecoverable loss of total pressure caused by the filter, and is mostly due to frictional drag on the fibers in the media.

Differential drop may increase as the particulate rating or efficiency of the filter (as expressed by its beta ratio) gets better.  $\Delta P$  also increases as the filter is being loaded with contaminant.

### Four Major Factors Contribute to Pressure Drop

#### 1. Filter Media

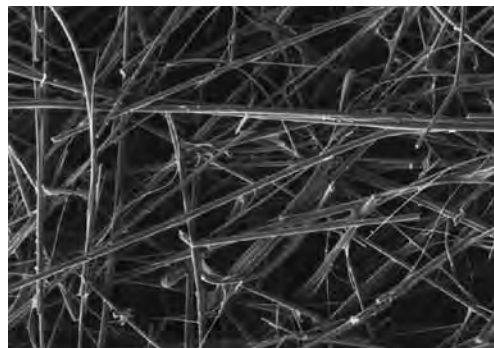


Natural Fiber Cellulose media, as seen under the scanning electron microscope.

Media is, of course, the main factor influencing pressure drop; indeed, it causes pressure drop. That's why having a low-friction, high-flowing media is so important. The natural cellulose or paper fibers (shown at left) typically used

in filtration are large, rough, and as irregular as nature made them.

Donaldson developed a synthetic media with smooth, rounded fibers, consistently shaped so that we can control the fiber size and distribution pattern throughout the media mat, and still allow the smoothest, least inhibited fluid flow. Our synthetic media is named Synteq™.



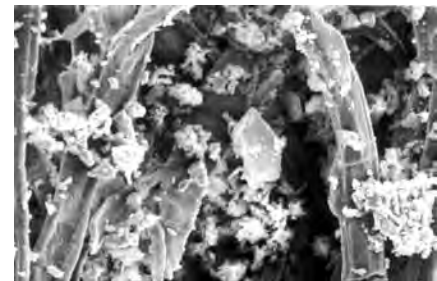
Donaldson's synthetic Synteq filter media — photo from scanning electron microscope — magnified hundreds of times.

Synteq fibers offer the least amount of resistance to fluid passing through the media. Consistency of fiber shape allows the maximum amount of contaminant-catching surface area and specific pore size control. The result is media with predictable filtration efficiencies at removing specified contaminants (i.g., 4  $\mu\text{m}$ ) and maximum dirt holding capacity. Natural cellulose fibers are larger than synthetic fibers and jagged in shape, so controlling size of the pores in the media mat is difficult and there is less open volume. In most applications this results in higher  $\Delta P$  as compared to synthetic filters. Higher beta ratings mean there are smaller pores in the media; smaller media pores cause more flow resistance, in turn causing higher pressure drop.

#### 2. Dirt, Contaminant

As dirt gets caught in the media, it eventually begins to build up and fill the pore openings. As the pore openings shrink, the differential pressure (pressure drop) increases. This is called restriction. This photo from our scanning electron microscope shows actual dirt particles building up in the media pores.

Excessive dirt in the media can cause dirt migration or even filter failure. Dirt migration occurs when the restriction is so great that the differential



pressure pushes dirt deeper into the media and, eventually, through the media and back into the system. Filter failure occurs when the restriction becomes so high that the filter cartridge collapses (outside-in flow) or bursts (inside-out flow) to relieve the upstream pressure.

To avoid such catastrophe, use of a filter service indicator is recommended. It measures the pressure drop across the filter, then signals when the filter is 'full' and needs to be changed.



### 3. Flow

Higher flows create higher pressure drop. With fast moving fluid, there will be more friction causing higher pressure drop across the media.

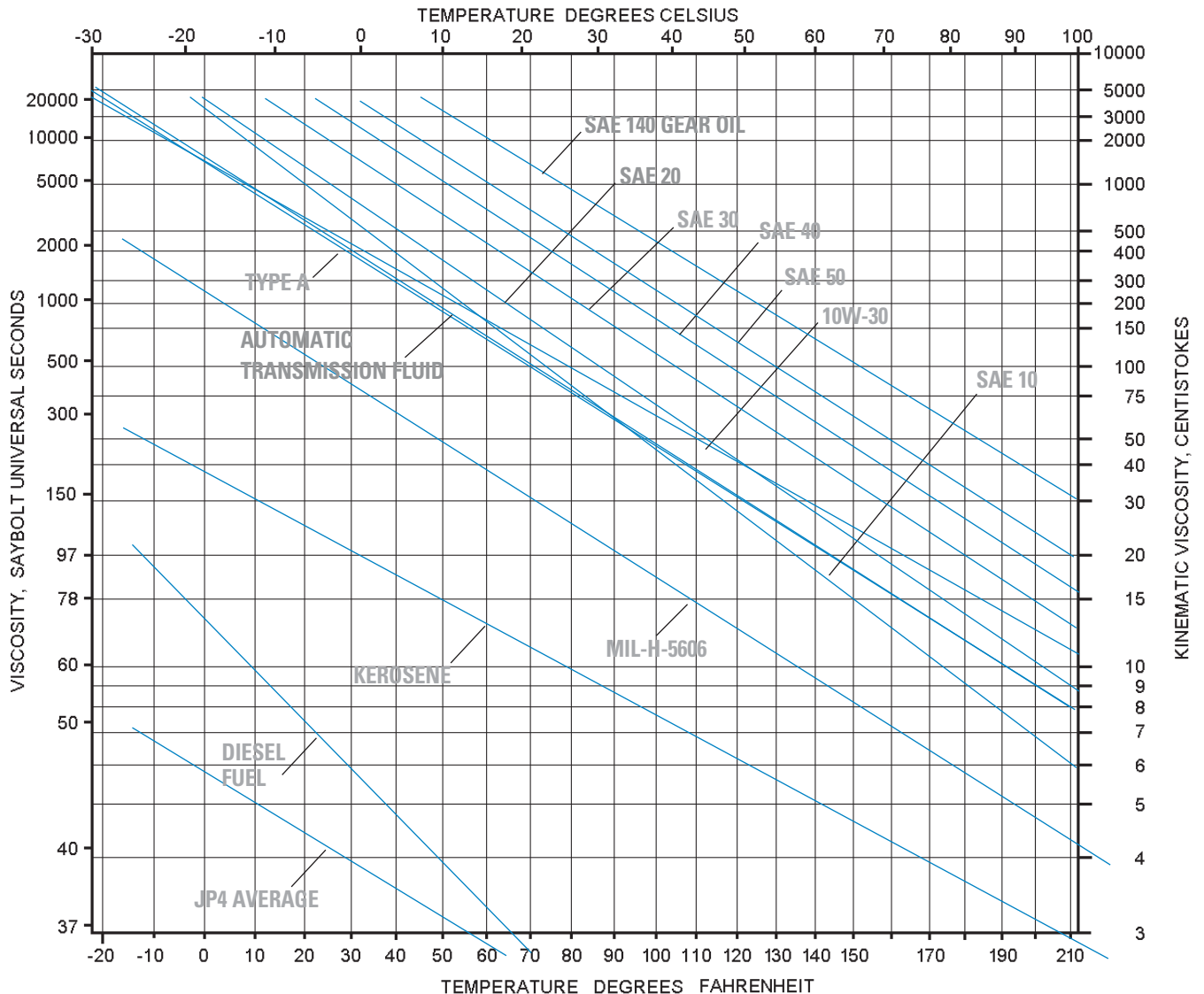
### 4. Fluid Viscosity

Measured in centistokes (cSt) or Saybolt Seconds Universal (SSU or SUS), fluid viscosity is the resistance of a fluid to flow. As fluid viscosity increases, the cSt rating increases. Higher fluid viscosities also mean higher pressure drop because the thicker oil has a tougher time passing through the layer of media fibers. Cold start fluid is a good example of highly viscous fluid. See chart below.

Filter media, amount of contamination, the flow rate, and fluid viscosity are all factors in the importance of sizing the filter for the system requirements. Filters that are too small won't be able to handle the system flow rate and will create excessive pressure drop from the start. The results could be filter operation in the bypass mode, filter failure, component malfunction, or catastrophic system failures. Filters that are too large for the system can be too costly. Oversized filters require more system oil and higher cost replacement filters. Optimal sizing is best.

## Viscosity/Temperature Chart

A.S.T.M. Standard Viscosity-Temperature Chart for Liquid Petroleum Products (D 341-43) Saybolt Universal Viscosity



## Filter Design and Construction

There are two main differences in a filter. The first is the design of the filter itself, and the second is the type of media that is used in the filter.

### Filter

Filters have some attributes that are immediately obvious to the casual observer, such as height, inside diameter, outside diameter, media concentration, type of liner, seal design, and the way the media and components are glued or potted together.

### Liners

Liners must be structurally sturdy to withstand pressure variance, yet open enough to allow good flow.

### Seals

The top seal design must be leak-free, with a gasket or sealing device that ensures a good seal throughout the life of the filter. Standard seals are made of Buna-N® material, which is fine for most applications. However, if the filtered fluid is diester or phosphate ester fluid, you'll need a seal made of a fluoroelastomer such as Viton®.

Buna-N® and Viton® are registered trademarks of E. I. DuPont de Nemours and Company.

### Media Potting

Media potting is key since it holds the media in place in between the end caps (not visible). Not only should the potting be fully around the ends of the media to prevent leaks, it should also be of a material that can withstand the application. For instance, epoxy potting should be used in filters that must perform in higher temperature environments, phosphate ester fluids and some high



water based fluids.

Inside the filter, the media can vary in thickness, pleat depth and pleat concentration.

For example, Donaldson hydraulic filters are generally equipped with either white ("Synteq™" our synthetic material) or natural brown (paper or cellulose material) media. ***It is important to note that media colors vary according to each manufacturer—it should not be assumed that any white-colored media is made of synthetic material.***

Some of the most important characteristics of filter media (structure, fiber diameter, volume solidity, basis weight, thickness, layering) can only be detected under a microscope.

### Damaged Equipment

Damage happens when key filtration points are ignored! The pistons in this pump are severely damaged from contamination in the oil.





## Combining the ISO Rating and Filter Performance Ratings

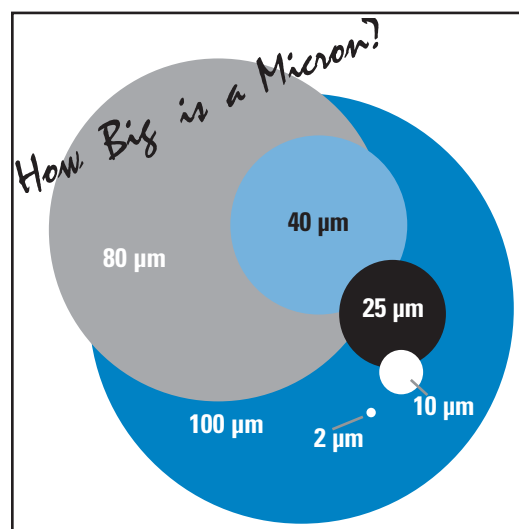
While filter manufacturers publish beta ratings for filter media to describe efficiency performance levels, a direct connection between the beta rating scale and the ISO rating scale cannot be made.

The solution is monitoring filter media performance at removing particles in the 4 µm, 6 µm, and 14 µm ranges. Fluid analysis and field monitoring are the only ways to get these measurements. Combine data from several tests to form a range of performance. Remember, actual filter performance will vary between applications.

Here's how to determine which filter media will best protect your hydraulic components: plot any media performance range on the Application Guide to Donaldson Filter Media (page 345), then connect the dots to make a line. On the same graph, plot your component requirement. (Reference chart below for some popular components, or ask your supplier for the recommended ISO rating.) If the line of the media falls below the ISO line, or if the bottom line of the filtration range does not intersect the ISO line, the component will be protected.

## Micron Sizes of Familiar Particles

Grain of table salt	100 µm
Human hair	80 µm
Lower limit of visibility	40 µm
White blood cell	25 µm
Talcum powder	10 µm
Red blood cell	8 µm
Bacteria	2 µm
Silt	<5 µm



## Typical ISO Cleanliness

Here are some typical ISO cleanliness recommendations from component manufacturers. (These are guidelines; always check the ratings specified by the manufacturer of your specific components.)

Pressure	<3000 PSI ≤210 Bar	>3000 PSI >210 Bar
<b>Pumps</b>	--- ISO RATINGS ---	
Fixed Gear Pump	19/17/15	18/16/13
Fixed Vane Pump	19/17/14	18/16/13
Fixed Piston Pump	18/16/14	17/15/13
Variable Vane Pump	18/16/14	17/15/13
Variable Piston Pump	17/15/13	16/14/12
<b>Valves</b>		
Directional (solenoid)	20/18/15	19/17/14
Pressure (modulating)	19/17/14	19/17/14
Flow Controls (standard)	19/17/14	19/17/14
Check Valves	20/18/15	20/18/15
Cartridge Valves	20/18/15	19/17/14
Load-sensing Directional Valves	18/16/14	17/15/13
Proportional Pressure Controls	18/16/13	17/15/12*
Proportional Cartridge Valves	18/16/13	17/15/12*
Servo Valves	16/14/11*	15/13/10*
<b>Actuators</b>		
Cylinders	20/18/15	20/18/15
Vane Motors	19/17/14	18/16/13
Axial Piston Motors	18/16/13	17/15/12
Gear Motors	20/18/15	19/17/14
Radial Piston Motors	19/17/15	18/16/13

\* Requires precise sampling practices to verify cleanliness levels.  
Source: Vickers

## Media Application Guide and ISO Rating System

The Application Guide for Donaldson Filter Media on page 345 provides a data format for rating fluid contamination level and plotting filter media performance.

The vertical numbers on the left side of the chart represent particle counts in a logarithmic progression of ten: .01, .1, 1, 10, 102, 103, 104, 105 and 106. (This represents the number of particle in the oil sample at the given size.) The numbers across the bottom of the chart represent particle size in microns.

Donaldson media efficiency performance levels are derived from the ISO 16889 test standard with NIST-certified on-line automatic particle counters and ISO medium test dust. The Donaldson media efficiency performance levels shown are based on test averages under steady flow conditions. Actual performance levels may vary by application, viscosity, flow variance and contamination differences. Contact Donaldson or your Donaldson distributor for specific application calculations. The international rating system for fluid contamination levels is called the ISO contamination code and it is detailed in the ISO 4406 document. Most component manufacturers publish filtration level recommendations using the ISO code. The ISO code, located on the right side of the media application guide on page 345, is easy to use if you remember the 4 µm, 6 µm and 14 µm numbers along the bottom of the chart.

Manufacturer's ISO contamination levels are based on controlling the particle counts of 4 µm, 6 µm and 14 µm particles in hydraulic system oil. This level is identified by measuring the number of particles 4µm and greater, 6 µm and greater, and 14 µm and greater in one milliliter of the system hydraulic oil sample.

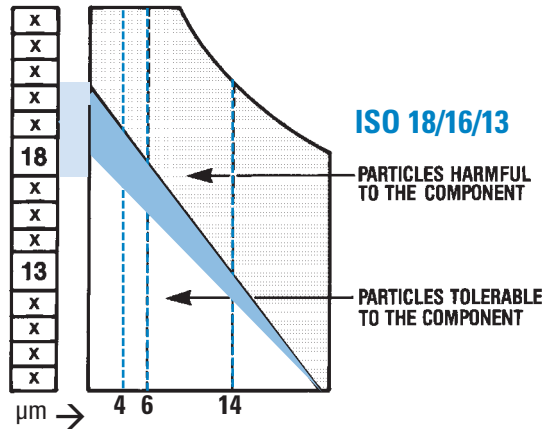
### How to Use the ISO Rating

**Example:** A cartridge valve manufacturer recommends an ISO cleanliness level of 18/16/13.

- 1) On the Application Guide for Donaldson Filter Media on the next page, place a dot on the vertical 4 µm line, horizontally even with the 18 box of the ISO code.
- 2) Place a dot on the vertical 6 µm line horizontally even with the 16 box of the ISO code.
- 3) Place a dot on the vertical 14 µm line horizontally even with the 13 box of the ISO code.
- 4) Connect the dots to get the ISO cleanliness level 18/16/13.

As illustrated below, particle counts falling on and above the 18/16/13 line are damaging to the component and exceed the 18/16/13 specification set by the manufacturer.

Select a Donaldson media that falls below 18/16/13 to achieve cleanliness level tolerable to the component.



### ISO 4406 Contamination Code

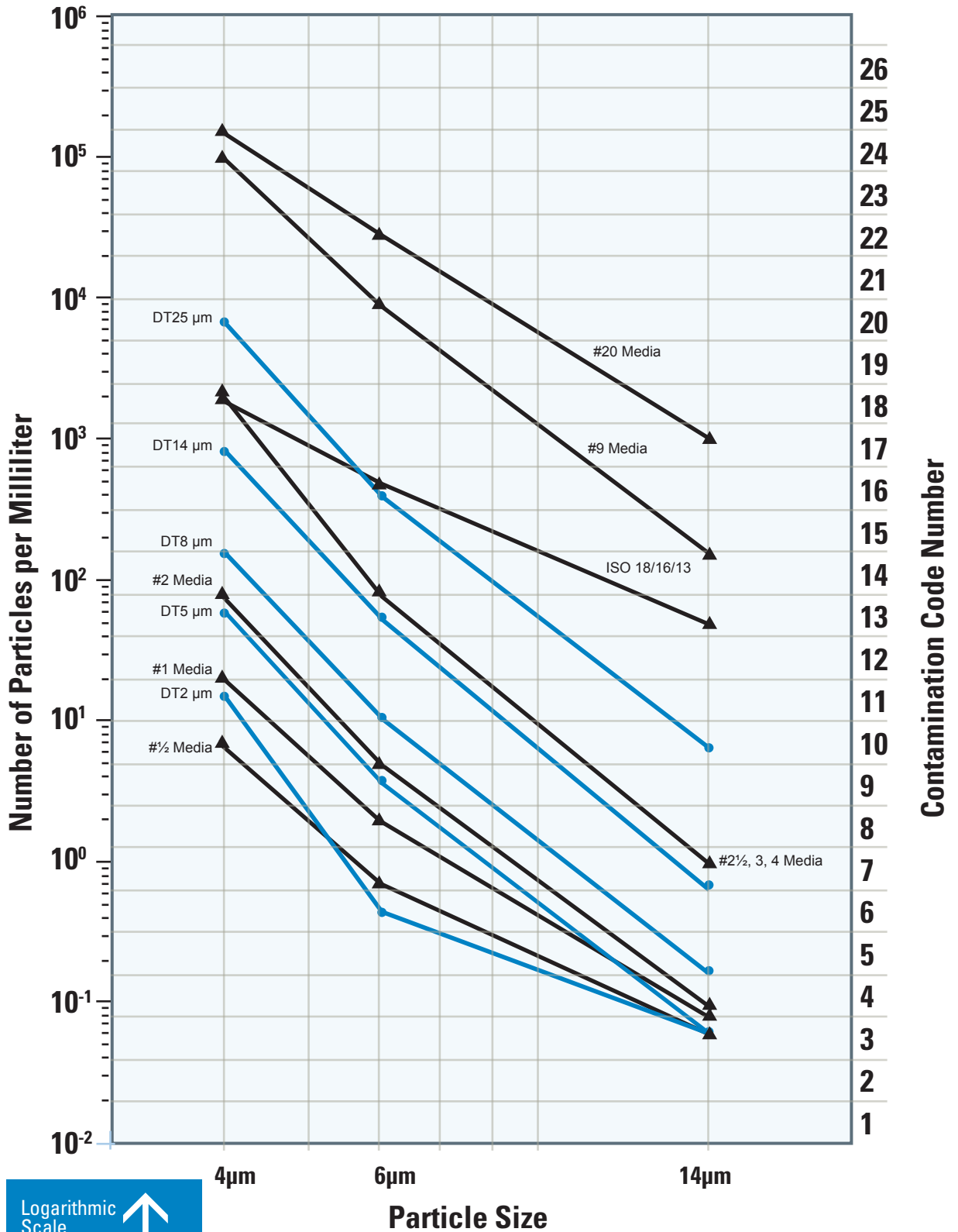
This correlates to the numbers in the boxes along the right side of the graph on the next page.


#### Range of number of particles per milliliter:

Code	More Than	Up to & Including	Code	More Than	Up to & Including
24	80,000	160,000	14	80	160
23	40,000	80,000	13	40	80
22	20,000	40,000	12	20	40
21	10,000	20,000	11	10	20
20	5,000	10,000	10	5	10
19	2,500	5,000	9	2.5	5
18	1,300	2,500	8	1.3	2.5
17	640	1,300	7	.64	1.3
16	320	640	6	.32	.64
15	160	320			

HYDRAULIC FILTRATION TECHNICAL REFERENCE

### Application Guide for Donaldson Filter Media



Logarithmic Scale   
This represents the number of particles at a given size in the oil sample

## Filter Efficiency Standards

### Understanding the Beta Rating System

This information is provided as an aid to understanding fluid filter efficiency terminology based on current ISO, ANSI and NFPA test standards. It is not proprietary and may be reproduced or distributed in any manner for educational purposes.

### What is Beta Ratio?

Beta ratio (symbolized by  $\beta$ ) is a formula used to calculate the filtration efficiency of a particular fluid filter using base data obtained from multi-pass testing.

In a multi-pass test, fluid is continuously injected with a uniform amount of contaminant (i.e., ISO medium test dust), then pumped through the filter unit being tested. Filter efficiency is determined by monitoring oil contamination levels upstream and downstream of the test filter at specific times. An automatic particle counter is used to determine the contamination level. Through this process an upstream to downstream particle count ratio is developed, known as the beta ratio. The formula used to calculate the beta ratio is:

$$\text{Beta ratio}_{(x)} = \frac{\text{particle count in upstream oil}}{\text{particle count in downstream oil}}$$

where (x) is a given particle size

Indicates that testing was done with APC's calibrated with NIST fluid

$$\beta_{10(c)} = 1000$$

1000 times more particles upstream than downstream that are 10  $\mu\text{m}$  and larger

### Why the Efficiency Rating Test Standard was Updated

The International Industry Standard (ISO) for multi-pass testing provides a common testing format for filter manufacturers to rate filter performance. This standardization gives you the ability to reliably compare published filter ratings among different brands of filters.

ISO test standards were updated in 1999 to reflect the improved technology available in particle counters and other test equipment. The newer particle counters provide more precise counting and greater detail—reflecting a truer indication of filter performance.

The National Fluid Power Association (NFPA), the National Institute of Standards & Technology (NIST), and industry volunteers, including several engineers from Donaldson, helped revise the ISO standard. ISO 16889 has been in force since late 1999 and ISO 4572 is officially discontinued.

### Better Test Dust

The old test dust (AC fine test dust or ACFTD) was “ball milled,” which produced dust particles of varying size and shape. Particle distribution was often different from batch to batch. The accuracy of ACFTD distribution and previous APC calibration procedure was questioned by industry, due to lack of traceability and certification. ACFTD hasn't been produced since 1992.

Now, the new test dust (ISO medium test dust) is “jet milled” to produce consistent particle size, shape, and distribution from batch to batch. See dust size comparison chart below.

### Liquid Automatic Particle Counters (APC's)

In the old test standard (ISO 4572), fluid samples obtained in bottles and off-line particle counting were allowed. Now, in the updated standard (ISO 16889), on-line, laser-based automatic particle counters, especially made for measuring liquids, are required and bottle counting methods are disallowed, as illustrated on next page.

Find further information on ISO 16889 at [www.NFPA.com](http://www.NFPA.com) or your ISO document source. Ask for ISO/TR16386: 1999 “The Impact of Changes in ISO Fluid Power Particle Counting—Contamination Control and Filter Test Standards.”

The old particle counter calibration was based on only one dimension of an irregularly-shaped particle (the longest cord). Today, the particle counter calibration is based on equivalent spherical area of an irregularly-shaped particle.

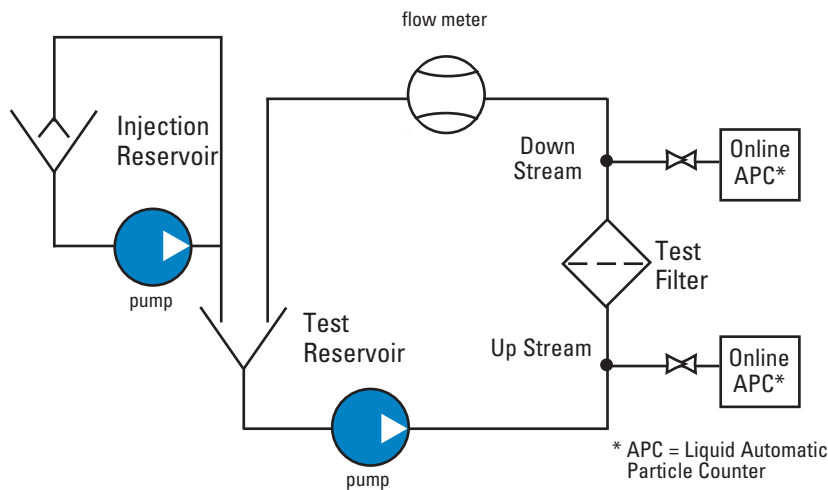
NIST provides calibration suspension, which is certified with X number of particles at a certain size. This is verified by NIST. The new way to list beta ratios includes a subscript (c) to indicate NIST certified test suspension and assures you of traceability and repeatability.

Overall, you can have strong confidence in filter ratings resulting from tests per ISO 16889, as they are highly accurate. As always, keep in mind that beta ratings are laboratory measurements under steady flow conditions with artificial contaminants – the real proof of the performance is how clean the filter keeps the fluids in the application. A good oil analysis program that checks the cleanliness of the oil periodically will verify that the proper filters are being used.

### Test Dust Size Comparisons

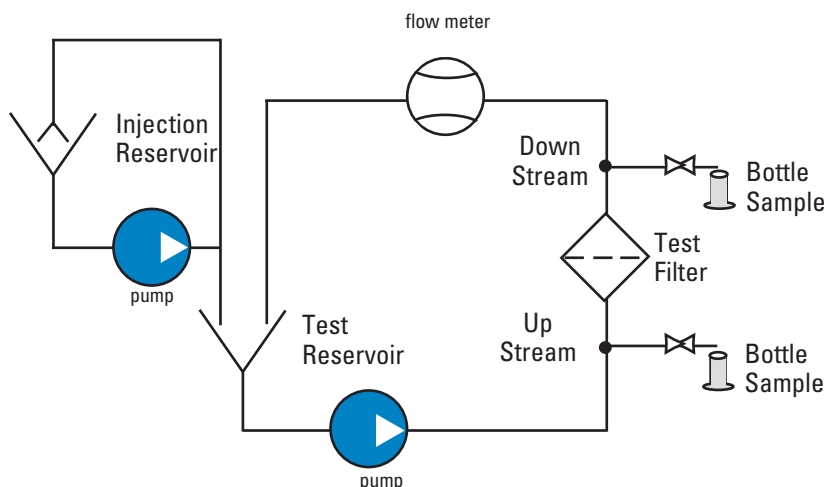
**ACFTD calibrated size (µm) per ISO 4402 corresponds to a NIST-calibrated size [µm<sub>(c)</sub>] per ISO 11171**

<b>ACFTD</b>	<b>0.8</b>	<b>1</b>	<b>2</b>	<b>2.7</b>	<b>3</b>	<b>4.3</b>	<b>5</b>	<b>7</b>	<b>10</b>	<b>12</b>	<b>15</b>	<b>15.5</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>40</b>	<b>50</b>
<b>NIST</b>	<b>4</b>	<b>4.2</b>	<b>4.6</b>	<b>5</b>	<b>5.1</b>	<b>6</b>	<b>6.4</b>	<b>7.7</b>	<b>9.8</b>	<b>11.3</b>	<b>13.6</b>	<b>14</b>	<b>17.5</b>	<b>21.2</b>	<b>24.9</b>	<b>31.7</b>	<b>38.2</b>



### ISO 16889

- In-Line Liquid Automatic Particle Counters (APC) are now required for proper testing.
- APC calibration follows ISO 11171 procedures
- ISO 11171 uses NIST (National Institute of Standards & Technology) certified calibration fluid



### ISO 4572 (Discontinued)

- Either bottle samples or APC's were allowed.
- APC calibration followed ISO4402 ACFTD (Discontinued)

### Highlights of ISO 16889

- ISO 4572 is now replaced by ISO 16889 as the international standard for Multi-Pass Tests to determine the efficiency (beta rating or beta ratio) and the dirt-holding capacity of the filter.
- The test bench for ISO 16889 must have On-Line Liquid Automatic Optical Particle Counters (APC) calibrated using NIST (National Institute of Standards & Technology)-certified calibration fluid. This includes added enhancements to APC's, to allow for better resolution, accuracy, repeatability and reproducibility.
- ISO 12103-1,A3 (ISO Medium, 5µm-80µm)
- Test Dust was selected as replacement dust for calibration and testing procedures.
- APC's are calibrated by passing a sample of calibration fluid with a known particle size distribution and producing a calibration curve to match the known count distribution.
- NIST used the Scanning Electron Microscope analysis and statistical analysis techniques to certify the particle size distribution.
- Particle counts, upstream and downstream, are taken every minute of the test.
- Beta ratios are reported with (c) to designate NIST traceability.

### ISO 16889 recommends reporting beta ratings at:

Rating	Efficiency
2	50%
10	90%
75	98.7%
100	99%
200	99.5%
1000	99.9%

**Example:**  $\beta_{4(c)}=200$  signifies that there are 200 times as many particles that are 4 µm and larger upstream as downstream. This is **99.5% efficiency**.

**Example:**  $\beta_{5(c)}=1000$  indicates that there are 1000 times as many particles that are 5 µm and larger upstream as downstream. This is **99.9% efficiency**.

## Donaldson Hydraulic Filter Media Beta Ratings

Donaldson hydraulic filter media beta ratings are average ratings obtained from multi-pass tests performed per the new ISO 16889 standard.

According to the ISO standard, each filter manufacturer can test a given filter at a variety of flow rates and terminal pressure drop ratings that fit the application, system configuration and filter size. Your actual performance may vary depending on the configuration of the filter tested and test conditions.

### Donaldson Filter Media Efficiency Ratings Per ISO 16889 Test Standards

Media Number	FORMER Rating Beta <sub>x</sub> =75 per ISO 4572	NEW Rating Beta <sub>x(c)</sub> =200 per ISO 16889	NEW Rating Beta <sub>x(c)</sub> =1000 per ISO 16889
<b>Donaldson Synteq™ Synthetic Media</b>			
No. ½	2 µm	<4 µm <sub>(c)</sub>	<4 µm <sub>(c)</sub>
No. 1	3 µm	4 µm <sub>(c)</sub>	5 µm <sub>(c)</sub>
No. 2	5 µm	5 µm <sub>(c)</sub>	9 µm <sub>(c)</sub>
No. 2½	10 µm	8 µm <sub>(c)</sub>	10 µm <sub>(c)</sub>
No. 3	10 µm	8 µm <sub>(c)</sub>	10 µm <sub>(c)</sub>
No. 4	10 µm	8 µm <sub>(c)</sub>	10 µm <sub>(c)</sub>
No. 6	13 µm	10 µm <sub>(c)</sub>	13 µm <sub>(c)</sub>
No. 7	22 µm	18 µm <sub>(c)</sub>	33 µm <sub>(c)</sub>
No. 9	22 µm	18 µm <sub>(c)</sub>	23 µm <sub>(c)</sub>
No. 16	37 µm	16 µm <sub>(c)</sub>	22 µm <sub>(c)</sub>
No. 20	40 µm	>50 µm <sub>(c)</sub>	>50 µm <sub>(c)</sub>
<b>Donaldson DT Synteq Synthetic Media</b>			
DT 2µm	N/A	<4 µm <sub>(c)</sub>	<4 µm <sub>(c)</sub>
DT 5µm	N/A	4 µm <sub>(c)</sub>	5 µm <sub>(c)</sub>
DT 8µm	N/A	6 µm <sub>(c)</sub>	8 µm <sub>(c)</sub>
DT 14µm	N/A	10 µm <sub>(c)</sub>	14 µm <sub>(c)</sub>
DT 25µm	N/A	20 µm <sub>(c)</sub>	25 µm <sub>(c)</sub>
<b>Donaldson Cellulose Media</b>			
No. 3	16 µm	18 µm <sub>(c)</sub>	24 µm <sub>(c)</sub>
No. 10	25 µm	19 µm <sub>(c)</sub>	23 µm <sub>(c)</sub>
No. 20	35 µm	>40 µm <sub>(c)</sub>	>40 µm <sub>(c)</sub>
No. 25	N/A	32 µm <sub>(c)</sub>	>40 µm <sub>(c)</sub>
<b>Donaldson Wire Mesh Media</b>			
No. 44	45 µm nominal	325 mesh	
No. 74	75 µm nominal	200 mesh	
No. 149	150 µm nominal	100 mesh	
<b>Donaldson Water Absorbing Media</b>			
WA	N/A	>30 µm(c)	>30 µm(c)



## Cleanliness Level Correlation Table

Conversion of cleanliness specifications to filter performance is not an exact science because the contamination level in a hydraulic system is a function of the ingress and generation rate as well as the filter performance.

### Factors That Affect Cleanliness Levels in a Hydraulic System

- Abrasive wear in space between adjacent moving surfaces of components.
- Erosive wear at component edges or direction changes where there is high fluid velocity.
- Fatigue wear by particles trapped between moving surfaces.

### Identification of the Most Sensitive Component

- Required cleanliness level is dominated by the component with smallest clearances and/or highest loading on the lubricating film.
- Best source for determining this level is the specification published by the component manufacturer.
- Higher pressures reduce component life, unless contamination level is decreased accordingly.
- Operating at half the rated pressure of component will increase its life by more than four times.
- Percent of operating time at maximum pressure depends on individual machines and application.

ISO Code	Particles Per Milliliter >10 microns	ISO FTD* Gravimetric Level (mg/l)	Mil Std 1236A (1967)	NAS 1638 (1964)	SAE Level (1963)
30/26/23	140,000	1000			
29/25/23	85,000		1000		
26/25/20	14,000	100	700		
23/21/18	4,500			12	
2220/18	2,400		500		
22/20/17	2,300			11	
21/20/17	1,400	10			
21/19/16	1,200		10		
20/18/15	580			9	6
19/17/14	280		300	8	5
18/16/13	140	1		7	4
17/15/12	70			6	3
16/14/12	40		200		
16/14/10	35			5	2
15/13/10	14	0.1		4	1
14/12/9	9			3	0
13/11/8	5			2	
12/10/8	3		100		
12/10/7	2.3			1	
11/10/6	1.4	0.01			
11/9/6	1.2			0	
10/8/5	0.6			0	
9/7/5	0.3		50		
8/6/3	0.14	0.001			
7/5/2	0.04		25		
6/2/8	0.01		10		

\* SAE Fine Test Dust — ISO approved test and calibration contaminant.  
Source: Milwaukee School of Engineering Seminar, Contamination & Filtration of Hydraulic Systems

## Compatibility of Donaldson Filter Media with Hydraulic Fluids

While Donaldson has developed many formulations of media, they can be divided into two broad categories: natural fibers, usually cellulose, and synthetic or man-made fibers.

Petroleum-Based (Hydrocarbon) Fluids	Recommended Filter Media		
	Cellulose	Synteq	DT Synteq
Straight oils	Yes	Yes	Yes
ATFs	Yes	Yes	Yes
Military hydraulic fluids	Yes	Yes	Yes
#2 Diesel fuel	Yes	Yes	Yes
Gasoline	Yes	Yes	Yes
E85 (85/15 Ethanol/Gasoline)	No	No	Yes
Fire Resistant Fluids	Cellulose	Synteq	DT Synteq
HFA - Oil-in-water emulsion	No	<150°F	Yes
HFB - Water-in-oil emulsion	No	<150°F	Yes
HFC - Water glycol	No	<150°F	Yes
HFD Synthetics - Polyol esters, Esters, Diesters, & blends	No	Yes	Yes
HFD Synthetics - Phosphate esters	No	No	Yes
HFD Synthetics - Polyalkylene glycols (PAG), Polyalphaolefins (PAO), & blends	No	Yes	Yes
HFD Synthetics - Silicone (siloxane) oil	No	Yes	Yes
Biodegradable Fluids	Cellulose	Synteq	DT Synteq
Vegetable-based oils - sunflower, rapeseed oils	No	Yes	Yes
Synthetic oils - PAG / PAO	No	Yes	Yes
Synthetic oils - Esters, Diesters	No	Yes	Yes



### Piston Pump Damage

The severe score marks on the piston slippers leave no question about why good hydraulic filtration is important.

## A Note on Seals

- Filters with seals made of Buna-N<sup>®</sup> are appropriate for most applications involving petroleum oil and some high water content fluids. Filters with seals made of Viton<sup>®</sup> or Fluorel<sup>®</sup> (both fluoroelastomers) are required when using diesters, phosphate ester fluids. Donaldson offers both types. EPR (ethylene propylene rubber) seals are required for use with Skydrol<sup>®</sup> and Skydrol 500 fluids.

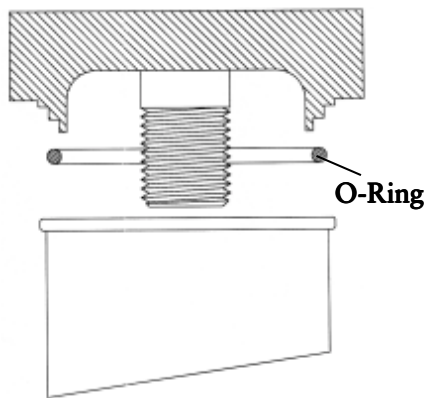
Buna-N<sup>®</sup> and Viton<sup>®</sup> are registered trademarks of E. I. DuPont de Nemours and Company. Skydrol is a registered trademarks of Solutin, Inc.

- In Donaldson filters with fluorocarbon elastomer seals, epoxy potting is used to accommodate higher temperature environments and for compatibility with fluids such as phosphate ester, diesters, and high water based fluids. The plastisol (heat cured) and urethane (self curing) potting materials used in other filters perform well with petroleum-based fluids.

## Seal Installation Instructions

### Remember...

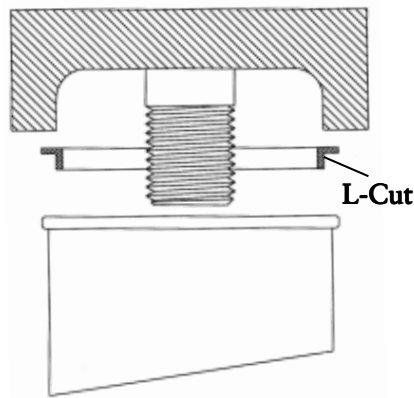
- Over-tightening filter may damage head.
- Dispose of used filter properly



### O-Ring Seal

**P166435**

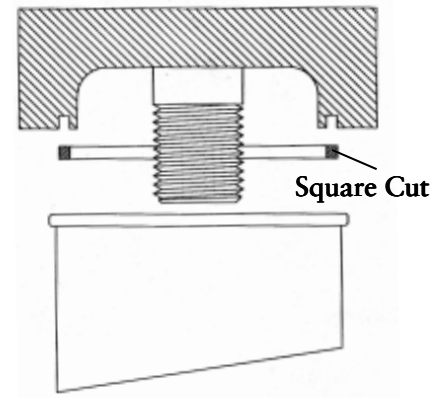
1. Remove used seal and clean gasket seat in head. Apply clean oil to new surfaces.
2. Install new seal on inside lip of filter.
3. Screw on new filter until gasket makes contact. Tighten filter until top edge makes metal to metal contact with filter head (approximately 1 ½ turns).



### L-Cut Gasket

**P170894 or P569908**

1. Remove used seal and clean gasket seat in head. Apply clean oil to new surfaces.
2. Install new seal on inside lip of filter.
3. Screw on new filter until gasket makes contact. Tighten filter an additional ¾ turn.



### Square-Cut Gasket

**P165641**

1. Remove old gasket and clean groove in head. Apply clean oil to new gasket surfaces.
2. Install new gasket into groove in filter head.
3. Screw on new filter until gasket makes contact. Tighten filter an additional ¼ turn.

## How to Best Position Filters in Your Hydraulic Circuit

Within every hydraulic circuit there are many possible places for filters.

The best systems are strategically engineered to ensure that oil is filtered properly at each stage of its journey through the circuit. Ideally, filtration should occur in the following places:

- In the Reservoir
- Before/After the Pump
- In the Return-line System
- Off-line

In reality, many companies have to make tough decisions about which filters they can afford and which ones they'll have to live without.

Much depends on the cleanliness level requirements of the components, environment, duty cycle of the equipment and other variables that can vary from application to application.



Portable Kidney Loop Filter Cart

### Kidney Loop Filters

**Benefit: High**

Sometimes referred to as “off-line” filters, kidney loop filters achieve very fine filtration by maintaining steady-state flow, independent of the hydraulic circuit.

With this type of filtration, the entire hydraulic system can keep operating while the kidney loop filter is being serviced.

A kidney loop filter utilizes low-pressure housings that are easily accessible and serviceable. These filters can either be integrated into the main hydraulic reservoir, or used in mobile filter carts like the one shown at left to service many hydraulic systems.

Note that kidney loop filters do not directly protect components — rather, their main function is to polish the oil to a very clean condition. It's also important to remember that an additional pump and motor will be required.

### Filler / Breather

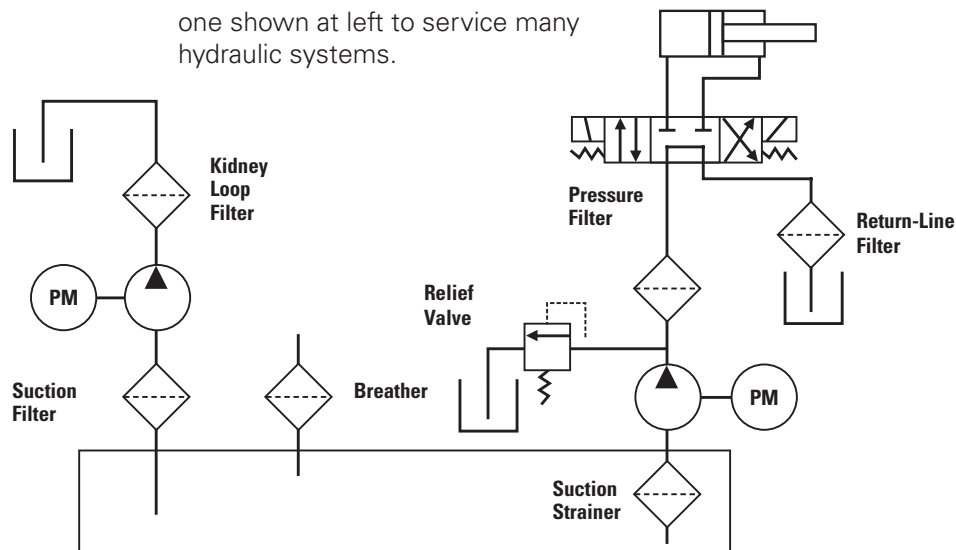
**Benefit: High**

Tank breathers are placed on hydraulic reservoirs to prevent atmospheric contamination from entering and to allow for sufficient air movement inside the reservoir.

Breathers should prevent particles larger than 3 microns from entering the system. This is a sensible, affordable solution for any hydraulic system, but by all means cannot be the only filter on a hydraulic system.



**This diagram shows how various types of filters can be used in hydraulic circuits.**



## Suction Filter

### Benefit: Medium

Normally placed between the reservoir and the pump, suction filters are designed to remove particles in the 5 to 150 micron range. They are easier to service and less expensive than many other types of filters—but because restriction in the suction line must be kept very low, filter housing size tends to be larger than similar flow return or pressure filter housings.

The most popular application for suction filters is with variable-speed hydrostatic pumps commonly found in off-road mobile applications and industrial variable-speed drives. They are also often used in harsh environments and charge pump applications.

## Suction Strainer

### Benefit: Low

Suction strainers, or sump-type filters, are often used in hydraulic fluid reservoirs. Their only real use is to keep cigarette butts, moths, nuts & bolts and the like out of the pump. Instead, such contaminants can easily be eliminated by keeping the reservoir sealed and by using a Filler/Breather and Return-Line Filter.

## Return-Line Filter

### Benefit: High

The advantages of return-line filters are many. They are usually low-pressure housings, which are less typically expensive. Their purpose is to collect the dirt from around the circuit as the oil returns to the reservoir. Much like the kidney loop, the return-line filter provides ultimate flexibility in positioning—it can perform almost anywhere within the return line circuit, either mounted inline or built into the reservoir.



Downsides are few, but worth noting: return-line filters can be subject to flow surges (which contribute to poor filter performance) and they do not filter the drain lines.

**Note regarding return-line and kidney-loop filtration:** If you're looking for a great value filter that's easy to maintain and with lots of media choices, this is a wise investment. Although these filters are very common, one downside is that there are very few standards of consistency from one manufacturer to the next, so replacement cartridges are not necessarily interchangeable.

## Pressure Filter

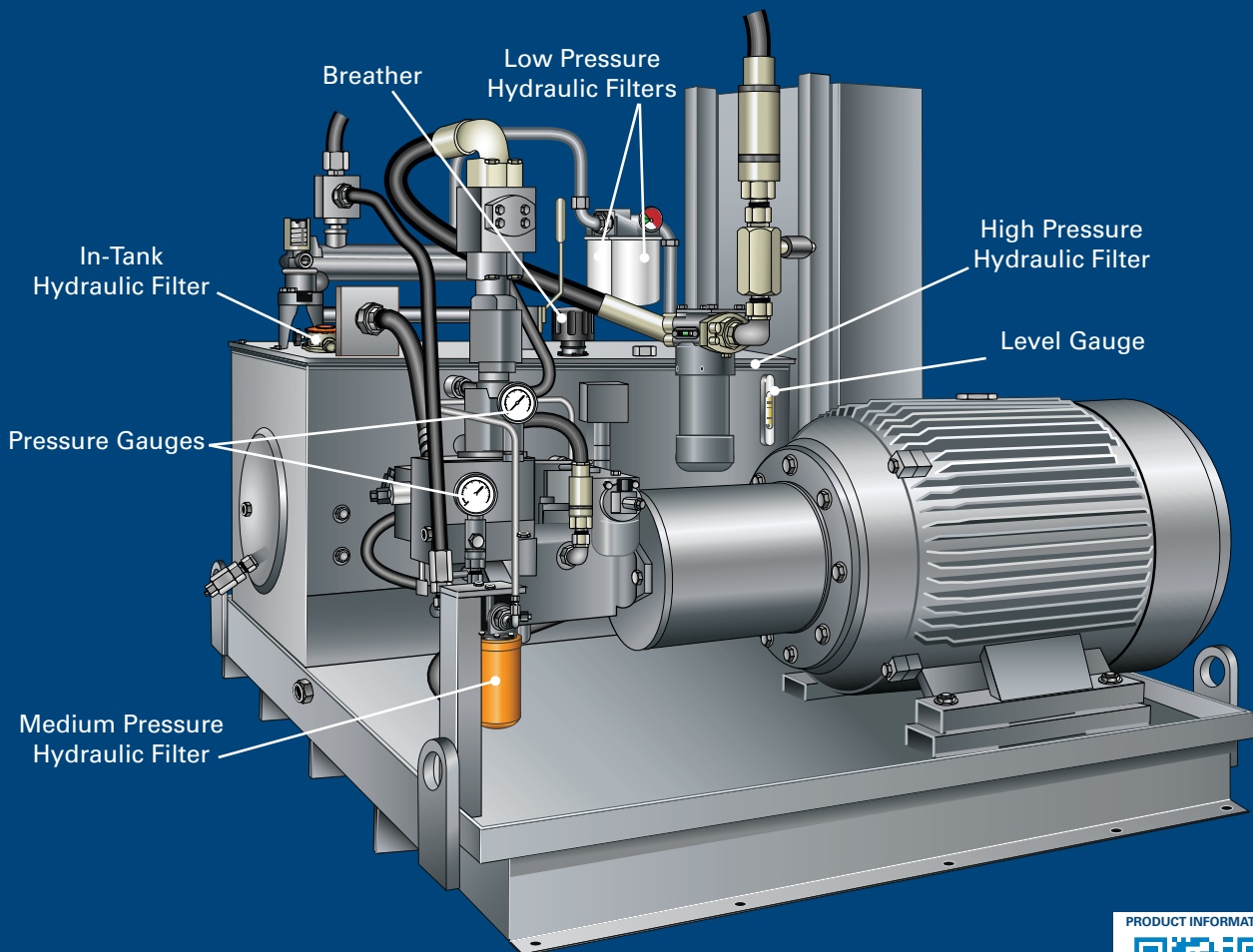
### Benefit: High

This is also known as “last-chance” filtration. High pressure filters keep clean the oil that comes directly from the pump so that the more expensive downstream components (such as valves and actuators) are protected. Pressure line filters offer protection from catastrophic pump failure. They are a worthwhile investment for high-value systems — as are found in the aircraft industry, paper and steel mills, plastic injection molding, and in die-casting machines.



One downside to high pressure filters is, ironically, the high pressure. The entire system must be stopped in order to service a high-pressure filter—unless a duplex configuration is used. When oil is shooting out of a pump at 6000+ psi, it will take out anything in its way! By nature, a high-pressure pump is a prime mover of fluids, so it will experience significant wear over time. Service can also be more difficult because of its heavy-duty construction—as anyone who's ever tried to change a slippery, 200-pound cast-iron filter can attest.

# Donaldson Delivers Performance Under **Any** Pressure.



[www.donaldsonfilters.com](http://www.donaldsonfilters.com)

PRODUCT INFORMATION

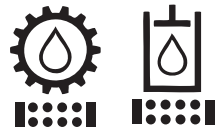


[www.donaldsonfilters.com](http://www.donaldsonfilters.com)





# HYDRAULIC FILTRATION FOR VEHICLES/EQUIPMENT APPLICATION DESIGN WORKSHEET



For proper development/design engineering solution, we ask you to provide details about your engine, project due dates, hydraulic or transmission system and performance (mechanical and filtration), system mounting, service, final packaging and product markings.

When completed, please forward to Donaldson.  
Email: engine@donaldson.com  
Fax: 952-887-3502

<b>Customer Name:</b>		<b>Revision:</b>	
<b>Project Name:</b>			
<b>Contact Name:</b>		<b>Title</b>	
<b>Phone:</b>	<b>Fax:</b>	<b>Email:</b>	
<b>Current Donaldson Model Used: (if applicable)</b>		<b>Your Part Number:</b>	
<b>Target Cost:</b>			

**Project Details**

Type of Vehicle/Machine: \_\_\_\_\_  
 Units Per Year: \_\_\_\_\_  
**Key Project Dates:**  
 Design Proposal: \_\_\_\_\_  
 Quote: \_\_\_\_\_  
 Sample Delivery: \_\_\_\_\_  
 Design Freeze: \_\_\_\_\_  
 PPAP: \_\_\_\_\_  
 Start of Production: \_\_\_\_\_

**Application Information**

**Components That Need Protection**  
 Pump (type?): \_\_\_\_\_  
 Circuit:     Hydraulic     Pilot  
 Transmission:     Hydrostatic     Powershift

**Filter Location:**  
 Suction     Pressure     Return  
 Side Loop     Charge     Sump  
 Other .. \_\_\_\_\_

**Port Size & Type:**  
**NPT:**  1/2"     3/4"     1-1/4"     1-1/2"     2-1/2"  
**SAE O-ring:**  -8     -12     -16     -20     -24  
**4 Bolt Flange:**  2" SAE     3" SAE     4" ANSI  
 2" Code 61     2-1/2" Code 61  
**Other** .....

**Mounting Requirements:**  
 \_\_\_\_\_

**Operating Conditions**

**Flow Rates:**  lpm or  gpm  
 Min \_\_\_\_\_ Normal \_\_\_\_\_ Max \_\_\_\_\_  
**Oil System Pressure (psi/kPa):**  
 Minimum \_\_\_\_\_ Normal \_\_\_\_\_ Maximum \_\_\_\_\_  
**Temperature:**  °C or  °F  
 Fluid: Min \_\_\_\_\_ Normal \_\_\_\_\_ Max \_\_\_\_\_  
 Ambient: Min \_\_\_\_\_ Normal \_\_\_\_\_ Max \_\_\_\_\_

**Fluid Type:**  
 Petroleum     Water-glycol  
 Phosphate-ester     HWBF  
 Other \_\_\_\_\_

**Viscosity:** (2 required)  
 \_\_\_\_\_ cSt or Ssu @ \_\_\_\_\_ °C Temp  
 \_\_\_\_\_ cSt or Ssu @ \_\_\_\_\_ °C Temp

**Filtration Performance**

**ISO Contamination Level Required** \_\_\_\_\_  
 Beta 200/1000 = \_\_\_\_\_ / \_\_\_\_\_  
 Filter Media: .....  Synthetic     Cellulose  
 Wire

More on next page.

Capacity:

\_\_\_\_\_ gms ISO Medium @ \_\_\_\_\_ flow to \_\_\_\_\_ psid

**Pressure Drop Limits:**

Limits	psid	Flow	Viscosity
1	@	@	
2	@	@	
3	@	@	

**Structural Performance**

**Hydrostatic Pressure Resistance (Burst):**

Test Method : \_\_\_\_\_

Minimum Value: \_\_\_\_\_ psid / kPa

**Collapse Pressure:**

Test Method : \_\_\_\_\_

Minimum Value: \_\_\_\_\_ psid / kPa

**Pressure Testing:**

	Min. Cycles	Range (psid)	Frequency (Hz)
Hydrodynamic		to	
Flow Fatigue		to	
Vibration		to	

**Cracking Pressure:**

Test Method : \_\_\_\_\_

Minimum Value: \_\_\_\_\_ psid / kPa

**By-pass Valve:**  In Head  In Filter

Setting: \_\_\_\_\_ psid / kPa

**Leak Testing:**

Test Method : \_\_\_\_\_

Minimum Value: \_\_\_\_\_ psid / kPa

**Additional Information**

**Filter Service**

**Indicator Type:**  Electric

Type: \_\_\_\_\_

**Filter Change Interval:**

\_\_\_\_\_  km or  miles or  hours

Do you require installation, service or maintenance recommendations from Donaldson?  Yes  No

**Packaging**

**Do you have any special packaging requirements?**

Yes  No If yes, please check all that apply:

Protective caps:  on inlet  on outlet  on port

**Final Assembly:**

Bulk / Bagged  Bulk/Individual Boxes

Other \_\_\_\_\_

**Product Markings/Identity**

**Do you have any product marking requirements?**

Head Assembly?  Yes  No

Filters?  Yes  No

If yes, artwork it is assumed customer will provide artwork for filter markings. Donaldson can provide marking area for artwork design. Standard installation icons are available from Donaldson.

**Special Requirements or Application Notes**

Use this area to provide additional information that will assist Donaldson engineering.

**For Donaldson USE ONLY**

**Date Received:** \_\_\_\_\_

**Request From:**  Catalog  Web Site

Other \_\_\_\_\_

**Assigned to:**

Business Unit: \_\_\_\_\_

Account Manager: \_\_\_\_\_

Product Manager: \_\_\_\_\_

Engineer: \_\_\_\_\_



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Hydraulic Applications Engineering

Doc. No. F115354 Rev.1

January 2012

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Use this section to help guide you to the proper page in this product guide to find more information and/or details about a individual part. The descriptions shown are, in most cases, abbreviated. A number of parts; i.e., indicators, are displayed in multiple product family pages.

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K040799	77	Head Assembly, FIK in-tank, SAE 16 O-Ring
K040811	77	Head Assembly, FIK in-tank, SAE 12 O-Ring
K040812	77	Head Assembly, FIK in-tank, SAE 16 O-Ring
K040813	77	Head Assembly, FIK in-tank, SAE 20 O-Ring
K041634	83	FIK04 Assembly, SAE-20 & SAE-16
K041769	77	Head Assembly, FIK in-tank, SAE 12 O-Ring
K041770	77	Head Assembly, FIK in-tank, 1" NPT
K041771	77	Head Assembly, FIK in-tank, 3/4" NPT
K041772	77	Head Assembly, FIK in-tank, 1" NPT
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K041774	77	Head Assembly, FIK in-tank, SAE 12 O-Ring
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K052024	209	Head Assembly, HPK05, 2" SAE 4-bolt Flange
K052039	209	Head Assembly, HPK05, 2" SAE 4-bolt Flange
K052053	77	Head Assembly, FIK in-tank, SAE 20 O-Ring
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K060173	116	In-Tank Assembly, HDK06
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K080085	128	Assembly, HFK08, In-Line, 3" NPT
K080087	128	Assembly, HFK08, In-Line, SAE-20
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p160130	117	Bypass Spring, HDK06
P160135	117	Top Handle, HDK06
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P160365	117	Nut Assembly, HDK06
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P160476	117	Cup Seal, Buna N, HDK06
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P160710	117	Visual Indicator Repair Kit, Buna N Seal, HDK06, HDK08
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P161016	116	Filter Cartridge, HDK06, Synteq
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P161277	129	Cup Seal, HDK08
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P162642	48, 101	Visual indicators, 15 psi/103 kPa
P162694	48	Visual Indicator, 5 psi / 34.5 kPa
P162696	48, 101	Visual indicators, 25 psi/172 kPa
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P163839	48, 101	Electric Indicator, SP, DC, Normally closed
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P164059	100, 101	Spin-on filter, HMK04/24, Synteq
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P164378	100, 101	Spin-on filter, HMK04/24, Synteq
P164381	100, 101	Spin-on filter, HMK04/24, Synteq
P164384	100, 101	Spin-on filter, HMK04/24, Synteq
P164405	128	Filter Cartridge, HFK08, Synteq
P164407	128	Filter Cartridge, HFK08, Synteq
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P167529	101	Head Assembly, HMK04, SAE-12 O-Ring
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P170312	96	Spin-on filter, HMK03, Synteq
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P171274	104	Spin-on filter, HMK05/25, Synteq
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P171556	78, 79	Filter Cartridge High Flow, FIK, Synteq
P171557	78, 79	Filter Cartridge High Flow, FIK, Cellulose
P171558	78, 79	Filter Cartridge High Flow, FIK, Cellulose
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P171572	78, 79	Filter Cartridge High Flow, FIK, Wire Mesh
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P171574	78, 79	Filter Cartridge High Flow, FIK, Synteq
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P171576	78, 79	Filter Cartridge High Flow, FIK, Cellulose
P171577	78, 79	Filter Cartridge High Flow, FIK, Wire Mesh
P171578	78, 79	Filter Cartridge High Flow, FIK, Wire Mesh
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P171855	270	Filler Breather Assemblies
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P171859	270	Filler Breather Assemblies
P171860	270	Filler Breather Assemblies
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P171869	260	Reservoir Suction Strainer, Steel fitting
P171877	260	Reservoir Suction Strainer, Steel fitting
P171885	260	Reservoir Suction Strainer, Steel fitting
P171889	260	Reservoir Suction Strainer, Steel fitting
P171913	284	Fluid Level Gauge
P171918	284	Fluid Level Gauge
P171920	284	Fluid Level & Temp Gauge
P171922	284	Fluid Level & Temp Gauge
P171953	238	Pressure Gauge
P171956	238	Pressure Gauge
P172434	79	FIK In-tank Breather
P172953	48	Head Assembly, HBK05, 1¼" NPT
P173292	270	Filler Breather Replacement Cap
P173330	79	FIK In-tank Breather
P173364	270	Filler Breather Replacement Cap
P173544	263	Breather, Threaded Adapter
P173545	263	Breather, Threaded Adapter
P173573	128	Filter Cartridge, HFK08, Wire Mesh

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P173702	96	Spin-on filter, HMK03, Synteq
P173737	100, 101	Spin-on filter, HMK04/24, Synteq
P173750	101	Head Assembly, HMK04, SAE-12 O-Ring
P173893	101	Electrical Indicator, 3 wire, DC
P173910	260	Reservoir Suction Strainer, Steel fitting
P173911	260	Reservoir Suction Strainer, Steel fitting
P173912	260	Reservoir Suction Strainer, Steel fitting
P173913	260	Reservoir Suction Strainer, Steel fitting
P173914	260	Reservoir Suction Strainer, Steel fitting
P173915	260	Reservoir Suction Strainer, Steel fitting
P173916	260	Reservoir Suction Strainer, Steel fitting
P173917	260	Reservoir Suction Strainer, Steel fitting
P173943	104	Spin-on filter, HMK05/25, Wire Mesh
P173944	101	Electrical Indicator, 3 wire, AC/DC
P174396	90, 96, 101	Electrical Indicator, 3 wire, AC/DC
P176107	96	Spin-on filter, HMK03, Synteq
P176207	104	Spin-on filter, HMK05/25, Synteq
P176221	116	Filter Cartridge, HDK06, Synteq
P176222	128	Filter Cartridge, HFK08, Synteq
P176431	287, 310	Sampling Pump
P176433	287, 310	Plastic Tubing
P176565	100, 101	Spin-on filter, HMK04/24, Synteq
P176566	100, 101	Spin-on filter, HMK04/24, Synteq
P176567	104	Spin-on filter, HMK05/25, Synteq
P176568	101	Head Assembly, HMK04, SAE-16 O-Ring
P176569	101	Head Assembly, HMK04, SAE-16 O-Ring
P176749	78, 79	Filter Cartridge High Flow, FIK, Synteq
P179075	104	Spin-on filter, HMK05/25, WA
P179089	32, 36, 263	Spin-on Filter, SP15/25, WO12, Synteq
P179381	101	Head Assembly, HMK04, SAE-16 O-Ring
P179460	96	Head Assembly, HMK03, 3/4" SAE 12
P179579	170	Housing, HPK03, 8" / 204 mm filter
P179582	100	Head Assembly, HMK24, 1¼" SAE 4-Bolt Code 61
P179609	100	Head Assembly, HMK24, SAE-20 O-Ring
P179763	104	Spin-on filter, HMK05/25, Synteq
P468793	278	ARV™ Kit Breather Assembly
P550250	40, 44, 52, 56, 60, 65, 263	Spin-on Filter, WO15/WO21/023/WO22/SP50-60/SP80-90/SP100/120/Accy, Cellulose

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P550252	40, 44, 52, 56, 60, 65	Spin-on Filter, WO15/WO21/023/WO22/SP50-60/SP80-90/SP100/120, Cellulose
P550274	32, 36	Spin-on Filter, SP15-25/WO12, Wiremesh
P550275	44, 44, 52, 56, 60	Spin-on Filter, WO15/WO21/WO23/WO22/SP50-60/SP80-90/SP100-120, Wiremesh
P550276	44, 44, 52, 56, 60	Spin-on Filter, WO15/WO21/WO23/WO22/SP50-60/SP80-90/SP100-120, Wiremesh
P550386	40, 44, 52, 56, 60, 65, 263	Spin-on Filter, WO15/WO21/023/WO22/SP50-60/SP80-90/SP100/120/Accy, Cellulose
P550387	40, 44, 52, 56, 60, 65	Spin-on Filter, WO15/WO21/023/WO22/SP50-60/SP80-90/SP100/120, Cellulose
P550388	40, 44, 52, 56, 60, 65, 263	Spin-on Filter, WO15/WO21/023/WO22/SP50-60/SP80-90/SP100/120/Accy, Cellulose
P551551	32, 36, 263	Spin-on Filter, SP15-25/WO12, Breather, Cellulose
P551553	32, 36	Spin-on Filter, SP15-25/WO12, Cellulose
P556005	263	Breather, Spin-on Filter
P560584	100, 101	Spin-on filter, HMK04/24, WA
P560693	32, 36, 263	Spin-on Filter, SP15-25/WO12/Accy, Synteq
P560694	32, 36	Spin-on Filter, SP15-25/WO12, Synteq
P560855	105	Head Assembly, HMK25, 1½" SAE
P561131	32	Head Assembly, SP15/25, ¾" NPT
P561132	32	Head Assembly, SP15/25, ¾" NPT
P561133	32	Head Assembly, SP15/25, SAE-12
P561134	32	Head Assembly, SP15/25, ¾" NPT
P561135	32	Head Assembly, SP15/25, ¾" NPT
P561136	32	Head Assembly, SP15/25, ¾" NPT
P561137	32	Head Assembly, SP15/25, SAE-12
P561138	32	Head Assembly, SP15/25, SAE-8
P561140	32	Head Assembly, SP15/25, SAE-12
P561141	32	Head Assembly, SP15/25, SAE-12
P561183	40, 44, 52, 56, 60	Spin-on Filter, WO15/WO21/023/WO22/SP50-60/SP80-90/SP100-120, Cellulose WA
P561880	321	Bulk Fluid, Manifold Assembly, 2" 150 Flange
P561885	105	Head Assembly, HMK05, O-Ring
P561924	105	Head Assembly, HMK25, 3 port s
P561952	52	Head Assembly, SP50/60, 1¼" NPT
P562211	260	Reservoir Suction Strainer, Steel fitting



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P562212	260	Reservoir Suction Strainer, Steel fitting
P562213	260	Reservoir Suction Strainer, Steel fitting
P562214	260	Reservoir Suction Strainer, Steel fitting
P562221	260	Reservoir Suction Strainer, Steel fitting
P562222	260	Reservoir Suction Strainer, Steel fitting
P562223	260	Reservoir Suction Strainer,nylon fitting
P562224	260	Reservoir Suction Strainer,nylon fitting
P562225	260	Reservoir Suction Strainer,nylon fitting
P562226	260	Reservoir Suction Strainer,nylon fitting
P562227	260	Reservoir Suction Strainer,nylon fitting
P562228	260	Reservoir Suction Strainer,nylon fitting
P562229	260	Reservoir Suction Strainer,nylon fitting
P562231	260	Reservoir Suction Strainer,nylon fitting
P562232	260	Reservoir Suction Strainer,nylon fitting
P562233	260	Reservoir Suction Strainer,nylon fitting
P562235	260	Reservoir Suction Strainer,nylon fitting
P562236	260	Reservoir Suction Strainer,nylon fitting
P562237	260	Reservoir Suction Strainer,nylon fitting
P562238	260	Reservoir Suction Strainer,nylon fitting
P562239	260	Reservoir Suction Strainer,nylon fitting
P562240	260	Reservoir Suction Strainer,nylon fitting
P562242	260	Reservoir Suction Strainer,nylon fitting
P562243	260	Reservoir Suction Strainer,nylon fitting
P562244	260	Reservoir Suction Strainer,nylon fitting
P562245	260	Reservoir Suction Strainer,nylon fitting
P562246	260	Reservoir Suction Strainer,nylon fitting
P562247	261	Tank Mounted Strainer
P562248	261	Tank Mounted Strainer
P562249	261	Tank Mounted Strainer
P562250	261	Tank Mounted Strainer
P562251	261	Tank Mounted Strainer
P562252	261	Tank Mounted Strainer
P562253	261	Tank Mounted Strainer
P562254	261	Tank Mounted Strainer
P562255	261	Tank Mounted Strainer

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P562257	261	Tank Mounted Strainer
P562259	261	Tank Mounted Strainer
P562260	261	Tank Mounted Strainer
P562264	261	Tank Mounted Strainer
P562265	261	Tank Mounted Strainer
P562266	261	Tank Mounted Strainer
P562267	261	Tank Mounted Strainer
P562269	261	Tank Mounted Strainer
P562270	261	Tank Mounted Strainer
P562271	261	Tank Mounted Strainer
P562272	261	Tank Mounted Strainer
P562273	261	Tank Mounted Strainer
P562274	261	Tank Mounted Strainer
P562275	261	Tank Mounted Strainer
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P562282	262	Diffuser, TMD, Tank Mounted
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P562290	262	Diffuser, DFD, Line Mount
P562291	262	Diffuser, DFD, Line Mount
P562292	262	Diffuser, DFD, Line Mount
P562293	262	Diffuser, DFD, Line Mount
P562297	247	In line Check Valves
P562298	247	In line Check Valves
P562299	247	In line Check Valves
P562301	247	In line Check Valves
P562302	247	In line Check Valves
P562303	247	In line Check Valves
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P562306	247	In line Check Valves
P562307	247	In line Check Valves
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P562309	247	In line Check Valves
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P562316	247	In line Check Valves
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P562332	250	Ball Valve Lock Device
P562333	248	Ball Valve, Low Pressure
P562335	250	Ball Valve Lock Device
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P562338	248	Ball Valve, Low Pressure
P562339	248	Ball Valve, Low Pressure
P562340	250	Ball Valve Lock Device
P562341	248	Ball Valve, Low Pressure
P562342	251	Ball Valve, 3 Way
P562343	248	Ball Valve, Low Pressure
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P562346	248	Ball Valve, Low Pressure
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P562377	250	Ball Valve Handle
P562378	250	Ball Valve Handle
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P562381	250	Ball Valve Seal Kit
P562382	250	Ball Valve Seal Kit
P562383	250	Ball Valve Seal Kit
P562387	249	Ball Valve, Medium Pressure
P562388	249	Ball Valve, Medium Pressure
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P562398	249	Ball Valve, Medium Pressure
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P562406	251	Ball Valve, 3 Way
P562407	251	Ball Valve, 3 Way
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P562409	282	Sight Glass, Prism lens, nickel coated

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P562411	282	Sight Glass, Prism lens, nickel coated
P562412	282	Sight Glass, Prism lens, nickel coated
P562413	282	Sight Glass, Prism lens, nickel coated
P562414	282	Sight Glass, Prism lens, nickel coated
P562415	282	Sight Glass, Prism lens, nickel coated
P562417	282	Sight Glass, Prism lens
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P562419	281	Sight Glass, Transparent
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P562434	286	Fuel Level Gauge, LG-10 Series
P562435	286	Fuel Level Gauge, LG-10 Series
P562436	286	Fuel Level & Temp Gauge, LG-10 Series
P562437	286	Fuel Level & Temp Gauge, LG-10 Series
P562438	286	Fuel Level Gauge, LG-3 Series
P562440	286	Fuel Level Gauge, LG-3 Series
P562441	286	Fuel Level & Temp Gauge, LG-3 Series
P562442	286	Fuel Level & Temp Gauge, LG-3 Series
P562444	286	Fuel Level Gauge, LG-5 Series
P562445	286	Fuel Level & Temp Gauge, LG-5 Series
P562447	286	Fuel Level Gauge, LG-5 Series
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P562452	286	Fuel Level & Temp Gauge, LG-5 Series
P562453	285	Fuel Level Gauge, LG-5 Series
P562454	286	Fuel Level Gauge, LG-Z Series
P562456	286	Fuel Level Gauge, LG-Z Series
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P562477	269	Filler Breather Cap, ABO
P562480	269	Filler Breather Cap, BPS
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P562492	269	Filler Breather Cap, RPS
P562494	269	Filler Breather Cap, DPS
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P562512	267	Breathers, MBS
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P562541	274	Filter Breather, Bayonet, High Impact
P562542	274	Filter Breather, Bayonet, High Impact
P562544	274	Filter Breather, Bayonet, High Impact
P562550	273	Filler, Non-vent, Threaded
P562552	274	Filter Breather, Bayonet, High Impact
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P562671	240	Pressure Gauge, Front Flange

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P562674	241	Pressure Gauge, 4" dial, panel mount
P562675	241	Pressure Gauge, 4" dial stem mount
P562676	241	Pressure Gauge, 4" dial, panel mount
P562677	241	Pressure Gauge, 4" dial stem mount
P562678	241	Pressure Gauge, 4" dial, panel mount
P562679	241	Pressure Gauge, 4" dial stem mount
P562680	241	Pressure Gauge, 4" dial, panel mount
P562681	241	Pressure Gauge, 4" dial stem mount
P562682	241	Pressure Gauge, 4" dial, panel mount
P562683	241	Pressure Gauge, 4" dial stem mount
P562684	241	Pressure Gauge, 4" dial, panel mount
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P562702	240	Pressure Gauge, 2-1/2 dial, Panel mount
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P562707	240	Pressure Gauge, 2-1/2 dial, stem mount
P562708	240	Pressure Gauge, 2-1/2 dial, Panel mount
P562709	240	Pressure Gauge, 2-1/2 dial, stem mount

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P562713	240	Pressure Gauge, 2-1/2 dial, stem mount
P562716	240	Pressure Gauge, 2-1/2 dial, Panel mount
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P562718	240	Pressure Gauge, 2-1/2 dial, stem mount
P562719	240	Pressure Gauge, 2-1/2 dial, stem mount
P562720	240	Pressure Gauge, 2-1/2 dial, Panel mount
P562721	240	Pressure Gauge, 2-1/2 dial, stem mount
P562722	240	Pressure Gauge, 2-1/2 dial, Panel mount
P562723	240	Pressure Gauge, 2-1/2 dial, stem mount
P562724	240	Pressure Gauge, 2-1/2 dial, Panel mount
P562725	240	Pressure Gauge, 2-1/2 dial, stem mount
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P562729	240	Pressure Gauge, 2-1/2 dial, stem mount
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P562731	240	Pressure Gauge, 2-1/2 dial, stem mount
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P562733	240	Pressure Gauge, 2-1/2 dial, stem mount
P562734	240	Pressure Gauge, 2-1/2 dial, stem mount
P562735	240	Pressure Gauge, 2-1/2 dial, stem mount
P562736	240	Pressure Gauge, 2-1/2 dial, stem mount
P562737	240	Pressure Gauge, 2-1/2 dial, stem mount
P562738	240	Pressure Gauge, 2-1/2 dial, stem mount
P562739	240	Pressure Gauge, 2-1/2 dial, stem mount
P562740	240	Pressure Gauge, 2-1/2 dial, stem mount
P563042	252	Flange, Split Code 61
P563044	252	Flange, Split Code 61
P563046	252	Flange Split, Code 62

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P563049	252	Flange Split, Code 62
P563050	252	Flange, Split Code 61
P563051	252	Flange Split, Code 62
P563053	252	Flange, Split Code 61
P563054	252	Flange Split, Code 62
P563056	252	Flange, Split Code 61
P563061	253	Flange, Blank, Code 61
P563063	253	Flange, Blank, Code 61
P563064	253	Flange, Blank, Code 62
P563065	253	Flange, Blank, Code 61
P563067	253	Flange, Blank, Code 61
P563088	254	Flange, 4-bolt, NPTF, Code 61
P563090	256	Flange, 4-bolt, SAE Code 61, ST-O-ring
P563093	254	Flange, 4-bolt, NPTF, Code 61
P563094	255	Flange, 4-bolt, NPTF, Code 62
P563095	256	Flange, 4-bolt, SAE Code 61, ST-O-ring
P563096	256	Flange, 4-bolt, SAE Code 62, ST-O-ring
P563100	254	Flange, 4-bolt, NPTF, Code 61
P563101	255	Flange, 4-bolt, NPTF, Code 62
P563102	256	Flange, 4-bolt, SAE Code 61, ST-O-ring
P563103	256	Flange, 4-bolt, SAE Code 62, ST-O-ring
P563107	254	Flange, 4-bolt, NPTF, Code 61
P563108	255	Flange, 4-bolt, NPTF, Code 62
P563109	256	Flange, 4-bolt, SAE Code 61, ST-O-ring
P563110	256	Flange, 4-bolt, SAE Code 62, ST-O-ring
P563113	254	Flange, 4-bolt, NPTF, Code 61
P563115	256	Flange, 4-bolt, SAE Code 61, ST-O-ring
P563117	254	Flange, 4-bolt, NPTF, Code 61
P563118	254	Flange, 4-bolt, NPTF, Code 61
P563119	257	Flange, Flat Socket Weld, Code 61, O-ring
P563120	257	Flange, Flat Socket Weld, Code 61, O-ring
P563121	257	Flange, Flat Socket Weld, Code 61, O-ring
P563122	257	Flange, Flat Socket Weld, Code 61, O-ring
P563123	257	Flange, Flat Socket Weld, Code 61, O-ring
P563124	257	Flange, Flat Socket Weld, Code 61, O-ring
P563127	257	Flange, Flat Socket Weld, Code 61, O-ring
P563162	256	Flange, 4-bolt, SAE Code 61, ST-flat face
P563163	255	Flange, 4-bolt, NPTF, Code 61
P563165	256	Flange, 4-bolt, SAE Code 61, ST-flat face
P563166	255	Flange, 4-bolt, NPTF, Code 61

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P563168	256	Flange, 4-bolt, SAE Code 61, ST-flat face
P563171	255	Flange, 4-bolt, NPTF, Code 61
P563176	257	Flange, Flat Socket Weld, Code 61, Flat Face
P563177	257	Flange, Flat Socket Weld, Code 61, Flat Face
P563178	257	Flange, Flat Socket Weld, Code 61, Flat Face
P563179	257	Flange, Flat Socket Weld, Code 61, Flat Face
P563180	257	Flange, Flat Socket Weld, Code 61, Flat Face
P563181	257	Flange, Flat Socket Weld, Code 61, Flat Face
P563192	243	Test Point, M12x1.5 thrd
P563193	243	Test Point, M12x1.5 thrd
P563197	243	Test Point, M12x1.5 thrd
P563199	243	Test Point, M12x1.5 thrd
P563206	243	Test Point, M12x1.5 thrd
P563207	243	Test Point, M12x1.5 thrd
P563210	243	Test Point, M16x2 Thread
P563212	243	Test Point, M16x2 Thread
P563215	243	Test Point, M16x2 Thread
P563219	243	Test Point, M16x2 Thread
P563220	243	Test Point, M16x2 Thread
P563224	243	Test Point, M16x2 Thread
P563231	243	Test Point, M16x2 Thread
P563232	243	Test Point, M16x2 Thread
P563240	245	Test Point+Hose, M12 x 1.5 Thread
P563243	245	Test Point+Hose, M12 x 1.5 Thread
P563244	245	Test Point+Hose, M12 x 1.5 Thread
P563245	245	Test Point+Hose, M12 x 1.5 Thread
P563246	245	Test Point+Hose, M12 x 1.5 Thread
P563247	245	Test Point+Hose, M12 x 1.5 Thread
P563248	245	Test Point+Hose, M12 x 1.5 Thread
P563249	245	Test Point+Hose, M12 x 1.5 Thread
P563250	245	Test Point+Hose, M16 x 2 Thread
P563251	245	Test Point+Hose, M16 x 2 Thread
P563252	245	Test Point+Hose, M16 x 2 Thread
P563254	245	Test Point+Hose, M16 x 2 Thread
P563255	245	Test Point+Hose, M16 x 2 Thread
P563256	245	Test Point+Hose, M16 x 2 Thread
P563257	245	Test Point+Hose, M16 x 2 Thread
P563259	245	Test Point+Hose, M16 x 2 Thread
P563260	245	Test Point+Hose, M16 x 2 Thread
P563261	245	Test Point+Hose, M16 x 2 Thread
P563262	244	Test Point Adapter, Pressure Gauge Connection
P563263	244	Test Point Adapter, Hose Union Gauge
P563264	244	Test Point Adapter, Hose Union Gauge
P563265	244	Test Point Adapter, Series Converter
P563266	244	Test Point Adapter, Series Converter

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P563268	52	Head Assembly, SP50/60, 1/4" NPT
P563269	52	Head Assembly, SP50/60, 1/4" NPT
P563270	52	Head Assembly, SP50/60, 1/4" NPT
P563271	52	Head Assembly, SP50/60, SAE-20
P563272	52	Head Assembly, SP50/60, SAE-20
P563273	56	Head Assembly, SP80/90, 1/2" NPT & 2" SAE 4 BOLT
P563274	56	Head Assembly, SP80/90, 1/2" NPT & 2" SAE 4 BOLT
P563275	56	Head Assembly, SP80/90, 1/2" NPT & 2" SAE 4 BOLT
P563276	56	Head Assembly, SP80/90, 1/2" NPT & 2" SAE 4 BOLT
P563277	61	Head Assembly, SP100/120, 1/2" NPT
P563278	32	Head Assembly, SP15/25, 3/4" NPT
P563279	32	Head Assembly, SP15/25, SAE-12
P563280	32	Head Assembly, SP15/25, SAE-12
P563287	32	Head Assembly, SP15/25, SAE-12
P563288	32	Head Assembly, SP15/25, 1/2" NPT
P563296	33, 53, 57, 61, 238	Pressure Gauge, numeric, return or suction
P563297	33, 53, 57, 61, 238	Pressure Gauge, color-coded, return
P563298	33, 53, 57, 61, 67, 238	Pressure Gauge, color-coded, return or suction
P563299	33, 53, 57, 61, 238	Pressure Gauge, numeric, suction
P563300	66, 238	Pressure Gauge, color-coded, return
P563305	260	Reservoir Suction Strainer, Steel fitting
P563306	261	Tank Mounted Strainer
P563307	247	In line Check Valves
P563308	249	Ball Valve, Medium Pressure
P563309	249	Ball Valve, Medium Pressure
P563310	249	Ball Valve, Medium Pressure
P563311	248	Ball Valve, Low Pressure
P563322	276	Filler Breather, Bayonet, PBB
P563326	276	Filler Breather, Bayonet, PBB
P563346	276	Filler Breather, Bayonet, PBB
P563347	276	Filler Breather, Bayonet, PBB
P563348	276	Filler Breather, Bayonet, PBB
P563349	276	Filler Breather, Bayonet, PBB
P563350	276	Filler Breather, Bayonet, PBB
P563351	276	Filler Breather, Bayonet, PBB
P563352	276	Filler Breather, Bayonet, PBB
P563353	276	Filler Breather, Bayonet, PBB
P563354	276	Filler Breather, Bayonet, PBB
P563355	276	Filler Breather, Bayonet, PBB
P563356	276	Filler Breather, Bayonet, PBB
P563357	276	Filler Breather, Bayonet, PBB
P563358	276	Filler Breather, Bayonet, PBB
P563360	276	Filler Breather, Bayonet, PBB

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P563361	276	Filler Breather, Bayonet, PBB
P563362	268	Filler Breather Cap, PBS, threaded
P563363	268	Filler Breather Cap, PBS, threaded
P563365	268	Filler Breather Cap, PBS, threaded
P563366	268	Filler Breather Cap, PBS, threaded
P563367	268	Filler Breather Cap, PBS, threaded
P563368	268	Filler Breather Cap, PBS, threaded
P563369	268	Filler Breather Cap, PBS, threaded
P563370	268	Filler Breather Cap, PBS, threaded
P563371	268	Filler Breather Cap, PBS, threaded
P563372	268	Filler Breather Cap, PBS, threaded
P563453	265	T.R.A.P.™ Bayonet Filler Basket/ Flange
P563465	276	Filler Breather, Bayonet, PBB
P563466	276	Filler Breather, Bayonet, PBB
P563490	52	Head Assembly, SP50/60, 1/4" NPT
P563491	52	Head Assembly, SP50/60, 1/4" NPT
P563492	52	Head Assembly, SP50/60, 1/4" NPT
P563513	286	Fuel Level, Fast Mount Kit
P563514	286	Fuel Level, Fast Mount Kit
P563614	269	Filler Breather Cap, DPS
P563800	244	Test Point Adapter, Bulkhead Gauge Adapter
P563807	244	Test Point Adapter, Bulkhead Gauge Adapter
P563808	244	Test Point Adapter, Direct Gauge Adapter
P563809	244	Test Point Adapter, Direct Gauge Adapter
P563813	274	Filter Breather, Bayonet, High Impact
P563874	265	T.R.A.P.™ Bayonet Filler Basket/ Flange
P563901	267	Breathers, ABS
P563909	286	Fuel Level & Temp Gauge, LG-10 Series
P563913	286	Fuel Level & Temp Gauge, LG-5 Series
P563973	67	Head Assembly TT30/60, 1/2" NPT
P563975	67	Head to Tank Seal, TT15
P563976	67	Head to Tank Seal, TT30/60
P563978	33, 53, 57, 61, 67, 238	Visual Indicator, electrical, return
P563979	33, 53, 57, 61, 67, 238	Visual Indicator, electrical, suction or return
P563987	243	Test Point, M16x2 Thread
P564038	67	Head Assembly TT15, 3/4" NPT
P564147	52	Head Assembly, SP50/60, SAE-20
P564357	32, 36, 263	Spin-on Filter, SP15/25, WO12, Accy Synteq
P564424	263	Breather, Spin-on Filter
P564468	104	Spin-on filter, HMK05/25, Synteq
P564484	101	Head Assembly, HMK04, 1" NPT
P564485	101	Head Assembly, HMK04, 1" NPT
P564486	105	Head Assembly, HMK05, O-Ring
P564669	265	Breather, T.R.A.P.™



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P564858	105	Head Assembly, HMK05, O-Ring
P564892	56	Head Assembly, SP80/90, SAE-24 O-Ring
P564936	112, 170, 176, 182, 190, 199, 204	Filter Cartridge, WO61/HPK04/W621/W620/WS620/HPK03, FPK04 Synthetic
P564967	32, 36	Spin-on Filter, SP15/25, WO12, Synteq
P565059	32, 36	Spin-on Filter, SP15/25, WO12, Cellulose
P565060	32, 36	Spin-on Filter, SP15/25, WO12, Cellulose
P565061	32, 36	Spin-on Filter, SP15/25, WO12, Cellulose
P565062	32, 36	Spin-on Filter, SP15/25, WO12 Water Absorbing
P565122	112, 170, 176, 182, 190, 199, 204	Filter Cartridge, WO61/HPK04/W621/W620/WS620/HPK03, FPK04 Synthetic
P565123	112, 170, 176, 182, 190, 199, 204	Filter Cartridge, WO61/HPK04/W621/W620/WS620/HPK03, FPK04 Synthetic
P565183	323	Spin-on Filter, Bulk Fluid
P565184	323	Spin-on Filter, Bulk Fluid
P565185	323	Spin-on Filter, Bulk Fluid
P565187	112, 176, 182, 190, 199, 204, 209	Filter Cartridge, WO61/W350/FPK04/HPK04/W621/W620/WS620/HPK05 Synthetic
P565188	112, 176, 182, 190, 199, 204	Filter Cartridge, WO61/W350/FPK04/HPK04/W621/W620/WS620 Synthetic
P565189	112, 176, 182, 190, 199, 204	Filter Cartridge, WO61/W350/FPK04/HPK04/W621/W620/WS620 Synthetic
P565195	183, 199, 204, 209	Filter Cartridge, HPK04/W620/WS620/HPK05 Synthetic
P565196	183, 199, 204, 209	Filter Cartridge, HPK04/W620/WS620/HPK05 Synthetic
P565197	183, 199, 204, 209	Filter Cartridge, HPK04/W620/WS620/HPK05 Synthetic
P565242	66	Spin-on filter, TT15, Cellulose
P565245	40, 44, 52, 56, 60, 65	Spin-on Filter, SP15-25/WO12, Cellulose
P565616	265	Breather, T.R.A.P.™
P565857	265	Breather, T.R.A.P.™
P565858	265	Breather, T.R.A.P.™
P566023	323	Bulk Fluid, Head Assembly, SAE-16 O-Ring
P566024	323	Bulk Fluid, Head Assembly, SAE-16 O-Ring

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P566037	265	Breather, T.R.A.P.™
P566151	265	Breather, T.R.A.P.™
P566156	265	Breather, T.R.A.P.™
P566168	265	T.R.A.P.™ Mechanical Indicator Kit
P566174	265	Breather, T.R.A.P.™
P566187	90	Filter Cartridge, HRK/HEK11, Synthetic
P566188	90	Filter Cartridge, HRK, Synthetic
P566189	90	Filter Cartridge, HRK/HEK11, Synthetic
P566190	90	Filter Cartridge, HRK/HEK11, Synthetic
P566191	90	Filter Cartridge, HRK/HEK11, Synthetic
P566192	90	Filter Cartridge, HRK/HEK11, Synthetic
P566194	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566195	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566196	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566197	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566198	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566199	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566200	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566201	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
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P566203	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566204	112, 166, 176, 190	Filter Cartridge, WO61/W350/FPK04/W621 Synthetic
P566205	112, 166, 176, 190	Filter Cartridge, WO61/W350/FPK04/W621 Synthetic
P566206	112, 166, 176, 190	Filter Cartridge, WO61/W350/FPK04/W621 Synthetic
P566207	112, 166, 176, 190	Filter Cartridge, WO61/W350/FPK04/W621 Synthetic
P566208	112, 166, 176, 190	Filter Cartridge, WO61/W350/FPK04/W621 Synthetic
P566209	112, 166, 170, 176, 182, 190, 199, 204	Filter Cartridge, W350/HPK03/FPK04/WO61/HPK04/W621/W620/WS620 Synthetic
P566210	112, 166, 170, 176, 182, 190, 199, 204	Filter Cartridge, W350/HPK03/FPK04/WO61/HPK04/W621/W620/WS620 Synthetic

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P566211	112, 166, 170, 176, 182, 190, 199, 204	Filter Cartridge, W350/HPK03/FPK04/WO61/HPK04/W621/W620/WS620 Synthetic
P566212	112, 166, 170, 176, 182, 190, 199, 204	Filter Cartridge, W350/HPK03/FPK04/WO61/HPK04/W621/W620/WS620 Synthetic
P566213	112, 166, 170, 176, 182, 190, 199, 204	Filter Cartridge, W350/HPK03/FPK04/WO61/HPK04/W621/W620/WS620 Synthetic
P566214	112, 176, 182, 190, 199, 204	Filter Cartridge, WO61/W350/FPK04/HPK04/W621/W620/WS620 Synthetic
P566215	112, 176, 182, 190, 199, 204	Filter Cartridge, WO61/W350/FPK04/HPK04/W621/W620/WS620 Synthetic
P566216	112, 176, 182, 190, 199, 204	Filter Cartridge, WO61/W350/FPK04/HPK04/W621/W620/WS620 Synthetic
P566217	112, 176, 182, 190, 199, 204	Filter Cartridge, WO61/W350/FPK04/HPK04/W621/W620/WS620 Synthetic
P566218	112, 176, 182, 190, 199, 204	Filter Cartridge, WO61/W350/FPK04/HPK04/W621/W620/WS620 Synthetic
P566219	183, 199, 204	Filter Cartridge, FPK04/W620/WS620 Synthetic
P566220	183, 199, 204	Filter Cartridge, FPK04/W620/WS620 Synthetic
P566221	183, 199, 204	Filter Cartridge, FPK04/W620/WS620 Synthetic
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P566240	120, 124	Filter Cartridge, WO41/WO42, Synteq
P566241	120, 124	Filter Cartridge, WO41/WO42, Synteq
P566242	120, 124	Filter Cartridge, WO41/WO42, Synteq
P566243	120, 124	Filter Cartridge, WO41/WO42, Synteq
P566244	120, 124	Filter Cartridge, WO41/WO42, Synteq
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P566246	120, 124	Filter Cartridge, WO41/WO42, Synteq
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P566248	120, 124	Filter Cartridge, WO41/WO42, Synteq
P566249	120, 124	Filter Cartridge, WO41/WO42, Synteq

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P566251	120, 124	Filter Cartridge, W041/W042, Synteq
P566252	120, 124	Filter Cartridge, W041/W042, Synteq
P566253	120, 124	Filter Cartridge, W041/W042, Synteq
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P566255	120, 124	Filter Cartridge, W041/W042, Synteq
P566256	120, 124	Filter Cartridge, W041/W042, Synteq
P566257	120, 124	Filter Cartridge, W041/W042, Synteq
P566258	120, 124, 171	Filter Cartridge, W041/W042/HPK03 Synteq
P566270	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566271	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566272	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566273	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566274	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566275	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566276	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566277	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566278	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566279	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566280	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566281	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566321	265	T.R.A.P. <sup>TM</sup> Bayonet Filler Basket/Flange
P566335	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566336	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566337	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566338	139, 148, 153	Filter Cartridge, HPK02/W440/FPK02 Synthetic
P566364	112, 166, 177, 190	Filter Cartridge, W061/W350/FPK04/W621, Synthetic
P566365	112, 166, 177, 190	Filter Cartridge, W061/W350/FPK04/W621, Synthetic
P566365	166, 171, 177	Filter Cartridge, W350/FPK04/W621, Synthetic

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P566366	112, 166, 171, 177, 183, 190, 199, 204	Filter Cartridge, W061/W350/HPK03/FPK04/HPK04/W621/W620/WS620, Synthetic
P566367	112, 166, 171, 177, 183, 190, 199, 204	Filter Cartridge, W061/W350/HPK03/FPK04/HPK04/W621/W620/WS620, Synthetic
P566368	112, 177, 183, 190, 199, 204	Filter Cartridge, W061/FPK04/HPK04/W621/W620/WS620, Synthetic
P566369	112, 177, 183, 190, 199, 204	Filter Cartridge, W061/FPK04/HPK04/W621/W620/WS620, Synthetic
P566370	183, 199, 204	Filter Cartridge, FPK04/W620/WS620 Synthetic
P566371	183, 199, 204	Filter Cartridge, FPK04/W620/WS620 Synthetic
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P566393	158, 162	Filter Cartridge, W613, W322, Synthetic
P566394	158, 162	Filter Cartridge, W613, W322, Synthetic
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P566396	158, 162	Filter Cartridge, W613, W322, Synthetic
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P566408	158, 162	Filter Cartridge, W613, W322, Synthetic
P566409	158, 162	Filter Cartridge, W613, W322, Synthetic
P566412	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566413	70, 74, 86, 195	Cartridge Filter, WL15/WL16/W033/W451, Synthetic
P566449	209	Filter Cartridge, HPK05, Synthetic
P566450	209	Filter Cartridge, HPK05, Synthetic
P566451	209	Filter Cartridge, HPK05, Synthetic
P566452	209	Filter Cartridge, HPK05, Synthetic
P566453	209	Filter Cartridge, HPK05, Synthetic
P566454	209	Filter Cartridge, HPK05, Synthetic
P566455	209	Filter Cartridge, HPK05, Synthetic
P566462	209	Filter Cartridge, HPK05, Synthetic
P566643	209	Filter Cartridge, HPK05, Synthetic
P567065	144	Filter Cartridge, W341, Synthetic
P567066	144	Filter Cartridge, W341, Synthetic

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P567068	144	Filter Cartridge, W341, Synthetic
P567069	144	Filter Cartridge, W341, Synthetic
P567070	144	Filter Cartridge, W341, Synthetic
P567071	144	Filter Cartridge, W341, Synthetic
P567072	144	Filter Cartridge, W341, Synthetic
P567390	265	Breather, T.R.A.P. <sup>TM</sup>
P567392	265	Breather, T.R.A.P. <sup>TM</sup>
P567456	139, 171, 184, 210, 236	Visual Electric Indicator, All HPK Series
P567457	139, 171, 184, 210, 236	Visual Electric Indicator, All HPK Series
P567458	139, 171, 184, 210, 236	Visual Electric Indicator, All HPK Series
P567459	139, 171, 184, 210, 236	Visual Electric Indicator, All HPK Series
P567639	182	Head Assembly, HPK04, 1-1/2" SAE 4-Bolt / SAE-20 O-ring
P567640	182	Head Assembly, HPK04, 1-1/2" SAE 4-Bolt / SAE-20 O-ring
P567641	182	Head Assembly, HPK04, 1-1/2" SAE 4-Bolt / SAE-20 O-ring
P567642	182	Head Assembly, HPK04, 1-1/2" SAE 4-Bolt
P567643	182	Head Assembly, HPK04, 1-1/2" SAE 4-Bolt
P567644	182	Head Assembly, HPK04, 1-1/2" SAE 4-Bolt
P567648	182	Housing, HPK04, 16" / 406 mm Filters
P567649	182	Housing, HPK04, 13" / 330 mm Filters
P567650	182	Housing, HPK04, 8" / 204 mm filter
P567843	312	Portable Oil Diagnostic System
P567851	310	Re-agent A for Water Analysis (set of 50)
P567855	310	Water Test Vessel
P567858	310	Syringe
P567860	310	Filter for Solvent Dispensing Bottle
P567861	310	Sample Bottle, 120ml
P567862	310	Solvent Dispensing Bottle, 1000 ml
P567863	310	Membrane Holder & Funnel Assembly
P567864	310	Microscope, 100x
P567865	310	Analysis Cards (set of 50)
P567866	310	Beaker
P567869	310	Membrane Filters, 0.8 micron
P567875	112, 166, 170, 176, 182, 190, 199, 204	Filter Cartridge, W061/W350/HPK03/FPK04/HPK04/W621/W620/WS620, Synthetic
P567931	265	Breather, T.R.A.P. <sup>TM</sup> , Mini
P567932	265	Breather, T.R.A.P. <sup>TM</sup> , Mini
P567933	265	Breather, T.R.A.P. <sup>TM</sup> , Mini



Part No.	Page No.	Product Description
P567986	139, 171, 184, 210, 236	Visual Electrical Indicator, AC/DC Hirshman receptacle, All HPK Series
P567987	139, 171, 184, 210, 236	Visual Electrical Indicator, AC/DC Hirshman receptacle, All HPK Series
P567988	139, 171, 184, 210, 236	Visual Indicator, all HPK Series
P567989	139, 171, 184, 210, 236	Visual Indicator, all HPK Series
P568583	320	Bulk Fluid, Head Assemblies, 1-1/2" SAE 4-Bolt
P568664	320	Spin-on Filter, Bulk Fluid
P568665	320	Spin-on Filter, Bulk Fluid
P568666	320	Spin-on Filter, Bulk Fluid
P568720	176	Head Assembly, FPK04, SAE-20
P568721	176	Head Assembly, FPK04, SAE-20
P568722	176	Housing, FPK04, 4" / 102mm Filters
P568723	176	Housing, FPK04, 8" / 204 mm Filter
P568724	176	Housing, FPK04, 13" / 330 mm Filters
P568790	278,322	Bulk Fluid, Active Reservoir Vent™
P568791	278,322	ARV™, Active Reservoir Vent
P568848	108	Housing for HNK05, 10.54/267.8
P568850	108	Filter Cartridge, HNK05, Synteq
P568851	108	Filter Cartridge, HNK05, Synteq
P568852	108	Filter Cartridge, HNK05, Synteq
P568853	108	Filter Cartridge, HNK05, Synteq
P568856	108	Head Assembly, HNK04, SAE-12
P568857	108	Head Assembly, HNK04, SAE-12
P568858	108	Head Assembly, HNK04, SAE-16
P568859	108	Head Assembly, HNK04, SAE-16
P568860	108	Head Assembly, SAE-20
P568861	108	Head Assembly, SAE-20
P568932	321	Bulk Fluid, Manifold Assembly, 4" Ansi 150 Flange
P568933	321	Bulk Fluid, Manifold Assembly, 4" Ansi 150 Flange
P569203	108	Spin-on filter, HNK04, Synteq
P569204	108	Spin-on filter, HNK04, Synteq
P569205	108	Spin-on filter, HNK04, Synteq
P569206	108	Spin-on filter, HNK04, Synteq
P569209	108	Spin-on filter, HNK05, Synteq
P569210	108	Spin-on filter, HNK05, Synteq
P569211	108	Spin-on filter, HNK05, Synteq
P569212	108	Spin-on filter, HNK05, Synteq
P569273	78, 79	Filter Cartridge Low Flow, FIK, Synteq
P569274	78, 79	Filter Cartridge Low/High Flow, FIK, Synteq
P569275	78, 79	Filter Cartridge Low Flow, FIK, Synteq
P569275	78, 79	Filter Cartridge High Flow, FIK, Synteq
P569276	78, 79	Filter Cartridge Low Flow, FIK, Synteq

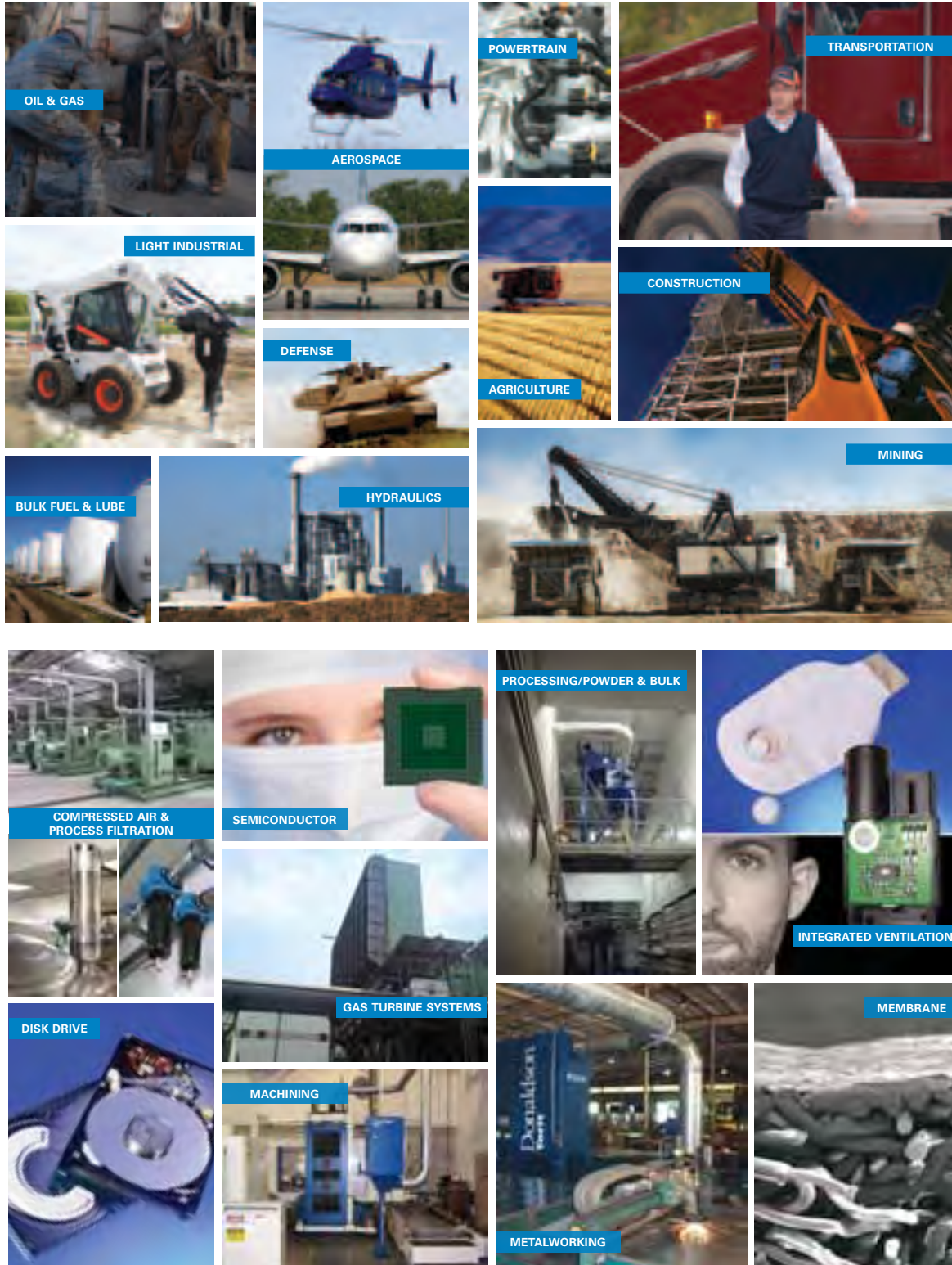
Part No.	Page No.	Product Description
P569277	78, 79	Filter Cartridge High Flow, FIK, Synteq
P569278	78, 79	Filter Cartridge High Flow, FIK, Synteq
P569279	78, 79	Filter Cartridge High Flow, FIK, Synteq
P569280	78, 79	Filter Cartridge High Flow, FIK, Synteq
P569527	70, 74, 86, 195	Cartridge Filter, WL15/WL16/WO33/W451, Synthetic
P569528	112, 170, 177, 183	Filter Cartridge, WO61/HPK03/FPK04/HPK04, WA
P569529	112, 177, 183	Filter Cartridge, WO61/FPK04/HPK04 WA
P569531	90	Filter Cartridge, HRK, Synthetic, WA
P569533	120, 124, 171	Filter Cartridge, WO41/WO42/HPK03, WA
P569534	120, 124, 171	Filter Cartridge, WO41/WO42/HPK03, WA
P569632	139, 171, 184, 210, 236	Visual Indicator, all HPK Series
P569633	139, 171, 184, 210, 236	Visual Indicator, all HPK Series
P569634	139, 171, 184, 210, 236	Visual Electrical Indicator, AC/DC Hirshman receptacle, All HPK Series
P569635	139, 171, 184, 210, 236	Visual Electrical Indicator, AC/DC Hirshman receptacle, All HPK Series
P569636	139, 171, 184, 210, 236	Visual Electric Indicator, All HPK Series
P569637	139, 171, 184, 210, 236	Visual Electric Indicator, All HPK Series
P569638	139, 171, 184, 210, 236	Visual Electric Indicator, All HPK Series
P569639	139, 171, 184, 210, 236	Visual Electric Indicator, All HPK Series
P569823	323	Spin-on Filter, Bulk Fluid
P569824	323	Spin-on Filter, Bulk Fluid
P569825	323	Spin-on Filter, Bulk Fluid
P569826	323	Spin-on Filter, Bulk Fluid
P569830	323	Bulk Fluid, Head Assembly, SAE-16 O-Ring
P569831	323	Bulk Fluid, Head Assembly, SAE-16 O-Ring
P569908	53	Gasket, LPS05, L Shaped
P570248	320	Spin-on Filter, Bulk Fluid
P570329	320	Bulk Fluid, Head Assemblies, SAE-20 O-Ring
P570330	320	Bulk Fluid, Head Assemblies, 1-1/14" NPT
P570353	263	Breather, Threaded Adapter
P572298	134	Filter Cartridge, W331, Synthetic
P572299	134	Filter Cartridge, W331, Synthetic

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P572300	134	Filter Cartridge, W331, Synthetic
P572301	134	Filter Cartridge, W331, Synthetic
P572302	134	Filter Cartridge, W331, Synthetic
P572303	144	Filter Cartridge, W341, Synthetic
P572304	144	Filter Cartridge, W341, Synthetic
P572305	144	Filter Cartridge, W341, Synthetic
P572306	144	Filter Cartridge, W341, Synthetic
P761056	155, 237	Electrical Indicator, AC/DC
P762766	155	Head Assembly, FPK02, SAE-12 O-Ring
P762767	155	Head Assembly, FPK02, SAE-12 O-Ring
P762768	155	Head Assembly, FPK02, SAE-12 O-Ring
P762769	155	FPK02 Housing for 4" /102 mm filter
P762770	155	FPK02 Housing for 8" /204 mm filter
P764183	83	Filter Cartridge, FIK04, Suction, Wire Mesh 125µm
P764467	83	Electrical Indicator, DC, NO, 36 psi/2.5 bar
P764612	83	Visual Indicator, 36 psi/2.5 bar
P764613	83	Electrical Indicator, DC, NC, 36 psi/2.5 bar
P765457	83	Filter Cartridge, FIK04, Synteq 11µm
X009329	310	Portable Fluid Analysis Kit
X009330	301	Fluid Analysis Service
X011297	303	Off-Line Filtration, Filter Cart, Low Viscosity Fluids
X011298	303	Off-Line Filtration, Filter Cart, High Viscosity Fluids
X011299	307	Off Line Filtration, Filter Panel, Low Viscosity Fluids
X011300	307	Off Line Filtration, Filter Panel, Low Viscosity Fluids
X011301	307	Off Line Filtration, Filter Panel, Low Viscosity Fluids
X011302	307	Off Line Filtration, Filter Panel, High Viscosity Fluids
X011303	305	Off-Line Filtration, Filter Buddy, Low Viscosity Fluids
X011304	305	Off-Line Filtration, Filter Buddy, High Viscosity Fluids
X920006	322	Bulk Fluid, T.R.A.P.™ Breather

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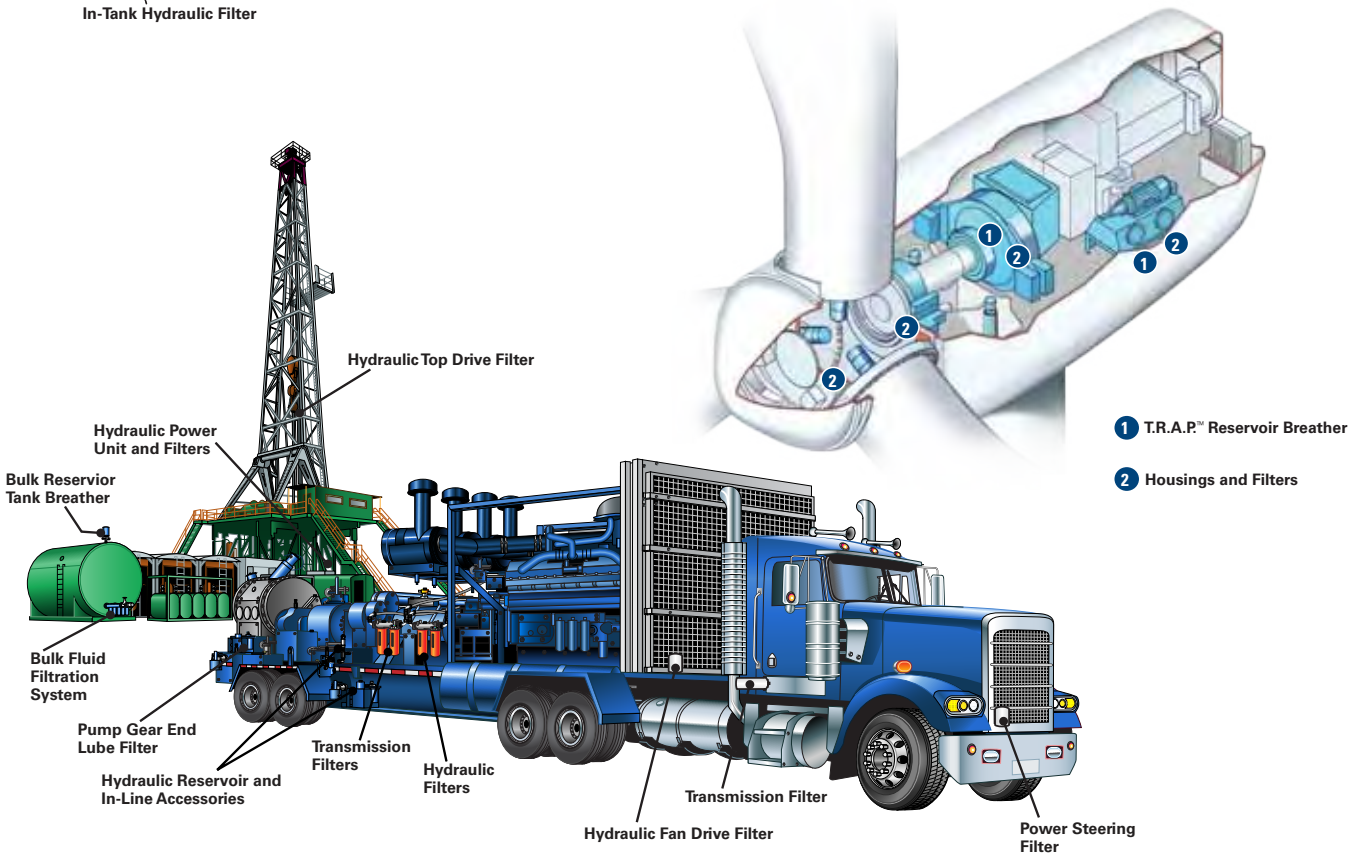
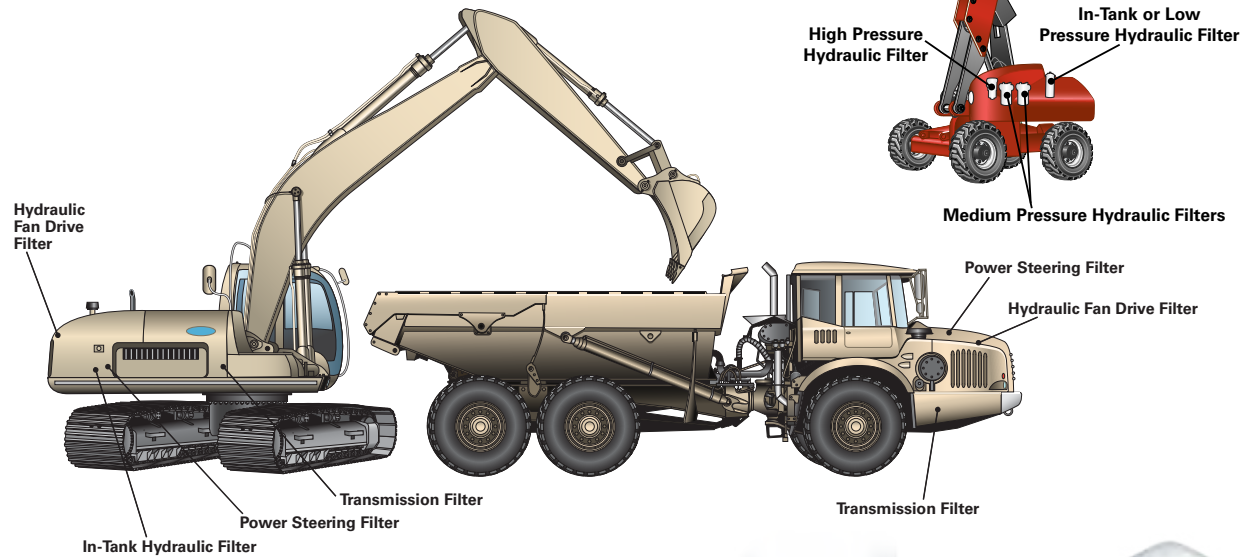
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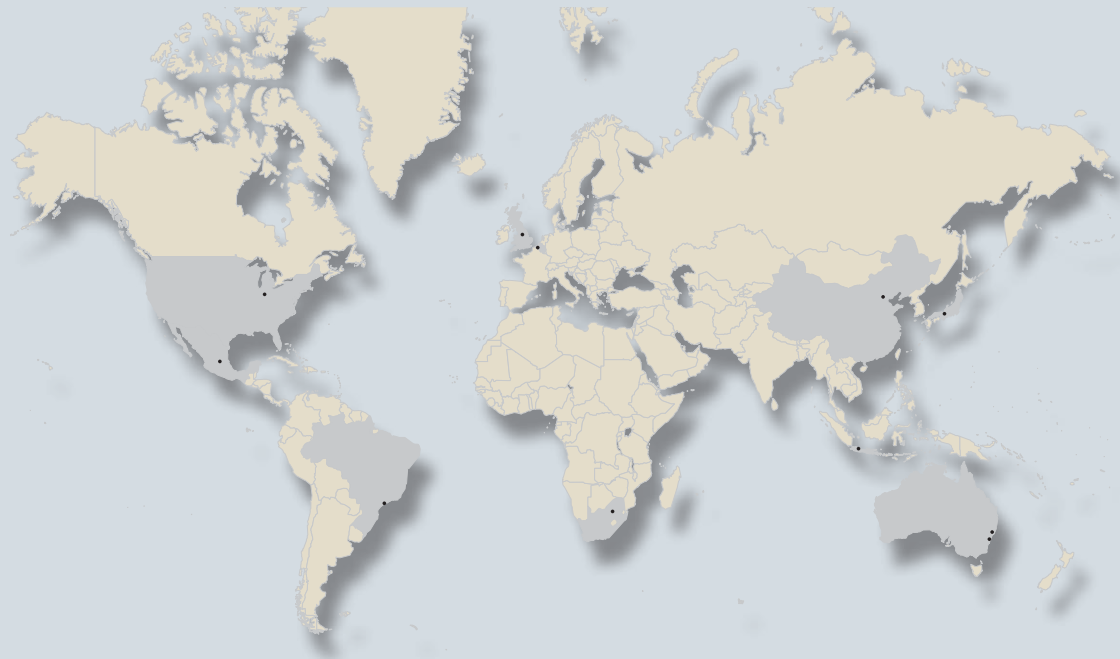
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